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**INTEGRATED HYPERSONIC
AEROTHERMOELASTIC METHODOLOGY
FOR TRANS ATMOSPHERIC VEHICLE
(TAV)/THERMAL PROTECTION SYSTEM
(TPS) STRUCTURAL DESIGN AND
OPTIMIZATION
Thermal Protection System Optimization
(TPSOPT)**



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**AIR VEHICLES DIRECTORATE
AIR FORCE RESEARCH LABORATORY
AIR FORCE MATERIEL COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OH 45433-7542**

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/s/

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14. ABSTRACT This report was developed under a SBIR contract. The objective of this project was to develop a hypersonic aerothermoelastic methodology that optimizes the Thermal Protection System (TPS) for the Trans Atmospheric Vehicles (TAV) in the re-entry/maneuver flight phases. The outcome of this project is a Thermal Protection System Optimization (TPSOPT) software system that integrates multiple disciplines, including the hypersonic aerodynamics, aerothermodynamics, heat transfer, aeroelasticity, with an automatic optimization technique for the minimum weight design of the TPS while subjected to the temperature constraints. A proper orthogonal decomposition and response surface method (PODIRSM) has also been integrated into the TPSOPT system to accelerate the aerodynamic data generation process. There are three manuals generated for the TPSOPT, namely the TPSOPT Theoretical Manual, the TPSOPT Users Manual and the TPSOPT Applications Manual. The design capability of the TPSOPT system is demonstrated on two wing-body configurations including the X-34 and Micro-X vehicles and is documented in the TPSOPT Applications Manual. In addition, a ZONAIR-Adaptive Modeling Environment (ZONAIR-AME) using the Adaptive Modeling Language (AML) was developed by TechnoSoft, Inc. ZONAIR-AME is expedient aerodynamic mesh generation tool that allows varying of parametric geometry for rapid assessment of aerodynamic design concept.					
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Foreword

The Contract No. F33615-02-C-3213, entitled, “Integrated Hypersonic Aerothermoelastic Methodology for TAV/TPS Structural Design and Optimization,” was initiated by the United States Air Force Research Laboratory of the Air Force Wright-Patterson AFB. The contract’s objective is to develop a hypersonic aerothermoelastic methodology that optimizes the Thermal Protection System (TPS) for the Trans Atmospheric Vehicles (TAV) in the re-entry/maneuver flight phases.

ZONA Technology participants on the subject contract include: Danny Liu, as the program manager; P.C. Chen, as the principal investigator; Xiaowei Gao, as the project engineer; and Reggie Chang, as the project engineer. Hilmi Kamhawi, of TechnoSoft, Inc. as the subcontractor was responsible for the ZONAIR-AME development (Manual IV). The AFRL sponsors are: Amar Bhungalia, amarshi.bhungalia@wpafb.af.mil. This final report covers all technical tasks completed on the contract from its initiation on 27 September 2002 through 27 December 2005.

1.0 INTRODUCTION

1.1 What is TPSOPT

TPSOPT is a software system to design a Thermal Protection System (TPS) on the surface of a hypersonic flight vehicle. It employs an automatic optimization technique to minimize the total weight of the TPS which is subjected to the temperature constraints at each layer of the TPS.

1.2 Background

Current Trans-Atmospheric Vehicle (TAV) design requires aerothermoelastic analysis to ascertain the TAV/TPS structural integrity in extreme hypersonic environments. More urgently, it is required to develop and integrate maturing technologies in key areas, such as hypersonic aerodynamics/aeroheating, propulsion, structures and integrated vehicle systems preferably in a Multidisciplinary Design/analysis Optimization (MDO) manner. In response to these programs, it is required to identify technologies needed to create a new, safe, cost-effective launch system thus to generate an integrated technology plan.

To develop a comprehensive aerothermoelastic program for Reusable Launch Vehicle (RLV)/TPS design requires careful planning of the required disciplines. It appears that thus far all required disciplines have been developed individually to a large extent including the trajectory analysis, the TPS sizing analysis, the thermal/structure analysis and the aerodynamic/aerothermodynamic programs. Thus, to integrate these programs into an efficient MDO procedure is a challenging task. Because the disparate analysis disciplines and their adopted methodologies being at different levels, these programs could not readily constitute a viable RLV/TPS design process. There are many stumbling blocks in achieving this integration task. For example, the low computational efficiency of the high fidelity aerodynamic/surface temperatures would prevent sufficient iterations in the design cycles. The interface between the surface temperature calculations and the structural heat transfer appears to be underdeveloped. Note that the temperature calculation is driven by trajectory analysis and high-fidelity aerodynamic computation; whereas the structural heat transfer analysis is driven by the thermal properties of the TPS and primary structure. Finally, the primary structural loads must be kept synchronized with the structural temperature distributions in order to ensure the primary structure is capable of bearing the in-flight launch loads and re-entry/maneuver loads.

Therefore, for an expedient integrated aerothermodynamics/aerothermoelastic design methodology we realize that a unified hypersonic panel method with high-fidelity aerodynamic surface-compliant panels must be employed. Thus, these panels could be tightly coupled with a structural FEM (Finite Element Method) module such as ASTROS* (Automated STRuctural Optimization Systems), or NASTRAN for an aerodynamic/structural interface in order to ensure a proper MDO procedure. On the other hand, any high-level CFD method would not be suitable as a rapid design tool under the proposed environment. Clearly, for an expedient, high-fidelity aerothermoelastic/aerothermodynamic program, a compatible hypersonic aerodynamic methodology is warranted. ZONAIR is a unified hypersonic/supersonic panel method that

satisfies all requirements and is proven computationally efficient with comparable accuracy to CFD/Euler solutions.

The TPSOPT software system carries out an integrated hypersonic aerothermoelastic methodology for TAV/TPS design/optimization (see TPSOPT Theoretical Manual), which focuses on the hypersonic aerothermoelastic method development and its design/optimization compatibility. It integrates multiple disciplines, including Aerodynamics, Aerothermodynamics, Heat Transfer, Aeroelasticity and Structure Optimization, to design a Thermal Protection System (TPS) on the surface of a hypersonic flight vehicle.

1.3 TPSOPT Formulation

TPSOPT is optimization software which covers multiple discipline knowledge, such as aerodynamics, heat transfer, and size optimization. The aerodynamics task is conducted by ZONAIR, the heat transfer part is implemented by SHABP and MINIVER/EXITS, and the size optimization is performed by the formulation derived in the completion of the Air Force Phase II project. The following is a brief description of the typical formulation (for details go to the TPSOPT Theoretical Manual).

1.3.1. Aerodynamic formulation in ZONAIR

The governing equation used in ZONAIR is the Prandtl-Glauert equation which can be expressed as

$$\left(1 - M_{\infty}^2\right) \phi_{xx} + \phi_{yy} + \phi_{zz} = 0 \quad (1.1)$$

where:

M_{∞} is the freestream Mach number and for incompressible flow ($M_{\infty} = 0$).

ϕ is the velocity potential.

Applying Green's theorem to Eq 1.1, an integral solution for a point p can be obtained:

$$\phi(P) = -\frac{1}{4\pi} \iint_{S+S_w} \left[\sigma(Q) \frac{1}{R} - \mu(Q) \bar{n} \cdot \nabla \left(\frac{1}{R} \right) \right] dS \quad (1.2)$$

where:

σ is the source singularity distribution on the configuration S.

μ is the doublet singularity distribution on the configuration S and the wake surface S_w .

$\bar{n}$ is the out-normal vector.

$\bar{R} = |\vec{P} - \vec{Q}|$ is the distance between the point P and Q.

The boundary condition requires the flow to be tangential only to a moving body, i.e.:

$$\vec{n} \cdot \nabla \phi = -\vec{n} \cdot \vec{V}_\infty \quad (1.3)$$

1.3.2 Heat transfer formulation in MINIVER/EXITS

The heat conduction equation used in EXITS for an isotropic material with one special dimension is:

$$\rho c_p \frac{\partial T}{\partial t} = k \frac{\partial^2 T}{\partial x^2} \quad (1.4)$$

where

T	is the temperature
t	is the time
ρ	is the density
c_p	is the specific heat
k	is the thermal conductivity

The finite difference method is used to solve equation (1.4). For three adjacent discretized points x_1 , x_0 and x_2 separated with spaces Δx_1 and Δx_2 , the second derivative of the temperature at time step n can be expressed as

$$\left. \frac{\partial^2 T}{\partial x^2} \right|_0^n = \frac{2}{\Delta x_1 + \Delta x_2} \left[\frac{T_1^n \Delta x_2 + T_2^n \Delta x_1 - T_0^n (\Delta x_1 + \Delta x_2)}{\Delta x_1 \Delta x_2} \right] \quad (1.5)$$

where T_1 , T_0 and T_2 are temperatures at the three points.

The forward difference approximation is taken for the time derivative as shown below

$$\frac{\partial T}{\partial t} = \frac{T_0^{n+1} - T_0^n}{\Delta t} \quad (1.6)$$

and substitute into equation (1.4) it follows that

$$T_i^{n+1} = T_i^n \left(1 - \frac{\Delta t}{C_i} \sum_j K_{ij} \right) + \frac{\Delta t}{C_i} \sum_j K_{ij} T_j^n \quad (1.7)$$

where

$$V_i = \frac{\Delta x_1 + \Delta x_2}{2} \quad (1.8)$$

$$C_i = \rho c_p V_i \quad (1.9)$$

$$K_{ij} = \frac{k}{\Delta x_{ij}} \quad (1.10)$$

The temperature can be solved by an iterative procedure using equation (1.7).

1.3.3 Size optimization

Size optimization is performed by minimizing the total weight of the vehicle surface. To do this, the following objective function is defined for a TPS consisting of L layers.

$$F = \sum_{l=1}^L \sum_{p=1}^P A_p \rho_p^l h_p^l \quad (1.11)$$

where

- A_p is the area of the panel p
- ρ_p^l is the density of the panel p on layer l
- h_p^l is the thickness of the panel p on layer l
- L is the number of layers
- P is the number of all panels over the patch

The thickness h_p^l of each layer can be expressed with the thickness of element nodes using shape functions as

$$h_p^l = \sum_{\alpha=1}^{M_l} N_{\alpha}^l(\xi_p, \eta_p) h^{\alpha l} \quad (1.12)$$

where

- $h^{\alpha l}$ is the thickness of node α on layer l
- $N_{\alpha}^l(\xi_p, \eta_p)$ is the value of shape function α on layer l for panel p
- ξ_p and η_p is the intrinsic coordinates of panel p
- M_l is the number of element nodes on layer l

The shape functions $N_{\alpha}^l(\xi_p, \eta_p)$ can be found in the TPSOPT Theoretical Manual. The objective function F shown in equation (1.11) is subjected to the Thickness constraints:

$$H_{\min}^l < h_p^l < H_{\max}^l \quad (1.13)$$

and the temperature constraints:

$$T_{nms}^{\beta} < T_{\max}^{\beta} \quad (1.14)$$

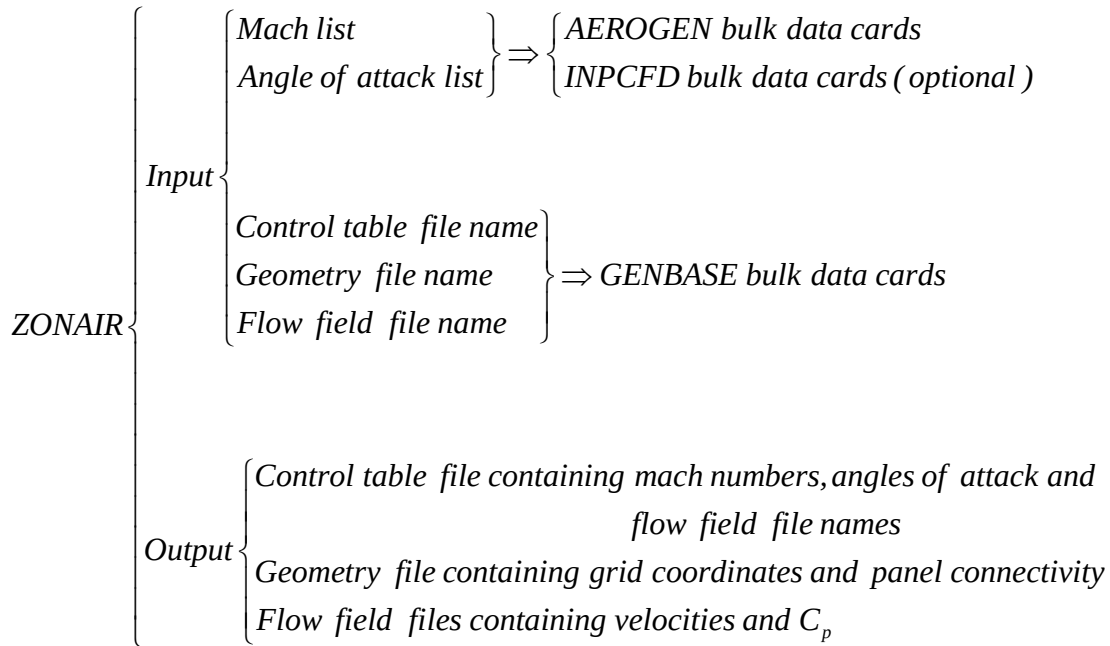
where

$H_{\min}^l$ and $H_{\max}^l$ is the allowable minimum and maximum thickness for layer l
 T_{nms}^{β} is the temperature of hot panel n on the side s for trajectory m at the heat point β
 $T_{\max}^{\beta}$ is the allowable maximum temperature of layer heat point β

This optimization problem can be solved by linking a TPS analysis code such as the MINIVER/EXITS module with an optimization driver like the usable/feasible direction method imbedded in ADS.

1.4 Operational Procedure of Using the TPSOPT System

To apply the TPSOPT system to design a TPS a two-step procedure should be followed. The first step is to prepare data and run ZONAIR, and the other is to use the TPSOPT software. Figure 1.1 is a skeleton of the two steps. Following the figure are detailed descriptions of the steps.



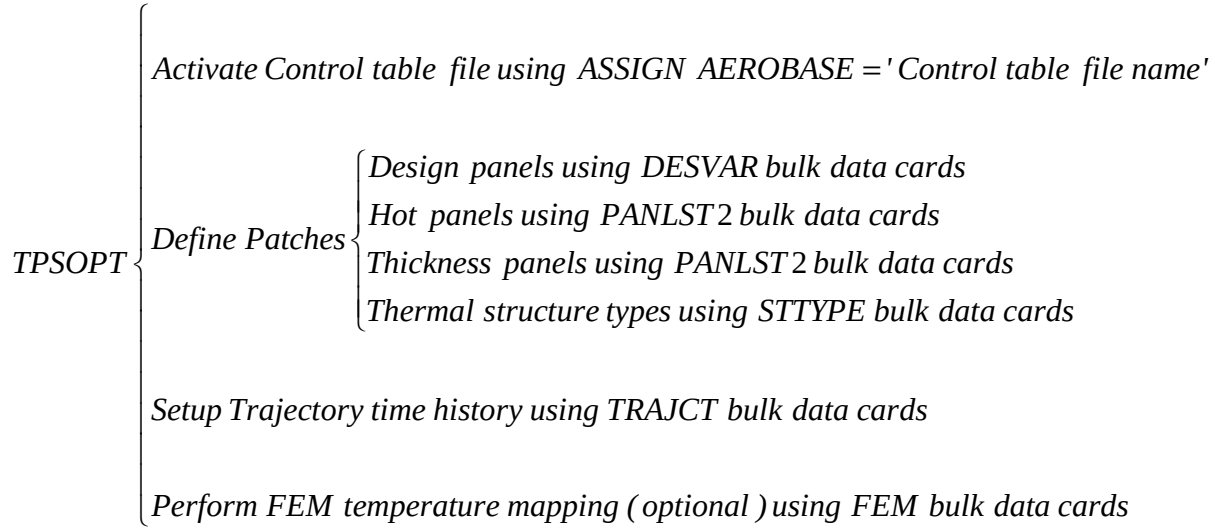


Figure 1.1. Outline of two-step procedure to use TPSOPT

Step 1: Run ZONAIR to Setup Aerodynamic Database Files

To setup aerodynamic database files which are necessary input information to run TPSOPT, the aerodynamic software ZONAIR is first executed for different combinations of Mach number, M , and angle of attack, α . The ZONAIR input geometry model should cover the whole surface of the TPS to be designed. The aerodynamic database files will be generated according to the combination sequence of the Mach number and angle of attack by using the ZONAIR input bulk data card AEROGN. The AEROGN cards are numbered in ascending order for both Mach number and angle of attack. For example, Table 1.1 shows the case of 5 Mach numbers (2, 4, 6, 8, 10) and 4 angles of attack (0, 4, 7, 10).

Table 1.1. Combination of 5 Mach numbers and 4 angles of attack

AEROGN Card Number	M	α
1	2.0	.0
2	4.0	.0
3	6.0	.0
4	8.0	.0
5	10.	.0
6	2.0	4.0
7	4.0	4.0
8	6.0	4.0
9	8.0	4.0
10	10.	4.0
11	2.0	7.0
12	4.0	7.0
13	6.0	7.0
14	8.0	7.0
15	10.	7.0
16	2.0	10.

17	4.0	10.
18	6.0	10.
19	8.0	10.
20	10.	10.

If CFD results are used to replace the ZONAIR results, then in addition to the AEROGEN cards, the INPCFD bulk data cards are also needed in the ZONAIR input file and they should have the same card numbers as the AEROGEN cards.

It is noted that the ranges of Mach number and angle of attack should cover the minimum and maximum values of the Mach number and angle of attack specified in the trajectory data in the TPSOPT input file.

After running ZONAIR, an aerodynamic database is generated, which consists of three types of files: the Control table file, the Geometry file, and the flow field files. The Control table file, containing the combination table of the Mach number and angle of attack, is output in ASCII format, the geometry file, containing the grid coordinates and panel connectivity, is written in the binary format, and the flow field files (one file for one AEROGEN card), containing the velocities and C_p , are generated in OUTPUT4 format.

In order to use the database, the name of the Control table file, say CTRTABLE.DAT, should be assigned in the TPSOPT input file by the following statement

ASSIGN AEROBASE='CTRTABLE.DAT'

And other two database files will be activated automatically by this Control table file.

Step 2: Run TPSOPT to Perform Size Optimization

After the aerodynamic database is established by running ZONAIR, users can setup bulk data cards for the TPSOPT input file based on the geometry provided by the ZONAIR output geometry file. The central tasks of setting up the TPSOPT input file are the definition of patches over the TPS and generation of the trajectory time history data for thermal analysis. The definition of patches includes defining design variable panels, hot panels and thickness panels as well as the thermal structure types. Usually, the smaller the number of patches defined over the TPS, the smoother the optimal TPS surface is, of course, the lower the level of the optimization is achieved. The trajectory time history data consist of values of Mach number, altitude and angle of attack at different time moments. The number of time moments selected heavily influences the computational time and accuracy. The fewer time moments, the shorter the computational time is consumed and the poorer the accuracy of the computational result is.

If temperature mapping from optimal TPS to the structure surface (FEM surface elements) is required, FEM input file (only NASTRAN input file is available so far) needs to be specified using FEM bulk data card.

1.5 About the Application Manual

The objectives of the application manual is to provide guidelines and sample cases to demonstrate the key features and uses of the TPSOPT software system. This manual presents four sample cases for the generation of the optimal thickness and temperature mapping files.

2.0 Simplified X-34 Wing-Body Configuration

- *Purpose:* To demonstrate the applicability of the TPSOPT software system for the X-34 configuration over a wide range of flight conditions.
- *Input File:*
 - Standard input File: X34TPS.INP (Listing 2.1)
 - Aerodynamic Database: CTRTABLE.DAT (Listing 2.2)
 - Geometry File: X34GEO.DAT (Binary file)
 - ZONAIR Solution File: FLOWi (Listing 2.3)
- *Output File:*
 - Standard Output File: X34TPS.OUT (Listing 2.4)
 - Vehicle Surface Mesh: X34SURF.NAS (Figure 2.1)
 - Response surfaces for POD analysis (Figure 2.4)
 - C_p and Temperature Plot File: CPTEMP.PLT (Figure 2.5)
 - Optimal Thickness Distribution Plot File: X34THICK.PLT (Figure 2.6)

2.1 Surface Panels of X-34 Wing-Body Configuration

The simplified X-34 wing-body configuration consists of a body with a round nose of 7.0" radius, a strake, and a swept wing which are shown in Figure 2.1. The surface mesh is generated by ZONAIR and outputted as a binary file "X34GEO.DAT". Due to symmetry, only half of the configuration is considered in the ZONAIR model which consists of 1554 panels and 1559 grid points. These panels and grid points are stored in the file "X34GEO.DAT" which is used in TPSOPT by specifying the name on the second row of the aerodynamic database (CTRTABLE.DAT) that is imported by the "ASSIGN AEROBASE=" executive control command.

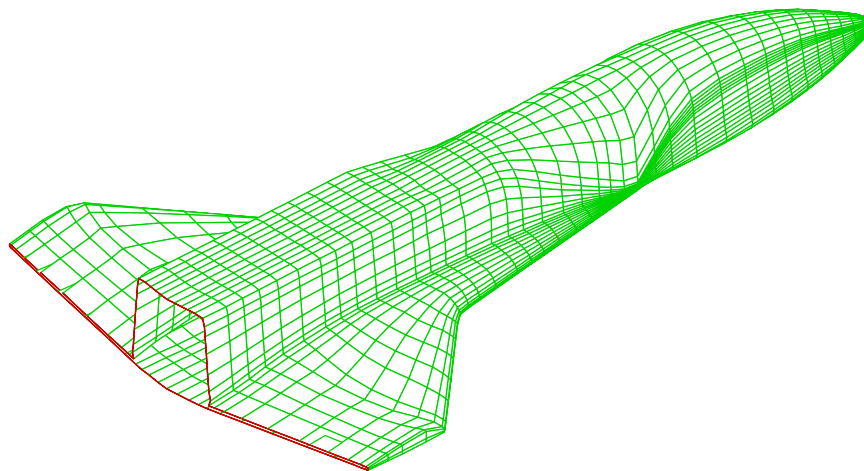


Figure 2.1. X-34 surface mesh

2.2 The Aerodynamic Database: CTRTABLE.DAT

The aerodynamic database is generated by running ZONAIR for 68 combinations of 4 Mach numbers (2, 5, 8, 10) and 17 angles of attack (0, 6, 10, 13, 15, 17, 19, 21, 22-30). This database provides the TPSOPT system with all flow field information from ZONAIR. The first row is a title card (X34); the second row provides the geometry file name (X34GEO.DAT); the third and fourth rows list the name of the reference chord, span, ...etc, and their values, respectively; the fifth row lists the names of items in the following rows (Mach number, Altitude, Angle of attack, etc.), and the remaining rows contain the values of the items listed in the fifth row and, in the last column, the file names (FLOW0001-FLOW0068) which store the velocities and pressure coefficients for the combinations of the Mach number and Angle of attack listed in the corresponding row.

It is noted that the order of the Mach numbers and angles of attack in the table must be ascending.

2.3 The Standard Input File (X34TPS.INP)

The standard input file consists of two major parts: the flow field quantities and TPS optimization system. The flow field quantities are provided by ZONAIR and imported by the aerodynamic database file (CTRTABLE.DAT) using the following statement on the first row:

ASSIGN AEROBASE='CTRTABLE.DAT'

The TPS optimization system is the major portion of the standard input file, which includes specification of trajectory data and definition of patches for the TPS. Fourteen patches are defined for the X-34 configuration (Figure 2.2), among which the patches 2, 5, 10, 12 and 14 which are defined on the lower surface of the vehicle and patch 9 is located over the leading edge of the horizontal wing. Figure 2.3 shows individual patches and panel numbers over them.

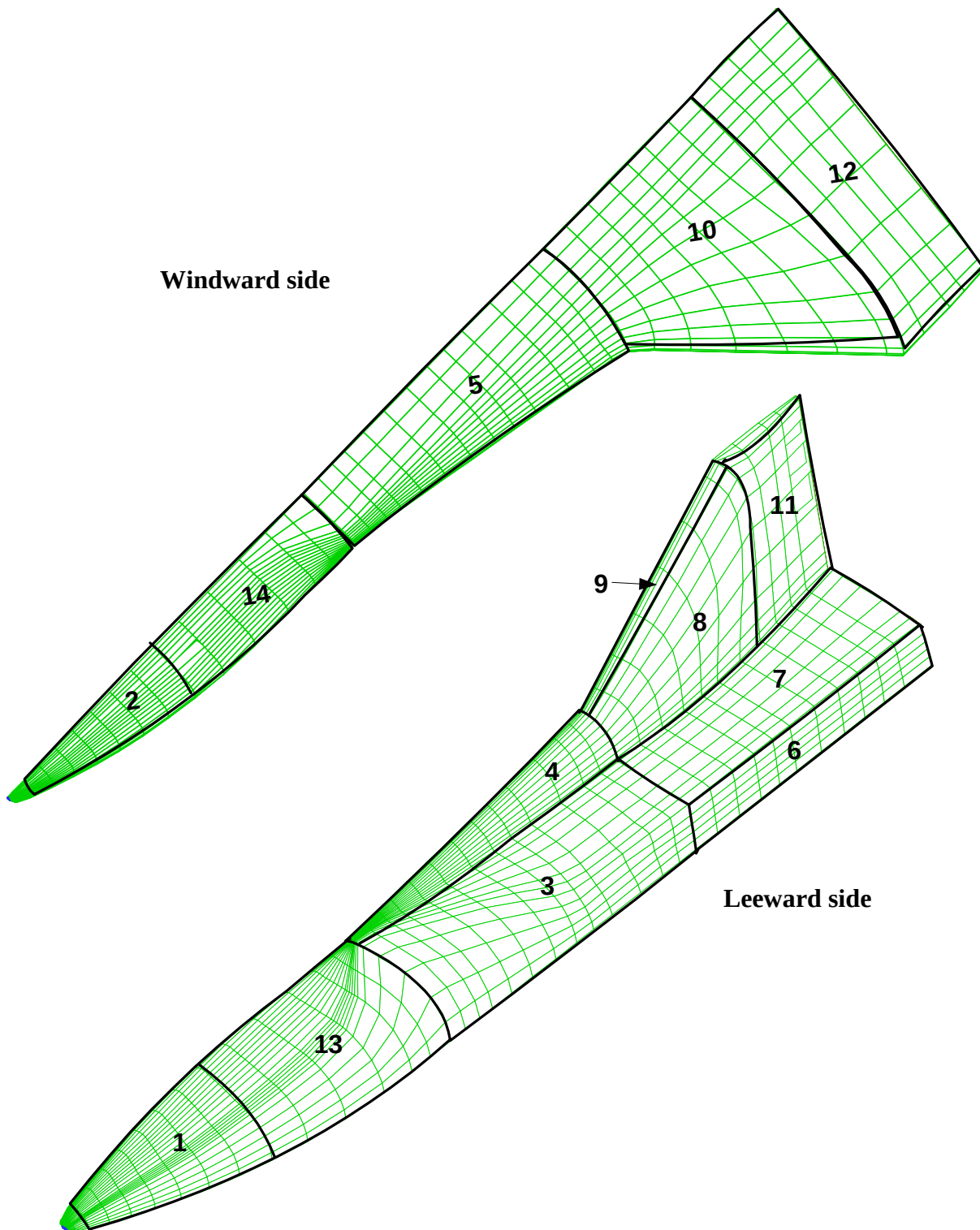


Figure 2.2. Fourteen patches defined over the surface of X-34

764	765	766	767	768	769	770	771
754	755	756	757	758	759	760	761
744	745	746	747	748	749	750	751
734	735	736	737	738	739	740	741
724	725	726	727	728	729	730	731
714	715	716	717	718	719	720	721
704	705	706	707	708	709	710	711
694	695	696	697	698	699	700	701
684	685	686	687	688	689	690	691
674	675	676	677	678	679	680	681
664	665	666	667	668	669	670	671
654	655	656	657	658	659	660	661
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274	275	276	277	278	279	280	281
264	265	266	267	268	269	270	271
254	255	256	257	258	259	260	261
244	245	246	247	248	249	250	251
234	235	236	237	238	239	240	241
224	225	226	227	228	229	230	231
214	215	216	217	218	219	220	221
204	205	206	207	208	209	210	211
194	195	196	197	198	199	200	201
184	185	186	187	188	189	190	191
174	175	176	177	178	179	180	181
164	165	166	167	168	169	170	171
154	155	156	157	158	159	160	161
144	145	146	147	148	149	150	151
134	135	136	137	138	139	140	141
124	125	126	127	128	129	130	131
114	115	116	117	118	119	120	121
104	105	106	107	108	109	110	111
94	95	96	97	98	99	100	101
84	85	86	87	88	89	90	91
74	75	76	77	78	79	80	81
64	65	66	67	68	69	70	71
54	55	56	57	58	59	60	61
44	45	46	47	48	49	50	51
34	35	36	37	38	39	40	41
24	25	26	27	28	29	30	31
14	15	16	17	18	19	20	21
4	5	6	7	8	9	10	11

Patch 1

1444	1445	1446	1447	1448	1449	1450	1451
1434	1435	1436	1437	1438	1439	1440	1441
1424	1425	1426	1427	1428	1429	1430	1431
1414	1415	1416	1417	1418	1419	1420	1421
1404	1405	1406	1407	1408	1409	1410	1411
1394	1395	1396	1397	1398	1399	1400	1401
1384	1385	1386	1387	1388	1389	1390	1391
1374	1375	1376	1377	1378	1379	1380	1381
1364	1365	1366	1367	1368	1369	1370	1371
1354	1355	1356	1357	1358	1359	1360	1361
1344	1345	1346	1347	1348	1349	1350	1351
1334	1335	1336	1337	1338	1339	1340	1341
1324	1325	1326	1327	1328	1329	1330	1331
1314	1315	1316	1317	1318	1319	1320	1321
1304	1305	1306	1307	1308	1309	1310	1311
1294	1295	1296	1297	1298	1299	1300	1301
1284	1285	1286	1287	1288	1289	1290	1291
1274	1275	1276	1277	1278	1279	1280	1281
1264	1265	1266	1267	1268	1269	1270	1271
1254	1255	1256	1257	1258	1259	1260	1261
1244	1245	1246	1247	1248	1249	1250	1251
1234	1235	1236	1237	1238	1239	1240	1241
1224	1225	1226	1227	1228	1229	1230	1231
1214	1215	1216	1217	1218	1219	1220	1221
1204	1205	1206	1207	1208	1209	1210	1211
1194	1195	1196	1197	1198	1199	1200	1201
1184	1185	1186	1187	1188	1189	1190	1191
1174	1175	1176	1177	1178	1179	1180	1181
1164	1165	1166	1167	1168	1169	1170	1171
1154	1155	1156	1157	1158	1159	1160	1161
1144	1145	1146	1147	1148	1149	1150	1151
1134	1135	1136	1137	1138	1139	1140	1141
1124	1125	1126	1127	1128	1129	1130	1131
1114	1115	1116	1117	1118	1119	1120	1121
1104	1105	1106	1107	1108	1109	1110	1111
1094	1095	1096	1097	1098	1099	1100	1101
1084	1085	1086	1087	1088	1089	1090	1091
1074	1075	1076	1077	1078	1079	1080	1081
1064	1065	1066	1067	1068	1069	1070	1071
1054	1055	1056	1057	1058	1059	1060	1061
1044	1045	1046	1047	1048	1049	1050	1051
1034	1035	1036	1037	1038	1039	1040	1041
1024	1025	1026	1027	1028	1029	1030	1031
1014	1015	1016	1017	1018	1019	1020	1021
1004	1005	1006	1007	1008	1009	1010	1011
994	995	996	997	998	999	1000	1001
984	985	986	987	988	989	990	991
974	975	976	977	978	979	980	981
964	965	966	967	968	969	970	971
954	955	956	957	958	959	960	961
944	945	946	947	948	949	950	951
934	935	936	937	938	939	940	941
924	925	926	927	928	929	930	931
914	915	916	917	918	919	920	921
904	905	906	907	908	909	910	911
894	895	896	897	898	899	900	901
884	885	886	887	888	889	890	891
874	875	876	877	878	879	880	881
864	865	866	867	868	869	870	871
854	855	856	857	858	859	860	861
844	845	846	847	848	849	850	851
834	835	836	837	838	839	840	841
824	825	826	827	828	829	830	831
814	815	816	817	818	819	820	821
804	805	806	807	808	809	810	811
794	795	796	797	798	799	800	801
784	785	786	787	788	789	790	791
774	775	776	777	778	779	780	781
764	765	766	767	768	769	770	771

Patch 2

Patch 3

247	248	249	250	251	252	253	254	255	256	257	258	259
177	178	179	180	181	182	183	184	185	186	187	188	189
137	138	139	140	141	142	143	144	145	146	147	148	149
97	98	99	100	101	102	103	104	105	106	107	108	109
57	58	59	60	61	62	63	64	65	66	67	68	69
17	18	19	20	21	22	23	24	25	26	27	28	29

Patch 4

301	302	303	304	305	306	307	308	309	310	311	312	313
211	212	213	214	215	216	217	218	219	220	221	222	223
121	122	123	124	125	126	127	128	129	130	131	132	133
31	32	33	34	35	36	37	38	39	40	41	42	43
1	2	3	4	5	6	7	8	9	10	11	12	13

Patch 5

1457	1458	1459	1460	1461	1462	1463	1464	1465	1466	1467	1468	1469
1417	1418	1419	1420	1421	1422	1423	1424	1425	1426	1427	1428	1429
1377	1378	1379	1380	1381	1382	1383	1384	1385	1386	1387	1388	1389
1337	1338	1339	1340	1341	1342	1343	1344	1345	1346	1347	1348	1349
1297	1298	1299	1300	1301	1302	1303	1304	1305	1306	1307	1308	1309
1257	1258	1259	1260	1261	1262	1263	1264	1265	1266	1267	1268	1269
1217	1218	1219	1220	1221	1222	1223	1224	1225	1226	1227	1228	1229
1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189
1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149
1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109
1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069
1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029
977	978	979	980	981	982	983	984	985	986	987	988	989
937	938	939	940	941	942	943	944	945	946	947	948	949
897	898	899	900	901	902	903	904	905	906	907	908	909
857	858	859	860	861	862	863	864	865	866	867	868	869
817	818	819	820	821	822	823	824	825	826	827	828	829
777	778	779	780	781	782	783	784	785	786	787	788	789
737	738	739	740	741	742	743	744	745	746	747	748	749
697	698	699	700	701	702	703	704	705	706	707	708	709
657	658	659	660	661	662	663	664	665	666	667	668	669
617	618	619	620	621	622	623	624	625	626	627	628	629
577	578	579	580	581	582	583	584	585	586	587	588	589
537	538	539	540	541	542	543	544	545	546	547	548	549
497	498	499	500	501	502	503	504	505	506	507	508	509

Patch 6

190	191	192	193	194	195	196	197	198	199	200
150	151	152	153	154	155	156	157	158	159	160
110	111	112	113	114	115	116	117	118	119	120
70	71	72	73	74	75	76	77	78	79	80
30	31	32	33	34	35	36	37	38	39	40

Patch 7

470	471	472	473	474	475	476	477	478	479	480
430	431	432	433	434	435	436	437	438	439	440
390	391	392	393	394	395	396	397	398	399	400
350	351	352	353	354	355	356	357	358	359	360
310	311	312	313	314	315	316	317	318	319	320
270	271	272	273	274	275	276	277	278	279	280
230	231	232	233	234	235	236	237	238	239	240

Patch 8

830	831	832	833	834	835	836
750	751	752	753	754	755	756
710	711	712	713	714	715	716
670	671	672	673	674	675	676
630	631	632	633	634	635	636
590	591	592	593	594	595	596
550	551	552	553	554	555	556
510	511	512	513	514	515	516

900	901	902	903	904	905	906
910	911	912	913	914	915	916
920	921	922	923	924	925	926

Patch 9

1470	1471	1472	1473	1474	1475	1476
1430	1431	1432	1433	1434	1435	1436
1390	1391	1392	1393	1394	1395	1396
1350	1351	1352	1353	1354	1355	1356
1310	1311	1312	1313	1314	1315	1316
1270	1271	1272	1273	1274	1275	1276
1230	1231	1232	1233	1234	1235	1236
1190	1191	1192	1193	1194	1195	1196
1150	1151	1152	1153	1154	1155	1156
1110	1111	1112	1113	1114	1115	1116
1070	1071	1072	1073	1074	1075	1076
1030	1031	1032	1033	1034	1035	1036

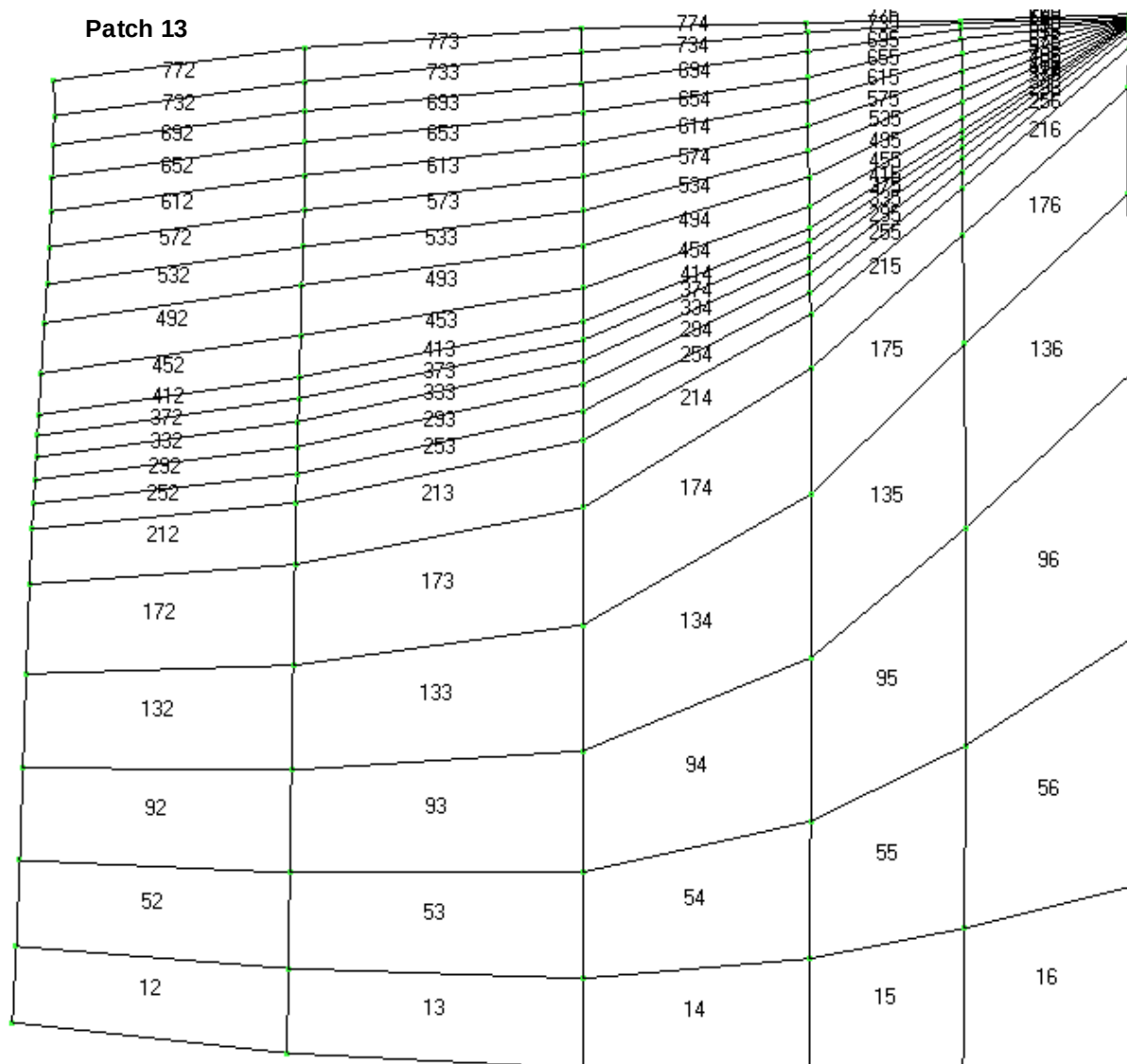
Patch 10

877	878	879	880
837	838	839	840
797	798	799	800
757	758	759	760
717	718	719	720
677	678	679	680
637	638	639	640
597	598	599	600
557	558	559	560
517	518	519	520

Patch 11

1477	1478	1479	1480
1437	1438	1439	1440
1397	1398	1399	1400
1357	1358	1359	1360
1317	1318	1319	1320
1277	1278	1279	1280
1237	1238	1239	1240
1197	1198	1199	1200
1157	1158	1159	1160
1117	1118	1119	1120
1077	1078	1079	1080
1037	1038	1039	1040
997	998	999	1000

Patch 12



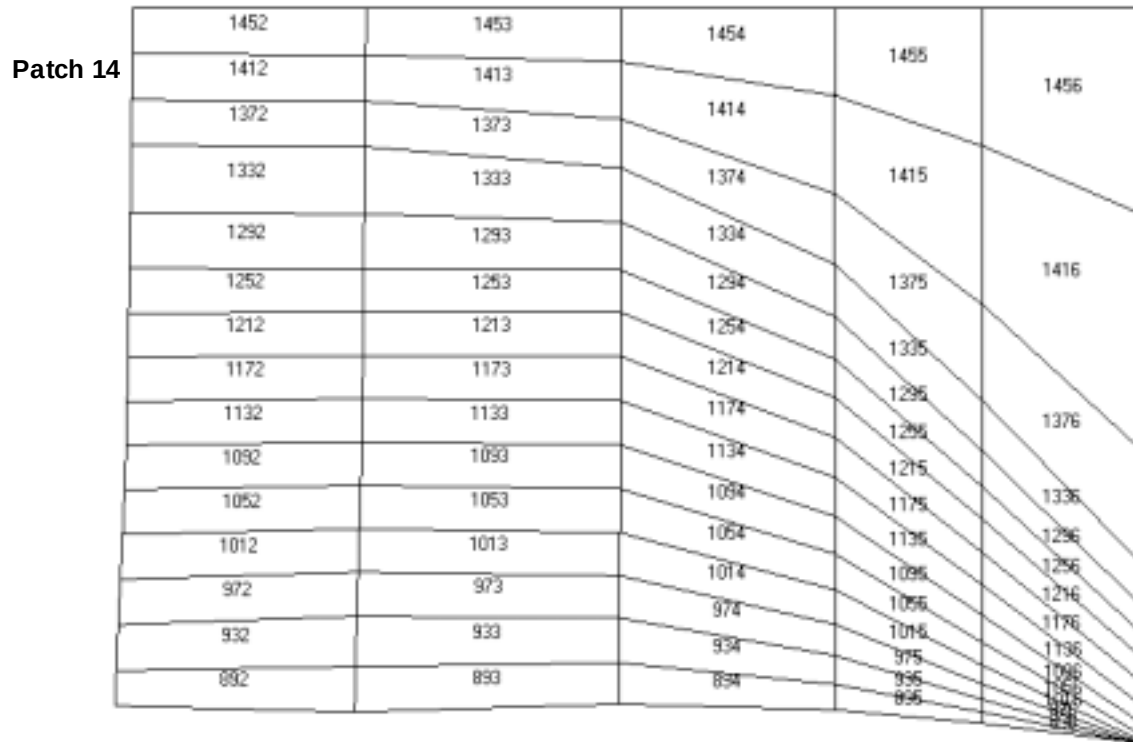


Figure 2.3. Fourteen separated patches defined over X-34

2.4 Thermal Structures for Patches

Two sets of thermal structures are used for the X-34 TPS. The last layer of either set is a structure layer, that is, no design panels are defined over it.

The first set of structures consists of 4 layers denoted using the bulk data card STTYPE numbers of 21, 23, 24, 25, respectively. The structures for the 4 layers are Slab, Honeycomb, Corrugated standoff, Slab, respectively, and material numbers for the optimization thickness parts of the five layers are 221 (HRSI COATING), 103 (ALUMINUM 7075-T6), 114 (INCONEL 617), and 101 (ALUMINUM 2024-T4). This set of thermal structures is defined for nose-near patches 1 and 2, and leading edge patch 9.

The second set of structures consists of 6 layers denoted using the bulk data card STTYPE numbers of 31, 32, 33, 34, 35, 36, respectively. The structures for the 6 layers are Thin skin, Slab, Thin skin, Slab, Thin skin, Slab, respectively. The materials for these layers are 221 (HRSI COATING), 266 (AB312 Fabric), 260 (Q-Felt(3.5 PCF)), 266 (AB312 Fabric), 245 (RTV-560), and 101 (ALUMINUM 2024-T4). This set of thermal structures is defined for patches 3-8 and 10-14.

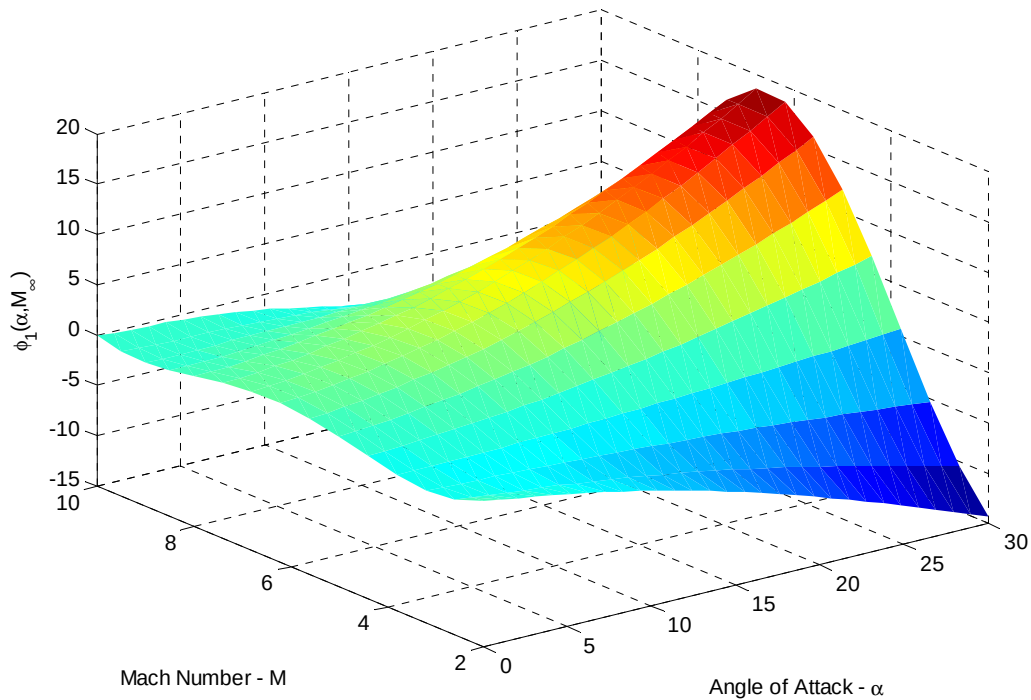
2.5 Output Information

The output information consists of the following items:

- (1) Response surfaces of C_p and velocities for POD analysis (Plot files)
- (2) C_p and temperatures for specified time steps in trajectory bulk data cards (Plot files)
- (3) Schematic text plotting of trajectory-related thermal quantities versus time over every patch. These quantities include enthalpy-based heat transfer coefficient, adiabatic wall enthalpy, and pressure.
- (4) Thickness of every design layer and the ratio of objective function values between optimal and initial thickness
- (5) Schematic text plotting of optimal thickness and maximum temperature over each layer for every patch
- (6) Optimal thickness and temperature over each layer for every panel (Plot file)

2.6 Results

The output items listed in Section 2.5 have been stored in a text file and some plotting files. The text file is the Standard Output File (X34TPS.OUT) which includes all the input information appearing in the Standard Input File (X34TPS.INP) and items (3)-(5) listed in the above section. Figures 2.4-2.6 show the response surfaces of C_p , and C_p and temperatures specified in the trajectory bulk data card, as well as the optimal thickness, respectively.



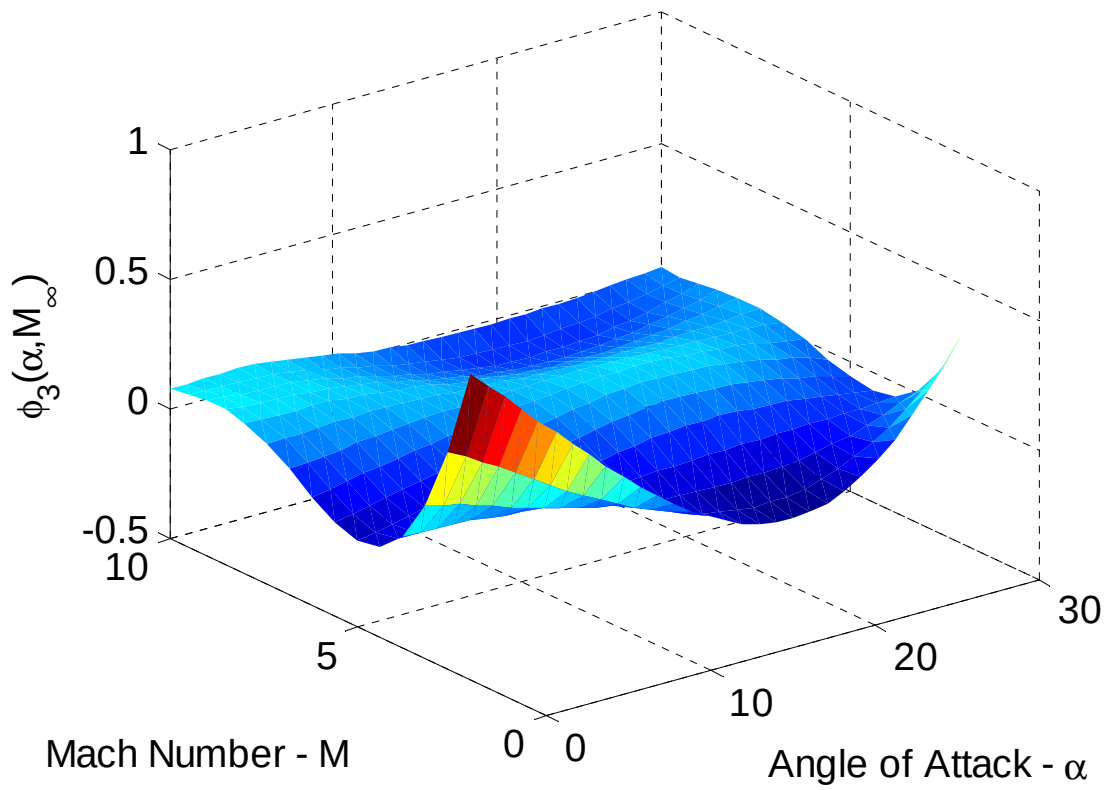
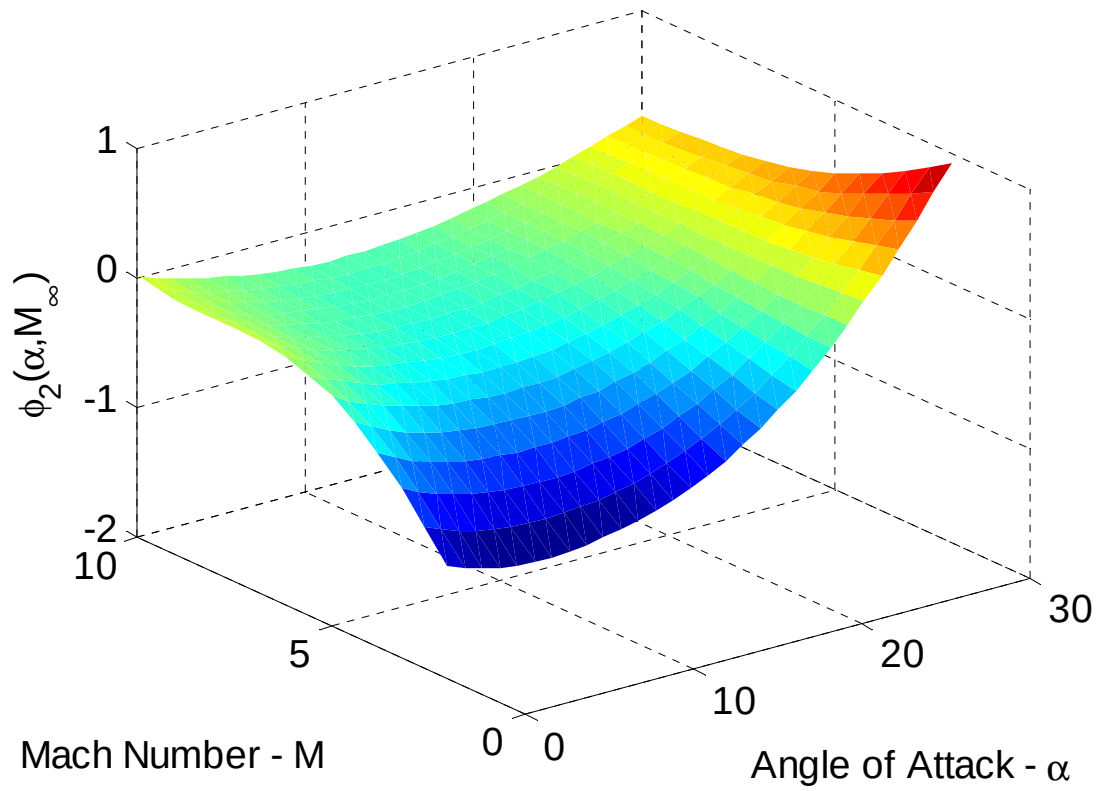


Figure 2.4. Response Surface of first three modes for POD analysis

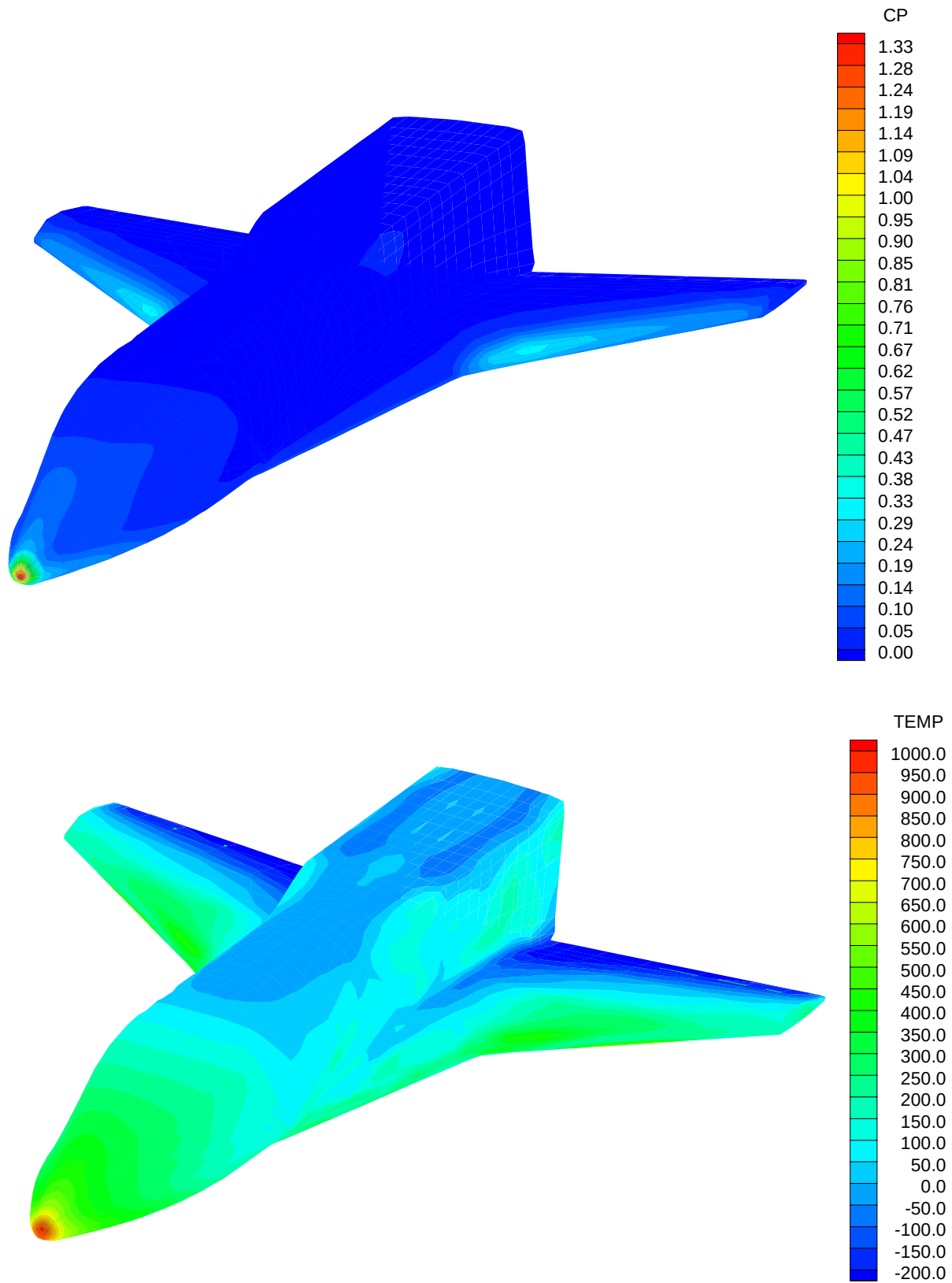
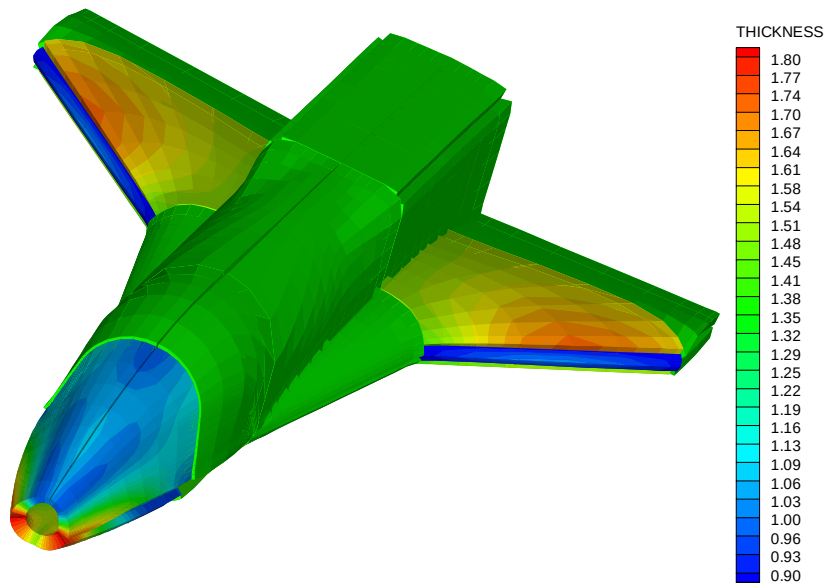
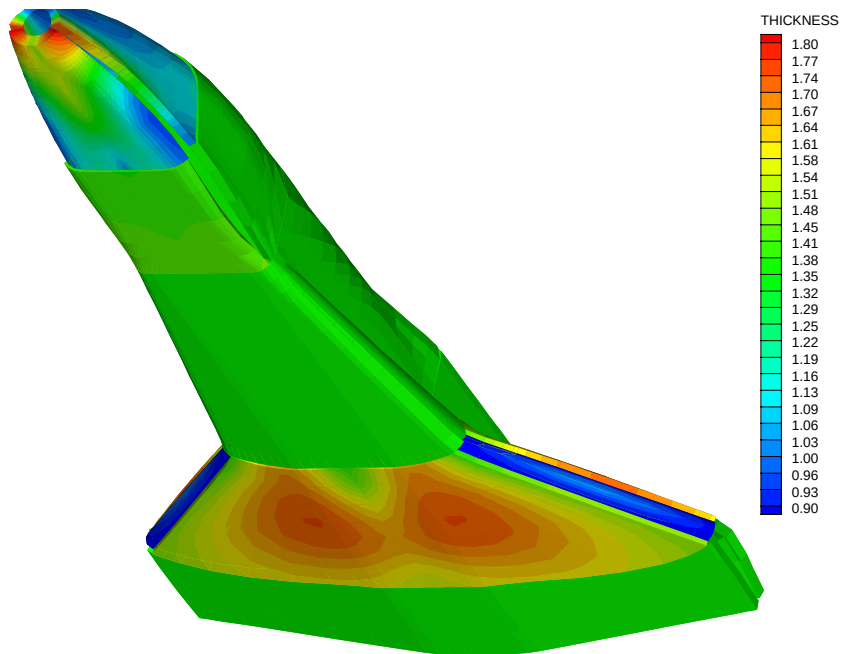


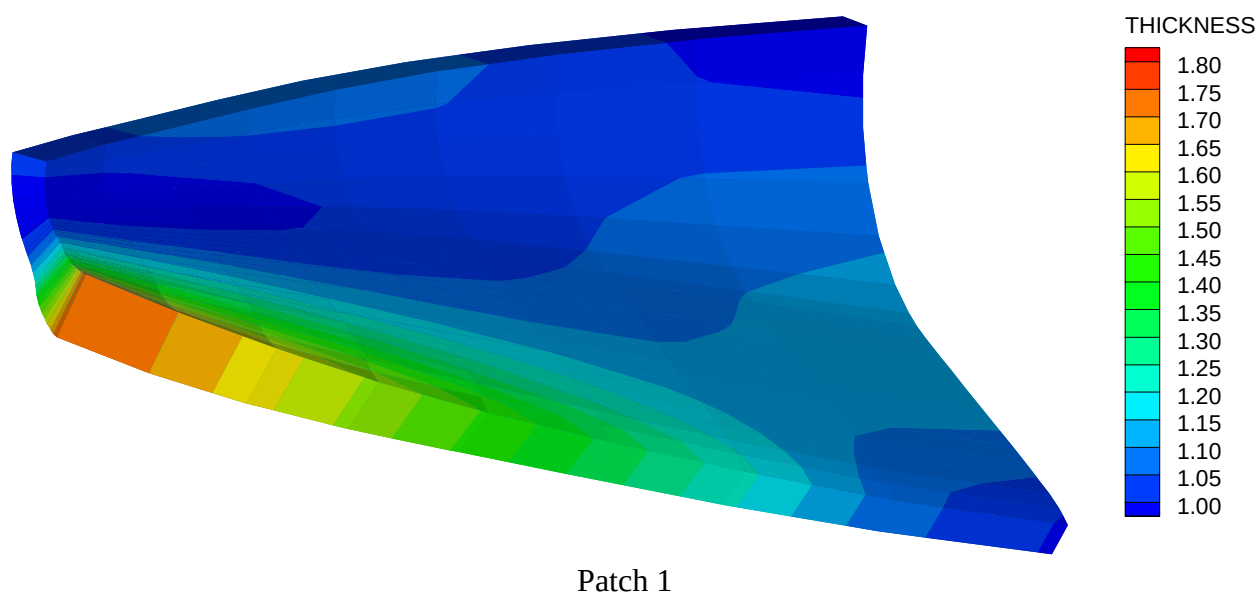
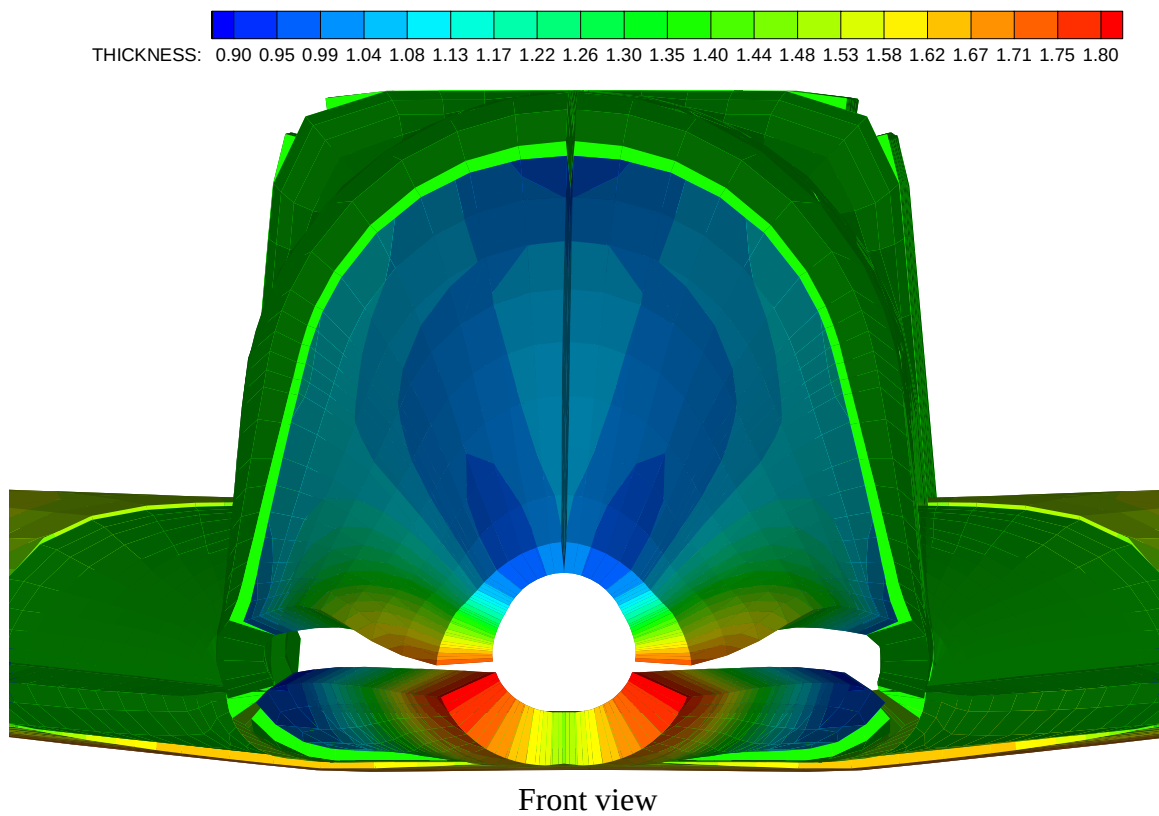
Figure 2.5. Plots of C_p and temperature at time=225 with $M=8.8$, $AoA=10.225$



Leeward surface



Windward surface



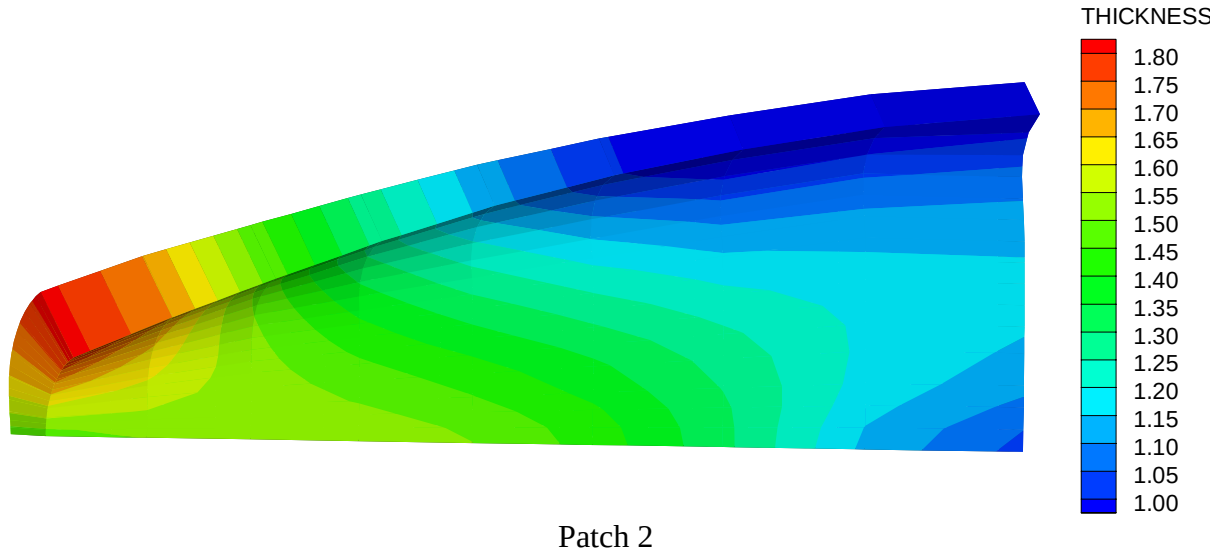


Figure 2.6 Plot of the optimal thickness of the TPS

2.7 Lists of Input and Output Files

- *Input Data Listing:*

Listing 2.1 Standard input File: X34TPS.INP

```

ASSIGN AEROBASE='CTRTABLE.DAT',PRINT=0
SOL 1
$ Begin Executive Control Section
CEND
ECHO = SORT
SUBCASE = 1
    SUBTITLE=TPS OPTIMISATION FOR X34
    LABEL= HYPERSONIC AERODYNAMIC DATABASE BY ZONAIR
    TPSDES=1

$
BEGIN BULK
$
$ PLOTTING AERODYNAMIC MODEL
PLTAERO 1      YES      NO      NASTRAN X34SURF.NAS
$ PLOTTING TPS THICKNESS
PLTTPS  1      1      ALL      TECPLOT  THICKML.PLT    -4.0
PLTTPS -2      1      ALL      TECPLOT  THICK1L.PLT    -4.0
$
$TPSDES SETID  PODRSM  TRJLST  IFPREH  IDFEM/TPSSYM
TPSDES  1      1      1      2      101
CONT    1      2      3      4      5      6      7      8      CONT
CONT    9      10     11     12     13     14
$FEM    |IDFEM  |IDCORD  |FLIP   |FMUNIT  |FLUNIT  |FORM   |NMINP1 |NMINP2 |CONT   |
FEM      101   |         |      |        |        |        |        |        |        |CONT   |
CONT     X34_DYN.OUT
$PODRSM  |TPSDES |METHOD |NRDMOD |TOLER  |NEURON  |SAVE   |FILENM

```

PODRSM	1	1			SAVE	X34M1.RST	CONT
CONT	CPPODRSM.P3D	UPODRSM.P3D			VPODRSM.P3D	WPODRSM.P3D	
\$							
\$TPSSYM	SETID	IDPATCH	NLAYER				
TPSSYM	1	1	4	4			CONT
CONT	1	21	0.08	2.			CONT
CONT	1	23	0.3	1.5			CONT
CONT	1	24	0.4	1.3			CONT
CONT	0	25	0.1	1.2			
TPSSYM	2	2	4	4			CONT
CONT	2	21	0.08	2.			CONT
CONT	2	23	0.3	1.5			CONT
CONT	2	24	0.4	1.3			CONT
CONT	0	25	0.1	1.2			
TPSSYM	3	3	6	4			CONT
CONT	3	31	0.05	1.			CONT
CONT	3	32	0.08	0.6			CONT
CONT	3	33	1.00	3.			CONT
CONT	3	34	0.05	0.5			CONT
CONT	3	35	0.05	0.5			CONT
CONT	0	36	0.1	0.2			
TPSSYM	4	4	6	4			CONT
CONT	4	31	0.05	1.			CONT
CONT	4	32	0.08	0.6			CONT
CONT	4	33	1.00	3.			CONT
CONT	4	34	0.05	0.5			CONT
CONT	4	35	0.05	0.5			CONT
CONT	0	36	0.1	0.2			
TPSSYM	5	5	6	4			CONT
CONT	5	31	0.05	1.			CONT
CONT	5	32	0.08	0.6			CONT
CONT	5	33	1.00	3.			CONT
CONT	5	34	0.05	0.5			CONT
CONT	5	35	0.05	0.5			CONT
CONT	0	36	0.1	0.2			
TPSSYM	6	6	6	4			CONT
CONT	6	31	0.05	1.			CONT
CONT	6	32	0.08	0.6			CONT
CONT	6	33	1.00	3.			CONT
CONT	6	34	0.05	0.5			CONT
CONT	6	35	0.05	0.5			CONT
CONT	0	36	0.1	0.2			
TPSSYM	7	7	6	4			CONT
CONT	7	31	0.05	1.			CONT
CONT	7	32	0.08	0.6			CONT
CONT	7	33	1.00	3.			CONT
CONT	7	34	0.05	0.5			CONT
CONT	7	35	0.05	0.5			CONT
CONT	0	36	0.1	0.2			
TPSSYM	8	8	6	4			CONT
CONT	8	31	0.05	1.			CONT
CONT	8	32	0.08	0.6			CONT
CONT	8	33	1.00	3.			CONT
CONT	8	34	0.05	0.5			CONT
CONT	8	35	0.05	0.5			CONT
CONT	0	36	0.1	0.2			
TPSSYM	9	9	4	4			CONT
CONT	9	21	0.08	2.			CONT
CONT	9	23	0.3	1.5			CONT
CONT	9	24	0.4	1.3			CONT
CONT	0	25	0.1	1.2			
TPSSYM	10	10	6	4			CONT
CONT	10	31	0.05	1.			CONT
CONT	10	32	0.08	0.6			CONT
CONT	10	33	1.00	3.			CONT
CONT	10	34	0.05	0.5			CONT
CONT	10	35	0.05	0.5			CONT
CONT	0	36	0.1	0.2			
TPSSYM	11	11	6	4			CONT
CONT	11	31	0.05	1.			CONT
CONT	11	32	0.08	0.6			CONT

CONT	11	33	1.00	3.			CONT
CONT	11	34	0.05	0.5			CONT
CONT	11	35	0.05	0.5			CONT
CONT	0	36	0.1	0.2			
TPSSYM	12	12	6	4			CONT
CONT	12	31	0.05	1.			CONT
CONT	12	32	0.08	0.6			CONT
CONT	12	33	1.00	3.			CONT
CONT	12	34	0.05	0.5			CONT
CONT	12	35	0.05	0.5			CONT
CONT	0	36	0.1	0.2			
TPSSYM	13	13	6	4			CONT
CONT	13	31	0.05	1.			CONT
CONT	13	32	0.08	0.6			CONT
CONT	13	33	1.00	3.			CONT
CONT	13	34	0.05	0.5			CONT
CONT	13	35	0.05	0.5			CONT
CONT	0	36	0.1	0.2			
TPSSYM	14	14	6	4			CONT
CONT	14	31	0.05	1.			CONT
CONT	14	32	0.08	0.6			CONT
CONT	14	33	1.00	3.			CONT
CONT	14	34	0.05	0.5			CONT
CONT	14	35	0.05	0.5			CONT
CONT	0	36	0.1	0.2			
\$	FOR NOSE SECTION ADN LEADING EDGE OF WING						
STTYPE	21	1	221				CONT
CONT	0.1						
STTYPE	22	1	206				CONT
CONT	0.5						
STTYPE	23	3	103	103	103		CONT
CONT	0.12	0.11	0.095	0.75	0.3		
STTYPE	24	4	114	114	127		CONT
CONT	0.08	0.08	0.12	1.0	0.8		
STTYPE	25	1	101				CONT
CONT	0.1						
\$	AFRSI BLANKET FOR OTHER PART OF THE VEHICLE						
STTYPE	31	6	221				CONT
CONT	0.08						
STTYPE	32	1	266				CONT
CONT	0.18						
STTYPE	33	6	260				CONT
CONT	2.0						
STTYPE	34	1	266				CONT
CONT	0.11						
STTYPE	35	6	245				CONT
CONT	0.1						
STTYPE	36	1	101				CONT
CONT	0.15						
\$							
PRVAL	4		90000000	50.0	15.	1.1	
\$							
\$PATCH	ID	RHSPAN	RHSHOT	SYMY	YVAL	TIMESP	
PATCH	1	11	12			1	
PATCH	2	21	22			1	
PATCH	3	31	32			1	
PATCH	4	41	42			1	
PATCH	5	51	52			1	
PATCH	6	61	62			1	
PATCH	7	71	72			1	
PATCH	8	81	82			1	
PATCH	9	91	92			1	
PATCH	10	101	102			1	
PATCH	11	111	112			1	
PATCH	12	121	122			1	
PATCH	13	131	132			1	
PATCH	14	141	142			1	
\$							
\$DESVAR	ID	NE	ME				
DESVAR	1	3	3				CONT
CONT	4	8	11				CONT

CONT	364	328	371						CONT
CONT	764	768	771						
DESVAR	2	3	3						CONT
CONT	884	888	891						CONT
CONT	1164	1208	1211						CONT
CONT	1444	1448	1451						
DESVAR	3	3	3						CONT
CONT	17	24	29						CONT
CONT	97	264	229						CONT
CONT	457	464	469						
DESVAR	4	3	3						CONT
CONT	497	504	509						CONT
CONT	697	664	669						CONT
CONT	897	904	909						
DESVAR	5	3	3						CONT
CONT	937	944	949						CONT
CONT	1377	1304	1269						CONT
CONT	1457	1464	1469						
DESVAR	6	2	2						CONT
CONT	30	40							CONT
CONT	190	200							
DESVAR	7	3	2						CONT
CONT	230	235	240						CONT
CONT	470	475	480						
DESVAR	8	3	3						CONT
CONT	510	513	516						CONT
CONT	670	673	676						CONT
CONT	830	833	836						
DESVAR	9	3	4						CONT
CONT	870	873	876						CONT
CONT	910	913	916						CONT
CONT	950	953	956						CONT
CONT	990	993	996						
DESVAR	10	3	3						CONT
CONT	1476	1473	1470						CONT
CONT	1236	1233	1270						CONT
CONT	1036	1033	1030						
DESVAR	11	3	2						CONT
CONT	877	677	517						CONT
CONT	880	680	520						
DESVAR	12	3	2						CONT
CONT	1000	1240	1480						CONT
CONT	997	1237	1477						
DESVAR	13	3	3						CONT
CONT	12	14	16						CONT
CONT	372	214	136						CONT
CONT	772	774	776						
DESVAR	14	3	3						CONT
CONT	892	894	896						CONT
CONT	1212	1214	1376						CONT
CONT	1452	1454	1456						
\$									
TIMESP	1	100.	200.	300.	400.	500.	600.	700.	CONT
CONT	800.	900.	1000.	1100.					
\$									
PANEL LIST PART									
PANLST2	11		4	5	6	7	8		9+CON
+CON	10	11	44	45	46	47	48		49+CON
+CON	50	51	84	85	86	87	88		89+CON
+CON	90	91	124	125	126	127	128		129+CON
+CON	130	131	164	165	166	167	168		169+CON
+CON	170	171	204	205	206	207	208		209+CON
+CON	210	211	244	245	246	247	248		249+CON
+CON	250	251	284	285	286	287	288		289+CON
+CON	290	291	324	325	326	327	328		329+CON
+CON	330	331	364	365	366	367	368		369+CON
+CON	370	371	404	405	406	407	408		409+CON
+CON	410	411	444	445	446	447	448		449+CON
+CON	450	451	484	485	486	487	488		489+CON
+CON	490	491	524	525	526	527	528		529+CON
+CON	530	531	564	565	566	567	568		569+CON
+CON	570	571	604	605	606	607	608		609+CON

+CON	610	611	644	645	646	647	648	649+CON
+CON	650	651	684	685	686	687	688	689+CON
+CON	690	691	724	725	726	727	728	729+CON
+CON	730	731	764	765	766	767	768	769+CON
+CON	770	771						
PANLST2	12		4	8	11	364	328	371
CONT	764	768	771					CONT
PANLST2	21		884	885	886	887	888	889+CON
+CON	890	891	924	925	926	927	928	929+CON
+CON	930	931	964	965	966	967	968	969+CON
+CON	970	971	1004	1005	1006	1007	1008	1009+CON
+CON	1010	1011	1044	1045	1046	1047	1048	1049+CON
+CON	1050	1051	1084	1085	1086	1087	1088	1089+CON
+CON	1090	1091	1124	1125	1126	1127	1128	1129+CON
+CON	1130	1131	1164	1165	1166	1167	1168	1169+CON
+CON	1170	1171	1204	1205	1206	1207	1208	1209+CON
+CON	1210	1211	1244	1245	1246	1247	1248	1249+CON
+CON	1250	1251	1284	1285	1286	1287	1288	1289+CON
+CON	1290	1291	1324	1325	1326	1327	1328	1329+CON
+CON	1330	1331	1364	1365	1366	1367	1368	1369+CON
+CON	1370	1371	1404	1405	1406	1407	1408	1409+CON
+CON	1410	1411	1444	1445	1446	1447	1448	1449+CON
+CON	1450	1451						
PANLST2	22		884	888	891	1164	1208	1211
CONT	1444	1448	1451					CONT
PANLST2	31		17	18	19	20	21	22+CON
+CON	23	24	25	26	27	28	29	57+CON
+CON	58	59	60	61	62	63	64	65+CON
+CON	66	67	68	69	97	98	99	100+CON
+CON	101	102	103	104	105	106	107	108+CON
+CON	109	137	138	139	140	141	142	143+CON
+CON	144	145	146	147	148	149	177	178+CON
+CON	179	180	181	182	183	184	185	186+CON
+CON	187	188	189	217	218	219	220	221+CON
+CON	222	223	224	225	226	227	228	229+CON
+CON	257	258	259	260	261	262	263	264+CON
+CON	265	266	267	268	269	297	298	299+CON
+CON	300	301	302	303	304	305	306	307+CON
+CON	308	309	337	338	339	340	341	342+CON
+CON	343	344	345	346	347	348	349	377+CON
+CON	378	379	380	381	382	383	384	385+CON
+CON	386	387	388	389	417	418	419	420+CON
+CON	421	422	423	424	425	426	427	428+CON
+CON	429	457	458	459	460	461	462	463+CON
+CON	464	465	466	467	468	469		
PANLST2	32		17	24	29	97	264	229+CON
+CON		457	464	469				
PANLST2	41		497	498	499	500	501	502+CON
+CON	503	504	505	506	507	508	509	537+CON
+CON	538	539	540	541	542	543	544	545+CON
+CON	546	547	548	549	577	578	579	580+CON
+CON	581	582	583	584	585	586	587	588+CON
+CON	589	617	618	619	620	621	622	623+CON
+CON	624	625	626	627	628	629	657	658+CON
+CON	659	660	661	662	663	664	665	666+CON
+CON	667	668	669	697	698	699	700	701+CON
+CON	702	703	704	705	706	707	708	709+CON
+CON	737	738	739	740	741	742	743	744+CON
+CON	745	746	747	748	749	777	778	779+CON
+CON	780	781	782	783	784	785	786	787+CON
+CON	788	789	817	818	819	820	821	822+CON
+CON	823	824	825	826	827	828	829	857+CON
+CON	858	859	860	861	862	863	864	865+CON
+CON	866	867	868	869	897	898	899	900+CON
+CON	901	902	903	904	905	906	907	908+CON
+CON	909							
PANLST2	42		497	697	897	501	701	901
CONT	504	664	904	507	707	907	509	589
CONT	669	789	909					CONT
PANLST2	51		937	938	939	940	941	942+CON
+CON	943	944	945	946	947	948	949	977+CON

+CON	978	979	980	981	982	983	984	985+CON
+CON	986	987	988	989	1017	1018	1019	1020+CON
+CON	1021	1022	1023	1024	1025	1026	1027	1028+CON
+CON	1029	1057	1058	1059	1060	1061	1062	1063+CON
+CON	1064	1065	1066	1067	1068	1069	1097	1098+CON
+CON	1099	1100	1101	1102	1103	1104	1105	1106+CON
+CON	1107	1108	1109	1137	1138	1139	1140	1141+CON
+CON	1142	1143	1144	1145	1146	1147	1148	1149+CON
+CON	1177	1178	1179	1180	1181	1182	1183	1184+CON
+CON	1185	1186	1187	1188	1189	1217	1218	1219+CON
+CON	1220	1221	1222	1223	1224	1225	1226	1227+CON
+CON	1228	1229	1257	1258	1259	1260	1261	1262+CON
+CON	1263	1264	1265	1266	1267	1268	1269	1297+CON
+CON	1298	1299	1300	1301	1302	1303	1304	1305+CON
+CON	1306	1307	1308	1309	1337	1338	1339	1340+CON
+CON	1341	1342	1343	1344	1345	1346	1347	1348+CON
+CON	1349	1377	1378	1379	1380	1381	1382	1383+CON
+CON	1384	1385	1386	1387	1388	1389	1417	1418+CON
+CON	1419	1420	1421	1422	1423	1424	1425	1426+CON
+CON	1427	1428	1429	1457	1458	1459	1460	1461+CON
+CON	1462	1463	1464	1465	1466	1467	1468	1469
PANLST2 52		937		944	949	1377	1304	1269+CON
+CON	1457	1464	1469					
PANLST2 61			30	31	32	33	34	35+CON
+CON	36	37	38	39	40	70	71	72+CON
+CON	73	74	75	76	77	78	79	80+CON
+CON	110	111	112	113	114	115	116	117+CON
+CON	118	119	120	150	151	152	153	154+CON
+CON	155	156	157	158	159	160	190	191+CON
+CON	192	193	194	195	196	197	198	199+CON
+CON	200							
PANLST2 62			30		40	190	200	
PANLST2 71			230	231	232	233	234	235+CON
+CON	236	237	238	239	240	270	271	272+CON
+CON	273	274	275	276	277	278	279	280+CON
+CON	310	311	312	313	314	315	316	317+CON
+CON	318	319	320	350	351	352	353	354+CON
+CON	355	356	357	358	359	360	390	391+CON
+CON	392	393	394	395	396	397	398	399+CON
+CON	400	430	431	432	433	434	435	436+CON
+CON	437	438	439	440	470	471	472	473+CON
+CON	474	475	476	477	478	479	480	
PANLST2 72			230	350	470	312	392	235 CONT
CONT 355		475	238	358	478	240	360	480
PANLST2 81			510	511	512	513	514	515+CON
+CON	516	550	551	552	553	554	555	556+CON
+CON	590	591	592	593	594	595	596	630+CON
+CON	631	632	633	634	635	636	670	671+CON
+CON	672	673	674	675	676	710	711	712+CON
+CON	713	714	715	716	750	751	752	753+CON
+CON	754	755	756	790	791	792	793	794+CON
+CON	795	796	830	831	832	833	834	835+CON
+CON	836							
PANLST2 82			510	590	670	750	830	512 CONT
CONT 632		752	832	513	673	833	514	634 CONT
CONT 754		834	635	715	795	516	596	676 CONT
CONT 756		836						
PANLST2 91			870	871	872	873	874	875+CON
+CON	876	910	911	912	913	914	915	916+CON
+CON	950	951	952	953	954	955	956	990+CON
+CON	991	992	993	994	995	996		
PANLST2 92			870	910	950	990	871	951 CONT
CONT 912		992	873	913	953	993	874	954 CONT
CONT 915		995	876	916	956	996		
PANLST2 101			1030	1031	1032	1033	1034	1035+CON
+CON	1036	1070	1071	1072	1073	1074	1075	1076+CON
+CON	1110	1111	1112	1113	1114	1115	1116	1150+CON
+CON	1151	1152	1153	1154	1155	1156	1190	1191+CON
+CON	1192	1193	1194	1195	1196	1230	1231	1232+CON
+CON	1233	1234	1235	1236	1270	1271	1272	1273+CON
+CON	1274	1275	1276	1310	1311	1312	1313	1314+CON

+CON	1315	1316	1350	1351	1352	1353	1354	1355+CON
+CON	1356	1390	1391	1392	1393	1394	1395	1396+CON
+CON	1430	1431	1432	1433	1434	1435	1436	1470+CON
+CON	1471	1472	1473	1474	1475	1476		
PANLST2	102		1476	1473	1470	1236	1233	1270+CON
+CON	1036	1033	1030					
PANLST2	111		517	518	519	520	557	558+CON
+CON	559	560	597	598	599	600	637	638+CON
+CON	639	640	677	678	679	680	717	718+CON
+CON	719	720	757	758	759	760	797	798+CON
+CON	799	800	837	838	839	840	877	878+CON
+CON	879	880						
PANLST2	112		877	677	517	838	758	598
CONT	719	639	880	760	680	600	520	CONT
PANLST2	121		997	998	999	1000	1037	1038+CON
+CON	1039	1040	1077	1078	1079	1080	1117	1118+CON
+CON	1119	1120	1157	1158	1159	1160	1197	1198+CON
+CON	1199	1200	1237	1238	1239	1240	1277	1278+CON
+CON	1279	1280	1317	1318	1319	1320	1357	1358+CON
+CON	1359	1360	1397	1398	1399	1400	1437	1438+CON
+CON	1439	1440	1477	1478	1479	1480		
PANLST2	122		1000	1240	1480	997	1237	1477
PANLST2	131		12	13	14	15	16	52+CON
+CON	53	54	55	56	92	93	94	95+CON
+CON	96	132	133	134	135	136	172	173+CON
+CON	174	175	176	212	213	214	215	216+CON
+CON	252	253	254	255	256	292	293	294+CON
+CON	295	296	332	333	334	335	336	372+CON
+CON	373	374	375	376	412	413	414	415+CON
+CON	416	452	453	454	455	456	492	493+CON
+CON	494	495	496	532	533	534	535	536+CON
+CON	572	573	574	575	576	612	613	614+CON
+CON	615	616	652	653	654	655	656	692+CON
+CON	693	694	695	696	732	733	734	735+CON
+CON	736	772	773	774	775	776		
PANLST2	132		12	14	16	132	134	372
CONT	214	136	533	772	774	776		CONT
PANLST2	141		892	893	894	895	896	932+CON
+CON	933	934	935	936	972	973	974	975+CON
+CON	976	1012	1013	1014	1015	1016	1052	1053+CON
+CON	1054	1055	1056	1092	1093	1094	1095	1096+CON
+CON	1132	1133	1134	1135	1136	1172	1173	1174+CON
+CON	1175	1176	1212	1213	1214	1215	1216	1252+CON
+CON	1253	1254	1255	1256	1292	1293	1294	1295+CON
+CON	1296	1332	1333	1334	1335	1336	1372	1373+CON
+CON	1374	1375	1376	1412	1413	1414	1415	1416+CON
+CON	1452	1453	1454	1455	1456			
PANLST2	142		892	894	896	1212	1214	1376+CON
+CON	1452	1454	1456					
\$TRJLST	SETID							
TRJLST	1							
	1	1.						
\$TRAJCT	TRAJID							
\$	TIME	MACH	ALTH	AOA	BETA	FORM	FILE1	FILE1
TRAJCT	1	1						
CONT	.00000E0	0.71871	4.5600E6	4.0000	0.0			CONT
CONT	.16000E2	0.98944	4.1990E6	14.0000				CONT
CONT	.33000E2	1.34826	4.3688E6	9.4208				CONT
CONT	.49000E2	1.63429	5.8196E6	3.6000				CONT
CONT	.68000E2	2.17754	8.2141E6	3.6000		TECPLOT	CPTEMP1.PLT	CONT
CONT	.88000E2	2.99306	1.1358E7	3.6000				CONT
CONT	.10800E3	4.03065	1.4897E7	3.6000				CONT
CONT	.12800E3	5.30536	1.8668E7	3.6000				CONT
CONT	.14700E3	7.18387	2.2489E7	8.7000				CONT
CONT	.16500E3	8.14718	2.6307E7	10.2250				CONT
CONT	.18500E3	8.48577	2.9382E7	10.2250				CONT
CONT	.20500E3	8.73075	3.1108E7	10.2250				CONT
CONT	.22500E3	8.80061	3.1479E7	10.2250		TECPLOT	CPTEMP2.PLT	CONT
CONT	.24500E3	8.62765	3.0495E7	10.2250				CONT
CONT	.26300E3	8.35804	2.8476E7	30.0000				CONT
CONT	.28300E3	7.92715	2.5083E7	30.0000				CONT

CONT	.30300E3	7.42020	.20828E7	30.0000						CONT
CONT	.32300E3	6.98630	.17006E7	30.0000						CONT
CONT	.34100E3	6.51451	.15705E7	17.6576						CONT
CONT	.35900E3	6.29482	.15555E7	11.3822						CONT
CONT	.37900E3	6.12626	.15505E7	11.5945						CONT
CONT	.39900E3	5.96248	.15405E7	11.6852						CONT
CONT	.41900E3	5.80340	.15256E7	11.6316						CONT
CONT	.43900E3	5.64886	.15063E7	11.4712						CONT
CONT	.45900E3	5.49856	.14827E7	11.2120						CONT
CONT	.47900E3	5.35216	.14551E7	10.8676						CONT
CONT	.49900E3	5.20938	.14237E7	10.4565						CONT
CONT	.51900E3	5.06993	.13890E7	9.9883						CONT
CONT	.53900E3	4.92935	.13511E7	9.3991						CONT
CONT	.55900E3	4.78106	.13103E7	8.7931						CONT
CONT	.57900E3	4.62119	.12670E7	8.2187						CONT
CONT	.59900E3	4.44764	.12216E7	7.6847						CONT
CONT	.61900E3	4.25902	.11747E7	7.2020						CONT
CONT	.63900E3	4.05448	.11267E7	6.7771						CONT
CONT	.65900E3	3.82413	.10782E7	6.3472						CONT
CONT	.67900E3	3.56631	.10300E7	5.9874						CONT
CONT	.69900E3	3.28723	.98254E6	5.7202						CONT
CONT	.71759E3	3.00000	.93312E6	4.8191						CONT
CONT	.73600E3	2.68846	.87329E6	4.1829						CONT
CONT	.75600E3	2.29065	.80146E6	3.4982						CONT
CONT	.77600E3	1.86649	.72891E6	3.0646						CONT
CONT	.79600E3	1.47000	.66074E6	3.0928						CONT
CONT	.81600E3	1.14676	.59940E6	3.3054						CONT
CONT	.83600E3	0.96665	.54315E6	3.8323						CONT
CONT	.85600E3	0.86983	.48792E6	3.8046						CONT
CONT	.87400E3	0.80178	.43914E6	3.9110						CONT
CONT	.89400E3	0.73186	.38870E6	3.9359						CONT
CONT	.91400E3	0.67432	.34157E6	3.9549						CONT
CONT	.93400E3	0.62713	.29712E6	3.9492						CONT
CONT	.95400E3	0.58784	.25488E6	3.9046						CONT
CONT	.97400E3	0.55190	.21464E6	3.8498						CONT
CONT	.99400E3	0.51899	.17633E6	3.8233						CONT
CONT	.10140E4	0.48941	.13984E6	3.8101						CONT
CONT	.10340E4	0.46307	.10502E6	3.8009						CONT
CONT	.10540E4	0.43975	.71741E5	3.7895						CONT
CONT	.10740E4	0.41915	.39891E5	3.7718						CONT
CONT	.10940E4	0.40098	.93915E4	3.7458						CONT
\$THERMPR	SETID	TRAJID	TEMP	HOTWALL	TRANS	GAS	EMMS			
THERMPR	1	1								
ENDDATA										

TECPLOT CPTEMP3.PLT

Listing 2.2 Control Table File: CTRTABLE.DAT

[illegible]

Listing 2.3 ZONAIR Solution File: FLOWi

(Only SHOWS a part of the file:FLOW0001)

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      8      1517      2      1UVWCP      1P,5E16.9
      1      1      1517
1.1500000095E-02 1.140511036E-02 1.132160425E-02 1.121962070E-02 1.105749607E-02
1.089066267E-02 1.077836752E-02 1.073867083E-02 1.065516472E-02 1.057207584E-02
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 6.285789013E-01 8.550428748E-01 9.875801802E-01 9.709893465E-01 9.588729739E-01
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4.207676649E-02 4.144012928E-02 4.076701403E-02 4.004353285E-02 3.922158480E-02
3.848284483E-02 3.803020716E-02 3.772085905E-02 3.740942478E-02 3.709489107E-02
3.678220510E-02 3.632402420E-02 3.575998545E-02 3.515738249E-02 3.474771976E-02
3.441327810E-02 3.418260813E-02 3.409445286E-02 3.413468599E-02 3.429150581E-02
3.453403711E-02 3.485882282E-02 3.525209427E-02 3.569960594E-02 3.619986773E-02
3.673422337E-02 3.729069233E-02 3.786003590E-02 3.844159842E-02 3.901946545E-02
3.958940506E-02 4.013943672E-02 4.080557823E-02 4.146063328E-02 4.221755266E-02
4.257190228E-02 4.302090406E-02

- ### Listing 2.4 Standard Output File: X34TPS.OUT

[illegible]

96 -	CONT	1444	1448	1451						
97 -	PANLST2	31		17	18	19	20	21	22	+CON
98 -	+CON	23	24	25	26	27	28	29	57	+CON
99 -	+CON	58	59	60	61	62	63	64	65	+CON
100 -	+CON	66	67	68	69	97	98	99	100	+CON
101 -	+CON	101	102	103	104	105	106	107	108	+CON
102 -	+CON	109	137	138	139	140	141	142	143	+CON
103 -	+CON	144	145	146	147	148	149	177	178	+CON
104 -	+CON	179	180	181	182	183	184	185	186	+CON
105 -	+CON	187	188	189	217	218	219	220	221	+CON
106 -	+CON	222	223	224	225	226	227	228	229	+CON
107 -	+CON	257	258	259	260	261	262	263	264	+CON
108 -	+CON	265	266	267	268	269	297	298	299	+CON
109 -	+CON	300	301	302	303	304	305	306	307	+CON
110 -	+CON	308	309	337	338	339	340	341	342	+CON
111 -	+CON	343	344	345	346	347	348	349	377	+CON
112 -	+CON	378	379	380	381	382	383	384	385	+CON
113 -	+CON	386	387	388	389	417	418	419	420	+CON
114 -	+CON	421	422	423	424	425	426	427	428	+CON
115 -	+CON	429	457	458	459	460	461	462	463	+CON
116 -	+CON	464	465	466	467	468	469			
117 -	PANLST2	32		17	24	29	97	264	229	+CON
118 -	+CON	457	464	469						
119 -	PANLST2	41		497	498	499	500	501	502	+CON
120 -	+CON	503	504	505	506	507	508	509	537	+CON
121 -	+CON	538	539	540	541	542	543	544	545	+CON
122 -	+CON	546	547	548	549	577	578	579	580	+CON
123 -	+CON	581	582	583	584	585	586	587	588	+CON
124 -	+CON	589	617	618	619	620	621	622	623	+CON
125 -	+CON	624	625	626	627	628	629	657	658	+CON
126 -	+CON	659	660	661	662	663	664	665	666	+CON
127 -	+CON	667	668	669	697	698	699	700	701	+CON
128 -	+CON	702	703	704	705	706	707	708	709	+CON
129 -	+CON	737	738	739	740	741	742	743	744	+CON
130 -	+CON	745	746	747	748	749	777	778	779	+CON
131 -	+CON	780	781	782	783	784	785	786	787	+CON
132 -	+CON	788	789	817	818	819	820	821	822	+CON
133 -	+CON	823	824	825	826	827	828	829	857	+CON
134 -	+CON	858	859	860	861	862	863	864	865	+CON
135 -	+CON	866	867	868	869	897	898	899	900	+CON
136 -	+CON	901	902	903	904	905	906	907	908	+CON
137 -	+CON	909								
138 -	PANLST2	42		497	697	897	501	701	901	CONT
139 -	CONT	504	664	904	507	707	907	509	589	CONT
140 -	CONT	669	789	909						
141 -	PANLST2	51		937	938	939	940	941	942	+CON
142 -	+CON	943	944	945	946	947	948	949	977	+CON
143 -	+CON	978	979	980	981	982	983	984	985	+CON
144 -	+CON	986	987	988	989	1017	1018	1019	1020	+CON
145 -	+CON	1021	1022	1023	1024	1025	1026	1027	1028	+CON
146 -	+CON	1029	1057	1058	1059	1060	1061	1062	1063	+CON
147 -	+CON	1064	1065	1066	1067	1068	1069	1097	1098	+CON
148 -	+CON	1099	1100	1101	1102	1103	1104	1105	1106	+CON
149 -	+CON	1107	1108	1109	1137	1138	1139	1140	1141	+CON
150 -	+CON	1142	1143	1144	1145	1146	1147	1148	1149	+CON
151 -	+CON	1177	1178	1179	1180	1181	1182	1183	1184	+CON
152 -	+CON	1185	1186	1187	1188	1189	1217	1218	1219	+CON
153 -	+CON	1220	1221	1222	1223	1224	1225	1226	1227	+CON
154 -	+CON	1228	1229	1257	1258	1259	1260	1261	1262	+CON
155 -	+CON	1263	1264	1265	1266	1267	1268	1269	1297	+CON
156 -	+CON	1298	1299	1300	1301	1302	1303	1304	1305	+CON
157 -	+CON	1306	1307	1308	1309	1337	1338	1339	1340	+CON
158 -	+CON	1341	1342	1343	1344	1345	1346	1347	1348	+CON
159 -	+CON	1349	1377	1378	1379	1380	1381	1382	1383	+CON
160 -	+CON	1384	1385	1386	1387	1388	1389	1417	1418	+CON
161 -	+CON	1419	1420	1421	1422	1423	1424	1425	1426	+CON
162 -	+CON	1427	1428	1429	1457	1458	1459	1460	1461	+CON
163 -	+CON	1462	1463	1464	1465	1466	1467	1468	1469	
164 -	PANLST2	52		937	944	949	1377	1304	1269	+CON
165 -	+CON	1457	1464	1469						
166 -	PANLST2	61		30	31	32	33	34	35	+CON
167 -	+CON	36	37	38	39	40	70	71	72	+CON
168 -	+CON	73	74	75	76	77	78	79	80	+CON
169 -	+CON	110	111	112	113	114	115	116	117	+CON
170 -	+CON	118	119	120	150	151	152	153	154	+CON
171 -	+CON	155	156	157	158	159	160	190	191	+CON
172 -	+CON	192	193	194	195	196	197	198	199	+CON
173 -	+CON	200								
174 -	PANLST2	62		30	40	190	200			
175 -	PANLST2	71		230	231	232	233	234	235	+CON
176 -	+CON	236	237	238	239	240	270	271	272	+CON
177 -	+CON	273	274	275	276	277	278	279	280	+CON
178 -	+CON	310	311	312	313	314	315	316	317	+CON
179 -	+CON	318	319	320	350	351	352	353	354	+CON
180 -	+CON	355	356	357	358	359	360	390	391	+CON
181 -	+CON	392	393	394	395	396	397	398	399	+CON
182 -	+CON	400	430	431	432	433	434	435	436	+CON
183 -	+CON	437	438	439	440	470	471	472	473	+CON
184 -	+CON	474	475	476	477	478	479	480		
185 -	PANLST2	72		230	350	470	312	392	235	CONT
186 -	CONT	355	475	238	358	478	240	360	480	
187 -	PANLST2	81		510	511	512	513	514	515	+CON
188 -	+CON	516	550	551	552	553	554	555	556	+CON
189 -	+CON	590	591	592	593	594	595	596	630	+CON
190 -	+CON	631	632	633	634	635	636	670	671	+CON

191 -	+CON	672	673	674	675	676	710	711	712	+CON
192 -	+CON	713	714	715	716	750	751	752	753	+CON
193 -	+CON	754	755	756	790	791	792	793	794	+CON
194 -	+CON	795	796	830	831	832	833	834	835	+CON
195 -	+CON	836								
196 -	PANLST2	82		510	590	670	750	830	512	CONT
197 -	CONT	632	752	832	513	673	833	514	634	CONT
198 -	CONT	754	834	635	715	795	516	596	676	CONT
199 -	CONT	756	836							
200 -	PANLST2	91		870	871	872	873	874	875	+CON
201 -	+CON	876	910	911	912	913	914	915	916	+CON
202 -	+CON	950	951	952	953	954	955	956	990	+CON
203 -	+CON	991	992	993	994	995	996			
204 -	PANLST2	92		870	910	950	990	871	951	CONT
205 -	CONT	912	992	873	913	953	993	874	954	CONT
206 -	CONT	915	995	876	916	956	996			
207 -	PANLST2	101		1030	1031	1032	1033	1034	1035	+CON
208 -	+CON	1036	1070	1071	1072	1073	1074	1075	1076	+CON
209 -	+CON	1110	1111	1112	1113	1114	1115	1116	1150	+CON
210 -	+CON	1151	1152	1153	1154	1155	1156	1190	1191	+CON
211 -	+CON	1192	1193	1194	1195	1196	1230	1231	1232	+CON
212 -	+CON	1233	1234	1235	1236	1270	1271	1272	1273	+CON
213 -	+CON	1274	1275	1276	1310	1311	1312	1313	1314	+CON
214 -	+CON	1315	1316	1350	1351	1352	1353	1354	1355	+CON
215 -	+CON	1356	1390	1391	1392	1393	1394	1395	1396	+CON
216 -	+CON	1430	1431	1432	1433	1434	1435	1436	1470	+CON
217 -	+CON	1471	1472	1473	1474	1475	1476			
218 -	PANLST2	102		1476	1473	1470	1236	1233	1270	+CON
219 -	+CON	1036	1033	1030						
220 -	PANLST2	111		517	518	519	520	557	558	+CON
221 -	+CON	559	560	597	598	599	600	637	638	+CON
222 -	+CON	639	640	677	678	679	680	717	718	+CON
223 -	+CON	719	720	757	758	759	760	797	798	+CON
224 -	+CON	799	800	837	838	839	840	877	878	+CON
225 -	+CON	879	880							
226 -	PANLST2	112		877	677	517	838	758	598	CONT
227 -	CONT	719	639	880	760	680	600	520		
228 -	PANLST2	121		997	998	999	1000	1037	1038	+CON
229 -	+CON	1039	1040	1077	1078	1079	1080	1117	1118	+CON
230 -	+CON	1119	1120	1157	1158	1159	1160	1197	1198	+CON
231 -	+CON	1199	1200	1237	1238	1239	1240	1277	1278	+CON
232 -	+CON	1279	1280	1317	1318	1319	1320	1357	1358	+CON
233 -	+CON	1359	1360	1397	1398	1399	1400	1437	1438	+CON
234 -	+CON	1439	1440	1477	1478	1479	1480			
235 -	PANLST2	122		1000	1240	1480	997	1237	1477	
236 -	PANLST2	131		12	13	14	15	16	52	+CON
237 -	+CON	53	54	55	56	92	93	94	95	+CON
238 -	+CON	96	132	133	134	135	136	172	173	+CON
239 -	+CON	174	175	176	212	213	214	215	216	+CON
240 -	+CON	252	253	254	255	256	292	293	294	+CON
241 -	+CON	295	296	332	333	334	335	336	372	+CON
242 -	+CON	373	374	375	376	412	413	414	415	+CON
243 -	+CON	416	452	453	454	455	456	492	493	+CON
244 -	+CON	494	495	496	532	533	534	535	536	+CON
245 -	+CON	572	573	574	575	576	612	613	614	+CON
246 -	+CON	615	616	652	653	654	655	656	692	+CON
247 -	+CON	693	694	695	696	732	733	734	735	+CON
248 -	+CON	736	772	773	774	775	776			
249 -	PANLST2	132		12	14	16	132	134	372	CONT
250 -	CONT	214	136	533	772	774	776			
251 -	PANLST2	141		892	893	894	895	896	932	+CON
252 -	+CON	933	934	935	936	972	973	974	975	+CON
253 -	+CON	976	1012	1013	1014	1015	1016	1052	1053	+CON
254 -	+CON	1054	1055	1056	1092	1093	1094	1095	1096	+CON
255 -	+CON	1132	1133	1134	1135	1136	1172	1173	1174	+CON
256 -	+CON	1175	1176	1212	1213	1214	1215	1216	1252	+CON
257 -	+CON	1253	1254	1255	1256	1292	1293	1294	1295	+CON
258 -	+CON	1296	1332	1333	1334	1335	1336	1372	1373	+CON
259 -	+CON	1374	1375	1376	1412	1413	1414	1415	1416	+CON
260 -	+CON	1452	1453	1454	1455	1456				
261 -	PANLST2	142		892	894	896	1212	1214	1376	+CON
262 -	+CON	1452	1454	1456						
263 -	PATCH	1	11	12			1			
264 -	PATCH	2	21	22			1			
265 -	PATCH	3	31	32			1			
266 -	PATCH	4	41	42			1			
267 -	PATCH	5	51	52			1			
268 -	PATCH	6	61	62			1			
269 -	PATCH	7	71	72			1			
270 -	PATCH	8	81	82			1			
271 -	PATCH	9	91	92			1			
272 -	PATCH	10	101	102			1			
273 -	PATCH	11	111	112			1			
274 -	PATCH	12	121	122			1			
275 -	PATCH	13	131	132			1			
276 -	PATCH	14	141	142			1			
277 -	PLTAERO	1	YES	NO		NASTRAN	X34SURF.NAS			
278 -	PLTTTPS	-2	1	ALL	TECPLOT	THICK1L	.PLT	-4.0		
279 -	PLTTTPS	1	1	ALL	TECPLOT	THICKML	.PLT	-4.0		
280 -	PRVAL	4		9000000050.0		15.	1.1			
281 -	PODRSM	1	1			SAVE	X34M1.R	ST		CONT
282 -	CONT	CPPODRSM.P3D		UPODRSM.P3D		VPODRSM	.P3D	WPODRSM	.P3D	
283 -	STTYPE	21	1	221						CONT
284 -	CONT	0.1								
285 -	STTYPE	22	1	206						CONT

2-32

381 -	CONT	0	36	0.1	0.2	
382 -	TPSSYM	12	12	6	4	CONT
383 -	CONT	12	31	0.05	1.	CONT
384 -	CONT	12	32	0.08	0.6	CONT
385 -	CONT	12	33	1.00	3.	CONT
386 -	CONT	12	34	0.05	0.5	CONT
387 -	CONT	12	35	0.05	0.5	CONT
388 -	CONT	0	36	0.1	0.2	
389 -	TPSSYM	13	13	6	4	CONT
390 -	CONT	13	31	0.05	1.	CONT
391 -	CONT	13	32	0.08	0.6	CONT
392 -	CONT	13	33	1.00	3.	CONT
393 -	CONT	13	34	0.05	0.5	CONT
394 -	CONT	13	35	0.05	0.5	CONT
395 -	CONT	0	36	0.1	0.2	
396 -	TPSSYM	14	14	6	4	CONT
397 -	CONT	14	31	0.05	1.	CONT
398 -	CONT	14	32	0.08	0.6	CONT
399 -	CONT	14	33	1.00	3.	CONT
400 -	CONT	14	34	0.05	0.5	CONT
401 -	CONT	14	35	0.05	0.5	CONT
402 -	CONT	0	36	0.1	0.2	
403 -	TRAJCT	1	1			CONT
404 -	CONT	.00000E00.	71871	.45600E64.	0.000 0.0	CONT
405 -	CONT	.16000E20.	98944	.41990E614.	0.0000	CONT
406 -	CONT	.33000E21.	34826	.43688E69.	4208	CONT
407 -	CONT	.49000E21.	63429	.58196E63.	6000	CONT
408 -	CONT	.68000E22.	17754	.82141E63.	6000	TECPLOT CPTEMP1.PLT
409 -	CONT	.88000E22.	99306	.11358E73.	6000	CONT
410 -	CONT	.10800E34.	03065	.14897E73.	6000	CONT
411 -	CONT	.12800E35.	30536	.18668E73.	6000	CONT
412 -	CONT	.14700E37.	18387	.22489E78.	7000	CONT
413 -	CONT	.16500E38.	14718	.26307E710.	2250	CONT
414 -	CONT	.18500E38.	48577	.29382E710.	2250	CONT
415 -	CONT	.20500E38.	73075	.31108E710.	2250	TECPLOT CPTEMP2.PLT
416 -	CONT	.22500E38.	80061	.31479E710.	2250	CONT
417 -	CONT	.24500E38.	62765	.30495E710.	2250	CONT
418 -	CONT	.26300E38.	35804	.28476E730.	0000	CONT
419 -	CONT	.28300E37.	92715	.25083E730.	0000	CONT
420 -	CONT	.30300E37.	42020	.20828E730.	0000	CONT
421 -	CONT	.32300E36.	98630	.17006E730.	0000	CONT
422 -	CONT	.34100E36.	51451	.15705E717.	6576	CONT
423 -	CONT	.35900E36.	29482	.15555E711.	3822	CONT
424 -	CONT	.37900E36.	12626	.15505E711.	5945	CONT
425 -	CONT	.39900E35.	96248	.15405E711.	6852	CONT
426 -	CONT	.41900E35.	80340	.15256E711.	6316	CONT
427 -	CONT	.43900E35.	64886	.15063E711.	4712	CONT
428 -	CONT	.45900E35.	49856	.14827E711.	2120	CONT
429 -	CONT	.47900E35.	35216	.14551E710.	8676	CONT
430 -	CONT	.49900E35.	20938	.14237E710.	4565	CONT
431 -	CONT	.51900E35.	06993	.13890E79.	9883	CONT
432 -	CONT	.53900E34.	92935	.13511E79.	3991	CONT
433 -	CONT	.55900E34.	78106	.13103E78.	7931	CONT
434 -	CONT	.57900E34.	62119	.12670E78.	2187	CONT
435 -	CONT	.59900E34.	44764	.12216E77.	6847	CONT
436 -	CONT	.61900E34.	25902	.11747E77.	2020	CONT
437 -	CONT	.63900E34.	05448	.11267E76.	7771	CONT
438 -	CONT	.65900E33.	82413	.10782E76.	3472	CONT
439 -	CONT	.67900E33.	56631	.10300E75.	9874	CONT
440 -	CONT	.69900E33.	28723	.98254E65.	7202	CONT
441 -	CONT	.71759E33.	00000	.93312E64.	8191	CONT
442 -	CONT	.73600E32.	68846	.87329E64.	1829	CONT
443 -	CONT	.75600E32.	29065	.80146E63.	4982	TECPLOT CPTEMP3.PLT
444 -	CONT	.77600E31.	86649	.72891E63.	0646	CONT
445 -	CONT	.79600E31.	47000	.66074E63.	0928	CONT
446 -	CONT	.81600E31.	14676	.59940E63.	3054	CONT
447 -	CONT	.83600E30.	96665	.54315E63.	8323	CONT
448 -	CONT	.85600E30.	86983	.48792E63.	8046	CONT
449 -	CONT	.87400E30.	80178	.43914E63.	9110	CONT
450 -	CONT	.89400E30.	73186	.38870E63.	9359	CONT
451 -	CONT	.91400E30.	67432	.34157E63.	9549	CONT
452 -	CONT	.93400E30.	62713	.29712E63.	9492	CONT
453 -	CONT	.95400E30.	58784	.25488E63.	9046	CONT
454 -	CONT	.97400E30.	55190	.21464E63.	8498	CONT
455 -	CONT	.99400E30.	51899	.17633E63.	8233	CONT
456 -	CONT	.10140E40.	48941	.13984E63.	8101	CONT
457 -	CONT	.10340E40.	46307	.10502E63.	8009	CONT
458 -	CONT	.10540E40.	43975	.71741E53.	7895	CONT
459 -	CONT	.10740E40.	41915	.39891E53.	7718	CONT
460 -	CONT	.10940E40.	40098	.93915E43.	7458	
461 -	TRJLST	1				
462 -		1	1.			
463 -	ENDDATA					

```

*****
*
*      SUBCASE      =      1      *
*      DISCIPLINE   = TPSDES      *
*      BULK ENTRY ID =      1      *
*
*****

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```

i      i      i      i      honey comb      0.39506 in.   328.3 F
i      i      i      i
i      i      i      i      cell = 0.30000 in.
-----
0.11000 in. ALUMINUM 7075-T6
=====
0.08000 in. INCONEL 617
-----
v      v      v      v      0.12000 in.
v      v      v      v      TITANIUM (6AL-4V)
v      v      v      v      corrugated      0.50815 in.   327.3 F
v      v      v      v      pitch = 0.80000 in.
-----
0.08000 in. INCONEL 617
=====
ALUMINUM 2024-T4      slab      0.10000 in.   299.7 F
=====

```

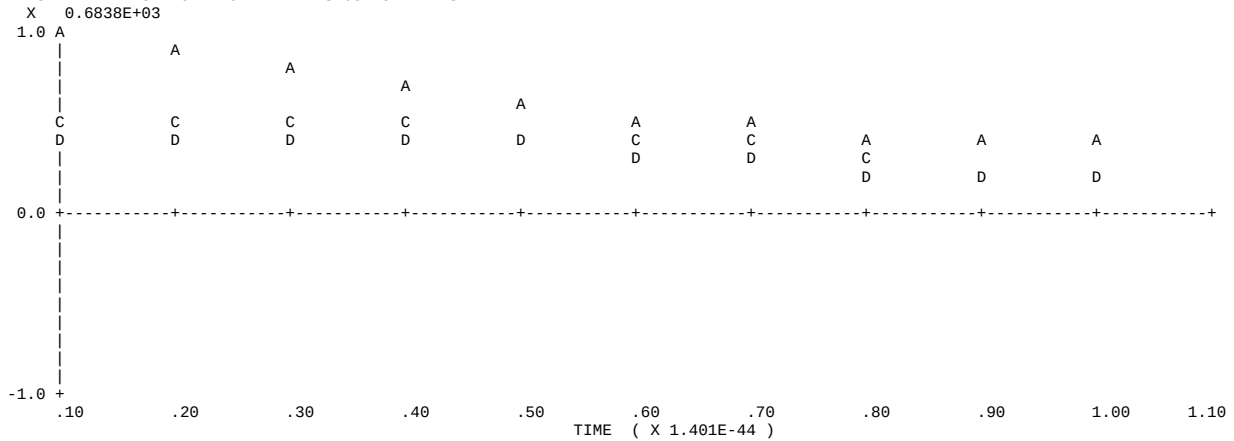
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 1

PANEL	LAYER01		LAYER02		LAYER03		LAYER04	
4	0.21576	446.48	0.31605	350.33	0.40000	327.83	0.10000	300.33
5	0.19430	392.49	0.34945	319.47	0.40760	297.95	0.10000	276.36
6	0.17378	340.94	0.37726	289.33	0.41438	268.86	0.10000	252.71
7	0.15481	293.38	0.39733	260.58	0.42001	241.24	0.10000	229.83
8	0.13816	251.78	0.40681	234.08	0.42400	215.97	0.10000	208.30
9	0.12504	219.26	0.40188	211.31	0.42570	194.49	0.10000	189.15
10	0.11682	199.27	0.37738	193.71	0.42428	178.32	0.10000	173.34
11	0.11568	197.38	0.32593	183.83	0.41852	169.96	0.10000	162.59
44	0.19221	426.12	0.30499	349.49	0.40052	326.75	0.10000	300.33
45	0.17786	214.68	0.33624	177.61	0.40292	176.97	0.10000	165.93
46	0.16322	332.12	0.36320	288.41	0.40596	268.16	0.10000	252.64
47	0.14959	288.71	0.38373	259.80	0.40900	240.76	0.10000	229.81
48	0.13852	251.12	0.39421	233.97	0.41045	216.10	0.10000	208.74
49	0.13025	221.06	0.39665	211.55	0.41513	194.74	0.10000	189.56
50	0.12763	202.78	0.38118	194.70	0.41674	178.85	0.10000	174.01
51	0.13497	201.39	0.35004	186.37	0.41802	171.02	0.10000	164.02
84	0.17076	408.09	0.29917	348.86	0.40574	325.74	0.10000	300.33
85	0.16081	364.57	0.32508	317.74	0.40280	296.19	0.10000	276.34
86	0.15199	322.93	0.34884	287.63	0.40104	267.54	0.10000	252.68
87	0.14455	284.21	0.36885	259.23	0.40068	240.45	0.10000	229.94
88	0.13961	250.82	0.38207	233.98	0.40125	216.30	0.10000	209.16
89	0.13744	223.77	0.39017	212.16	0.40506	195.30	0.10000	190.28
90	0.14097	207.18	0.38623	196.15	0.41000	179.73	0.10000	175.05
91	0.15315	205.31	0.37298	188.92	0.41808	172.20	0.10000	165.55
124	0.15257	243.60	0.29999	204.26	0.41652	203.53	0.10000	184.71
125	0.14690	353.34	0.32005	317.12	0.40965	295.36	0.10000	276.28
126	0.14321	315.70	0.33931	287.02	0.40370	266.94	0.10000	252.61
127	0.14108	205.83	0.35725	183.34	0.39988	182.76	0.10000	169.75
128	0.14129	250.75	0.37163	233.98	0.39884	216.42	0.10000	209.42
129	0.14428	226.27	0.38402	212.75	0.40089	195.83	0.10000	190.88
130	0.15273	211.07	0.39009	197.54	0.40725	180.65	0.10000	176.06
131	0.16835	208.79	0.39243	191.28	0.41890	173.45	0.10000	167.11
164	0.13850	382.78	0.30816	348.28	0.43309	324.01	0.10000	300.33
165	0.13684	345.48	0.32184	316.71	0.42369	294.56	0.10000	276.09
166	0.13733	310.70	0.33545	286.57	0.41424	266.34	0.10000	252.38
167	0.13927	278.57	0.34985	258.54	0.40720	239.89	0.10000	229.86
168	0.14335	250.78	0.36370	233.92	0.40408	216.39	0.10000	209.42
169	0.15012	228.23	0.37841	213.21	0.40354	196.23	0.10000	191.26
170	0.16179	214.08	0.39187	198.70	0.40908	181.48	0.10000	176.94
171	0.17916	211.53	0.40665	193.27	0.42053	174.69	0.10000	168.59
204	0.13022	377.24	0.32050	348.30	0.45096	323.40	0.10000	300.33
205	0.13142	341.47	0.32837	316.49	0.44043	293.91	0.10000	275.82
206	0.13451	308.12	0.33643	286.28	0.42867	265.81	0.10000	252.05
207	0.13890	277.44	0.34687	258.35	0.41916	239.59	0.10000	229.61
208	0.14525	250.83	0.35906	233.81	0.41402	216.23	0.10000	209.23
209	0.15402	229.37	0.37419	213.45	0.41073	196.43	0.10000	191.39
210	0.16701	215.81	0.39155	199.44	0.41401	182.08	0.10000	177.51
211	0.18444	213.17	0.41403	194.59	0.42248	175.68	0.10000	169.73
244	0.12674	375.32	0.33007	348.36	0.46316	323.06	0.10000	300.33
245	0.12938	340.09	0.33435	316.39	0.45248	293.51	0.10000	275.62
246	0.13365	307.19	0.33881	286.13	0.43981	265.46	0.10000	251.79
247	0.13914	277.04	0.34642	258.24	0.42894	239.36	0.10000	229.38
248	0.14647	250.86	0.35708	233.72	0.42236	216.09	0.10000	209.03
249	0.15594	229.83	0.37185	213.54	0.41705	196.50	0.10000	191.37
250	0.16915	216.52	0.39061	199.77	0.41831	182.38	0.10000	177.77
251	0.18602	213.87	0.41653	195.22	0.42385	176.25	0.10000	170.35
284	0.12501	374.59	0.33728	348.43	0.47184	322.85	0.10000	300.33
285	0.12849	339.57	0.33915	316.35	0.46131	293.25	0.10000	275.46
286	0.13342	306.82	0.34114	286.04	0.44827	265.21	0.10000	251.58
287	0.13950	276.89	0.34668	258.17	0.43653	239.20	0.10000	229.19
288	0.14731	250.89	0.35609	233.65	0.42892	215.98	0.10000	208.86
289	0.15707	230.07	0.37036	213.58	0.42207	196.52	0.10000	191.34
290	0.17019	216.86	0.38971	199.95	0.42167	182.56	0.10000	177.92
291	0.18646	214.22	0.41745	195.57	0.42483	176.61	0.10000	170.74
324	0.12372	374.28	0.34517	348.51	0.48101	322.64	0.10000	300.33
325	0.12797	339.37	0.34464	316.32	0.47083	292.99	0.10000	275.28
326	0.13346	306.66	0.34406	285.96	0.45754	264.96	0.10000	251.35
327	0.14001	276.83	0.34739	258.09	0.44497	239.01	0.10000	228.98
328	0.14818	250.92	0.35535	233.58	0.43627	215.85	0.10000	208.67
329	0.15808	230.24	0.36891	213.60	0.42778	196.53	0.10000	191.27

330	0.17097	217.11	0.38859	200.10	0.42546	182.73	0.10000	178.05
331	0.18647	214.48	0.41783	195.88	0.42584	176.95	0.10000	171.10
364	0.12286	374.37	0.35373	348.61	0.49062	322.43	0.10000	300.33
365	0.12783	339.35	0.35062	316.19	0.48072	292.62	0.10000	275.01
366	0.13380	306.52	0.34753	285.72	0.46741	264.55	0.10000	250.98
367	0.14071	276.67	0.34856	257.84	0.45402	238.65	0.10000	228.60
368	0.14921	250.73	0.35495	233.28	0.44492	215.49	0.10000	208.26
369	0.15890	230.31	0.36770	213.57	0.43338	196.49	0.10000	191.17
370	0.17148	217.26	0.38727	200.22	0.42967	182.88	0.10000	178.15
371	0.18607	214.68	0.41773	196.14	0.42690	177.29	0.10000	171.45
404	0.12242	374.72	0.36375	348.55	0.50154	322.05	0.10000	300.12
405	0.12808	339.57	0.35783	315.97	0.49219	292.15	0.10000	274.63
406	0.13447	306.52	0.35180	285.41	0.47870	264.05	0.10000	250.50
407	0.14164	276.53	0.35026	257.50	0.46452	238.19	0.10000	228.11
408	0.15026	250.58	0.35481	232.99	0.45438	215.14	0.10000	207.84
409	0.15987	230.21	0.36636	213.40	0.44101	196.31	0.10000	190.91
410	0.17184	217.26	0.38599	200.24	0.43411	182.93	0.10000	178.14
411	0.18516	214.81	0.41705	196.39	0.42818	177.66	0.10000	171.83
444	0.12268	376.12	0.38012	348.50	0.51888	321.49	0.10000	299.78
445	0.12923	340.48	0.36992	315.62	0.51073	291.38	0.10000	273.98
446	0.13604	306.82	0.35929	284.88	0.49714	263.20	0.10000	249.68
447	0.14336	276.41	0.35365	256.92	0.48185	237.39	0.10000	227.26
448	0.15191	250.26	0.35512	232.48	0.47005	214.51	0.10000	207.09
449	0.16109	229.88	0.36449	213.07	0.45378	195.95	0.10000	190.42
450	0.17193	217.04	0.38339	200.18	0.44270	182.96	0.10000	178.07
451	0.18288	214.85	0.41493	196.69	0.43021	178.21	0.10000	172.37
484	0.12503	380.07	0.40772	348.49	0.54711	320.68	0.10000	299.24
485	0.13263	343.00	0.39076	314.96	0.54143	290.05	0.10000	272.79
486	0.13963	307.84	0.37273	283.85	0.52800	261.65	0.10000	248.15
487	0.14667	276.33	0.36045	255.78	0.51116	235.90	0.10000	225.67
488	0.15452	249.55	0.35668	231.45	0.49675	213.29	0.10000	205.68
489	0.16240	228.95	0.36198	212.35	0.47578	195.22	0.10000	189.45
490	0.17080	216.22	0.37863	199.91	0.45744	182.90	0.10000	177.81
491	0.17753	214.57	0.40943	196.94	0.43355	179.00	0.10000	173.12
524	0.12972	386.22	0.43913	348.54	0.57820	319.88	0.10000	298.62
525	0.13794	346.90	0.41460	314.21	0.57545	288.57	0.10000	271.39
526	0.14458	309.54	0.38858	282.64	0.56255	259.88	0.10000	246.33
527	0.15074	276.41	0.36906	254.44	0.54427	234.16	0.10000	223.78
528	0.15721	248.62	0.35934	230.24	0.52695	211.85	0.10000	204.02
529	0.16303	227.54	0.35970	211.44	0.50091	194.31	0.10000	188.27
530	0.16816	214.86	0.37279	199.45	0.47416	182.73	0.10000	177.41
531	0.17001	213.91	0.40130	196.99	0.43720	179.75	0.10000	173.80
564	0.13580	393.49	0.47017	348.66	0.60814	319.17	0.10000	298.03
565	0.14408	351.51	0.43800	313.58	0.60807	287.25	0.10000	270.07
566	0.14998	311.73	0.40455	281.58	0.59615	258.25	0.10000	244.62
567	0.15485	276.72	0.37808	253.22	0.57660	232.54	0.10000	222.00
568	0.15956	247.71	0.36249	229.10	0.55650	210.50	0.10000	202.42
569	0.16297	225.98	0.35776	210.53	0.52554	193.42	0.10000	187.11
570	0.16459	213.24	0.36673	198.90	0.49042	182.52	0.10000	176.96
571	0.16172	213.02	0.39214	196.86	0.44065	180.39	0.10000	174.34
604	0.14354	402.37	0.50373	348.86	0.63982	318.52	0.10000	297.43
605	0.15135	357.21	0.46323	313.12	0.64248	286.05	0.10000	268.81
606	0.15618	314.69	0.42226	280.70	0.63216	256.76	0.10000	242.97
607	0.15933	277.45	0.38842	252.16	0.61153	231.03	0.10000	220.26
608	0.16184	246.89	0.36640	228.04	0.58849	209.20	0.10000	200.84
609	0.16235	224.23	0.35588	209.62	0.55227	192.54	0.10000	185.93
610	0.15998	211.31	0.35984	198.26	0.50801	182.27	0.10000	176.46
611	0.15212	211.90	0.38137	196.60	0.44425	181.00	0.10000	174.83
644	0.15304	412.90	0.54029	349.09	0.67375	317.85	0.10000	296.76
645	0.15986	363.94	0.49067	312.69	0.67929	284.82	0.10000	267.49
646	0.16303	318.14	0.44121	279.86	0.66980	255.27	0.10000	241.29
647	0.16410	278.40	0.39976	251.13	0.64821	229.52	0.10000	218.49
648	0.16404	246.06	0.37095	227.00	0.62226	207.89	0.10000	199.22
649	0.16125	222.30	0.35412	208.69	0.58061	191.63	0.10000	184.69
650	0.15451	209.10	0.35231	197.55	0.52670	181.99	0.10000	175.91
651	0.14142	210.57	0.36927	196.22	0.44795	181.57	0.10000	175.26
684	0.16419	424.95	0.57945	349.35	0.70959	317.17	0.10000	296.02
685	0.16960	371.57	0.52019	312.22	0.71851	283.53	0.10000	266.04
686	0.17039	321.87	0.46094	278.97	0.70851	253.71	0.10000	239.52
687	0.16901	279.39	0.41161	250.07	0.68556	227.97	0.10000	216.66
688	0.16611	245.15	0.37589	225.93	0.65672	206.55	0.10000	197.55
689	0.15975	220.20	0.35249	207.70	0.60957	190.68	0.10000	183.41
690	0.14842	206.69	0.34444	196.76	0.54582	181.67	0.10000	175.30
691	0.12997	209.08	0.35622	195.74	0.45168	182.11	0.10000	175.64
724	0.17659	438.31	0.62029	349.74	0.74628	316.60	0.10000	295.34
725	0.18056	380.40	0.55222	311.92	0.76023	282.32	0.10000	264.63
726	0.17865	326.38	0.48292	278.21	0.75055	252.21	0.10000	237.74
727	0.17424	280.67	0.42460	249.09	0.72507	226.46	0.10000	214.82
728	0.16811	244.29	0.38137	224.90	0.69239	205.24	0.10000	195.89
729	0.15794	218.02	0.35102	206.72	0.63893	189.74	0.10000	182.13
730	0.14201	204.18	0.33653	195.93	0.56477	181.32	0.10000	174.67
731	0.11839	207.53	0.34296	195.20	0.45528	182.59	0.10000	175.97
764	0.19007	452.93	0.66265	350.33	0.78345	316.21	0.10000	294.79
765	0.18988	388.33	0.57906	311.95	0.79411	281.60	0.10000	263.69
766	0.18683	331.41	0.50492	277.82	0.79089	251.08	0.10000	236.30
767	0.18052	282.74	0.44090	248.25	0.77194	224.95	0.10000	212.91
768	0.17043	243.60	0.38857	223.93	0.73465	203.90	0.10000	194.12
769	0.15575	215.64	0.34974	205.71	0.67245	188.76	0.10000	180.75
770	0.13493	201.42	0.32802	195.04	0.58550	180.94	0.10000	173.98
771	0.10599	205.83	0.32871	194.58	0.45898	183.05	0.10000	176.26

TOTAL NUMBER OF DESIGN VARIABLES = 27
TOTAL NUMBER OF CONSTRAINS = 1062
TOTAL NUMBER OF TEMP. CONSTRAINS = 396
TOTAL NUMBER OF TEMP. PRINTOUTS = 11

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER: 1 2 3 4
Tmax: 2300.33 350.33 800.33 300.33
Optv: 683.79 323.75 322.17 297.61

VALUES OF DESIGN VARIABLES :

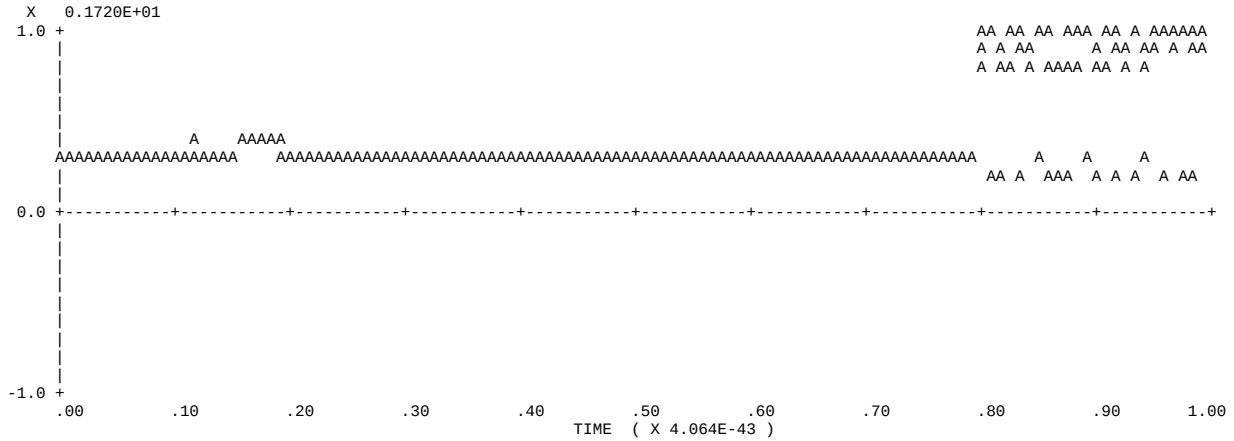
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.25962	0.14541	0.15421	0.46935	0.38882	0.35891	0.29578	0.37768	0.22798
2	0.85539	0.36679	0.31244	0.63331	0.39891	0.30137	0.60128	0.55816	0.30178
3	0.60571	0.43798	0.40000	0.47894	0.44026	0.40182	0.48369	0.44099	0.40237

THE ORIGINAL OBJECTIVE FUNCTION = 5818.9228516

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.5389165

THE TOTAL OPTIMAL WEIGHT = 9.55097023E+05

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



OPTIMAL STRUCTURES OF TPS FOR PATCH = 2 (WITH AVERAGE THICKNESS)

=====				-----	
HRSI COAT				i	
slab				0.29753 in.	683.8 F
=====				i	
0.12000 in. ALUMINUM 7075-T6				i	
=====				i	
i	i	i	i	0.09500 in.	
i	i	i	i	ALUMINUM 7075-T6	
i	i	i	i	honey comb	0.48105 in. 323.8 F
i	i	i	i		
i	i	i	i	cell = 0.30000 in.	
=====				i	
0.11000 in. ALUMINUM 7075-T6				i	

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=====
0.08000 in. INCONEL 617
-----
v      v      v      0.12000 in.
v      v      v      TITANIUM (6AL-4V)
v      v      v      corrugated
v      v      v      pitch = 0.80000 in.
-----
0.08000 in. INCONEL 617
=====
ALUMINUM 2024-T4      slab
=====

```

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 2

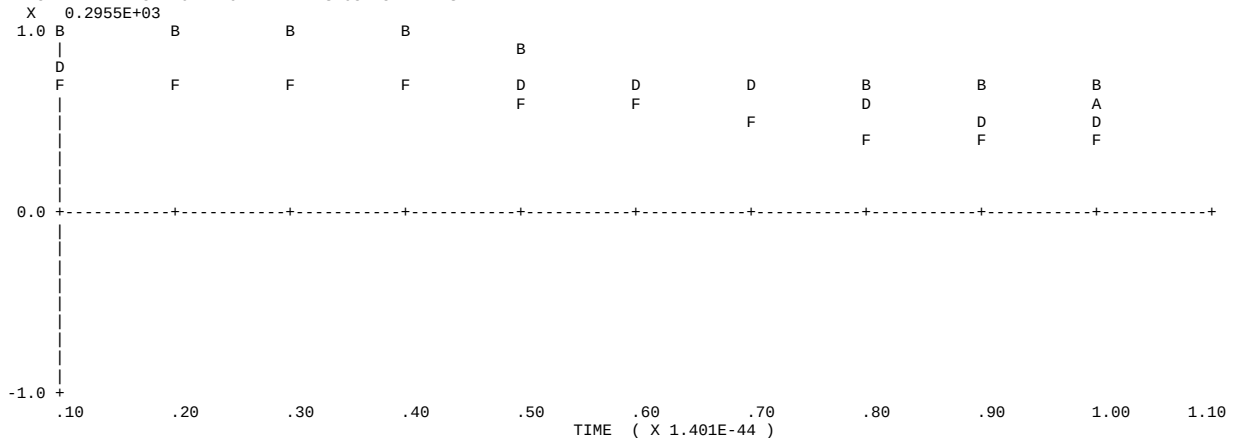
PANEL	LAYER01	LAYER02	LAYER03	LAYER04		
884	0.25962	0.85539	350.33	0.60571	305.13	0.10000 290.60
885	0.22139	0.70083	325.29	0.55454	288.28	0.10000 276.00
886	0.18928	0.56697	302.18	0.50932	272.19	0.10000 261.91
887	0.16366	0.45474	280.97	0.47024	256.76	0.10000 248.23
888	0.14541	0.36679	261.78	0.43798	241.95	0.10000 234.91
889	0.13609	0.30852	245.14	0.41410	227.99	0.10000 222.09
890	0.13783	0.28638	231.38	0.40030	214.82	0.10000 209.67
891	0.15421	0.31244	221.57	0.40000	202.84	0.10000 197.89
924	0.31050	0.81191	350.22	0.57988	300.59	0.10000 287.59
925	0.24333	0.68561	325.85	0.54646	285.79	0.10000 274.05
926	0.20614	0.55796	303.11	0.50533	269.99	0.10000 260.04
927	0.19100	0.44579	283.48	0.46746	253.14	0.10000 244.99
928	0.19176	0.35999	267.58	0.43815	236.17	0.10000 229.54
929	0.16337	0.30692	249.16	0.41571	224.99	0.10000 219.26
930	0.15847	0.28619	234.78	0.40168	213.21	0.10000 208.16
931	0.19940	0.31043	229.36	0.40029	201.48	0.10000 196.82
964	0.35523	0.77179	350.16	0.55627	296.84	0.10000 285.08
965	0.28999	0.65511	327.35	0.52974	280.76	0.10000 270.11
966	0.25442	0.53608	306.25	0.49495	264.07	0.10000 254.99
967	0.24086	0.43288	288.30	0.46293	246.68	0.10000 239.18
968	0.23887	0.35619	273.46	0.43845	230.19	0.10000 224.00
969	0.21143	0.30645	256.30	0.41873	219.71	0.10000 214.29
970	0.20350	0.28676	242.23	0.40473	209.68	0.10000 204.86
971	0.24123	0.30850	236.61	0.40058	200.27	0.10000 195.87
1004	0.39301	0.73552	350.15	0.53520	293.95	0.10000 283.13
1005	0.33190	0.62792	328.81	0.51441	276.35	0.10000 266.60
1006	0.29846	0.51800	309.23	0.48550	258.70	0.10000 250.35
1007	0.28535	0.42460	292.65	0.45903	240.85	0.10000 233.89
1008	0.28008	0.35635	278.56	0.43878	224.81	0.10000 219.00
1009	0.25373	0.30889	262.50	0.42141	214.89	0.10000 209.77
1010	0.24406	0.28883	248.88	0.40753	206.39	0.10000 201.81
1011	0.27611	0.30681	242.70	0.40084	199.31	0.10000 195.14
1044	0.42333	0.70341	350.17	0.51688	291.95	0.10000 281.75
1045	0.36782	0.60470	330.16	0.50082	272.71	0.10000 263.62
1046	0.33609	0.50461	311.87	0.47739	254.11	0.10000 246.32
1047	0.32189	0.42120	296.27	0.45592	235.98	0.10000 229.44
1048	0.31333	0.36003	282.62	0.43910	220.32	0.10000 214.83
1049	0.28865	0.31390	267.53	0.42366	210.74	0.10000 205.89
1050	0.27873	0.29236	254.51	0.40997	203.45	0.10000 199.10
1051	0.30482	0.30532	247.77	0.40108	198.58	0.10000 194.60
1084	0.44602	0.67569	350.21	0.50140	290.86	0.10000 280.96
1085	0.39711	0.58583	331.38	0.48918	269.89	0.10000 261.23
1086	0.36632	0.49609	314.10	0.47082	250.45	0.10000 243.03
1087	0.35019	0.42196	299.11	0.45359	232.14	0.10000 225.90
1088	0.33927	0.36646	285.75	0.43941	216.68	0.10000 211.45
1089	0.31674	0.32105	271.49	0.42553	207.23	0.10000 202.64
1090	0.30722	0.29723	259.09	0.41207	200.90	0.10000 196.76
1091	0.32736	0.30404	251.81	0.40129	198.08	0.10000 194.25
1124	0.46122	0.65235	350.27	0.48878	290.64	0.10000 280.73
1125	0.41942	0.57143	332.44	0.47960	267.95	0.10000 259.47
1126	0.38944	0.49191	315.92	0.46569	247.70	0.10000 240.48
1127	0.37161	0.42582	301.32	0.45189	229.21	0.10000 223.16
1128	0.35950	0.37502	288.16	0.43971	213.74	0.10000 208.72
1129	0.33915	0.33004	274.58	0.42707	204.27	0.10000 199.90
1130	0.32983	0.30337	262.68	0.41385	198.71	0.10000 194.77
1131	0.34371	0.30296	254.82	0.40149	197.81	0.10000 194.10
1164	0.46935	0.63331	350.33	0.47894	291.21	0.10000 281.01
1165	0.43473	0.56145	333.32	0.47213	266.85	0.10000 258.33
1166	0.40679	0.49129	317.42	0.46171	245.68	0.10000 238.53
1167	0.38848	0.43229	303.10	0.45059	226.85	0.10000 220.92
1168	0.37579	0.38573	290.07	0.44000	211.24	0.10000 206.40
1169	0.35723	0.34097	276.97	0.42837	201.67	0.10000 197.53
1170	0.34737	0.31087	265.38	0.41535	196.81	0.10000 193.07
1171	0.35421	0.30207	256.86	0.40166	197.75	0.10000 194.12
1204	0.47086	0.61686	350.32	0.47115	292.48	0.10000 281.71
1205	0.44215	0.55653	333.90	0.46775	266.55	0.10000 257.86
1206	0.41907	0.49369	318.61	0.45871	244.31	0.10000 237.10
1207	0.40181	0.44149	304.55	0.44960	224.90	0.10000 219.03
1208	0.38882	0.39893	291.53	0.44027	209.06	0.10000 204.37
1209	0.37151	0.35415	278.72	0.42943	199.35	0.10000 195.42
1210	0.36009	0.31990	267.23	0.41659	195.15	0.10000 191.60
1211	0.35891	0.30137	257.94	0.40182	197.92	0.10000 194.33
1244	0.46548	0.60388	350.32	0.46573	294.58	0.10000 282.93
1245	0.44703	0.55220	334.46	0.46280	266.60	0.10000 257.46
1246	0.42713	0.49881	319.48	0.45638	243.25	0.10000 235.88

1247	0.41166	434.45	0.45369	305.55	0.44882	223.14	0.10000	217.28
1248	0.39861	377.69	0.41499	292.42	0.44043	207.02	0.10000	202.46
1249	0.38185	335.06	0.36963	279.72	0.43018	197.24	0.10000	193.54
1250	0.36783	312.84	0.33041	268.14	0.41747	194.33	0.10000	190.81
1251	0.35761	317.69	0.30084	258.03	0.40196	198.31	0.10000	194.74
1284	0.45096	678.17	0.59363	350.31	0.46262	297.94	0.10000	284.94
1285	0.44409	588.30	0.55255	334.88	0.45965	267.65	0.10000	257.70
1286	0.43066	506.51	0.50983	320.18	0.45470	242.68	0.10000	234.91
1287	0.41783	436.72	0.47207	306.20	0.44839	221.65	0.10000	215.70
1288	0.40487	380.20	0.43618	292.77	0.44059	205.17	0.10000	200.74
1289	0.38826	337.78	0.38971	279.94	0.43067	195.24	0.10000	191.78
1290	0.37019	314.10	0.34395	268.01	0.41806	194.33	0.10000	190.81
1291	0.34876	314.71	0.30050	256.91	0.40209	199.04	0.10000	195.43
1324	0.42090	663.23	0.58749	350.31	0.46316	303.49	0.10000	288.32
1325	0.42848	580.31	0.56042	335.10	0.45923	270.37	0.10000	259.02
1326	0.42483	503.13	0.53029	320.44	0.45460	243.18	0.10000	234.66
1327	0.41723	436.07	0.50031	306.20	0.44858	220.74	0.10000	214.55
1328	0.40569	380.73	0.46655	292.25	0.44075	203.58	0.10000	199.25
1329	0.38847	338.50	0.41803	278.95	0.43080	194.33	0.10000	190.81
1330	0.36388	312.49	0.36294	266.23	0.41823	194.33	0.10000	190.81
1331	0.32723	307.11	0.30042	253.76	0.40222	200.32	0.10000	196.62
1364	0.38168	642.90	0.58810	350.32	0.46787	309.94	0.10000	292.28
1365	0.40275	566.97	0.57466	335.03	0.46211	274.22	0.10000	261.19
1366	0.40984	495.44	0.55554	320.13	0.45638	244.79	0.10000	235.32
1367	0.40892	432.21	0.53151	305.45	0.44945	220.79	0.10000	214.24
1368	0.39990	378.80	0.49846	290.89	0.44086	202.77	0.10000	198.49
1369	0.38140	336.70	0.44741	276.82	0.43047	194.33	0.10000	190.81
1370	0.34935	308.04	0.38259	263.05	0.41787	194.33	0.10000	190.81
1371	0.29729	296.37	0.30068	249.18	0.40230	201.88	0.10000	198.03
1404	0.34225	622.05	0.59282	350.32	0.47451	316.04	0.10000	296.04
1405	0.37420	552.07	0.59094	334.76	0.46667	278.26	0.10000	263.58
1406	0.39117	486.09	0.58031	319.50	0.45907	246.86	0.10000	236.46
1407	0.39694	426.88	0.56025	304.34	0.45063	221.42	0.10000	214.50
1408	0.39079	375.61	0.52697	289.19	0.44093	202.57	0.10000	198.29
1409	0.37076	333.58	0.47351	274.30	0.42990	194.33	0.10000	190.81
1410	0.33171	302.43	0.40009	259.45	0.41723	194.33	0.10000	190.81
1411	0.26600	285.06	0.30112	244.30	0.40235	203.41	0.10000	199.39
1444	0.29578	597.19	0.60128	350.33	0.48369	322.96	0.10000	300.33
1445	0.33853	533.40	0.61156	334.33	0.47324	283.14	0.10000	266.57
1446	0.36656	473.88	0.60912	318.52	0.46291	249.64	0.10000	238.15
1447	0.38020	419.54	0.59237	302.77	0.45223	222.60	0.10000	215.22
1448	0.37768	370.96	0.55816	286.95	0.44099	202.78	0.10000	198.47
1449	0.35568	328.98	0.50200	271.04	0.42907	194.33	0.10000	190.81
1450	0.30869	294.99	0.41929	254.90	0.41629	194.33	0.10000	190.81
1451	0.22798	271.26	0.30178	238.31	0.40237	205.19	0.10000	200.96

OPTIMIZATION SYSTEM FOR TPSSYM = 3

TOTAL NUMBER OF DESIGN VARIABLES = 45
TOTAL NUMBER OF CONSTRAINS = 2064
TOTAL NUMBER OF TEMP. CONSTRAINS = 594
TOTAL NUMBER OF TEMP. PRINTOUTS = 11

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4	5	6
Tmax:	2300.33	2020.33	1800.33	2020.33	550.33	300.33
Optv:	295.54	295.54	232.49	232.49	203.76	203.76

VALUES OF DESIGN VARIABLES :

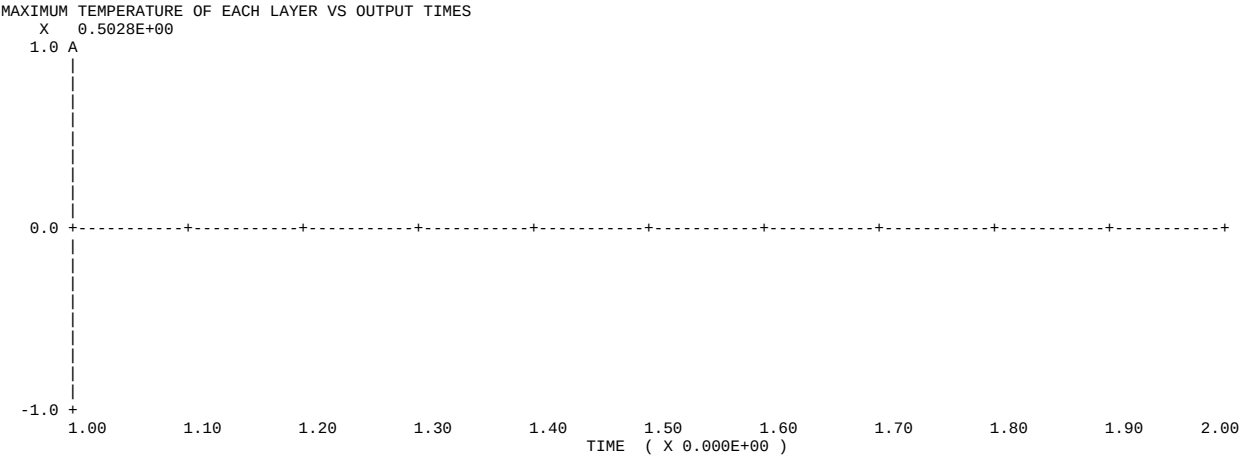
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
2	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000
3	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

5 0.05000 0.05000 0.05000 0.05000 0.05000 0.05000 0.05000 0.05000 0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 545.4285278

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.5028006

THE TOTAL OPTIMAL WEIGHT = 6.25791764E+05



OPTIMAL STRUCTURES OF TPS FOR PATCH = 3
(WITH AVERAGE THICKNESS)

=====	-----
HRSI COAT	thin skin
=====	-----
AB312 Fabric	slab
=====	-----
Q-Felt(3.5 PCF)	thin skin
=====	-----
AB312 Fabric	slab
=====	-----
RTV-560	thin skin
=====	-----
ALUMINUM 2024-T4	slab
=====	-----

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 3

PANEL	LAYER01	LAYER02	LAYER03	LAYER04	LAYER05	LAYER06
17	0.05000	237.06	0.08000	237.06	1.00000	206.18
18	0.05000	236.18	0.08000	236.18	1.00000	205.83
19	0.05000	235.48	0.08000	235.48	1.00000	205.56
20	0.05000	234.73	0.08000	234.73	1.00000	205.29
21	0.05000	233.91	0.08000	233.91	1.00000	205.04
22	0.05000	233.20	0.08000	233.20	1.00000	204.90
23	0.05000	232.76	0.08000	232.76	1.00000	204.94
24	0.05000	232.55	0.08000	232.55	1.00000	205.09
25	0.05000	232.55	0.08000	232.51	1.00000	205.33
26	0.05000	232.67	0.08000	232.67	1.00000	205.79
27	0.05000	233.12	0.08000	233.12	1.00000	206.48
28	0.05000	233.67	0.08000	233.67	1.00000	207.16
29	0.05000	234.28	0.08000	234.28	1.00000	207.82
57	0.05000	237.61	0.08000	237.61	1.00000	208.67
58	0.05000	238.66	0.08000	238.66	1.00001	209.09
59	0.05000	239.32	0.08000	239.32	1.00002	209.29
60	0.05000	239.78	0.08000	239.78	1.00002	209.42
61	0.05000	239.93	0.08000	239.93	1.00003	209.46
62	0.05000	239.62	0.08000	239.62	1.00003	209.37
63	0.05000	238.85	0.08000	238.85	1.00002	209.11
64	0.05000	238.33	0.08000	238.33	1.00002	209.06
65	0.05000	238.37	0.08000	238.37	1.00002	209.42
66	0.05000	239.24	0.08000	239.24	1.00002	210.55
67	0.05000	240.22	0.08000	240.22	1.00001	211.92
68	0.05000	241.02	0.08000	241.02	1.00001	213.10
69	0.05000	241.61	0.08000	241.61	1.00000	214.09
97	0.05000	243.76	0.08000	243.76	1.00000	216.05
98	0.05000	245.31	0.08000	245.31	1.00002	216.18
99	0.05000	246.11	0.08000	246.11	1.00003	215.90
100	0.05000	246.76	0.08000	246.76	1.00004	215.58
101	0.05000	247.01	0.08000	247.01	1.00005	215.11
102	0.05000	246.46	0.08000	246.46	1.00005	214.43
103	0.05000	245.04	0.08000	245.04	1.00005	213.51

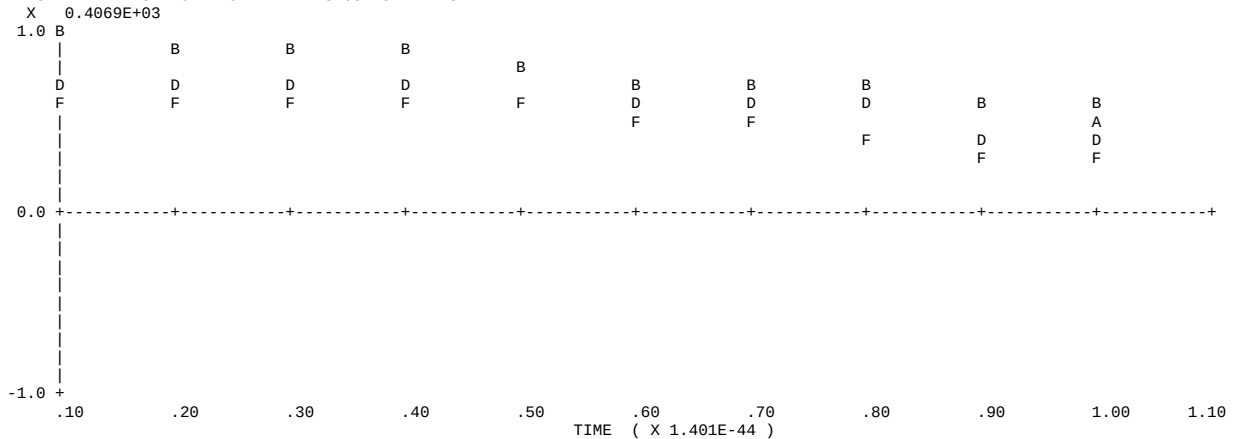
104	0.05000	243.95	0.08000	243.95	1.00004	213.01	0.05000	182.08	0.05000	172.92	0.15000	163.75
105	0.05000	244.01	0.08000	244.01	1.00004	213.41	0.05000	182.81	0.05000	173.68	0.15000	164.56
106	0.05000	245.15	0.08000	245.15	1.00003	214.83	0.05000	184.52	0.05000	175.48	0.15000	166.43
107	0.05000	246.22	0.08000	246.22	1.00002	216.49	0.05000	186.75	0.05000	177.71	0.15000	168.68
108	0.05000	246.93	0.08000	246.93	1.00001	217.86	0.05000	188.79	0.05000	179.68	0.15000	170.58
109	0.05000	247.31	0.08000	247.31	1.00000	218.93	0.05000	190.56	0.05000	181.35	0.15000	172.14
137	0.05000	257.72	0.08000	257.72	1.00000	229.84	0.05000	201.95	0.05000	191.02	0.15000	180.08
138	0.05000	257.02	0.08000	257.02	1.00002	227.70	0.05000	198.39	0.05000	187.93	0.15000	177.46
139	0.05000	255.81	0.08000	255.81	1.00003	225.31	0.05000	194.82	0.05000	184.81	0.15000	174.81
140	0.05000	255.04	0.08000	255.04	1.00005	223.32	0.05000	191.60	0.05000	182.05	0.15000	172.49
141	0.05000	254.32	0.08000	254.32	1.00006	221.49	0.05000	188.66	0.05000	179.54	0.15000	170.42
142	0.05000	253.07	0.08001	253.07	1.00007	219.72	0.05000	186.37	0.05000	177.54	0.15000	168.72
143	0.05000	250.92	0.08001	250.92	1.00006	217.89	0.05000	184.85	0.05000	176.11	0.15000	167.36
144	0.05000	249.27	0.08000	249.27	1.00005	216.86	0.05000	184.45	0.05000	175.68	0.15000	166.90
145	0.05000	249.19	0.08000	249.19	1.00005	217.14	0.05000	185.09	0.05000	176.33	0.15000	167.57
146	0.05000	250.41	0.08000	250.41	1.00004	218.68	0.05000	186.95	0.05000	178.24	0.15000	169.53
147	0.05000	251.42	0.08000	251.42	1.00003	220.44	0.05000	189.46	0.05000	180.71	0.15000	171.96
148	0.05000	251.94	0.08000	251.94	1.00002	221.85	0.05000	191.77	0.05000	182.91	0.15000	174.05
149	0.05000	252.09	0.08000	252.09	1.00000	222.94	0.05000	193.79	0.05000	184.79	0.15000	175.79
177	0.05000	275.12	0.08000	275.12	1.00000	245.85	0.05000	216.58	0.05000	204.22	0.15000	191.87
178	0.05000	271.68	0.08000	271.68	1.00001	241.63	0.05000	211.58	0.05000	199.76	0.15000	187.95
179	0.05000	267.74	0.08000	267.74	1.00003	236.89	0.05000	206.05	0.05000	194.91	0.15000	183.78
180	0.05000	264.39	0.08000	264.39	1.00004	232.45	0.05000	200.50	0.05000	190.12	0.15000	179.73
181	0.05000	261.40	0.08000	261.40	1.00006	228.19	0.05000	194.97	0.05000	185.39	0.15000	175.81
182	0.05000	258.78	0.08001	258.78	1.00007	224.70	0.05000	190.62	0.05000	181.68	0.15000	172.74
183	0.05000	256.19	0.08001	256.19	1.00007	222.06	0.05000	187.93	0.05000	179.32	0.15000	170.70
184	0.05000	254.29	0.08001	254.29	1.00007	220.63	0.05000	186.97	0.05000	178.43	0.15000	169.89
185	0.05000	253.90	0.08000	253.90	1.00006	220.62	0.05000	187.33	0.05000	178.81	0.15000	170.29
186	0.05000	254.97	0.08000	254.97	1.00005	222.06	0.05000	189.14	0.05000	180.64	0.15000	172.14
187	0.05000	255.96	0.08000	255.96	1.00004	223.88	0.05000	191.80	0.05000	183.24	0.15000	174.67
188	0.05000	256.30	0.08000	256.30	1.00002	225.29	0.05000	194.28	0.05000	185.58	0.15000	176.88
189	0.05000	256.20	0.08000	256.20	1.00000	226.31	0.05000	196.42	0.05000	187.56	0.15000	178.70
217	0.05000	286.43	0.08000	286.43	1.00000	255.97	0.05000	225.51	0.05000	212.07	0.15000	198.63
218	0.05000	282.13	0.08000	282.13	1.00001	251.40	0.05000	220.66	0.05000	207.63	0.15000	194.60
219	0.05000	276.83	0.08000	276.83	1.00002	245.72	0.05000	214.61	0.05000	202.28	0.15000	189.96
220	0.05000	271.63	0.08000	271.63	1.00003	239.73	0.05000	207.83	0.05000	196.40	0.15000	184.98
221	0.05000	266.97	0.08000	266.97	1.00005	233.83	0.05000	200.69	0.05000	190.34	0.15000	179.99
222	0.05000	263.31	0.08001	263.31	1.00007	229.01	0.05000	194.71	0.05000	185.35	0.15000	175.99
223	0.05000	260.27	0.08001	260.27	1.00008	225.54	0.05000	190.81	0.05000	182.08	0.15000	173.34
224	0.05000	258.43	0.08001	258.43	1.00007	223.90	0.05000	189.38	0.05000	180.87	0.15000	172.37
225	0.05000	257.63	0.08001	257.63	1.00007	223.47	0.05000	189.31	0.05000	180.87	0.15000	172.43
226	0.05000	258.10	0.08000	258.10	1.00006	224.42	0.05000	190.74	0.05000	182.31	0.15000	173.89
227	0.05000	258.71	0.08000	258.71	1.00004	225.96	0.05000	193.21	0.05000	184.70	0.15000	176.19
228	0.05000	258.74	0.08000	258.74	1.00002	227.15	0.05000	195.56	0.05000	186.91	0.15000	178.25
229	0.05000	258.27	0.08000	258.27	1.00000	227.94	0.05000	197.62	0.05000	188.79	0.15000	179.97
257	0.05000	290.63	0.08000	290.63	1.00000	259.69	0.05000	228.75	0.05000	214.89	0.15000	201.02
258	0.05000	286.49	0.08000	286.49	1.00000	255.43	0.05000	224.38	0.05000	210.81	0.15000	197.24
259	0.05000	281.18	0.08000	281.18	1.00001	249.94	0.05000	218.71	0.05000	205.74	0.15000	192.77
260	0.05000	275.55	0.08000	275.55	1.00003	243.73	0.05000	211.91	0.05000	199.81	0.15000	187.70
261	0.05000	270.33	0.08000	270.33	1.00005	237.40	0.05000	204.46	0.05000	193.47	0.15000	182.48
262	0.05000	266.36	0.08001	266.36	1.00007	232.17	0.05000	197.98	0.05000	188.10	0.15000	178.23
263	0.05000	263.36	0.08001	263.36	1.00008	228.41	0.05000	193.46	0.05000	184.43	0.15000	175.40
264	0.05000	261.46	0.08001	261.46	1.00008	226.47	0.05000	191.47	0.05000	182.84	0.15000	174.20
265	0.05000	260.47	0.08001	260.47	1.00007	225.75	0.05000	191.02	0.05000	182.54	0.15000	174.05
266	0.05000	260.29	0.08000	260.29	1.00006	226.12	0.05000	191.95	0.05000	183.50	0.15000	175.06
267	0.05000	261.47	0.08000	261.47	1.00004	228.07	0.05000	194.68	0.05000	186.11	0.15000	177.55
268	0.05000	260.80	0.08000	260.80	1.00002	228.68	0.05000	196.56	0.05000	187.86	0.15000	179.17
269	0.05000	259.91	0.08000	259.91	1.00000	229.12	0.05000	198.33	0.05000	189.49	0.15000	180.64
297	0.05000	292.42	0.08000	292.42	1.00000	261.27	0.05000	230.12	0.05000	216.08	0.15000	202.03
298	0.05000	288.57	0.08000	288.57	1.00000	257.36	0.05000	226.16	0.05000	212.32	0.15000	198.48
299	0.05000	283.60	0.08000	283.60	1.00001	252.29	0.05000	220.99	0.05000	207.64	0.15000	194.30
300	0.05000	278.16	0.08000	278.16	1.00002	246.42	0.05000	214.68	0.05000	202.08	0.15000	189.49
301	0.05000	272.97	0.08000	272.97	1.00004	240.29	0.05000	207.61	0.05000	196.01	0.15000	184.42
302	0.05000	269.02	0.08000	269.02	1.00006	235.14	0.05000	201.26	0.05000	190.74	0.15000	180.22
303	0.05000	266.26	0.08001	266.26	1.00007	231.41	0.05000	196.56	0.05000	186.98	0.15000	177.40
304	0.05000	264.60	0.08001	264.60	1.00007	229.40	0.05000	194.19	0.05000	185.16	0.15000	176.14
305	0.05000	263.88	0.08001	263.88	1.00007	228.71	0.05000	193.55	0.05000	184.76	0.15000	175.98
306	0.05000	263.73	0.08000	263.73	1.00006	228.99	0.05000	194.24	0.05000	185.51	0.15000	176.77
307	0.05000	262.98	0.08000	262.98	1.00004	229.25	0.05000	195.51	0.05000	186.71	0.15000	177.91
308	0.05000	261.71	0.08000	261.71	1.00002	229.21	0.05000	196.71	0.05000	187.81	0.15000	178.92
309	0.05000	260.28	0.08000	260.28	1.00000	229.07	0.05000	197.87	0.05000	188.87	0.15000	179.86
337	0.05000	293.65	0.08000	293.65	1.00000	262.35	0.05000	231.06	0.05000	216.88	0.15000	202.71
338	0.05000	290.16	0.08000	290.16	1.00000	258.83	0.05000	227.50	0.05000	213.46	0.15000	199.41
339	0.05000	285.59	0.08000	285.59	1.00001	254.23	0.05000	222.87	0.05000	209.21	0.15000	195.55
340	0.05000	280.54	0.08000	280.54	1.00001	248.88	0.05000	217.23	0.05000	204.16	0.15000	191.09
341	0.05000	275.57	0.08000	275.57	1.00003	243.21	0.05000	210.85	0.05000	198.58	0.15000	186.31
342	0.05000	271.60	0.08000	271.60	1.00004	238.29	0.05000	204.97	0.05000	193.59	0.15000	182.20
343	0.05000	268.78	0.08000	268.78	1.00006	234.54	0.05000	200.30	0.05000	189.78	0.15000	179.26
344	0.05000	267.13	0.08001	267.13	1.00006	232.35	0.05000	197.56	0.05000	187.65	0.15000	177.75
345	0.05000	266.04	0.08001	266.04	1.00006	231.11	0.05000	196.18	0.05000	186.64	0.15000	177.09
346	0.05000	264.72	0.08000	264.72	1.00005	230.16	0.05000	195.61	0.05000	186.19	0.15000	176.77
347	0.05000	262.48	0.08000	262.48	1.00004	228.87	0.05000	195.27	0.05000	185.86		

388	0.05000	255.57	0.08000	255.57	1.00001	223.49	0.05000	191.41	0.05000	181.24	0.15000	171.07
389	0.05000	252.33	0.08000	252.33	1.00000	221.00	0.05000	189.67	0.05000	179.64	0.15000	169.62
417	0.05000	295.04	0.08000	295.04	1.00000	263.58	0.05000	232.11	0.05000	217.80	0.15000	203.48
418	0.05000	292.07	0.08000	292.07	1.00000	260.59	0.05000	229.12	0.05000	214.82	0.15000	200.53
419	0.05000	288.15	0.08000	288.15	1.00000	256.71	0.05000	225.28	0.05000	211.20	0.15000	197.12
420	0.05000	283.81	0.08000	283.81	1.00001	252.28	0.05000	220.76	0.05000	207.01	0.15000	193.25
421	0.05000	279.25	0.08000	279.25	1.00001	247.49	0.05000	215.73	0.05000	202.36	0.15000	188.99
422	0.05000	274.93	0.08000	274.93	1.00001	242.90	0.05000	210.88	0.05000	197.87	0.15000	184.87
423	0.05000	270.82	0.08000	270.82	1.00002	238.57	0.05000	206.33	0.05000	193.71	0.15000	181.08
424	0.05000	267.38	0.08000	267.38	1.00002	235.05	0.05000	202.72	0.05000	190.40	0.15000	178.09
425	0.05000	264.34	0.08000	264.34	1.00002	231.88	0.05000	199.42	0.05000	187.50	0.15000	175.57
426	0.05000	259.99	0.08000	259.99	1.00002	227.70	0.05000	195.41	0.05000	183.85	0.15000	172.28
427	0.05000	254.77	0.08000	254.77	1.00001	222.89	0.05000	191.02	0.05000	179.82	0.15000	168.62
428	0.05000	250.39	0.08000	250.39	1.00001	218.94	0.05000	187.48	0.05000	176.59	0.15000	165.70
429	0.05000	246.46	0.08000	246.46	1.00000	215.40	0.05000	184.35	0.05000	173.75	0.15000	163.14
457	0.05000	295.54	0.08000	295.54	1.00000	264.02	0.05000	232.49	0.05000	218.13	0.15000	203.76
458	0.05000	292.33	0.08000	292.33	1.00000	260.83	0.05000	229.34	0.05000	215.01	0.15000	200.68
459	0.05000	289.04	0.08000	289.04	1.00000	257.58	0.05000	226.12	0.05000	211.89	0.15000	197.67
460	0.05000	284.92	0.08000	284.92	1.00000	253.45	0.05000	221.98	0.05000	207.98	0.15000	193.98
461	0.05000	280.45	0.08000	280.45	1.00000	248.92	0.05000	217.38	0.05000	203.61	0.15000	189.84
462	0.05000	275.82	0.08000	275.82	1.00000	244.31	0.05000	212.80	0.05000	199.21	0.15000	185.61
463	0.05000	270.95	0.08000	270.95	1.00000	239.56	0.05000	208.18	0.05000	194.77	0.15000	181.36
464	0.05000	266.49	0.08000	266.49	1.00000	235.30	0.05000	204.11	0.05000	190.87	0.15000	177.62
465	0.05000	262.49	0.08000	262.49	1.00000	231.24	0.05000	200.00	0.05000	187.14	0.15000	174.27
466	0.05000	257.03	0.08000	257.03	1.00000	225.86	0.05000	194.68	0.05000	182.28	0.15000	169.87
467	0.05000	250.90	0.08000	250.90	1.00000	219.88	0.05000	188.86	0.05000	176.97	0.15000	165.08
468	0.05000	245.95	0.08000	245.95	1.00000	215.07	0.05000	184.18	0.05000	172.73	0.15000	161.27
469	0.05000	241.60	0.08000	241.60	1.00000	210.83	0.05000	180.05	0.05000	168.99	0.15000	157.93

OPTIMIZATION SYSTEM FOR TPSSYM = 4

TOTAL NUMBER OF DESIGN VARIABLES = 45
TOTAL NUMBER OF CONSTRAINTS = 2462
TOTAL NUMBER OF TEMP. CONSTRAINTS = 1122
TOTAL NUMBER OF TEMP. PRINTOUTS = 11

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4	5	6
Tmax:	2300.33	2020.33	1800.33	2020.33	550.33	300.33
Optv:	406.90	406.90	281.78	281.78	250.88	250.88

VALUES OF DESIGN VARIABLES :

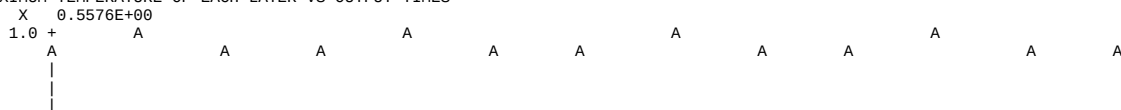
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
2	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000
3	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
5	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

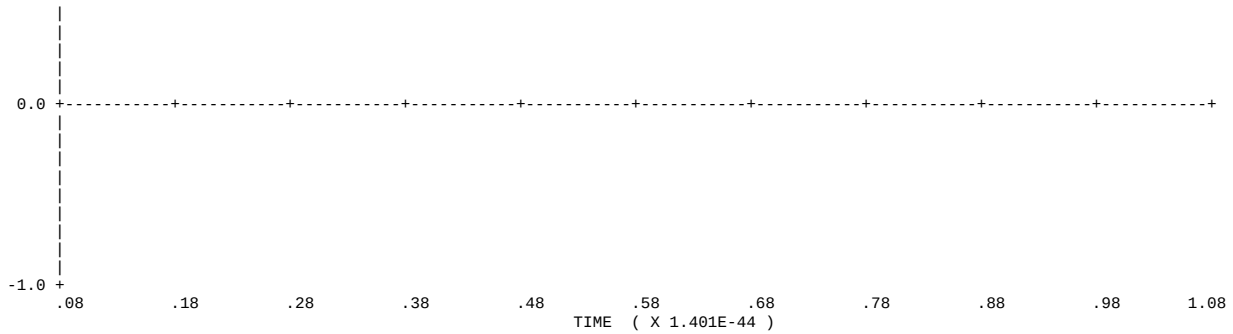
THE ORIGINAL OBJECTIVE FUNCTION = 499.9669800

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.5028006

THE TOTAL OPTIMAL WEIGHT = 1.67899825E+05

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES





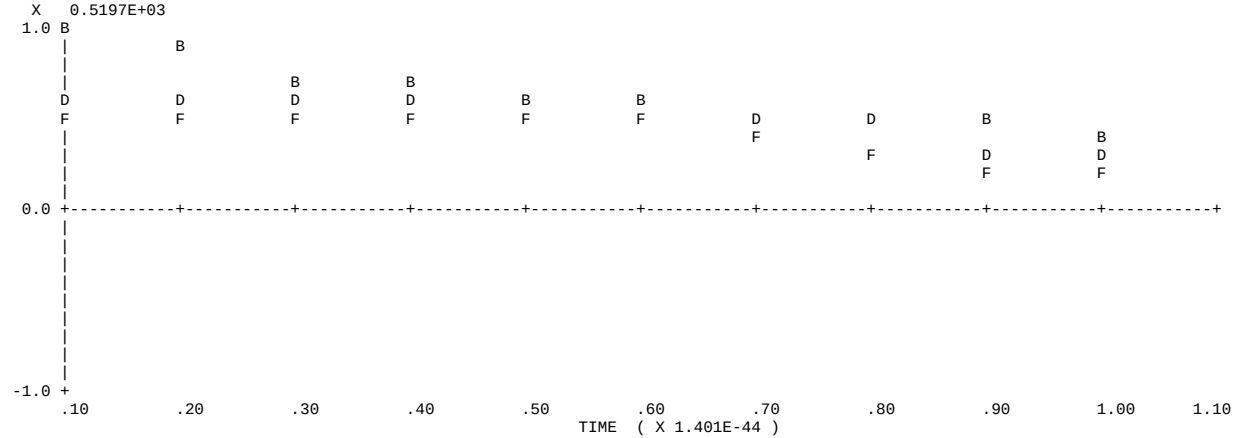
OPTIMAL STRUCTURES OF TPS FOR PATCH = 4 (WITH AVERAGE THICKNESS)			
=====			
HRSI COAT	thin skin	0.05000 in.	406.9 F
=====			
AB312 Fabric	slab	0.08000 in.	406.9 F
=====			
Q-Felt(3.5 PCF)	thin skin	1.00000 in.	281.8 F
=====			
AB312 Fabric	slab	0.05000 in.	281.8 F
=====			
RTV-560	thin skin	0.05000 in.	250.9 F
=====			
ALUMINUM 2024-T4	slab	0.15000 in.	250.9 F
=====			

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 4										
PANEL	LAYER01		LAYER02		LAYER03		LAYER04		LAYER05	LAYER06
497	0.05000	390.69	0.08000	390.69	1.00000	321.27	0.05000	251.85	0.05000	223.87
498	0.05000	376.57	0.08000	376.57	1.00000	313.60	0.05000	250.63	0.05000	217.92
499	0.05000	370.58	0.08000	370.58	1.00000	305.16	0.05000	239.73	0.05000	209.88
500	0.05000	360.42	0.08000	360.42	1.00000	295.46	0.05000	230.50	0.05000	201.81
501	0.05000	346.60	0.08000	346.60	1.00000	284.20	0.05000	221.79	0.05000	193.04
502	0.05000	331.35	0.08000	331.35	1.00000	272.14	0.05000	212.92	0.05000	184.30
503	0.05000	316.01	0.08000	316.01	1.00000	260.39	0.05000	204.77	0.05000	176.48
504	0.05000	302.84	0.08000	302.84	1.00000	250.62	0.05000	198.40	0.05000	170.54
505	0.05000	290.47	0.08000	290.47	1.00000	241.69	0.05000	192.92	0.05000	165.62
506	0.05000	273.98	0.08000	273.98	1.00000	230.18	0.05000	186.39	0.05000	160.02
507	0.05000	256.19	0.08000	256.19	1.00000	218.26	0.05000	180.33	0.05000	155.21
508	0.05000	242.54	0.08000	242.54	1.00000	209.45	0.05000	176.35	0.05000	152.37
509	0.05000	230.88	0.08000	230.88	1.00000	202.15	0.05000	173.41	0.05000	150.53
537	0.05000	383.84	0.08000	383.84	1.00000	320.65	0.05000	257.47	0.05000	225.33
538	0.05000	371.97	0.08000	371.97	1.00000	315.26	0.05000	258.54	0.05000	220.48
539	0.05000	366.35	0.08000	366.35	1.00000	308.59	0.05000	250.83	0.05000	213.38
540	0.05000	358.19	0.08000	358.19	1.00000	299.12	0.05000	240.06	0.05000	204.72
541	0.05000	345.49	0.08000	345.49	1.00000	288.53	0.05000	231.56	0.05000	195.98
542	0.05000	330.81	0.08000	330.81	1.00001	278.16	0.05000	225.51	0.05000	188.01
543	0.05000	315.78	0.08000	315.78	1.00001	267.25	0.05000	218.72	0.05000	180.37
544	0.05000	302.45	0.08000	302.45	1.00001	257.28	0.05000	212.12	0.05000	174.03
545	0.05000	289.44	0.08000	289.44	1.00001	246.86	0.05000	204.28	0.05000	167.97
546	0.05000	271.63	0.08000	271.63	1.00001	232.88	0.05000	194.14	0.05000	160.65
547	0.05000	251.95	0.08000	251.95	1.00000	217.83	0.05000	183.71	0.05000	153.77
548	0.05000	236.64	0.08000	236.64	1.00000	206.31	0.05000	175.99	0.05000	150.53
549	0.05000	230.88	0.08000	223.19	1.00000	196.33	0.05000	169.48	0.05000	150.53
577	0.05000	378.93	0.08000	378.93	1.00000	320.50	0.05000	262.08	0.05000	226.64
578	0.05000	369.25	0.08000	369.25	1.00000	316.81	0.05000	264.38	0.05000	222.65
579	0.05000	363.87	0.08000	363.87	1.00001	311.52	0.05000	259.16	0.05000	216.48
580	0.05000	356.20	0.08000	356.20	1.00001	303.83	0.05000	251.45	0.05000	208.77
581	0.05000	344.75	0.08000	344.75	1.00001	294.83	0.05000	244.91	0.05000	200.75
582	0.05000	331.40	0.08000	331.40	1.00001	285.39	0.05000	239.37	0.05000	193.17
583	0.05000	317.25	0.08000	317.25	1.00001	274.81	0.05000	232.38	0.05000	185.59
584	0.05000	304.29	0.08000	304.29	1.00001	264.62	0.05000	224.96	0.05000	178.96
585	0.05000	291.07	0.08000	291.07	1.00001	253.54	0.05000	216.02	0.05000	172.22
586	0.05000	272.44	0.08000	272.44	1.00001	237.91	0.05000	203.38	0.05000	163.55
587	0.05000	251.40	0.08000	251.40	1.00001	220.32	0.05000	189.24	0.05000	154.80
588	0.05000	234.84	0.08000	234.84	1.00000	206.49	0.05000	178.15	0.05000	150.53
589	0.05000	230.88	0.08000	220.02	1.00000	194.14	0.05000	168.26	0.05000	150.53
617	0.05000	375.29	0.08000	375.29	1.00000	320.74	0.05000	266.19	0.05000	227.94
618	0.05000	367.72	0.08000	367.72	1.00000	318.46	0.05000	269.19	0.05000	224.76
619	0.05000	362.64	0.08000	362.64	1.00001	314.25	0.05000	265.87	0.05000	219.49
620	0.05000	355.52	0.08000	355.52	1.00001	308.17	0.05000	260.82	0.05000	212.91
621	0.05000	345.40	0.08000	345.40	1.00001	300.77	0.05000	256.15	0.05000	205.93
622	0.05000	333.66	0.08000	333.66	1.00002	292.50	0.05000	251.33	0.05000	199.17
623	0.05000	320.94	0.08000	320.94	1.00002	282.78	0.05000	244.62	0.05000	192.16
624	0.05000	309.03	0.08000	309.03	1.00002	273.07	0.05000	237.11	0.05000	185.77
625	0.05000	296.45	0.08000	296.45	1.00002	262.23	0.05000	228.00	0.05000	179.00
626	0.05000	278.32	0.08000	278.32	1.00001	246.30	0.05000	214.28	0.05000	169.81
627	0.05000	257.46	0.08000	257.46	1.00001	227.71	0.05000	197.97	0.05000	160.01

628	0.05000	240.87	0.08000	240.87	1.00000	212.75	0.05000	184.63	0.05000	168.65	0.15000	152.67
629	0.05000	230.88	0.08000	225.97	1.00000	199.19	0.05000	172.40	0.05000	159.41	0.15000	150.53
657	0.05000	372.93	0.08000	372.93	1.00000	321.37	0.05000	269.80	0.05000	249.51	0.15000	229.22
658	0.05000	367.29	0.08000	367.29	1.00000	320.12	0.05000	272.94	0.05000	249.84	0.15000	226.74
659	0.05000	362.53	0.08000	362.53	1.00001	316.85	0.05000	271.17	0.05000	246.81	0.15000	222.45
660	0.05000	356.09	0.08000	356.09	1.00001	312.12	0.05000	268.15	0.05000	242.62	0.15000	217.09
661	0.05000	347.45	0.08000	347.45	1.00002	306.18	0.05000	264.91	0.05000	238.14	0.15000	211.37
662	0.05000	337.55	0.08000	337.55	1.00002	299.13	0.05000	260.71	0.05000	233.22	0.15000	205.72
663	0.05000	326.78	0.08000	326.78	1.00002	290.67	0.05000	254.56	0.05000	227.15	0.15000	199.75
664	0.05000	316.65	0.08000	316.65	1.00002	282.12	0.05000	247.58	0.05000	220.88	0.15000	194.19
665	0.05000	305.84	0.08000	305.84	1.00002	272.52	0.05000	239.20	0.05000	213.69	0.15000	188.17
666	0.05000	290.18	0.08000	290.18	1.00002	258.16	0.05000	226.14	0.05000	202.95	0.15000	179.76
667	0.05000	272.10	0.08000	272.10	1.00001	241.05	0.05000	210.01	0.05000	190.23	0.15000	170.45
668	0.05000	257.67	0.08000	257.67	1.00001	227.10	0.05000	196.53	0.05000	179.88	0.15000	163.24
669	0.05000	245.07	0.08000	245.07	1.00000	214.61	0.05000	184.15	0.05000	170.65	0.15000	157.15
697	0.05000	371.81	0.08000	371.81	1.00000	322.36	0.05000	272.92	0.05000	251.69	0.15000	230.47
698	0.05000	367.68	0.08000	367.68	1.00000	321.59	0.05000	275.49	0.05000	251.94	0.15000	228.39
699	0.05000	363.17	0.08000	363.17	1.00001	318.74	0.05000	274.30	0.05000	249.50	0.15000	224.69
700	0.05000	357.46	0.08000	357.46	1.00001	315.04	0.05000	272.63	0.05000	246.57	0.15000	220.52
701	0.05000	350.27	0.08000	350.27	1.00002	310.37	0.05000	270.47	0.05000	243.35	0.15000	216.23
702	0.05000	342.39	0.08000	342.39	1.00002	304.70	0.05000	267.02	0.05000	239.56	0.15000	212.10
703	0.05000	334.01	0.08000	334.01	1.00002	297.88	0.05000	261.75	0.05000	234.70	0.15000	207.66
704	0.05000	326.32	0.08000	326.32	1.00002	291.05	0.05000	255.79	0.05000	229.64	0.15000	203.48
705	0.05000	317.78	0.08000	317.78	1.00002	283.13	0.05000	248.48	0.05000	223.51	0.15000	198.53
706	0.05000	305.74	0.08000	305.74	1.00001	271.42	0.05000	237.10	0.05000	214.37	0.15000	191.64
707	0.05000	292.28	0.08000	292.28	1.00001	257.67	0.05000	223.07	0.05000	203.55	0.15000	184.03
708	0.05000	281.77	0.08000	281.77	1.00000	246.57	0.05000	211.38	0.05000	194.74	0.15000	178.10
709	0.05000	273.54	0.08000	273.54	1.00000	237.36	0.05000	201.19	0.05000	187.33	0.15000	173.47
737	0.05000	371.94	0.08000	371.94	1.00000	323.80	0.05000	275.66	0.05000	253.71	0.15000	231.76
738	0.05000	368.90	0.08000	368.90	1.00000	323.28	0.05000	277.66	0.05000	253.92	0.15000	230.18
739	0.05000	364.74	0.08000	364.74	1.00001	320.93	0.05000	277.11	0.05000	252.24	0.15000	227.38
740	0.05000	359.94	0.08000	359.94	1.00001	318.06	0.05000	276.19	0.05000	250.31	0.15000	224.44
741	0.05000	354.32	0.08000	354.32	1.00001	314.38	0.05000	274.44	0.05000	248.02	0.15000	221.59
742	0.05000	348.51	0.08000	348.51	1.00002	309.93	0.05000	271.34	0.05000	245.14	0.15000	218.94
743	0.05000	342.61	0.08000	342.61	1.00002	304.74	0.05000	266.87	0.05000	241.46	0.15000	216.04
744	0.05000	337.51	0.08000	337.51	1.00002	299.78	0.05000	262.06	0.05000	237.69	0.15000	213.32
745	0.05000	332.05	0.08000	332.05	1.00001	294.25	0.05000	256.44	0.05000	233.24	0.15000	210.04
746	0.05000	324.89	0.08000	324.89	1.00001	286.37	0.05000	247.86	0.05000	226.68	0.15000	205.51
747	0.05000	317.53	0.08000	317.53	1.00001	277.50	0.05000	237.47	0.05000	218.99	0.15000	200.51
748	0.05000	312.24	0.08000	312.24	1.00000	270.63	0.05000	229.03	0.05000	212.84	0.15000	196.66
749	0.05000	309.62	0.08000	309.62	1.00000	266.08	0.05000	222.55	0.05000	208.44	0.15000	194.32
777	0.05000	373.54	0.08000	373.54	1.00000	325.79	0.05000	278.04	0.05000	255.59	0.15000	233.13
778	0.05000	370.99	0.08000	370.99	1.00000	325.10	0.05000	279.21	0.05000	255.60	0.15000	232.00
779	0.05000	367.20	0.08000	367.20	1.00001	323.04	0.05000	278.88	0.05000	254.47	0.15000	230.06
780	0.05000	363.26	0.08000	363.26	1.00001	320.68	0.05000	278.11	0.05000	253.18	0.15000	228.26
781	0.05000	359.05	0.08000	359.05	1.00001	317.71	0.05000	276.38	0.05000	251.56	0.15000	226.74
782	0.05000	355.09	0.08000	355.09	1.00001	314.32	0.05000	273.56	0.05000	249.51	0.15000	225.47
783	0.05000	351.53	0.08000	351.53	1.00001	310.75	0.05000	269.98	0.05000	247.03	0.15000	224.08
784	0.05000	348.94	0.08000	348.94	1.00001	307.70	0.05000	266.46	0.05000	244.63	0.15000	222.81
785	0.05000	346.47	0.08000	346.47	1.00001	304.55	0.05000	262.63	0.05000	241.89	0.15000	221.15
786	0.05000	344.05	0.08000	344.05	1.00001	300.57	0.05000	257.09	0.05000	238.03	0.15000	218.96
787	0.05000	342.62	0.08000	342.62	1.00001	296.71	0.05000	250.79	0.05000	233.70	0.15000	216.62
788	0.05000	342.37	0.08000	342.37	1.00000	294.16	0.05000	245.95	0.05000	230.42	0.15000	214.89
789	0.05000	344.94	0.08000	344.94	1.00000	294.13	0.05000	243.31	0.05000	229.07	0.15000	214.82
817	0.05000	376.73	0.08000	376.73	1.00000	328.31	0.05000	279.88	0.05000	257.20	0.15000	234.52
818	0.05000	374.01	0.08000	374.01	1.00000	327.05	0.05000	280.09	0.05000	256.97	0.15000	233.85
819	0.05000	370.52	0.08000	370.52	1.00001	325.06	0.05000	279.60	0.05000	256.17	0.15000	232.75
820	0.05000	367.26	0.08000	367.26	1.00001	322.93	0.05000	278.60	0.05000	255.27	0.15000	231.94
821	0.05000	364.10	0.08000	364.10	1.00001	320.40	0.05000	276.71	0.05000	254.12	0.15000	231.52
822	0.05000	361.60	0.08000	361.60	1.00001	317.91	0.05000	274.22	0.05000	252.82	0.15000	231.42
823	0.05000	359.99	0.08000	359.99	1.00001	315.79	0.05000	271.60	0.05000	251.45	0.15000	231.31
824	0.05000	359.49	0.08000	359.49	1.00001	314.43	0.05000	269.36	0.05000	250.30	0.15000	231.23
825	0.05000	359.41	0.08000	359.41	1.00001	313.30	0.05000	267.18	0.05000	249.01	0.15000	230.84
826	0.05000	360.67	0.08000	360.67	1.00001	312.51	0.05000	264.35	0.05000	247.38	0.15000	230.40
827	0.05000	363.67	0.08000	363.67	1.00000	312.59	0.05000	261.51	0.05000	245.75	0.15000	229.99
828	0.05000	366.97	0.08000	366.97	1.00000	313.26	0.05000	259.56	0.05000	244.64	0.15000	229.72
829	0.05000	373.43	0.08000	373.43	1.00000	316.72	0.05000	260.01	0.05000	245.70	0.15000	231.39
857	0.05000	381.56	0.08000	381.56	1.00000	331.35	0.05000	281.14	0.05000	258.52	0.15000	235.90
858	0.05000	378.06	0.08000	378.06	1.00000	329.16	0.05000	280.27	0.05000	258.00	0.15000	235.73
859	0.05000	374.68	0.08000	374.68	1.00000	326.99	0.05000	279.29	0.05000	257.36	0.15000	235.42
860	0.05000	371.72	0.08000	371.72	1.00000	324.80	0.05000	277.89	0.05000	256.65	0.15000	235.42
861	0.05000	369.12	0.08000	369.12	1.00000	322.52	0.05000	275.92	0.05000	255.88	0.15000	235.83
862	0.05000	367.56	0.08000	367.56	1.00000	320.73	0.05000	273.89	0.05000	255.22	0.15000	236.55
863	0.05000	367.34	0.08000	367.34	1.00000	319.79	0.05000	272.24	0.05000	254.80	0.15000	237.36
864	0.05000	368.36	0.08000	368.36	1.00000	319.77	0.05000	271.18	0.05000	254.65	0.15000	238.13
865	0.05000	369.91	0.08000	369.91	1.00000	320.14	0.05000	270.36	0.05000	254.45	0.15000	238.54
866	0.05000	373.58	0.08000	373.58	1.00000	321.61	0.05000	269.65	0.05000	254.42	0.15000	239.19
867	0.05000	379.40	0.08000	379.40	1.00000	324.37	0.05000	269.34	0.05000	254.63	0.15000	239.93
868	0.05000	384.90	0.08000	384.90	1.00000	327.15	0.05000	269.40	0.05000	254.95	0.15000	240.49
869	0.05000	393.92	0.08000	393.92	1.00000	332.96	0.05000	272.00	0.05000	257.66	0.15000	243.32
897	0.05000	388.03	0.08000	388.03	1.00000	334.91	0.05000	281.78	0.05000	259.53	0.15000	237.28
898	0.05000	383.21	0.08000	383.21	1.00000	331.44	0.05000	279.66	0.05000	258.6		

TOTAL NUMBER OF DESIGN VARIABLES = 45
TOTAL NUMBER OF CONSTRAINS = 2324
TOTAL NUMBER OF TEMP. CONSTRAINS = 594
TOTAL NUMBER OF TEMP. PRINTOUTS = 11

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4	5	6
Tmax:	2300.33	2020.33	1800.33	2020.33	550.33	300.33
Optv:	519.75	519.75	301.98	301.98	264.86	264.86

VALUES OF DESIGN VARIABLES :

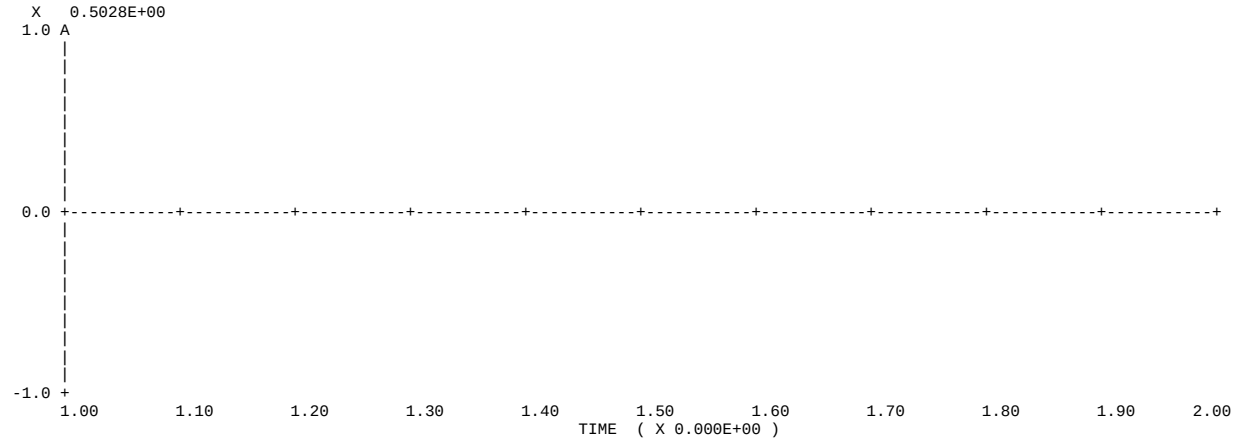
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
2	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000
3	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
5	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 636.2790527

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.5028189

THE TOTAL OPTIMAL WEIGHT = 4.39993838E+05

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



OPTIMAL STRUCTURES OF TPS FOR PATCH = 5
(WITH AVERAGE THICKNESS)

=====	-----
HRSI COAT	thin skin
=====	=====
AB312 Fabric	slab
=====	=====
Q-Felt(3.5 PCF)	thin skin
=====	=====

AB312 Fabric	slab	i 0.05000 in.	302.0 F
RTV-560	thin skin	i 0.05000 in.	264.9 F
ALUMINUM 2024-T4	slab	i 0.15000 in.	264.9 F

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 5

PANEL	LAYER01	LAYER02	LAYER03	LAYER04	LAYER05	LAYER06						
937	0.05000	519.75	0.08000	519.75	1.00000	410.87	0.05000	301.98	0.05000	279.26	0.15000	256.54
938	0.05000	497.92	0.08000	497.92	1.00000	398.66	0.05000	299.39	0.05000	277.12	0.15000	254.86
939	0.05000	479.63	0.08000	479.63	1.00000	388.36	0.05000	297.10	0.05000	275.27	0.15000	253.44
940	0.05000	460.33	0.08000	460.33	1.00000	377.45	0.05000	294.57	0.05000	273.24	0.15000	251.91
941	0.05000	439.75	0.08000	439.75	1.00000	365.71	0.05000	291.66	0.05000	270.97	0.15000	250.28
942	0.05000	421.53	0.08000	421.53	1.00000	355.15	0.05000	288.78	0.05000	268.81	0.15000	248.83
943	0.05000	407.70	0.08000	407.70	1.00000	346.95	0.05000	286.19	0.05000	266.96	0.15000	247.72
944	0.05000	399.44	0.08000	399.44	1.00000	341.82	0.05000	284.20	0.05000	265.63	0.15000	247.06
945	0.05000	399.44	0.08000	394.94	1.00000	338.68	0.05000	282.41	0.05000	264.51	0.15000	246.60
946	0.05000	399.44	0.08000	393.77	1.00000	337.07	0.05000	280.36	0.05000	263.36	0.15000	246.35
947	0.05000	399.44	0.08000	398.47	1.00000	338.55	0.05000	278.63	0.05000	262.59	0.15000	246.54
948	0.05000	405.73	0.08000	405.73	1.00000	341.69	0.05000	277.64	0.05000	262.31	0.15000	246.97
949	0.05000	413.54	0.08000	413.54	1.00000	345.50	0.05000	277.47	0.05000	262.68	0.15000	247.90
977	0.05000	519.40	0.08000	519.40	1.00000	410.69	0.05000	301.98	0.05000	279.31	0.15000	256.65
978	0.05000	497.49	0.08000	497.49	1.00000	398.41	0.05000	299.32	0.05000	277.17	0.15000	255.01
979	0.05000	479.33	0.08000	479.33	1.00000	388.13	0.05000	296.93	0.05000	275.27	0.15000	253.60
980	0.05000	460.41	0.08000	460.41	0.99999	377.35	0.05000	294.29	0.05000	273.15	0.15000	252.01
981	0.05000	440.26	0.08000	440.26	0.99999	365.76	0.05000	291.26	0.05000	270.77	0.15000	250.27
982	0.05000	422.44	0.08000	422.44	0.99999	355.35	0.05000	288.26	0.05000	268.48	0.15000	248.69
983	0.05000	408.91	0.08000	408.91	0.99999	347.23	0.05000	285.55	0.05000	266.50	0.15000	247.46
984	0.05000	400.78	0.08000	400.78	0.99999	342.13	0.05000	283.48	0.05000	265.08	0.15000	246.68
985	0.05000	399.44	0.08000	396.25	0.99999	338.96	0.05000	281.66	0.05000	263.90	0.15000	246.14
986	0.05000	399.44	0.08000	394.84	0.99999	337.22	0.05000	279.60	0.05000	262.70	0.15000	245.79
987	0.05000	399.44	0.08000	399.11	0.99999	338.49	0.05000	277.86	0.05000	261.87	0.15000	245.89
988	0.05000	405.92	0.08000	405.92	1.00000	341.40	0.05000	276.88	0.05000	261.57	0.15000	246.25
989	0.05000	413.39	0.08000	413.39	1.00000	345.05	0.05000	276.71	0.05000	261.92	0.15000	247.13
1017	0.05000	518.70	0.08000	518.70	1.00000	410.33	0.05000	301.97	0.05000	279.42	0.15000	256.86
1018	0.05000	496.68	0.08000	496.68	1.00000	397.94	0.05000	299.19	0.05000	277.25	0.15000	255.30
1019	0.05000	478.81	0.08000	478.81	0.99999	387.72	0.05000	296.63	0.05000	275.26	0.15000	253.89
1020	0.05000	460.54	0.08000	460.54	0.99998	377.17	0.05000	293.80	0.05000	272.99	0.15000	252.18
1021	0.05000	441.18	0.08000	441.18	0.99998	365.88	0.05000	290.57	0.05000	270.41	0.15000	250.25
1022	0.05000	424.08	0.08000	424.08	0.99997	355.71	0.05000	287.35	0.05000	267.90	0.15000	248.46
1023	0.05000	411.08	0.08000	411.08	0.99997	347.76	0.05000	284.44	0.05000	265.72	0.15000	247.00
1024	0.05000	403.18	0.08000	403.18	0.99997	342.70	0.05000	282.23	0.05000	264.13	0.15000	246.02
1025	0.05000	399.44	0.08000	398.63	0.99997	339.48	0.05000	280.33	0.05000	262.82	0.15000	245.32
1026	0.05000	399.44	0.08000	396.84	0.99997	337.52	0.05000	278.20	0.05000	261.49	0.15000	244.77
1027	0.05000	400.33	0.08000	400.33	0.99998	338.38	0.05000	276.43	0.05000	260.55	0.15000	244.67
1028	0.05000	406.31	0.08000	406.31	0.99999	340.88	0.05000	275.45	0.05000	260.17	0.15000	244.89
1029	0.05000	413.10	0.08000	413.10	1.00000	344.18	0.05000	275.26	0.05000	260.46	0.15000	245.65
1057	0.05000	517.45	0.08000	517.45	1.00000	409.70	0.05000	301.95	0.05000	279.60	0.15000	257.24
1058	0.05000	495.51	0.08000	495.51	0.99999	397.26	0.05000	299.01	0.05000	277.37	0.15000	255.74
1059	0.05000	478.16	0.08000	478.16	0.99998	387.20	0.05000	296.24	0.05000	275.26	0.15000	254.28
1060	0.05000	460.77	0.08000	460.77	0.99997	376.98	0.05000	293.18	0.05000	272.80	0.15000	252.41
1061	0.05000	442.43	0.08000	442.43	0.99996	366.06	0.05000	289.70	0.05000	269.97	0.15000	250.24
1062	0.05000	426.25	0.08000	426.25	0.99995	356.23	0.05000	286.21	0.05000	267.19	0.15000	248.18
1063	0.05000	413.92	0.08000	413.92	0.99994	348.49	0.05000	283.05	0.05000	264.74	0.15000	246.42
1064	0.05000	406.34	0.08000	406.34	0.99994	343.50	0.05000	280.66	0.05000	262.93	0.15000	245.20
1065	0.05000	401.78	0.08000	401.78	0.99994	340.21	0.05000	278.63	0.05000	261.45	0.15000	244.27
1066	0.05000	399.57	0.08000	399.57	0.99995	337.97	0.05000	276.38	0.05000	259.90	0.15000	243.43
1067	0.05000	402.05	0.08000	402.05	0.99997	338.28	0.05000	274.51	0.05000	258.77	0.15000	243.03
1068	0.05000	406.91	0.08000	406.91	0.99998	340.20	0.05000	273.49	0.05000	258.26	0.15000	243.03
1069	0.05000	412.69	0.08000	412.69	1.00000	342.97	0.05000	273.25	0.05000	258.42	0.15000	243.60
1097	0.05000	515.57	0.08000	515.57	1.00000	408.74	0.05000	301.92	0.05000	279.87	0.15000	257.82
1098	0.05000	494.11	0.08000	494.11	0.99999	396.45	0.05000	298.78	0.05000	277.53	0.15000	256.28
1099	0.05000	477.50	0.08000	477.50	0.99997	386.66	0.05000	295.82	0.05000	275.27	0.15000	254.71
1100	0.05000	461.09	0.08000	461.09	0.99996	376.81	0.05000	292.54	0.05000	272.60	0.15000	252.67
1101	0.05000	443.89	0.08000	443.89	0.99994	366.33	0.05000	288.76	0.05000	269.51	0.15000	250.25
1102	0.05000	428.78	0.07999	428.78	0.99992	356.88	0.05000	284.97	0.05000	266.43	0.15000	247.88
1103	0.05000	417.24	0.07999	417.24	0.99992	349.39	0.05000	281.55	0.05000	263.68	0.15000	245.81
1104	0.05000	410.05	0.07999	410.05	0.99991	344.49	0.05000	278.93	0.05000	261.61	0.15000	244.29
1105	0.05000	405.55	0.07999	405.55	0.99992	341.14	0.05000	276.73	0.05000	259.91	0.15000	243.09
1106	0.05000	402.89	0.07999	402.89	0.99993	338.58	0.05000	274.27	0.05000	258.08	0.15000	241.88
1107	0.05000	404.19	0.08000	404.19	0.99995	338.21	0.05000	272.24	0.05000	256.66	0.15000	241.07
1108	0.05000	407.71	0.08000	407.71	0.99998	339.42	0.05000	271.12	0.05000	255.96	0.15000	240.79
1109	0.05000	412.17	0.08000	412.17	1.00000	341.46	0.05000	270.75	0.05000	255.90	0.15000	241.05
1137	0.05000	513.16	0.08000	513.16	1.00000	407.52	0.05000	301.88	0.05000	280.23	0.15000	258.57
1138	0.05000	492.62	0.08000	492.62	0.99998	395.58	0.05000	298.55	0.05000	277.72	0.15000	256.89
1139	0.05000	476.90	0.08000	476.90	0.99996	386.15	0.05000	295.40	0.05000	275.29	0.15000	255.18
1140	0.05000	461.51	0.08000	461.51	0.99994	376.70	0.05000	291.89	0.05000	272.43	0.15000	252.96
1141	0.05000	445.55	0.07999	445.55	0.99992	366.69	0.05000	287.83	0.05000	269.06	0.15000	250.29
1142	0.05000	431.62	0.07999	431.62	0.99990	357.68	0.05000	283.73	0.05000	265.67	0.15000	247.61
1143	0.05000	420.96	0.07999	420.96	0.99989	350.49	0.05000	280.01	0.05000	262.60	0.15000	245.19
1144	0.05000	414.22	0.07999	414.22	0.99989	345.69	0.05000	277.16	0.05000	260.26	0.15000	243.37
1145	0.05000	409.82	0.07999	409.82	0.99989	342.29	0.05000	274.75	0.05000	258.30	0.15000	241.86
1146	0.05000	406.71	0.07999	406.71	0.99990	339.38	0.05000	272.04	0.05000	256.13	0.15000	240.22
1147	0.05000	406.69	0.07999	406.69	0.99994	338.23	0.05000	269.77	0.05000	254.35	0.15000	238.94
1148	0.05000	408.68	0.08000	408.68	0.99997	338.59	0.05000	268.49	0.05000	253.39	0.15000	238.29
1149	0.05000	411.55	0.08000	411.55	1.00000	339.73	0.05000	267.91	0.05000	253.03	0.15000	238.16
1177	0.05000	510.41	0.08000	510.41	1.00000	406.13	0.05000	301.84	0.05000	280.64	0.15000	259.43
1178	0.05000	491.10	0.08000	491.10	0.99998							

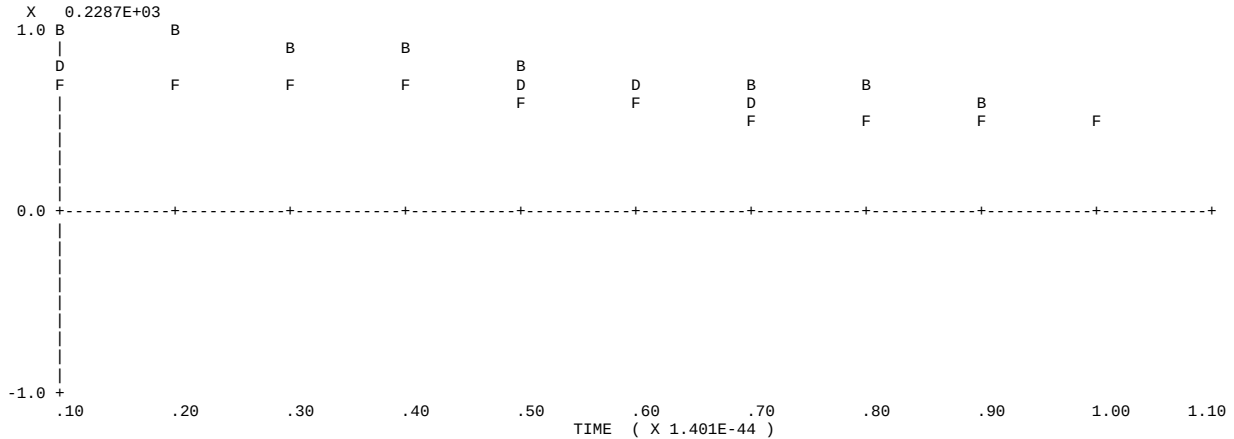
1179	0.05000	476.35	0.08000	476.35	0.99995	385.68	0.05000	295.01	0.05000	275.34	0.15000	255.67
1180	0.05000	462.03	0.07999	462.03	0.99993	376.66	0.05000	291.29	0.05000	272.29	0.15000	253.28
1181	0.05000	447.36	0.07999	447.36	0.99990	367.15	0.05000	286.95	0.05000	268.66	0.15000	250.37
1182	0.05000	434.67	0.07999	434.67	0.99988	358.62	0.05000	282.56	0.05000	264.97	0.15000	247.38
1183	0.05000	424.94	0.07999	424.94	0.99986	351.76	0.05000	278.58	0.05000	261.61	0.15000	244.64
1184	0.05000	418.68	0.07999	418.68	0.99986	347.09	0.05000	275.50	0.05000	259.00	0.15000	242.51
1185	0.05000	414.39	0.07999	414.39	0.99986	343.64	0.05000	272.89	0.05000	256.79	0.15000	240.69
1186	0.05000	410.83	0.07999	410.83	0.99988	340.37	0.05000	269.91	0.05000	254.26	0.15000	238.62
1187	0.05000	409.42	0.07999	409.42	0.99992	338.39	0.05000	267.35	0.05000	252.09	0.15000	236.83
1188	0.05000	409.77	0.08000	409.77	0.99996	337.82	0.05000	265.87	0.05000	250.83	0.15000	235.79
1189	0.05000	410.88	0.08000	410.88	1.00000	337.94	0.05000	265.00	0.05000	250.11	0.15000	235.22
1217	0.05000	507.52	0.08000	507.52	1.00000	404.66	0.05000	301.79	0.05000	281.06	0.15000	260.33
1218	0.05000	489.60	0.08000	489.60	0.99997	393.84	0.05000	298.09	0.05000	278.14	0.15000	258.20
1219	0.05000	475.88	0.08000	475.88	0.99994	385.27	0.05000	294.65	0.05000	275.41	0.15000	256.17
1220	0.05000	462.63	0.07999	462.63	0.99991	376.69	0.05000	290.76	0.05000	272.19	0.15000	253.62
1221	0.05000	449.25	0.07999	449.25	0.99988	367.72	0.05000	286.19	0.05000	268.34	0.15000	250.49
1222	0.05000	437.81	0.07999	437.81	0.99985	359.69	0.05000	281.57	0.05000	264.40	0.15000	247.24
1223	0.05000	428.99	0.07999	428.99	0.99984	353.18	0.05000	277.37	0.05000	260.79	0.15000	244.20
1224	0.05000	423.18	0.07999	423.18	0.99983	348.65	0.05000	274.12	0.05000	257.96	0.15000	241.80
1225	0.05000	418.99	0.07999	418.99	0.99984	345.17	0.05000	271.35	0.05000	255.53	0.15000	239.72
1226	0.05000	414.95	0.07999	414.95	0.99986	341.54	0.05000	268.14	0.05000	252.70	0.15000	237.25
1227	0.05000	412.16	0.07999	412.16	0.99991	338.73	0.05000	265.30	0.05000	250.15	0.15000	235.00
1228	0.05000	410.88	0.08000	410.88	0.99995	337.22	0.05000	263.56	0.05000	248.57	0.15000	233.58
1229	0.05000	410.22	0.08000	410.22	1.00000	336.30	0.05000	262.38	0.05000	247.48	0.15000	232.58
1257	0.05000	504.70	0.08000	504.70	1.00000	403.22	0.05000	301.74	0.05000	281.46	0.15000	261.19
1258	0.05000	488.18	0.08000	488.18	0.99997	393.03	0.05000	297.89	0.05000	278.36	0.15000	258.83
1259	0.05000	475.48	0.07999	475.48	0.99994	384.92	0.05000	294.35	0.05000	275.50	0.15000	256.66
1260	0.05000	463.28	0.07999	463.28	0.99990	376.80	0.05000	290.32	0.05000	272.15	0.15000	253.98
1261	0.05000	451.16	0.07999	451.16	0.99987	368.37	0.05000	285.59	0.05000	268.13	0.15000	250.67
1262	0.05000	440.88	0.07999	440.88	0.99984	360.85	0.05000	280.82	0.05000	264.01	0.15000	247.20
1263	0.05000	432.90	0.07999	432.90	0.99982	354.69	0.05000	276.49	0.05000	260.21	0.15000	243.93
1264	0.05000	427.49	0.07999	427.49	0.99982	350.31	0.05000	273.13	0.05000	257.23	0.15000	241.32
1265	0.05000	423.33	0.07999	423.33	0.99983	346.80	0.05000	270.26	0.05000	254.65	0.15000	239.04
1266	0.05000	418.80	0.07999	418.80	0.99985	342.85	0.05000	266.90	0.05000	251.58	0.15000	236.26
1267	0.05000	414.73	0.07999	414.73	0.99990	339.27	0.05000	263.82	0.05000	248.73	0.15000	233.64
1268	0.05000	411.96	0.08000	411.96	0.99995	336.89	0.05000	261.82	0.05000	246.84	0.15000	231.87
1269	0.05000	409.64	0.08000	409.64	1.00000	334.97	0.05000	260.30	0.05000	245.40	0.15000	230.50
1297	0.05000	501.90	0.08000	501.90	1.00000	401.79	0.05000	301.68	0.05000	281.85	0.15000	262.03
1298	0.05000	486.75	0.08000	486.75	0.99996	392.23	0.05000	297.70	0.05000	278.59	0.15000	259.48
1299	0.05000	475.11	0.07999	475.11	0.99993	384.60	0.05000	294.08	0.05000	275.62	0.15000	257.17
1300	0.05000	464.03	0.07999	464.03	0.99989	376.99	0.05000	289.96	0.05000	272.16	0.15000	254.37
1301	0.05000	453.19	0.07999	453.19	0.99985	369.16	0.05000	285.13	0.05000	268.02	0.15000	250.91
1302	0.05000	444.08	0.07999	444.08	0.99982	362.19	0.05000	280.30	0.05000	263.78	0.15000	247.27
1303	0.05000	436.90	0.07998	436.90	0.99981	356.41	0.05000	275.93	0.05000	259.88	0.15000	243.83
1304	0.05000	431.82	0.07998	431.82	0.99981	352.18	0.05000	272.54	0.05000	256.81	0.15000	241.07
1305	0.05000	427.58	0.07999	427.58	0.99982	348.60	0.05000	269.62	0.05000	254.12	0.15000	238.62
1306	0.05000	422.42	0.07999	422.42	0.99985	344.28	0.05000	266.13	0.05000	250.86	0.15000	235.60
1307	0.05000	417.06	0.07999	417.06	0.99990	339.93	0.05000	262.81	0.05000	247.73	0.15000	232.65
1308	0.05000	412.84	0.08000	412.84	0.99995	336.68	0.05000	260.52	0.05000	245.55	0.15000	230.58
1309	0.05000	409.12	0.08000	409.12	1.00000	333.93	0.05000	258.73	0.05000	243.84	0.15000	229.20
1337	0.05000	498.35	0.08000	498.35	1.00000	399.97	0.05000	301.59	0.05000	282.33	0.15000	263.06
1338	0.05000	484.87	0.08000	484.87	0.99996	391.17	0.05000	297.47	0.05000	278.91	0.15000	260.34
1339	0.05000	474.68	0.07999	474.68	0.99992	384.23	0.05000	293.78	0.05000	275.83	0.15000	257.88
1340	0.05000	465.14	0.07999	465.14	0.99988	377.38	0.05000	289.63	0.05000	272.28	0.15000	254.94
1341	0.05000	455.90	0.07999	455.90	0.99984	370.36	0.05000	284.83	0.05000	268.08	0.15000	251.33
1342	0.05000	448.05	0.07999	448.05	0.99981	364.04	0.05000	280.04	0.05000	263.78	0.15000	247.53
1343	0.05000	441.62	0.07998	441.62	0.99980	358.67	0.05000	275.72	0.05000	259.83	0.15000	243.93
1344	0.05000	436.70	0.07998	436.70	0.99980	354.53	0.05000	272.37	0.05000	256.70	0.15000	241.04
1345	0.05000	432.22	0.07999	432.22	0.99982	350.84	0.05000	269.46	0.05000	253.96	0.15000	238.46
1346	0.05000	426.24	0.07999	426.24	0.99985	346.07	0.05000	265.89	0.05000	250.57	0.15000	235.26
1347	0.05000	419.43	0.07999	419.43	0.99990	340.87	0.05000	262.31	0.05000	247.17	0.15000	232.03
1348	0.05000	413.73	0.08000	413.73	0.99995	336.70	0.05000	259.67	0.05000	244.68	0.15000	229.68
1349	0.05000	408.63	0.08000	408.63	1.00000	333.08	0.05000	257.53	0.05000	242.66	0.15000	229.20
1377	0.05000	491.72	0.08000	491.72	1.00000	396.54	0.05000	301.36	0.05000	283.11	0.15000	264.86
1378	0.05000	481.67	0.08000	481.67	0.99995	389.42	0.05000	297.17	0.05000	279.49	0.15000	261.81
1379	0.05000	474.18	0.07999	474.18	0.99991	383.86	0.05000	293.54	0.05000	276.32	0.15000	259.10
1380	0.05000	467.15	0.07999	467.15	0.99988	378.35	0.05000	289.55	0.05000	272.74	0.15000	255.93
1381	0.05000	460.10	0.07999	460.10	0.99984	372.56	0.05000	285.03	0.05000	268.59	0.15000	252.15
1382	0.05000	453.65	0.07999	453.65	0.99982	367.12	0.05000	280.60	0.05000	264.43	0.15000	248.27
1383	0.05000	447.74	0.07998	447.74	0.99981	362.17	0.05000	276.59	0.05000	260.61	0.15000	244.63
1384	0.05000	442.68	0.07999	442.68	0.99982	358.03	0.05000	273.39	0.05000	257.54	0.15000	241.68
1385	0.05000	437.65	0.07999	437.65	0.99983	354.07	0.05000	270.49	0.05000	254.75	0.15000	239.02
1386	0.05000	430.46	0.07999	430.46	0.99987	348.60	0.05000	266.73	0.05000	251.17	0.15000	235.61
1387	0.05000	421.93	0.07999	421.93	0.99991	342.32	0.05000	262.71	0.05000	247.39	0.15000	232.07
1388	0.05000	414.67	0.08000	414.67	0.99996	337.11	0.05000	259.54	0.05000	244.47	0.15000	229.39
1389	0.05000	408.13	0.08000	408.13	1.00000	332.47	0.05000	256.82	0.05000	242.00	0.15000	229.20
1417	0.05000	482.85	0.08000	482.85	1.00000	391.75	0.05000	300.65	0.05000	283.11	0.15000	264.86
1418	0.05000	478.55	0.08000	478.55	0.99996	387.90	0.05000	297.26	0.05000	280.30	0.15000	263.34
1419	0.05000	475.03	0.07999	475.03	0.99993	384.73	0.05000	294.43	0.05000	277.53	0.15000	260.63
1420	0.05000	471.14	0.07999	471.14	0.99990	381.24	0.05000	291.34	0.05000	274.47	0.15000	257.61
1421	0.05000	466.35	0.07999	466.35	0.99988	377.05	0.05000	287.75	0.05000	270.90	0.15000	254.05
1422	0.05000	460.88	0.07999									

1463	0.05000	460.38	0.08000	460.38	1.00000	374.33	0.05000	288.27	0.05000	269.65	0.15000	251.02
1464	0.05000	454.03	0.08000	454.03	1.00000	369.43	0.05000	284.83	0.05000	266.48	0.15000	248.13
1465	0.05000	447.42	0.08000	447.42	1.00000	364.31	0.05000	281.20	0.05000	263.22	0.15000	245.25
1466	0.05000	437.70	0.08000	437.70	1.00000	356.74	0.05000	275.79	0.05000	258.48	0.15000	241.17
1467	0.05000	426.04	0.08000	426.04	1.00000	347.62	0.05000	269.21	0.05000	252.84	0.15000	236.47
1468	0.05000	416.20	0.08000	416.20	1.00000	339.91	0.05000	263.61	0.05000	248.12	0.15000	232.62
1469	0.05000	407.28	0.08000	407.28	1.00000	332.89	0.05000	258.50	0.05000	243.85	0.15000	229.20

OPTIMIZATION SYSTEM FOR TPSSYM = 6

TOTAL NUMBER OF DESIGN VARIABLES = 20
 TOTAL NUMBER OF CONSTRAINS = 774
 TOTAL NUMBER OF TEMP. CONSTRAINS = 264
 TOTAL NUMBER OF TEMP. PRINTOUTS = 11

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4	5	6
Tmax:	2300.33	2020.33	1800.33	2020.33	550.33	300.33
Optv:	228.68	228.68	176.35	176.35	156.91	156.91

VALUES OF DESIGN VARIABLES :

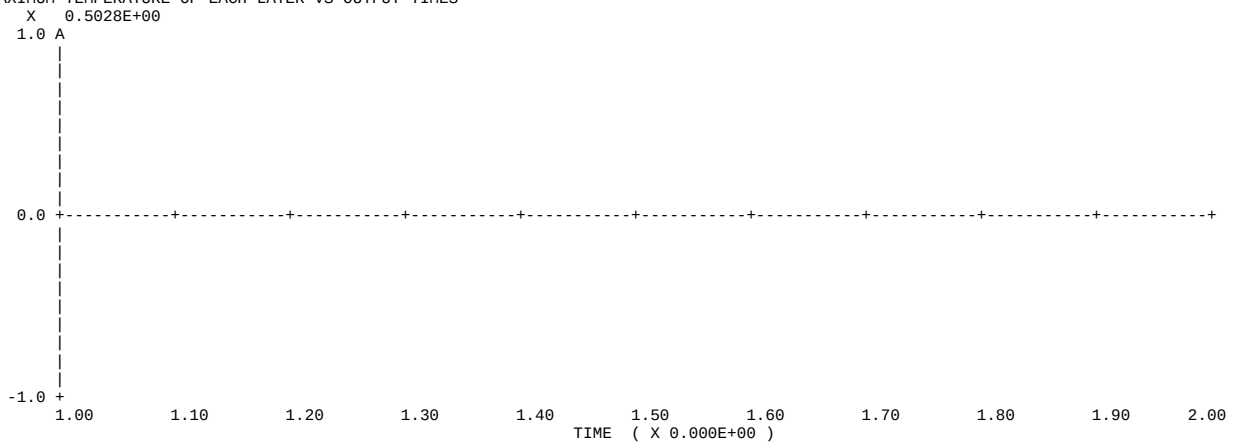
LAYER	DEV01	DEV02	DEV03	DEV04
1	0.05000	0.05000	0.05000	0.05000
2	0.08000	0.08000	0.08000	0.08000
3	1.00000	1.00000	1.00000	1.00000
4	0.05000	0.05000	0.05000	0.05000
5	0.05000	0.05000	0.05000	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 192.2937622

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.5028006

THE TOTAL OPTIMAL WEIGHT = 2.39849037E+05

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



OPTIMAL STRUCTURES OF TPS FOR PATCH = 6
 (WITH AVERAGE THICKNESS)

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=====
HRSI COAT      thin skin      0.05000 in.   228.7 F
=====
i
AB312 Fabric    slab      0.08000 in.   228.7 F
=====
i
Q-Felt(3.5 PCF) thin skin      1.00000 in.   176.3 F
=====
i
AB312 Fabric    slab      0.05000 in.   176.3 F
=====
i
RTV-560         thin skin      0.05000 in.   156.9 F
=====
i
ALUMINUM 2024-T4 slab      0.15000 in.   156.9 F
=====
i
=====

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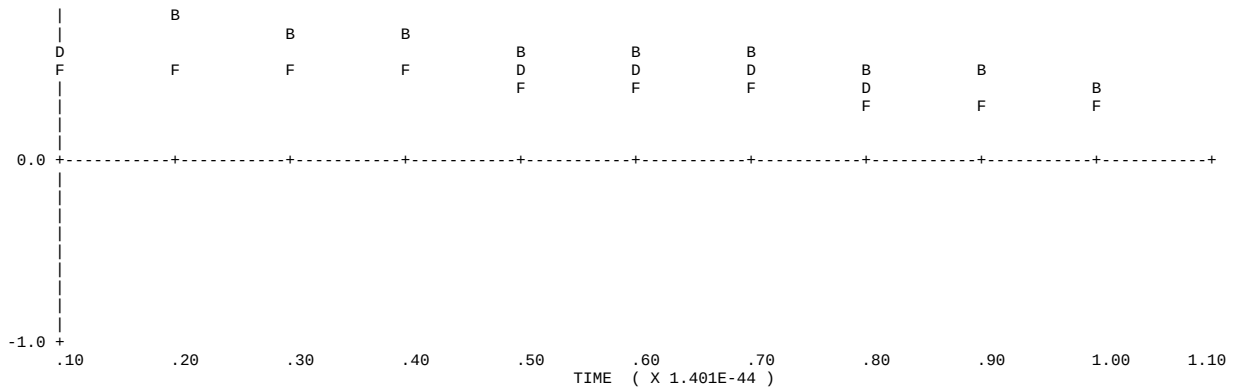
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 6

PANEL	LAYER01	LAYER02	LAYER03	LAYER04	LAYER05	LAYER06
30	0.05000	228.68	0.08000	228.68	1.00000	202.51
31	0.05000	226.92	0.08000	226.92	1.00000	200.91
32	0.05000	225.17	0.08000	225.17	1.00000	199.32
33	0.05000	223.56	0.08000	223.56	1.00000	197.86
34	0.05000	222.14	0.08000	222.14	1.00000	196.56
35	0.05000	220.46	0.08000	220.46	1.00000	195.03
36	0.05000	218.53	0.08000	218.53	1.00000	193.28
37	0.05000	216.79	0.08000	216.79	1.00000	191.70
38	0.05000	215.20	0.08000	215.20	1.00000	190.25
39	0.05000	213.63	0.08000	213.63	1.00000	188.82
40	0.05000	211.75	0.08000	211.75	1.00000	187.11
70	0.05000	226.67	0.08000	226.67	1.00000	200.51
71	0.05000	225.12	0.08000	225.12	1.00000	199.11
72	0.05000	223.58	0.08000	223.58	1.00000	197.73
73	0.05000	222.16	0.08000	222.16	1.00000	196.45
74	0.05000	220.90	0.08000	220.90	1.00000	195.32
75	0.05000	219.42	0.08000	219.42	1.00000	193.98
76	0.05000	217.73	0.08000	217.73	1.00000	192.45
77	0.05000	216.19	0.08000	216.19	1.00000	191.07
78	0.05000	214.79	0.08000	214.79	1.00000	189.81
79	0.05000	213.43	0.08000	213.43	1.00000	188.58
80	0.05000	211.80	0.08000	211.80	1.00000	187.11
110	0.05000	224.81	0.08000	224.81	1.00000	198.66
111	0.05000	223.45	0.08000	223.45	1.00000	197.46
112	0.05000	222.11	0.08000	222.11	1.00000	196.26
113	0.05000	220.87	0.08000	220.87	1.00000	195.16
114	0.05000	219.77	0.08000	219.77	1.00000	194.17
115	0.05000	218.47	0.08000	218.47	1.00000	193.02
116	0.05000	216.99	0.08000	216.99	1.00000	191.70
117	0.05000	215.64	0.08000	215.64	1.00000	190.50
118	0.05000	214.42	0.08000	214.42	1.00000	189.42
119	0.05000	213.24	0.08000	213.24	1.00000	188.37
120	0.05000	211.84	0.08000	211.84	1.00000	187.12
150	0.05000	222.89	0.08000	222.89	1.00000	196.76
151	0.05000	221.74	0.08000	221.74	1.00000	195.75
152	0.05000	220.59	0.08000	220.59	1.00000	194.74
153	0.05000	219.54	0.08000	219.54	1.00000	193.82
154	0.05000	218.60	0.08000	218.60	1.00000	193.00
155	0.05000	217.50	0.08000	217.50	1.00000	192.04
156	0.05000	216.23	0.08000	216.23	1.00000	190.93
157	0.05000	215.09	0.08000	215.09	1.00000	189.93
158	0.05000	214.06	0.08000	214.06	1.00000	189.02
159	0.05000	213.06	0.08000	213.06	1.00000	188.15
160	0.05000	211.88	0.08000	211.88	1.00000	187.12
190	0.05000	220.75	0.08000	220.75	1.00000	194.62
191	0.05000	219.83	0.08000	219.83	1.00000	193.84
192	0.05000	218.91	0.08000	218.91	1.00000	193.06
193	0.05000	218.06	0.08000	218.06	1.00000	192.33
194	0.05000	217.31	0.08000	217.31	1.00000	191.70
195	0.05000	216.42	0.08000	216.42	1.00000	190.95
196	0.05000	215.40	0.08000	215.40	1.00000	190.08
197	0.05000	214.48	0.08000	214.48	1.00000	189.29
198	0.05000	213.65	0.08000	213.65	1.00000	188.59
199	0.05000	212.87	0.08000	212.87	1.00000	187.92
200	0.05000	211.93	0.08000	211.93	1.00000	187.12

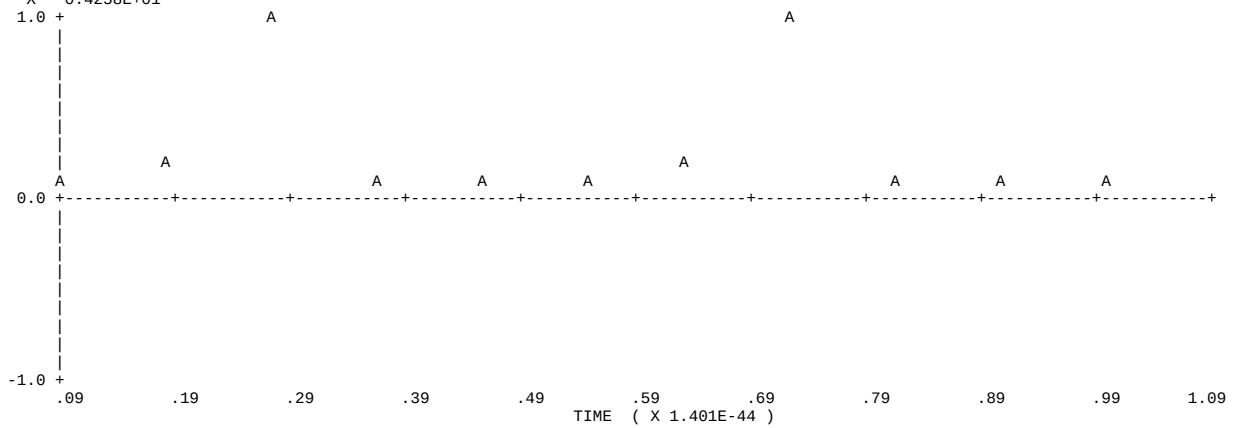
OPTIMIZATION SYSTEM FOR TPSSYM = 7

TOTAL NUMBER OF DESIGN VARIABLES = 30
 TOTAL NUMBER OF CONSTRAINTS = 1634
 TOTAL NUMBER OF TEMP. CONSTRAINTS = 924
 TOTAL NUMBER OF TEMP. PRINTOUTS = 11

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES
 X 0.4161E+03
 1.0 B
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MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES
X 0.4258E+01



PANEL	LAYER01		LAYER02		LAYER03		LAYER04		LAYER05		LAYER06	
230	0.05000	237.42	0.08000	237.42	1.00000	210.52	0.05000	183.62	0.05000	175.36	0.15000	167.09
231	0.05000	230.26	0.08000	230.26	1.00000	205.51	0.05000	180.76	0.05000	172.19	0.15000	163.61
232	0.05000	225.63	0.08000	225.63	1.00000	202.21	0.05000	178.78	0.05000	169.94	0.15000	161.10
233	0.05000	225.49	0.08000	223.72	1.00000	200.76	0.05000	177.79	0.05000	168.73	0.15000	159.66
234	0.05000	225.49	0.08000	223.58	1.00000	200.51	0.05000	177.43	0.05000	168.21	0.15000	158.98
235	0.05000	225.49	0.08000	225.49	1.00000	201.60	0.05000	177.72	0.05000	168.35	0.15000	158.98
236	0.05000	230.63	0.08000	230.63	1.00000	204.86	0.05000	179.09	0.05000	169.58	0.15000	160.08
237	0.05000	237.89	0.08000	237.89	1.00000	209.56	0.05000	181.23	0.05000	171.64	0.15000	162.04
238	0.05000	246.23	0.08000	246.23	1.00000	215.00	0.05000	183.78	0.05000	174.16	0.15000	164.53
239	0.05000	256.10	0.08000	256.10	1.00000	221.48	0.05000	186.86	0.05000	177.21	0.15000	167.55
240	0.05000	270.08	0.08000	270.08	1.00000	230.71	0.05000	191.34	0.05000	181.75	0.15000	172.15
270	0.05000	240.40	0.08000	240.40	1.00000	211.73	0.05000	183.07	0.05000	174.63	0.15000	166.19
271	0.05000	241.54	0.08000	241.54	1.00000	213.08	0.05000	184.62	0.05000	175.27	0.15000	165.92
272	0.05000	243.07	0.08000	243.07	1.00000	214.46	0.05000	185.86	0.05000	175.75	0.15000	165.64
273	0.05000	245.14	0.08000	245.14	1.00000	216.01	0.05000	186.88	0.05000	176.18	0.15000	165.49
274	0.05000	247.03	0.08000	247.03	1.00000	217.26	0.05000	187.50	0.05000	176.40	0.15000	165.30
275	0.05000	249.70	0.08000	249.70	1.00000	218.88	0.05000	188.05	0.05000	176.60	0.15000	165.15
276	0.05000	252.85	0.08000	252.85	1.00000	220.54	0.05000	188.24	0.05000	176.59	0.15000	164.95
277	0.05000	256.67	0.08000	256.67	1.00000	222.53	0.05000	188.39	0.05000	176.69	0.15000	164.99
278	0.05000	260.49	0.08000	260.49	1.00000	224.44	0.05000	188.40	0.05000	176.78	0.15000	165.16
279	0.05000	265.00	0.08000	265.00	1.00000	226.73	0.05000	188.47	0.05000	176.99	0.15000	165.50
280	0.05000	271.17	0.08000	271.17	1.00000	229.88	0.05000	188.58	0.05000	177.42	0.15000	166.26
310	0.05000	244.31	0.08000	244.31	1.00000	213.33	0.05000	182.35	0.05000	173.67	0.15000	164.99
311	0.05000	256.52	0.08000	256.52	1.00000	223.13	0.05000	189.75	0.05000	179.36	0.15000	168.97
312	0.05000	266.22	0.08000	266.22	1.00000	230.73	0.05000	195.24	0.05000	183.45	0.15000	171.66
313	0.05000	273.53	0.08000	273.53	1.00000	236.23	0.05000	198.92	0.05000	186.07	0.15000	173.21
314	0.05000	278.46	0.08000	278.46	1.00000	239.73	0.05000	201.00	0.05000	187.39	0.15000	173.78
315	0.05000	282.81	0.08000	282.81	1.00000	242.49	0.05000	202.18	0.05000	187.89	0.15000	173.59
316	0.05000	283.67	0.08000	283.67	1.00000	242.29	0.05000	200.92	0.05000	186.32	0.15000	171.71
317	0.05000	283.14	0.08000	283.14	1.00000	240.81	0.05000	198.49	0.05000	183.82	0.15000	169.15
318	0.05000	281.14	0.08000	281.14	1.00000	238.11	0.05000	195.09	0.05000	180.58	0.15000	166.08
319	0.05000	278.20	0.08000	278.20	1.00000	234.54	0.05000	190.88	0.05000	176.69	0.15000	162.49
320	0.05000	272.88	0.08000	272.88	1.00000	228.66	0.05000	184.45	0.05000	170.91	0.15000	157.38
350	0.05000	249.32	0.08000	249.32	1.00000	215.38	0.05000	181.43	0.05000	172.45	0.15000	163.47
351	0.05000	275.63	0.08000	275.63	1.00000	235.95	0.05000	196.28	0.05000	184.57	0.15000	172.87
352	0.05000	295.79	0.08000	295.79	1.00000	251.51	0.05000	207.22	0.05000	193.29	0.15000	179.35
353	0.05000	309.85	0.08000	309.85	1.00000	262.09	0.05000	214.33	0.05000	198.71	0.15000	183.09
354	0.05000	318.89	0.08000	318.89	1.00000	268.63	0.05000	218.36	0.05000	201.52	0.15000	184.69
355	0.05000	325.81	0.08000	325.81	1.00000	273.16	0.05000	220.52	0.05000	202.55	0.15000	184.57
356	0.05000	324.11	0.08000	324.11	1.00000	270.84	0.05000	217.58	0.05000	199.09	0.15000	180.60
357	0.05000	318.28	0.08000	318.28	1.00000	265.09	0.05000	211.90	0.05000	193.30	0.15000	174.70
358	0.05000	308.92	0.08000	308.92	1.00000	256.51	0.05000	204.10	0.05000	185.72	0.15000	167.34
359	0.05000	296.16	0.08000	296.16	1.00000	245.16	0.05000	194.16	0.05000	176.28	0.15000	158.41
360	0.05000	275.25	0.08000	275.25	1.00000	227.00	0.05000	178.76	0.05000	161.96	0.15000	145.17
390	0.05000	254.11	0.08000	254.11	1.00000	217.33	0.05000	180.55	0.05000	171.28	0.15000	162.01
391	0.05000	293.88	0.08000	293.88	1.00000	248.20	0.05000	202.51	0.05000	189.55	0.15000	176.58
392	0.05000	324.04	0.08000	324.04	1.00000	271.35	0.05000	218.67	0.05000	202.68	0.15000	186.70
393	0.05000	344.58	0.08000	344.58	1.00000	286.82	0.05000	229.05	0.05000	210.80	0.15000	192.54
394	0.05000	357.63	0.08000	357.63	1.00000	296.31	0.05000	234.99	0.05000	215.06	0.15000	195.14
395	0.05000	367.13	0.08000	367.13	1.00000	302.64	0.05000	238.16	0.05000	216.65	0.15000	195.13
396	0.05000	363.11	0.08000	363.11	1.00000	298.38	0.05000	233.65	0.05000	211.42	0.15000	189.19
397	0.05000	352.28	0.08000	352.28	1.00000	288.59	0.05000	224.89	0.05000	202.48	0.15000	180.08
398	0.05000	335.89	0.08000	335.89	1.00000	274.37	0.05000	212.85	0.05000	190.71	0.15000	168.58
399	0.05000	313.59	0.08000	313.59	1.00000	255.46	0.05000	197.33	0.05000	175.88	0.15000	154.44
400	0.05000	277.53	0.08000	277.53	1.00000	225.36	0.05000	173.19	0.05000	153.22	0.15000	133.24
430	0.05000	257.57	0.08000	257.57	1.00000	218.74	0.05000	179.91	0.05000	170.43	0.15000	160.96
431	0.05000	307.04	0.08000	307.04	1.00000	257.02	0.05000	207.00	0.05000	193.13	0.15000	179.25
432	0.05000	344.40	0.08000	344.40	1.00000	285.66	0.05000	226.91	0.05000	209.45	0.15000	191.99
433	0.05000	369.60	0.08000	369.60	1.00000	304.63	0.05000	239.66	0.05000	219.51	0.15000	199.35
434	0.05000	385.48	0.08000	385.48	1.00000	316.21	0.05000	246.95	0.05000	224.80	0.15000	202.66
435	0.05000	396.73	0.08000	396.73	1.00000	323.76	0.05000	250.80	0.05000	226.75	0.15000	202.71
436	0.05000	390.94	0.08000	390.94	1.00000	318.03	0.05000	245.12	0.05000	220.23	0.15000	195.33
437	0.05000	376.41	0.08000	376.41	1.00000	305.26	0.05000	234.11	0.05000	209.01	0.15000	183.91
438	0.05000	354.94	0.08000	354.94	1.00000	287.00	0.05000	219.05	0.05000	194.27	0.15000	169.49
439	0.05000	325.92	0.08000	325.92	1.00000	262.77	0.05000	199.62	0.05000	175.66	0.15000	151.70
440	0.05000	279.22	0.08000	279.22	1.00000	224.30	0.05000	169.37	0.05000	147.18	0.15000	124.99
470	0.05000	259.89	0.08000	259.89	1.00000	219.69	0.05000	179.48	0.05000	169.87	0.15000	160.25
471	0.05000	315.84	0.08000	315.84	1.00000	262.92	0.05000	210.00	0.05000	195.52	0.15000	181.04
472	0.05000	358.01	0.08000	358.01	1.00000	295.21	0.05000	232.42	0.05000	213.97	0.15000	195.52
473	0.05000	386.28	0.08000	386.28	1.00000	316.51	0.05000	246.73	0.05000	225.31	0.15000	203.88
474	0.05000	403.92	0.08000	403.92	1.00000	329.39	0.05000	254.86	0.05000	231.25	0.15000	207.63
475	0.05000	416.10	0.08000	416.10	1.00000	337.58	0.05000	259.06	0.05000	233.36	0.15000	207.66
476	0.05000	408.91	0.08000	408.91	1.00000	330.72	0.05000	252.53	0.05000	225.92	0.15000	199.30
477	0.05000	391.72	0.08000	391.72	1.00000	315.84	0.05000	239.96	0.05000	213.15	0.15000	186.34
478	0.05000	366.68	0.08000	366.68	1.00000	294.77	0.05000	222.85	0.05000	196.43	0.15000	170.01
479	0.05000	333.12	0.08000	333.12	1.00000	266.99	0.05000	200.86	0.05000	175.40	0.15000	149.95
480	0.05000	279.88	0.08000	279.88	1.00000	223.42	0.05000	166.97	0.05000	143.50	0.15000	120.03

OPTIMIZATION SYSTEM FOR TPSSYM = 8

TOTAL NUMBER OF DESIGN VARIABLES = 45
TOTAL NUMBER OF CONSTRAINS = 2124
TOTAL NUMBER OF TEMP. CONSTRAINS = 1584
TOTAL NUMBER OF TEMP. PRINTOUTS = 11

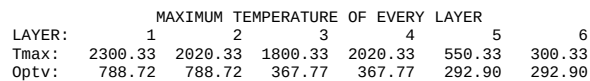
MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES

X 0.7887E+03

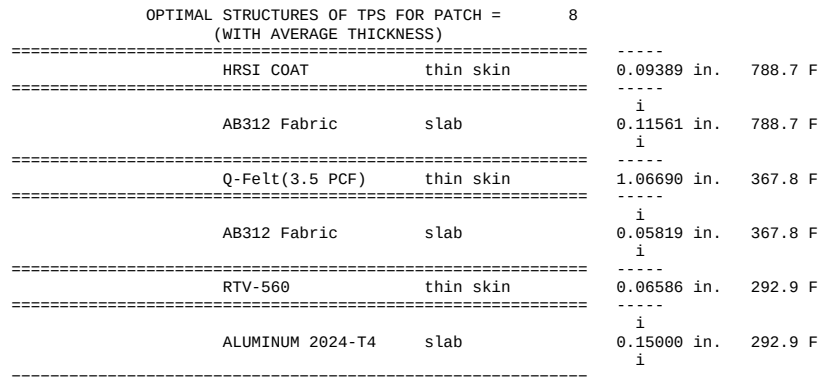
1.0 B

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B



THE ORIGINAL OBJECTIVE FUNCTION = 220.3228912
THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.7153327
THE TOTAL OPTIMAL WEIGHT = 5.66354956E+05



2-52

510	0.12585	212.72	0.08000	212.72	1.00000	187.54	0.05000	162.35	0.05000	153.56	0.15000	144.78
511	0.11652	222.83	0.08434	222.83	1.01013	193.87	0.05051	164.91	0.05051	154.35	0.15000	143.78
512	0.11093	225.82	0.08705	225.82	1.01829	194.88	0.05091	163.93	0.05091	152.36	0.15000	140.78
513	0.10902	222.33	0.08811	222.33	1.02411	191.12	0.05121	159.90	0.05121	148.07	0.15000	136.23
514	0.10987	213.96	0.08795	213.96	1.02799	183.81	0.05139	153.67	0.05144	142.18	0.15000	130.69
515	0.11410	198.07	0.08635	198.07	1.03086	170.69	0.05153	143.31	0.05159	132.87	0.15000	122.43
516	0.12331	172.46	0.08254	172.46	1.03175	150.11	0.05159	127.75	0.05159	119.32	0.15000	110.89
550	0.13178	186.22	0.08720	186.22	1.00328	168.12	0.05015	150.02	0.05024	142.49	0.15000	134.95
551	0.11509	202.25	0.08932	202.25	1.01407	179.14	0.05000	156.03	0.05400	147.34	0.15000	138.66
552	0.10560	208.01	0.09129	208.01	1.02286	182.28	0.05000	156.54	0.05568	147.10	0.15000	137.67
553	0.10116	204.82	0.09265	204.82	1.02967	178.70	0.05012	152.58	0.05648	143.04	0.15000	133.50
554	0.10076	196.12	0.09311	196.12	1.03441	171.01	0.05045	145.89	0.05637	136.65	0.15000	127.41
555	0.10498	179.63	0.09254	179.63	1.03802	157.13	0.05106	134.62	0.05500	126.12	0.15000	117.62
556	0.11586	172.46	0.09010	154.60	1.03912	136.53	0.05195	119.32	0.05197	111.18	0.15000	110.89
590	0.13599	172.46	0.09514	167.99	1.00726	154.64	0.05030	141.28	0.05066	134.73	0.15000	128.18
591	0.11293	183.32	0.09654	183.32	1.01962	165.46	0.05000	147.60	0.05878	140.94	0.15000	134.28
592	0.09829	189.48	0.09833	189.48	1.02999	169.05	0.05000	148.63	0.06286	141.80	0.15000	134.97
593	0.09034	186.85	0.10014	186.85	1.03848	165.85	0.05000	144.84	0.06447	138.10	0.15000	131.36
594	0.08806	177.91	0.10146	177.91	1.04484	157.76	0.05000	137.61	0.06382	131.10	0.15000	124.60
595	0.09210	172.46	0.10208	160.53	1.04989	142.83	0.05082	125.13	0.05996	118.92	0.15000	112.71
596	0.10437	172.46	0.10110	150.11	1.05172	127.75	0.05259	119.32	0.05259	110.89	0.15000	110.89
630	0.13583	173.13	0.10280	173.13	1.01161	157.98	0.05053	142.83	0.05104	136.33	0.15000	129.84
631	0.11012	182.43	0.10600	182.43	1.02639	164.40	0.05000	146.38	0.06429	140.77	0.15000	135.17
632	0.09085	187.55	0.10898	187.55	1.03963	167.28	0.05000	147.02	0.07202	141.93	0.15000	136.84
633	0.07886	186.28	0.11189	186.28	1.05124	164.97	0.05000	143.66	0.07518	138.86	0.15000	134.06
634	0.07413	178.39	0.11403	178.39	1.06061	157.44	0.05019	136.49	0.07371	131.76	0.15000	127.03
635	0.07732	172.46	0.11488	160.20	1.06841	141.68	0.05170	123.17	0.06597	118.23	0.15000	113.28
636	0.08869	172.46	0.11396	150.11	1.07197	127.75	0.05360	119.32	0.05360	110.89	0.15000	110.89
670	0.12784	220.08	0.10758	220.08	1.01521	191.56	0.05076	163.04	0.05076	154.82	0.15000	146.61
671	0.10686	223.89	0.11597	223.89	1.03260	193.23	0.05163	162.57	0.06865	155.34	0.15000	148.11
672	0.08768	232.06	0.12248	232.06	1.04956	197.86	0.05233	163.66	0.08053	156.88	0.15000	150.10
673	0.07432	236.71	0.12720	236.71	1.06539	199.63	0.05327	162.55	0.08577	155.76	0.15000	148.97
674	0.06735	232.84	0.12901	232.84	1.07927	195.12	0.05412	157.40	0.08358	150.39	0.15000	143.38
675	0.06687	215.82	0.12700	215.82	1.09190	180.87	0.05471	145.92	0.07198	138.58	0.15000	131.23
676	0.07285	189.80	0.12225	189.80	1.09939	160.32	0.05497	130.85	0.05497	123.22	0.15000	115.58
710	0.11022	307.66	0.10930	307.66	1.01917	254.43	0.05117	201.20	0.05201	189.59	0.15000	177.98
711	0.10088	313.25	0.12457	313.25	1.03828	255.92	0.05537	198.58	0.07200	186.65	0.15000	174.71
712	0.08896	328.53	0.13612	328.53	1.05882	264.62	0.05871	200.71	0.08648	187.99	0.15000	175.27
713	0.07916	338.97	0.14227	338.97	1.07915	270.27	0.06087	201.56	0.09245	188.04	0.15000	174.51
714	0.07181	339.25	0.14136	339.25	1.09805	269.36	0.06121	199.47	0.08854	185.49	0.15000	171.51
715	0.06556	321.79	0.13118	321.79	1.11654	256.66	0.05891	191.52	0.07217	177.89	0.15000	164.26
716	0.06318	300.56	0.12085	300.56	1.12576	241.71	0.05629	182.86	0.05629	169.92	0.15000	156.97
750	0.08924	415.88	0.10749	415.88	1.02121	332.33	0.05153	248.78	0.05224	232.78	0.15000	216.77
751	0.09485	425.27	0.12969	425.27	1.04091	334.89	0.05959	244.51	0.07260	226.24	0.15000	207.97
752	0.09519	451.93	0.14709	451.93	1.06382	350.42	0.06650	248.91	0.08841	227.77	0.15000	206.63
753	0.09263	470.95	0.15517	470.95	1.08800	361.89	0.07039	252.82	0.09529	229.64	0.15000	206.45
754	0.08501	475.18	0.15045	475.18	1.11202	364.88	0.06972	254.58	0.09098	230.97	0.15000	207.36
755	0.06974	458.94	0.12980	458.94	1.13658	355.81	0.06322	252.68	0.07289	230.86	0.15000	209.04
756	0.05874	457.24	0.11133	457.24	1.15106	357.32	0.05755	257.39	0.05755	236.63	0.15000	215.86
790	0.06869	517.61	0.10342	517.61	1.02178	405.81	0.05146	294.00	0.05173	273.93	0.15000	253.85
791	0.08792	532.25	0.13127	532.25	1.04120	410.69	0.06293	289.13	0.07143	264.86	0.15000	240.58
792	0.10132	567.38	0.15414	567.38	1.06524	430.98	0.07327	294.59	0.08774	265.41	0.15000	236.23
793	0.10739	593.14	0.16468	593.14	1.09237	446.81	0.07909	300.49	0.09559	267.99	0.15000	235.49
794	0.10034	599.42	0.15677	599.42	1.12063	452.25	0.07753	305.07	0.09172	272.30	0.15000	239.53
795	0.07807	586.99	0.12820	586.99	1.14942	448.22	0.06774	309.46	0.07456	279.69	0.15000	249.92
796	0.05825	570.56	0.10223	570.56	1.16584	441.07	0.05829	311.58	0.05829	285.06	0.15000	258.55
830	0.05109	599.57	0.09889	599.57	1.02171	465.18	0.05109	330.78	0.05109	307.54	0.15000	284.29
831	0.08100	614.97	0.13081	614.97	1.04061	469.55	0.06500	324.13	0.06993	295.36	0.15000	266.59
832	0.10484	650.10	0.15776	650.10	1.06504	488.88	0.07774	327.65	0.08639	292.77	0.15000	257.88
833	0.11797	677.28	0.17046	677.28	1.09392	505.31	0.08502	333.34	0.09499	294.33	0.15000	255.31
834	0.11216	677.28	0.16094	677.28	1.12463	508.46	0.08303	339.22	0.09184	300.04	0.15000	260.86
835	0.08681	675.63	0.12863	675.63	1.15550	508.46	0.07169	347.87	0.07627	312.23	0.15000	276.59
836	0.05882	661.68	0.09412	661.68	1.17647	508.46	0.05882	355.24	0.05882	324.07	0.15000	292.90

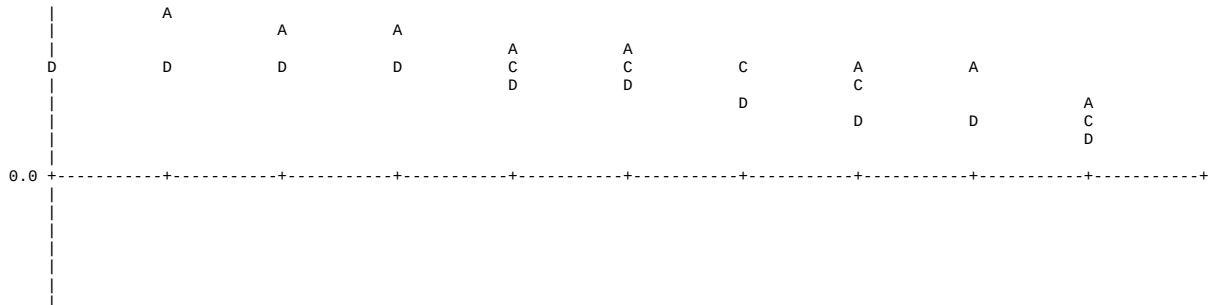
OPTIMIZATION SYSTEM FOR TPSSYM = 9

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINS = 976
TOTAL NUMBER OF TEMP. CONSTRAINS = 880
TOTAL NUMBER OF TEMP. PRINTOUTS = 11

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES

X 0.5062E+03

1.0 A

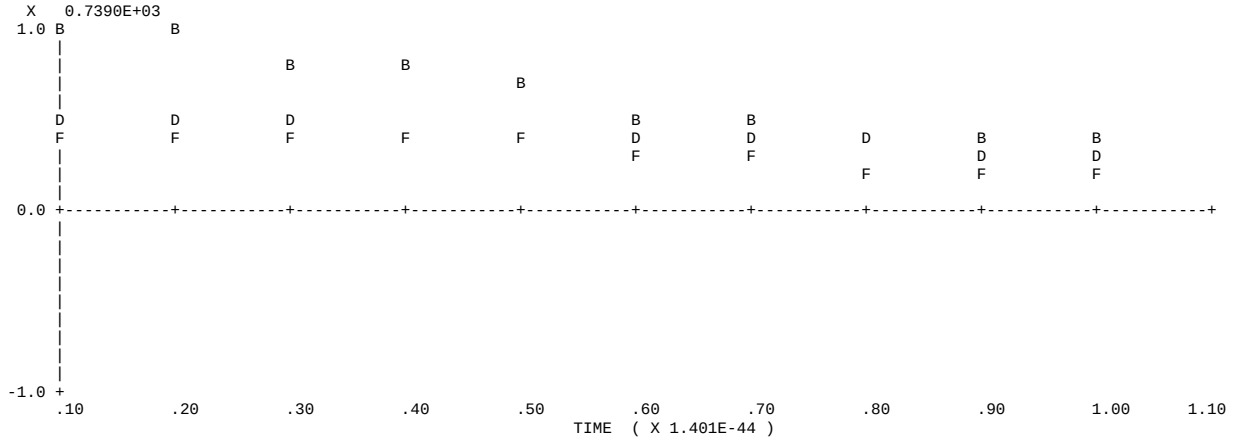


910	0.08000	365.19	0.30000	343.39	0.40000	320.86	0.10000	300.33
911	0.14962	428.86	0.30169	350.33	0.40226	325.47	0.10000	300.33
912	0.21294	491.88	0.30324	350.33	0.40432	325.47	0.10000	300.33
913	0.24428	506.20	0.30401	350.33	0.40535	324.19	0.10000	300.33
914	0.22484	463.17	0.30354	325.25	0.40472	301.10	0.10000	280.54
915	0.15476	363.28	0.30183	284.67	0.40244	264.33	0.10000	249.76
916	0.08000	263.89	0.30000	248.06	0.40000	231.76	0.10000	222.71
950	0.08000	470.10	0.30000	350.33	0.40000	299.29	0.10000	283.94
951	0.11485	422.38	0.30093	343.98	0.40124	304.10	0.10000	286.01
952	0.16004	389.77	0.30210	348.67	0.40279	321.02	0.10000	297.83
953	0.19839	393.46	0.30304	350.32	0.40405	325.46	0.10000	300.33
954	0.18453	381.63	0.30268	341.83	0.40358	309.72	0.10000	287.61
955	0.13386	379.22	0.30138	328.87	0.40184	279.76	0.10000	264.53
956	0.08000	384.38	0.30000	318.41	0.40000	252.03	0.10000	243.53
990	0.08000	269.03	0.30000	257.08	0.40000	244.84	0.10000	236.88
991	0.08000	287.34	0.30000	270.65	0.40000	253.47	0.10000	244.50
992	0.08000	302.70	0.30000	281.94	0.40000	260.51	0.10000	250.63
993	0.08000	308.72	0.30000	286.15	0.40000	262.82	0.10000	252.41
994	0.08000	300.90	0.30000	279.93	0.40000	258.24	0.10000	247.93
995	0.08000	279.09	0.30000	263.18	0.40000	246.73	0.10000	237.17
996	0.08000	256.77	0.30000	246.15	0.40000	235.20	0.10000	226.50

OPTIMIZATION SYSTEM FOR TPSSYM = 10

TOTAL NUMBER OF DESIGN VARIABLES = 45
TOTAL NUMBER OF CONSTRAINTS = 1344
TOTAL NUMBER OF TEMP. CONSTRAINTS = 594
TOTAL NUMBER OF TEMP. PRINTOUTS = 11

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4	5	6
Tmax:	2300.33	2020.33	1800.33	2020.33	550.33	300.33
Optv:	738.99	738.99	350.96	350.96	296.45	296.45

VALUES OF DESIGN VARIABLES :

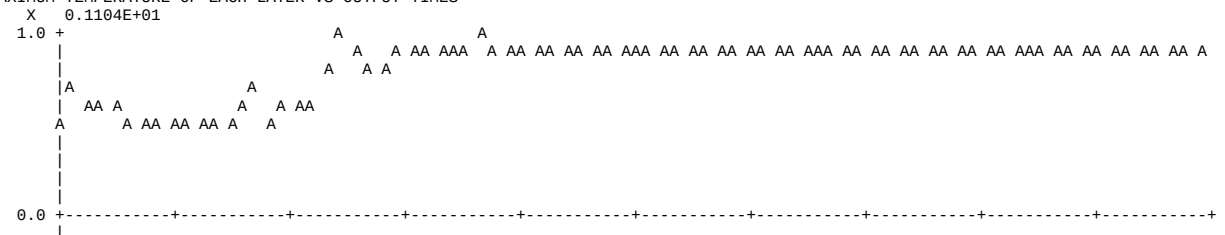
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.09460	0.16549	0.05000	0.15318	0.22170	0.17325	0.05000	0.06563	0.06392
2	0.11396	0.13766	0.08000	0.14082	0.13967	0.15177	0.16372	0.16463	0.08000
3	1.02025	1.02691	1.00000	1.00000	1.00000	1.03522	1.00000	1.00000	1.00000
4	0.05000	0.10737	0.05000	0.07784	0.15291	0.09079	0.06525	0.06200	0.05000
5	0.10929	0.07403	0.05000	0.07269	0.06720	0.06555	0.05000	0.05000	0.05000

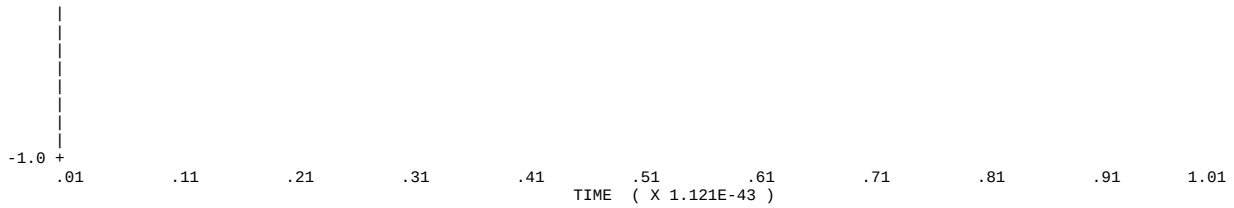
THE ORIGINAL OBJECTIVE FUNCTION = 293.9654846

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.9512293

THE TOTAL OPTIMAL WEIGHT = 8.93290402E+05

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES





OPTIMAL STRUCTURES OF TPS FOR PATCH = 10 (WITH AVERAGE THICKNESS)			
=====			
HRSI COAT	thin skin	0.11533 in.	739.0 F
=====			
AB312 Fabric	slab	0.13028 in.	739.0 F
=====			
Q-Felt(3.5 PCF)	thin skin	1.00949 in.	351.0 F
=====			
AB312 Fabric	slab	0.07848 in.	351.0 F
=====			
RTV-560	thin skin	0.06544 in.	296.4 F
=====			
ALUMINUM 2024-T4	slab	0.15000 in.	296.4 F
=====			

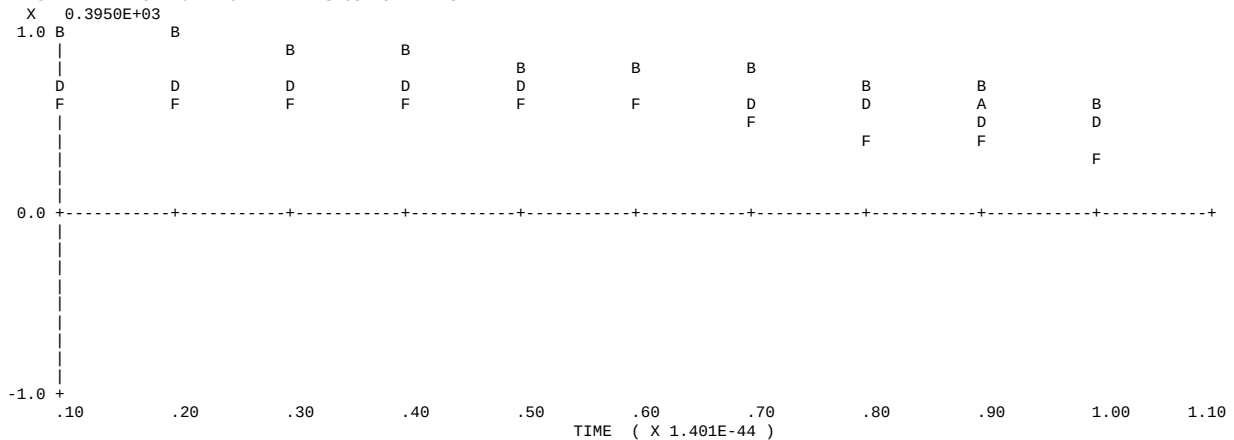
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 10										
PANEL	LAYER01	LAYER02	LAYER03	LAYER04	LAYER05	LAYER06				
1030	0.06392	464.58	0.08000	464.58	1.00000	386.17	0.05000	307.75	0.05000	295.47
1031	0.07003	560.77	0.11244	560.77	1.00073	441.13	0.05617	321.48	0.05050	303.45
1032	0.06928	659.76	0.14132	659.76	1.00015	498.96	0.05980	338.16	0.05026	314.90
1033	0.06563	738.99	0.16463	738.99	1.00000	544.98	0.06200	350.96	0.05000	323.71
1034	0.06221	738.99	0.17601	738.99	0.99998	544.98	0.06461	350.96	0.05002	323.71
1035	0.05580	738.99	0.17339	738.99	0.99999	544.98	0.06549	349.21	0.05001	320.57
1036	0.05000	718.22	0.16372	718.22	1.00000	529.64	0.06525	341.06	0.05000	314.22
1070	0.08589	449.84	0.09547	449.84	1.00663	371.34	0.05840	292.83	0.05299	279.08
1071	0.09608	530.71	0.12291	530.71	1.00489	417.69	0.06968	304.67	0.05355	284.69
1072	0.09842	609.50	0.14493	609.50	1.00167	464.20	0.07722	318.91	0.05321	293.72
1073	0.09543	671.77	0.16181	671.77	0.99920	500.89	0.08040	330.02	0.05261	301.36
1074	0.08901	700.12	0.17028	700.12	0.99797	516.99	0.07974	333.85	0.05201	304.11
1075	0.07827	687.86	0.16827	687.86	0.99798	508.58	0.07445	329.29	0.05136	301.33
1076	0.07007	661.78	0.16205	661.78	0.99858	492.31	0.06915	322.84	0.05095	297.27
1110	0.11169	428.52	0.11221	428.52	1.01401	351.56	0.06871	274.61	0.05647	259.16
1111	0.12789	487.04	0.13307	487.04	1.00929	385.13	0.08680	283.22	0.05718	261.00
1112	0.13520	538.90	0.14708	538.90	1.00310	416.21	0.09944	293.53	0.05691	266.12
1113	0.13369	580.27	0.15693	580.27	0.99819	441.12	0.10367	301.98	0.05608	271.78
1114	0.12404	604.34	0.16238	604.34	0.99573	455.24	0.09882	306.15	0.05495	275.97
1115	0.10761	598.73	0.16194	598.73	0.99585	450.60	0.08486	302.47	0.05369	275.66
1116	0.08749	611.16	0.16029	611.16	0.99752	458.79	0.07236	306.43	0.05218	282.04
1150	0.13763	402.15	0.12779	402.15	1.02129	328.54	0.07927	254.93	0.05996	237.89
1151	0.15997	434.17	0.14073	434.17	1.01343	347.00	0.10439	259.83	0.06082	235.57
1152	0.17256	457.49	0.14678	457.49	1.00466	361.59	0.12187	265.69	0.06079	236.39
1153	0.17312	478.08	0.15044	478.08	0.99781	374.53	0.12692	270.98	0.06011	239.60
1154	0.16183	495.68	0.15325	495.68	0.99432	385.03	0.11852	274.38	0.05895	244.07
1155	0.13983	498.53	0.15463	498.53	0.99445	385.15	0.09566	271.77	0.05766	246.37
1156	0.12425	495.26	0.15480	495.26	0.99616	381.86	0.07824	268.45	0.05694	247.04
1190	0.15856	375.89	0.14010	375.89	1.02768	306.30	0.08743	236.71	0.06289	218.57
1191	0.18496	383.84	0.14512	383.84	1.01719	311.30	0.11781	238.76	0.06378	213.24
1192	0.20136	384.11	0.14491	384.11	1.00703	312.57	0.13847	241.03	0.06413	210.75
1193	0.20455	387.27	0.14420	387.27	0.99938	315.24	0.14448	243.21	0.06414	211.35
1194	0.19413	396.86	0.14478	396.86	0.99525	320.94	0.13500	245.01	0.06381	214.79
1195	0.16932	405.53	0.14656	405.53	0.99485	324.38	0.10744	243.24	0.06360	218.66
1196	0.14601	409.99	0.14832	409.99	0.99700	324.92	0.08004	239.85	0.06377	221.07
1230	0.17063	356.03	0.14815	356.03	1.03248	289.36	0.09126	222.69	0.06479	204.11
1231	0.19837	347.33	0.14673	347.33	1.02031	285.45	0.12443	223.58	0.06555	197.71
1232	0.21650	333.80	0.14286	333.80	1.01009	278.82	0.14629	223.84	0.06634	193.52
1233	0.22189	325.84	0.14000	325.84	1.00303	274.78	0.15307	223.71	0.06738	192.10
1234	0.21395	328.65	0.13904	328.65	0.99901	276.35	0.14502	224.06	0.06839	194.05
1235	0.19031	338.29	0.13945	338.29	0.99786	280.58	0.11899	222.87	0.07009	198.10
1236	0.15318	354.21	0.14082	354.21	1.00000	287.23	0.07784	220.25	0.07269	203.78
1270	0.17325	345.52	0.15177	345.52	1.03522	279.84	0.09079	214.15	0.06555	195.71
1271	0.20230	326.13	0.14570	326.13	1.02158	270.65	0.12680	215.16	0.06618	189.25
1272	0.22066	324.27	0.14045	306.11	1.01217	260.32	0.14819	214.54	0.06749	184.55
1273	0.22558	324.27	0.13758	295.20	1.00671	254.29	0.15335	213.38	0.06960	182.59
1274	0.21801	324.27	0.13628	295.23	1.00385	253.91	0.14498	212.60	0.07210	183.59
1275	0.19395	324.27	0.13534	305.52	1.00293	258.54	0.11955	211.55	0.07594	187.63
1276	0.15079	328.47	0.13384	328.47	1.00409	269.60	0.07572	210.74	0.08145	195.42
1310	0.17107	341.15	0.15083	341.15	1.03463	275.90	0.09077	210.65	0.06537	191.99
1311	0.19984	324.27	0.14280	316.08	1.02150	263.98	0.12634	211.87	0.06601	186.12
1312	0.21772	324.27	0.13830	295.19	1.01379	253.06	0.14596	210.94	0.06791	181.57
1313	0.22192	324.27	0.13648	285.09	1.01008	247.22	0.14942	209.35	0.07096	179.53
1314	0.21403	324.27	0.13545	285.27	1.00845	246.69	0.14053	208.11	0.07468	180.17
1315	0.18925	324.27	0.13352	296.65	1.00797	251.94	0.11565	207.23	0.08038	184.24
1316	0.14178	324.27	0.12871	323.31	1.00808	265.50	0.07109	207.70	0.08854	193.35
1350	0.16168	342.11	0.14567	342.11	1.03210	276.62	0.08796	211.14	0.06426	192.63

1351	0.19220	324.27	0.13872	313.61	1.02091	262.71	0.12301	211.81	0.06529	186.57	0.15000	161.32
1352	0.21098	324.27	0.13640	293.21	1.01531	251.74	0.14141	210.28	0.06794	181.71	0.15000	159.69
1353	0.21520	324.27	0.13604	284.60	1.01315	246.46	0.14384	208.32	0.07188	179.49	0.15000	159.69
1354	0.20713	324.27	0.13547	285.84	1.01246	246.36	0.13469	206.89	0.07659	179.97	0.15000	159.69
1355	0.18195	324.27	0.13280	298.26	1.01219	252.23	0.11048	206.20	0.08368	184.07	0.15000	161.93
1356	0.13222	326.11	0.12507	326.11	1.01117	266.78	0.06651	207.44	0.09374	193.81	0.15000	180.18
1390	0.14211	350.09	0.13452	350.09	1.02668	283.44	0.08144	216.80	0.06183	198.91	0.15000	181.02
1391	0.17754	324.27	0.13264	318.79	1.01968	266.97	0.11595	215.14	0.06383	190.85	0.15000	166.55
1392	0.19946	324.27	0.13431	298.51	1.01708	255.25	0.13385	211.99	0.06762	184.54	0.15000	159.69
1393	0.20531	324.27	0.13600	290.61	1.01655	249.88	0.13623	209.16	0.07266	181.48	0.15000	159.69
1394	0.19797	324.27	0.13594	292.25	1.01647	249.79	0.12748	207.33	0.07837	181.51	0.15000	159.69
1395	0.17307	324.27	0.13242	304.63	1.01600	255.62	0.10437	206.61	0.08664	185.38	0.15000	164.14
1396	0.12280	331.67	0.12207	331.67	1.01369	269.94	0.06207	208.22	0.09803	195.20	0.15000	182.19
1430	0.10514	369.92	0.11287	369.92	1.01610	300.65	0.06888	231.39	0.05713	214.82	0.15000	198.25
1431	0.15057	336.62	0.12270	336.62	1.01712	280.45	0.10263	224.28	0.06105	201.67	0.15000	179.07
1432	0.17900	324.27	0.13157	315.58	1.01944	266.58	0.12066	217.57	0.06673	191.90	0.15000	166.23
1433	0.18869	324.27	0.13648	306.82	1.02124	259.76	0.12398	212.69	0.07342	186.70	0.15000	160.71
1434	0.18348	324.27	0.13708	307.21	1.02187	258.50	0.11664	209.79	0.08054	185.46	0.15000	161.12
1435	0.15994	324.27	0.13223	317.51	1.02089	263.01	0.09573	208.51	0.09035	188.43	0.15000	168.34
1436	0.11008	341.40	0.11830	341.40	1.01677	275.77	0.05641	210.13	0.10331	197.82	0.15000	185.50
1470	0.05000	403.17	0.08000	403.17	1.00000	329.73	0.05000	256.29	0.05000	241.82	0.15000	227.35
1471	0.11117	369.51	0.10918	369.51	1.01311	304.83	0.08296	240.16	0.05692	219.95	0.15000	199.74
1472	0.14968	346.63	0.12847	346.63	1.02213	287.19	0.10198	227.74	0.06520	204.43	0.15000	181.12
1473	0.16549	334.93	0.13766	334.93	1.02691	277.23	0.10737	219.53	0.07403	195.65	0.15000	171.76
1474	0.16392	331.89	0.13900	331.89	1.02833	273.32	0.10252	214.74	0.08290	192.18	0.15000	169.61
1475	0.14306	337.42	0.13233	337.42	1.02663	274.82	0.08509	212.21	0.09452	193.41	0.15000	174.61
1476	0.09460	355.46	0.11396	355.46	1.02025	284.41	0.05000	213.36	0.10929	201.72	0.15000	190.09

OPTIMIZATION SYSTEM FOR TPSSYM = 11

TOTAL NUMBER OF DESIGN VARIABLES = 30
TOTAL NUMBER OF CONSTRAINTS = 1198
TOTAL NUMBER OF TEMP. CONSTRAINTS = 858
TOTAL NUMBER OF TEMP. PRINTOUTS = 11

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4	5	6
Tmax:	2300.33	2020.33	1800.33	2020.33	550.33	300.33
Optv:	394.95	394.95	287.23	287.23	255.73	255.73

VALUES OF DESIGN VARIABLES :

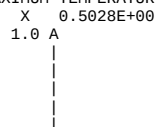
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06
1	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
2	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000
3	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
5	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

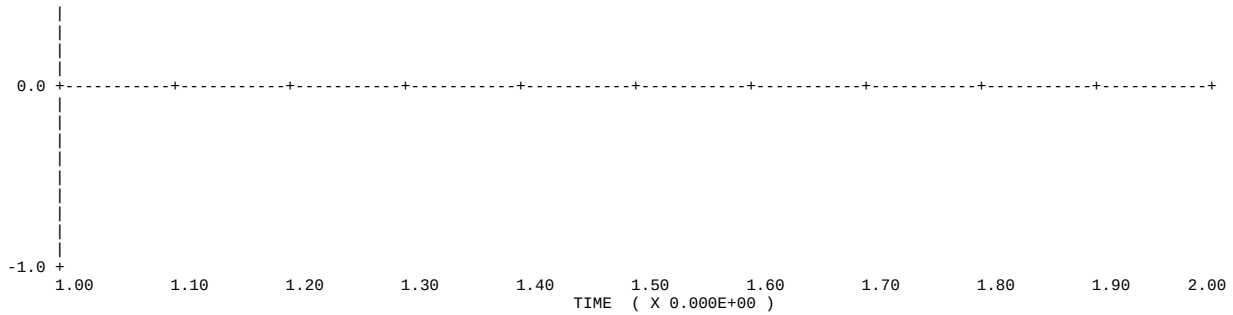
THE ORIGINAL OBJECTIVE FUNCTION = 139.8500061

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.5028006

THE TOTAL OPTIMAL WEIGHT = 3.41962291E+05

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES





OPTIMAL STRUCTURES OF TPS FOR PATCH = 11 (WITH AVERAGE THICKNESS)			
=====	HRSI COAT	thin skin	0.05000 in. 395.0 F
=====			-----
			i
	AB312 Fabric	slab	0.08000 in. 395.0 F
			i
=====			-----
	Q-Felt(3.5 PCF)	thin skin	1.00000 in. 287.2 F
=====			-----
			i
	AB312 Fabric	slab	0.05000 in. 287.2 F
			i
=====			-----
	RTV-560	thin skin	0.05000 in. 255.7 F
=====			-----
			i
	ALUMINUM 2024-T4	slab	0.15000 in. 255.7 F
			i
=====			-----

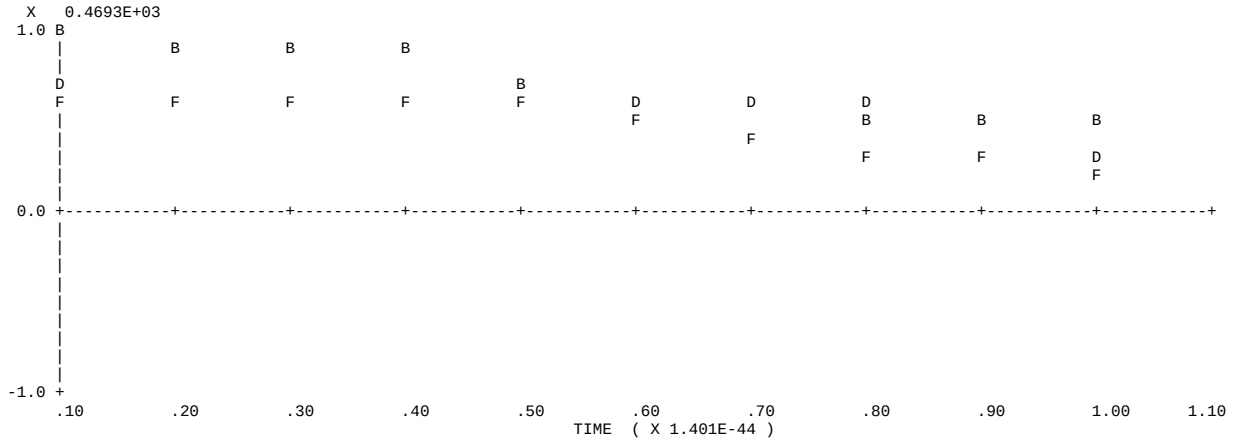
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 11

PANEL	LAYER01		LAYER02		LAYER03		LAYER04		LAYER05		LAYER06	
517	0.05000	185.54	0.08000	185.54	1.00000	158.19	0.05000	130.84	0.05000	119.88	0.15000	108.92
518	0.05000	184.12	0.08000	184.12	1.00000	156.45	0.05000	128.78	0.05000	117.96	0.15000	107.15
519	0.05000	183.00	0.08000	183.00	1.00000	154.96	0.05000	126.92	0.05000	116.24	0.15000	105.57
520	0.05000	181.66	0.08000	181.66	1.00000	153.32	0.05000	124.98	0.05000	114.49	0.15000	104.01
557	0.05000	181.66	0.08000	179.99	1.00000	153.39	0.05000	126.79	0.05000	115.55	0.15000	104.32
558	0.05000	181.66	0.08000	181.18	1.00000	153.53	0.05000	125.87	0.05000	114.83	0.15000	104.01
559	0.05000	182.46	0.08000	182.46	1.00000	153.74	0.05000	125.02	0.05000	114.16	0.15000	104.01
560	0.05000	183.87	0.08000	183.87	1.00000	154.01	0.05000	124.15	0.05000	113.54	0.15000	104.01
597	0.05000	181.66	0.08000	174.61	1.00000	148.76	0.05000	122.92	0.05000	111.21	0.15000	104.01
598	0.05000	181.66	0.08000	179.02	1.00000	151.11	0.05000	123.20	0.05000	111.75	0.15000	104.01
599	0.05000	183.39	0.08000	183.39	1.00000	153.43	0.05000	123.47	0.05000	112.27	0.15000	104.01
600	0.05000	188.38	0.08000	188.38	1.00000	156.09	0.05000	123.80	0.05000	112.92	0.15000	104.01
637	0.05000	181.66	0.08000	177.05	1.00000	150.92	0.05000	124.80	0.05000	112.37	0.15000	104.01
638	0.05000	183.43	0.08000	183.43	1.00000	154.32	0.05000	125.22	0.05000	113.09	0.15000	104.01
639	0.05000	189.93	0.08000	189.93	1.00000	157.83	0.05000	125.72	0.05000	113.89	0.15000	104.01
640	0.05000	197.44	0.08000	197.44	1.00000	161.82	0.05000	126.20	0.05000	114.73	0.15000	104.01
677	0.05000	200.08	0.08000	200.08	1.00000	171.15	0.05000	142.21	0.05000	128.85	0.15000	115.50
678	0.05000	203.59	0.08000	203.59	1.00000	171.64	0.05000	139.69	0.05000	126.59	0.15000	113.50
679	0.05000	207.87	0.08000	207.87	1.00000	172.73	0.05000	137.59	0.05000	124.75	0.15000	111.91
680	0.05000	212.75	0.08000	212.75	1.00000	173.85	0.05000	134.96	0.05000	122.42	0.15000	109.89
717	0.05000	247.91	0.08000	247.91	1.00000	212.27	0.05000	176.63	0.05000	162.37	0.15000	148.11
718	0.05000	242.04	0.08000	242.04	1.00000	204.88	0.05000	167.73	0.05000	153.57	0.15000	139.42
719	0.05000	237.63	0.08000	237.63	1.00000	198.70	0.05000	159.76	0.05000	145.68	0.15000	131.60
720	0.05000	232.65	0.08000	232.65	1.00000	191.70	0.05000	150.75	0.05000	136.76	0.15000	122.76
757	0.05000	302.19	0.08000	302.19	1.00000	259.67	0.05000	217.15	0.05000	202.12	0.15000	187.10
758	0.05000	283.95	0.08000	283.95	1.00000	241.93	0.05000	199.90	0.05000	184.75	0.15000	169.61
759	0.05000	268.20	0.08000	268.20	1.00000	226.38	0.05000	184.56	0.05000	169.27	0.15000	153.98
760	0.05000	251.82	0.08000	251.82	1.00000	210.20	0.05000	168.59	0.05000	153.15	0.15000	137.70
797	0.05000	349.03	0.08000	349.03	1.00000	300.83	0.05000	252.62	0.05000	237.13	0.15000	221.65
798	0.05000	318.55	0.08000	318.55	1.00000	272.85	0.05000	227.15	0.05000	211.31	0.15000	195.46
799	0.05000	291.79	0.08000	291.79	1.00000	248.20	0.05000	204.61	0.05000	188.42	0.15000	172.22
800	0.05000	265.92	0.08000	265.92	1.00000	224.36	0.05000	182.80	0.05000	166.27	0.15000	149.74
837	0.05000	380.30	0.08000	380.30	1.00000	328.26	0.05000	276.23	0.05000	260.55	0.15000	244.86
838	0.05000	341.65	0.08000	341.65	1.00000	293.53	0.05000	245.42	0.05000	229.19	0.15000	212.96
839	0.05000	306.64	0.08000	306.64	1.00000	262.06	0.05000	217.48	0.05000	200.74	0.15000	184.00
840	0.05000	274.39	0.08000	274.39	1.00000	233.03	0.05000	191.68	0.05000	174.49	0.15000	157.31
877	0.05000	394.95	0.08000	394.95	1.00000	341.09	0.05000	287.23	0.05000	271.48	0.15000	255.73
878	0.05000	352.31	0.08000	352.31	1.00000	303.07	0.05000	253.83	0.05000	237.45	0.15000	221.06
879	0.05000	313.04	0.08000	313.04	1.00000	268.05	0.05000	223.07	0.05000	206.10	0.15000	189.12
880	0.05000	278.34	0.08000	278.34	1.00000	237.11	0.05000	195.89	0.05000	178.40	0.15000	160.90

OPTIMIZATION SYSTEM FOR TPSSYM = 12

TOTAL NUMBER OF DESIGN VARIABLES = 30
TOTAL NUMBER OF CONSTRAINS = 856
TOTAL NUMBER OF TEMP. CONSTRAINS = 396
TOTAL NUMBER OF TEMP. PRINTOUTS = 11

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4	5	6
Tmax:	2300.33	2020.33	1800.33	2020.33	550.33	300.33
Optv:	469.31	469.31	335.77	335.77	283.75	283.75

VALUES OF DESIGN VARIABLES :

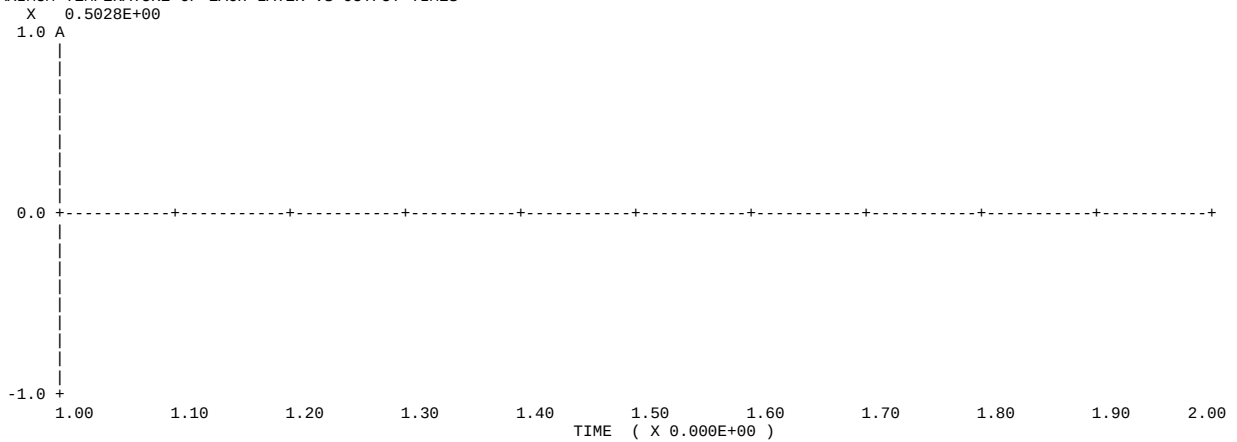
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06
1	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
2	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000
3	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
5	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 181.8050079

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.5028006

THE TOTAL OPTIMAL WEIGHT = 4.49206701E+05

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



OPTIMAL STRUCTURES OF TPS FOR PATCH = 12
(WITH AVERAGE THICKNESS)

=====	HRSI COAT	thin skin	0.05000 in.	469.3 F
=====				
=====	AB312 Fabric	slab	0.08000 in.	469.3 F
=====				
=====	Q-Felt(3.5 PCF)	thin skin	1.00000 in.	335.8 F
=====				
=====	AB312 Fabric	slab	0.05000 in.	335.8 F
=====				
=====	RTV-560	thin skin	0.05000 in.	283.7 F
=====				
=====	ALUMINUM 2024-T4	slab	0.15000 in.	283.7 F
=====				

=====

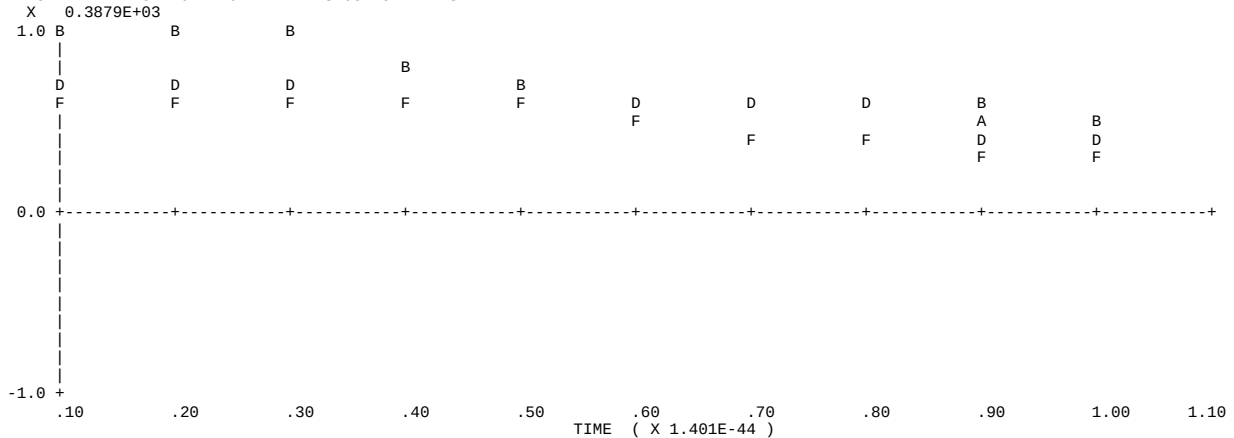
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 12

PANEL	LAYER01		LAYER02		LAYER03		LAYER04		LAYER05		LAYER06	
997	0.05000	469.31	0.08000	469.31	1.00000	402.54	0.05000	335.77	0.05000	309.76	0.15000	283.75
998	0.05000	458.94	0.08000	458.94	1.00000	390.14	0.05000	321.34	0.05000	298.69	0.15000	276.05
999	0.05000	449.62	0.08000	449.62	1.00000	379.00	0.05000	308.37	0.05000	288.75	0.15000	269.13
1000	0.05000	441.24	0.08000	441.24	1.00000	368.98	0.05000	296.72	0.05000	279.82	0.15000	262.91
1037	0.05000	465.14	0.08000	465.14	1.00000	397.97	0.05000	330.80	0.05000	305.70	0.15000	280.61
1038	0.05000	455.83	0.08000	455.83	1.00000	386.87	0.05000	317.91	0.05000	295.80	0.15000	273.69
1039	0.05000	447.20	0.08000	447.20	1.00000	376.57	0.05000	305.95	0.05000	286.62	0.15000	267.28
1040	0.05000	439.02	0.08000	439.02	1.00000	366.84	0.05000	294.66	0.05000	277.93	0.15000	261.21
1077	0.05000	457.48	0.08000	457.48	1.00000	389.65	0.05000	321.82	0.05000	298.33	0.15000	274.83
1078	0.05000	449.45	0.08000	449.45	1.00000	380.19	0.05000	310.93	0.05000	289.89	0.15000	268.86
1079	0.05000	441.92	0.08000	441.92	1.00000	371.28	0.05000	300.65	0.05000	281.96	0.15000	263.26
1080	0.05000	434.54	0.08000	434.54	1.00000	362.53	0.05000	290.52	0.05000	274.15	0.15000	257.78
1117	0.05000	445.43	0.08000	445.43	1.00000	376.76	0.05000	308.08	0.05000	286.92	0.15000	265.75
1118	0.05000	438.99	0.08000	438.99	1.00000	369.35	0.05000	299.72	0.05000	280.34	0.15000	260.96
1119	0.05000	432.84	0.08000	432.84	1.00000	362.23	0.05000	291.62	0.05000	274.00	0.15000	256.39
1120	0.05000	426.52	0.08000	426.52	1.00000	354.84	0.05000	283.17	0.05000	267.43	0.15000	251.68
1157	0.05000	429.59	0.08000	429.59	1.00000	360.12	0.05000	290.65	0.05000	272.25	0.15000	253.86
1158	0.05000	424.60	0.08000	424.60	1.00000	354.66	0.05000	284.72	0.05000	267.44	0.15000	250.16
1159	0.05000	419.73	0.08000	419.73	1.00000	349.28	0.05000	278.83	0.05000	262.69	0.15000	246.54
1160	0.05000	414.39	0.08000	414.39	1.00000	343.33	0.05000	272.26	0.05000	257.42	0.15000	242.58
1197	0.05000	412.61	0.08000	412.61	1.00000	342.62	0.05000	272.62	0.05000	256.91	0.15000	241.20
1198	0.05000	408.60	0.08000	408.60	1.00000	338.59	0.05000	268.58	0.05000	253.43	0.15000	238.29
1199	0.05000	404.70	0.08000	404.70	1.00000	334.65	0.05000	264.60	0.05000	250.02	0.15000	235.45
1200	0.05000	400.22	0.08000	400.22	1.00000	330.08	0.05000	259.93	0.05000	246.06	0.15000	232.18
1237	0.05000	398.92	0.08000	398.92	1.00000	328.81	0.05000	258.71	0.05000	244.90	0.15000	231.08
1238	0.05000	395.37	0.08000	395.37	1.00000	325.62	0.05000	255.87	0.05000	242.26	0.15000	228.64
1239	0.05000	392.04	0.08000	392.04	1.00000	322.62	0.05000	253.20	0.05000	239.77	0.15000	226.35
1240	0.05000	388.14	0.08000	388.14	1.00000	319.08	0.05000	250.02	0.05000	236.83	0.15000	223.65
1277	0.05000	389.86	0.08000	389.86	1.00000	320.11	0.05000	250.36	0.05000	237.43	0.15000	224.50
1278	0.05000	386.76	0.08000	386.76	1.00000	317.55	0.05000	248.34	0.05000	235.44	0.15000	222.53
1279	0.05000	383.86	0.08000	383.86	1.00000	315.17	0.05000	246.47	0.05000	233.58	0.15000	220.70
1280	0.05000	380.48	0.08000	380.48	1.00000	312.38	0.05000	244.27	0.05000	231.41	0.15000	218.55
1317	0.05000	384.91	0.08000	384.91	1.00000	315.63	0.05000	246.35	0.05000	233.66	0.15000	220.97
1318	0.05000	382.01	0.08000	382.01	1.00000	313.36	0.05000	244.71	0.05000	232.00	0.15000	219.28
1319	0.05000	379.39	0.08000	379.39	1.00000	311.31	0.05000	243.23	0.05000	230.50	0.15000	217.76
1320	0.05000	376.31	0.08000	376.31	1.00000	308.90	0.05000	241.48	0.05000	228.72	0.15000	215.96
1357	0.05000	382.23	0.08000	382.23	1.00000	313.37	0.05000	244.51	0.05000	231.81	0.15000	219.11
1358	0.05000	379.52	0.08000	379.52	1.00000	311.30	0.05000	243.07	0.05000	230.35	0.15000	217.64
1359	0.05000	377.06	0.08000	377.06	1.00000	309.41	0.05000	241.76	0.05000	229.03	0.15000	216.31
1360	0.05000	374.12	0.08000	374.12	1.00000	307.15	0.05000	240.19	0.05000	227.45	0.15000	214.70
1397	0.05000	380.58	0.08000	380.58	1.00000	312.07	0.05000	243.56	0.05000	230.77	0.15000	217.98
1398	0.05000	377.97	0.08000	377.97	1.00000	310.09	0.05000	242.21	0.05000	229.43	0.15000	216.65
1399	0.05000	375.55	0.08000	375.55	1.00000	308.25	0.05000	240.95	0.05000	228.18	0.15000	215.41
1400	0.05000	372.62	0.08000	372.62	1.00000	306.02	0.05000	239.41	0.05000	226.66	0.15000	213.90
1437	0.05000	378.99	0.08000	378.99	1.00000	310.94	0.05000	242.90	0.05000	229.91	0.15000	216.93
1438	0.05000	376.47	0.08000	376.47	1.00000	309.03	0.05000	241.59	0.05000	228.66	0.15000	215.73
1439	0.05000	374.03	0.08000	374.03	1.00000	307.17	0.05000	240.31	0.05000	227.44	0.15000	214.57
1440	0.05000	371.05	0.08000	371.05	1.00000	304.90	0.05000	238.75	0.05000	225.95	0.15000	213.15
1477	0.05000	377.67	0.08000	377.67	1.00000	310.18	0.05000	242.69	0.05000	229.39	0.15000	216.09
1478	0.05000	375.21	0.08000	375.21	1.00000	308.29	0.05000	241.37	0.05000	228.19	0.15000	215.02
1479	0.05000	372.74	0.08000	372.74	1.00000	306.38	0.05000	240.03	0.05000	226.99	0.15000	213.94
1480	0.05000	369.69	0.08000	369.69	1.00000	304.04	0.05000	238.39	0.05000	225.50	0.15000	212.62

OPTIMIZATION SYSTEM FOR TPSSYM = 13

TOTAL NUMBER OF DESIGN VARIABLES = 45
TOTAL NUMBER OF CONSTRAINS = 1702
TOTAL NUMBER OF TEMP. CONSTRAINS = 792
TOTAL NUMBER OF TEMP. PRINTOUTS = 11

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4	5	6
Tmax:	2300.33	2020.33	1800.33	2020.33	550.33	300.33
Optv:	387.91	387.91	270.21	270.21	236.06	236.06

VALUES OF DESIGN VARIABLES :

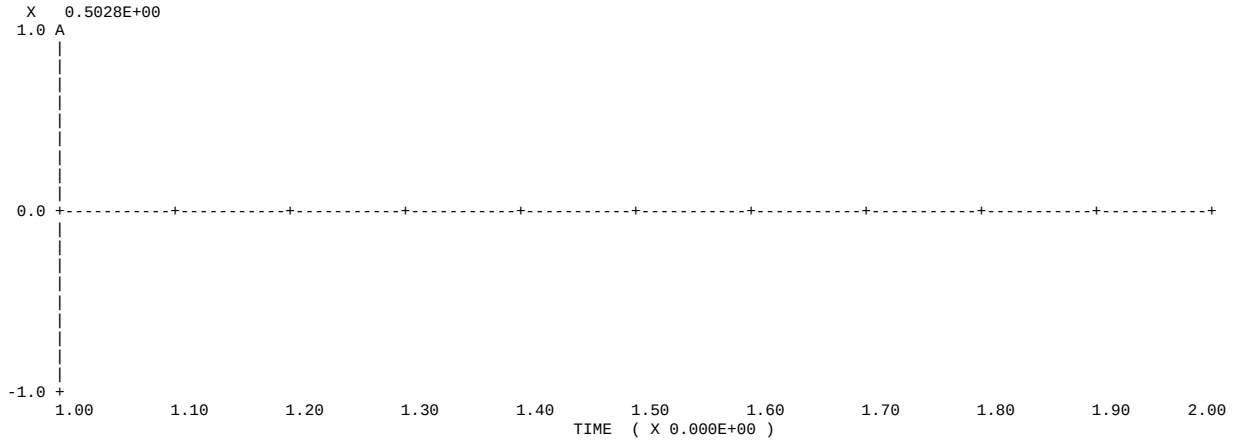
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
2	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000	0.08000
3	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
5	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 349.5949707

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.5028266

THE TOTAL OPTIMAL WEIGHT = 3.55799600E+05

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



OPTIMAL STRUCTURES OF TPS FOR PATCH = 13
(WITH AVERAGE THICKNESS)

=====	=====	=====	=====
HRSI COAT	thin skin	0.05000 in.	387.9 F
=====	=====	=====	=====
AB312 Fabric	slab	0.08000 in.	387.9 F
=====	=====	=====	=====
Q-Felt(3.5 PCF)	thin skin	0.99994 in.	270.2 F
=====	=====	=====	=====
AB312 Fabric	slab	0.05000 in.	270.2 F
=====	=====	=====	=====
RTV-560	thin skin	0.05000 in.	236.1 F
=====	=====	=====	=====
ALUMINUM 2024-T4	slab	0.15000 in.	236.1 F
=====	=====	=====	=====

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 13

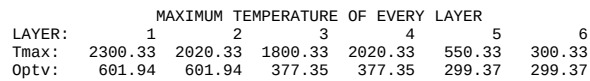
PANEL	LAYER01	LAYER02	LAYER03	LAYER04	LAYER05	LAYER06
12	0.05000	302.66	0.08000	302.66	1.00000	261.99
13	0.05000	265.96	0.08000	265.96	1.00000	231.44
14	0.05000	245.56	0.08000	245.56	1.00000	214.07
15	0.05000	238.57	0.08000	238.57	1.00000	207.73
16	0.05000	237.90	0.08000	237.90	1.00000	206.57
52	0.05000	320.99	0.08000	320.99	1.00000	276.19
53	0.05000	275.60	0.08000	275.60	0.99994	239.14
54	0.05000	250.80	0.07999	250.80	0.99992	218.83
55	0.05000	239.81	0.07999	239.81	0.99994	209.97
56	0.05000	237.90	0.08000	235.43	1.00000	206.90
92	0.05000	339.39	0.08000	339.39	1.00000	290.50
93	0.05000	287.46	0.07999	287.46	0.99987	248.67
94	0.05000	258.04	0.07999	258.04	0.99983	225.23
95	0.05000	245.22	0.07999	245.22	0.99987	215.56
96	0.05000	241.98	0.08000	241.98	1.00000	213.96
132	0.05000	356.22	0.08000	356.22	1.00000	303.65
133	0.05000	299.34	0.07999	299.34	0.99981	258.27
134	0.05000	267.18	0.07998	267.18	0.99977	233.09
135	0.05000	256.15	0.07999	256.15	0.99983	225.11
136	0.05000	260.63	0.08000	260.63	1.00000	229.19

172	0.05000	370.07	0.08000	370.07	1.00000	314.58	0.05000	259.09	0.05000	243.13	0.15000	227.17
173	0.05000	310.22	0.07998	310.22	0.99977	267.13	0.05000	224.05	0.05000	211.72	0.15000	199.39
174	0.05000	276.96	0.07998	276.96	0.99973	241.29	0.05000	205.63	0.05000	195.43	0.15000	185.24
175	0.05000	269.77	0.07999	269.77	0.99983	236.18	0.05000	202.59	0.05000	193.08	0.15000	183.58
176	0.05000	288.66	0.08000	288.66	1.00000	250.46	0.05000	212.27	0.05000	202.05	0.15000	191.83
212	0.05000	378.80	0.08000	378.80	1.00000	321.56	0.05000	264.32	0.05000	247.85	0.15000	231.38
213	0.05000	317.98	0.07998	317.98	0.99976	273.51	0.05000	229.04	0.05000	216.56	0.15000	204.07
214	0.05000	284.46	0.07998	284.46	0.99972	247.49	0.05000	210.52	0.05000	200.25	0.15000	189.98
215	0.05000	282.74	0.07999	282.74	0.99984	246.35	0.05000	209.97	0.05000	200.09	0.15000	190.20
216	0.05000	308.95	0.08000	308.95	1.00000	265.45	0.05000	221.94	0.05000	210.90	0.15000	199.86
252	0.05000	382.76	0.08000	382.76	1.00000	324.77	0.05000	266.78	0.05000	250.06	0.15000	233.35
253	0.05000	321.96	0.07998	321.96	0.99975	276.80	0.05000	231.65	0.05000	219.05	0.15000	206.44
254	0.05000	289.11	0.07998	289.11	0.99973	251.29	0.05000	213.47	0.05000	203.09	0.15000	192.72
255	0.05000	289.35	0.07999	289.35	0.99985	251.46	0.05000	213.57	0.05000	203.43	0.15000	193.28
256	0.05000	317.30	0.08000	317.30	1.00000	271.55	0.05000	225.80	0.05000	214.38	0.15000	202.97
292	0.05000	384.84	0.08000	384.84	1.00000	326.48	0.05000	268.12	0.05000	251.27	0.15000	234.42
293	0.05000	324.27	0.07998	324.27	0.99975	278.73	0.05000	233.19	0.05000	220.51	0.15000	207.82
294	0.05000	291.96	0.07998	291.96	0.99973	253.61	0.05000	215.26	0.05000	204.79	0.15000	194.33
295	0.05000	292.97	0.07999	292.97	0.99986	254.24	0.05000	215.51	0.05000	205.20	0.15000	194.89
296	0.05000	321.21	0.08000	321.21	1.00000	274.39	0.05000	227.58	0.05000	215.99	0.15000	204.40
332	0.05000	386.55	0.08000	386.55	1.00000	327.90	0.05000	269.26	0.05000	252.29	0.15000	235.32
333	0.05000	325.69	0.07998	325.69	0.99975	279.91	0.05000	234.13	0.05000	221.40	0.15000	208.66
334	0.05000	294.65	0.07998	294.65	0.99974	255.79	0.05000	216.92	0.05000	206.36	0.15000	195.79
335	0.05000	296.14	0.07999	296.14	0.99987	256.66	0.05000	217.18	0.05000	206.73	0.15000	196.27
336	0.05000	324.15	0.08000	324.15	1.00000	276.53	0.05000	228.92	0.05000	217.19	0.15000	205.46
372	0.05000	387.91	0.08000	387.91	1.00000	329.06	0.05000	270.21	0.05000	253.14	0.15000	236.06
373	0.05000	327.76	0.07998	327.76	0.99976	281.66	0.05000	235.56	0.05000	222.74	0.15000	209.92
374	0.05000	297.15	0.07998	297.15	0.99974	257.80	0.05000	218.46	0.05000	207.79	0.15000	197.12
375	0.05000	298.92	0.07999	298.92	0.99987	258.78	0.05000	218.64	0.05000	208.05	0.15000	197.46
376	0.05000	326.44	0.08000	326.44	1.00000	278.20	0.05000	229.95	0.05000	218.11	0.15000	206.28
412	0.05000	387.91	0.08000	387.91	1.00000	329.06	0.05000	270.21	0.05000	253.14	0.15000	236.06
413	0.05000	329.59	0.07998	329.59	0.99976	283.22	0.05000	236.84	0.05000	223.94	0.15000	211.04
414	0.05000	299.44	0.07998	299.44	0.99975	259.65	0.05000	219.86	0.05000	209.09	0.15000	198.31
415	0.05000	301.35	0.07999	301.35	0.99988	260.63	0.05000	219.91	0.05000	209.19	0.15000	198.48
416	0.05000	328.27	0.08000	328.27	1.00000	279.52	0.05000	230.78	0.05000	218.85	0.15000	206.93
452	0.05000	387.91	0.08000	387.91	1.00000	329.06	0.05000	270.21	0.05000	253.14	0.15000	236.06
453	0.05000	331.94	0.07998	331.94	0.99977	285.24	0.05000	238.53	0.05000	225.50	0.15000	212.47
454	0.05000	302.51	0.07998	302.51	0.99976	262.11	0.05000	221.72	0.05000	210.79	0.15000	199.85
455	0.05000	304.44	0.07999	304.44	0.99989	262.97	0.05000	221.51	0.05000	210.63	0.15000	199.75
456	0.05000	330.36	0.08000	330.36	1.00000	281.04	0.05000	231.72	0.05000	219.69	0.15000	207.67
492	0.05000	387.91	0.08000	387.91	1.00000	329.06	0.05000	270.21	0.05000	253.14	0.15000	236.06
493	0.05000	334.94	0.07998	334.94	0.99979	287.85	0.05000	240.77	0.05000	227.54	0.15000	214.31
494	0.05000	307.11	0.07998	307.11	0.99978	265.79	0.05000	224.47	0.05000	213.27	0.15000	202.08
495	0.05000	309.08	0.07999	309.08	0.99990	266.48	0.05000	223.89	0.05000	212.75	0.15000	201.62
496	0.05000	333.26	0.08000	333.26	1.00000	283.14	0.05000	233.02	0.05000	220.85	0.15000	208.69
532	0.05000	387.48	0.08000	387.48	1.00000	329.06	0.05000	270.21	0.05000	253.14	0.15000	236.06
533	0.05000	337.35	0.07998	337.35	0.99981	290.02	0.05000	242.70	0.05000	229.25	0.15000	215.79
534	0.05000	311.99	0.07998	311.99	0.99981	269.67	0.05000	227.35	0.05000	215.84	0.15000	204.33
535	0.05000	314.21	0.07999	314.21	0.99991	270.35	0.05000	226.49	0.05000	215.07	0.15000	203.64
536	0.05000	336.34	0.08000	336.34	1.00000	285.37	0.05000	234.40	0.05000	222.08	0.15000	209.76
572	0.05000	384.60	0.08000	384.60	1.00000	327.72	0.05000	270.21	0.05000	253.14	0.15000	236.06
573	0.05000	338.99	0.07999	338.99	0.99983	291.56	0.05000	244.14	0.05000	230.48	0.15000	216.82
574	0.05000	316.51	0.07999	316.51	0.99984	273.25	0.05000	229.99	0.05000	218.15	0.15000	206.32
575	0.05000	319.18	0.07999	319.18	0.99993	274.09	0.05000	228.99	0.05000	217.27	0.15000	205.55
576	0.05000	339.30	0.08000	339.30	1.00000	287.51	0.05000	235.72	0.05000	223.26	0.15000	210.79
612	0.05000	380.81	0.08000	380.81	1.00000	325.09	0.05000	269.38	0.05000	252.17	0.15000	234.96
613	0.05000	340.19	0.07999	340.19	0.99986	292.76	0.05000	245.33	0.05000	231.46	0.15000	217.58
614	0.05000	321.01	0.07999	321.01	0.99987	276.80	0.05000	232.58	0.05000	220.40	0.15000	208.21
615	0.05000	324.20	0.08000	324.20	0.99994	277.84	0.05000	231.48	0.05000	219.45	0.15000	207.43
616	0.05000	342.24	0.08000	342.24	1.00000	289.64	0.05000	237.03	0.05000	224.42	0.15000	211.80
652	0.05000	376.28	0.08000	376.28	1.00000	321.89	0.05000	267.51	0.05000	250.42	0.15000	233.34
653	0.05000	340.98	0.07999	340.98	0.99990	293.63	0.05000	246.29	0.05000	232.19	0.15000	218.10
654	0.05000	325.39	0.07999	325.39	0.99990	280.24	0.05000	235.08	0.05000	222.53	0.15000	209.98
655	0.05000	329.12	0.08000	329.12	0.99996	281.52	0.05000	233.91	0.05000	221.57	0.15000	209.23
656	0.05000	345.08	0.08000	345.08	1.00000	291.68	0.05000	238.29	0.05000	225.53	0.15000	212.77
692	0.05000	371.11	0.08000	371.11	1.00000	318.20	0.05000	265.29	0.05000	248.36	0.15000	231.44
693	0.05000	341.41	0.07999	341.41	0.99993	294.22	0.05000	247.02	0.05000	232.71	0.15000	218.40
694	0.05000	329.58	0.07999	329.58	0.99993	283.52	0.05000	237.45	0.05000	224.53	0.15000	211.61
695	0.05000	333.88	0.08000	333.88	0.99997	285.06	0.05000	236.24	0.05000	223.59	0.15000	210.94
696	0.05000	347.83	0.08000	347.83	1.00000	293.66	0.05000	239.50	0.05000	226.60	0.15000	213.70
732	0.05000	365.64	0.08000	365.64	1.00000	314.26	0.05000	262.87	0.05000	246.12	0.15000	229.38
733	0.05000	341.50	0.08000	341.50	0.99996	294.52	0.05000	247.54	0.05000	233.03	0.15000	218.51
734	0.05000	333.45	0.08000	333.45	0.99997	286.53	0.05000	239.62	0.05000	226.34	0.15000	213.05
735	0.05000	338.29	0.08000	338.29	0.99999	288.34	0.05000	238.39	0.05000	225.44	0.15000	212.50
736	0.05000	350.38	0.08000	350.38	1.00000	295.50	0.05000	240.62	0.05000	227.59	0.15000	214.56
772	0.05000	359.57	0.08000	359.57	1.00000	309.86	0.05000	260.15	0.05000	243.60	0.15000	227.06
773	0.05000	341.34	0.08000	341.34	1.00000	294.63	0.05000	247.92	0.05000	233.19	0.15000	218.47
774	0.05000	337.12	0.08000	337.12	1.00000	289.39	0.05000	241.66	0.05000	228.02	0.15000	214.38
775	0.05000	342.34	0.08000	342.34	1.00000	291.34	0.05000	240.34	0.05000	227.12	0.15000	213.90
776	0.05000	352.72	0.08000	352.72	1.00000	297.18	0.05000	241.65	0.05000	228.50	0.15000	215.35

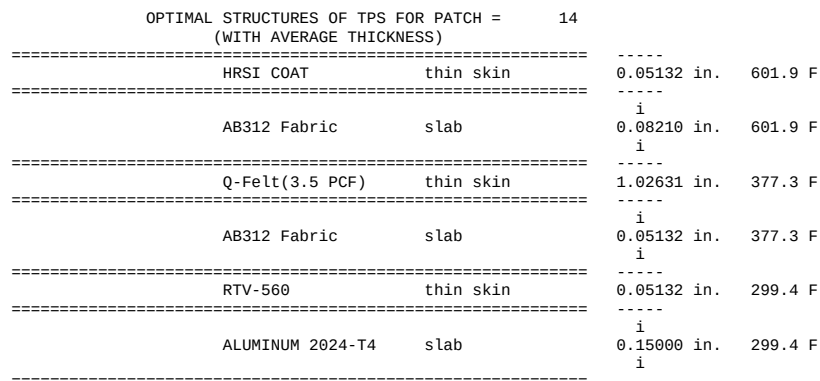
OPTIMIZATION SYSTEM FOR TPSSYM = 14

TOTAL NUMBER OF DESIGN VARIABLES = 45
TOTAL NUMBER OF CONSTRAINTS = 1254
TOTAL NUMBER OF TEMP. CONSTRAINTS = 594
TOTAL NUMBER OF TEMP. PRINTOUTS = 11

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES
X 0.6019E+03
1.0 B



```
THE ORIGINAL OBJECTIVE FUNCTION =      262.2429810
THE RATIO OF OPTIMAL OBJECTIVE FUNCTION =    0.5173807
THE TOTAL OPTIMAL WEIGHT = 1.53420341E+05
```



2-63

PANEL	LAYER01		LAYER02		LAYER03		LAYER04		LAYER05		LAYER06	
892	0.05019	502.16	0.08031	502.16	1.00388	408.78	0.05019	315.40	0.05019	296.86	0.15000	278.32
893	0.05099	450.36	0.08158	437.18	1.01973	355.86	0.05099	274.53	0.05099	262.00	0.15000	249.47
894	0.05174	450.36	0.08278	450.36	1.03479	366.58	0.05174	282.81	0.05174	265.63	0.15000	248.44
895	0.05231	513.02	0.08369	513.02	1.04618	417.36	0.05231	321.70	0.05231	294.05	0.15000	266.41
896	0.05280	601.94	0.08448	601.94	1.05602	489.65	0.05280	377.35	0.05280	335.71	0.15000	294.07
932	0.05020	511.98	0.08031	511.98	1.00393	415.99	0.05020	319.99	0.05020	301.01	0.15000	282.03
933	0.05100	457.25	0.08160	457.25	1.01995	371.35	0.05100	285.46	0.05100	271.19	0.15000	256.92
934	0.05173	460.77	0.08277	460.77	1.03468	374.39	0.05173	288.02	0.05173	270.34	0.15000	252.66
935	0.05229	511.54	0.08367	511.54	1.04582	415.78	0.05229	320.02	0.05229	293.20	0.15000	266.38
936	0.05279	597.89	0.08446	597.89	1.05577	486.23	0.05279	374.56	0.05279	333.72	0.15000	292.88
972	0.05020	520.63	0.08031	520.63	1.00393	422.34	0.05020	324.04	0.05020	304.67	0.15000	285.31
973	0.05100	474.30	0.08161	474.30	1.02006	384.52	0.05100	294.75	0.05100	279.01	0.15000	263.27
974	0.05173	470.43	0.08276	470.43	1.03453	381.65	0.05173	292.87	0.05173	274.73	0.15000	256.59
975	0.05227	510.10	0.08363	510.10	1.04543	414.22	0.05227	318.35	0.05227	292.36	0.15000	266.38
976	0.05277	593.24	0.08444	593.24	1.05548	482.30	0.05277	371.36	0.05277	331.44	0.15000	291.51
1012	0.05020	527.77	0.08031	527.77	1.00391	427.58	0.05020	327.38	0.05020	307.70	0.15000	288.02
1013	0.05101	488.52	0.08161	488.52	1.02010	395.51	0.05101	302.50	0.05101	285.54	0.15000	268.58
1014	0.05172	479.33	0.08275	479.33	1.03431	388.34	0.05172	297.34	0.05172	278.77	0.15000	260.21
1015	0.05225	508.66	0.08360	508.66	1.04499	412.66	0.05225	316.65	0.05225	291.53	0.15000	266.40
1016	0.05276	587.54	0.08441	587.54	1.05511	477.49	0.05276	367.44	0.05276	328.64	0.15000	289.84
1052	0.05019	534.08	0.08031	534.08	1.00384	432.22	0.05019	330.35	0.05019	310.39	0.15000	290.42
1053	0.05100	501.22	0.08161	501.22	1.02007	405.32	0.05100	309.42	0.05100	291.37	0.15000	273.33
1054	0.05170	487.69	0.08272	487.69	1.03404	394.62	0.05170	301.55	0.05170	282.58	0.15000	263.62
1055	0.05222	507.21	0.08356	507.21	1.04450	411.07	0.05222	314.94	0.05222	290.69	0.15000	266.44
1056	0.05273	580.45	0.08437	580.45	1.05465	471.51	0.05273	362.56	0.05273	325.16	0.15000	287.76
1092	0.05019	539.72	0.08030	539.72	1.00372	436.37	0.05019	333.02	0.05019	312.80	0.15000	292.58
1093	0.05100	512.37	0.08160	512.37	1.01994	413.94	0.05100	315.50	0.05100	296.51	0.15000	277.52
1094	0.05168	495.36	0.08270	495.36	1.03370	400.39	0.05168	305.42	0.05168	286.09	0.15000	266.75
1095	0.05220	505.79	0.08352	505.79	1.04394	409.51	0.05220	313.23	0.05220	289.87	0.15000	266.50
1096	0.05270	571.77	0.08432	571.77	1.05406	464.18	0.05270	356.58	0.05270	320.90	0.15000	285.22
1132	0.05018	544.64	0.08028	544.64	1.00352	440.00	0.05018	335.37	0.05018	314.93	0.15000	294.49
1133	0.05099	521.90	0.08158	521.90	1.01972	421.30	0.05099	320.71	0.05099	300.91	0.15000	281.12
1134	0.05166	502.23	0.08266	502.23	1.03328	405.56	0.05166	308.90	0.05166	289.24	0.15000	269.58
1135	0.05217	504.43	0.08347	504.43	1.04331	408.01	0.05217	311.60	0.05217	289.09	0.15000	266.58
1136	0.05267	561.63	0.08427	561.63	1.05334	455.62	0.05267	349.60	0.05267	315.93	0.15000	282.26
1172	0.05016	548.81	0.08026	548.81	1.00326	443.09	0.05016	337.38	0.05016	316.75	0.15000	296.13
1173	0.05097	529.79	0.08155	529.79	1.01942	427.41	0.05097	325.03	0.05097	304.58	0.15000	284.13
1174	0.05164	508.21	0.08262	508.21	1.03278	410.08	0.05164	311.95	0.05164	292.00	0.15000	272.06
1175	0.05213	503.19	0.08341	503.19	1.04263	406.63	0.05213	310.08	0.05213	288.38	0.15000	266.68
1176	0.05263	550.62	0.08420	550.62	1.05251	446.32	0.05263	342.02	0.05263	310.53	0.15000	279.05
1212	0.05015	552.23	0.08024	552.23	1.00296	445.64	0.05015	339.04	0.05015	318.27	0.15000	297.50
1213	0.05095	536.03	0.08152	536.03	1.01905	432.24	0.05095	328.44	0.05095	307.49	0.15000	286.53
1214	0.05161	513.22	0.08258	513.22	1.03221	413.86	0.05161	314.50	0.05161	294.33	0.15000	274.16
1215	0.05209	502.10	0.08335	502.10	1.04189	405.42	0.05209	308.73	0.05209	287.77	0.15000	266.80
1216	0.05258	539.53	0.08413	539.53	1.05161	436.96	0.05258	334.38	0.05258	305.10	0.15000	275.83
1252	0.05013	554.89	0.08021	554.89	1.00266	447.61	0.05013	340.34	0.05013	319.46	0.15000	298.57
1253	0.05093	540.58	0.08149	540.58	1.01863	435.76	0.05093	330.94	0.05093	309.63	0.15000	288.31
1254	0.05158	517.13	0.08253	517.13	1.03160	416.82	0.05158	316.52	0.05158	296.17	0.15000	275.82
1255	0.05206	501.23	0.08329	501.23	1.04113	404.43	0.05206	307.63	0.05206	287.28	0.15000	266.94
1256	0.05253	529.19	0.08406	529.19	1.05070	428.23	0.05253	327.27	0.05253	300.05	0.15000	272.83
1292	0.05011	557.00	0.08018	557.00	1.00227	449.20	0.05011	341.39	0.05011	320.43	0.15000	299.37
1293	0.05090	543.69	0.08145	543.69	1.01807	438.18	0.05090	332.66	0.05090	311.12	0.15000	289.58
1294	0.05154	520.15	0.08247	520.15	1.03089	419.12	0.05154	318.09	0.05154	297.61	0.15000	277.13
1295	0.05202	500.54	0.08323	500.54	1.04032	403.63	0.05202	306.72	0.05202	286.91	0.15000	267.10
1296	0.05249	519.39	0.08398	519.39	1.04975	419.96	0.05249	320.53	0.05249	295.26	0.15000	270.00
1332	0.05009	558.29	0.08014	558.29	1.00172	450.19	0.05009	342.10	0.05009	321.09	0.15000	299.37
1333	0.05086	544.87	0.08138	544.87	1.01729	439.11	0.05086	333.34	0.05086	311.76	0.15000	290.17
1334	0.05150	522.28	0.08240	522.28	1.02999	420.76	0.05150	319.23	0.05150	298.67	0.15000	278.12
1335	0.05196	499.97	0.08314	499.97	1.03928	402.94	0.05196	305.91	0.05196	286.62	0.15000	267.32
1336	0.05243	508.20	0.08388	508.20	1.04851	410.52	0.05243	312.84	0.05243	289.81	0.15000	266.78
1372	0.05006	558.19	0.08009	558.19	1.00113	450.17	0.05006	342.15	0.05006	321.16	0.15000	299.37
1373	0.05082	543.44	0.08131	543.44	1.01642	438.02	0.05082	332.60	0.05082	311.20	0.15000	289.80
1374	0.05144	522.97	0.08231	522.97	1.02883	421.31	0.05144	319.66	0.05144	299.11	0.15000	278.55
1375	0.05188	499.67	0.08301	499.67	1.03764	402.51	0.05188	305.35	0.05188	286.52	0.15000	267.70
1376	0.05231	491.22	0.08369	491.22	1.04613	396.21	0.05231	301.19	0.05231	281.58	0.15000	261.98
1412	0.05003	557.21	0.08005	557.21	1.00060	449.50	0.05003	341.78	0.05003	320.85	0.15000	299.37
1413	0.05078	539.90	0.08124	539.90	1.01551	435.31	0.05078	330.71	0.05078	309.68	0.15000	288.65
1414	0.05136	521.23	0.08218	521.23	1.02726	420.07	0.05136	318.90	0.05136	298.49	0.15000	278.08
1415	0.05174	500.48	0.08279	500.48	1.03486	403.21	0.05174	305.95	0.05174	287.16	0.15000	268.37
1416	0.05206	476.06	0.08330	476.06	1.04130	383.47	0.05206	290.88	0.05206	274.46	0.15000	258.04
1452	0.05000	555.40	0.08000	555.40	1.00000	448.22	0.05000	341.04	0.05000	320.20	0.15000	299.37
1453	0.05073	534.55	0.08116	534.55	1.01456	431.20	0.05073	327.84	0.05073	307.34	0.15000	286.83
1454	0.05127	516.16	0.08203	516.16	1.02536	416.32	0.05127	316.48	0.05127	296.40	0.15000	276.31
1455	0.05158	503.03	0.08253	503.03	1.03157	405.81	0.05158	308.59	0.05158	288.89	0.15000	269.18
1456	0.05177	492.55	0.08283	492.55	1.03541	397.50	0.05177	302.46	0.05177	283.12	0.15000	263.79

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*****
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*** T P S O P T T E R M I N A T E D ***
***
*** N O R M A L L Y ***
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*** 17:19:17 09/15/2005 ***
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3.0 Blunt Cone Configuration

- *Purpose:* To demonstrate the capability of the TPSOPT software system to result in a varying optimal thickness distribution over a blunt cone surface.
- *Input File:*
 - Standard input File: CONE_TPS.INP (Listing 3.1)
 - Aerodynamic Database: CFDTABLE.DAT (Listing 3.2)
 - Geometry File: ZNRGEO.DAT (Binary file)
 - ZONAIR Solution File: FLAOWi (Listing 3.3)
- *Output File:*
 - Standard Output File: CONE_TPS.OUT (Listing 3.4)
 - Vehicle Surface Mesh: CONE.NAS (Figure 3.1)
 - Response surfaces for POD analysis (Figure 3.4)
 - C_p and Temperature Plot File: CPTEMP.PLT (Figure 3.5)
 - Thickness Distribution Plot File: CONETHICK.PLT (Figure 3.6)

3.1 The Surface Mesh of a Blunt Cone Configuration

A blunt cone configuration is shown in Figure 3.1. The surface mesh is generated by ZONAIR and outputted as a binary file “ZNRGEO.DAT”. The ZONAIR model consists of 272 panels and 273 grid points. These panels and grid points are stored in the file “ZNRGEO.DAT” which is used in TPSOPT by specifying the name on the second row of the aerodynamic database (CFDTABLE.DAT) that is imported by the “ASSIGN AEROBASE=” executive control command.

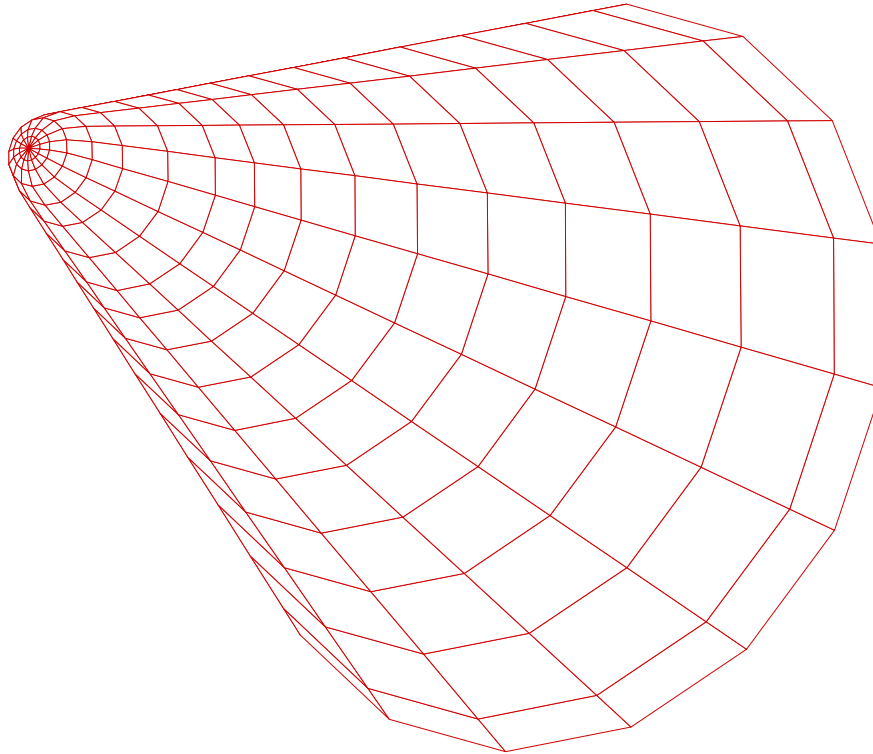


Figure 3.1. Blunt cone surface mesh

3.2 The Aerodynamic Database: CFDTABLE.DAT

The aerodynamic database is generated by running ZONAIR for 55 combinations of 5 Mach numbers (2, 4, 7, 10, 15) and 11 angles of attack (0, 4, 7, 10, 13, 15, 20, 25, 30, 35, 40). This file provides TPSOPT system with all flow field information from ZONAIR. The first row is a title card (CONE); the second row provide the geometry file name (ZNRGEO.DAT); the third and fourth rows list the name of the reference chord, span, ...etc, and their values, respectively; the fifth row lists the names of items in the following rows (Mach number, Altitude, Angle of attack, etc.) and the remaining rows contain the values of the items listed in the fifth row and the file names (FLAOW0001-FLAOW55) in the last column which stores the velocity and pressure coefficients for the 55 combinations of Mach number and Angle of attack listed in the corresponding row.

It is noted that the order of the Mach numbers and angles of attack in the table must be ascending.

3.3 The Standard Input File (CONE_TPS.INP)

The standard input file consists of two major parts: the flow field quantities and the TPS optimization system. The flow field quantities are provided by ZONAIR and imported by the aerodynamic database (CFDTABLE.DAT) using the following statement on the first row:

ASSIGN AEROBASE='CFDTABLE.DAT'

The TPS optimization system is the major portion of the standard input file, which includes specification of trajectory data and definition of patches for the TPS. Four patches are defined for the blunt cone configuration (Figure 3.2), among which patches 1 and 2 are located around the nose of the vehicle and patches 3 and 4 are defined for the body. Figure 3.3 shows individual patches and panel numbers over them.

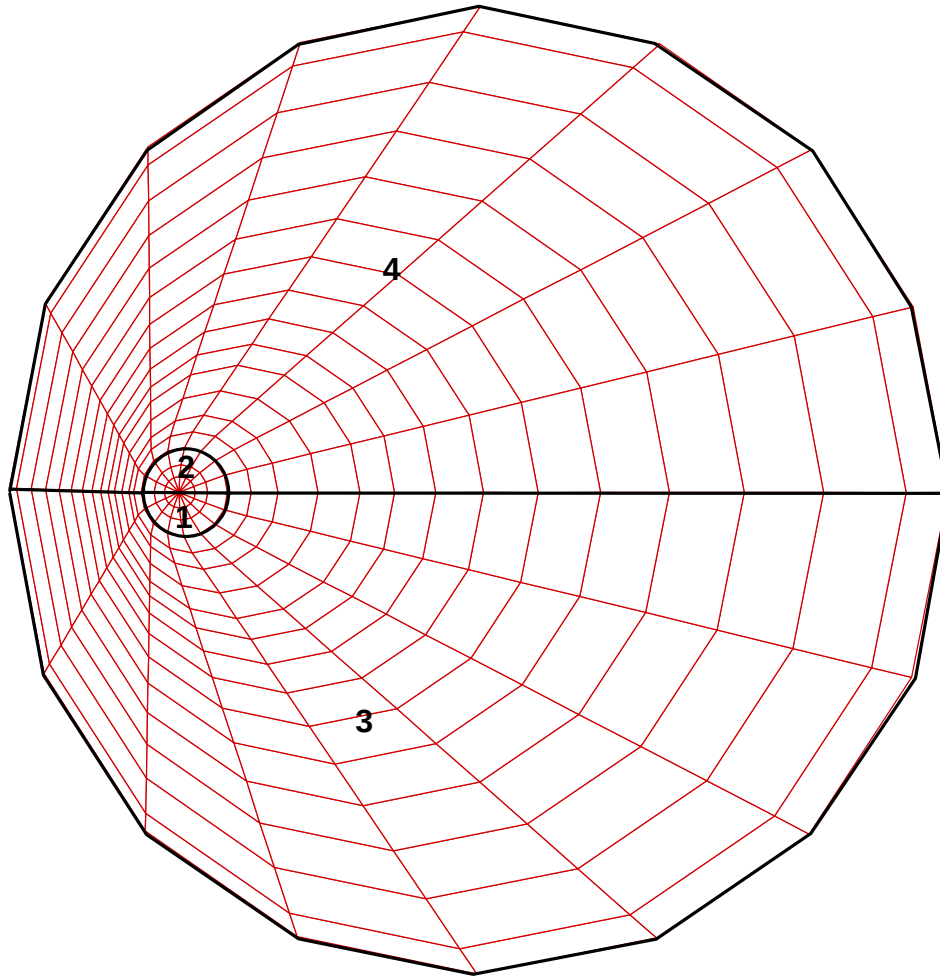
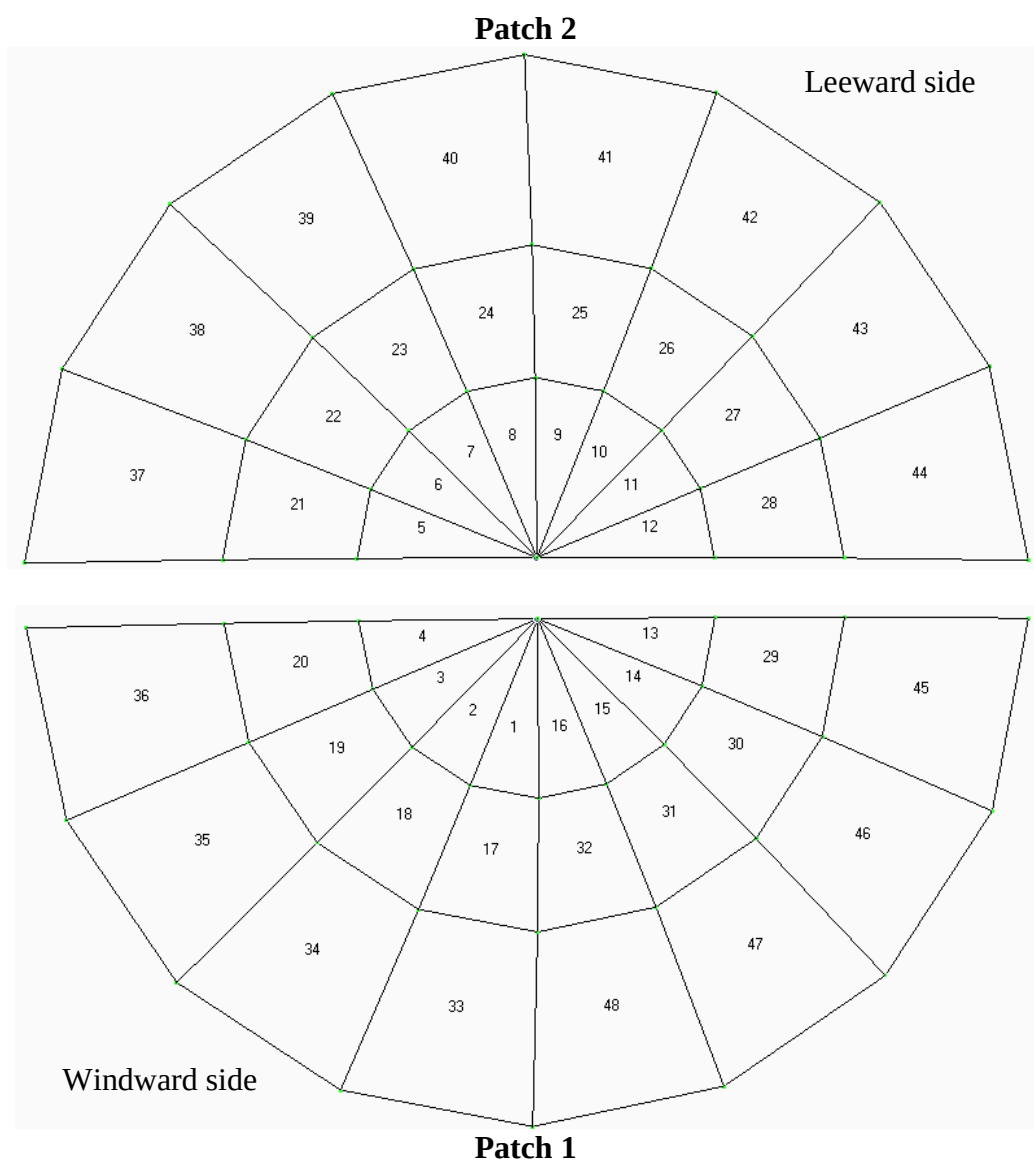
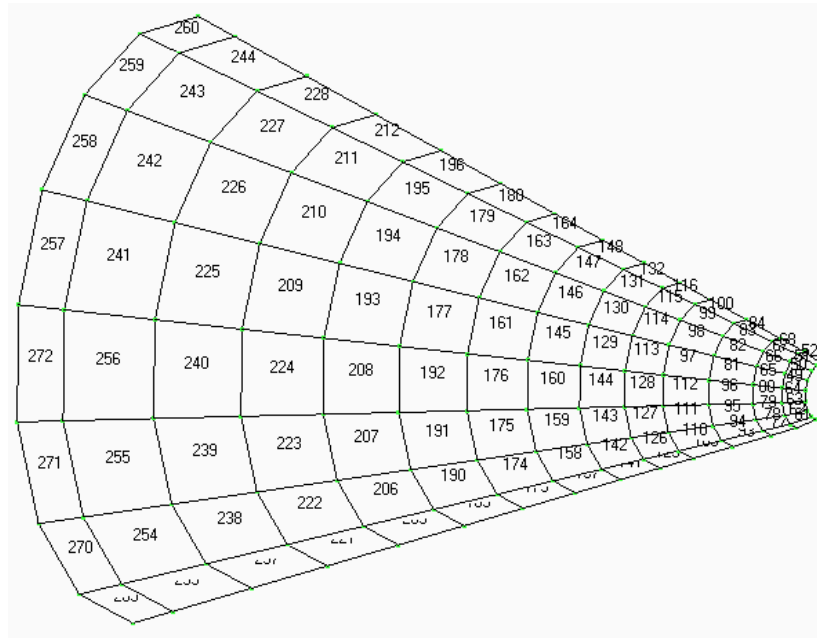
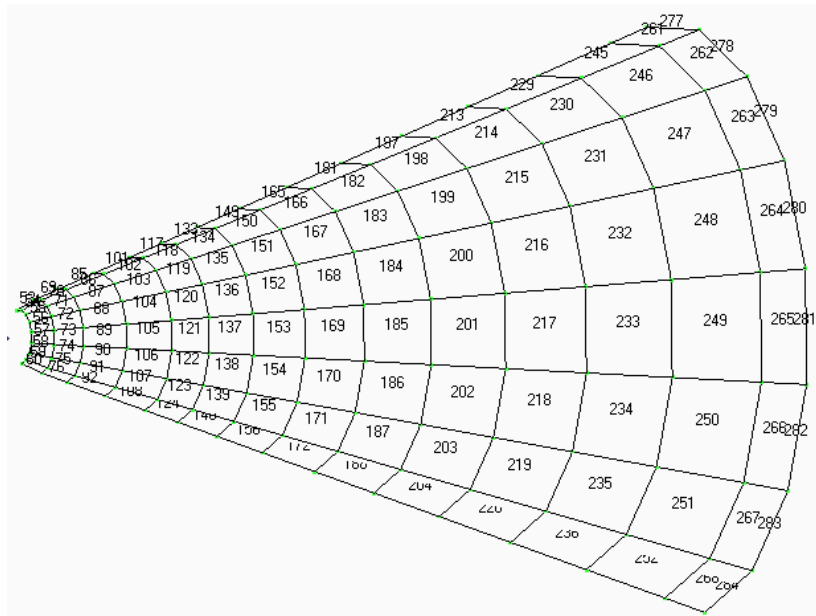


Figure 3.2. Four patches defined over blunt cone surface





Patch 3



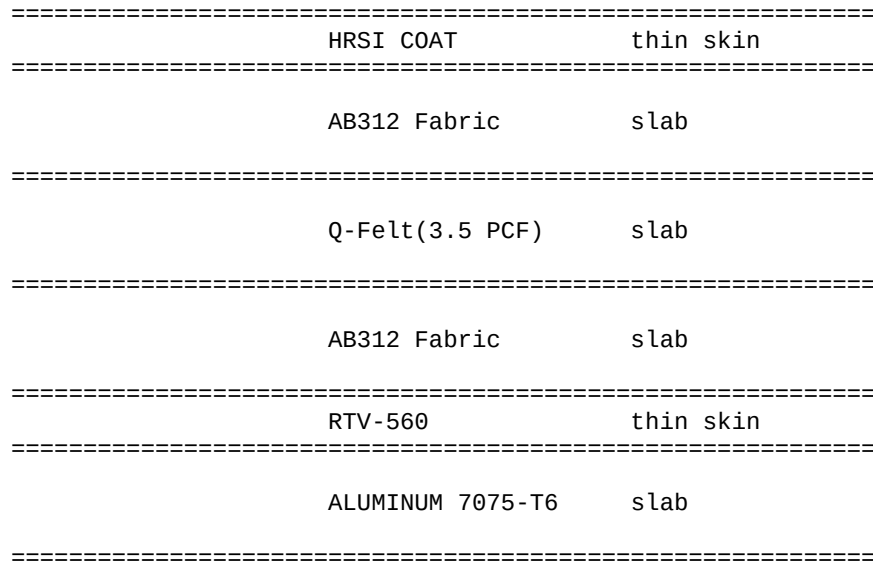
Patch 4

Figure 3.3. Four separated patches defined over the cone surface

3.4 Thermal Structures for Patches

Two sets of 6 layered TPS structures are used for the blunt wedge configuration. The first one is for the nose cap (patches 1 and 2) and the windward surface (patch 3), and the second one for the Leeward surface (patch 4).

The thermal structures specified for the first set TPS using the STTYPE numbers 1, 2, 3, 4, 5 and 6 are Slab, Slab, Thin skin, Slab, Thin skin and Slab, and the corresponding optimization materials are 508 (RCG Coating), 501 (LI-9000), 245 (RTV-560), 313 (5.4LB SIP), 245 (RTV-560) and 103 (Aluminum). The maximum temperatures for these materials are: $2760^{\circ}R$, $2860^{\circ}R$, $1010^{\circ}R$, $910^{\circ}R$, $1010^{\circ}R$, and $810^{\circ}R$. The following is a schematic plot of this TPS.



The structures specified for the second set TPS is the AFRSI (Advanced Flexible Reusable Surface Insulation) TPS which consists of 6 layers: Thin skin, Slab, Slab, Slab, Thin skin and Slab denoted by the STTYPE numbers 31, 32, 33, 34, 35 and 36. The corresponding optimization materials are 221 (HRSI COAT), 266 (AB312 Fabric), 260 (Q-Felt), 266 (AB312 Fabric), 245 (RTV-560) and 103 (Aluminum) and the maximum temperatures for these materials are: $2760^{\circ}R$, $2480^{\circ}R$, $2480^{\circ}R$, $2260^{\circ}R$, and $810^{\circ}R$. The following is a schematic plot of this TPS.

=====	
RCG COATING	slab
=====	
LI900	slab
=====	
RTV-560	thin skin
=====	
5.4 LB SIP	slab
=====	
RTV-560	thin skin
=====	
ALUMINUM 7075-T6	slab
=====	

The sixth layer of both sets of TPS is defined as the structure layer, which means that the thickness of the sixth layer is constant during the computation of optimization.

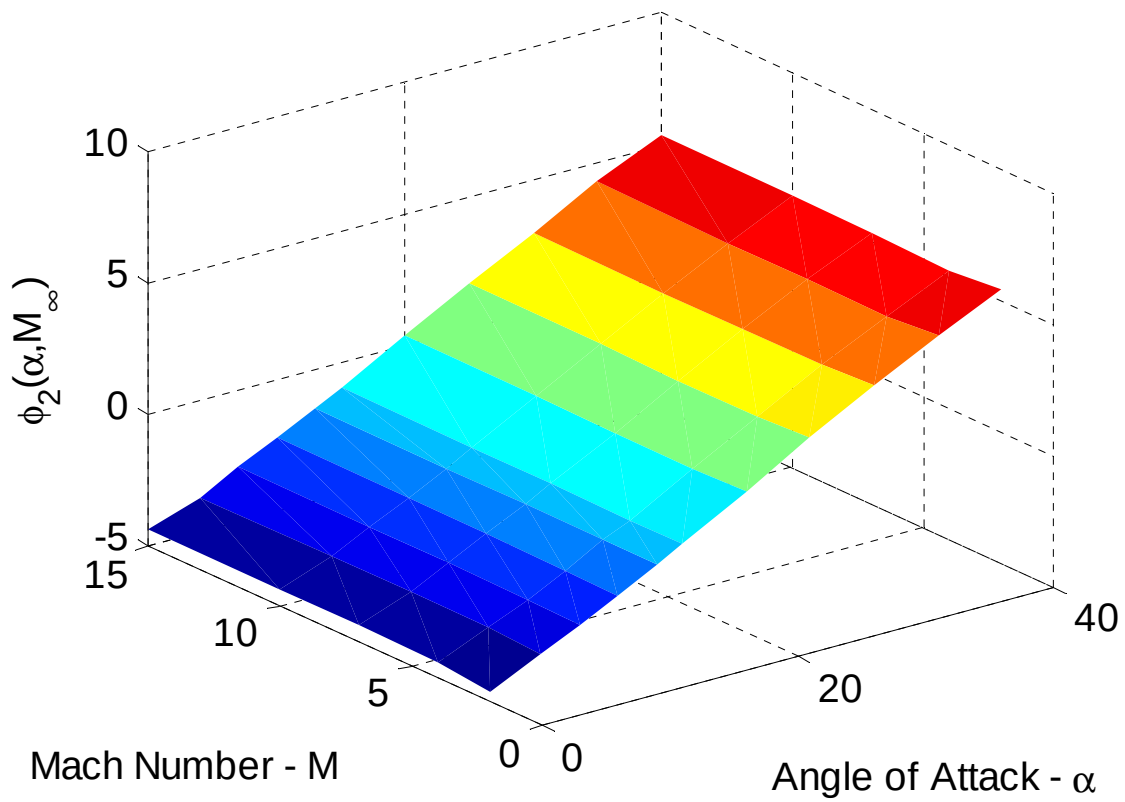
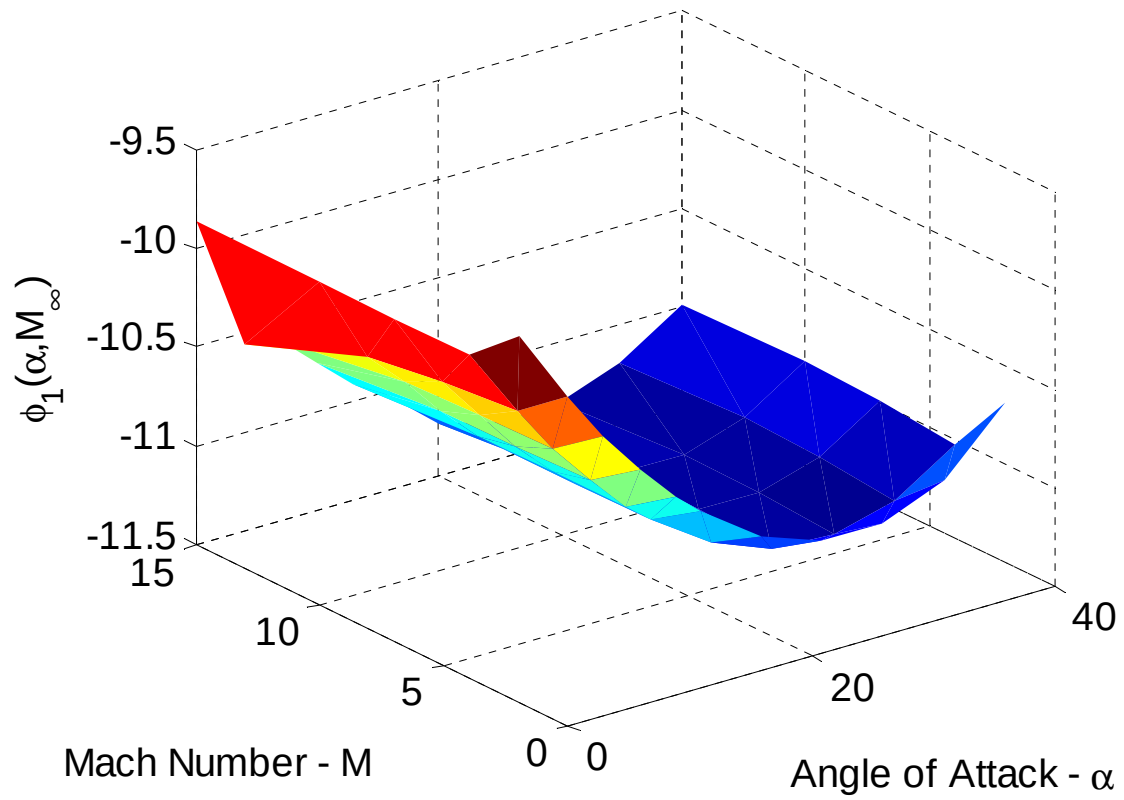
3.5 Output Information

The output information consists of the following items:

- (1) Response surfaces of C_p and velocities for POD analysis (Plot files).
- (2) C_p and temperature for specified times in trajectory bulk data cards (Plot files).
- (3) Schematic text plotting of trajectory-related thermal quantities versus time over every patch. These quantities include enthalpy-based heat transfer coefficient, adiabatic wall enthalpy, and pressure.
- (4) Thickness of every design layer and the ratio of the objective functions between the optimal and initial thickness.
- (5) Schematic text plotting of optimal thickness and maximum temperature over each layer for every patch.
- (6) Optimal thickness and temperature over each layer for every panel (Plot file).

3.6 Results

The output items listed in Section 3.5 have been stored in a text file and some plotting files. The text file is the Standard Output File (CONE_TPS.OUT) which includes all the input information appearing in the Standard Input File (CONE_TPS.INP) and items (3)-(5) listed in the above section. Figures 3.4-3.6 show the response surfaces of C_p , C_p and temperature specified in trajectory bulk data card, and the optimal thickness, respectively.



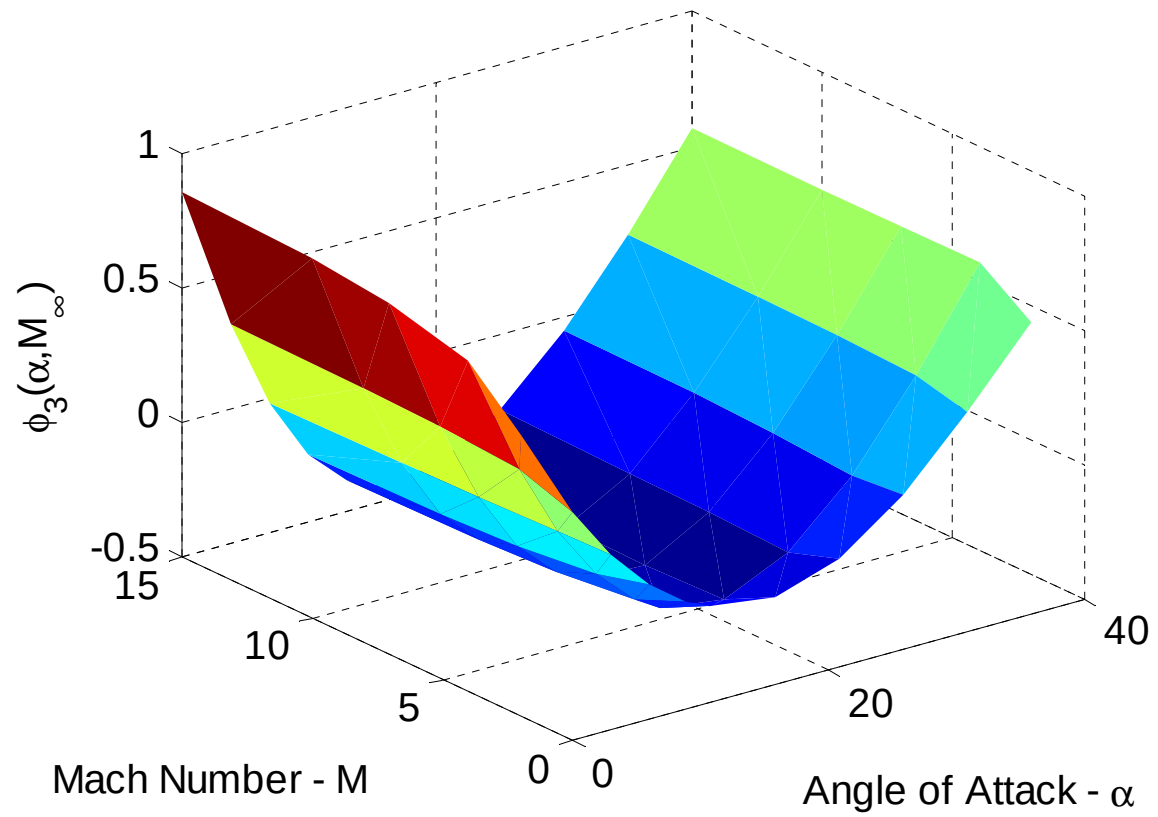


Figure 3.4. Response surface of first three modes for POD analysis

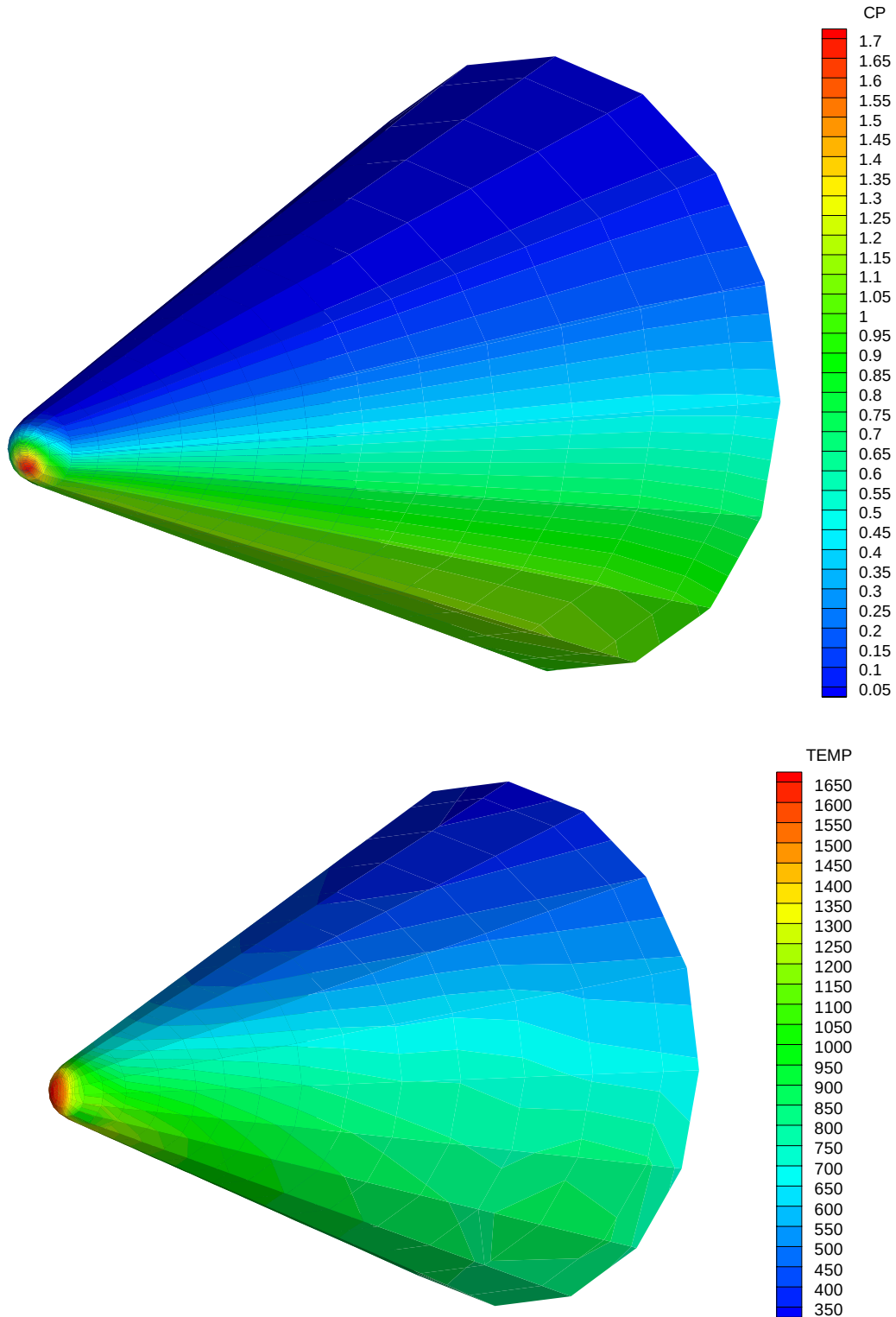
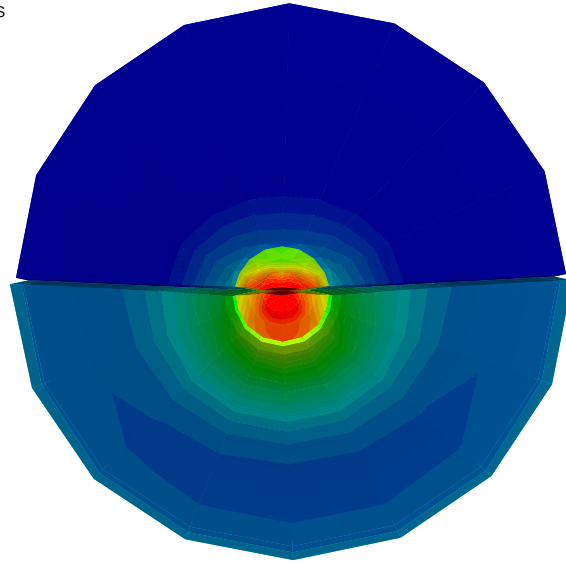
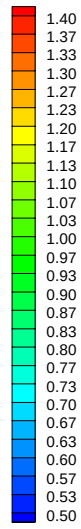


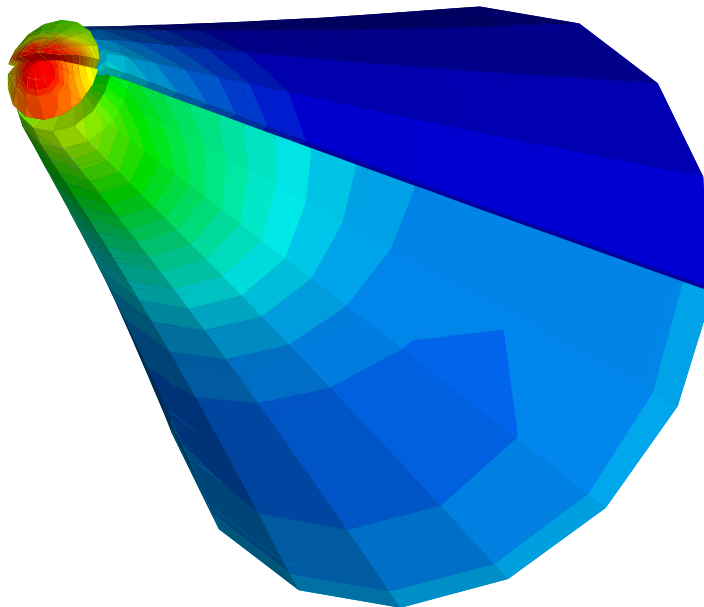
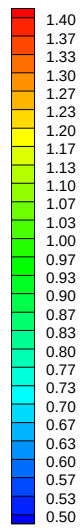
Figure 3.5. Plots of Cp and temperature at time=263 with $M=8.4$, $AoA=30$

THICKNESS



Front view

THICKNESS



Side view

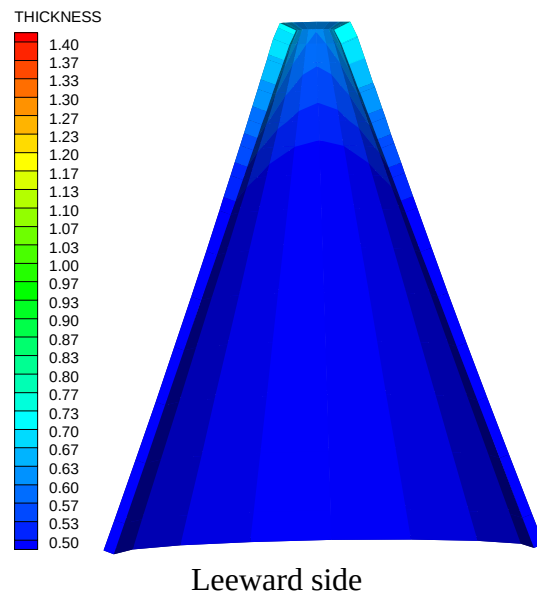
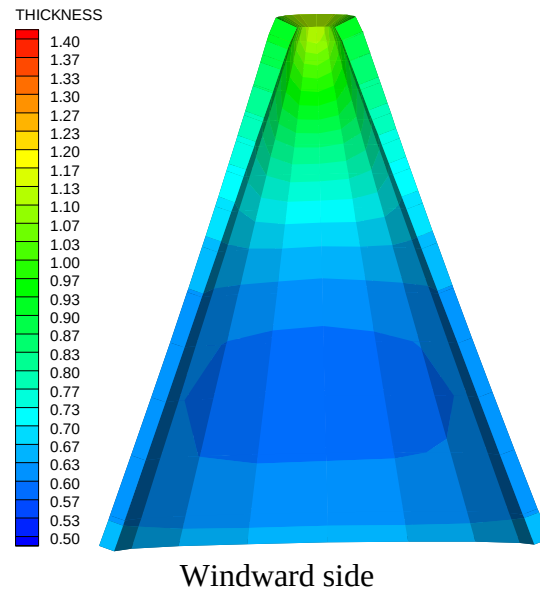


Figure 3.6. Optimal thickness plot

3.7 Lists of Input and Output Files

- *Input Data Listing:*

Listing 3.1 Standard input File: CONE_TPS.INP

```
ASSIGN AEROBASE='CFDTABLE.DAT',PRINT=0
SOL 1
$ Begin Executive Control Section
CEND
ECHO = SORT
SUBCASE = 1
      SUBTITLE=BLENT-NOSE  CONE WITH 20 DEG NOSE ANGLE
      LABEL=  HYPERSONIC AERODYNAMIC DATABASE BY ZONAIR
      TPSDES=1
$
BEGIN BULK
$
PLTAERO 1          YES      NO          NASTRAN AEROMESH.NAS
$ POLTTING TPS THICKNESS
PLTTPS  -1         1        ALL        TECPLOT  CONE1L.PLT      -1.0
PLTTPS   2         1        ALL        TECPLOT  CONEML.PLT      0.05
$
$PODRSM |TPSDES |METHOD |NRDMOD |TOLER |NEURON |SAVE |FILENM
PODRSM  1         1        1          1          1        SAVE  CONEM1.RST  CONT
CONT    CPPODRSM.P3D  UPODRSM.P3D      VPODRSM.P3D      WPODRSM.P3D
$
$TPSDES SETID     PODRSM  TRJLST  IFPREH  IDFEM/TPSSYM
TPSDES  1         1        1        1          1          CONT
CONT    1         2        3        4
$
$TPSSYM SETID     IDPATCH  NLAYER  PRVAL
TPSSYM  1         1         6         4          CONT
CONT    1         1        0.008    0.05          CONT
CONT    1         2         0.5      4.0          CONT
CONT    1         3         0.01     0.1          CONT
CONT    1         4        0.015     0.2          CONT
CONT    1         5         0.01     0.1          CONT
CONT    0         6         0.02     0.2
TPSSYM  2         2         6         4          CONT
CONT    2         1        0.008    0.05          CONT
CONT    2         2         0.5      4.0          CONT
CONT    2         3         0.01     0.1          CONT
CONT    2         4        0.015     0.2          CONT
CONT    2         5         0.01     0.1          CONT
CONT    0         6         0.02     0.2
TPSSYM  3         3         6         4          CONT
CONT    3         1        0.008    0.05          CONT
CONT    3         2         0.5      4.0          CONT
CONT    3         3         0.01     0.1          CONT
CONT    3         4        0.015     0.2          CONT
CONT    3         5         0.01     0.1          CONT
CONT    0         6         0.02     0.2
TPSSYM  4         4         6         4          CONT
CONT    4         31        0.003    0.1          CONT
CONT    4         32        0.004    0.1          CONT
CONT    4         33         0.2      5.0          CONT
CONT    4         34        0.015     1.0          CONT
CONT    4         35        0.005     0.8          CONT
CONT    0         36         0.01     1.0
$
$      TILE TPS (Based on First of Fig10 of Chiu adn Pitts paper, 1991)
STTYPE  1         1        508          CONT
CONT    0.01
```

[illegible]

+CON	79	80	81	82	83	84	93	94+CON
+CON	95	96	97	98	99	100	109	110+CON
+CON	111	112	113	114	115	116	125	126+CON
+CON	127	128	129	130	131	132	141	142+CON
+CON	143	144	145	146	147	148	157	158+CON
+CON	159	160	161	162	163	164	173	174+CON
+CON	175	176	177	178	179	180	189	190+CON
+CON	191	192	193	194	195	196	205	206+CON
+CON	207	208	209	210	211	212	221	222+CON
+CON	223	224	225	226	227	228	237	238+CON
+CON	239	240	241	242	243	244	253	254+CON
+CON	255	256	257	258	259	260	269	270+CON
+CON	271	272						
PANLST2	32			61	189		269	63
CONT								191
CONT	50	178	258	52	180	260		271CONT
\$								
\$								
PATCH	4	41	42					
\$								
\$DESVAR	ID	NE	ME					
DESVAR	4	3	4					CONT
CONT	60	188	268					CONT
CONT	58	186	266					CONT
CONT	55	183	263					CONT
CONT	53	181	261					
PANLST2	41		53	54	55	56	57	58+CON
+CON	59	60	69	70	71	72	73	74+CON
+CON	75	76	85	86	87	88	89	90+CON
+CON	91	92	101	102	103	104	105	106+CON
+CON	107	108	117	118	119	120	121	122+CON
+CON	123	124	133	134	135	136	137	138+CON
+CON	139	140	149	150	151	152	153	154+CON
+CON	155	156	165	166	167	168	169	170+CON
+CON	171	172	181	182	183	184	185	186+CON
+CON	187	188	197	198	199	200	201	202+CON
+CON	203	204	213	214	215	216	217	218+CON
+CON	219	220	229	230	231	232	233	234+CON
+CON	235	236	245	246	247	248	249	250+CON
+CON	251	252	261	262	263	264	265	266+CON
+CON	267	268						
PANLST2	42		53	181	261	55	183	263CONT
CONT	58	186	266	60	188	268		
\$								
\$TRJLST	SETID							
TRJLST	1							CONT
CONT	1	1.						
\$	TRAJCT	FACT	TRAJCT	FACT	TRAJCT	FACT	TRAJCT	FACT
\$								
\$	TIME	MACH	ALTH	AOA	BETA	FORM	FILE1	FILE1
\$...1..	...2...	...3...	...4...	...5...	...6...	...7...	...8...	...9...
TRAJCT	1	1						
CONT	.00000E0	0.71871.45600E6	4.0000					CONT
CONT	.16000E2	0.98944.41990E6	14.0000					CONT
CONT	.33000E2	1.34826.43688E6	9.4208					CONT
CONT	.49000E2	1.63429.58196E6	3.6000					CONT
CONT	.68000E2	2.17754.82141E6	3.6000					CONT
CONT	.88000E2	2.99306.11358E7	3.6000					CONT
CONT	.10800E3	4.03065.14897E7	3.6000					CONT
CONT	.12800E3	5.30536.18668E7	3.6000					CONT
CONT	.14700E3	7.18387.22489E7	8.7000					CONT
CONT	.16500E3	8.14718.26307E7	10.2250					CONT
CONT	.18500E3	8.48577.29382E7	10.2250					CONT
CONT	.20500E3	8.73075.31108E7	10.2250					CONT
CONT	.22500E3	8.80061.31479E7	10.2250					CONT
CONT	.24500E3	8.62765.30495E7	10.2250					CONT
CONT	.26300E3	8.35804.28476E7	30.0000					CONT
CONT	.28300E3	7.92715.25083E7	30.0000					CONT
CONT	.30300E3	7.42020.20828E7	30.0000					CONT
CONT	.32300E3	6.98630.17006E7	30.0000					CONT
CONT	.34100E3	6.51451.15705E7	17.6576					CONT

CONT	.35900E3	6.29482.15555E7	11.3822							CONT
CONT	.37900E3	6.12626.15505E7	11.5945							CONT
CONT	.39900E3	5.96248.15405E7	11.6852							CONT
CONT	.41900E3	5.80340.15256E7	11.6316							CONT
CONT	.43900E3	5.64886.15063E7	11.4712							CONT
CONT	.45900E3	5.49856.14827E7	11.2120							CONT
CONT	.47900E3	5.35216.14551E7	10.8676							CONT
CONT	.49900E3	5.20938.14237E7	10.4565							CONT
CONT	.51900E3	5.06993.13890E7	9.9883							CONT
CONT	.53900E3	4.92935.13511E7	9.3991							CONT
CONT	.55900E3	4.78106.13103E7	8.7931							CONT
CONT	.57900E3	4.62119.12670E7	8.2187							CONT
CONT	.59900E3	4.44764.12216E7	7.6847							CONT
CONT	.61900E3	4.25902.11747E7	7.2020							CONT
CONT	.63900E3	4.05448.11267E7	6.7771							CONT
CONT	.65900E3	3.82413.10782E7	6.3472							CONT
CONT	.67900E3	3.56631.10300E7	5.9874							CONT
CONT	.69900E3	3.28723.98254E6	5.7202							CONT
CONT	.71759E3	3.00000.93312E6	4.8191							CONT
CONT	.73600E3	2.68846.87329E6	4.1829							CONT
CONT	.75600E3	2.29065.80146E6	3.4982							CONT
CONT	.77600E3	1.86649.72891E6	3.0646							CONT
CONT	.79600E3	1.47000.66074E6	3.0928							CONT
CONT	.81600E3	1.14676.59940E6	3.3054							CONT
CONT	.83600E3	0.96665.54315E6	3.8323							CONT
CONT	.85600E3	0.86983.48792E6	3.8046							CONT
CONT	.87400E3	0.80178.43914E6	3.9110							CONT
CONT	.89400E3	0.73186.38870E6	3.9359							CONT
CONT	.91400E3	0.67432.34157E6	3.9549							CONT
CONT	.93400E3	0.62713.29712E6	3.9492							CONT
CONT	.95400E3	0.58784.25488E6	3.9046							CONT
CONT	.97400E3	0.55190.21464E6	3.8498							CONT
CONT	.99400E3	0.51899.17633E6	3.8233							CONT
CONT	.10140E4	0.48941.13984E6	3.8101							CONT
CONT	.10340E4	0.46307.10502E6	3.8009							CONT
CONT	.10540E4	0.43975.71741E5	3.7895							CONT
CONT	.10740E4	0.41915.39891E5	3.7718							CONT
CONT	.10940E4	0.40098.93915E4	3.7458							CONT
\$	TIME	MACH	ALTH	AOA	BETA	P	Q	R		
\$										
\$THERMPR	SETID	TEMP	HOTWALL	TRANS	GAS	EMMS				
THERMPR	1	100F								
ENDDATA										

TECPLOT CPTEMP2.PLT

Listing 3.2 Control Table File: CFDTABLE.DAT

CONE														ZNR GEO. DAT	
REFC	REFB	REFS	REFX	REFY	REFZ	NO	AESURFZ	LENGTH	UNIT	MASS	UNIT				
2.0622E+01	1.0000E+00	1.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0			IN	SLIN					
MACH	H	ALPHA	BETA	PRATE	QRATE		RRATE		CD	CY	CL	CR	CM	CN	FILE
2.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.1677E+01	3.9853E-07	3.1696E-05	-9.1579E-07	-2.4108E-05	1.3317E-05	FLAOW0001	
4.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	5.8882E+01	1.6087E-07	2.6786E-05	-2.1905E-06	-1.8734E-05	7.3458E-06	FLAOW0002	
7.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	5.5485E+01	2.4641E-07	3.5422E-05	-8.2970E-07	-2.7614E-05	8.9297E-06	FLAOW0003	
1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	5.4679E+01	1.8156E-07	2.2260E-05	-4.3105E-07	-1.6718E-05	6.8477E-06	FLAOW0004	
1.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	5.4266E+01	2.7226E-07	3.9372E-05	-2.1199E-06	-2.8657E-05	8.6641E-06	FLAOW0005	
2.0000E+00	0.0000E+00	4.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.3222E+01	-4.3014E-04	1.9863E+01	5.5029E-05	-1.8285E+01	7.8704E-04	FLAOW0006	
4.0000E+00	0.0000E+00	4.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.0976E+01	2.6790E-04	2.1524E+01	-3.7475E-05	-1.9172E+01	-4.5588E-04	FLAOW0007	
7.0000E+00	0.0000E+00	4.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	5.7720E+01	-6.6446E-05	2.2540E+01	7.7301E-06	-1.9764E+01	1.1624E-04	FLAOW0008	
1.0000E+01	0.0000E+00	4.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	5.7147E+01	-4.3300E-04	2.2973E+01	2.6737E-05	-2.0024E+01	4.1108E-04	FLAOW0009	
1.5000E+01	0.0000E+00	4.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	5.7799E+01	-4.8966E-04	2.3569E+01	3.3456E-05	-2.0469E+01	5.0995E-04	FLAOW0010	
2.0000E+00	0.0000E+00	7.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.6404E+01	2.3285E-04	3.4549E+01	-6.3325E-05	-3.1974E+01	-5.1033E-04	FLAOW0011	
4.0000E+00	0.0000E+00	7.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.5239E+01	2.1879E-04	3.6948E+01	-5.9407E-05	-3.3258E+01	-4.8382E-04	FLAOW0012	
7.0000E+00	0.0000E+00	7.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.2002E+01	-2.4108E-04	3.8384E+01	2.6890E-05	-3.4135E+01	2.3908E-04	FLAOW0013	
1.0000E+01	0.0000E+00	7.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.1167E+01	-2.9374E-04	3.9052E+01	3.1322E-05	-3.4588E+01	2.7106E-04	FLAOW0014	
1.5000E+01	0.0000E+00	7.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.1141E+01	-3.6500E-04	3.9791E+01	2.9149E-05	-3.5157E+01	2.6401E-04	FLAOW0015	
2.0000E+00	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.1282E+01	-1.0924E-04	4.8868E+01	2.0896E-05	-4.5606E+01	1.2791E-04	FLAOW0016	
4.0000E+00	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.1680E+01	-3.1771E-04	5.1337E+01	8.3453E-05	-4.6961E+01	4.8063E-04	FLAOW0017	
7.0000E+00	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.8719E+01	2.6707E-04	5.2649E+01	-6.3493E-05	-4.7776E+01	-3.6004E-04	FLAOW0018	
1.0000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.7885E+01	2.2880E-04	5.3307E+01	-3.6633E-05	-4.8256E+01	-2.0473E-04	FLAOW0019	
1.5000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.7707E+01	-2.8531E-04	5.4023E+01	1.1445E-04	-4.8839E+01	6.6047E-04	FLAOW0020	
2.0000E+00	0.0000E+00	1.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.7812E+01	-1.2895E-03	6.2646E+01	5.2425E-04	-5.9136E+01	2.2920E-03	FLAOW0021	
4.0000E+00	0.0000E+00	1.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.0102E+01	-3.5613E-04	6.4439E+01	1.0833E-04	-6.0226E+01	4.8715E-04	FLAOW0022	
7.0000E+00	0.0000E+00	1.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.7542E+01	-6.0890E-04	6.5009E+01	2.7973E-04	-6.0535E+01	1.2213E-03	FLAOW0023	
1.0000E+01	0.0000E+00	1.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.6800E+01	4.4272E-04	6.5326E+01	-1.4424E-04	-6.0775E+01	-6.0727E-04	FLAOW0024	
1.5000E+01	0.0000E+00	1.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.6631E+01	3.5711E-04	6.5773E+01	-1.4772E-04	-6.1164E+01	-6.3042E-04	FLAOW0025	
2.0000E+00	0.0000E+00	1.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.3036E+01	-2.2305E-03	7.1416E+01	1.0773E-03	-6.8055E+01	4.0279E-03	FLAOW0026	
4.0000E+00	0.0000E+00	1.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.6735E+01	-7.8530E-04	7.2553E+01	3.3803E-04	-6.8808E+01	1.2685E-03	FLAOW0027	
7.0000E+00	0.0000E+00	1.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.4431E+01	3.2635E-03	7.2161E+01	-1.6706E-03	-6.8581E+01	-6.2162E-03	FLAOW0028	
1.0000E+01	0.0000E+00	1.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.3764E+01	-2.0867E-03	7.2124E+01	1.0059E-03	-6.8561E+01	3.7604E-03	FLAOW0029	
1.5000E+01	0.0000E+00	1.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.3477E+01	-1.5872E-04	7.2212E+01	-3.6095E-05	-6.8654E+01	-1.1170E-04	FLAOW0030	
2.0000E+00	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0884E+02	-4.0801E-04	9.1305E+01	1.9956E-04	-8.9691E+01	5.6837E-04	FLAOW0031	
4.0000E+00	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0638E+02	-8.9973E-04	8.8846E+01	5.0849E-04	-8.9245E+01	1.4034E-03	FLAOW0032	
7.0000E+00	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0461E+02	-1.0961E-04	8.6269E+01	1.1938E-05	-8.7360E+01	5.0313E-05	FLAOW0033	
1.0000E+01	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0410E+02	9.7958E-05	8.5395E+01	-8.8668E-05	-8.6722E+01	-2.4330E-04	FLAOW0034	
1.5000E+01	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0443E+02	-2.4118E-06	8.5366E+01	-1.1152E-04	-8.6845E+01	-3.0098E-04	FLAOW0035	
2.0000E+00	0.0000E+00	2.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2776E+02	2.0604E-03	1.0707E+02	-1.7755E-03	-1.0961E+02	-3.7955E-03	FLAOW0036	
4.0000E+00	0.0000E+00	2.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2932E+02	6.1739E-04	9.9954E+01	-5.0425E-04	-1.0793E+02	-1.0753E-03	FLAOW0037	
7.0000E+00	0.0000E+00	2.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2777E+02	-1.8576E-05	9.5041E+01	4.8327E-05	-1.0450E+02	1.1309E-04	FLAOW0038	
1.0000E+01	0.0000E+00	2.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2726E+02	2.3855E-03	9.3471E+01	-1.9418E-03	-1.0337E+02	-4.1621E-03	FLAOW0039	
1.5000E+01	0.0000E+00	2.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2762E+02	2.3000E-03	9.3019E+01	-1.9694E-03	-1.0322E+02	-4.2215E-03	FLAOW0040	
2.0000E+00	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4851E+02	-1.2938E-03	1.1770E+02	1.0475E-03	-1.2726E+02	1.8245E-03	FLAOW0041	
4.0000E+00	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.5393E+02	9.5688E-04	1.0501E+02	6.4775E-04	-1.2441E+02	1.1191E-03	FLAOW0042	
7.0000E+00	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.5241E+02	5.0372E-03	9.8415E+01	-5.0817E-03	-1.2004E+02	-8.7954E-03	FLAOW0043	
1.0000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.5188E+02	-4.4268E-05	9.6408E+01	-7.2857E-05	-1.1864E+02	-1.1447E-04	FLAOW0044	
1.5000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.5222E+02	4.5101E-04	9.5677E+01	-5.4858E-04	-1.1834E+02	-9.4642E-04	FLAOW0045	
2.0000E+00	0.0000E+00	3.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7011E+02	-9.0670E-03	1.2285E+02	7.9142E-03	-1.4272E+02	1.1323E-02	FLAOW0046	
4.0000E+00	0.0000E+00	3.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7809E+02	-6.6063E-03	1.0393E+02	6.9317E-03	-1.3811E+02	9.9071E-03	FLAOW0047	
7.0000E+00	0.0000E+00	3.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7674E+02	2.6866E-03	9.6487E+01	-3.1053E-03	-1.3365E+02	-4.4254E-03	FLAOW0048	
1.0000E+01	0.0000E+00	3.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7619E+02	-3.9039E-05	9.4280E+01	-1.1365E-04	-1.3220E+02	-1.5207E-04	FLAOW0049	
1.5000E+01	0.0000E+00	3.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7653E+02	-8.6800E-04	9.3394E+01	8.0016E-04	-1.3187E+02	1.1533E-03	FLAOW0050	
2.0000E+00	0.0000E+00	4.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00									

Listing 3.3 ZONAIR Solution File: FLAOWi

(Only shows the file:FLOW0001)

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1.289397478E-02	1.289385557E-02	1.287919283E-02	1.287919283E-02	1.289385557E-02
1.289397478E-02	1.287907362E-02	1.287907362E-02	1.289397478E-02	1.289385557E-02
1.287919283E-02	1.047065854E-01	1.048373580E-01	1.048370600E-01	1.047057509E-01
1.047056317E-01	1.048370600E-01	1.048373580E-01	1.047066450E-01	1.047066450E-01
1.048373580E-01	1.048370600E-01	1.047056317E-01	1.047057509E-01	1.048370600E-01
1.048373580E-01	1.047065854E-01	2.978144288E-01	2.978913188E-01	2.978905439E-01
2.978137136E-01	2.978137136E-01	2.978909016E-01	2.978910804E-01	2.978144288E-01
2.978144288E-01	2.978910804E-01	2.978909016E-01	2.978137136E-01	2.978137136E-01
2.978905439E-01	2.978913188E-01	2.978144288E-01	7.419244647E-01	7.406833172E-01
7.406836748E-01	7.419244051E-01	7.419238091E-01	7.406833172E-01	7.406834364E-01
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7.419244051E-01	7.406836748E-01	7.406833172E-01	7.419244647E-01	7.330892086E-01
7.326928377E-01	7.326924801E-01	7.330884337E-01	7.330890298E-01	7.326923013E-01
7.326927185E-01	7.330886722E-01	7.330886722E-01	7.326927185E-01	7.326923013E-01
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7.303544283E-01	7.302240729E-01	7.302243114E-01	7.303547859E-01	7.303547859E-01
7.302237749E-01	7.302243114E-01	7.303545475E-01	7.303545475E-01	7.302243114E-01
7.302237749E-01	7.303547859E-01	7.303547859E-01	7.302243114E-01	7.302240729E-01
7.303544283E-01	7.354699373E-01	7.356298566E-01	7.356303930E-01	7.354695201E-01
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7.356298566E-01	7.354699373E-01	7.421951890E-01	7.425407171E-01	7.425409555E-01
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7.823546529E-01	7.819361687E-01	7.819361687E-01	7.823546529E-01	7.823546529E-01
7.819361687E-01	7.819361687E-01	7.823546529E-01	7.823546529E-01	7.819361687E-01
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7.865738869E-01	7.865741253E-01	7.862043977E-01	7.862043977E-01	7.865735888E-01
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7.905990481E-01	7.901998758E-01	7.901998758E-01	7.905992270E-01	7.905990481E-01
7.901996374E-01	8.155235052E-01	8.170753717E-01	8.170760274E-01	8.155237436E-01
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8.170753717E-01	8.155235052E-01			
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-2.362316102E-02	5.648148060E-02	1.475492120E-01	2.266284525E-01	2.641122639E-01
2.641121745E-01	2.266284525E-01	1.475491971E-01	5.648140609E-02	5.648140609E-02
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-1.475492120E-01	-5.648148060E-02	8.096106350E-02	2.113893926E-01	3.248688579E-01
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3.076060414E-01 3.078166842E-01 3.078162670E-01 3.076063395E-01 3.076063395E-01
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3.295210600E-01 3.295220137E-01 3.292825818E-01 3.292831182E-01 3.295215964E-01
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3.306425810E-01 3.306421041E-01 3.308820128E-01 3.308810592E-01 3.306422234E-01
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3.316497803E-01 3.317630887E-01 3.317626119E-01 3.316494226E-01 3.316496015E-01
3.317628503E-01 3.317632675E-01 3.316492438E-01 3.316492438E-01 3.317632675E-01
3.317628503E-01 3.316496015E-01 3.316494226E-01 3.317626119E-01 3.317630887E-01
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2.938433886E-01 2.922539115E-01 2.922524810E-01 2.938422561E-01 2.938422561E-01
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2.922536135E-01 2.938427925E-01

- *Output Data Listing*

Listing 3.4 Standard Output File: CONE_TPS.OUT

[illegible]

2 -	CONT	4	20	36						CONT
3 -	CONT	2	18	34						CONT
4 -	CONT	15	31	47						CONT
5 -	CONT	13	29	45						
6 -	DESVAR	2	3	4						CONT
7 -	CONT	5	21	37						CONT
8 -	CONT	7	23	39						CONT
9 -	CONT	10	26	42						CONT
10 -	CONT	12	28	44						
11 -	DESVAR	3	3	4						CONT
12 -	CONT	61	189	269						CONT
13 -	CONT	63	191	271						CONT
14 -	CONT	50	178	258						CONT
15 -	CONT	52	180	260						
16 -	DESVAR	4	3	4						CONT
17 -	CONT	60	188	268						CONT
18 -	CONT	58	186	266						CONT
19 -	CONT	55	183	263						CONT
20 -	CONT	53	181	261						
21 -	PANLST2	11	1	2	3	4	13	14		+CON
22 -	+CON	15	16	17	18	19	20	29	30	+CON
23 -	+CON	31	32	33	34	35	36	45	46	+CON
24 -	+CON	47	48							
25 -	PANLST2	12	4	20	36	2	18	34		+CON
26 -	+CON	15	31	47	13	29	45			
27 -	PANLST2	21	5	6	7	8	9	10		+CON
28 -	+CON	11	12	21	22	23	24	25	26	+CON
29 -	+CON	27	28	37	38	39	40	41	42	+CON
30 -	+CON	43	44							
31 -	PANLST2	22	12	28	44	10	26	42		+CON
32 -	+CON	7	23	39	5	21	37			
33 -	PANLST2	31	49	50	51	52	61	62		+CON
34 -	+CON	63	64	65	66	67	68	77	78	+CON
35 -	+CON	79	80	81	82	83	84	93	94	+CON
36 -	+CON	95	96	97	98	99	100	109	110	+CON
37 -	+CON	111	112	113	114	115	116	125	126	+CON
38 -	+CON	127	128	129	130	131	132	141	142	+CON
39 -	+CON	143	144	145	146	147	148	157	158	+CON
40 -	+CON	159	160	161	162	163	164	173	174	+CON
41 -	+CON	175	176	177	178	179	180	189	190	+CON
42 -	+CON	191	192	193	194	195	196	205	206	+CON
43 -	+CON	207	208	209	210	211	212	221	222	+CON
44 -	+CON	223	224	225	226	227	228	237	238	+CON
45 -	+CON	239	240	241	242	243	244	253	254	+CON
46 -	+CON	255	256	257	258	259	260	269	270	+CON
47 -	+CON	271	272							
48 -	PANLST2	32	61	189	269	63	191	271		CONT
49 -	CONT	50	178	258	52	180	260			
50 -	PANLST2	41	53	54	55	56	57	58		+CON
51 -	+CON	59	60	69	70	71	72	73	74	+CON
52 -	+CON	75	76	85	86	87	88	89	90	+CON
53 -	+CON	91	92	101	102	103	104	105	106	+CON
54 -	+CON	107	108	117	118	119	120	121	122	+CON
55 -	+CON	123	124	133	134	135	136	137	138	+CON
56 -	+CON	139	140	149	150	151	152	153	154	+CON
57 -	+CON	155	156	165	166	167	168	169	170	+CON
58 -	+CON	171	172	181	182	183	184	185	186	+CON
59 -	+CON	187	188	197	198	199	200	201	202	+CON
60 -	+CON	203	204	213	214	215	216	217	218	+CON
61 -	+CON	219	220	229	230	231	232	233	234	+CON
62 -	+CON	235	236	245	246	247	248	249	250	+CON
63 -	+CON	251	252	261	262	263	264	265	266	+CON
64 -	+CON	267	268							
65 -	PANLST2	42	53	181	261	55	183	263		CONT
66 -	CONT	58	186	266	60	188	268			
67 -	PATCH	1	11	12						
68 -	PATCH	2	21	22						
69 -	PATCH	3	31	32						
70 -	PATCH	4	41	42						
71 -	PLTAERO	1	YES	NO		NASTRAN	AEROMESH.NAS			
72 -	PLTTPS	-1	1	ALL	TECPLOT	CONE1L. PLT	-1.0			
73 -	PLTTPS	2	1	ALL	TECPLOT	CONEML. PLT	0.05			
74 -	PRVAL	4	30000000							
75 -	PODRSM	1	1			SAVE	CONEM1. RST			CONT
76 -	CONT	CPPODRSM.P3D	UPODRSM.P3D	VPODRSM .P3D		WPODRSM .P3D				
77 -	STTYPE	1	1	508						CONT
78 -	CONT	0.01								
79 -	STTYPE	2	1	501						CONT
80 -	CONT	1.0								
81 -	STTYPE	3	6	245						CONT
82 -	CONT	0.01								
83 -	STTYPE	4	1	313						CONT
84 -	CONT	0.05								
85 -	STTYPE	5	6	245						CONT
86 -	CONT	0.01								
87 -	STTYPE	6	1	103						CONT
88 -	CONT	0.1								
89 -	STTYPE	31	6	221						CONT
90 -	CONT	0.05								
91 -	STTYPE	32	1	266						CONT
92 -	CONT	0.05								
93 -	STTYPE	33	1	260						CONT
94 -	CONT	1.2								
95 -	STTYPE	34	1	266						CONT
96 -	CONT	0.2								

97 -	STTYPE	35	6	245		CONT
98 -	CONT	0.3				
99 -	STTYPE	36	1	103		CONT
100 -	CONT	0.2				
101 -	THERMPR	1	100F			
102 -	TPSDES	1	1	1		
103 -	CONT	1	2	3	4	
104 -	TPSSYM	1	1	6	4	
105 -	CONT	1	1	0.008	0.05	CONT
106 -	CONT	1	2	0.5	4.0	CONT
107 -	CONT	1	3	0.01	0.1	CONT
108 -	CONT	1	4	0.015	0.2	CONT
109 -	CONT	1	5	0.01	0.1	CONT
110 -	CONT	0	6	0.02	0.2	
111 -	TPSSYM	2	2	6	4	CONT
112 -	CONT	2	1	0.008	0.05	CONT
113 -	CONT	2	2	0.5	4.0	CONT
114 -	CONT	2	3	0.01	0.1	CONT
115 -	CONT	2	4	0.015	0.2	CONT
116 -	CONT	2	5	0.01	0.1	CONT
117 -	CONT	0	6	0.02	0.2	
118 -	TPSSYM	3	3	6	4	CONT
119 -	CONT	3	1	0.008	0.05	CONT
120 -	CONT	3	2	0.5	4.0	CONT
121 -	CONT	3	3	0.01	0.1	CONT
122 -	CONT	3	4	0.015	0.2	CONT
123 -	CONT	3	5	0.01	0.1	CONT
124 -	CONT	0	6	0.02	0.2	
125 -	TPSSYM	4	4	6	4	CONT
126 -	CONT	4	31	0.003	0.1	CONT
127 -	CONT	4	32	0.004	0.1	CONT
128 -	CONT	4	33	0.2	5.0	CONT
129 -	CONT	4	34	0.015	1.0	CONT
130 -	CONT	4	35	0.005	0.8	CONT
131 -	CONT	0	36	0.01	1.0	
132 -	TRAJCT	1	1			CONT
133 -	CONT	.00000E00.	71871	.45600E64.	.0000	CONT
134 -	CONT	.16000E20.	98944	.41990E614.	.0000	CONT
135 -	CONT	.33000E21.	34826	.43688E69.	.4208	CONT
136 -	CONT	.49000E21.	63429	.58196E63.	.6000	CONT
137 -	CONT	.68000E22.	17754	.82141E63.	.6000	CONT
138 -	CONT	.88000E22.	99306	.11358E73.	.6000	CONT
139 -	CONT	.10800E34.	03065	.14897E73.	.6000	CONT
140 -	CONT	.12800E35.	30536	.18668E73.	.6000	CONT
141 -	CONT	.14700E37.	18387	.22489E78.	.7000	CONT
142 -	CONT	.16500E38.	14718	.26307E710.	.2250	CONT
143 -	CONT	.18500E38.	48577	.29382E710.	.2250	CONT
144 -	CONT	.20500E38.	73075	.31108E710.	.2250	CONT
145 -	CONT	.22500E38.	80061	.31479E710.	.2250	CONT
146 -	CONT	.24500E38.	62765	.30495E710.	.2250	CONT
147 -	CONT	.26300E38.	35804	.28476E730.	.0000	TECPL0T CPTEMP1.PLT
148 -	CONT	.28300E37.	92715	.25083E730.	.0000	CONT
149 -	CONT	.30300E37.	42020	.20828E730.	.0000	CONT
150 -	CONT	.32300E36.	98630	.17006E730.	.0000	CONT
151 -	CONT	.34100E36.	51451	.15705E717.	.6576	CONT
152 -	CONT	.35900E36.	29482	.15555E711.	.3822	CONT
153 -	CONT	.37900E36.	12626	.15505E711.	.5945	CONT
154 -	CONT	.39900E35.	96248	.15405E711.	.6852	CONT
155 -	CONT	.41900E35.	80340	.15256E711.	.6316	CONT
156 -	CONT	.43900E35.	64886	.15063E711.	.4712	CONT
157 -	CONT	.45900E35.	49856	.14827E711.	.2120	CONT
158 -	CONT	.47900E35.	35216	.14551E710.	.8676	CONT
159 -	CONT	.49900E35.	20938	.14237E710.	.4565	CONT
160 -	CONT	.51900E35.	06993	.13890E79.	.9883	CONT
161 -	CONT	.53900E34.	92935	.13511E79.	.3991	CONT
162 -	CONT	.55900E34.	78106	.13103E78.	.7931	CONT
163 -	CONT	.57900E34.	62119	.12670E78.	.2187	CONT
164 -	CONT	.59900E34.	44764	.12216E77.	.6847	CONT
165 -	CONT	.61900E34.	25902	.11747E77.	.2020	CONT
166 -	CONT	.63900E34.	05448	.11267E76.	.7771	CONT
167 -	CONT	.65900E33.	82413	.10782E76.	.3472	CONT
168 -	CONT	.67900E33.	56631	.10300E75.	.9874	CONT
169 -	CONT	.69900E33.	28723	.98254E65.	.7202	CONT
170 -	CONT	.71759E33.	00000	.93312E64.	.8191	TECPL0T CPTEMP2.PLT
171 -	CONT	.73600E32.	68846	.87329E64.	.1829	CONT
172 -	CONT	.75600E32.	29065	.80146E63.	.4982	CONT
173 -	CONT	.77600E31.	86649	.72891E63.	.0646	CONT
174 -	CONT	.79600E31.	47000	.66074E63.	.0928	CONT
175 -	CONT	.81600E31.	14676	.59940E63.	.3054	CONT
176 -	CONT	.83600E30.	96665	.54315E63.	.8323	CONT
177 -	CONT	.85600E30.	86983	.48792E63.	.8046	CONT
178 -	CONT	.87400E30.	80178	.43914E63.	.9110	CONT
179 -	CONT	.89400E30.	73186	.38870E63.	.9359	CONT
180 -	CONT	.91400E30.	67432	.34157E63.	.9549	CONT
181 -	CONT	.93400E30.	62713	.29712E63.	.9492	CONT
182 -	CONT	.95400E30.	58784	.25488E63.	.9046	CONT
183 -	CONT	.97400E30.	55190	.21464E63.	.8498	CONT
184 -	CONT	.99400E30.	51899	.17633E63.	.8233	CONT
185 -	CONT	.10140E40.	48941	.13984E63.	.8101	CONT
186 -	CONT	.10340E40.	46307	.10502E63.	.8009	CONT
187 -	CONT	.10540E40.	43975	.71741E53.	.7895	CONT
188 -	CONT	.10740E40.	41915	.39891E53.	.7718	CONT
189 -	CONT	.10940E40.	40098	.93915E43.	.7458	CONT
190 -	TRJLST	1				CONT
191 -	CONT	1	1.			

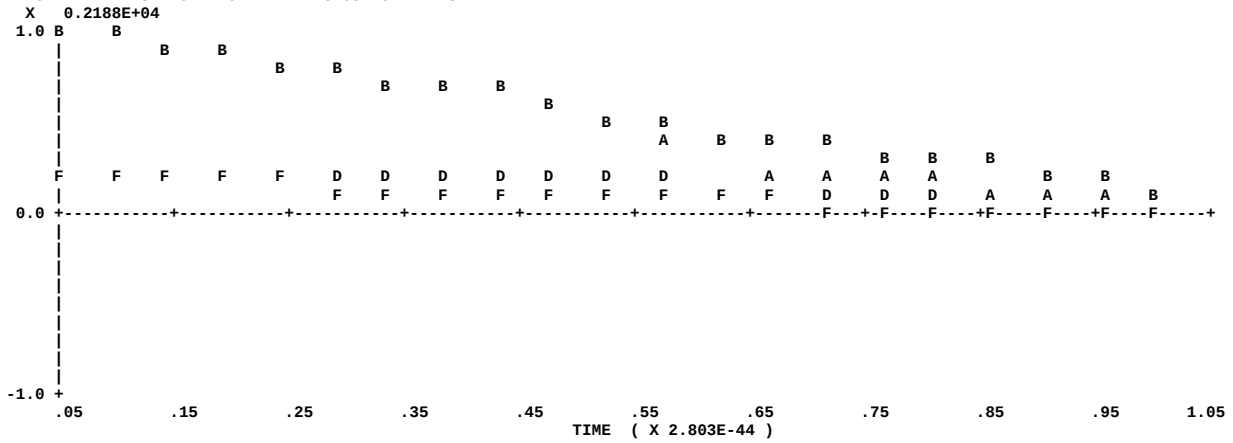
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*      SUBCASE      =      1
*      DISCIPLINE   =  TPSDES
*      BULK ENTRY ID =      1
*
*****
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OPTIMIZATION SYSTEM FOR TPSSYM = 1

TOTAL NUMBER OF DESIGN VARIABLES	=	60
TOTAL NUMBER OF CONSTRAINS	=	1704
TOTAL NUMBER OF TEMP. CONSTRAINS	=	1584
TOTAL NUMBER OF TEMP. PRINTOUTS	=	22

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



	MAXIMUM TEMPERATURE OF EVERY LAYER					
LAYER:	1	2	3	4	5	6
Tmax:	2300.33	2400.33	550.33	450.33	550.33	350.33
Optv:	2187.64	2183.67	448.35	448.35	349.07	349.07

LAYER	VALUES OF DESIGN VARIABLES :											
	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09	DEV10	DEV11	DEV12
1	0.00826	0.00827	0.00800	0.00900	0.00808	0.00808	0.00900	0.00808	0.00810	0.00826	0.00827	0.00800
2	0.09182	0.07761	0.92326	1.24383	1.11360	1.05243	1.24383	1.11386	1.05286	1.09812	1.07764	0.92323
3	0.01579	0.01579	0.02410	0.01125	0.01010	0.01010	0.01125	0.01010	0.01012	0.01580	0.01579	0.02410
4	0.12181	0.10537	0.05006	0.19538	0.12863	0.12622	0.19538	0.12865	0.12568	0.12181	0.10539	0.05006
5	0.01604	0.01606	0.02512	0.01125	0.01010	0.01010	0.01125	0.01010	0.01012	0.01605	0.01606	0.02512

THE ORIGINAL OBJECTIVE FUNCTION = 24.1400013

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 1.1389003

THE TOTAL OPTIMAL WEIGHT = 3.30052600E+01

OPTIMAL STRUCTURES OF TPS FOR PATCH = 1
(WITH AVERAGE THICKNESS)

RCG COATING	slab	0.00828 in.	2187.6 F
LI900	slab	1.08382 in.	2183.7 F
RTV-560	thin skin	0.01452 in.	448.4 F
5.4 LB SIP	slab	0.12120 in.	448.4 F
RTV-560	thin skin	0.01478 in.	349.1 F
ALUMINUM 7075-T6	slab	0.10000 in.	349.1 F

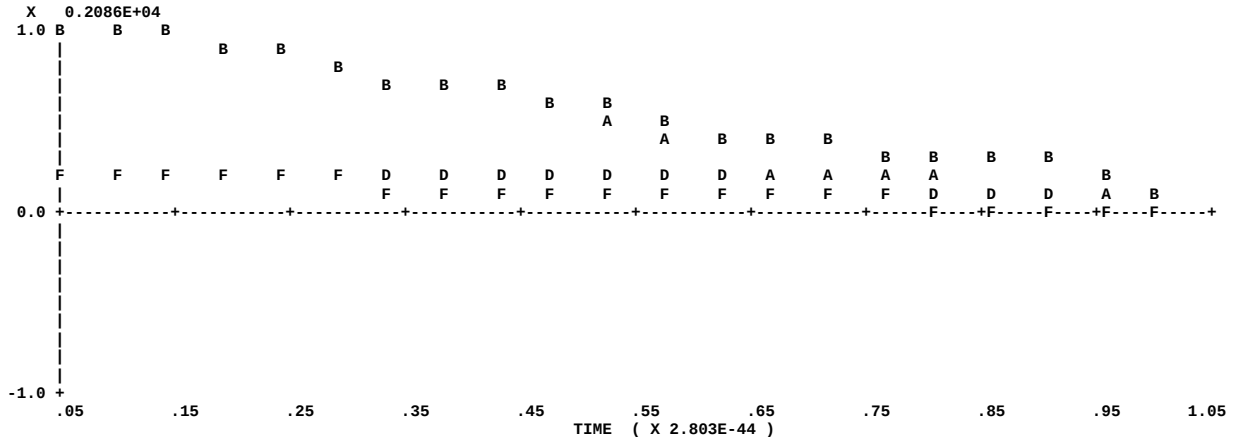
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 1

PANEL	LAYER01	LAYER02	LAYER03	LAYER04	LAYER05	LAYER06
1	0.00892	2168.46	1.24379	2166.31	0.01014	550.33
2	0.00900	2150.24	1.24383	2145.96	0.01125	448.01
3	0.00865	2136.70	1.17686	2134.67	0.01293	550.33
4	0.00826	2111.13	1.09182	2107.36	0.01579	437.18
13	0.00826	2079.82	1.09181	2076.09	0.01580	417.65
14	0.00865	2136.70	1.17688	2134.67	0.01293	550.33
15	0.00900	2187.64	1.24383	2183.67	0.01125	448.07
16	0.00892	2168.46	1.24381	2166.31	0.01014	550.33
17	0.00800	2187.64	1.09823	2185.66	0.00870	550.33
18	0.00808	2164.79	1.11360	2160.84	0.01010	448.35
19	0.00812	2143.23	1.08988	2141.30	0.01244	550.33
20	0.00827	1969.39	1.07761	1965.99	0.01579	369.38
29	0.00827	2079.82	1.07764	2077.96	0.01579	550.33
30	0.00812	2143.24	1.09018	2141.31	0.01244	550.33
31	0.00808	2187.64	1.11386	2185.66	0.01010	550.33
32	0.00800	2187.64	1.09834	2185.66	0.00870	550.33
33	0.00810	2187.64	1.07756	2185.66	0.00800	550.33
34	0.00808	2164.79	1.05243	2162.82	0.01010	550.33
35	0.00804	2087.00	1.00092	2085.13	0.01567	550.33
36	0.00800	1969.39	0.92326	1967.69	0.02410	550.33
45	0.00800	1969.52	0.92323	1967.82	0.02410	550.33
46	0.00806	2087.16	1.00135	2085.29	0.01569	550.33
47	0.00810	2164.91	1.05286	2162.93	0.01012	550.33
48	0.00811	2187.64	1.07773	2185.66	0.00800	550.33

OPTIMIZATION SYSTEM FOR TPSSYM = 2

TOTAL NUMBER OF DESIGN VARIABLES = 60
TOTAL NUMBER OF CONSTRAINTS = 1704
TOTAL NUMBER OF TEMP. CONSTRAINTS = 1584
TOTAL NUMBER OF TEMP. PRINTOUTS = 22

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



LAYER:	1	2	3	4	5	6
Tmax:	2300.33	2400.33	550.33	450.33	550.33	350.33
Optv:	2085.86	2082.24	450.29	450.29	349.96	

LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09	DEV10	DEV11	DEV12
1	0.00809	0.00908	0.00808	0.00906	0.00800	0.00800	0.00906	0.00800	0.00808	0.00809	0.00908	0.00808
2	1.07279	1.17915	0.90940	1.20439	0.96897	0.80846	1.20426	0.96894	0.81500	1.07271	1.17920	0.90939
3	0.01341	0.01135	0.01010	0.01267	0.02282	0.01000	0.01276	0.02284	0.01010	0.01342	0.01135	0.01010
4	0.12521	0.19584	0.11594	0.19553	0.05276	0.11018	0.19552	0.05272	0.10675	0.12518	0.19584	0.11594
5	0.01356	0.01135	0.01010	0.01274	0.02410	0.01000	0.01283	0.02410	0.01010	0.01357	0.01135	0.01010

THE ORIGINAL OBJECTIVE FUNCTION = 24.1400013

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 1.0873410

THE TOTAL OPTIMAL WEIGHT = 3.15091709E+01

OPTIMAL STRUCTURES OF TPS FOR PATCH = 2
(WITH AVERAGE THICKNESS)

RCG COATING	slab	0.00839 in.	2085.9 F
LI900	slab	1.02439 in.	2082.2 F

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i
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RTV-560      thin skin    0.01341 in.   450.3 F
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i
5.4 LB SIP    slab        0.13228 in.   450.3 F
i
-----
RTV-560      thin skin    0.01366 in.   350.0 F
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i
ALUMINUM 7075-T6 slab      0.10000 in.   350.0 F
i
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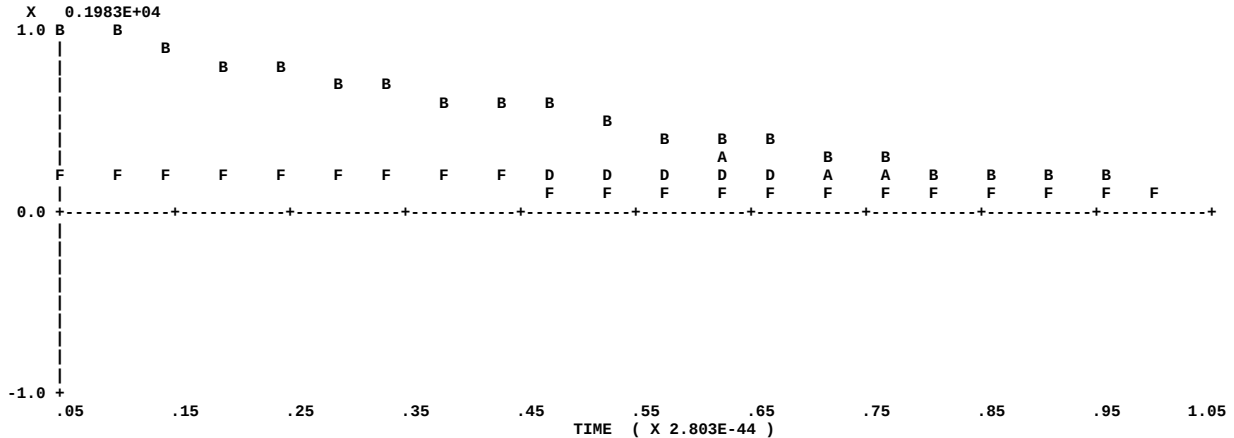
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 2

PANEL	LAYER01	LAYER02	LAYER03	LAYER04	LAYER05	LAYER06
5	0.00809	2085.86	1.07279	2084.05	0.01341	550.33
6	0.00866	2048.08	1.14599	2046.21	0.01362	448.50
7	0.00906	2048.02	1.20439	2047.08	0.01267	550.33
8	0.00895	2085.86	1.17307	2082.24	0.01565	449.15
9	0.00894	2012.28	1.17295	2010.45	0.01568	449.53
10	0.00906	2048.08	1.20426	2047.15	0.01276	550.33
11	0.00866	1958.79	1.14573	1956.92	0.01370	371.62
12	0.00809	2085.86	1.07271	2084.05	0.01342	550.33
21	0.00908	2012.28	1.17915	2011.37	0.01135	550.33
22	0.00840	1768.11	1.03825	1766.16	0.01830	444.03
23	0.00800	1958.79	0.96897	1957.85	0.02282	550.33
24	0.00800	1878.00	0.87960	1876.45	0.02532	446.87
25	0.00800	1919.97	0.87980	1919.01	0.02533	550.33
26	0.00800	1958.79	0.96894	1957.85	0.02284	550.33
27	0.00840	1968.20	1.03849	1967.30	0.01832	550.33
28	0.00908	2012.29	1.17920	2011.38	0.01135	550.33
37	0.00808	1878.18	0.90940	1877.41	0.01010	550.33
38	0.00802	1810.15	0.84728	1809.26	0.01002	550.33
39	0.00800	1765.94	0.80846	1764.96	0.01000	550.33
40	0.00802	1764.96	0.79162	1744.14	0.01002	550.33
41	0.00805	1764.96	0.79410	1744.96	0.01006	550.33
42	0.00808	1768.11	0.81500	1767.13	0.01010	550.33
43	0.00810	1812.31	0.85393	1811.41	0.01012	550.33
44	0.00808	1878.00	0.90939	1877.22	0.01010	550.33

OPTIMIZATION SYSTEM FOR TPSSYM = 3

TOTAL NUMBER OF DESIGN VARIABLES = 60
TOTAL NUMBER OF CONSTRAINTS = 2584
TOTAL NUMBER OF TEMP. CONSTRAINTS = 1584
TOTAL NUMBER OF TEMP. PRINTOUTS = 22

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4	5	6
Tmax:	2300.33	2400.33	550.33	450.33	550.33	350.33
Optv:	1982.72	1979.12	450.29	450.29	350.23	350.23

VALUES OF DESIGN VARIABLES :

LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09	DEV10	DEV11	DEV12
1	0.00808	0.00800	0.00800	0.00810	0.00800	0.00800	0.00800	0.00800	0.00800	0.00809	0.00800	0.00800
2	0.69612	0.50000	0.50000	0.87185	0.50000	0.50000	0.85142	0.50000	0.50000	0.68282	0.50000	0.50000
3	0.01010	0.01000	0.01000	0.01013	0.01000	0.01000	0.01000	0.01000	0.01000	0.01011	0.01000	0.01000
4	0.10220	0.01500	0.01500	0.11240	0.01500	0.01500	0.11065	0.01500	0.01500	0.10181	0.01500	0.01500
5	0.01010	0.01000	0.01000	0.01013	0.01000	0.01000	0.01000	0.01000	0.01000	0.01011	0.01000	0.01000

THE ORIGINAL OBJECTIVE FUNCTION = 112.6533356
 THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.6718338
 THE TOTAL OPTIMAL WEIGHT = 7.69771397E+03

OPTIMAL STRUCTURES OF TPS FOR PATCH = 3 (WITH AVERAGE THICKNESS)			
RCG COATING	slab	0.00802 in.	1982.7 F
LI900	slab	0.59185 in.	1979.1 F
RTV-560	thin skin	0.01003 in.	450.3 F
5.4 LB SIP	slab	0.04559 in.	450.3 F
RTV-560	thin skin	0.01003 in.	350.2 F
ALUMINUM 7075-T6	slab	0.10000 in.	350.2 F

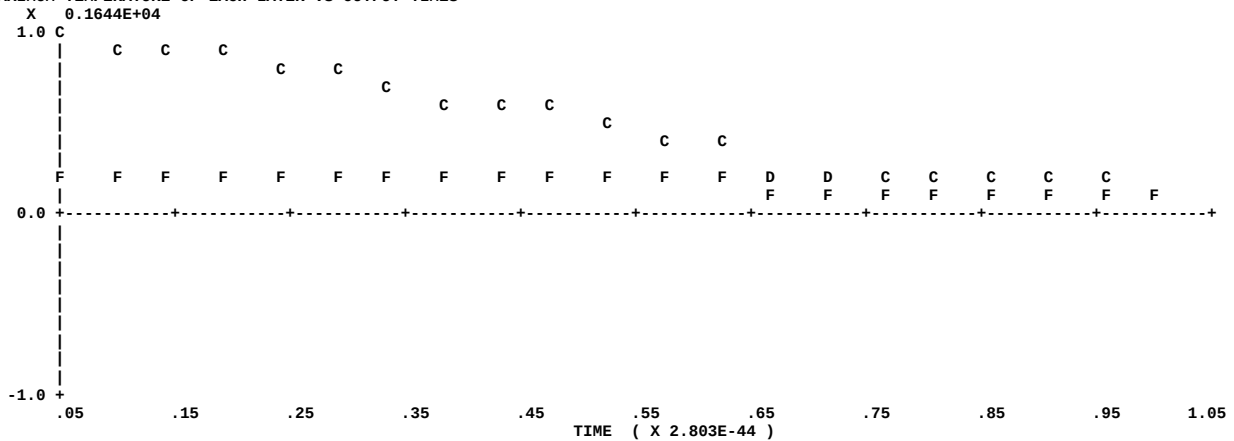
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 3												
PANEL	LAYER01	LAYER02	LAYER03	LAYER04	LAYER05	LAYER06	LAYER07	LAYER08	LAYER09	LAYER10	LAYER11	LAYER12
49	0.00802	1982.72	0.88797	1980.92	0.01003	550.33	0.11241	449.37	0.01003	399.48	0.10000	349.58
50	0.00800	1982.72	0.85142	1980.92	0.01000	550.33	0.11065	450.29	0.01000	400.26	0.10000	350.23
51	0.00801	1882.05	0.77996	1880.72	0.01002	550.33	0.10650	449.66	0.01002	399.78	0.10000	349.90
52	0.00809	1731.14	0.68282	1730.50	0.01011	550.33	0.10181	448.47	0.01011	398.19	0.10000	347.91
61	0.00808	1752.06	0.69612	1751.29	0.01010	550.33	0.10220	448.14	0.01010	397.90	0.10000	347.66
62	0.00812	1887.79	0.80441	1886.39	0.01015	550.33	0.10838	447.40	0.01015	397.07	0.10000	346.73
63	0.00810	1982.57	0.87185	1980.74	0.01013	550.33	0.11240	448.17	0.01013	397.67	0.10000	347.18
64	0.00807	1982.72	0.89596	1980.92	0.01008	550.33	0.11312	448.50	0.01008	398.42	0.10000	348.34
65	0.00802	1957.29	0.84645	1955.45	0.01003	550.33	0.10204	440.60	0.01003	395.85	0.10000	350.23
66	0.00800	1332.29	0.81470	1331.53	0.01000	349.33	0.10065	349.33	0.01000	346.38	0.10000	346.38
67	0.00801	1822.98	0.75039	1821.75	0.01001	550.33	0.09684	438.45	0.01001	393.68	0.10000	348.91
68	0.00808	1217.05	0.66371	1216.18	0.01010	310.49	0.09274	310.49	0.01010	307.82	0.10000	307.82
77	0.00807	1699.86	0.67563	1699.12	0.01009	550.33	0.09309	434.64	0.01009	389.50	0.10000	344.36
78	0.00810	1828.05	0.77225	1826.75	0.01013	550.33	0.09852	436.33	0.01013	391.15	0.10000	345.98
79	0.00809	1918.41	0.83299	1916.73	0.01012	550.33	0.10222	438.81	0.01012	393.43	0.10000	348.05
80	0.00806	1956.67	0.85376	1954.83	0.01008	550.33	0.10268	439.77	0.01008	394.84	0.10000	349.91
81	0.00802	1867.32	0.79189	1865.71	0.01002	550.33	0.08832	428.75	0.01002	390.81	0.10000	350.23
82	0.00800	1832.90	0.76597	1831.44	0.01000	550.33	0.08739	428.04	0.01000	389.80	0.10000	350.23
83	0.00801	1744.04	0.71122	1742.94	0.01001	550.33	0.08404	423.43	0.01001	385.43	0.10000	347.43
84	0.00807	1614.01	0.63837	1613.42	0.01008	550.33	0.08070	416.82	0.01008	378.42	0.10000	340.03
93	0.00806	1629.93	0.64843	1629.23	0.01008	550.33	0.08100	416.56	0.01008	378.19	0.10000	339.83
94	0.00809	1748.21	0.72967	1747.05	0.01011	550.33	0.08545	421.49	0.01011	383.14	0.10000	344.80
95	0.00808	1823.60	0.78144	1831.12	0.01010	550.33	0.08871	426.20	0.01010	387.61	0.10000	349.02
96	0.00805	1866.75	0.79800	1865.14	0.01006	550.33	0.08886	427.99	0.01006	389.91	0.10000	350.23
97	0.00801	1764.92	0.73052	1763.57	0.01002	550.33	0.07289	415.09	0.01002	384.81	0.10000	350.23
98	0.00800	1735.20	0.71114	1733.96	0.01000	550.33	0.07247	413.34	0.01000	382.67	0.10000	350.23
99	0.00801	1654.07	0.66718	1653.11	0.01001	550.33	0.06964	406.21	0.01001	375.83	0.10000	345.45
100	0.00805	1537.38	0.60984	1536.82	0.01006	550.33	0.06716	396.15	0.01006	365.39	0.10000	334.62
109	0.00805	1092.31	0.61783	1091.49	0.01006	280.47	0.06739	280.47	0.01006	278.28	0.10000	278.28
110	0.00807	1657.24	0.68178	1656.23	0.01009	550.33	0.07076	404.48	0.01009	373.83	0.10000	343.17
111	0.00806	1200.61	0.72341	1199.88	0.01008	312.97	0.07352	312.97	0.01008	310.49	0.10000	310.49
112	0.00804	1764.41	0.73532	1763.05	0.01005	550.33	0.07332	414.42	0.01005	384.02	0.10000	350.23
113	0.00801	1676.85	0.67854	1675.72	0.01001	550.33	0.05984	403.15	0.01001	379.35	0.10000	350.23
114	0.00800	1651.02	0.66461	1649.97	0.01000	550.33	0.05980	400.50	0.01000	376.26	0.10000	350.23
115	0.00801	1576.54	0.62986	1575.70	0.01001	550.33	0.05744	391.29	0.01001	367.36	0.10000	343.44
116	0.00804	1471.15	0.58564	1470.61	0.01005	550.33	0.05567	378.33	0.01005	354.04	0.10000	329.75
125	0.00804	1481.12	0.59187	1480.52	0.01005	550.33	0.05585	378.15	0.01005	353.88	0.10000	329.61
126	0.00805	1578.86	0.64120	1577.99	0.01007	550.33	0.05832	389.74	0.01007	365.60	0.10000	341.47
127	0.00805	1650.57	0.67418	1649.50	0.01006	550.33	0.06062	399.03	0.01006	374.56	0.10000	350.09
128	0.00803	1676.39	0.68225	1675.26	0.01004	550.33	0.06016	402.55	0.01004	378.66	0.10000	350.23
129	0.00801	1596.97	0.63222	1596.04	0.01001	550.33	0.04820	392.12	0.01001	374.09	0.10000	350.23
130	0.00800	1574.49	0.62307	1573.61	0.01000	550.33	0.04850	388.67	0.01000	370.16	0.10000	350.23
131	0.00800	1506.04	0.59658	1505.31	0.01001	550.33	0.04657	377.62	0.01001	359.45	0.10000	341.29
132	0.00803	1410.72	0.56403	1410.21	0.01004	550.33	0.04540	362.10	0.01004	343.59	0.10000	325.09
141	0.00803	1418.24	0.56868	1417.68	0.01004	550.33	0.04554	361.96	0.01004	343.47	0.10000	324.98
142	0.00804	1507.62	0.60501	1506.85	0.01005	550.33	0.04721	376.25	0.01005	357.92	0.10000	339.60
143	0.00804	1573.99	0.63023	1573.09	0.01005	550.33	0.04911	387.35	0.01005	368.68	0.10000	350.01
144	0.00802	1596.56	0.63496	1595.62	0.01003	550.33	0.04844	391.58	0.01003	373.49	0.10000	350.23
145	0.00801	1512.52	0.58442	1511.79	0.01001	550.33	0.03620	380.17	0.01001	368.11	0.10000	350.23
146	0.00800	1493.34	0.58005	1492.63	0.01000	550.33	0.03679	375.88	0.01000	363.32	0.10000	350.23
147	0.00800	1431.26	0.56218	1430.65	0.01000	550.33	0.03532	362.98	0.01000	350.78	0.10000	338.57
148	0.00802	1346.34	0.54165	1345.85	0.01002	550.33	0.03478	344.86	0.01002	332.35	0.10000	319.84
157	0.00802	1351.32	0.54468	1350.80	0.01002	550.33	0.03486	344.75	0.01002	332.25	0.10000	319.75
158	0.00803	1432.07	0.56761	1431.43	0.01003	550.33	0.03574	361.81	0.01003	349.50	0.10000	337.18
159	0.00802	1492.79	0.58471	1492.07	0.01003	550.33	0.03719	374.74	0.01003	362.07	0.10000	349.40
160	0.00801	1512.16	0.58616	1511.42	0.01002	550.33	0.03635	379.71	0.01002	367.61	0.10000	350.23
161	0.00800	1427.23	0.53786	1426.69	0.01000	550.33	0.02451	367.67	0.01000	361.43	0.10000	350.23
162	0.00800	1411.00	0.53795	1410.47	0.01000	550.33	0.02533	362.57	0.01000	355.83	0.10000	349.10
163	0.00800	1355.36	0.52861	1354.86	0.01000	550.33	0.02435	347.94	0.01000	341.55	0.10000	335.16
164	0.00801	1280.58	0.51974	1280.12	0.01001	550.33	0.02437	327.32	0.01001	320.68	0.10000	314.05
173	0.00801	1283.06	0.52118	1282.58	0.01001	550.33	0.02442	327.25	0.01001	320.62	0.10000	313.99

174	0.00801	1355.43	0.53111	1354.91	0.01001	550.33	0.02454	346.96	0.01001	340.52	0.10000	334.09
175	0.00801	1410.42	0.54016	1409.86	0.01001	550.33	0.02552	361.62	0.01001	354.83	0.10000	348.04
176	0.00801	1426.93	0.53864	1426.38	0.01001	550.33	0.02458	367.29	0.01001	361.03	0.10000	350.23
177	0.00800	1346.36	0.49630	1345.99	0.01000	550.33	0.01407	355.19	0.01000	354.15	0.10000	350.23
178	0.00800	1332.29	0.50000	1331.91	0.01000	550.33	0.01500	349.33	0.01000	347.85	0.10000	346.38
179	0.00800	1282.80	0.49851	1282.41	0.01000	550.33	0.01451	333.25	0.01000	332.09	0.10000	330.93
180	0.00800	1217.05	0.50000	1216.62	0.01000	550.33	0.01500	310.49	0.01000	309.16	0.10000	307.82
189	0.00800	1217.27	0.50000	1216.83	0.01000	550.33	0.01500	310.46	0.01000	309.12	0.10000	307.78
190	0.00800	1282.23	0.49838	1281.82	0.01000	550.33	0.01450	332.49	0.01000	331.33	0.10000	330.16
191	0.00800	1331.70	0.50000	1331.30	0.01000	550.33	0.01500	348.57	0.01000	347.09	0.10000	345.61
192	0.00800	1346.11	0.49623	1345.74	0.01000	550.33	0.01407	354.89	0.01000	353.85	0.10000	350.23
193	0.00800	1276.24	0.46421	1276.02	0.01000	550.33	0.00800	346.39	0.01000	349.38	0.10000	349.38
194	0.00800	1263.26	0.47017	1263.00	0.01000	550.33	0.00800	339.61	0.01000	342.28	0.10000	342.28
195	0.00800	1219.07	0.47508	1218.75	0.01000	550.33	0.00800	322.84	0.01000	325.76	0.10000	325.76
196	0.00800	1160.35	0.48448	1159.93	0.00999	550.33	0.00800	298.48	0.00999	301.32	0.10000	301.32
205	0.00800	1158.75	0.48335	1158.34	0.00999	550.33	0.00800	298.46	0.00999	301.30	0.10000	301.30
206	0.00800	1218.01	0.47290	1217.69	0.00999	550.33	0.00800	322.31	0.00999	325.27	0.10000	325.27
207	0.00800	1262.69	0.46844	1262.42	0.00999	550.33	0.00800	339.09	0.00999	341.79	0.10000	341.79
208	0.00800	1276.06	0.46347	1275.83	0.00999	550.33	0.00800	346.18	0.00999	349.19	0.10000	349.19
209	0.00800	1224.18	0.44656	1224.04	0.01000	550.33	0.00800	338.36	0.01000	343.58	0.10000	343.58
210	0.00800	1210.66	0.45282	1210.47	0.01000	550.33	0.00800	331.41	0.01000	336.51	0.10000	336.51
211	0.00800	1170.41	0.46185	1170.14	0.01000	550.33	0.00800	314.29	0.01000	319.54	0.10000	319.54
212	0.00800	1115.61	0.47545	1115.20	0.00999	550.33	0.00800	289.46	0.00999	294.75	0.10000	294.75
221	0.00800	1112.90	0.47367	1112.52	0.00999	550.33	0.00800	289.45	0.00999	294.74	0.10000	294.74
222	0.00800	1169.13	0.45852	1168.85	0.00998	550.33	0.00800	313.98	0.00998	319.29	0.10000	319.29
223	0.00800	1210.16	0.45007	1209.96	0.00998	550.33	0.00800	331.09	0.00998	336.25	0.10000	336.25
224	0.00800	1224.06	0.44546	1223.91	0.00999	550.33	0.00800	338.23	0.00999	343.49	0.10000	343.49
225	0.00800	1197.30	0.44810	1197.15	0.01000	550.33	0.00800	330.29	0.01000	335.38	0.10000	335.38
226	0.00800	1181.18	0.45210	1181.00	0.01000	550.33	0.00800	323.57	0.01000	328.83	0.10000	328.83
227	0.00800	1142.97	0.46221	1142.70	0.01000	550.33	0.00800	307.00	0.01000	312.24	0.10000	312.24
228	0.00800	1091.90	0.47508	1087.54	0.00999	550.33	0.00800	282.91	0.00999	288.36	0.10000	288.36
237	0.00800	1091.90	0.47327	1084.71	0.00999	550.33	0.00800	282.91	0.00999	288.35	0.10000	288.35
238	0.00800	1141.79	0.45891	1141.52	0.00998	550.33	0.00800	306.85	0.00998	312.15	0.10000	312.15
239	0.00800	1180.79	0.44932	1180.60	0.00998	550.33	0.00800	323.42	0.00998	328.74	0.10000	328.74
240	0.00800	1197.22	0.44703	1197.07	0.00999	550.33	0.00800	330.24	0.00999	335.35	0.10000	335.35
241	0.00800	1201.44	0.47256	1201.20	0.01000	550.33	0.00811	322.46	0.01000	324.56	0.10000	324.57
242	0.00800	1180.35	0.47135	1180.10	0.01000	550.33	0.00800	316.45	0.01000	319.11	0.10000	319.11
243	0.00800	1141.85	0.47882	1141.53	0.01000	550.33	0.00808	301.45	0.01000	303.88	0.10000	303.88
244	0.00800	1091.90	0.48510	1081.24	0.00999	550.33	0.00800	279.56	0.00999	282.39	0.10000	282.39
253	0.00800	1091.90	0.48401	1079.39	0.00999	550.33	0.00800	279.53	0.00999	282.37	0.10000	282.37
254	0.00800	1141.16	0.47697	1140.85	0.00999	550.33	0.00800	301.40	0.00999	303.87	0.10000	303.87
255	0.00800	1180.15	0.46968	1179.89	0.00999	550.33	0.00800	316.40	0.00999	319.10	0.10000	319.10
256	0.00800	1201.42	0.47200	1201.17	0.00999	550.33	0.00806	322.44	0.00999	324.56	0.10000	324.56
257	0.00800	1221.09	0.50000	1220.73	0.01000	550.33	0.01500	319.12	0.01000	317.85	0.10000	316.59
258	0.00800	1200.64	0.50000	1200.27	0.01000	550.33	0.01500	312.98	0.01000	311.74	0.10000	310.50
259	0.00800	1157.63	0.50000	1157.24	0.01000	550.33	0.01500	300.05	0.01000	298.87	0.10000	297.70
260	0.00800	1092.61	0.50000	1092.20	0.01000	550.33	0.01500	280.51	0.01000	279.42	0.10000	278.33
269	0.00800	1092.31	0.50000	1091.90	0.01000	550.33	0.01500	280.47	0.01000	279.37	0.10000	278.28
270	0.00800	1157.52	0.50000	1157.13	0.01000	550.33	0.01500	300.03	0.01000	298.85	0.10000	297.67
271	0.00800	1200.61	0.50000	1200.25	0.01000	550.33	0.01500	312.97	0.01000	311.73	0.10000	310.49
272	0.00800	1221.08	0.50000	1220.73	0.01000	550.33	0.01500	319.11	0.01000	317.85	0.10000	316.59

OPTIMIZATION SYSTEM FOR TPSSYM = 4

TOTAL NUMBER OF DESIGN VARIABLES = 60
TOTAL NUMBER OF CONSTRAINTS = 2584
TOTAL NUMBER OF TEMP. CONSTRAINTS = 1584
TOTAL NUMBER OF TEMP. PRINTOUTS = 22

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4	5	6
Tmax:	2300.33	2020.33	1800.33	2020.33	550.33	350.33
Optv:	1643.91	1643.91	1637.62	356.70	350.07	350.08

VALUES OF DESIGN VARIABLES :												
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09	DEV10	DEV11	DEV12
1	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300	0.00300
2	0.00400	0.00400	0.00400	0.00400	0.00400	0.00400	0.00400	0.00400	0.00400	0.00400	0.00400	0.00400
3	0.48603	0.21535	0.20000	0.39225	0.20000	0.20000	0.39285	0.20000	0.20000	0.47696	0.21542	0.20000
4	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500	0.01500
5	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500	0.00500

THE ORIGINAL OBJECTIVE FUNCTION = 477.6333618

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.0556153

THE TOTAL OPTIMAL WEIGHT = 1.17136855E+04

OPTIMAL STRUCTURES OF TPS FOR PATCH = 4 (WITH AVERAGE THICKNESS)		
=====		
HRSI COAT	thin skin	0.00300 in. 1643.9 F
=====		
AB312 Fabric	slab	0.00400 in. 1643.9 F
=====		
Q-Felt(3.5 PCF)	slab	0.28157 in. 1637.6 F
=====		
AB312 Fabric	slab	0.01500 in. 356.7 F
=====		
RTV-560	thin skin	0.00500 in. 350.1 F
=====		
ALUMINUM 7075-T6	slab	0.20000 in. 350.1 F
=====		

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 4

PANEL	LAYER01		LAYER02		LAYER03		LAYER04		LAYER05		LAYER06	
53	0.00300	1632.96	0.00400	1632.96	0.47696	1629.89	0.01500	991.67	0.00500	353.24	0.20000	349.96
54	0.00300	1561.58	0.00400	1561.58	0.42628	1558.06	0.01500	955.21	0.00500	352.44	0.20000	349.01
55	0.00300	1515.83	0.00400	1515.83	0.39285	1512.01	0.01500	931.86	0.00500	352.00	0.20000	348.47
56	0.00300	1489.47	0.00400	1489.47	0.37495	1485.52	0.01500	918.33	0.00500	351.52	0.20000	347.96
57	0.00300	1488.89	0.00400	1488.89	0.37445	1484.94	0.01500	918.03	0.00500	351.52	0.20000	347.98
58	0.00300	1515.15	0.00400	1515.15	0.39225	1511.33	0.01500	931.49	0.00500	351.99	0.20000	348.52
59	0.00300	1563.98	0.00400	1563.98	0.42823	1560.44	0.01500	956.36	0.00500	352.46	0.20000	349.09
60	0.00300	1643.91	0.00400	1643.91	0.48603	1640.76	0.01500	997.07	0.00500	353.30	0.20000	350.08
69	0.00300	1581.00	0.00400	1581.00	0.45008	1577.80	0.01500	966.04	0.00500	353.30	0.20000	350.08
70	0.00300	953.74	0.00400	953.74	0.40321	946.58	0.01500	313.40	0.00500	305.59	0.20000	305.59
71	0.00300	1460.16	0.00400	1460.16	0.37269	1456.36	0.01500	902.31	0.00500	348.48	0.20000	344.91
72	0.00300	1101.37	0.00400	1101.37	0.35606	1092.80	0.01500	356.70	0.00500	349.85	0.20000	349.86
73	0.00300	1432.21	0.00400	1432.21	0.35561	1428.30	0.01500	887.59	0.00500	347.18	0.20000	343.58
74	0.00300	1459.57	0.00400	1459.57	0.37216	1455.76	0.01500	902.02	0.00500	348.56	0.20000	345.03
75	0.00300	1509.06	0.00400	1509.06	0.40495	1505.47	0.01500	928.03	0.00500	350.77	0.20000	347.36
76	0.00300	1590.82	0.00400	1590.82	0.45819	1587.55	0.01500	970.88	0.00500	353.30	0.20000	350.08
85	0.00300	1511.42	0.00400	1511.42	0.41434	1508.04	0.01500	931.63	0.00500	353.30	0.20000	350.08
86	0.00300	1433.84	0.00400	1433.84	0.37262	1430.22	0.01500	889.13	0.00500	348.14	0.20000	344.63
87	0.00300	1385.75	0.00400	1385.75	0.34596	1381.96	0.01500	862.73	0.00500	343.64	0.20000	340.01
88	0.00300	1356.67	0.00400	1356.67	0.33085	1352.81	0.01500	846.90	0.00500	341.15	0.20000	337.46
89	0.00300	1356.24	0.00400	1356.24	0.33048	1352.39	0.01500	846.72	0.00500	341.22	0.20000	337.55
90	0.00300	1385.27	0.00400	1385.27	0.34550	1381.48	0.01500	862.56	0.00500	343.82	0.20000	340.22
91	0.00300	1435.69	0.00400	1435.69	0.37408	1432.05	0.01500	890.11	0.00500	348.34	0.20000	344.87
92	0.00300	1519.73	0.00400	1519.73	0.42118	1516.30	0.01500	935.73	0.00500	353.30	0.20000	350.08
101	0.00300	1431.98	0.00400	1431.98	0.37397	1428.42	0.01500	892.19	0.00500	353.30	0.20000	350.08
102	0.00300	1350.66	0.00400	1350.66	0.33816	1346.97	0.01500	845.92	0.00500	345.00	0.20000	341.43
103	0.00300	1301.04	0.00400	1301.04	0.31586	1297.28	0.01500	817.56	0.00500	337.89	0.20000	334.19
104	0.00300	1270.26	0.00400	1270.26	0.30257	1266.47	0.01500	800.27	0.00500	334.09	0.20000	330.32
105	0.00300	979.28	0.00400	979.28	0.30228	971.08	0.01500	324.63	0.00500	318.03	0.20000	318.03
106	0.00300	1300.68	0.00400	1300.68	0.31550	1296.93	0.01500	817.50	0.00500	338.17	0.20000	334.49
107	0.00300	849.52	0.00400	849.52	0.33932	843.07	0.01500	279.06	0.00500	271.85	0.20000	271.85
108	0.00300	1438.60	0.00400	1438.60	0.37939	1434.99	0.01500	895.46	0.00500	353.30	0.20000	350.08
117	0.00300	1363.39	0.00400	1363.39	0.33958	1359.66	0.01500	857.98	0.00500	353.30	0.20000	350.08
118	0.00300	1279.06	0.00400	1279.06	0.30890	1275.32	0.01500	808.59	0.00500	342.01	0.20000	338.40
119	0.00300	1228.16	0.00400	1228.16	0.29033	1224.42	0.01500	778.56	0.00500	332.68	0.20000	328.92
120	0.00300	1196.09	0.00400	1196.09	0.27867	1192.37	0.01500	760.11	0.00500	327.76	0.20000	323.93
121	0.00300	1195.85	0.00400	1195.85	0.27844	1192.12	0.01500	760.07	0.00500	327.91	0.20000	324.09
122	0.00300	1227.90	0.00400	1227.90	0.29005	1224.16	0.01500	778.60	0.00500	333.04	0.20000	329.30
123	0.00300	1280.24	0.00400	1280.24	0.30980	1276.50	0.01500	809.36	0.00500	342.39	0.20000	338.81
124	0.00300	1368.57	0.00400	1368.57	0.34378	1364.80	0.01500	860.54	0.00500	353.30	0.20000	350.08
133	0.00300	1300.89	0.00400	1300.89	0.30870	1297.01	0.01500	826.63	0.00500	353.30	0.20000	350.08
134	0.00300	1214.03	0.00400	1214.03	0.28275	1210.25	0.01500	774.55	0.00500	338.99	0.20000	335.35
135	0.00300	1161.99	0.00400	1161.99	0.26754	1158.28	0.01500	743.03	0.00500	327.68	0.20000	323.88
136	0.00300	1128.94	0.00400	1128.94	0.25741	1125.27	0.01500	723.62	0.00500	321.76	0.20000	317.88
137	0.00300	1128.77	0.00400	1128.77	0.25724	1125.10	0.01500	723.63	0.00500	321.94	0.20000	318.07
138	0.00300	1161.82	0.00400	1161.82	0.26733	1158.11	0.01500	743.15	0.00500	328.11	0.20000	324.32
139	0.00300	1214.94	0.00400	1214.94	0.28340	1211.15	0.01500	775.21	0.00500	339.44	0.20000	335.82
140	0.00300	1304.77	0.00400	1304.77	0.31182	1300.87	0.01500	828.56	0.00500	353.30	0.20000	350.08
149	0.00300	1234.39	0.00400	1234.39	0.27651	1230.37	0.01500	793.06	0.00500	353.30	0.20000	350.08
150	0.00300	1145.17	0.00400	1145.17	0.25562	1141.36	0.01500	738.30	0.00500	335.39	0.20000	331.72
151	0.00300	1091.97	0.00400	1091.97	0.24393	1088.30	0.01500	705.24	0.00500	322.02	0.20000	318.17
152	0.00300	1058.12	0.00400	1058.12	0.23552	1054.52	0.01500	684.95	0.00500	315.06	0.20000	311.13
153	0.00300	1058.02	0.00400	1058.02	0.23541	1054.42	0.01500	685.00	0.00500	315.26	0.20000	311.33

154	0.00300	1091.87	0.00400	1091.87	0.24379	1088.20	0.01500	705.44	0.00500	322.51	0.20000	318.67
155	0.00300	1145.78	0.00400	1145.78	0.25604	1141.96	0.01500	738.85	0.00500	335.90	0.20000	332.24
156	0.00300	1236.93	0.00400	1236.93	0.27851	1232.89	0.01500	794.33	0.00500	353.30	0.20000	350.08
165	0.00300	1166.61	0.00400	1166.61	0.24465	1162.44	0.01500	758.50	0.00500	353.30	0.20000	350.08
166	0.00300	1075.46	0.00400	1075.46	0.22901	1071.60	0.01500	701.29	0.00500	331.13	0.20000	327.44
167	0.00300	1021.14	0.00400	1021.14	0.22083	1017.50	0.01500	666.73	0.00500	315.73	0.20000	311.86
168	0.00300	986.84	0.00400	986.84	0.21427	983.31	0.01500	645.75	0.00500	307.74	0.20000	303.77
169	0.00300	986.80	0.00400	986.80	0.21423	983.27	0.01500	645.84	0.00500	307.96	0.20000	303.99
170	0.00300	1021.10	0.00400	1021.10	0.22076	1017.47	0.01500	667.00	0.00500	316.27	0.20000	312.40
171	0.00300	1075.75	0.00400	1075.75	0.22919	1071.91	0.01500	701.72	0.00500	331.69	0.20000	328.00
172	0.00300	1167.83	0.00400	1167.83	0.24556	1163.66	0.01500	759.12	0.00500	353.30	0.20000	350.08
181	0.00300	1101.35	0.00400	1101.35	0.21542	1097.06	0.01500	724.73	0.00500	353.26	0.20000	349.84
182	0.00300	1009.06	0.00400	1009.06	0.20493	1005.19	0.01500	665.60	0.00500	326.17	0.20000	322.47
183	0.00300	953.73	0.00400	953.73	0.20000	950.14	0.01500	629.69	0.00500	308.93	0.20000	305.03
184	0.00300	919.61	0.00400	919.61	0.19542	916.16	0.01500	608.35	0.00500	300.00	0.20000	296.00
185	0.00300	919.62	0.00400	919.62	0.19543	916.17	0.01500	608.47	0.00500	300.23	0.20000	296.23
186	0.00300	953.74	0.00400	953.74	0.20000	950.16	0.01500	629.99	0.00500	309.49	0.20000	305.59
187	0.00300	1009.06	0.00400	1009.06	0.20490	1005.20	0.01500	665.90	0.00500	326.75	0.20000	323.03
188	0.00300	1101.37	0.00400	1101.37	0.21535	1097.08	0.01500	724.75	0.00500	353.28	0.20000	349.86
197	0.00300	1043.40	0.00400	1043.40	0.19160	1039.04	0.01500	694.00	0.00500	349.90	0.20000	346.49
198	0.00300	951.11	0.00400	951.11	0.18585	947.25	0.01500	633.78	0.00500	320.47	0.20000	316.76
199	0.00300	895.08	0.00400	895.08	0.18363	891.54	0.01500	596.83	0.00500	301.76	0.20000	297.86
200	0.00300	861.87	0.00400	861.87	0.18103	858.51	0.01500	575.60	0.00500	292.06	0.20000	288.07
201	0.00300	861.91	0.00400	861.91	0.18107	858.55	0.01500	575.73	0.00500	292.28	0.20000	288.28
202	0.00300	895.10	0.00400	895.10	0.18368	891.57	0.01500	597.13	0.00500	302.30	0.20000	298.39
203	0.00300	950.85	0.00400	950.85	0.18565	947.00	0.01500	633.94	0.00500	321.02	0.20000	317.30
204	0.00300	1042.46	0.00400	1042.46	0.19076	1038.10	0.01500	693.54	0.00500	349.91	0.20000	346.49
213	0.00300	998.16	0.00400	998.16	0.17628	993.77	0.01500	668.86	0.00500	344.94	0.20000	341.54
214	0.00300	907.46	0.00400	907.46	0.17447	903.63	0.01500	608.75	0.00500	314.03	0.20000	310.35
215	0.00300	851.11	0.00400	851.11	0.17411	847.64	0.01500	571.24	0.00500	294.43	0.20000	290.55
216	0.00300	849.05	0.00400	845.82	0.17341	816.58	0.01500	550.75	0.00500	284.24	0.20000	280.28
217	0.00300	849.05	0.00400	845.82	0.17348	816.61	0.01500	550.87	0.00500	284.43	0.20000	280.46
218	0.00300	851.09	0.00400	851.09	0.17419	847.63	0.01500	571.48	0.00500	294.91	0.20000	291.02
219	0.00300	907.00	0.00400	907.00	0.17419	903.17	0.01500	608.78	0.00500	314.51	0.20000	310.81
220	0.00300	996.63	0.00400	996.63	0.17500	992.24	0.01500	668.10	0.00500	344.93	0.20000	341.51
229	0.00300	970.97	0.00400	970.97	0.17246	966.61	0.01500	651.87	0.00500	338.11	0.20000	334.73
230	0.00300	883.83	0.00400	883.83	0.17341	880.06	0.01500	593.41	0.00500	306.90	0.20000	303.27
231	0.00300	849.05	0.00400	845.82	0.17372	824.29	0.01500	555.95	0.00500	287.18	0.20000	283.37
232	0.00300	849.05	0.00400	845.82	0.17476	796.42	0.01500	537.00	0.00500	276.87	0.20000	272.99
233	0.00300	849.05	0.00400	845.82	0.17483	796.41	0.01500	537.06	0.00500	277.01	0.20000	273.12
234	0.00300	849.05	0.00400	845.82	0.17380	824.17	0.01500	556.07	0.00500	287.53	0.20000	283.70
235	0.00300	883.24	0.00400	883.24	0.17313	879.48	0.01500	593.30	0.00500	307.24	0.20000	303.59
236	0.00300	969.34	0.00400	969.34	0.17117	964.99	0.01500	651.06	0.00500	338.08	0.20000	334.69
245	0.00300	966.29	0.00400	966.29	0.18251	962.05	0.01500	645.21	0.00500	329.27	0.20000	325.93
246	0.00300	884.96	0.00400	884.96	0.18474	881.29	0.01500	590.18	0.00500	299.18	0.20000	295.63
247	0.00300	849.05	0.00400	845.82	0.18428	826.31	0.01500	553.50	0.00500	280.27	0.20000	276.56
248	0.00300	849.05	0.00400	845.82	0.18681	803.01	0.01500	536.98	0.00500	271.80	0.20000	271.80
249	0.00300	849.05	0.00400	845.82	0.18685	802.90	0.01500	536.96	0.00500	271.80	0.20000	271.80
250	0.00300	849.05	0.00400	845.82	0.18433	826.02	0.01500	553.43	0.00500	280.42	0.20000	276.70
251	0.00300	884.34	0.00400	884.34	0.18458	880.68	0.01500	589.95	0.00500	299.31	0.20000	295.74
252	0.00300	965.17	0.00400	965.17	0.18175	960.93	0.01500	644.63	0.00500	329.21	0.20000	325.87
261	0.00300	979.28	0.00400	979.28	0.20000	975.18	0.01500	647.85	0.00500	321.33	0.20000	318.03
262	0.00300	901.24	0.00400	901.24	0.20000	897.67	0.01500	595.65	0.00500	293.72	0.20000	290.23
263	0.00300	849.52	0.00400	849.52	0.20000	846.29	0.01500	561.07	0.00500	275.45	0.20000	271.85
264	0.00300	849.05	0.00400	845.82	0.20000	821.76	0.01500	544.57	0.00500	271.80	0.20000	271.80
265	0.00300	849.05	0.00400	845.82	0.20000	821.57	0.01500	544.47	0.00500	271.80	0.20000	271.80
266	0.00300	849.05	0.00400	849.05	0.20000	845.82	0.01500	560.81	0.00500	275.41	0.20000	271.80
267	0.00300	900.68	0.00400	900.68	0.20000	897.11	0.01500	595.34	0.00500	293.65	0.20000	290.16
268	0.00300	978.96	0.00400	978.96	0.20000	974.86	0.01500	647.66	0.00500	321.25	0.20000	317.95

```
*****
***                                     ***
***  T P S O P T   T E R M I N A T E D  ***
***                                     ***
***               N O R M A L L Y       ***
***                                     ***
***          11:36:45    09/08/2005    ***
***                                     ***
*****
```

4.0 Blunt Nose Wedge

- *Purpose:* To demonstrate the applicability of the TPSOPT software system for a wedge with blunt nose over a wide range of flight conditions.
- *Input File:*
 - Standard input File: WEDGE_TPS.INP (Listing 4.1)
 - Aerodynamic Database: CFDTABLE.DAT (Listing 4.2)
 - Geometry File: CFDGEO.DAT (Binary file)
 - ZONAIR Solution File: THERMi (Listing 4.3)
- *Output File:*
 - Standard Output File: WEDGE_TPS.OUT (Listing 4.4)
 - Vehicle Surface Mesh: WEDGE30.NAS (Figure 4.1)
 - Response surfaces for POD analysis (Figure 4.4)
 - Cp and Temperature Plot File: CPTEMP.PLT (Figure 4.5)
 - Thickness Distribution Plot File: WEDGE30.PLT (Figure 4.6)

4.1 The Surface Mesh of the Blunt Nose Wedge

A blunt nose wedge configuration is analyzed in this example. The wedge is subjected to a two-dimensional flow condition in x-z-plane. Therefore, only one panel is placed along longitudinal direction (y-direction) as shown in Figure 4.1. The surface mesh is generated by ZONAIR and outputted as the binary file “CFDGEO.DAT”. The surface consists of 64 panels and 66 grid points. These panels and grid points are stored in a file named CFDGEO.DAT which is used in TPSOPT by specifying the name on the second row of the aerodynamic database (CFDTABLE.DAT) that is imported by the “ASSIGN AEROBASE=” executive control command.

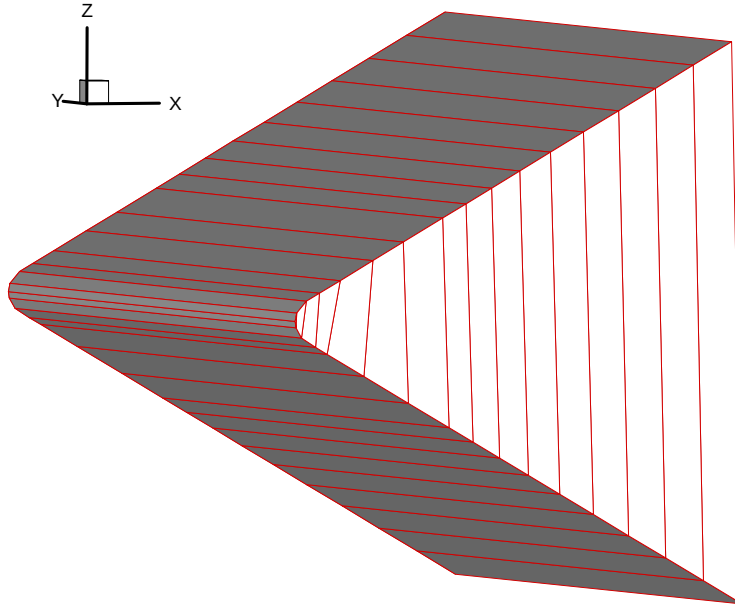


Figure 4.1. Blunt cone surface mesh

4.2 The Aerodynamic Database: CFDTABLE.DAT

The aerodynamic database is generated by running ZONAIR for 324 combinations of 9 Mach numbers (2,3,4,6,8,10,12,14,15) and 36 angles of attack (0,2,4,6,8,10,11-40). This file provides the TPSOPT system with all of the flow field information from ZONAIR. The first row is a title card (A WEDGE PROBLEM WITH 30 DEG OPENING ANGLE); the second row provide the geometry file name (CFDGEO.DAT); the third and fourth rows list the name of the reference chord, span, ...etc, and their values, respectively; the fifth row lists the names of items in the following rows (Mach number, Altitude, Angle of attack, etc.) and the remaining rows contain the values of the items listed in the fifth row and the file names (THERM0001-THERM0324) in the last column which store the velocities and pressure coefficients for the combination of the Mach number and Angle of attack listed in the corresponding row.

4.3 The Standard Input File (WEDGE_TPS.INP)

The standard input file consists of two major parts: the airflow information and the TPS optimization system. The airflow information is provided by ZONAIR and imported by the aerodynamic database (CFDTABLE.DAT) using the following statement on the first row of the input file:

ASSIGN AEROBASE='CFDTABLE.DAT'

The TPS optimization system is the major portion of the standard input file, which includes the specification of trajectory data and definition of patches for the TPS. Three patches are defined over the TPS (Figure 4.2), among which patch 1 is located on the nose of the vehicle and patches

2 and 3 are for the remaining part. Figure 4.3 shows individual patches and panel numbers defined over them.

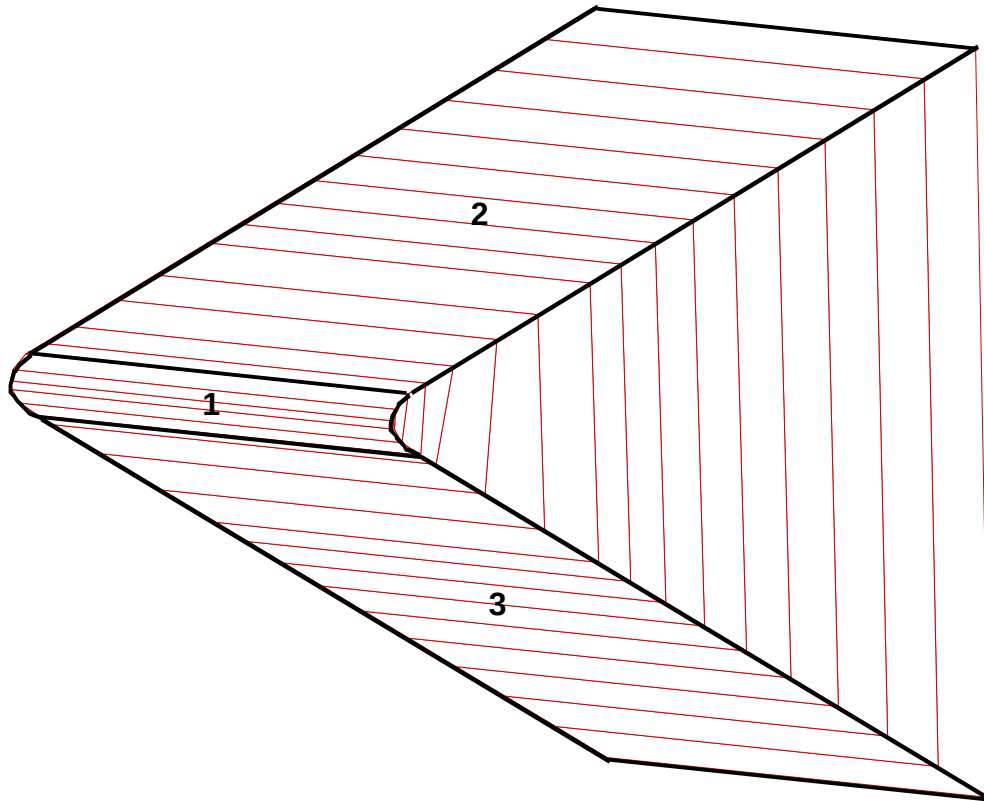
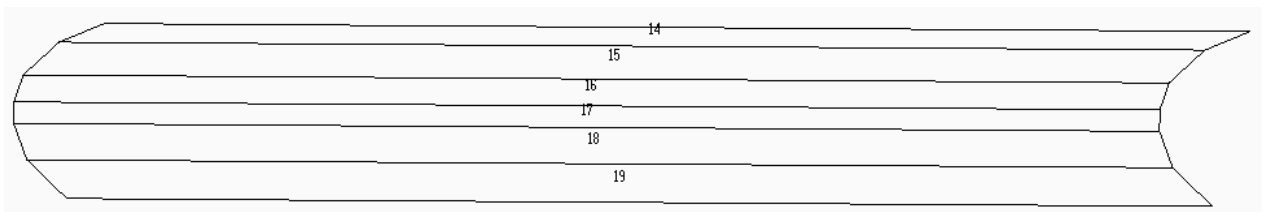
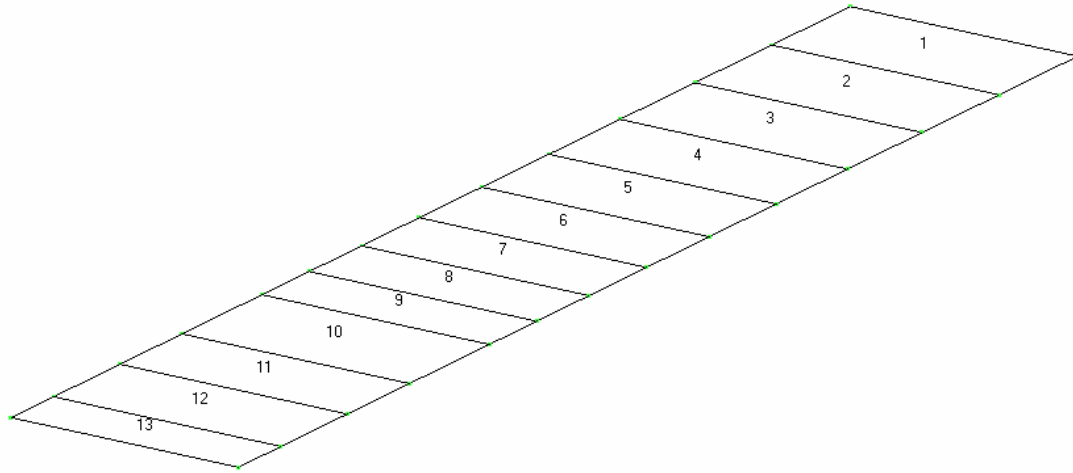


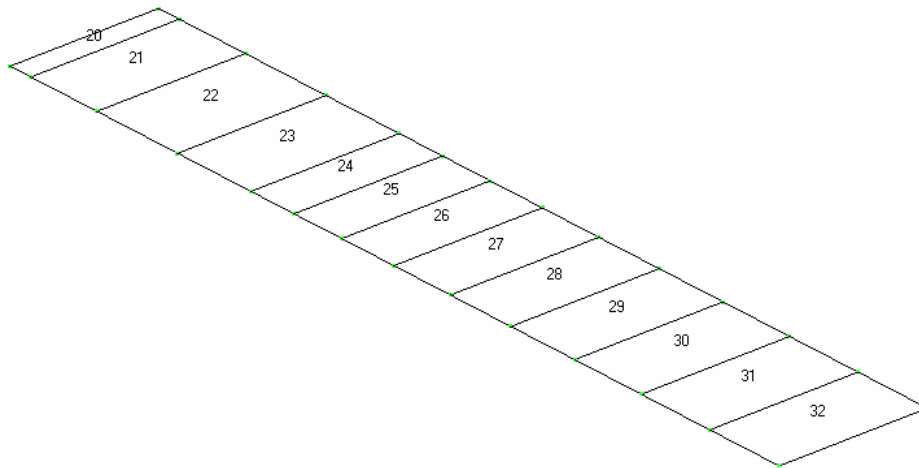
Figure 4.2. Three patches defined over the surface of the wedge



Patch 1 (Nose cap)



Patch 2 (Leeward side)



Patch 3 (Windward side)

Figure 4.3. Three separated patches defined over wedge

4.4 Thermal Structures for TPS

Two sets of 6 layered TPS structures are used for the blunt wedge configuration. The first one is for the nose patch (patch 1) and the windward side patch (patch 3), and the second one for the leeward patch (patch 2).

The thermal structures specified for the first set of TPS use the STTYPE numbers 1, 2, 3, 4, 5 and 6 are Slab, Slab, Thin skin, Slab, Thin skin and Slab, and the corresponding optimization materials are 508 (RCG Coating), 501 (LI-9000), 245 (RTV-560), 313 (5.4LB SIP), 245 (RTV-

560) and 103 (Aluminum). The maximum temperatures for these materials are: $2760^{\circ}R$, $2860^{\circ}R$, $1010^{\circ}R$, $910^{\circ}R$, $1010^{\circ}R$, and $810^{\circ}R$.

The structures specified for the second set of TPS are the AFRSI (Advanced Flexible Reusable Surface Insulation) TPS which consists of 6 layers: Thin skin, Slab, Slab, Slab, Thin skin and Slab denoted by the STTYPE numbers 31, 32, 33, 34, 35 and 36. The corresponding optimization materials are 221 (HRSI COAT), 266 (AB312 Fabric), 260 (Q-Felt) , 266 (AB312 Fabric), 245 (RTV-560) and 103 (Aluminum) and the maximum temperatures for these materials are: $2760^{\circ}R$, $2480^{\circ}R$, $2480^{\circ}R$, $2260^{\circ}R$, and $810^{\circ}R$.

The sixth layer of both sets of the TPS is defined as the structure layer. That means that the thickness of the sixth layer is constant during the computation of optimization.

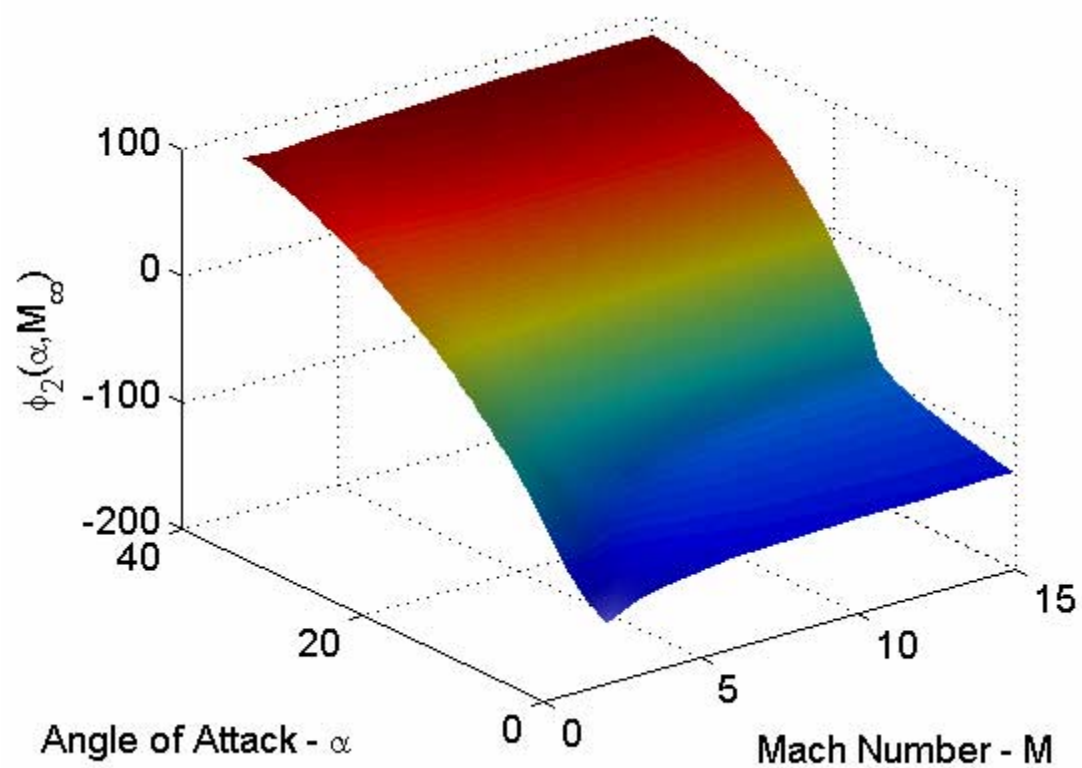
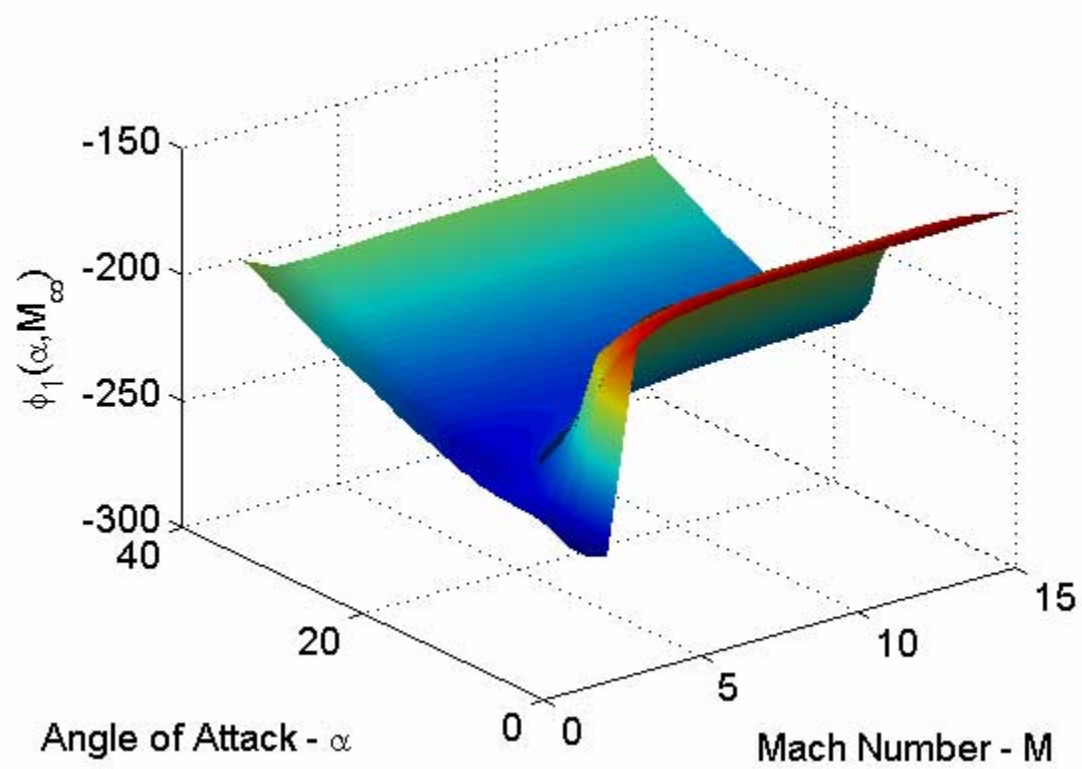
4.5 Output Information

The output information consists of the following items:

- (1) Response surfaces of C_p and velocities for POD analysis (Plot files).
- (2) C_p and temperature for specified times in trajectory bulk data cards (Plot files).
- (3) Schematic plotting of trajectory related thermal quantities versus time for over every patch. These quantities include enthalpy-based heat transfer coefficient, adiabatic wall enthalpy, and pressure.
- (4) Thickness of every design layer and objective function value for every iteration.
- (5) Schematic plotting of optimal thickness and maximum temperature for over each layer for every patch.
- (6) Optimal thickness over each layer for every panel (Plot file).

4.6 Results

The outputted items listed in Section 4.5 have been stored in a text file and some plotting files. The test file is the Standard Output File (WEDGE_TPS.OUT) which includes all the input information from the Standard Input File (WEDGE_TPS.INP) and items (3)-(5) listed in the above section. Figures 4.4-4.6 show the response surfaces of C_p , C_p specified in trajectory bulk data card, and the optimal thickness, respectively.



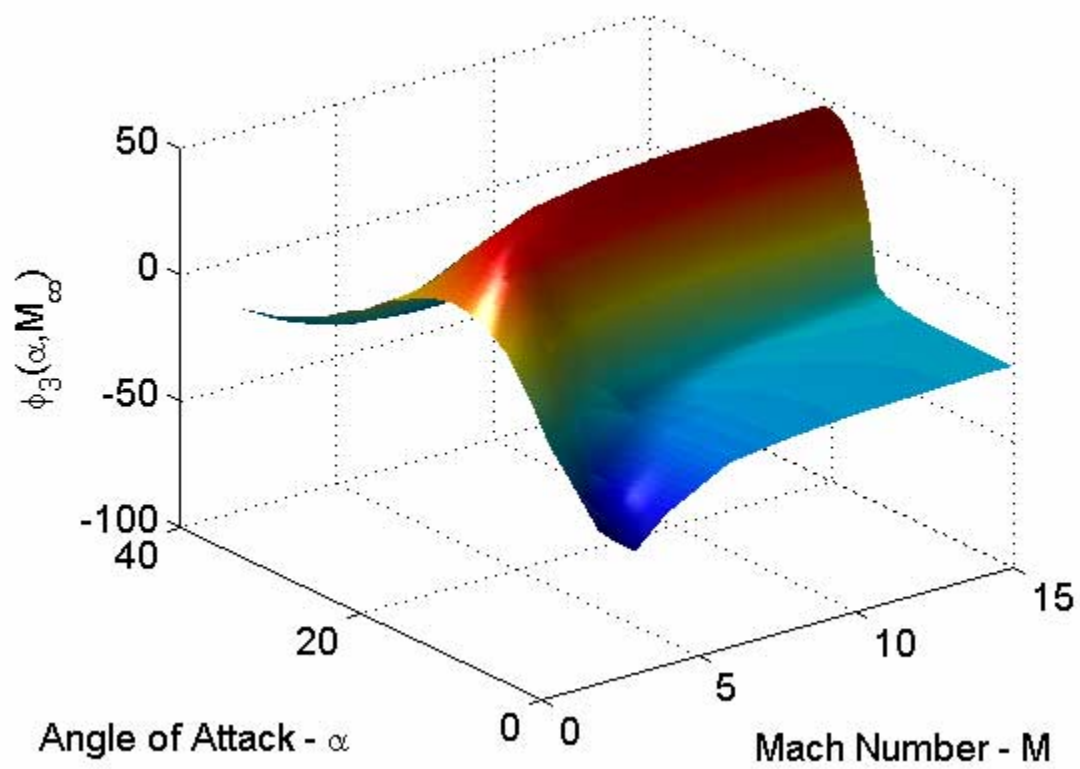
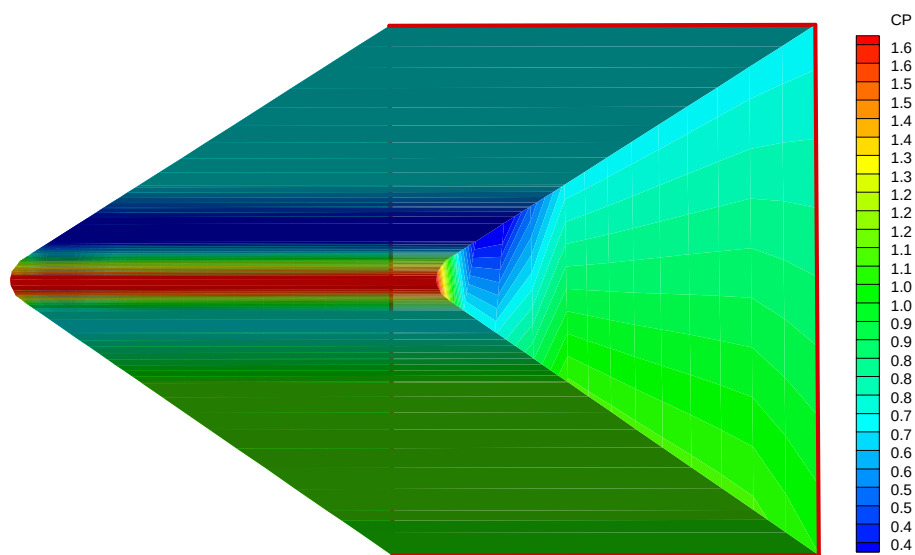


Figure 4.4. Response surfaces of first three modes for POD analysis directly using CFD results



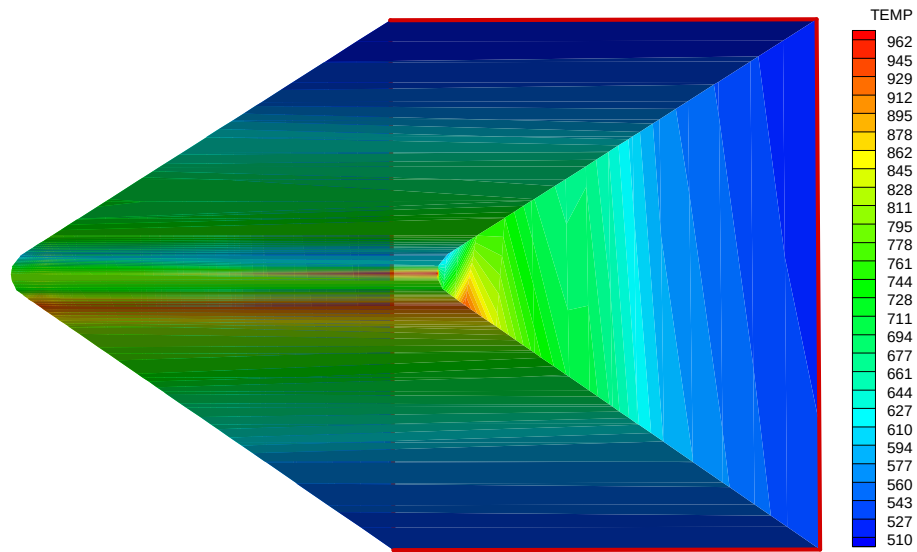
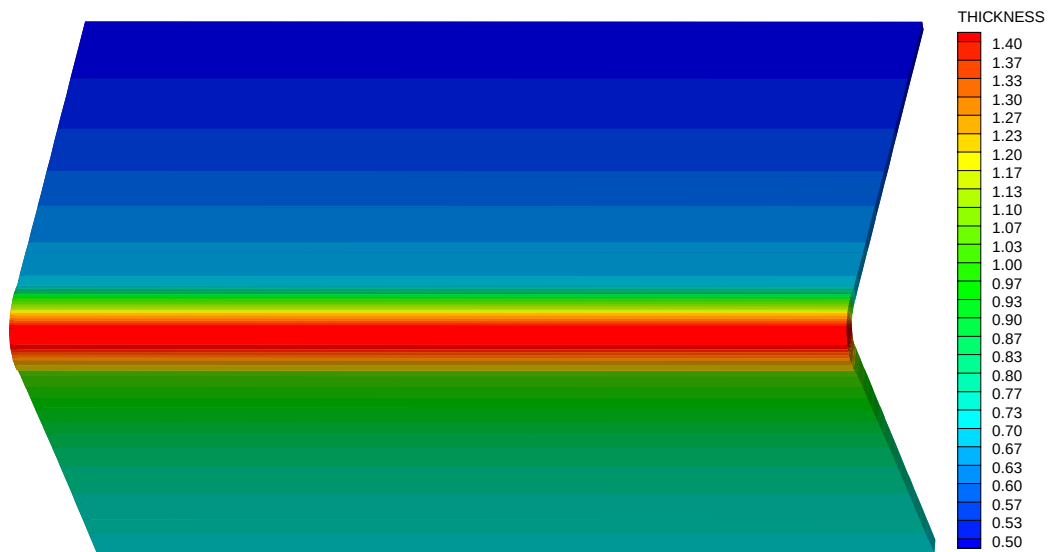


Figure 4.5. Plots of C_p and temperature at time=225 seconds ($M=8.8$, $AoA=10.2$)



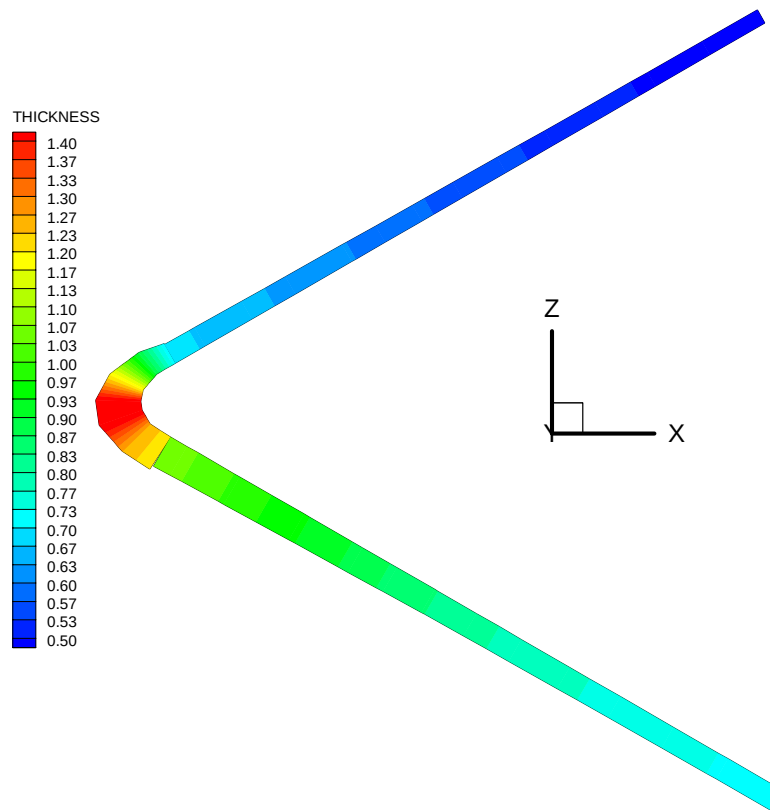


Figure 4.6. Optimal thickness plot

4.7 Lists of Input and Output Files

- *Input Data Listing:*

Listing 4.1 Standard input File: WEDGE_TPS.INP

```

ASSIGN AEROBASE='CFDTABLE.DAT',PRINT=0
$DIAG 1,2,3
SOL 1
$ Begin Executive Control Section
CEND
ECHO = SORT
SUBCASE = 1
    SUBTITLE=BENT-NOSE BODY AT MACH 10.5, AoA=0.0 Degrees
    LABEL= HYPERSONIC AERODYNAMIC ANALYSIS
    TPSDES=1
$
BEGIN BULK
$
PLTAERO 1      YES      NO      NASTRAN AEROMESH.NAS
$ POLTTING TPS THICKNESS
PLTTIPS 1      1      ALL      TECPLOT  WEDGELAYED.PLT  -1.0
PLTTIPS -2     1      ALL      TECPLOT  WEDGESINGL.PLT  -1.0
$
PARAM  STREAM 1.E-6
$
$PODRSM |TPSDES |METHOD |NRDMOD |TOLER |NEURON |SAVE |FILENM

```

PODRSM	1	1			SAVE	WEDGE30.RST	CONT
CONT	CPPODRSM.P3D	UPODRSM.P3D	VPODRSM.P3D	WPODRSM.P3D			
\$							
\$TPSDES	SETID	TPSSYM					
TPSDES	1	1	1	1			CONT
CONT	1	2	3				
\$							
\$TPSSYM	SETID	IDPATCH	NLAYER	PRVAL	MSGOUT		
TPSSYM	1	1	6	4	5		CONT
CONT	1	1	0.008	0.05			CONT
CONT	1	2	0.5	4.0			CONT
CONT	1	3	0.01	0.1			CONT
CONT	1	4	0.015	0.2			CONT
CONT	1	5	0.01	0.1			CONT
CONT	0	6	0.02	0.2			
TPSSYM	2	2	6	4			CONT
CONT	2	31	0.005	0.1			CONT
CONT	2	32	0.005	0.1			CONT
CONT	2	33	0.3	5.0			CONT
CONT	2	34	0.02	1.0			CONT
CONT	2	35	0.01	0.8			CONT
CONT	0	36	0.01	1.0			
TPSSYM	3	3	6	4			CONT
CONT	3	1	0.008	0.05			CONT
CONT	3	2	0.5	4.0			CONT
CONT	3	3	0.01	0.1			CONT
CONT	3	4	0.015	0.2			CONT
CONT	3	5	0.01	0.1			CONT
CONT	0	6	0.02	0.2			
\$							
\$	TILE	TPS	(Based on First of Fig10 of Chiu adn Pitts paper, 1991)				
STTYPE	1	1	508				CONT
CONT	0.01						
STTYPE	2	1	501				CONT
CONT	1.0						
STTYPE	3	6	245				CONT
CONT	0.01						
STTYPE	4	1	313				CONT
CONT	0.05						
STTYPE	5	6	245				CONT
CONT	0.01						
STTYPE	6	1	103				CONT
CONT	0.1						
\$	AFRSI	TPS	(Based on Fig7 of Myers report, 2000)				
STTYPE	31	6	221				CONT
CONT	0.02						
STTYPE	32	1	266				CONT
CONT	0.02						
STTYPE	33	1	260				CONT
CONT	1.						
STTYPE	34	1	266				CONT
CONT	0.15						
STTYPE	35	6	245				CONT
CONT	0.2						
STTYPE	36	1	103				CONT
CONT	0.1						
\$							
PRVAL	4		30000000				
\$							
\$PATCH	ID	RHSPAN	RHSHOT	LHSPAN	LHSHOT		\$
PATCH	1	11	12				
\$							
\$DESVAR	ID	NE	ME				
DESVAR	1	6	1				CONT
CONT	14	15	16	17	18	19	
\$	IE1	IE2	IE3	IE4	IE5	IE6	IE7
PANLST2	11			14	15	16	17
PANLST2	12			14	15	16	17
\$							
\$							
PATCH	2	21	22				
\$							
\$DESVAR	ID	NE	ME				
DESVAR	2	3	1				CONT
CONT	1	6	13				CONT
\$	IE1	IE2	IE3	IE4	IE5	IE6	IE7
PANLST2	21			1	THRU	13	
PANLST2	22			1	6	13	
\$							
\$							
PATCH	3	31	32				

```

$
$DESVAR ID      NE      ME
DESVAR  3        3        1
CONT    20       26       32
PANLST2 31
PANLST2 32          20   THRU   32
          20       26   32
$
$
$TRJLST SETID
TRJLST  1
CONT    1        1.
$      TRAJCT  FACT    TRAJCT  FACT    TRAJCT  FACT    TRAJCT  FACT
$
$      TIME    MACH    ALTH    AOA    BETA    FORM    FILE1  FILE1
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
TRAJCT  1        1
CONT    .00000E0 0.71871.45600E6 4.0000
CONT    .16000E2 0.98944.41990E6 14.0000
CONT    .33000E2 1.34826.43688E6 9.4208
CONT    .49000E2 1.63429.58196E6 3.6000
CONT    .68000E2 2.17754.82141E6 3.6000
CONT    .88000E2 2.99306.11358E7 3.6000
CONT    .10800E3 4.03065.14897E7 3.6000
CONT    .12800E3 5.30536.18668E7 3.6000
CONT    .14700E3 7.18387.22489E7 8.7000
CONT    .16500E3 8.14718.26307E7 10.2250
CONT    .18500E3 8.48577.29382E7 10.2250
CONT    .20500E3 8.73075.31108E7 10.2250
CONT    .22500E3 8.80061.31479E7 10.2250
CONT    .24500E3 8.62765.30495E7 10.2250
CONT    .26300E3 8.35804.28476E7 30.0000
CONT    .28300E3 7.92715.25083E7 30.0000
CONT    .30300E3 7.42020.20828E7 30.0000
CONT    .32300E3 6.98630.17006E7 30.0000
CONT    .34100E3 6.51451.15705E7 17.6576
CONT    .35900E3 6.29482.15555E7 11.3822
CONT    .37900E3 6.12626.15505E7 11.5945
CONT    .39900E3 5.96248.15405E7 11.6852
CONT    .41900E3 5.80340.15256E7 11.6316
CONT    .43900E3 5.64886.15063E7 11.4712
CONT    .45900E3 5.49856.14827E7 11.2120
CONT    .47900E3 5.35216.14551E7 10.8676
CONT    .49900E3 5.20938.14237E7 10.4565
CONT    .51900E3 5.06993.13890E7 9.9883
CONT    .53900E3 4.92935.13511E7 9.3991
CONT    .55900E3 4.78106.13103E7 8.7931
CONT    .57900E3 4.62119.12670E7 8.2187
CONT    .59900E3 4.44764.12216E7 7.6847
CONT    .61900E3 4.25902.11747E7 7.2020
CONT    .63900E3 4.05448.11267E7 6.7771
CONT    .65900E3 3.82413.10782E7 6.3472
CONT    .67900E3 3.56631.10300E7 5.9874
CONT    .69900E3 3.28723.98254E6 5.7202
CONT    .71759E3 3.00000.93312E6 4.8191
CONT    .73600E3 2.68846.87329E6 4.1829
CONT    .75600E3 2.29065.80146E6 3.4982
CONT    .77600E3 1.86649.72891E6 3.0646
CONT    .79600E3 1.47000.66074E6 3.0928
CONT    .81600E3 1.14676.59940E6 3.3054
CONT    .83600E3 0.96665.54315E6 3.8323
CONT    .85600E3 0.86983.48792E6 3.8046
CONT    .87400E3 0.80178.43914E6 3.9110
CONT    .89400E3 0.73186.38870E6 3.9359
CONT    .91400E3 0.67432.34157E6 3.9549
CONT    .93400E3 0.62713.29712E6 3.9492
CONT    .95400E3 0.58784.25488E6 3.9046
CONT    .97400E3 0.55190.21464E6 3.8498
CONT    .99400E3 0.51899.17633E6 3.8233
CONT    .10140E4 0.48941.13984E6 3.8101
CONT    .10340E4 0.46307.10502E6 3.8009
CONT    .10540E4 0.43975.71741E5 3.7895
CONT    .10740E4 0.41915.39891E5 3.7718
CONT    .10940E4 0.40098.93915E4 3.7458
$      TIME    MACH    ALTH    AOA    BETA    P      Q      R
$
$THERMPR|SETID |TEMP |HOTWALL|TRANS |GAS |EMMS | | |
THERMPR 1      100F
ENDDATA

```

Listing 4.2 Control Table File: CFDTABLE.DAT

A WEDGE PROBLEM WITH 30 DEG OPENING ANGLE
CFDGE0.DAT

REFC	REFB	REFS	REFX	REFY	REFZ	NO	AESURFZ	LENGTH	UNIT	MASS	UNIT						
						0			IN	SLIN							
MACH	H	ALPHA	BETA	PRATE	QRATE				CD	CY		CL	CR	CM	CN	FILE	
2.0231E+01	1.0000E+00	1.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0464E+03	-1.2154E-04	9.9256E+00	-1.9851E+02	-1.3663E+01	2.0929E+04	THERM0001			
2.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.4591E+02	-3.4213E-04	1.1572E+01	-2.3145E+02	-1.8299E+01	1.6918E+04	THERM0002			
3.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.4730E+02	-4.1446E-04	1.1469E+01	-2.2938E+02	-1.8067E+01	1.4946E+04	THERM0003			
4.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.8501E+02	-5.1848E-04	1.1076E+01	-2.2153E+02	-1.7478E+01	1.3700E+04	THERM0004			
8.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6359E+02	-5.1988E-04	1.0881E+01	-2.1761E+02	-1.7193E+01	1.3272E+04	THERM0005			
1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.5367E+02	-5.1934E-04	1.0780E+01	-2.1560E+02	-1.7049E+01	1.3073E+04	THERM0006			
1.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.4828E+02	-5.6304E-04	1.0737E+01	-2.1475E+02	-1.6966E+01	1.2966E+04	THERM0007			
1.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.4502E+02	-5.6212E-04	1.0705E+01	-2.1410E+02	-1.6917E+01	1.2900E+04	THERM0008			
1.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.4387E+02	-5.6451E-04	1.0643E+01	-2.1286E+02	-1.6899E+01	1.2878E+04	THERM0009			
2.0000E+00	0.0000E+00	2.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0439E+03	-4.8093E-04	6.4793E+01	-1.2960E+03	-5.8482E+01	2.0873E+04	THERM0010			
3.0000E+00	0.0000E+00	2.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.5863E+02	-4.2905E-04	1.4391E+02	-2.8781E+03	-1.2328E+02	1.7174E+04	THERM0011			
4.0000E+00	0.0000E+00	2.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.5534E+02	-4.4107E-04	1.1705E+02	-2.3410E+03	-1.0724E+02	1.5105E+04	THERM0012			
6.0000E+00	0.0000E+00	2.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.9228E+02	-4.5437E-04	1.0932E+02	-2.1863E+03	-1.0111E+02	1.3846E+04	THERM0013			
8.0000E+00	0.0000E+00	2.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.7082E+02	-4.6100E-04	1.0764E+02	-2.1527E+03	-9.9627E+01	1.3415E+04	THERM0014			
1.0000E+01	0.0000E+00	2.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6106E+02	-4.4964E-04	1.0714E+02	-2.1427E+03	-9.9085E+01	1.3221E+04	THERM0015			
1.2000E+01	0.0000E+00	2.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.5600E+02	-4.5693E-04	1.0690E+02	-2.1380E+03	-9.8859E+01	1.3119E+04	THERM0016			
1.4000E+01	0.0000E+00	2.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.5331E+02	-4.6469E-04	1.0692E+02	-2.1384E+03	-9.8795E+01	1.3066E+04	THERM0017			
1.5000E+01	0.0000E+00	2.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.5231E+02	-4.6656E-04	1.0707E+02	-2.1415E+03	-9.8794E+01	1.3045E+04	THERM0018			
2.0000E+00	0.0000E+00	4.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0344E+03	-8.5129E-04	1.2535E+02	-2.5070E+03	-1.0488E+02	2.0688E+04	THERM0019			
3.0000E+00	0.0000E+00	4.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.0106E+02	-6.0923E-04	2.9063E+02	-5.8125E+03	-2.2782E+02	1.8023E+04	THERM0020			
4.0000E+00	0.0000E+00	4.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.7812E+02	-6.0818E-04	2.2374E+02	-4.4749E+03	-1.9722E+02	1.5562E+04	THERM0021			
6.0000E+00	0.0000E+00	4.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.1199E+02	-6.3874E-04	2.0713E+02	-4.1425E+03	-1.8479E+02	1.4240E+04	THERM0022			
8.0000E+00	0.0000E+00	4.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.8998E+02	-6.5148E-04	2.0390E+02	-4.0781E+03	-1.8198E+02	1.3800E+04	THERM0023			
1.0000E+01	0.0000E+00	4.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.7919E+02	-6.5651E-04	2.0244E+02	-4.0488E+03	-1.8099E+02	1.3584E+04	THERM0024			
1.2000E+01	0.0000E+00	4.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.7474E+02	-6.6063E-04	2.0243E+02	-4.0486E+03	-1.8054E+02	1.3494E+04	THERM0025			
1.4000E+01	0.0000E+00	4.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.7111E+02	-6.6273E-04	2.0194E+02	-4.0388E+03	-1.8041E+02	1.3422E+04	THERM0026			
1.5000E+01	0.0000E+00	4.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.7107E+02	-6.6387E-04	2.0235E+02	-4.0470E+03	-1.8039E+02	1.3421E+04	THERM0027			
2.0000E+00	0.0000E+00	6.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0165E+03	-1.0910E-03	2.0025E+02	-4.0051E+03	-1.5651E+02	2.0329E+04	THERM0028			
3.0000E+00	0.0000E+00	6.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.3070E+02	-9.5714E-04	3.9539E+02	-7.9077E+03	-2.9116E+02	1.8615E+04	THERM0029			
4.0000E+00	0.0000E+00	6.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.1621E+02	-7.6174E-04	3.3217E+02	-6.6431E+03	-2.8926E+02	1.6327E+04	THERM0030			
6.0000E+00	0.0000E+00	6.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.4321E+02	-7.9385E-04	3.0316E+02	-6.0632E+03	-2.6864E+02	1.4865E+04	THERM0031			
8.0000E+00	0.0000E+00	6.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.1934E+02	-8.0817E-04	2.9735E+02	-5.9468E+03	-2.6420E+02	1.4388E+04	THERM0032			
1.0000E+01	0.0000E+00	6.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.0856E+02	-8.1621E-04	2.9553E+02	-5.9101E+03	-2.6259E+02	1.4176E+04	THERM0033			
1.2000E+01	0.0000E+00	6.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.0301E+02	-8.2009E-04	2.9476E+02	-5.8947E+03	-2.6189E+02	1.4065E+04	THERM0034			
1.4000E+01	0.0000E+00	6.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.9991E+02	-8.2188E-04	2.9445E+02	-5.8886E+03	-2.6160E+02	1.4003E+04	THERM0035			
1.5000E+01	0.0000E+00	6.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.9889E+02	-8.2280E-04	2.9442E+02	-5.8880E+03	-2.6156E+02	1.3981E+04	THERM0036			
2.0000E+00	0.0000E+00	8.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.9067E+02	-1.1359E-03	3.0145E+02	-6.0290E+03	-2.1923E+02	1.9813E+04	THERM0037			
3.0000E+00	0.0000E+00	8.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.4881E+02	-1.1461E-03	4.6709E+02	-9.3415E+03	-3.4944E+02	1.8978E+04	THERM0038			
4.0000E+00	0.0000E+00	8.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.7727E+02	-9.1757E-04	4.5022E+02	-9.0044E+03	-3.8573E+02	1.7545E+04	THERM0039			
6.0000E+00	0.0000E+00	8.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.8723E+02	-9.4325E-04	3.9784E+02	-7.9567E+03	-3.5294E+02	1.5746E+04	THERM0040			
8.0000E+00	0.0000E+00	8.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.6176E+02	-9.5864E-04	3.8906E+02	-7.7810E+03	-3.4614E+02	1.5236E+04	THERM0041			
1.0000E+01	0.0000E+00	8.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.5056E+02	-9.6773E-04	3.8603E+02	-7.7204E+03	-3.4367E+02	1.5014E+04	THERM0042			
1.2000E+01	0.0000E+00	8.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.4455E+02	-9.7217E-04	3.8472E+02	-7.6943E+03	-3.4256E+02	1.4892E+04	THERM0043			
1.4000E+01	0.0000E+00	8.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.4130E+02	-9.7454E-04	3.8411E+02	-7.6819E+03	-3.4205E+02	1.4829E+04	THERM0044			
1.5000E+01	0.0000E+00	8.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.4034E+02	-9.7542E-04	3.8396E+02	-7.6786E+03	-3.4194E+02	1.4811E+04	THERM0045			
2.0000E+00	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.7483E+02	-1.1034E-03	3.9256E+02	-7.8512E+03	-2.8576E+02	1.9497E+04	THERM0046			
3.0000E+00	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.6750E+02	-1.2098E-03	5.2340E+02	-1.0468E+04	-4.0264E+02	1.9350E+04	THERM0047			
4.0000E+00	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.4231E+02	-1.1667E-03	5.5045E+02	-1.1009E+04	-4.4420E+02	1.8846E+04	THERM0048			
6.0000E+00	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.4648E+02	-1.0887E-03	4.9227E+02	-9.8455E+03	-4.3877E+02	1.6929E+04	THERM0049			
8.0000E+00	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.1659E+02	-1.1046E-03	4.7758E+02	-9.5514E+03	-4.2818E+02	1.6333E+04	THERM0050			
1.0000E+01	0.0000E+00	1.0000															

1.4000E+01	0.0000E+00	1.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.2448E+02	-1.1912E-03	5.1014E+02	-1.0203E+04	-4.6114E+02	1.6489E+04THERM0062
1.5000E+01	0.0000E+00	1.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.2307E+02	-1.1923E-03	5.0959E+02	-1.0192E+04	-4.6073E+02	1.6461E+04THERM0063
2.0000E+00	0.0000E+00	1.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.7140E+02	-1.0312E-03	4.6324E+02	-9.2648E+03	-3.4735E+02	1.9428E+04THERM0064
3.0000E+00	0.0000E+00	1.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.8809E+02	-1.1914E-03	5.6729E+02	-1.1346E+04	-4.5034E+02	1.9762E+04THERM0065
4.0000E+00	0.0000E+00	1.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.7752E+02	-1.2833E-03	5.9973E+02	-1.1995E+04	-4.8818E+02	1.9550E+04THERM0066
6.0000E+00	0.0000E+00	1.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.3097E+02	-1.2280E-03	5.9554E+02	-1.1911E+04	-5.2844E+02	1.8620E+04THERM0067
8.0000E+00	0.0000E+00	1.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.8830E+02	-1.2412E-03	5.6621E+02	-1.1324E+04	-5.1183E+02	1.7767E+04THERM0068
1.0000E+01	0.0000E+00	1.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.7231E+02	-1.2491E-03	5.5714E+02	-1.1143E+04	-5.0553E+02	1.7447E+04THERM0069
1.2000E+01	0.0000E+00	1.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.6561E+02	-1.2547E-03	5.5351E+02	-1.1070E+04	-5.0249E+02	1.7311E+04THERM0070
1.4000E+01	0.0000E+00	1.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.5954E+02	-1.2580E-03	5.5076E+02	-1.1015E+04	-5.0087E+02	1.7190E+04THERM0071
1.5000E+01	0.0000E+00	1.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.5792E+02	-1.2592E-03	5.5003E+02	-1.1001E+04	-5.0033E+02	1.7157E+04THERM0072
2.0000E+00	0.0000E+00	1.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.7275E+02	-9.7912E-04	4.9409E+02	-9.8818E+03	-3.7664E+02	1.9455E+04THERM0073
3.0000E+00	0.0000E+00	1.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.9935E+02	-1.1589E-03	5.8542E+02	-1.1708E+04	-4.7219E+02	1.9987E+04THERM0074
4.0000E+00	0.0000E+00	1.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.9426E+02	-1.2862E-03	6.1766E+02	-1.2353E+04	-5.0860E+02	1.9885E+04THERM0075
6.0000E+00	0.0000E+00	1.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.7491E+02	-1.3182E-03	6.3808E+02	-1.2762E+04	-5.4610E+02	1.9498E+04THERM0076
8.0000E+00	0.0000E+00	1.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.3541E+02	-1.3049E-03	6.1438E+02	-1.2288E+04	-5.5536E+02	1.8707E+04THERM0077
1.0000E+01	0.0000E+00	1.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.1554E+02	-1.3125E-03	6.0096E+02	-1.2019E+04	-5.4718E+02	1.8310E+04THERM0078
1.2000E+01	0.0000E+00	1.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.0475E+02	-1.3176E-03	5.9452E+02	-1.1891E+04	-5.4330E+02	1.8094E+04THERM0079
1.4000E+01	0.0000E+00	1.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.9931E+02	-1.3211E-03	5.9138E+02	-1.1828E+04	-5.4112E+02	1.7985E+04THERM0080
1.5000E+01	0.0000E+00	1.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.9745E+02	-1.3224E-03	5.9036E+02	-1.1807E+04	-5.4041E+02	1.7950E+04THERM0081
2.0000E+00	0.0000E+00	1.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.7582E+02	-9.1516E-04	5.2236E+02	-1.0447E+04	-4.0488E+02	1.9516E+04THERM0082
3.0000E+00	0.0000E+00	1.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0112E+03	-1.1120E-03	6.0138E+02	-1.2028E+04	-4.9295E+02	2.0224E+04THERM0083
4.0000E+00	0.0000E+00	1.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0110E+03	-1.2624E-03	6.3218E+02	-1.2644E+04	-5.2786E+02	2.0220E+04THERM0084
6.0000E+00	0.0000E+00	1.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.9864E+02	-1.3652E-03	6.5513E+02	-1.3103E+04	-5.5974E+02	1.9972E+04THERM0085
8.0000E+00	0.0000E+00	1.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.8841E+02	-1.3682E-03	6.6387E+02	-1.3277E+04	-5.8345E+02	1.9768E+04THERM0086
1.0000E+01	0.0000E+00	1.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.6645E+02	-1.3726E-03	6.4906E+02	-1.2981E+04	-5.8995E+02	1.9328E+04THERM0087
1.2000E+01	0.0000E+00	1.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.5357E+02	-1.3766E-03	6.3963E+02	-1.2793E+04	-5.8531E+02	1.9071E+04THERM0088
1.4000E+01	0.0000E+00	1.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.4659E+02	-1.3799E-03	6.3483E+02	-1.2697E+04	-5.8250E+02	1.8931E+04THERM0089
1.5000E+01	0.0000E+00	1.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.4426E+02	-1.3812E-03	6.3324E+02	-1.2665E+04	-5.8151E+02	1.8885E+04THERM0090
2.0000E+00	0.0000E+00	1.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.8007E+02	-8.3763E-04	5.4865E+02	-1.0973E+04	-4.3207E+02	1.9602E+04THERM0091
3.0000E+00	0.0000E+00	1.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0230E+03	-1.0507E-03	6.1607E+02	-1.2320E+04	-5.1269E+02	2.0465E+04THERM0092
4.0000E+00	0.0000E+00	1.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0266E+03	-1.2174E-03	6.4498E+02	-1.2898E+04	-5.4581E+02	2.0539E+04THERM0093
6.0000E+00	0.0000E+00	1.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0196E+03	-1.3678E-03	6.6833E+02	-1.3365E+04	-5.7489E+02	2.0400E+04THERM0094
8.0000E+00	0.0000E+00	1.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0146E+03	-1.4086E-03	6.7621E+02	-1.3522E+04	-5.8976E+02	2.0301E+04THERM0095
1.0000E+01	0.0000E+00	1.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0105E+03	-1.4255E-03	6.8101E+02	-1.3618E+04	-6.0052E+02	2.0219E+04THERM0096
1.2000E+01	0.0000E+00	1.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0077E+03	-1.4286E-03	6.8482E+02	-1.3693E+04	-6.1007E+02	2.0167E+04THERM0097
1.4000E+01	0.0000E+00	1.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0041E+03	-1.4346E-03	6.8450E+02	-1.3687E+04	-6.1907E+02	2.0094E+04THERM0098
1.5000E+01	0.0000E+00	1.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0010E+03	-1.4357E-03	6.8243E+02	-1.3645E+04	-6.2033E+02	2.0034E+04THERM0099
2.0000E+00	0.0000E+00	1.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.8629E+02	-7.4441E-04	5.7252E+02	-1.1450E+04	-4.5824E+02	1.9728E+04THERM0100
3.0000E+00	0.0000E+00	1.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0365E+03	-9.7384E-04	6.2763E+02	-1.2553E+04	-5.3159E+02	2.0731E+04THERM0101
4.0000E+00	0.0000E+00	1.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0435E+03	-1.1541E-03	6.5365E+02	-1.3073E+04	-5.6271E+02	2.0870E+04THERM0102
6.0000E+00	0.0000E+00	1.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0404E+03	-1.3352E-03	6.7586E+02	-1.3517E+04	-5.8955E+02	2.0808E+04THERM0103
8.0000E+00	0.0000E+00	1.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0369E+03	-1.3990E-03	6.8445E+02	-1.3689E+04	-6.0177E+02	2.0738E+04THERM0104
1.0000E+01	0.0000E+00	1.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0342E+03	-1.4262E-03	6.8909E+02	-1.3782E+04	-6.0883E+02	2.0684E+04THERM0105
1.2000E+01	0.0000E+00	1.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0329E+03	-1.4419E-03	6.9137E+02	-1.3828E+04	-6.1345E+02	2.0658E+04THERM0106
1.4000E+01	0.0000E+00	1.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0329E+03	-1.4516E-03	6.9411E+02	-1.3882E+04	-6.1673E+02	2.0658E+04THERM0107
1.5000E+01	0.0000E+00	1.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0326E+03	-1.4555E-03	6.9479E+02	-1.3896E+04	-6.1803E+02	2.0652E+04THERM0108
2.0000E+00	0.0000E+00	1.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.9471E+02	-6.3279E-04	5.9379E+02	-1.1876E+04	-4.8338E+02	1.9895E+04THERM0109
3.0000E+00	0.0000E+00	1.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0498E+03	-8.7932E-04	6.3813E+02	-1.2763E+04	-5.4970E+02	2.0995E+04THERM0110
4.0000E+00	0.0000E+00	1.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0599E+03	-1.0733E-03	6.6104E+02	-1.3221E+04	-5.7862E+02	2.1198E+04THERM0111
6.0000E+00	0.0000E+00	1.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0604E+03	-1.2728E-03	6.8147E+02	-1.3629E+04	-6.0336E+02	2.1209E+04THERM0112
8.0000E+00	0.0000E+00	1.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0585E+03	-1.3550E-03	6.8971E+02	-1.3794E+04	-6.1403E+02	2.1169E+04THERM0113
1.0000E+01	0.0000E+00	1.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0569E+03	-1.3924E-03	6.9396E+02	-1.3879E+04	-6.1972E+02	2.1137E+04THERM0114
1.2000E+01	0.0000E+00	1.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0560E+03	-1.4123E-03	6.9633E+02	-1.3927E+04	-6.2317E+02	2.1119E+04THERM0115
1.4000E+01	0.0000E+00	1.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0554E+03	-1.4240E-03	6.9790E+02	-1.3958E+04	-6.2542E+02	2.1107E+04THERM0116
1.5000E+01	0.0000E+00	1.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0552E+03	-1.4285E-03	6.9849E+02	-1.3970E+04	-6.2627E+02	2.1

6.0000E+00	0.0000E+00	1.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0991E+03	-1.0791E-03	6.8589E+02	-1.3718E+04	-6.2874E+02	2.1983E+04THERM0130
8.0000E+00	0.0000E+00	1.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1000E+03	-1.1775E-03	6.9230E+02	-1.3846E+04	-6.3712E+02	2.1999E+04THERM0131
1.0000E+00	0.0000E+00	1.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1001E+03	-1.2271E-03	6.9543E+02	-1.3909E+04	-6.4131E+02	2.2002E+04THERM0132
1.2000E+01	0.0000E+00	1.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0999E+03	-1.2551E-03	6.9740E+02	-1.3949E+04	-6.4374E+02	2.1996E+04THERM0133
1.4000E+01	0.0000E+00	1.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1001E+03	-1.2723E-03	6.9830E+02	-1.3967E+04	-6.4528E+02	2.2001E+04THERM0134
1.5000E+01	0.0000E+00	1.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1001E+03	-1.2786E-03	6.9879E+02	-1.3976E+04	-6.4587E+02	2.2001E+04THERM0135
2.0000E+00	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0239E+03	-1.4266E-04	6.4648E+02	-1.2930E+04	-5.5296E+02	2.0478E+04THERM0136
3.0000E+00	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0917E+03	-4.5389E-04	6.6071E+02	-1.3214E+04	-6.0023E+02	2.1834E+04THERM0137
4.0000E+00	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1095E+03	-7.0237E-04	6.7274E+02	-1.3455E+04	-6.2204E+02	2.2190E+04THERM0138
6.0000E+00	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1182E+03	-9.4793E-04	6.8502E+02	-1.3700E+04	-6.4057E+02	2.2365E+04THERM0139
8.0000E+00	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1199E+03	-1.0522E-03	6.9046E+02	-1.3810E+04	-6.4796E+02	2.2396E+04THERM0140
1.0000E+01	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1204E+03	-1.1047E-03	6.9324E+02	-1.3866E+04	-6.5161E+02	2.2406E+04THERM0141
1.2000E+01	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1209E+03	-1.1345E-03	6.9457E+02	-1.3891E+04	-6.5371E+02	2.2418E+04THERM0142
1.4000E+01	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1211E+03	-1.1529E-03	6.9561E+02	-1.3912E+04	-6.5502E+02	2.2421E+04THERM0143
1.5000E+01	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1211E+03	-1.1596E-03	6.9602E+02	-1.3921E+04	-6.5552E+02	2.2421E+04THERM0144
2.0000E+00	0.0000E+00	2.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0356E+03	9.7463E-05	6.6020E+02	-1.3204E+04	-5.7430E+02	2.0713E+04THERM0145
3.0000E+00	0.0000E+00	2.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1063E+03	-2.4425E-04	6.6539E+02	-1.3308E+04	-6.1600E+02	2.2127E+04THERM0146
4.0000E+00	0.0000E+00	2.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1261E+03	-5.2135E-04	6.7369E+02	-1.3474E+04	-6.3545E+02	2.2523E+04THERM0147
6.0000E+00	0.0000E+00	2.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1367E+03	-7.8865E-04	6.8296E+02	-1.3661E+04	-6.5194E+02	2.2731E+04THERM0148
8.0000E+00	0.0000E+00	2.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1394E+03	-9.0053E-04	6.8730E+02	-1.3747E+04	-6.5844E+02	2.2787E+04THERM0149
1.0000E+01	0.0000E+00	2.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1403E+03	-9.5631E-04	6.8919E+02	-1.3785E+04	-6.6162E+02	2.2803E+04THERM0150
1.2000E+01	0.0000E+00	2.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1407E+03	-9.8782E-04	6.9049E+02	-1.3811E+04	-6.6340E+02	2.2812E+04THERM0151
1.4000E+01	0.0000E+00	2.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1409E+03	-1.0072E-03	6.9139E+02	-1.3829E+04	-6.6455E+02	2.2814E+04THERM0152
1.5000E+01	0.0000E+00	2.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1413E+03	-1.0143E-03	6.9165E+02	-1.3833E+04	-6.6498E+02	2.2825E+04THERM0153
2.0000E+00	0.0000E+00	2.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0477E+03	3.9014E-04	6.7244E+02	-1.3449E+04	-5.9476E+02	2.0954E+04THERM0154
3.0000E+00	0.0000E+00	2.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1213E+03	1.4468E-05	6.6878E+02	-1.3375E+04	-6.3127E+02	2.2426E+04THERM0155
4.0000E+00	0.0000E+00	2.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1426E+03	-2.9846E-04	6.7345E+02	-1.3469E+04	-6.4843E+02	2.2852E+04THERM0156
6.0000E+00	0.0000E+00	2.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1553E+03	-5.9526E-04	6.7935E+02	-1.3587E+04	-6.6296E+02	2.3106E+04THERM0157
8.0000E+00	0.0000E+00	2.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1587E+03	-7.1661E-04	6.8254E+02	-1.3651E+04	-6.6863E+02	2.3174E+04THERM0158
1.0000E+01	0.0000E+00	2.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1599E+03	-7.7673E-04	6.8424E+02	-1.3686E+04	-6.7135E+02	2.3197E+04THERM0159
1.2000E+01	0.0000E+00	2.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1605E+03	-8.1058E-04	6.8527E+02	-1.3707E+04	-6.7288E+02	2.3207E+04THERM0160
1.4000E+01	0.0000E+00	2.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1611E+03	-8.3132E-04	6.8587E+02	-1.3718E+04	-6.7386E+02	2.3221E+04THERM0161
1.5000E+01	0.0000E+00	2.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1612E+03	-8.3887E-04	6.8616E+02	-1.3724E+04	-6.7424E+02	2.3223E+04THERM0162
2.0000E+00	0.0000E+00	2.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0610E+03	4.7185E-04	6.8253E+02	-1.3650E+04	-6.1437E+02	2.1221E+04THERM0163
3.0000E+00	0.0000E+00	2.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1361E+03	3.2321E-04	6.7102E+02	-1.3420E+04	-6.4606E+02	2.2723E+04THERM0164
4.0000E+00	0.0000E+00	2.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1595E+03	-2.1769E-05	6.7156E+02	-1.3431E+04	-6.6106E+02	2.3190E+04THERM0165
6.0000E+00	0.0000E+00	2.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1731E+03	-3.5897E-04	6.7151E+02	-1.3503E+04	-6.7368E+02	2.3462E+04THERM0166
8.0000E+00	0.0000E+00	2.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1771E+03	-4.9395E-04	6.7728E+02	-1.3545E+04	-6.7856E+02	2.3542E+04THERM0167
1.0000E+01	0.0000E+00	2.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1788E+03	-5.5961E-04	6.7835E+02	-1.3567E+04	-6.8089E+02	2.3575E+04THERM0168
1.2000E+01	0.0000E+00	2.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1796E+03	-5.9640E-04	6.7903E+02	-1.3580E+04	-6.8219E+02	2.3593E+04THERM0169
1.4000E+01	0.0000E+00	2.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1799E+03	-6.1888E-04	6.7964E+02	-1.3596E+04	-6.8302E+02	2.3589E+04THERM0170
1.5000E+01	0.0000E+00	2.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1804E+03	-6.2698E-04	6.7970E+02	-1.3594E+04	-6.8334E+02	2.3610E+04THERM0171
2.0000E+00	0.0000E+00	2.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0742E+03	6.9263E-05	6.9147E+02	-1.3830E+04	-6.3316E+02	2.1484E+04THERM0172
3.0000E+00	0.0000E+00	2.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1516E+03	2.8734E-04	6.7166E+02	-1.3433E+04	-6.6038E+02	2.3034E+04THERM0173
4.0000E+00	0.0000E+00	2.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1755E+03	2.9040E-04	6.6951E+02	-1.3390E+04	-6.7331E+02	2.3512E+04THERM0174
6.0000E+00	0.0000E+00	2.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1905E+03	-6.5154E-05	6.7024E+02	-1.3404E+04	-6.8414E+02	2.3812E+04THERM0175
8.0000E+00	0.0000E+00	2.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1951E+03	-2.1879E-04	6.7102E+02	-1.3420E+04	-6.8829E+02	2.3901E+04THERM0176
1.0000E+01	0.0000E+00	2.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1970E+03	-2.9324E-04	6.7162E+02	-1.3433E+04	-6.9025E+02	2.3938E+04THERM0177
1.2000E+01	0.0000E+00	2.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1980E+03	-3.3471E-04	6.7196E+02	-1.3439E+04	-6.9134E+02	2.3960E+04THERM0178
1.4000E+01	0.0000E+00	2.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1988E+03	-3.6015E-04	6.7218E+02	-1.3443E+04	-6.9204E+02	2.3976E+04THERM0179
1.5000E+01	0.0000E+00	2.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1991E+03	-3.6923E-04	6.7229E+02	-1.3446E+04	-6.9231E+02	2.3981E+04THERM0180
2.0000E+00	0.0000E+00	2.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.0883E+03	-4.2416E-04	6.9856E+02	-1.3971E+04	-6.5116E+02	2.1766E+04THERM0181
3.0000E+00	0.0000E+00	2.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1667E+03	-2.2441E-04	6.7153E+02	-1.3430E+04	-6.7424E+02	2.3335E+04THERM0182
4.0000E+00	0.0000E+00	2.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1916E+03	1.4193E-04	6.6610E+02	-1.3321E+04	-6.8524E+02	2.3834E+04THERM0183
6.0000E+00	0.0000E+00	2.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2078E+03	2.4604E-04	6.6403E+02	-1.3282E+04	-6.9439E+02	2.4154E+04THERM0184
8.0000E+00	0.0000E+00	2.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2130E+03	1.1904E-04	6.6370E+02	-1.3274E+04	-6.9785E+02	2.4

1.5000E+01	0.0000E+00	2.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2349E+03	2.0458E-04	6.5510E+02	-1.3100E+04	-7.0994E+02	2.4703E+04THERM0198
2.0000E+00	0.0000E+00	2.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1171E+03	-1.0600E-03	7.0868E+02	-1.4173E+04	-6.8496E+02	2.2343E+04THERM0199
3.0000E+00	0.0000E+00	2.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1970E+03	-9.8750E-04	6.6780E+02	-1.3355E+04	-7.0057E+02	2.3942E+04THERM0200
4.0000E+00	0.0000E+00	2.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2234E+03	-8.1348E-04	6.5640E+02	-1.3128E+04	-7.0814E+02	2.4468E+04THERM0201
6.0000E+00	0.0000E+00	2.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2412E+03	-5.3812E-04	6.4922E+02	-1.2986E+04	-7.1428E+02	2.4820E+04THERM0202
8.0000E+00	0.0000E+00	2.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2468E+03	-3.8309E-04	6.4721E+02	-1.2943E+04	-7.1650E+02	2.4940E+04THERM0203
1.0000E+01	0.0000E+00	2.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2494E+03	-2.9756E-04	6.4632E+02	-1.2928E+04	-7.1753E+02	2.4985E+04THERM0204
1.2000E+01	0.0000E+00	2.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2507E+03	-2.4782E-04	6.4592E+02	-1.2917E+04	-7.1809E+02	2.5017E+04THERM0205
1.4000E+01	0.0000E+00	2.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2518E+03	-2.1701E-04	6.4542E+02	-1.2910E+04	-7.1847E+02	2.5033E+04THERM0206
1.5000E+01	0.0000E+00	2.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2520E+03	-2.0594E-04	6.4543E+02	-1.2907E+04	-7.1862E+02	2.5044E+04THERM0207
2.0000E+00	0.0000E+00	2.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1324E+03	-1.2494E-03	7.1131E+02	-1.4226E+04	-7.0082E+02	2.2648E+04THERM0208
3.0000E+00	0.0000E+00	2.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2122E+03	-1.1993E-03	6.6423E+02	-1.3284E+04	-7.1307E+02	2.4245E+04THERM0209
4.0000E+00	0.0000E+00	2.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2391E+03	-1.0892E-03	6.5004E+02	-1.3000E+04	-7.1910E+02	2.4783E+04THERM0210
6.0000E+00	0.0000E+00	2.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2574E+03	-9.1964E-04	6.4060E+02	-1.2814E+04	-7.2392E+02	2.5143E+04THERM0211
8.0000E+00	0.0000E+00	2.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2633E+03	-8.2417E-04	6.3768E+02	-1.2751E+04	-7.2561E+02	2.5271E+04THERM0212
1.0000E+01	0.0000E+00	2.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2658E+03	-7.7014E-04	6.3647E+02	-1.2734E+04	-7.2637E+02	2.5309E+04THERM0213
1.2000E+01	0.0000E+00	2.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2674E+03	-7.3792E-04	6.3573E+02	-1.2712E+04	-7.2678E+02	2.5353E+04THERM0214
1.4000E+01	0.0000E+00	2.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2683E+03	-7.1747E-04	6.3535E+02	-1.2710E+04	-7.2706E+02	2.5361E+04THERM0215
1.5000E+01	0.0000E+00	2.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2686E+03	-7.1008E-04	6.3529E+02	-1.2703E+04	-7.2718E+02	2.5377E+04THERM0216
2.0000E+00	0.0000E+00	2.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1477E+03	-1.3781E-03	7.1270E+02	-1.4253E+04	-7.1603E+02	2.2955E+04THERM0217
3.0000E+00	0.0000E+00	2.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2275E+03	-1.3368E-03	6.5947E+02	-1.3189E+04	-7.2512E+02	2.4549E+04THERM0218
4.0000E+00	0.0000E+00	2.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2548E+03	-1.2705E-03	6.4237E+02	-1.2848E+04	-7.2975E+02	2.5096E+04THERM0219
6.0000E+00	0.0000E+00	2.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2733E+03	-1.1675E-03	6.3127E+02	-1.2623E+04	-7.3334E+02	2.5470E+04THERM0220
8.0000E+00	0.0000E+00	2.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2795E+03	-1.1097E-03	6.2735E+02	-1.2550E+04	-7.3454E+02	2.5585E+04THERM0221
1.0000E+01	0.0000E+00	2.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2822E+03	-1.0772E-03	6.2569E+02	-1.2512E+04	-7.3507E+02	2.5647E+04THERM0222
1.2000E+01	0.0000E+00	2.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2837E+03	-1.0579E-03	6.2478E+02	-1.2497E+04	-7.3534E+02	2.5671E+04THERM0223
1.4000E+01	0.0000E+00	2.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2845E+03	-1.0458E-03	6.2437E+02	-1.2485E+04	-7.3553E+02	2.5694E+04THERM0224
1.5000E+01	0.0000E+00	2.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2849E+03	-1.0415E-03	6.2419E+02	-1.2486E+04	-7.3562E+02	2.5693E+04THERM0225
2.0000E+00	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1631E+03	-1.4408E-03	7.1277E+02	-1.4255E+04	-7.3061E+02	2.3262E+04THERM0226
3.0000E+00	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2426E+03	-1.3960E-03	6.5359E+02	-1.3071E+04	-7.3673E+02	2.4853E+04THERM0227
4.0000E+00	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2700E+03	-1.3725E-03	6.3431E+02	-1.2685E+04	-7.4007E+02	2.5403E+04THERM0228
6.0000E+00	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2889E+03	-1.3224E-03	6.2091E+02	-1.2421E+04	-7.4255E+02	2.5775E+04THERM0229
8.0000E+00	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2953E+03	-1.2905E-03	6.1620E+02	-1.2321E+04	-7.4331E+02	2.5912E+04THERM0230
1.0000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2980E+03	-1.2720E-03	6.1422E+02	-1.2289E+04	-7.4361E+02	2.5952E+04THERM0231
1.2000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2996E+03	-1.2610E-03	6.1308E+02	-1.2258E+04	-7.4376E+02	2.5999E+04THERM0232
1.4000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3005E+03	-1.2543E-03	6.1250E+02	-1.2254E+04	-7.4388E+02	2.6002E+04THERM0233
1.5000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3010E+03	-1.2519E-03	6.1226E+02	-1.2242E+04	-7.4395E+02	2.6026E+04THERM0234
2.0000E+00	0.0000E+00	3.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1788E+03	-1.4200E-03	7.1144E+02	-1.4228E+04	-7.4460E+02	2.3577E+04THERM0235
3.0000E+00	0.0000E+00	3.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2578E+03	-1.3585E-03	6.4655E+02	-1.2931E+04	-7.4793E+02	2.5155E+04THERM0236
4.0000E+00	0.0000E+00	3.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2853E+03	-1.3771E-03	6.2490E+02	-1.2499E+04	-7.5008E+02	2.5705E+04THERM0237
6.0000E+00	0.0000E+00	3.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3044E+03	-1.3870E-03	6.0963E+02	-1.2189E+04	-7.5154E+02	2.6093E+04THERM0238
8.0000E+00	0.0000E+00	3.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3108E+03	-1.3816E-03	6.0441E+02	-1.2091E+04	-7.5190E+02	2.6211E+04THERM0239
1.0000E+01	0.0000E+00	3.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3137E+03	-1.3764E-03	6.0183E+02	-1.2033E+04	-7.5200E+02	2.6279E+04THERM0240
1.2000E+01	0.0000E+00	3.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3154E+03	-1.3729E-03	6.0027E+02	-1.2009E+04	-7.5205E+02	2.6302E+04THERM0241
1.4000E+01	0.0000E+00	3.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3163E+03	-1.3707E-03	5.9956E+02	-1.1988E+04	-7.5210E+02	2.6333E+04THERM0242
1.5000E+01	0.0000E+00	3.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3167E+03	-1.3701E-03	5.9938E+02	-1.1992E+04	-7.5214E+02	2.6326E+04THERM0243
2.0000E+00	0.0000E+00	3.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1945E+03	-1.3353E-03	7.0879E+02	-1.4177E+04	-7.5799E+02	2.3890E+04THERM0244
3.0000E+00	0.0000E+00	3.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2728E+03	-1.2636E-03	6.3840E+02	-1.2768E+04	-7.5870E+02	2.5456E+04THERM0245
4.0000E+00	0.0000E+00	3.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3003E+03	-1.2924E-03	6.1456E+02	-1.2289E+04	-7.5976E+02	2.6009E+04THERM0246
6.0000E+00	0.0000E+00	3.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3196E+03	-1.3416E-03	5.9745E+02	-1.1952E+04	-7.6031E+02	2.6387E+04THERM0247
8.0000E+00	0.0000E+00	3.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3259E+03	-1.3626E-03	5.9164E+02	-1.1829E+04	-7.6031E+02	2.6524E+04THERM0248
1.0000E+01	0.0000E+00	3.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3287E+03	-1.3720E-03	5.8901E+02	-1.1783E+04	-7.6023E+02	2.6569E+04THERM0249
1.2000E+01	0.0000E+00	3.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3305E+03	-1.3772E-03	5.8704E+02	-1.1738E+04	-7.6018E+02	2.6615E+04THERM0250
1.4000E+01	0.0000E+00	3.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3315E+03	-1.3805E-03	5.8623E+02	-1.1728E+04	-7.6017E+02	2.6625E+04THERM0251
1.5000E+01	0.0000E+00	3.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3319E+03	-1.3818E-03	5.8596E+02	-1.1716E+04	-7.6019E+02	2.6643E+04THERM0252
2.0000E+00	0.0000E+00	3.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2105E+03	-1.2489E-03	7.0483E+02	-1.4094E+04	-7.7083E+02	2.4

8.0000E+00	0.0000E+00	3.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3553E+03	-1.1805E-03	5.6368E+02	-1.1270E+04	-7.7656E+02	2.7111E+04THERM0266
1.0000E+01	0.0000E+00	3.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3580E+03	-1.1883E-03	5.6050E+02	-1.1215E+04	-7.7617E+02	2.7153E+04THERM0267
1.2000E+01	0.0000E+00	3.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3597E+03	-1.1933E-03	5.5866E+02	-1.1170E+04	-7.7595E+02	2.7199E+04THERM0268
1.4000E+01	0.0000E+00	3.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3607E+03	-1.1967E-03	5.5764E+02	-1.1156E+04	-7.7584E+02	2.7209E+04THERM0269
1.5000E+01	0.0000E+00	3.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3611E+03	-1.1980E-03	5.5729E+02	-1.1143E+04	-7.7582E+02	2.7227E+04THERM0270
2.0000E+00	0.0000E+00	3.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2418E+03	-1.1677E-03	6.9356E+02	-1.3871E+04	-7.9490E+02	2.4836E+04THERM0271
3.0000E+00	0.0000E+00	3.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3166E+03	-1.1221E-03	6.0786E+02	-1.2157E+04	-7.8859E+02	2.6333E+04THERM0272
4.0000E+00	0.0000E+00	3.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3436E+03	-1.1202E-03	5.7803E+02	-1.1565E+04	-7.8694E+02	2.6866E+04THERM0273
6.0000E+00	0.0000E+00	3.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3628E+03	-1.1288E-03	5.5645E+02	-1.1125E+04	-7.8527E+02	2.7261E+04THERM0274
8.0000E+00	0.0000E+00	3.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3693E+03	-1.1355E-03	5.4863E+02	-1.0977E+04	-7.8439E+02	2.7380E+04THERM0275
1.0000E+01	0.0000E+00	3.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3722E+03	-1.1398E-03	5.4505E+02	-1.0898E+04	-7.8389E+02	2.7449E+04THERM0276
1.2000E+01	0.0000E+00	3.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3738E+03	-1.1423E-03	5.4316E+02	-1.0866E+04	-7.8358E+02	2.7471E+04THERM0277
1.4000E+01	0.0000E+00	3.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3748E+03	-1.1438E-03	5.4203E+02	-1.0838E+04	-7.8342E+02	2.7500E+04THERM0278
1.5000E+01	0.0000E+00	3.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3752E+03	-1.1444E-03	5.4167E+02	-1.0836E+04	-7.8339E+02	2.7500E+04THERM0279
2.0000E+00	0.0000E+00	3.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2574E+03	-1.1526E-03	6.8608E+02	-1.3722E+04	-8.0617E+02	2.5147E+04THERM0280
3.0000E+00	0.0000E+00	3.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3308E+03	-1.1059E-03	5.9559E+02	-1.1911E+04	-7.9778E+02	2.6618E+04THERM0281
4.0000E+00	0.0000E+00	3.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3575E+03	-1.1007E-03	5.6403E+02	-1.1278E+04	-7.9540E+02	2.7152E+04THERM0282
6.0000E+00	0.0000E+00	3.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3765E+03	-1.1051E-03	5.4108E+02	-1.0824E+04	-7.9314E+02	2.7527E+04THERM0283
8.0000E+00	0.0000E+00	3.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3829E+03	-1.1091E-03	5.3282E+02	-1.0654E+04	-7.9203E+02	2.7661E+04THERM0284
1.0000E+01	0.0000E+00	3.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3857E+03	-1.1115E-03	5.2910E+02	-1.0585E+04	-7.9140E+02	2.7710E+04THERM0285
1.2000E+01	0.0000E+00	3.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3873E+03	-1.1130E-03	5.2703E+02	-1.0539E+04	-7.9104E+02	2.7748E+04THERM0286
1.4000E+01	0.0000E+00	3.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3882E+03	-1.1140E-03	5.2589E+02	-1.0520E+04	-7.9084E+02	2.7761E+04THERM0287
1.5000E+01	0.0000E+00	3.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3887E+03	-1.1144E-03	5.2544E+02	-1.0507E+04	-7.9080E+02	2.7776E+04THERM0288
2.0000E+00	0.0000E+00	3.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2727E+03	-1.1400E-03	6.7759E+02	-1.3551E+04	-8.1694E+02	2.5455E+04THERM0289
3.0000E+00	0.0000E+00	3.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3444E+03	-1.0891E-03	5.8259E+02	-1.1651E+04	-8.0660E+02	2.6890E+04THERM0290
4.0000E+00	0.0000E+00	3.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3709E+03	-1.0816E-03	5.4919E+02	-1.0985E+04	-8.0356E+02	2.7417E+04THERM0291
6.0000E+00	0.0000E+00	3.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3897E+03	-1.0834E-03	5.2509E+02	-1.0499E+04	-8.0078E+02	2.7796E+04THERM0292
8.0000E+00	0.0000E+00	3.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3959E+03	-1.0863E-03	5.1656E+02	-1.0334E+04	-7.9946E+02	2.7916E+04THERM0293
1.0000E+01	0.0000E+00	3.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3990E+03	-1.0883E-03	5.1224E+02	-1.0242E+04	-7.9874E+02	2.7984E+04THERM0294
1.2000E+01	0.0000E+00	3.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4006E+03	-1.0894E-03	5.0990E+02	-1.0200E+04	-7.9832E+02	2.8009E+04THERM0295
1.4000E+01	0.0000E+00	3.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4016E+03	-1.0901E-03	5.0866E+02	-1.0171E+04	-7.9809E+02	2.8035E+04THERM0296
1.5000E+01	0.0000E+00	3.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4020E+03	-1.0903E-03	5.0822E+02	-1.0167E+04	-7.9804E+02	2.8038E+04THERM0297
2.0000E+00	0.0000E+00	3.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.2879E+03	-1.1261E-03	6.6795E+02	-1.3359E+04	-8.2724E+02	2.5758E+04THERM0298
3.0000E+00	0.0000E+00	3.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3579E+03	-1.0700E-03	5.6851E+02	-1.1370E+04	-8.1506E+02	2.7158E+04THERM0299
4.0000E+00	0.0000E+00	3.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3839E+03	-1.0605E-03	5.3360E+02	-1.0670E+04	-8.1144E+02	2.7681E+04THERM0300
6.0000E+00	0.0000E+00	3.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4025E+03	-1.0605E-03	5.0828E+02	-1.0170E+04	-8.0820E+02	2.8044E+04THERM0301
8.0000E+00	0.0000E+00	3.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4088E+03	-1.0626E-03	4.9923E+02	-9.9820E+03	-8.0670E+02	2.8180E+04THERM0302
1.0000E+01	0.0000E+00	3.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4116E+03	-1.0639E-03	4.9505E+02	-9.9035E+03	-8.0589E+02	2.8229E+04THERM0303
1.2000E+01	0.0000E+00	3.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4134E+03	-1.0648E-03	4.9234E+02	-9.8450E+03	-8.0543E+02	2.8269E+04THERM0304
1.4000E+01	0.0000E+00	3.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4142E+03	-1.0654E-03	4.9111E+02	-9.8259E+03	-8.0517E+02	2.8280E+04THERM0305
1.5000E+01	0.0000E+00	3.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4148E+03	-1.0657E-03	4.9057E+02	-9.8097E+03	-8.0510E+02	2.8297E+04THERM0306
2.0000E+00	0.0000E+00	3.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3030E+03	-1.1099E-03	6.5707E+02	-1.3137E+04	-8.3708E+02	2.6066E+04THERM0307
3.0000E+00	0.0000E+00	3.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3707E+03	-1.0488E-03	5.5376E+02	-1.1073E+04	-8.2318E+02	2.7417E+04THERM0308
4.0000E+00	0.0000E+00	3.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3965E+03	-1.0366E-03	5.1724E+02	-1.0347E+04	-8.1905E+02	2.7928E+04THERM0309
6.0000E+00	0.0000E+00	3.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4149E+03	-1.0349E-03	4.9074E+02	-9.8122E+03	-8.1541E+02	2.8302E+04THERM0310
8.0000E+00	0.0000E+00	3.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4212E+03	-1.0362E-03	4.8131E+02	-9.6280E+03	-8.1375E+02	2.8421E+04THERM0311
1.0000E+01	0.0000E+00	3.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4239E+03	-1.0376E-03	4.7692E+02	-9.5370E+03	-8.1286E+02	2.8480E+04THERM0312
1.2000E+01	0.0000E+00	3.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4254E+03	-1.0383E-03	4.7457E+02	-9.4935E+03	-8.1233E+02	2.8505E+04THERM0313
1.4000E+01	0.0000E+00	3.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4264E+03	-1.0387E-03	4.7309E+02	-9.4606E+03	-8.1204E+02	2.8530E+04THERM0314
1.5000E+01	0.0000E+00	3.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4269E+03	-1.0389E-03	4.7257E+02	-9.4528E+03	-8.1197E+02	2.8536E+04THERM0315
2.0000E+00	0.0000E+00	4.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3174E+03	-1.0915E-03	6.4555E+02	-1.2911E+04	-8.4647E+02	2.6348E+04THERM0316
3.0000E+00	0.0000E+00	4.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.3835E+03	-1.0256E-03	5.3791E+02	-1.0758E+04	-8.3098E+02	2.7670E+04THERM0317
4.0000E+00	0.0000E+00	4.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4087E+03	-1.0112E-03	5.0013E+02	-9.9998E+03	-8.2638E+02	2.8176E+04THERM0318
6.0000E+00	0.0000E+00	4.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4268E+03	-1.0075E-03	4.7258E+02	-9.4539E+03	-8.2240E+02	2.8534E+04THERM0319
8.0000E+00	0.0000E+00	4.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4330E+03	-1.0083E-03	4.6277E+02	-9.2541E+03	-8.2060E+02	2.8661E+04THERM0320
1.0000E+01	0.0000E+00	4.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.4356E+03	-1.0089E-03	4.5830E+02	-9.1686E+03	-8.1963E+02	2.8

Listing 4.3 ZONAIR Solution File: THERMi

(Only SHOWS the file:THERM0001)

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4.585480690E-01 4.396029711E-01 4.232070446E-01 4.084888697E-01 3.949568868E-01
3.823106885E-01 3.627509475E-01 3.413421512E-01 3.189724684E-01 2.948293686E-01
2.806720734E-01 2.003856301E-01 1.782751083E-02 8.712649345E-03 1.259056330E-01
2.839162350E-01 2.865498066E-01 3.102762699E-01 3.413421512E-01 3.665290475E-01
3.864405751E-01 3.993574381E-01 4.132434130E-01 4.284523726E-01 4.455744028E-01
4.656879306E-01 4.910055399E-01 5.279328823E-01 6.171896458E-01 4.585480690E-01
4.455744028E-01 4.284523726E-01 4.181436896E-01 4.038643241E-01 3.906537890E-01
3.782590032E-01 3.665290475E-01 3.590351343E-01 3.413421512E-01 3.219955564E-01
2.971912622E-01 2.811959386E-01 2.238786221E-02 4.235446453E-03 4.585480690E-01
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2.971912622E-01 2.811959386E-01 2.238786221E-02 4.235446453E-03
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2.647452950E-01 2.538042665E-01 2.443374693E-01 2.358411849E-01 2.280283868E-01
2.207271755E-01 2.094340175E-01 1.970738024E-01 1.841595173E-01 1.702201366E-01
1.620455533E-01 2.351514697E-01 9.430852532E-02 7.450746000E-02 2.146733254E-01
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-2.688661814E-01 2.834716737E-01 3.047956228E-01 3.563324213E-01 2.647452950E-01
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1.715839207E-01 1.623488069E-01 1.043592542E-01 4.625983909E-02 2.647452950E-01
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1.150778770E+00 1.196199059E+00 1.244264126E+00 1.292564631E+00 1.341477394E+00
1.363949180E+00 1.420445085E+00 1.685338855E+00 1.696901679E+00 1.526892900E+00
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1.141001344E+00 1.110002995E+00 1.076003313E+00 1.038015962E+00 9.943884015E-01
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1.336923599E+00 1.364203334E+00 1.679828525E+00 1.703988910E+00 9.607827067E-01
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3.864405751E-01 3.993574381E-01 4.132434130E-01 4.284523726E-01 4.455744028E-01
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3.782590032E-01 3.665290475E-01 3.590351343E-01 3.413421512E-01 3.219955564E-01
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3.782590032E-01 3.665290475E-01 3.590351343E-01 3.413421512E-01 3.219955564E-01
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-2.183878124E-01 2.116155773E-01 2.072888911E-01 1.970738024E-01 1.859041899E-01
1.715839207E-01 1.623488069E-01 1.043592542E-01 4.625983909E-02 2.647452950E-01
-2.572523654E-01 2.473666668E-01 2.414155006E-01 2.331710905E-01 2.255440950E-01
-2.183878124E-01 2.116155773E-01 2.072888911E-01 1.970738024E-01 1.859041899E-01
1.715839207E-01 1.623488069E-01 1.043592542E-01 4.625983909E-02
      8      1      64
1.700157046E+00 1.707506537E+00 6.652494073E-01 8.149340749E-01 8.996474147E-01
9.607827067E-01 1.009701967E+00 1.051200986E+00 1.087720633E+00 1.120633721E+00
1.150778770E+00 1.196199059E+00 1.244264126E+00 1.292564631E+00 1.341477394E+00
1.363949180E+00 1.420445085E+00 1.685338855E+00 1.696901679E+00 1.526892900E+00
1.349177718E+00 1.356628299E+00 1.310680509E+00 1.244264126E+00 1.187540054E+00
1.141001344E+00 1.110002995E+00 1.076003313E+00 1.038015962E+00 9.943884015E-01
9.421096444E-01 8.749709725E-01 7.766770720E-01 5.660333037E-01 9.607827067E-01
9.943884015E-01 1.038015962E+00 1.063846469E+00 1.099042654E+00 1.130959034E+00
1.160308242E+00 1.187540054E+00 1.204663634E+00 1.244264126E+00 1.286167979E+00
1.336923599E+00 1.364203334E+00 1.679828525E+00 1.703988910E+00 9.607827067E-01
9.943884015E-01 1.038015962E+00 1.063846469E+00 1.099042654E+00 1.130959034E+00
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1.160308242E+00 1.187540054E+00 1.204663634E+00 1.244264126E+00 1.286167979E+00
1.336923599E+00 1.364203334E+00 1.679828525E+00 1.703988910E+00
9 1 64
1.700157046E+00 1.707506537E+00 6.652494073E-01 8.149340749E-01 8.996474147E-01
9.607827067E-01 1.009701967E+00 1.051200986E+00 1.087720633E+00 1.120633721E+00
1.150778770E+00 1.196199059E+00 1.244264126E+00 1.292564631E+00 1.341477394E+00
1.363949180E+00 1.420445085E+00 1.685338855E+00 1.696901679E+00 1.526892900E+00
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1.141001344E+00 1.110002995E+00 1.076003313E+00 1.038015962E+00 9.943884015E-01
9.421096444E-01 8.749709725E-01 7.766770720E-01 5.660333037E-01 9.607827067E-01
9.943884015E-01 1.038015962E+00 1.063846469E+00 1.099042654E+00 1.130959034E+00
1.160308242E+00 1.187540054E+00 1.204663634E+00 1.244264126E+00 1.286167979E+00
1.336923599E+00 1.364203334E+00 1.679828525E+00 1.703988910E+00 9.607827067E-01
9.943884015E-01 1.038015962E+00 1.063846469E+00 1.099042654E+00 1.130959034E+00
1.160308242E+00 1.187540054E+00 1.204663634E+00 1.244264126E+00 1.286167979E+00
1.336923599E+00 1.364203334E+00 1.679828525E+00 1.703988910E+00

- *Output Data Listing*

Listing 4.4 Standard Output File: WEDGE_TPS.OUT

[illegible]

1 -	DESVAR	1	6	1						CONT
2 -	CONT	14	15	16	17	18	19			
3 -	DESVAR	2	3	1						CONT
4 -	CONT	1	6	13						CONT
5 -	DESVAR	3	3	1						CONT
6 -	CONT	20	26	32						
7 -	PANLST2	11		14	15	16	17	18	19	
8 -	PANLST2	12		14	15	16	17	18	19	
9 -	PANLST2	21		1	THRU	13				
10 -	PANLST2	22		1	6	13				
11 -	PANLST2	31		20	THRU	32				
12 -	PANLST2	32		20	26	32				
13 -	PARAM	STREAM	1. E-6							
14 -	PATCH	1	11	12						
15 -	PATCH	2	21	22						
16 -	PATCH	3	31	32						
17 -	PLTAERO	1	YES	NO		NASTRAN	AEROMESH.NAS			
18 -	PLTTPS	-2	1	ALL	TECPLOT	WEDGE30	STS.PLT	-1.0		
19 -	PLTTPS	1	1	ALL	TECPLOT	WEDGE30	STM.PLT	0.05		
20 -	PRVAL	4		30000000						
21 -	PODRSM	1	1			SAVE	WEDGE30	.RST		CONT
22 -	CONT	CPPODRSM	.P3D	UPPODRSM	.P3D	VPPODRSM	.P3D	WPPODRSM	.P3D	
23 -	STTYPE	1	1	508						CONT
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25 -	STTYPE	2	1	501						CONT
26 -	CONT	1.0								
27 -	STTYPE	3	6	245						CONT
28 -	CONT	0.01								
29 -	STTYPE	4	1	313						CONT
30 -	CONT	0.05								
31 -	STTYPE	5	6	245						CONT
32 -	CONT	0.01								
33 -	STTYPE	6	1	103						CONT
34 -	CONT	0.1								
35 -	STTYPE	31	6	221						CONT
36 -	CONT	0.02								
37 -	STTYPE	32	1	266						CONT
38 -	CONT	0.02								
39 -	STTYPE	33	1	260						CONT
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41 -	STTYPE	34	1	266						CONT
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43 -	STTYPE	35	6	245						CONT
44 -	CONT	0.2								
45 -	STTYPE	36	1	103						CONT
46 -	CONT	0.1								
47 -	THERMPR	1	100F							
48 -	TPSDES	1	1	1	1					CONT
49 -	CONT	1	2	3						
50 -	TPSSYM	1	1	6	4					CONT
51 -	CONT	1	1	0.008	0.05					CONT
52 -	CONT	1	2	0.5	4.0					CONT
53 -	CONT	1	3	0.01	0.1					CONT
54 -	CONT	1	4	0.015	0.2					CONT
55 -	CONT	1	5	0.01	0.1					CONT
56 -	CONT	0	6	0.02	0.2					
57 -	TPSSYM	2	2	6	4					CONT
58 -	CONT	2	31	0.005	0.1					CONT
59 -	CONT	2	32	0.005	0.1					CONT
60 -	CONT	2	33	0.3	5.0					CONT
61 -	CONT	2	34	0.02	1.0					CONT
62 -	CONT	2	35	0.01	0.8					CONT
63 -	CONT	0	36	0.01	1.0					
64 -	TPSSYM	3	3	6	4					CONT
65 -	CONT	3	1	0.008	0.05					CONT
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69 -	CONT	3	5	0.01	0.1					CONT
70 -	CONT	0	6	0.02	0.2					
71 -	TRAJCT	1	1							CONT
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73 -	CONT	.16000E20	.98944	.41990E614	.0000					CONT
74 -	CONT	.33000E21	.34826	.43688E69	.4208					CONT
75 -	CONT	.49000E21	.63429	.58196E63	.6000					CONT
76 -	CONT	.68000E22	.17754	.82141E63	.6000					CONT
77 -	CONT	.88000E22	.99306	.11358E73	.6000					CONT
78 -	CONT	.10800E34	.03065	.14897E73	.6000					CONT
79 -	CONT	.12800E35	.30536	.18668E73	.6000					CONT
80 -	CONT	.14700E37	.18387	.22489E78	.7000					CONT
81 -	CONT	.16500E38	.14718	.26307E710	.2250					CONT
82 -	CONT	.18500E38	.48577	.29382E710	.2250					CONT
83 -	CONT	.20500E38	.73075	.31108E710	.2250					CONT
84 -	CONT	.22500E38	.80061	.31479E710	.2250					CONT
85 -	CONT	.24500E38	.62765	.30495E710	.2250					CONT
86 -	CONT	.26300E38	.35804	.28476E730	.0000					CONT
87 -	CONT	.28300E37	.92715	.25083E730	.0000					CONT
88 -	CONT	.30300E37	.42020	.20828E730	.0000					CONT
89 -	CONT	.32300E36	.98630	.17006E730	.0000					CONT
90 -	CONT	.34100E36	.51451	.15705E717	.6576					CONT
91 -	CONT	.35900E36	.29482	.15555E711	.3822					CONT
92 -	CONT	.37900E36	.12626	.15505E711	.5945					CONT
93 -	CONT	.39900E35	.96248	.15405E711	.6852					CONT

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94 -      CONT      .41900E35.80340 .15256E711.6316      CONT
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100 -     CONT      .53900E34.92935 .13511E79.3991      CONT
101 -     CONT      .55900E34.78106 .13103E78.7931      CONT
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103 -     CONT      .59900E34.44764 .12216E77.6847      CONT
104 -     CONT      .61900E34.25902 .11747E77.2020      CONT
105 -     CONT      .63900E34.05448 .11267E76.7771      CONT
106 -     CONT      .65900E33.82413 .10782E76.3472      CONT
107 -     CONT      .67900E33.56631 .10300E75.9874      CONT
108 -     CONT      .69900E33.28723 .98254E65.7202      CONT
109 -     CONT      .71759E33.00000 .93312E64.8191      CONT
110 -     CONT      .73600E32.68846 .87329E64.1829      CONT
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113 -     CONT      .79600E31.47000 .66074E63.0928      CONT
114 -     CONT      .81600E31.14676 .59940E63.3054      CONT
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121 -     CONT      .95400E30.58784 .25488E63.9046      CONT
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124 -     CONT      .10140E40.48941 .13984E63.8101      CONT
125 -     CONT      .10340E40.46307 .10502E63.8009      CONT
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127 -     CONT      .10740E40.41915 .39891E53.7718      CONT
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130 -     CONT      1      1.      CONT
131 -     ENDDATA

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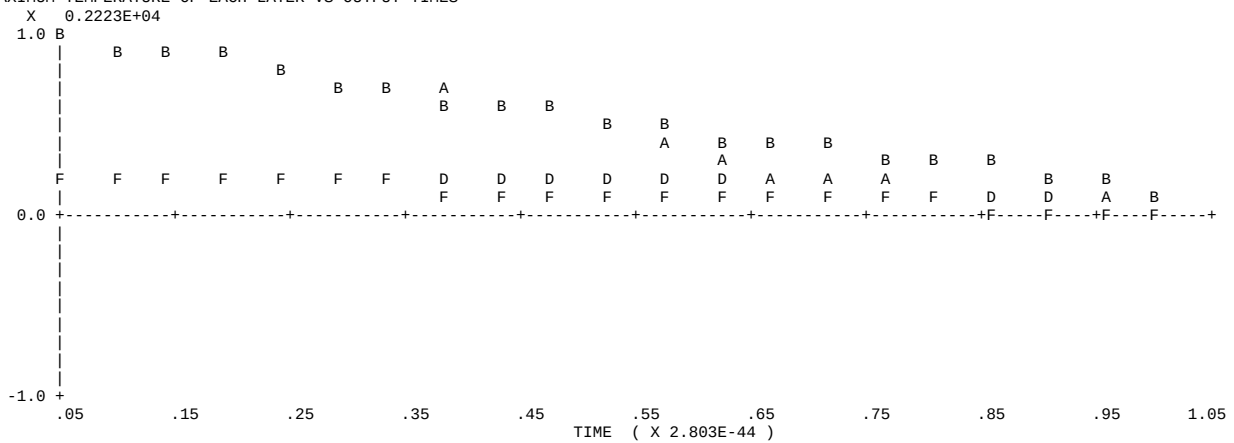
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*                                     *
*      SUBCASE      =      1      *
*      DISCIPLINE   = TPSDES      *
*      BULK ENTRY ID =      1      *
*                                     *
*****

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OPTIMIZATION SYSTEM FOR TPSSYM = 1

TOTAL NUMBER OF DESIGN VARIABLES = 30
TOTAL NUMBER OF CONSTRAINTS = 792
TOTAL NUMBER OF TEMP. CONSTRAINTS = 792
TOTAL NUMBER OF TEMP. PRINTOUTS = 22

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4	5	6
Tmax:	2300.33	2400.33	550.33	450.33	550.33	350.33
Optv:	2223.00	2219.04	449.45	449.45	349.96	349.96

VALUES OF DESIGN VARIABLES :

LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06
1	0.00800	0.00808	0.00800	0.00902	0.00809	0.00810
2	0.56594	0.82798	1.06020	1.23897	1.07278	0.94884
3	0.01000	0.01010	0.01000	0.01127	0.01345	0.01013
4	0.01500	0.11378	0.12437	0.19531	0.12512	0.12317
5	0.01000	0.01010	0.01000	0.01127	0.01361	0.01013

THE ORIGINAL OBJECTIVE FUNCTION = 6.0350003

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.9909588

THE TOTAL OPTIMAL WEIGHT = 3.75722822E+03

OPTIMAL STRUCTURES OF TPS FOR PATCH = 1
(WITH AVERAGE THICKNESS)

RCG COATING	slab	0.00821 in.	2223.0 F
LI900	slab	0.95245 in.	2219.0 F
RTV-560	thin skin	0.01082 in.	449.4 F
5.4 LB SIP	slab	0.11612 in.	449.4 F
RTV-560	thin skin	0.01085 in.	350.0 F
ALUMINUM 7075-T6	slab	0.10000 in.	350.0 F

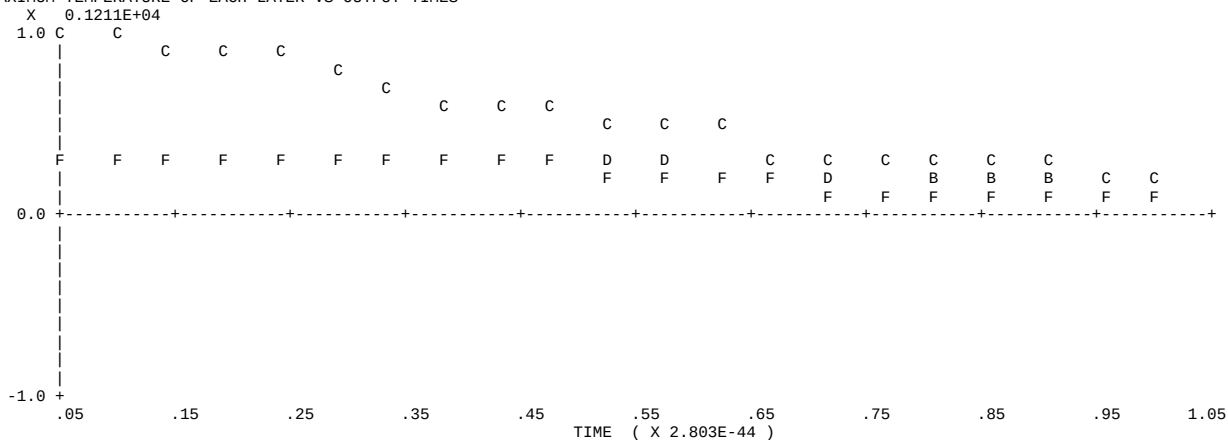
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 1

PANEL	LAYER01		LAYER02		LAYER03		LAYER04		LAYER05		LAYER06	
14	0.00800	1250.59	0.56594	1250.09	0.01000	550.33	0.01500	352.40	0.01000	351.18	0.10000	349.96
15	0.00808	1709.70	0.82798	1708.53	0.01010	550.33	0.11378	447.56	0.01010	397.52	0.10000	347.48
16	0.00800	2031.55	1.06020	2030.66	0.01000	550.33	0.12437	447.03	0.01000	396.73	0.10000	346.42
17	0.00902	2161.90	1.23897	2159.80	0.01127	550.33	0.19531	447.91	0.01127	366.64	0.10000	285.37
18	0.00809	2223.00	1.07278	2221.02	0.01345	550.33	0.12512	449.20	0.01361	397.55	0.10000	345.89
19	0.00810	2122.85	0.94884	2120.86	0.01013	550.33	0.12317	449.45	0.01013	398.03	0.10000	346.61

OPTIMIZATION SYSTEM FOR TPSSYM = 2

TOTAL NUMBER OF DESIGN VARIABLES = 15
TOTAL NUMBER OF CONSTRAINS = 496
TOTAL NUMBER OF TEMP. CONSTRAINS = 396
TOTAL NUMBER OF TEMP. PRINTOUTS = 22

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



3 0.33529 0.40782 0.53436
 4 0.02000 0.02020 0.02000
 5 0.01000 0.01010 0.01000

THE ORIGINAL OBJECTIVE FUNCTION = 36.4379196

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.1323187

THE TOTAL OPTIMAL WEIGHT = 1.87973729E+04

OPTIMAL STRUCTURES OF TPS FOR PATCH = 2
 (WITH AVERAGE THICKNESS)

Layer	Material	Thickness (in.)	Temperature (F)
1	HRSI COAT	0.00502	1211.1
2	AB312 Fabric	0.00502	1211.1
3	Q-Felt(3.5 PCF)	0.42582	1206.5
4	AB312 Fabric	0.02007	354.2
5	RTV-560	0.01003	350.2
6	ALUMINUM 7075-T6	0.10000	350.2

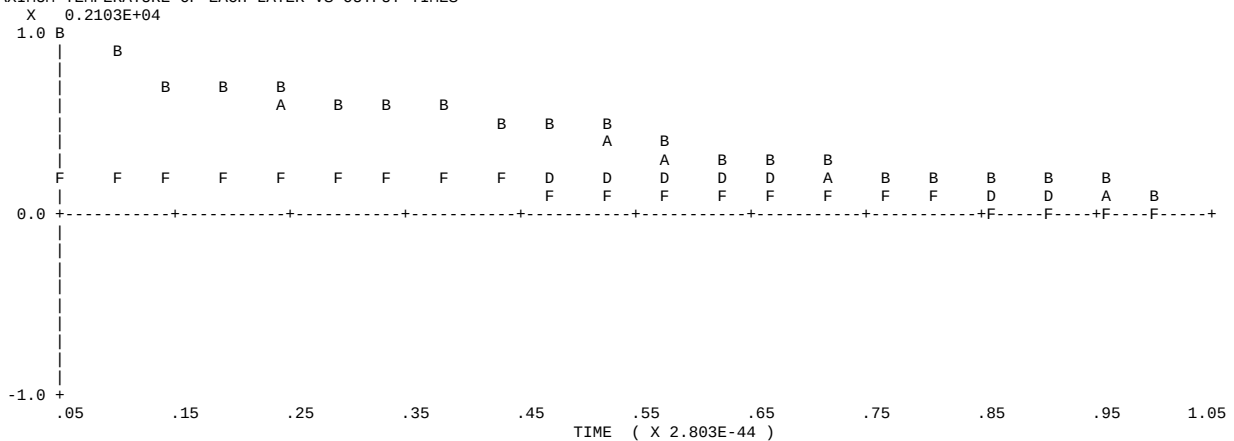
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 2

PANEL	LAYER01	LAYER02	LAYER03	LAYER04	LAYER05	LAYER06
1	0.00500	0.00500	0.33529	0.02000	0.01000	0.10000
2	0.00502	0.00502	0.34808	0.02007	0.01004	0.10000
3	0.00503	0.00503	0.36206	0.02013	0.01006	0.10000
4	0.00504	0.00504	0.37691	0.02017	0.01008	0.10000
5	0.00505	0.00505	0.39229	0.02019	0.01010	0.10000
6	0.00505	0.00505	0.40782	0.02020	0.01010	0.10000
7	0.00505	0.00505	0.42318	0.02020	0.01010	0.10000
8	0.00505	0.00505	0.43808	0.02019	0.01010	0.10000
9	0.00504	0.00504	0.45227	0.02018	0.01009	0.10000
10	0.00504	0.00504	0.47131	0.02015	0.01007	0.10000
11	0.00503	0.00503	0.49382	0.02011	0.01005	0.10000
12	0.00501	0.00501	0.51532	0.02005	0.01003	0.10000
13	0.00500	0.00500	0.53436	0.02000	0.01000	0.10000

OPTIMIZATION SYSTEM FOR TPSSYM = 3

TOTAL NUMBER OF DESIGN VARIABLES = 15
 TOTAL NUMBER OF CONSTRAINTS = 496
 TOTAL NUMBER OF TEMP. CONSTRAINTS = 396
 TOTAL NUMBER OF TEMP. PRINTOUTS = 22

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4	5	6
Tmax:	2300.33	2400.33	550.33	450.33	550.33	350.33
Optv:	2103.05	2099.08	447.63	447.63	349.73	349.74

VALUES OF DESIGN VARIABLES :

LAYER	DEV01	DEV02	DEV03
1	0.00808	0.00800	0.00808
2	0.81594	0.67940	0.58516
3	0.01010	0.01000	0.01010
4	0.11833	0.01500	0.01515
5	0.01010	0.01000	0.01010

THE ORIGINAL OBJECTIVE FUNCTION = 13.0758333

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.7439033

THE TOTAL OPTIMAL WEIGHT = 2.35277212E+04

OPTIMAL STRUCTURES OF TPS FOR PATCH = 3
(WITH AVERAGE THICKNESS)

RCG COATING	slab	0.00806 in.	2103.0 F
LI900	slab	0.69350 in.	2099.1 F
RTV-560	thin skin	0.01007 in.	447.6 F
5.4 LB SIP	slab	0.04950 in.	447.6 F
RTV-560	thin skin	0.01007 in.	349.7 F
ALUMINUM 7075-T6	slab	0.10000 in.	349.7 F

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 3

PANEL	LAYER01	LAYER02	LAYER03	LAYER04	LAYER05	LAYER06
20	0.00808	2103.05	0.81594	2101.06	0.01010	550.33
21	0.00806	2102.04	0.79626	2100.01	0.01008	550.33
22	0.00804	2100.49	0.76470	2098.41	0.01005	550.33
23	0.00802	2099.09	0.73390	2096.96	0.01002	550.33
24	0.00801	2098.18	0.71215	2096.01	0.01001	550.33
25	0.00800	2097.56	0.69610	2095.37	0.01000	550.33
26	0.00800	2096.97	0.67940	2094.75	0.01000	550.33
27	0.00800	2096.43	0.66235	2094.19	0.01000	550.33
28	0.00801	2095.98	0.64530	2093.72	0.01001	550.33
29	0.00802	2095.64	0.62867	2093.37	0.01002	550.33
30	0.00803	2095.44	0.61284	2093.16	0.01004	550.33
31	0.00805	2095.41	0.59823	2093.12	0.01007	550.33
32	0.00808	2095.55	0.58516	2093.27	0.01010	550.33

 *** T P S O P T T E R M I N A T E D ***
 *** N O R M A L L Y ***
 *** 12:10:37 09/04/2005 ***

5.0 Micro-X Vehicle

- *Purpose:* To demonstrate the applicability of the TPSOPT software system for the Micro-X configuration.
- *Input File:*
 - Standard input File: MICRO_X_TPS.INP (Listing 5.1)
 - Aerodynamic Database: CFDTABLE.DAT (Listing 5.2)
 - Geometry File: MICROXGEO.DAT (Binary file)
 - ZONAIR Solution File: FLOWi (Listing 5.3)
- *Output File:*
 - Standard Output File: MICRO_X_TPS.OUT (Listing 5.4)
 - Vehicle Surface Mesh: MICRO_X_GEO.PLT (Figure 5.1)
 - Response surfaces for POD analysis (Figure 5.4)
 - C_p Plot File: CPTEMP.PLT (Figure 5.5)
 - Temperature Plot File: CPTEMP.PLT (Figure 5.6)
 - Thickness Distribution Plot File: MICRO_X_HT.PLT (Figure 5.7)

5.1 The Surface Mesh of the Micro-X Vehicle

The ZONAIR model for the Micro-X configuration consists of the body, two wings and one vertical wing. The surface panels shown in Figure 5.1 are generated by ZONAIR and outputted as a binary file “MICROXGEO.DAT”. This file is invoked by specifying the name on the second row of the aerodynamic database (CFDTABLE.DAT) that is imported by the “ASSIGN AEROBASE=” executive control command.

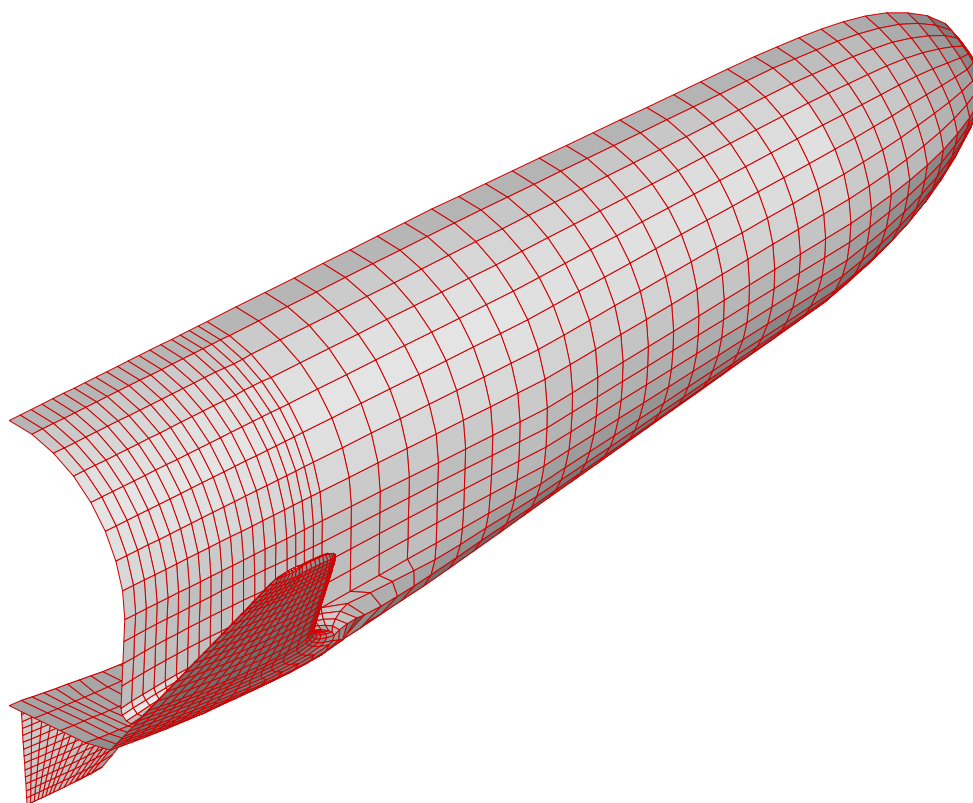


Figure 5.1. Surface mesh for Micro-X vehicle

5.2 The Aerodynamic Database: CFDTABLE.DAT

The aerodynamic database is generated by running ZONAIR for 80 combinations of 20 Mach numbers (2, 5, 8, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27) and 4 angles of attack (0, 10, 20, 30). This file provides TPSOPT system with all flowfield information from ZONAIR. The first row is a title card (Micro-x model consists of body, wing and vertical wing); the second row provide the geometry file name (MICROXGEO.DAT); the third and fourth rows list the name of the reference chord, span, ...etc, and their values, respectively; the fifth row lists the names of items in the following rows (Mach number, Altitude, Angle of attack, etc.) and the remaining rows contain the values of the items listed in the fifth row and the file names of flowfield (FLOW0001 to FLOW0080) in the last column which stored the velocity and pressure coefficients for the combination of the Mach number and Angle of attack listed in the corresponding row.

5.3 The Standard Input File (MICRO_X_TPS.INP)

The standard input file consists of two major parts: the flow field information and the TPS optimization system. The flow field information is provided by ZONAIR and imported by the aerodynamic database (CFDTABLE.DAT) using the following statement on the first row in the Input File:

```
ASSIGN AEROBASE='CFDTABLE.DAT'
```

The TPS optimization system is the major portion of the standard input file, which includes the definition of optimization patches for TPS and specification of trajectory data. Twenty nine optimization patches are defined over the TPS located on the whole vehicle surface (Figure 5.2), among which patch 1 is located around nose of the vehicle, 10 and 29 on the leading edge of the wing and 30 over the vertical wing. Figure 5.3 shows individual patches and panel numbers over them.

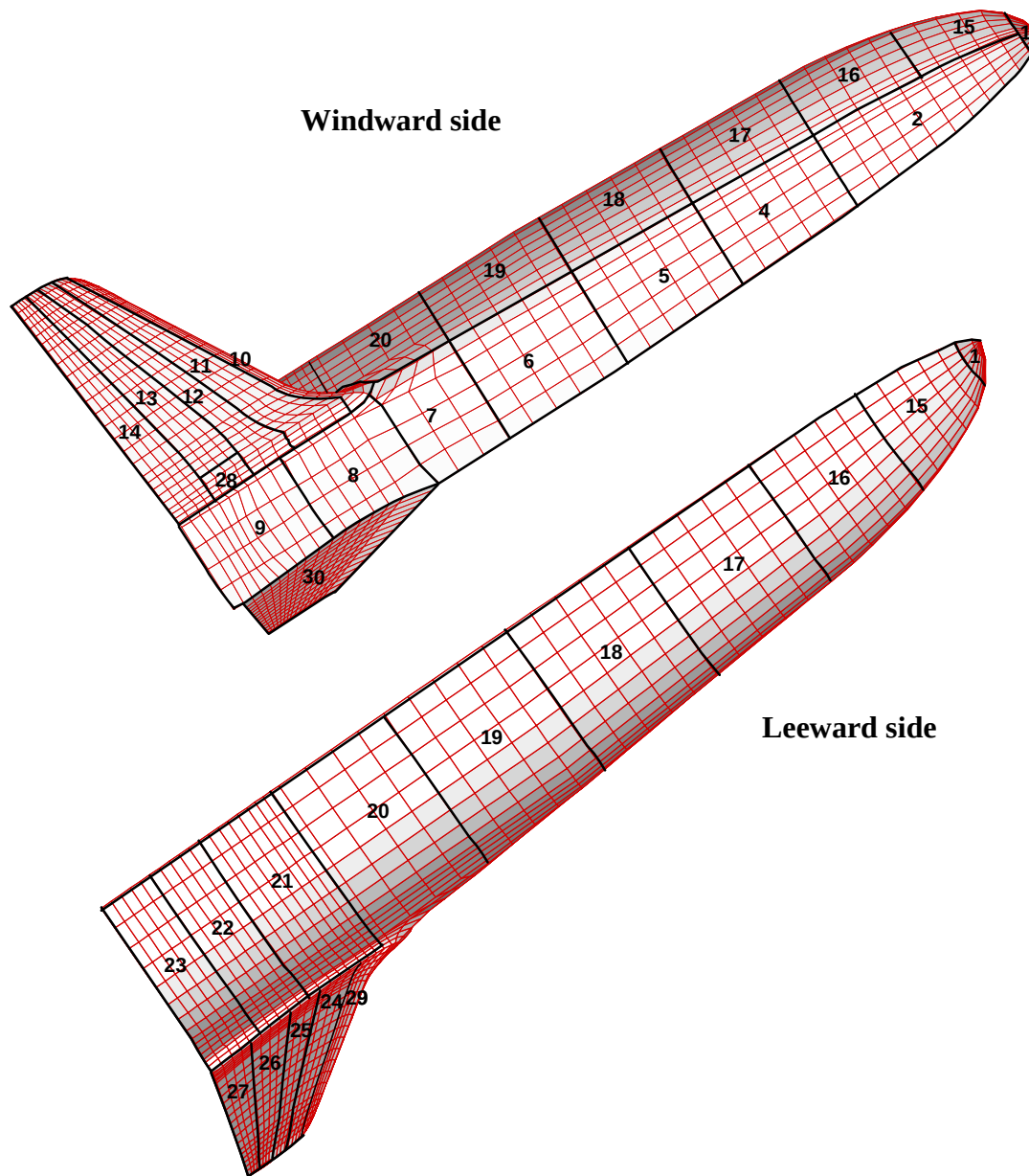
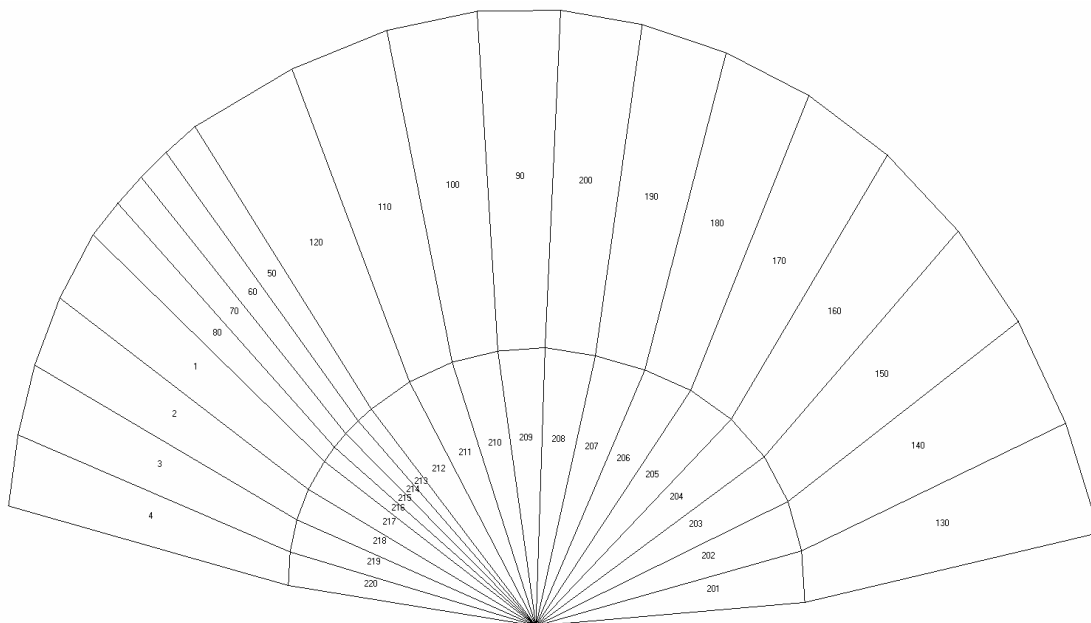
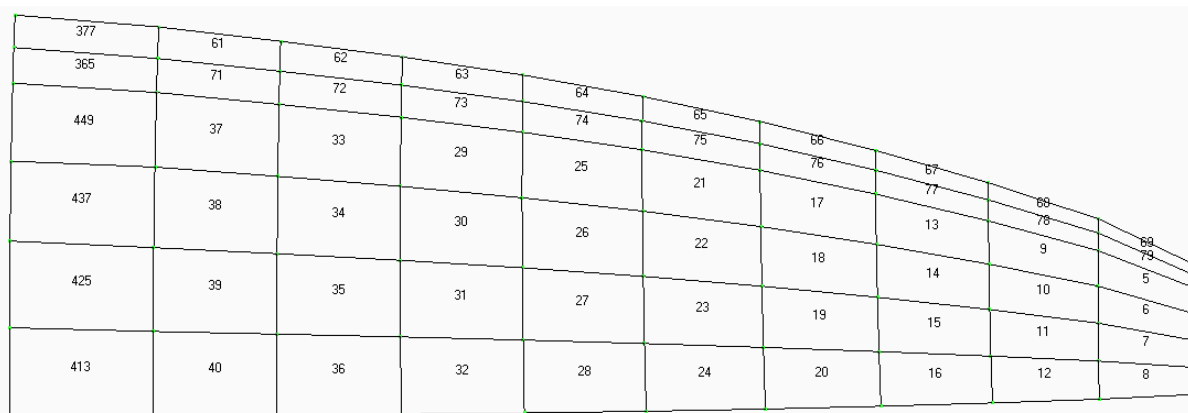


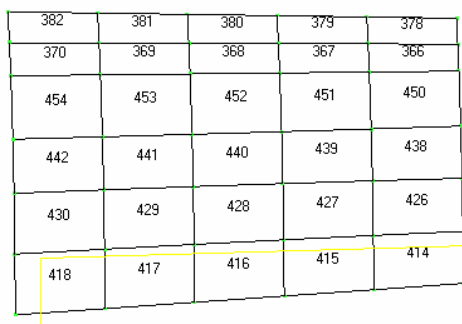
Figure 5.2. Twenty nine patches defined over TPS



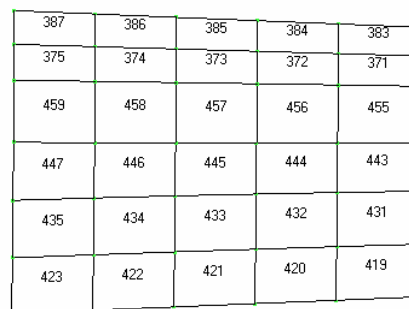
Patch1



Patch 2



Patch 4



Patch5

523	519	515	511	388
524	520	516	512	376
1937	1938	1939	1940	460
1941	1942	1943	1944	448
1945	1946	1947	1948	436
1949	1950	1951	1952	424

Patch 6

	613	614	615	616
1936	617	618	619	620
621	622	623	624	
625	626	627	628	
629	630	631	632	
633	634	635	636	

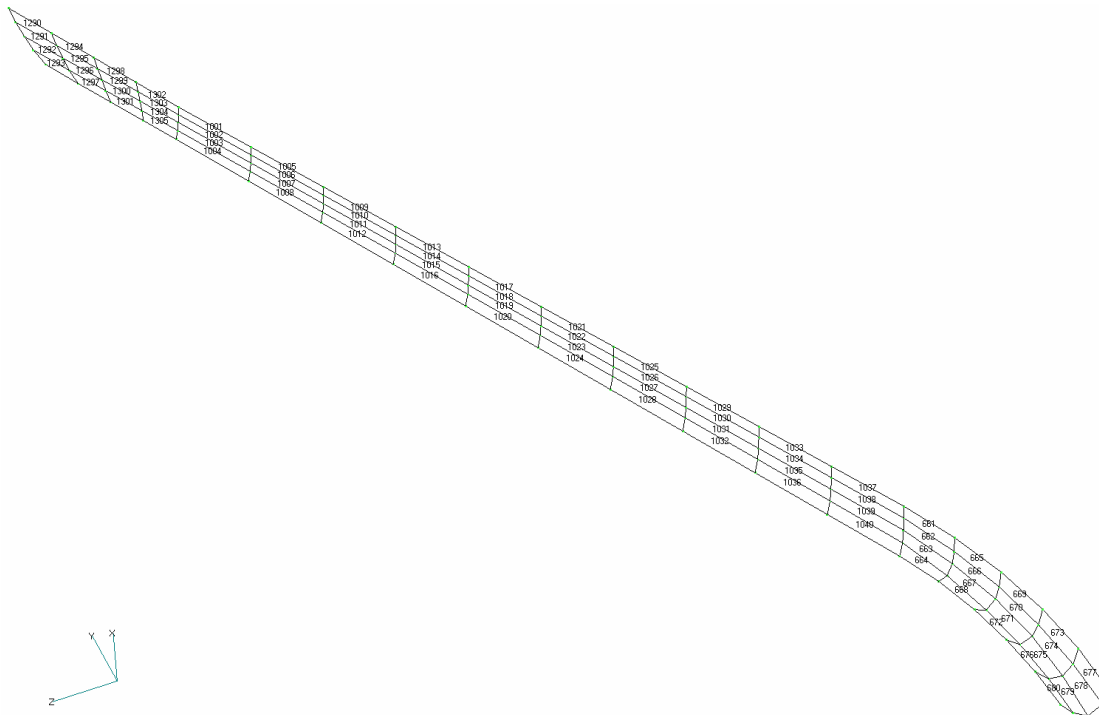
Patch 7

1174	1175	1176	1177	1178	1179	1180
1181	1182	1183	1184	1185	1186	1187
1188	1189	1190	1191	1192	1193	1194
1195	1196	1197	1198	1199	1200	1201

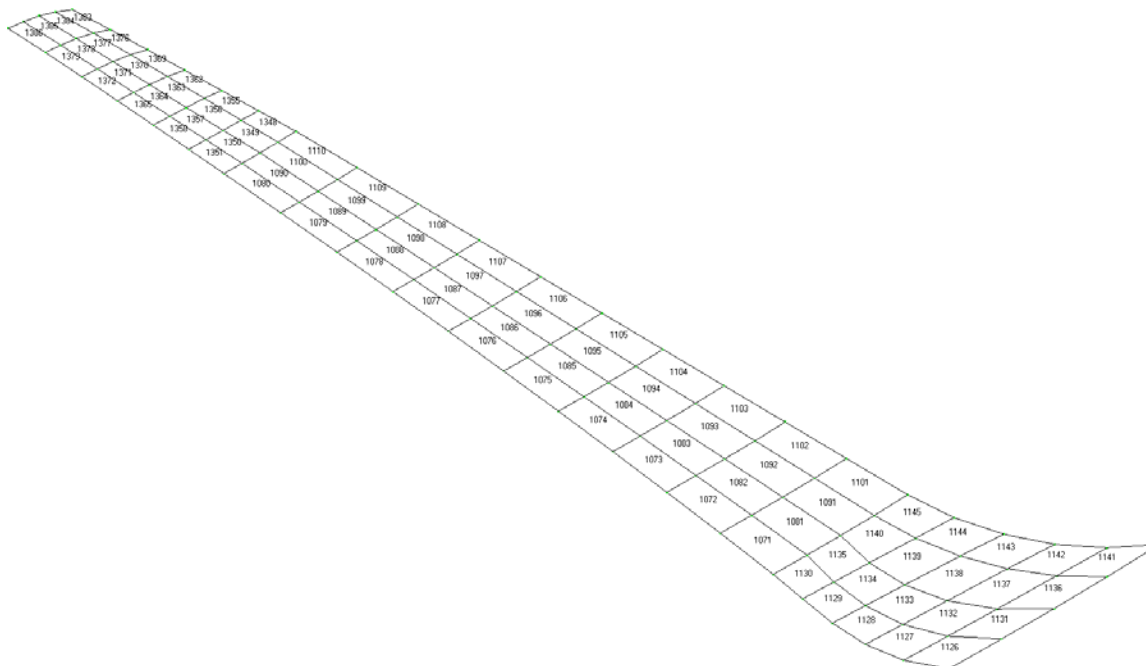
Patch 8

1886	1887	1888	1889	1890	1891	1892	1893
1894	1895	1896	1897	1898	1899	1900	1901
1902	1903	1904	1905	1906	1907	1908	1909
1910	1911	1912	1913	1914	1915	1916	1917

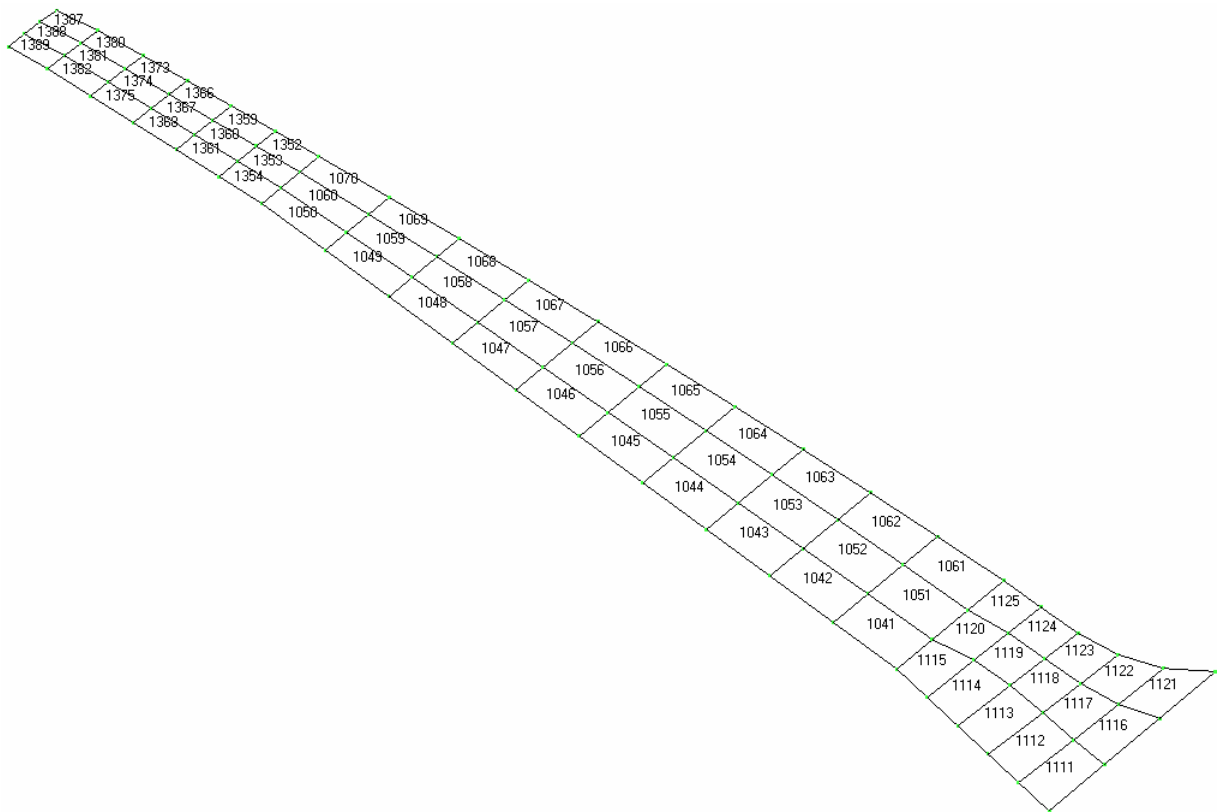
Patch 9



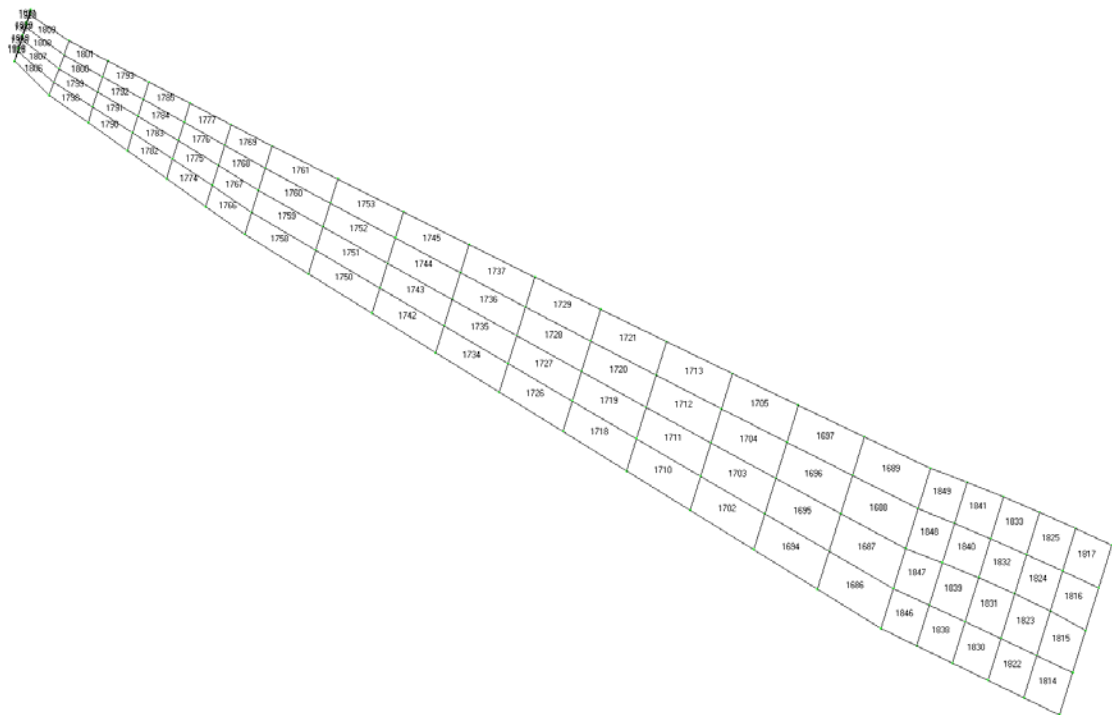
Patch 10



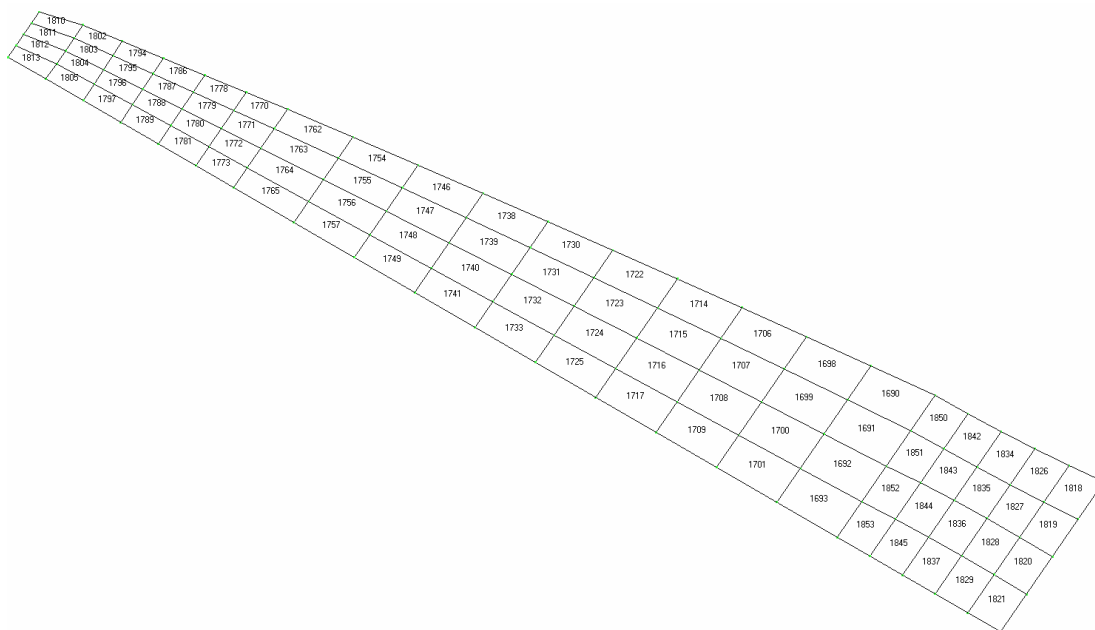
Patch 11



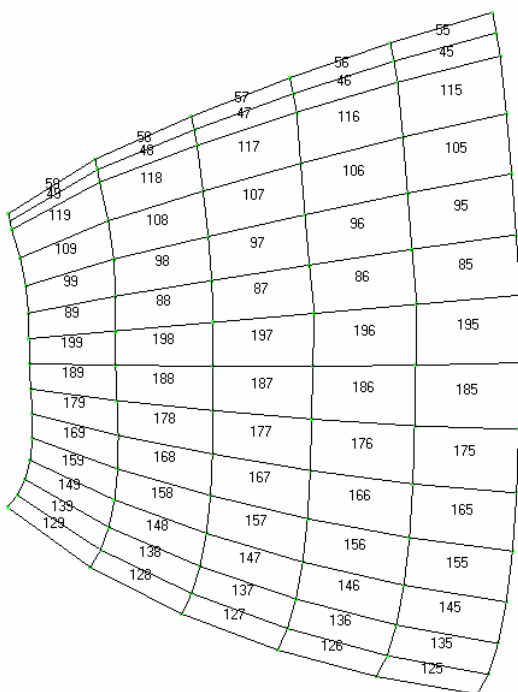
Patch 12



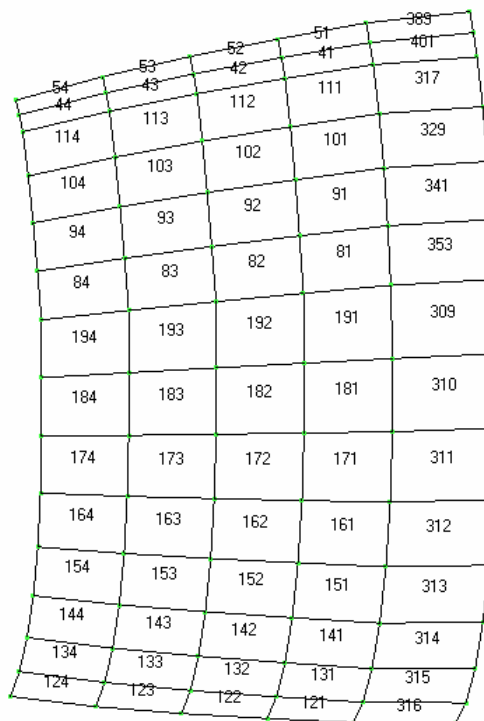
Patch 13



Patch 14



Patch 15



Patch 16

398	391	392	393	394
402	403	404	405	406
318	319	320	321	322
330	331	332	333	334
342	343	344	345	346
354	355	356	357	358
301	293	285	277	269
302	294	286	278	270
303	295	287	279	271
304	296	288	280	272
305	297	289	281	273
306	298	290	282	274
307	299	291	283	275
308	300	292	284	276

Patch 17

395	396	397	398	399
407	408	409	410	411
323	324	325	326	327
335	336	337	338	339
347	348	349	350	351
359	360	361	362	363
261	253	245	237	229
262	254	246	238	230
263	255	247	239	231
264	256	248	240	232
265	257	249	241	233
266	258	250	242	234
267	259	251	243	235
268	260	252	244	236

Patch 18

400	510	514	518	522
412	509	513	517	521
328	505	501	497	493
340	506	502	498	494
352	507	503	499	495
364	508	504	500	496
221	485	477	469	461
222	486	478	470	462
223	487	479	471	463
224	488	480	472	464
225	489	481	473	465
226	490	482	474	466
227	491	483	475	467
228	492	484	476	468

Patch 19

612	611	610	609
608	607	606	605
581	597	593	589
582	598	594	590
583	599	595	591
584	600	596	592
581	573	565	557
582	574	566	558
583	575	567	559
584	576	568	560
585	577	569	561
586	578	570	562
587	579	571	563
588	580	572	564

Patch 20

717	718	719	720	938	939	940	941
721	722	723	724	945	946	947	948
725	726	727	728	952	953	954	955
729	730	731	732	959	960	961	962
757	749	741	733	1257	1256	1255	1254
758	750	742	734	1250	1249	1248	1247
759	751	743	735	1243	1242	1241	1240
760	752	744	736	1236	1235	1234	1233
761	753	745	737	1229	1228	1227	1226
762	754	746	738	1222	1221	1220	1219
763	755	747	739	1215	1214	1213	1212
764	756	748	740	1208	1207	1206	1205

Patch 21

942	943	944	1590	1591
949	950	951	1598	1599
956	957	958	1606	1607
963	964	965	1614	1615
1253	1252	1251	1622	1623
1246	1245	1244	1630	1631
1239	1238	1237	1638	1639
1232	1231	1230	1646	1647
1225	1224	1223	1654	1655
1218	1217	1216	1662	1663
1211	1210	1209	1670	1671
1204	1203	1202	1678	1679

Patch 22

1592	1593	1594	1595	1596	1597
1600	1601	1602	1603	1604	1605
1608	1609	1610	1611	1612	1613
1616	1617	1618	1619	1620	1621
1624	1625	1626	1627	1628	1629
1632	1633	1634	1635	1636	1637
1640	1641	1642	1643	1644	1645
1648	1649	1650	1651	1652	1653
1656	1657	1658	1659	1660	1661
1664	1665	1666	1667	1668	1669
1672	1673	1674	1675	1676	1677
1680	1681	1682	1683	1684	1685

Patch 23

1390	1391	1392	1393
1398	1399	1400	1401
1406	1407	1408	1409
1414	1415	1416	1417
1422	1423	1424	1425
1430	1431	1432	1433
1438	1439	1440	1441
1446	1447	1448	1449
1454	1455	1456	1457
1462	1463	1464	1465
1517	1518	1519	1514
1509	1508	1507	1506
1501	1500	1499	1498
1492	1491	1490	
1484	1483	1482	
1476	1475	1474	

Patch 27

1397	1396	1395	1394
1405	1404	1403	1402
1413	1412	1411	1410
1421	1420	1419	1418
1429	1428	1427	1426
1437	1436	1435	1434
1445	1444	1443	1442
1453	1452	1451	1450
1461	1460	1459	1458
1469	1468	1467	1466
1519	1518	1517	1516
1504	1503	1502	1501
1494	1493	1492	1491
1484	1483	1482	1481
1474	1473	1472	1471

Patch 26

774	784	794
773	783	793
772	782	792
771	781	791
770	780	790
769	779	789
768	778	788
767	777	787
766	776	786
765	775	785
308	307	306
313	312	311
320	319	318
327	326	325
334	333	332
341	340	339

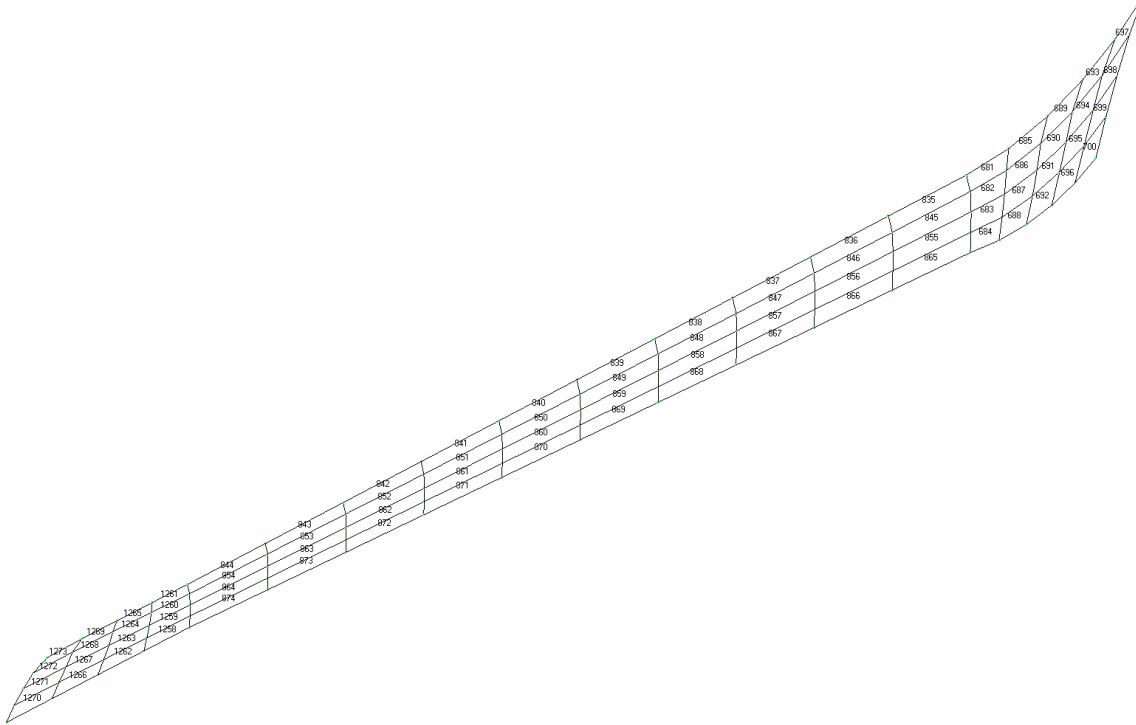
Patch 25

804	814	824	834
803	813	823	833
802	812	822	832
801	811	821	831
800	810	820	830
799	809	819	829
798	808	818	828
797	807	817	827
796	806	816	826
795	805	815	825
310	311	312	
316	317	318	319
322	323	324	325
328	329	330	331
334	335	336	337
340	341	342	343

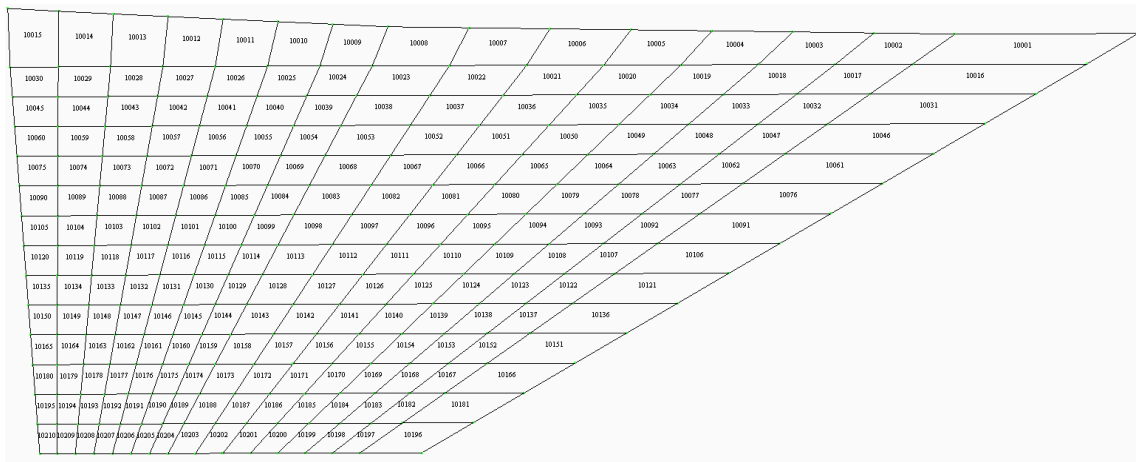
Patch 24

1858	1859	1860	1861
1866	1867	1868	1869
1874	1875	1876	1877
1882	1883	1884	1885

Patch 28



Patch 29



Patch 30

Figure 5.3. Individual view of the twenty nine patches

5.4 Thermal Structures for TPS Patches

Two sets of TPS structures are used for the Micro-X surface. The first one using 5 layers is for the nose (patch 1) and the wings (patches 10, 29 and 30), and the second one consisting of 4 layers is for the remaining patches.

The thermal structures specified for the first set TPS using the STTYPE numbers 11, 12, 13, 14, 15 are Thin skin, Radiation gap, Slab, Thin skin and Slab and the corresponding optimization materials are 256 (ACC(N)), 129 (ZIRCONIUM), 225 (LI-2200 (N)), 245 (RTV-560), 247 (LB SIP) and the maximum temperatures for these materials are: $3260^{\circ}R$, $3160^{\circ}R$, $1010^{\circ}R$ and $1060^{\circ}R$.

The structures specified for the second set TPS using the STTYPE numbers 21, 42, 23, 24 are Thin skin, Slab, Thin skin and Slab. The corresponding optimization materials are 221 (HRSI COAT), 224 (LI-900 (P)), 245 (RTV-560) and 247 (LB SIP) and the maximum temperatures for these materials are: $2760^{\circ}R$, $2760^{\circ}R$, $1010^{\circ}R$ and $1060^{\circ}R$.

No structure layers are defined for the TPS. That means that all layer's thickness may be changed during computation of optimization.

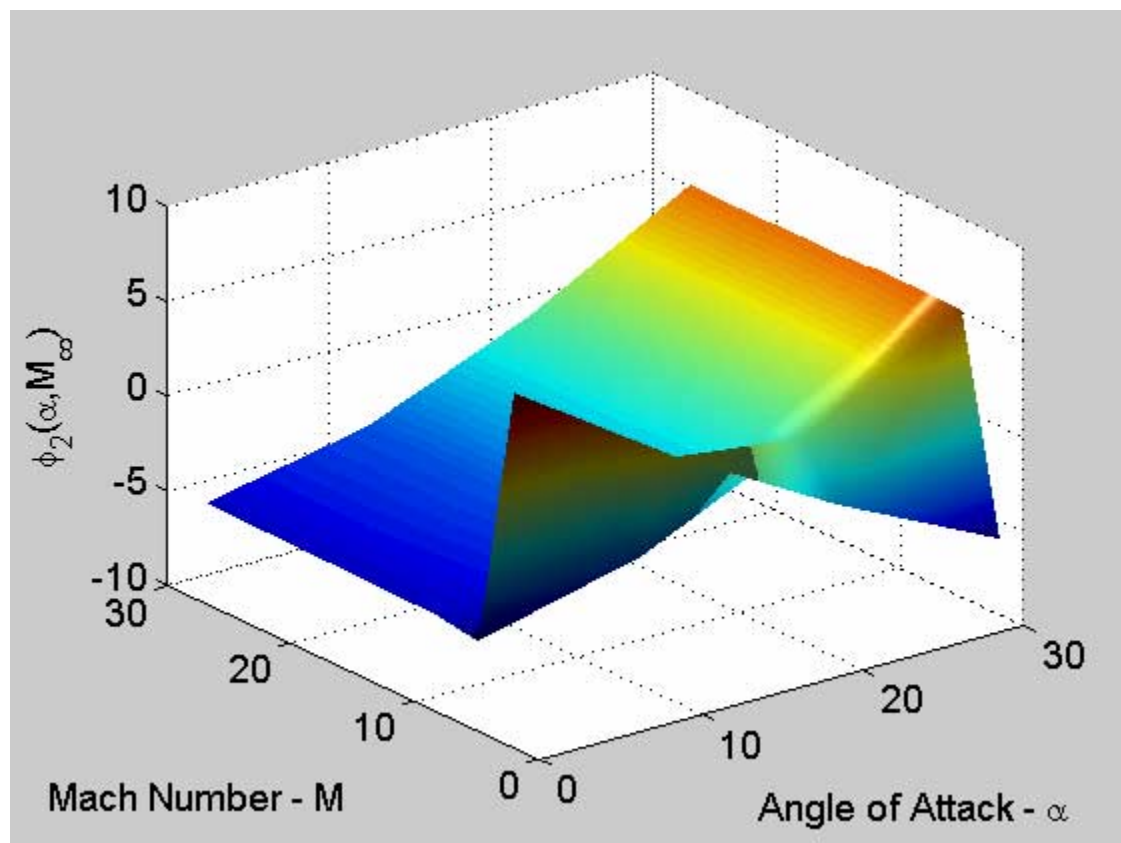
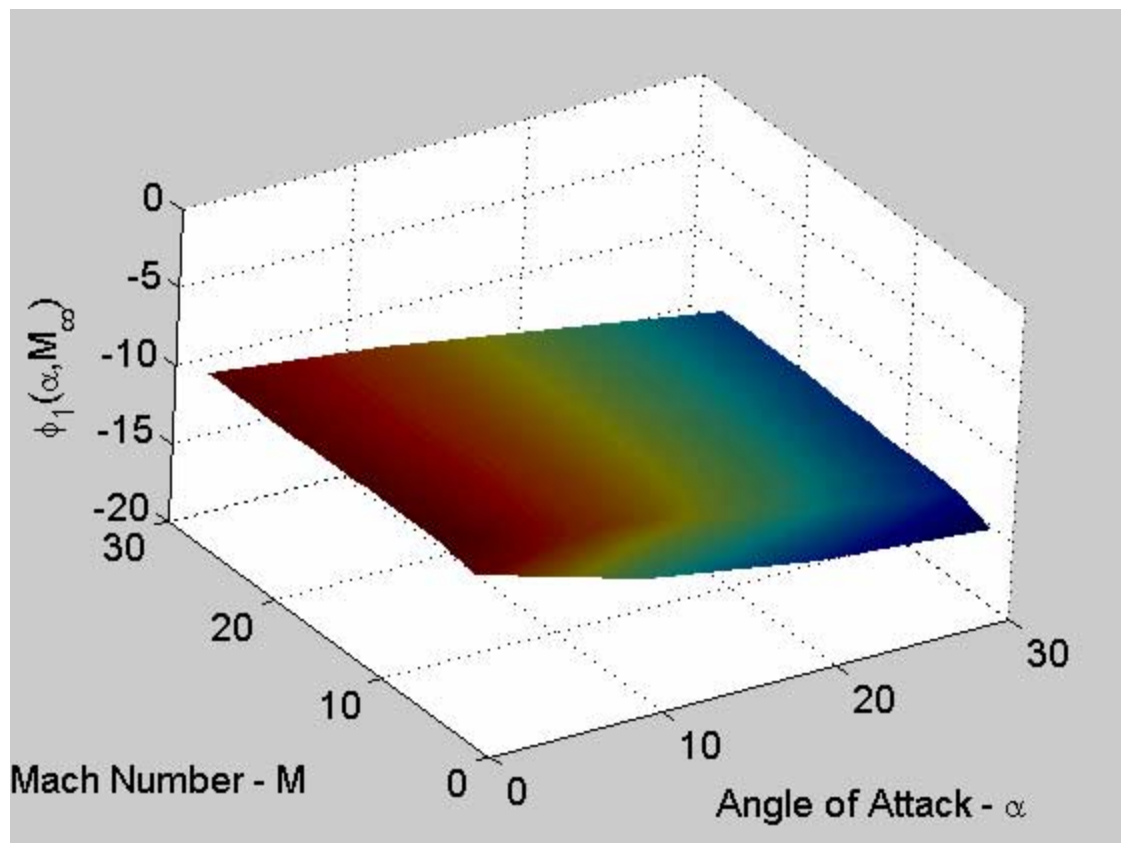
5.5 Output Information

The output information consists of the following items:

- (1) Response surface data of C_p and velocities for POD analysis (Tecplot files).
- (2) C_p and temperature data at specified times (Tecplot files).
- (3) Schematic plotting of trajectory related thermal quantities versus time over every patch. These quantities include enthalpy-based heat transfer coefficient, adiabatic wall enthalpy, and pressure.
- (4) Optimal thickness of each design layer and the ratio of the final objective function to that computed using the initial thickness.
- (5) Schematic plotting of optimal thickness and maximum temperature over each layer for every patch.
- (6) Optimal thickness data of each layer of each panel (Tecplot file).

5.6 Results

The output items listed in Section 5.5 have been stored in a ASCII text file and some plotting files. The test file is the Standard Output File (MICRO_X_TPS.OUT) which includes all the input information appearing in the Standard Input File (MICRO_X_TPS.INP) and items (3)-(5) listed in the above section. Figures 5.4-5.7 show the Response surfaces of C_p , C_p and temperature plottings at a specified time in the trajectory bulk data card, and the optimal thickness, respectively.



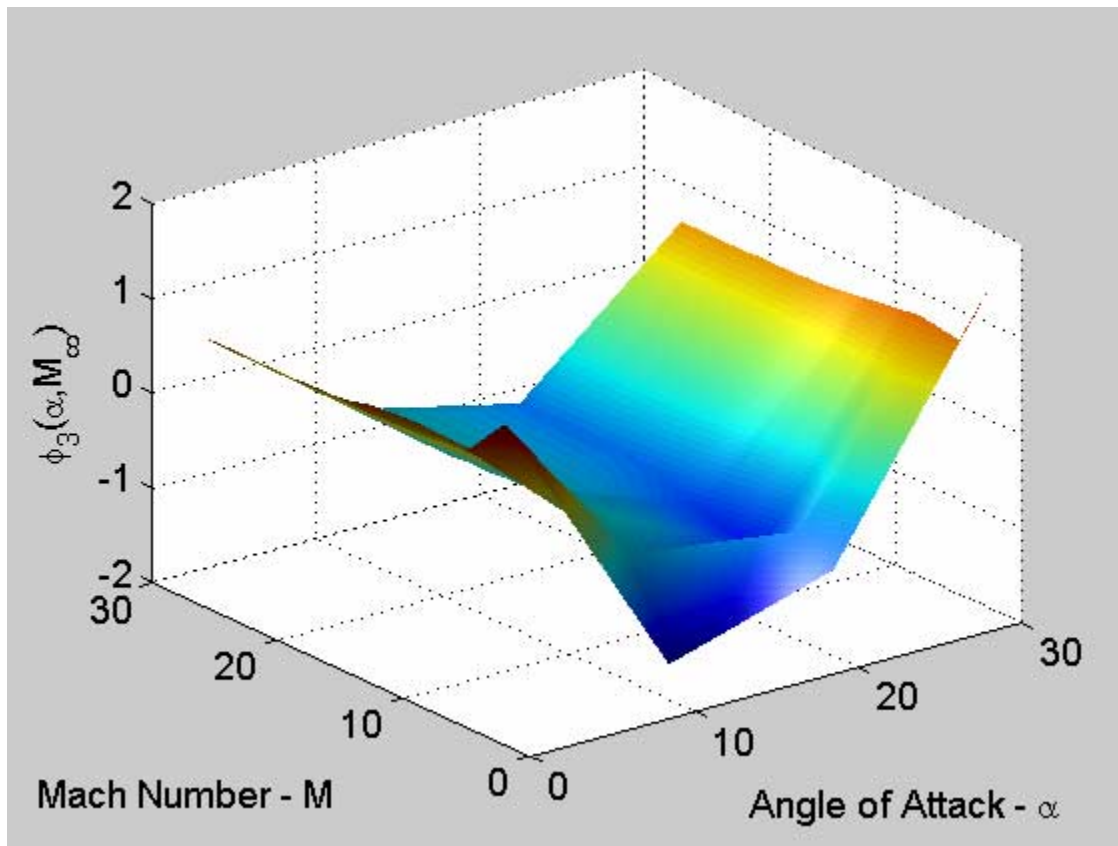


Figure 5.4. Response surfaces of the first three modes in POD analysis

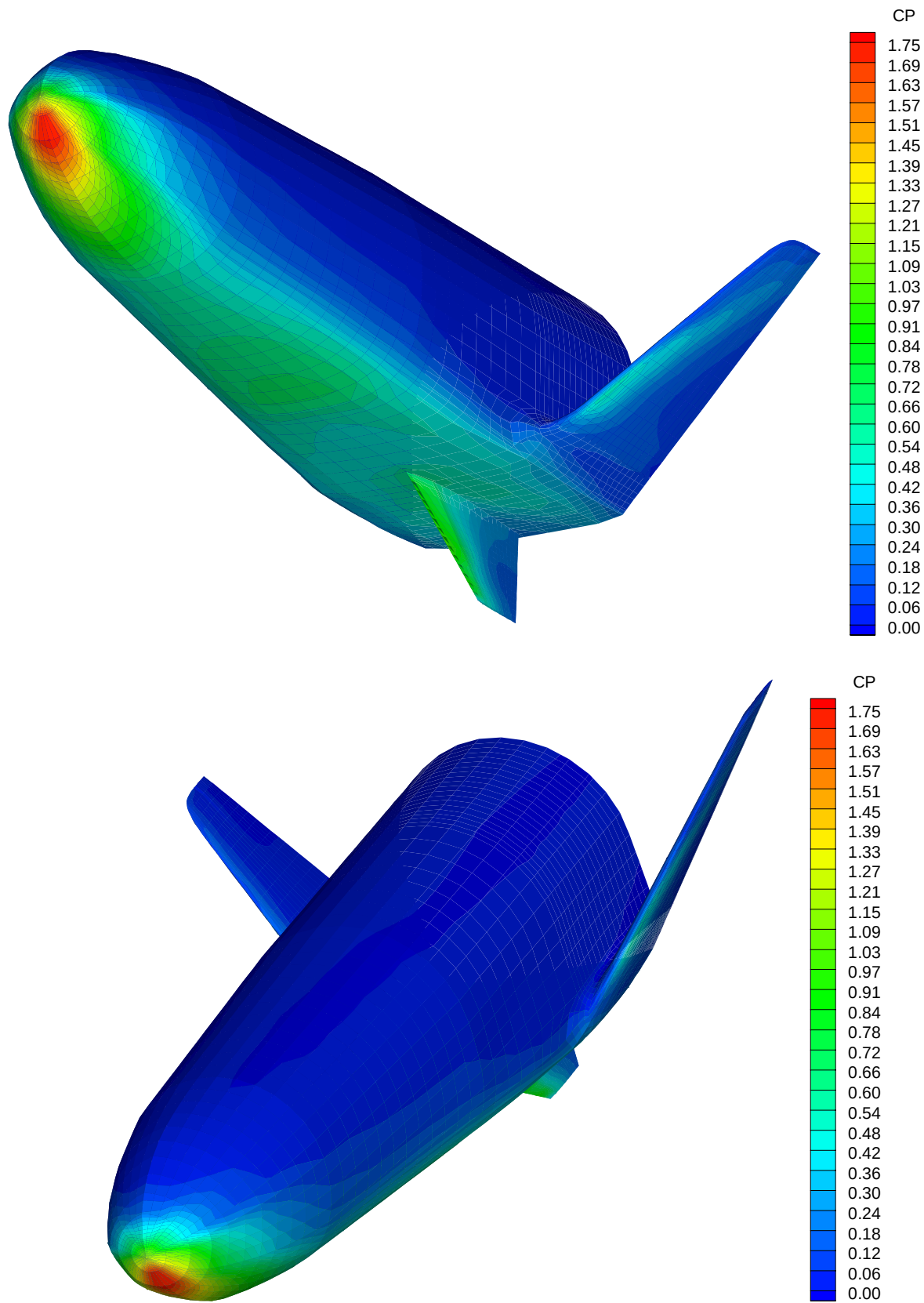


Figure 5.5. Plots of C_p at time=990 with $M=21.7$ and $AoA=30^\circ$

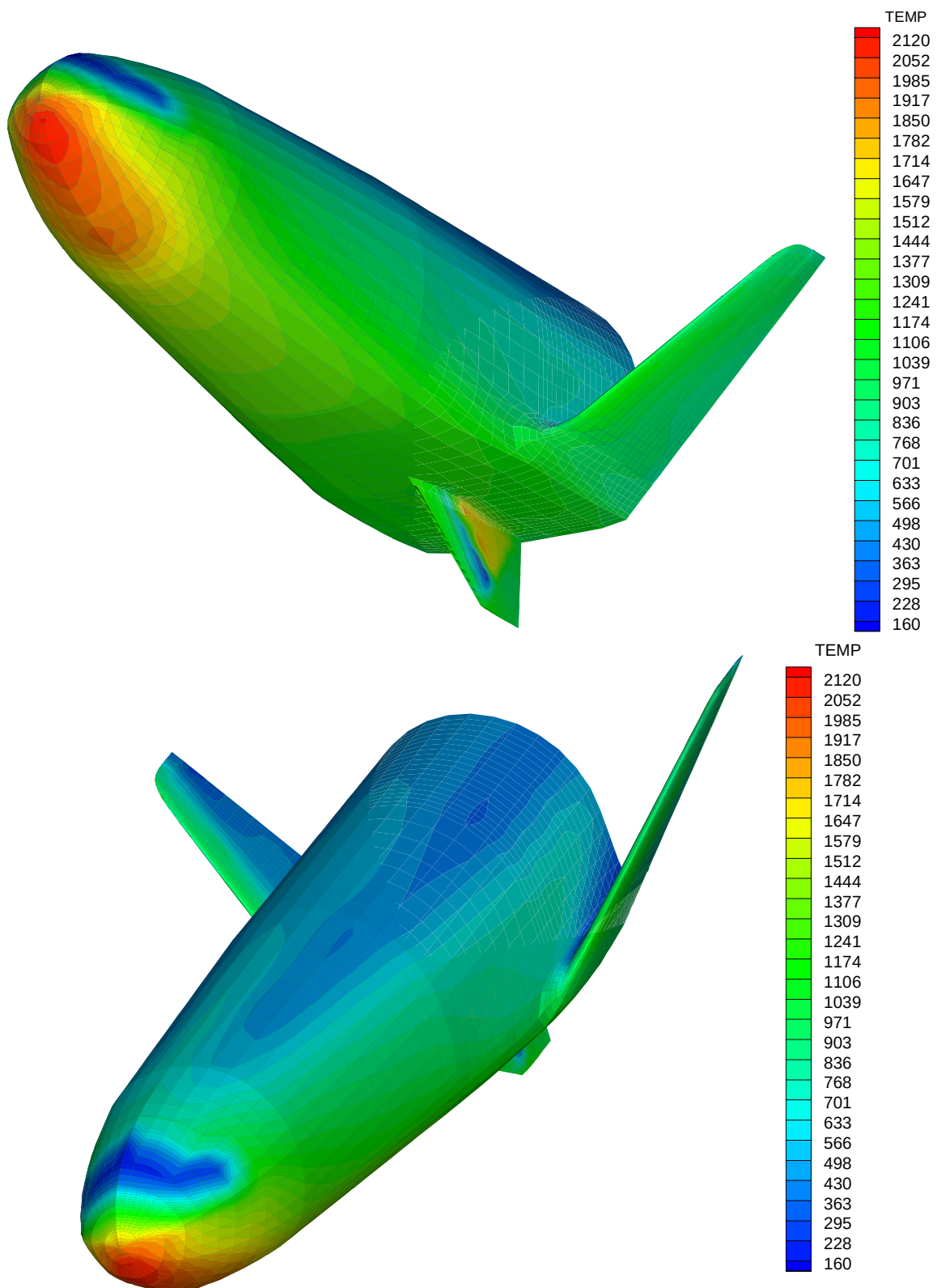
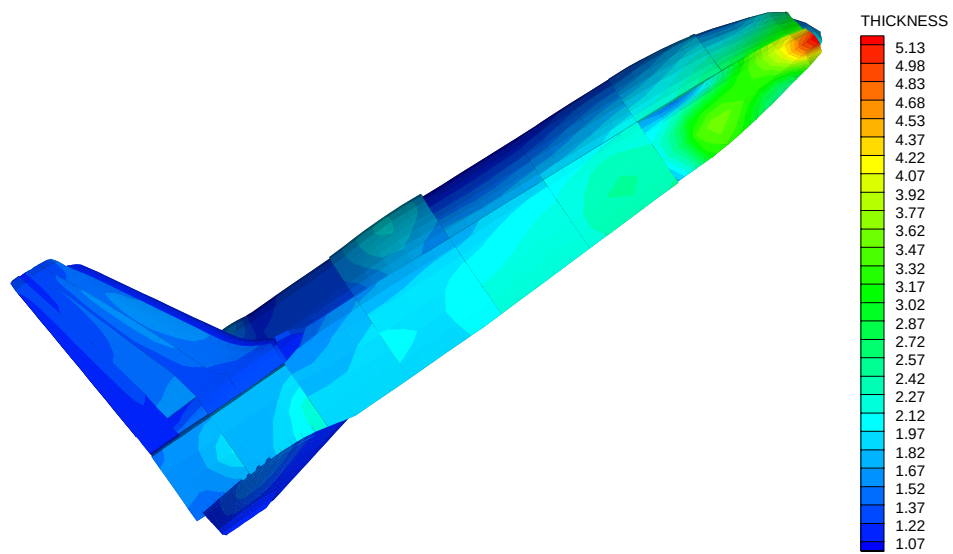
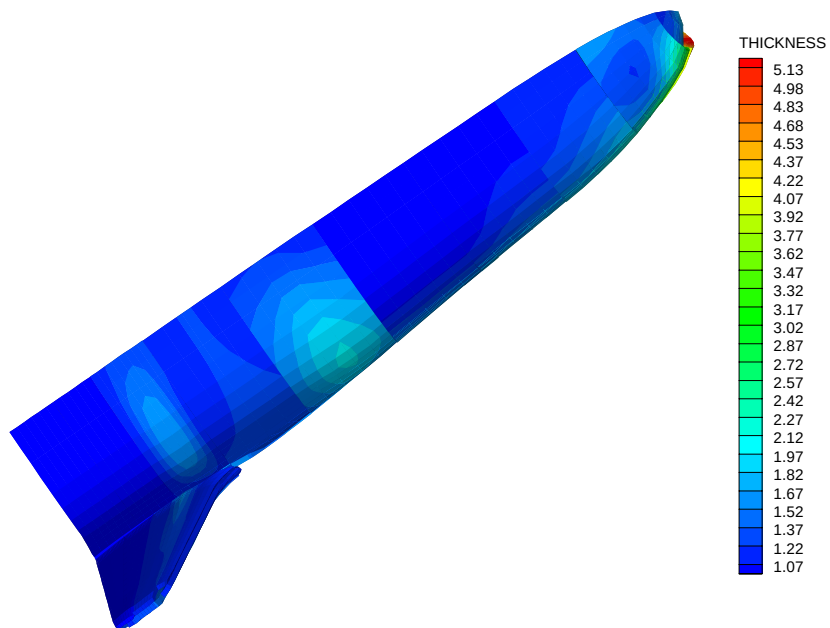


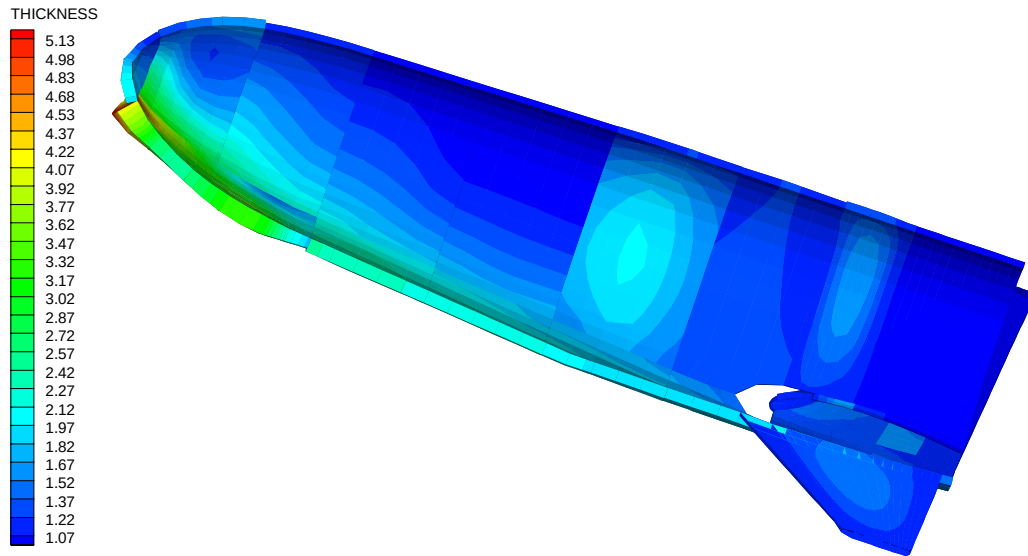
Figure 5.6. Plots of temperature at time=990 with $M=21.7$ and $AoA=30^\circ$



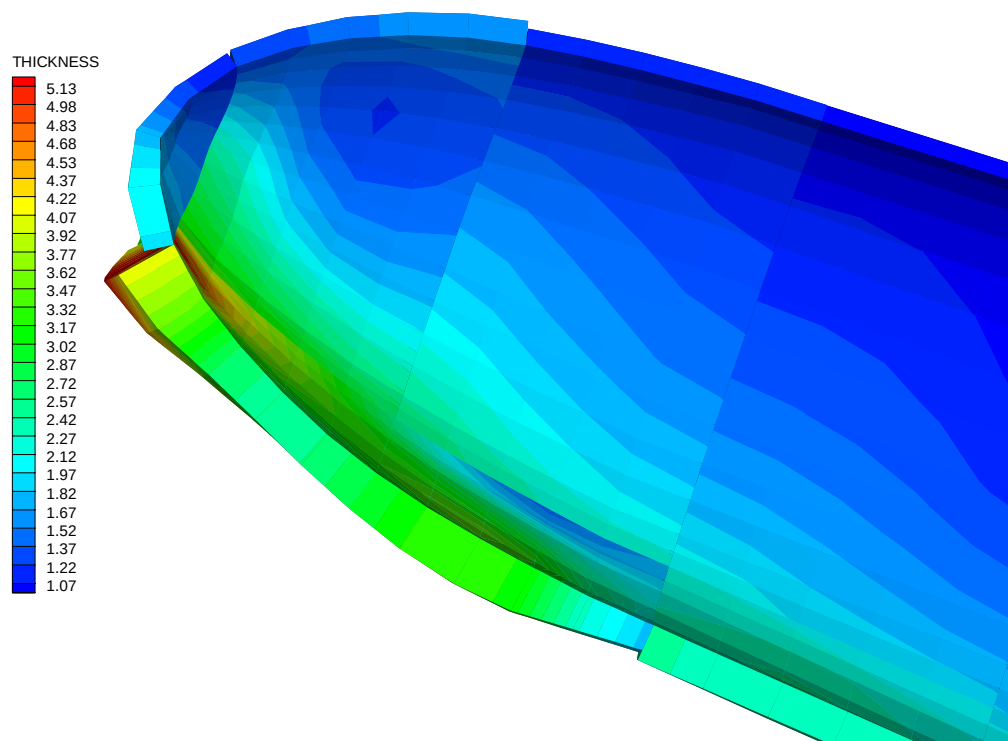
Windward surface



Leeward surface



Intersection view through middle vertical line



Enlarged intersection view

Figure 5.7. Optimal thickness plot (Thickness scaling factor=2.5)

5.7 Lists of Input and Output Files

Listing 5.1 Standard input File: MICRO_X_TPS.INP

```

ASSIGN AEROBASE='CTRTABLE.DAT',PRINT=0
$ Begin Executive Control Section
CEND
ECHO = SORT
SUBCASE = 1
    SUBTITLE=TPS OPTIMISATION FOR MICRO-X
    LABEL= HYPERSONIC AERODYNAMIC ANALYSIS
    TPSDES=1

$
BEGIN BULK
$
$ PLOTTING AERODYNAMIC MODEL
PLTAERO 1      YES    NO          TECPLOT MICRO_X_GEO.PLT
PLTAERO 1      YES    NO          NASTRAN MICRO_X_GEO.NAS
$ POLTTING TPS THICKNESS
PLTTPS  1      1      ALL      TECPLOT MICRO_X_HT.PLT  0.05
PLTTPS -2      1      ALL      TECPLOT MICRO_X_HT1.PLT -2.5
$
$TPSDES SETID  PODRSM  TRJLST  IFPREH  IDFEM/TPSSYM
TPSDES  1      1      1      2
CONT    1      2      30      4      5      6      7      8      CONT
CONT    9      10     11     12     13     14     15     16     CONT
CONT    17     18     19     20     21     22     23     24     CONT
CONT    25     26     27     28     29
$PODRSM |TPSDES |METHOD |NRDMOD |TOLER |NEURON |SAVE |FILENM
PODRSM  1      1
CONT    CPPODRSM.P3D  UPODRSM.P3D  VPODRSM.P3D  WPODRSM.P3D  CONT
$
$      THERMAL STRUCTURES FOR NOSE SECTION
STTYPE  11     6      256
CONT    0.03
STTYPE  12     2      129      129
CONT    0.03    0.03    0.5
STTYPE  13     1      225
CONT    2.0
STTYPE  14     6      245
CONT    0.008
STTYPE  15     1      247
CONT    0.16
STTYPE  21     6      221
CONT    0.05
STTYPE  22     1      225
CONT    3.0
STTYPE  23     6      245
CONT    0.008
STTYPE  24     1      247
CONT    0.16
STTYPE  42     1      224
CONT    3.0
$TPSSYM SETID  IDPATCH  NLAYER
TPSSYM  1      1      5      4
CONT    1      11     0.01    2.
CONT    1      12     0.01    1.28333
CONT    1      13     1.0     10.
CONT    1      14     0.001   1.28333
CONT    1      15     0.05    1.28333
TPSSYM  2      2      4
CONT    2      21     0.01    2.
CONT    2      22     1.      10.
CONT    2      23     0.001   1.5
CONT    2      24     0.05    1.28333
TPSSYM  4      4      4
CONT    4      21     0.01    2.

```

CONT	4	42	1.0	10.	CONT
CONT	4	23	0.001	1.5	CONT
CONT	4	24	0.05	1.4	
TPSSYM	5	5	4	4	CONT
CONT	5	21	0.01	2.	CONT
CONT	5	42	1.0	10.	CONT
CONT	5	23	0.001	1.5	CONT
CONT	5	24	0.05	1.4	
TPSSYM	6	6	4	4	CONT
CONT	6	21	0.01	2.	CONT
CONT	6	42	1.0	10.	CONT
CONT	6	23	0.001	1.5	CONT
CONT	6	24	0.05	1.4	
TPSSYM	7	7	4	4	CONT
CONT	7	21	0.01	2.	CONT
CONT	7	42	1.0	10.	CONT
CONT	7	23	0.001	1.5	CONT
CONT	7	24	0.05	1.4	
TPSSYM	8	8	4	4	CONT
CONT	8	21	0.01	2.	CONT
CONT	8	42	1.0	10.	CONT
CONT	8	23	0.001	1.5	CONT
CONT	8	24	0.05	1.4	
TPSSYM	9	9	4	4	CONT
CONT	9	21	0.01	2.	CONT
CONT	9	42	1.0	10.	CONT
CONT	9	23	0.001	1.5	CONT
CONT	9	24	0.05	1.4	
TPSSYM	10	10	5	4	CONT
CONT	10	11	0.01	2.	CONT
CONT	10	12	0.01	1.28333	CONT
CONT	10	13	1.0	10.	CONT
CONT	10	14	0.001	1.28333	CONT
CONT	10	15	0.05	1.28333	
TPSSYM	11	11	4	4	CONT
CONT	11	21	0.01	2.	CONT
CONT	11	42	1.0	10.	CONT
CONT	11	23	0.001	1.5	CONT
CONT	11	24	0.05	1.4	
TPSSYM	12	12	4	4	CONT
CONT	12	21	0.01	2.	CONT
CONT	12	42	1.0	10.	CONT
CONT	12	23	0.001	1.5	CONT
CONT	12	24	0.05	1.4	
TPSSYM	13	13	4	4	CONT
CONT	13	21	0.01	2.	CONT
CONT	13	42	1.0	10.	CONT
CONT	13	23	0.001	1.5	CONT
CONT	13	24	0.05	1.4	
TPSSYM	14	14	4	4	CONT
CONT	14	21	0.01	2.	CONT
CONT	14	42	1.0	10.	CONT
CONT	14	23	0.001	1.5	CONT
CONT	14	24	0.05	1.4	
TPSSYM	15	15	4	4	CONT
CONT	15	21	0.01	2.	CONT
CONT	15	42	1.0	10.	CONT
CONT	15	23	0.001	1.5	CONT
CONT	15	24	0.05	1.4	
TPSSYM	16	16	4	4	CONT
CONT	16	21	0.01	2.	CONT
CONT	16	42	1.0	10.	CONT
CONT	16	23	0.001	1.5	CONT
CONT	16	24	0.05	1.4	
TPSSYM	17	17	4	4	CONT
CONT	17	21	0.01	2.	CONT
CONT	17	42	1.0	10.	CONT
CONT	17	23	0.001	1.5	CONT
CONT	17	24	0.05	1.4	
TPSSYM	18	18	4	4	CONT
CONT	18	21	0.01	2.	CONT

CONT	18	42	1.0	10.			CONT
CONT	18	23	0.001	1.5			CONT
CONT	18	24	0.05	1.4			
TPSSYM	19	19	4	4			CONT
CONT	19	21	0.01	2.			CONT
CONT	19	42	1.0	10.			CONT
CONT	19	23	0.001	1.5			CONT
CONT	19	24	0.05	1.4			
TPSSYM	20	20	4	4			CONT
CONT	20	21	0.01	2.			CONT
CONT	20	42	1.0	10.			CONT
CONT	20	23	0.001	1.5			CONT
CONT	20	24	0.05	1.4			
TPSSYM	21	21	4	4			CONT
CONT	21	21	0.01	2.			CONT
CONT	21	42	1.0	10.			CONT
CONT	21	23	0.001	1.5			CONT
CONT	21	24	0.05	1.4			
TPSSYM	22	22	4	4			CONT
CONT	22	21	0.01	2.			CONT
CONT	22	42	1.0	10.			CONT
CONT	22	23	0.001	1.5			CONT
CONT	22	24	0.05	1.4			
TPSSYM	23	23	4	4			CONT
CONT	23	21	0.01	2.			CONT
CONT	23	42	1.0	10.			CONT
CONT	23	23	0.001	1.5			CONT
CONT	23	24	0.05	1.4			
\$							
TPSSYM	24	24	4	4			CONT
CONT	24	21	0.01	2.			CONT
CONT	24	42	1.0	10.			CONT
CONT	24	23	0.001	1.5			CONT
CONT	24	24	0.05	1.4			
TPSSYM	25	25	4	4			CONT
CONT	25	21	0.01	2.			CONT
CONT	25	42	1.0	10.			CONT
CONT	25	23	0.001	1.5			CONT
CONT	25	24	0.05	1.4			
TPSSYM	26	26	4	4			CONT
CONT	26	21	0.01	2.			CONT
CONT	26	42	1.0	10.			CONT
CONT	26	23	0.001	1.5			CONT
CONT	26	24	0.05	1.4			
TPSSYM	27	27	4	4			CONT
CONT	27	21	0.01	2.			CONT
CONT	27	42	1.0	10.			CONT
CONT	27	23	0.001	1.5			CONT
CONT	27	24	0.05	1.4			
TPSSYM	28	28	4	4			CONT
CONT	28	21	0.01	2.			CONT
CONT	28	42	1.0	10.			CONT
CONT	28	23	0.001	1.5			CONT
CONT	28	24	0.05	1.4			
TPSSYM	29	29	5	4			CONT
CONT	29	11	0.01	2.			CONT
CONT	29	12	0.01	1.28333			CONT
CONT	29	13	1.0	10.			CONT
CONT	29	14	0.001	1.28333			CONT
CONT	29	15	0.05	1.28333			
TPSSYM	30	30	5	4			CONT
CONT	30	11	0.01	2.			CONT
CONT	30	12	0.01	1.28333			CONT
CONT	30	13	1.0	10.			CONT
CONT	30	14	0.001	1.28333			CONT
CONT	30	15	0.05	1.28333			
\$							
PRVAL	4						
\$							
\$PATCH	ID	RHSPAN	RHSHOT	SYMY	YVAL	TIMESP	
PATCH	1	1	101				

```

$
$ ALL PANELS for Patch 1
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      1      1      2      3      4      50      60+PN1101
+PN1101      70      80      90      100     110     120     130     140+PN1102
+PN1102      150     160     170     180     190     200     201     202+PN1103
+PN1103      203     204     205     206     207     208     209     210+PN1104
+PN1104      211     212     213     214     215     216     217     218+PN1105
+PN1105      219     220
$
$ DESVAR for Patch 1
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
DESVAR      1      2      3
            130     201
            90      209
            4      220
$ HOT PANELS FOR Patch 1
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      101      130     201     90      209      4      220 CONT
CONT          170
$
PATCH      2      2      102
$
$ PANLST2 for Patch 2 (+3)
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      2      5      6      7      8      9      10+PN1201
+PN1201      11      12      13      14      15      16      17      18+PN1202
+PN1202      19      20      21      22      23      24      65      66+PN1203
+PN1203      67      68      69      75      76      77      78      79 CONT
CONT          25      26      27      28      29      30      31      32 CONT
CONT          33      34      35      36      37      38      39      40 CONT
CONT          61      62      63      64      71      72      73      74 CONT
CONT          365     377     413     425     437     449
$
$ DESVAR for Patch 2
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
DESVAR      2      3      4      CONT
CONT          8      6      69      CONT
CONT          20     18      66      CONT
CONT          32     30      63      CONT
CONT          413     437     377
$
PATCH      4      4      104      1
$
$ PANLST2 for Patch 4
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      4      366     367     368     369     370     378+PN1401
+PN1401      379     380     381     382     414     415     416     417+PN1402
+PN1402      418     426     427     428     429     430     438     439+PN1403
+PN1403      440     441     442     450     451     452     453     454
$
$ DESVAR for Patch 4
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
DESVAR      4      3      3      +DE1401
+DE1401      418     416     414      +DE1402
+DE1402      442     440     438      +DE1403
+DE1403      382     380     378
PATCH      5      5      105      1
$
$ PANLST2 for Patch 5
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      5      371     372     373     374     375     383+PN1501
+PN1501      384     385     386     387     419     420     421     422+PN1502
+PN1502      423     431     432     433     434     435     443     444+PN1503
+PN1503      445     446     447     455     456     457     458     459
$
$ DESVAR for Patch 5
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
DESVAR      5      3      3      +DE1501
+DE1501      423     421     419      +DE1502
+DE1502      447     445     443      +DE1503

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+DE1503      387      385      383
$
PATCH      6          6          106                      1
$
$ PANLST2 for Patch 6
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      6          376      388      424      436      448      460+PN1601
+PN1601      511      512      515      516      519      520      523      524+PN1602
+PN1602      1937     1938     1939     1940     1941     1942     1943     1944+PN1603
+PN1603      1945     1946     1947     1948     1949     1950     1951     1952
$ DESVAR for Patch 6
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
DESVAR      6          3          3                      +DE1601
+DE1601      1949     1951     424                      +DE1602
+DE1602      1941     1943     448                      +DE1603
+DE1603      523      515      388
PATCH      7          7          107                      1
$
$ PANLST2 for Patch 7
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      7          613      614      615      616      617      618+PN1701
+PN1701      619      620      621      622      623      624      625      626+PN1702
+PN1702      627      628      629      630      631      632      633      634+PN1703
+PN1703      635      636      1936
$
$ DESVAR for Patch 7
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
DESVAR      7          3          3                      +DE1701
+DE1701      633      635      636                      +DE1702
+DE1702      625      627      628                      +DE1703
+DE1703      613      615      616
PATCH      8          8          108                      1
$
$ PANLST2 for Patch 8
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      8          1174     1175     1176     1177     1178     1179+PN1801
+PN1801      1180     1181     1182     1183     1184     1185     1186     1187+PN1802
+PN1802      1188     1189     1190     1191     1192     1193     1194     1195+PN1803
+PN1803      1196     1197     1198     1199     1200     1201
$
$ DESVAR for Patch 8
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
DESVAR      8          3          3                      +DE1801
+DE1801      1195     1198     1201                      +DE1802
+DE1802      1181     1184     1187                      +DE1803
+DE1803      1174     1177     1180
PATCH      9          9          109                      1
$
$ PANLST2 for Patch 9
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      9          1886     1887     1888     1889     1890     1891+PN1901
+PN1901      1892     1893     1894     1895     1896     1897     1898     1899+PN1902
+PN1902      1900     1901     1902     1903     1904     1905     1906     1907+PN1903
+PN1903      1908     1909     1910     1911     1912     1913     1914     1915+PN1904
+PN1904      1916     1917
$
$ DESVAR for Patch 9
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
DESVAR      9          3          3                      +DE1901
+DE1901      1910     1914     1917                      +DE1902
+DE1902      1894     1898     1901                      +DE1903
+DE1903      1886     1890     1893
PATCH     10          10          110                      1
$
$ PANLST2 for Patch 10
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2     10          661      662      663      664      665      666+CON
+CON          667      668      669      670      671      672      673      674+CON
+CON          675      676      677      678      679      680      1001     1002+CON
+CON          1003     1004     1005     1006     1007     1008     1009     1010+CON
+CON          1011     1012     1013     1014     1015     1016     1017     1018+CON

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+CON      1019    1020    1021    1022    1023    1024    1025    1026+CON
+CON      1027    1028    1029    1030    1031    1032    1033    1034+CON
+CON      1035    1036    1037    1038    1039    1040    1290    1291+CON
+CON      1292    1293    1294    1295    1296    1297    1298    1299+CON
+CON      1300    1301    1302    1303    1304    1305
$
$ DESVAR for Patch 10
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
DESVAR      10      4      4                                     +DE2001
+DE2001     1290     1291     1292     1293                                     +DE2002
+DE2002     1017     1018     1019     1020                                     +DE2003
+DE2003     1037     1038     1039     1040                                     +DE2004
+DE2004      677      678      679      680
$
PATCH      29      29      129      1
$ DESVAR for Patch 29
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
DESVAR      29      4      4                                     +DE2001
+DE2001     1273     1272     1271     1270                                     +DE2002
+DE2002      840      850      860      870                                     +DE2003
+DE2003      835      845      855      865                                     +DE2004
+DE2004      697      698      699      700
$ PANLST2 for Patch 29
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
PANLST2      29      681      682      683      684      685      686+CON
+CON      687      688      689      690      691      692      693      694+CON
+CON      695      696      697      698      699      700      835      836+CON
+CON      837      838      839      840      841      842      843      844+CON
+CON      845      846      847      848      849      850      851      852+CON
+CON      853      854      855      856      857      858      859      860+CON
+CON      861      862      863      864      865      866      867      868+CON
+CON      869      870      871      872      873      874      1258     1259+CON
+CON      1260     1261     1262     1263     1264     1265     1266     1267+CON
+CON      1268     1269     1270     1271     1272     1273
PATCH      30      30      130      1
$ DESVAR for Patch 30
DESVAR      30      3      3                                     +DE2001
+DE2001    10210     10201     10196                                     +DE2002
+DE2002    10105     10096     10091                                     +DE2003
+DE2003    10015     10006     10001
$ PANLST2 for Patch 30
PANLST2      30      10001     10002     10003     10004     10005     10006+CON
+CON      10007     10008     10009     10010     10011     10012     10013     10014+CON
+CON      10015     10016     10017     10018     10019     10020     10021     10022+CON
+CON      10023     10024     10025     10026     10027     10028     10029     10030+CON
+CON      10031     10032     10033     10034     10035     10036     10037     10038+CON
+CON      10039     10040     10041     10042     10043     10044     10045     10046+CON
+CON      10047     10048     10049     10050     10051     10052     10053     10054+CON
+CON      10055     10056     10057     10058     10059     10060     10061     10062+CON
+CON      10063     10064     10065     10066     10067     10068     10069     10070+CON
+CON      10071     10072     10073     10074     10075     10076     10077     10078+CON
+CON      10079     10080     10081     10082     10083     10084     10085     10086+CON
+CON      10087     10088     10089     10090     10091     10092     10093     10094+CON
+CON      10095     10096     10097     10098     10099     10100     10101     10102+CON
+CON      10103     10104     10105     10106     10107     10108     10109     10110+CON
+CON      10111     10112     10113     10114     10115     10116     10117     10118+CON
+CON      10119     10120     10121     10122     10123     10124     10125     10126+CON
+CON      10127     10128     10129     10130     10131     10132     10133     10134+CON
+CON      10135     10136     10137     10138     10139     10140     10141     10142+CON
+CON      10143     10144     10145     10146     10147     10148     10149     10150+CON
+CON      10151     10152     10153     10154     10155     10156     10157     10158+CON
+CON      10159     10160     10161     10162     10163     10164     10165     10166+CON
+CON      10167     10168     10169     10170     10171     10172     10173     10174+CON
+CON      10175     10176     10177     10178     10179     10180     10181     10182+CON
+CON      10183     10184     10185     10186     10187     10188     10189     10190+CON
+CON      10191     10192     10193     10194     10195     10196     10197     10198+CON
+CON      10199     10200     10201     10202     10203     10204     10205     10206+CON
+CON      10207     10208     10209     10210     10421     10422     10423     10424+CON
+CON      10425     10426     10427     10428     10429     10430     10431     10432+CON
+CON      10433     10434     10435
$

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PATCH 11      11      111      1
$ PANLST2 for Patch 11
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
PANLST2      11      1071      1072      1073      1074      1075      1076+PN2101
+PN2101      1077      1078      1079      1080      1081      1082      1083      1084+PN2102
+PN2102      1085      1086      1087      1088      1089      1090      1091      1092+PN2103
+PN2103      1093      1094      1095      1096      1097      1098      1099      1100+PN2104
+PN2104      1101      1102      1103      1104      1105      1106      1107      1108+PN2105
+PN2105      1109      1110      1126      1127      1128      1129      1130      1131+PN2106
+PN2106      1132      1133      1134      1135      1136      1137      1138      1139+PN2107
+PN2107      1140      1141      1142      1143      1144      1145      1158      1159+PN2108
+PN2108      1160      1161      1162      1163      1164      1165      1166      1167+PN2109
+PN2109      1168      1169      1170      1171      1172      1173      1348      1349+PN2110
+PN2110      1350      1351      1355      1356      1357      1358      1362      1363+PN2111
+PN2111      1364      1365      1369      1370      1371      1372      1376      1377+PN2112
+PN2112      1378      1379      1383      1384      1385      1386
$
$ DESVAR for Patch 11
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
DESVAR      11      3      3      +DE2101
+DE2101      1383      1385      1386      +DE2102
+DE2102      1107      1087      1077      +DE2103
+DE2103      1141      1131      1126
PATCH 12      12      112      1
$
$ PANLST2 for Patch 12
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
PANLST2      12      1041      1042      1043      1044      1045      1046+PN2201
+PN2201      1047      1048      1049      1050      1051      1052      1053      1054+PN2202
+PN2202      1055      1056      1057      1058      1059      1060      1061      1062+PN2203
+PN2203      1063      1064      1065      1066      1067      1068      1069      1070+PN2204
+PN2204      1111      1112      1113      1114      1115      1116      1117      1118+PN2205
+PN2205      1119      1120      1121      1122      1123      1124      1125      1146+PN2206
+PN2206      1147      1148      1149      1150      1151      1152      1153      1154+PN2207
+PN2207      1155      1156      1157      1352      1353      1354      1359      1360+PN2208
+PN2208      1361      1366      1367      1368      1373      1374      1375      1380+PN2209
+PN2209      1381      1382      1387      1388      1389
$
$ DESVAR for Patch 12
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
DESVAR      12      3      3      +DE2201
+DE2201      1387      1388      1389      +DE2202
+DE2202      1067      1057      1047      +DE2203
+DE2203      1121      1116      1111
$
PATCH 13      13      113
$ PANLST2 for Patch 13
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
PANLST2      13      1686      1687      1688      1689      1694      1695+CON
+CON      1696      1697      1702      1703      1704      1705      1710      1711+CON
+CON      1712      1713      1718      1719      1720      1721      1726      1727+CON
+CON      1728      1729      1734      1735      1736      1737      1742      1743+CON
+CON      1744      1745      1750      1751      1752      1753      1758      1759+CON
+CON      1760      1761      1766      1767      1768      1769      1774      1775+CON
+CON      1776      1777      1782      1783      1784      1785      1790      1791+CON
+CON      1792      1793      1798      1799      1800      1801      1806      1807+CON
+CON      1808      1809      1814      1815      1816      1817      1822      1823+CON
+CON      1824      1825      1830      1831      1832      1833      1838      1839+CON
+CON      1840      1841      1846      1847      1848      1849
$
$ DESVAR for Patch 13
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
DESVAR      13      3      3      +DE2301
+DE2301      1806      1808      1809      +DE2302
+DE2302      1734      1736      1737      +DE2303
+DE2303      1814      1816      1817
PATCH 14      14      114      1
$
$ PANLST2 for Patch 14
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
PANLST2      14      1690      1691      1692      1693      1698      1699+PN2401

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+PN2401      1700      1701      1706      1707      1708      1709      1714      1715+PN2402
+PN2402      1716      1717      1722      1723      1724      1725      1730      1731+PN2403
+PN2403      1732      1733      1738      1739      1740      1741      1746      1747+PN2404
+PN2404      1748      1749      1754      1755      1756      1757      1762      1763+PN2405
+PN2405      1764      1765      1770      1771      1772      1773      1778      1779+PN2406
+PN2406      1780      1781      1786      1787      1788      1789      1794      1795+PN2407
+PN2407      1796      1797      1802      1803      1804      1805      1810      1811+PN2408
+PN2408      1812      1813      1818      1819      1820      1821      1826      1827+PN2409
+PN2409      1828      1829      1834      1835      1836      1837      1842      1843+PN2410
+PN2410      1844      1845      1850      1851      1852      1853      1854      1855+PN2411
+PN2411      1856      1857      1862      1863      1864      1865      1870      1871+PN2412
+PN2412      1872      1873      1878      1879      1880      1881      1929      1930+PN2413
+PN2413      1931      1933
$
$ DESVAR for Patch 14
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
DESVAR          14          3          3                                     +DE2401
+DE2401        1810        1812        1813                                     +DE2402
+DE2402        1738        1740        1741                                     +DE2403
+DE2403        1818        1820        1821
PATCH    15          15          115                                     1
$
$ PANLST2 for Patch 15
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
PANLST2        15          45          46          47          48          49          55+PN2501
+PN2501        56          57          58          59          85          86          87          88+PN2502
+PN2502        89          95          96          97          98          99          105         106+PN2503
+PN2503        107         108         109         115         116         117         118         119+PN2504
+PN2504        125         126         127         128         129         135         136         137+PN2505
+PN2505        138         139         145         146         147         148         149         155+PN2506
+PN2506        156         157         158         159         165         166         167         168+PN2507
+PN2507        169         175         176         177         178         179         185         186+PN2508
+PN2508        187         188         189         195         196         197         198         199
$
$ DESVAR for Patch 15
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
DESVAR          15          3          3                                     +DE2501
+DE2501        55          57          59                                     +DE2502
+DE2502        195         197         199                                     +DE2503
+DE2503        125         127         129
$
PATCH    16          16          116                                     1
$
$ PANLST2 for Patch 16
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
PANLST2        16          41          42          43          44          51          52+PN2601
+PN2601        53          54          81          82          83          84          91          92+PN2602
+PN2602        93          94          101         102         103         104         111         112+PN2603
+PN2603        113         114         121         122         123         124         131         132+PN2604
+PN2604        133         134         141         142         143         144         151         152+PN2605
+PN2605        153         154         161         162         163         164         171         172+PN2606
+PN2606        173         174         181         182         183         184         191         192+PN2607
+PN2607        193         194         309         310         311         312         313         314+PN2608
+PN2608        315         316         317         329         341         353         389         401
$ DESVAR for Patch 16
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
DESVAR          16          3          3                                     +DE2601
+DE2601        389         52          54                                     +DE2602
+DE2602        309         192         194                                     +DE2603
+DE2603        316         122         124
PATCH    17          17          117                                     1
$
$ PANLST2 for Patch 17
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
PANLST2        17          269         270         271         272         273         274+PN2701
+PN2701        275         276         277         278         279         280         281         282+PN2702
+PN2702        283         284         285         286         287         288         289         290+PN2703
+PN2703        291         292         293         294         295         296         297         298+PN2704
+PN2704        299         300         301         302         303         304         305         306+PN2705
+PN2705        307         308         318         319         320         321         322         330+PN2706
+PN2706        331         332         333         334         342         343         344         345+PN2707

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+PN2707      346      354      355      356      357      358      390      391+PN2708
+PN2708      392      393      394      402      403      404      405      406
$
$ DESVAR for Patch 17
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
DESVAR      17      3      3
+DE2701      394      392      390
+DE2702      269      285      301
+DE2703      276      292      308
$
PATCH      18      18      118      1
$
$ PANLST2 for Patch 18
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
PANLST2      18      229      230      231      232      233      234+PN2801
+PN2801      235      236      237      238      239      240      241      242+PN2802
+PN2802      243      244      245      246      247      248      249      250+PN2803
+PN2803      251      252      253      254      255      256      257      258+PN2804
+PN2804      259      260      261      262      263      264      265      266+PN2805
+PN2805      267      268      323      324      325      326      327      335+PN2806
+PN2806      336      337      338      339      347      348      349      350+PN2807
+PN2807      351      359      360      361      362      363      395      396+PN2808
+PN2808      397      398      399      407      408      409      410      411
$ DESVAR for Patch 18
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
DESVAR      18      3      3
+DE2801      399      397      395
+DE2802      229      245      261
+DE2803      236      252      268
PATCH      19      19      119      1
$
$ PANLST2 for Patch 19
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
PANLST2      19      221      222      223      224      225      226+PN2901
+PN2901      227      228      328      340      352      364      400      412+PN2902
+PN2902      461      462      463      464      465      466      467      468+PN2903
+PN2903      469      470      471      472      473      474      475      476+PN2904
+PN2904      477      478      479      480      481      482      483      484+PN2905
+PN2905      485      486      487      488      489      490      491      492+PN2906
+PN2906      493      494      495      496      497      498      499      500+PN2907
+PN2907      501      502      503      504      505      506      507      508+PN2908
+PN2908      509      510      513      514      517      518      521      522
$
$ DESVAR for Patch 19
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
DESVAR      19      3      3
+DE2901      522      514      400
+DE2902      461      477      221
+DE2903      468      484      228
PATCH      20      20      120      1
$
$ PANLST2 for Patch 20
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
PANLST2      20      557      558      559      560      561      562+PN3001
+PN3001      563      564      565      566      567      568      569      570+PN3002
+PN3002      571      572      573      574      575      576      577      578+PN3003
+PN3003      579      580      581      582      583      584      585      586+PN3004
+PN3004      587      588      589      590      591      592      593      594+PN3005
+PN3005      595      596      597      598      599      600      601      602+PN3006
+PN3006      603      604      605      606      607      608      609      610+PN3007
+PN3007      611      612
$
$ DESVAR for Patch 20
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
DESVAR      20      3      3
+DE3001      609      611      612
+DE3002      557      573      581
+DE3003      564      580      588
PATCH      21      21      121      1
$
$ PANLST2 for Patch 21

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$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      21      717      718      719      720      721      722+PN3101
+PN3101      723      724      725      726      727      728      729      730+PN3102
+PN3102      731      732      733      734      735      736      737      738+PN3103
+PN3103      739      740      741      742      743      744      745      746+PN3104
+PN3104      747      748      749      750      751      752      753      754+PN3105
+PN3105      755      756      757      758      759      760      761      762+PN3106
+PN3106      763      764      938      939      940      941      945      946+PN3107
+PN3107      947      948      952      953      954      955      959      960+PN3108
+PN3108      961      962      1205     1206     1207     1208     1212     1213+PN3109
+PN3109     1214     1215     1219     1220     1221     1222     1226     1227+PN3110
+PN3110     1228     1229     1233     1234     1235     1236     1240     1241+PN3111
+PN3111     1242     1243     1247     1248     1249     1250     1254     1255+PN3112
+PN3112     1256     1257
$
$ DESVAR for Patch 21
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
DESVAR      21      3      3      +DE3101
+DE3101      941      938      717      +DE3102
+DE3102     1254     1257      757      +DE3103
+DE3103     1205     1208      764
$
PATCH      22      22      122      1
$
$ PANLST2 for Patch 22
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      22      942      943      944      949      950      951+PN3201
+PN3201      956      957      958      963      964      965      1202     1203+PN3202
+PN3202     1204     1209     1210     1211     1216     1217     1218     1223+PN3203
+PN3203     1224     1225     1230     1231     1232     1237     1238     1239+PN3204
+PN3204     1244     1245     1246     1251     1252     1253     1590     1591+PN3205
+PN3205     1598     1599     1606     1607     1614     1615     1622     1623+PN3206
+PN3206     1630     1631     1638     1639     1646     1647     1654     1655+PN3207
+PN3207     1662     1663     1670     1671     1678     1679
$ DESVAR for Patch 22
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
DESVAR      22      3      3      +DE3201
+DE3201     1591      944      942      +DE3202
+DE3202     1623     1251     1253      +DE3203
+DE3203     1679     1202     1204
$
PATCH      23      23      123      1
$
$ PANLST2 for Patch 23
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      23      1592     1593     1594     1595     1596     1597+PN3301
+PN3301     1600     1601     1602     1603     1604     1605     1608     1609+PN3302
+PN3302     1610     1611     1612     1613     1616     1617     1618     1619+PN3303
+PN3303     1620     1621     1624     1625     1626     1627     1628     1629+PN3304
+PN3304     1632     1633     1634     1635     1636     1637     1640     1641+PN3305
+PN3305     1642     1643     1644     1645     1648     1649     1650     1651+PN3306
+PN3306     1652     1653     1656     1657     1658     1659     1660     1661+PN3307
+PN3307     1664     1665     1666     1667     1668     1669     1672     1673+PN3308
+PN3308     1674     1675     1676     1677     1680     1681     1682     1683+PN3309
+PN3309     1684     1685
$ DESVAR for Patch 23
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
DESVAR      23      3      3      +DE3301
+DE3301     1597     1594     1592      +DE3302
+DE3302     1629     1626     1624      +DE3303
+DE3303     1685     1683     1680
PATCH      24      24      124      1
$
$ PANLST2 for Patch 24
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      24      795      796      797      798      799      800+PN3401
+PN3401     801      802      803      804      805      806      807      808+PN3402
+PN3402     809      810      811      812      813      814      815      816+PN3403
+PN3403     817      818      819      820      821      822      823      824+PN3404
+PN3404     825      826      827      828      829      830      831      832+PN3405
+PN3405     833      834      875      876      877      878      882      883+PN3406

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+PN3406      884      885      889      890      891      892      896      897+PN3407
+PN3407      898      899      903      904      905      906      910      911+PN3408
+PN3408      912      913      917      918      919      920      924      925+PN3409
+PN3409      926      927      931      932      933      934      1309     1310+PN3410
+PN3410     1311     1312     1316     1317     1318     1319     1323     1324+PN3411
+PN3411     1325     1326     1330     1331     1332     1333     1337     1338+PN3412
+PN3412     1339     1340     1344     1345     1346     1347
$
$ DESVAR for Patch 24
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
DESVAR      24      3      3
+DE3401      834      824      804
+DE3402      827      817      797
+DE3403     1347     1346     1344
$
PATCH      25      25      125      1
$
$ PANLST2 for Patch 25
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
PANLST2     25      765     766     767     768     769     770+PN3501
+PN3501     771     772     773     774     775     776     777     778+PN3502
+PN3502     779     780     781     782     783     784     785     786+PN3503
+PN3503     787     788     789     790     791     792     793     794+PN3504
+PN3504     879     880     881     886     887     888     893     894+PN3505
+PN3505     895     900     901     902     907     908     909     914+PN3506
+PN3506     915     916     921     922     923     928     929     930+PN3507
+PN3507     935     936     937     1306    1307    1308    1313    1314+PN3508
+PN3508     1315    1320    1321    1322    1327    1328    1329    1334+PN3509
+PN3509     1335    1336    1341    1342    1343
$ DESVAR for Patch 25
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
DESVAR      25      3      3
+DE3501     794     784     774
+DE3502     787     777     767
+DE3503     1343    1342    1341
PATCH      26      26      126      1
$
$ PANLST2 for Patch 26
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
PANLST2     26     1394    1395    1396    1397    1402    1403+PN3601
+PN3601     1404    1405    1410    1411    1412    1413    1418    1419+PN3602
+PN3602     1420    1421    1426    1427    1428    1429    1434    1435+PN3603
+PN3603     1436    1437    1442    1443    1444    1445    1450    1451+PN3604
+PN3604     1452    1453    1458    1459    1460    1461    1466    1467+PN3605
+PN3605     1468    1469    1470    1471    1472    1473    1478    1479+PN3606
+PN3606     1480    1481    1486    1487    1488    1489    1494    1495+PN3607
+PN3607     1496    1497    1502    1503    1504    1505    1510    1511+PN3608
+PN3608     1512    1513    1518    1519    1520    1521    1526    1527+PN3609
+PN3609     1528    1529    1534    1535    1536    1537    1542    1543+PN3610
+PN3610     1544    1545    1550    1551    1552    1553    1558    1559+PN3611
+PN3611     1560    1561    1566    1567    1568    1569    1574    1575+PN3612
+PN3612     1576    1577    1582    1583    1584    1585    1918    1919+PN3613
+PN3613     1920    1921
$
$ DESVAR for Patch 26
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
DESVAR      26      3      3
+DE3601     1397    1396    1394
+DE3602     1453    1452    1450
+DE3603     1470    1471    1472
PATCH      27      27      127      1
$
$ PANLST2 for Patch 27
$. . . 1 . . | . . . 2 . . | . . . 3 . . | . . . 4 . . | . . . 5 . . | . . . 6 . . | . . . 7 . . | . . . 8 . . | . . . 9 . . | . . . 10 . . |
PANLST2     27     1390    1391    1392    1393    1398    1399+PN3701
+PN3701     1400    1401    1406    1407    1408    1409    1414    1415+PN3702
+PN3702     1416    1417    1422    1423    1424    1425    1430    1431+PN3703
+PN3703     1432    1433    1438    1439    1440    1441    1446    1447+PN3704
+PN3704     1448    1449    1454    1455    1456    1457    1462    1463+PN3705
+PN3705     1464    1465    1474    1475    1476    1477    1482    1483+PN3706
+PN3706     1484    1485    1490    1491    1492    1493    1498    1499+PN3707

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+PN3707      1500      1501      1506      1507      1508      1509      1514      1515+PN3708
+PN3708      1516      1517      1522      1523      1524      1525      1530      1531+PN3709
+PN3709      1532      1533      1538      1539      1540      1541      1546      1547+PN3710
+PN3710      1548      1549      1554      1555      1556      1557      1562      1563+PN3711
+PN3711      1564      1565      1570      1571      1572      1573      1578      1579+PN3712
+PN3712      1580      1581      1586      1587      1588      1589      1922      1923+PN3713
+PN3713      1924      1932
$
$ DESVAR for Patch 27
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
DESVAR      27          3          3
+DE3701      1393      1392      1390
+DE3702      1449      1448      1446
+DE3703      1474      1475      1477
$
PATCH      28          28          128          1
$ PANLST2 for Patch 28
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      28          1882      1883      1884      1885      1874      1875 CONT
CONT      1876      1877      1866      1867      1868      1869      1858      1859 CONT
CONT      1860      1861
$ DESVAR for Patch 28
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
DESVAR      28          2          4
+DE3701      1882      1885
+DE3702      1874      1877
+DE3703      1866      1869
+CONT      1858      1861
$
$ HOT PANELS for Patch 2
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      102          8          6          69          20          18          66 CONT
CONT      32          30          63          413          437          377
$
$ PANLST2 of DESVAR for Patch 4
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      104          418          416          414          442          440          438+PA1403
+PA1403      382          380          378
$
$ PANLST2 of DESVAR for Patch 5
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      105          423          421          419          447          445          443+PA1503
+PA1503      387          385          383
$
$ PANLST2 of DESVAR for Patch 6
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      106          1949      1951          424          1941          1943          448+PA1603
+PA1603      523          515          388
$
$ PANLST2 of DESVAR for Patch 7
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      107          633          635          636          625          627          628+PA1703
+PA1703      613          615          616
$
$ PANLST2 of DESVAR for Patch 8
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      108          1195      1198          1201          1180          1184          1187+PA1803
+PA1803      1174          1177          1181
$
$ PANLST2 of DESVAR for Patch 9
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      109          1910      1914          1917          1894          1898          1901+PA1903
+PA1903      1886          1890          1893
$
$ PANLST2 of DESVAR for Patch 10
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      110          1290      1291          1292          1293          1017          1018 CONT
CONT      1019          1020      1037          1038          1039          1040          677          678 CONT
CONT      679          680
$
$ PANLST2 of DESVAR for Patch 11

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$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      111      1383      1385      1386      1107      1087      1077+PA2103
+PA2103      1141      1131      1126
$
$ PANLST2 of DESVAR for Patch 12
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      112      1387      1388      1389      1067      1057      1047+PA2203
+PA2203      1121      1116      1111
$
$ PANLST2 of DESVAR for Patch 13
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      113      1806      1808      1809      1734      1736      1737+PA2303
+PA2303      1814      1816      1817
$
$ PANLST2 of DESVAR for Patch 14
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      114      1810      1812      1813      1738      1740      1741+PA2403
+PA2403      1818      1820      1821
$
$ PANLST2 of DESVAR for Patch 15
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      115      55      57      59      195      197      199+PA2503
+PA2503      125      127      129
$
$ PANLST2 of DESVAR for Patch 16
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      116      389      52      54      309      192      194+PA2603
+PA2603      316      122      124
$
$ PANLST2 of DESVAR for Patch 17
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      117      394      392      390      269      285      301+PA2703
+PA2703      276      292      308
$
$ PANLST2 of DESVAR for Patch 18
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      118      399      397      395      229      245      261+PA2803
+PA2803      236      252      268
$
$ PANLST2 of DESVAR for Patch 19
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      119      522      514      400      461      477      221+PA2903
+PA2903      468      484      228
$
$ PANLST2 of DESVAR for Patch 20
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      120      609      611      612      557      573      581+PA3003
+PA3003      564      580      588
$
$ PANLST2 of DESVAR for Patch 21
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      121      941      938      717      1254      1257      757+PA3103
+PA3103      1205      1208      764
$
$ PANLST2 of DESVAR for Patch 22
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      122      1591      944      942      1623      1251      1253+PA3203
+PA3203      1679      1202      1204
$
$ PANLST2 of DESVAR for Patch 23
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      123      1597      1594      1592      1629      1626      1624+PA3303
+PA3303      1685      1683      1680
$
$ PANLST2 of DESVAR for Patch 24
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|
PANLST2      124      834      824      804      827      817      797+PA3403
+PA3403      1347      1346      1344
$
$ PANLST2 of DESVAR for Patch 25
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10...|

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PANLST2      125      794      784      774      787      777      767+PA3503
+PA3503      1343      1342      1341
$
$ PANLST2 of DESVAR for Patch 26
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10..|
PANLST2      126      1397      1396      1394      1453      1452      1450+PA3603
+PA3603      1470      1471      1472
$
$ PANLST2 of DESVAR for Patch 27
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10..|
PANLST2      127      1393      1392      1390      1449      1448      1446+PA3703
+PA3703      1474      1475      1477
$
$ PANLST2 of DESVAR for Patch 28
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10..|
PANLST2      128      1882      1885      1874      1877      1866      1869 CONT
CONT      1858      1861
$ PANLST2 of DESVAR for Patch 29
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10..|
PANLST2      129      1273      1272      1271      1270      840      850 CONT
CONT      860      870      835      845      855      865      697      698 CONT
CONT      699      700
$ PANLST2 of HOT PANELS for Patch 30 (VERTICAL WING)
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10..|
PANLST2      130      10210      10201      10196      10105      10096      10091 CONT
CONT      10015      10006      10001
$
$
$ PANEL LIST PART
$TRJLST SETID
TRJLST 1 CONT
CONT 1 1.
$TRAJCT TRAJID
$ TIME MACH ALTH AOA BETA FORM FILE1 FILE1
$...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|...10..|
TRAJCT 1 1 CONT
CONT 0.0 26.8004800000. 10.0 TECPLOT CPTMP1.PLT CONT
CONT 30.0 26.9004572000. 30.0 CONT
CONT 70.0 26.9004260000. 30.0 CONT
CONT 110.0 26.9003948000. 30.0 CONT
CONT 150.0 26.9003636000. 30.0 CONT
CONT 190.0 26.6003336000. 30.0 CONT
CONT 230.0 25.6002748000. 30.0 CONT
CONT 270.0 24.9003012000. 30.0 CONT
CONT 310.0 24.7003108000. 30.0 CONT
CONT 350.0 25.1003300000. 30.0 CONT
CONT 390.0 25.4003492000. 30.0 CONT
CONT 430.0 25.3003648000. 30.0 CONT
CONT 470.0 25.3003756000. 30.0 CONT
CONT 510.0 25.2003792000. 30.0 CONT
CONT 550.0 25.2003768000. 30.0 CONT
CONT 590.0 25.2003672000. 30.0 CONT
CONT 630.0 25.2003528000. 30.0 CONT
CONT 670.0 24.8003324000. 30.0 CONT
CONT 710.0 23.9003108000. 30.0 CONT
CONT 750.0 23.1002952000. 30.0 CONT
CONT 790.0 22.5002940000. 30.0 CONT
CONT 830.0 22.3003048000. 30.0 CONT
CONT 870.0 22.4003168000. 30.0 CONT
CONT 910.0 22.4003240000. 30.0 CONT
CONT 950.0 22.2003228000. 30.0 CONT
CONT 990.0 21.7003120000. 30.0 TECPLOT CPTMP2.PLT CONT
CONT 1030.0 21.0002964000. 30.0 CONT
CONT 1070.0 20.1002820000. 30.0 CONT
CONT 1110.0 19.4002796000. 30.0 CONT
CONT 1150.0 18.9002868000. 30.0 CONT
CONT 1190.0 18.6002916000. 30.0 CONT
CONT 1230.0 18.2002904000. 30.0 CONT
CONT 1270.0 17.5002808000. 30.0 CONT
CONT 1310.0 16.5002688000. 30.0 CONT
CONT 1350.0 15.5002616000. 30.0 CONT
CONT 1390.0 14.8002628000. 30.0 CONT

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CONT	1430.0	14.1002640000.	30.0						CONT
CONT	1470.0	13.3002592000.	30.0						CONT
CONT	1510.0	12.4002496000.	30.0						CONT
CONT	1550.0	11.4002400000.	30.0						CONT
CONT	1590.0	10.3002352000.	30.0	TECPLOT	CPTEMP3.PLT				CONT
CONT	1630.0	9.4002316000.	30.0						CONT
CONT	1670.0	8.4802256000.	30.0						CONT
CONT	1710.0	7.4902148000.	30.0						CONT
CONT	1750.0	6.4402040000.	30.0						CONT
CONT	1790.0	5.4701932000.	30.0						CONT
CONT	1830.0	4.5501824000.	30.0						CONT
CONT	1870.0	3.7101716000.	30.0						CONT
CONT	1910.0	2.8901572000.	30.0						CONT
CONT	1950.0	2.1401428000.	30.0						CONT
\$CONT	1990.0	1.5001284000.	30.0						CONT
\$CONT	2030.0	1.060 91000.	30.0						CONT
\$CONT	2070.0	0.881 68100.	30.0						CONT
\$CONT	2110.0	0.703 48900.	30.0						CONT
\$CONT	2150.0	0.493 38900.	30.0						CONT
\$CONT	2190.0	0.404 29900.	30.0						CONT
\$CONT	2230.0	0.339 21800.	30.0						CONT
\$CONT	2270.0	0.292 14700.	30.0						CONT
\$CONT	2310.0	0.257 8230.	30.0						CONT
\$CONT	2350.0	0.230 2330.	30.0						CONT
\$CONT	2370.0	0.221 0.	30.0	TECPLOT	CPTEMP4.PLT				CONT
\$									
TIMESP	1	0.0	190.0	310.0	470.0	630.0	790.0	950.	CONT
CONT	1110.0	1270.0	1430.0	1590.0	1750.0	1950.0			
\$THERMPR	SETID	TEMP	HOTWALL	TRANS	GAS	EMMS			
THERMPR	1	100F							
ENDDATA									

Listing 5.2 Control Table File: CFDTABLE.DAT

Micro-x model consists of body, wing and vertical wing
MICROXGEO.DAT

REFC	REFB	REFS	REFX	REFY	REFZ	NO	AESURFZ	LENGTH	UNIT	MASS	UNIT						
2.2000E+00	1.0000E+00	3.8000E+00	2.6000E+01	0.0000E+00	0.0000E+00	0			IN		LBF/						
MACH	H	ALPHA	BETA	PRATE	QRATE		RRATE		CD		CY		CL	CR	CM	CN	FILE
2.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.9987E+02	2.4940E-02	-1.8397E+01	-1.0540E+00	2.6271E+04	5.9185E+00	FLOW0001			
5.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	7.0135E+02	-1.0868E-02	1.3357E+02	-4.1108E-01	-1.7130E+03	-1.6889E+00	FLOW0002			
8.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.7330E+02	-1.8019E-02	1.2049E+02	5.9189E-01	-1.9725E+03	-1.3009E+00	FLOW0003			
1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6795E+02	-9.2218E-03	1.1453E+02	1.4663E-01	-1.6545E+03	2.5563E+00	FLOW0004			
1.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6520E+02	-1.1292E-02	1.1113E+02	-4.1814E-02	-1.4654E+03	1.1444E+00	FLOW0005			
1.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6430E+02	-1.6831E-02	1.1003E+02	-6.2272E-01	-1.4239E+03	-1.3820E+00	FLOW0006			
1.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6354E+02	-1.3034E-02	1.0916E+02	-9.4352E-02	-1.3887E+03	6.4319E+00	FLOW0007			
1.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6306E+02	-4.3498E-03	1.0844E+02	5.1646E-02	-1.3535E+03	-1.6757E+00	FLOW0008			
1.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6282E+02	-6.1532E-03	1.0779E+02	-6.8531E-01	-1.3243E+03	8.8840E+00	FLOW0009			
1.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6235E+02	-2.3464E-02	1.0726E+02	-6.8298E-01	-1.3045E+03	8.9478E-01	FLOW0010			
1.8000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6197E+02	-1.8758E-02	1.0681E+02	-2.6989E-01	-1.2883E+03	-3.2834E+00	FLOW0011			
1.9000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6159E+02	-1.4584E-02	1.0644E+02	-8.2392E-02	-1.2760E+03	-3.5558E+00	FLOW0012			
2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6099E+02	-1.6163E-02	1.0610E+02	-9.5029E-01	-1.2613E+03	-3.3039E+00	FLOW0013			
2.1000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6060E+02	-9.5137E-03	1.0581E+02	-9.0870E-01	-1.2525E+03	7.5001E+00	FLOW0014			
2.2000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6037E+02	-1.1439E-02	1.0553E+02	-1.0797E+00	-1.2429E+03	4.8779E+00	FLOW0015			
2.3000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.6001E+02	-1.7055E-02	1.0530E+02	-1.1169E+00	-1.2339E+03	8.2430E+00	FLOW0016			
2.4000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.5934E+02	1.4383E-03	1.0511E+02	-7.8896E-01	-1.2241E+03	1.3088E+00	FLOW0017			
2.5000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.5951E+02	-8.7321E-03	1.0491E+02	1.2757E-01	-1.2252E+03	-1.4377E+01	FLOW0018			
2.6000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.5907E+02	6.9294E-03	1.0479E+02	-6.2751E-01	-1.2162E+03	9.4547E+00	FLOW0019			
2.7000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	6.5909E+02	-2.2828E-03	1.0465E+02	-4.6464E-01	-1.2138E+03	7.5297E+00	FLOW0020			
2.8000E+00	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.1302E+03	-5.3110E-02	1.8840E+03	2.6184E+00	-1.7694E+05	2.4126E+01	FLOW0021			
5.0000E+00	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.8955E+02	1.0233E-03	1.1771E+03	-1.3776E+00	-1.0334E+05	-3.2820E+00	FLOW0022			
8.0000E+00	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.3275E+02	-2.7573E-02	9.3087E+02	1.7026E+00	-7.6650E+04	1.4705E+01	FLOW0023			
1.0000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.1579E+02	-1.8801E-02	8.6497E+02	-2.1790E+00	-6.9495E+04	-8.3944E+00	FLOW0024			
1.2000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.0716E+02	-3.0075E-02	8.2660E+02	6.5880E-01	-6.5357E+04	7.6306E+00	FLOW0025			
1.3000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.0388E+02	-4.6081E-02	8.1343E+02	1.4123E+00	-6.3929E+04	1.0514E+01	FLOW0026			
1.4000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	9.0126E+02	-3.4669E-02	8.0285E+02	-3.1132E-01	-6.2790E+04	7.1792E-01	FLOW0027			
1.5000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.9921E+02	-2.0596E-02	7.9411E+02	-2.4779E+00	-6.1850E+04	-8.2591E+00	FLOW0028			
1.6000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.9753E+02	-3.8426E-02	7.8695E+02	-3.2025E+00	-6.1077E+04	-1.1007E+01	FLOW0029			
1.7000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.9606E+02	-5.0142E-02	7.8099E+02	-8.2283E-01	-6.0428E+04	-5.6778E-01	FLOW0030			
1.8000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.9492E+02	-4.1506E-02	7.7594E+02	-3.0758E-01	-5.9886E+04	3.6475E+00	FLOW0031			
1.9000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.9378E+02	-4.2402E-02	7.7170E+02	1.4419E-01	-5.9417E+04	4.5156E+00	FLOW0032			
2.0000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.9328E+02	-1.4706E-02	7.6795E+02	-1.9454E-01	-5.9029E+04	2.2919E+00	FLOW0033			
2.1000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.9236E+02	-3.8416E-02	7.6483E+02	-8.0568E-01	-5.8686E+04	-3.1053E+00	FLOW0034			
2.2000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.9165E+02	3.5135E-05	7.6207E+02	-1.5491E+00	-5.8389E+04	-7.6918E+00	FLOW0035			
2.3000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.9083E+02	-3.5267E-02	7.5975E+02	-3.0131E+00	-5.8117E+04	-1.2309E+01	FLOW0036			
2.4000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.9034E+02	-3.6381E-02	7.5762E+02	-1.1169E+00	-5.7896E+04	-4.5978E+00	FLOW0037			
2.5000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.9012E+02	-3.0701E-02	7.5565E+02	-7.0691E-01	-5.7690E+04	-9.9133E-01	FLOW0038			
2.6000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.8955E+02	-8.5557E-03	7.5399E+02	-1.3854E-01	-5.7512E+04	-7.0207E-01	FLOW0039			
2.7000E+01	0.0000E+00	1.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	8.8909E+02	-4.6470E-02	7.5258E+02	1.1052E+00	-5.7348E+04	9.7538E+00	FLOW0040			
2.8000E+00	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	2.3237E+03	-5.3518E-02	4.0260E+03	9.4471E+00	-4.1912E+05	2.6880E+01	FLOW0041			
5.0000E+00	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.9169E+03	-7.2632E-02	2.5728E+03	1.8532E+01	-2.6326E+05	5.1118E+01	FLOW0042			
8.0000E+00	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7952E+03	-1.5172E-01	2.2460E+03	2.4724E+01	-2.2584E+05	6.9763E+01	FLOW0043			
1.0000E+01	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7638E+03	-1.5190E-01	2.1598E+03	2.2984E+01	-2.1580E+05	6.6612E+01	FLOW0044			
1.2000E+01	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7468E+03	-6.7094E-02	2.1100E+03	2.0345E+01	-2.1010E+05	5.5507E+01	FLOW0045			
1.3000E+01	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7406E+03	-9.3756E-02	2.0937E+03	1.5848E+01	-2.0817E+05	4.4619E+01	FLOW0046			
1.4000E+01	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7370E+03	-6.7049E-02	2.0802E+03	2.6660E+01	-2.0666E+05	6.6820E+01	FLOW0047			
1.5000E+01	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7333E+03	-7.1051E-02	2.0694E+03	2.0563E+01	-2.0540E+05	5.5005E+01	FLOW0048			
1.6000E+01	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7303E+03	-6.9892E-02	2.0607E+03	1.3451E+01	-2.0438E+05	3.9020E+01	FLOW0049			
1.7000E+01	0.0000E+00	2.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	1.7276E+03	-6.2605E-02	2.0534E+03	1.7465E+01	-2.0351E+05	4.8107E+01	FLOW0050			
1.8000E+01																	

5.0000E+00	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.5528E+03	1.6714E-02	3.9715E+03	2.5802E+01	-4.6293E+05	4.4717E+01FLOW0062
8.0000E+00	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.4141E+03	-2.4570E-02	3.6795E+03	6.1014E+01	-4.3003E+05	1.0571E+02FLOW0063
1.0000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3798E+03	-1.9887E-03	3.6100E+03	6.4606E+01	-4.2225E+05	1.0649E+02FLOW0064
1.2000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3584E+03	2.5231E-02	3.5713E+03	4.8518E+01	-4.1765E+05	7.9896E+01FLOW0065
1.3000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3497E+03	6.2068E-02	3.5576E+03	3.7255E+01	-4.1587E+05	6.5100E+01FLOW0066
1.4000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3408E+03	5.5995E-02	3.5448E+03	4.4213E+01	-4.1409E+05	7.4399E+01FLOW0067
1.5000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3344E+03	2.6728E-02	3.5323E+03	4.0167E+01	-4.1241E+05	6.9410E+01FLOW0068
1.6000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3267E+03	3.2710E-02	3.5233E+03	3.4928E+01	-4.1097E+05	5.8694E+01FLOW0069
1.7000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3223E+03	1.0074E-01	3.5154E+03	5.6788E+01	-4.0995E+05	9.8485E+01FLOW0070
1.8000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3194E+03	5.8266E-02	3.5087E+03	3.4700E+01	-4.0914E+05	5.3266E+01FLOW0071
1.9000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3158E+03	3.8586E-02	3.5040E+03	4.5140E+01	-4.0849E+05	7.3626E+01FLOW0072
2.0000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3132E+03	5.3006E-02	3.5001E+03	3.4775E+01	-4.0797E+05	5.6040E+01FLOW0073
2.1000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3122E+03	4.0929E-02	3.4959E+03	4.1413E+01	-4.0752E+05	7.1934E+01FLOW0074
2.2000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3097E+03	1.1559E-02	3.4931E+03	3.9542E+01	-4.0710E+05	6.8340E+01FLOW0075
2.3000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3079E+03	4.8312E-02	3.4903E+03	5.6794E+01	-4.0670E+05	9.3945E+01FLOW0076
2.4000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3068E+03	3.9368E-02	3.4876E+03	4.0710E+01	-4.0640E+05	6.9294E+01FLOW0077
2.5000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3063E+03	6.2402E-02	3.4848E+03	4.3829E+01	-4.0614E+05	7.3055E+01FLOW0078
2.6000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3041E+03	6.0713E-02	3.4837E+03	3.7603E+01	-4.0586E+05	5.8154E+01FLOW0079
2.7000E+01	0.0000E+00	3.0000E+01	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	3.3033E+03	8.4541E-02	3.4818E+03	5.2618E+01	-4.0565E+05	9.1047E+01FLOW0080

Listing 5.3 ZONAIR Solution File: FLOWi

(Only SHOWS a part of the file:FLOW0001)

8	2102	2	1UVWCP	1P,5E16.9
1	1	2102		
4.961669445E-02	5.189758539E-02	5.357742310E-02	5.527937412E-02	5.487614870E-02
5.512845516E-02	9.627217054E-02	9.199601412E-02	9.134024382E-02	9.309083223E-02
9.619778395E-02	5.436116457E-02	4.991298914E-02	4.770684242E-02	4.299765825E-02
4.183274508E-02	3.665608168E-02	3.512001038E-02	3.758484125E-02	3.772926331E-02
9.825031757E-01	6.754822135E-01	7.071994543E-01	9.892979860E-01	9.892979860E-01
9.913231730E-01	9.913231730E-01	7.071994543E-01	6.754822135E-01	9.765903354E-01
8.811721802E-01	1.057591319E+00	2.001529932E-01	2.191572785E-01	2.264531851E-01
2.185388207E-01	3.946537971E-01	4.044893384E-01	4.169285893E-01	4.162319303E-01
5.695723295E-01	5.387215614E-01	5.536199808E-01	5.355664492E-01	6.703280210E-01
6.499575377E-01	6.616235375E-01	6.523061395E-01	7.403930426E-01	7.205289602E-01
7.282637358E-01	7.106499672E-01	7.752522826E-01	7.821137905E-01	7.876996398E-01
7.693804502E-01	8.099160790E-01	8.136164546E-01	8.202944994E-01	8.268239498E-01
8.743689060E-01	8.761911392E-01	8.513665199E-01	8.575658798E-01	9.023347497E-01
9.044589400E-01	9.107141714E-01	8.887947798E-01	9.338375330E-01	9.368398786E-01
9.407097101E-01	9.425043464E-01	9.344698191E-01	9.142818451E-01	8.865199685E-01
8.537606011E-01	8.148640394E-01	7.312706709E-01	6.483232379E-01	5.672322512E-01
3.968895674E-01	2.550852299E-01	9.324694872E-01	9.096474051E-01	8.817826509E-01
8.509297371E-01	7.730867863E-01	7.356270552E-01	6.463022828E-01	5.659247637E-01
3.957239389E-01	2.168511748E-01	9.319043756E-01	9.072631598E-01	8.793535233E-01
8.465566039E-01	7.726080418E-01	7.356981635E-01	6.600649953E-01	5.641983747E-01
3.756154180E-01	2.204477191E-01	9.317995310E-01	9.036346674E-01	8.756830692E-01
8.435465693E-01	7.730142474E-01	7.371219397E-01	6.619831324E-01	5.563127995E-01
3.749534488E-01	2.093282342E-01	9.567841291E-01	9.322148561E-01	9.004755020E-01
8.686194420E-01	8.314152360E-01	7.523470521E-01	7.020314932E-01	6.259181499E-01
4.749082923E-01	2.801206708E-01	9.541627169E-01	9.274450541E-01	8.965132236E-01
8.644680977E-01	8.265590072E-01	7.436026335E-01	6.984293461E-01	6.227619052E-01
4.736346006E-01	2.918058634E-01	9.473541975E-01	9.219430685E-01	8.923835754E-01
8.598377705E-01	8.217999339E-01	7.377539277E-01	6.943725944E-01	5.805786252E-01
4.377623796E-01	3.018875718E-01	9.391267300E-01	9.172304273E-01	8.890945315E-01
8.561005592E-01	8.175423145E-01	7.335067987E-01	6.517419815E-01	5.690606833E-01
4.147208333E-01	2.478796244E-01	9.690355062E-01	9.419223666E-01	9.255076647E-01
9.052516222E-01	8.650664091E-01	8.053377271E-01	7.529918551E-01	6.625885963E-01
5.126075149E-01	2.867027521E-01	9.714803696E-01	9.547722936E-01	9.190834761E-01
8.960282803E-01	8.675774336E-01	8.252123594E-01	7.357569933E-01	6.735879779E-01
5.126667023E-01	2.907317877E-01	9.695904255E-01	9.505588412E-01	9.288552403E-01
9.074940085E-01	8.529952765E-01	8.293216228E-01	7.596417665E-01	6.694614887E-01
4.953107834E-01	2.709343433E-01	9.681845307E-01	9.501296878E-01	9.267408848E-01
9.038483500E-01	8.421618938E-01	8.157646656E-01	7.339729071E-01	6.093517542E-01
5.040116310E-01	2.336642742E-01	9.669685960E-01	9.469172955E-01	9.204613566E-01
8.944909573E-01	8.603591323E-01	7.933048010E-01	7.068026662E-01	6.052747965E-01
4.951819181E-01	2.580187321E-01	9.677367210E-01	9.407646656E-01	9.127049446E-01
8.854962587E-01	5.330088067E-01	7.805593610E-01	7.416632175E-01	6.013102531E-01
4.852774143E-01	3.086234331E-01	9.635854363E-01	9.351812601E-01	9.058901668E-01
8.780711293E-01	8.453629613E-01	7.708094120E-01	7.261687517E-01	6.434904337E-01
5.166019201E-01	3.026077151E-01	9.584079981E-01	9.335537553E-01	9.032195210E-01
7.740550876E-01	8.396849036E-01	7.628893852E-01	7.162442803E-01	6.398017406E-01
5.029938221E-01	9.917279005E-01	9.438464046E-01	9.445108771E-01	9.451671839E-01
9.454044700E-01	9.460297823E-01	9.479354620E-01	9.471712112E-01	9.491357207E-01
9.456458688E-01	9.462529421E-01	9.464932084E-01	9.468935728E-01	9.479064345E-01
9.500255585E-01	9.496641755E-01	9.513887763E-01	9.465497732E-01	9.472666979E-01
9.474167824E-01	9.480848908E-01	9.498215318E-01	9.508824944E-01	9.515964985E-01
9.523003697E-01	9.482669234E-01	9.490635991E-01	9.491779208E-01	9.501470327E-01
9.519696236E-01	9.535661936E-01	9.531328678E-01	9.548018575E-01	9.498889446E-01
9.511200190E-01	9.516320229E-01	9.527657628E-01	9.549323320E-01	9.560825229E-01
9.553934932E-01	9.567515254E-01	9.506882429E-01	9.522814751E-01	9.534317851E-01
9.546514153E-01	9.570878744E-01	9.568267465E-01	9.572555423E-01	9.573662281E-01
9.523281455E-01	9.542443752E-01	9.567255378E-01	9.581092596E-01	9.594438672E-01
9.601275921E-01	9.597842097E-01	9.597848058E-01	9.561302066E-01	9.579753876E-01
9.603042006E-01	9.619971514E-01	9.633533955E-01	9.627323151E-01	9.625139236E-01
9.629999399E-01	9.593969584E-01	9.607691765E-01	9.624396563E-01	9.643654823E-01
9.660834074E-01	9.633639455E-01	9.642868638E-01	9.649439454E-01	9.642736316E-01
9.667644501E-01	9.666230679E-01	9.680783749E-01	9.702935815E-01	9.677446485E-01
9.671377540E-01	9.691674709E-01	9.678723216E-01	9.733684063E-01	9.756859541E-01
9.725812078E-01	9.732803702E-01	9.737625122E-01	9.749863148E-01	9.730598927E-01
9.693874121E-01	9.769586325E-01	9.792969823E-01	9.739045501E-01	9.749622941E-01
9.773043990E-01	9.784490466E-01	9.737172723E-01	9.504315853E-01	9.510926008E-01
9.514005184E-01	9.508147240E-01	9.505600929E-01	9.510518909E-01	9.512313604E-01
9.510741830E-01	9.503611922E-01	9.491632581E-01	9.485347867E-01	9.484843016E-01
9.601158500E-01	9.581252337E-01	9.534714222E-01	9.525035024E-01	9.527075887E-01
9.533905387E-01	9.534686208E-01	9.526965022E-01	9.506376386E-01	9.487861991E-01
9.483409524E-01	9.482708573E-01	9.661309123E-01	9.623928666E-01	9.563593268E-01
9.551820755E-01	9.549900293E-01	9.546374679E-01	9.529896379E-01	9.506558180E-01
9.496128559E-01	9.479526281E-01	9.471045732E-01	9.464525580E-01	9.663274288E-01
9.645853639E-01	9.604538083E-01	9.568601251E-01	9.554597139E-01	9.531974196E-01
9.509860277E-01	9.493875504E-01	9.485206008E-01	9.469638467E-01	9.462821484E-01
9.450588226E-01	9.476897717E-01	9.455850720E-01	9.403474927E-01	9.379333854E-01
9.365255237E-01	9.357213974E-01	9.351361394E-01	9.339736700E-01	9.333461523E-01
9.333251715E-01	9.329270720E-01	9.337096810E-01	9.443598986E-01	9.429737329E-01
9.415159225E-01	9.397905469E-01	9.388477802E-01	9.377201200E-01	9.375258088E-01
9.376475811E-01	9.376143217E-01	9.373876452E-01	9.367871284E-01	9.371138811E-01
9.431901574E-01	9.432367086E-01	9.442253113E-01	9.439497590E-01	9.433389902E-01
9.419655204E-01	9.414310455E-01	9.414383769E-01	9.414669275E-01	9.417830706E-01
9.416160583E-01	9.419059753E-01	9.444782734E-01	9.459754825E-01	9.474326372E-01
9.480428696E-01	9.474448562E-01	9.463661909E-01	9.467152953E-01	9.465767145E-01
9.460361004E-01	9.462343454E-01	9.459815025E-01	9.460914731E-01	9.536048770E-01

9.524666667E-01 9.496737719E-01 9.467542171E-01 9.444725513E-01 9.396740794E-01
9.363129139E-01 9.353519678E-01 9.339725375E-01 9.324278831E-01 9.318145514E-01
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9.411191940E-01 9.381878972E-01 9.359021783E-01 9.338542819E-01 9.328705668E-01
9.310671091E-01 9.305924177E-01 9.308806062E-01 9.569718242E-01 9.548056722E-01
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9.335790873E-01 9.324477911E-01 9.305544496E-01 9.301338792E-01 9.303376675E-01
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9.354926348E-01 9.346323013E-01 9.330041409E-01 9.321290255E-01 9.306634665E-01
9.306342602E-01 9.305275083E-01 9.694574475E-01 9.671690464E-01 9.642636776E-01
9.611760974E-01 9.599646330E-01 9.597029686E-01 9.576573372E-01 9.577214718E-01
9.730380774E-01 9.692742229E-01 9.659183025E-01 9.627172351E-01 9.612869620E-01
9.607436657E-01 9.587616920E-01 9.586780071E-01 9.743645191E-01 9.704622030E-01
9.666330218E-01 9.639587998E-01 9.622958302E-01 9.613127112E-01 9.594726562E-01
9.595896006E-01 9.727776647E-01 9.698629379E-01 9.663221836E-01 9.635865092E-01
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9.780064821E-01 9.722341895E-01 9.788441062E-01 9.787991047E-01 9.770042300E-01
9.619266391E-01 9.477216005E-01 9.359242916E-01 9.368804097E-01 9.601591229E-01
9.495724440E-01 9.400708079E-01 9.400839210E-01 9.622512460E-01 9.552273750E-01
9.462556243E-01 9.451209307E-01 9.714625478E-01 9.664507508E-01 9.577656388E-01
9.549493194E-01 9.565449357E-01 9.543385506E-01 9.568895102E-01 9.573080540E-01
9.565079212E-01 9.567908049E-01 9.551559091E-01 9.555811286E-01 9.560835958E-01
9.571747780E-01 9.595530033E-01 9.584078789E-01 9.571655989E-01 9.571560621E-01
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1.026394606E+00 1.031477451E+00 1.033251166E+00 1.003541708E+00 1.007524133E+00
1.011615753E+00 1.018964291E+00 1.022344947E+00 1.025594473E+00 1.031781197E+00
1.034201384E+00 9.646638632E-01 9.867162704E-01 9.952065945E-01 1.007617354E+00
1.012647390E+00 1.017520428E+00 1.024854302E+00 1.030871511E+00 9.721808434E-01
9.983487129E-01 1.006428599E+00 1.013007164E+00 1.023530722E+00 1.027757049E+00
1.034016013E+00 1.036998391E+00 9.810225368E-01 1.004247308E+00 1.012284875E+00
1.019000411E+00 1.026260257E+00 1.031864285E+00 1.035555601E+00 1.042564273E+00
9.862399697E-01 1.008311152E+00 1.016469479E+00 1.022778988E+00 1.027149558E+00
1.033189058E+00 1.039517522E+00 1.048620462E+00 9.891831279E-01 1.011639714E+00
1.018797755E+00 1.024170876E+00 1.027840972E+00 1.031474710E+00 1.041994929E+00
1.056609154E+00 9.911850095E-01 1.011639714E+00 1.018858194E+00 1.023226976E+00
1.027021408E+00 1.031612873E+00 1.045928717E+00 1.057832241E+00 9.940954447E-01
1.005682230E+00 1.017967582E+00 1.020812273E+00 1.024664521E+00 1.032405734E+00
1.039777756E+00 1.059102893E+00 9.957999587E-01 1.006090164E+00 1.015544415E+00
1.017983079E+00 1.024569273E+00 1.033073187E+00 1.040255904E+00 1.061597228E+00
9.957146645E-01 1.006080151E+00 1.015327573E+00 1.019863129E+00 1.026304483E+00
1.033527374E+00 1.039867997E+00 1.068329811E+00 9.835546613E-01 9.951319695E-01
1.005443931E+00 1.0144403224E+00 1.026846886E+00 1.032639265E+00 1.034806967E+00
1.069575906E+00 9.612034559E-01 9.727799296E-01 9.834834933E-01 1.002753854E+00
1.011104941E+00 1.018979311E+00 1.023516178E+00 1.054274559E+00 9.223535657E-01
9.497953653E-01 9.623195529E-01 9.768127799E-01 9.852799773E-01 9.932957292E-01
1.000203609E+00 1.034539461E+00 8.750023246E-01 9.053074121E-01 9.447121024E-01
9.570680857E-01 9.670771956E-01 9.754706025E-01 9.830918908E-01 9.965162277E-01
1.190070391E-01 8.451732397E-01 8.889208436E-01 9.102389812E-01 9.267660975E-01
9.400799274E-01 9.516601562E-01 9.625324607E-01 8.438773155E-01 8.247150779E-01
8.375765085E-01 8.564134240E-01 8.770832419E-01 8.951858282E-01 9.112104774E-01
9.260224104E-01 9.531531334E-01 9.410623312E-01 8.715946674E-01 8.519198895E-01
8.498955369E-01 8.581279305E-01 8.727642298E-01 8.891910315E-01 9.511023164E-01
9.517663717E-01 9.509505630E-01 9.390847683E-01 9.128435850E-01 8.850923777E-01
8.711460829E-01 8.683576584E-01 9.511168003E-01 9.509820938E-01 9.508953691E-01
9.515340924E-01 9.522268772E-01 9.508979321E-01 9.405984879E-01 9.193908572E-01
9.536509514E-01 9.532753229E-01 9.527460337E-01 9.525797963E-01 9.523589611E-01
9.524509907E-01 9.528926015E-01 9.530597925E-01 9.539402127E-01 9.536955357E-01
9.531242847E-01 9.528344870E-01 9.525801539E-01 9.523677230E-01 9.521296024E-01
9.517868757E-01 9.552257061E-01 9.551532865E-01 9.549090266E-01 9.547278881E-01
9.544923306E-01 9.542392492E-01 9.539032578E-01 9.534206390E-01 1.010421038E+00
1.015262604E+00 1.016598463E+00 1.017641306E+00 1.017527699E+00 1.016622305E+00
1.016582012E+00 1.013813138E+00 9.932233095E-01 1.009137392E+00 1.005748630E+00
1.014841199E+00 1.012593508E+00 1.015921354E+00 1.015642762E+00 1.013163686E+00
9.863376021E-01 9.966636300E-01 1.000711083E+00 1.007161975E+00 1.009661317E+00
1.013403893E+00 1.015134215E+00 1.014123678E+00 9.773190022E-01 9.886758924E-01
9.933187366E-01 1.001172543E+00 1.004509568E+00 1.010175824E+00 1.012921214E+00
1.015068293E+00 9.711677432E-01 9.855222106E-01 9.872111082E-01 9.982610941E-01
9.986627102E-01 1.001879573E+00 1.007843852E+00 1.010413885E+00 9.684581757E-01
9.797869921E-01 9.843775034E-01 9.921884537E-01 9.956066012E-01 1.001651525E+00
1.004708052E+00 1.005592108E+00 9.636831284E-01 9.753827453E-01 9.800427556E-01
9.841306806E-01 9.910877943E-01 9.940801859E-01 9.995414019E-01 1.001960754E+00
9.588957429E-01 9.735743403E-01 9.765967727E-01 9.809820056E-01 9.882994294E-01
9.913322926E-01 9.965947270E-01 9.988943934E-01 9.557528496E-01 9.689971209E-01
9.743207693E-01 9.830925465E-01 9.867824316E-01 9.900251627E-01 9.955976009E-01
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9.838519096E-01 9.878319502E-01 9.946029186E-01 9.976698756E-01 9.527300596E-01
9.602699280E-01 9.669730067E-01 9.783224463E-01 9.831900597E-01 9.911227822E-01
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9.855993390E-01 9.545148611E-01 9.661136270E-01 9.705131054E-01 9.741336107E-01
9.771575332E-01 9.817115068E-01 9.827104211E-01 9.847977757E-01 9.632993340E-01
9.677227139E-01 9.716919065E-01 9.753774457E-01 9.818907976E-01 9.847618341E-01
9.871166945E-01 9.897794127E-01 1.005447745E+00 1.007267833E+00 1.008570433E+00
1.008573890E+00 1.007089734E+00 1.005214334E+00 1.002960801E+00 1.003262997E+00
1.008807898E+00 1.009069920E+00 1.009649873E+00 1.010323524E+00 1.009912848E+00
1.009276390E+00 1.008605361E+00 1.004135489E+00 1.012917757E+00 1.012503743E+00
1.012285590E+00 1.010968566E+00 1.011114001E+00 1.011071563E+00 1.010847330E+00
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1.018383861E+00 1.018690705E+00 1.018109322E+00 1.045373321E+00 1.019199252E+00
1.019855261E+00 1.019537210E+00 1.019023538E+00 1.018458009E+00 1.018172383E+00
1.018618464E+00 1.016155362E+00 1.001734138E+00 9.965904951E-01 9.962066412E-01
9.975734353E-01 1.000180244E+00 1.002205014E+00 1.002673388E+00 9.998856783E-01
1.000120759E+00 9.959940910E-01 9.942358732E-01 9.946061373E-01 9.968177080E-01
9.963892698E-01 9.987709522E-01 9.998059869E-01 9.994566441E-01 9.968314171E-01
9.930324236E-01 9.914932251E-01 9.921708703E-01 9.939869046E-01 9.954401255E-01
9.994204044E-01 1.000447512E+00 9.985973835E-01 9.942225218E-01 9.915949702E-01
9.904123545E-01 9.902310967E-01 9.916859269E-01 9.962977171E-01 1.010408282E+00
1.008325934E-01 1.003032327E+00 9.992443919E-01 9.957760572E-01 9.913356900E-01
9.861409664E-01 9.743839502E-01 1.033594489E+00 1.030242920E+00 1.023961663E+00
1.018420696E+00 1.012780070E+00 1.006267309E+00 9.990444183E-01 9.90832096E-01
1.054497600E+00 1.047814012E+00 1.046084523E+00 1.040315986E+00 1.033833623E+00
1.026265264E+00 1.017892241E+00 1.005015016E+00 1.050654054E+00 1.054751635E+00
1.051947713E+00 1.048288941E+00 1.045998573E+00 1.042581916E+00 1.032233715E+00

1.025180101E+00 9.900228977E-01 9.905315042E-01 9.909904003E-01 9.910537004E-01
9.911105037E-01 9.910841584E-01 9.900228977E-01 9.905315042E-01 9.909904003E-01
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9.529698491E-01 9.529951811E-01 9.677066803E-01 9.642311335E-01 9.657726288E-01
9.656545520E-01 9.733516574E-01 9.746221900E-01 9.753733873E-01 9.729104638E-01
9.757050872E-01 9.781599641E-01 9.802461267E-01 9.820924997E-01 8.939133286E-01
9.338871837E-01 9.470753074E-01 9.626667500E-01 9.759947062E-01 9.957512617E-01
1.004343987E+00 1.020272374E+00 1.025063872E+00 1.030619621E+00 1.034663200E+00
1.037121654E+00 1.038638592E+00 1.039679766E+00 1.040550113E+00 8.865965605E-01
9.387108088E-01 9.526506066E-01 9.654336572E-01 9.793950319E-01 9.956505299E-01
1.006496191E+00 1.019605517E+00 1.024944544E+00 1.029599190E+00 1.032925010E+00
1.034850001E+00 1.036020994E+00 1.036863804E+00 1.037609220E+00 8.925445080E-01
9.488989115E-01 9.570653439E-01 9.693323970E-01 9.837755561E-01 9.982656240E-01
1.010647058E+00 1.019605517E+00 1.027107000E+00 1.030871987E+00 1.033406615E+00
1.034619451E+00 1.035131812E+00 1.035367489E+00 1.035523415E+00 9.043428898E-01
9.567778707E-01 9.645742774E-01 9.734985828E-01 9.909817576E-01 1.002720356E+00
1.017070532E+00 1.022599459E+00 1.031764984E+00 1.034765363E+00 1.036574960E+00
1.037088990E+00 1.036877394E+00 1.036333680E+00 1.035557032E+00 9.156116247E-01
9.552410245E-01 9.738866091E-01 9.810441136E-01 9.996590614E-01 1.009549618E+00
1.024725676E+00 1.027940989E+00 1.038041353E+00 1.040513873E+00 1.041810751E+00
1.041821241E+00 1.041047215E+00 1.039817095E+00 1.037885189E+00 9.250282645E-01
9.644158483E-01 9.830436707E-01 9.901049137E-01 1.007971406E+00 1.017132759E+00
1.032036781E+00 1.037434101E+00 1.044556737E+00 1.046802163E+00 1.047900319E+00
1.047727466E+00 1.046688795E+00 1.045008063E+00 1.045624733E+00 9.337037206E-01
9.728511572E-01 9.916085601E-01 9.985174537E-01 1.015319943E+00 1.023983955E+00
1.038378835E+00 1.043642759E+00 1.050643563E+00 1.052893400E+00 1.054051280E+00
1.053984761E+00 1.052990675E+00 1.051144838E+00 1.051241517E+00 9.412385225E-01
9.802306890E-01 9.914758801E-01 1.005961418E+00 1.013412952E+00 1.029740810E+00
1.043737531E+00 1.049022079E+00 1.056221366E+00 1.058631420E+00 1.060009003E+00
1.060225010E+00 1.059507012E+00 1.057766080E+00 1.057571173E+00 9.468733668E-01
9.858049750E-01 9.971848130E-01 1.011952043E+00 1.019089937E+00 1.034427762E+00
1.048128366E+00 1.053541183E+00 1.061200738E+00 1.063900113E+00 1.065612435E+00
1.066208243E+00 1.065896034E+00 1.064447284E+00 1.064155698E+00 9.506205320E-01
9.894208908E-01 1.000998378E+00 1.016542315E+00 1.023668051E+00 1.038393259E+00
1.045374513E+00 1.057332754E+00 1.065499902E+00 1.068545818E+00 1.070651412E+00
1.071658015E+00 1.071750879E+00 1.070607781E+00 1.070239782E+00 9.531196952E-01
9.918963313E-01 1.003744483E+00 1.020401835E+00 1.027748823E+00 1.042165637E+00
1.048903227E+00 1.060709834E+00 1.069129705E+00 1.072420835E+00 1.074813128E+00
1.076100588E+00 1.076398492E+00 1.075315714E+00 1.074624062E+00 8.850626349E-01
9.945017695E-01 1.006414294E+00 1.015884042E+00 1.031584024E+00 1.045831323E+00
1.052308679E+00 1.063677788E+00 1.071814775E+00 1.074994326E+00 1.077265501E+00
1.078381419E+00 1.078401446E+00 1.076871753E+00 1.075399041E+00 8.904650211E-01
9.819126129E-01 1.008878589E+00 1.018564105E+00 1.034707308E+00 1.048711419E+00
1.054838181E+00 1.065202355E+00 1.069028854E+00 1.074554205E+00 1.076092362E+00
1.076417208E+00 1.075581908E+00 1.073109031E+00 1.070754170E+00 8.930106759E-01
9.838773608E-01 1.009599924E+00 1.019168615E+00 1.035101175E+00 1.048453569E+00
1.054068446E+00 1.063022971E+00 1.068216205E+00 1.069613576E+00 1.070097446E+00
1.069476485E+00 1.067933202E+00 1.065230370E+00 1.063017726E+00 9.981904030E-01
1.019168615E+00 1.027511120E+00 1.042101502E+00 1.048453569E+00 1.058945775E+00
1.066079855E+00 1.068216205E+00 1.069613576E+00 1.070097446E+00 1.069476485E+00
1.067933202E+00 1.058326840E+00

[illegible]

|...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|..10...|

CASE CONTROL SUMMARY

SINGLE PRECISION COMPUTATION

|...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|..10...|

S O R T E D B U L K D A T A E C H O

|...1...|...2...|...3...|...4...|...5...|...6...|...7...|...8...|...9...|..10...|

1 -	DESVAR	1	2	3
2 -		130	201	

3 -		90	209		
4 -		4	220		
5 -	DESVAR	2	3	4	CONT
6 -	CONT	8	6	69	CONT
7 -	CONT	20	18	66	CONT
8 -	CONT	32	30	63	CONT
9 -	CONT	413	437	377	
10 -	DESVAR	4	3	3	+DE1401
11 -	+DE1401	418	416	414	+DE1402
12 -	+DE1402	442	440	438	+DE1403
13 -	+DE1403	382	380	378	
14 -	DESVAR	5	3	3	+DE1501
15 -	+DE1501	423	421	419	+DE1502
16 -	+DE1502	447	445	443	+DE1503
17 -	+DE1503	387	385	383	
18 -	DESVAR	6	3	3	+DE1601
19 -	+DE1601	1949	1951	424	+DE1602
20 -	+DE1602	1941	1943	448	+DE1603
21 -	+DE1603	523	515	388	
22 -	DESVAR	7	3	3	+DE1701
23 -	+DE1701	633	635	636	+DE1702
24 -	+DE1702	625	627	628	+DE1703
25 -	+DE1703	613	615	616	
26 -	DESVAR	8	3	3	+DE1801
27 -	+DE1801	1195	1198	1201	+DE1802
28 -	+DE1802	1181	1184	1187	+DE1803
29 -	+DE1803	1174	1177	1180	
30 -	DESVAR	9	3	3	+DE1901
31 -	+DE1901	1910	1914	1917	+DE1902
32 -	+DE1902	1894	1898	1901	+DE1903
33 -	+DE1903	1886	1890	1893	
34 -	DESVAR	10	4	4	+DE2001
35 -	+DE2001	1290	1291	1292	+DE2002
36 -	+DE2002	1017	1018	1019	+DE2003
37 -	+DE2003	1037	1038	1039	+DE2004
38 -	+DE2004	677	678	679	
39 -	DESVAR	11	3	3	+DE2101
40 -	+DE2101	1383	1385	1386	+DE2102
41 -	+DE2102	1107	1087	1077	+DE2103
42 -	+DE2103	1141	1131	1126	
43 -	DESVAR	12	3	3	+DE2201
44 -	+DE2201	1387	1388	1389	+DE2202
45 -	+DE2202	1067	1057	1047	+DE2203
46 -	+DE2203	1121	1116	1111	
47 -	DESVAR	13	3	3	+DE2301
48 -	+DE2301	1806	1808	1809	+DE2302
49 -	+DE2302	1734	1736	1737	+DE2303
50 -	+DE2303	1814	1816	1817	
51 -	DESVAR	14	3	3	+DE2401
52 -	+DE2401	1810	1812	1813	+DE2402
53 -	+DE2402	1738	1740	1741	+DE2403
54 -	+DE2403	1818	1820	1821	
55 -	DESVAR	15	3	3	+DE2501
56 -	+DE2501	55	57	59	+DE2502
57 -	+DE2502	195	197	199	+DE2503
58 -	+DE2503	125	127	129	
59 -	DESVAR	16	3	3	+DE2601
60 -	+DE2601	389	52	54	+DE2602
61 -	+DE2602	309	192	194	+DE2603
62 -	+DE2603	316	122	124	
63 -	DESVAR	17	3	3	+DE2701
64 -	+DE2701	394	392	390	+DE2702
65 -	+DE2702	269	285	301	+DE2703
66 -	+DE2703	276	292	308	
67 -	DESVAR	18	3	3	+DE2801
68 -	+DE2801	399	397	395	+DE2802
69 -	+DE2802	229	245	261	+DE2803
70 -	+DE2803	236	252	268	
71 -	DESVAR	19	3	3	+DE2901
72 -	+DE2901	522	514	400	+DE2902
73 -	+DE2902	461	477	221	+DE2903
74 -	+DE2903	468	484	228	
75 -	DESVAR	20	3	3	+DE3001
76 -	+DE3001	609	611	612	+DE3002
77 -	+DE3002	557	573	581	+DE3003
78 -	+DE3003	564	580	588	
79 -	DESVAR	21	3	3	+DE3101
80 -	+DE3101	941	938	717	+DE3102
81 -	+DE3102	1254	1257	757	+DE3103
82 -	+DE3103	1205	1208	764	
83 -	DESVAR	22	3	3	+DE3201
84 -	+DE3201	1591	944	942	+DE3202
85 -	+DE3202	1623	1251	1253	+DE3203
86 -	+DE3203	1679	1202	1204	
87 -	DESVAR	23	3	3	+DE3301
88 -	+DE3301	1597	1594	1592	+DE3302
89 -	+DE3302	1629	1626	1624	+DE3303
90 -	+DE3303	1685	1683	1680	
91 -	DESVAR	24	3	3	+DE3401
92 -	+DE3401	834	824	804	+DE3402
93 -	+DE3402	827	817	797	+DE3403
94 -	+DE3403	1347	1346	1344	
95 -	DESVAR	25	3	3	+DE3501
96 -	+DE3501	794	784	774	+DE3502
97 -	+DE3502	787	777	767	+DE3503

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193 -	PANLST2 13		1686	1687	1688	1689	1694	1695	+CON
194 -	+CON 1696	1697	1702	1703	1704	1705	1710	1711	+CON
195 -	+CON 1712	1713	1718	1719	1720	1721	1726	1727	+CON
196 -	+CON 1728	1729	1734	1735	1736	1737	1742	1743	+CON
197 -	+CON 1744	1745	1750	1751	1752	1753	1758	1759	+CON
198 -	+CON 1760	1761	1766	1767	1768	1769	1774	1775	+CON
199 -	+CON 1776	1777	1782	1783	1784	1785	1790	1791	+CON
200 -	+CON 1792	1793	1798	1799	1800	1801	1806	1807	+CON
201 -	+CON 1808	1809	1814	1815	1816	1817	1822	1823	+CON
202 -	+CON 1824	1825	1830	1831	1832	1833	1838	1839	+CON
203 -	+CON 1840	1841	1846	1847	1848	1849			
204 -	PANLST2 14		1690	1691	1692	1693	1698	1699	+PN2401
205 -	+PN2401 1700	1701	1706	1707	1708	1709	1714	1715	+PN2402
206 -	+PN2402 1716	1717	1722	1723	1724	1725	1730	1731	+PN2403
207 -	+PN2403 1732	1733	1738	1739	1740	1741	1746	1747	+PN2404
208 -	+PN2404 1748	1749	1754	1755	1756	1757	1762	1763	+PN2405
209 -	+PN2405 1764	1765	1770	1771	1772	1773	1778	1779	+PN2406
210 -	+PN2406 1780	1781	1786	1787	1788	1789	1794	1795	+PN2407
211 -	+PN2407 1796	1797	1802	1803	1804	1805	1810	1811	+PN2408
212 -	+PN2408 1812	1813	1818	1819	1820	1821	1826	1827	+PN2409
213 -	+PN2409 1828	1829	1834	1835	1836	1837	1842	1843	+PN2410
214 -	+PN2410 1844	1845	1850	1851	1852	1853	1854	1855	+PN2411
215 -	+PN2411 1856	1857	1862	1863	1864	1865	1870	1871	+PN2412
216 -	+PN2412 1872	1873	1878	1879	1880	1881	1929	1930	+PN2413
217 -	+PN2413 1931	1933							
218 -	PANLST2 15		45	46	47	48	49	55	+PN2501
219 -	+PN2501 56	57	58	59	85	86	87	88	+PN2502
220 -	+PN2502 89	95	96	97	98	99	105	106	+PN2503
221 -	+PN2503 107	108	109	115	116	117	118	119	+PN2504
222 -	+PN2504 125	126	127	128	129	135	136	137	+PN2505
223 -	+PN2505 138	139	145	146	147	148	149	155	+PN2506
224 -	+PN2506 156	157	158	159	165	166	167	168	+PN2507
225 -	+PN2507 169	175	176	177	178	179	185	186	+PN2508
226 -	+PN2508 187	188	189	195	196	197	198	199	
227 -	PANLST2 16		41	42	43	44	51	52	+PN2601
228 -	+PN2601 53	54	81	82	83	84	91	92	+PN2602
229 -	+PN2602 93	94	101	102	103	104	111	112	+PN2603
230 -	+PN2603 113	114	121	122	123	124	131	132	+PN2604
231 -	+PN2604 133	134	141	142	143	144	151	152	+PN2605
232 -	+PN2605 153	154	161	162	163	164	171	172	+PN2606
233 -	+PN2606 173	174	181	182	183	184	191	192	+PN2607
234 -	+PN2607 193	194	309	310	311	312	313	314	+PN2608
235 -	+PN2608 315	316	317	329	341	353	389	401	
236 -	PANLST2 17		269	270	271	272	273	274	+PN2701
237 -	+PN2701 275	276	277	278	279	280	281	282	+PN2702
238 -	+PN2702 283	284	285	286	287	288	289	290	+PN2703
239 -	+PN2703 291	292	293	294	295	296	297	298	+PN2704
240 -	+PN2704 299	300	301	302	303	304	305	306	+PN2705
241 -	+PN2705 307	308	318	319	320	321	322	330	+PN2706
242 -	+PN2706 331	332	333	334	342	343	344	345	+PN2707
243 -	+PN2707 346	354	355	356	357	358	390	391	+PN2708
244 -	+PN2708 392	393	394	402	403	404	405	406	
245 -	PANLST2 18		229	230	231	232	233	234	+PN2801
246 -	+PN2801 235	236	237	238	239	240	241	242	+PN2802
247 -	+PN2802 243	244	245	246	247	248	249	250	+PN2803
248 -	+PN2803 251	252	253	254	255	256	257	258	+PN2804
249 -	+PN2804 259	260	261	262	263	264	265	266	+PN2805
250 -	+PN2805 267	268	323	324	325	326	327	335	+PN2806
251 -	+PN2806 336	337	338	339	347	348	349	350	+PN2807
252 -	+PN2807 351	359	360	361	362	363	395	396	+PN2808
253 -	+PN2808 397	398	399	407	408	409	410	411	
254 -	PANLST2 19		221	222	223	224	225	226	+PN2901
255 -	+PN2901 227	228	328	340	352	364	400	412	+PN2902
256 -	+PN2902 461	462	463	464	465	466	467	468	+PN2903
257 -	+PN2903 469	470	471	472	473	474	475	476	+PN2904
258 -	+PN2904 477	478	479	480	481	482	483	484	+PN2905
259 -	+PN2905 485	486	487	488	489	490	491	492	+PN2906
260 -	+PN2906 493	494	495	496	497	498	499	500	+PN2907
261 -	+PN2907 501	502	503	504	505	506	507	508	+PN2908
262 -	+PN2908 509	510	513	514	517	518	521	522	
263 -	PANLST2 20		557	558	559	560	561	562	+PN3001
264 -	+PN3001 563	564	565	566	567	568	569	570	+PN3002
265 -	+PN3002 571	572	573	574	575	576	577	578	+PN3003
266 -	+PN3003 579	580	581	582	583	584	585	586	+PN3004
267 -	+PN3004 587	588	589	590	591	592	593	594	+PN3005
268 -	+PN3005 595	596	597	598	599	600	601	602	+PN3006
269 -	+PN3006 603	604	605	606	607	608	609	610	+PN3007
270 -	+PN3007 611	612							
271 -	PANLST2 21		717	718	719	720	721	722	+PN3101
272 -	+PN3101 723	724	725	726	727	728	729	730	+PN3102
273 -	+PN3102 731	732	733	734	735	736	737	738	+PN3103
274 -	+PN3103 739	740	741	742	743	744	745	746	+PN3104
275 -	+PN3104 747	748	749	750	751	752	753	754	+PN3105
276 -	+PN3105 755	756	757	758	759	760	761	762	+PN3106
277 -	+PN3106 763	764	938	939	940	941	945	946	+PN3107
278 -	+PN3107 947	948	952	953	954	955	959	960	+PN3108
279 -	+PN3108 961	962	1205	1206	1207	1208	1212	1213	+PN3109
280 -	+PN3109 1214	1215	1219	1220	1221	1222	1226	1227	+PN3110
281 -	+PN3110 1228	1229	1233	1234	1235	1236	1240	1241	+PN3111
282 -	+PN3111 1242	1243	1247	1248	1249	1250	1254	1255	+PN3112
283 -	+PN3112 1256	1257							
284 -	PANLST2 22		942	943	944	949	950	951	+PN3201
285 -	+PN3201 956	957	958	963	964	965	1202	1203	+PN3202
286 -	+PN3202 1204	1209	1210	1211	1216	1217	1218	1223	+PN3203
287 -	+PN3203 1224	1225	1230	1231	1232	1237	1238	1239	+PN3204

288 -	+PN3204	1244	1245	1246	1251	1252	1253	1590	1591	+PN3205
289 -	+PN3205	1598	1599	1606	1607	1614	1615	1622	1623	+PN3206
290 -	+PN3206	1630	1631	1638	1639	1646	1647	1654	1655	+PN3207
291 -	+PN3207	1662	1663	1670	1671	1678	1679			
292 -	PANLST2	23		1592	1593	1594	1595	1596	1597	+PN3301
293 -	+PN3301	1600	1601	1602	1603	1604	1605	1608	1609	+PN3302
294 -	+PN3302	1610	1611	1612	1613	1616	1617	1618	1619	+PN3303
295 -	+PN3303	1620	1621	1624	1625	1626	1627	1628	1629	+PN3304
296 -	+PN3304	1632	1633	1634	1635	1636	1637	1640	1641	+PN3305
297 -	+PN3305	1642	1643	1644	1645	1648	1649	1650	1651	+PN3306
298 -	+PN3306	1652	1653	1656	1657	1658	1659	1660	1661	+PN3307
299 -	+PN3307	1664	1665	1666	1667	1668	1669	1672	1673	+PN3308
300 -	+PN3308	1674	1675	1676	1677	1680	1681	1682	1683	+PN3309
301 -	+PN3309	1684	1685							
302 -	PANLST2	24		795	796	797	798	799	800	+PN3401
303 -	+PN3401	801	802	803	804	805	806	807	808	+PN3402
304 -	+PN3402	809	810	811	812	813	814	815	816	+PN3403
305 -	+PN3403	817	818	819	820	821	822	823	824	+PN3404
306 -	+PN3404	825	826	827	828	829	830	831	832	+PN3405
307 -	+PN3405	833	834	875	876	877	878	882	883	+PN3406
308 -	+PN3406	884	885	889	890	891	892	896	897	+PN3407
309 -	+PN3407	898	899	903	904	905	906	910	911	+PN3408
310 -	+PN3408	912	913	917	918	919	920	924	925	+PN3409
311 -	+PN3409	926	927	931	932	933	934	1309	1310	+PN3410
312 -	+PN3410	1311	1312	1316	1317	1318	1319	1323	1324	+PN3411
313 -	+PN3411	1325	1326	1330	1331	1332	1333	1337	1338	+PN3412
314 -	+PN3412	1339	1340	1344	1345	1346	1347			
315 -	PANLST2	25		765	766	767	768	769	770	+PN3501
316 -	+PN3501	771	772	773	774	775	776	777	778	+PN3502
317 -	+PN3502	779	780	781	782	783	784	785	786	+PN3503
318 -	+PN3503	787	788	789	790	791	792	793	794	+PN3504
319 -	+PN3504	879	880	881	886	887	888	893	894	+PN3505
320 -	+PN3505	895	900	901	902	907	908	909	914	+PN3506
321 -	+PN3506	915	916	921	922	923	928	929	930	+PN3507
322 -	+PN3507	935	936	937	1306	1307	1308	1313	1314	+PN3508
323 -	+PN3508	1315	1320	1321	1322	1327	1328	1329	1334	+PN3509
324 -	+PN3509	1335	1336	1341	1342	1343				
325 -	PANLST2	26		1394	1395	1396	1397	1402	1403	+PN3601
326 -	+PN3601	1404	1405	1410	1411	1412	1413	1418	1419	+PN3602
327 -	+PN3602	1420	1421	1426	1427	1428	1429	1434	1435	+PN3603
328 -	+PN3603	1436	1437	1442	1443	1444	1445	1450	1451	+PN3604
329 -	+PN3604	1452	1453	1458	1459	1460	1461	1466	1467	+PN3605
330 -	+PN3605	1468	1469	1470	1471	1472	1473	1478	1479	+PN3606
331 -	+PN3606	1480	1481	1486	1487	1488	1489	1494	1495	+PN3607
332 -	+PN3607	1496	1497	1502	1503	1504	1505	1510	1511	+PN3608
333 -	+PN3608	1512	1513	1518	1519	1520	1521	1526	1527	+PN3609
334 -	+PN3609	1528	1529	1534	1535	1536	1537	1542	1543	+PN3610
335 -	+PN3610	1544	1545	1550	1551	1552	1553	1558	1559	+PN3611
336 -	+PN3611	1560	1561	1566	1567	1568	1569	1574	1575	+PN3612
337 -	+PN3612	1576	1577	1582	1583	1584	1585	1918	1919	+PN3613
338 -	+PN3613	1920	1921							
339 -	PANLST2	27		1390	1391	1392	1393	1398	1399	+PN3701
340 -	+PN3701	1400	1401	1406	1407	1408	1409	1414	1415	+PN3702
341 -	+PN3702	1416	1417	1422	1423	1424	1425	1430	1431	+PN3703
342 -	+PN3703	1432	1433	1438	1439	1440	1441	1446	1447	+PN3704
343 -	+PN3704	1448	1449	1454	1455	1456	1457	1462	1463	+PN3705
344 -	+PN3705	1464	1465	1474	1475	1476	1477	1482	1483	+PN3706
345 -	+PN3706	1484	1485	1490	1491	1492	1493	1498	1499	+PN3707
346 -	+PN3707	1500	1501	1506	1507	1508	1509	1514	1515	+PN3708
347 -	+PN3708	1516	1517	1522	1523	1524	1525	1530	1531	+PN3709
348 -	+PN3709	1532	1533	1538	1539	1540	1541	1546	1547	+PN3710
349 -	+PN3710	1548	1549	1554	1555	1556	1557	1562	1563	+PN3711
350 -	+PN3711	1564	1565	1570	1571	1572	1573	1578	1579	+PN3712
351 -	+PN3712	1580	1581	1586	1587	1588	1589	1922	1923	+PN3713
352 -	+PN3713	1924	1932							
353 -	PANLST2	28		1882	1883	1884	1885	1874	1875	CONT
354 -	CONT	1876	1877	1866	1867	1868	1869	1858	1859	CONT
355 -	CONT	1860	1861							
356 -	PANLST2	29		681	682	683	684	685	686	+CON
357 -	+CON	687	688	689	690	691	692	693	694	+CON
358 -	+CON	695	696	697	698	699	700	835	836	+CON
359 -	+CON	837	838	839	840	841	842	843	844	+CON
360 -	+CON	845	846	847	848	849	850	851	852	+CON
361 -	+CON	853	854	855	856	857	858	859	860	+CON
362 -	+CON	861	862	863	864	865	866	867	868	+CON
363 -	+CON	869	870	871	872	873	874	1258	1259	+CON
364 -	+CON	1260	1261	1262	1263	1264	1265	1266	1267	+CON
365 -	+CON	1268	1269	1270	1271	1272	1273			
366 -	PANLST2	30		10001	10002	10003	10004	10005	10006	+CON
367 -	+CON	10007	10008	10009	10010	10011	10012	10013	10014	+CON
368 -	+CON	10015	10016	10017	10018	10019	10020	10021	10022	+CON
369 -	+CON	10023	10024	10025	10026	10027	10028	10029	10030	+CON
370 -	+CON	10031	10032	10033	10034	10035	10036	10037	10038	+CON
371 -	+CON	10039	10040	10041	10042	10043	10044	10045	10046	+CON
372 -	+CON	10047	10048	10049	10050	10051	10052	10053	10054	+CON
373 -	+CON	10055	10056	10057	10058	10059	10060	10061	10062	+CON
374 -	+CON	10063	10064	10065	10066	10067	10068	10069	10070	+CON
375 -	+CON	10071	10072	10073	10074	10075	10076	10077	10078	+CON
376 -	+CON	10079	10080	10081	10082	10083	10084	10085	10086	+CON
377 -	+CON	10087	10088	10089	10090	10091	10092	10093	10094	+CON
378 -	+CON	10095	10096	10097	10098	10099	10100	10101	10102	+CON
379 -	+CON	10103	10104	10105	10106	10107	10108	10109	10110	+CON
380 -	+CON	10111	10112	10113	10114	10115	10116	10117	10118	+CON
381 -	+CON	10119	10120	10121	10122	10123	10124	10125	10126	+CON
382 -	+CON	10127	10128	10129	10130	10131	10132	10133	10134	+CON

383 -	+CON	10135	10136	10137	10138	10139	10140	10141	10142	+CON
384 -	+CON	10143	10144	10145	10146	10147	10148	10149	10150	+CON
385 -	+CON	10151	10152	10153	10154	10155	10156	10157	10158	+CON
386 -	+CON	10159	10160	10161	10162	10163	10164	10165	10166	+CON
387 -	+CON	10167	10168	10169	10170	10171	10172	10173	10174	+CON
388 -	+CON	10175	10176	10177	10178	10179	10180	10181	10182	+CON
389 -	+CON	10183	10184	10185	10186	10187	10188	10189	10190	+CON
390 -	+CON	10191	10192	10193	10194	10195	10196	10197	10198	+CON
391 -	+CON	10199	10200	10201	10202	10203	10204	10205	10206	+CON
392 -	+CON	10207	10208	10209	10210	10421	10422	10423	10424	+CON
393 -	+CON	10425	10426	10427	10428	10429	10430	10431	10432	+CON
394 -	+CON	10433	10434	10435						
395 -	PANLST2	101		130	201	90	209	4	220	CONT
396 -	CONT	170								
397 -	PANLST2	102		8	6	69	20	18	66	CONT
398 -	CONT	32	30	63	413	437	377			
399 -	PANLST2	104		418	416	414	442	440	438	+PA1403
400 -	+PA1403	382	380	378						
401 -	PANLST2	105		423	421	419	447	445	443	+PA1503
402 -	+PA1503	387	385	383						
403 -	PANLST2	106		1949	1951	424	1941	1943	448	+PA1603
404 -	+PA1603	523	515	388						
405 -	PANLST2	107		633	635	636	625	627	628	+PA1703
406 -	+PA1703	613	615	616						
407 -	PANLST2	108		1195	1198	1201	1180	1184	1187	+PA1803
408 -	+PA1803	1174	1177	1181						
409 -	PANLST2	109		1910	1914	1917	1894	1898	1901	+PA1903
410 -	+PA1903	1886	1890	1893						
411 -	PANLST2	110		1290	1291	1292	1293	1017	1018	CONT
412 -	CONT	1019	1020	1037	1038	1039	1040	677	678	CONT
413 -	CONT	679	680							
414 -	PANLST2	111		1383	1385	1386	1107	1087	1077	+PA2103
415 -	+PA2103	1141	1131	1126						
416 -	PANLST2	112		1387	1388	1389	1067	1057	1047	+PA2203
417 -	+PA2203	1121	1116	1111						
418 -	PANLST2	113		1806	1808	1809	1734	1736	1737	+PA2303
419 -	+PA2303	1814	1816	1817						
420 -	PANLST2	114		1810	1812	1813	1738	1740	1741	+PA2403
421 -	+PA2403	1818	1820	1821						
422 -	PANLST2	115		55	57	59	195	197	199	+PA2503
423 -	+PA2503	125	127	129						
424 -	PANLST2	116		389	52	54	309	192	194	+PA2603
425 -	+PA2603	316	122	124						
426 -	PANLST2	117		394	392	390	269	285	301	+PA2703
427 -	+PA2703	276	292	308						
428 -	PANLST2	118		399	397	395	229	245	261	+PA2803
429 -	+PA2803	236	252	268						
430 -	PANLST2	119		522	514	400	461	477	221	+PA2903
431 -	+PA2903	468	484	228						
432 -	PANLST2	120		609	611	612	557	573	581	+PA3003
433 -	+PA3003	564	580	588						
434 -	PANLST2	121		941	938	717	1254	1257	757	+PA3103
435 -	+PA3103	1205	1208	764						
436 -	PANLST2	122		1591	944	942	1623	1251	1253	+PA3203
437 -	+PA3203	1679	1202	1204						
438 -	PANLST2	123		1597	1594	1592	1629	1626	1624	+PA3303
439 -	+PA3303	1685	1683	1680						
440 -	PANLST2	124		834	824	804	827	817	797	+PA3403
441 -	+PA3403	1347	1346	1344						
442 -	PANLST2	125		794	784	774	787	777	767	+PA3503
443 -	+PA3503	1343	1342	1341						
444 -	PANLST2	126		1397	1396	1394	1453	1452	1450	+PA3603
445 -	+PA3603	1470	1471	1472						
446 -	PANLST2	127		1393	1392	1390	1449	1448	1446	+PA3703
447 -	+PA3703	1474	1475	1477						
448 -	PANLST2	128		1882	1885	1874	1877	1866	1869	CONT
449 -	CONT	1858	1861							
450 -	PANLST2	129		1273	1272	1271	1270	840	850	CONT
451 -	CONT	860	870	835	845	855	865	697	698	CONT
452 -	CONT	699	700							
453 -	PANLST2	130		10210	10201	10196	10105	10096	10091	CONT
454 -	CONT	10015	10006	10001						
455 -	PATCH	1	1	101						
456 -	PATCH	2	2	102						
457 -	PATCH	4	4	104			1			
458 -	PATCH	5	5	105			1			
459 -	PATCH	6	6	106			1			
460 -	PATCH	7	7	107			1			
461 -	PATCH	8	8	108			1			
462 -	PATCH	9	9	109			1			
463 -	PATCH	10	10	110			1			
464 -	PATCH	11	11	111			1			
465 -	PATCH	12	12	112			1			
466 -	PATCH	13	13	113						
467 -	PATCH	14	14	114			1			
468 -	PATCH	15	15	115			1			
469 -	PATCH	16	16	116			1			
470 -	PATCH	17	17	117			1			
471 -	PATCH	18	18	118			1			
472 -	PATCH	19	19	119			1			
473 -	PATCH	20	20	120			1			
474 -	PATCH	21	21	121			1			
475 -	PATCH	22	22	122			1			
476 -	PATCH	23	23	123			1			
477 -	PATCH	24	24	124			1			

478 -	PATCH	25	25	125		1					
479 -	PATCH	26	26	126		1					
480 -	PATCH	27	27	127		1					
481 -	PATCH	28	28	128		1					
482 -	PATCH	29	29	129		1					
483 -	PATCH	30	30	130		1					
484 -	PLTAERO	1	YES	NO			TECPL0T	MICRO_X_GEO.PLT			
485 -	PLTAERO	1	YES	NO			NASTRAN	MICRO_X_GEO.NAS			
486 -	PLTTPS	-2	1	ALL			TECPL0T	MICRO_X_HT1.PLT	-30.		
487 -	PLTTPS	1	1	ALL			TECPL0T	MICRO_X_HT.PLT	0.05		
488 -	PRVAL	4									
489 -	PODRSM	1	1				SAVE	MICRO-X	1.RST	CONT	
490 -	CONT	CPPODRSM	.P3D	UPODRSM	.P3D		VPPODRSM	.P3D	WPODRSM	.P3D	
491 -	STTYPE	11	6	256						CONT	
492 -	CONT	0.03									
493 -	STTYPE	12	2	129	129					CONT	
494 -	CONT	0.03	0.03	0.5							
495 -	STTYPE	13	1	225						CONT	
496 -	CONT	2.0									
497 -	STTYPE	14	6	245						CONT	
498 -	CONT	0.008									
499 -	STTYPE	15	1	247						CONT	
500 -	CONT	0.16									
501 -	STTYPE	21	6	221						CONT	
502 -	CONT	0.05									
503 -	STTYPE	22	1	225						CONT	
504 -	CONT	3.0									
505 -	STTYPE	23	6	245						CONT	
506 -	CONT	0.008									
507 -	STTYPE	24	1	247						CONT	
508 -	CONT	0.16									
509 -	STTYPE	42	1	224						CONT	
510 -	CONT	3.0									
511 -	THERMPR	1	100F								
512 -	TIMESP	1	0.0	190.0	310.0	470.0	630.0	790.0	950.	CONT	
513 -	CONT	1110.0	1270.0	1430.0	1590.0	1750.0	1950.0				
514 -	TPSDES	1	1	2						CONT	
515 -	CONT	1	2	30	4	5	6	7	8	CONT	
516 -	CONT	9	10	11	12	13	14	15	16	CONT	
517 -	CONT	17	18	19	20	21	22	23	24	CONT	
518 -	CONT	25	26	27	28	29					
519 -	TPSSYM	1	1	5	4					CONT	
520 -	CONT	1	11	0.01	2.					CONT	
521 -	CONT	1	12	0.01	1.28333					CONT	
522 -	CONT	1	13	1.0	10.					CONT	
523 -	CONT	1	14	0.001	1.28333					CONT	
524 -	CONT	1	15	0.05	1.28333						
525 -	TPSSYM	2	2	4	4					CONT	
526 -	CONT	2	21	0.01	2.					CONT	
527 -	CONT	2	22	1.	10.					CONT	
528 -	CONT	2	23	0.001	1.5					CONT	
529 -	CONT	2	24	0.05	1.28333						
530 -	TPSSYM	4	4	4	4					CONT	
531 -	CONT	4	21	0.01	2.					CONT	
532 -	CONT	4	42	1.0	10.					CONT	
533 -	CONT	4	23	0.001	1.5					CONT	
534 -	CONT	4	24	0.05	1.4						
535 -	TPSSYM	5	5	4	4					CONT	
536 -	CONT	5	21	0.01	2.					CONT	
537 -	CONT	5	42	1.0	10.					CONT	
538 -	CONT	5	23	0.001	1.5					CONT	
539 -	CONT	5	24	0.05	1.4						
540 -	TPSSYM	6	6	4	4					CONT	
541 -	CONT	6	21	0.01	2.					CONT	
542 -	CONT	6	42	1.0	10.					CONT	
543 -	CONT	6	23	0.001	1.5					CONT	
544 -	CONT	6	24	0.05	1.4						
545 -	TPSSYM	7	7	4	4					CONT	
546 -	CONT	7	21	0.01	2.					CONT	
547 -	CONT	7	42	1.0	10.					CONT	
548 -	CONT	7	23	0.001	1.5					CONT	
549 -	CONT	7	24	0.05	1.4						
550 -	TPSSYM	8	8	4	4					CONT	
551 -	CONT	8	21	0.01	2.					CONT	
552 -	CONT	8	42	1.0	10.					CONT	
553 -	CONT	8	23	0.001	1.5					CONT	
554 -	CONT	8	24	0.05	1.4						
555 -	TPSSYM	9	9	4	4					CONT	
556 -	CONT	9	21	0.01	2.					CONT	
557 -	CONT	9	42	1.0	10.					CONT	
558 -	CONT	9	23	0.001	1.5					CONT	
559 -	CONT	9	24	0.05	1.4						
560 -	TPSSYM	10	10	5	4					CONT	
561 -	CONT	10	11	0.01	2.					CONT	
562 -	CONT	10	12	0.01	1.28333					CONT	
563 -	CONT	10	13	1.0	10.					CONT	
564 -	CONT	10	14	0.001	1.28333					CONT	
565 -	CONT	10	15	0.05	1.28333						
566 -	TPSSYM	11	11	4	4					CONT	
567 -	CONT	11	21	0.01	2.					CONT	
568 -	CONT	11	42	1.0	10.					CONT	
569 -	CONT	11	23	0.001	1.5					CONT	
570 -	CONT	11	24	0.05	1.4						
571 -	TPSSYM	12	12	4	4					CONT	
572 -	CONT	12	21	0.01	2.					CONT	

573 -	CONT	12	42	1.0	10.	CONT
574 -	CONT	12	23	0.001	1.5	CONT
575 -	CONT	12	24	0.05	1.4	
576 -	TPSSYM	13	13	4	4	CONT
577 -	CONT	13	21	0.01	2.	CONT
578 -	CONT	13	42	1.0	10.	CONT
579 -	CONT	13	23	0.001	1.5	CONT
580 -	CONT	13	24	0.05	1.4	
581 -	TPSSYM	14	14	4	4	CONT
582 -	CONT	14	21	0.01	2.	CONT
583 -	CONT	14	42	1.0	10.	CONT
584 -	CONT	14	23	0.001	1.5	CONT
585 -	CONT	14	24	0.05	1.4	
586 -	TPSSYM	15	15	4	4	CONT
587 -	CONT	15	21	0.01	2.	CONT
588 -	CONT	15	42	1.0	10.	CONT
589 -	CONT	15	23	0.001	1.5	CONT
590 -	CONT	15	24	0.05	1.4	
591 -	TPSSYM	16	16	4	4	CONT
592 -	CONT	16	21	0.01	2.	CONT
593 -	CONT	16	42	1.0	10.	CONT
594 -	CONT	16	23	0.001	1.5	CONT
595 -	CONT	16	24	0.05	1.4	
596 -	TPSSYM	17	17	4	4	CONT
597 -	CONT	17	21	0.01	2.	CONT
598 -	CONT	17	42	1.0	10.	CONT
599 -	CONT	17	23	0.001	1.5	CONT
600 -	CONT	17	24	0.05	1.4	
601 -	TPSSYM	18	18	4	4	CONT
602 -	CONT	18	21	0.01	2.	CONT
603 -	CONT	18	42	1.0	10.	CONT
604 -	CONT	18	23	0.001	1.5	CONT
605 -	CONT	18	24	0.05	1.4	
606 -	TPSSYM	19	19	4	4	CONT
607 -	CONT	19	21	0.01	2.	CONT
608 -	CONT	19	42	1.0	10.	CONT
609 -	CONT	19	23	0.001	1.5	CONT
610 -	CONT	19	24	0.05	1.4	
611 -	TPSSYM	20	20	4	4	CONT
612 -	CONT	20	21	0.01	2.	CONT
613 -	CONT	20	42	1.0	10.	CONT
614 -	CONT	20	23	0.001	1.5	CONT
615 -	CONT	20	24	0.05	1.4	
616 -	TPSSYM	21	21	4	4	CONT
617 -	CONT	21	21	0.01	2.	CONT
618 -	CONT	21	42	1.0	10.	CONT
619 -	CONT	21	23	0.001	1.5	CONT
620 -	CONT	21	24	0.05	1.4	
621 -	TPSSYM	22	22	4	4	CONT
622 -	CONT	22	21	0.01	2.	CONT
623 -	CONT	22	42	1.0	10.	CONT
624 -	CONT	22	23	0.001	1.5	CONT
625 -	CONT	22	24	0.05	1.4	
626 -	TPSSYM	23	23	4	4	CONT
627 -	CONT	23	21	0.01	2.	CONT
628 -	CONT	23	42	1.0	10.	CONT
629 -	CONT	23	23	0.001	1.5	CONT
630 -	CONT	23	24	0.05	1.4	
631 -	TPSSYM	24	24	4	4	CONT
632 -	CONT	24	21	0.01	2.	CONT
633 -	CONT	24	42	1.0	10.	CONT
634 -	CONT	24	23	0.001	1.5	CONT
635 -	CONT	24	24	0.05	1.4	
636 -	TPSSYM	25	25	4	4	CONT
637 -	CONT	25	21	0.01	2.	CONT
638 -	CONT	25	42	1.0	10.	CONT
639 -	CONT	25	23	0.001	1.5	CONT
640 -	CONT	25	24	0.05	1.4	
641 -	TPSSYM	26	26	4	4	CONT
642 -	CONT	26	21	0.01	2.	CONT
643 -	CONT	26	42	1.0	10.	CONT
644 -	CONT	26	23	0.001	1.5	CONT
645 -	CONT	26	24	0.05	1.4	
646 -	TPSSYM	27	27	4	4	CONT
647 -	CONT	27	21	0.01	2.	CONT
648 -	CONT	27	42	1.0	10.	CONT
649 -	CONT	27	23	0.001	1.5	CONT
650 -	CONT	27	24	0.05	1.4	
651 -	TPSSYM	28	28	4	4	CONT
652 -	CONT	28	21	0.01	2.	CONT
653 -	CONT	28	42	1.0	10.	CONT
654 -	CONT	28	23	0.001	1.5	CONT
655 -	CONT	28	24	0.05	1.4	
656 -	TPSSYM	29	29	5	4	CONT
657 -	CONT	29	11	0.01	2.	CONT
658 -	CONT	29	12	0.01	1.28333	CONT
659 -	CONT	29	13	1.0	10.	CONT
660 -	CONT	29	14	0.001	1.28333	CONT
661 -	CONT	29	15	0.05	1.28333	
662 -	TPSSYM	30	30	5	4	CONT
663 -	CONT	30	11	0.01	2.	CONT
664 -	CONT	30	12	0.01	1.28333	CONT
665 -	CONT	30	13	1.0	10.	CONT
666 -	CONT	30	14	0.001	1.28333	CONT
667 -	CONT	30	15	0.05	1.28333	

668 -	TRAJCT	1	1				CONT
669 -	CONT	0.0	26.800	4800000.10.0	TECPL0T CPTEMP1.PLT		CONT
670 -	CONT	30.0	26.900	4572000.30.0			CONT
671 -	CONT	70.0	26.900	4260000.30.0			CONT
672 -	CONT	110.0	26.900	3948000.30.0			CONT
673 -	CONT	150.0	26.900	3636000.30.0			CONT
674 -	CONT	190.0	26.600	3336000.30.0			CONT
675 -	CONT	230.0	25.600	2748000.30.0			CONT
676 -	CONT	270.0	24.900	3012000.30.0			CONT
677 -	CONT	310.0	24.700	3108000.30.0			CONT
678 -	CONT	350.0	25.100	3300000.30.0			CONT
679 -	CONT	390.0	25.400	3492000.30.0			CONT
680 -	CONT	430.0	25.300	3648000.30.0			CONT
681 -	CONT	470.0	25.300	3756000.30.0			CONT
682 -	CONT	510.0	25.200	3792000.30.0			CONT
683 -	CONT	550.0	25.200	3768000.30.0			CONT
684 -	CONT	590.0	25.200	3672000.30.0			CONT
685 -	CONT	630.0	25.200	3528000.30.0			CONT
686 -	CONT	670.0	24.800	3324000.30.0			CONT
687 -	CONT	710.0	23.900	3108000.30.0			CONT
688 -	CONT	750.0	23.100	2952000.30.0			CONT
689 -	CONT	790.0	22.500	2940000.30.0			CONT
690 -	CONT	830.0	22.300	3048000.30.0			CONT
691 -	CONT	870.0	22.400	3168000.30.0			CONT
692 -	CONT	910.0	22.400	3240000.30.0			CONT
693 -	CONT	950.0	22.200	3228000.30.0			CONT
694 -	CONT	990.0	21.700	3120000.30.0	TECPL0T CPTEMP2.PLT		CONT
695 -	CONT	1030.0	21.000	2964000.30.0			CONT
696 -	CONT	1070.0	20.100	2820000.30.0			CONT
697 -	CONT	1110.0	19.400	2796000.30.0			CONT
698 -	CONT	1150.0	18.900	2868000.30.0			CONT
699 -	CONT	1190.0	18.600	2916000.30.0			CONT
700 -	CONT	1230.0	18.200	2904000.30.0			CONT
701 -	CONT	1270.0	17.500	2808000.30.0			CONT
702 -	CONT	1310.0	16.500	2688000.30.0			CONT
703 -	CONT	1350.0	15.500	2616000.30.0			CONT
704 -	CONT	1390.0	14.800	2628000.30.0			CONT
705 -	CONT	1430.0	14.100	2640000.30.0			CONT
706 -	CONT	1470.0	13.300	2592000.30.0			CONT
707 -	CONT	1510.0	12.400	2496000.30.0			CONT
708 -	CONT	1550.0	11.400	2400000.30.0			CONT
709 -	CONT	1590.0	10.300	2352000.30.0	TECPL0T CPTEMP3.PLT		CONT
710 -	CONT	1630.0	9.400	2316000.30.0			CONT
711 -	CONT	1670.0	8.480	2256000.30.0			CONT
712 -	CONT	1710.0	7.490	2148000.30.0			CONT
713 -	CONT	1750.0	6.440	2040000.30.0			CONT
714 -	CONT	1790.0	5.470	1932000.30.0			CONT
715 -	CONT	1830.0	4.550	1824000.30.0			CONT
716 -	CONT	1870.0	3.710	1716000.30.0			CONT
717 -	CONT	1910.0	2.890	1572000.30.0			CONT
718 -	CONT	1950.0	2.140	1428000.30.0			CONT
719 -	TRJLST	1					CONT
720 -	CONT	1	1.				
721 -	ENDDATA						

```

*****
*                                     *
*      SUBCASE      =      1      *
*      DISCIPLINE   = TPSDES      *
*      BULK ENTRY ID =      1      *
*                                     *
*****

```

OPTIMIZATION SYSTEM FOR TPSSYM = 1

OBJECTIVE FUNCTION VS ITERATIONS FOR NODE = 1

1	1.000000
2	0.8619470
3	0.6555990
4	0.1992105
5	0.1927428
6	0.1787381
7	0.1509816
8	0.1098324
9	0.1873981
10	0.1098324
11	0.1178954
12	0.1161861
13	0.1148047
14	0.1403729
15	0.1130093
16	0.1380401
17	0.1122150
18	0.1384899
19	0.1128107
20	0.1381724
21	0.1148047
22	0.1228500

23 0.1168473
24 0.1151548
25 0.1148693
26 0.1193772
27 0.1157456
28 0.1149580
29 0.1156361
30 0.1149406
31 0.1148047
32 0.1148604

OBJECTIVE FUNCTION VS ITERATIONS FOR NODE = 2

1 1.000000
2 0.8619470
3 0.6555990
4 0.1992105
5 0.1927428
6 0.1787381
7 0.1509816
8 0.1098324
9 0.1619511
10 0.1482310
11 0.1384977
12 0.1466411
13 0.1498380
14 0.1513185
15 0.1521285
16 0.1525497
17 0.1433644
18 0.1459661
19 0.1466090
20 0.1430387
21 0.1457928
22 0.1466051
23 0.1431651
24 0.1458006
25 0.1465679
26 0.1445534
27 0.1487602
28 0.1470972
29 0.1476513
30 0.1454385
31 0.1466468
32 0.1459758
33 0.1464297
34 0.1459539
35 0.1464241
36 0.1451332
37 0.1491063
38 0.1485837
39 0.1457786
40 0.1474750
41 0.1456173
42 0.1480470
43 0.1457383
44 0.1477097
45 0.1464241

OBJECTIVE FUNCTION VS ITERATIONS FOR NODE = 3

1 1.000000
2 0.8619470
3 0.6555990
4 0.1992105
5 0.1927428
6 0.1787381
7 0.1509816
8 0.1943640
9 0.1098324
10 0.1613127
11 0.1542900
12 0.1434504
13 0.1544319
14 0.1589835
15 0.1613415
16 0.1626578
17 0.1634029
18 0.1638218
19 0.1640624
20 0.1488702
21 0.1525284
22 0.1534407
23 0.1537016
24 0.1499756
25 0.1529160
26 0.1537117
27 0.1539558
28 0.1487054
29 0.1525009
30 0.1534694
31 0.1538033
32 0.1522575
33 0.1526673
34 0.1549307
35 0.1524106
36 0.1530485

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37 0.1536698
38 0.1522680
39 0.1531929
40 0.1523351
41 0.1496977
42 0.1558923
43 0.1509828
44 0.1540505
45 0.1468836
46 0.1551150
47 0.1547381
48 0.1519669
49 0.1524779
50 0.1496977
51 0.1558923
52 0.1509828
53 0.1540505
54 0.1468836
55 0.1551150
56 0.1547381
57 0.1519669
58 0.1524779
59 0.1522680
60 0.1524107
61 0.1525274

```

OBJECTIVE FUNCTION VS ITERATIONS FOR NODE = 4

```

1 1.000000
2 0.8619470
3 0.6555990
4 0.1992105
5 0.1927428
6 0.1787381
7 0.1509816
8 0.1875214
9 0.1098324
10 0.1657731
11 0.1599743
12 0.1479175
13 0.1617407
14 0.1678228
15 0.1711528
16 0.1731032
17 0.1743192
18 0.1750919
19 0.1755755
20 0.1758803
21 0.1539459
22 0.1590738
23 0.1607162
24 0.1613934
25 0.1616629
26 0.1555961
27 0.1593449
28 0.1577646
29 0.1585333
30 0.1582286
31 0.1585263
32 0.1592863
33 0.1585323
34 0.1587316
35 0.1584627
36 0.1546549
37 0.1660913
38 0.1692441
39 0.1705153
40 0.1710598
41 0.1565588
42 0.1610985
43 0.1620035
44 0.1560828
45 0.1621306
46 0.1633436
47 0.1636883
48 0.1564398
49 0.1612751
50 0.1623059
51 0.1625859
52 0.1584627
53 0.1585535

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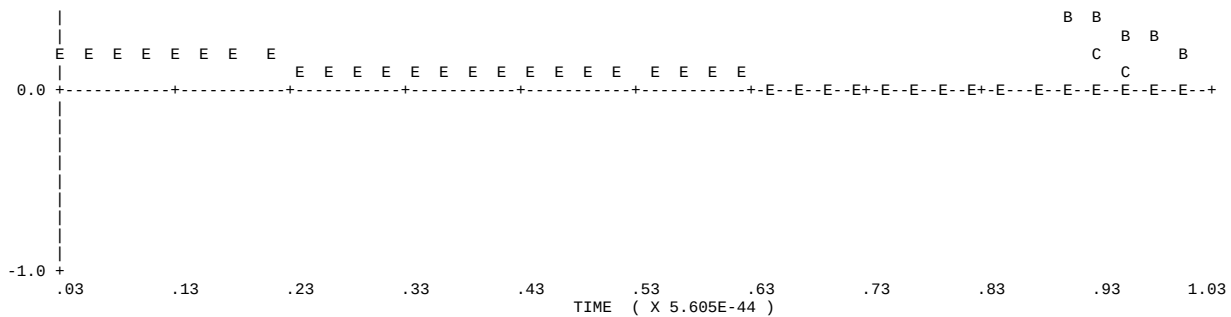
TOTAL NUMBER OF DESIGN VARIABLES = 30
 TOTAL NUMBER OF CONSTRAINS = 1740
 TOTAL NUMBER OF TEMP. CONSTRAINS = 1400
 TOTAL NUMBER OF TEMP. PRINTOUTS = 40

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES

```

X 0.2798E+04
1.0 B
| B B
C C B B B B B B B B
| C C C C C C C C C C C C C C B B B B B
| C C C C C C C C C C C C C C C C C C C C C C C C C C
|

```



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4	5
Tmax:	2800.33	2900.33	2700.33	550.33	600.33
Optv:	2797.91	2797.91	2122.77	549.98	549.98

VALUES OF DESIGN VARIABLES :

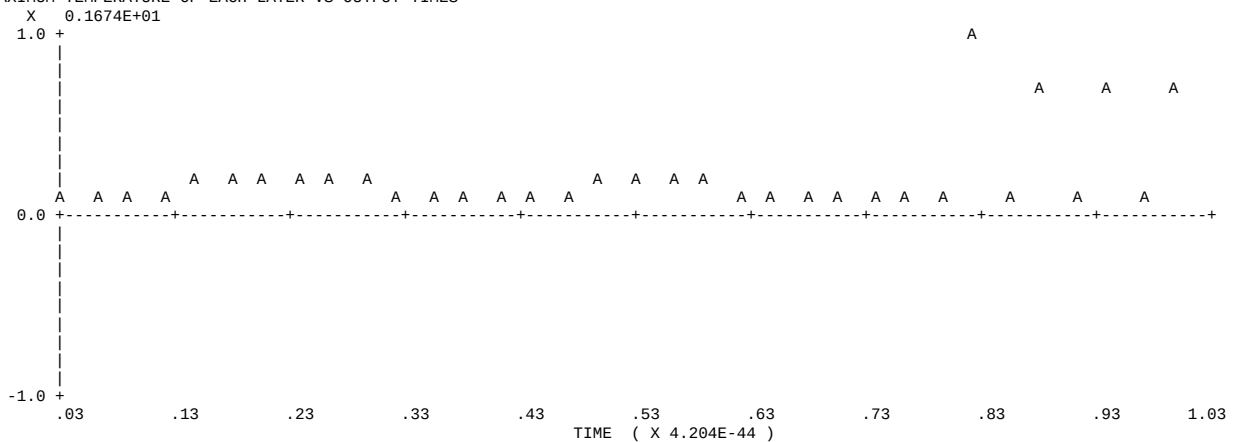
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06
1	0.03287	0.03064	0.04464	0.04156	0.26692	0.23816
2	0.01000	0.01000	0.01000	0.04437	0.01000	0.01000
3	1.00000	1.25496	1.37562	1.46831	1.57187	1.97282
4	0.01488	0.04355	0.03019	0.02513	0.03313	0.00103
5	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 852.1166992

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.2050737

THE TOTAL OPTIMAL WEIGHT = 1.95336740E+04

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



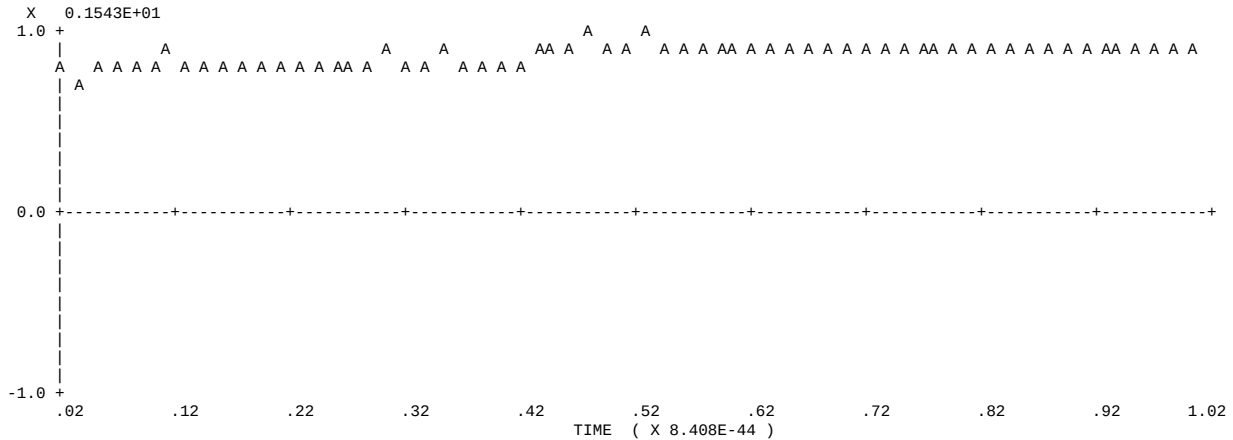
OPTIMAL STRUCTURES OF TPS FOR PATCH = 1
(WITH AVERAGE THICKNESS)

=====	ACC(N)	thin skin	0.09516 in.	2797.9 F
=====	0.03000 in. ZIRCONIUM			
-----		radiation gap	0.01491 in.	2797.9 F
-----	0.03000 in. ZIRCONIUM			
=====	LI-2200 (N)	slab	1.41006 in.	2122.8 F
=====	RTV-560	thin skin	0.02467 in.	550.0 F
=====	17 LB SIP .16 IN	slab	0.05000 in.	550.0 F
=====				

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 1

PANEL	LAYER01	LAYER02	LAYER03	LAYER04	LAYER05
201	0.03064	0.01000	1.25496	0.04355	0.05000
202	0.01912	0.01879	1.24416	0.03887	0.05000

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



OPTIMAL STRUCTURES OF TPS FOR PATCH = 2
(WITH AVERAGE THICKNESS)

=====	=====	=====	=====
HRSI COAT	thin skin	0.38616 in.	2283.9 F
=====	=====	=====	=====
LI-2200 (N)	slab	2.25364 in.	2283.9 F
=====	=====	=====	=====
RTV-560	thin skin	0.14783 in.	483.6 F
=====	=====	=====	=====
17 LB SIP .16 IN	slab	0.27324 in.	483.6 F
=====	=====	=====	=====

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 2

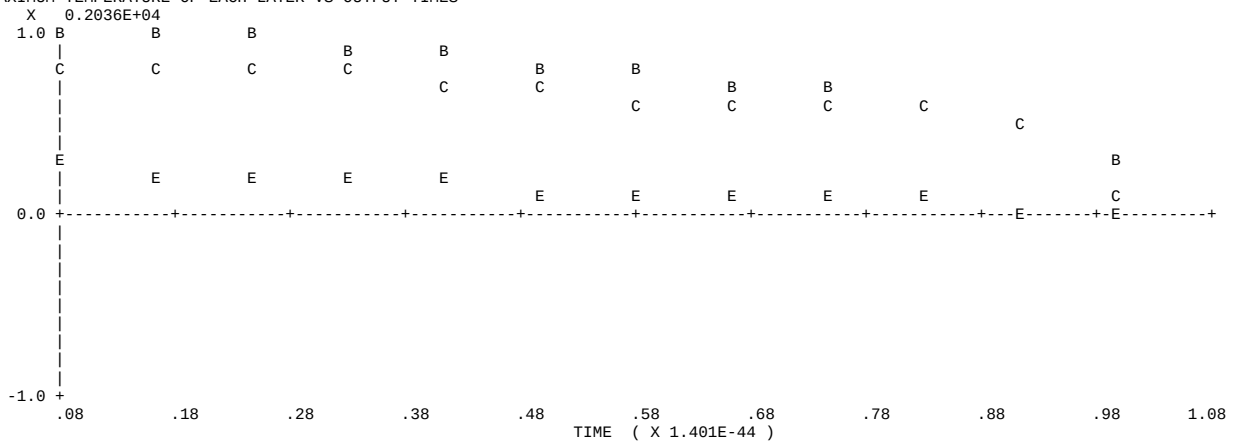
PANEL	LAYER01	LAYER02	LAYER03	LAYER04
5	0.64710	2269.82	2.93327	2269.82
6	0.69224	2283.92	3.30871	2283.92
7	0.72051	2250.00	3.40285	2250.00
8	0.73781	2282.83	3.24830	2282.83
9	0.53735	2210.20	2.78215	2210.20
10	0.55314	2176.90	2.70922	2176.90
11	0.56650	2266.99	2.53616	2266.99
12	0.58133	2281.52	2.30041	2281.52
13	0.43711	2241.18	2.72121	2241.18
14	0.45580	2240.97	2.48400	2240.97
15	0.47541	2263.76	2.20021	2263.76
16	0.49833	2273.21	1.90030	2273.21
17	0.35190	2235.93	2.71495	2235.93
18	0.39408	2261.53	2.52073	2261.53
19	0.43195	2269.74	2.25113	2269.74
20	0.46749	2260.01	1.90442	2260.01
21	0.28556	2274.90	2.71157	2274.90
22	0.35949	2283.92	2.69799	2283.92
23	0.41999	2276.38	2.50887	2276.38
24	0.46471	1625.84	2.15193	1625.84
25	0.24057	2196.44	2.67382	2196.44
26	0.34403	2283.92	2.89356	2283.92
27	0.42011	1835.40	2.83046	1835.40
28	0.46610	2227.27	2.48508	2227.27
29	0.22058	2280.48	2.55384	2280.48
30	0.33980	2280.45	2.98440	2280.45
31	0.41533	2257.10	3.04562	2257.10
32	0.44762	2212.00	2.74102	2212.00
33	0.23291	2198.58	2.32522	2198.58
34	0.33883	2212.63	2.84898	2212.63
35	0.38974	2212.17	2.99198	2212.17
36	0.38512	2200.25	2.76058	2200.25
37	0.27873	2026.98	1.93446	2026.98
38	0.33325	2077.41	2.36529	2077.41
39	0.32489	2131.64	2.50799	2131.64
40	0.25434	2194.18	2.38142	2194.18
61	0.11692	1979.40	1.00072	1979.40
62	0.01823	2166.54	1.13103	2166.54
63	0.01026	2250.00	1.50063	2250.00
64	0.06953	2259.70	1.98858	2259.70
65	0.17323	2225.39	2.47685	2225.39
66	0.29810	2176.90	2.84569	2176.90
67	0.42138	2143.85	2.97782	2143.85
68	0.52054	2155.83	2.75475	2155.83
69	0.57214	2241.18	2.06826	2241.18
71	0.19410	1995.47	1.42465	1995.47
72	0.11377	2180.79	1.67209	2180.79
73	0.10086	2265.96	1.98072	2265.96
74	0.14054	2279.39	2.30420	2279.39

75	0.21833	2249.25	2.59752	2249.25	0.08683	550.33	0.08649	152.55
76	0.31866	2203.63	2.80772	2203.63	0.13731	550.33	0.11640	101.07
77	0.42584	2170.55	2.88664	2170.55	0.18964	550.33	0.28049	101.07
78	0.52637	2177.80	2.78515	2177.80	0.23514	550.33	0.63568	101.07
79	0.60444	2253.67	2.46700	2253.67	0.26919	550.33	1.22912	144.51
365	0.37034	1654.53	1.27531	1654.53	0.19848	550.33	0.06270	388.97
377	0.35115	1625.84	1.26102	1625.84	0.04101	550.33	0.05000	483.58
413	0.01000	2196.44	1.34451	2196.44	0.31394	550.33	0.07586	255.04
425	0.19468	1993.78	1.33249	1993.78	0.46823	550.33	0.08660	190.94
437	0.31320	1835.40	1.31592	1835.40	0.48671	550.33	0.08690	199.89
449	0.36931	1717.61	1.29472	1717.61	0.37374	550.33	0.07707	279.81

OPTIMIZATION SYSTEM FOR TPSSYM = 30

TOTAL NUMBER OF DESIGN VARIABLES = 45
TOTAL NUMBER OF CONSTRAINS = 2745
TOTAL NUMBER OF TEMP. CONSTRAINS = 585
TOTAL NUMBER OF TEMP. PRINTOUTS = 13
WARNING: MODIFICATION EXCEEDS ALLOWED VALUE

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER					
LAYER:	1	2	3	4	5
Tmax:	2800.33	2900.33	2700.33	550.33	600.33
Optv:	2036.22	2036.22	1726.37	548.47	548.47

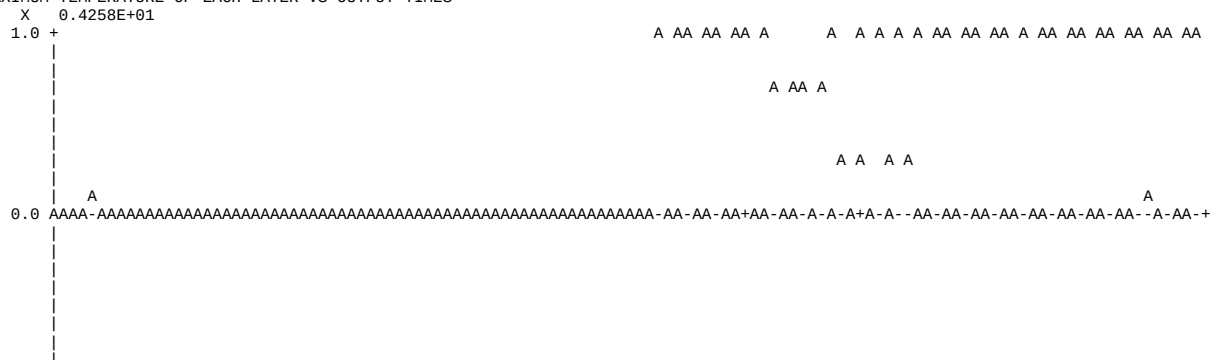
VALUES OF DESIGN VARIABLES :									
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
2	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
3	1.00000	1.00000	1.00000	1.00000	1.23009	1.00000	1.00000	1.22957	1.03625
4	0.00100	0.02994	0.00175	0.00109	0.06513	0.00333	0.00111	0.08491	0.00567
5	0.05000	0.07508	0.07814	0.05000	0.12918	0.07310	0.05000	0.05000	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 4793.1660156

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.1337998

THE TOTAL OPTIMAL WEIGHT = 7.82763492E+04

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



-1.0 +
|
.01 .11 .21 .31 .41 .51 .61 .71 .81 .91 1.01
TIME (X 2.242E-43)

OPTIMAL STRUCTURES OF TPS FOR PATCH = 30
(WITH AVERAGE THICKNESS)

=====

ACC(N)	thin skin	0.01000 in.	2036.2 F

0.03000 in. ZIRCONIUM		i	
		i	
		i	
	radiation gap	0.01000 in.	2036.2 F

0.03000 in. ZIRCONIUM		i	
		i	
		i	
=====			
LI-2200 (N)	slab	1.05510 in.	1726.4 F

RTV-560	thin skin	0.02155 in.	548.5 F
=====			
17 LB SIP .16 IN	slab	0.06728 in.	548.5 F

		i	
		i	
		i	

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 30

PANEL	LAYER01	LAYER02	LAYER03	LAYER04	LAYER05
10421	0.01000	1331.94	0.01000	1331.94	1.00000
10435	0.01000	1151.03	0.01000	1151.03	1.00000
10001	0.01000	1439.15	0.01000	1439.15	1.03625
10002	0.01000	1720.21	0.01000	1720.21	1.12926
10003	0.01000	1839.35	0.01000	1839.35	1.16953
10004	0.01000	1929.36	0.01000	1929.36	1.20086
10005	0.01000	1982.15	0.01000	1982.15	1.22049
10006	0.01000	2001.18	0.01000	2001.18	1.22957
10007	0.01000	1988.07	0.01000	1988.07	1.22858
10008	0.01000	1940.61	0.01000	1940.61	1.21691
10009	0.01000	1872.66	0.01000	1872.66	1.19842
10010	0.01000	1798.40	0.01000	1798.40	1.17749
10011	0.01000	1708.02	0.01000	1708.02	1.15152
10012	0.01000	1601.67	0.01000	1601.67	1.12956
10013	0.01000	1479.46	0.01000	1479.46	1.08463
10014	0.01000	1341.54	0.01000	1341.54	1.04378
10015	0.01000	1194.63	0.01000	1194.63	1.00000
10016	0.01000	1419.17	0.01000	1419.17	1.02784
10017	0.01000	1731.43	0.01000	1731.43	1.12986
10018	0.01000	1867.46	0.01000	1867.46	1.17517
10019	0.01000	1966.45	0.01000	1966.45	1.20904
10020	0.01000	2029.02	0.01000	2029.02	1.23168
10021	0.01000	2036.22	0.01000	2036.22	1.24320
10022	0.01000	2036.22	0.01000	2036.22	1.24340
10023	0.01000	1995.93	0.01000	1995.93	1.23194
10024	0.01000	1924.72	0.01000	1924.72	1.21311
10025	0.01000	1846.62	0.01000	1846.62	1.19164
10026	0.01000	1749.79	0.01000	1749.79	1.16447
10027	0.01000	1634.00	0.01000	1634.00	1.13154
10028	0.01000	1498.99	0.01000	1498.99	1.09278
10029	0.01000	1344.50	0.01000	1344.50	1.04811
10030	0.01000	1178.99	0.01000	1178.99	1.00000
10031	0.01000	1401.50	0.01000	1401.50	1.02042
10032	0.01000	1737.13	0.01000	1737.13	1.12906
10033	0.01000	1883.71	0.01000	1883.71	1.17748
10034	0.01000	1990.44	0.01000	1990.44	1.21374
10035	0.01000	2036.22	0.01000	2036.22	1.23804
10036	0.01000	2036.22	0.01000	2036.22	1.25051
10037	0.01000	2036.22	0.01000	2036.22	1.25107
10038	0.01000	2024.47	0.01000	2024.47	1.23937
10039	0.01000	1949.60	0.01000	1949.60	1.21995
10040	0.01000	1867.56	0.01000	1867.56	1.19775
10041	0.01000	1765.99	0.01000	1765.99	1.16967
10042	0.01000	1644.72	0.01000	1644.72	1.13565
10043	0.01000	1503.58	0.01000	1503.58	1.09564
10044	0.01000	1342.39	0.01000	1342.39	1.04959
10045	0.01000	1169.79	0.01000	1169.79	1.00000
10046	0.01000	1385.99	0.01000	1385.99	1.01392
10047	0.01000	1735.76	0.01000	1735.76	1.12648
10048	0.01000	1888.74	0.01000	1888.74	1.17677
10049	0.01000	2000.09	0.01000	2000.09	1.21447
10050	0.01000	2036.22	0.01000	2036.22	1.23979
10051	0.01000	2036.22	0.01000	2036.22	1.25286
10052	0.01000	2036.22	0.01000	2036.22	1.25368
10053	0.01000	2036.21	0.01000	2036.21	1.24194
10054	0.01000	1959.12	0.01000	1959.12	1.22229
10055	0.01000	1874.80	0.01000	1874.80	1.19980
10056	0.01000	1770.61	0.01000	1770.61	1.17136
10057	0.01000	1646.46	0.01000	1646.46	1.13695
10058	0.01000	1502.22	0.01000	1502.22	1.09652
10059	0.01000	1337.79	0.01000	1337.79	1.05005
10060	0.01000	1161.80	0.01000	1161.80	1.00000

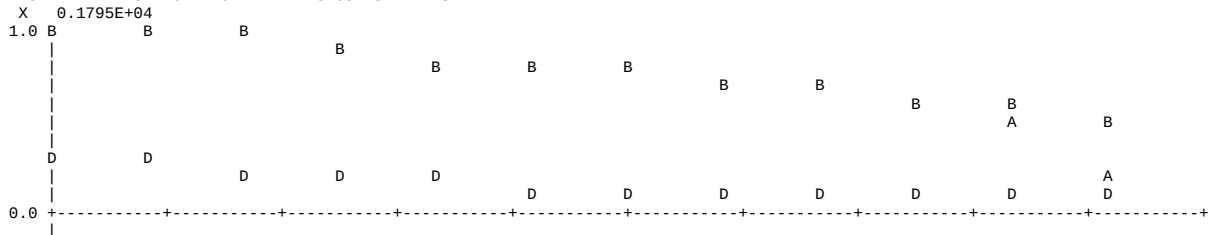
10061	0.01000	1372.64	0.01000	1372.64	1.00835	1180.25	0.00401	550.33	0.06734	544.66
10062	0.01000	1727.30	0.01000	1727.30	1.12209	1553.71	0.03640	550.33	0.09093	502.53
10063	0.01000	1882.51	0.01000	1882.51	1.17302	1717.21	0.05090	550.33	0.10135	480.12
10064	0.01000	1995.39	0.01000	1995.39	1.21124	1836.16	0.06175	550.33	0.10899	459.87
10065	0.01000	2036.22	0.01000	2036.22	1.23693	1881.30	0.06900	550.33	0.11390	441.71
10066	0.01000	2036.22	0.01000	2036.22	1.25025	1881.30	0.07268	550.33	0.11609	425.61
10067	0.01000	2036.22	0.01000	2036.22	1.25124	1881.30	0.07285	550.33	0.11545	411.34
10068	0.01000	2031.16	0.01000	2031.16	1.23964	1874.39	0.06942	550.33	0.11187	399.04
10069	0.01000	1953.29	0.01000	1953.29	1.22012	1792.56	0.06377	550.33	0.10655	390.25
10070	0.01000	1868.37	0.01000	1868.37	1.19779	1703.27	0.05736	550.33	0.10067	384.16
10071	0.01000	1763.69	0.01000	1763.69	1.16957	1593.19	0.04928	550.33	0.09336	378.98
10072	0.01000	1639.21	0.01000	1639.21	1.13545	1462.26	0.03955	550.33	0.08459	374.71
10073	0.01000	1494.91	0.01000	1494.91	1.09543	1310.47	0.02816	550.33	0.07435	371.35
10074	0.01000	1330.72	0.01000	1330.72	1.04949	1137.74	0.01512	550.33	0.06262	368.89
10075	0.01000	1155.04	0.01000	1155.04	1.00000	952.91	0.00110	550.33	0.05000	367.40
10076	0.01000	1361.46	0.01000	1361.46	1.00371	1169.41	0.00366	550.33	0.07046	543.85
10077	0.01000	1711.74	0.01000	1711.74	1.11592	1538.29	0.03450	550.33	0.09681	502.60
10078	0.01000	1865.03	0.01000	1865.03	1.16624	1699.77	0.04831	550.33	0.10838	480.53
10079	0.01000	1976.32	0.01000	1976.32	1.20403	1817.04	0.05864	550.33	0.11677	460.46
10080	0.01000	2036.22	0.01000	2036.22	1.22945	1881.30	0.06554	550.33	0.12204	442.34
10081	0.01000	2036.22	0.01000	2036.22	1.24266	1881.30	0.06904	550.33	0.12421	426.14
10082	0.01000	2036.22	0.01000	2036.22	1.24375	1881.30	0.06918	550.33	0.12321	411.61
10083	0.01000	2009.34	0.01000	2009.34	1.23247	1852.29	0.06591	550.33	0.11896	398.96
10084	0.01000	1932.15	0.01000	1932.15	1.21346	1771.14	0.06052	550.33	0.11283	389.80
10085	0.01000	1848.32	0.01000	1848.32	1.19173	1682.97	0.05442	550.33	0.10616	383.36
10086	0.01000	1745.27	0.01000	1745.27	1.16430	1574.56	0.04675	550.33	0.09794	377.78
10087	0.01000	1623.06	0.01000	1623.06	1.13118	1445.98	0.03752	550.33	0.08816	373.07
10088	0.01000	1481.69	0.01000	1481.69	1.09239	1297.23	0.02673	550.33	0.07681	369.22
10089	0.01000	1321.18	0.01000	1321.18	1.04791	1128.33	0.01438	550.33	0.06388	366.25
10090	0.01000	1149.49	0.01000	1149.49	1.00000	947.66	0.00110	550.33	0.05000	364.21
10091	0.01000	1352.44	0.01000	1352.44	1.00000	1160.94	0.00333	550.33	0.07310	543.09
10092	0.01000	1689.07	0.01000	1689.07	1.10794	1515.45	0.03248	550.33	0.10091	502.06
10093	0.01000	1836.27	0.01000	1836.27	1.15642	1670.51	0.04554	550.33	0.11304	480.04
10094	0.01000	1942.86	0.01000	1942.86	1.19284	1782.82	0.05531	550.33	0.12176	459.95
10095	0.01000	2009.37	0.01000	2009.37	1.21735	1852.94	0.06183	550.33	0.12713	441.76
10096	0.01000	2036.22	0.01000	2036.22	1.23010	1881.30	0.06513	550.33	0.12918	425.43
10097	0.01000	2023.52	0.01000	2023.52	1.23120	1868.01	0.06525	550.33	0.12786	410.71
10098	0.01000	1970.77	0.01000	1970.77	1.22045	1812.56	0.06214	550.33	0.12310	397.85
10099	0.01000	1895.75	0.01000	1895.75	1.20233	1733.64	0.05704	550.33	0.11643	388.48
10100	0.01000	1814.70	0.01000	1814.70	1.18164	1648.36	0.05127	550.33	0.10926	381.87
10101	0.01000	1715.42	0.01000	1715.42	1.15557	1543.89	0.04404	550.33	0.10049	376.12
10102	0.01000	1598.02	0.01000	1598.02	1.12415	1420.33	0.03534	550.33	0.09011	371.22
10103	0.01000	1462.59	0.01000	1462.59	1.08739	1277.78	0.02518	550.33	0.07813	367.19
10104	0.01000	1309.19	0.01000	1309.19	1.04533	1116.32	0.01358	550.33	0.06455	364.01
10105	0.01000	1145.17	0.01000	1145.17	1.00000	943.66	0.00109	550.33	0.05000	361.78
10106	0.01000	1345.59	0.01000	1345.59	0.99721	1154.83	0.00303	550.33	0.07527	542.39
10107	0.01000	1658.41	0.01000	1658.41	1.09788	1484.28	0.03028	550.33	0.10316	501.01
10108	0.01000	1795.38	0.01000	1795.38	1.14328	1628.55	0.04253	550.33	0.11529	478.76
10109	0.01000	1894.24	0.01000	1894.24	1.17741	1732.70	0.05170	550.33	0.12394	458.47
10110	0.01000	1955.44	0.01000	1955.44	1.20040	1797.19	0.05781	550.33	0.12917	440.09
10111	0.01000	1979.37	0.01000	1979.37	1.21237	1822.43	0.06091	550.33	0.13101	423.60
10112	0.01000	1966.34	0.01000	1966.34	1.21352	1808.76	0.06104	550.33	0.12943	408.76
10113	0.01000	1915.93	0.01000	1915.93	1.20365	1755.72	0.05814	550.33	0.12438	395.81
10114	0.01000	1844.99	0.01000	1844.99	1.18692	1681.04	0.05338	550.33	0.11747	386.41
10115	0.01000	1768.65	0.01000	1768.65	1.16781	1600.67	0.04799	550.33	0.11010	379.80
10116	0.01000	1675.40	0.01000	1675.40	1.14372	1502.50	0.04123	550.33	0.10113	374.07
10117	0.01000	1565.35	0.01000	1565.35	1.11467	1386.63	0.03310	550.33	0.09057	369.22
10118	0.01000	1438.59	0.01000	1438.59	1.08071	1253.15	0.02361	550.33	0.07841	365.27
10119	0.01000	1295.20	0.01000	1295.20	1.04186	1102.17	0.01276	550.33	0.06467	362.20
10120	0.01000	1145.17	0.01000	1145.07	1.00000	940.91	0.00108	550.33	0.05000	361.78
10121	0.01000	1340.90	0.01000	1340.90	0.99536	1151.10	0.00275	550.33	0.07695	541.74
10122	0.01000	1620.66	0.01000	1620.66	1.08602	1445.71	0.02798	550.33	0.10360	499.35
10123	0.01000	1743.05	0.01000	1743.05	1.12704	1574.61	0.03934	550.33	0.11514	476.59
10124	0.01000	1830.98	0.01000	1830.98	1.15791	1667.21	0.04785	550.33	0.12331	455.90
10125	0.01000	1884.77	0.01000	1884.77	1.17873	1723.86	0.05354	550.33	0.12813	437.22
10126	0.01000	1904.75	0.01000	1904.75	1.18960	1744.90	0.05643	550.33	0.12965	420.53
10127	0.01000	1891.36	0.01000	1891.36	1.19073	1730.78	0.05656	550.33	0.12786	405.63
10128	0.01000	1844.25	0.01000	1844.25	1.18196	1681.15	0.05388	550.33	0.12272	392.74
10129	0.01000	1778.92	0.01000	1778.92	1.16702	1612.32	0.04949	550.33	0.11583	383.48
10130	0.01000	1709.04	0.01000	1709.04	1.14994	1538.71	0.04450	550.33	0.10856	377.05
10131	0.01000	1623.99	0.01000	1623.99	1.12840	1449.11	0.03825	550.33	0.09975	371.57
10132	0.01000	1523.86	0.01000	1523.86	1.10245	1343.62	0.03072	550.33	0.08942	367.03
10133	0.01000	1408.77	0.01000	1408.77	1.07210	1222.37	0.02193	550.33	0.07758	363.44
10134	0.01000	1278.81	0.01000	1278.81	1.03739	1085.45	0.01189	550.33	0.06423	361.78
10135	0.01000	1145.17	0.01000	1140.18	1.00000	939.41	0.00107	550.33	0.05000	361.78
10136	0.01000	1338.37	0.01000	1338.37	0.99443	1149.74	0.00250	550.33	0.07815	541.15
10137	0.01000	1575.80	0.01000	1575.80	1.07236	1399.74	0.02556	550.33	0.10224	497.09
10138	0.01000	1679.37	0.01000	1679.37	1.10774	1508.78	0.03598	550.33	0.11261	473.54
10139	0.01000	1753.17	0.01000	1753.17	1.13439	1586.46	0.04379	550.33	0.11986	452.24
10140	0.01000	1797.43	0.01000	1797.43	1.15238	1633.02	0.04901	550.33	0.12402	433.15
10141	0.01000	1812.38	0.01000	1812.38	1.16178	1648.70	0.05167	550.33	0.12511	416.24
10142	0.01000	1798.58	0.01000	1798.58	1.16282	1634.09	0.05180	550.33	0.12315	401.33
10143	0.01000	1755.71	0.01000	1755.71	1.15536	1588.84	0.04937	550.33	0.11811	388.64
10144	0.01000	1697.55	0.01000	1697.55	1.14262	1527.50	0.04535	550.33	0.11153	379.71
10145	0.01000	1635.88	0.01000	1635.88	1.12803	1462.46	0.04080	550.33	0.10464	373.65
10146	0.01000	1561.19	0.01000	1561.19	1.10963	1383.71	0.03508	550.33	0.09635	368.62
10147	0.01000	1473.58	0.01000	1473.58	1.08746	1291.34	0.02819	550.33	0.08668	364.64
10148	0.01000	1373.15	0.01000	1373.15	1.06155	1185.46	0.02015	550.33	0.07563	361.78
10149	0.01000	1259.99	0.01000	1259.99	1.03191	1066.16	0.01096	550.33	0.06321	361.78
10150	0.01000	1145.17	0.01000	1139.52	1.00000	939.16	0.00106	550.33	0.05000	361.78
10151	0.01000	1338.02	0.01000	1338.02	0.99443	1150.76	0.00228	550.33	0.07887	540.61
10152	0.01000	1523.90	0.01000	1523.90	1.05692	1346.42	0.02304	550.33	0.09908	494.24
10153	0.01000	1604.38	0.01000	1604.38	1.08539	1431.11	0.03245	550.33	0.10770	469.61
10154	0.01000	1660.86	0.01000	1660.86	1.10686	1490.49				

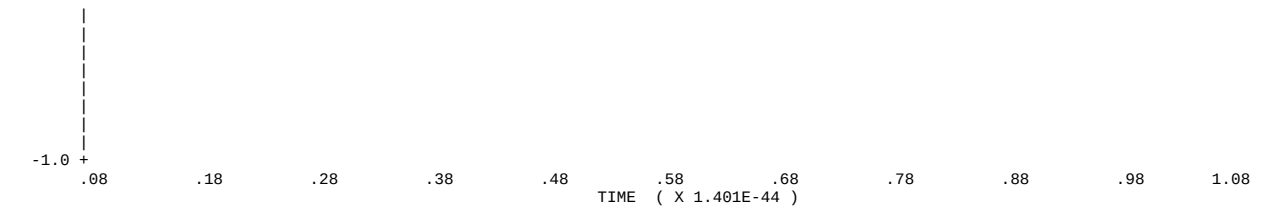
10156	0.01000	1702.26	0.01000	1702.26	1.12891	1533.85	0.04664	550.33	0.11738	410.71
10157	0.01000	1688.00	0.01000	1688.00	1.12980	1518.67	0.04678	550.33	0.11530	395.86
10158	0.01000	1650.34	0.01000	1650.34	1.12388	1478.82	0.04459	550.33	0.11056	383.50
10159	0.01000	1600.90	0.01000	1600.90	1.11372	1426.58	0.04098	550.33	0.10455	375.08
10160	0.01000	1549.17	0.01000	1549.17	1.10208	1371.95	0.03688	550.33	0.09834	369.57
10161	0.01000	1487.01	0.01000	1487.01	1.08741	1306.31	0.03173	550.33	0.09094	365.23
10162	0.01000	1414.49	0.01000	1414.49	1.06973	1229.77	0.02552	550.33	0.08234	362.07
10163	0.01000	1331.72	0.01000	1331.72	1.04906	1142.40	0.01827	550.33	0.07256	361.78
10164	0.01000	1238.77	0.01000	1238.77	1.02543	1044.31	0.00998	550.33	0.06161	361.78
10165	0.01000	1145.17	0.01000	1140.08	1.00000	940.16	0.00105	550.33	0.05000	361.78
10166	0.01000	1339.83	0.01000	1339.83	0.99536	1154.15	0.00208	550.33	0.07911	540.13
10167	0.01000	1465.03	0.01000	1465.03	1.03972	1285.84	0.02041	550.33	0.09414	490.80
10168	0.01000	1518.16	0.01000	1518.16	1.06001	1341.66	0.02874	550.33	0.10041	464.80
10169	0.01000	1554.07	0.01000	1554.07	1.07531	1379.32	0.03500	550.33	0.10455	441.68
10170	0.01000	1572.78	0.01000	1572.78	1.08563	1398.85	0.03920	550.33	0.10657	421.41
10171	0.01000	1574.38	0.01000	1574.38	1.09099	1400.32	0.04134	550.33	0.10647	403.95
10172	0.01000	1559.62	0.01000	1559.62	1.09166	1384.53	0.04148	550.33	0.10431	389.21
10173	0.01000	1528.12	0.01000	1528.12	1.08749	1351.07	0.03956	550.33	0.10006	377.34
10174	0.01000	1488.95	0.01000	1488.95	1.08032	1309.56	0.03637	550.33	0.09490	369.60
10175	0.01000	1448.91	0.01000	1448.91	1.07210	1267.17	0.03275	550.33	0.08967	364.83
10176	0.01000	1401.44	0.01000	1401.44	1.06173	1216.93	0.02820	550.33	0.08350	361.78
10177	0.01000	1346.61	0.01000	1346.61	1.04924	1158.92	0.02271	550.33	0.07641	361.78
10178	0.01000	1284.50	0.01000	1284.50	1.03464	1093.22	0.01629	550.33	0.06838	361.78
10179	0.01000	1215.15	0.01000	1215.15	1.01796	1019.90	0.00895	550.33	0.05944	361.78
10180	0.01000	1145.17	0.01000	1141.86	1.00000	942.41	0.00103	550.33	0.05000	361.78
10181	0.01000	1343.82	0.01000	1343.82	0.99721	1159.91	0.00190	550.33	0.07887	539.70
10182	0.01000	1399.30	0.01000	1399.30	1.02079	1218.11	0.01767	550.33	0.08742	486.78
10183	0.01000	1420.76	0.01000	1420.76	1.03162	1240.52	0.02487	550.33	0.09076	459.12
10184	0.01000	1432.85	0.01000	1432.85	1.03978	1253.02	0.03028	550.33	0.09270	434.78
10185	0.01000	1435.53	0.01000	1435.53	1.04525	1255.58	0.03391	550.33	0.09324	413.74
10186	0.01000	1428.74	0.01000	1428.74	1.04802	1248.14	0.03578	550.33	0.09236	395.96
10187	0.01000	1413.45	0.01000	1413.45	1.04841	1231.68	0.03591	550.33	0.09018	381.40
10188	0.01000	1389.06	0.01000	1389.06	1.04622	1205.60	0.03427	550.33	0.08661	370.15
10189	0.01000	1361.73	0.01000	1361.73	1.04243	1176.46	0.03153	550.33	0.08258	363.27
10190	0.01000	1335.11	0.01000	1335.11	1.03808	1148.12	0.02841	550.33	0.07862	361.78
10191	0.01000	1304.51	0.01000	1304.51	1.03260	1115.55	0.02448	550.33	0.07405	361.78
10192	0.01000	1269.94	0.01000	1269.94	1.02600	1078.80	0.01975	550.33	0.06887	361.78
10193	0.01000	1231.47	0.01000	1231.47	1.01829	1037.91	0.01421	550.33	0.06309	361.78
10194	0.01000	1189.12	0.01000	1189.12	1.00948	992.92	0.00786	550.33	0.05670	361.78
10195	0.01000	1145.17	0.01000	1144.86	1.00000	945.91	0.00102	550.33	0.05000	363.09
10196	0.01000	1349.97	0.01000	1349.97	1.00000	1168.05	0.00175	550.33	0.07814	539.33
10197	0.01000	1326.81	0.01000	1326.81	1.00016	1143.33	0.01483	550.33	0.07894	482.20
10198	0.01000	1312.30	0.01000	1312.30	1.00025	1127.79	0.02083	550.33	0.07876	452.57
10199	0.01000	1297.27	0.01000	1297.27	1.00027	1111.65	0.02534	550.33	0.07806	426.80
10200	0.01000	1281.66	0.01000	1281.66	1.00019	1094.86	0.02838	550.33	0.07684	404.87
10201	0.01000	1265.35	0.01000	1265.35	1.00000	1077.28	0.02994	550.33	0.07508	386.74
10202	0.01000	1249.47	0.01000	1249.47	1.00004	1060.10	0.03007	550.33	0.07291	372.41
10203	0.01000	1233.16	0.01000	1233.16	1.00004	1042.41	0.02872	550.33	0.07022	361.93
10204	0.01000	1219.21	0.01000	1219.21	1.00004	1027.26	0.02645	550.33	0.06759	361.78
10205	0.01000	1207.78	0.01000	1207.78	1.00003	1014.81	0.02386	550.33	0.06520	361.78
10206	0.01000	1196.20	0.01000	1196.20	1.00002	1002.19	0.02059	550.33	0.06258	361.78
10207	0.01000	1184.49	0.01000	1184.49	1.00001	989.42	0.01664	550.33	0.05974	361.78
10208	0.01000	1172.65	0.01000	1172.65	1.00000	976.47	0.01202	550.33	0.05667	361.78
10209	0.01000	1160.68	0.01000	1160.68	1.00000	963.38	0.00672	550.33	0.05338	361.78
10210	0.01000	1149.08	0.01000	1149.08	1.00000	950.66	0.00100	550.33	0.05000	365.96
10422	0.01000	1320.17	0.01000	1320.17	1.00000	1136.24	0.01746	550.33	0.07884	469.46
10423	0.01000	1310.68	0.01000	1310.68	1.00000	1126.08	0.02106	550.33	0.07864	451.13
10424	0.01000	1296.61	0.01000	1296.61	1.00000	1110.98	0.02524	550.33	0.07797	427.16
10425	0.01000	1265.35	0.01000	1265.35	1.00000	1077.28	0.02994	550.33	0.07508	386.74
10426	0.01000	1264.08	0.01000	1264.08	1.00000	1075.91	0.03000	550.33	0.07492	385.46
10427	0.01000	1248.40	0.01000	1248.40	1.00000	1058.95	0.03003	550.33	0.07275	371.70
10428	0.01000	1224.41	0.01000	1224.41	1.00000	1032.91	0.02743	550.33	0.06862	361.78
10429	0.01000	1215.44	0.01000	1215.44	1.00000	1023.16	0.02569	550.33	0.06683	361.78
10430	0.01000	1207.67	0.01000	1207.67	1.00000	1014.70	0.02385	550.33	0.06519	361.78
10431	0.01000	1196.12	0.01000	1196.12	1.00000	1002.11	0.02058	550.33	0.06257	361.78
10432	0.01000	1184.44	0.01000	1184.44	1.00000	989.36	0.01664	550.33	0.05973	361.78
10433	0.01000	1172.62	0.01000	1172.62	1.00000	976.44	0.01201	550.33	0.05667	361.78
10434	0.01000	1160.67	0.01000	1160.67	1.00000	963.37	0.00672	550.33	0.05337	361.78

OPTIMIZATION SYSTEM FOR TPSSYM = 4

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINS = 636
TOTAL NUMBER OF TEMP. CONSTRAINS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES





MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4
Tmax:	2300.33	2300.33	550.33	600.33
Optv:	1795.44	1795.44	549.97	549.97

VALUES OF DESIGN VARIABLES :

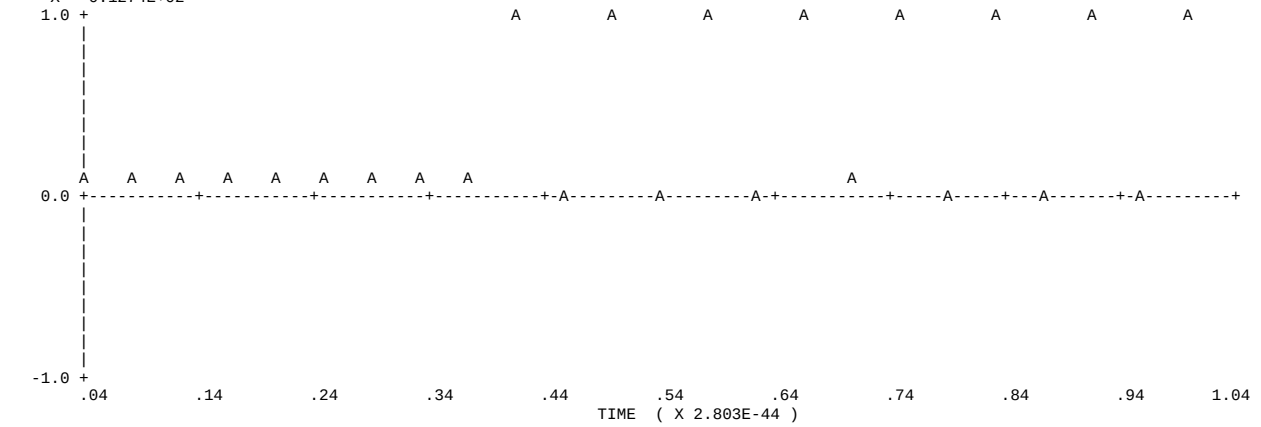
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
2	2.16049	2.27166	2.35272	2.11795	2.40248	2.24113	1.91584	1.99332	2.04564
3	0.02362	0.01719	0.01761	0.02425	0.00103	0.02301	0.02365	0.02088	0.02266
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 89.0599976

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.6475893

THE TOTAL OPTIMAL WEIGHT = 4.91543861E+04

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



OPTIMAL STRUCTURES OF TPS FOR PATCH = 4
(WITH AVERAGE THICKNESS)

=====	-----
HRSI COAT	thin skin
=====	-----
	0.01000 in. 1795.4 F
	i
LI-900 (P)	slab
=====	-----
	2.16680 in. 1795.4 F
	i
RTV-560	thin skin
=====	-----
	0.01932 in. 550.0 F
	i
17 LB SIP .16 IN	slab
=====	-----
	0.05000 in. 550.0 F
	i
=====	-----

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 4

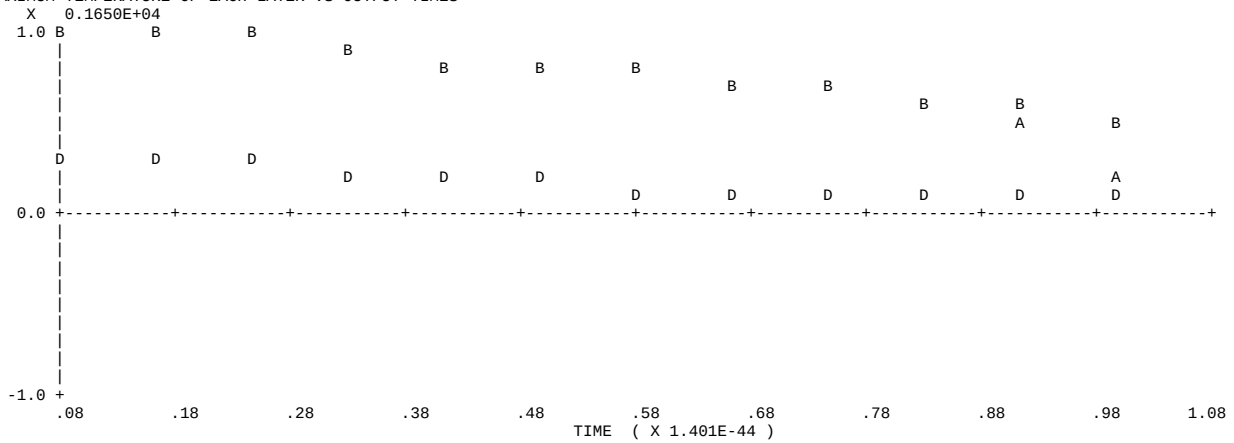
PANEL	LAYER01		LAYER02		LAYER03		LAYER04	
366	0.01000	1667.01	2.09657	1667.01	0.02326	550.33	0.05000	548.83
367	0.01000	1633.98	2.14317	1633.98	0.01533	550.33	0.05000	548.78
368	0.01000	1605.26	2.13971	1605.26	0.01273	550.33	0.05000	548.08
369	0.01000	1580.84	2.08461	1580.84	0.01559	550.33	0.05000	546.70
370	0.01000	1560.96	1.97802	1560.96	0.02392	550.33	0.05000	544.66
378	0.01000	1632.28	2.04564	1632.28	0.02266	550.33	0.05000	548.83
379	0.01000	1600.21	2.02264	1600.21	0.02120	550.33	0.05000	547.95
380	0.01000	1571.45	1.99332	1571.45	0.02088	550.33	0.05000	546.93
381	0.01000	1546.03	1.95774	1546.03	0.02170	550.33	0.05000	545.78
382	0.01000	1523.92	1.91584	1523.92	0.02365	550.33	0.05000	544.49
414	0.01000	1795.44	2.35272	1795.44	0.01761	550.33	0.05000	549.89
415	0.01000	1751.94	2.31607	1751.94	0.01653	550.33	0.05000	549.10
416	0.01000	1716.49	2.27166	1716.49	0.01719	550.33	0.05000	548.37
417	0.01000	1689.11	2.21996	1689.11	0.01953	550.33	0.05000	547.71
418	0.01000	1669.77	2.16049	1669.77	0.02362	550.33	0.05000	547.11
426	0.01000	1783.01	2.30353	1783.01	0.02097	550.33	0.05000	549.42

427	0.01000	1742.12	2.39223	1742.12	0.00851	550.33	0.05000	549.97
428	0.01000	1709.01	2.39744	1709.01	0.00483	550.33	0.05000	549.70
429	0.01000	1683.60	2.31798	1683.60	0.01003	550.33	0.05000	548.42
430	0.01000	1665.99	2.15421	1665.99	0.02409	550.33	0.05000	546.20
438	0.01000	1755.50	2.24113	1755.50	0.02301	550.33	0.05000	549.09
439	0.01000	1717.41	2.37755	1717.41	0.00636	550.33	0.05000	549.97
440	0.01000	1686.20	2.40248	1686.20	0.00103	550.33	0.05000	549.97
441	0.01000	1661.82	2.31589	1661.82	0.00699	550.33	0.05000	548.41
442	0.01000	1644.35	2.11795	1644.35	0.02425	550.33	0.05000	545.52
450	0.01000	1711.92	2.16670	1711.92	0.02354	550.33	0.05000	548.90
451	0.01000	1677.10	2.28116	1677.10	0.00922	550.33	0.05000	549.69
452	0.01000	1647.77	2.30090	1647.77	0.00451	550.33	0.05000	549.30
453	0.01000	1623.95	2.22447	1623.95	0.00954	550.33	0.05000	547.73
454	0.01000	1605.90	2.05344	1605.90	0.02417	550.33	0.05000	545.00

OPTIMIZATION SYSTEM FOR TPSSYM = 5

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINS = 636
TOTAL NUMBER OF TEMP. CONSTRAINS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4
Tmax:	2300.33	2300.33	550.33	600.33
Optv:	1650.15	1650.15	549.88	549.88

VALUES OF DESIGN VARIABLES :

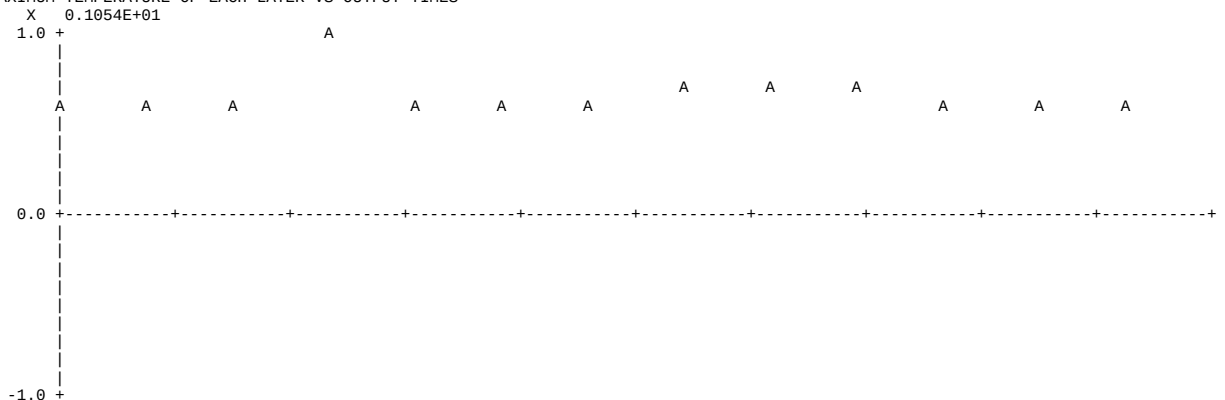
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
2	2.05560	2.09683	2.13030	2.01462	2.06486	2.14598	1.63378	1.79870	1.84334
3	0.02436	0.02404	0.02433	0.02606	0.02433	0.01920	0.03813	0.02569	0.02667
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 89.0599976

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.6166089

THE TOTAL OPTIMAL WEIGHT = 5.35626799E+04

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



.08 .18 .28 .38 .48 .58 .68 .78 .88 .98 1.08
TIME (X 1.401E-44)

OPTIMAL STRUCTURES OF TPS FOR PATCH = 5
(WITH AVERAGE THICKNESS)

=====	HRSI COAT	thin skin	0.01000 in.	1650.2 F
=====			i	
	LI-900 (P)	slab	1.97600 in.	1650.2 F
			i	
=====	RTV-560	thin skin	0.02587 in.	549.9 F
=====			i	
	17 LB SIP .16 IN	slab	0.05000 in.	549.9 F
			i	
=====				

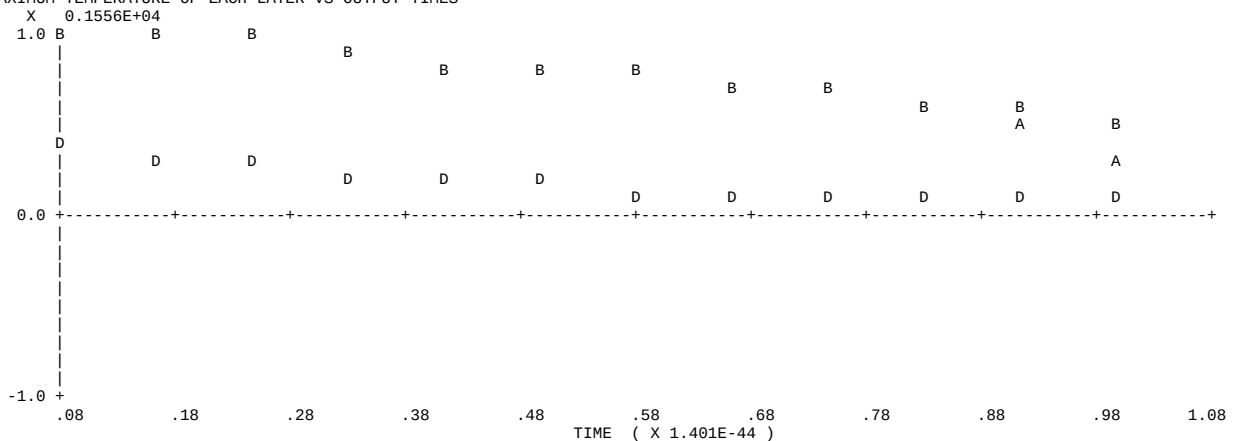
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 5

PANEL	LAYER01		LAYER02		LAYER03		LAYER04	
371	0.01000	1538.22	1.94562	1538.22	0.02362	550.33	0.05000	549.83
372	0.01000	1517.72	1.92325	1517.72	0.02352	550.33	0.05000	549.82
373	0.01000	1499.26	1.88427	1499.26	0.02529	550.33	0.05000	549.70
374	0.01000	1482.79	1.82889	1482.79	0.02890	550.33	0.05000	549.48
375	0.01000	1468.52	1.75847	1468.52	0.03423	550.33	0.05000	549.17
383	0.01000	1497.87	1.84334	1497.87	0.02667	550.33	0.05000	549.82
384	0.01000	1474.28	1.83607	1474.28	0.02450	550.33	0.05000	549.88
385	0.01000	1453.74	1.79870	1453.74	0.02569	550.33	0.05000	549.79
386	0.01000	1436.25	1.73129	1436.25	0.03023	550.33	0.05000	549.44
387	0.01000	1421.80	1.63378	1421.80	0.03813	550.33	0.05000	548.87
419	0.01000	1650.15	2.13030	1650.15	0.02433	550.33	0.05000	549.74
420	0.01000	1631.46	2.11458	1631.46	0.02411	550.33	0.05000	549.85
421	0.01000	1613.35	2.09683	1613.35	0.02404	550.33	0.05000	549.88
422	0.01000	1595.86	2.07721	1595.86	0.02413	550.33	0.05000	549.82
423	0.01000	1578.94	2.05560	1578.94	0.02436	550.33	0.05000	549.67
431	0.01000	1648.82	2.17142	1648.82	0.02029	550.33	0.05000	549.80
432	0.01000	1632.58	2.13349	1632.58	0.02265	550.33	0.05000	549.72
433	0.01000	1616.40	2.10371	1616.40	0.02409	550.33	0.05000	549.70
434	0.01000	1600.22	2.08202	1600.22	0.02460	550.33	0.05000	549.73
435	0.01000	1584.13	2.06840	1584.13	0.02421	550.33	0.05000	549.80
443	0.01000	1627.25	2.14598	1627.25	0.01920	550.33	0.05000	549.83
444	0.01000	1611.21	2.10159	1611.21	0.02219	550.33	0.05000	549.69
445	0.01000	1595.39	2.06486	1595.39	0.02433	550.33	0.05000	549.62
446	0.01000	1579.71	2.03579	1579.71	0.02563	550.33	0.05000	549.64
447	0.01000	1564.26	2.01462	1564.26	0.02606	550.33	0.05000	549.74
455	0.01000	1586.59	2.06106	1586.59	0.02062	550.33	0.05000	549.84
456	0.01000	1568.89	2.02332	1568.89	0.02259	550.33	0.05000	549.73
457	0.01000	1552.07	1.98362	1552.07	0.02479	550.33	0.05000	549.63
458	0.01000	1536.09	1.94200	1536.09	0.02720	550.33	0.05000	549.56
459	0.01000	1521.21	1.89928	1521.21	0.02978	550.33	0.05000	549.50

OPTIMIZATION SYSTEM FOR TPSSYM = 6

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINS = 636
TOTAL NUMBER OF TEMP. CONSTRAINS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4
Tmax:	2300.33	2300.33	550.33	600.33
Optv:	1556.36	1556.36	547.20	547.20

VALUES OF DESIGN VARIABLES :

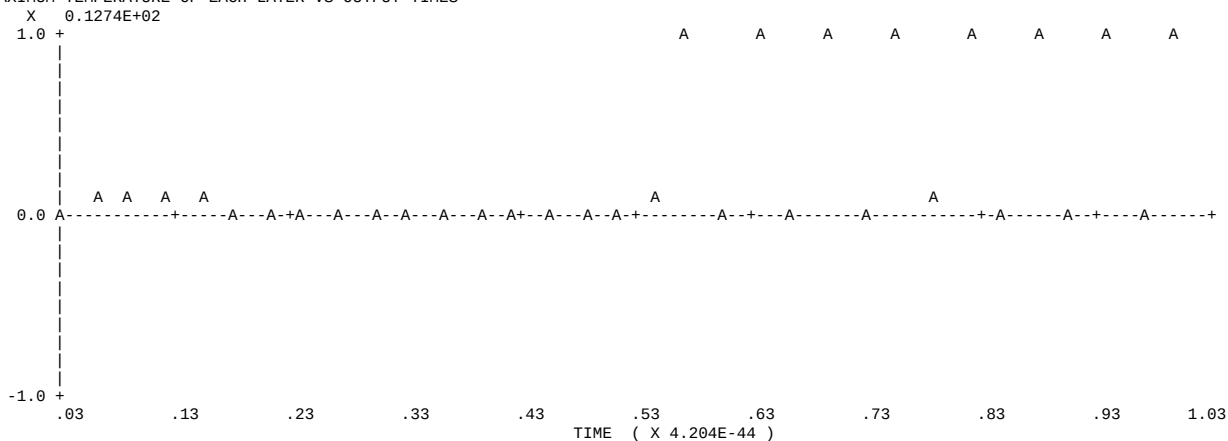
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
2	1.82148	1.81220	1.99811	1.92879	1.81392	1.99431	1.52682	1.66251	1.65857
3	0.02778	0.03389	0.02671	0.01594	0.03543	0.02550	0.03120	0.02485	0.03280
4	0.05000	0.05000	0.05000	0.07482	0.08000	0.06504	0.05000	0.05000	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 89.0600052

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.5853232

THE TOTAL OPTIMAL WEIGHT = 5.74007395E+04

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



OPTIMAL STRUCTURES OF TPS FOR PATCH = 6
(WITH AVERAGE THICKNESS)

=====	=====	=====
HRSI COAT	thin skin	0.01000 in. 1556.4 F
=====	=====	=====
LI-900 (P)	slab	1.80186 in. 1556.4 F
=====	=====	=====
RTV-560	thin skin	0.02823 in. 547.2 F
=====	=====	=====
17 LB SIP .16 IN	slab	0.05776 in. 547.2 F
=====	=====	=====

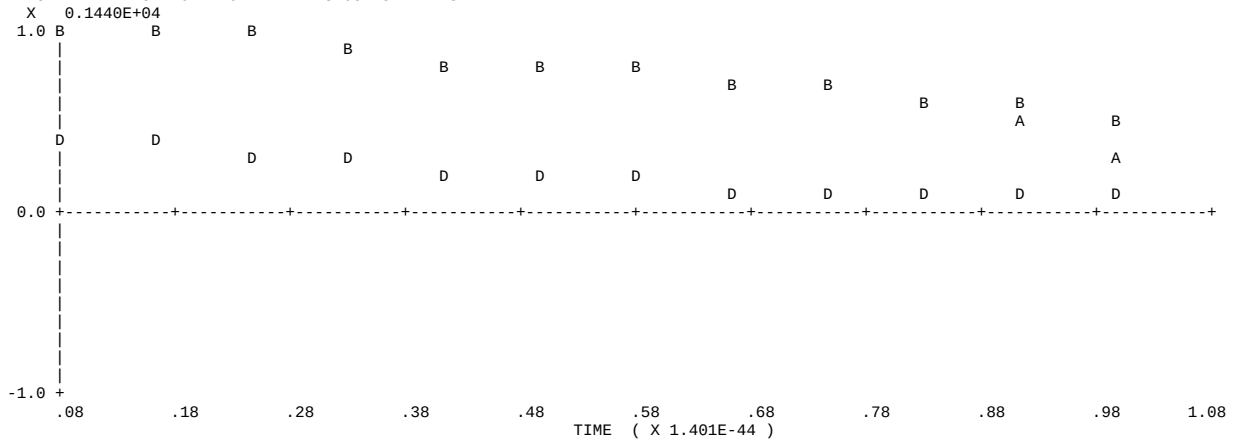
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 6

PANEL	LAYER01	LAYER02	LAYER03	LAYER04
376	0.01000	1446.89	1.77201	1446.89
388	0.01000	1399.64	1.65857	1399.64
424	0.01000	1556.36	1.99811	1556.36
436	0.01000	1556.36	2.02891	1556.36
448	0.01000	1543.75	1.99431	1543.75
460	0.01000	1499.97	1.89582	1499.97
511	0.01000	1372.95	1.67818	1372.95
512	0.01000	1419.21	1.74101	1419.21
515	0.01000	1348.55	1.66251	1348.55
516	0.01000	1394.85	1.71424	1394.85
519	0.01000	1327.20	1.61217	1327.20
520	0.01000	1374.17	1.69260	1374.17
523	0.01000	1308.69	1.52682	1308.69
524	0.01000	1357.80	1.67669	1357.80
1937	0.01000	1411.19	1.83195	1411.19
1938	0.01000	1425.76	1.77882	1425.76
1939	0.01000	1445.57	1.77144	1445.57
1940	0.01000	1470.30	1.81091	1470.30
1941	0.01000	1449.78	1.92879	1449.78
1942	0.01000	1462.58	1.83428	1462.58
1943	0.01000	1482.60	1.81392	1482.60
1944	0.01000	1509.72	1.86758	1509.72
1945	0.01000	1460.90	1.92752	1460.90
1946	0.01000	1472.61	1.84031	1472.61
1947	0.01000	1493.53	1.82812	1493.53
1948	0.01000	1523.66	1.89128	1523.66
1949	0.01000	1442.36	1.82148	1442.36
1950	0.01000	1453.89	1.79243	1453.89
1951	0.01000	1476.73	1.81220	1476.73
1952	0.01000	1510.97	1.88101	1510.97

OPTIMIZATION SYSTEM FOR TPSSYM = 7

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINS = 596
TOTAL NUMBER OF TEMP. CONSTRAINS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4
Tmax:	2300.33	2300.33	550.33	600.33
Optv:	1439.59	1439.59	550.16	550.16

VALUES OF DESIGN VARIABLES :

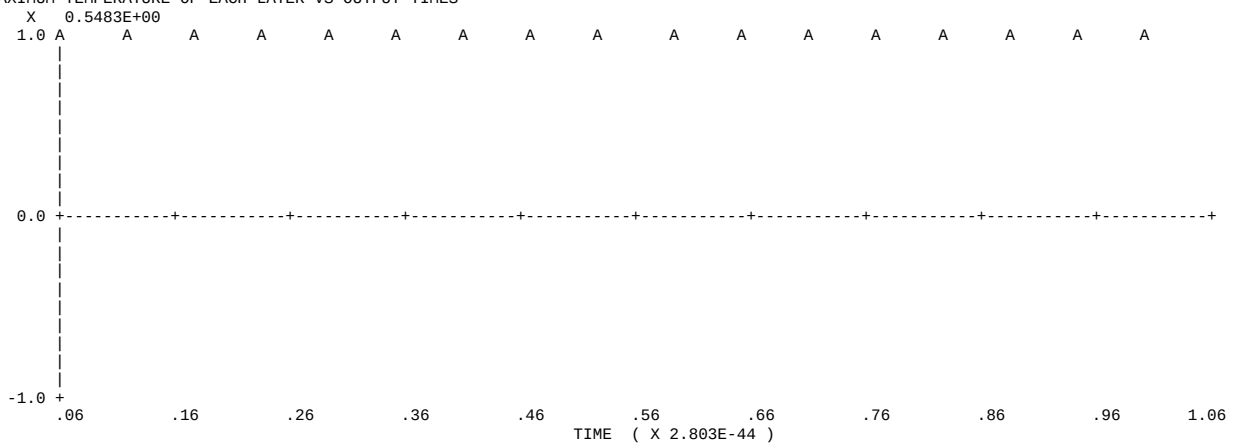
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.01000	0.01094	0.01000	0.01000	0.01098	0.01000	0.01000	0.01015	0.01000
2	1.82137	1.74461	1.80796	1.70278	1.74113	1.83854	1.34930	1.48626	1.57262
3	0.02748	0.03172	0.02662	0.03306	0.03180	0.02386	0.03731	0.02676	0.02167
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 74.2167816

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.5455250

THE TOTAL OPTIMAL WEIGHT = 4.69528964E+04

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



OPTIMAL STRUCTURES OF TPS FOR PATCH = 7
(WITH AVERAGE THICKNESS)

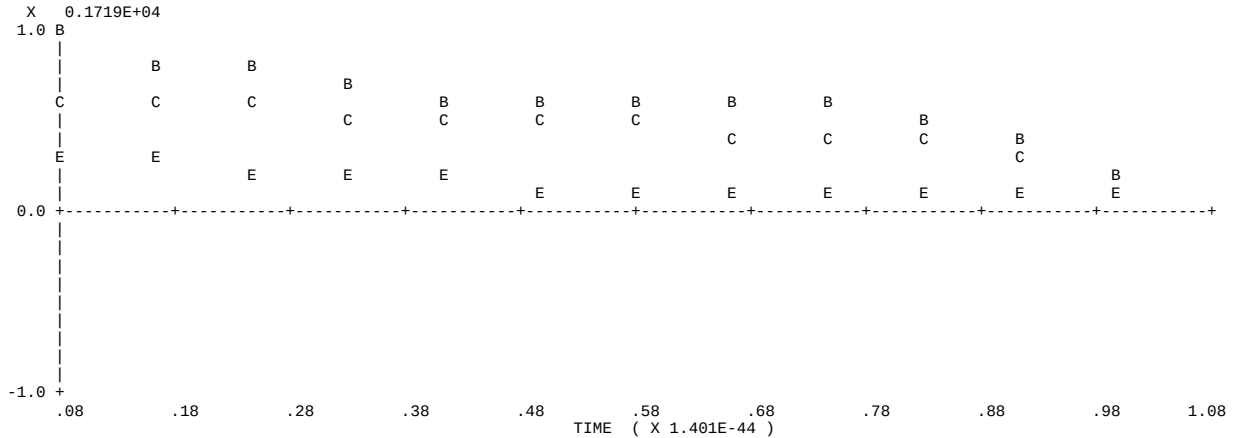
=====	=====	=====
HRSI COAT	thin skin	0.01023 in. 1439.6 F
=====	=====	=====
LI-900 (P)	slab	1.67384 in. 1439.6 F
=====	=====	=====
RTV-560	thin skin	0.02892 in. 550.2 F
=====	=====	=====
17 LB SIP .16 IN	slab	0.05000 in. 550.2 F

1899	0.00999	1307.40	1.63838	1307.40	0.02618	550.01	0.04997	541.76
1900	0.01000	1319.78	1.75236	1319.78	0.01732	550.10	0.04998	544.51
1901	0.01000	1337.01	1.94763	1337.01	0.00108	550.33	0.05000	550.09
1902	0.01000	1259.03	1.51203	1259.03	0.02713	550.33	0.05000	547.58
1903	0.01000	1265.71	1.46663	1265.71	0.03409	550.14	0.04998	544.16
1904	0.00999	1272.85	1.46067	1272.85	0.03678	550.04	0.04997	542.47
1905	0.00999	1280.39	1.48006	1280.39	0.03675	549.99	0.04997	541.88
1906	0.00999	1288.67	1.52037	1288.67	0.03458	549.98	0.04997	542.10
1907	0.00999	1299.03	1.58930	1299.03	0.02979	550.02	0.04997	543.23
1908	0.01000	1313.99	1.71312	1313.99	0.02014	550.11	0.04998	546.01
1909	0.01000	1334.88	1.91598	1334.88	0.00325	550.33	0.05000	550.27
1910	0.01000	1213.62	1.36658	1213.62	0.03455	550.33	0.05000	550.27
1911	0.01000	1219.63	1.35434	1219.63	0.03744	550.33	0.05000	548.11
1912	0.01000	1227.09	1.35614	1227.09	0.03895	550.33	0.05000	546.61
1913	0.01000	1236.18	1.36967	1236.18	0.03940	550.33	0.05000	545.58
1914	0.01000	1246.99	1.39460	1246.99	0.03886	550.33	0.05000	544.98
1915	0.01000	1260.50	1.43402	1260.50	0.03718	550.33	0.05000	544.80
1916	0.01000	1277.44	1.49160	1277.44	0.03406	550.33	0.05000	545.14
1917	0.01000	1298.18	1.56943	1298.18	0.02933	550.33	0.05000	546.11

OPTIMIZATION SYSTEM FOR TPSSYM = 10

TOTAL NUMBER OF DESIGN VARIABLES = 80
TOTAL NUMBER OF CONSTRAINTS = 1640
TOTAL NUMBER OF TEMP. CONSTRAINTS = 1040
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4	5
Tmax:	2800.33	2900.33	2700.33	550.33	600.33
Optv:	1718.85	1718.85	956.42	514.00	514.00

VALUES OF DESIGN VARIABLES :

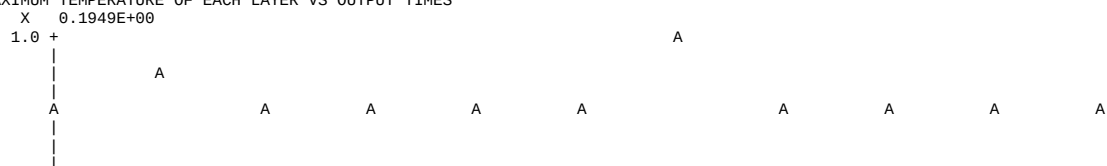
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09	DEV10	DEV11	DEV12	DEV13
DEV14	DEV15	DEV16											
1	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
0.01000	0.01000	0.01000											
2	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
0.01000	0.01000	0.01000											
3	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
1.00000	1.00000	1.00000											
4	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
0.00100	0.00100	0.00100											
5	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000
0.05000	0.05000	0.05000											

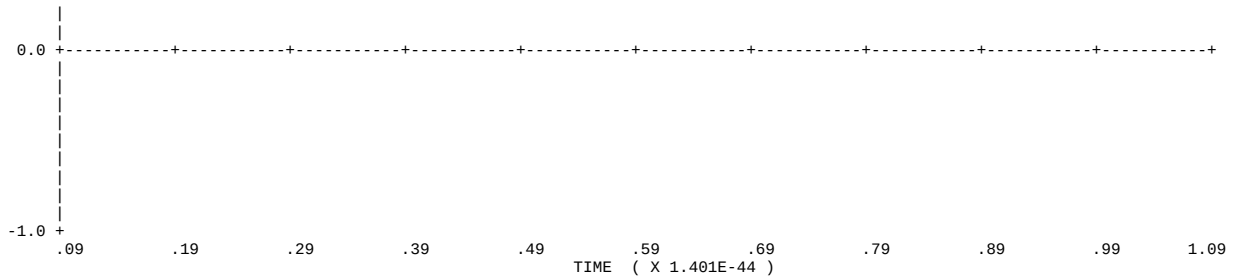
THE ORIGINAL OBJECTIVE FUNCTION = 1619.0898438

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.1098324

THE TOTAL OPTIMAL WEIGHT = 1.39254345E+04

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES





OPTIMAL STRUCTURES OF TPS FOR PATCH = 10 (WITH AVERAGE THICKNESS)			
=====	ACC(N)	thin skin	0.01000 in. 1718.8 F
=====	0.03000 in. ZIRCONIUM		i
-----			i
-----		radiation gap	0.01000 in. 1718.8 F
-----			i
-----	0.03000 in. ZIRCONIUM		i
=====			-----
=====	LI-2200 (N)	slab	0.99999 in. 956.4 F
=====			i
=====	RTV-560	thin skin	0.00100 in. 514.0 F
=====			-----
=====	17 LB SIP .16 IN	slab	0.05000 in. 514.0 F
=====			i
=====			-----

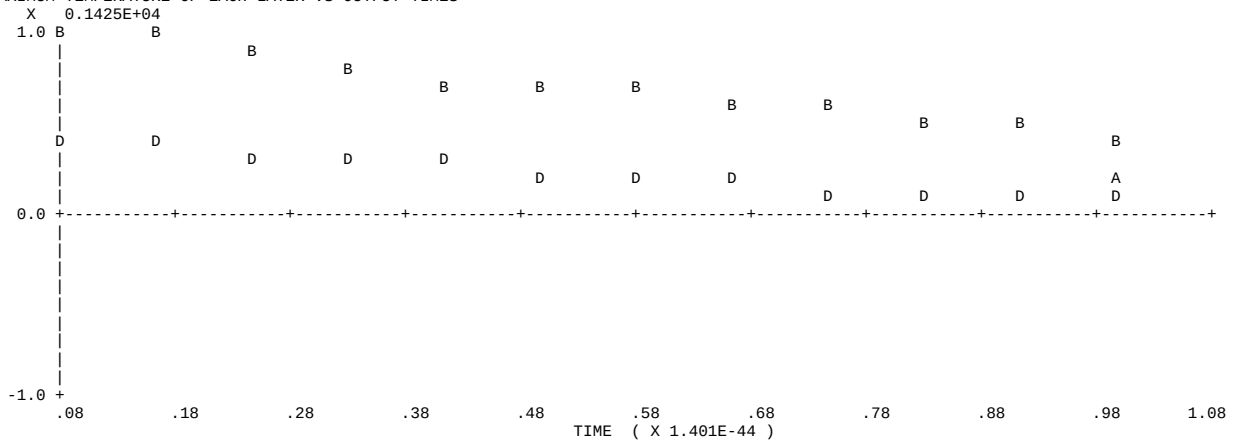
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 10										
PANEL	LAYER01	LAYER02	LAYER03	LAYER04	LAYER05					
661	0.01000	1319.63	0.01000	1319.63	1.00000	1125.61	0.00100	550.05	0.05000	494.62
662	0.01000	1318.48	0.01000	1318.48	1.00000	1124.35	0.00100	550.03	0.05000	493.59
663	0.01001	1334.59	0.01001	1334.59	1.00000	1136.47	0.00100	550.33	0.05005	500.65
664	0.00999	1307.50	0.00999	1307.50	0.99948	1112.43	0.00100	545.31	0.04997	483.13
665	0.01000	1297.79	0.01000	1297.79	1.00000	1102.02	0.00100	549.90	0.05000	475.22
666	0.01000	1296.39	0.01000	1296.39	1.00000	1100.52	0.00100	549.90	0.05000	473.99
667	0.01001	1306.97	0.01001	1306.97	1.00057	1108.81	0.00100	550.33	0.05003	479.00
668	0.01000	1301.86	0.01000	1301.86	1.00002	1102.65	0.00100	546.53	0.05000	473.47
669	0.01000	1269.32	0.01000	1269.32	1.00000	1071.67	0.00100	549.90	0.05000	450.14
670	0.01000	1267.88	0.01000	1267.88	1.00000	1070.14	0.00100	549.90	0.05000	448.87
671	0.01001	1283.06	0.01001	1283.06	1.00059	1082.19	0.00100	550.33	0.05003	455.87
672	0.01000	1259.51	0.01000	1259.51	0.99983	1059.34	0.00100	540.98	0.04999	441.27
673	0.01000	1233.80	0.01000	1233.80	1.00000	1034.08	0.00100	550.03	0.05000	418.94
674	0.01000	1238.37	0.01000	1238.37	1.00016	1037.56	0.00100	550.33	0.05001	420.37
675	0.01000	1218.31	0.01000	1218.31	1.00007	1016.22	0.00100	544.61	0.05000	407.29
676	0.01000	1045.70	0.01000	1045.70	0.99975	860.30	0.00100	479.03	0.04999	321.18
677	0.01000	1190.83	0.01000	1190.83	1.00000	988.81	0.00100	550.33	0.05000	381.25
678	0.01000	1164.41	0.01000	1164.41	1.00000	962.11	0.00100	550.33	0.05000	364.87
679	0.01000	1083.32	0.01000	1083.32	1.00000	885.32	0.00100	505.23	0.05000	323.16
680	0.01000	996.19	0.01000	996.19	1.00000	802.46	0.00100	442.92	0.05000	277.11
1001	0.01000	1236.21	0.01000	1236.21	0.99950	1008.01	0.00100	550.33	0.04998	359.86
1002	0.01000	1202.19	0.01000	1202.19	0.99976	974.02	0.00100	547.55	0.04999	341.41
1003	0.01001	1033.13	0.01001	1033.13	1.00097	847.38	0.00100	512.03	0.05005	315.86
1004	0.01000	1512.05	0.01000	1512.05	1.00013	1159.55	0.00100	493.69	0.05001	365.76
1005	0.01000	1218.34	0.01000	1218.34	0.99959	1005.19	0.00100	550.33	0.04998	373.09
1006	0.01000	1176.82	0.01000	1176.82	0.99973	966.86	0.00100	549.05	0.04999	352.62
1007	0.01001	1056.95	0.01001	1056.95	1.00102	875.06	0.00100	523.90	0.05005	334.11
1008	0.01000	1636.22	0.01000	1636.22	1.00013	1250.66	0.00100	507.59	0.05001	389.93
1009	0.01000	1218.59	0.01000	1218.59	0.99975	1016.46	0.00100	549.75	0.04999	393.70
1010	0.01000	1174.58	0.01000	1174.58	0.99977	977.51	0.00100	549.88	0.04999	372.84
1011	0.01001	1092.55	0.01001	1092.55	1.00091	913.10	0.00100	534.50	0.05005	359.35
1012	0.01000	1708.79	0.01000	1708.79	1.00009	1309.26	0.00100	522.46	0.05000	411.59
1013	0.01000	1231.21	0.01000	1231.21	0.99991	1036.91	0.00100	549.71	0.05000	418.52
1014	0.01000	1189.85	0.01000	1189.85	0.99987	1001.10	0.00100	550.25	0.04999	399.02
1015	0.01001	1136.61	0.01001	1136.61	1.00068	957.90	0.00100	543.40	0.05003	388.73
1016	0.01000	1718.85	0.01000	1718.85	1.00003	1337.18	0.00100	537.09	0.05000	429.39
1017	0.01000	1251.07	0.01000	1251.07	1.00000	1062.08	0.00100	550.33	0.05000	444.49
1018	0.01000	1217.07	0.01000	1217.07	1.00001	1032.82	0.00100	550.33	0.05000	428.15
1019	0.01000	1184.73	0.01000	1184.73	1.00037	1005.23	0.00100	550.33	0.05002	419.29
1020	0.01000	1718.85	0.01000	1718.85	1.00000	1337.18	0.00100	550.33	0.05000	441.95
1021	0.01000	1281.68	0.01000	1281.68	1.00000	1092.55	0.00100	550.33	0.05000	468.24
1022	0.01000	1249.85	0.01000	1249.85	1.00018	1067.33	0.00100	550.30	0.05001	457.14
1023	0.01000	1228.93	0.01000	1228.93	1.00001	1048.77	0.00100	550.33	0.05000	448.13
1024	0.01000	1641.12	0.01000	1641.12	1.00000	1295.58	0.00100	550.33	0.05000	447.82
1025	0.01000	1307.46	0.01000	1307.46	1.00000	1118.00	0.00100	550.33	0.05000	488.44
1026	0.01000	1284.29	0.01000	1284.29	1.00034	1101.00	0.00100	550.28	0.05002	483.22
1027	0.01000	1268.51	0.01000	1268.51	0.99965	1086.44	0.00100	550.33	0.04998	472.36
1028	0.01000	1548.01	0.01000	1548.01	0.99997	1241.24	0.00100	550.33	0.05000	448.44
1029	0.01000	1326.19	0.01000	1326.19	1.00000	1136.13	0.00100	550.33	0.05000	503.05
1030	0.01000	1315.14	0.01000	1315.14	1.00049	1129.24	0.00100	550.33	0.05002	503.43
1031	0.00999	1298.15	0.00999	1298.15	0.99933	1113.36	0.00100	550.33	0.04997	488.83

1032	0.01000	1444.23	0.01000	1444.23	0.99994	1176.07	0.00100	550.33	0.05000	442.34
1033	0.01000	1335.63	0.01000	1335.63	1.00000	1144.63	0.00100	550.33	0.05000	510.03
1034	0.01001	1337.11	0.01001	1337.11	1.00059	1147.43	0.00100	550.33	0.05003	514.00
1035	0.00999	1312.22	0.00999	1312.22	0.99907	1124.44	0.00100	550.33	0.04995	494.35
1036	0.01000	1334.21	0.01000	1334.21	0.99995	1101.79	0.00100	550.33	0.05000	428.13
1037	0.01000	1333.56	0.01000	1333.56	1.00000	1141.20	0.00100	550.33	0.05000	507.33
1038	0.01001	1344.81	0.01001	1344.81	1.00062	1150.84	0.00100	550.33	0.05003	514.00
1039	0.00999	1304.95	0.00999	1304.95	0.99892	1114.43	0.00100	549.81	0.04995	485.67
1040	0.01000	1223.40	0.01000	1223.40	1.00000	1021.00	0.00100	550.33	0.05000	404.76
1290	0.01000	1088.41	0.01000	1088.41	1.00000	900.46	0.00100	528.63	0.05000	344.74
1291	0.01000	1439.45	0.01000	1439.45	1.00000	1129.18	0.00100	550.33	0.05000	377.88
1292	0.01000	1050.82	0.01000	1050.82	1.00000	848.58	0.00100	481.48	0.05000	316.62
1293	0.01000	1042.78	0.01000	1042.78	1.00000	841.70	0.00100	476.12	0.05000	311.62
1294	0.01000	1173.42	0.01000	1173.42	0.99992	958.38	0.00100	540.83	0.05000	350.39
1295	0.01000	1359.89	0.01000	1359.89	0.99988	1073.52	0.00100	548.01	0.04999	359.94
1296	0.01000	1028.23	0.01000	1028.23	1.00034	832.90	0.00100	486.98	0.05002	308.85
1297	0.01000	1188.35	0.01000	1188.35	1.00000	938.07	0.00100	478.39	0.05000	325.34
1298	0.01000	1221.64	0.01000	1221.64	0.99975	991.87	0.00100	548.04	0.04999	353.32
1299	0.01000	1296.76	0.01000	1296.76	0.99982	1031.01	0.00100	547.09	0.04999	348.24
1300	0.01001	1024.96	0.01001	1024.96	1.00061	832.38	0.00100	494.79	0.05003	307.00
1301	0.01000	1316.99	0.01000	1316.99	1.00000	1024.26	0.00100	481.80	0.05000	338.93
1302	0.01000	1246.97	0.01000	1246.97	0.99958	1010.58	0.00100	550.33	0.04998	355.69
1303	0.01000	1246.59	0.01000	1246.59	0.99979	998.83	0.00100	546.64	0.04999	341.73
1304	0.01001	1026.16	0.01001	1026.16	1.00079	836.30	0.00100	502.45	0.05004	308.56
1305	0.01000	1395.98	0.01000	1395.98	1.00008	1078.08	0.00100	485.20	0.05000	348.47

OPTIMIZATION SYSTEM FOR TPSSYM = 11

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINS = 1196
TOTAL NUMBER OF TEMP. CONSTRAINS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4
Tmax:	2300.33	2300.33	550.33	600.33
Optv:	1425.15	1425.15	549.84	549.84

VALUES OF DESIGN VARIABLES :

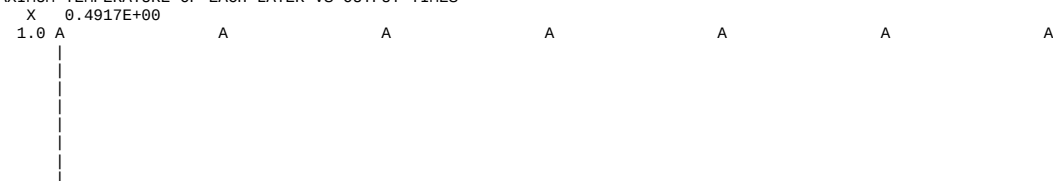
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
2	1.30766	1.15843	1.16613	1.41172	1.47614	1.40625	1.24850	1.25626	1.21618
3	0.02776	0.02951	0.02978	0.03979	0.03463	0.03950	0.04086	0.03060	0.03115
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

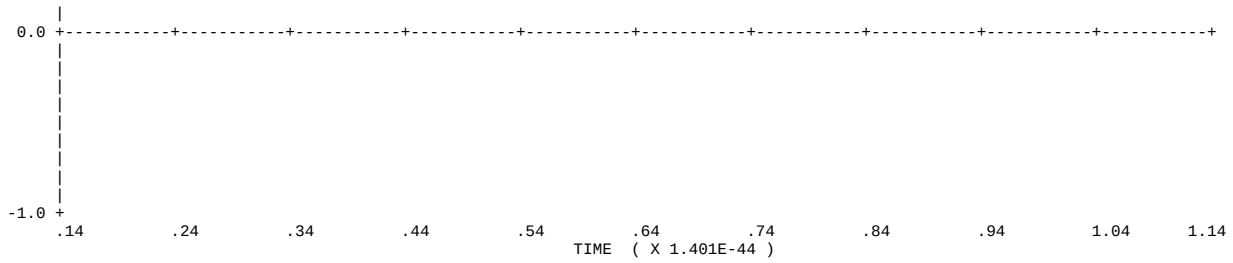
THE ORIGINAL OBJECTIVE FUNCTION = 296.8915405

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.4759319

THE TOTAL OPTIMAL WEIGHT = 3.06143389E+04

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES





OPTIMAL STRUCTURES OF TPS FOR PATCH = 11 (WITH AVERAGE THICKNESS)			
=====	-----		
HSRI COAT	thin skin	0.01000 in.	1425.2 F
=====	-----		
LI-900 (P)	slab	1.29418 in.	1425.2 F
=====	-----		
RTV-560	thin skin	0.03373 in.	549.8 F
=====	-----		
17 LB SIP .16 IN	slab	0.05000 in.	549.8 F
=====	-----		

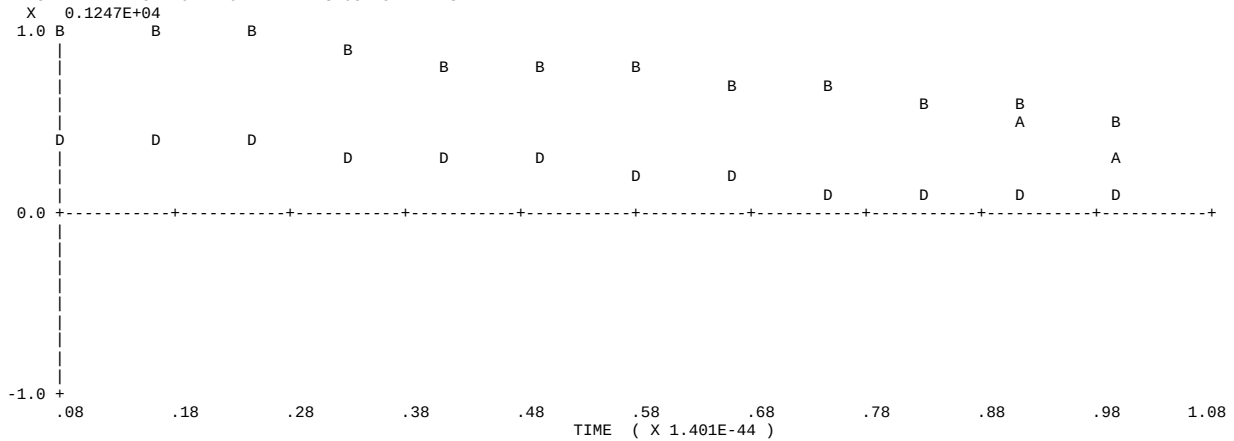
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 11							
PANEL	LAYER01	LAYER02	LAYER03	LAYER04			
1071	0.01000	1214.08	1.34207	1214.08	0.03655	550.33	0.05000 549.25
1072	0.01000	1235.72	1.37045	1235.72	0.03778	550.33	0.05000 549.15
1073	0.01000	1251.72	1.39176	1251.72	0.03871	550.33	0.05000 549.07
1074	0.01000	1262.08	1.40599	1262.08	0.03935	550.33	0.05000 549.02
1075	0.01000	1266.80	1.41315	1266.80	0.03970	550.33	0.05000 548.99
1076	0.01000	1265.88	1.41324	1265.88	0.03975	550.33	0.05000 548.99
1077	0.01000	1259.33	1.40625	1259.33	0.03950	550.33	0.05000 549.01
1078	0.01000	1248.30	1.39724	1248.30	0.03859	550.33	0.05000 549.06
1079	0.01000	1230.54	1.37910	1230.54	0.03750	550.33	0.05000 549.14
1080	0.01000	1206.05	1.35179	1206.05	0.03625	550.33	0.05000 549.23
1081	0.01000	1226.71	1.37868	1226.71	0.03460	550.33	0.05000 549.27
1082	0.01000	1251.15	1.41533	1251.15	0.03526	550.33	0.05001 549.18
1083	0.01000	1269.37	1.44436	1269.37	0.03563	550.33	0.05001 549.12
1084	0.01000	1281.17	1.46539	1281.17	0.03573	550.33	0.05001 549.08
1085	0.01000	1286.44	1.47806	1286.44	0.03558	550.33	0.05001 549.07
1086	0.01000	1285.13	1.48192	1285.13	0.03520	550.33	0.05001 549.07
1087	0.01000	1277.42	1.47649	1277.42	0.03464	550.33	0.05001 549.10
1088	0.01000	1263.23	1.45787	1263.23	0.03420	550.33	0.05001 549.15
1089	0.01000	1243.54	1.43015	1243.54	0.03362	550.33	0.05001 549.21
1090	0.01000	1218.85	1.39341	1218.85	0.03293	550.33	0.05001 549.29
1091	0.01000	1237.16	1.41781	1237.16	0.03324	550.33	0.05001 549.24
1092	0.01000	1258.75	1.45337	1258.75	0.03374	550.33	0.05001 549.16
1093	0.01000	1273.61	1.47939	1273.61	0.03408	550.33	0.05001 549.11
1094	0.01000	1281.90	1.49554	1281.90	0.03429	550.33	0.05002 549.08
1095	0.01000	1284.01	1.50145	1284.01	0.03440	550.33	0.05002 549.06
1096	0.01000	1280.83	1.49665	1280.83	0.03445	550.33	0.05002 549.07
1097	0.01000	1274.39	1.48072	1274.39	0.03453	550.33	0.05002 549.09
1098	0.01000	1269.21	1.46138	1269.21	0.03416	550.33	0.05001 549.14
1099	0.01000	1263.23	1.43502	1263.23	0.03366	550.33	0.05001 549.21
1100	0.01000	1258.38	1.40256	1258.38	0.03300	550.33	0.05001 549.30
1101	0.01000	1228.67	1.41443	1228.67	0.03509	550.33	0.05001 549.11
1102	0.01000	1242.10	1.44236	1242.10	0.03576	550.33	0.05001 549.05
1103	0.01000	1249.57	1.45930	1249.57	0.03640	550.33	0.05001 549.00
1104	0.01000	1251.86	1.46490	1251.86	0.03705	550.33	0.05001 548.97
1105	0.01000	1250.43	1.45886	1250.43	0.03778	550.33	0.05001 548.95
1106	0.01000	1248.12	1.44100	1248.12	0.03865	550.33	0.05001 548.95
1107	0.01000	1250.76	1.41172	1250.76	0.03979	550.33	0.05000 548.97
1108	0.01000	1269.72	1.40789	1269.72	0.03860	550.33	0.05000 549.05
1109	0.01000	1291.14	1.39999	1291.14	0.03720	550.33	0.05000 549.15
1110	0.01000	1315.03	1.38800	1315.03	0.03558	550.33	0.05000 549.27
1126	0.01000	1116.63	1.21618	1116.63	0.03115	550.33	0.05000 549.69
1127	0.01000	1136.20	1.24133	1136.20	0.03223	550.33	0.05000 549.60
1128	0.01000	1156.01	1.26684	1156.01	0.03332	550.33	0.05000 549.51
1129	0.01000	1175.16	1.29156	1175.16	0.03437	550.33	0.05000 549.43
1130	0.01000	1192.92	1.31456	1192.92	0.03536	550.33	0.05000 549.34
1131	0.01000	1131.61	1.25626	1131.61	0.03060	550.33	0.05000 549.59
1132	0.01000	1144.42	1.26961	1144.42	0.03116	550.33	0.05000 549.58
1133	0.01000	1161.04	1.28467	1161.04	0.03243	550.33	0.05000 549.51
1134	0.01000	1179.81	1.30689	1179.81	0.03355	550.33	0.05000 549.43
1135	0.01000	1201.14	1.33914	1201.14	0.03408	550.33	0.05000 549.35
1136	0.01000	1156.70	1.26852	1156.70	0.03377	550.33	0.05000 549.35
1137	0.01000	1161.85	1.29618	1161.85	0.03228	550.33	0.05000 549.42
1138	0.01000	1176.37	1.32353	1176.37	0.03196	550.33	0.05000 549.42
1139	0.01000	1194.83	1.35151	1194.83	0.03224	550.33	0.05001 549.38
1140	0.01000	1214.44	1.38146	1214.44	0.03270	550.33	0.05001 549.31
1141	0.01000	1191.02	1.24850	1191.02	0.04086	550.33	0.05000 548.97
1142	0.01000	1180.35	1.28166	1180.35	0.03767	550.33	0.05000 549.11
1143	0.01000	1184.48	1.31641	1184.48	0.03575	550.33	0.05000 549.18
1144	0.01000	1196.89	1.35050	1196.89	0.03482	550.33	0.05001 549.20
1145	0.01000	1212.18	1.38207	1212.18	0.03466	550.33	0.05001 549.17

1158	0.01000	1116.63	1.21618	1116.63	0.03115	550.33	0.05000	549.69
1159	0.01000	1116.63	1.21618	1116.63	0.03115	550.33	0.05000	549.69
1160	0.01000	1116.63	1.21618	1116.63	0.03115	550.33	0.05000	549.69
1161	0.01000	1117.57	1.22055	1117.57	0.03098	550.33	0.05000	549.69
1162	0.01000	1131.61	1.25626	1131.61	0.03060	550.33	0.05000	549.59
1163	0.01000	1131.61	1.25626	1131.61	0.03060	550.33	0.05000	549.59
1164	0.01000	1131.61	1.25626	1131.61	0.03060	550.33	0.05000	549.59
1165	0.01000	1134.32	1.25962	1134.32	0.03079	550.33	0.05000	549.57
1166	0.01000	1143.64	1.26666	1143.64	0.03178	550.33	0.05000	549.48
1167	0.01000	1147.79	1.26805	1147.79	0.03235	550.33	0.05000	549.44
1168	0.01000	1153.08	1.26865	1153.08	0.03317	550.33	0.05000	549.39
1169	0.01000	1161.64	1.26736	1161.64	0.03466	550.33	0.05000	549.30
1170	0.01000	1177.46	1.25945	1177.46	0.03783	550.33	0.05000	549.13
1171	0.01000	1188.50	1.25077	1188.50	0.04028	550.33	0.05000	549.00
1172	0.01000	1191.02	1.24850	1191.02	0.04086	550.33	0.05000	548.97
1173	0.01000	1191.02	1.24850	1191.02	0.04086	550.33	0.05000	548.97
1348	0.01000	1335.64	1.37563	1335.64	0.03416	550.33	0.05000	549.37
1349	0.01000	1254.33	1.37275	1254.33	0.03229	550.33	0.05001	549.39
1350	0.01000	1194.70	1.35652	1194.70	0.03233	550.33	0.05001	549.37
1351	0.01000	1181.40	1.32255	1181.40	0.03515	550.33	0.05000	549.32
1355	0.01000	1351.81	1.36487	1351.81	0.03303	550.33	0.05000	549.45
1356	0.01000	1247.81	1.34716	1247.81	0.03163	550.33	0.05001	549.46
1357	0.01000	1172.67	1.32370	1172.67	0.03186	550.33	0.05001	549.44
1358	0.01000	1159.88	1.29594	1159.88	0.03426	550.33	0.05000	549.40
1362	0.01000	1368.78	1.35275	1368.78	0.03182	550.33	0.05000	549.54
1363	0.01000	1240.31	1.31877	1240.31	0.03094	550.33	0.05001	549.53
1364	0.01000	1148.46	1.28760	1148.46	0.03134	550.33	0.05001	549.51
1365	0.01000	1136.08	1.26631	1136.08	0.03329	550.33	0.05000	549.49
1369	0.01000	1377.89	1.33657	1377.89	0.03053	550.33	0.05000	549.63
1370	0.01000	1231.30	1.28750	1231.30	0.03020	550.33	0.05000	549.62
1371	0.01000	1121.96	1.24817	1121.96	0.03076	550.33	0.05000	549.59
1372	0.01000	1110.29	1.23380	1110.29	0.03222	550.33	0.05000	549.59
1376	0.01000	1406.47	1.32332	1406.47	0.02912	550.33	0.05000	549.74
1377	0.01000	1220.67	1.25322	1220.67	0.02943	550.33	0.05000	549.70
1378	0.01000	1093.05	1.20531	1093.05	0.03012	550.33	0.05000	549.68
1379	0.01000	1082.67	1.19869	1082.67	0.03105	550.33	0.05000	549.69
1383	0.01000	1425.15	1.30766	1425.15	0.02776	550.33	0.05000	549.84
1384	0.01000	1182.65	1.20782	1182.65	0.02881	550.33	0.05000	549.79
1385	0.01000	1055.77	1.15843	1055.77	0.02951	550.33	0.05000	549.78
1386	0.01000	1061.07	1.16613	1061.07	0.02978	550.33	0.05000	549.81

OPTIMIZATION SYSTEM FOR TPSSYM = 12

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINS = 996
TOTAL NUMBER OF TEMP. CONSTRAINS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



VALUES OF DESIGN VARIABLES :

LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
2	1.16452	1.16872	1.15166	1.58434	1.35072	1.24258	1.16777	1.14984	1.13925
3	0.03053	0.03045	0.03064	0.01750	0.03675	0.04225	0.03322	0.03308	0.03286
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 222.6478729

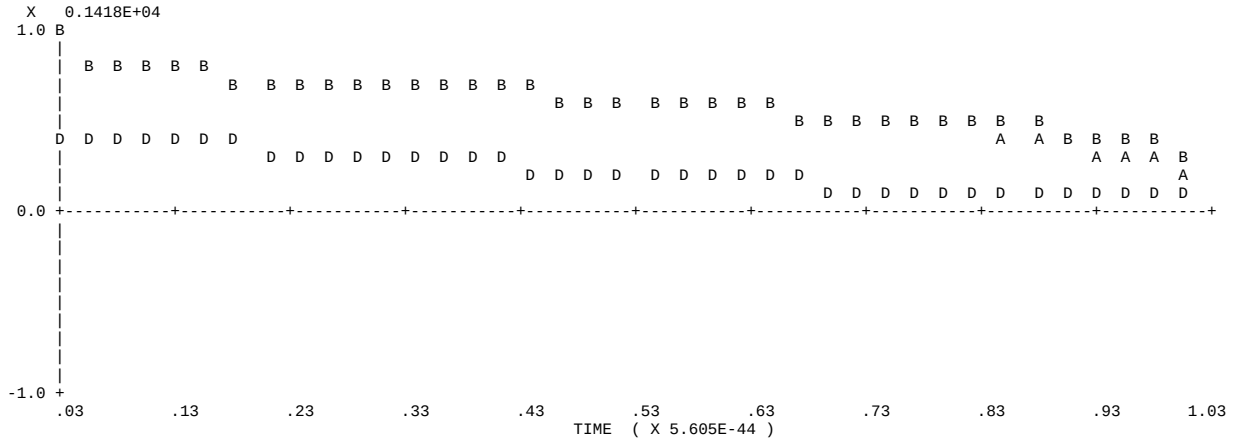
THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.4537162

1146	0.01000	1070.70	1.13925	1070.70	0.03286	550.33	0.05000	550.05
1147	0.01000	1070.70	1.13925	1070.70	0.03286	550.33	0.05000	550.05
1148	0.01000	1070.70	1.13925	1070.70	0.03286	550.33	0.05000	550.05
1149	0.01000	1070.70	1.13925	1070.70	0.03286	550.33	0.05000	550.05
1150	0.01000	1078.27	1.14984	1078.27	0.03308	550.33	0.05000	550.08
1151	0.01000	1078.27	1.14984	1078.27	0.03308	550.33	0.05000	550.08
1152	0.01000	1078.27	1.14984	1078.27	0.03308	550.33	0.05000	550.08
1153	0.01000	1078.27	1.14984	1078.27	0.03308	550.33	0.05000	550.08
1154	0.01000	1085.93	1.15718	1085.93	0.03315	550.33	0.05000	550.08
1155	0.01000	1088.16	1.15919	1088.16	0.03317	550.33	0.05000	550.07
1156	0.01000	1094.27	1.16450	1094.27	0.03320	550.33	0.05000	550.07
1157	0.01000	1098.14	1.16777	1098.14	0.03322	550.33	0.05000	550.06
1352	0.01000	1178.17	1.43380	1178.17	0.02194	550.33	0.05000	550.02
1353	0.01000	1167.02	1.31599	1167.02	0.03213	550.32	0.05000	549.37
1354	0.01000	1147.72	1.22855	1147.72	0.03775	550.32	0.05000	549.16
1359	0.01000	1159.35	1.39040	1159.35	0.02330	550.33	0.05000	550.00
1360	0.01000	1150.35	1.29085	1150.35	0.03196	550.32	0.05000	549.45
1361	0.01000	1132.23	1.21562	1132.23	0.03663	550.32	0.05000	549.28
1366	0.01000	1138.38	1.34166	1138.38	0.02484	550.33	0.05000	549.97
1367	0.01000	1131.75	1.26294	1131.75	0.03176	550.32	0.05000	549.54
1368	0.01000	1114.95	1.20154	1114.95	0.03535	550.33	0.05000	549.41
1373	0.01000	1115.30	1.28767	1115.30	0.02657	550.33	0.05000	549.94
1374	0.01000	1111.27	1.23270	1111.27	0.03148	550.32	0.05000	549.64
1375	0.01000	1095.87	1.18640	1095.87	0.03391	550.33	0.05000	549.56
1380	0.01000	1090.01	1.22801	1090.01	0.02849	550.33	0.05000	549.90
1381	0.01000	1088.93	1.20089	1088.93	0.03106	550.33	0.05000	549.76
1382	0.01000	1075.09	1.17046	1075.09	0.03230	550.33	0.05000	549.73
1387	0.01000	1063.04	1.16452	1063.04	0.03053	550.33	0.05000	549.87
1388	0.01000	1065.03	1.16872	1065.03	0.03045	550.33	0.05000	549.90
1389	0.01000	1051.35	1.15166	1051.35	0.03064	550.33	0.05000	549.89

OPTIMIZATION SYSTEM FOR TPSSYM = 13

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINS = 2040
TOTAL NUMBER OF TEMP. CONSTRAINS = 1440
TOTAL NUMBER OF TEMP. PRINTOUTS = 40

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4
Tmax:	2300.33	2300.33	550.33	600.33
Optv:	1417.77	1417.77	550.00	550.00

VALUES OF DESIGN VARIABLES :

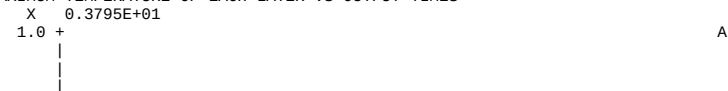
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.01000	0.01000	0.01000	0.01015	0.01000	0.01000	0.01000	0.01000	0.01000
2	1.28395	1.03009	1.02402	1.31879	1.22340	1.19037	1.50502	1.49693	1.49431
3	0.02062	0.04959	0.05020	0.03379	0.03573	0.03652	0.00118	0.00115	0.00115
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

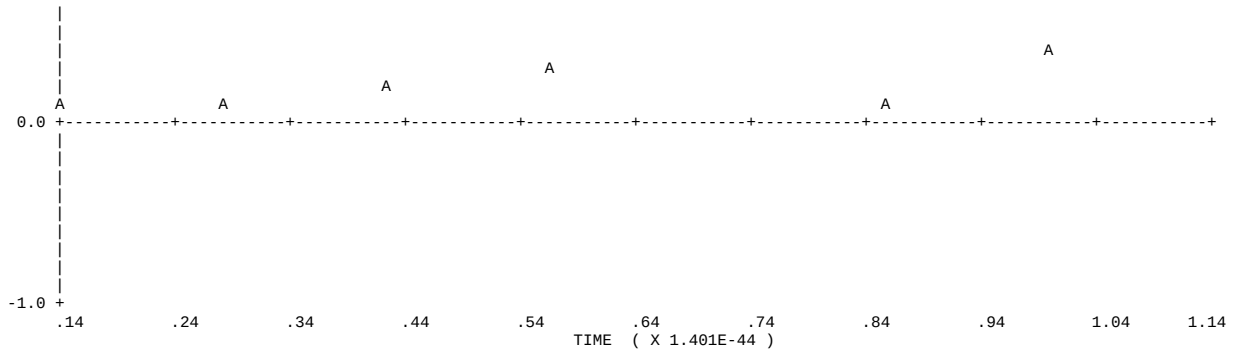
THE ORIGINAL OBJECTIVE FUNCTION = 249.3671265

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.4470765

THE TOTAL OPTIMAL WEIGHT = 2.38048271E+04

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES





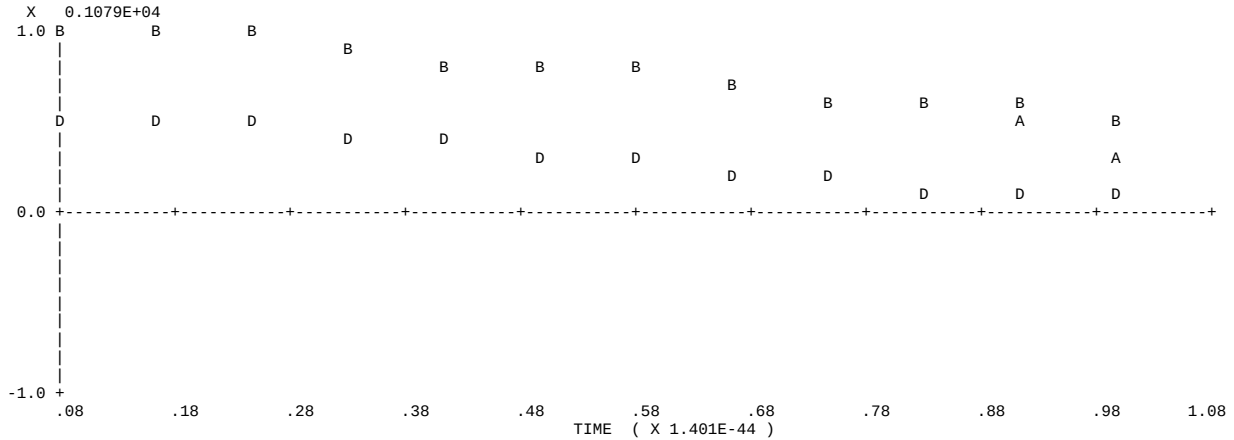
OPTIMAL STRUCTURES OF TPS FOR PATCH = 13 (WITH AVERAGE THICKNESS)			
=====	-----		
=====	-----		
HRSI COAT	thin skin	0.01002 in.	1417.8 F
=====	-----		
LI-900 (P)	slab	1.28521 in.	1417.8 F
=====	-----		
RTV-560	thin skin	0.02555 in.	550.0 F
=====	-----		
17 LB SIP .16 IN	slab	0.05000 in.	550.0 F
=====	-----		

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 13									
PANEL	LAYER01		LAYER02		LAYER03		LAYER04		
1686	0.01009	1379.15	1.42635	1379.15	0.01795	550.33	0.05000	544.20	
1687	0.01004	1362.72	1.42068	1362.72	0.01611	550.33	0.05000	543.83	
1688	0.01000	1343.70	1.40728	1343.70	0.01471	550.33	0.05000	543.46	
1689	0.01000	1330.08	1.38750	1330.08	0.01479	550.33	0.05000	543.26	
1694	0.01011	1394.12	1.40345	1394.12	0.02231	550.33	0.05000	542.80	
1695	0.01005	1374.29	1.39448	1374.29	0.02026	550.33	0.05000	542.61	
1696	0.01000	1352.36	1.37688	1352.36	0.01882	550.32	0.05000	542.36	
1697	0.01000	1336.29	1.35269	1336.29	0.01899	550.33	0.05000	542.10	
1702	0.01013	1405.68	1.38254	1405.68	0.02598	550.33	0.05000	541.70	
1703	0.01006	1382.92	1.36879	1382.92	0.02395	550.33	0.05000	541.66	
1704	0.01000	1359.02	1.34655	1359.02	0.02267	550.32	0.05000	541.50	
1705	0.01000	1341.18	1.31864	1341.18	0.02296	550.33	0.05000	541.20	
1710	0.01014	1413.82	1.36362	1413.82	0.02897	550.33	0.05000	540.90	
1711	0.01006	1388.61	1.34340	1388.61	0.02720	550.32	0.05000	540.99	
1712	0.01000	1363.64	1.31617	1363.64	0.02627	550.32	0.05000	540.89	
1713	0.01000	1344.72	1.28532	1344.72	0.02671	550.33	0.05000	540.56	
1718	0.01015	1417.77	1.34669	1417.77	0.03126	550.33	0.05000	540.39	
1719	0.01006	1391.43	1.31802	1391.42	0.03006	550.32	0.05000	540.59	
1720	0.01000	1366.23	1.28559	1366.23	0.02963	550.32	0.05000	540.53	
1721	0.01000	1346.91	1.25275	1346.91	0.03022	550.33	0.05000	540.17	
1726	0.01015	1417.77	1.33175	1417.77	0.03287	550.33	0.05000	540.18	
1727	0.01006	1391.45	1.29233	1391.45	0.03258	550.32	0.05000	540.46	
1728	0.01000	1366.83	1.25470	1366.83	0.03277	550.32	0.05000	540.43	
1729	0.01000	1347.74	1.22103	1347.74	0.03350	550.33	0.05000	540.15	
1734	0.01015	1417.77	1.31879	1417.77	0.03379	550.33	0.05000	540.26	
1735	0.01005	1388.82	1.26593	1388.82	0.03482	550.32	0.05000	540.59	
1736	0.01000	1365.51	1.22338	1365.51	0.03573	550.32	0.05000	540.56	
1737	0.01000	1347.26	1.19037	1347.26	0.03652	550.33	0.05000	540.15	
1742	0.01014	1412.14	1.30766	1412.14	0.03402	550.33	0.05000	540.65	
1743	0.01005	1387.53	1.24713	1387.53	0.03652	550.32	0.05000	540.98	
1744	0.01000	1365.14	1.19688	1365.14	0.03837	550.32	0.05000	540.99	
1745	0.01000	1347.28	1.16361	1347.28	0.03924	550.33	0.05000	540.61	
1750	0.01013	1402.93	1.29855	1402.93	0.03354	550.33	0.05000	541.34	
1751	0.01006	1383.50	1.23147	1383.50	0.03752	550.32	0.05000	541.63	
1752	0.01000	1362.89	1.17133	1362.89	0.04067	550.32	0.05000	541.66	
1753	0.01000	1346.08	1.13763	1346.08	0.04175	550.33	0.05000	541.33	
1758	0.01011	1390.17	1.29152	1390.17	0.03233	550.33	0.05000	542.35	
1759	0.01005	1376.43	1.22007	1376.43	0.03767	550.33	0.05000	542.56	
1760	0.01000	1358.64	1.14693	1358.64	0.04261	550.32	0.05000	542.60	
1761	0.01000	1343.60	1.11230	1343.60	0.04405	550.33	0.05000	542.32	
1766	0.01010	1377.15	1.28732	1377.15	0.03082	550.33	0.05000	543.39	
1767	0.01005	1367.15	1.20803	1367.15	0.03757	550.33	0.05000	543.53	
1768	0.01000	1353.02	1.12570	1353.02	0.04405	550.33	0.05000	543.54	
1769	0.01000	1340.31	1.09184	1340.31	0.04575	550.33	0.05000	543.31	
1774	0.01008	1365.45	1.28501	1365.45	0.02933	550.33	0.05000	544.34	
1775	0.01004	1357.73	1.19099	1357.73	0.03798	550.33	0.05000	544.42	
1776	0.01000	1347.24	1.10669	1347.24	0.04524	550.33	0.05000	544.38	
1777	0.01000	1336.88	1.07625	1336.88	0.04694	550.33	0.05000	544.18	
1782	0.01006	1352.33	1.28352	1352.33	0.02755	550.33	0.05000	545.41	
1783	0.01003	1347.73	1.17474	1347.73	0.03824	550.33	0.05000	545.41	
1784	0.01000	1340.98	1.08820	1340.98	0.04632	550.33	0.05000	545.33	
1785	0.01000	1333.07	1.06123	1333.07	0.04803	550.33	0.05000	545.17	
1790	0.01004	1337.78	1.28286	1337.78	0.02548	550.33	0.05000	546.61	
1791	0.01002	1337.07	1.15959	1337.07	0.03831	550.33	0.05000	546.51	
1792	0.01000	1334.20	1.07032	1334.20	0.04729	550.33	0.05000	546.38	

1793	0.01000	1328.87	1.04673	1328.87	0.04903	550.33	0.05000	546.27
1798	0.01002	1321.96	1.28302	1321.96	0.02315	550.33	0.05000	547.91
1799	0.01001	1325.89	1.14532	1325.89	0.03823	550.33	0.05000	547.68
1800	0.01000	1327.02	1.05298	1327.02	0.04815	550.33	0.05000	547.51
1801	0.01000	1324.31	1.03312	1324.31	0.04990	550.33	0.05000	547.43
1806	0.01000	1305.28	1.28395	1305.28	0.02062	550.33	0.05000	549.30
1807	0.01000	1315.06	1.11718	1315.06	0.03968	550.33	0.05000	548.90
1808	0.01000	1319.65	1.03009	1319.65	0.04959	550.33	0.05000	548.70
1809	0.01000	1318.97	1.02402	1318.97	0.05020	550.33	0.05000	548.71
1814	0.01000	1315.51	1.50502	1315.50	0.00118	550.33	0.05000	550.00
1815	0.01000	1310.17	1.50048	1310.16	0.00117	550.33	0.05000	548.64
1816	0.01000	1306.46	1.49693	1306.46	0.00115	550.33	0.05000	548.07
1817	0.01000	1304.32	1.49431	1304.32	0.00115	550.33	0.05000	548.26
1822	0.01002	1329.45	1.48922	1329.45	0.00472	550.33	0.05000	548.74
1823	0.01001	1320.57	1.48491	1320.57	0.00409	550.33	0.05000	547.59
1824	0.01000	1313.79	1.47942	1313.79	0.00379	550.33	0.05000	547.05
1825	0.01000	1309.51	1.47303	1309.51	0.00386	550.33	0.05000	547.15
1830	0.01004	1342.40	1.47401	1342.40	0.00806	550.33	0.05000	547.56
1831	0.01001	1330.72	1.46976	1330.72	0.00694	550.33	0.05000	546.63
1832	0.01000	1320.90	1.46240	1320.90	0.00636	550.33	0.05000	546.11
1833	0.01000	1314.48	1.45254	1314.48	0.00648	550.33	0.05000	546.13
1838	0.01006	1354.34	1.45939	1354.34	0.01119	550.33	0.05000	546.47
1839	0.01002	1340.77	1.45507	1340.77	0.00974	550.33	0.05000	545.74
1840	0.01000	1327.96	1.44597	1327.96	0.00888	550.33	0.05000	545.25
1841	0.01000	1319.31	1.43290	1319.31	0.00900	550.33	0.05000	545.19
1846	0.01007	1365.28	1.44535	1365.28	0.01412	550.33	0.05000	545.47
1847	0.01003	1350.81	1.44090	1350.81	0.01250	550.33	0.05000	544.93
1848	0.01000	1335.07	1.43019	1335.07	0.01134	550.33	0.05000	544.47
1849	0.01000	1324.10	1.41422	1324.10	0.01143	550.33	0.05000	544.33

TOTAL NUMBER OF DESIGN VARIABLES = 36
 TOTAL NUMBER OF CONSTRAINS = 1228
 TOTAL NUMBER OF TEMP. CONSTRAINS = 468
 TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER
 LAYER: 1 2 3 4
 Tmax: 2300.33 2300.33 550.33 600.33
 Optv: 1078.62 1078.62 550.24 550.24

VALUES OF DESIGN VARIABLES :

LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
2	1.15141	1.14778	1.14150	1.14414	1.10277	1.00039	1.11534	1.12092	1.11129
3	0.03401	0.03505	0.03595	0.03382	0.03217	0.04152	0.03276	0.03198	0.03189
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

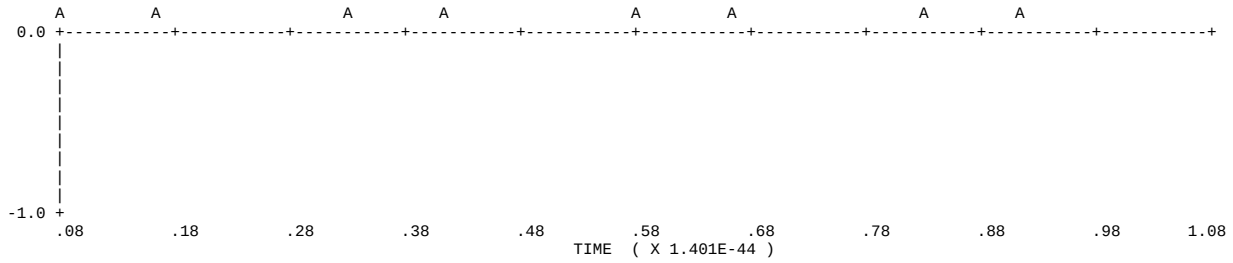
THE ORIGINAL OBJECTIVE FUNCTION = 308.7402344

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.4178517

THE TOTAL OPTIMAL WEIGHT = 2.50893306E+04

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES





OPTIMAL STRUCTURES OF TPS FOR PATCH = 14
(WITH AVERAGE THICKNESS)

=====	-----
HRSI COAT	thin skin
=====	-----
LI-900 (P)	slab
=====	-----
RTV-560	thin skin
=====	-----
17 LB SIP .16 IN	slab
=====	-----

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 14

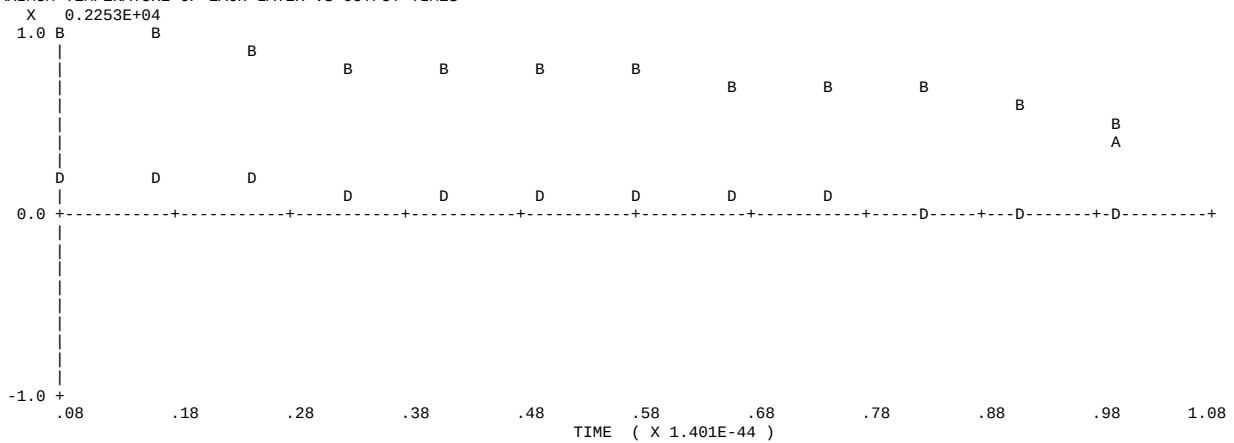
PANEL	LAYER01		LAYER02		LAYER03		LAYER04	
1933	0.01000	1078.44	1.14218	1078.44	0.03586	550.33	0.05000	550.23
1690	0.01000	1064.50	1.12721	1064.50	0.03321	550.33	0.05000	550.10
1691	0.01000	1052.78	1.13631	1052.78	0.03037	550.33	0.05000	550.11
1692	0.01000	1044.04	1.10850	1044.04	0.03138	550.32	0.05000	549.88
1693	0.01000	1042.57	1.03966	1040.71	0.03703	550.33	0.05000	549.39
1698	0.01000	1067.10	1.13072	1067.10	0.03334	550.33	0.05000	550.10
1699	0.01000	1052.77	1.14027	1052.77	0.02994	550.32	0.05000	550.13
1700	0.01000	1042.57	1.10561	1042.45	0.03133	550.32	0.05000	549.86
1701	0.01000	1042.57	1.02287	1039.12	0.03836	550.33	0.05000	549.29
1706	0.01000	1069.34	1.13395	1069.34	0.03346	550.33	0.05000	550.11
1707	0.01000	1052.94	1.14369	1052.94	0.02963	550.32	0.05000	550.14
1708	0.01000	1042.57	1.10346	1041.51	0.03135	550.32	0.05000	549.85
1709	0.01000	1042.57	1.01014	1038.29	0.03946	550.33	0.05000	549.21
1714	0.01000	1071.20	1.13691	1071.20	0.03356	550.33	0.05000	550.12
1715	0.01000	1053.27	1.14654	1053.27	0.02944	550.32	0.05000	550.15
1716	0.01000	1042.57	1.10207	1041.24	0.03144	550.32	0.05000	549.84
1717	0.01000	1042.57	1.00147	1038.22	0.04033	550.33	0.05000	549.19
1722	0.01000	1072.68	1.13960	1072.68	0.03366	550.33	0.05000	550.13
1723	0.01000	1053.76	1.14879	1053.76	0.02936	550.32	0.05000	550.16
1724	0.01000	1042.57	1.10144	1041.64	0.03161	550.32	0.05000	549.83
1725	0.01000	1042.57	0.99690	1038.91	0.04097	550.33	0.05000	549.19
1730	0.01000	1073.79	1.14201	1073.79	0.03374	550.33	0.05000	550.13
1731	0.01000	1054.42	1.15043	1054.42	0.02939	550.32	0.05000	550.17
1732	0.01000	1042.71	1.10164	1042.71	0.03186	550.32	0.05000	549.84
1733	0.01000	1042.57	0.99652	1040.36	0.04137	550.33	0.05000	549.19
1738	0.01000	1074.53	1.14414	1074.53	0.03382	550.33	0.05000	550.14
1739	0.01000	1055.30	1.15145	1055.30	0.02956	550.32	0.05000	550.17
1740	0.01000	1044.47	1.10275	1044.47	0.03217	550.32	0.05000	549.85
1741	0.01000	1042.57	1.09039	1042.57	0.04152	550.33	0.05000	549.19
1746	0.01000	1074.90	1.14602	1074.90	0.03388	550.33	0.05000	550.15
1747	0.01000	1057.32	1.15311	1057.32	0.02991	550.32	0.05000	550.18
1748	0.01000	1047.13	1.10738	1047.13	0.03233	550.32	0.05000	549.88
1749	0.01000	1045.52	1.00902	1045.52	0.04137	550.33	0.05000	549.26
1754	0.01000	1074.89	1.14761	1074.89	0.03393	550.33	0.05000	550.16
1755	0.01000	1059.55	1.15422	1059.55	0.03038	550.32	0.05000	550.18
1756	0.01000	1050.45	1.11288	1050.45	0.03256	550.32	0.05000	549.92
1757	0.01000	1049.23	1.02177	1049.23	0.04098	550.33	0.05000	549.36
1762	0.01000	1074.50	1.14893	1074.50	0.03397	550.33	0.05000	550.17
1763	0.01000	1061.96	1.15477	1061.96	0.03097	550.32	0.05000	550.18
1764	0.01000	1054.42	1.11922	1054.42	0.03286	550.32	0.05000	549.96
1765	0.01000	1053.69	1.03880	1053.69	0.04034	550.33	0.05000	549.49
1770	0.01000	1073.90	1.14980	1073.90	0.03399	550.33	0.05000	550.18
1771	0.01000	1064.02	1.15476	1064.02	0.03153	550.32	0.05000	550.18
1772	0.01000	1058.14	1.12507	1058.14	0.03315	550.32	0.05000	550.00
1773	0.01000	1057.86	1.05600	1057.86	0.03961	550.33	0.05000	549.61
1778	0.01000	1073.27	1.15034	1073.27	0.03400	550.33	0.05000	550.18
1779	0.01000	1065.65	1.15447	1065.65	0.03201	550.33	0.05000	550.18
1780	0.01000	1061.27	1.12987	1061.27	0.03340	550.33	0.05000	550.03
1781	0.01000	1061.40	1.07103	1061.40	0.03895	550.33	0.05000	549.72
1786	0.01000	1072.49	1.15078	1072.49	0.03401	550.33	0.05000	550.19
1787	0.01000	1067.35	1.15397	1067.35	0.03254	550.33	0.05000	550.18
1788	0.01000	1064.62	1.13455	1064.62	0.03372	550.33	0.05000	550.06
1789	0.01000	1065.23	1.08699	1065.23	0.03826	550.33	0.05000	549.84
1794	0.01000	1071.56	1.15110	1071.56	0.03402	550.33	0.05000	550.20
1795	0.01000	1069.10	1.15325	1069.10	0.03311	550.33	0.05000	550.17
1796	0.01000	1068.17	1.13913	1068.17	0.03409	550.33	0.05000	550.10
1797	0.01000	1069.37	1.10398	1069.37	0.03754	550.33	0.05000	549.96
1802	0.01000	1070.51	1.15131	1070.51	0.03402	550.33	0.05000	550.20
1803	0.01000	1070.86	1.15231	1070.86	0.03371	550.33	0.05000	550.16
1804	0.01000	1071.89	1.14362	1071.89	0.03451	550.33	0.05000	550.13

1805	0.01000	1073.78	1.12221	1073.78	0.03675	550.33	0.05000	550.10
1810	0.01000	1069.31	1.15141	1069.31	0.03401	550.33	0.05000	550.21
1811	0.01000	1073.10	1.15096	1073.10	0.03442	550.33	0.05000	550.15
1812	0.01000	1076.18	1.14778	1076.18	0.03505	550.33	0.05000	550.16
1813	0.01000	1078.62	1.14150	1078.62	0.03595	550.33	0.05000	550.24
1818	0.01000	1054.71	1.11534	1054.71	0.03276	550.33	0.05000	550.08
1819	0.01000	1054.02	1.12217	1054.02	0.03227	550.33	0.05000	550.04
1820	0.01000	1052.38	1.12092	1052.38	0.03198	550.33	0.05000	549.97
1821	0.01000	1049.73	1.11129	1049.73	0.03189	550.33	0.05000	549.86
1826	0.01000	1056.76	1.11771	1056.76	0.03285	550.33	0.05000	550.08
1827	0.01000	1053.49	1.12491	1053.49	0.03183	550.33	0.05000	550.06
1828	0.01000	1050.46	1.11811	1050.46	0.03184	550.33	0.05000	549.95
1829	0.01000	1047.61	1.09561	1047.61	0.03299	550.33	0.05000	549.75
1834	0.01000	1058.70	1.12000	1058.70	0.03294	550.33	0.05000	550.09
1835	0.01000	1053.16	1.12763	1053.16	0.03144	550.33	0.05000	550.07
1836	0.01000	1048.75	1.11596	1048.75	0.03168	550.33	0.05000	549.94
1837	0.01000	1045.69	1.08134	1045.69	0.03399	550.33	0.05000	549.66
1842	0.01000	1060.52	1.12220	1060.52	0.03302	550.33	0.05000	550.09
1843	0.01000	1053.00	1.13031	1053.00	0.03109	550.33	0.05000	550.08
1844	0.01000	1047.21	1.11398	1047.21	0.03154	550.33	0.05000	549.92
1845	0.01000	1043.97	1.06811	1043.97	0.03493	550.33	0.05000	549.58
1850	0.01000	1062.24	1.12432	1062.24	0.03310	550.33	0.05000	550.09
1851	0.01000	1052.90	1.13290	1052.90	0.03077	550.33	0.05000	550.10
1852	0.01000	1045.77	1.11161	1045.77	0.03145	550.33	0.05000	549.91
1853	0.01000	1042.57	1.05559	1042.47	0.03584	550.33	0.05000	549.49
1854	0.01000	1049.73	1.11129	1049.73	0.03189	550.33	0.05000	549.86
1855	0.01000	1052.40	1.12096	1052.40	0.03198	550.33	0.05000	549.97
1856	0.01000	1054.02	1.12217	1054.02	0.03227	550.33	0.05000	550.04
1857	0.01000	1054.71	1.11534	1054.71	0.03276	550.33	0.05000	550.08
1862	0.01000	1049.73	1.11129	1049.73	0.03189	550.33	0.05000	549.86
1863	0.01000	1052.45	1.12109	1052.45	0.03199	550.33	0.05000	549.97
1864	0.01000	1054.03	1.12214	1054.03	0.03227	550.33	0.05000	550.04
1865	0.01000	1054.71	1.11534	1054.71	0.03276	550.33	0.05000	550.08
1870	0.01000	1049.73	1.11129	1049.73	0.03189	550.33	0.05000	549.86
1871	0.01000	1052.38	1.12092	1052.38	0.03198	550.33	0.05000	549.97
1872	0.01000	1053.97	1.12229	1053.97	0.03225	550.33	0.05000	550.04
1873	0.01000	1054.70	1.11575	1054.70	0.03274	550.33	0.05000	550.08
1878	0.01000	1049.73	1.11129	1049.73	0.03189	550.33	0.05000	549.86
1879	0.01000	1052.38	1.12092	1052.38	0.03198	550.33	0.05000	549.97
1880	0.01000	1053.83	1.12251	1053.83	0.03221	550.33	0.05000	550.03
1881	0.01000	1054.68	1.11640	1054.68	0.03270	550.33	0.05000	550.08
1929	0.01000	1071.28	1.15153	1071.28	0.03419	550.33	0.05000	550.17
1930	0.01000	1073.61	1.15066	1073.61	0.03450	550.33	0.05000	550.15
1931	0.01000	1076.91	1.14640	1076.91	0.03527	550.33	0.05000	550.18

OPTIMIZATION SYSTEM FOR TPSSYM = 15

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINTS = 956
TOTAL NUMBER OF TEMP. CONSTRAINTS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4
Tmax:	2300.33	2300.33	550.33	600.33
Optv:	2252.56	2252.56	481.33	481.33

VALUES OF DESIGN VARIABLES :

LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.15588	0.30053	0.19904	0.39873	0.36375	0.26656	0.14822	0.34375	0.14274
2	2.43083	2.62965	2.86073	1.09518	1.09567	2.17544	1.03258	1.06641	1.00000
3	0.03969	0.14222	0.15485	0.01772	0.04890	0.04991	0.36959	0.07020	0.04679
4	0.06228	0.05000	0.05000	0.05000	0.06310	0.05000	0.09098	0.05000	0.05000

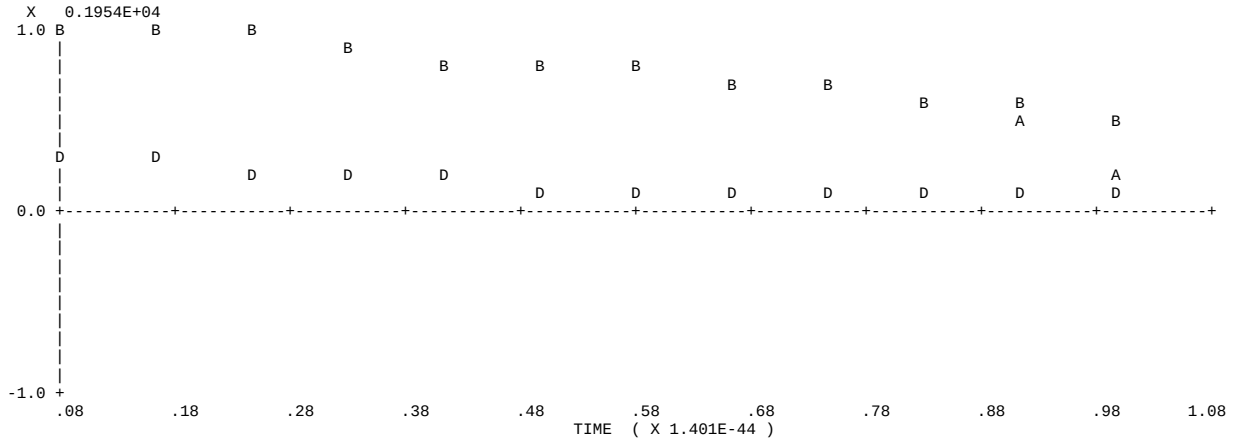
PANEL	LAYER01		LAYER02		LAYER03		LAYER04	
45	0.18922	1799.19	2.27791	1799.19	0.02971	524.63	0.05999	458.37
46	0.27327	1879.69	2.35081	1879.69	0.09060	546.32	0.05519	352.22
47	0.30786	1968.65	2.45540	1968.65	0.13056	550.33	0.05180	283.36
48	0.28624	2093.86	2.62519	2093.86	0.14974	550.33	0.04986	253.02
49	0.21129	2217.66	2.80634	2217.66	0.14405	550.33	0.04998	270.80
55	0.15588	1985.38	2.43083	1985.38	0.03969	550.33	0.06228	481.33
56	0.25928	2038.47	2.52628	2038.47	0.10233	550.33	0.05459	342.29
57	0.30053	2100.66	2.62965	2100.66	0.14222	550.33	0.05000	258.54
58	0.27996	2172.61	2.74200	2172.61	0.15973	550.33	0.04848	229.31
59	0.19904	2252.56	2.86073	2252.56	0.15485	550.33	0.05000	254.33
85	0.37930	624.85	1.26087	624.85	0.00603	377.34	0.04982	296.67
86	0.37864	737.78	1.13175	737.78	0.03730	491.09	0.05872	365.78
87	0.35911	981.73	1.25476	981.73	0.05784	550.33	0.06212	407.74
88	0.32298	1322.31	1.60863	1322.31	0.06475	550.33	0.05958	418.16
89	0.26847	1807.92	2.24368	1807.92	0.06196	550.33	0.05081	393.92
95	0.34715	853.22	1.47114	853.22	0.00129	402.46	0.05079	332.13
96	0.36010	968.28	1.37247	968.28	0.04312	506.97	0.05780	369.99
97	0.34997	1187.35	1.48652	1187.35	0.07099	550.33	0.06046	391.72
98	0.31867	1482.43	1.79726	1482.43	0.08146	550.33	0.05836	394.52
99	0.26452	1896.70	2.35298	1896.70	0.07793	550.33	0.05108	374.18
105	0.30132	1145.17	1.72769	1145.17	0.00442	438.04	0.05302	373.51
106	0.33407	1254.87	1.67662	1254.87	0.05466	522.30	0.05688	369.38
107	0.33730	1438.22	1.78501	1438.22	0.08862	550.33	0.05802	363.93
108	0.31039	1682.41	2.05188	1682.41	0.10249	550.33	0.05611	356.62
109	0.25320	2010.37	2.50438	2010.37	0.09827	550.33	0.05078	343.98
115	0.24114	1502.96	2.03169	1502.96	0.01602	484.57	0.05659	420.90
116	0.30046	1600.45	2.04750	1600.45	0.07290	536.94	0.05595	362.71
117	0.32102	1735.91	2.15554	1735.91	0.11140	550.33	0.05469	322.04
118	0.29770	1918.38	2.37309	1918.38	0.12868	550.33	0.05276	301.47
119	0.23201	2137.35	2.68545	2137.35	0.12369	550.33	0.05020	303.08
125	0.14822	914.09	1.03258	914.09	0.36959	548.44	0.09098	182.79
126	0.29690	422.61	1.06234	422.61	0.18416	267.62	0.06519	117.88
127	0.34375	219.35	1.06641	219.35	0.07020	168.61	0.05000	117.88
128	0.29050	297.68	1.04504	297.68	0.02454	247.92	0.04498	198.16
129	0.14274	644.88	1.00000	644.88	0.04679	496.25	0.05000	347.61
135	0.22588	658.97	0.90611	658.97	0.29385	489.84	0.08115	177.99
136	0.32397	321.00	0.87874	321.00	0.15653	313.65	0.06572	165.25
137	0.35588	219.35	0.90019	212.01	0.06002	251.88	0.05486	196.53
138	0.31132	368.48	0.99910	368.48	0.02050	308.84	0.04968	261.52
139	0.19634	794.11	1.18083	794.11	0.03154	484.99	0.04975	266.26

145	0.29277	456.67	0.81963	456.67	0.22349	439.48	0.07223	178.62
146	0.35259	237.76	0.74015	237.76	0.12434	349.13	0.06494	211.76
147	0.36612	227.71	0.78202	246.06	0.05002	326.01	0.05852	264.41
148	0.32490	457.76	0.96868	457.76	0.01897	375.60	0.05404	322.82
149	0.23117	937.92	1.32132	937.92	0.02446	494.18	0.05054	389.34
155	0.34558	319.77	0.78071	319.77	0.16122	399.88	0.06462	185.33
156	0.37655	219.35	0.66455	224.87	0.09353	377.27	0.06356	251.79
157	0.37319	277.77	0.72469	299.02	0.04187	390.31	0.06107	320.27
158	0.33212	569.68	0.98123	569.68	0.02029	436.23	0.05731	372.03
159	0.25274	1088.92	1.45937	1088.92	0.02324	511.69	0.05141	409.31
165	0.38232	254.82	0.79261	254.82	0.10899	372.54	0.05855	198.27
166	0.39252	219.35	0.65351	250.49	0.06767	403.13	0.06217	287.37
167	0.37615	368.48	0.73381	368.48	0.03715	444.92	0.06268	363.50
168	0.33424	710.76	1.04903	710.76	0.02461	487.67	0.05940	407.38
169	0.26475	1252.62	1.61667	1252.62	0.02627	529.36	0.05183	421.58
175	0.40251	261.60	0.85382	261.60	0.06778	357.81	0.05414	216.97
176	0.39912	288.40	0.70451	303.59	0.04933	429.59	0.06113	318.79
177	0.37489	498.72	0.80702	498.72	0.03687	489.99	0.06348	393.69
178	0.33237	879.58	1.17311	879.58	0.03205	528.16	0.06035	428.03
179	0.26983	1425.97	1.79845	1425.97	0.03236	542.33	0.05159	424.16
185	0.40719	333.25	0.95814	333.25	0.03764	354.90	0.05135	240.41
186	0.39713	416.01	0.81113	416.01	0.03942	456.40	0.06043	344.41
187	0.37031	658.79	0.93357	658.79	0.04110	525.20	0.06359	410.69
188	0.32772	1065.42	1.34202	1065.42	0.04236	550.33	0.06031	434.22
189	0.26996	1596.49	1.99260	1596.49	0.04055	548.92	0.05087	417.66
195	0.39873	456.85	1.09518	456.85	0.01772	361.95	0.05000	267.06
196	0.38928	574.14	0.95515	574.14	0.03703	480.20	0.05991	361.68
197	0.36376	832.95	1.09576	832.95	0.04890	550.33	0.06310	415.41
198	0.32247	1224.79	1.50574	1224.79	0.05286	550.33	0.05971	429.49
199	0.26656	1747.00	2.17544	1747.00	0.04991	550.33	0.05000	405.06

OPTIMIZATION SYSTEM FOR TPSSYM = 16

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINS = 956
TOTAL NUMBER OF TEMP. CONSTRAINS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4
Tmax:	2300.33	2300.33	550.33	600.33
Optv:	1954.13	1954.13	549.08	549.08

VALUES OF DESIGN VARIABLES :

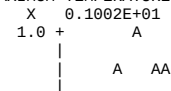
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
2	2.07346	2.21188	2.45880	1.33464	1.47211	1.65866	1.00000	1.03654	1.00000
3	0.01795	0.02309	0.02259	0.02617	0.02759	0.02456	0.02791	0.06275	0.05444
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

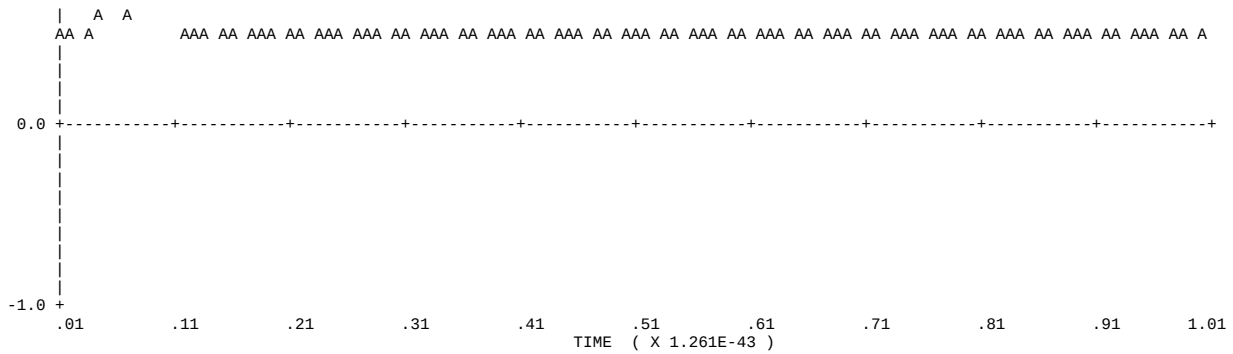
THE ORIGINAL OBJECTIVE FUNCTION = 207.8067322

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.5132689

THE TOTAL OPTIMAL WEIGHT = 8.02899942E+04

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES





OPTIMAL STRUCTURES OF TPS FOR PATCH = 16 (WITH AVERAGE THICKNESS)			
=====			-----
HRSI COAT	thin skin	0.01000 in.	1954.1 F
=====			-----
LI-900 (P)	slab	1.58290 in.	1954.1 F
=====			-----
RTV-560	thin skin	0.03190 in.	549.1 F
=====			-----
17 LB SIP .16 IN	slab	0.05000 in.	549.1 F
=====			-----

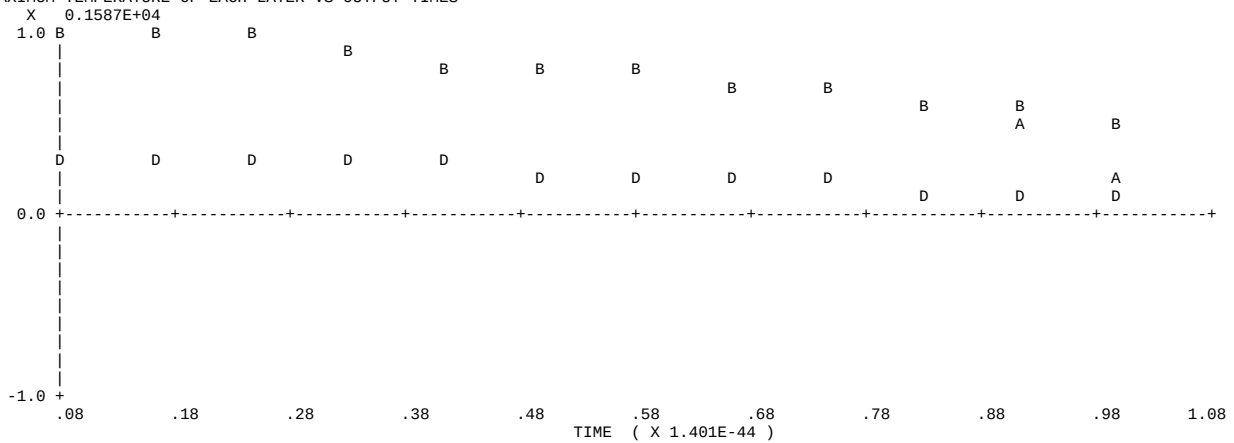
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 16							
PANEL	LAYER01	LAYER02	LAYER03	LAYER04			
41	0.01000	1652.61	0.02151	550.33	0.05000	549.08	
42	0.01000	1723.64	0.02284	550.33	0.05000	549.08	
43	0.01000	1807.19	0.02309	550.33	0.05000	549.08	
44	0.01000	1897.66	0.02222	550.33	0.05000	549.08	
51	0.01000	1698.07	0.02134	550.33	0.05000	548.52	
52	0.01000	1772.77	0.02309	550.33	0.05000	547.89	
53	0.01000	1858.27	0.02350	550.33	0.05000	547.14	
54	0.01000	1954.13	0.02259	550.33	0.05000	546.28	
81	0.01000	1318.81	0.02560	550.33	0.05000	549.08	
82	0.01000	1373.16	0.02550	550.33	0.05000	549.08	
83	0.01000	1427.32	0.02470	550.33	0.05000	549.08	
84	0.01000	1484.01	0.02315	550.33	0.05000	549.08	
91	0.01000	1399.70	0.02410	550.33	0.05000	549.08	
92	0.01000	1458.39	0.02401	550.33	0.05000	549.08	
93	0.01000	1518.69	0.02336	550.33	0.05000	549.08	
94	0.01000	1582.49	0.02215	550.33	0.05000	549.08	
101	0.01000	1487.11	0.02289	550.33	0.05000	549.08	
102	0.01000	1550.30	0.02308	550.33	0.05000	549.08	
103	0.01000	1617.95	0.02267	550.33	0.05000	549.08	
104	0.01000	1690.36	0.02168	550.33	0.05000	549.08	
111	0.01000	1580.19	0.02197	550.33	0.05000	549.08	
112	0.01000	1648.08	0.02272	550.33	0.05000	549.08	
113	0.01000	1724.62	0.02266	550.33	0.05000	549.08	
114	0.01000	1807.34	0.02179	550.33	0.05000	549.08	
121	0.01000	831.93	0.05173	550.33	0.05000	369.82	
122	0.01000	852.67	0.06275	550.33	0.05000	350.80	
123	0.01000	874.63	0.06364	550.33	0.05000	363.22	
124	0.01000	897.77	0.05444	550.33	0.05000	406.90	
131	0.01000	866.12	0.04731	550.33	0.05000	404.59	
132	0.01000	891.66	0.05612	550.33	0.05000	389.30	
133	0.01000	915.92	0.05672	550.33	0.05000	398.47	
134	0.01000	941.17	0.04907	550.33	0.05000	433.12	
141	0.01000	910.67	0.04297	550.33	0.05000	439.00	
142	0.01000	940.78	0.04961	550.33	0.05000	427.02	
143	0.01000	968.43	0.04978	550.33	0.05000	433.79	
144	0.01000	996.01	0.04356	550.33	0.05000	459.69	
151	0.01000	965.17	0.03893	550.33	0.05000	470.51	
152	0.01000	999.83	0.04355	550.33	0.05000	461.69	
153	0.01000	1031.36	0.04330	550.33	0.05000	466.44	
154	0.01000	1062.03	0.03830	550.33	0.05000	484.67	
161	0.01000	1028.50	0.03529	550.33	0.05000	497.59	
162	0.01000	1067.49	0.03820	550.33	0.05000	491.54	
163	0.01000	1103.42	0.03761	550.33	0.05000	494.64	
164	0.01000	1137.90	0.03362	550.33	0.05000	506.47	
171	0.01000	1098.25	0.03214	550.33	0.05000	519.32	
172	0.01000	1141.26	0.03373	550.33	0.05000	515.55	
173	0.01000	1182.26	0.03289	550.33	0.05000	517.35	
174	0.01000	1221.21	0.02972	550.33	0.05000	524.06	
181	0.01000	1170.89	0.02952	550.33	0.05000	535.49	
182	0.01000	1217.62	0.03021	550.33	0.05000	533.45	
183	0.01000	1264.54	0.02922	550.33	0.05000	534.27	
184	0.01000	1308.54	0.02672	550.33	0.05000	537.09	
191	0.01000	1240.60	0.02749	550.33	0.05000	546.33	
192	0.01000	1292.57	0.02759	550.33	0.05000	545.73	
193	0.01000	1344.48	0.02661	550.33	0.05000	545.62	

194	0.01000	1395.79	1.65866	1395.79	0.02456	550.33	0.05000	545.89
309	0.01000	1183.15	1.33464	1183.15	0.02617	550.33	0.05000	547.41
310	0.01000	1116.29	1.24131	1116.29	0.02709	550.33	0.05000	539.81
311	0.01000	1048.65	1.15513	1048.65	0.02787	550.33	0.05000	528.66
312	0.01000	984.29	1.08354	984.29	0.02842	550.33	0.05000	513.66
313	0.01000	926.66	1.03181	926.66	0.02868	550.33	0.05000	495.04
314	0.01000	878.07	1.00197	878.07	0.02866	550.33	0.05000	473.55
315	0.01000	839.46	0.99272	839.46	0.02838	550.33	0.05000	450.39
316	0.01000	810.57	1.00000	810.57	0.02791	550.33	0.05000	427.09
317	0.01000	1511.64	1.86526	1511.64	0.02036	550.33	0.05000	549.08
329	0.01000	1422.77	1.71288	1422.77	0.02210	550.33	0.05000	549.08
341	0.01000	1338.26	1.57325	1338.26	0.02365	550.33	0.05000	549.08
353	0.01000	1260.31	1.45005	1260.31	0.02498	550.33	0.05000	549.08
389	0.01000	1628.91	2.07346	1628.91	0.01795	550.33	0.05000	549.08
401	0.01000	1581.67	1.98870	1581.67	0.01894	550.33	0.05000	549.08

OPTIMIZATION SYSTEM FOR TPSSYM = 17

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINS = 956
TOTAL NUMBER OF TEMP. CONSTRAINS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4
Tmax:	2300.33	2300.33	550.33	600.33
Optv:	1586.86	1586.86	550.23	550.23

VALUES OF DESIGN VARIABLES :

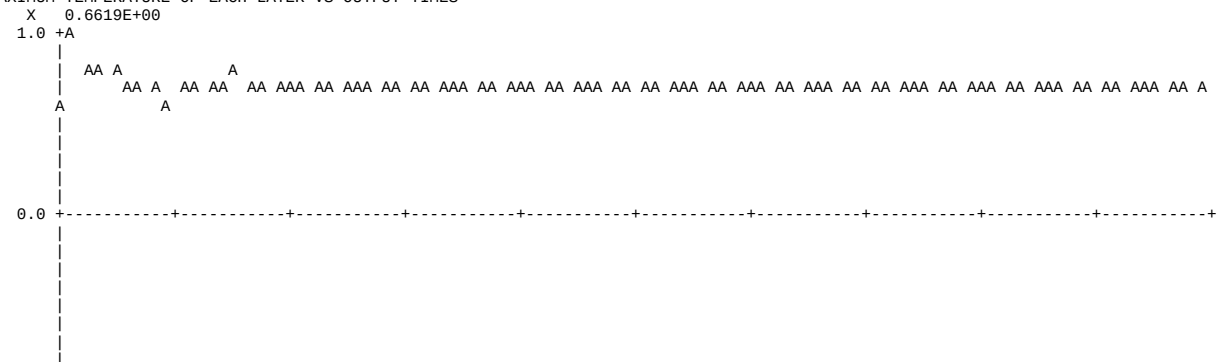
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.01069	0.01000	0.01038	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
2	1.77636	1.84544	1.98148	1.00046	1.18568	1.23522	1.00000	1.00000	1.00000
3	0.02600	0.02648	0.02124	0.04017	0.02877	0.03279	0.00100	0.00100	0.00100
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 207.8066864

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.4270920

THE TOTAL OPTIMAL WEIGHT = 8.43256413E+04

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



-1.0 +
 .01 .11 .21 .31 .41 .51 .61 .71 .81 .91 1.01
 TIME (X 1.261E-43)

OPTIMAL STRUCTURES OF TPS FOR PATCH = 17
 (WITH AVERAGE THICKNESS)

=====	HRSI COAT	thin skin	0.01012 in.	1586.9 F
=====			i	
	LI-900 (P)	slab	1.33607 in.	1586.9 F
			i	
=====	RTV-560	thin skin	0.01983 in.	550.2 F
=====			i	
	17 LB SIP .16 IN	slab	0.05000 in.	550.2 F
			i	
=====				

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 17

PANEL	LAYER01		LAYER02		LAYER03		LAYER04	
269	0.01000	1060.87	1.00046	1060.87	0.04017	550.33	0.05000	549.63
270	0.00993	1002.66	0.92176	1002.66	0.03921	550.33	0.05000	546.97
271	0.00988	945.62	0.86153	945.62	0.03674	550.33	0.05000	543.03
272	0.00985	893.73	0.82884	893.73	0.03249	550.33	0.05000	537.70
273	0.00985	850.12	0.82879	850.12	0.02643	550.33	0.05000	531.06
274	0.00988	816.49	0.86135	816.49	0.01880	550.33	0.05000	523.37
275	0.00993	793.10	0.92146	793.10	0.01010	550.33	0.05000	515.06
276	0.01000	778.87	1.00000	778.87	0.00100	550.33	0.05000	506.70
277	0.01000	1083.38	1.10994	1083.38	0.03255	550.33	0.05000	549.73
278	0.00998	1024.92	1.03269	1024.92	0.03123	550.33	0.05000	548.02
279	0.00996	967.46	0.96878	967.46	0.02882	550.33	0.05000	545.46
280	0.00995	914.96	0.92609	914.96	0.02515	550.33	0.05000	542.00
281	0.00995	870.57	0.90933	870.57	0.02026	550.33	0.05000	537.68
282	0.00996	836.00	0.91903	836.00	0.01433	550.33	0.05000	532.70
283	0.00998	811.56	0.95156	811.56	0.00774	550.33	0.05000	527.36
284	0.01000	796.24	1.00000	796.24	0.00100	550.33	0.05000	522.04
285	0.01000	1108.67	1.18568	1108.67	0.02877	550.33	0.05000	549.88
286	0.01000	1049.15	1.10778	1049.15	0.02731	550.33	0.05000	548.64
287	0.01000	990.19	1.04002	990.19	0.02496	550.33	0.05000	546.80
288	0.01000	935.69	0.98957	935.69	0.02161	550.33	0.05000	544.30
289	0.01000	888.82	0.96100	888.82	0.01731	550.33	0.05000	541.17
290	0.01000	851.37	0.95536	851.37	0.01223	550.33	0.05000	537.54
291	0.01000	823.80	0.97015	823.80	0.00666	550.33	0.05000	533.64
292	0.01000	805.29	1.00000	805.29	0.00100	550.33	0.05000	529.72
293	0.01000	1136.67	1.22749	1136.67	0.02884	550.33	0.05000	550.05
294	0.01000	1075.19	1.14597	1075.19	0.02754	550.33	0.05000	548.82
295	0.00999	1013.53	1.07355	1013.53	0.02531	550.33	0.05000	546.99
296	0.00999	955.54	1.01740	955.54	0.02202	550.33	0.05000	544.49
297	0.00999	904.45	0.98226	904.45	0.01772	550.33	0.05000	541.36
298	0.00999	862.24	0.96949	862.24	0.01256	550.33	0.05000	537.71
299	0.00999	829.60	0.97704	829.60	0.00685	550.33	0.05000	533.76
300	0.01000	806.03	1.00000	806.03	0.00100	550.33	0.05000	529.75
301	0.01000	1167.36	1.23522	1167.36	0.03279	550.33	0.05000	550.23
302	0.00996	1102.96	1.14712	1102.96	0.03193	550.33	0.05000	548.53
303	0.00993	1037.38	1.06932	1037.38	0.02985	550.33	0.05000	545.99
304	0.00992	974.45	1.00962	974.45	0.02637	550.33	0.05000	542.55
305	0.00992	917.46	0.97321	917.46	0.02147	550.33	0.05000	538.23
306	0.00993	868.63	0.96152	868.63	0.01532	550.33	0.05000	533.19
307	0.00996	828.99	0.97225	828.99	0.00833	550.33	0.05000	527.71
308	0.01000	798.45	1.00000	798.45	0.00100	550.33	0.05000	522.14
318	0.01026	1474.27	1.76078	1474.27	0.02640	550.33	0.05000	550.23
319	0.01004	1434.06	1.70128	1434.06	0.02733	550.33	0.05000	550.23
320	0.01000	1398.97	1.64135	1398.97	0.02863	550.33	0.05000	550.23
321	0.01015	1369.11	1.58034	1369.11	0.03041	550.33	0.05000	550.23
322	0.01046	1344.69	1.51827	1344.69	0.03269	550.33	0.05000	550.23
330	0.01018	1391.48	1.60672	1391.48	0.02935	550.33	0.05000	550.23
331	0.01003	1353.21	1.56315	1353.21	0.02866	550.33	0.05000	550.23
332	0.01000	1319.66	1.50768	1319.66	0.02955	550.33	0.05000	550.23
333	0.01010	1290.91	1.44011	1290.91	0.03206	550.33	0.05000	550.23
334	0.01032	1267.28	1.36167	1267.28	0.03612	550.33	0.05000	550.23
342	0.01011	1313.21	1.46840	1313.21	0.03140	550.33	0.05000	550.23
343	0.01002	1277.24	1.43884	1277.24	0.02937	550.33	0.05000	550.23
344	0.01000	1245.47	1.38795	1245.47	0.02990	550.33	0.05000	550.23
345	0.01006	1217.95	1.31584	1217.95	0.03300	550.33	0.05000	550.23
346	0.01020	1194.98	1.22421	1194.98	0.03853	550.33	0.05000	550.23
354	0.01005	1240.41	1.34744	1240.41	0.03255	550.33	0.05000	550.23
355	0.01001	1207.07	1.32981	1207.07	0.02946	550.33	0.05000	550.23
356	0.01000	1177.25	1.28354	1177.25	0.02968	550.33	0.05000	550.23
357	0.01003	1151.00	1.20891	1151.00	0.03319	550.33	0.05000	550.23
358	0.01010	1128.57	1.10738	1128.57	0.03989	550.33	0.05000	550.23
390	0.01038	1586.86	1.98148	1586.86	0.02124	550.33	0.05000	549.98
391	0.01006	1548.36	1.90509	1548.36	0.02458	550.33	0.05000	549.85
392	0.01000	1515.19	1.84544	1515.19	0.02648	550.33	0.05000	549.80
393	0.01021	1487.35	1.80253	1487.35	0.02695	550.33	0.05000	549.85
394	0.01069	1464.83	1.77636	1464.83	0.02600	550.33	0.05000	549.98
402	0.01033	1540.69	1.88950	1540.69	0.02351	550.33	0.05000	550.23
403	0.01005	1500.66	1.81892	1500.66	0.02584	550.33	0.05000	550.23
404	0.01000	1465.85	1.75775	1465.85	0.02750	550.33	0.05000	550.23
405	0.01018	1436.41	1.70555	1436.41	0.02856	550.33	0.05000	550.23
406	0.01059	1412.37	1.66167	1412.37	0.02910	550.33	0.05000	550.23


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=====
17 LB SIP .16 IN      slab      i
                                0.05000 in.  550.3 F
                                i
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THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 18

PANEL	LAYER01		LAYER02		LAYER03		LAYER04	
229	0.01000	975.95	1.00012	975.95	0.02601	550.33	0.05000	550.02
230	0.01000	921.32	0.92733	921.32	0.02540	550.33	0.05000	544.16
231	0.01000	867.41	0.87166	867.41	0.02382	550.33	0.05000	535.39
232	0.01000	817.88	0.84148	817.88	0.02110	550.33	0.05000	523.48
233	0.01000	775.65	0.84148	775.65	0.01724	550.33	0.05000	508.58
234	0.01000	742.34	0.87162	742.34	0.01237	550.33	0.05000	491.26
235	0.01000	718.30	0.92728	718.30	0.00681	550.33	0.05000	472.52
236	0.01000	702.73	1.00000	702.73	0.00100	550.33	0.05000	453.62
237	0.01000	990.25	1.00009	990.25	0.02846	550.33	0.05000	549.98
238	0.01000	934.57	0.93322	934.57	0.02700	550.33	0.05000	544.73
239	0.01000	879.87	0.88201	879.87	0.02468	550.33	0.05000	536.87
240	0.01000	829.92	0.85423	829.92	0.02138	550.33	0.05000	526.18
241	0.01000	787.71	0.85423	787.71	0.01714	550.33	0.05000	512.82
242	0.01000	754.85	0.88198	754.85	0.01212	550.33	0.05000	497.32
243	0.01000	731.66	0.93319	731.66	0.00661	550.33	0.05000	480.58
244	0.01000	717.22	1.00000	717.22	0.00100	550.33	0.05000	463.77
245	0.01000	1004.86	1.00025	1004.86	0.03082	550.33	0.05000	550.01
246	0.01000	948.50	0.93483	948.50	0.02899	550.33	0.05000	545.45
247	0.01000	893.37	0.88478	893.37	0.02627	550.33	0.05000	538.63
248	0.01000	843.33	0.85764	843.32	0.02258	550.33	0.05000	529.35
249	0.01000	801.38	0.85762	801.38	0.01798	550.33	0.05000	517.74
250	0.01000	769.16	0.88469	769.16	0.01263	550.33	0.05000	504.29
251	0.01000	746.90	0.93468	746.90	0.00684	550.33	0.05000	489.76
252	0.01000	733.58	1.00000	733.58	0.00100	550.33	0.05000	475.18
253	0.01000	1019.81	1.00040	1019.81	0.03313	550.33	0.05000	550.12
254	0.01000	963.09	0.93204	963.09	0.03137	550.33	0.05000	546.35
255	0.01000	907.81	0.87976	907.81	0.02861	550.33	0.05000	540.68
256	0.01000	857.91	0.85140	857.91	0.02472	550.33	0.05000	532.95
257	0.01000	816.45	0.85136	816.45	0.01976	550.33	0.05000	523.28
258	0.01000	785.06	0.87960	785.06	0.01391	550.33	0.05000	512.07
259	0.01000	763.89	0.93178	763.89	0.00751	550.33	0.05000	499.97
260	0.01000	751.80	1.00000	751.80	0.00100	550.33	0.05000	487.84
261	0.01000	1035.09	1.00031	1035.09	0.03539	550.33	0.05000	550.32
262	0.01000	978.26	0.92463	978.26	0.03416	550.33	0.05000	547.41
263	0.01000	923.11	0.86681	923.11	0.03169	550.33	0.05000	543.01
264	0.01000	873.65	0.83548	873.65	0.02779	550.33	0.05000	536.99
265	0.01000	832.94	0.83545	832.94	0.02248	550.33	0.05000	529.44
266	0.01000	802.57	0.86670	802.57	0.01595	550.33	0.05000	520.68
267	0.01000	782.64	0.92444	782.64	0.00861	550.33	0.05000	511.23
268	0.01000	771.89	1.00000	771.89	0.00100	550.33	0.05000	501.76
323	0.01000	1311.90	1.49095	1311.90	0.03141	550.33	0.05000	550.32
324	0.01000	1291.17	1.43804	1291.17	0.03333	550.33	0.05000	550.32
325	0.01000	1269.62	1.41378	1269.62	0.03231	550.33	0.05000	550.32
326	0.01000	1247.44	1.41797	1247.44	0.02838	550.33	0.05000	550.32
327	0.01000	1224.82	1.44907	1224.82	0.02173	550.33	0.05000	550.32
335	0.01000	1236.07	1.34298	1236.07	0.03361	550.33	0.05000	550.32
336	0.01000	1217.25	1.30651	1217.25	0.03418	550.33	0.05000	550.32
337	0.01000	1197.88	1.28990	1197.88	0.03269	550.33	0.05000	550.32
338	0.01000	1178.10	1.29313	1178.10	0.02915	550.33	0.05000	550.32
339	0.01000	1158.12	1.31525	1158.12	0.02369	550.33	0.05000	550.32
347	0.01000	1165.58	1.21322	1165.58	0.03502	550.33	0.05000	550.32
348	0.01000	1148.42	1.19104	1148.42	0.03446	550.33	0.05000	550.32
349	0.01000	1130.99	1.18104	1130.99	0.03261	550.33	0.05000	550.32
350	0.01000	1113.36	1.18338	1113.36	0.02945	550.33	0.05000	550.32
351	0.01000	1095.72	1.19769	1095.72	0.02507	550.33	0.05000	550.32
359	0.01000	1101.06	1.10267	1101.06	0.03563	550.33	0.05000	550.32
360	0.01000	1085.22	1.09251	1085.22	0.03416	550.33	0.05000	550.32
361	0.01000	1069.37	1.08801	1069.37	0.03205	550.33	0.05000	550.32
362	0.01000	1053.58	1.08947	1053.58	0.02928	550.33	0.05000	550.32
363	0.01000	1037.91	1.09695	1037.91	0.02585	550.33	0.05000	550.32
395	0.01000	1433.32	1.74265	1433.32	0.02665	550.33	0.05000	549.69
396	0.01000	1412.09	1.66654	1412.09	0.03094	550.33	0.05000	549.87
397	0.01000	1389.44	1.63332	1389.44	0.03083	550.33	0.05000	550.02
398	0.01000	1365.36	1.64299	1365.36	0.02632	550.33	0.05000	550.15
399	0.01000	1339.86	1.69554	1339.86	0.01741	550.33	0.05000	550.26
407	0.01000	1379.48	1.62896	1379.48	0.02894	550.33	0.05000	550.32
408	0.01000	1357.85	1.56220	1357.85	0.03215	550.33	0.05000	550.32
409	0.01000	1335.02	1.53193	1335.02	0.03161	550.33	0.05000	550.32
410	0.01000	1311.22	1.53805	1311.22	0.02736	550.33	0.05000	550.32
411	0.01000	1286.51	1.57905	1286.51	0.01955	550.33	0.05000	550.32

OPTIMIZATION SYSTEM FOR TPSSYM = 19

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINTS = 956
TOTAL NUMBER OF TEMP. CONSTRAINTS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

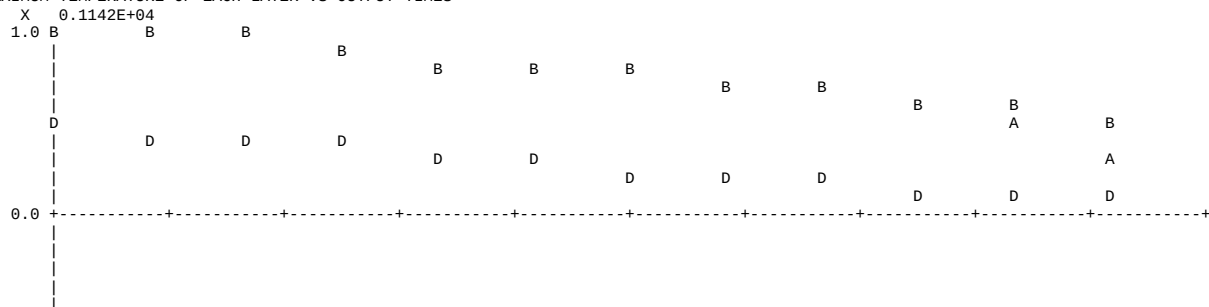
MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES
X 0.1202E+04

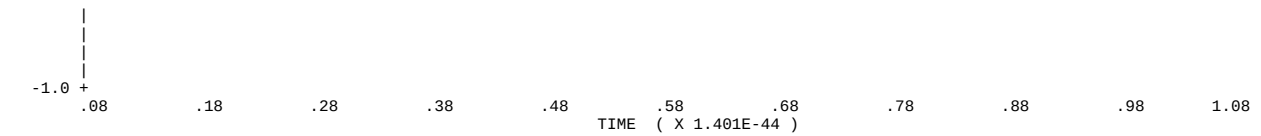
226	0.25985	645.41	0.99048	645.41	0.00100	549.90	0.14303	382.51
227	0.14416	658.80	0.99460	658.80	0.00100	550.10	0.09955	408.82
228	0.02213	682.32	1.00000	682.32	0.00110	550.33	0.05294	439.39
328	0.40306	1057.93	1.03269	1057.93	0.06352	549.85	0.16777	479.67
340	0.45225	979.73	1.02298	979.73	0.05268	549.67	0.19092	446.51
352	0.48804	909.87	1.01448	909.87	0.04266	549.73	0.20880	418.65
364	0.51066	848.45	1.00715	848.45	0.03356	549.97	0.22154	396.00
400	0.29487	1202.26	1.05136	1202.26	0.08323	550.33	0.11710	544.47
412	0.34872	1133.52	1.04229	1133.52	0.07381	550.16	0.14261	513.18
461	0.40907	722.96	1.00000	722.96	0.00170	550.33	0.15414	445.28
462	0.40308	682.08	1.00000	682.08	0.00100	543.64	0.15017	424.22
463	0.38344	646.18	1.00000	646.18	0.00144	533.70	0.14251	400.11
464	0.34779	619.10	1.00000	619.10	0.00669	520.32	0.13068	373.77
465	0.29566	603.02	1.00000	603.02	0.01603	503.62	0.11467	346.04
466	0.22906	598.58	1.00000	598.58	0.02909	484.26	0.09510	317.97
467	0.15214	604.69	1.00000	604.69	0.04497	463.27	0.07311	290.68
468	0.07117	618.75	1.00000	618.75	0.06222	442.10	0.05037	265.45
469	0.63817	669.47	1.00007	669.47	0.07235	467.32	0.17652	282.61
470	0.63502	621.53	1.00073	621.53	0.07288	455.89	0.16104	258.39
471	0.60938	580.58	1.00122	580.58	0.07260	444.96	0.14365	238.88
472	0.55682	568.28	1.00149	551.31	0.07133	435.39	0.12499	226.71
473	0.47628	568.28	1.00148	536.40	0.06899	427.78	0.10571	223.29
474	0.37088	568.28	1.00119	536.44	0.06568	422.40	0.08656	228.75
475	0.24748	568.28	1.00067	549.79	0.06164	419.23	0.06826	241.90
476	0.11640	572.87	1.00000	572.87	0.05722	417.95	0.05160	260.40
477	0.73258	662.95	1.00000	662.95	0.09930	440.21	0.19743	217.47
478	0.73074	610.93	1.00000	610.93	0.09974	428.13	0.17876	217.47
479	0.70224	568.28	1.00000	566.95	0.09767	418.35	0.15804	217.47
480	0.64159	568.28	1.00000	536.13	0.09255	412.15	0.13607	217.47
481	0.54748	568.28	1.00000	521.51	0.08422	410.27	0.11367	217.47
482	0.42354	568.28	1.00000	523.64	0.07299	412.78	0.09172	217.47
483	0.27802	568.28	1.00000	540.60	0.05965	419.08	0.07104	245.30
484	0.12320	568.28	1.00000	568.28	0.04534	428.03	0.05243	287.79
485	0.69288	702.47	0.99996	702.47	0.08299	468.25	0.21554	249.03
486	0.69052	650.08	0.99796	650.08	0.08088	459.88	0.20251	227.94
487	0.66209	605.02	0.99642	605.02	0.07675	453.54	0.18516	217.47
488	0.60195	573.31	0.99558	573.31	0.07031	450.40	0.16365	217.47
489	0.50890	568.28	0.99559	558.13	0.06157	451.01	0.13848	231.90
490	0.38656	568.28	0.99642	560.07	0.05087	455.36	0.11060	260.97
491	0.24322	577.12	0.99798	577.12	0.03888	462.85	0.08145	301.14
492	0.09160	604.96	1.00000	604.96	0.02657	472.36	0.05288	347.69
493	0.33542	944.08	1.00000	944.08	0.03213	550.33	0.14479	517.57
494	0.36681	881.01	1.00000	881.01	0.02136	550.33	0.15047	501.01
495	0.38953	824.32	1.00000	824.32	0.01279	550.33	0.15398	483.98
496	0.40360	773.97	1.00000	773.97	0.00640	550.33	0.15532	466.46
497	0.48731	935.14	0.99599	935.14	0.06406	522.21	0.23138	425.88
498	0.54648	858.70	0.99721	858.70	0.06689	507.29	0.21850	383.94
499	0.59121	790.34	0.99827	790.34	0.06921	493.46	0.20548	346.75
500	0.62139	730.06	0.99919	730.06	0.07099	480.77	0.19228	314.40
501	0.54808	951.85	0.99993	951.85	0.07924	510.53	0.26549	390.12
502	0.61949	868.52	0.99996	868.52	0.08667	489.96	0.24917	336.91
503	0.67379	794.10	0.99998	794.10	0.09245	471.73	0.23287	291.14
504	0.71090	728.66	1.00000	728.66	0.09658	455.87	0.21660	252.90
505	0.51878	993.59	1.01215	993.59	0.07870	520.25	0.24462	409.00
506	0.58702	909.59	1.00854	909.59	0.08161	504.54	0.24028	358.61
507	0.63849	834.62	1.00538	834.62	0.08332	490.90	0.23426	315.86
508	0.67320	768.77	1.00264	768.77	0.08384	479.34	0.22665	280.78
509	0.44407	1075.84	1.01580	1075.84	0.07515	535.90	0.24683	460.17
510	0.37037	1151.24	1.01934	1151.24	0.07156	550.33	0.24702	508.23
513	0.46899	1034.78	0.99992	1034.78	0.07114	531.12	0.28026	444.54
514	0.38994	1112.03	1.00000	1112.03	0.06315	550.33	0.29291	496.17
517	0.42073	1012.10	0.99474	1012.10	0.06105	536.80	0.24315	468.31
518	0.35299	1084.94	0.99355	1084.94	0.05805	550.33	0.25380	508.56
521	0.29871	1007.98	1.00000	1007.98	0.04402	550.33	0.13762	532.43
522	0.25947	1069.97	1.00000	1069.97	0.05629	550.33	0.12960	545.42

OPTIMIZATION SYSTEM FOR TPSSYM = 20

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINS = 844
TOTAL NUMBER OF TEMP. CONSTRAINS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES





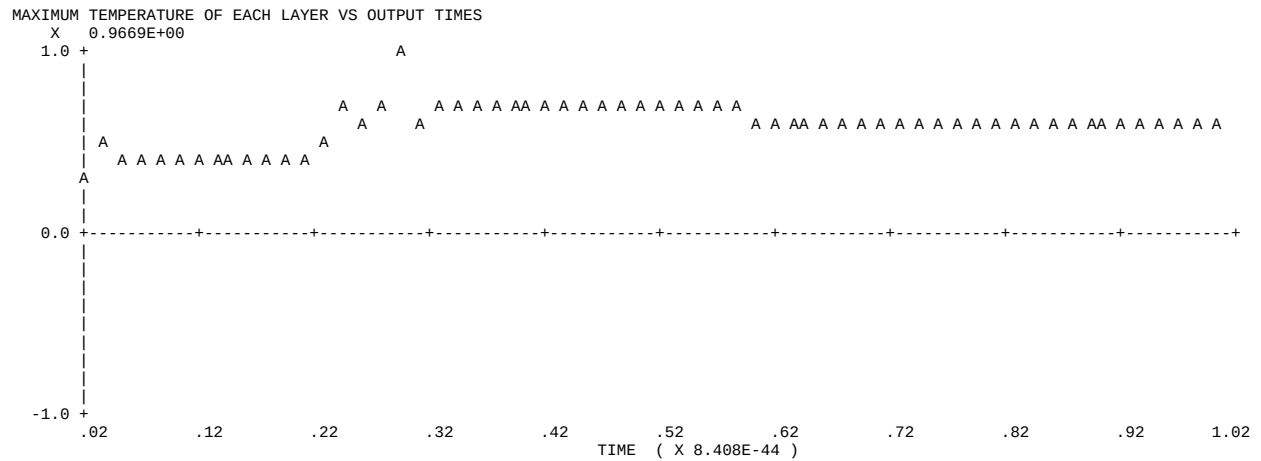
VALUES OF DESIGN VARIABLES :

LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.07036	0.01000	0.01000	0.07600	0.12296	0.10857	0.01001	0.13614	0.06223
2	1.11326	1.20167	1.20030	1.02858	1.05268	1.05540	1.00000	1.01651	1.00000
3	0.03467	0.10140	0.03991	0.01431	0.01977	0.02396	0.02535	0.02199	0.02676
4	0.05000	0.05000	0.05000	0.05000	0.08853	0.05000	0.05000	0.07467	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 166.2477417

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.6226656

THE TOTAL OPTIMAL WEIGHT = 1.24153078E+05



THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 20

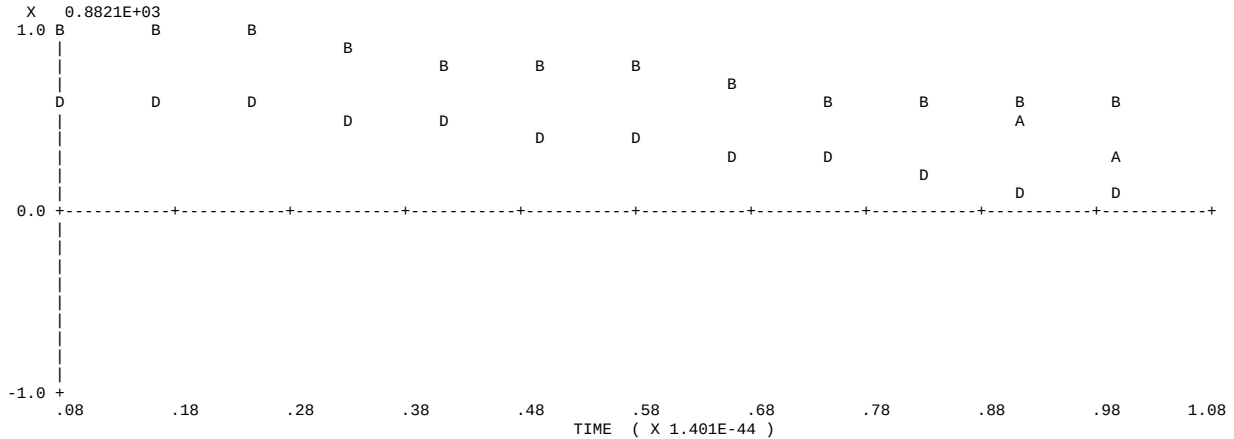
PANEL	LAYER01	LAYER02	LAYER03	LAYER04
557	0.07600	826.62	1.02858	826.62
558	0.07233	790.81	1.01907	790.81
559	0.06659	754.82	1.01053	754.82
560	0.05860	721.01	1.00379	721.01
561	0.04841	691.14	0.99938	691.14
562	0.03642	666.35	0.99746	666.35
563	0.02331	647.07	0.99784	647.07
564	0.01001	633.12	1.00000	633.12
565	0.11268	800.99	1.04354	800.99
566	0.12076	757.68	1.02979	757.68
567	0.12722	713.54	1.01807	713.54
568	0.13115	671.32	1.00974	671.32
569	0.13208	633.09	1.00557	633.09
570	0.12998	600.31	1.00572	600.31
571	0.12526	573.69	1.00971	573.69
572	0.11873	553.28	1.01651	553.28
573	0.12296	800.05	1.05274	800.05
574	0.13463	754.24	1.03619	754.24
575	0.14413	708.22	1.02192	708.22
576	0.15023	665.08	1.01154	665.08

577	0.15227	626.97	1.00595	626.97	0.00361	500.55	0.09060	397.62
578	0.15015	595.38	1.00537	595.38	0.00725	479.98	0.08659	374.10
579	0.14441	570.83	1.00928	570.83	0.01369	457.70	0.08108	346.61
580	0.13614	553.08	1.01651	553.08	0.02199	435.26	0.07467	317.43
581	0.10857	821.97	1.05540	821.97	0.02396	550.33	0.05000	450.66
582	0.11534	778.92	1.03779	778.92	0.02257	546.11	0.05000	434.37
583	0.11845	737.58	1.02186	737.58	0.02163	539.84	0.05000	416.63
584	0.11669	701.25	1.00916	701.25	0.02134	531.41	0.05001	398.26
585	0.10954	672.03	1.00062	672.03	0.02177	520.90	0.05001	379.95
586	0.09728	651.06	0.99656	651.06	0.02291	508.73	0.05000	362.39
587	0.08094	638.25	0.99665	638.25	0.02465	495.53	0.05000	346.19
588	0.06223	632.53	1.00000	632.53	0.02676	482.22	0.05000	331.91
589	0.07616	1007.29	1.08561	1007.29	0.02698	550.33	0.05000	528.90
590	0.07832	958.61	1.06916	958.61	0.02275	550.33	0.05000	518.04
591	0.07907	913.11	1.05440	913.11	0.01926	550.33	0.05000	506.20
592	0.07843	870.78	1.04134	870.78	0.01652	550.33	0.05000	493.38
593	0.07116	1003.74	1.09807	1003.74	0.04195	550.33	0.05537	483.22
594	0.07709	952.61	1.08707	952.61	0.04063	550.33	0.06362	459.06
595	0.08697	902.46	1.07347	902.46	0.03418	550.33	0.07258	449.08
596	0.09875	853.91	1.05917	853.91	0.02575	550.33	0.08091	445.73
597	0.05433	1007.55	1.14140	1007.55	0.07491	550.33	0.06700	386.26
598	0.07359	953.04	1.11673	953.04	0.05763	550.33	0.07502	405.30
599	0.09150	901.16	1.09392	901.16	0.04278	550.33	0.08120	419.86
600	0.10748	852.31	1.07337	852.31	0.03058	550.33	0.08557	429.41
601	0.04995	1027.70	1.14957	1027.70	0.04153	550.33	0.05320	489.90
602	0.06934	971.52	1.12273	971.52	0.03454	550.33	0.05340	485.34
603	0.08538	919.52	1.09862	919.52	0.02959	550.33	0.05282	477.02
604	0.09806	871.88	1.07717	871.88	0.02626	550.33	0.05170	465.95
605	0.07366	1045.48	1.09892	1045.48	0.03061	550.33	0.05000	536.32
606	0.05824	1046.81	1.12644	1046.81	0.06295	550.33	0.05470	445.20
607	0.03408	1059.48	1.16944	1059.48	0.09069	550.33	0.05866	369.63
608	0.02995	1084.15	1.17548	1084.15	0.04408	550.33	0.05115	507.03
609	0.07036	1085.67	1.11326	1085.67	0.03467	550.33	0.05000	543.24
610	0.02990	1098.06	1.17298	1098.06	0.10027	550.33	0.05000	367.06
611	0.01000	1116.82	1.20167	1116.82	0.10140	550.33	0.05000	368.27
612	0.01000	1141.82	1.20030	1141.82	0.03991	550.33	0.05000	541.83

OPTIMIZATION SYSTEM FOR TPSSYM = 21

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINTS = 1164
TOTAL NUMBER OF TEMP. CONSTRAINTS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4
Tmax:	2300.33	2300.33	550.33	600.33
Optv:	882.09	882.09	548.74	548.93

VALUES OF DESIGN VARIABLES :

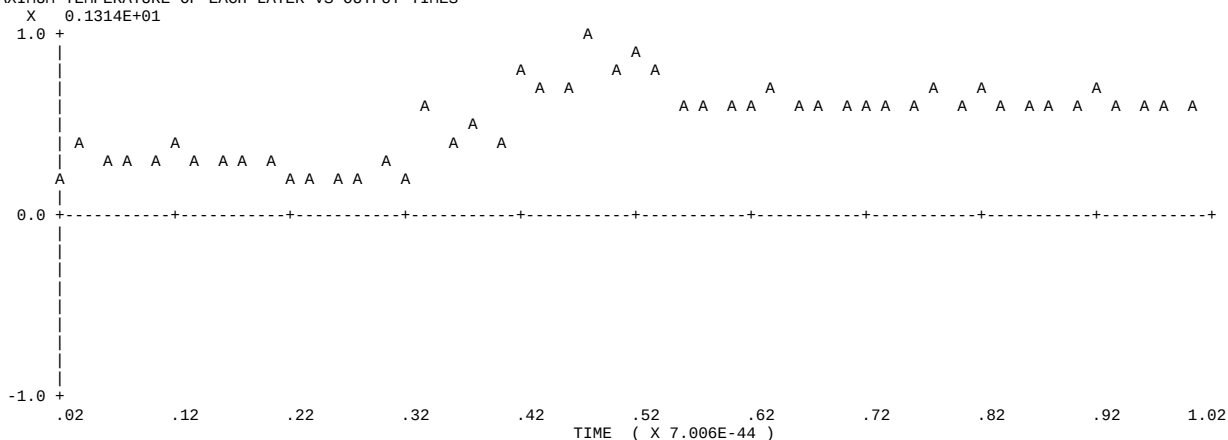
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
2	1.00000	1.12466	1.13139	1.00000	1.06586	1.05013	1.00000	1.20693	1.23164
3	0.00100	0.00100	0.00100	0.00100	0.46653	0.00100	0.00100	0.03518	0.00100
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 284.9608765

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.7809880

THE TOTAL OPTIMAL WEIGHT = 9.88459207E+04

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



OPTIMAL STRUCTURES OF TPS FOR PATCH = 21
(WITH AVERAGE THICKNESS)

=====	-----
HRSI COAT thin skin	0.01000 in. 882.1 F
=====	-----
LI-900 (P) slab	1.09003 in. 882.1 F
=====	-----
RTV-560 thin skin	0.05652 in. 548.7 F
=====	-----
17 LB SIP .16 IN slab	0.05000 in. 548.9 F
=====	-----

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 21

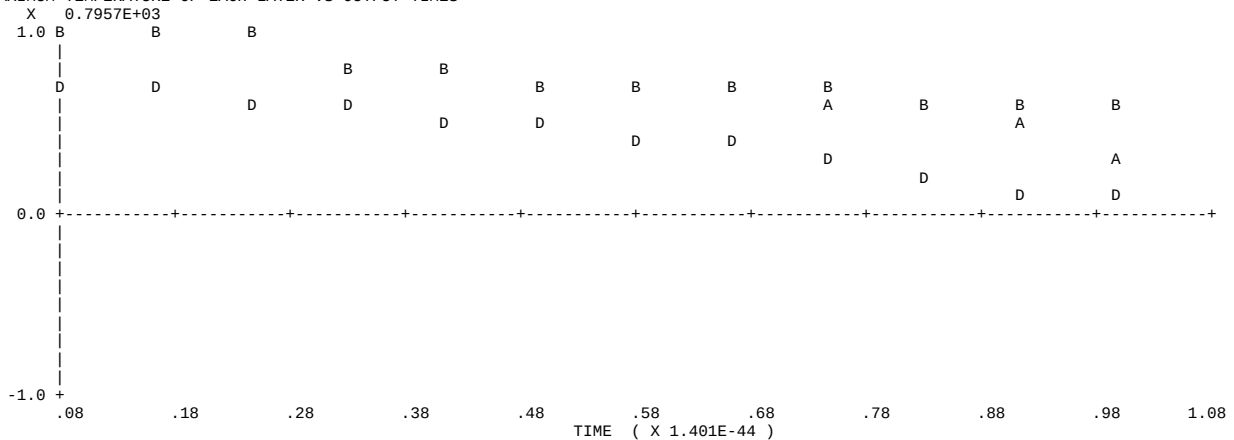
PANEL	LAYER01	LAYER02	LAYER03	LAYER04
717	0.01000	882.09	1.13139	882.09
718	0.01000	868.91	1.14181	868.91
719	0.01000	855.28	1.14462	855.28
720	0.01000	841.17	1.13983	841.17
721	0.01000	867.74	1.10113	867.74
722	0.01000	857.56	1.11220	857.56
723	0.01000	847.04	1.11643	847.04
724	0.01000	836.13	1.11384	836.13
725	0.01000	852.30	1.07765	852.30
726	0.01000	844.82	1.08928	844.82
727	0.01000	837.08	1.09466	837.08
728	0.01000	829.05	1.09381	829.05
729	0.01000	835.75	1.06093	835.75
730	0.01000	830.66	1.07304	830.66
731	0.01000	825.38	1.07929	825.38
732	0.01000	819.90	1.07968	819.90
733	0.01000	806.89	1.07073	806.89
734	0.01000	792.02	1.06926	792.02
735	0.01000	772.43	1.07546	772.43
736	0.01000	748.09	1.09106	748.09
737	0.01000	719.43	1.11661	719.43
738	0.01000	687.88	1.15080	687.88
739	0.01000	654.81	1.19148	654.81
740	0.01000	622.04	1.23544	622.04
741	0.01000	809.92	1.06947	809.92
742	0.01000	793.27	1.06777	793.27
743	0.01000	772.29	1.07438	772.29
744	0.01000	747.13	1.09119	747.13
745	0.01000	718.18	1.11897	718.18
746	0.01000	687.41	1.15570	687.41
747	0.01000	655.74	1.19936	655.74
748	0.01000	624.33	1.24727	624.33
749	0.01000	812.84	1.06260	812.84
750	0.01000	794.51	1.06067	794.51
751	0.01000	772.19	1.06737	772.19
752	0.01000	746.27	1.08462	746.27
753	0.01000	717.14	1.11333	717.14
754	0.01000	686.90	1.15131	686.90
755	0.01000	656.35	1.19640	656.35
756	0.01000	626.42	1.24600	626.42
757	0.01000	815.68	1.05013	815.68
758	0.01000	795.74	1.04797	795.74
759	0.01000	772.16	1.05439	772.16
760	0.01000	745.49	1.07135	745.49
761	0.01000	716.40	1.09956	716.40
762	0.01000	686.44	1.13745	686.44
763	0.01000	656.69	1.18259	656.69
764	0.01000	628.31	1.23164	628.31

938	0.01000	824.20	1.12466	824.20	0.00100	550.33	0.05000	507.73
939	0.01000	804.36	1.09531	804.36	0.00100	550.33	0.05000	500.32
940	0.01000	784.19	1.05407	784.19	0.00100	550.33	0.05000	495.61
941	0.01000	763.10	1.00000	763.10	0.00100	550.33	0.05000	493.41
945	0.01000	822.95	1.10213	822.95	0.15435	529.55	0.05000	396.91
946	0.01000	807.78	1.07831	807.78	0.13262	532.65	0.05000	408.13
947	0.01000	792.82	1.04517	792.82	0.08258	539.91	0.05000	443.17
948	0.01000	776.93	1.00075	776.93	0.00241	550.33	0.05000	503.04
952	0.01000	819.44	1.08502	819.44	0.28122	510.90	0.04999	302.34
953	0.01000	808.47	1.06579	808.47	0.24054	516.86	0.04999	330.09
954	0.01000	797.62	1.03821	797.62	0.14901	530.38	0.05000	398.48
955	0.01000	786.04	1.00050	786.04	0.00304	550.33	0.05000	510.05
959	0.01000	813.49	1.07307	813.49	0.38205	494.35	0.04999	223.63
960	0.01000	806.19	1.05728	806.19	0.32700	502.64	0.04999	264.43
961	0.01000	798.71	1.03308	798.71	0.20008	521.83	0.04999	361.83
962	0.01000	790.83	1.00000	790.83	0.00100	550.33	0.05000	515.97
1205	0.01000	608.85	1.00000	608.85	0.00100	499.36	0.05000	390.27
1206	0.01000	612.60	1.08829	612.60	0.01912	469.03	0.05000	325.69
1207	0.01000	616.08	1.15717	616.08	0.03050	449.27	0.05000	282.55
1208	0.01000	619.32	1.20693	619.32	0.03518	440.00	0.05000	260.69
1212	0.01000	650.61	1.00010	650.61	0.00115	509.73	0.05000	419.81
1213	0.01000	651.77	1.07276	651.77	0.10377	471.90	0.05000	298.84
1214	0.01000	652.83	1.12897	652.83	0.16770	447.62	0.05000	220.72
1215	0.01000	653.80	1.16932	653.80	0.19382	436.63	0.04999	184.53
1219	0.01000	690.44	1.00008	690.44	0.00125	519.91	0.05000	447.96
1220	0.01000	689.69	1.05834	689.69	0.17798	476.04	0.04999	278.58
1221	0.01000	689.00	1.10287	689.00	0.28841	448.11	0.04999	170.28
1222	0.01000	688.38	1.13429	688.38	0.33439	435.73	0.04999	152.18
1226	0.01000	725.54	1.00016	725.54	0.00185	529.10	0.05000	472.15
1227	0.01000	723.81	1.04638	723.81	0.23564	481.35	0.04999	266.98
1228	0.01000	722.23	1.08110	722.23	0.38163	451.16	0.04999	152.18
1229	0.01000	720.78	1.10489	720.78	0.44258	438.03	0.04999	152.18
1233	0.01000	753.85	1.00021	753.85	0.00257	536.90	0.05000	491.28
1234	0.01000	752.20	1.03747	752.20	0.27170	487.90	0.04999	266.14
1235	0.01000	750.68	1.06493	750.68	0.43954	457.07	0.04999	152.18
1236	0.01000	749.26	1.08306	749.26	0.50938	443.86	0.04998	152.18
1240	0.01000	773.94	1.00015	773.94	0.00238	543.08	0.05000	505.16
1241	0.01000	773.45	1.03194	773.45	0.28319	495.56	0.04999	277.07
1242	0.01000	773.02	1.05500	773.02	0.45878	465.68	0.04999	152.18
1243	0.01000	772.66	1.06968	772.66	0.53198	452.99	0.04998	152.18
1247	0.01000	786.01	1.00008	786.01	0.00177	547.51	0.05000	513.56
1248	0.01000	787.59	1.02971	787.59	0.27292	503.84	0.04999	297.64
1249	0.01000	789.12	1.05104	789.12	0.44331	476.30	0.04999	161.41
1250	0.01000	790.62	1.06433	790.62	0.51449	464.67	0.04998	152.18
1254	0.01000	791.19	1.00000	791.19	0.00100	550.33	0.05000	517.11
1255	0.01000	795.46	1.03017	795.46	0.24627	512.15	0.04999	324.58
1256	0.01000	799.53	1.05199	799.53	0.40154	487.94	0.04999	202.81
1257	0.01000	803.43	1.06556	803.43	0.46653	477.76	0.04999	152.18

OPTIMIZATION SYSTEM FOR TPSSYM = 22

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINS = 876
TOTAL NUMBER OF TEMP. CONSTRAINS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4
Tmax:	2300.33	2300.33	550.33	600.33
Optv:	795.73	795.73	520.52	520.52

VALUES OF DESIGN VARIABLES :

LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000

2	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
3	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 178.1200104

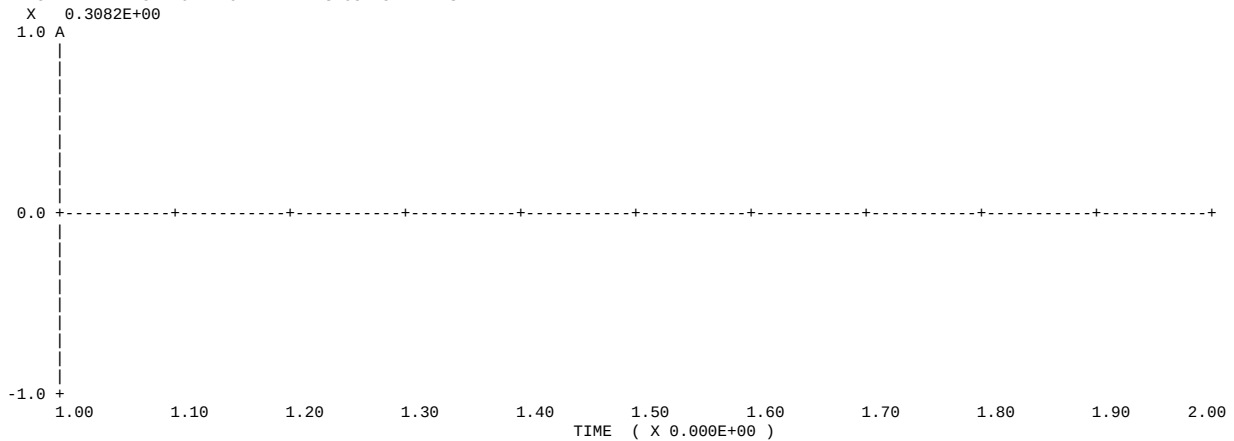
THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.3081630

THE TOTAL OPTIMAL WEIGHT = 2.60391281E+04

OBJECTIVE FUNCTION VS ITERATIONS :

1	0.3081630
2	0.3081630

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



OPTIMAL STRUCTURES OF TPS FOR PATCH = 22
(WITH AVERAGE THICKNESS)

=====	=====	=====	=====
HRSI COAT	thin skin	0.01000 in.	795.7 F
=====	=====	=====	=====
LI-900 (P)	slab	1.00000 in.	795.7 F
=====	=====	=====	=====
RTV-560	thin skin	0.00100 in.	520.5 F
=====	=====	=====	=====
17 LB SIP .16 IN	slab	0.05000 in.	520.5 F
=====	=====	=====	=====

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 22

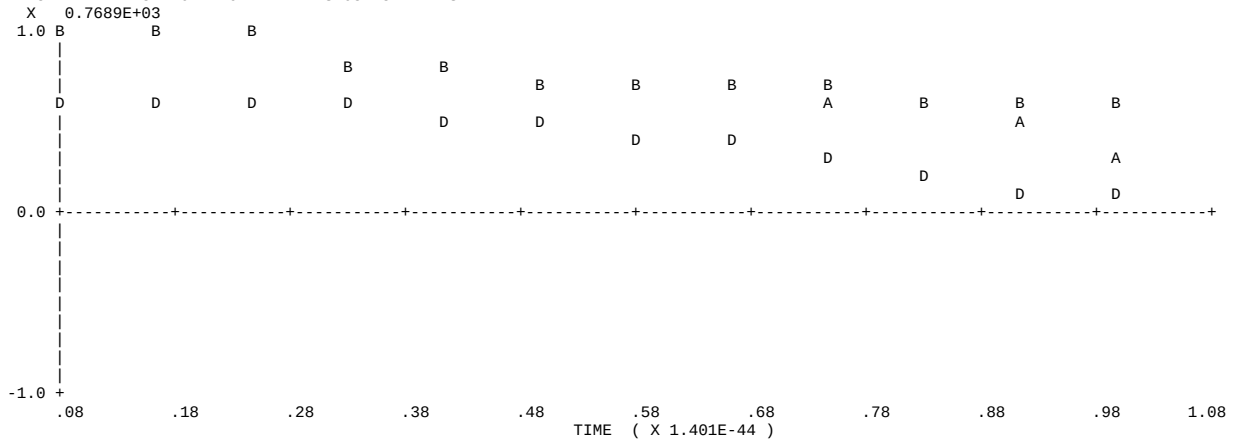
PANEL	LAYER01		LAYER02		LAYER03		LAYER04	
942	0.01000	704.32	1.00000	704.32	0.00100	550.33	0.05000	451.20
943	0.01000	653.23	1.00000	653.23	0.00100	523.73	0.05000	415.76
944	0.01000	605.23	1.00000	605.23	0.00100	494.04	0.05000	383.55
949	0.01000	733.58	1.00000	733.58	0.00100	550.33	0.05000	473.03
950	0.01000	700.05	1.00000	700.05	0.00100	533.25	0.05000	449.96
951	0.01000	667.22	1.00000	667.22	0.00100	512.37	0.05000	427.99
956	0.01000	756.61	1.00000	756.61	0.00100	550.33	0.05000	490.34
957	0.01000	738.34	1.00000	738.34	0.00100	540.75	0.05000	478.02
958	0.01000	718.91	1.00000	718.91	0.00100	527.65	0.05000	465.11
963	0.01000	773.45	1.00000	773.45	0.00100	550.33	0.05000	503.18
964	0.01000	768.22	1.00000	768.22	0.00100	546.30	0.05000	500.04
965	0.01000	760.23	1.00000	760.23	0.00100	539.86	0.05000	494.84
1202	0.01000	597.17	1.00000	597.17	0.00100	489.75	0.05000	382.71
1203	0.01000	601.29	1.00000	601.29	0.00100	493.13	0.05000	385.37
1204	0.01000	605.09	1.00000	605.09	0.00100	496.26	0.05000	387.83
1209	0.01000	668.58	1.00000	668.58	0.00100	511.27	0.05000	433.04
1210	0.01000	663.04	1.00000	663.04	0.00100	509.18	0.05000	429.16
1211	0.01000	655.06	1.00000	655.06	0.00100	507.34	0.05000	423.25
1216	0.01000	731.95	1.00000	731.95	0.00100	530.40	0.05000	477.60
1217	0.01000	718.58	1.00000	718.58	0.00100	523.94	0.05000	468.41
1218	0.01000	701.06	1.00000	701.06	0.00100	518.16	0.05000	455.73
1223	0.01000	780.97	1.00000	780.97	0.00100	545.25	0.05000	511.97
1224	0.01000	762.85	1.00000	762.85	0.00100	536.17	0.05000	499.57
1225	0.01000	739.37	1.00000	739.37	0.00100	528.03	0.05000	482.64
1230	0.01000	795.73	1.00000	795.73	0.00100	550.33	0.05000	520.52
1231	0.01000	792.52	1.00000	792.52	0.00100	545.04	0.05000	520.21
1232	0.01000	767.36	1.00000	767.36	0.00100	536.41	0.05000	502.04
1237	0.01000	795.73	1.00000	795.73	0.00100	550.33	0.05000	520.52
1238	0.01000	795.73	1.00000	795.73	0.00100	550.14	0.05000	520.52
1239	0.01000	783.66	1.00000	783.66	0.00100	542.91	0.05000	512.97
1244	0.01000	795.73	1.00000	795.73	0.00100	550.33	0.05000	520.52
1245	0.01000	795.73	1.00000	795.73	0.00100	550.33	0.05000	520.52
1246	0.01000	789.01	1.00000	789.01	0.00100	547.49	0.05000	515.99

1251	0.01000	795.73	1.00000	795.73	0.00100	550.33	0.05000	520.51
1252	0.01000	792.80	1.00000	792.80	0.00100	550.33	0.05000	518.34
1253	0.01000	785.51	1.00000	785.51	0.00100	550.33	0.05000	512.67
1590	0.01000	561.42	1.00000	561.42	0.00100	461.38	0.05000	355.39
1591	0.01000	520.75	1.00000	520.75	0.00100	425.30	0.05000	330.54
1598	0.01000	636.38	1.00000	636.38	0.00100	489.56	0.05000	408.05
1599	0.01000	606.51	1.00000	606.51	0.00100	464.46	0.05000	389.43
1606	0.01000	699.30	1.00000	699.30	0.00100	513.41	0.05000	452.29
1607	0.01000	678.80	1.00000	678.80	0.00100	497.82	0.05000	439.07
1614	0.01000	750.17	1.00000	750.17	0.00100	532.90	0.05000	488.09
1615	0.01000	737.62	1.00000	737.62	0.00100	525.35	0.05000	479.47
1622	0.01000	794.76	1.00000	794.76	0.00100	550.32	0.05000	519.53
1623	0.01000	789.66	1.00000	789.66	0.00100	550.33	0.05000	515.20
1630	0.01000	795.73	1.00000	795.73	0.00100	550.33	0.05000	520.52
1631	0.01000	795.73	1.00000	795.73	0.00100	550.33	0.05000	520.52
1638	0.01000	795.73	1.00000	795.73	0.00100	550.33	0.05000	520.52
1639	0.01000	795.73	1.00000	795.73	0.00100	550.33	0.05000	520.52
1646	0.01000	795.73	1.00000	795.73	0.00100	550.33	0.05000	520.52
1647	0.01000	795.73	1.00000	795.73	0.00100	550.33	0.05000	520.52
1654	0.01000	793.38	1.00000	793.38	0.00100	550.33	0.05000	519.60
1655	0.01000	795.73	1.00000	795.73	0.00100	550.33	0.05000	520.52
1662	0.01000	740.90	1.00000	740.90	0.00100	537.46	0.05000	483.09
1663	0.01000	745.65	1.00000	745.65	0.00100	545.14	0.05000	485.04
1670	0.01000	671.60	1.00000	671.60	0.00100	513.60	0.05000	434.84
1671	0.01000	672.26	1.00000	672.26	0.00100	516.18	0.05000	434.67
1678	0.01000	592.76	1.00000	592.76	0.00100	486.14	0.05000	379.88
1679	0.01000	588.05	1.00000	588.05	0.00100	482.28	0.05000	376.86

OPTIMIZATION SYSTEM FOR TPSSYM = 23

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINTS = 972
TOTAL NUMBER OF TEMP. CONSTRAINTS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4
Tmax:	2300.33	2300.33	550.33	600.33
Optv:	768.93	768.93	498.81	498.81

VALUES OF DESIGN VARIABLES :

LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
2	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
3	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 213.8315887

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.3081630

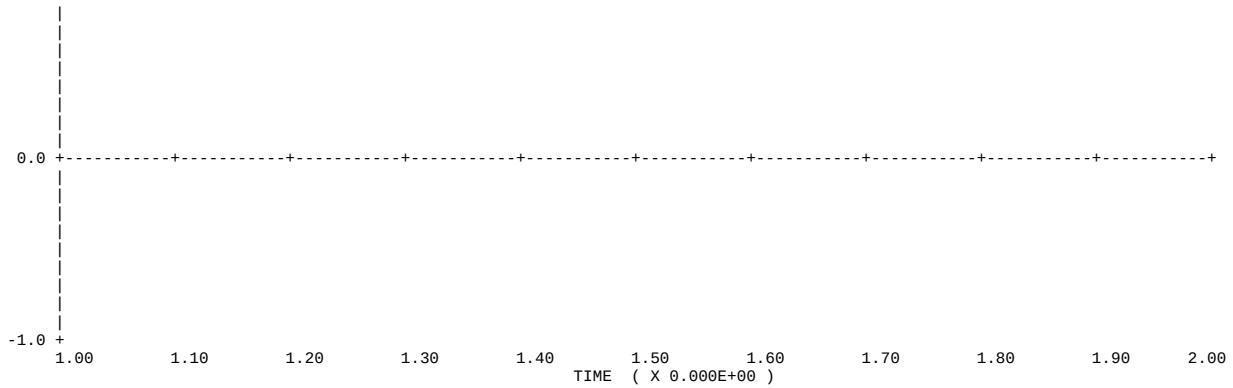
THE TOTAL OPTIMAL WEIGHT = 3.15029699E+04

OBJECTIVE FUNCTION VS ITERATIONS :

1	0.3081630
2	0.3081630

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES

X 0.3082E+00
1.0 A
|



OPTIMAL STRUCTURES OF TPS FOR PATCH = 23 (WITH AVERAGE THICKNESS)			
=====	HRSI COAT	thin skin	0.01000 in. 768.9 F
=====			-----
	LI-900 (P)	slab	i 1.00012 in. 768.9 F
			i -----
=====	RTV-560	thin skin	0.00100 in. 498.8 F
=====			-----
	17 LB SIP .16 IN	slab	i 0.05001 in. 498.8 F
			i -----
=====			

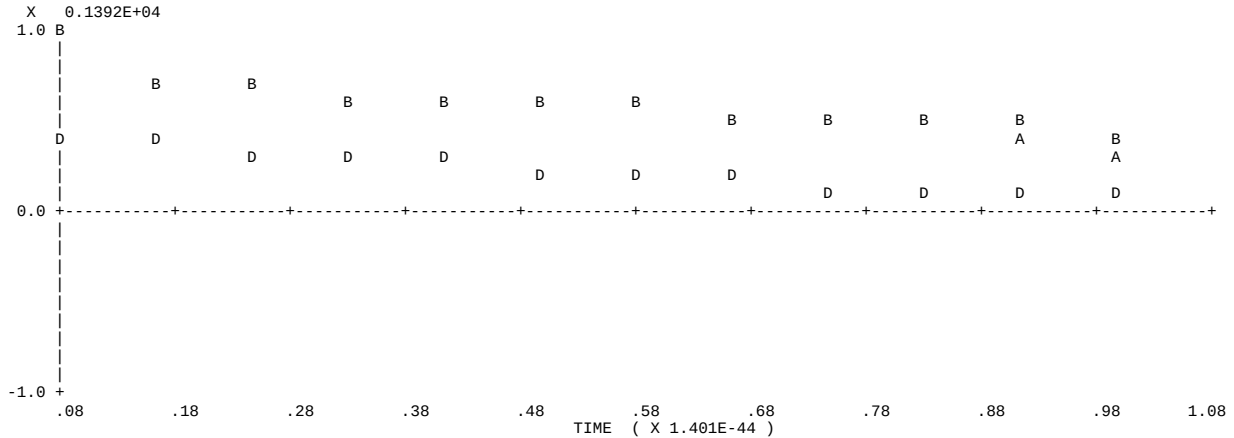
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 23							
PANEL	LAYER01		LAYER02		LAYER03		LAYER04
1592	0.01000	481.34	1.00000	481.34	0.00100	393.28	0.05000 305.89
1593	0.01000	443.26	1.00000	443.26	0.00100	361.47	0.05000 280.48
1594	0.01000	409.40	1.00000	409.40	0.00100	333.46	0.05000 258.10
1595	0.01000	381.06	1.00000	381.06	0.00100	310.05	0.05000 239.63
1596	0.01000	356.14	1.00000	356.14	0.00100	289.75	0.05000 223.67
1597	0.01000	335.53	1.00000	335.53	0.00100	273.18	0.05000 210.83
1600	0.01000	572.51	1.00000	572.51	0.00100	442.24	0.05000 367.06
1601	0.01000	541.51	1.00024	541.51	0.00100	420.37	0.05001 345.78
1602	0.01000	513.20	1.00036	513.20	0.00100	401.26	0.05002 326.56
1603	0.01000	488.63	1.00037	488.63	0.00100	385.55	0.05002 310.09
1604	0.01000	465.12	1.00025	465.12	0.00100	371.50	0.05001 294.58
1605	0.01000	443.99	1.00000	443.99	0.00100	359.98	0.05000 280.93
1608	0.01000	649.54	1.00000	649.54	0.00100	484.00	0.05000 418.73
1609	0.01000	624.85	1.00044	624.85	0.00100	470.75	0.05002 401.18
1610	0.01001	601.15	1.00066	601.15	0.00100	459.05	0.05003 384.59
1611	0.01001	579.65	1.00067	579.65	0.00100	449.65	0.05003 369.74
1612	0.01000	557.85	1.00046	557.85	0.00100	441.18	0.05002 354.96
1613	0.01000	536.68	1.00001	536.68	0.00100	434.13	0.05000 340.90
1616	0.01000	712.56	1.00000	712.56	0.00100	518.63	0.05000 461.01
1617	0.01001	693.40	1.00059	693.40	0.00100	512.59	0.05003 446.78
1618	0.01001	673.61	1.00089	673.61	0.00100	507.05	0.05004 432.43
1619	0.01001	654.49	1.00091	654.49	0.00100	502.81	0.05005 418.82
1620	0.01001	634.42	1.00062	634.42	0.00100	499.00	0.05003 404.87
1621	0.01000	613.61	1.00003	613.61	0.00100	495.68	0.05000 390.73
1624	0.01000	768.93	1.00000	768.93	0.00100	550.33	0.05000 498.81
1625	0.01001	754.46	1.00073	754.46	0.00100	550.33	0.05004 487.37
1626	0.01001	738.20	1.00110	738.20	0.00100	550.33	0.05005 475.07
1627	0.01001	720.99	1.00110	720.99	0.00100	550.33	0.05006 462.45
1628	0.01001	701.89	1.00074	701.89	0.00100	550.33	0.05004 448.89
1629	0.01000	680.80	1.00000	680.80	0.00100	550.33	0.05000 434.31
1632	0.01000	768.93	1.00000	768.93	0.00100	550.33	0.05000 498.81
1633	0.01001	768.93	1.00081	768.93	0.00100	550.33	0.05004 498.81
1634	0.01001	768.93	1.00121	768.93	0.00100	550.33	0.05006 498.81
1635	0.01001	765.17	1.00121	765.17	0.00100	550.33	0.05006 491.53
1636	0.01001	746.84	1.00081	746.84	0.00100	550.33	0.05004 478.32
1637	0.01000	725.65	1.00000	725.65	0.00100	550.33	0.05000 463.52
1640	0.01000	768.93	1.00000	768.93	0.00100	550.33	0.05000 498.81
1641	0.01001	768.93	1.00083	768.93	0.00100	550.33	0.05004 498.81
1642	0.01001	768.93	1.00125	768.93	0.00100	550.33	0.05006 498.81
1643	0.01001	768.93	1.00125	768.93	0.00100	550.33	0.05006 498.81
1644	0.01001	768.93	1.00083	768.93	0.00100	550.33	0.05004 497.06
1645	0.01000	754.72	1.00000	754.72	0.00100	550.33	0.05000 482.62
1648	0.01000	768.93	1.00000	768.93	0.00100	550.33	0.05000 498.81
1649	0.01001	768.93	1.00079	768.93	0.00100	550.33	0.05004 498.81
1650	0.01001	768.93	1.00119	768.93	0.00100	550.33	0.05006 498.81
1651	0.01001	768.93	1.00118	768.93	0.00100	550.33	0.05006 498.81
1652	0.01001	768.93	1.00079	768.93	0.00100	550.33	0.05004 498.81
1653	0.01000	761.66	1.00000	761.66	0.00100	550.33	0.05000 487.51
1656	0.01000	768.93	1.00000	768.93	0.00100	550.33	0.05000 498.81
1657	0.01001	768.93	1.00068	768.93	0.00100	550.33	0.05003 498.81
1658	0.01001	768.93	1.00102	768.93	0.00100	550.33	0.05005 498.81
1659	0.01001	768.93	1.00102	768.93	0.00100	550.33	0.05005 497.28
1660	0.01001	759.69	1.00068	759.69	0.00100	550.33	0.05003 487.70

1661	0.01000	743.41	1.00000	743.41	0.00100	550.33	0.05000	476.21
1664	0.01000	738.71	1.00000	738.71	0.00100	550.33	0.05000	478.32
1665	0.01000	736.15	1.00050	736.15	0.00100	550.33	0.05002	475.50
1666	0.01001	731.15	1.00075	731.15	0.00100	550.33	0.05004	471.24
1667	0.01001	723.64	1.00074	723.64	0.00100	550.33	0.05004	465.47
1668	0.01000	713.35	1.00050	713.35	0.00100	550.33	0.05002	458.03
1669	0.01000	700.67	1.00000	700.67	0.00100	550.33	0.05000	449.15
1672	0.01000	666.39	1.00000	666.39	0.00100	517.65	0.05000	429.74
1673	0.01000	663.28	1.00026	663.28	0.00100	519.79	0.05001	427.17
1674	0.01000	658.93	1.00039	658.93	0.00100	521.21	0.05002	423.87
1675	0.01000	653.34	1.00039	653.34	0.00100	521.92	0.05002	419.82
1676	0.01000	646.20	1.00026	646.20	0.00100	521.75	0.05001	414.85
1677	0.01000	637.86	1.00000	637.86	0.00100	520.86	0.05000	409.16
1680	0.01000	582.68	1.00000	582.68	0.00100	477.93	0.05000	373.51
1681	0.01000	578.25	1.00000	578.25	0.00100	474.34	0.05000	370.74
1682	0.01000	574.04	1.00000	574.04	0.00100	470.93	0.05000	368.13
1683	0.01000	570.04	1.00000	570.04	0.00100	467.70	0.05000	365.66
1684	0.01000	566.24	1.00000	566.24	0.00100	464.64	0.05000	363.33
1685	0.01000	562.65	1.00000	562.65	0.00100	461.76	0.05000	361.15

OPTIMIZATION SYSTEM FOR TPSSYM = 24

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINS = 1196
TOTAL NUMBER OF TEMP. CONSTRAINS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4
Tmax:	2300.33	2300.33	550.33	600.33
Optv:	1391.98	1391.98	550.28	550.28

VALUES OF DESIGN VARIABLES :

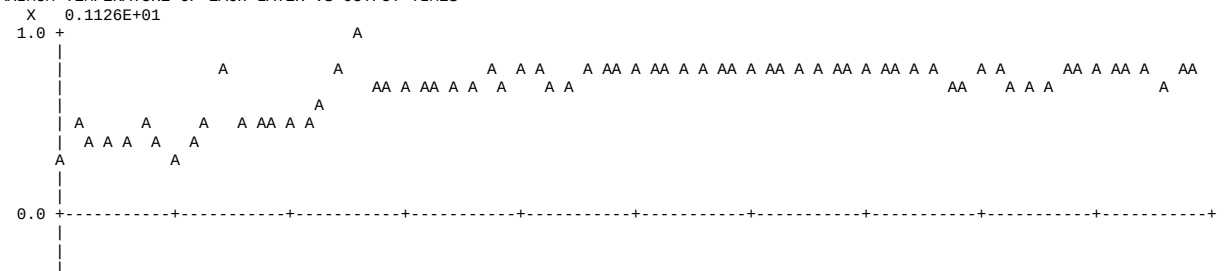
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.07358	0.26541	0.01000	0.02643	0.05898	0.12286	0.01012	0.04929	0.07236
2	1.00000	1.00001	1.00008	1.12671	1.05599	1.00000	1.10190	1.07994	1.00000
3	0.01911	0.26115	0.11265	0.03065	0.04353	0.02286	0.03678	0.02338	0.02117
4	0.05558	0.05000	0.06289	0.07640	0.06274	0.06294	0.05000	0.06700	0.07995

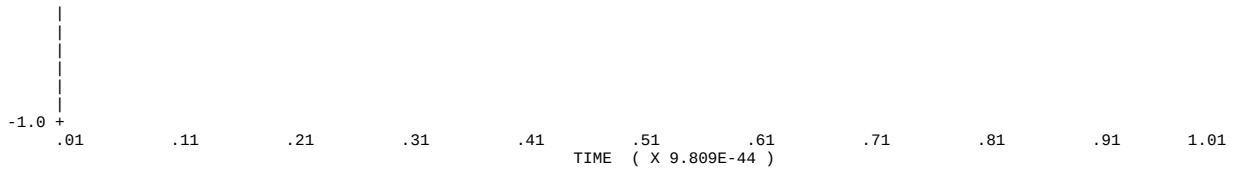
THE ORIGINAL OBJECTIVE FUNCTION = 296.8656311

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.8874019

THE TOTAL OPTIMAL WEIGHT = 4.03060289E+04

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES





OPTIMAL STRUCTURES OF TPS FOR PATCH = 24 (WITH AVERAGE THICKNESS)			
=====	HRSI COAT	thin skin	0.07656 in. 1392.0 F
=====			-----
	LI-900 (P)	slab	i 1.04051 in. 1392.0 F
			i -----
=====	RTV-560	thin skin	0.06348 in. 550.3 F
=====			-----
	17 LB SIP .16 IN	slab	i 0.06306 in. 550.3 F
			i -----
=====			

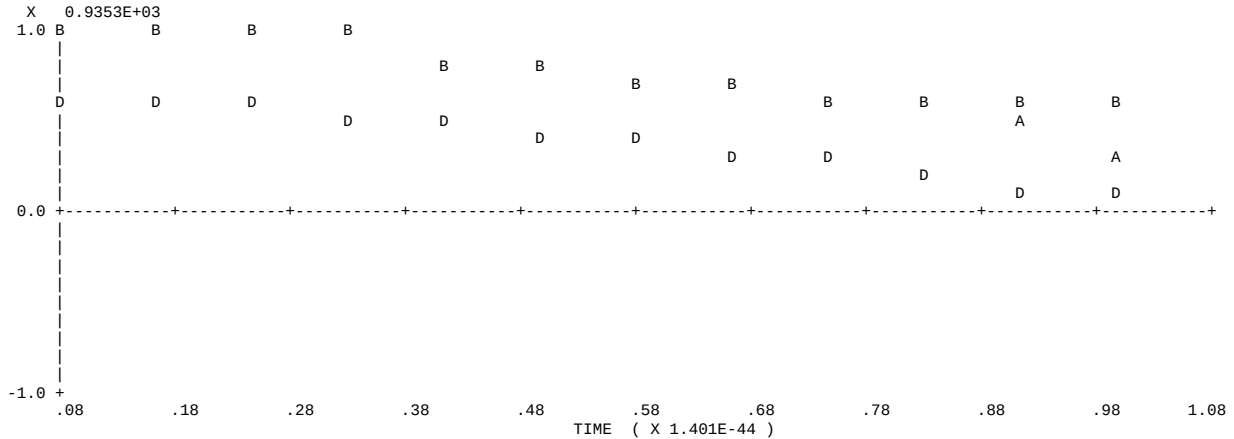
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 24								
PANEL	LAYER01		LAYER02		LAYER03		LAYER04	
795	0.11343	805.44	1.00152	805.44	0.01411	550.33	0.06602	465.80
796	0.12068	759.89	1.00019	759.89	0.01836	550.33	0.06415	441.15
797	0.12286	710.55	1.00000	710.55	0.02286	550.33	0.06294	415.94
798	0.11807	678.74	0.99991	678.74	0.03050	534.94	0.06148	388.43
799	0.11017	647.87	0.99982	647.87	0.04033	515.05	0.06050	358.64
800	0.09887	617.87	0.99979	617.87	0.05211	490.73	0.06001	326.77
801	0.08373	589.02	0.99982	589.02	0.06555	462.04	0.06000	293.11
802	0.06427	562.00	0.99991	562.00	0.08036	429.06	0.06049	257.93
803	0.03989	537.61	1.00002	537.61	0.09618	391.89	0.06145	221.57
804	0.01000	516.87	1.00008	516.87	0.11265	350.62	0.06289	184.38
805	0.06826	927.57	1.02571	927.57	0.01439	550.33	0.06283	483.01
806	0.07831	915.54	1.01881	915.54	0.02573	550.33	0.06019	454.54
807	0.09124	891.75	1.01282	891.75	0.04193	550.18	0.05787	420.54
808	0.10469	867.23	1.00958	867.23	0.06352	533.45	0.05595	383.54
809	0.12165	831.20	1.00664	831.20	0.09012	511.94	0.05439	341.13
810	0.14184	783.80	1.00410	783.80	0.12164	485.59	0.05319	293.33
811	0.16488	725.27	1.00207	725.27	0.15796	454.34	0.05236	240.21
812	0.19030	656.06	1.00065	656.06	0.19893	418.09	0.05192	181.88
813	0.21751	576.69	0.99994	576.69	0.24434	376.79	0.05192	167.42
814	0.24580	516.87	1.00004	487.92	0.29391	330.38	0.05238	167.42
815	0.03621	1041.14	1.07234	1041.14	0.02122	550.33	0.06527	513.09
816	0.04536	1023.04	1.06441	1023.04	0.02987	550.33	0.06421	493.01
817	0.05898	999.28	1.05597	999.28	0.04353	550.32	0.06274	467.04
818	0.07470	972.90	1.05073	972.90	0.06109	539.07	0.06166	440.57
819	0.09481	937.86	1.04433	937.86	0.08261	524.72	0.06031	409.34
820	0.11940	894.38	1.03683	894.38	0.10837	507.09	0.05869	372.99
821	0.14859	842.29	1.02841	842.29	0.13869	485.93	0.05679	331.09
822	0.18255	781.05	1.01927	781.05	0.17397	460.89	0.05466	283.18
823	0.22144	709.90	1.00969	709.90	0.21464	431.60	0.05237	228.79
824	0.26541	627.81	1.00001	627.81	0.26115	397.61	0.05000	167.42
825	0.01839	1139.76	1.13141	1139.76	0.03315	550.33	0.07167	549.31
826	0.02210	1088.62	1.13085	1088.62	0.03195	550.33	0.07464	550.19
827	0.02643	1044.64	1.12671	1044.64	0.03065	550.33	0.07640	550.28
828	0.03132	1008.08	1.11910	1008.08	0.02928	550.33	0.07695	549.62
829	0.03683	978.37	1.10799	978.37	0.02782	550.33	0.07633	548.19
830	0.04296	955.52	1.09338	955.52	0.02626	550.33	0.07453	546.00
831	0.04969	939.53	1.07528	939.53	0.02461	550.33	0.07156	543.05
832	0.05704	930.39	1.05368	930.39	0.02287	550.33	0.06741	539.34
833	0.06500	928.11	1.02859	928.11	0.02104	550.33	0.06208	534.87
834	0.07358	932.69	1.00000	932.69	0.01911	550.33	0.05558	529.64
875	0.07358	932.69	1.00000	932.69	0.01911	550.33	0.05558	529.64
876	0.26527	628.17	1.00001	628.17	0.26093	397.79	0.05000	167.80
877	0.24959	516.87	1.00004	489.72	0.29607	331.15	0.05218	167.42
878	0.02074	516.87	1.00008	513.36	0.12164	348.64	0.06244	176.31
882	0.07358	932.69	1.00000	932.69	0.01911	550.33	0.05558	529.64
883	0.26176	636.88	1.00001	636.88	0.25544	402.10	0.05007	177.25
884	0.26541	627.81	1.00001	627.81	0.26115	397.61	0.05000	167.42
885	0.04731	516.87	1.00007	505.12	0.14374	343.95	0.06130	167.42
889	0.07358	932.69	1.00000	932.69	0.01911	550.33	0.05558	529.64
890	0.25221	658.45	1.00001	658.45	0.24125	412.80	0.05028	201.04
891	0.26541	627.81	1.00001	627.81	0.26115	397.61	0.05000	167.42
892	0.07861	516.87	1.00007	496.36	0.16946	338.88	0.05996	167.42
896	0.07358	932.69	1.00000	932.69	0.01911	550.33	0.05558	529.64
897	0.22926	703.18	1.00001	703.18	0.20952	435.07	0.05086	251.80
898	0.26541	627.81	1.00001	627.81	0.26115	397.61	0.05000	167.42
899	0.26541	627.81	1.00001	627.81	0.26115	397.61	0.05000	167.42
903	0.07358	932.69	1.00000	932.69	0.01911	550.33	0.05558	529.64
904	0.17851	786.43	1.00000	786.43	0.14461	476.73	0.05231	349.97
905	0.26541	627.81	1.00001	627.81	0.26115	397.61	0.05000	167.42
906	0.26541	627.81	1.00001	627.81	0.26115	397.61	0.05000	167.42
910	0.07358	932.69	1.00000	932.69	0.01911	550.33	0.05558	529.64
911	0.17093	797.85	1.00000	797.85	0.13526	482.46	0.05254	363.71
912	0.26541	627.81	1.00001	627.81	0.26115	397.61	0.05000	167.42
913	0.26541	627.81	1.00001	627.81	0.26115	397.61	0.05000	167.42
917	0.07358	932.69	1.00000	932.69	0.01911	550.33	0.05558	529.64

918	0.21580	726.75	1.00000	726.75	0.19180	446.84	0.05123	279.18
919	0.26541	627.81	1.00001	627.81	0.26115	397.61	0.05000	167.42
920	0.26541	627.81	1.00001	627.81	0.26115	397.61	0.05000	167.42
924	0.07358	932.69	1.00000	932.69	0.01911	550.33	0.05558	529.64
925	0.23076	700.45	1.00001	700.45	0.21153	433.70	0.05082	248.65
926	0.26541	627.81	1.00001	627.81	0.26115	397.61	0.05000	167.42
927	0.26541	627.81	1.00001	627.81	0.26115	397.61	0.05000	167.42
931	0.07358	932.69	1.00000	932.69	0.01911	550.33	0.05558	529.64
932	0.22394	712.66	1.00000	712.66	0.20246	439.80	0.05101	262.77
933	0.26541	627.81	1.00001	627.81	0.26115	397.61	0.05000	167.42
934	0.26541	627.81	1.00001	627.81	0.26115	397.61	0.05000	167.42
1309	0.10632	835.08	1.00319	835.08	0.01172	550.33	0.06817	484.46
1310	0.06285	927.76	1.03164	927.76	0.00888	550.33	0.06517	501.77
1311	0.03209	1052.45	1.07786	1052.45	0.01764	550.33	0.06567	524.91
1312	0.01588	1185.64	1.12928	1185.64	0.03404	550.33	0.06843	548.04
1316	0.10139	853.65	1.00420	853.65	0.01125	550.33	0.07022	497.18
1317	0.06067	921.76	1.03616	921.76	0.00694	550.33	0.06707	513.39
1318	0.03093	1058.75	1.08109	1058.75	0.01670	550.33	0.06568	531.30
1319	0.01429	1222.23	1.12625	1222.23	0.03465	550.33	0.06556	546.80
1323	0.09571	871.68	1.00522	871.68	0.01190	550.33	0.07242	508.56
1324	0.06008	911.06	1.04071	911.06	0.00700	550.33	0.06905	522.66
1325	0.03144	1062.49	1.08337	1062.49	0.01710	550.33	0.06545	535.66
1326	0.01293	1261.08	1.12200	1261.08	0.03523	550.33	0.06229	545.29
1330	0.08935	889.96	1.00604	889.96	0.01368	550.33	0.07479	518.66
1331	0.06126	895.10	1.04498	895.10	0.00898	550.33	0.07116	529.63
1332	0.03380	1061.19	1.08445	1061.19	0.01861	550.33	0.06510	538.15
1333	0.01178	1302.24	1.11654	1302.24	0.03578	550.33	0.05861	543.52
1337	0.08180	909.18	1.00687	909.18	0.01649	550.33	0.07734	527.84
1338	0.06398	874.32	1.04919	874.32	0.01291	550.33	0.07344	534.56
1339	0.03804	1053.86	1.08473	1053.86	0.02131	550.33	0.06476	539.04
1340	0.01084	1345.85	1.10984	1345.85	0.03629	550.33	0.05452	541.48
1344	0.07236	963.89	1.00000	963.89	0.02117	550.33	0.07995	535.59
1345	0.07001	844.01	1.04691	844.01	0.01811	550.33	0.07693	537.17
1346	0.04929	989.29	1.07994	989.29	0.02338	550.33	0.06700	538.33
1347	0.01012	1391.98	1.10190	1391.98	0.03678	550.33	0.05000	539.17

OPTIMIZATION SYSTEM FOR TPSSYM = 25

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINTS = 996
TOTAL NUMBER OF TEMP. CONSTRAINTS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4
Tmax:	2300.33	2300.33	550.33	600.33
Optv:	935.32	935.32	550.25	550.45

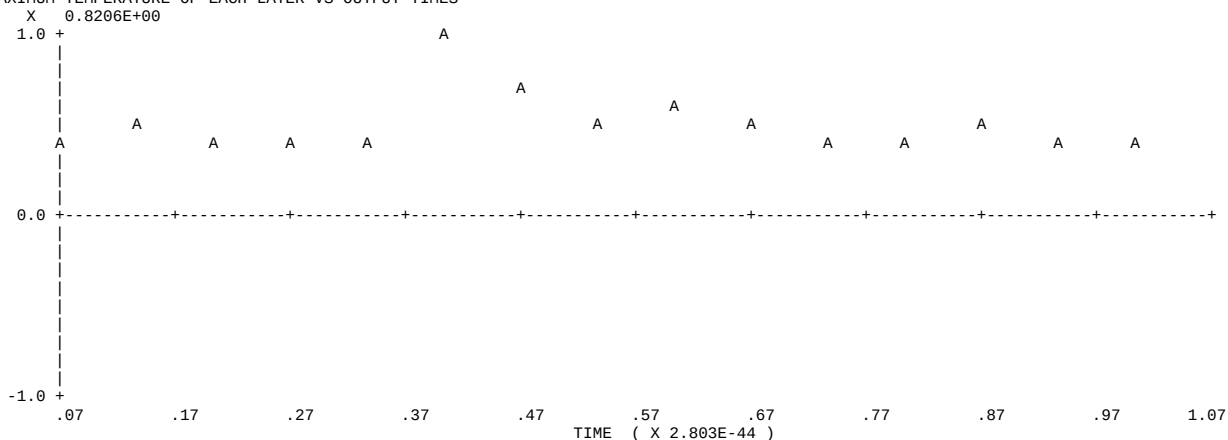
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
2	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
3	0.04250	0.04251	0.04257	0.06100	0.06097	0.06098	0.02060	0.01733	0.01300
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 222.6508484

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.4192527

THE TOTAL OPTIMAL WEIGHT = 1.55442568E+04

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



OPTIMAL STRUCTURES OF TPS FOR PATCH = 25
(WITH AVERAGE THICKNESS)

=====	-----
HRSI COAT thin skin	0.01000 in. 935.3 F
=====	-----
LI-900 (P) slab	1.00000 in. 935.3 F
=====	-----
RTV-560 thin skin	0.04016 in. 550.3 F
=====	-----
17 LB SIP .16 IN slab	0.05000 in. 550.5 F
=====	-----

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 25

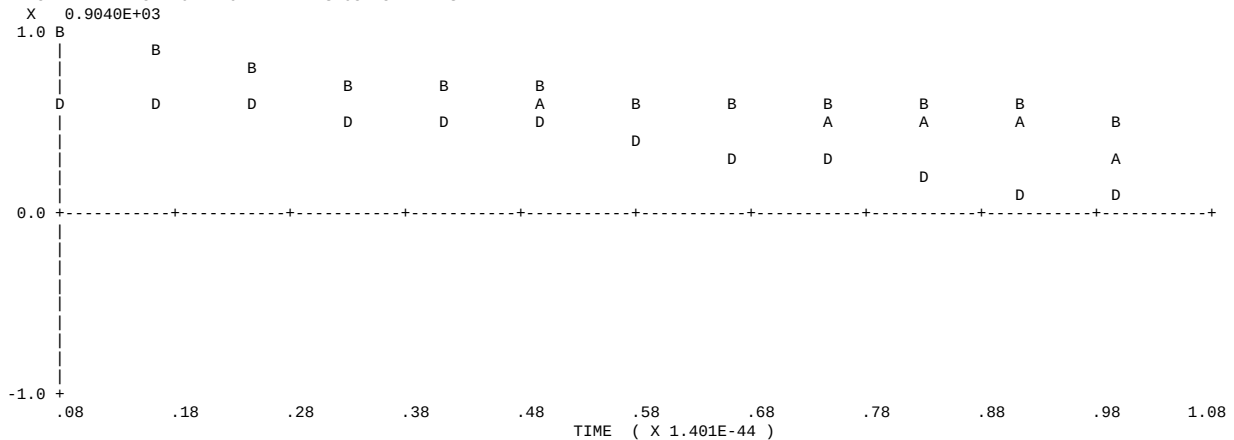
PANEL	LAYER01	LAYER02	LAYER03	LAYER04
765	0.01000	683.27	1.00001	683.27
766	0.01000	629.03	1.00001	629.03
767	0.01000	579.29	1.00000	579.29
768	0.01000	541.05	1.00000	541.05
769	0.01000	508.76	1.00000	508.76
770	0.01000	482.42	1.00000	482.42
771	0.01000	462.04	1.00000	462.04
772	0.01000	447.60	1.00000	447.60
773	0.01000	439.11	1.00000	439.11
774	0.01000	436.58	1.00000	436.58
775	0.01000	724.22	1.00002	724.22
776	0.01000	676.19	1.00002	676.19
777	0.01000	631.10	1.00003	631.10
778	0.01000	595.60	1.00003	595.60
779	0.01000	563.69	1.00002	563.69
780	0.01000	535.36	1.00002	535.36
781	0.01000	510.59	1.00002	510.59
782	0.01000	489.31	1.00001	489.31
783	0.01000	471.44	1.00001	471.44
784	0.01000	456.88	1.00000	456.88
785	0.01000	770.07	1.00000	770.07
786	0.01000	733.09	1.00000	733.09
787	0.01000	697.50	1.00000	697.50
788	0.01000	663.64	1.00000	663.64
789	0.01000	631.11	1.00000	631.11
790	0.01000	599.93	1.00000	599.93
791	0.01000	570.09	1.00000	570.09
792	0.01000	541.60	1.00000	541.60
793	0.01000	514.44	1.00000	514.44
794	0.01000	488.61	1.00000	488.61
879	0.01000	488.61	1.00000	488.61
880	0.01000	457.68	1.00000	457.68
881	0.01000	436.99	1.00000	436.99
886	0.01000	488.61	1.00000	488.61
887	0.01000	459.30	1.00000	459.30
888	0.01000	456.88	1.00000	456.88
893	0.01000	488.61	1.00000	488.61
894	0.01000	461.20	1.00000	461.20
895	0.01000	456.88	1.00000	456.88
900	0.01000	488.61	1.00000	488.61
901	0.01000	463.67	1.00000	463.67
902	0.01000	456.88	1.00000	456.88
907	0.01000	488.61	1.00000	488.61
908	0.01000	466.82	1.00000	466.82
909	0.01000	456.88	1.00000	456.88
914	0.01000	488.61	1.00000	488.61
915	0.01000	466.69	1.00000	466.69
916	0.01000	456.88	1.00000	456.88

921	0.01000	488.61	1.00000	488.61	0.04250	360.59	0.05000	232.57
922	0.01000	463.84	1.00000	463.84	0.04251	342.61	0.05000	221.39
923	0.01000	456.88	1.00000	456.88	0.04251	337.57	0.05000	218.26
928	0.01000	488.61	1.00000	488.61	0.04250	360.59	0.05000	232.57
929	0.01000	462.71	1.00000	462.71	0.04251	341.80	0.05000	220.88
930	0.01000	456.88	1.00000	456.88	0.04251	337.57	0.05000	218.26
935	0.01000	488.61	1.00000	488.61	0.04250	360.59	0.05000	232.57
936	0.01000	463.41	1.00000	463.41	0.04251	342.30	0.05000	221.19
937	0.01000	456.88	1.00000	456.88	0.04251	337.57	0.05000	218.26
1306	0.01000	728.66	1.00001	728.66	0.04612	478.73	0.05000	362.67
1307	0.01000	763.90	1.00002	763.90	0.04745	505.33	0.05000	377.90
1308	0.01000	801.39	1.00000	801.39	0.04822	527.99	0.05000	390.84
1313	0.01000	763.99	1.00001	763.99	0.04099	492.13	0.05000	394.98
1314	0.01000	793.36	1.00001	793.36	0.04278	515.41	0.05000	408.53
1315	0.01000	826.10	1.00000	826.10	0.04375	533.74	0.05000	418.88
1320	0.01000	801.25	1.00001	801.25	0.03519	505.77	0.05000	429.73
1321	0.01000	822.28	1.00001	822.28	0.03755	524.43	0.05000	440.69
1322	0.01000	850.91	1.00000	850.91	0.03879	538.79	0.05000	448.53
1327	0.01000	841.02	1.00000	841.02	0.02869	519.84	0.05000	467.03
1328	0.01000	851.23	1.00001	851.23	0.03170	532.80	0.05000	474.72
1329	0.01000	875.99	1.00000	875.99	0.03332	543.20	0.05000	479.95
1334	0.01000	884.29	1.00000	884.29	0.02143	534.80	0.05000	507.32
1335	0.01000	881.61	1.00000	881.61	0.02509	541.32	0.05000	511.56
1336	0.01000	901.89	1.00000	901.89	0.02723	547.07	0.05000	513.81
1341	0.01000	935.32	1.00000	935.32	0.01300	550.33	0.05000	548.72
1342	0.01000	913.52	1.00000	913.52	0.01733	550.33	0.05000	550.45
1343	0.01000	928.15	1.00000	928.15	0.02060	550.33	0.05000	549.54

OPTIMIZATION SYSTEM FOR TPSSYM = 26

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINTS = 1228
TOTAL NUMBER OF TEMP. CONSTRAINTS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4
Tmax:	2300.33	2300.33	550.33	600.33
Optv:	903.96	903.96	545.54	545.54

VALUES OF DESIGN VARIABLES :

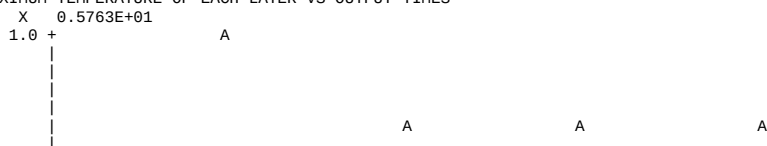
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
2	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
3	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
4	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

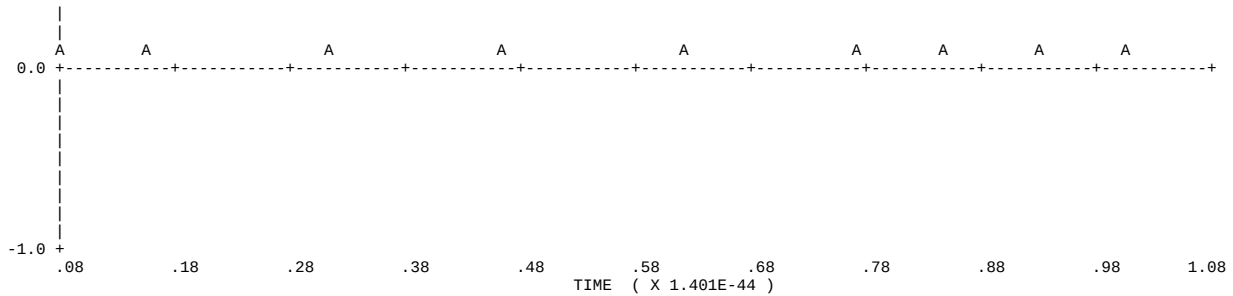
THE ORIGINAL OBJECTIVE FUNCTION = 308.7772827

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.3081630

THE TOTAL OPTIMAL WEIGHT = 1.59605106E+04

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES





OPTIMAL STRUCTURES OF TPS FOR PATCH = 26 (WITH AVERAGE THICKNESS)			
=====	HRSI COAT	thin skin	0.01000 in. 904.0 F
=====			i
	LI-900 (P)	slab	1.00007 in. 904.0 F
			i
=====	RTV-560	thin skin	0.00100 in. 545.5 F
=====			i
	17 LB SIP .16 IN	slab	0.05000 in. 545.5 F
			i
=====			-----

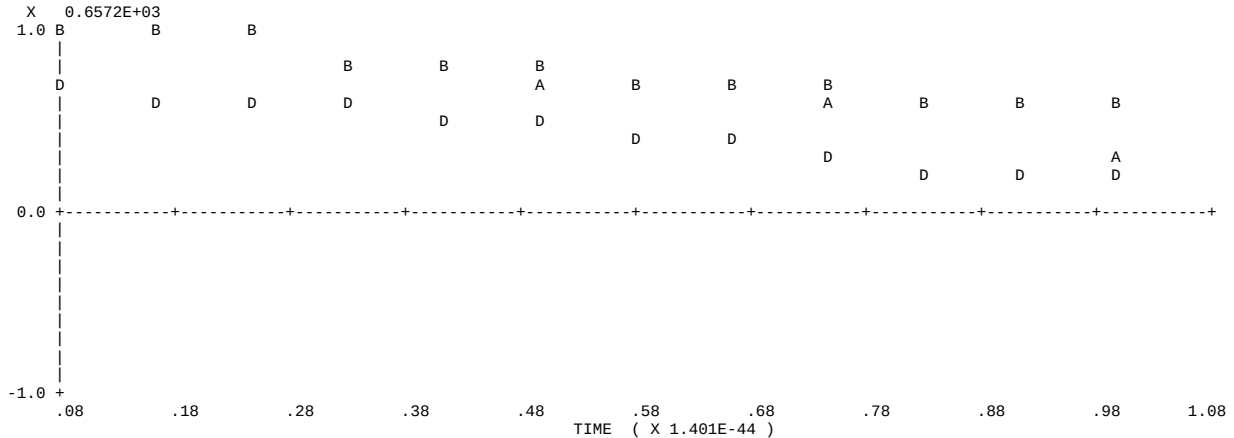
THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 26								
PANEL	LAYER01		LAYER02		LAYER03		LAYER04	
1918	0.01000	686.12	1.00000	686.12	0.00100	550.33	0.05000	444.39
1394	0.01000	336.50	1.00000	336.50	0.00100	273.86	0.05000	211.23
1395	0.01000	356.35	1.00000	356.35	0.00100	289.53	0.05000	222.86
1396	0.01000	383.16	1.00000	383.16	0.00100	311.29	0.05000	239.77
1397	0.01000	416.85	1.00000	416.85	0.00100	339.06	0.05000	261.89
1402	0.01000	366.75	1.00000	366.75	0.00100	299.28	0.05000	231.30
1403	0.01000	384.68	1.00019	384.68	0.00100	312.66	0.05001	241.58
1404	0.01000	401.99	1.00018	401.99	0.00100	331.59	0.05001	253.35
1405	0.01000	418.89	1.00000	418.89	0.00100	355.78	0.05000	266.59
1410	0.01000	396.29	1.00000	396.29	0.00100	324.00	0.05000	250.92
1411	0.01000	411.99	1.00035	411.99	0.00100	335.19	0.05002	259.75
1412	0.01000	421.89	1.00033	421.89	0.00100	351.47	0.05002	267.42
1413	0.01000	426.81	1.00000	426.81	0.00100	372.43	0.05000	274.14
1418	0.01000	425.10	1.00001	425.10	0.00100	348.04	0.05000	270.07
1419	0.01000	438.38	1.00047	438.38	0.00100	357.15	0.05002	277.43
1420	0.01000	443.11	1.00045	443.11	0.00100	370.95	0.05002	282.09
1421	0.01000	440.61	1.00000	440.61	0.00100	388.99	0.05000	284.53
1426	0.01000	453.19	1.00001	453.19	0.00100	371.41	0.05000	288.77
1427	0.01001	463.95	1.00057	463.95	0.00100	378.57	0.05003	294.67
1428	0.01001	465.82	1.00054	465.82	0.00100	390.08	0.05003	297.47
1429	0.01000	460.31	1.00000	460.31	0.00100	405.46	0.05000	297.76
1434	0.01000	480.54	1.00001	480.54	0.00100	394.10	0.05000	307.01
1435	0.01001	488.75	1.00063	488.75	0.00100	399.48	0.05003	311.49
1436	0.01001	490.13	1.00060	490.13	0.00100	408.87	0.05003	313.61
1437	0.01000	485.88	1.00000	485.88	0.00100	421.86	0.05000	313.83
1442	0.01000	507.20	1.00000	507.20	0.00100	416.12	0.05000	324.81
1443	0.01001	512.82	1.00066	512.82	0.00100	419.92	0.05003	327.93
1444	0.01001	516.04	1.00063	516.04	0.00100	427.36	0.05003	330.51
1445	0.01000	517.35	1.00000	517.35	0.00100	438.17	0.05000	332.75
1450	0.01000	533.17	1.00000	533.17	0.00100	437.48	0.05000	342.17
1451	0.01001	536.12	1.00066	536.12	0.00100	439.90	0.05003	343.98
1452	0.01001	543.43	1.00063	543.43	0.00100	445.57	0.05003	348.14
1453	0.01000	554.70	1.00000	554.70	0.00100	454.39	0.05000	354.50
1458	0.01000	558.46	1.00000	558.46	0.00100	458.17	0.05000	359.08
1459	0.01001	558.65	1.00062	558.65	0.00100	459.52	0.05003	359.63
1460	0.01001	572.84	1.00060	572.84	0.00100	463.87	0.05003	366.81
1461	0.01000	598.43	1.00000	598.43	0.00100	470.71	0.05000	379.38
1466	0.01000	583.02	1.00000	583.02	0.00100	478.15	0.05000	375.53
1467	0.01001	580.28	1.00055	580.28	0.00100	478.75	0.05003	374.83
1468	0.01001	605.09	1.00053	605.09	0.00100	482.03	0.05003	386.84
1469	0.01000	648.31	1.00000	648.31	0.00100	486.99	0.05000	407.24
1470	0.01000	903.96	1.00000	903.96	0.00100	550.33	0.05000	545.54
1471	0.01000	686.12	1.00000	686.12	0.00100	550.33	0.05000	444.39
1472	0.01000	672.91	1.00000	672.91	0.00100	550.33	0.05000	435.95
1473	0.01000	672.91	1.00000	672.91	0.00100	550.33	0.05000	435.95
1478	0.01000	858.41	1.00000	858.41	0.00100	540.65	0.05000	521.25
1479	0.01000	690.70	1.00013	690.70	0.00100	539.89	0.05001	443.55
1480	0.01000	644.11	1.00007	644.11	0.00100	539.77	0.05000	420.66
1481	0.01000	659.79	1.00000	659.79	0.00100	539.91	0.05000	427.11
1486	0.01000	813.75	1.00000	813.75	0.00100	530.63	0.05000	497.33
1487	0.01000	677.34	1.00024	677.34	0.00100	529.15	0.05001	434.16
1488	0.01000	631.67	1.00016	631.67	0.00100	528.75	0.05001	412.07
1489	0.01000	646.12	1.00000	646.12	0.00100	529.00	0.05000	417.91
1494	0.01000	771.25	1.00000	771.25	0.00100	520.52	0.05000	474.42
1495	0.01000	662.80	1.00034	662.80	0.00100	518.21	0.05002	424.18
1496	0.01000	620.07	1.00027	620.07	0.00100	517.32	0.05001	403.67
1497	0.01000	631.86	1.00000	631.86	0.00100	517.58	0.05000	408.31
1502	0.01000	731.15	1.00000	731.15	0.00100	510.37	0.05000	452.69

1503	0.01000	647.60	1.00041	647.60	0.00100	507.28	0.05002	413.90
1504	0.01000	608.55	1.00037	608.55	0.00100	505.75	0.05002	395.24
1505	0.01000	617.31	1.00000	617.31	0.00100	505.88	0.05000	398.54
1510	0.01000	693.47	1.00000	693.47	0.00100	500.19	0.05000	432.12
1511	0.01000	631.49	1.00046	631.49	0.00100	496.43	0.05002	403.23
1512	0.01000	596.79	1.00046	596.79	0.00100	494.08	0.05002	386.64
1513	0.01000	602.52	1.00000	602.52	0.00100	493.95	0.05000	388.61
1518	0.01000	416.85	1.00000	416.85	0.00100	339.06	0.05000	261.89
1519	0.01000	383.16	1.00000	383.16	0.00100	311.29	0.05000	239.77
1520	0.01000	356.33	1.00000	356.33	0.00100	289.52	0.05000	222.85
1521	0.01000	336.51	1.00000	336.51	0.00100	273.88	0.05000	211.24
1526	0.01000	416.85	1.00000	416.85	0.00100	339.06	0.05000	261.89
1527	0.01000	383.16	1.00000	383.16	0.00100	311.29	0.05000	239.77
1528	0.01000	357.19	1.00000	357.19	0.00100	290.21	0.05000	223.38
1529	0.01000	336.92	1.00000	336.92	0.00100	274.19	0.05000	211.46
1534	0.01000	416.85	1.00000	416.85	0.00100	339.06	0.05000	261.89
1535	0.01000	383.24	1.00000	383.24	0.00100	311.35	0.05000	239.82
1536	0.01000	358.40	1.00000	358.40	0.00100	291.18	0.05000	224.12
1537	0.01000	337.65	1.00000	337.65	0.00100	274.75	0.05000	211.86
1542	0.01000	416.85	1.00000	416.85	0.00100	339.06	0.05000	261.89
1543	0.01000	384.72	1.00000	384.72	0.00100	312.57	0.05000	240.78
1544	0.01000	383.16	1.00000	383.16	0.00100	311.29	0.05000	239.77
1545	0.01000	338.16	1.00000	338.16	0.00100	275.15	0.05000	212.15
1550	0.01000	416.85	1.00000	416.85	0.00100	339.06	0.05000	261.89
1551	0.01000	387.26	1.00000	387.26	0.00100	314.65	0.05000	242.42
1552	0.01000	383.16	1.00000	383.16	0.00100	311.29	0.05000	239.77
1553	0.01000	338.48	1.00000	338.48	0.00100	275.40	0.05000	212.33
1558	0.01000	416.85	1.00000	416.85	0.00100	339.06	0.05000	261.89
1559	0.01000	387.13	1.00000	387.13	0.00100	314.54	0.05000	242.34
1560	0.01000	383.16	1.00000	383.16	0.00100	311.29	0.05000	239.77
1561	0.01000	337.59	1.00000	337.59	0.00100	274.71	0.05000	211.83
1566	0.01000	416.85	1.00000	416.85	0.00100	339.06	0.05000	261.89
1567	0.01000	384.48	1.00000	384.48	0.00100	312.36	0.05000	240.62
1568	0.01000	383.16	1.00000	383.16	0.00100	311.29	0.05000	239.77
1569	0.01000	336.50	1.00000	336.50	0.00100	273.86	0.05000	211.23
1574	0.01000	416.85	1.00000	416.85	0.00100	339.06	0.05000	261.89
1575	0.01000	384.20	1.00000	384.20	0.00100	312.14	0.05000	240.45
1576	0.01000	383.16	1.00000	383.16	0.00100	311.29	0.05000	239.77
1577	0.01000	336.50	1.00000	336.50	0.00100	273.86	0.05000	211.23
1582	0.01000	416.85	1.00000	416.85	0.00100	339.06	0.05000	261.89
1583	0.01000	386.10	1.00000	386.10	0.00100	313.70	0.05000	241.67
1584	0.01000	383.16	1.00000	383.16	0.00100	311.29	0.05000	239.77
1585	0.01000	337.65	1.00000	337.65	0.00100	274.76	0.05000	211.87
1919	0.01000	655.52	1.00000	655.52	0.00100	550.33	0.05000	429.51
1920	0.01000	672.91	1.00000	672.91	0.00100	550.33	0.05000	435.95
1921	0.01000	672.91	1.00000	672.91	0.00100	550.33	0.05000	435.95

OPTIMIZATION SYSTEM FOR TPSSYM = 27

TOTAL NUMBER OF DESIGN VARIABLES = 36
TOTAL NUMBER OF CONSTRAINS = 1228
TOTAL NUMBER OF TEMP. CONSTRAINS = 468
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4
Tmax:	2300.33	2300.33	550.33	600.33
Optv:	657.20	657.20	427.54	427.98

VALUES OF DESIGN VARIABLES :

LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09
1	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
2	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
3	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100

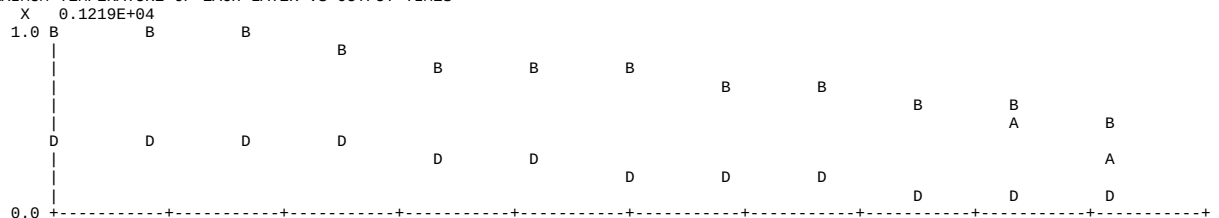
PANEL	LAYER01		LAYER02		LAYER03		LAYER04	
1932	0.01000	656.55	1.00000	656.55	0.00100	541.81	0.05000	427.51
1390	0.01000	297.20	1.00000	297.20	0.00100	243.42	0.05000	189.64
1391	0.01000	301.01	1.00000	301.01	0.00100	246.41	0.05000	191.98
1392	0.01000	308.10	1.00000	308.10	0.00100	251.87	0.05000	195.82
1393	0.01000	318.58	1.00000	318.58	0.00100	259.90	0.05000	201.21
1398	0.01000	333.29	1.00000	333.29	0.00100	272.72	0.05000	212.26
1399	0.01000	337.99	0.99999	337.99	0.00100	276.51	0.05000	215.28
1400	0.01000	344.57	0.99999	344.57	0.00100	281.71	0.05000	219.08
1401	0.01000	353.23	1.00000	353.23	0.00100	288.43	0.05000	223.71
1406	0.01000	368.00	1.00000	368.00	0.00100	300.99	0.05000	234.18
1407	0.01000	373.30	0.99998	373.30	0.00100	305.33	0.05000	237.66
1408	0.01000	379.44	0.99998	379.44	0.00100	310.27	0.05000	241.39
1409	0.01000	386.45	1.00000	386.45	0.00100	315.82	0.05000	245.34
1414	0.01000	401.33	1.00000	401.33	0.00100	328.22	0.05000	255.40
1415	0.01000	406.96	0.99998	406.96	0.00100	332.87	0.05000	259.13
1416	0.01000	412.65	0.99998	412.65	0.00100	337.54	0.05000	262.76
1417	0.01000	418.22	1.00000	418.22	0.00100	342.05	0.05000	266.09
1422	0.01000	433.28	1.00000	433.28	0.00100	354.42	0.05000	275.91
1423	0.01000	438.99	0.99997	438.99	0.00100	359.16	0.05000	279.72
1424	0.01000	444.20	0.99997	444.20	0.00100	363.50	0.05000	283.17
1425	0.01000	448.53	1.00000	448.53	0.00100	367.12	0.05000	285.98
1430	0.01000	463.84	1.00000	463.84	0.00100	379.58	0.05000	295.73
1431	0.01000	469.39	0.99997	469.39	0.00100	384.20	0.05000	299.43
1432	0.01000	474.07	0.99997	474.07	0.00100	388.14	0.05000	302.62
1433	0.01000	477.38	1.00000	477.38	0.00100	391.02	0.05000	304.98
1438	0.01000	493.03	1.00000	493.03	0.00100	403.71	0.05000	314.85
1439	0.01000	498.16	0.99997	498.16	0.00100	407.98	0.05000	318.26
1440	0.01000	502.24	0.99997	502.24	0.00100	411.46	0.05000	321.11
1441	0.01000	504.76	1.00000	504.76	0.00100	413.75	0.05000	323.10
1446	0.01000	520.83	1.00000	520.83	0.00100	426.80	0.05000	333.26
1447	0.01000	525.27	0.99997	525.27	0.00100	430.49	0.05000	336.19
1448	0.01000	528.68	0.99997	528.68	0.00100	433.43	0.05000	338.63
1449	0.01000	530.68	1.00000	530.68	0.00100	435.31	0.05000	340.35
1454	0.01000	547.26	1.00000	547.26	0.00100	448.86	0.05000	350.98
1455	0.01000	550.73	0.99997	550.73	0.00100	451.73	0.05000	353.22

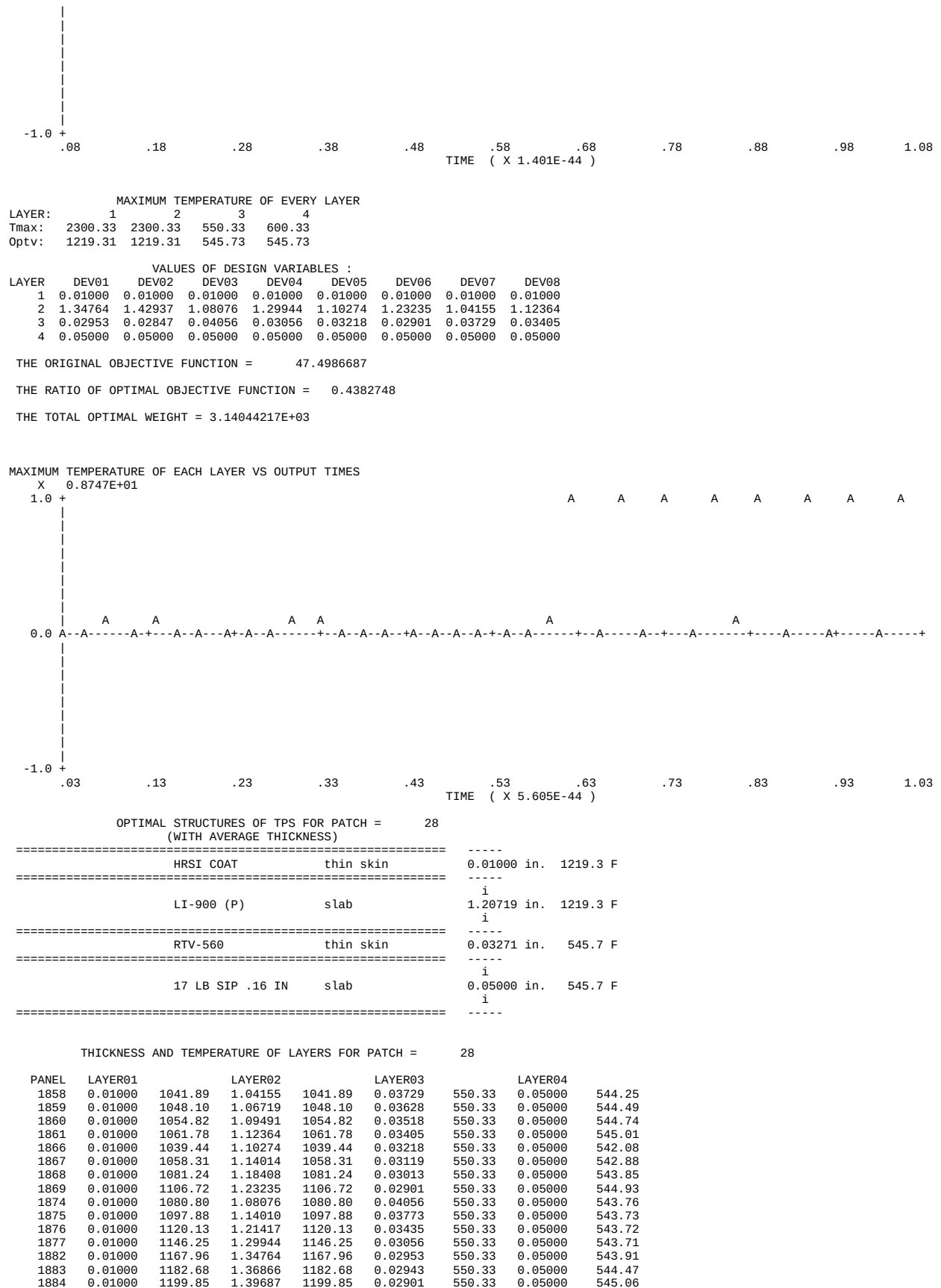
1456	0.01000	553.46	0.99997	553.46	0.00100	454.10	0.05000	355.21
1457	0.01000	555.18	1.00000	555.18	0.00100	455.75	0.05000	356.75
1462	0.01000	572.30	1.00000	572.30	0.00100	469.89	0.05000	368.00
1463	0.01000	574.43	0.99997	574.43	0.00100	471.62	0.05000	369.29
1464	0.01000	576.49	0.99997	576.49	0.00100	473.41	0.05000	370.79
1465	0.01000	578.20	1.00000	578.20	0.00100	475.01	0.05000	372.26
1474	0.01000	654.43	1.00000	654.43	0.00100	539.32	0.05000	424.67
1475	0.01000	649.55	1.00000	649.55	0.00100	535.48	0.05000	421.85
1476	0.01000	650.23	1.00000	650.23	0.00100	536.29	0.05000	422.79
1477	0.01000	657.20	1.00000	657.20	0.00100	542.37	0.05000	427.98
1482	0.01000	644.17	1.00000	644.17	0.00100	530.59	0.05000	417.49
1483	0.01000	640.39	0.99999	640.39	0.00100	527.56	0.05000	415.17
1484	0.01000	639.88	0.99999	639.88	0.00100	527.29	0.05000	415.16
1485	0.01000	644.66	1.00000	644.66	0.00100	531.51	0.05000	418.83
1490	0.01000	633.16	1.00000	633.16	0.00100	521.26	0.05000	409.83
1491	0.01000	629.99	0.99999	629.99	0.00100	518.65	0.05000	407.78
1492	0.01000	629.20	0.99999	629.20	0.00100	518.10	0.05000	407.46
1493	0.01000	632.30	1.00000	632.30	0.00100	520.86	0.05000	409.91
1498	0.01000	621.33	1.00000	621.33	0.00100	511.26	0.05000	401.66
1499	0.01000	618.68	0.99999	618.68	0.00100	509.03	0.05000	399.85
1500	0.01000	617.70	0.99998	617.70	0.00100	508.25	0.05000	399.28
1501	0.01000	619.33	1.00000	619.33	0.00100	509.76	0.05000	400.68
1506	0.01000	608.89	1.00000	608.89	0.00100	500.77	0.05000	393.13
1507	0.01000	606.67	0.99998	606.67	0.00100	498.85	0.05000	391.49
1508	0.01000	605.43	0.99998	605.43	0.00100	497.81	0.05000	390.67
1509	0.01000	605.78	1.00000	605.78	0.00100	498.21	0.05000	391.15
1514	0.01000	595.88	1.00000	595.88	0.00100	489.84	0.05000	384.25
1515	0.01000	593.97	0.99998	593.97	0.00100	488.12	0.05000	382.74
1516	0.01000	592.40	0.99997	592.40	0.00100	486.77	0.05000	381.62
1517	0.01000	591.62	1.00000	591.62	0.00100	486.19	0.05000	381.29
1522	0.01000	318.58	1.00000	318.58	0.00100	259.90	0.05000	201.21
1523	0.01000	308.35	1.00000	308.35	0.00100	252.06	0.05000	195.95
1524	0.01000	301.25	1.00000	301.25	0.00100	246.59	0.05000	192.12
1525	0.01000	297.22	1.00000	297.22	0.00100	243.43	0.05000	189.65
1530	0.01000	318.58	1.00000	318.58	0.00100	259.90	0.05000	201.21
1531	0.01000	308.58	1.00000	308.58	0.00100	252.24	0.05000	196.08
1532	0.01000	301.48	1.00000	301.48	0.00100	246.77	0.05000	192.25
1533	0.01000	297.24	1.00000	297.24	0.00100	243.45	0.05000	189.67
1538	0.01000	318.58	1.00000	318.58	0.00100	259.90	0.05000	201.21
1539	0.01000	308.75	1.00000	308.75	0.00100	252.37	0.05000	196.17
1540	0.01000	301.61	1.00000	301.61	0.00100	246.87	0.05000	192.32
1541	0.01000	297.25	1.00000	297.25	0.00100	243.46	0.05000	189.68
1546	0.01000	318.58	1.00000	318.58	0.00100	259.90	0.05000	201.21
1547	0.01000	308.77	1.00000	308.77	0.00100	252.39	0.05000	196.18
1548	0.01000	301.58	1.00000	301.58	0.00100	246.85	0.05000	192.31
1549	0.01000	297.25	1.00000	297.25	0.00100	243.46	0.05000	189.68
1554	0.01000	318.58	1.00000	318.58	0.00100	259.90	0.05000	201.21
1555	0.01000	308.74	1.00000	308.74	0.00100	252.36	0.05000	196.16
1556	0.01000	301.44	1.00000	301.44	0.00100	246.74	0.05000	192.22
1557	0.01000	297.24	1.00000	297.24	0.00100	243.45	0.05000	189.67
1562	0.01000	318.58	1.00000	318.58	0.00100	259.90	0.05000	201.21
1563	0.01000	308.57	1.00000	308.57	0.00100	252.23	0.05000	196.07
1564	0.01000	301.32	1.00000	301.32	0.00100	246.65	0.05000	192.16
1565	0.01000	297.20	1.00000	297.20	0.00100	243.42	0.05000	189.64
1570	0.01000	318.58	1.00000	318.58	0.00100	259.90	0.05000	201.21
1571	0.01000	308.61	1.00000	308.61	0.00100	252.26	0.05000	196.09
1572	0.01000	301.43	1.00000	301.43	0.00100	246.73	0.05000	192.22
1573	0.01000	297.20	1.00000	297.20	0.00100	243.42	0.05000	189.64
1578	0.01000	318.58	1.00000	318.58	0.00100	259.90	0.05000	201.21
1579	0.01000	309.05	1.00000	309.05	0.00100	252.60	0.05000	196.32
1580	0.01000	308.10	1.00000	308.10	0.00100	251.87	0.05000	195.82
1581	0.01000	297.23	1.00000	297.23	0.00100	243.44	0.05000	189.66
1586	0.01000	318.58	1.00000	318.58	0.00100	259.90	0.05000	201.21
1587	0.01000	309.18	1.00000	309.18	0.00100	252.70	0.05000	196.39
1588	0.01000	308.10	1.00000	308.10	0.00100	251.87	0.05000	195.82
1589	0.01000	297.36	1.00000	297.36	0.00100	243.55	0.05000	189.75
1922	0.01000	652.22	1.00000	652.22	0.00100	537.55	0.05000	423.34
1923	0.01000	649.18	1.00000	649.18	0.00100	535.28	0.05000	421.83
1924	0.01000	651.00	1.00000	651.00	0.00100	536.97	0.05000	423.39

OPTIMIZATION SYSTEM FOR TPSSYM = 28

TOTAL NUMBER OF DESIGN VARIABLES = 32
TOTAL NUMBER OF CONSTRAINS = 480
TOTAL NUMBER OF TEMP. CONSTRAINS = 416
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



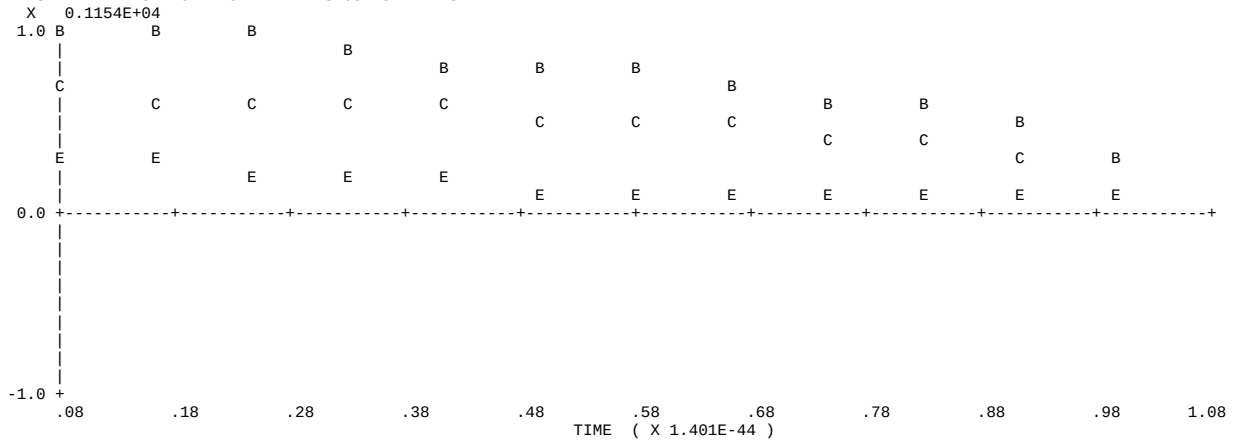


1885 0.01000 1219.31 1.42937 1219.31 0.02847 550.33 0.05000 545.73

OPTIMIZATION SYSTEM FOR TPSSYM = 29

TOTAL NUMBER OF DESIGN VARIABLES = 80
TOTAL NUMBER OF CONSTRAINS = 1640
TOTAL NUMBER OF TEMP. CONSTRAINS = 1040
TOTAL NUMBER OF TEMP. PRINTOUTS = 13

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



MAXIMUM TEMPERATURE OF EVERY LAYER

LAYER:	1	2	3	4	5
Tmax:	2800.33	2900.33	2700.33	550.33	600.33
Optv:	1153.58	1153.58	750.62	357.76	357.76

VALUES OF DESIGN VARIABLES :

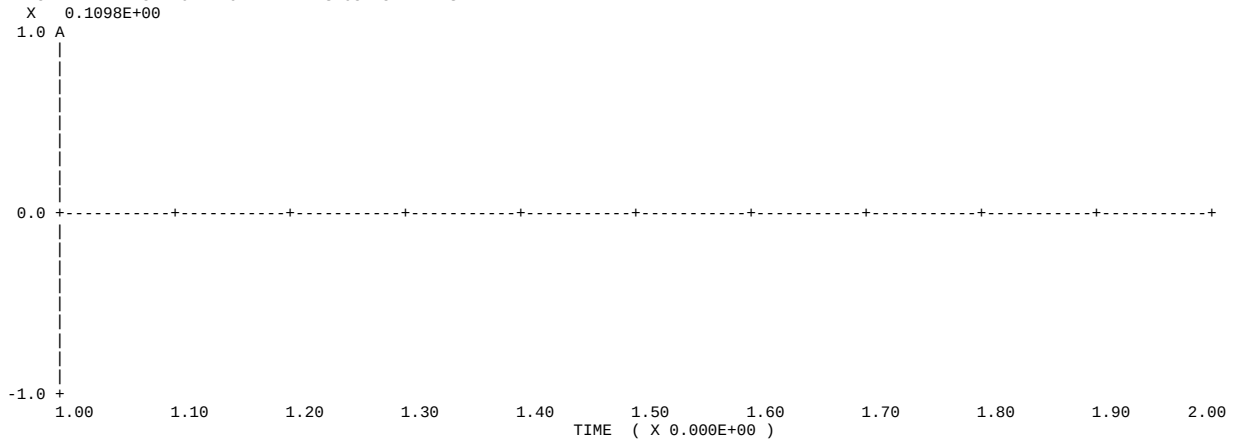
LAYER	DEV01	DEV02	DEV03	DEV04	DEV05	DEV06	DEV07	DEV08	DEV09	DEV10	DEV11	DEV12	DEV13
DEV14	DEV15	DEV16											
1	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
2	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000	0.01000
3	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
4	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100	0.00100
5	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000	0.05000

THE ORIGINAL OBJECTIVE FUNCTION = 1618.3453369

THE RATIO OF OPTIMAL OBJECTIVE FUNCTION = 0.1098325

THE TOTAL OPTIMAL WEIGHT = 1.53156968E+04

MAXIMUM TEMPERATURE OF EACH LAYER VS OUTPUT TIMES



OPTIMAL STRUCTURES OF TPS FOR PATCH = 29

(WITH AVERAGE THICKNESS)			
=====	ACC(N)	thin skin	0.01000 in. 1153.6 F
-----	0.03000 in. ZIRCONIUM		i
-----			i
		radiation gap	0.01000 in. 1153.6 F
-----			i
-----	0.03000 in. ZIRCONIUM		i
=====			i
	LI-2200 (N)	slab	0.99980 in. 750.6 F
=====			i
-----	RTV-560	thin skin	0.00100 in. 357.8 F
-----			i
	17 LB SIP .16 IN	slab	0.04999 in. 357.8 F
=====			i
-----			i

THICKNESS AND TEMPERATURE OF LAYERS FOR PATCH = 29

PANEL	LAYER01	LAYER02	LAYER03	LAYER04	LAYER05				
681	0.01001	1109.29	0.01001	1109.29	1.00064	907.63	0.00100	518.36	0.05003 334.45
682	0.01000	1079.74	0.01000	1079.74	1.00007	876.57	0.00100	494.75	0.05000 317.00
683	0.01000	1001.62	0.01000	1001.62	0.99976	801.38	0.00100	442.91	0.04999 283.69
684	0.01000	952.86	0.01000	952.86	1.00000	756.06	0.00100	412.62	0.05000 265.99
685	0.01000	1055.95	0.01000	1055.95	1.00049	854.93	0.00100	478.30	0.05002 305.25
686	0.01000	1013.02	0.01000	1013.02	0.99999	810.84	0.00100	446.42	0.05000 284.37
687	0.01000	917.23	0.01000	917.23	0.99987	719.16	0.00100	385.07	0.04999 248.49
688	0.01000	887.16	0.01000	887.16	1.00000	691.35	0.00100	367.19	0.05000 238.83
689	0.01000	1015.81	0.01000	1015.81	1.00041	816.66	0.00100	449.94	0.05002 284.29
690	0.01000	962.41	0.01000	962.41	1.00006	761.21	0.00100	409.31	0.05000 258.94
691	0.01000	865.09	0.01000	865.09	0.99989	667.21	0.00100	346.95	0.04999 224.09
692	0.01000	821.33	0.01000	821.33	1.00000	626.97	0.00100	322.16	0.05000 211.71
693	0.01000	981.25	0.01000	981.25	1.00019	784.49	0.00100	426.51	0.05001 266.15
694	0.01000	931.91	0.01000	931.91	1.00010	732.16	0.00100	386.91	0.05001 241.88
695	0.01000	839.68	0.01000	839.68	0.99995	640.92	0.00100	325.07	0.05000 207.75
696	0.01000	757.34	0.01000	757.34	1.00000	564.70	0.00100	278.73	0.05000 185.40
697	0.01000	959.47	0.01000	959.47	1.00000	764.53	0.00100	412.13	0.05000 254.67
698	0.01000	919.38	0.01000	919.38	1.00000	722.32	0.00100	379.46	0.05000 233.66
699	0.01000	835.09	0.01000	835.09	1.00000	635.80	0.00100	317.74	0.05000 198.98
700	0.01000	692.35	0.01000	692.35	1.00000	501.71	0.00100	234.89	0.05000 158.72
835	0.01000	1142.26	0.01000	1142.26	1.00000	939.04	0.00100	544.36	0.05000 352.90
836	0.01000	1153.58	0.01000	1153.58	1.00001	950.29	0.00100	550.33	0.05000 357.76
837	0.01000	1153.58	0.01000	1153.58	0.99999	950.29	0.00100	550.33	0.05000 357.76
838	0.01000	1151.78	0.01000	1151.78	0.99997	947.27	0.00100	550.33	0.05000 357.76
839	0.01000	1130.15	0.01000	1130.15	0.99997	926.19	0.00100	535.93	0.05000 349.66
840	0.01000	1102.67	0.01000	1102.67	1.00000	899.46	0.00100	516.11	0.05000 335.97
841	0.01000	1073.63	0.01000	1073.63	0.99990	871.65	0.00100	495.68	0.05000 321.62
842	0.01000	1046.24	0.01000	1046.24	0.99979	845.48	0.00100	476.54	0.04999 308.14
843	0.01000	1024.43	0.01000	1024.43	0.99969	824.70	0.00100	461.47	0.04998 297.58
844	0.01000	1012.19	0.01000	1012.19	0.99965	813.08	0.00100	453.25	0.04998 292.01
845	0.01000	1153.58	0.01000	1153.58	1.00049	950.29	0.00100	550.33	0.05002 357.76
846	0.01000	1153.58	0.01000	1153.58	1.00014	950.29	0.00100	550.33	0.05001 357.76
847	0.01000	1153.58	0.01000	1153.58	0.99961	950.29	0.00100	550.33	0.04998 357.76
848	0.00999	1153.58	0.00999	1153.58	0.99899	950.29	0.00100	550.33	0.04995 357.76
849	0.00998	1153.58	0.00998	1153.58	0.99834	950.29	0.00100	550.33	0.04992 357.76
850	0.00998	1118.67	0.00998	1118.67	0.99775	916.41	0.00100	529.91	0.04989 345.68
851	0.00997	1081.00	0.00997	1081.00	0.99728	879.64	0.00100	503.30	0.04986 327.08
852	0.00997	1045.65	0.00997	1045.65	0.99702	845.12	0.00100	478.12	0.04985 309.44
853	0.00997	1018.24	0.00997	1018.24	0.99704	818.27	0.00100	458.35	0.04985 295.55
854	0.00997	1004.27	0.00997	1004.27	0.99740	804.48	0.00100	447.90	0.04987 288.22
855	0.01000	1134.18	0.01000	1134.18	0.99978	930.08	0.00100	534.94	0.04999 343.90
856	0.01000	1153.58	0.01000	1153.58	0.99958	950.29	0.00100	550.33	0.04998 357.76
857	0.00999	1153.58	0.00999	1153.58	0.99936	950.29	0.00100	550.33	0.04997 357.76
858	0.00999	1153.58	0.00999	1153.58	0.99915	950.29	0.00100	550.33	0.04996 357.76
859	0.00999	1153.58	0.00999	1153.58	0.99896	950.29	0.00100	550.33	0.04995 357.76
860	0.00999	1121.99	0.00999	1121.99	0.99880	919.22	0.00100	530.43	0.04994 344.40
861	0.00999	1077.00	0.00999	1077.00	0.99868	874.96	0.00100	498.39	0.04993 323.89
862	0.00999	1034.96	0.00999	1034.96	0.99862	833.42	0.00100	468.13	0.04993 304.38
863	0.00999	1003.19	0.00999	1003.19	0.99863	801.83	0.00100	444.91	0.04993 289.29
864	0.00999	988.78	0.00999	988.78	0.99876	787.25	0.00100	433.92	0.04994 281.94
865	0.01000	1046.99	0.01000	1046.99	1.00000	850.02	0.00100	479.09	0.05000 305.12
866	0.01000	1122.95	0.01000	1122.95	1.00000	928.38	0.00100	535.48	0.05000 337.16
867	0.01000	1153.58	0.01000	1153.58	1.00000	950.29	0.00100	550.33	0.05000 352.17
868	0.01000	1153.58	0.01000	1153.58	1.00000	950.29	0.00100	550.33	0.05000 353.63
869	0.01000	1134.37	0.01000	1134.37	1.00000	950.29	0.00100	550.33	0.05000 345.00
870	0.01000	1094.98	0.01000	1094.98	1.00000	922.80	0.00100	540.19	0.05000 329.75
871	0.01000	1050.44	0.01000	1050.44	0.99999	879.98	0.00100	510.78	0.05000 312.10
872	0.01000	1007.55	0.01000	1007.55	1.00001	836.22	0.00100	479.55	0.05000 294.47
873	0.01000	975.23	0.01000	975.23	1.00003	800.29	0.00100	452.67	0.05000 280.53
874	0.01000	962.10	0.01000	962.10	1.00004	781.01	0.00100	436.60	0.05000 274.00
1258	0.01000	968.69	0.01000	968.69	1.00005	783.09	0.00100	436.41	0.05000 275.97
1259	0.00999	993.30	0.00999	993.30	0.99902	791.49	0.00100	436.65	0.04995 283.44
1260	0.00998	1005.95	0.00998	1005.95	0.99796	805.94	0.00100	448.56	0.04990 288.70
1261	0.01000	1011.76	0.01000	1011.76	0.99979	812.58	0.00100	453.08	0.04999 292.43
1262	0.01000	984.12	0.01000	984.12	1.00005	795.64	0.00100	444.37	0.05000 281.96
1263	0.00999	1006.08	0.00999	1006.08	0.99930	803.99	0.00100	445.48	0.04996 288.94
1264	0.00998	1014.02	0.00998	1014.02	0.99848	813.62	0.00100	453.81	0.04992 292.47
1265	0.01000	1016.13	0.01000	1016.13	0.99999	816.61	0.00100	456.18	0.05000 295.25

1266	0.01000	1012.56	0.01000	1012.56	1.00002	818.60	0.00100	458.73	0.05000	292.96
1267	0.01000	1029.12	0.01000	1029.12	0.99963	826.51	0.00100	461.54	0.04998	299.13
1268	0.00999	1028.89	0.00999	1028.89	0.99916	827.87	0.00100	463.81	0.04996	299.64
1269	0.01000	1024.49	0.01000	1024.49	1.00000	824.80	0.00100	462.64	0.05000	300.15
1270	0.01000	1055.88	0.01000	1055.88	1.00000	852.66	0.00100	479.40	0.05000	309.35
1271	0.01000	1064.44	0.01000	1064.44	1.00000	860.96	0.00100	486.18	0.05000	314.87
1272	0.01000	1051.93	0.01000	1051.93	1.00000	849.91	0.00100	479.33	0.05000	310.78
1273	0.01000	1037.24	0.01000	1037.24	1.00000	837.27	0.00100	472.33	0.05000	307.37

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*** T P S O P T   T E R M I N A T E D ***
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