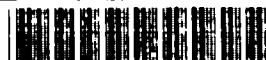


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FINAL REPORT
NOVEMBER 1991

REPORT NO. EVT 33-90-3

SAUDI ARABIA (SA)
AMMUNITION TEMPERATURES IN
OPEN STORAGE, 1991

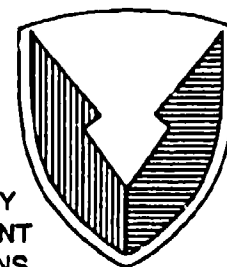


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U.S. Army Armament Research,
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ATTN: SMCAR-QAN-P (D)
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U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL
 VALIDATION ENGINEERING DIVISION
 SAVANNA, IL 61074-9639

SAUDI ARABIA (SA)

AMMUNITION TEMPERATURES
 IN OPEN STORAGE

1991

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SAUDI ARABIA (SA)

ENVIRONMENTAL CONDITIONS ON SENSITIVE AMMUNITION IN OPEN STORAGE

JUNE - NOVEMBER 1991

- **24 TYPES OF AMMUNITION MONITORED**
 - **TSAs 1, 4, AND 5**
- **DATA GATHERING EQUIPMENT**
 - **TWO WEATHER STATIONS**
 - **THREE CAMPBELL SCIENTIFIC DATA LOGGERS**
 - **NUMEROUS PORTABLE DATA LOGGERS**
- **PEAK TEMPERATURES**
 - **AMBIENT: 109.5 DEGREES FAHRENHEIT, 9 AUGUST 1991**
 - **EXTERNAL: TOW 2 PACKAGE, 161.5 DEGREES FAHRENHEIT, 23 JUNE 1991**
 - **INTERNAL: SHILLELAGH, 124.1 DEGREES FAHRENHEIT, 13 AUGUST 1991**
 - **EXTERNAL: 120MM TANK CONTAINER, 151.1 DEGREES FAHRENHEIT, 14 MAY 1991**
 - **INTERNAL: 120MM TANK CONTAINER, 112.2 DEGREES FAHRENHEIT, 13 JUNE 1991**
- **CONCLUSIONS**
 - **NO DIRECT CORRELATION BETWEEN EXTERNAL AND INTERNAL PACKAGE TEMPERATURES**
 - **INTERNAL PACKAGE TEMPERATURES EXCEEDED AMBIENT TEMPERATURE BY AN AVERAGE OF 5 DEGREES - 10 DEGREES FAHRENHEIT**
 - **EXTERNAL TEMPERATURES ON METAL CONTAINERS EXCEEDED WOODEN CONTAINERS; HOWEVER, THE HIGHER TEMPERATURES DISSIPATED QUICKER ON THE METAL CONTAINERS**
 - **SHIELDING DIVERTED SOLAR RADIATION RESULTING IN REDUCED TEMPERATURES**

PART 1

EXECUTIVE SUMMARY

Ammunition was monitored in Saudi Arabia (SA) under open storage conditions April - November 1991. The primary goal of this program was to identify areas of concern that would jeopardize the serviceability of 24 types of ammunition susceptible to high temperatures/humidity during open storage in SA.

Environmental conditions (temperature, humidity, and solar radiation) during this test period were as follows: peak solar radiation occurred during April - June 1991, peak temperatures occurred during June - September 1991, and peak humidity occurred during September - October 1991.

The maximum peak external temperature recorded on all items was 161.5 degrees Fahrenheit for the TOW 2 BGM-71D missile on 23 June 1991. The 120mm tank ammunition reached a peak external temperature of 151.1 degrees Fahrenheit on 14 May 1991. All ammunition tested had a maximum external temperature averaging 140.3 +/- 21.2 degrees Fahrenheit.

The maximum peak internal temperature recorded during this program was 124.1 degrees Fahrenheit for the SHILLELAGH MGM-51 missile on 13 August 1991. The 120mm tank ammunition reached 112.2 degrees Fahrenheit on 13 June 1991. All items had a maximum internal temperature averaging 110.6 +/- 13.5 degrees Fahrenheit. In most cases, internal temperature was more reliable at determining deterioration than external. As such, it is unlikely that substantial deterioration took place on the items tested.

No direct correlation of peak external temperature with peak internal temperature could be derived from this study. For example, the TOW 2 BGM-71D missile would be expected to have the greatest internal temperature; however, it only obtained a peak internal temperature of 121.1 degrees Fahrenheit.

The highest ambient temperature recorded during this test period was 109.5 degrees Fahrenheit on 9 August 1991. The daily peak ambient temperature during the test period averaged 98.9 +/- 4.4 degrees Fahrenheit. The daily peak temperature within the ammunition averaged 103.6 +/- 9.5 degrees Fahrenheit. Therefore, it can be expected that average internal

ammunition temperatures will be approximately 5 to 10 degrees higher than ambient temperature over long periods of time.

Other conclusions include items that are susceptible to high moisture conditions are at greatest risk during late summer early fall versus late spring early summer.

Ammunition items that contain sensitive components at or near the skin surface should be considered high risk for thermal deterioration due to solar radiation and should be covered to avoid direct radiation.

In general, higher maximum peak external temperature were noted on metal versus wood shipping containers which was expected. For example, under identical conditions C786 in metal containers reached 150.5 degrees Fahrenheit versus 132.3 degrees Fahrenheit for C326 in wooden boxes. However, when average peak daily internal temperatures are compared, both items were fairly close; i.e., 103.2 degrees Fahrenheit versus 102.2 degrees Fahrenheit. This strongly suggests that items having high skin temperatures dissipate off the heat fairly rapidly and do not transmit heat inward to the degree expected.

A continuation of this temperature monitoring program is planned with an expansion to 57 ammunition items, once a permanent storage site is established within Southwest Asia (SWA). Reference Report No. EVT 33-90-M, U.S. Army Defense Ammunition Center and School (USADACS), SMCAC-DEV, May 1991, Operation Desert Storm, Environmental Instrumentation and Monitoring Ammunition in Open Storage.

PART 2

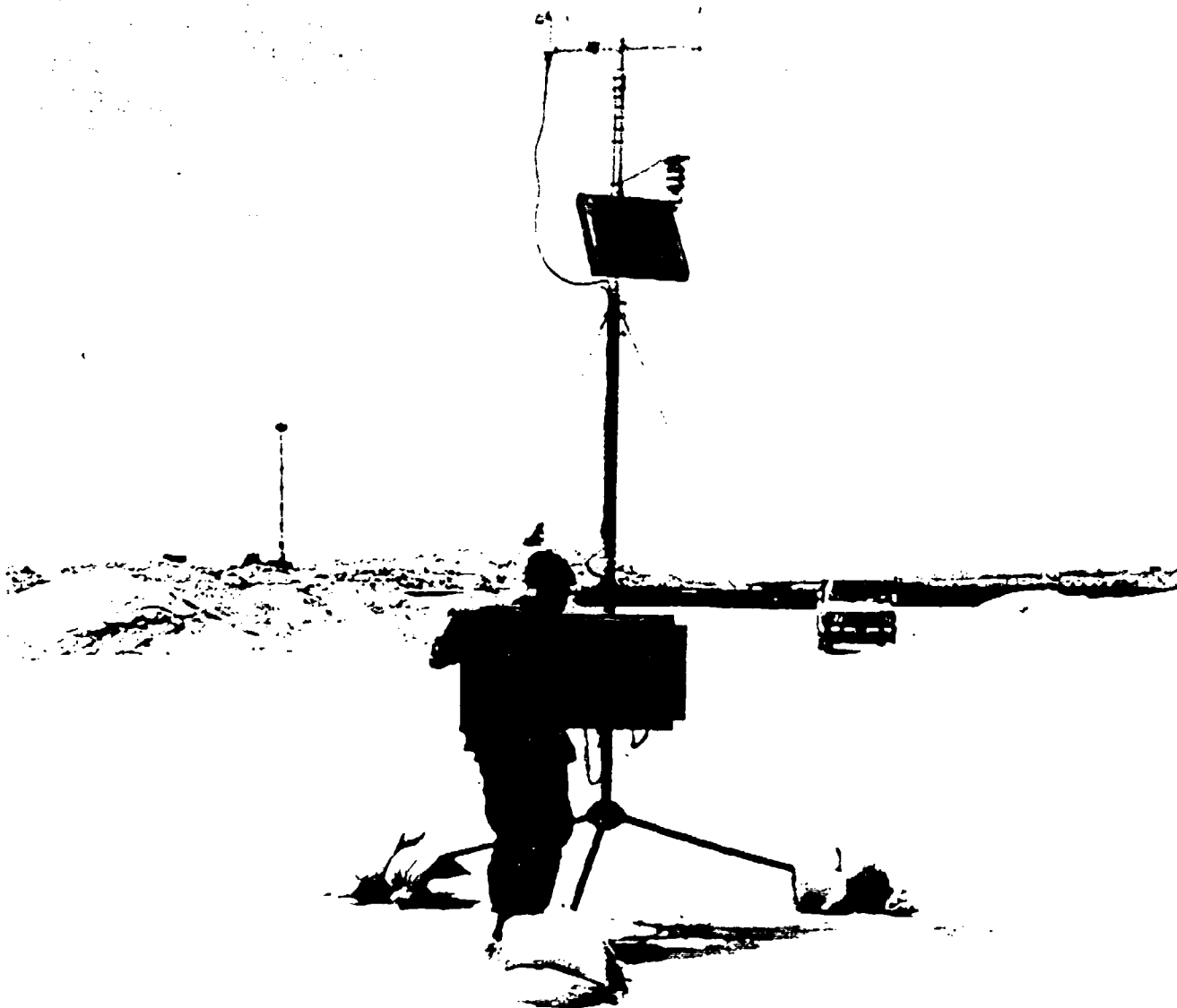
INTRODUCTION

Ammunition was monitored under open storage conditions within Saudi Arabia (SA) in support of U.S. Army Armament Research, Development and Engineering Center (ARDEC), Predictive Technology Branch. The primary goal of this study was to identify areas of concern that would jeopardize the serviceability of ammunition within SA due to high temperature, humidity, and solar radiation. U.S. Army Defense Ammunition Center and School (USADACS), SMCAC-DEV, set up instrumentation packages with Quality Assurance Specialist (Ammunition Surveillance) QASAS personnel performing onsite setup.

Tests were conducted on 24 ammunition items from 20 April - 1 November 1991. Tests began on two items, the 120mm APFSDS-T M829A1 and 120mm APFSDS-T M829 rounds, on 20 April 1991 with the balance of ammunition instrumented thereafter. Tables shown within this report are the highest peak external and internal temperatures recorded during the test period, as well as the highest average daily peak internal and external temperatures during the test period. Graphs shown within this report are the actual temperatures of the ammunition over the life of the test.

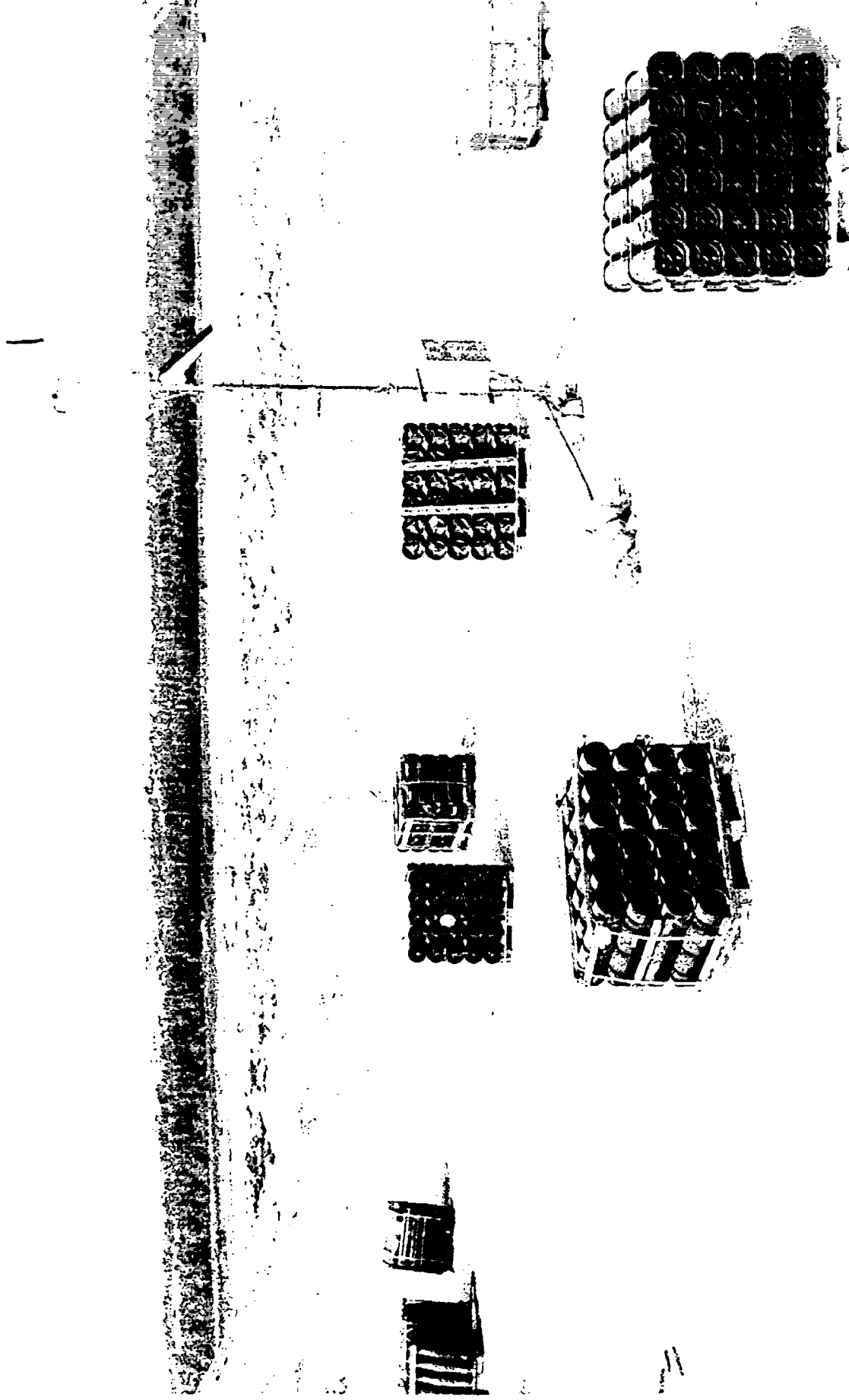
PART 3

PHOTOGRAPHS



	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL	
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	This photo shows the weather station and instrumentation package installed at TSA 1. Note, the wind speed, wind direction, and temperature/humidity sensor located above the solar radiation panel.	
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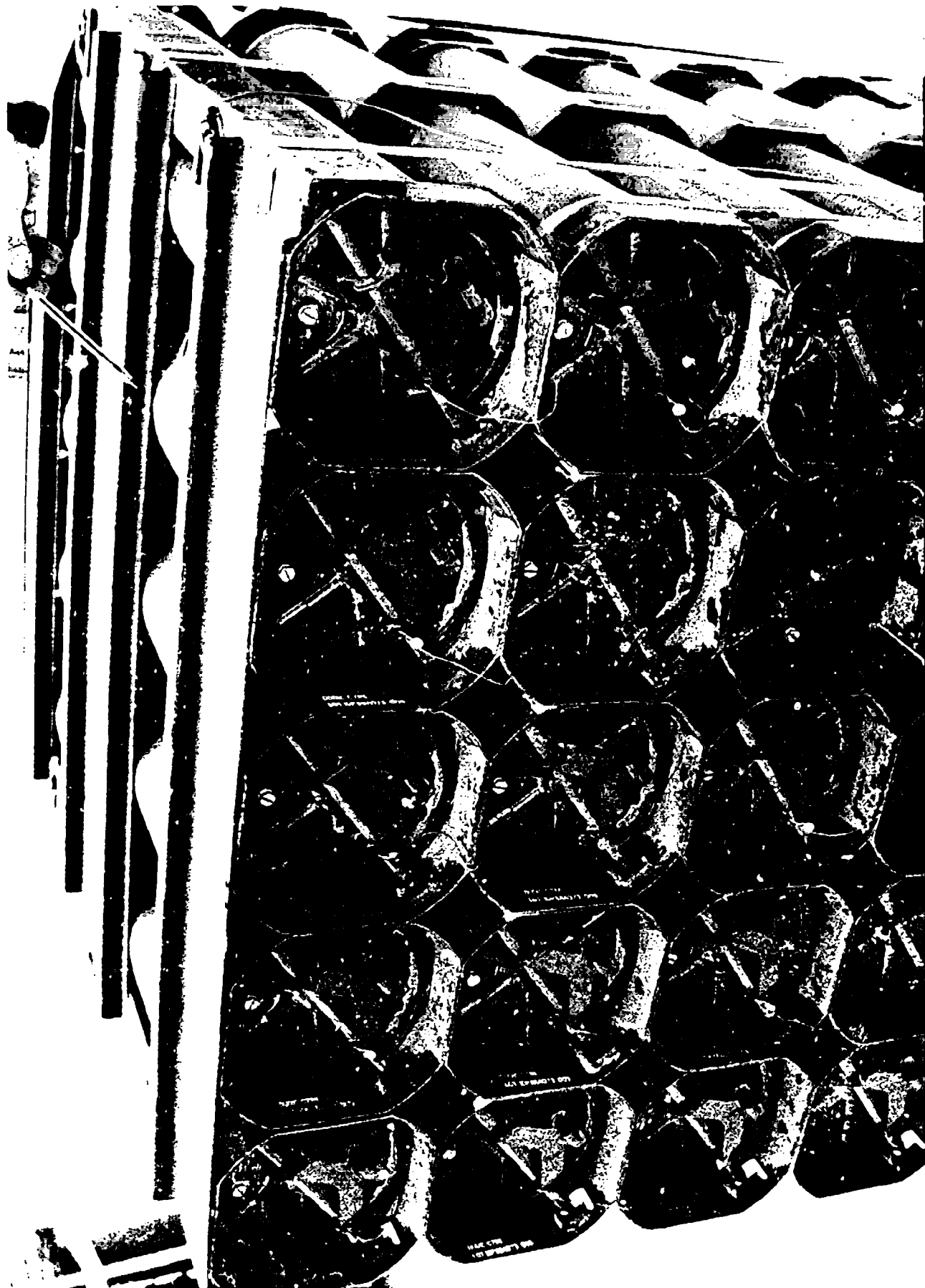
U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL

This photo shows 8 of the 23 test pallets at TSA 1.



U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL

This photo shows a typical exterior temperature probe installed in 105mm containers packed in wooden boxes. Note, the crack on the left-hand side of the box where the interior probe was installed.

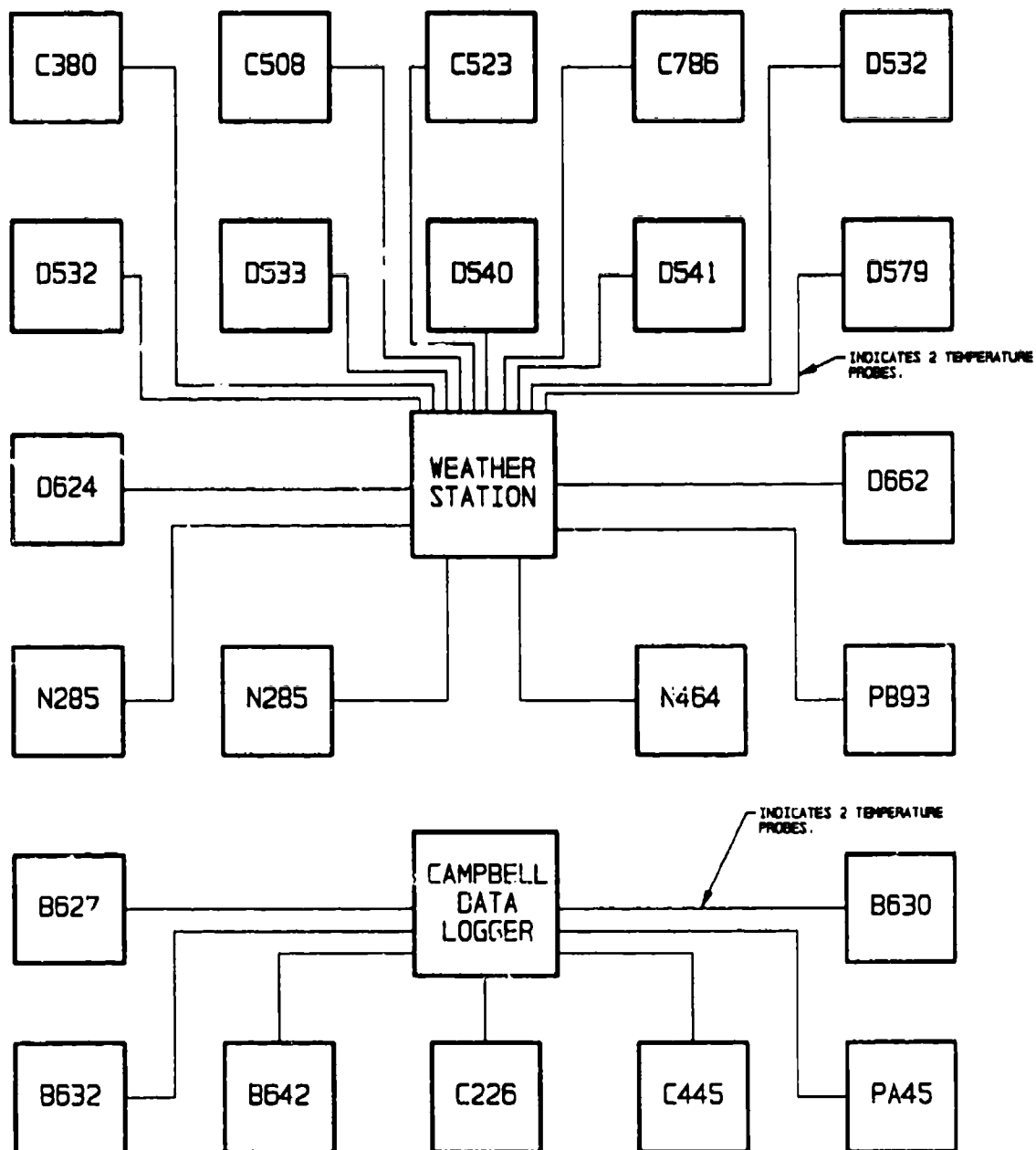


U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL

This photo shows a typical exterior temperature probe installed on a 120mm tank ammunition container. Note, the third row from the top is where the interior temperature probe was installed.

PART 4

AMMUNITION ITEMS TESTED



FOR INFORMATION ONLY

TITLE
SCHEMATIC DIAGRAM
OF TSA #1
IN SAUDI ARABIA

DWG NO

90-033-0-S00019

VALIDATION ENGINEERING DIVISION

SHEET 1 OF 1

Items Instrumented at TSA #1

<u>ITEM</u>	<u>DODIC</u>	<u>LOT#</u>	<u>INSTALLED</u>	<u>PAGES</u>
CTG, 60MM ILLUM M83A3	B627	LOW-69-64	07-14-91	7-2 & 7-3
CTG, 60MM SMK WP M302A1	B630	PB-1-2A	07-14-91	7-4 & 7-5
CTG, 60MM HE M49A4	B632	MA-19-88	07-14-91	7-6 & 7-7
CTG, 60MM HE M720	B642	MA-89M030-001	07-14-91	7-8 & 7-9
CTG, 81MM ILLUM M301A3	C226	LOW-99-12	07-14-91	7-10 & 7-11
CTG, 120MM APFSDS-T M829A1	C380	MHM90D094-005	05-12-91	7-12 & 7-13
CTG, 105MM HE M1 W/O FUZE	C445	JA-69-29	07-14-91	7-14 & 7-15
CTG, 105MM HEAT-T M456A2	C508	MA-88B144H001	06-07-91	7-16 & 7-17
CTG, 105MM APFSDS-T M774	C523	MA84A002-010	06-10-91	7-18 & 7-19
CTG, 120MM APFSDS-T M829	C786	10P88A073-009	05-12-91	7-22 & 7-23
CHG, PROP 155MM RB M203	D532	IND81H-070056	06-07-91	7-26 & 7-27
CHG, PROP 155MM RB M203	D532	IND90D-071280	06-07-91	7-26 & 7-27
CHG, PROP 155MM RB M119A2 W/O PRIMER	D533	IND90A-071303	06-10-91	7-28 & 7-29
CHG, PROP 155MM GB M3A1	D540	IND87G-070748	06-10-91	7-30 & 7-31
CHG, PROP 155MM WB M4A2	D541	BAJ-63448	06-10-91	7-32 & 7-33
PROJ, 155MM HE RAP M549A1 (COMP B)	D579	10P81U03L-019A	06-10-91	7-34 & 7-35
PROJ, 8IN HE RAP M650	D624	10P88U050-001	06-10-91	7-36 & 7-37
CHG, PROP 8IN WB M188A1 W/O PRIMER	D662	IND85D-070342	06-10-91	7-38 & 7-39
FUZE, MTSQ M577/M577A1 W/O BOOSTER	N285	BWV-7-14	06-07-91	7-44 & 7-45
FUZE, MTSQ M577/M577A1 W/O BOOSTER	N285	BWV82C012-017	06-07-91	7-44 & 7-45
FUZE, PROX M732 NON-PROP PKG	N464	LS-83L013-003	06-07-91	7-46 & 7-47
Shillelagh Missile	PA45	PHI-8-31C	07-14-91	7-48 & 7-49
TOW 2	PB93	HAQ-3148-4	06-10-91	7-50 & 7-51



SHEET 1 OF 1

Items Instrumented at TSA #5

<u>ITEM</u>	<u>DODIC</u>	<u>LOT #</u>	<u>INSTALLED</u>	<u>PAGES</u>
CTG, 4.2IN SMK WP M328A1 W/PD FUZE	C708	RD-4-7A	07-27-91	7-20 & 7-21
CTG, 120MM HEAT-MP-T M830	C787	MM-896-501-003	07-27-91	7-24 & 7-25
CHG, PROP 155MM GB M3A1	D540	RAD-69169-73	07-27-91	7-30 & 7-31
PROJ, 155MM HE RAP M549A1 (COMP B)	D579	IOP86B034-010A	07-27-91	7-34 & 7-35
GRENADE, HAND FRAG M67	G881	LS-56-3C	07-27-91	7-40 & 7-41
MINE, AT HEAVY M75 (GEMSS)	K184	IOP90D007-003	07-27-91	7-42 & 7-43
FUZE, PROX M732 NON-PROP PKG	N464	LS-84B013-007	07-27-91	7-46 & 7-47

PART 5

DEFINITIONS

External Maximum (Ext Max) Is the highest external temperature recorded during the test period over 90 minutes.

External Average (Ext Avg) Is the highest average external daily temperature over 90 minutes.

Internal Maximum (Int Max) Is the highest maximum internal temperature during the test period over 90 minutes.

Internal Average (Int Avg) Is the highest average internal daily temperature over 90 minutes.

PART 6

TEST RESULTS

A. Environmental Conditions in SA. Environmental conditions during the test period showed the peak solar radiation occurring during April - July 1991, with the highest average solar intensity from April - June 1991. The above was somewhat unexpected, it would be typically expected to have the highest solar radiation during the midsummer months. Maximum temperatures were obtained from June - August 1991. Generally speaking, humidity in SA increased during the test period while wind speed declined.

Table 1

Environmental Conditions During Test Period

Date	Temperature Degree F.		Humidity Percent		Wind Speed MPH		Solar Radiation Langley	
	Max	Avg. High	Max	Avg. High	Max	Avg. High	Max	Avg. High
Apr-Jun	107.2	94.6	60.3	40.6	30.7	18.1	1.1	0.9
Jun-Jul	109.1	102.8	91.8	51.9	27.3	15.1	1.1	0.8
Jul-Sep	109.5	103.3	100+	51.7	25.8	15.4	0.9	0.8
Sep-Oct	103.1	98.6	100+	89.2	25.2	12.0	0.9	0.8

B. 120mm APFSDS-T M829A1 Ammunition. The 120mm APFSDS-T M829A1 round experienced peak external temperatures in excess of 148 degrees Fahrenheit, with the average peak external temperature being 121.4 degrees Fahrenheit. Peak internal temperatures exceeded 112 degrees Fahrenheit, with the average peak internal temperature being 100.3 degrees Fahrenheit. Of interest during this test was the lack of variation in peak temperature during the test period. It would be expected that the peak temperatures during April - May 1991 would be lower than June - July 1991; however, this wasn't the case. Solar radiation was highest from May - July 1991; therefore, the higher external temperatures were recorded.

Table 2

Testing Conducted 20 April - 1 October 1991

Item: Ctg 120mm APFSDS-T M829A1

Date	DODIC	Ext Max. Degrees F.	Ext Avg. Degrees F.	Int Max. Degrees F.	Int Avg. Degrees F.
20 Apr - 2 Jun	C380	148.8	117.1	107.3	94.7
3 Jun - 18 Jul	C380	148.4	124.4	112.2	103.3
19 Jul - 1 Sep	C380	141.8	122.2	110.6	103.5
2 Sep - 1 Oct	C380	136.4	121.7	104.3	99.6

C. 120mm APFSDS-T M829 Ammunition. The 120mm APFSDS-T M829 round experienced slightly higher peak external temperatures than the M829A1 rounds at 151 degrees Fahrenheit. The average peak external temperature for this round was 121.2 degrees Fahrenheit, with the average internal peak temperature being 99.4 degrees Fahrenheit. The slight variations in temperatures experienced between the M829A1 and M829 rounds could be due to such variables as temperature probe location, amount of adhesive used to secure the probe, and variations in thermal mass, to name a few. As previously noted, this test showed higher peak external temperatures during the late spring and early summer than later in the summer. Again unexpected, but resulted from higher solar radiation levels during this period. Internal average peak temperatures increased through August 1991 then declined, as expected.

Table 3

Testing Conducted 20 April - 1 October 1991

Item: Ctg 120mm APFSDS-T M829

Date	DODIC	Ext Max. Degrees F.	Ext Avg. Degrees F.	Int Max. Degrees F.	Int Avg. Degrees F.
20 Apr - 2 Jun	C786	151.1	118.0	107.6	94.3
3 Jun - 18 Jul	C786	150.5	124.9	108.9	102.2
19 Jul - 1 Sep	C786	142.5	121.3	109.4	102.7
2 Sep - 1 Oct	C786	136.0	120.6	102.5	98.3

D. Ammunition Tested June - July 1991. During June 1991, 21 additional ammunition items were tested. These items showed substantial greater variations in peak temperatures than the 120mm rounds. The 8-inch HE M650 projectile had the lowest temperature at 117.3 degrees Fahrenheit to the TOW 2 BGM-71D missile being the highest at 161.5 degrees Fahrenheit. Average peak external temperatures were substantially closer from 109.5 degrees Fahrenheit to 129.1 degrees Fahrenheit with all ammunition being within 20 degrees of each other including the TOW 2 BGM-71D missile at 126.3 degrees Fahrenheit. Average peak internal temperatures showed even smaller variation between ammunition with 101.6 degrees Fahrenheit being the lowest versus 111.3 degrees Fahrenheit being the highest, and within several degrees of the ambient peak temperatures. Again, these findings were surprising in the fact that some overpack containers are made of wood, a poor heat transfer media, and others are made of metal, a good conductor of heat. This strongly suggests that items sensitive to high skin temperatures dissipate off heat fairly rapidly and don't transmit heat inward to the extent expected. As an example, the 8-inch M188A1 propelling charge container with metal canister had peak external temperatures of 149.5 degrees Fahrenheit with peak internal temperatures of only 110.9 degrees Fahrenheit, or approximately 40 degrees lower. During this time period, the TOW 2 BGM-71D missile showed the highest external skin temperature and can be contributed to the peak solar radiation during this timeframe.

Table 4

Testing Conducted 4 June - 18 July 1991

Item	DODIC	Ext Max. Degrees F.	Ext Avg. Degrees F.	Int Max. Degrees F.	Int Avg. Degrees F.
Ctg 60mm Ill M83A3	B627	133.6	127.7	106.6	101.6
Ctg 60mm Smk M302A1	B630	131.9	129.1	105.5	103.1
Ctg 60mm HE M49A4	B632	123.7	121.0	107.7	103.4
Ctg 60mm HE M7202	B642	131.8	129.1	113.1	107.2
Ctg 81mm Ill M301A3	C226	132.3	128.1	104.3	103.2
Ctg 105mm HE M1	C445	133.0	128.8	109.8	108.2
Ctg 105mm HE M456A2	C508	148.2	126.3	115.3	106.6
Ctg 105mm APFSDS-T M774	C523	149.5	127.0	110.0	103.2

Chg Prop 155mm M203	D532	145.7	124.1	119.5	108.9
Chg Prop 155mm M203	D532	147.1	127.4	112.6	105.6
Chg Prop 155mm M119A2	D533	142.9	125.0	120.0	108.6
Chg Prop 155mm M3A1	D540	147.8	126.9	114.4	106.4
Chg Prop 155mm M4A2	D541	143.9	124.0	112.9	106.3
Proj 155mm HE M549A1	D579	128.5	112.7	123.6	110.5
Proj 8-in HE M650	D624	117.3	109.5	114.6	107.9
Chg Prop 8-in M188A1	D662	149.5	128.5	110.9	105.2
Fuze MTSQ M577	N285	147.4	125.4	111.1	104.4
Fuze MTSQ M577	N285	139.7	119.2	114.2	105.4
Fuze Prox M732	N464	141.6	121.2	110.4	103.6
SHILLELAGH MGM-51	PA45	129.2	126.1	115.1	111.3
TOW 2 BGM-71D	PB93	161.5	126.3	121.1	110.6

E. Ammunition Tested July - September 1991. During 9 July - 1 September 1991 the maximum peak external temperature reached was 157.6 degrees Fahrenheit in the 4.2-in Smk WP M328A1 w/PD Fuze, with the lowest peak temperature, again, being the 8-inch projectiles, at 118.9 degrees Fahrenheit. The 8-inch projectiles showed the lowest temperature gain due to the mass required to be heated prior to elevated skin temperatures. During this phase of testing all items had peak external temperatures of 138.3 degrees Fahrenheit plus or minus 19.4 degrees Fahrenheit. As noted during the first phase of testing on these 24 items, the average internal peak temperatures on all items were fairly close at 107.7 degrees Fahrenheit plus or minus 5.4 degrees Fahrenheit. This data again suggests that internal temperatures are not directly related to the material the ammunition is packed in. Reference: wood, plastic, cardboard, etc., and the fact that internal temperatures remain fairly close even though some items have high external skin temperatures.

Table 5

Testing Conducted 19 July - 1 September 1991

Item	DODIC	Ext Max. Degrees F.	Ext Avg. Degrees F.	Int Max. Degrees F.	Int Avg. Degrees F.
Ctg 60mm Ill M83A3	B627	149.6	129.5	105.3	102.3
Ctg 60mm Smk M302A1	B630	150.9	130.7	107.4	104.4
Ctg 60mm HE M49A4	B632	143.8	126.6	107.1	103.7
Ctg 60mm HE M7202	B642	148.2	130.5	111.1	107.0
Ctg 81mm Ill M301A3	C226	135.1	123.8	107.7	104.8
Ctg 105mm HE M1	C445	149.9	130.1	114.7	109.8
Ctg 105mm HE M456A2	C508	144.4	123.7	116.7	107.8
Ctg 105mm APFSDS-T M774	C523	146.4	124.6	108.7	102.7
Ctg 4.2-in Smk WP M328A1 w/PD Fuze	C708	157.6	146.3	105.7	101.8
Ctg 120mm HEAT-MP-T	C787	155.9	142.8	112.0	107.9
Chg Prop 155mm M203	D532	142.1	124.9	111.6	104.8

Chg Prop 155mm M203	D532	139.3	121.3	118.3	109.3
Chg Prop 155mm M119A2	D532	142.9	123.6	115.7	107.7
Chg Prop 155mm M3A1	D540	143.3	124.0	112.6	106.0
Chg Prop 155mm M3A1	D540	152.4	139.4	107.1	102.6
Chg Prop 155mm M4A2	D541	140.2	120.7	112.6	105.3
Proj 155mm HE M549A1	D579	121.8	109.5	119.1	108.2
Proj 155mm HE M549A1	D579	145.7	145.7	109.5	106.1
Proj 8-in HE M650	D624	118.9	110.0	114.0	107.1
Chg Prop 8-in M188A1	D662	144.4	125.2	112.5	106.1
Mine AT Heavy M75 (GEMSS)	K184	152.4	138.5	110.0	105.5
Fuze MTSQ M577	N285	143.7	123.2	111.1	104.2
Fuze MTSQ M577	N285	135.5	117.1	111.9	104.8
Fuze Prox M732	N464	139.2	119.2	109.9	104.3
Fuze Prox M732	N464	155.2	141.5	110.5	106.2
SHILLELAGH MGM-51	PA45	147.8	132.6	124.1	113.1
TOW 2 BGM-71D	PB93	136.2	113.2	121.9	109.5

F. Ammunition Tested September - October 1991. During this series of tests, maximum peak external temperature reached 154 degrees Fahrenheit for the SHILLELAGH MGM-51 missile with peak temperatures for all items being 133.8 plus or minus 20 degrees Fahrenheit. Irrespective of the external temperatures, average peak internal temperatures ranged from 103.5 degrees Fahrenheit plus or minus 9.4 degrees Fahrenheit. Of interest during this test is the over all reduction in the external maximum temperature of the TOW 2 BGM-71D missile and the general increase in temperature of the SHILLELAGH MGM-51 missile (refer to tables 4 - 6 for temperature details). This general trend could be due to the location of temperature probes on the missile's surface with the SHILLELAGH MGM-51 exposed to direct sunlight for a longer period of time than the TOW 2 BGM-71D missile during late summer and early fall timeframe.

Table 6

Testing Conducted 2 September - 16 October 1991

Item	DODIC	Ext Max. Degrees F.	Ext Avg. Degrees F.	Int Max. Degrees F.	Int Avg. Degrees F.
Ctg 60mm Ill M83A3	B627	143.7	130.7	97.2	94.5
Ctg 50mm Smk M302A1	B630	147.8	132.8	100.5	100.1
Ctg 60mm HE M49A4	B632	141.5	128.2	98.8	98.2
Ctg 60mm HE M7202	B642	142.2	130.4	102.1	98.9
Ctg 81mm Ill M301A3	C226	122.8	114.0	100.2	100.0
Ctg 105mm HE M1	C445	146.4	131.3	108.7	106.2
Ctg 105mm HE M456A2	C508	138.7	124.8	111.9	105.3
Ctg 105mm APFSDS-T M774	C523	143.2	124.2	102.8	98.6
Ctg 4.2-in Smk WP M328A1 w/PD Fuze	C708	152.9	131.5	101.5	94.1
Ctg 120mm HEAT-MP-T M830	C787	150.5	129.6	112.4	102.4
Chg Prop 155mm M203	D532	134.5	120.8	113.0	106.4

Chg Prop 155mm M203	D532	137.5	123.9	104.3	100.5
Chg Prop 155mm M119A2	D533	140.1	123.3	108.7	103.1
Chg Prop 155mm M3A1	D540	140.4	124.7	106.5	102.0
Chg Prop 155mm M3A1	D540	144.5	125.5	101.3	94.7
Chg Prop 155mm M4A2	D541	135.0	120.3	105.1	101.1
Proj 155mm HE M549A1	D579	113.2	105.9	111.9	105.4
Proj 155mm HE M549A1	D579	151.5	131.3	106.8	98.2
Proj 8-in HE M650	D624	116.8	108.8	108.9	103.6
Chg Prop 8-in M188A1	D662	141.0	124.5	110.2	104.2
Mine AT Heavy M75 (GEMSS)	K184	143.9	124.3	105.8	96.8
Fuze MTSQ M577	N285	137.9	122.9	102.4	98.6
Fuze MTSQ M577	N285	127.3	116.0	102.5	100.1
Fuze Prox M732	N464	134.9	118.7	103.3	99.5
Fuze Prox M732	N464	144.1	126.0	105.0	96.7
SHILLELAGH MGM-51	PA45	154.4	140.1	120.4	112.8
TOW 2 BGM 71D	PB93	135.7	116.0	115.5	107.9

G. Ammunition Tested October - November 1991. During the final series of tests the 155mm HE M549A1 experienced the highest external temperature of 131.7 degrees Fahrenheit as well as the highest average external temperature of 112.9 degrees Fahrenheit, which is to be expected. On the other hand, peak internal temperature was found in the 120mm HEAT-MP-T M830 to be 99.7 degrees Fahrenheit. This item also had the highest average internal temperature of 88.8 degrees Fahrenheit.

TABLE 7

Testing Conducted 17 October - 30 November 1991

Item	DODIC	Ext Max. Degrees F.	Ext Avg. Degrees F.	Int Max. Degrees F.	Int Avg. Degrees F.
Ctg 4.2-in Smk WP w/PD Fuze	C708	127.4	111.5	86.5	78.7
Ctg 120mm HE-MP-T M830	C787	103.3	111.1	99.7	88.8
Chg Prop 155mm M3A1	D540	120.5	105.0	85.8	78.5
Proj 155mm HE M549A1	D579	131.7	112.9	92.1	82.2
Mine AT Heavy M75 (GEMSS)	K184	122.2	104.7	91.6	81.4
Fuze Prox M732	N464	124.0	107.8	89.4	79.4

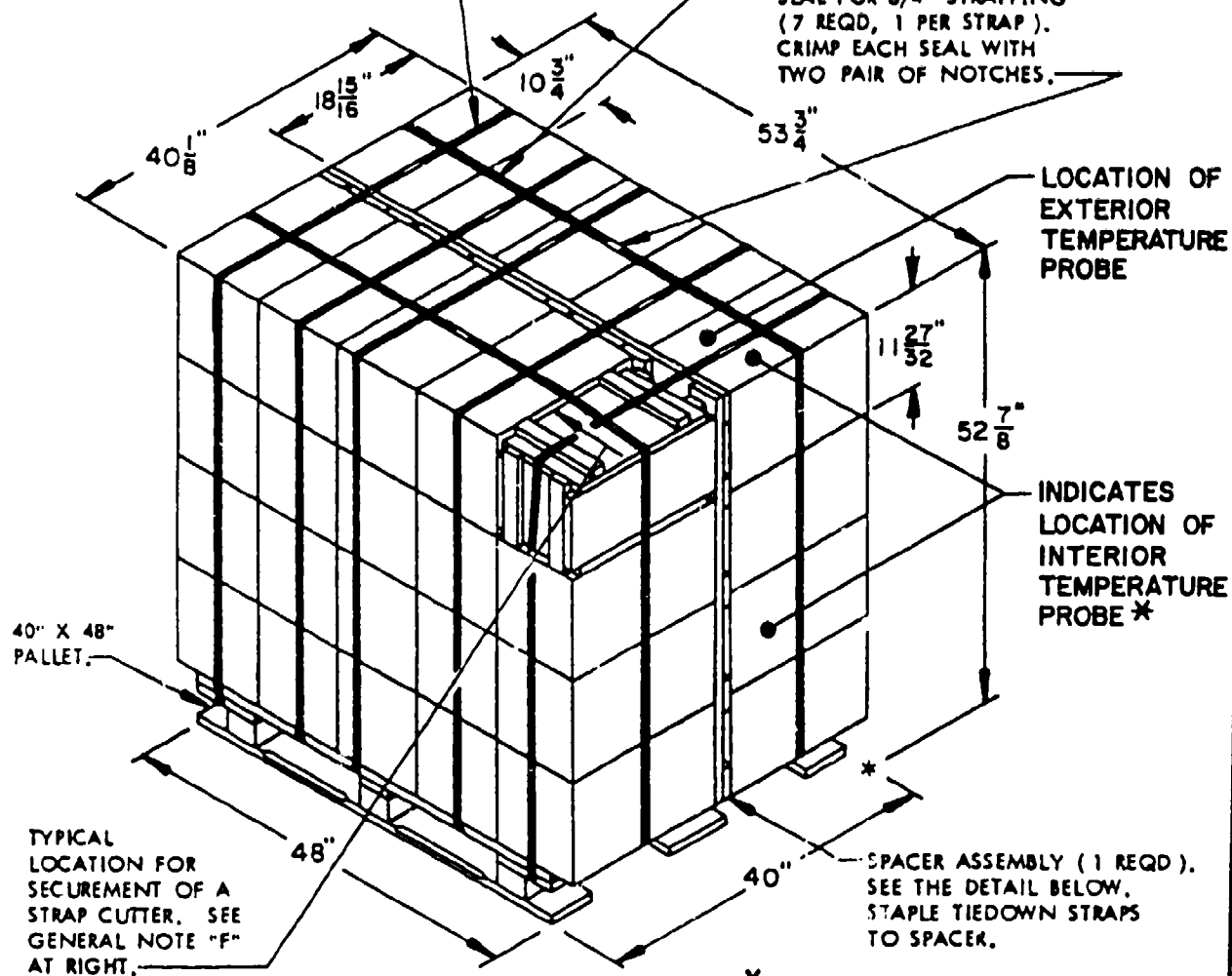
PART 7

THERMAL COUPLE PROBE LOCATIONS

TIEDOWN STRAP, 3/4" X .035" OR .031" X 15'-8" LONG STEEL STRAPPING (5 REQD). SEE GENERAL NOTE "D" AT RIGHT.

LOAD STRAP, 3/4" X .035" OR .031" X 18'-0" (2 REQD). SEE GENERAL NOTE "C" AT RIGHT.

SEAL FOR 3/4" STRAPPING (7 REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.



PALLET UNIT

SEE GENERAL NOTE "B" AT RIGHT.

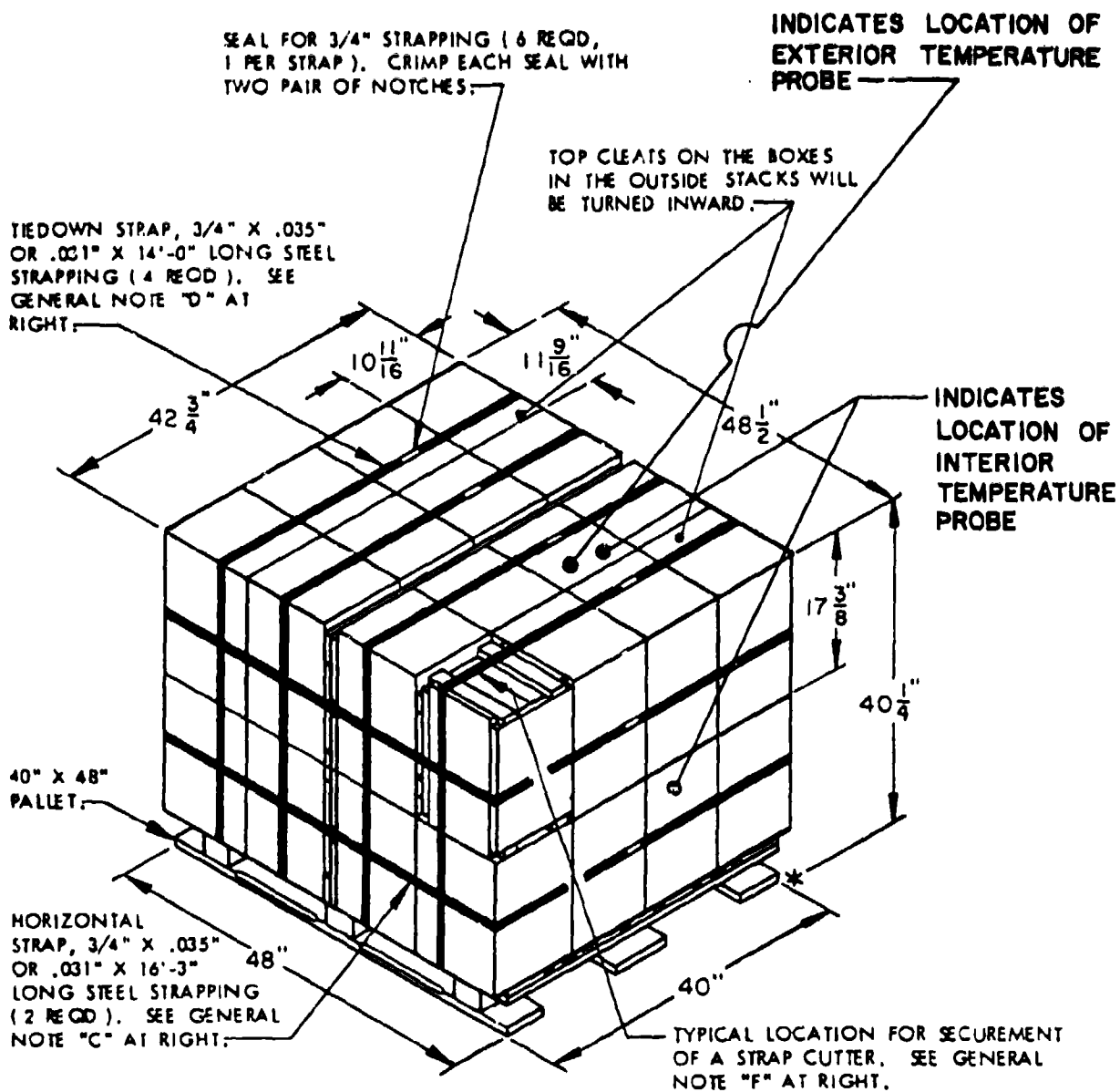
***NOTE:** POSITION PROBE INSIDE INNER PACK

40 BOXES OF 60MM CARTRIDGE (9 PER BOX) @ 57 LBS -----	2,280 LBS (APPROX)
DUNNAGE-----	56 LBS
PALLET-----	80 LBS

TOTAL WEIGHT-----	2,416 LBS (APPROX)
CUBE -----	66.0 CU FT (APPROX)

DODIC: B627

DRAFTSMAN TRS	TITLE 60 MM ILLUM. MORTAR, M83A3
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639



PALLET UNIT

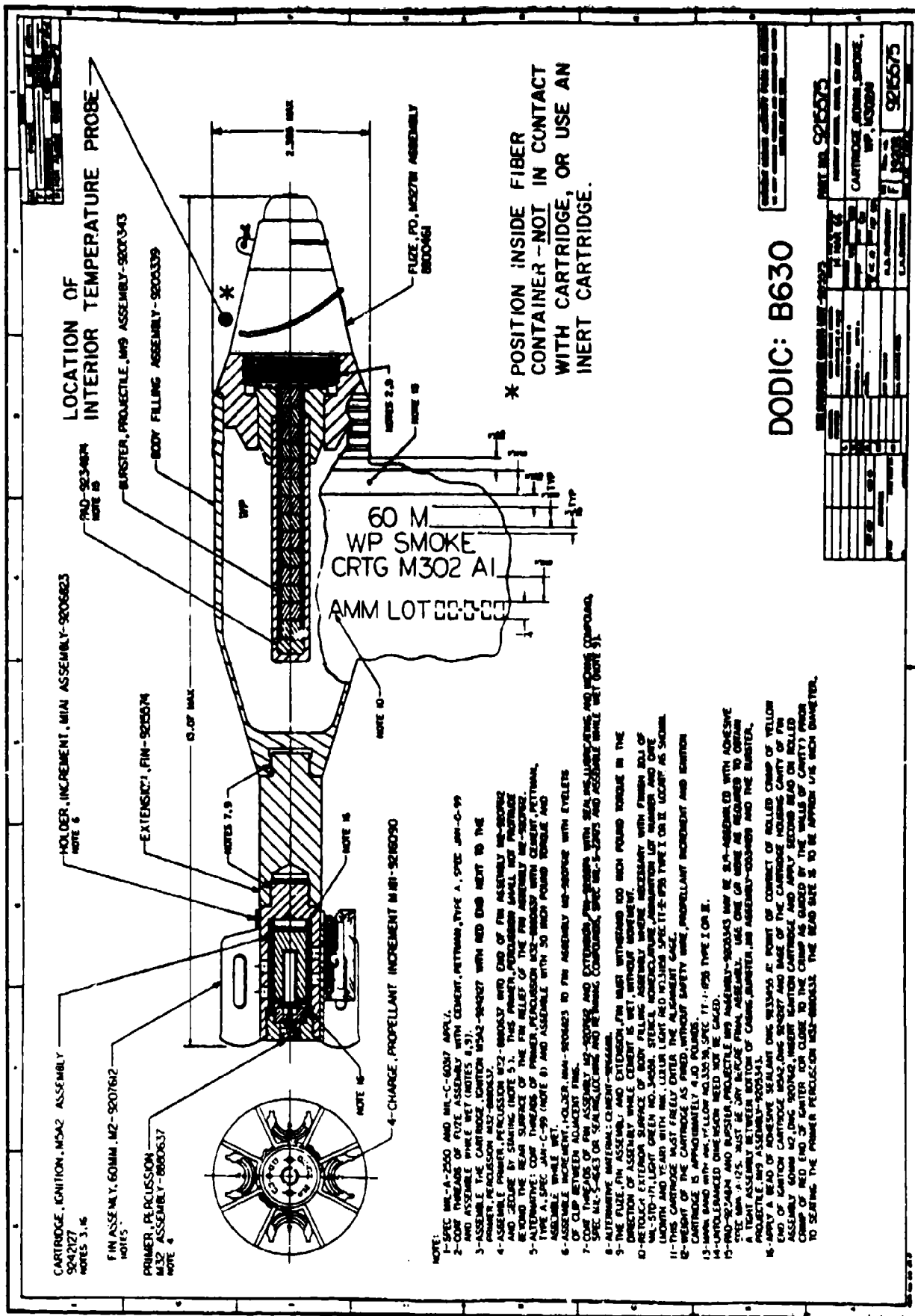
SEE GENERAL NOTE "B" AT RIGHT.

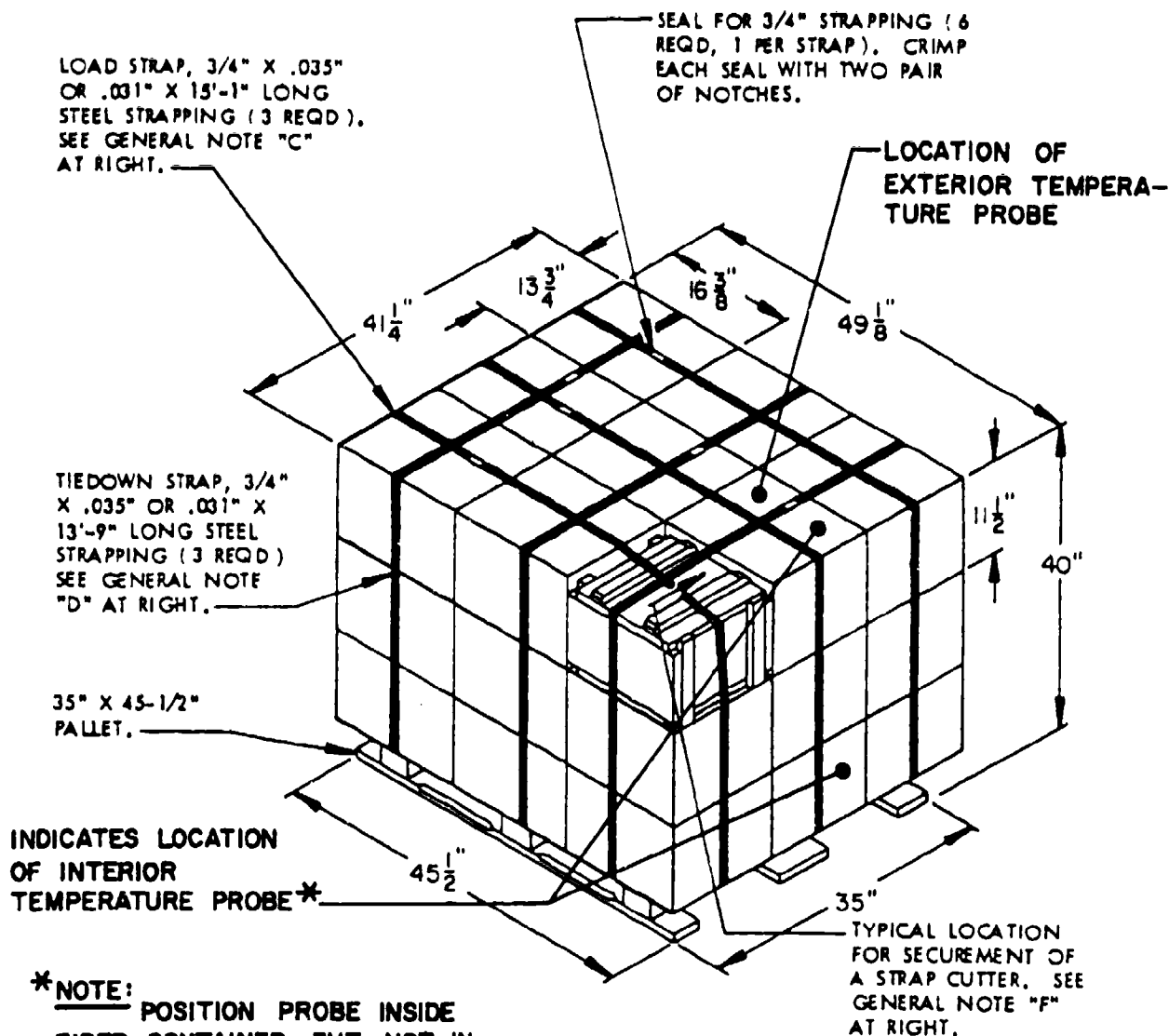
32 BOXES OF 60MM CARTRIDGES (9 PER BOX) @ 57 LBS -----	1,824 LBS (APPROX)
DUNNAGE -----	22 LBS
PALLET -----	80 LBS

TOTAL WEIGHT -----	1,926 LBS (APPROX)
CUBE -----	48.3 CU FT (APPROX)

DODIC: B630

DRAFTSMAN TRS	TITLE CARTRIDGE, 60 MM SMOKE WP M302A1
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639





***NOTE:** POSITION PROBE INSIDE FIBER CONTAINER, BUT NOT IN CONTACT WITH CARTRIDGE

PALLET UNIT

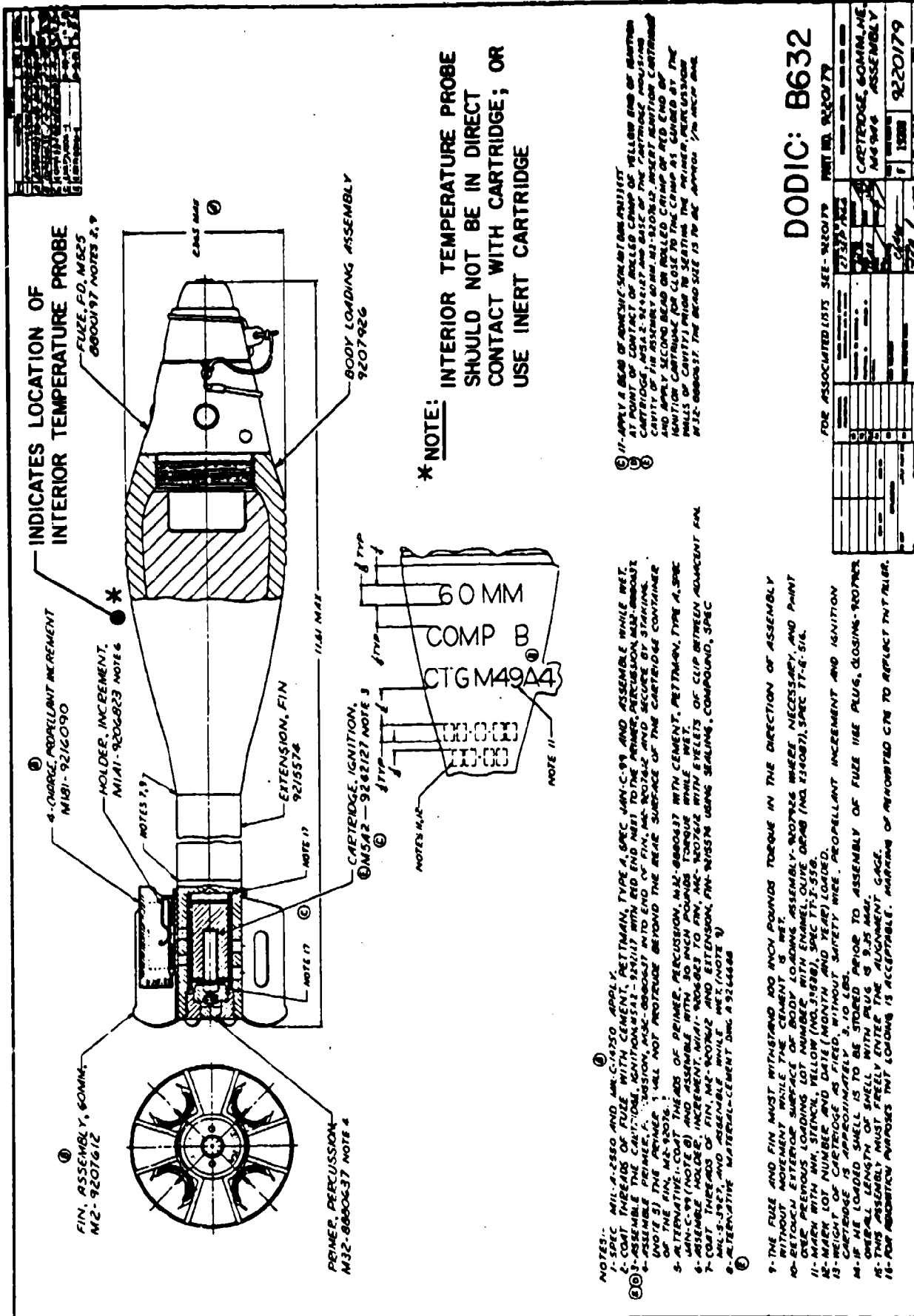
SEE GENERAL NOTE "B" AT RIGHT.

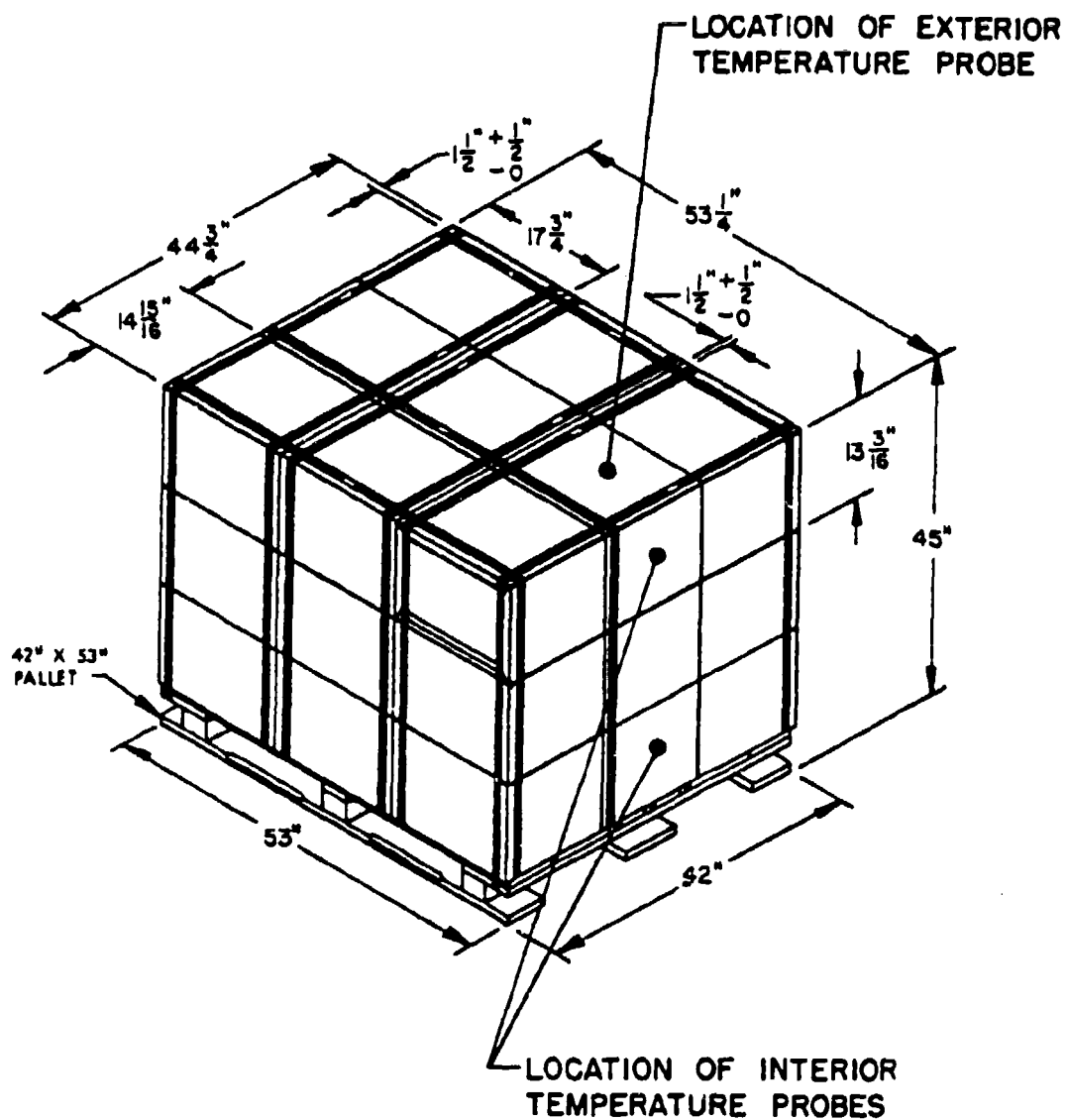
27 BOXES OF 60MM CARTRIDGE (12 PER BOX) @ 56 LBS	1,512 LBS (APPROX)
DUNNAGE	7 LBS
PALLET	65 LBS

TOTAL WEIGHT	1,584 LBS (APPROX)
CUBE	46.9 CU FT (APPROX)

DODIC: B632

DRAFTSMAN TRS	TITLE 60 MM HE MORTAR, M49A4
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639

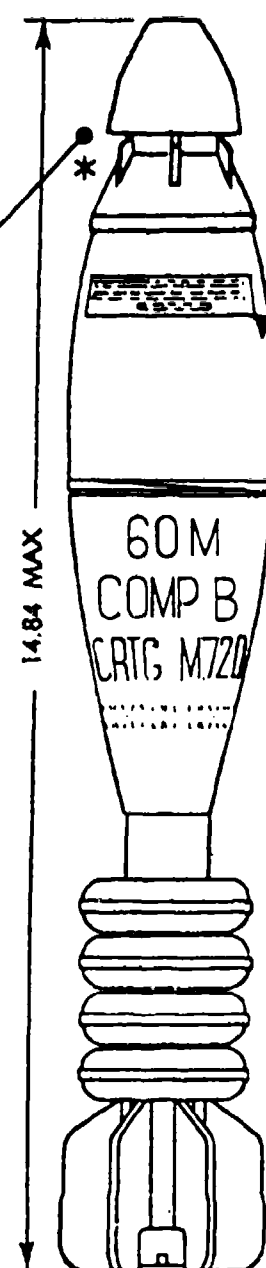




DODIC: B642

DRAFTSMAN <i>TRS</i>	TITLE CARTRIDGE, 60 MM HE, M720
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639

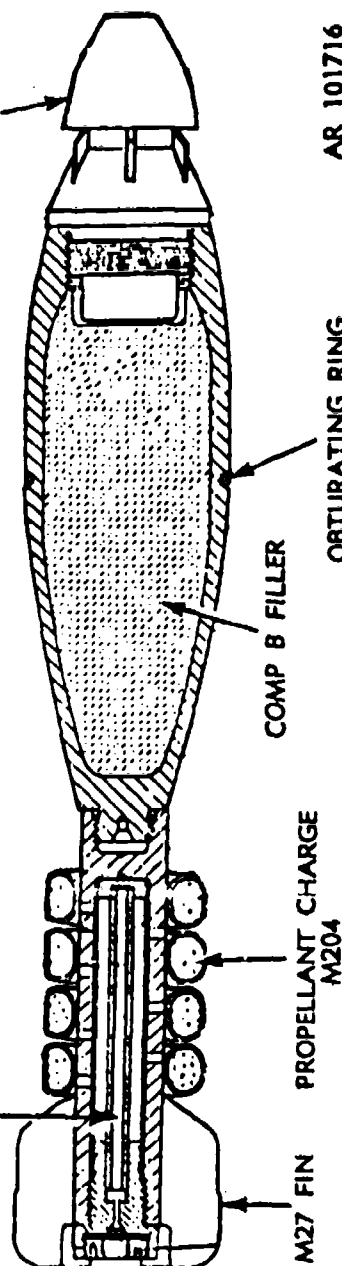
LOCATION OF INTERIOR
TEMPERATURE PROBE



WARNING: WHEN FIRING IN 60MM
MORTAR M19 USE NO MORE THAN
TWO CHARGES

IGNITION CARTRIDGE
M702

MULTI-OPTION
FUZE M734



AR 101716

OBTURATING RING

COMP B FILLER

PROPELLANT CHARGE
M204

M27 FIN

* POSITION PROBE INSIDE CONTAINER, BUT NOT IN
DIRECT CONTACT WITH ROUND.

DODIC: B642

DRAFTSMAN

TR5

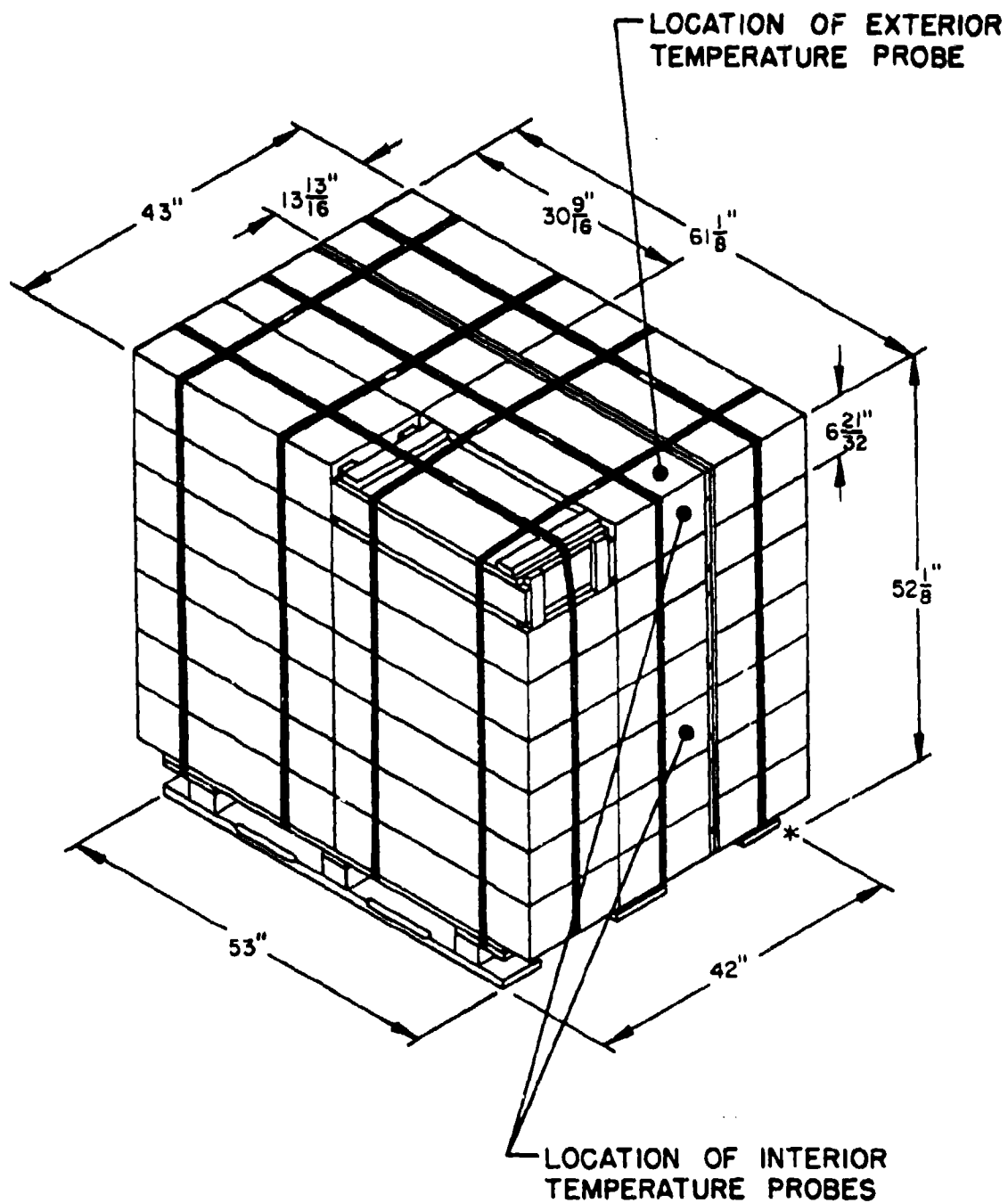
TITLE

**CARTRIDGE, 60 MM
HE, M720**

TEST ENGINEER

CHIEF, VALIDATION ENGINEERING DIVISION

U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639

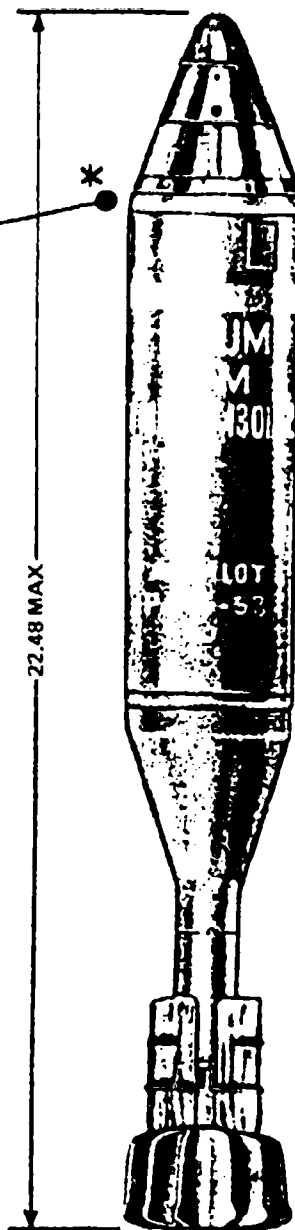


DODIC: C226

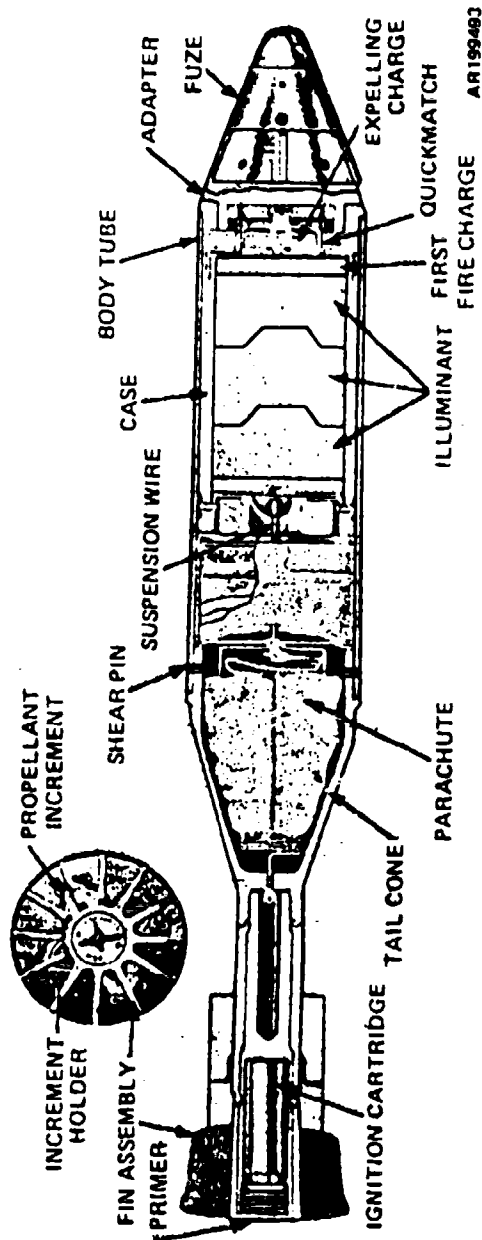
DRAFTSMAN TRS	TITLE CARTRIDGE, 81 MM ILLUM. M301 SERIES
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639

LOCATION OF
INTERIOR
TEMPERATURE
PROBE

CARTRIDGE, 81 MILLIMETER: ILLUMINATING, M301A2 AND M301A1



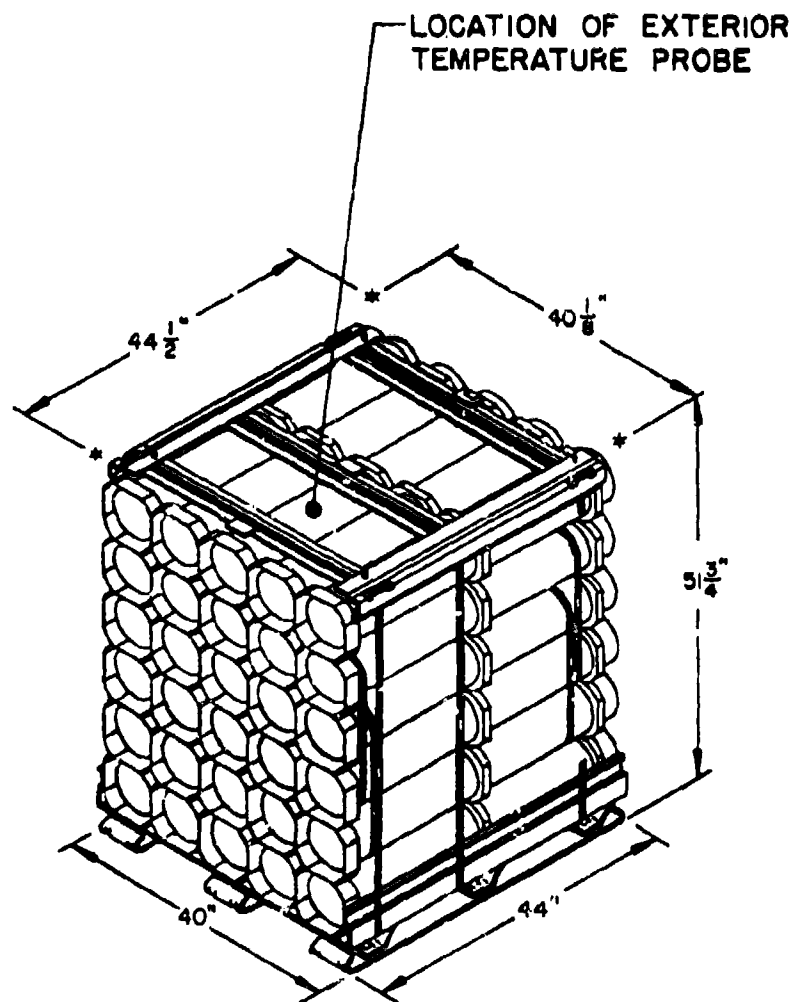
AR199494



* POSITION PROBE INSIDE CONTAINER, BUT NOT IN
DIRECT CONTACT WITH ROUND.

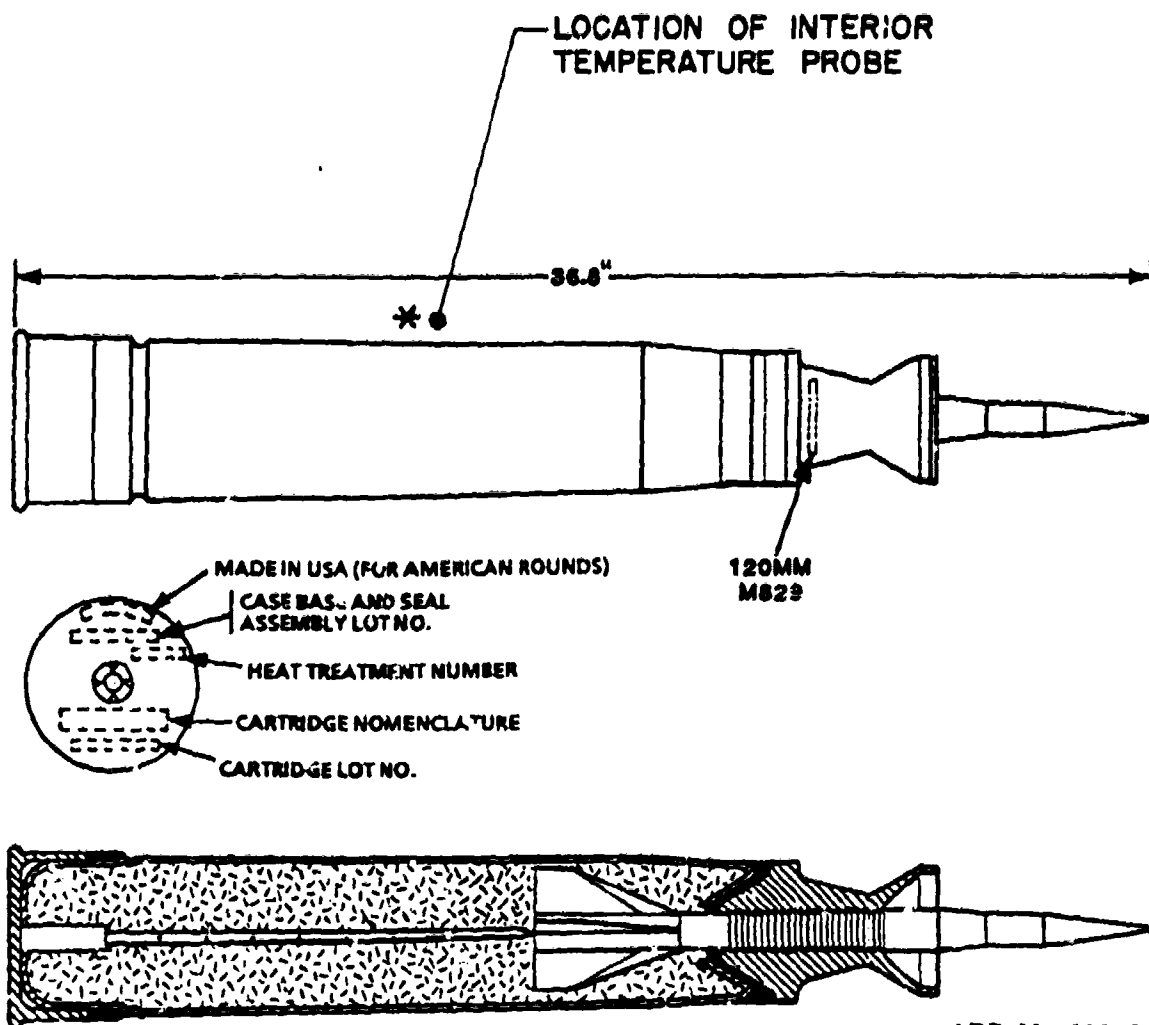
DODIC: C226

DRAFTSMAN TRS	TITLE CARTRIDGE, 81 MM ILLUM. M301 SERIES
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639



DODIC: C380

DRAFTSMAN	TRS	TITLE	CARTRIDGE, 120 MM:
TEST ENGINEER			APFSDS-T, M829A1
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639		

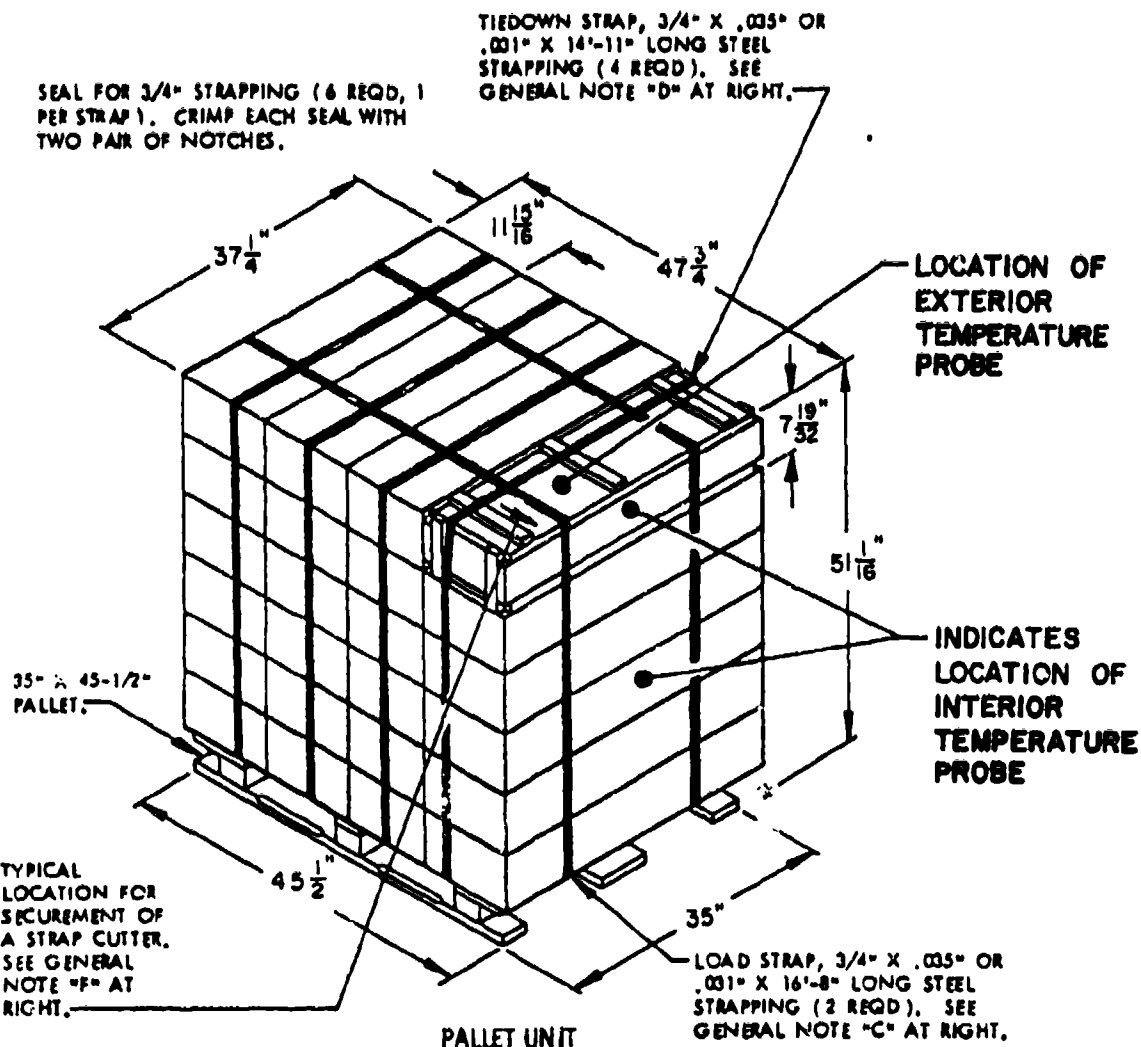


ARD 83-0866-D

* POSITION PROBE INSIDE CONTAINER, BUT NOT IN DIRECT CONTACT WITH ROUND, OR USE INERT CARTRIDGE.

DODIC: C380

DRAFTSMAN TRS	TITLE CARTRIDGE, 120 MM: APFSDS-T, M829A1
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639



SEE GENERAL NOTE "B" AT RIGHT.

24 BOXES OF 105MM CARTRIDGES (2 PER BOX) @ 105 LBS	2,520 LBS (APPROX)
DUNNAGE	7 LBS
PALLET	65 LBS

TOTAL WEIGHT	2,592 LBS (APPROX)
CUBE	32.6 CU FT (APPROX)

DODIC: C445

DRAFTSMAN TRS	TITLE CARTRIDGE, 105 MM HE MI W/O FUZE
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNAH, ILLINOIS 61074-9639

PLACE INTERIOR TEMPERATURE
PROBE ON CARTRIDGE CASE END



DOUBLE END OPENING CONTAINER

DODIC: C445

DRAFTSMAN <i>TRS</i>	TITLE CARTRIDGE, 105 MM HE MI W/O FUZE
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNAH, ILLINOIS 61074-0630

LOCATION OF EXTERIOR TEMPERATURE PROBE

TIEDOWN STRAP, 3/4" X .035" OR .031" X
14'-0" LONG STEEL STRAPPING (4 REQD).

SEAL FOR 3/4" STRAP (7 REQD, 1 PER STRAP),
CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.

INDICATES PAKON
SERIES CONTAINER.

BUNDLING STRAP, 3/4" X .035"
OR .031" X 11'-6" LONG STEEL
STRAPPING (2 REQD). SEE
SPECIAL NOTE 2 BELOW.

SPECIAL 40" X 44"
PALLET. SEE GENERAL
NOTE "J" ON PAGE 2.

STABILIZING STRAP, 3/4" X .035"
OR .031" X 9'-4" LONG STEEL
STRAPPING (1 REQD). SEE
SPECIAL NOTE 2 BELOW.

INDICATES
LOCATION OF
INTERIOR
TEMPERATURE
PROBE

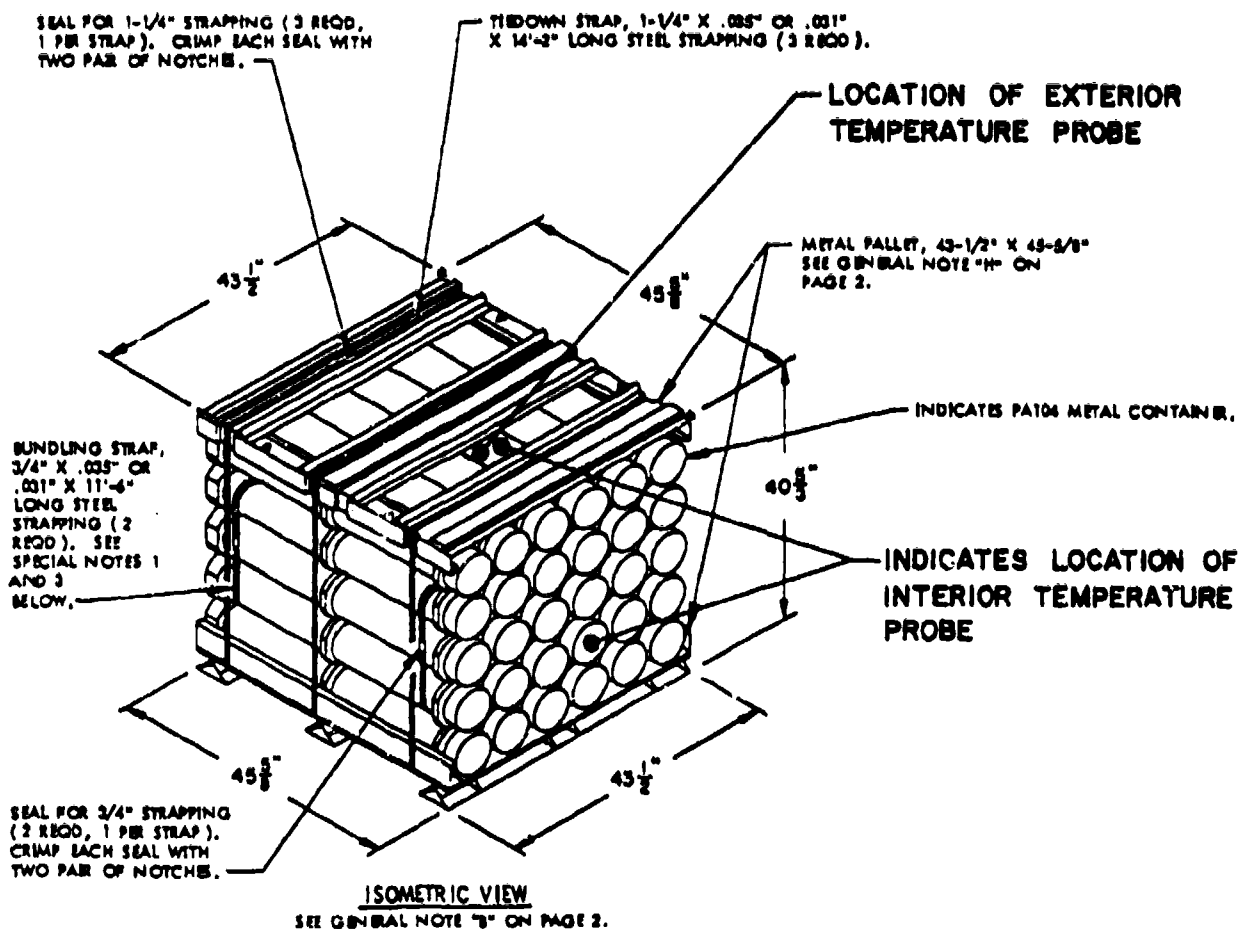
PALLET DUNNAGE (1 REQD).
SEE "DUNNAGE DETAIL" ON
PAGE 3.

TYPICAL LOCATION FOR SECUREMENT
OF A STRAP CUTTER. WIRE TIE TO STRAP.

ISOMETRIC VIEW

DODIC: C508

DRAFTSMAN <i>TRS</i>	TITLE CARTRIDGE, 105 MM HEAT-T M456A2
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639



UNIT DATA:

CUBE	46.7 CUBIC FEET (APPROX)	
CONTAINER	30 EA @ 70 LBS	2,100 LBS (APPROX)
DUNNAGE		8 LBS
PALLET		175 LBS
TOTAL WEIGHT		2,283 LBS (APPROX)

DODIC: C523

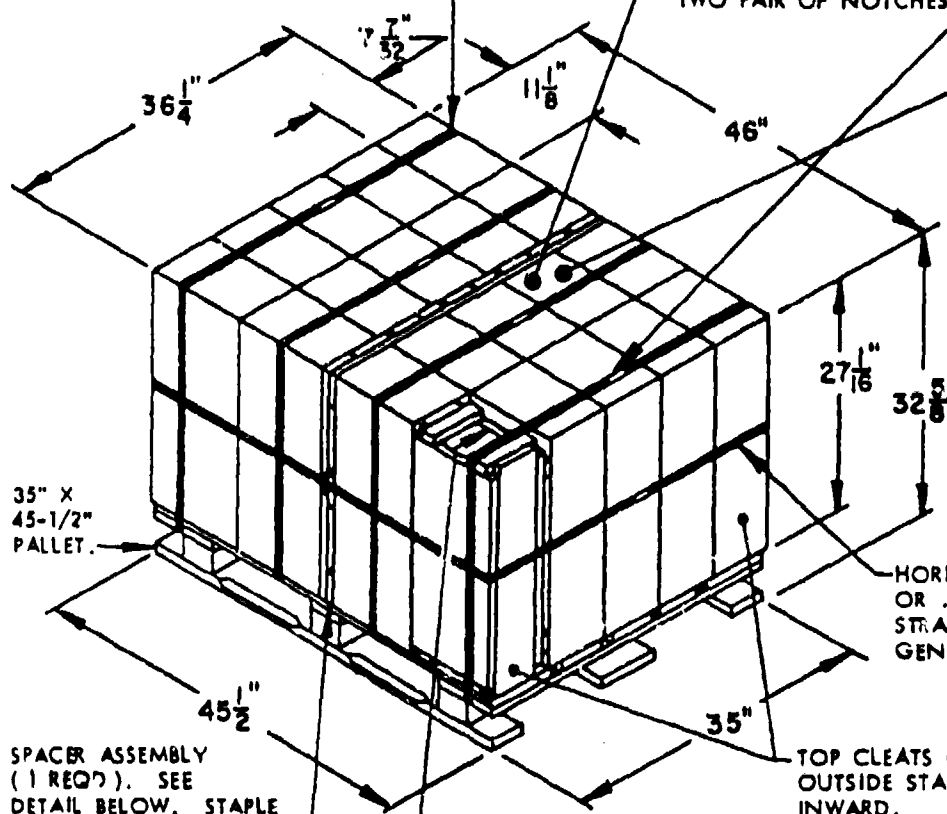
DRAFTSMAN <i>TRS</i>	TITLE 105 MM CARTRIDGE, APFSDS-T XM774
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639

TIEDOWN STRAP, 3/4" X .035" OR .031" X 11'-8"
LONG STEEL STRAPPING (4 REQD). SEE
GENERAL NOTE "D" AT RIGHT.

LOCATION OF EXTERIOR
TEMPERATURE PROBE

SEAL FOR 3/4" STRAPPING (5 REQD,
1 PER STRAP). CRIMP EACH SEAL WITH
TWO PAIR OF NOTCHES

INDICATES LOCATION
OF INTERIOR
TEMPERATURE
PROBE



35" X
45-1/2"
PALLET.

HORIZONTAL STRAP, 3/4" X .035"
OR .031" X 14'-9" LONG STEEL
STRAPPING (1 REQD). SEE
GENERAL NOTE "C" AT RIGHT.

SPACER ASSEMBLY
(1 REQD). SEE
DETAIL BELOW. STAPLE
HORIZONTAL STRAP
TO THE "SPACER
ASSEMBLY" AS SHOWN.

TOP CLEATS ON THE BOXES IN THE
OUTSIDE STACKS WILL BE TURNED
INWARD.

TYPICAL LOCATION FOR SECUREMENT OF A STRAP CUTTER.
SEE GENERAL NOTE "F" AT RIGHT.

PALLET UNIT

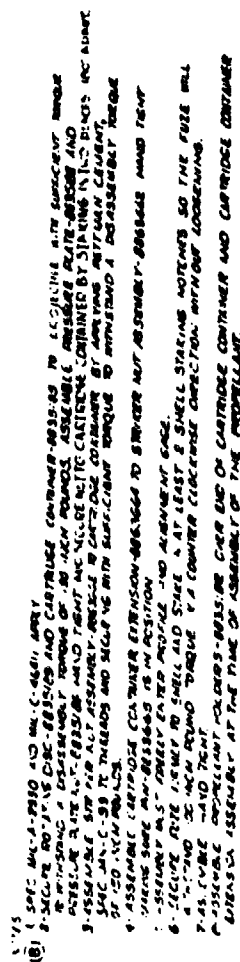
SEE GENERAL NOTE "B" AT RIGHT.

20 BOXES OF 4.2" CARTRIDGES (2 PER BOX) @ 70 LBS -----	1,400 LBS (APPROX)
DUNNAGE -----	19 LBS
PALLET -----	65 LBS

TOTAL WEIGHT -----	1,484 LBS (APPROX)
CUBE -----	31.5 CU FT (APPROX)

DODIC: C708

DRAFTSMAN TRS	TITLE CARTRIDGE, 4.2 INCH SMOKE WP M328AI W/PD FUZE
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639



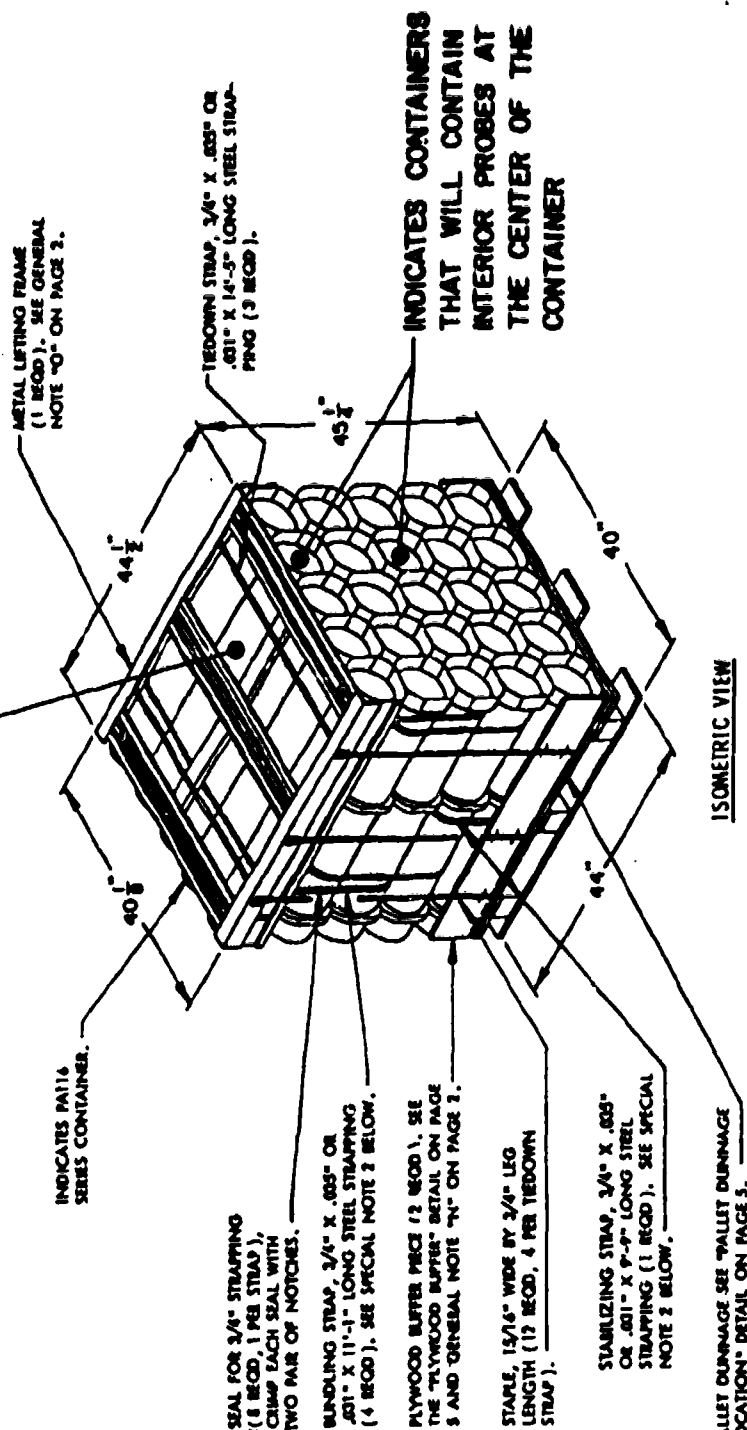
*** POSITION INSIDE FIBER CONTAINER,
NOT IN CONTACT WITH CARTRIDGE;
OR USE INERT CARTRIDGE**

DODIC: C708

FOR LIST OF PARTS SEE
MECHANICAL PARTS LIST ON PAGE 10

[illegible]

LOCATION OF EXTERIOR TEMPERATURE PROBE

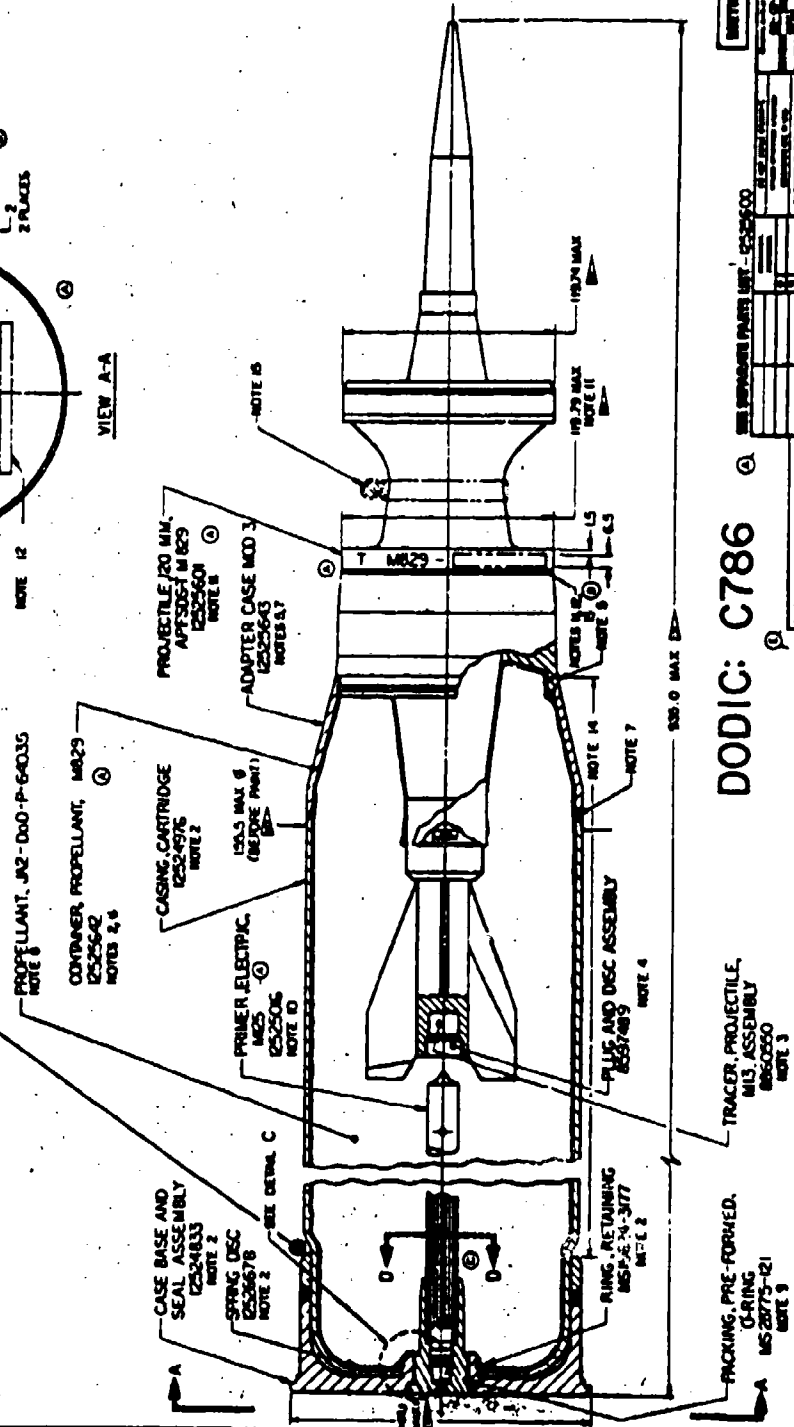
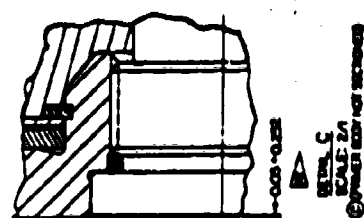
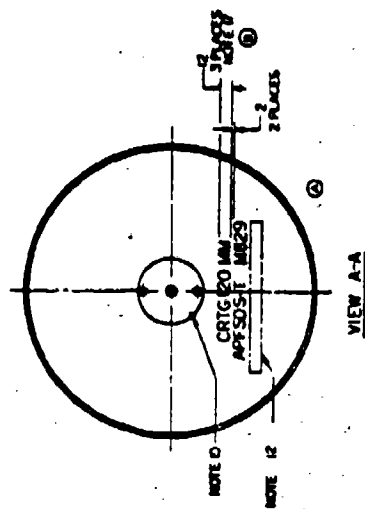
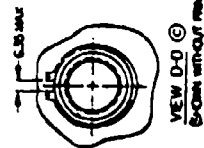


ISOMETRIC VIEW

DODIC: C786

DRAFTSMAN TRS	TITLE CARTRIDGE, 120 MM APFSDS-T M829
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639

SEE SHEET 2 FOR NOTES



DODIC: C786

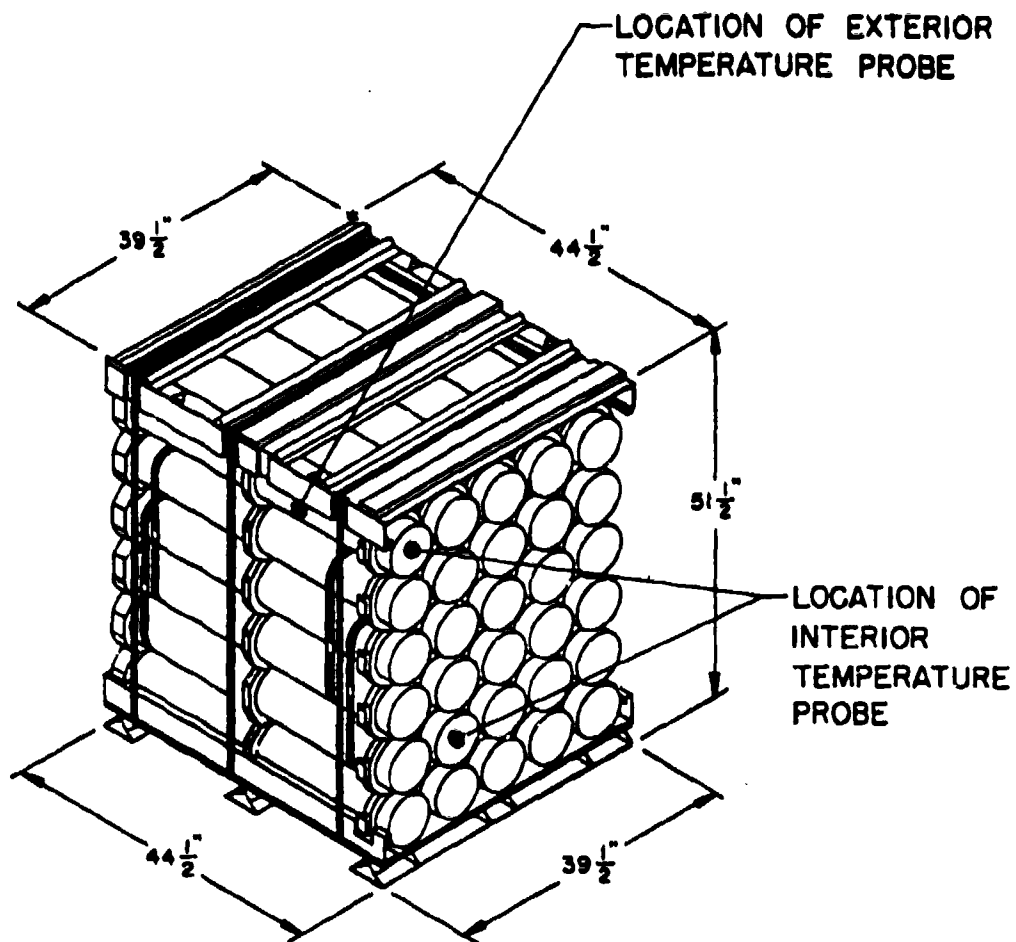
TRACER, PROJECTILE,
M13, ASSEMBLY
0060560
LOT 3

CL-RING
MS 28775-121
NOTE 9

[illegible][illegible][illegible]

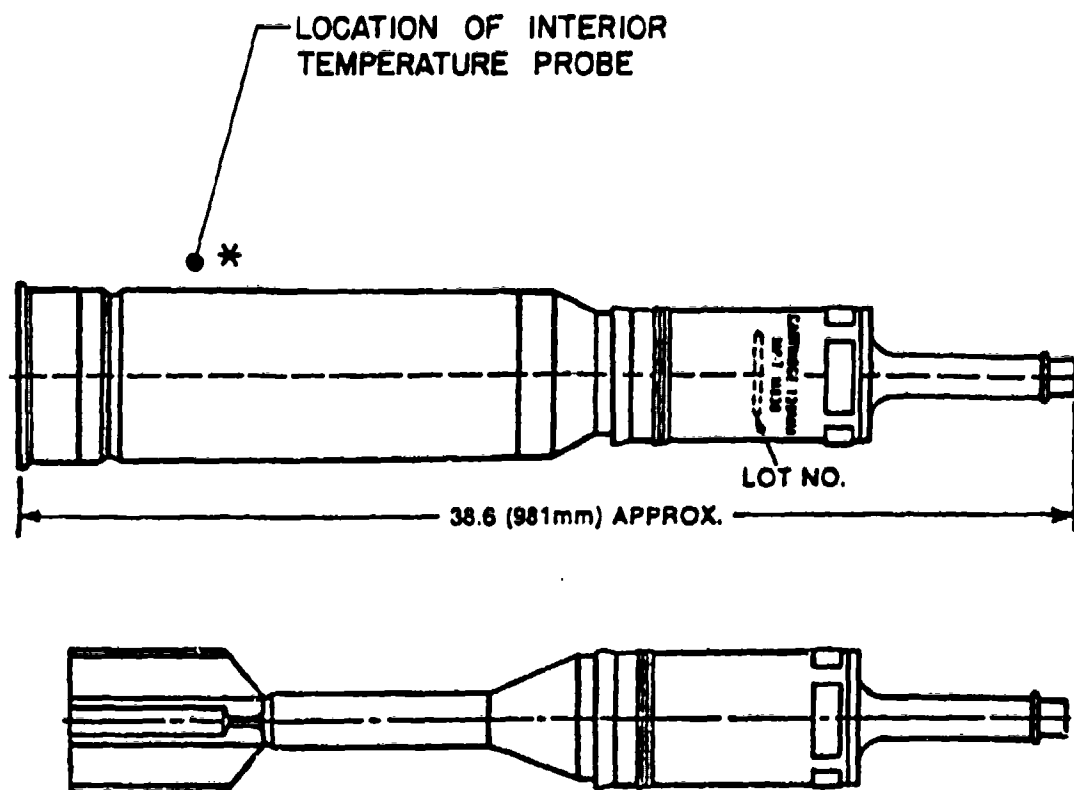
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...the ...



DODIC: C787

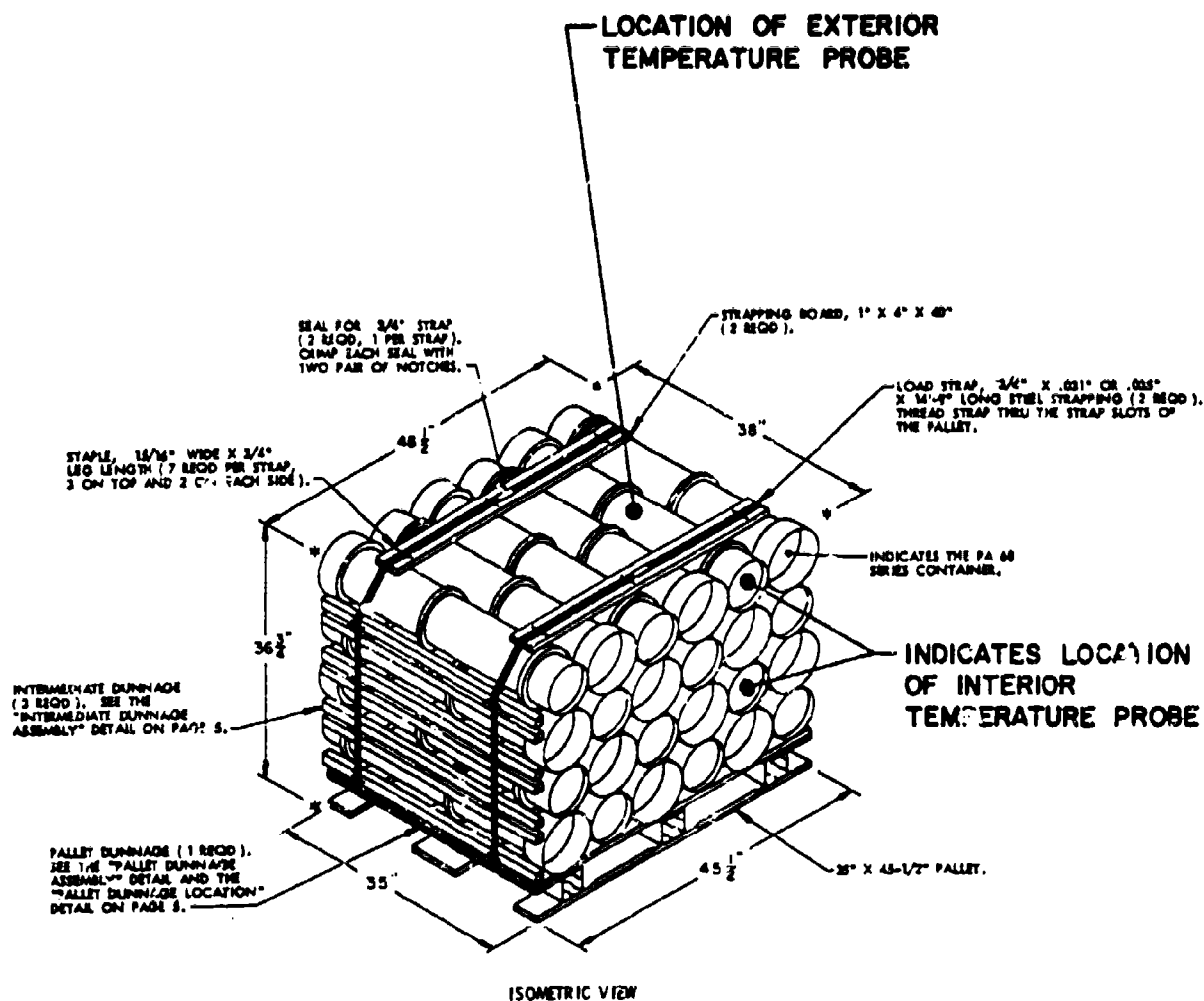
DRAFTSMAN TRS	TITLE CARTRIDGE, 120 MM HEAT-MP-T M830
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639



* POSITION PROBE INSIDE CONTAINER, BUT NOT IN
DIRECT CONTACT WITH ROUND.

DODIC: C787

DRAFTSMAN TRS	TITLE CARTRIDGE, 120 MM HEAT-MP-T M830
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639

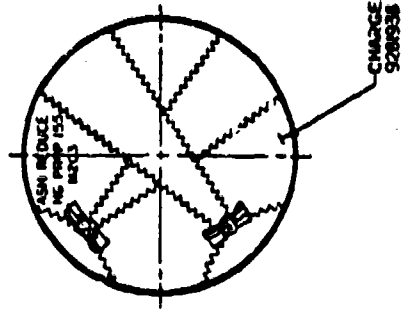
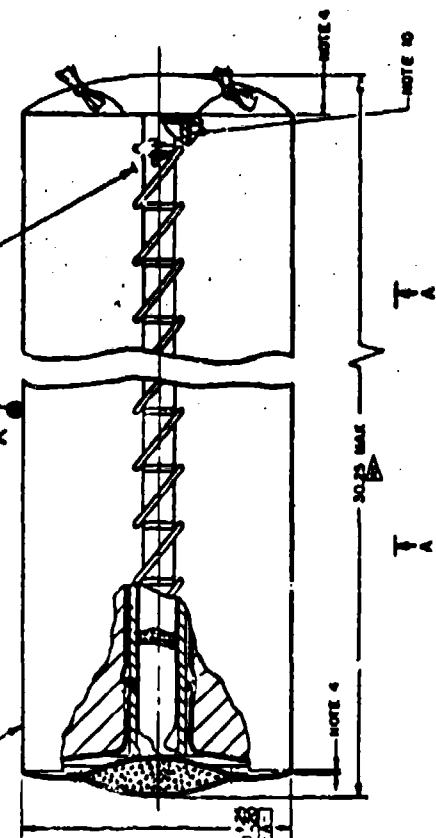
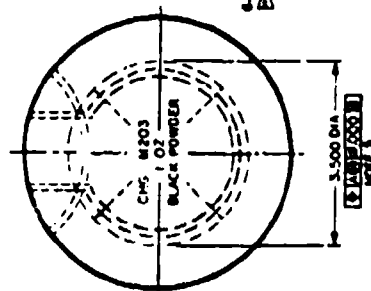


DODIC: D532

DRAFTSMAN TRS	TITLE CHARGE, PROPELLING 155 MM RB M203
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9630

JACQUET, LACING - 9281995

**INDICATES LOCATION OF INTERIOR
TEMPERATURE PROBE**



more:

- FOR COMBAT LOT
- 1 - SPEC. WL. - A - 2550, ANG. Y45-1973 AND WL. - C - 482-43 APPLY
- 2 - SLIP LACING JACKET OVER CHARGE PROPELLING ASSEMBLY (NOTE 9) AND LACE TIGHTLY USING SUE LACING CORD, TYPE B, CLASS C, SPEC. WL. - C - 453, LACING TO BE TIED AT BOTH ENDS.
- 3 - ONE IGNITER PROTECTION CAP 6849512-1 ON ALTERNATIVE MUST BE PLACED OVER IGNITER END OF CHARGE WHEN PACKED FOR SHIPMENT.
- 4 - CHARGE MUST BE FLUSH TO 1000 MCH BELOW FLUSH AT BOTH ENDS OF ASSEMBLED CHARGE. FOR A MINIMUM OF 2102.
- 5 - GAGE TUBE MUST BE FLUSH TO BASE AND PLUGGING CLOSURE SEAM SHALL BE WITHIN TWO DIMENSIONS.
- 6 - TIE ALL TIE RODS AT BASE END OF CHARGE TO 1025 MCH NUT AND REMOVE ALL LOOSE TIE RODS CONFORMING TO OUTER SURFACES OF THE COMPLETE CHARGE ASSEMBLY.
- 7 - DIM. - INTERFACE DIMENSION.
- 8 - REFERENCE: FOR 125 MM. SYSTEMS INTERFACE DIMENSION/REQUIREMENT, SEE INTERFACE CONTROL DRAWING 0025 327790-1 CD 327790 IS ON SOURCE REFERENCE ONLY AND NOT FOR MANUFACTURING USE.
- 9 - CHARGE WILL BE SHIPPED IN CONTAINER WITH THE FOLLOWING INFORMATION: PROJECT NAME, CALIBER, JOINT PROJECT NUMBER, SEMI-ACTIVE LASER GUIDED PROPELLER.
- 10 - POSITION LACING AREA OF JACKET APPROXIMATELY 180° FROM BODY SEAMS.
- 11 - FINAL ASSEMBLY IN VERTICAL POSITION WITH BASE GATED CAP AND TUBE ASSEMBLY END DOWN, SHALL BE SUCH THAT THE TUBE CAP SHALL BE 1/2 TO 1 1/2 INCHES BELOW THE END OF THE CHARGE.

CHARGE PROPPELLING M203
FOR SEMI HOW MISS
LOT

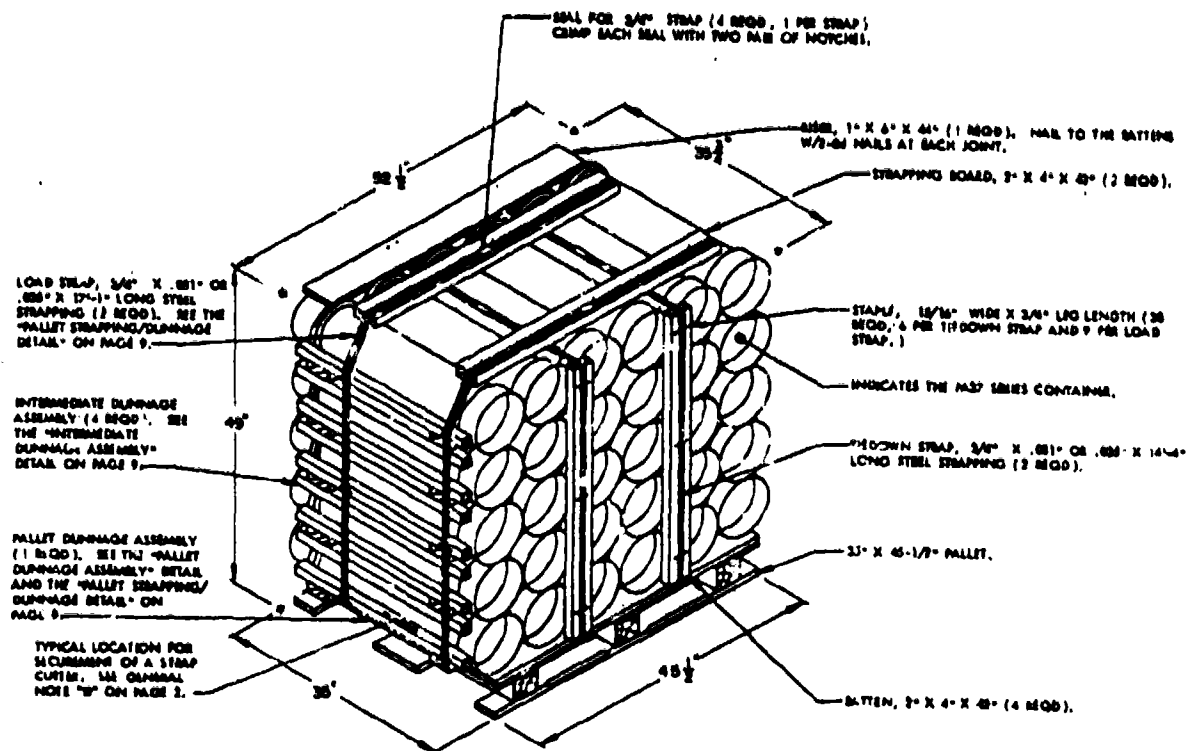
VIEW A-A
(MACHINE INFORMATION, REF)

*** NOTE:**

**POSITION TEMPERATURE
PROBE ON INERT CHARGE
ONLY**

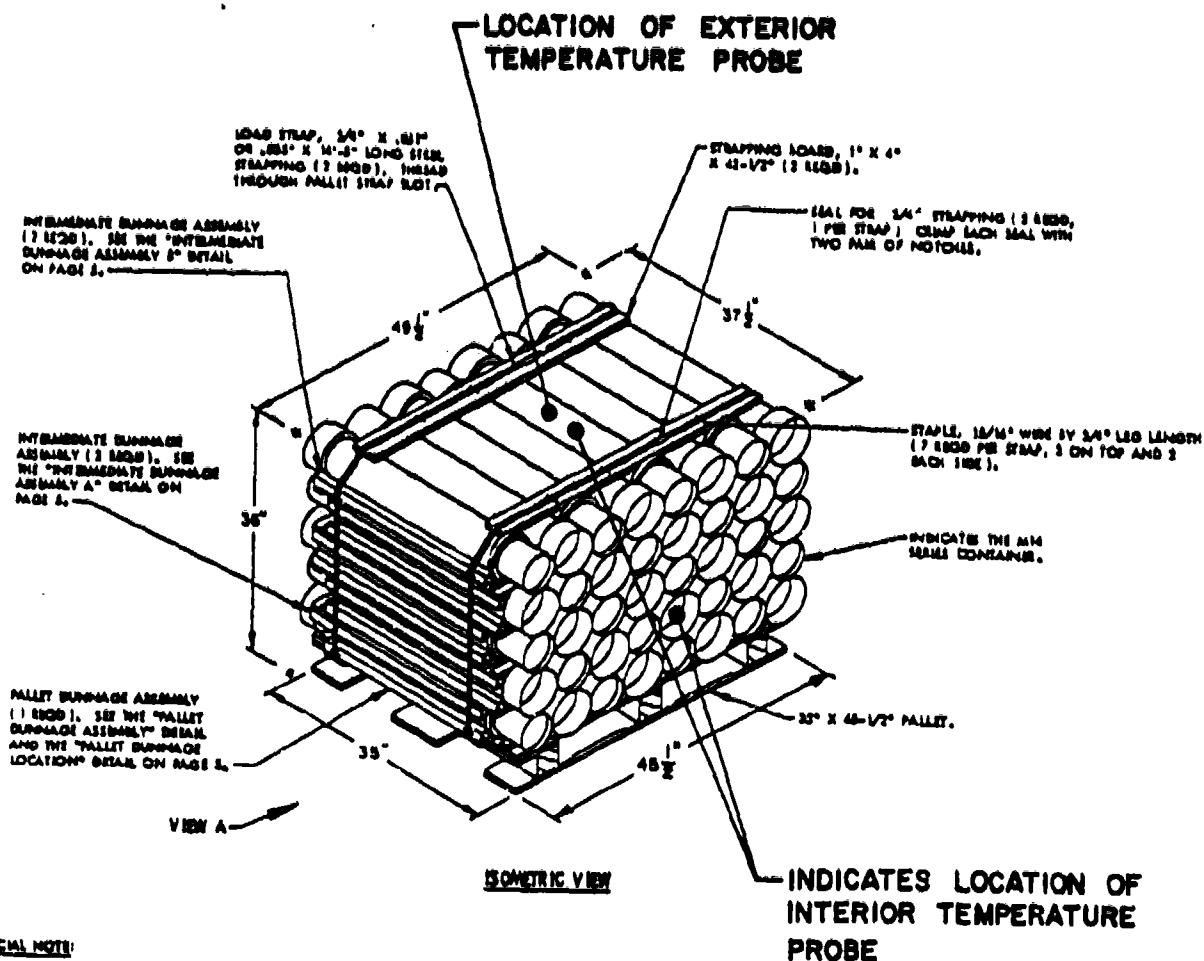
DODIC: D532

SEE SEPARATE PAGES LSI-928697		NAME: LEE, JIN DATE OF BIRTH: 72-09-11 PLACE OF BIRTH: SEOUL, KOREA CURRENT ADDRESS: 11400-10000 COUNTRY: KOREA B. DATE: 9-11-72		FBI NO: 928697 SOURCE FOR: WFO FILE NO: 928697 F. NO: 928697	
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DODIC: D533

DRAFTSMAN	TRK	TITLE	155 MM PROPELLING CHARGE M119 SERIES W/O PRIMER
TEST ENGINEER			
CHIEF, VALIDATION ENGINEERING DIVISION		U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639	



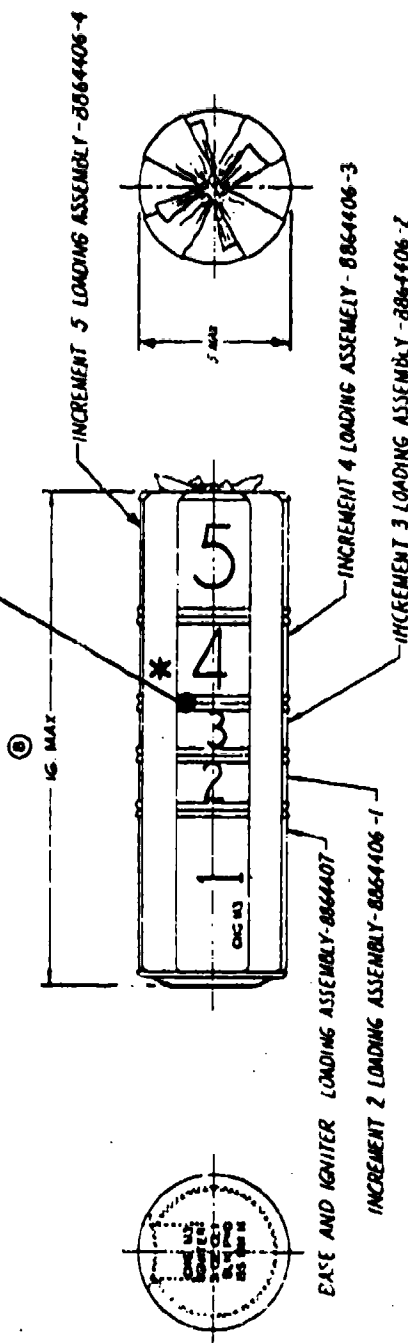
PECIAL NOTE:

1. THE UNIT SHOWN ABOVE MAY BE INCREASED BY ONE COMPLETE LAYER OF CONTAINERS BY THE ADDITION OF ONE MORE INTERMEDIATE BUNNAGE ASSEMBLY AND EIGHT MORE CONTAINERS, AND BY INCREASING STRAP LENGTHS APPROPRIATELY. THIS WILL RESULT IN AN OVERALL UNIT HEIGHT OF 41-5/16".

DODIC: D540

DRAFTSMAN TRS	TITLE PROPELLING CHARGE, M3 (GB) FOR 155 MM HOWITZER
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9839

DICATES LOCATION OF INTERIOR TEMPERATURE PROBE



***NOTE: USE INERT CHARGE ONLY!**

- NOTES:-
- 1- SPEC MIL-A-2550 AND MIL-C-46503 APPLIES
 - 2- ONE IGNITER PROTECTOR CAP (ORDINANCE PART NO B049912-2)
OR ALTERNATIVE MUST BE PLACED OVER IGNITER END OF CHARGE,
IF 1 PACKED FOR SHIPMENT AND MUST BE REMOVED BEFORE
Firing. (SEE DOW C040590)
 - 3- 31" ILAR TO PC MK 71-9-ITTA.

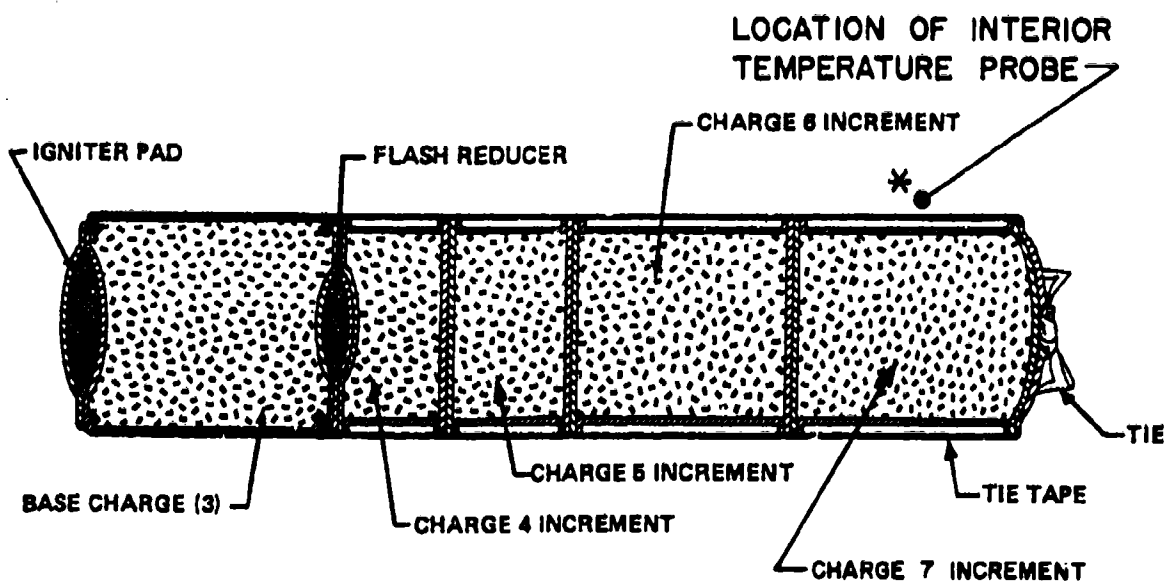
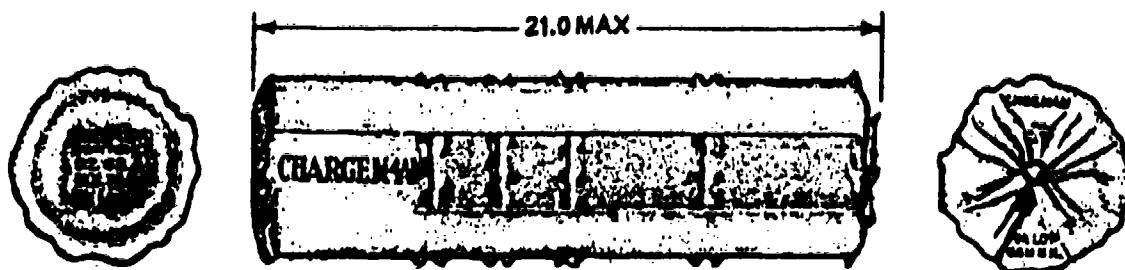
DODIC: D540

FOR LIST OF PARTS SEE

ENGINEERING PART LIST 8864406

① 8864406 PART NO. 8864406

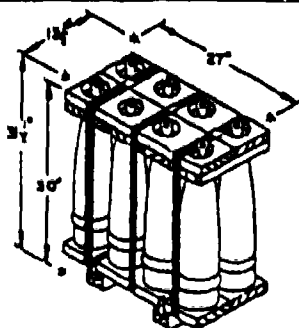
ITEM NO.	DESCRIPTION	QUANTITY	UNIT	REMARKS
1	CHARGE PROPELLANT	1	PC	SEE DOW C040590
2	IGNITER PROTECTOR CAP	1	PC	SEE DOW C040590
3	INCREMENT 1 LOADING ASSEMBLY	1	PC	SEE DOW C040590
4	INCREMENT 2 LOADING ASSEMBLY	1	PC	SEE DOW C040590
5	INCREMENT 3 LOADING ASSEMBLY	1	PC	SEE DOW C040590
6	INCREMENT 4 LOADING ASSEMBLY	1	PC	SEE DOW C040590
7	INCREMENT 5 LOADING ASSEMBLY	1	PC	SEE DOW C040590
8	CASE AND IGNITER LOADING ASSEMBLY	1	PC	SEE DOW C040590



* POSITION PROBE INSIDE CONTAINER, BUT NOT IN DIRECT CONTACT WITH CHARGE.

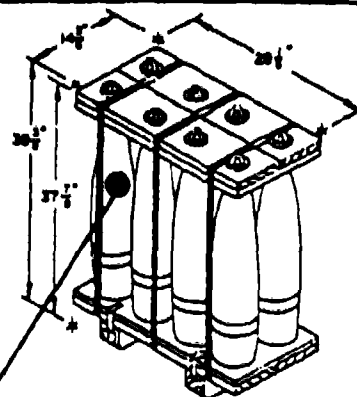
DODIC: D541

DRAFTSMAN TRS	TITLE CHARGE, PROPELLING, 155 MM WB M4 SERIES
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNAH, ILLINOIS 61074-9639



155MM 6PALLET (PALLET UNIT 1)

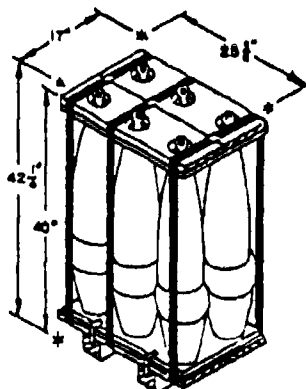
UNIT WEIGHT 888 LBS (APPROX)
CUM 6.6 CU FT



155MM 6PALLET (PALLET UNIT 2)

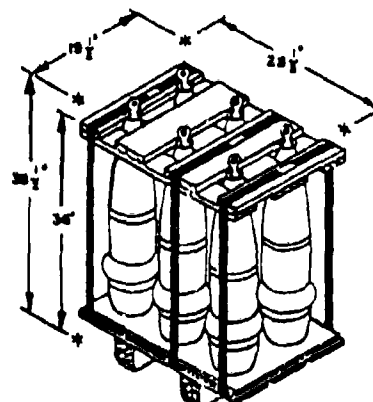
UNIT WEIGHT 874 LBS (APPROX)
CUM 9.7 CU FT

LOCATION OF
EXTERIOR
TEMPERATURE
PROBE



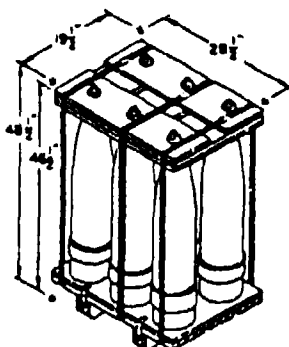
155MM 6PALLET (PALLET UNIT 3)

UNIT WEIGHT 934 LBS (APPROX)
CUM 10.7 CU FT



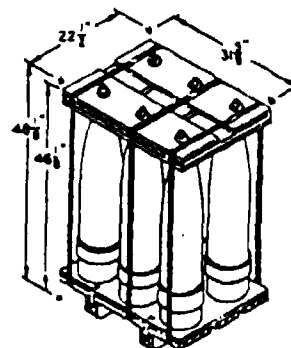
8\"/>

UNIT WEIGHT 1,256 LBS (APPROX)
CUM 12.4 CU FT



8\"/>

UNIT WEIGHT 1,276 LBS (APPROX)
CUM 12.4 CU FT



8\"/>

UNIT WEIGHT 1,301 LBS (APPROX)
CUM 12.8 CU FT

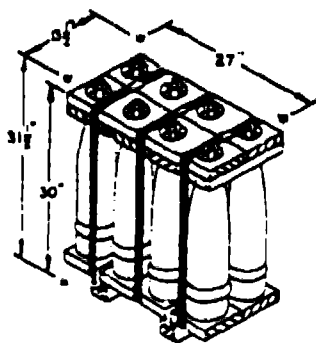
PALLET UNIT DETAILS

DODIC: D579

DRAFTSMAN *TRS*
TEST ENGINEER
CHIEF, VALIDATION ENGINEERING DIVISION

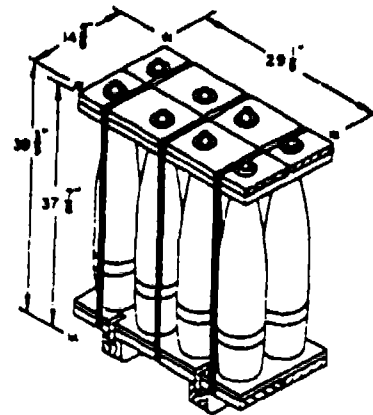
TITLE
155 MM PROJECTILE: HE, RA

U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNAH, ILLINOIS 61074-9639



155MM 6/PALLET (SMALL)

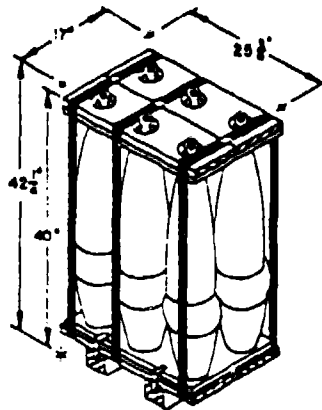
UNIT WEIGHT 800 LBS (APPROX)
CUBE 6.9 CU FT



155MM 6/PALLET (LARGE)

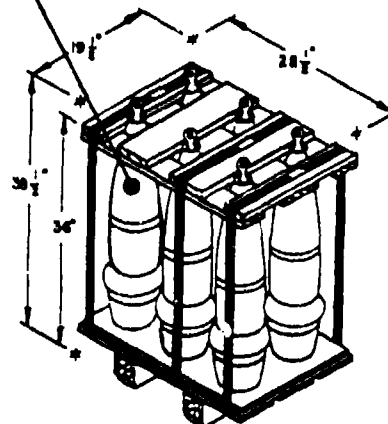
UNIT WEIGHT 800 LBS (APPROX)
CUBE 9.7 CU FT

LOCATION
OF EXTERIOR
TEMPERATURE
PROBE



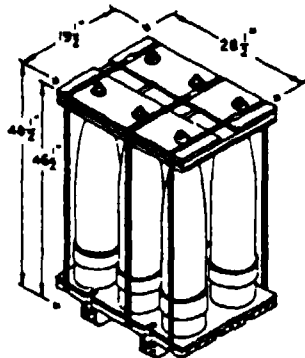
175MM 6/PALLET

UNIT WEIGHT 904 LBS (APPROX)
CUBE 10.7 CU FT



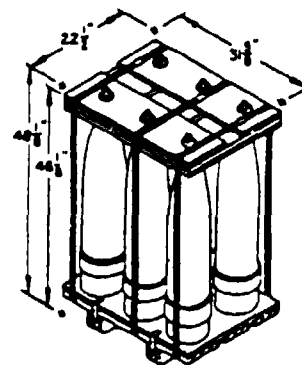
8\"/>

UNIT WEIGHT 1,226 LBS (APPROX)
CUBE 12.4 CU FT



8\"/>

UNIT WEIGHT 1,226 LBS (APPROX)
CUBE 12.4 CU FT



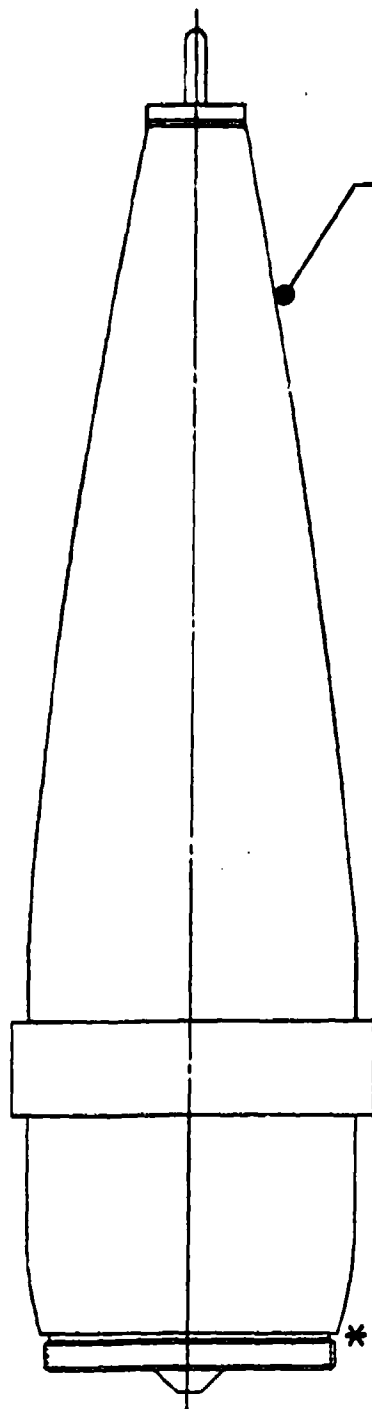
8\"/>

UNIT WEIGHT 1,301 LBS (APPROX)
CUBE 19.3 CU FT

PALLET UNIT DETAILS

DODIC: D624

DRAFTSMAN TRS	TITLE 8 INCH PROJECTILE, RA, HE: M650
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639



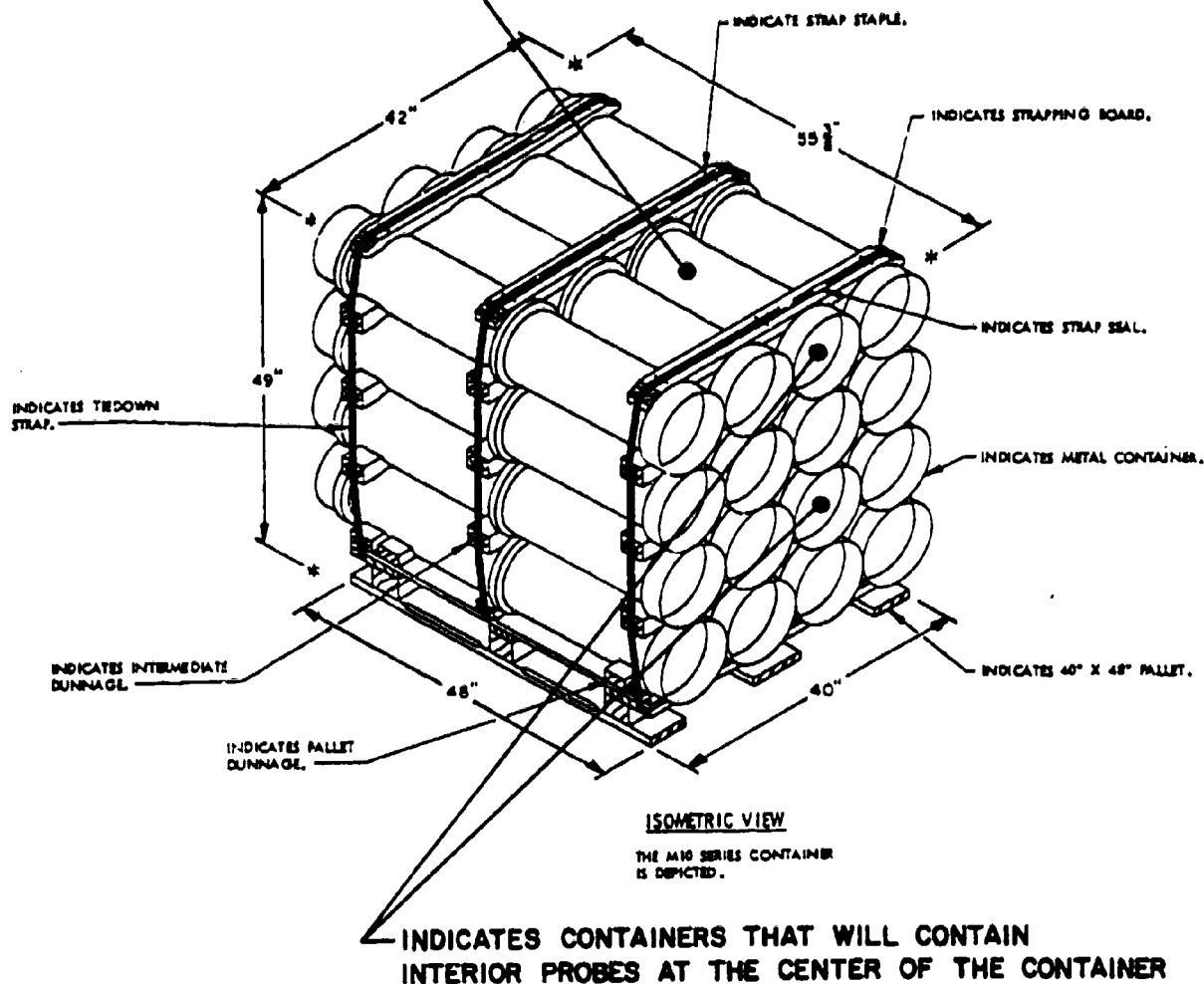
INDICATES LOCATION OF
INTERIOR TEMPERATURE
PROBE

*NO INSTRUMENTATION
SHOULD BE POSITIONED
ON OR NEAR LOWER
PROJECTILE BODY DUE
TO PRESENCE OF ROCKET
MOTOR PROPELLANT

DODIC: D624

DRAFTSMAN TRS	TITLE 8 INCH PROJECTILE
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 6:074-9639

LOCATION OF EXTERIOR
TEMPERATURE PROBE



DODIC: D662

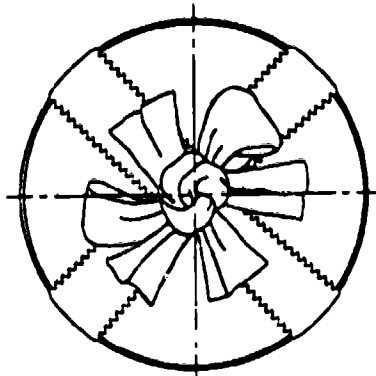
DRAFTSMAN TR5	TITLE 8 IN. PROP CHARGE, XM188E2, FOR 8 INCH HOW.; SP, M110E2
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNAH, ILLINOIS 61074-9639

INCREMENT 8 LOADING ASSEMBLY-927775

1000 4
UNCLAS
DIA

INCREMENT 9 LOADING ASSEMBLY 927780

**INDICATES LOCATION OF INTERIOR
TEMPERATURE PROBE**



5-107-3

REDUCER FLASH, PROP CHG: M3
FOR 8 INCH HOW M1/M2 - 888016

Notes:

1 - SPEC MIII - A - 2530 AMU WM - C - 42148 Δ POLY.

2-2-76

3. SELECT STRIPS AS FOLLOWS: OVERLAP 2 SETS
WITH THE EACH SET WITH SOME RING

2. INHYMCO'S APPLIES TO WINTER SEAM OF BASIC ICATER END

4. DIMENSIONS APPLIES TO WHOLE SEAL OF BASE IGNITER END
5. ONE IGNITER PROTECTOR CAP 8849912-4 OR ALTERNATIVE MUST BE PLACED OVER IGNITER END OF CHARGE WHEN PACKED FOR SHIPMENT AND REMOVED BEFORE FIRING.

DODIC: D662

[illegible]

SEAL FOR 3/4" STRAPPING
(7 REQD, 1 PER STRAP). CRIMP EACH
SEAL WITH TWO PAIR OF NOTCHES.

TIEDOWN STRAP, 3/4" X .035" OR .031"
X 14'-4" LONG STEEL STRAPPING (4 REQD).
SEE GENERAL NOTE "D" AT RIGHT.

LOCATION OF
EXTERIOR TEMPERA-
TURE PROBE

40" X 48"
PALLET.

LOAD STRAP,
3/4" X .035" OR
.031" X 15'-9" LONG
STEEL STRAPPING (3 REQD).
SEE GENERAL NOTE
"C" AT RIGHT.

TYPICAL LOCATION FOR
SECUREMENT OF A STRAP
CUTTER. SEE GENERAL
NOTE "F" AT RIGHT.

PALLET UNIT

SEE GENERAL NOTE "B" AT RIGHT.

48 BOXES OF HAND GRENADE (16 PER BOX) @ 43 LBS -----	2,064 LBS (APPROX)
DUNNAGE-----	8 LBS
PALLET-----	80 LBS

TOTAL WEIGHT-----	2,152 LBS (APPROX)
CUBE -----	54.3 CU FT (APPROX)

* NOTE:

POSITION PROBES INSIDE FIBER CONTAINER WITH INERT GRENADE

DODIC: G881

DRAFTSMAN <i>TRS</i>	TITLE GRENADES (GENERAL)
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNAH, ILLINOIS 61074-9639

7-41

LOCATION OF EXTERIOR TEMPERATURE PROBE

TIEDOWN STRAP, 3/4" X .003" OR .001" X 13'-2"
LONG STEEL STRAPPING (4 REQD). SEE
GENERAL NOTE "K" AT RIGHT.

SEAL FOR 3/4" STRAPPING (6 REQD, 1 PER
STRAP). CRIMP EACH SEAL WITH TWO PAIR
OF NOTCHES.

STRAPPING BOARD ASSEMBLY (2
REQD). SEE THE "STRAPPING
BOARD ASSEMBLY" DETAIL BELOW.
STAPLE TIEDOWN STRAPS TO
"STRAPPING BOARD ASSEMBLY"
AS SHOWN.

RISER ASSEMBLY
(2 REQD). SEE
THE "RISER ASSEM-
BLY" DETAIL BELOW.
STAPLE HORIZONTAL
STRAPS TO THE
"RISER ASSEMBLY"
AS SHOWN.

INDICATES TYPE
II SKID BASE. SEE
GENERAL NOTE "C"
AT RIGHT.

HORIZONTAL STRAP, 3/4" X
.003" OR .001" X 13'-0" LONG
STEEL STRAPPING (2 REQD).
SEE GENERAL NOTE "J" AT
RIGHT.

TYPICAL LOCATION FOR SECURE-
MENT OF A STRAP CUTTER. SEE
GENERAL NOTE "E" AT RIGHT.

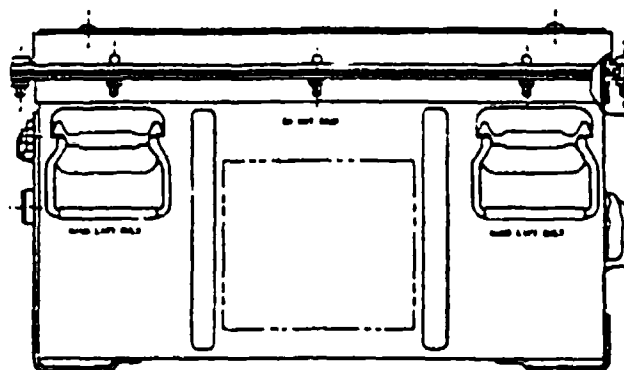
INDICATES LOCATION
OF INTERIOR TEMPER-
ATURE PROBE

SKIDDED UNIT

SEE GENERAL NOTE "B" AT RIGHT.

6 BOXES OF MINES (40 PER METAL BOX) @ 219 LBS	-----1,314 LBS (APPROX)
DUNNAGE	-----91 LBS
SKID	-----33 LBS

TOTAL WEIGHT	-----1,438 LBS (APPROX)
CUBE	-----25.5 CU FT (APPROX)



METAL CONTAINER

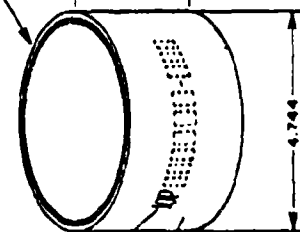
DODIC: K184

DRAFTSMAN TRS	TITLE M74 / M75 MINE, GEMSS
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNAH, ILLINOIS 61074-9639

* POSITION IN BOX,
NOT IN CONTACT
WITH CONTAINER

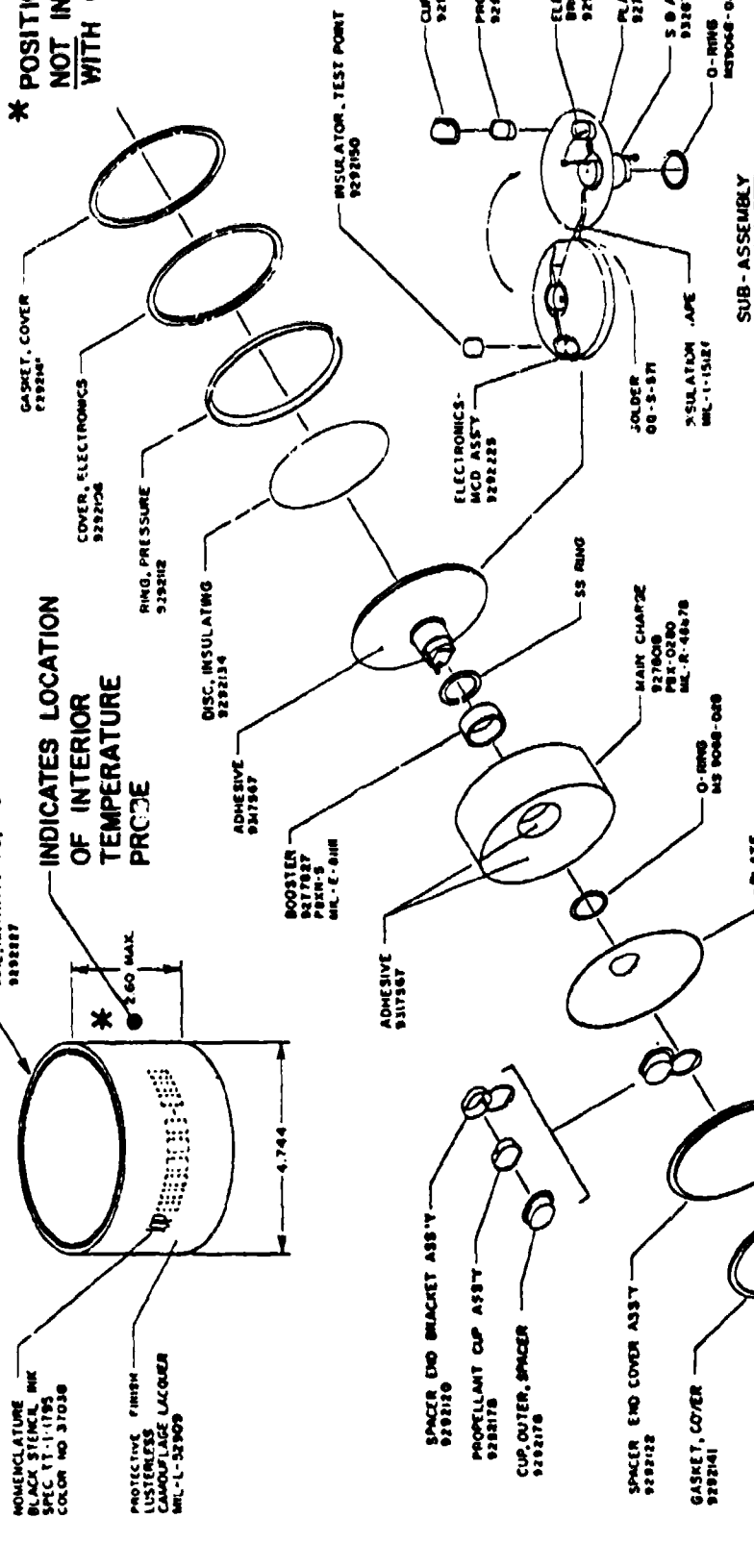
INDICATES LOCATION
OF INTERIOR
TEMPERATURE
PROBE

MINE, ANTITANK; HE, M75
9292227



NOUENCLATURE
MARK 3 (1) (1) (1) (1)
SPEC 17 (1) (1) (1) (1)
COLOR NO 31030

PROTECTIVE FINISH
LUSTERLESS
CAMOUFLAGE LACQUER
MIL-L-52909



SUB-ASSEMBLY

ITEM	QUANTITY	REMARKS
1	1	MINIATURE
2	1	MINIATURE
3	1	MINIATURE
4	1	MINIATURE
5	1	MINIATURE
6	1	MINIATURE
7	1	MINIATURE
8	1	MINIATURE
9	1	MINIATURE
10	1	MINIATURE

DESIGNED BY: <i>James F. Kasper - S. H. Kasper</i>	
CHECKED BY: <i>James F. Kasper</i>	
APPROVED BY: <i>James F. Kasper</i>	
DATE: <i>10/1/54</i>	
PROJECT: <i>OWA ARMY AMMUNITION PLANT</i>	
DRAWING NO: <i>9292227</i>	
MINE, ANTITANK; HE, M75 (EXPLODED VIEW)	

DODIC: K184

LOAD STRAP, 3/4" X .035"
OR .031" X 13'-11" LONG
STEEL STRAPPING (3 REQD).
SEE GENERAL NOTE "C"
AT RIGHT.

SEAL FOR 3/4" STRAPPING
(7 REQD, 1 PER STRAP).
CRIMP EACH SEAL WITH TWO
PAIR OF NOTCHES.

LOCATION OF EXTERIOR
TEMPERATURE PROBE

TIEDOWN STRAP,
3/4" X .035" OR
.031" X 12'-9" LONG
STEEL STRAPPING
(4 REQD). SEE GENERAL
NOTE "D" AT RIGHT.

FOR POSITIONING
OF BOXES SEE
GENERAL NOTE
"J" AT RIGHT.

40" X 48" PALLET.

INDICATES LOCATION OF
INTERIOR TEMPERATURE PROBE

TYPICAL LOCATION
FOR SECUREMENT OF A
STRAP CUTTER. WIRE TIE
TO STRAP. SEE GENERAL
NOTE "F" AT RIGHT.

PALLET UNIT

SEE GENERAL NOTE "B" AT RIGHT.

36 BOXES OF FUZES (16 PER BOX) @ 60 LBS	-----	2,160 LBS (APPROX)
DUNNAGE	-----	7 LBS
PALLET	-----	80 LBS
TOTAL WEIGHT		----- 2,247 LBS (APPROX)
CUBE		----- 40.7 CU FT (APPROX)

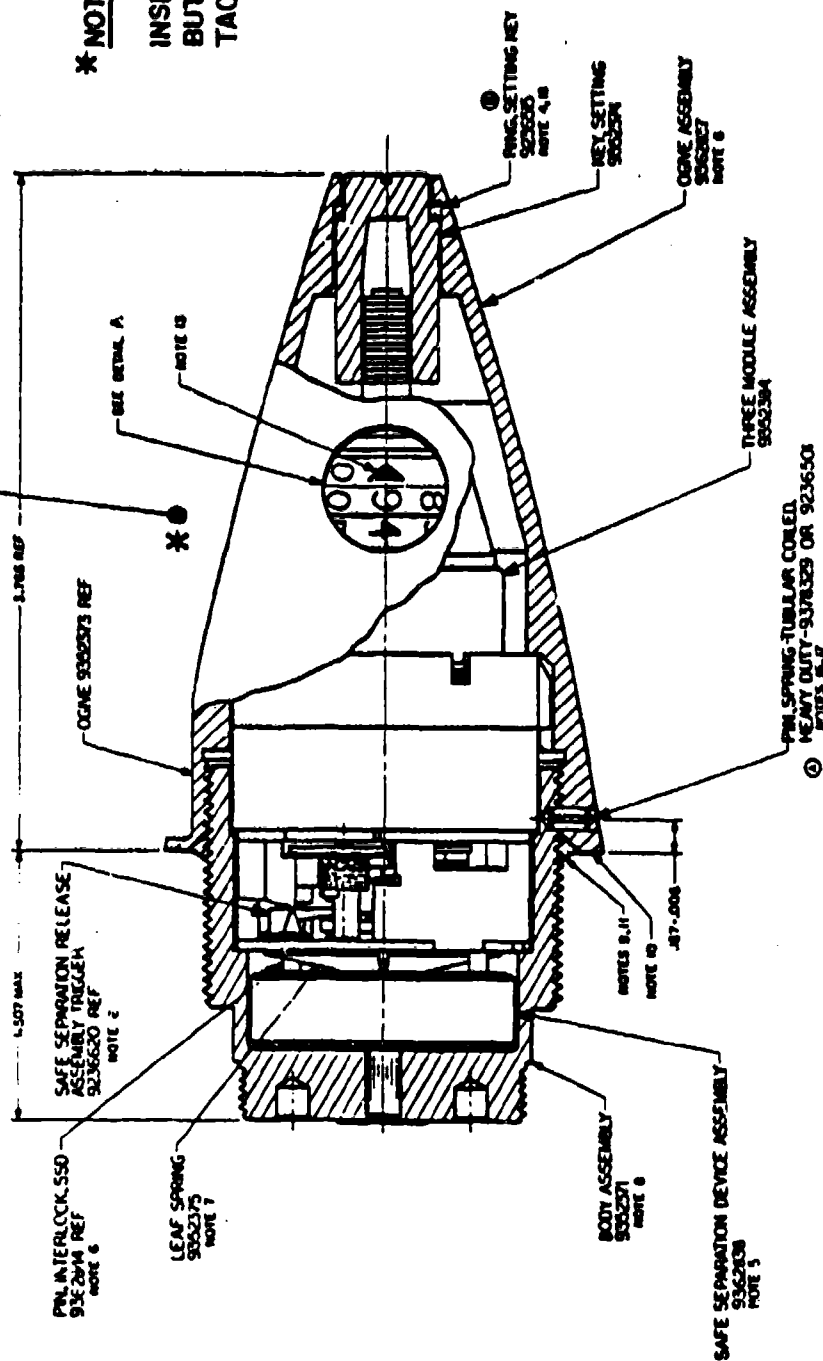
DODIC: N285

DRAFTSMAN <i>TRS</i>	TITLE M577A1 FUZE
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639	

0	0
SA 2	SA 1

*** NOTE:**

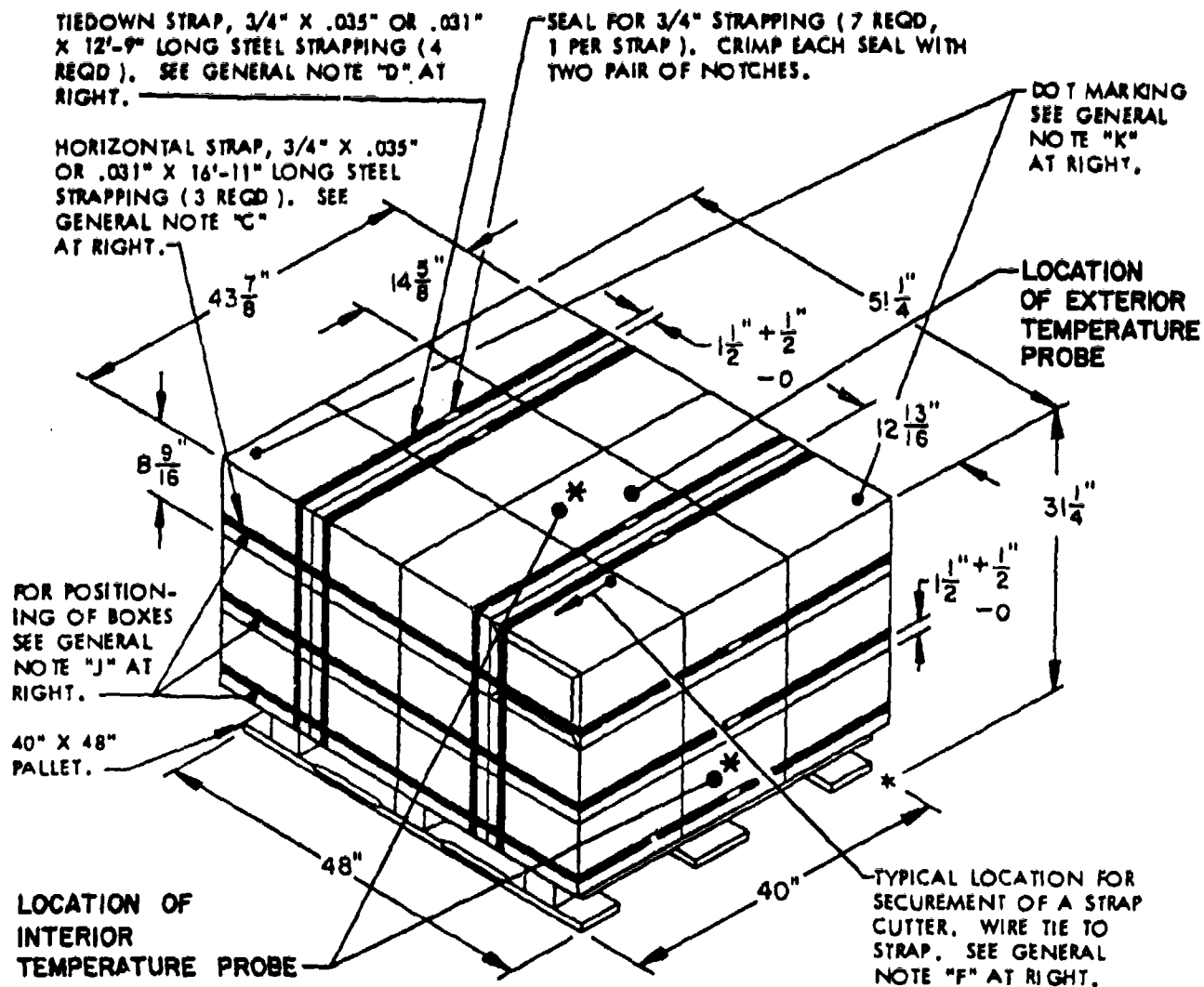
AFFIX PROBE TO
INSIDE METAL CONTAINER,
BUT NOT IN DIRECT CON-
TACT WITH LIVE FUZE



NOTES:
(- FOR VEDS AND NOTES THE SHEET 2 OF 2.

DODIC: N285

[illegible]



PALLET UNIT A

SEE GENERAL NOTE "B" AT RIGHT.

36 BOXES OF FUZES (16 PER BOX) @ 50 LBS -----	1,800 LBS (APPROX)
DUNNAGE -----	8 LBS
PALLET -----	80 LBS

* POSITION INTERIOR TEMPERATURE PROBES INSIDE METAL CONTAINERS, BUT NOT IN CONTACT WITH FUZES

TOTAL WEIGHT -----	1,888 LBS (APPROX)
CUBE -----	40.7 CU FT (APPROX)

DODIC: N464

DRAFTSMAN <i>TRS</i>	TITLE M732 FUZE
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639

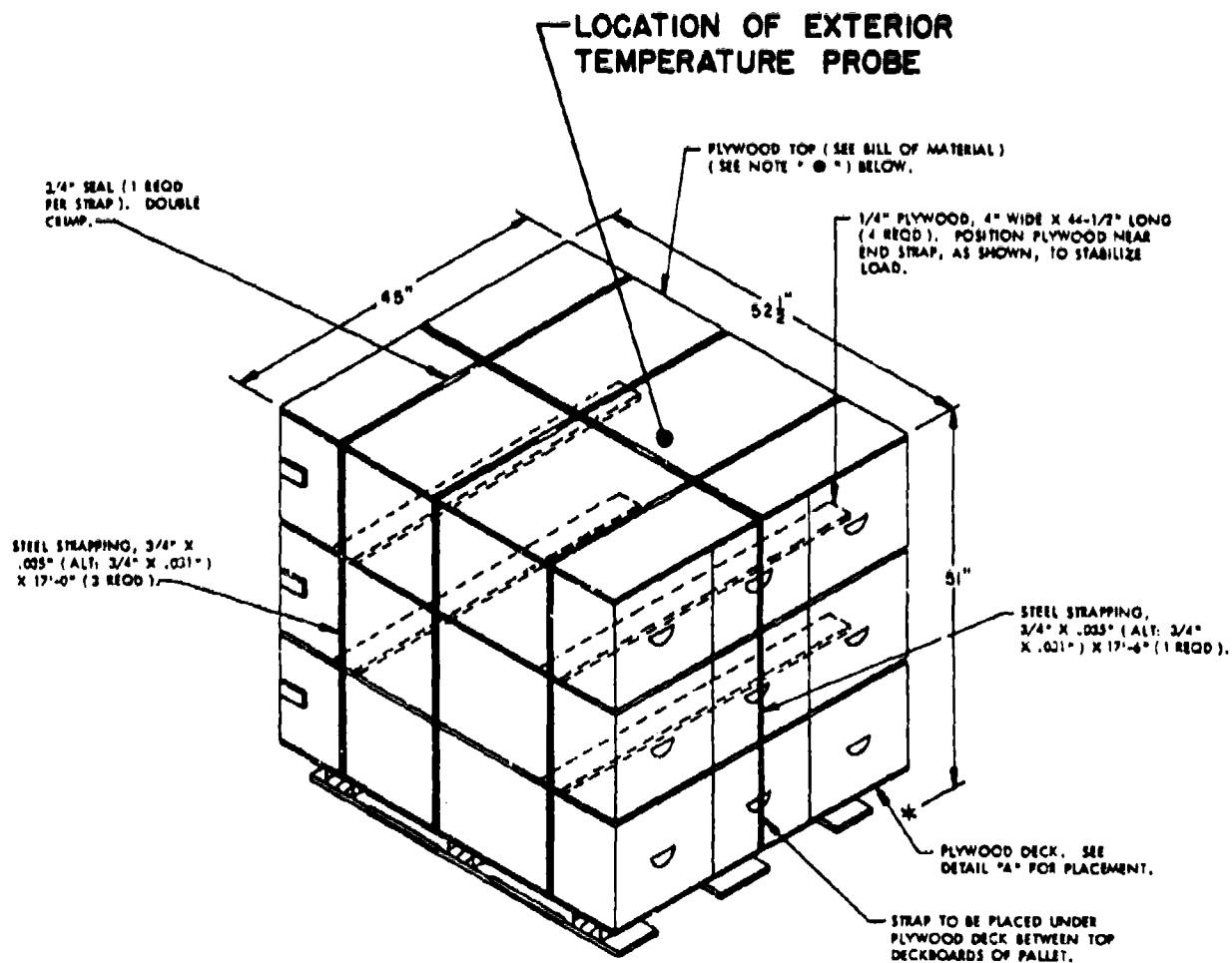
INDICATES LOCATION
OF INTERIOR TEMPERATURE PROBE



- * DO NOT POSITION INTERIOR TEMPERATURE PROBE IN CONTACT WITH FUZE BODY

DODIC: N464

[illegible]



UNIT ASSEMBLY

DODIC: PA45

DRAFTSMAN TRS	TITLE SHILLELAGH MISSILES
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9626

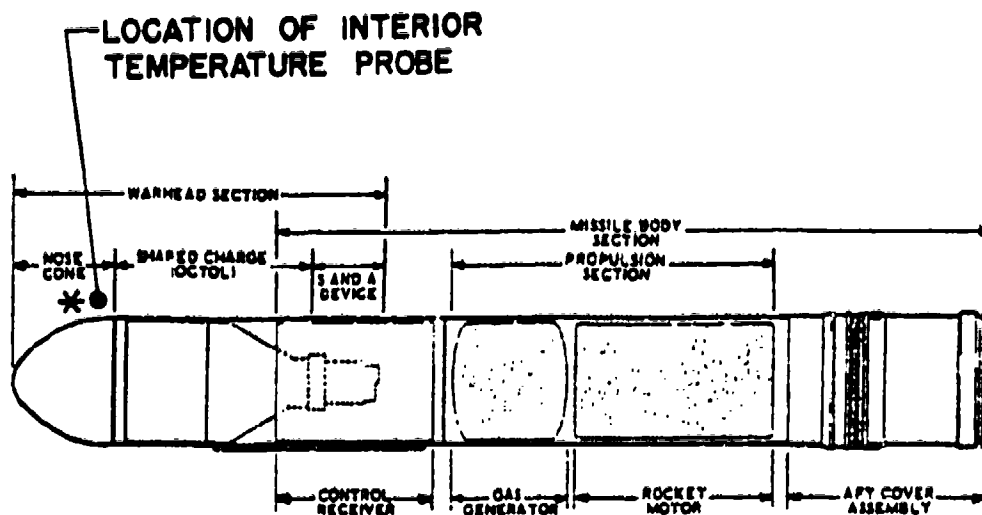
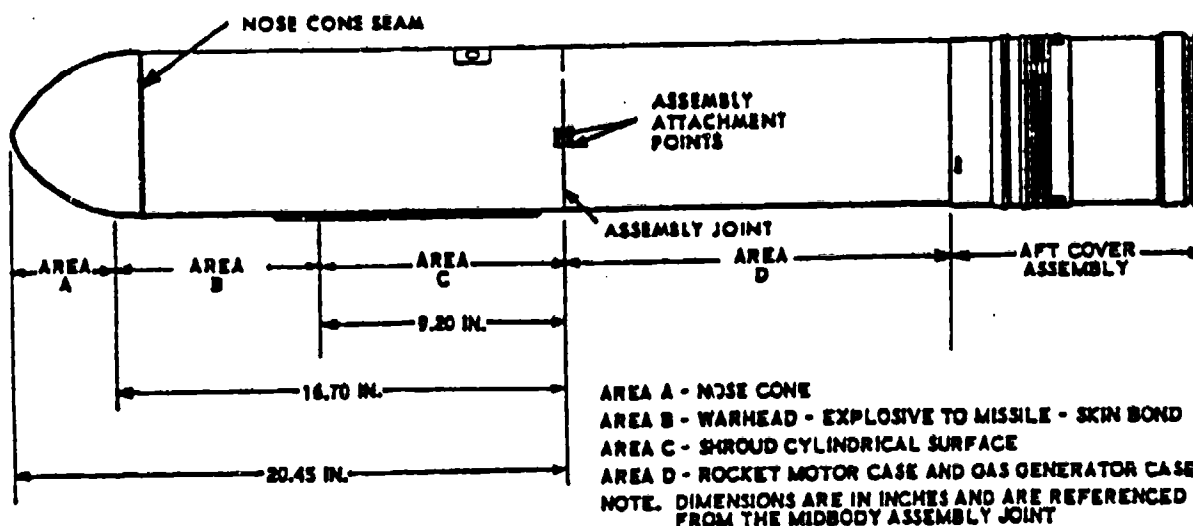


Figure 1-2. SHILLELAGH missile MGM-51A, MGM-51B, or MGM-51C - cutaway view.



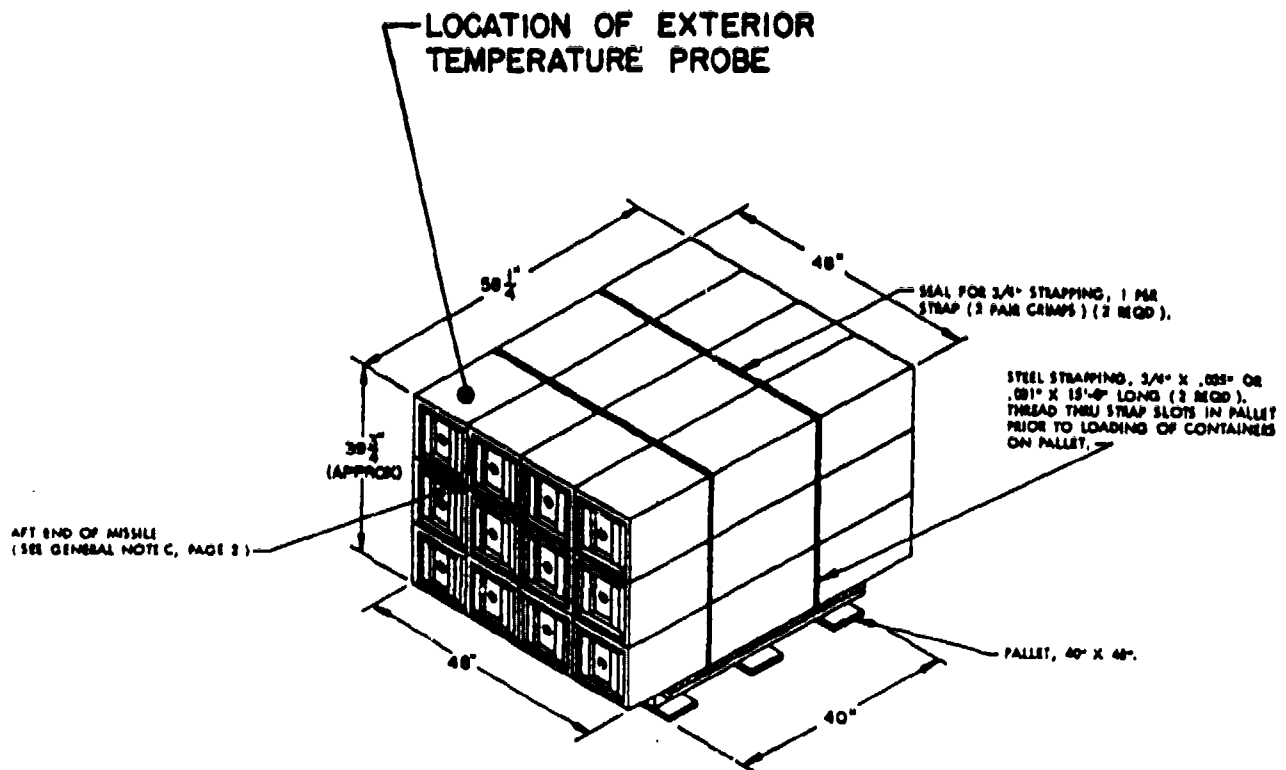
ORD G314,508A

Figure 1. Missile inspection areas.

* POSITION PROBE INSIDE CONTAINER, BUT NOT IN DIRECT CONTACT WITH MISSILE.

DODIC: PA45

DRAFTSMAN TRS	TITLE SHILLELAGH MISSILE
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNAH, ILLINOIS 61074-9639

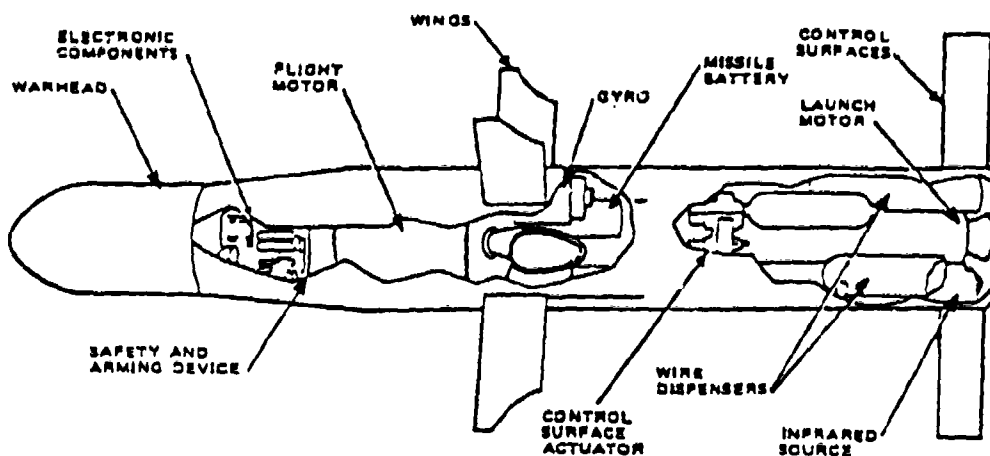


PALLET UNIT

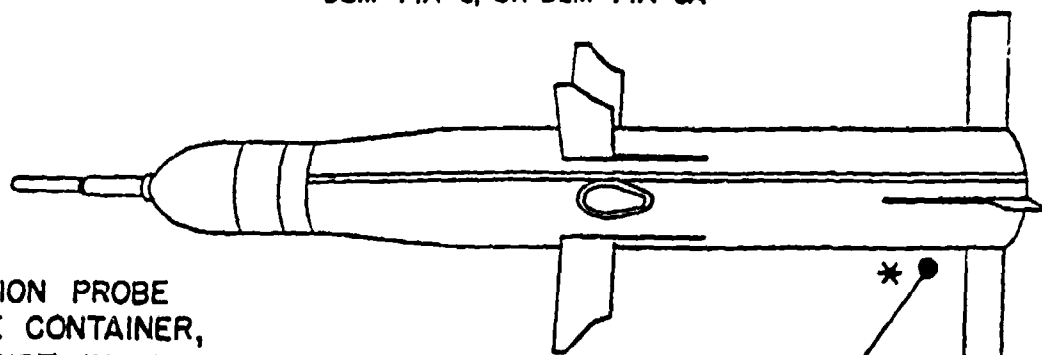
12 BOXES OF TOW MISSILE (1 PER BOX) -- 87 LBS	1,044 LBS (APPROX)
DUMMAGE	3 LBS
PALLET	89 LBS
TOTAL WEIGHT	1,177 LBS (APPROX)
CUBE	64.3 CU FT (APPROX)

DODIC: PB93

DRAFTSMAN TRS	TITLE TOW2/TOW2A/ITOW
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639



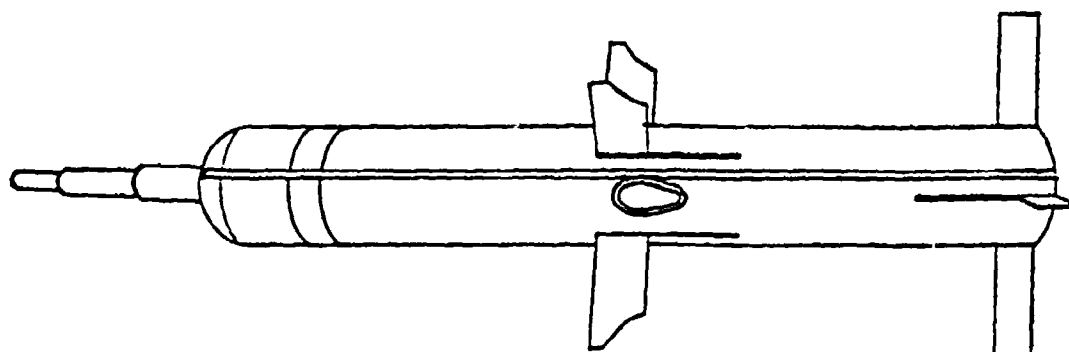
BGM-71A, BGM-71A-1, BGM-71A-2, BGM-71A-2A,
BGM-71A-3, OR BGM-71A-3A



*
POSITION PROBE
INSIDE CONTAINER,
BUT NOT IN DIRECT
CONTACT WITH
MISSILE.

BGM-71C, BGM-71C-1, OR BGM-71C-1A

*
LOCATION OF
INTERIOR TEMPER-
ATURE PROBE



BGM-71D OR BGM-71E

MI 106464B

TOW MISSILES

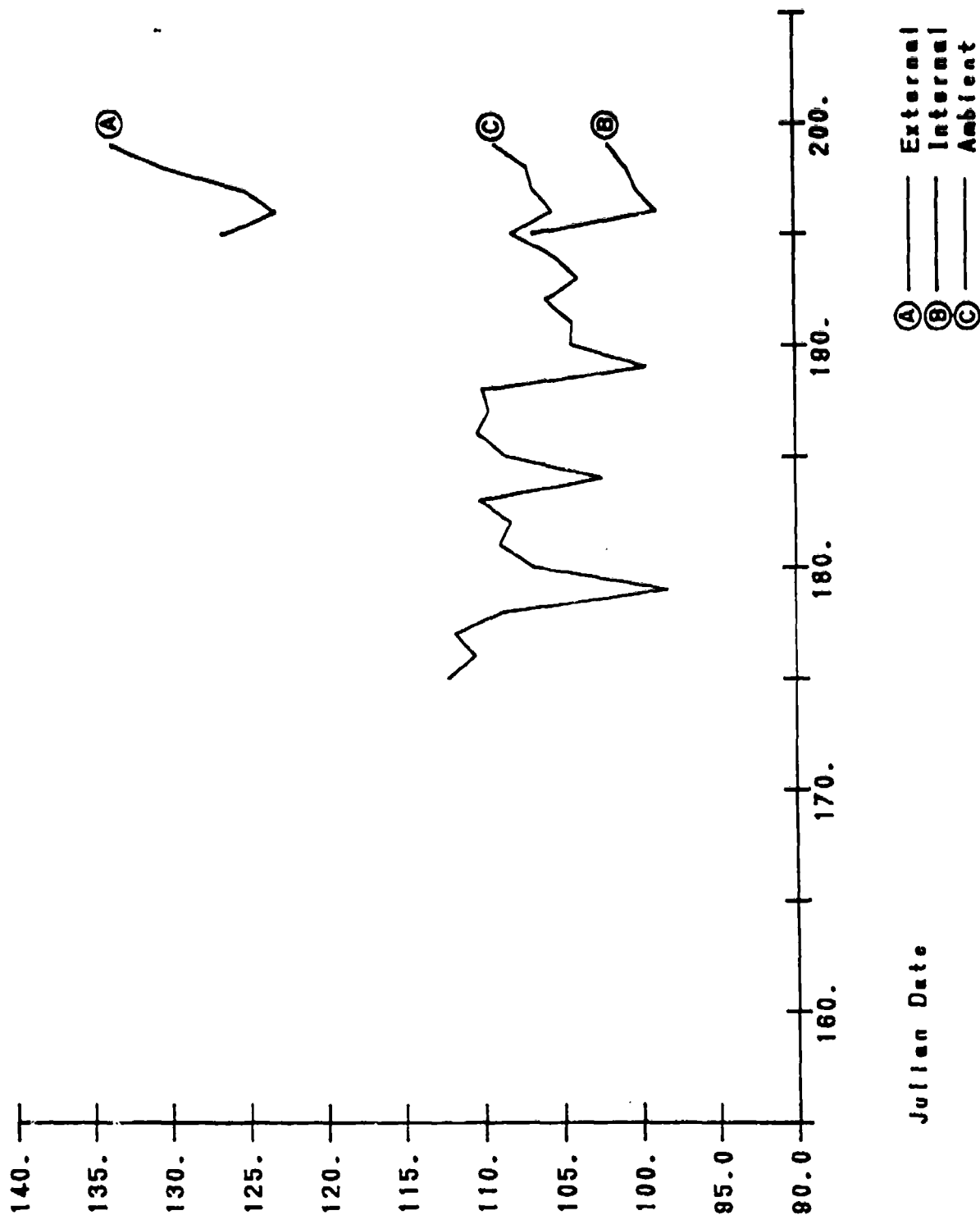
DODIC: PB93

DRAFTSMAN <i>TRS</i>	TITLE TOW MISSILES
TEST ENGINEER	
CHIEF, VALIDATION ENGINEERING DIVISION	U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL, SAVANNA, ILLINOIS 61074-9639

PART 8

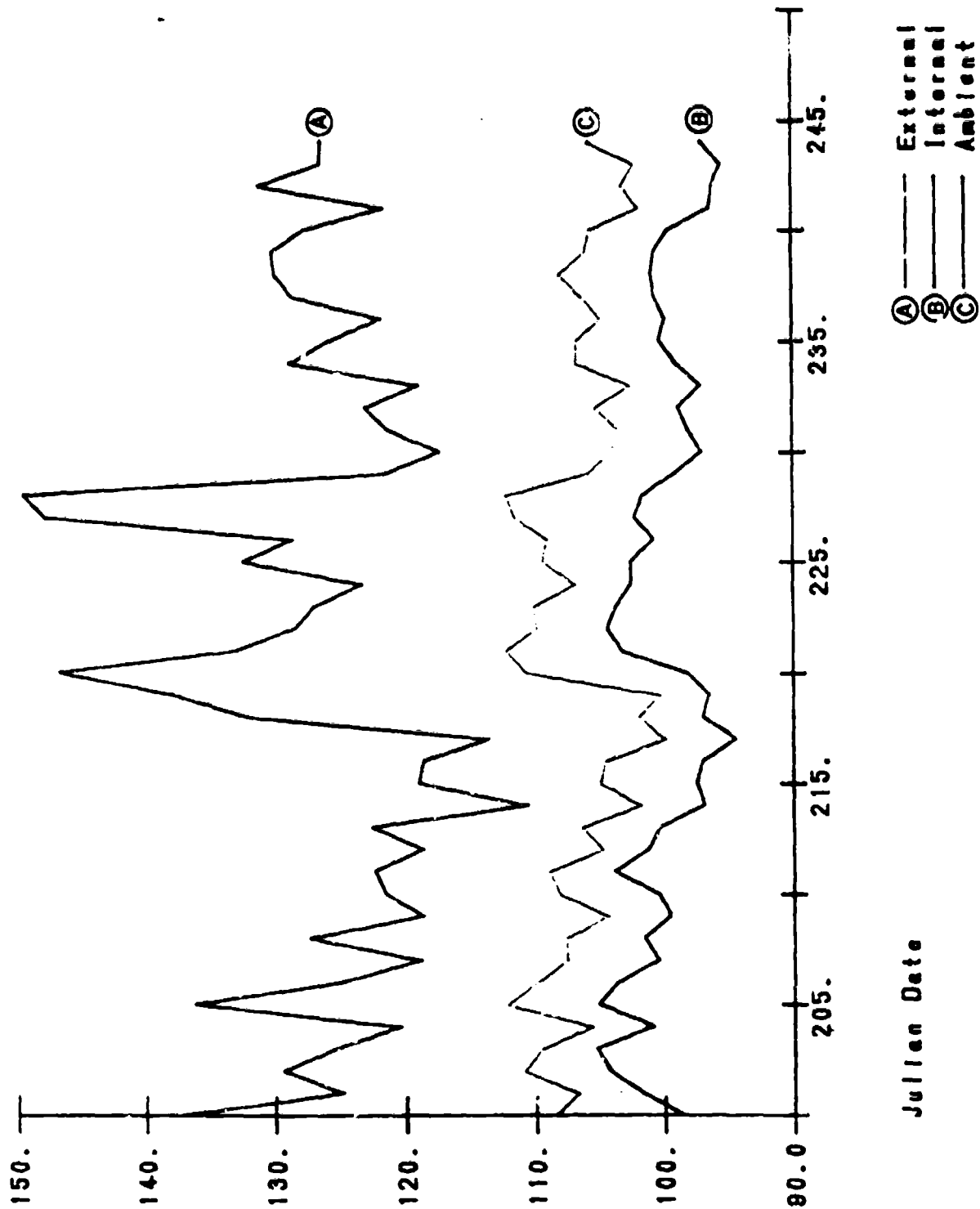
TEMPERATURE DATA GRAPHS

Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: June 4 - July 18, 1991



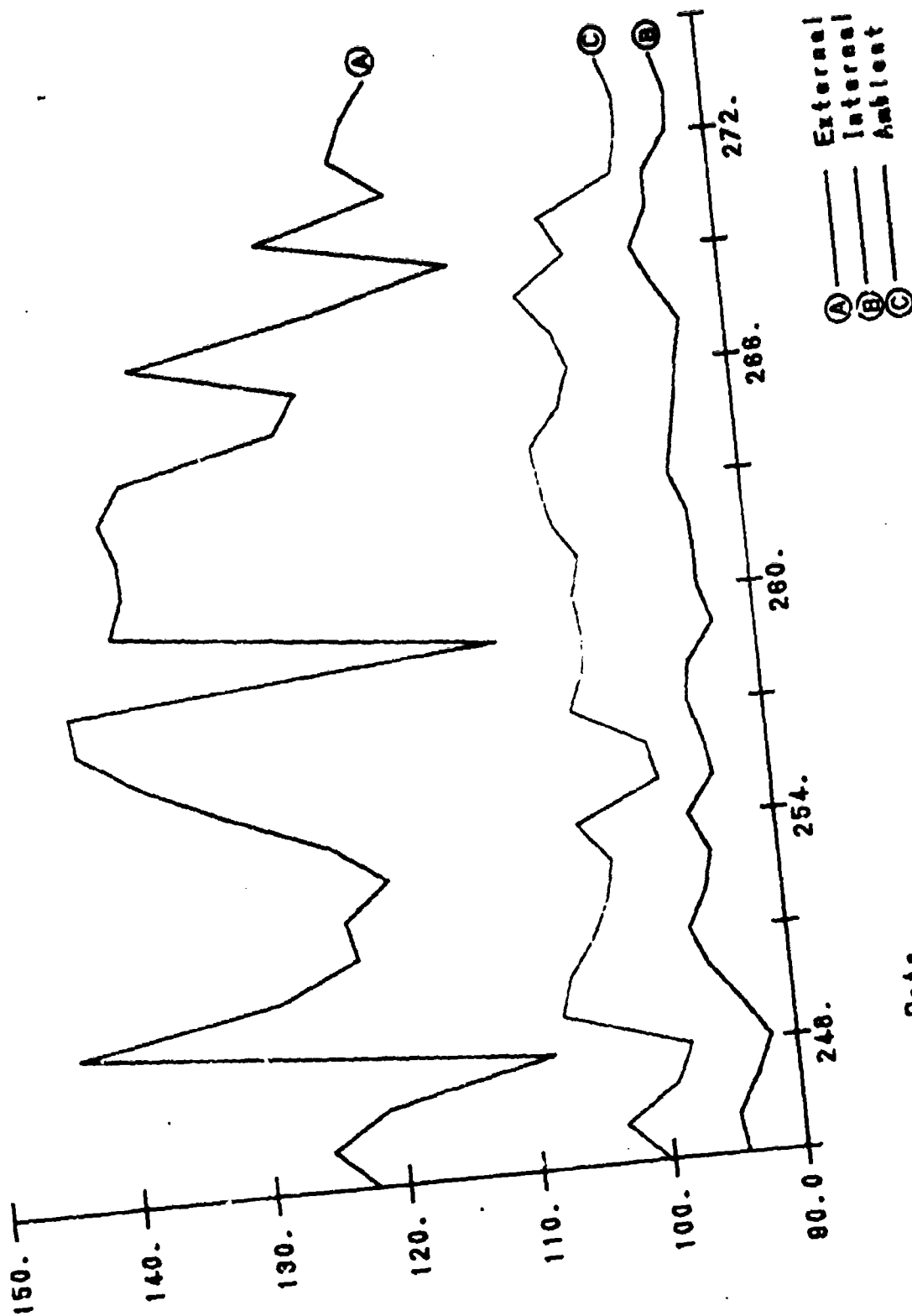
ITEM: CTO, 60MM ILLUM M83A3
 D.O.I.C: B627, LOT #: LOM-69-64
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbelli Logger #1 at TSA 1
 Date: July 18 - September 1, 1981



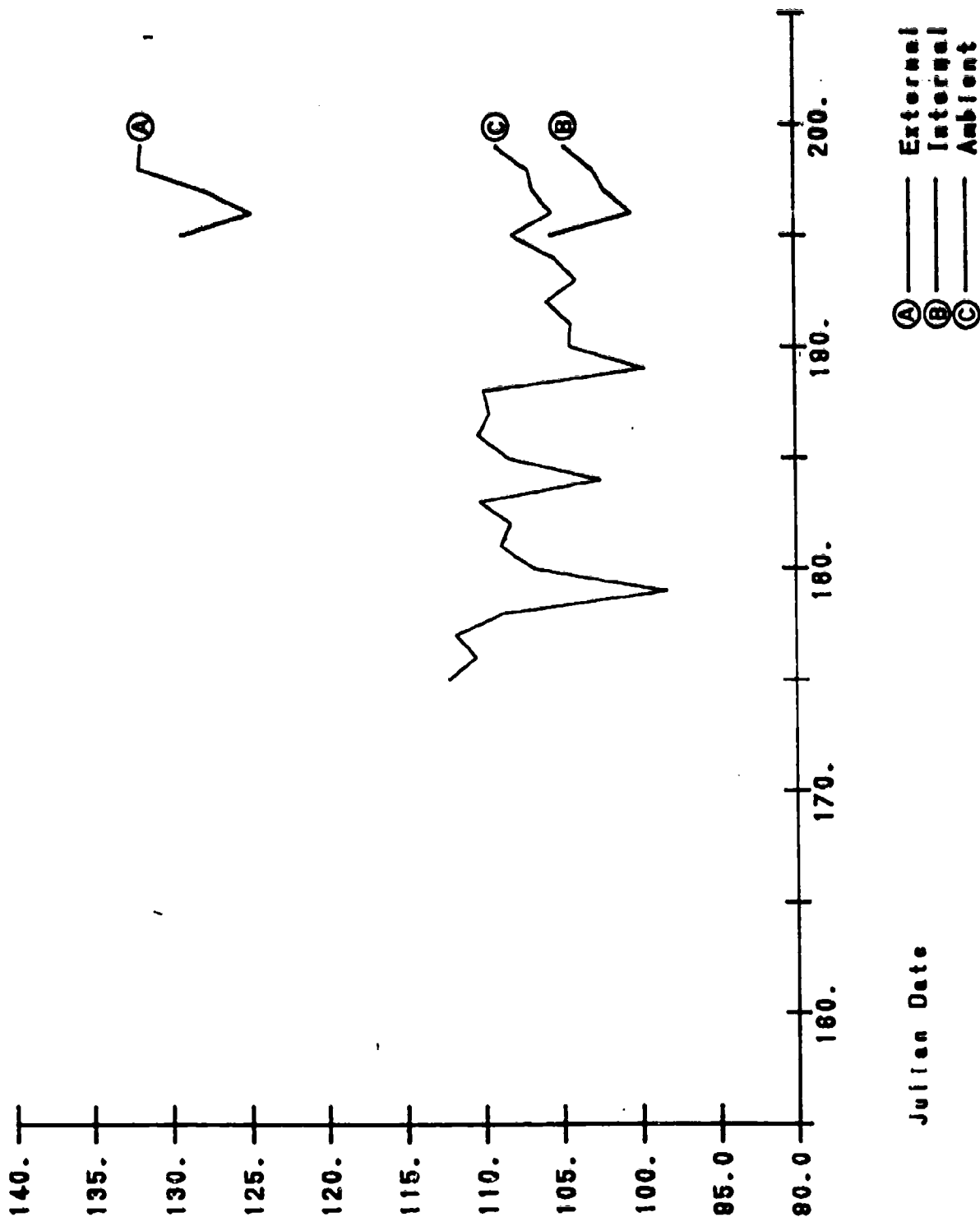
ITEM: CTG, 30MM ILLUM M83A3
 DODIC: B827, LOT #: LOM-89-84
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: September 2 - October 1, 1981



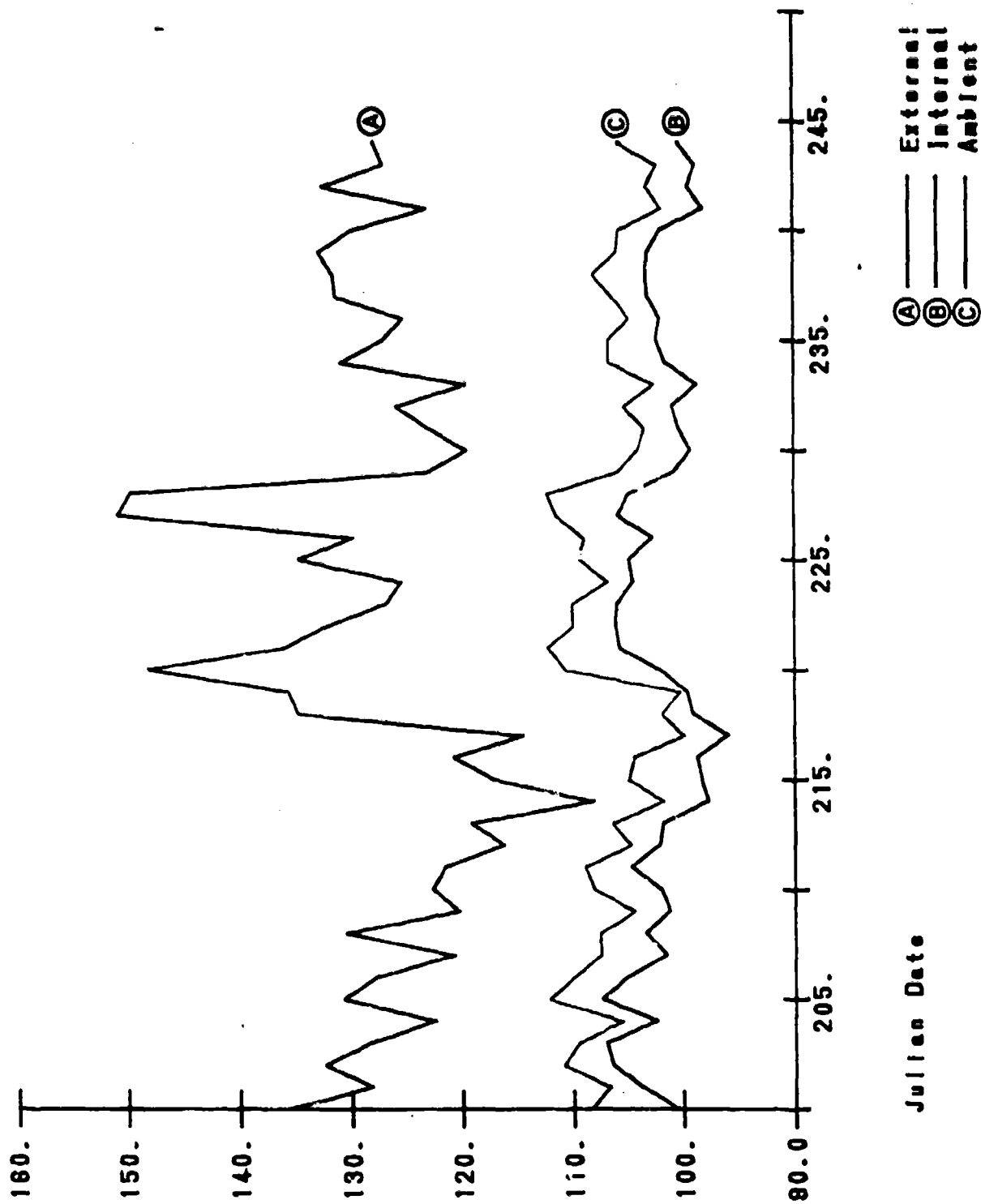
ITEM: CTG, 60MM ILLUM M83A3
 DODIC: B827, LDT #: LOM-69-64
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: June 4 - July 18, 1991



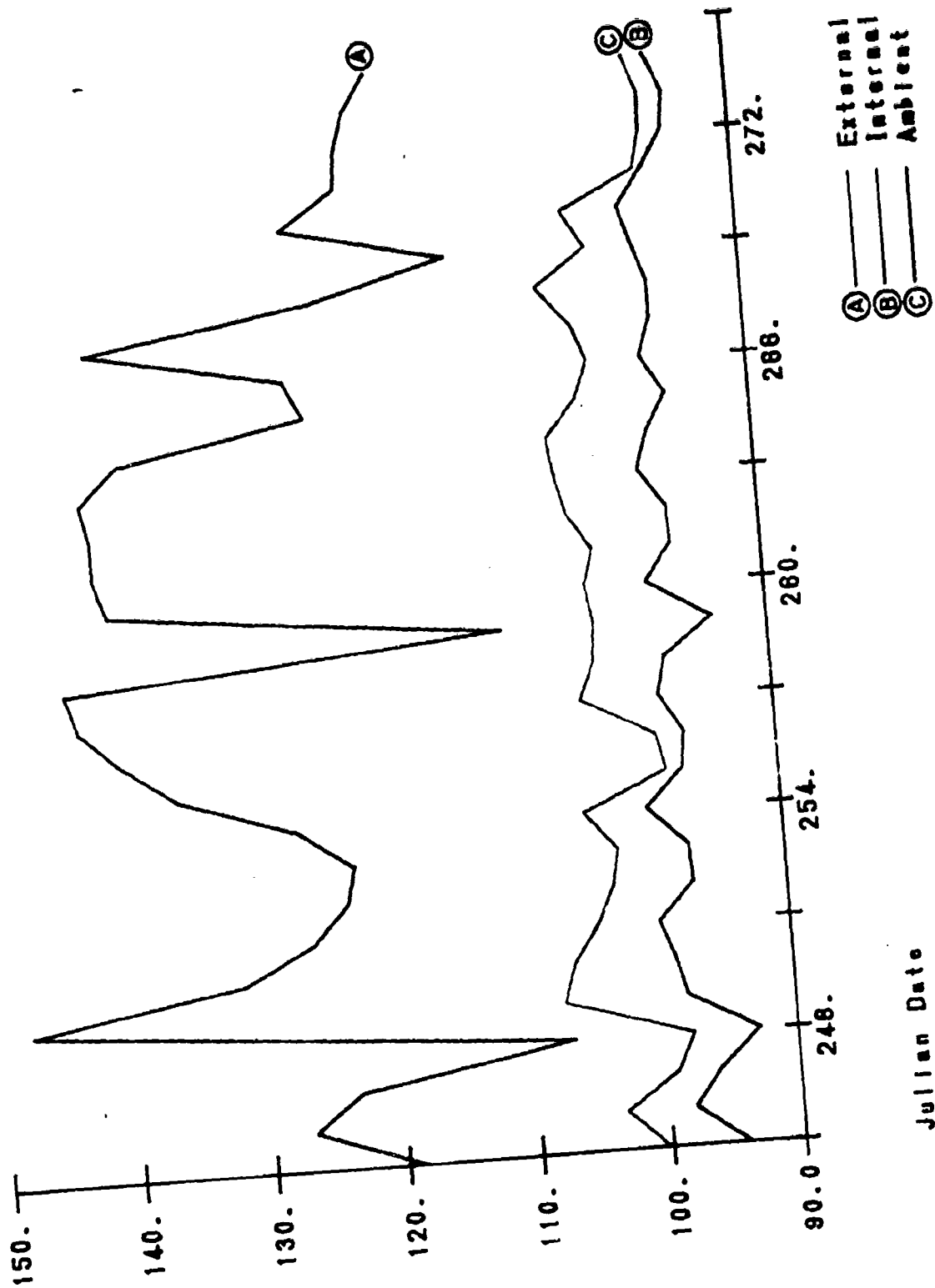
ITEM: CTO, 60MM SMK WP M302A1
 DODIC: B630, LOT #: PB-1-2A
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: July 18 - September 1, 1991



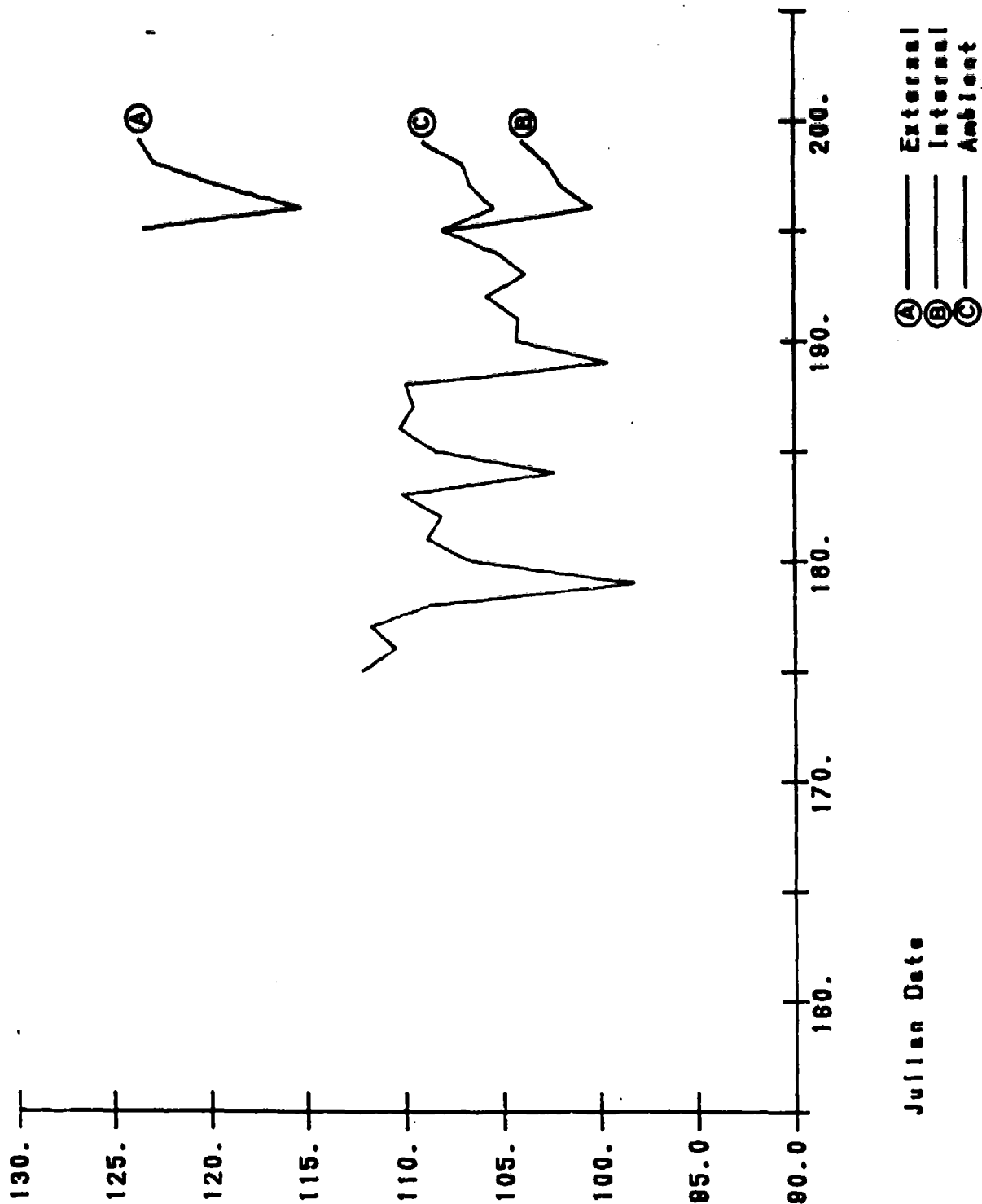
ITEM: CIG, 60MM SMK WP M302A1
 DODIC: B830, LOT #: PB-1-2A
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: September 2 - October 1, 1981



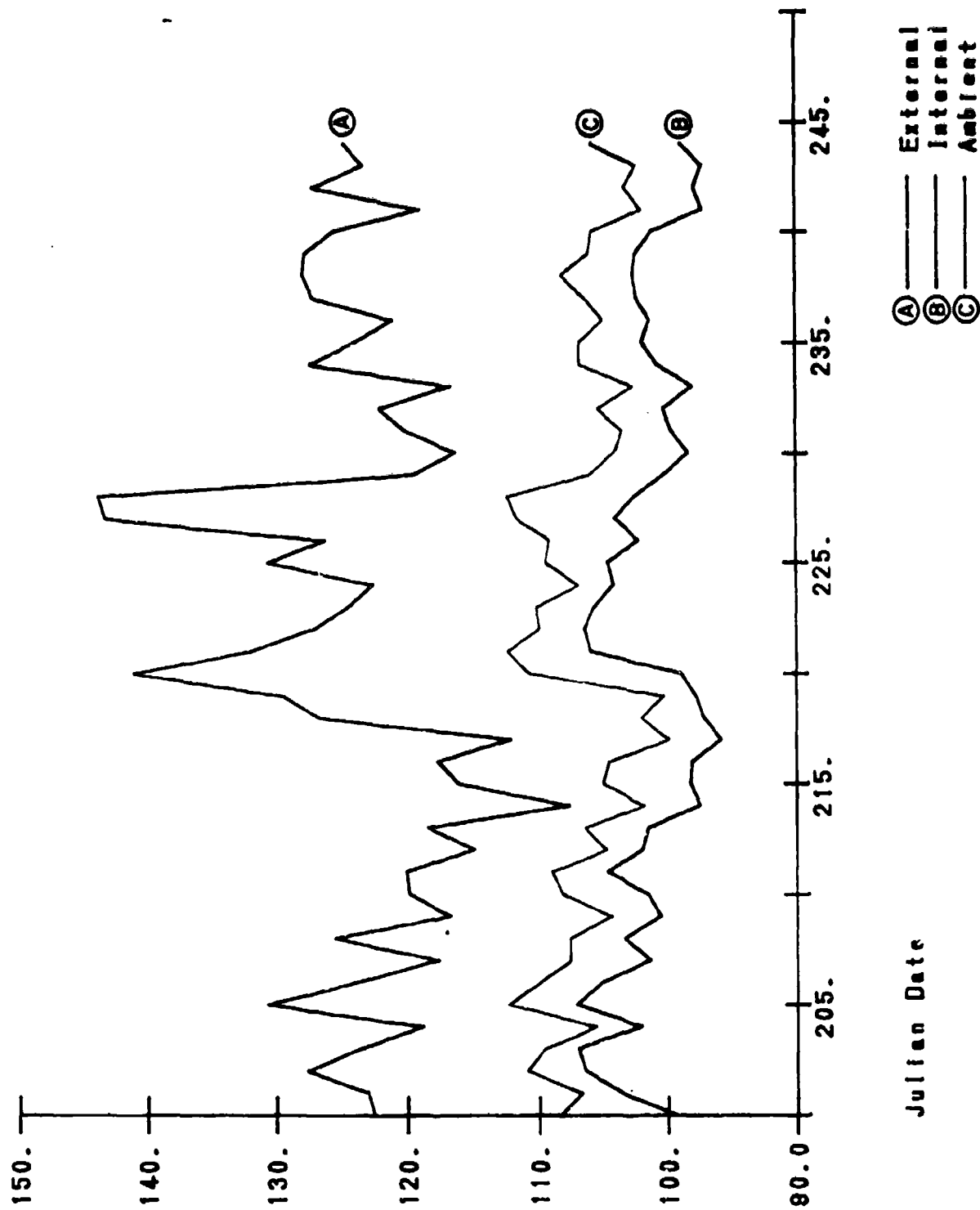
ITEM: CTG, 80MM SMK WP M302A1
 DODIC: B630, LOT #: PB-1-2A
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbelli Logger #1 at TSA 1
 Date: June 4 - July 18, 1981



ITEM: CTG, 60MM HE M49A4
 DDDIC: B632, LOT #: MA-19-88
 Degrees Fahrenheit

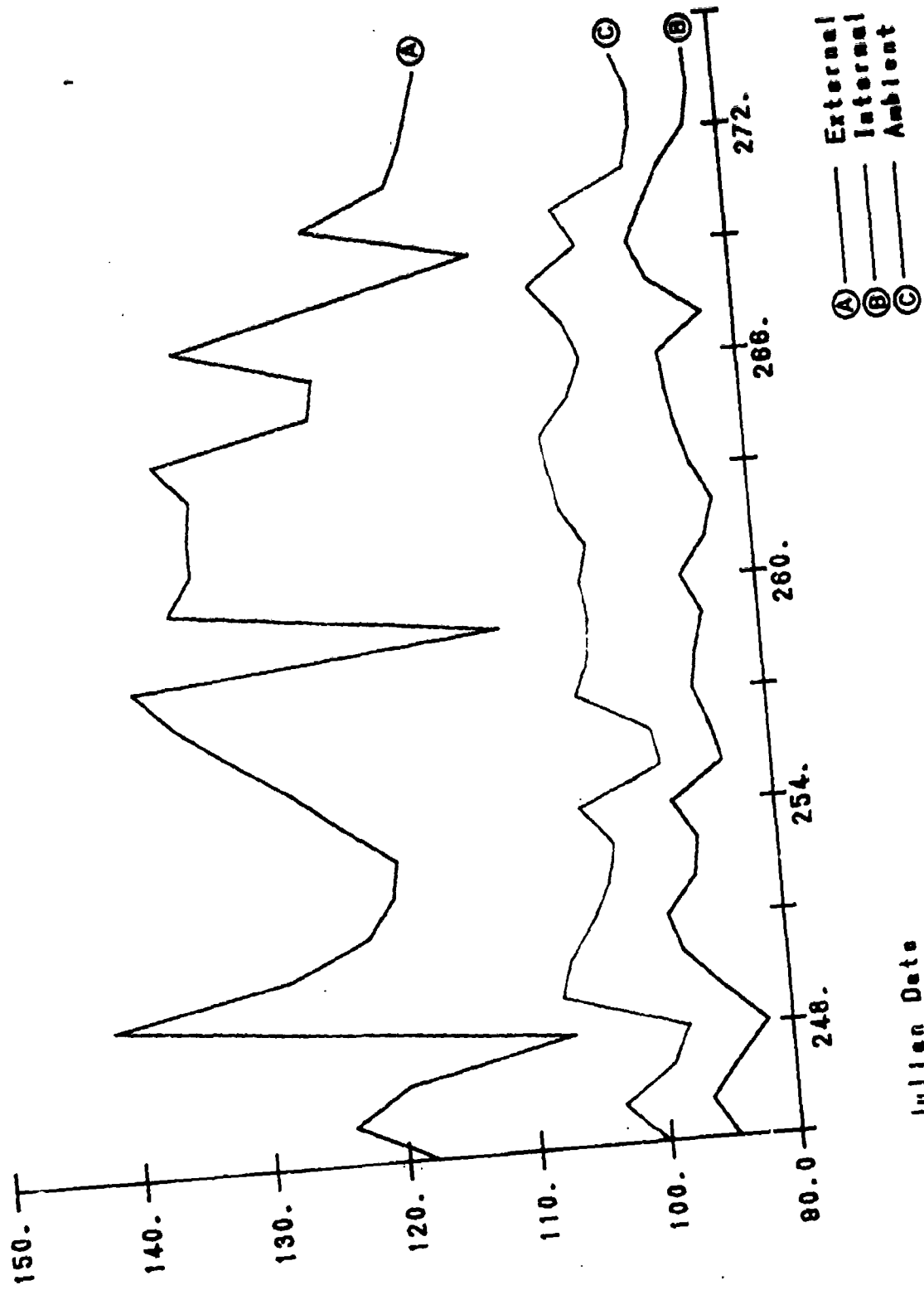
Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: July 18 - September 1, 1991



ITEM: CTG, 60MM HE M48A4
 DODIC: B632, LOT #: MA-19-88
 Degrees Fahrenheit

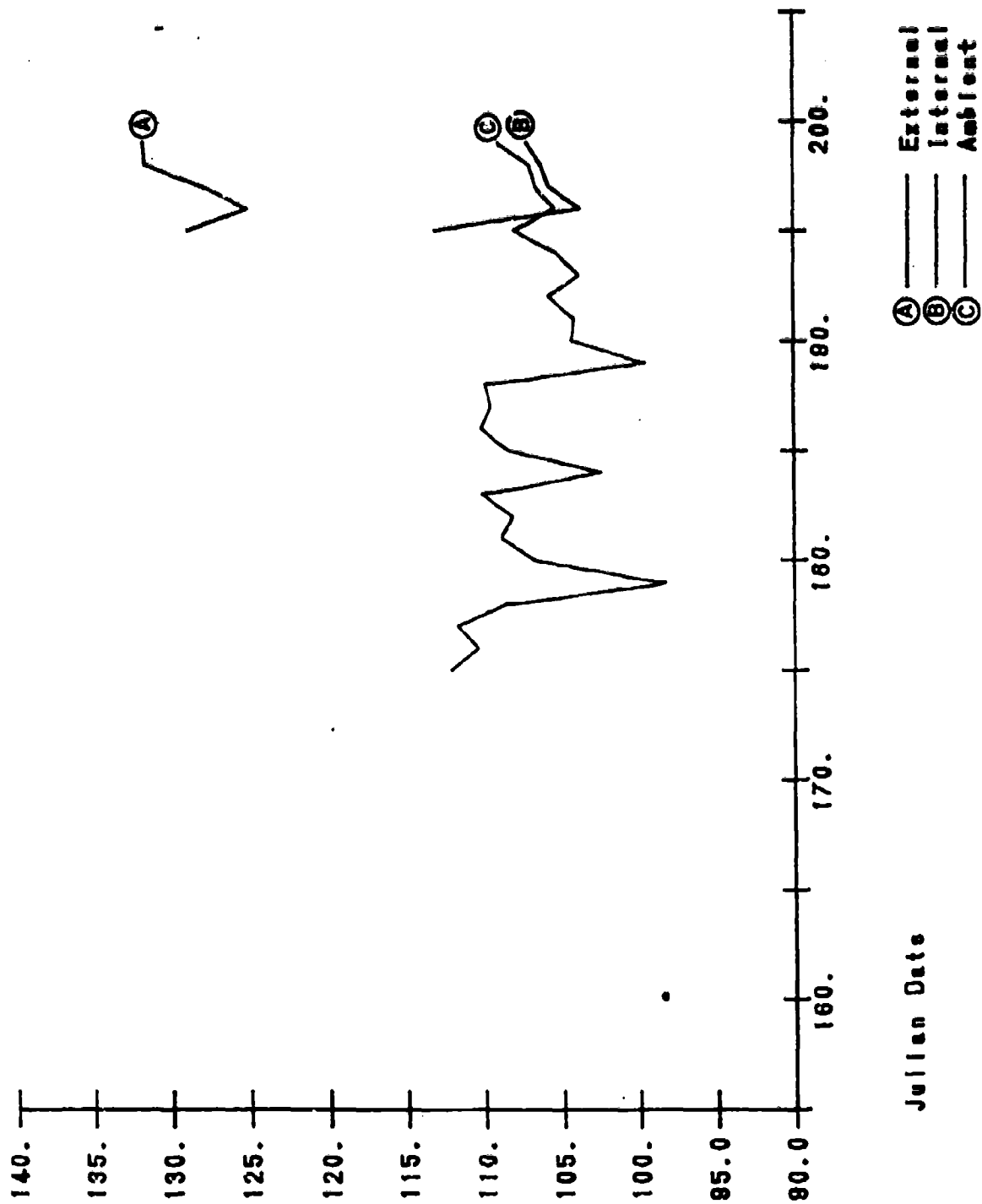
ITEM: CTO, 60MM HE M49A4
 DODIC: B632, LOT #: MA-19-88
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: September 2 - October 1, 1981

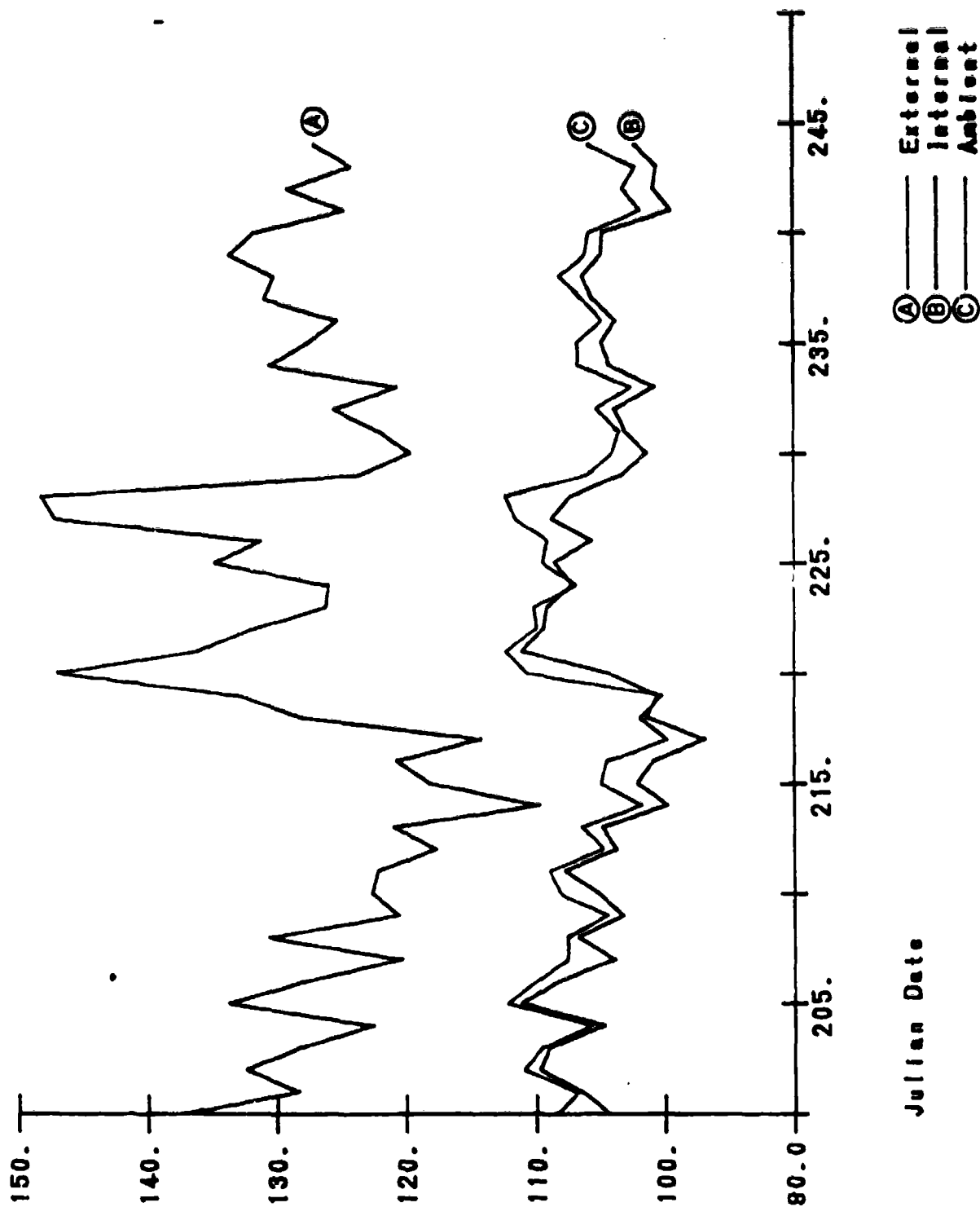


ITEM: CTG, 80MM HE M720
 DODIC: B842, LOT #: MA-89M030-001
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: June 4 - July 18, 1991

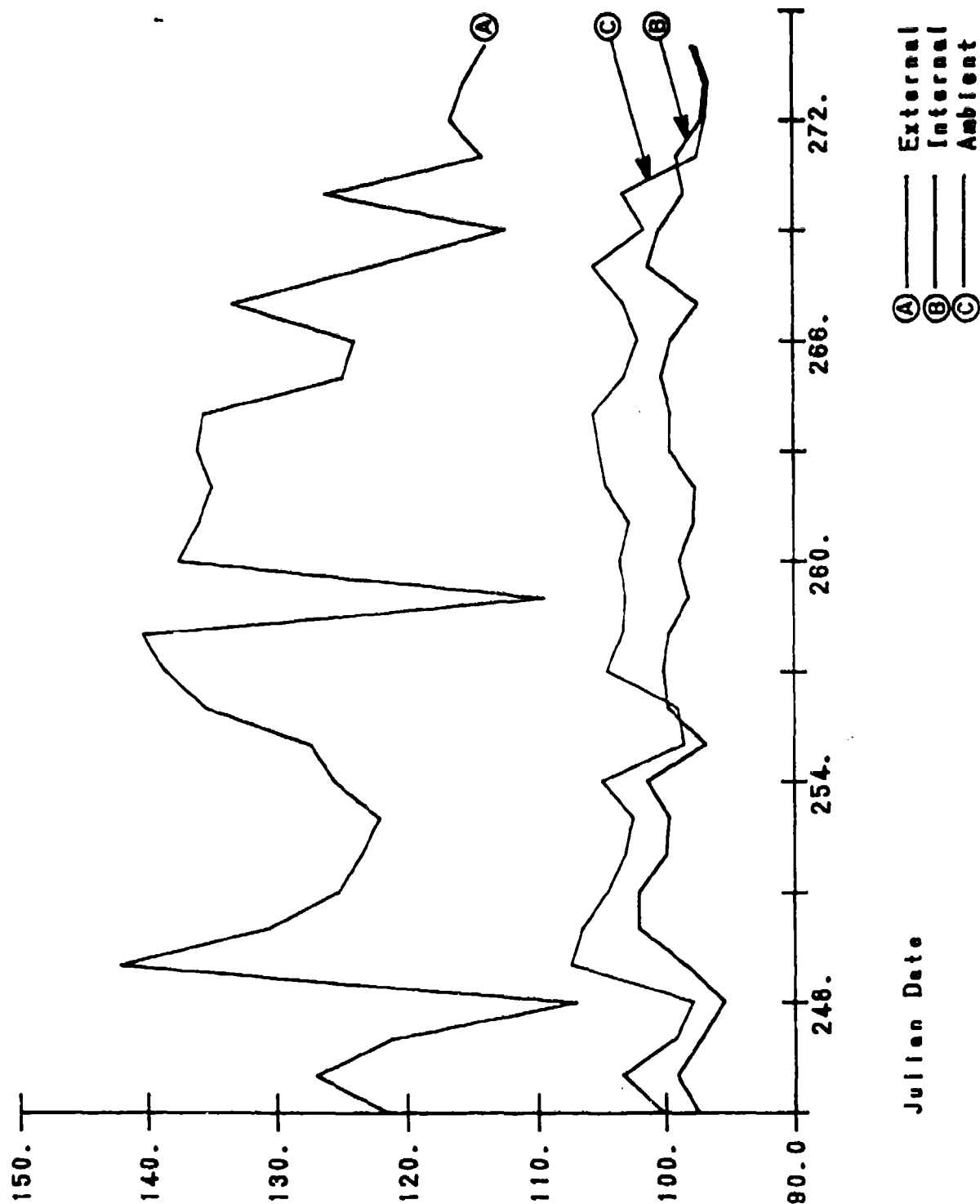


Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: July 18 - September 1, 1981



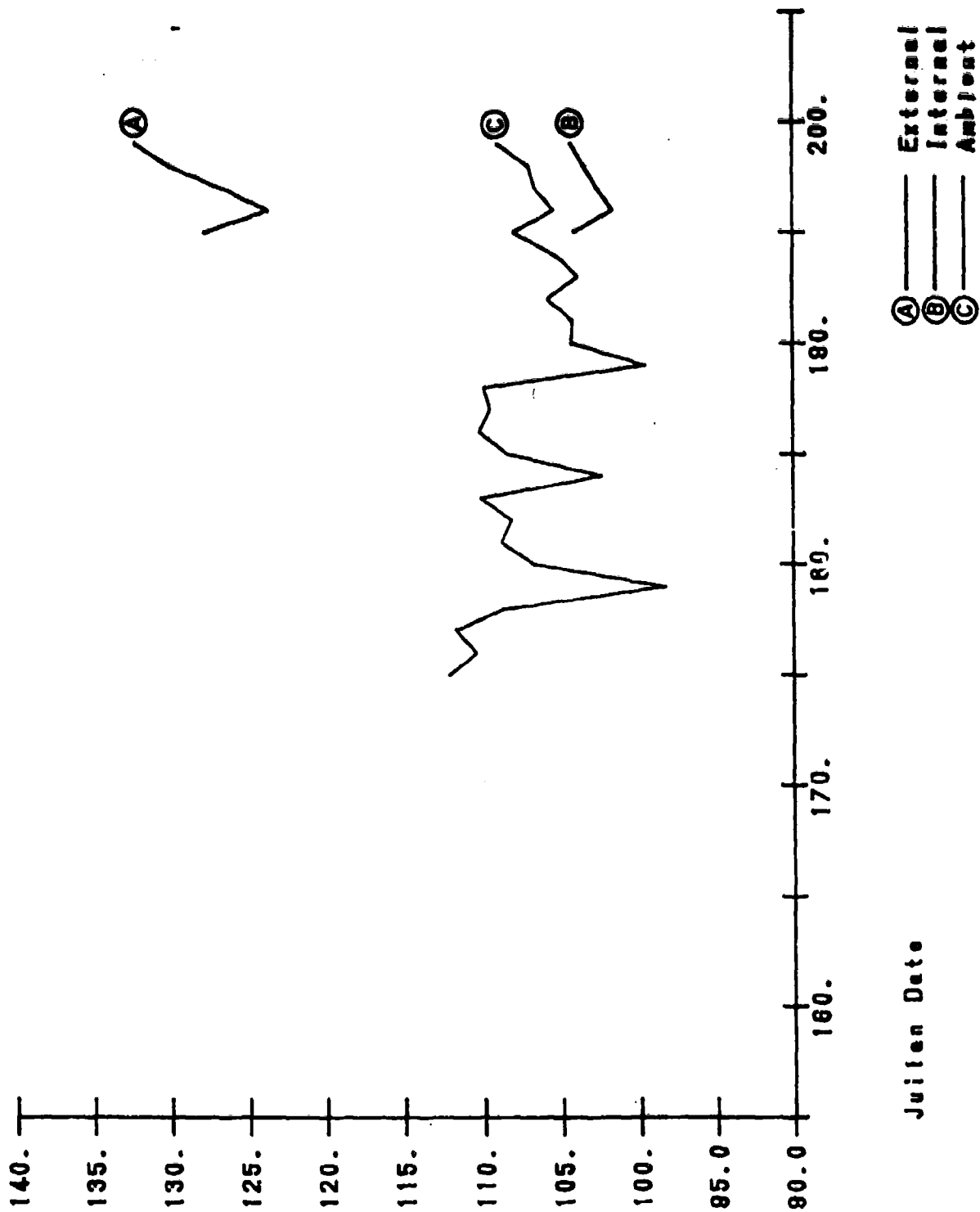
ITEM: CTG, 60MM HE M720
 DODIC: B642, LOT #: MA-88M030-001
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: September 2 - October 1, 1991



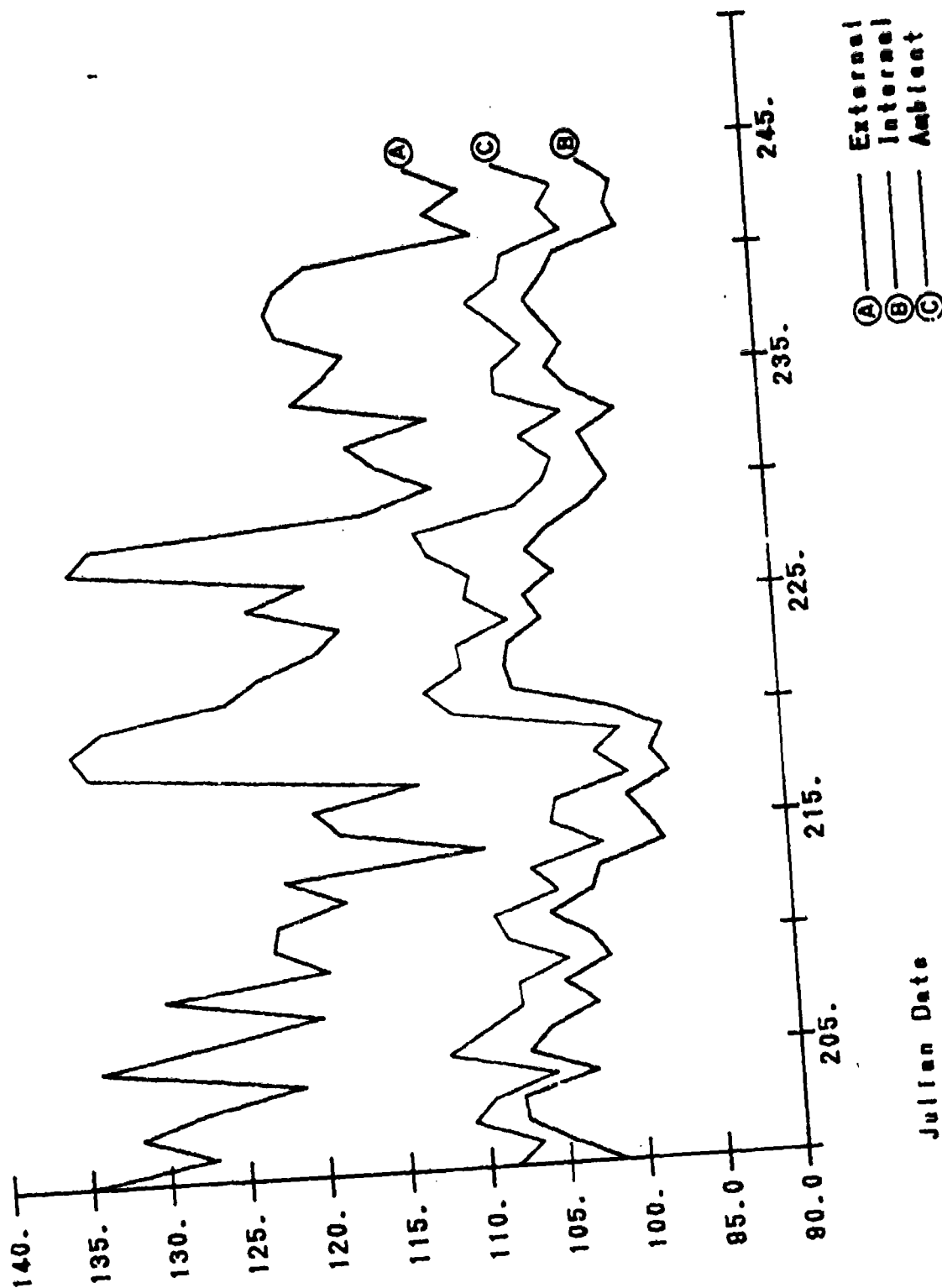
ITEM: CTG, 60MM HE M720
 DODIC: B642, LOT #: MA-89M030-001
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: June 4 - July 18, 1981



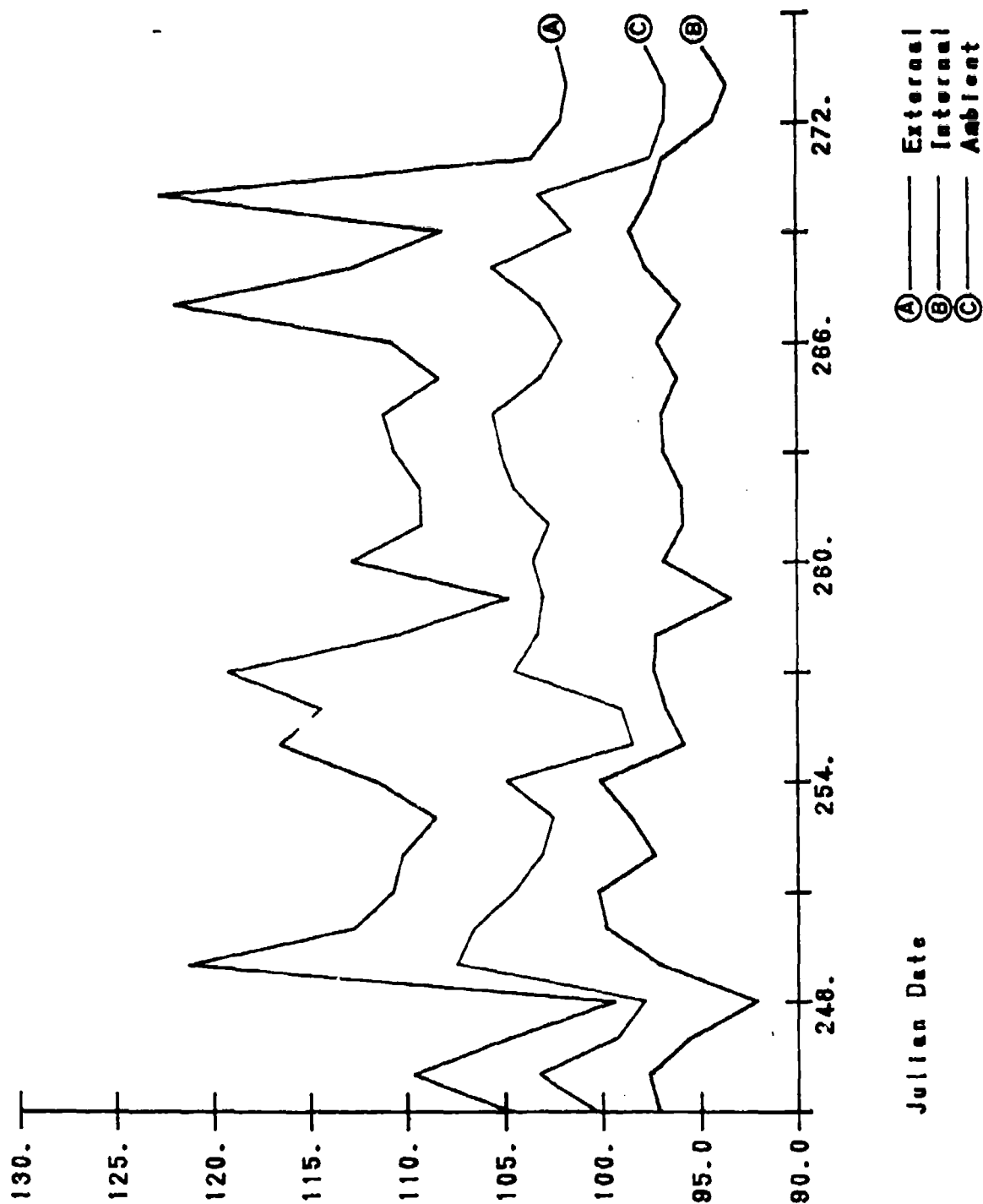
ITEM: CTG, 81MM ILLUM M301A3
 DODIG: C226, LOT #: LOM-89-12
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: July 18 - September 1, 1991



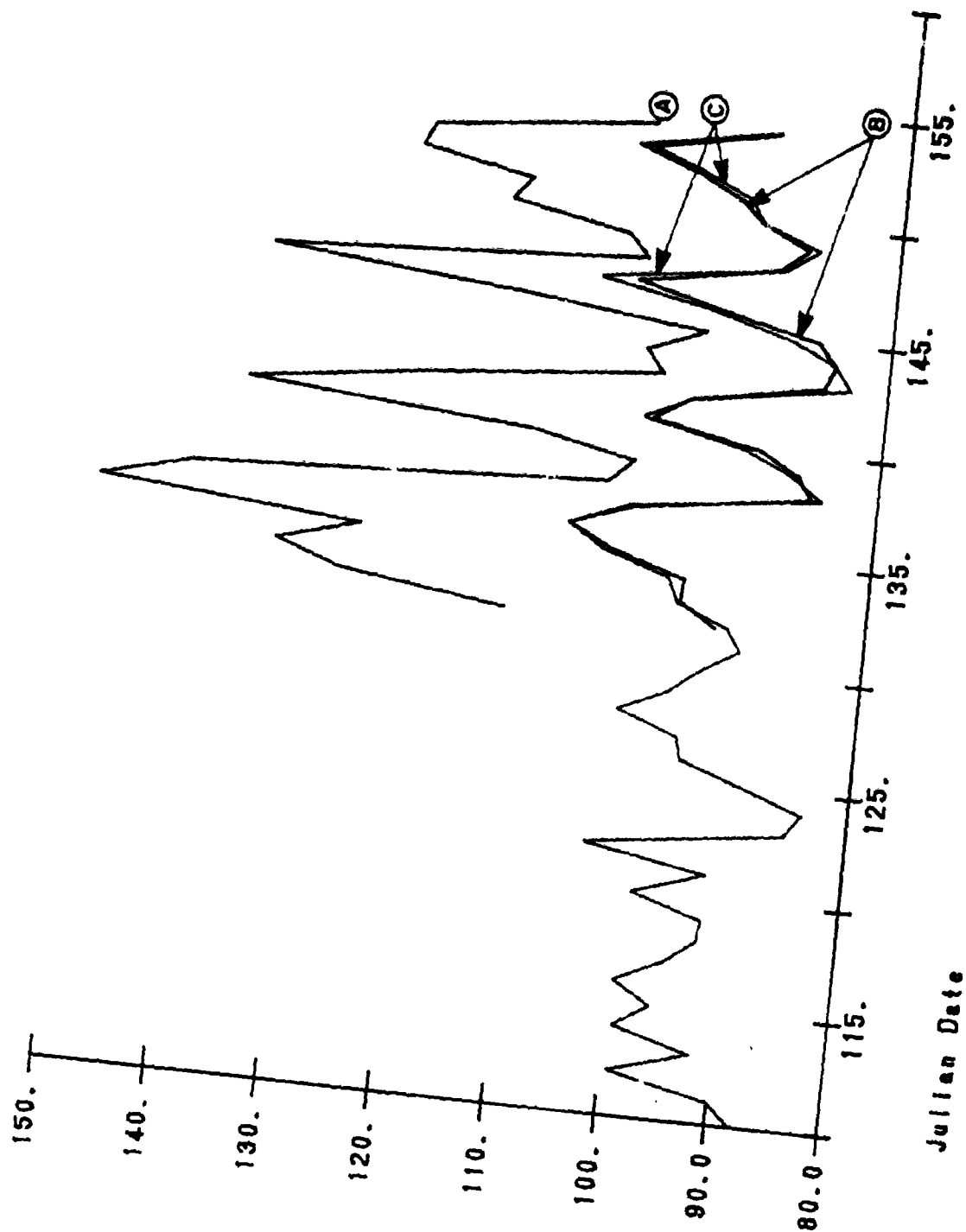
ITEM: CTG, 81MM ILLUM M301A3
 DODIC: C228, LOT #: LOM-88-12
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #1 at TSA
 Date: September 2 - October 1, 1991



ITEM: CTG, 81MM ILLUM M301A3
 DODIG: C228, LOT #: LOM-88-12
 Degrees Fahrenheit

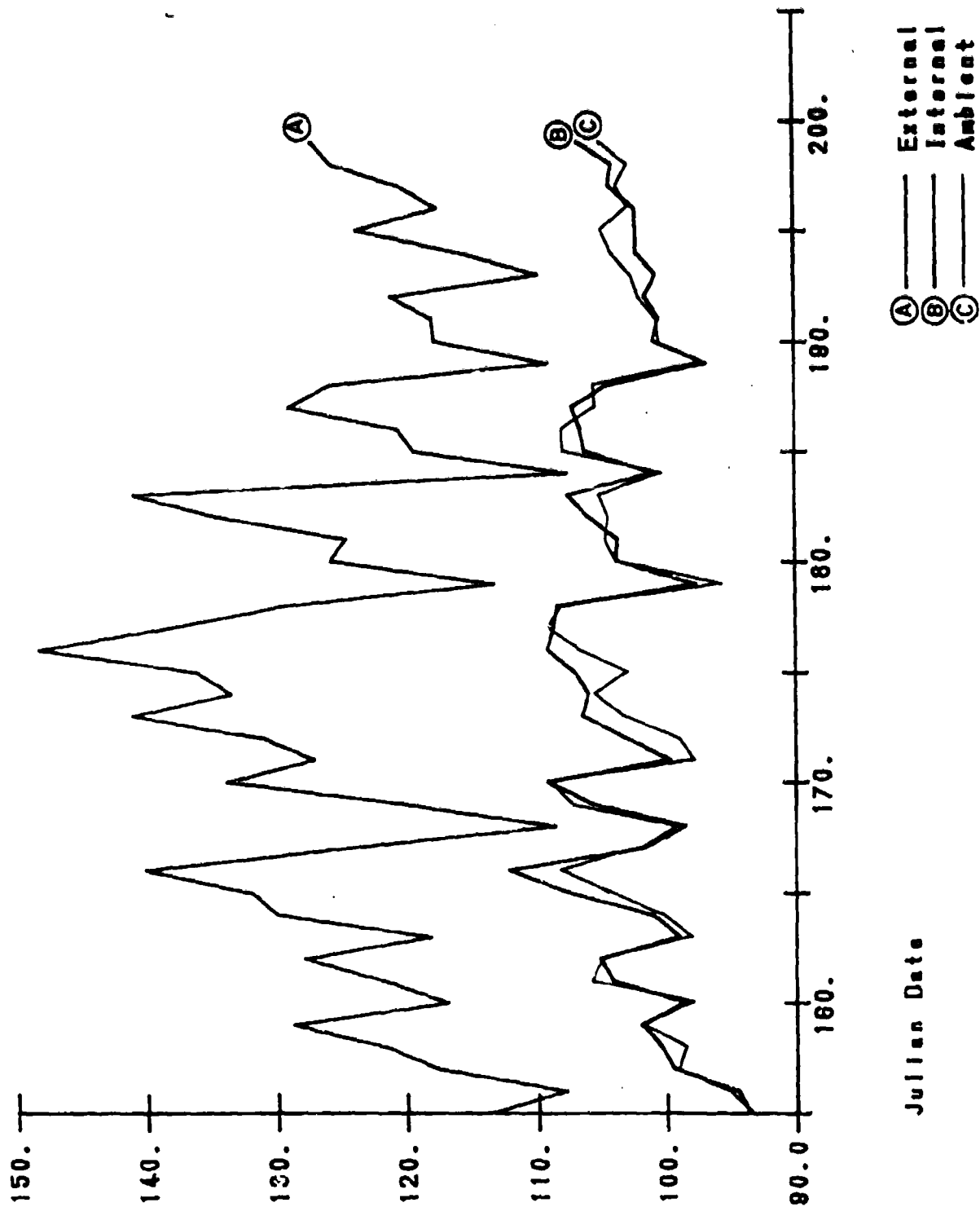
Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: April 20 - June 3, 1991



(A) External
 (B) Internal
 (C) Ambient

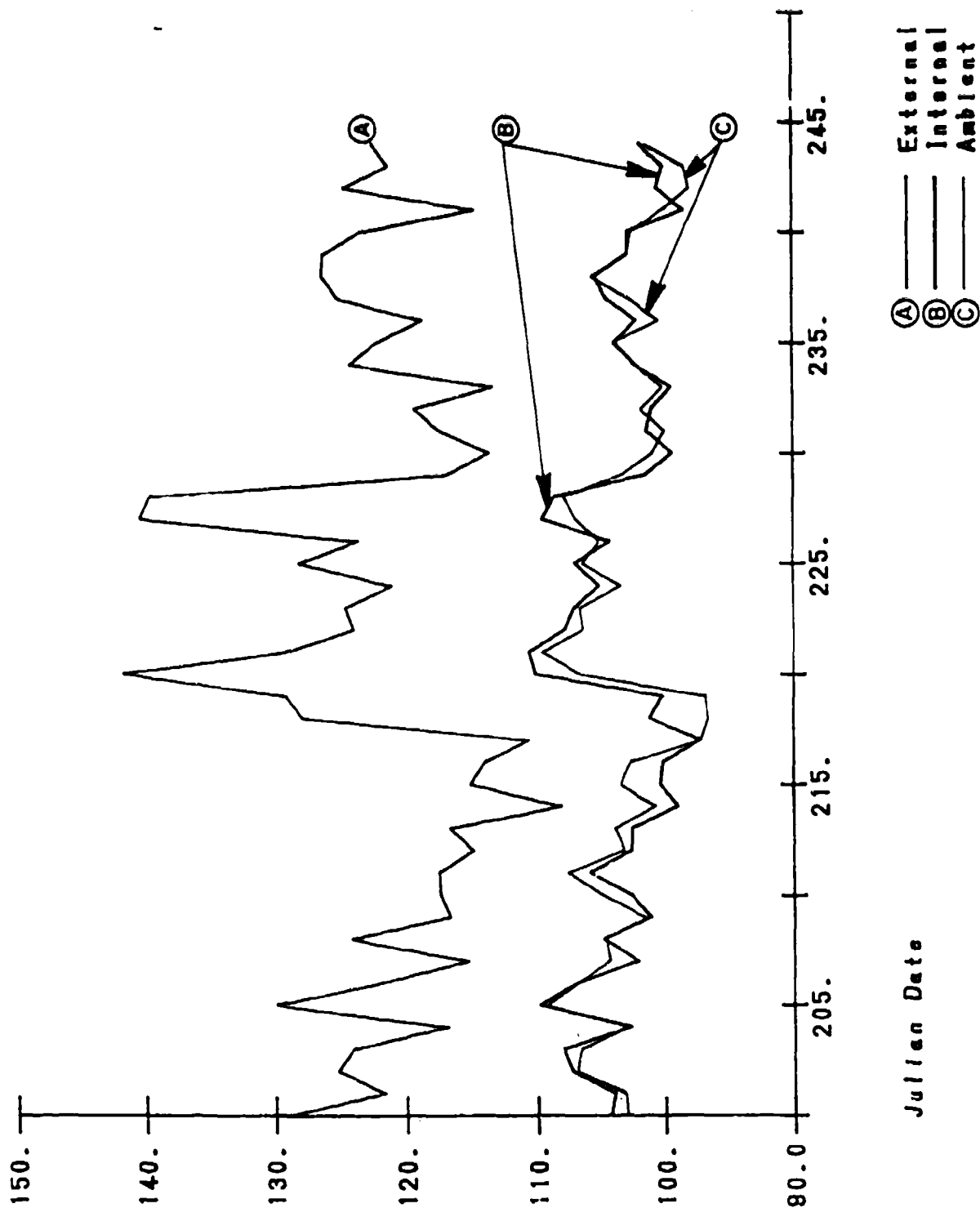
ITEM: G16, 120MM APFSDS-T M829A1
 DDDIC: G380, LOT #: MHMS00094-005
 Degree Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: June 4 - July 18, 1981



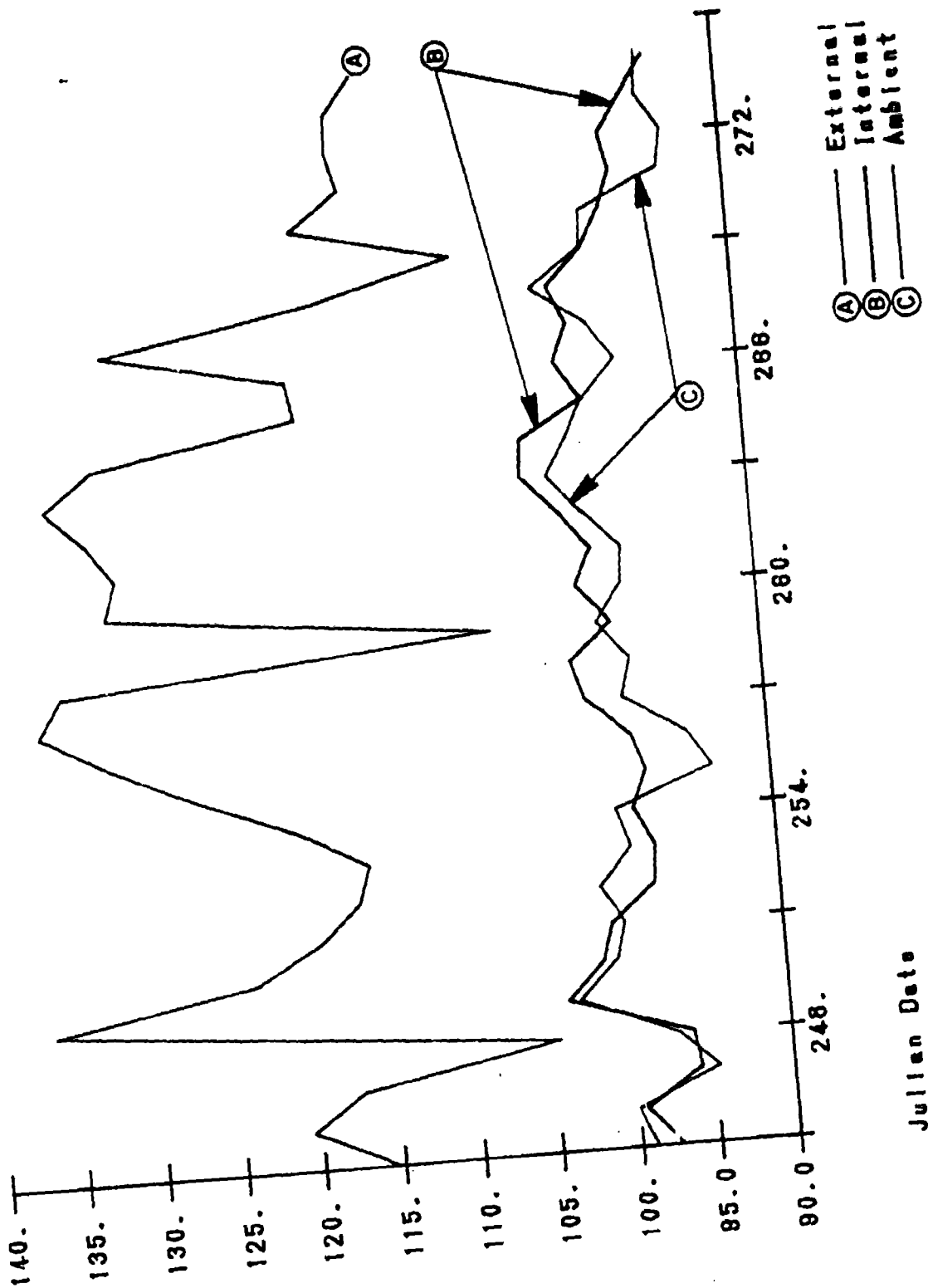
ITEM: CTG, 120MM APFSDS-T M828A1
 DODIC: C380, LOT #: MMH90D084-005
 81-8

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: July 18 - September 1, 1981



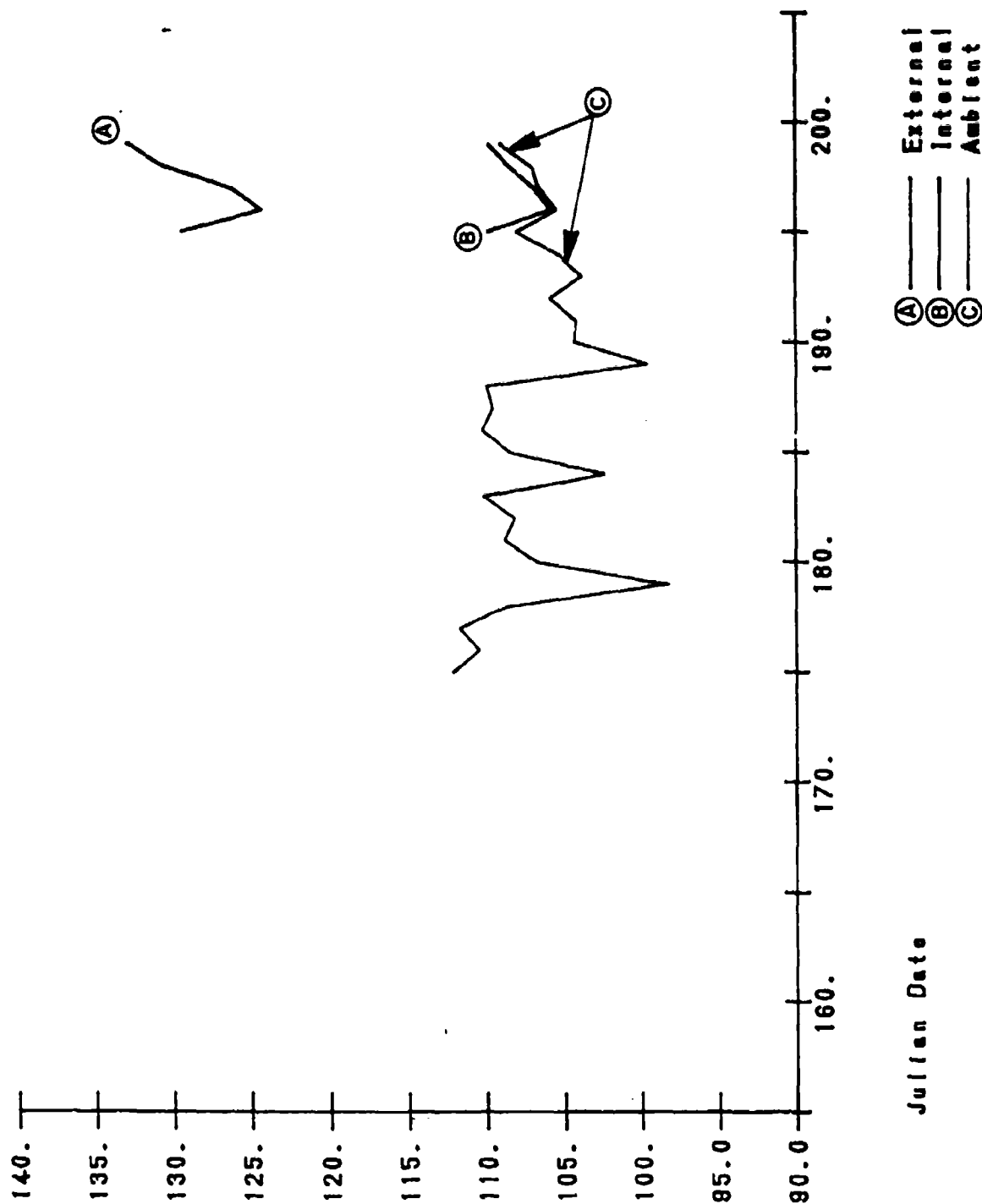
ITEM: CTG, 120MM APFSDS-T M829A1
 DODIC: C380, LOT #: MHM90D094-005
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: September 2 - October 1, 1991



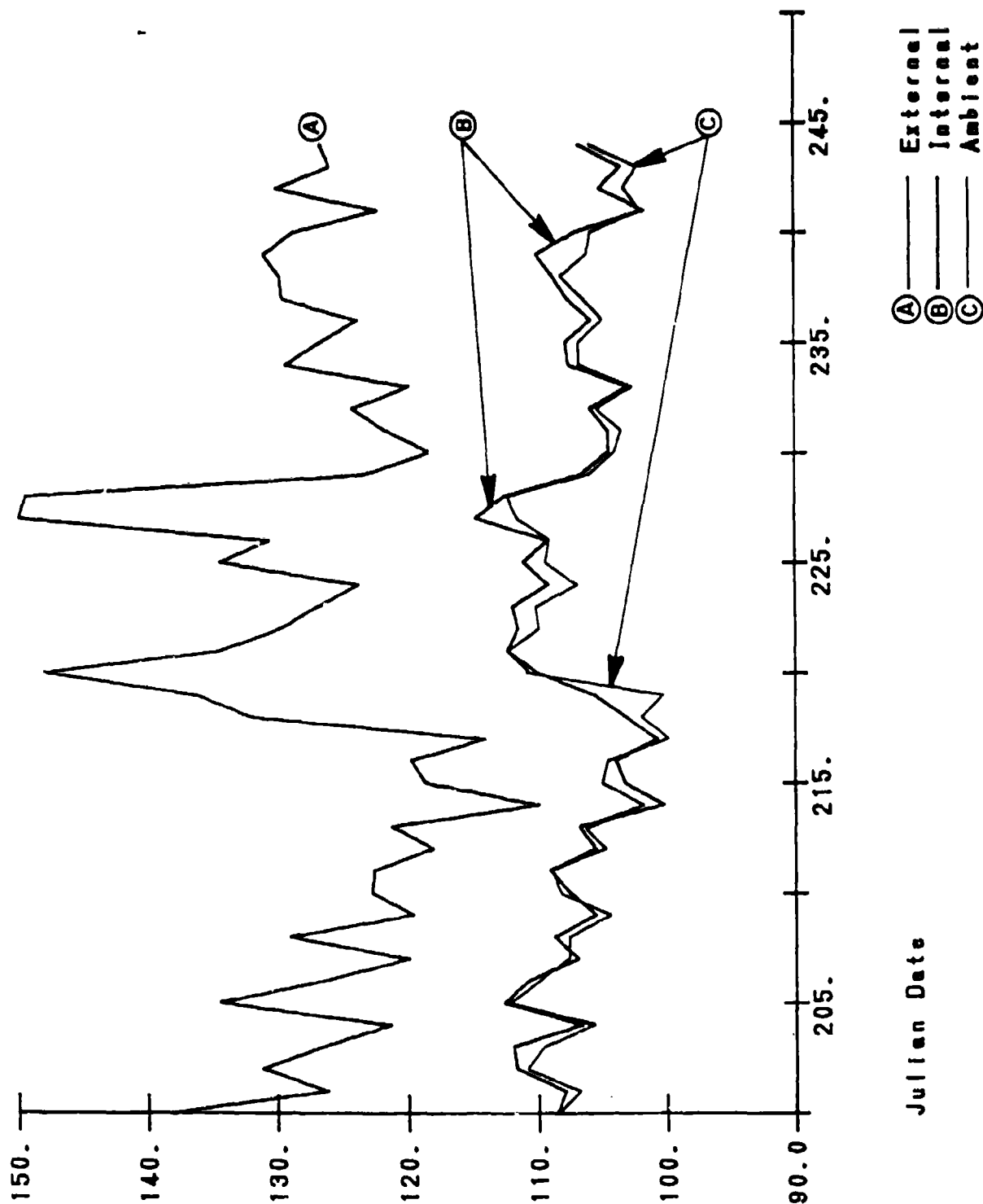
ITEM: CTG. 120MM APFSDS-T M829A1
 DODIC: C380. LOT #: MHM90D094-005
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: June 4 - July 18, 1981



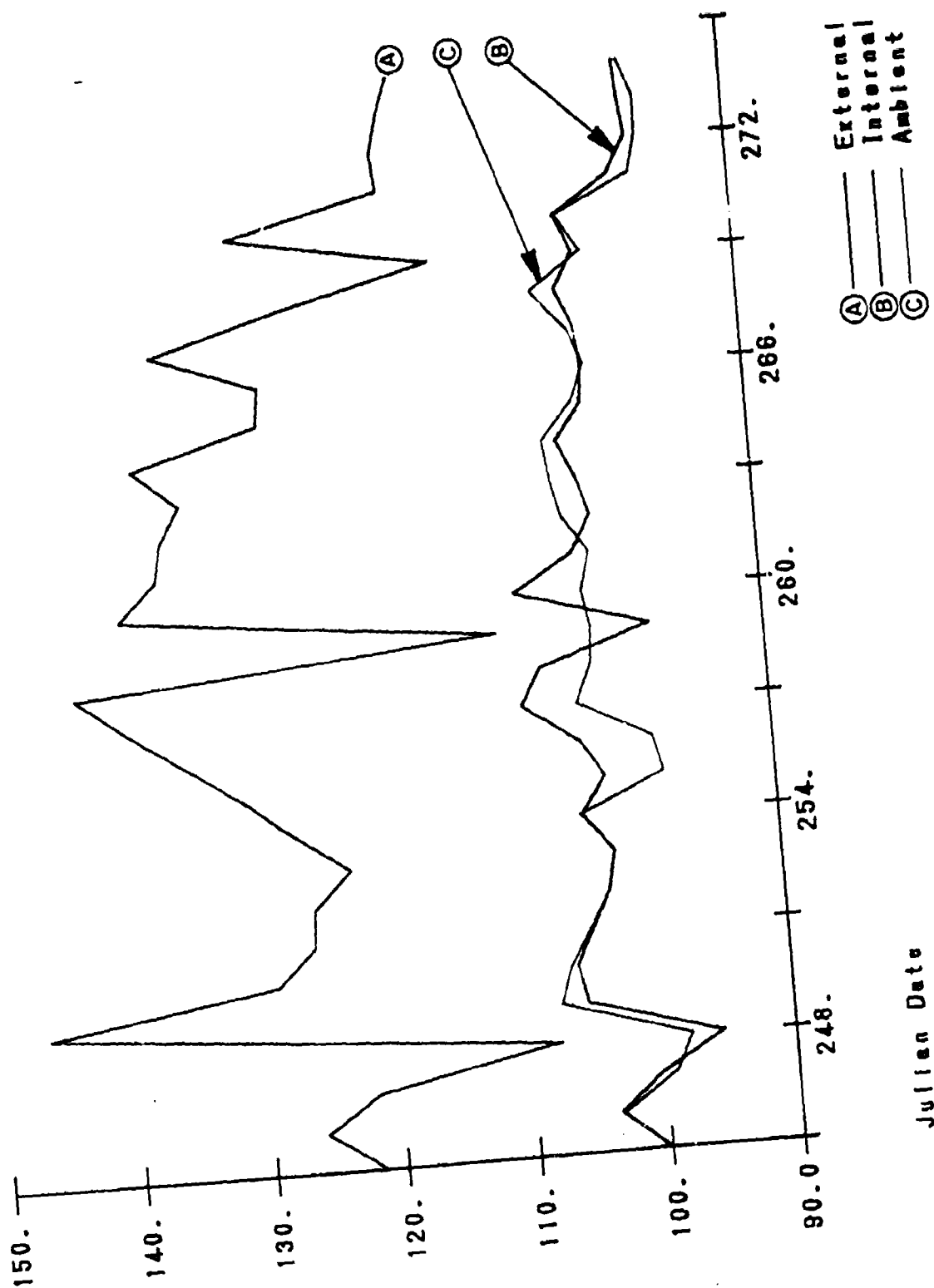
ITEM: CTG, 105MM HE M1 W/O FUZE
 DODIC: C445, LOT #: JA-89-29
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: July 19 - September 1, 1991



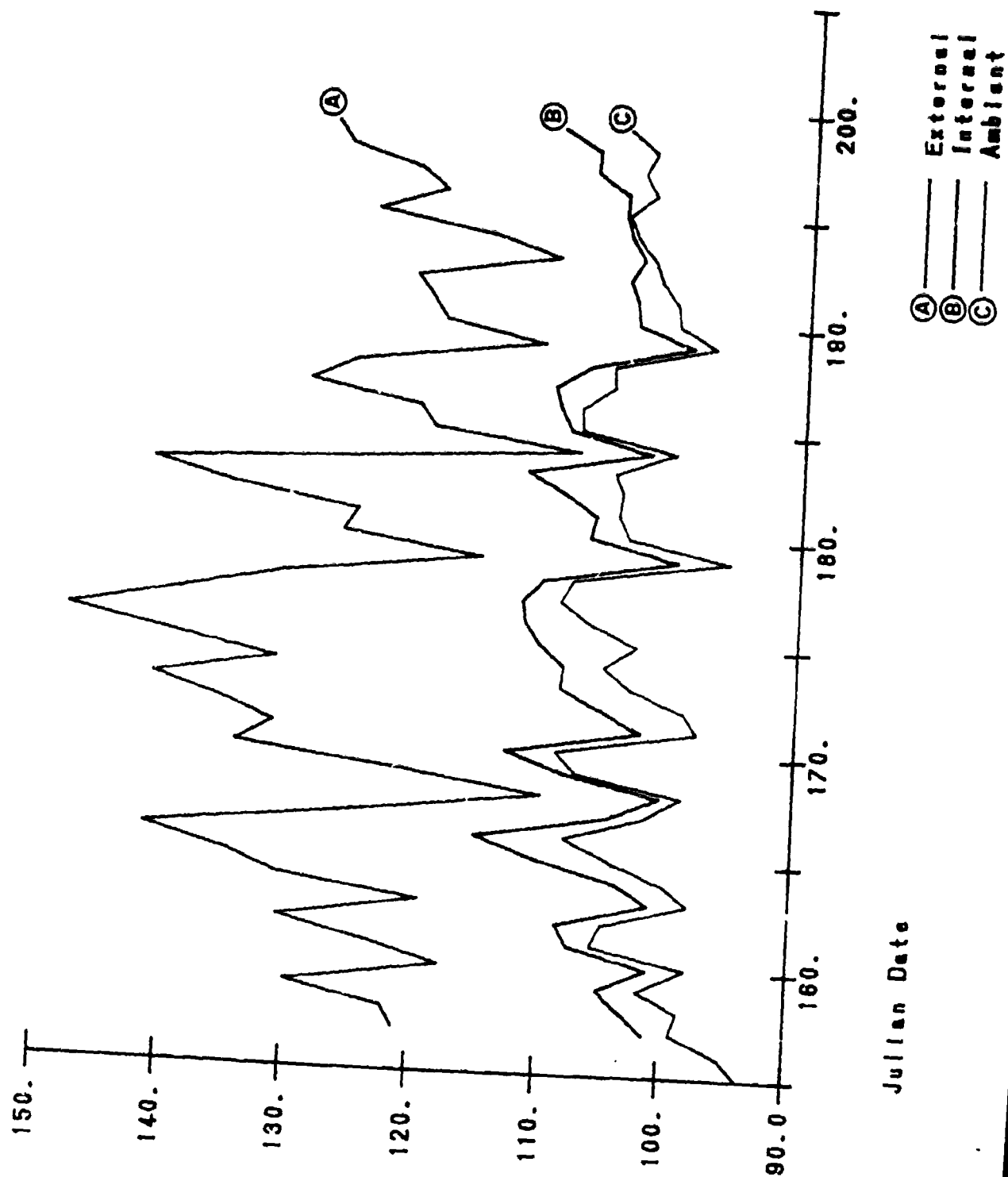
ITEM: CTG, 105MM HE M1 W/O FUZE
 DODIC: C445, LOT #: JA-69-29
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: September 2 - October 1, 1991



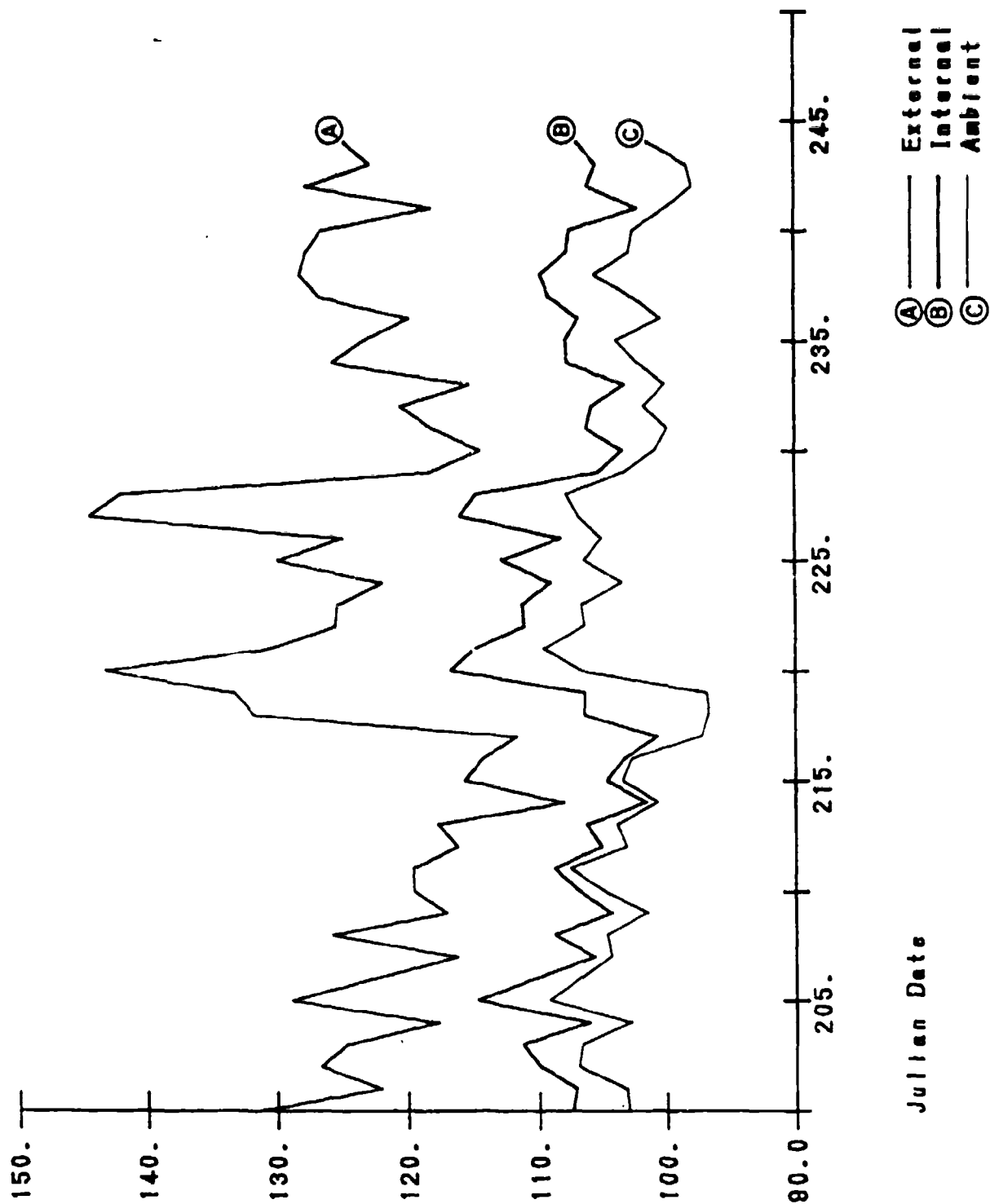
ITEM: CTG, 105MM HE M1 W/O FUZE
 DODIC: C445, LOT #: JA-69-29
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: June 4 - July 18, 1991



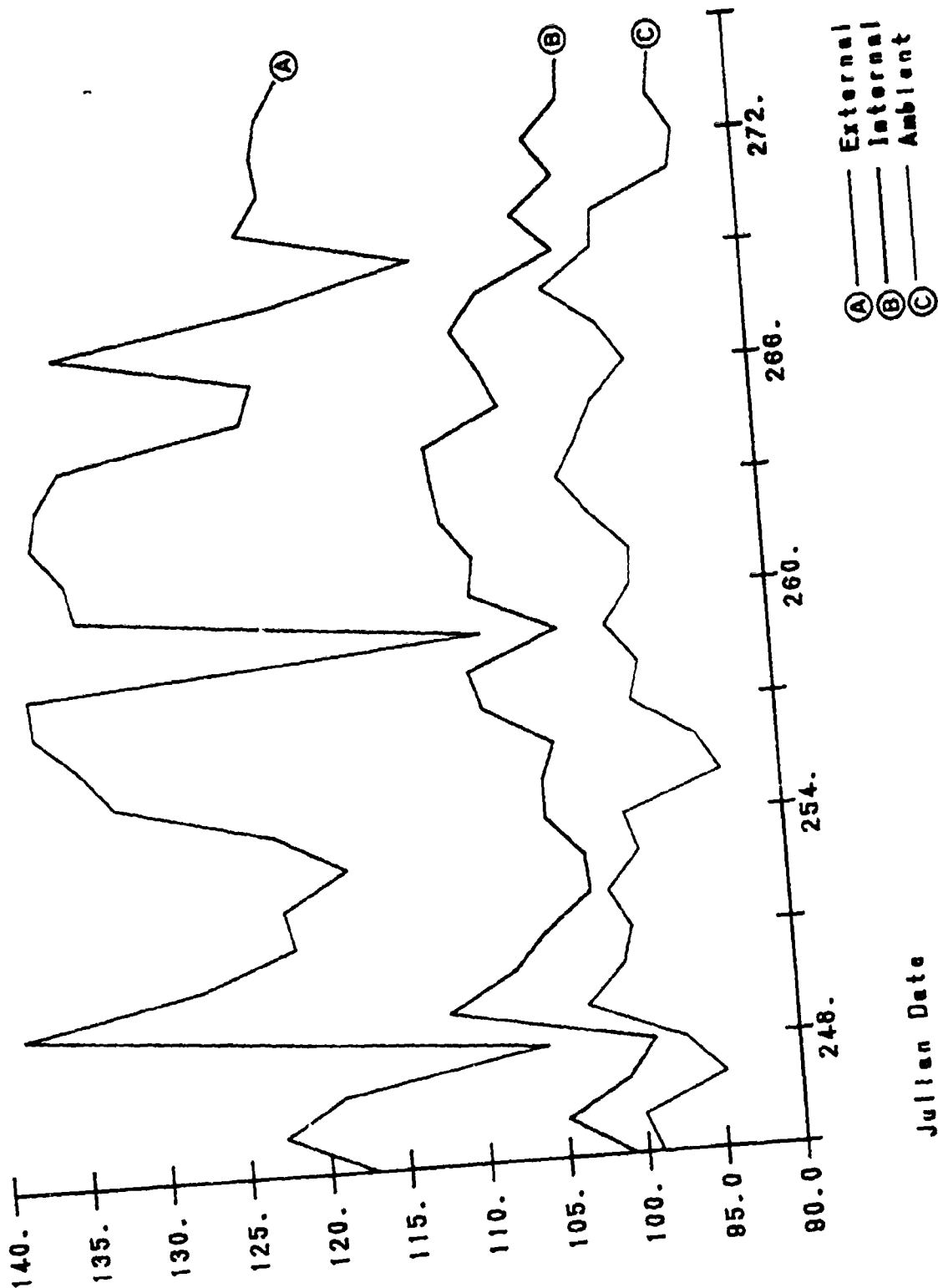
ITEM: CTG, 105MM HEAT-T M456A2
 DDDIC: C508, LOT #: MA-88B144H001
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: July 18 - September 1, 1991



ITEM: CTG, 105MM HEAT-T M456A2
 DODIC: C508, LOT #: MA-88B144H001
 Degrees Fahrenheit

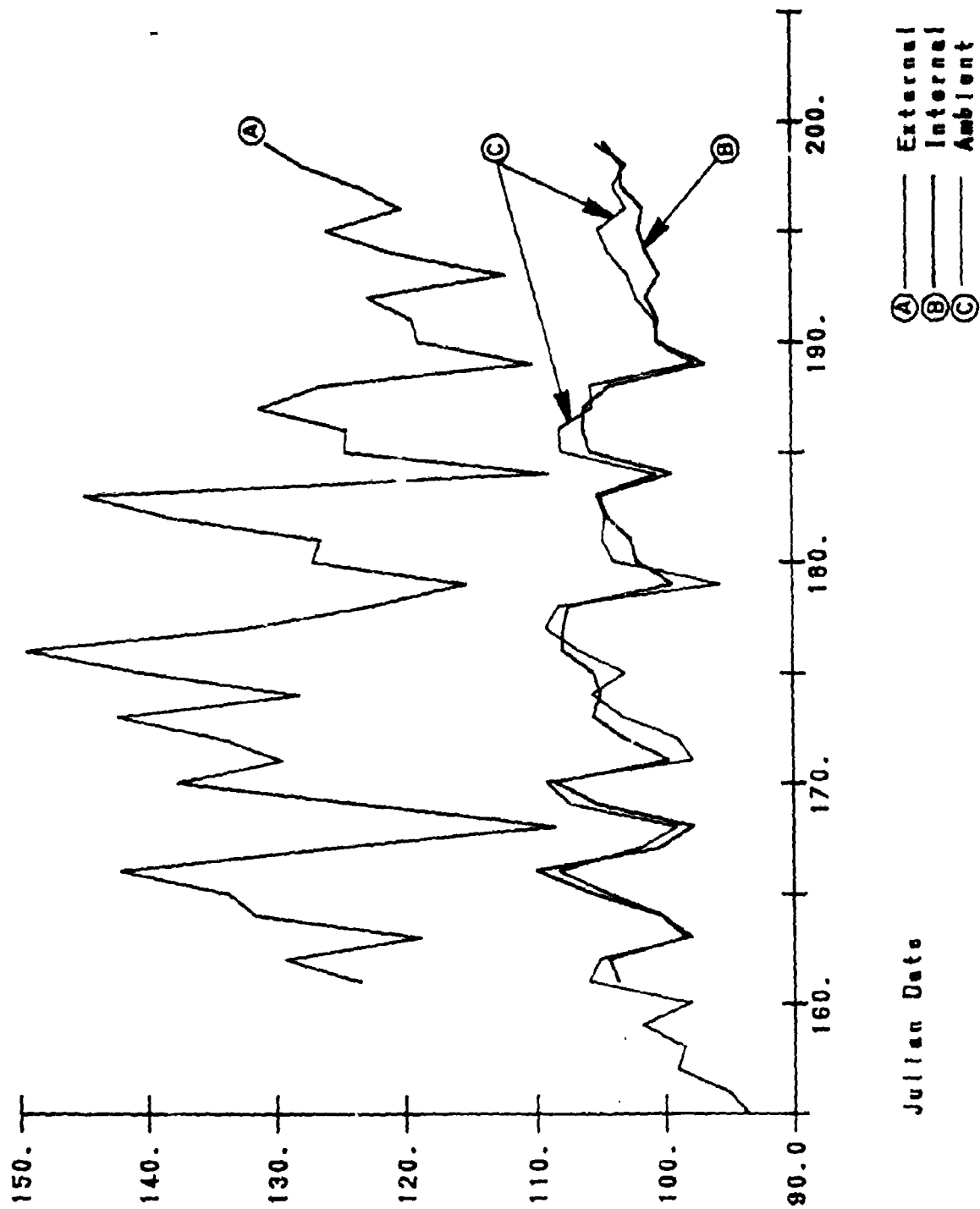
Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: September 2 - October 1, 1991



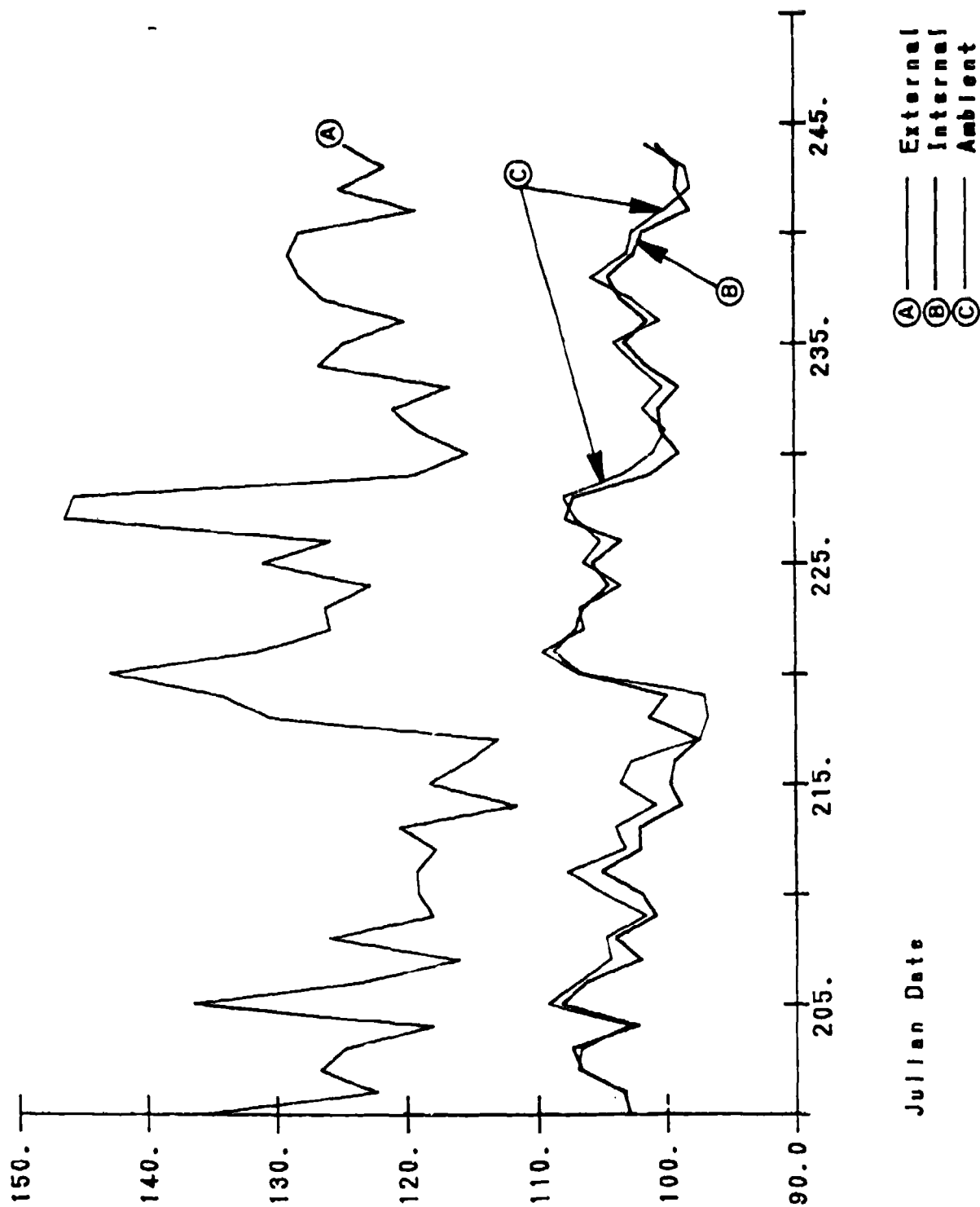
ITEM: CTG, 105MM HEAT-1 M456A2
 DODIC: C508, LOT #: MA-88B144H001
 Degrees Fahrenheit

ITEM: CTG, 105MM APFSDS-T M774
 DDIC: C523, LOT #: MAB4A002-010
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: June 4 - July 18, 1981

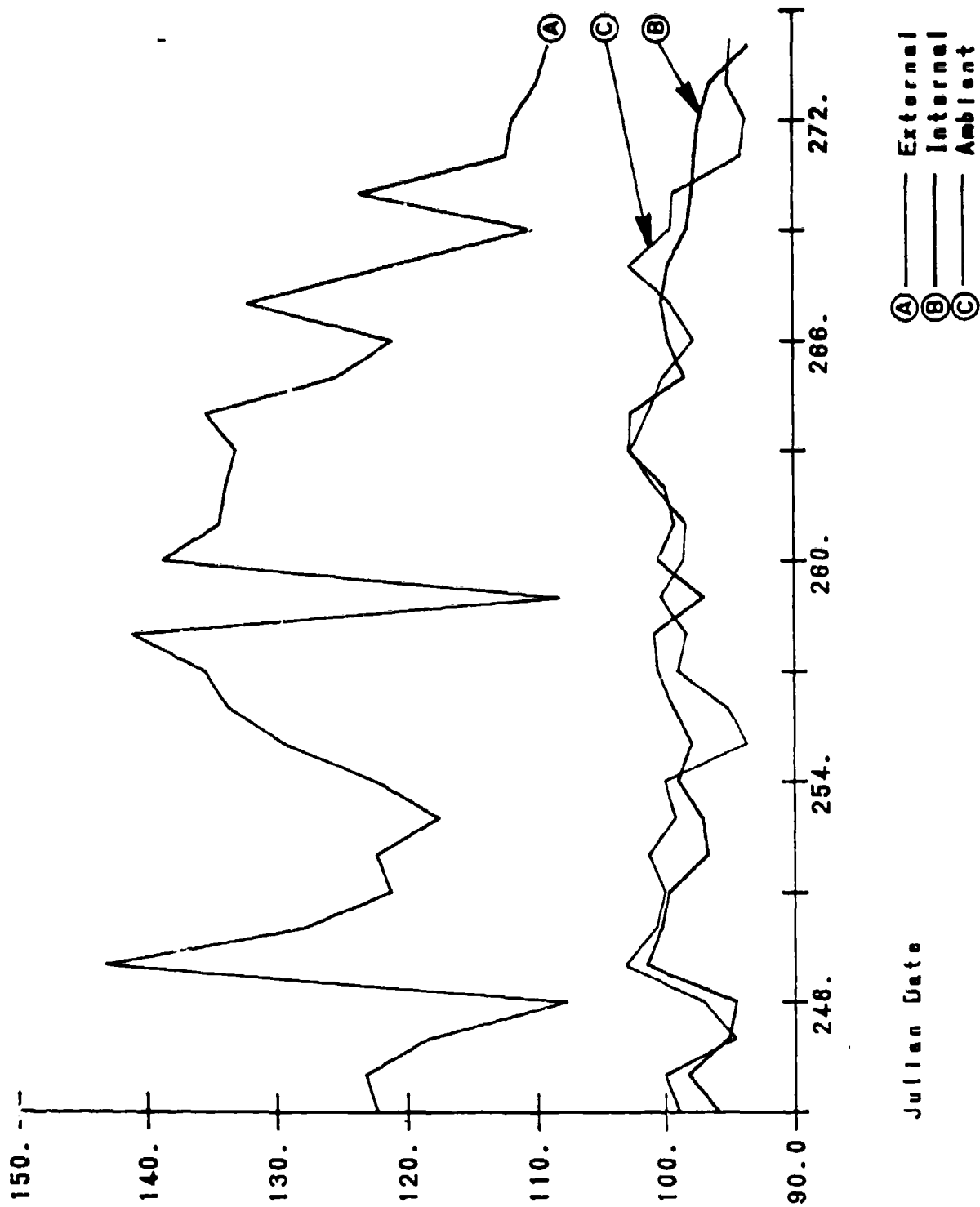


Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: July 19 - September 1, 1981



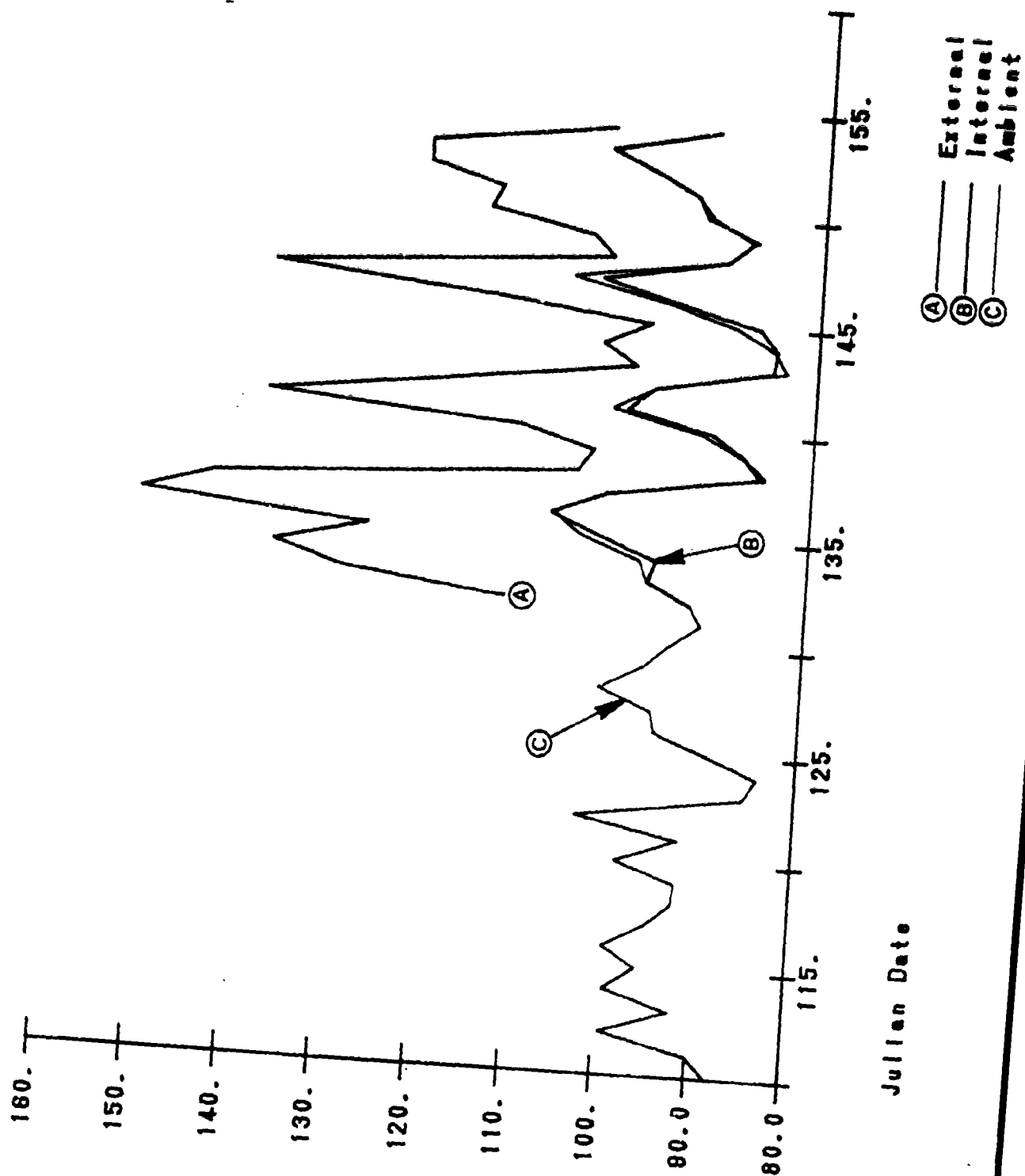
ITEM: CTG, 105MM APFSDS-T M774
 DODIC: C523, LOT #: M484A002-010
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: September 2 - October 1, 1981



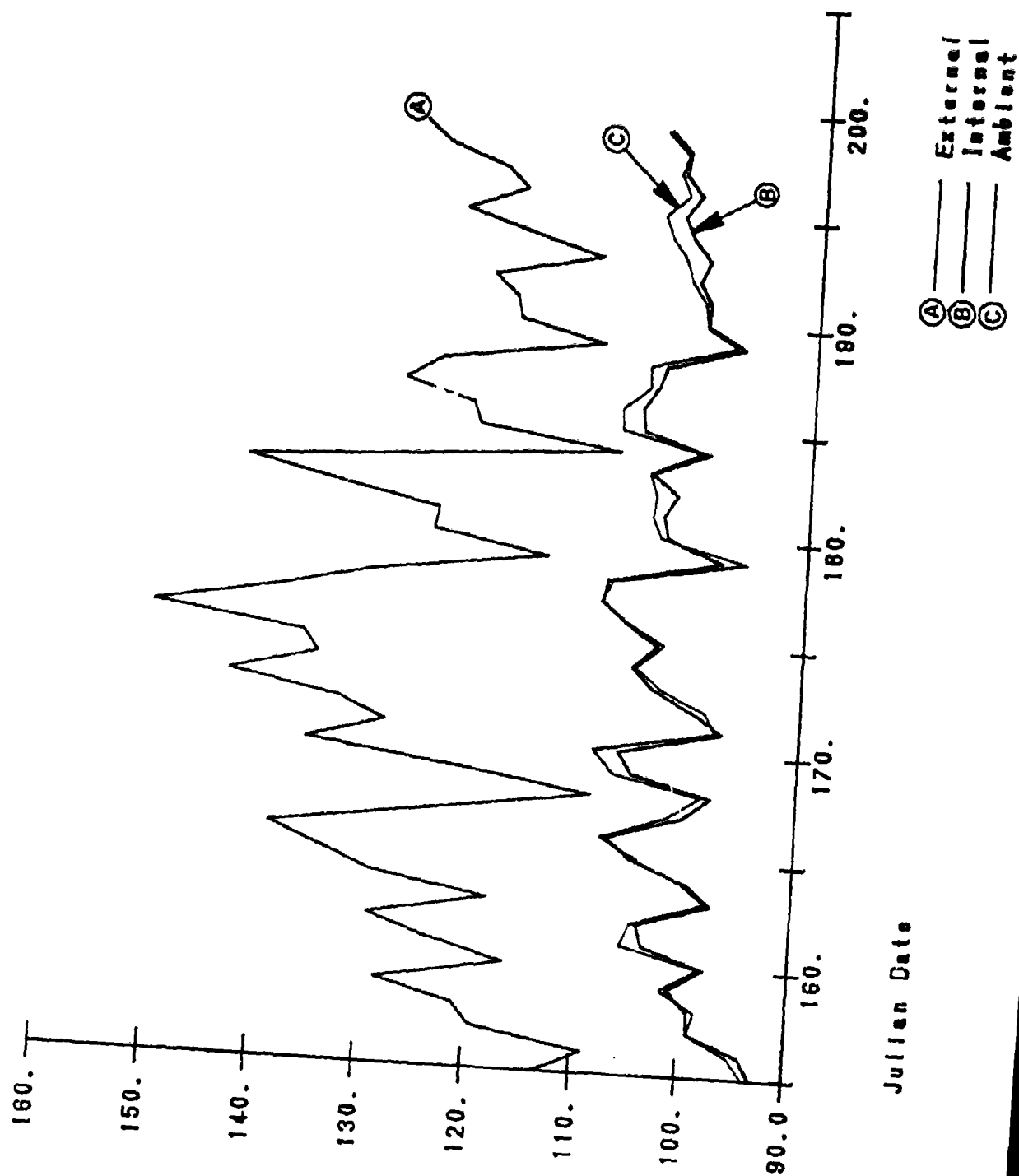
ITEM: CTG, 105MM APFSDS-T M774
 DDDIC: C523, LOT #: M84A002-010
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: April 20 - June 3, 1991



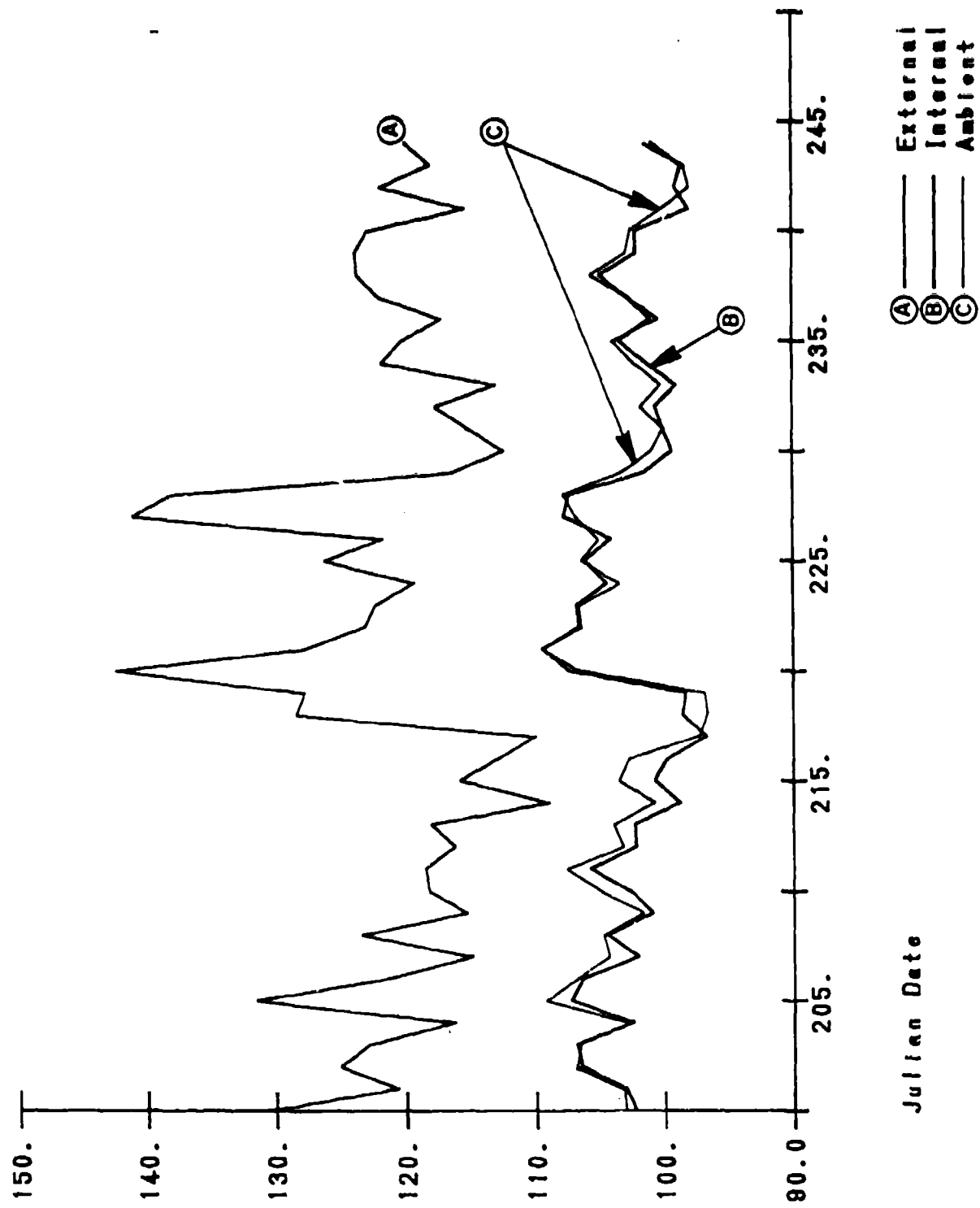
ITEM: CTG. 120MM APFSDS-T M829
 DODIC: C786, LOT #: 10P88A073-009
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: June 4 - July 18, 1981



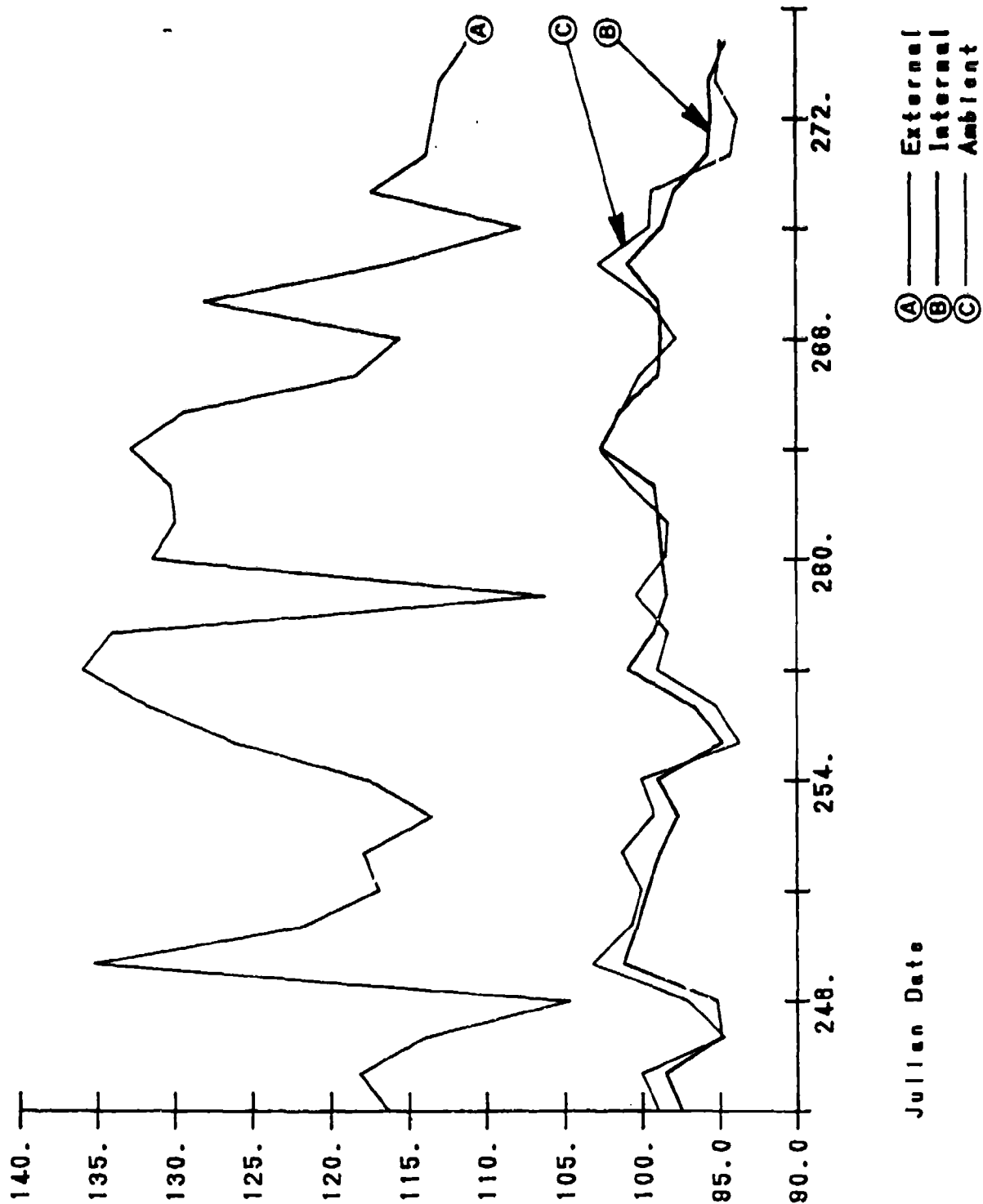
ITEM: CTG, 120MM APFSDS-T M829
 DDDIC: C786, LOT #: 10P88A073-009
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: July 18 - September 1, 1991



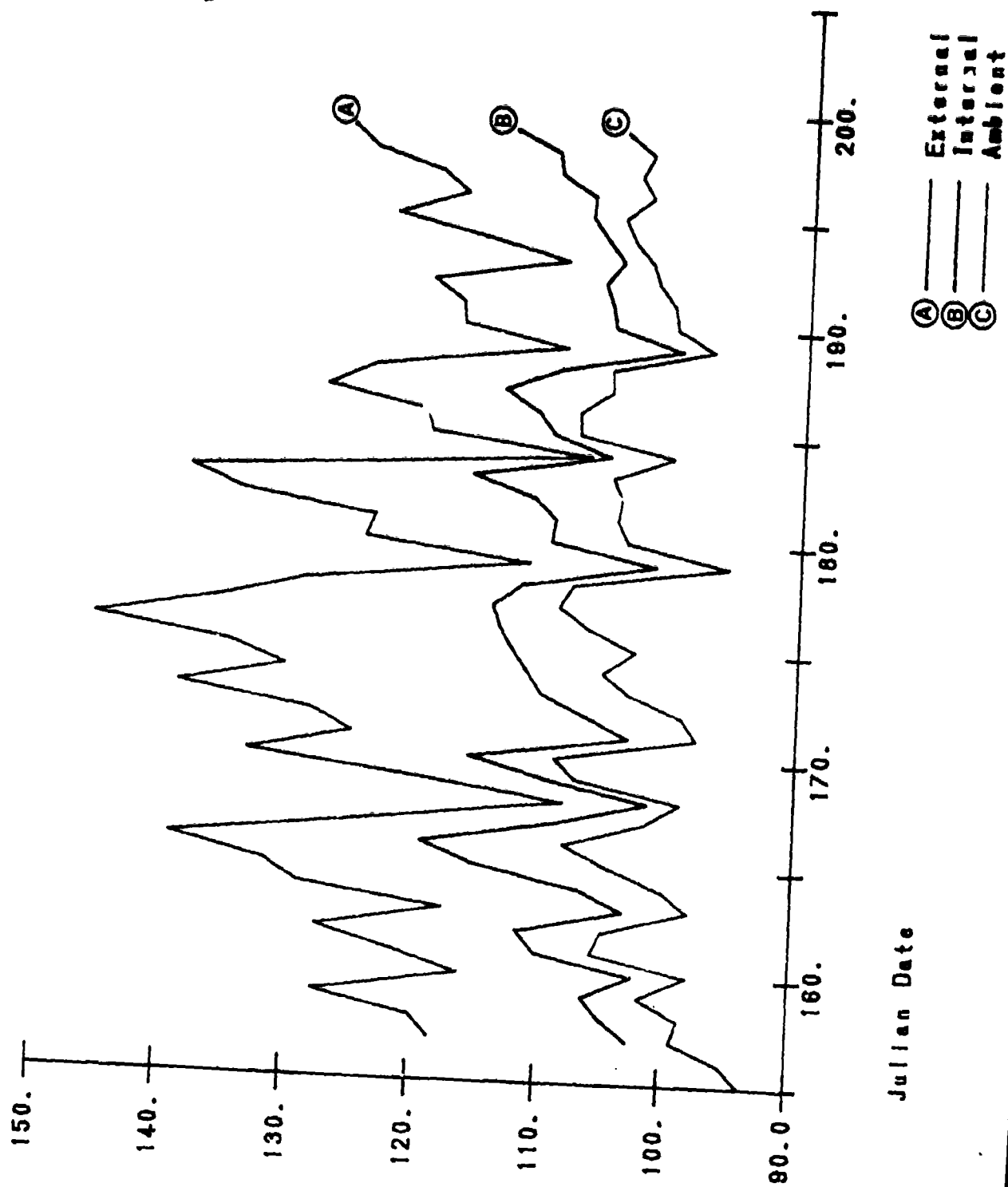
ITEM: CTG, 120MM APFSDS-T M829
 DODIC: C786, LOT #: 10P88A073-009
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: September 2 - October 1, 1981



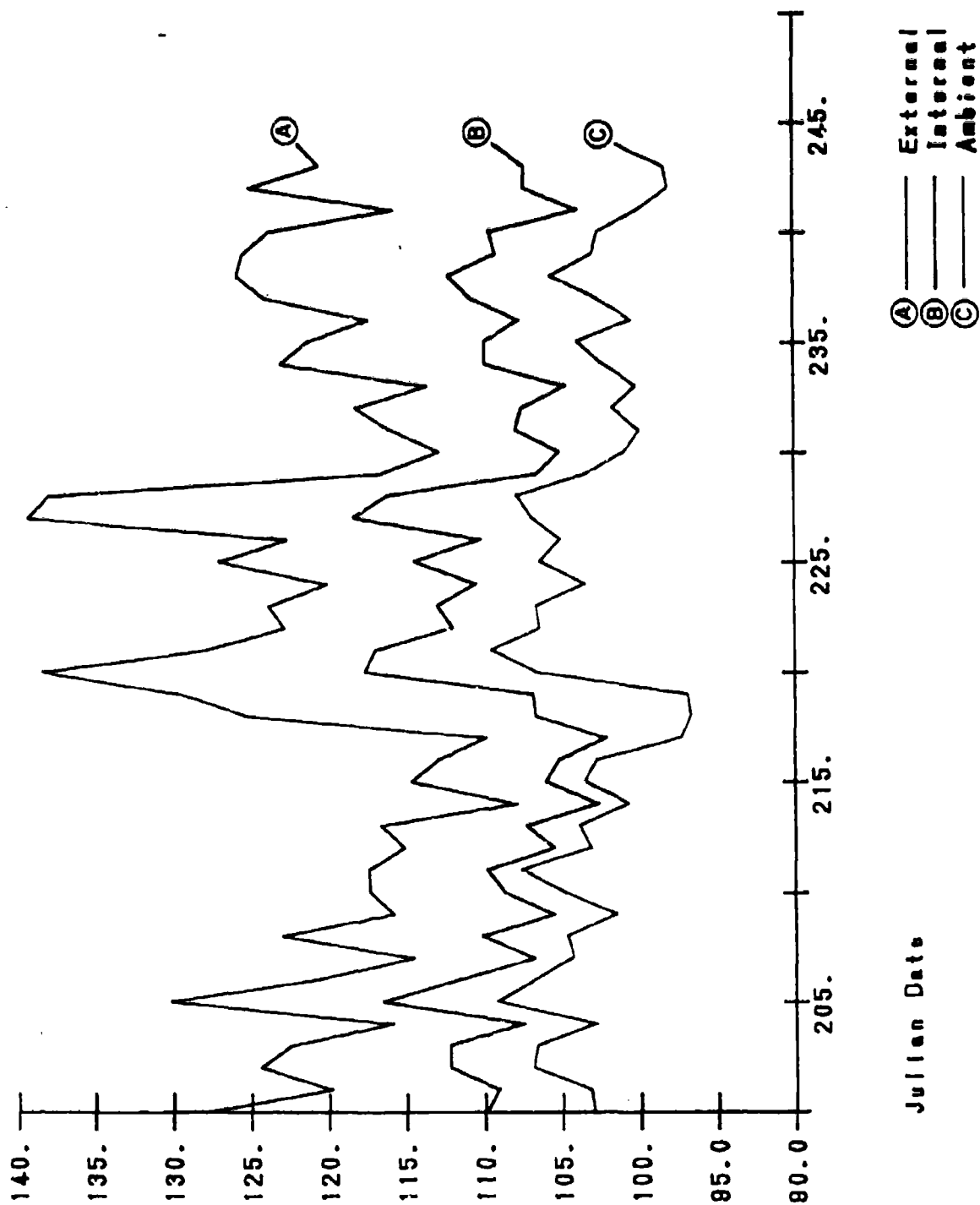
ITEM: CTG, 120MM APFSDS-T M829
 DODIC: C786, LOT #: 10P88A073-009
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: June 4 - July 18, 1981



ITEM: CHG, PROP 155MM RB M203
 DODIC: D532, LOT #: IND81H-070056
 Degrees Fahrenheit

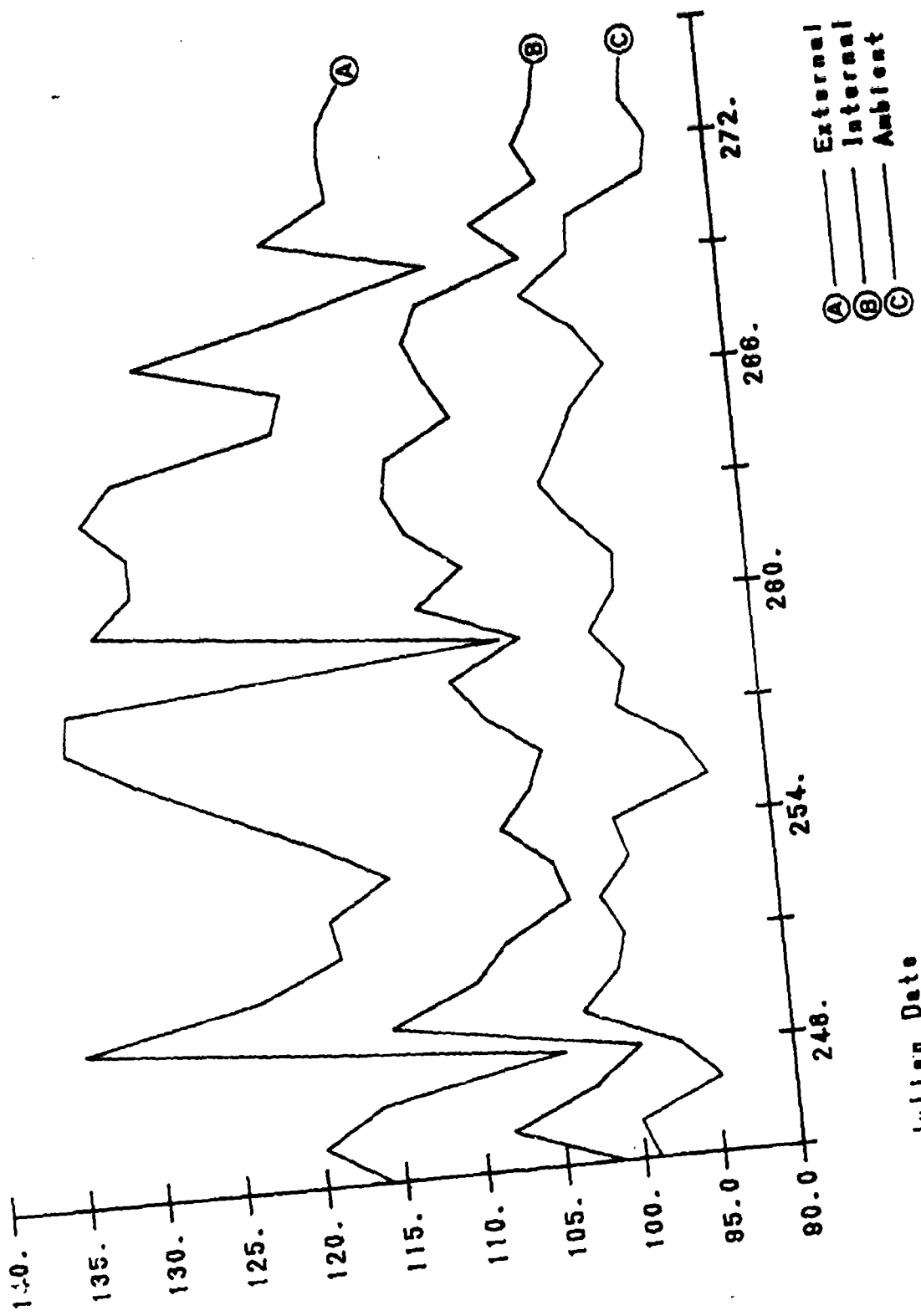
Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: July 18 - September 1, 1991



ITEM: CHG, PROP 155MM RB M203
 DODIC: D532, LOT #: IND81H-070056
 Degrees Fahrenheit

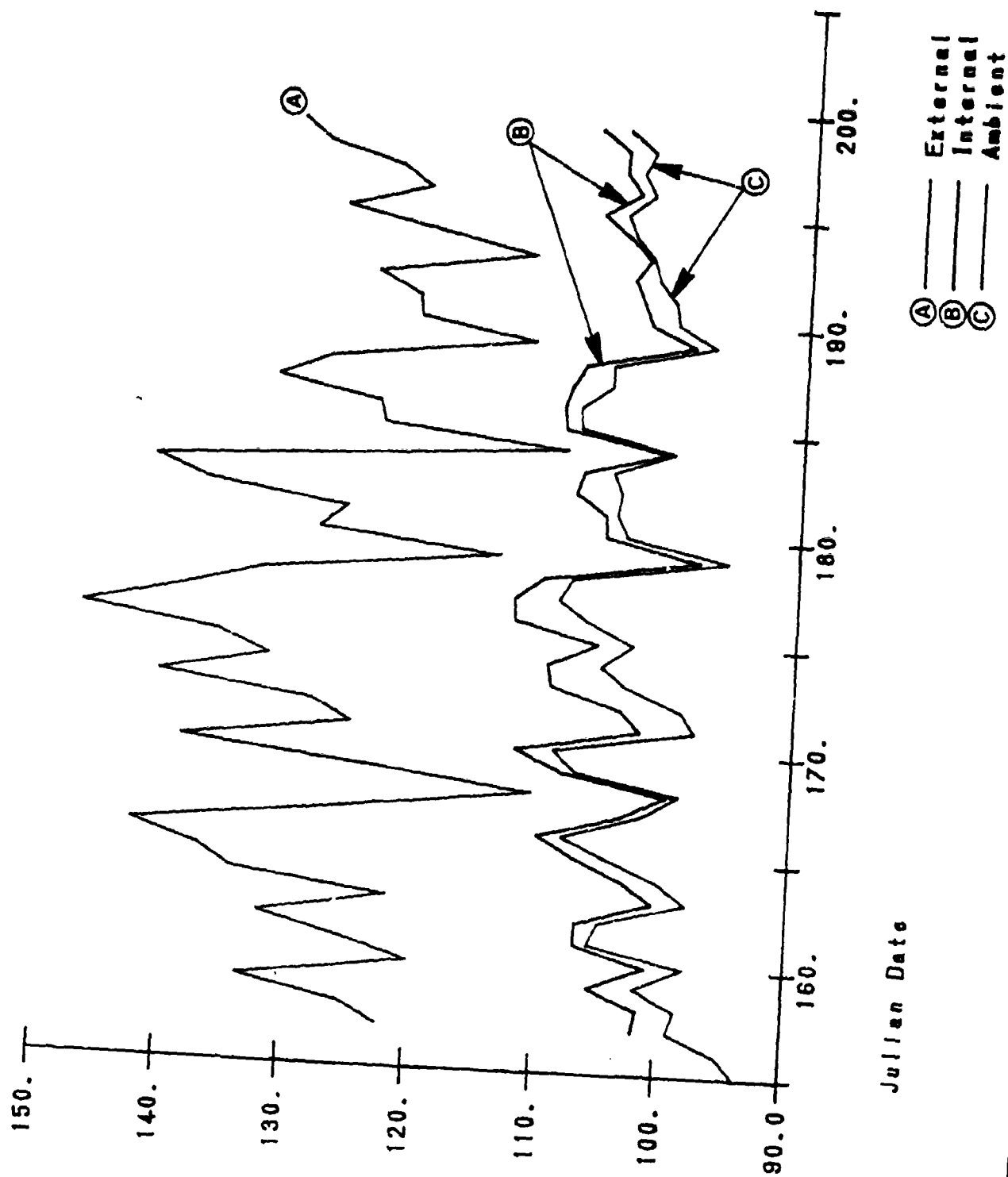
Daily Peak Environmental Data From Weather Station #2 at TSA 1

Date: September 2 - October 1, 1991



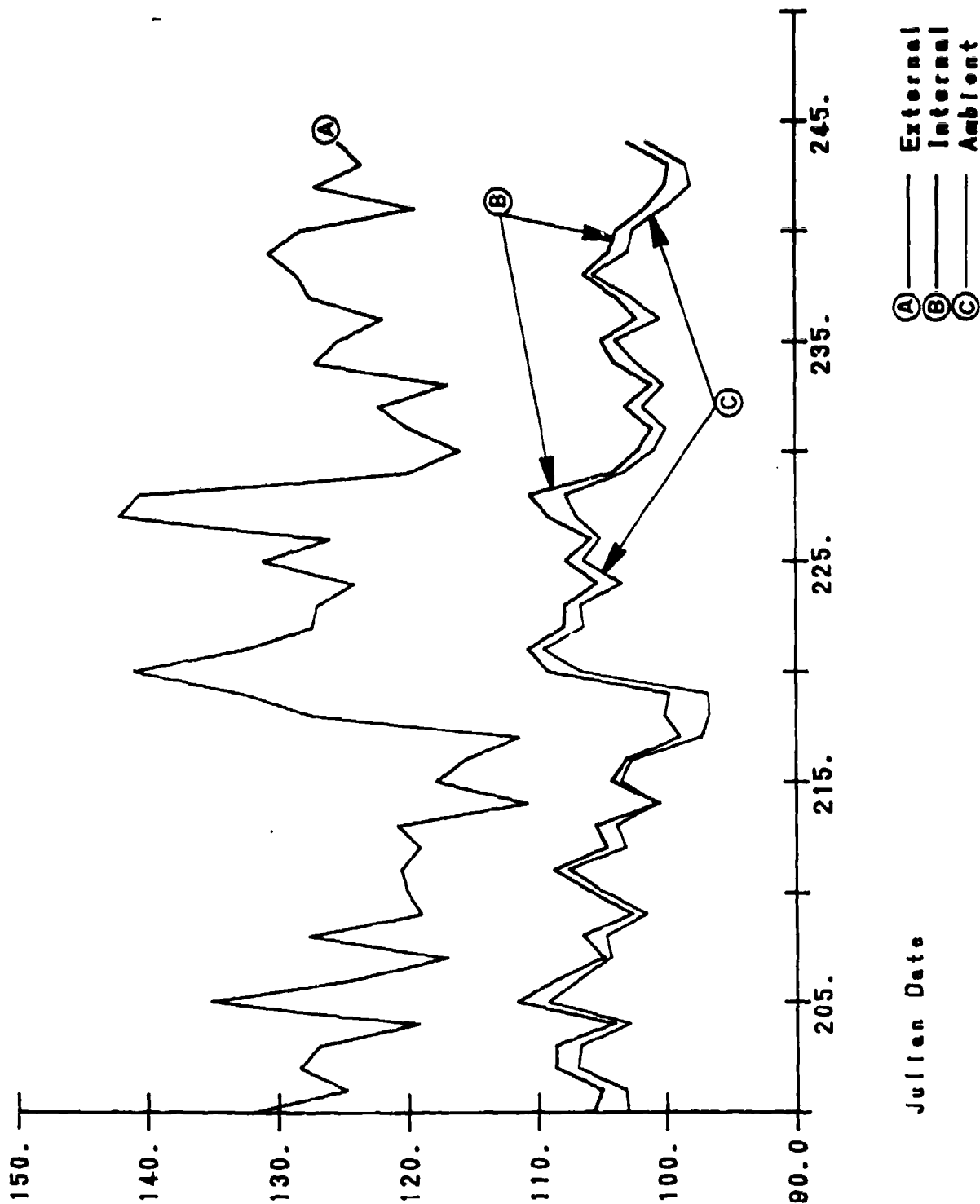
ITEM: CHG, PROP 155MM RB M203
 DDDIC: D532, LOT #: INDB1H-070056
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: June 4 - July 18, 1991



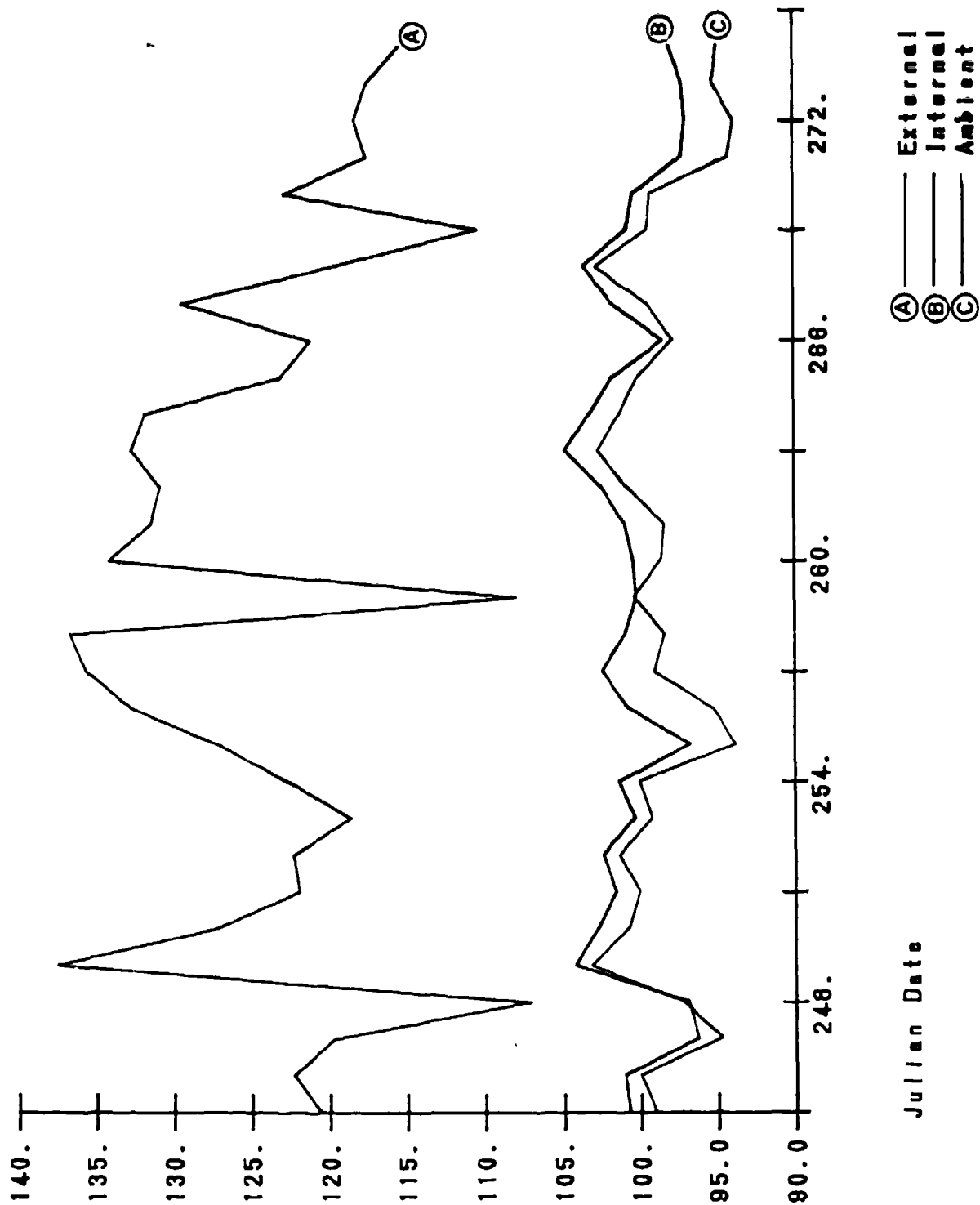
ITEM: CHG, PROP 155MM RB M203
 DODIC: D532, LOT #: IND80D-071280
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: July 19 - September 1, 1981



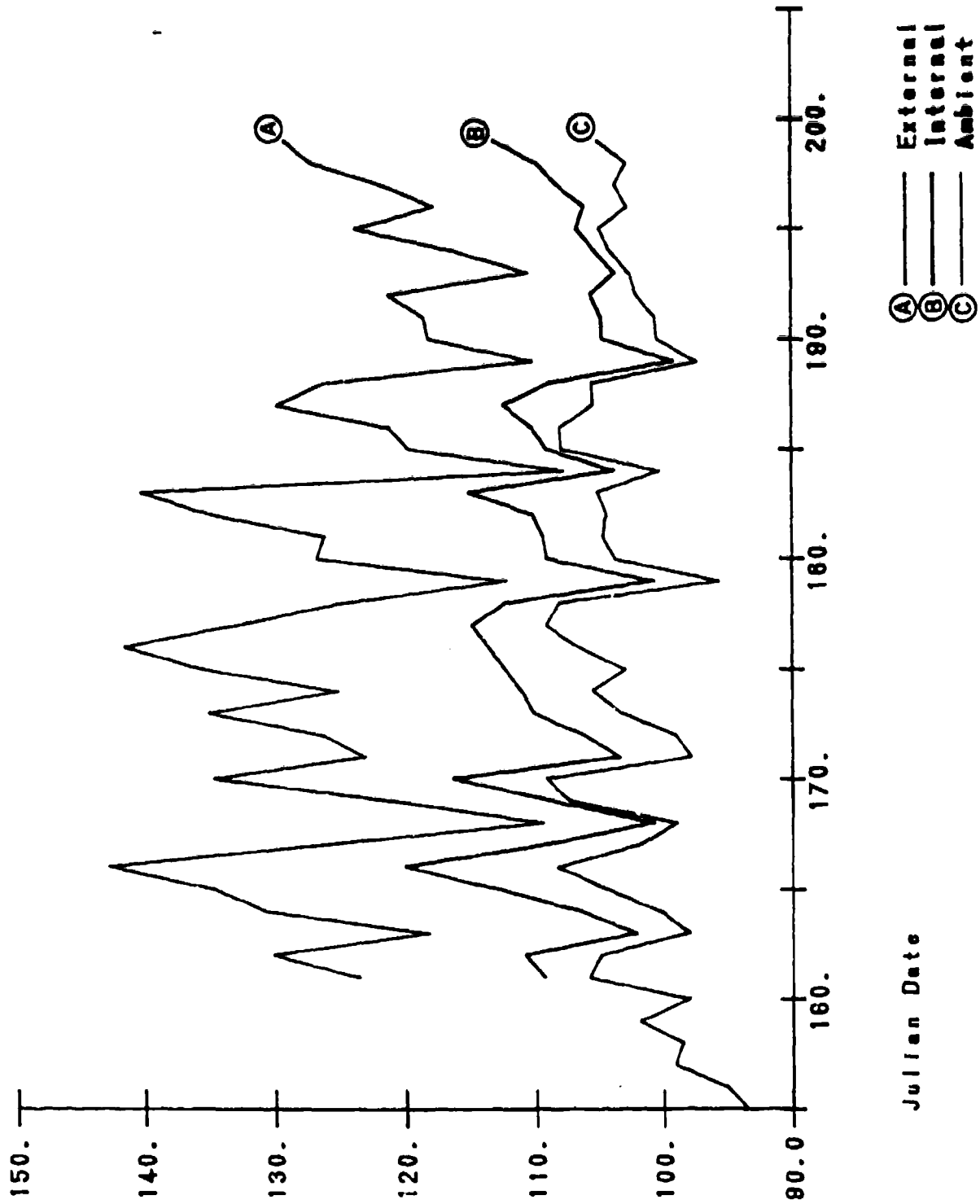
ITEM: CHG, PROP 155MM RB M203
 DDD12: D532, LOT #: IND90D-071280
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: September 2 - October 1, 1991



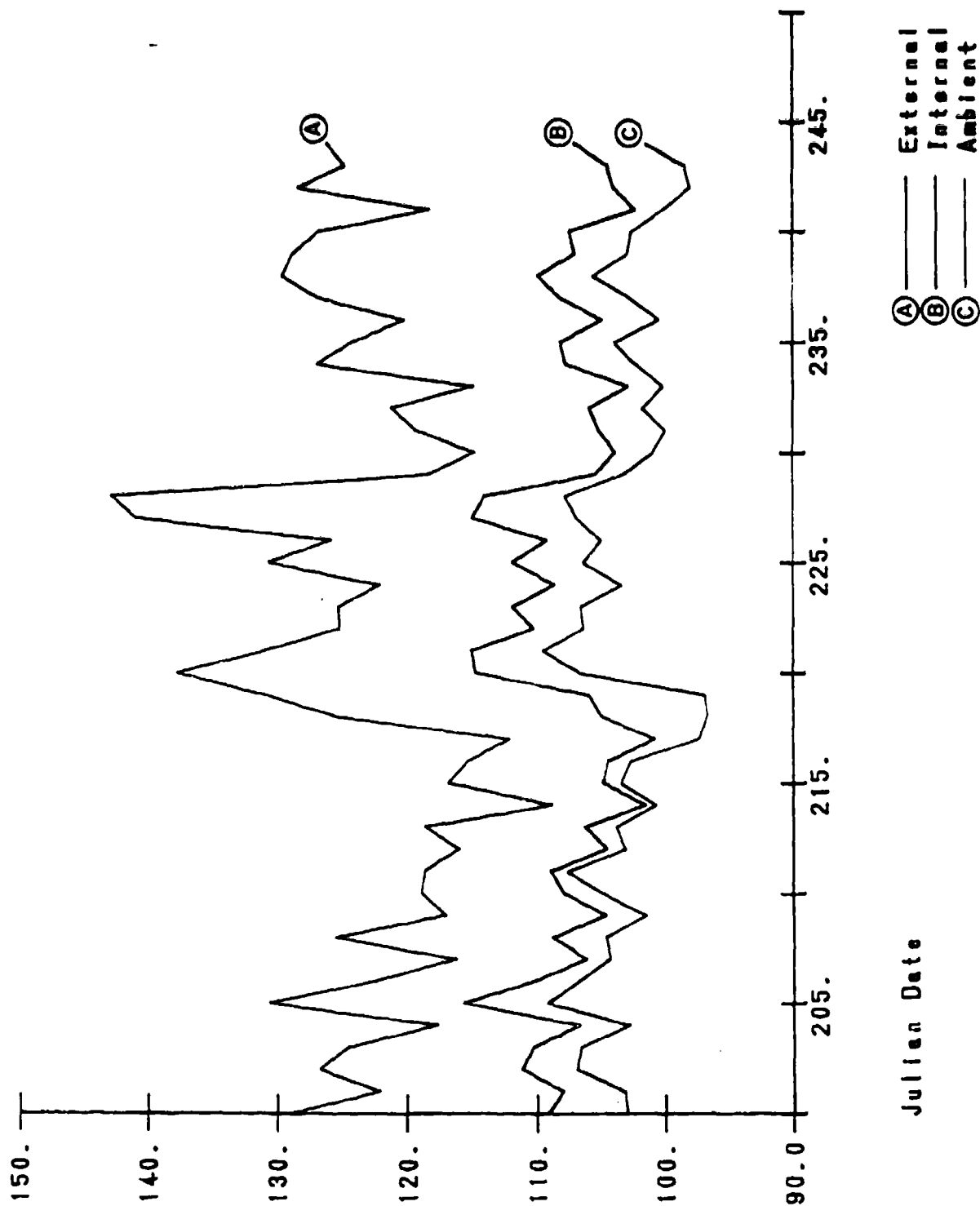
ITEM: CHG, PROP 155MM RB M203
 DODIC: D532, LOT #: IND90D-071280
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: June 4 - July 18, 1981



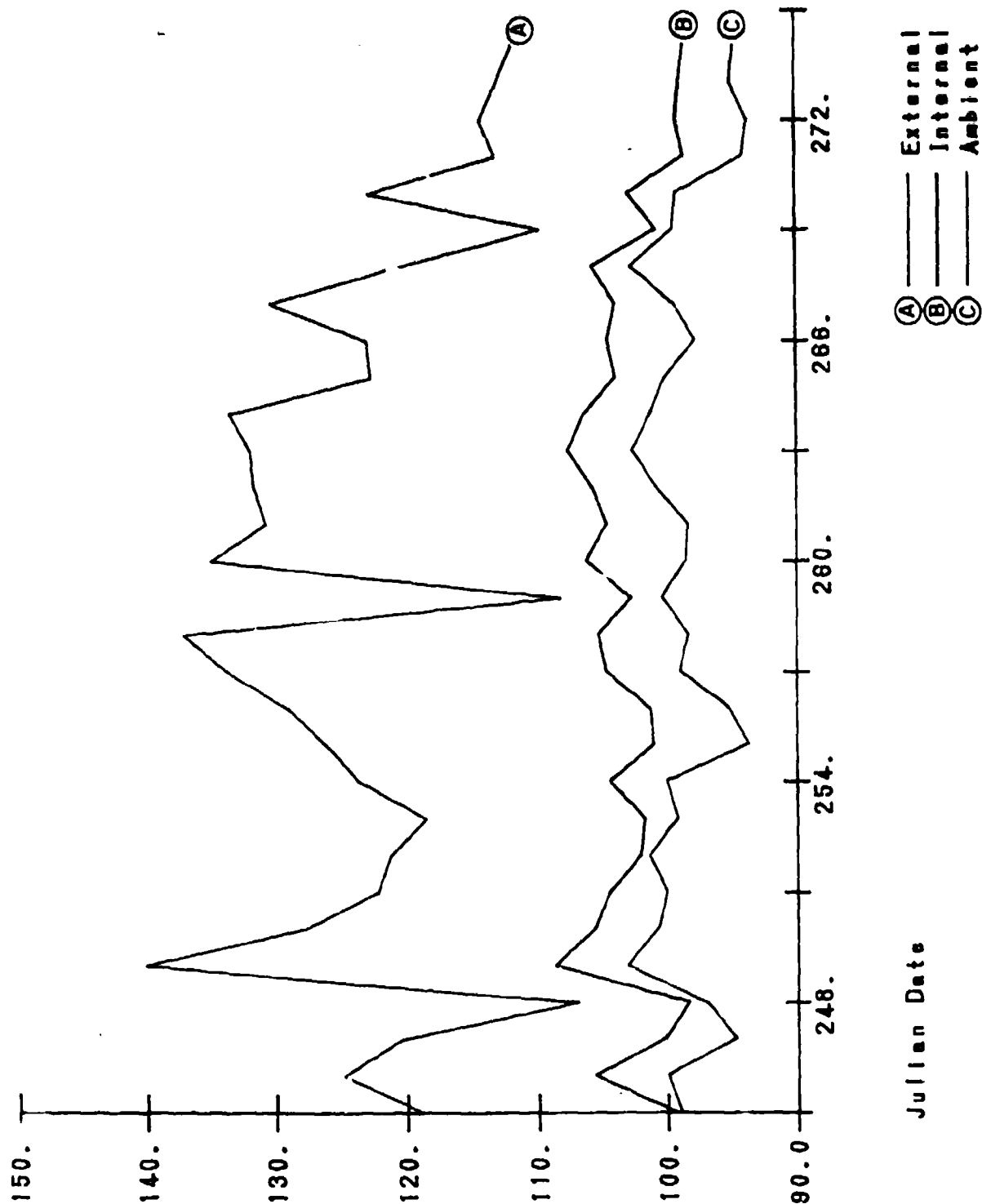
ITEM: CHG, PROP 155MM RB M119A2 W/O PRIM
 DODIC: D533, LOT #: 1D90A-071303
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: July 19 - September 1, 1991



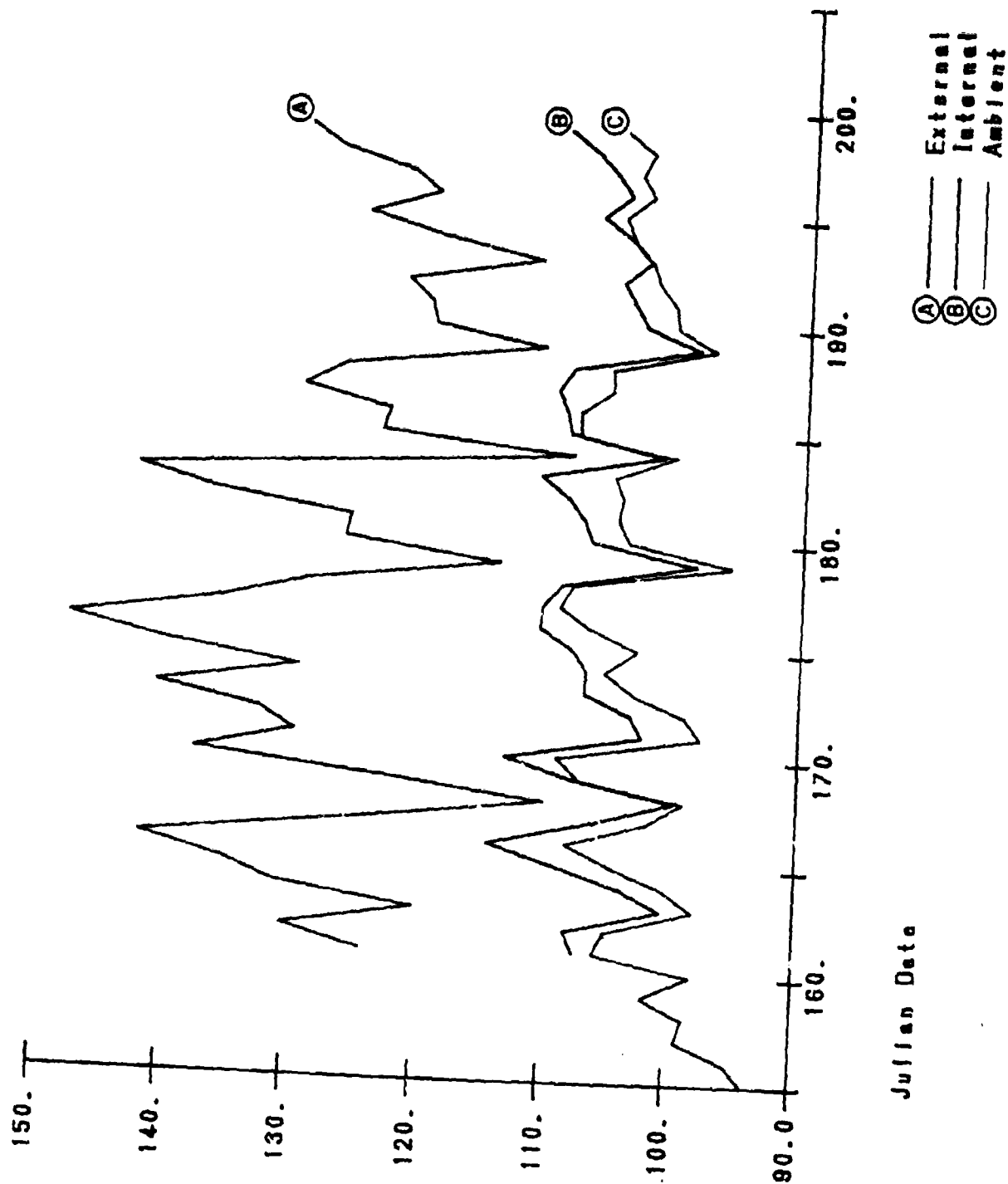
ITEM: CHG, PROP 155MM RB M119A2 W/O PRIM
 DODIC: D533, LOT #: IND90A-071303
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: September 2 - October 1, 1991



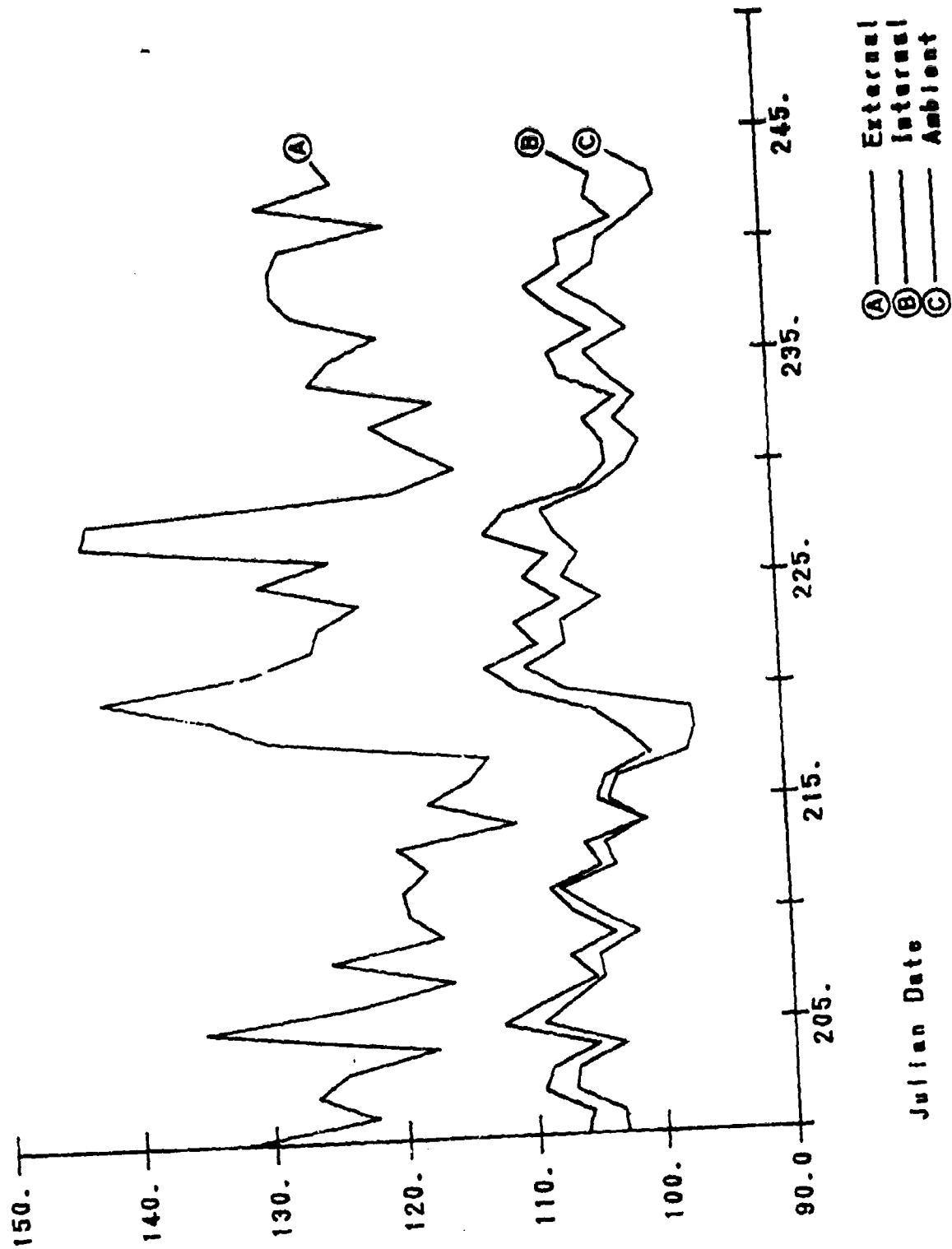
ITEM: CHG, PROP 155MM RB M119A2 W/O PRIM
 DODIC: D533, LOT #: IND90A-071303
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA ;
 Date: June 4 - July 18, 1981



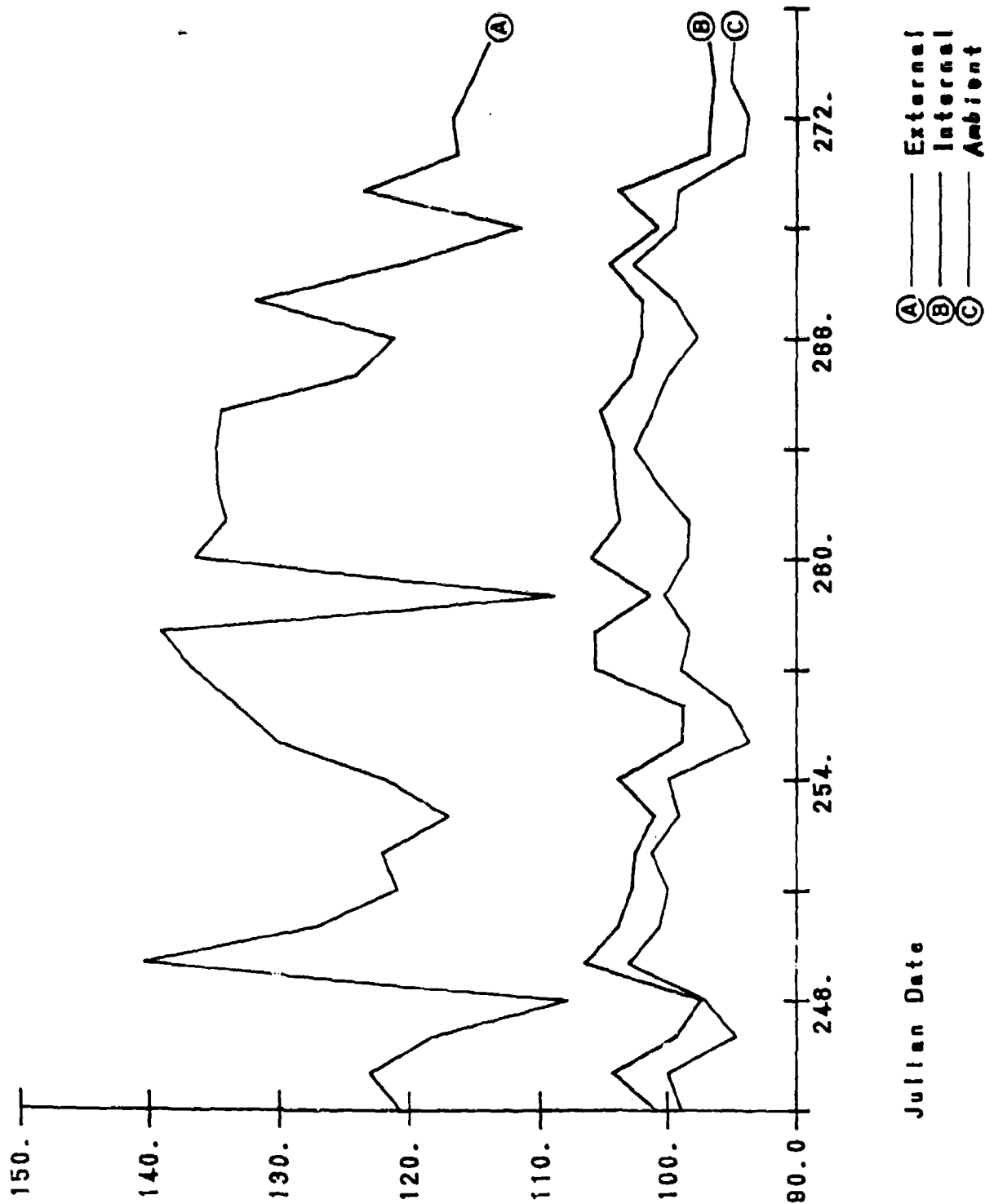
ITEM: CHG, PROP 155MM GB M3A1
 DODIC: 0540, LOT #: IND87G-070748
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: July 19 - September 1, 1981



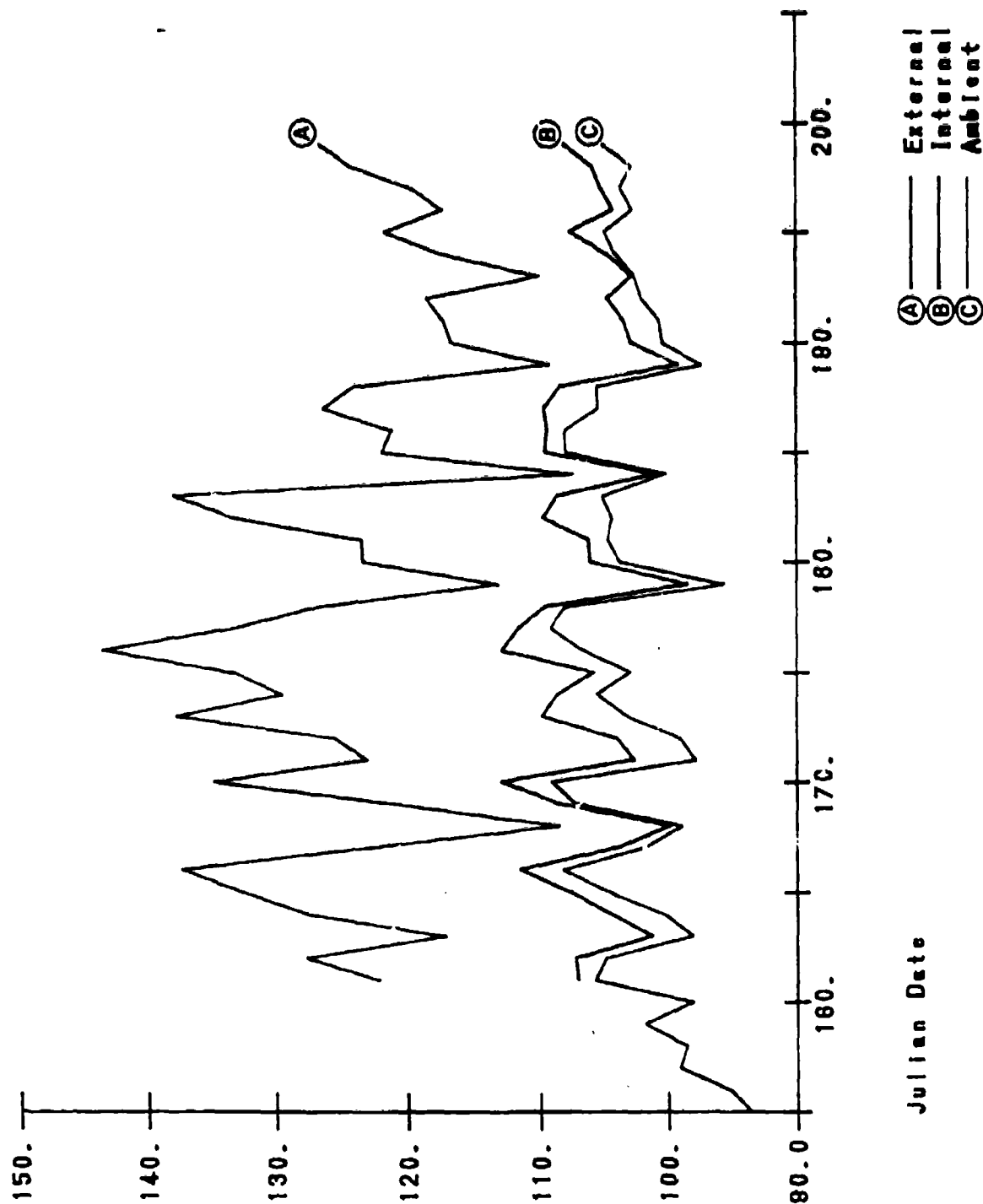
ITEM: CHG, PROP 155MM GB M3A1
 DDDIC: D540, LOT #: 1ND87G-070748
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: September 2 - October 1, 1991



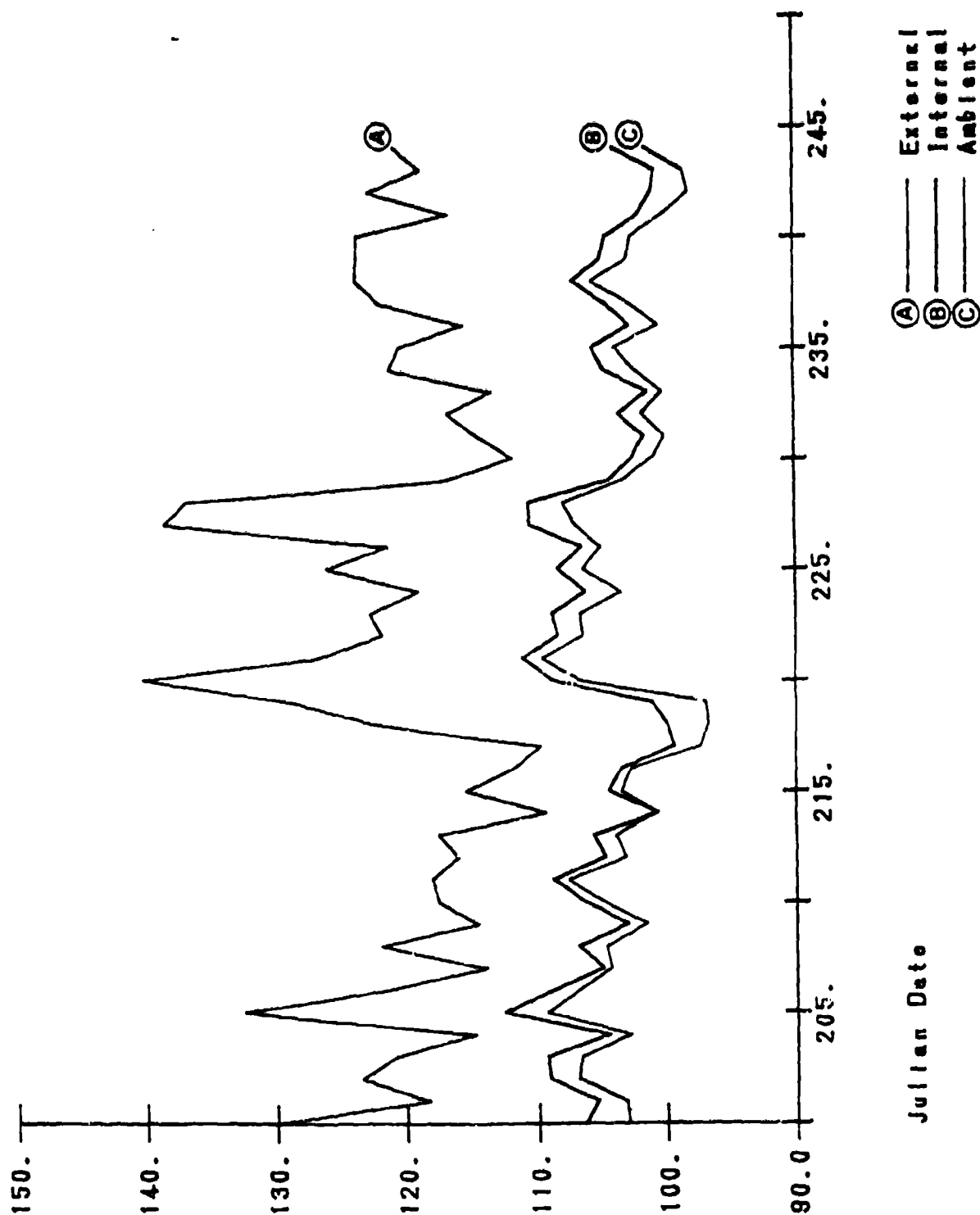
ITEM: CHG, PROP 155MM GB M3A1
 DODIC: D540, LOT #: 1ND87G-070748
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: June 4 - July 18, 1991



ITEM: CHQ, PROP 155MM WB M4A2
 DODIC: D541, LOT #: BAJ-83448
 Degrees Fahrenheit

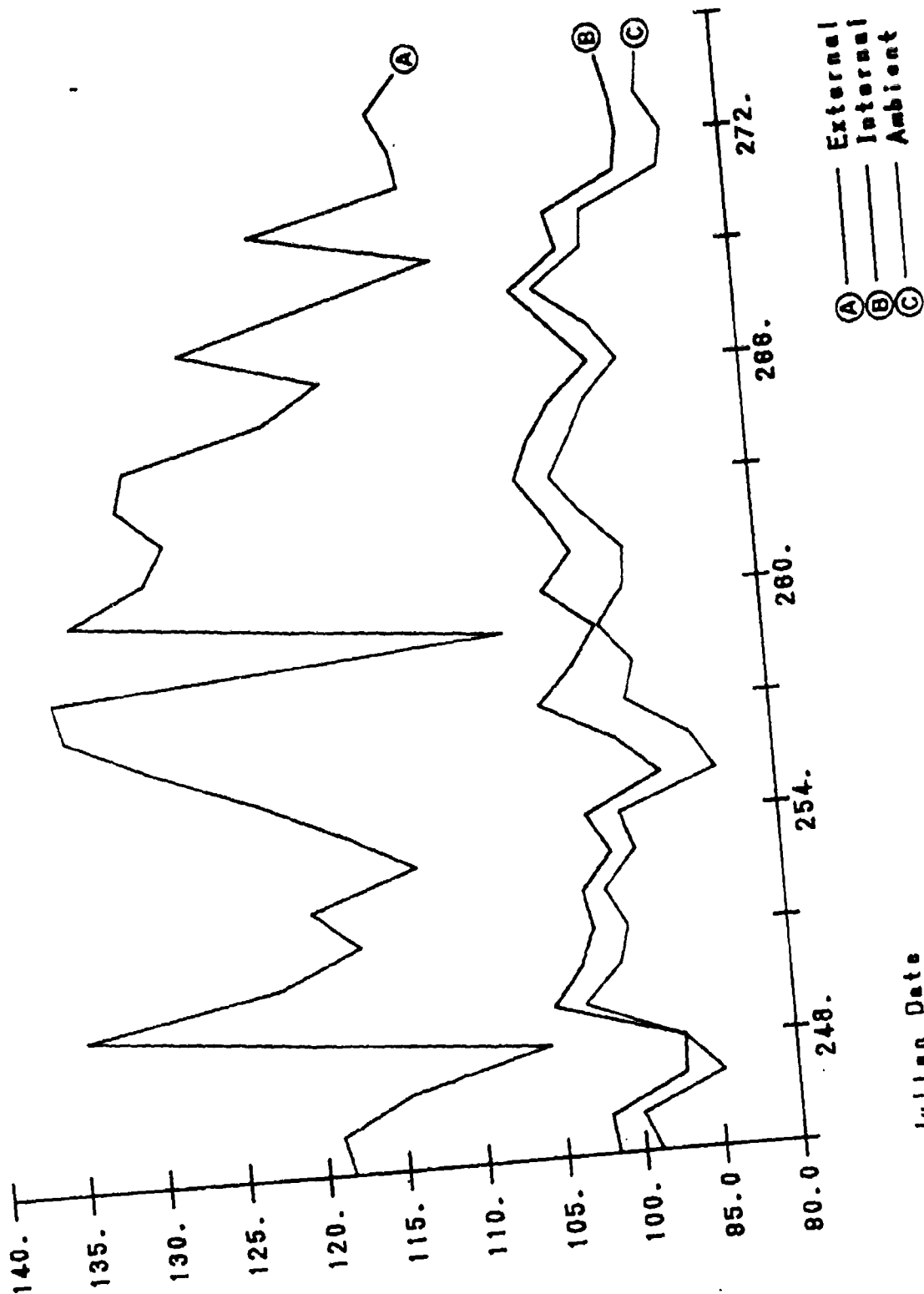
Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: July 19 - September 1, 1981



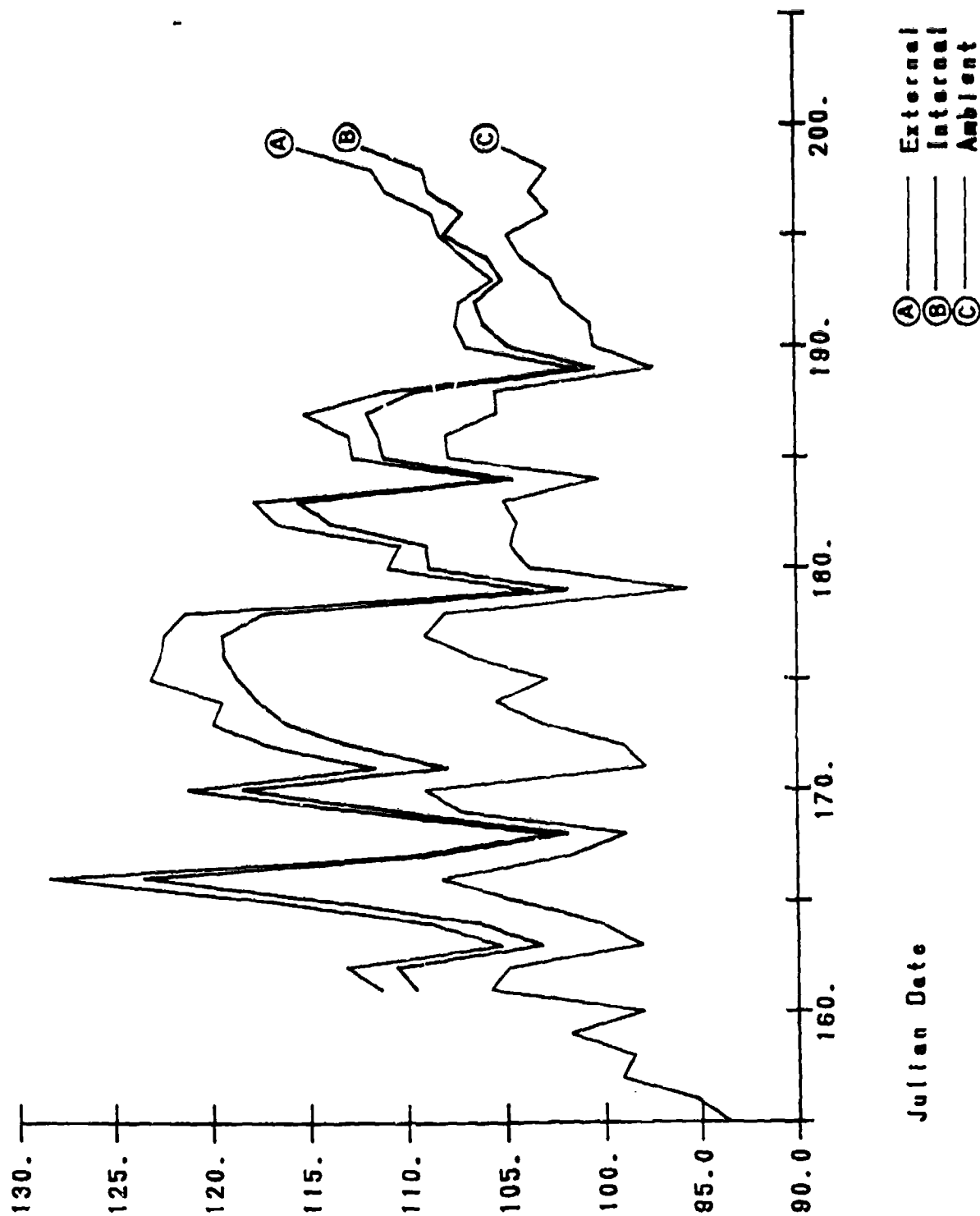
ITEM: CHG, PROP 155MM WB M4A2
 DODIC: D541, LOT #: BAJ-63448
 Degrees Fahrenheit

ITEM: CHG. PROP 155MM WB M4A2
 DODIC: D541, LOT #: BAJ-63448
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: September 2 - October 1, 1991



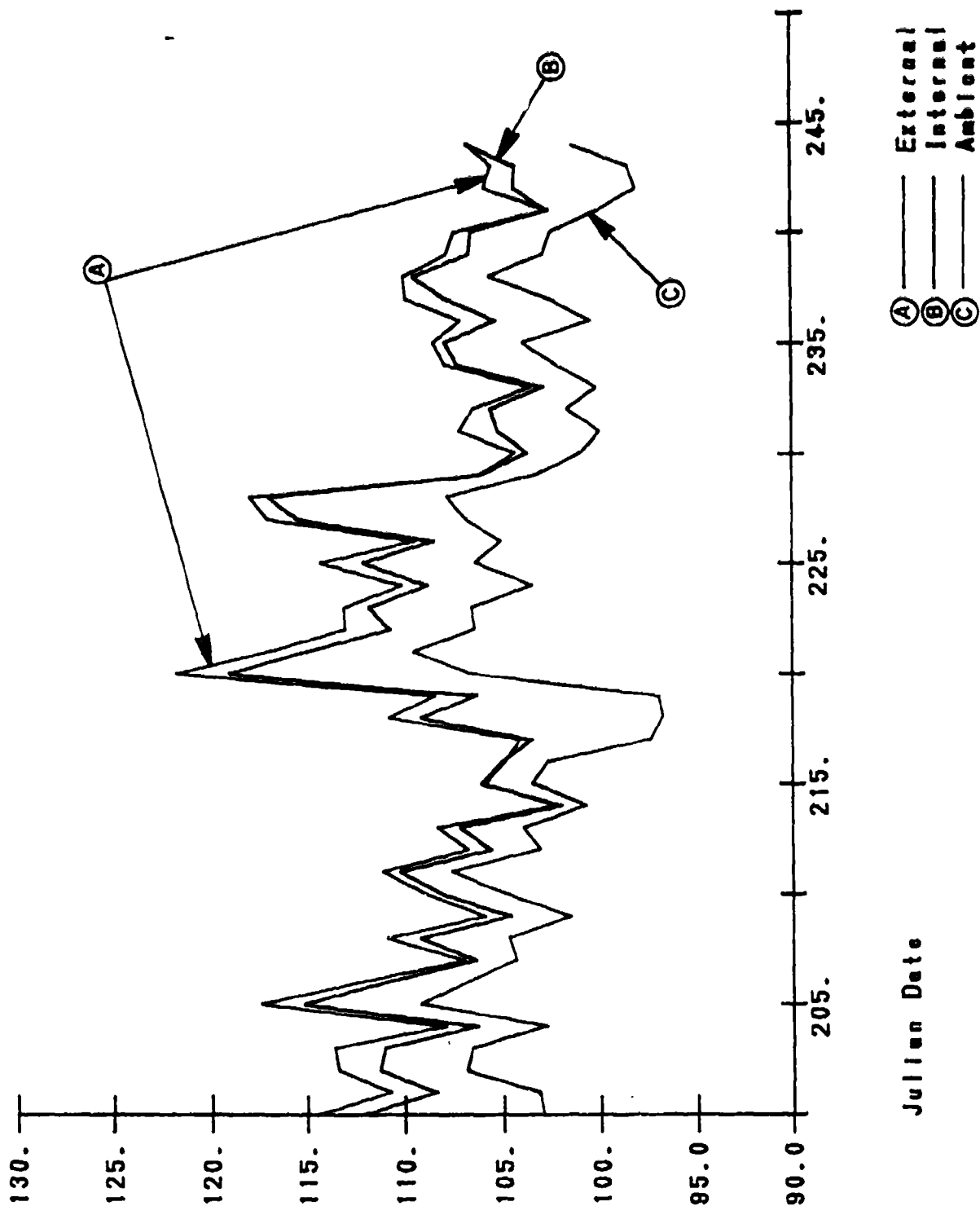
Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: June 4 - July 18, 1991



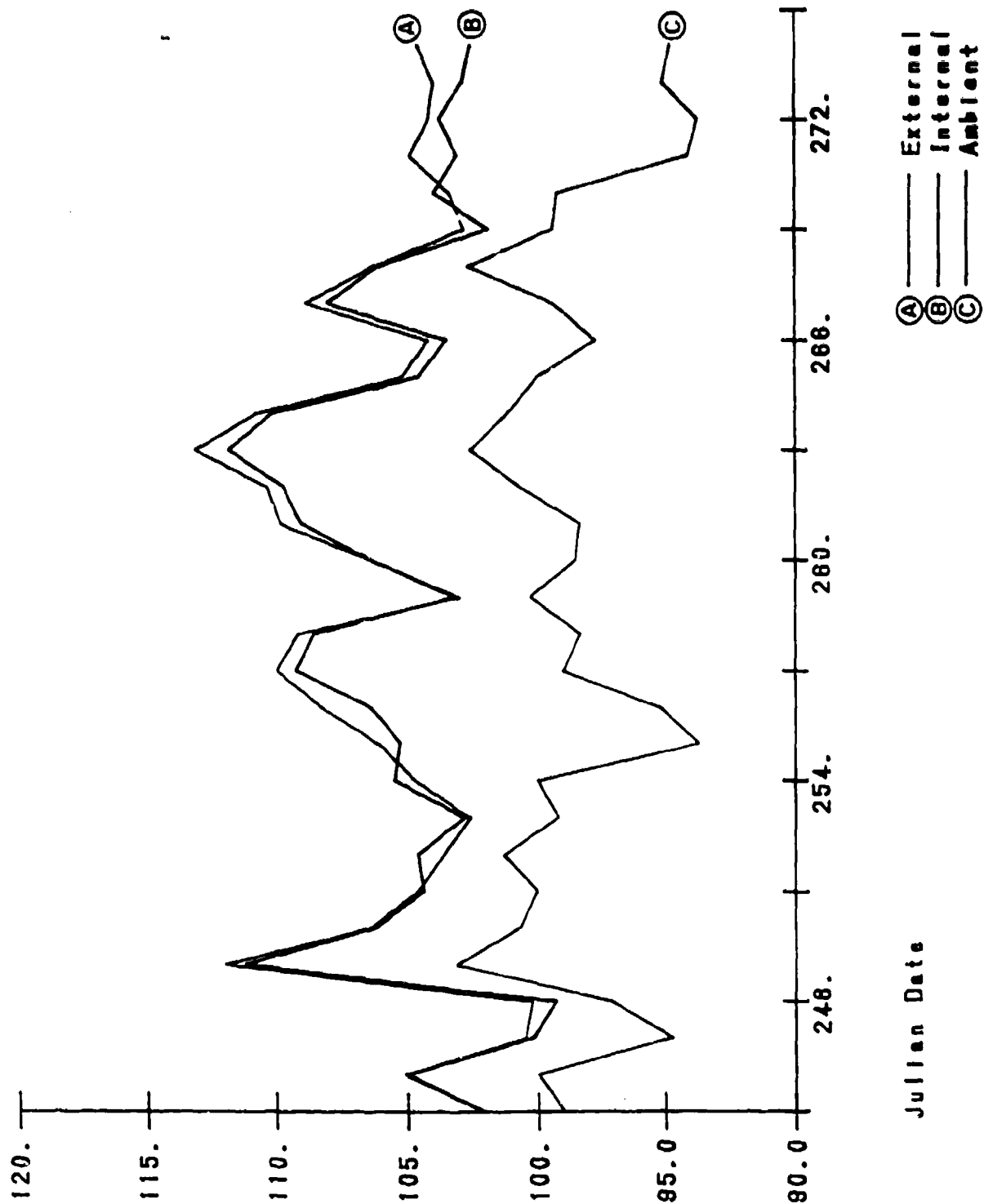
64-8
 ITEM: PROJ, 155MM HE RAP M549A1 (COMP B)
 DDDIC: D579, LOT #: 10P81U03L-019A
 Degrees Fahrenheit

ITEM: PROJ, 155MM HE RAP M549A1 (COMP B)
 DODIC: D579, LOT #: 10P81U03L-019A
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: July 18 - September 1, 1981

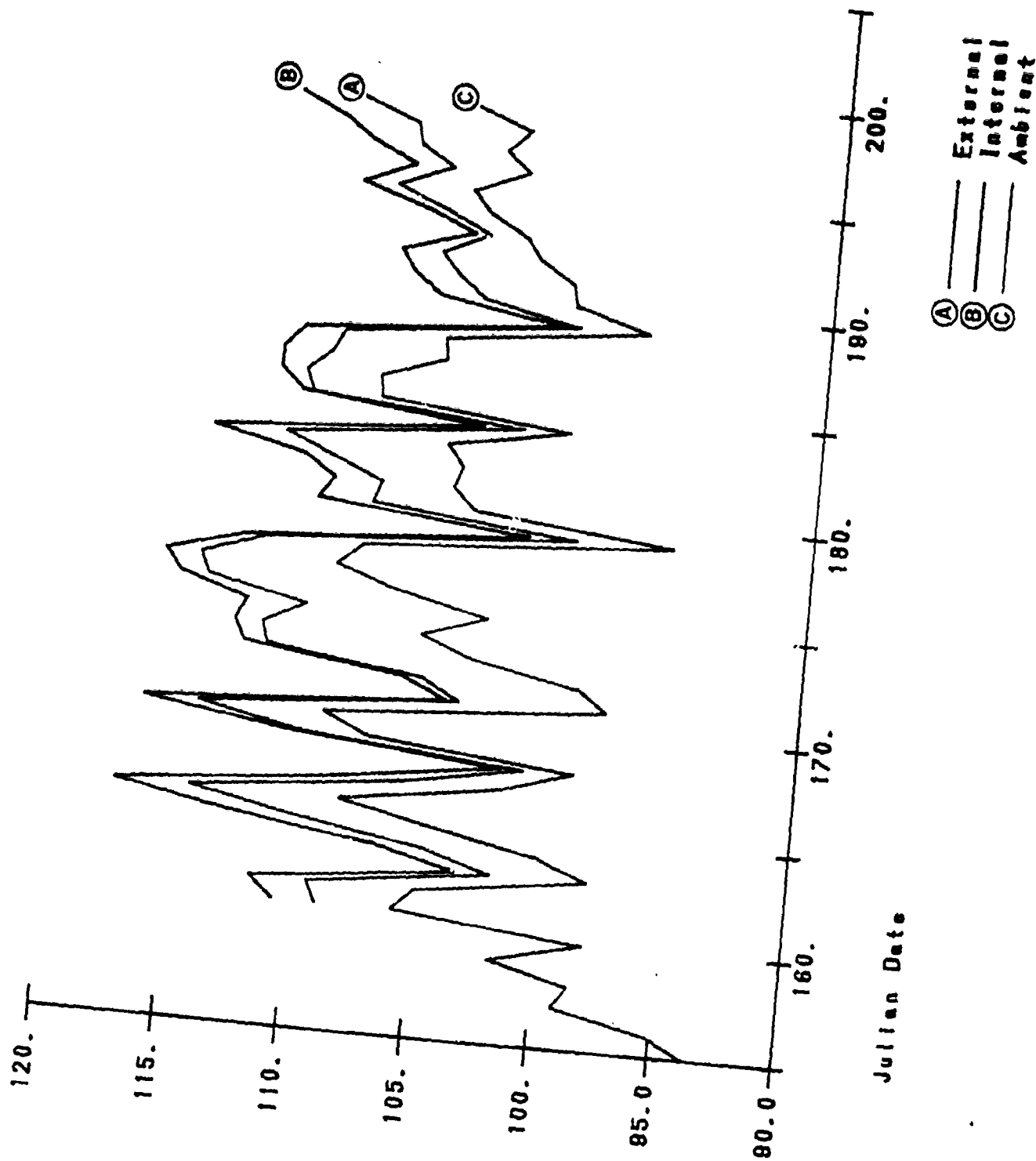


Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: September 2 - October 1, 1991



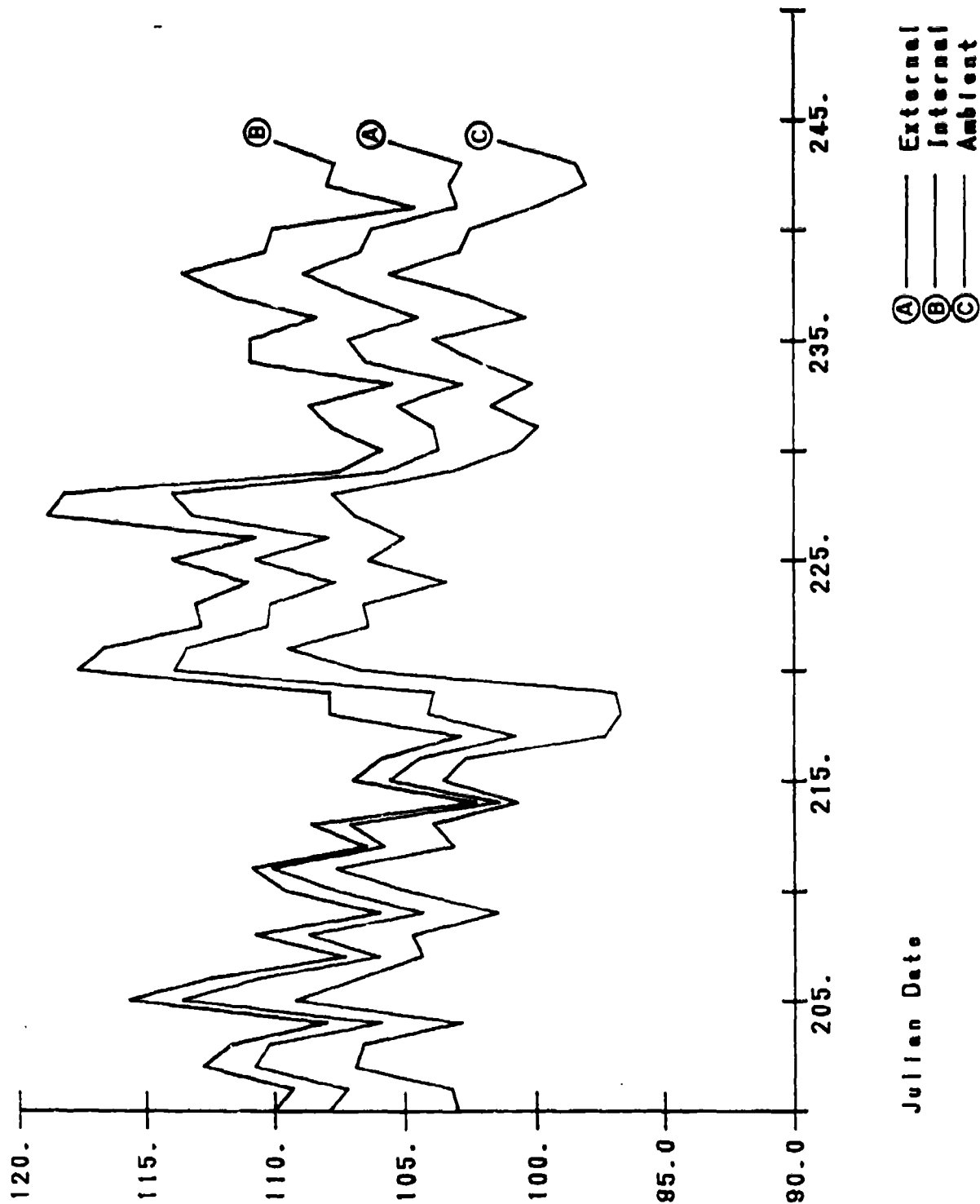
ITEM: PROJ, 155MM HE RAP M549A1 (COMP B)
 DODIC: D578, LOT #: 10P81U03L-019A
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: June 4 - July 18, 1991



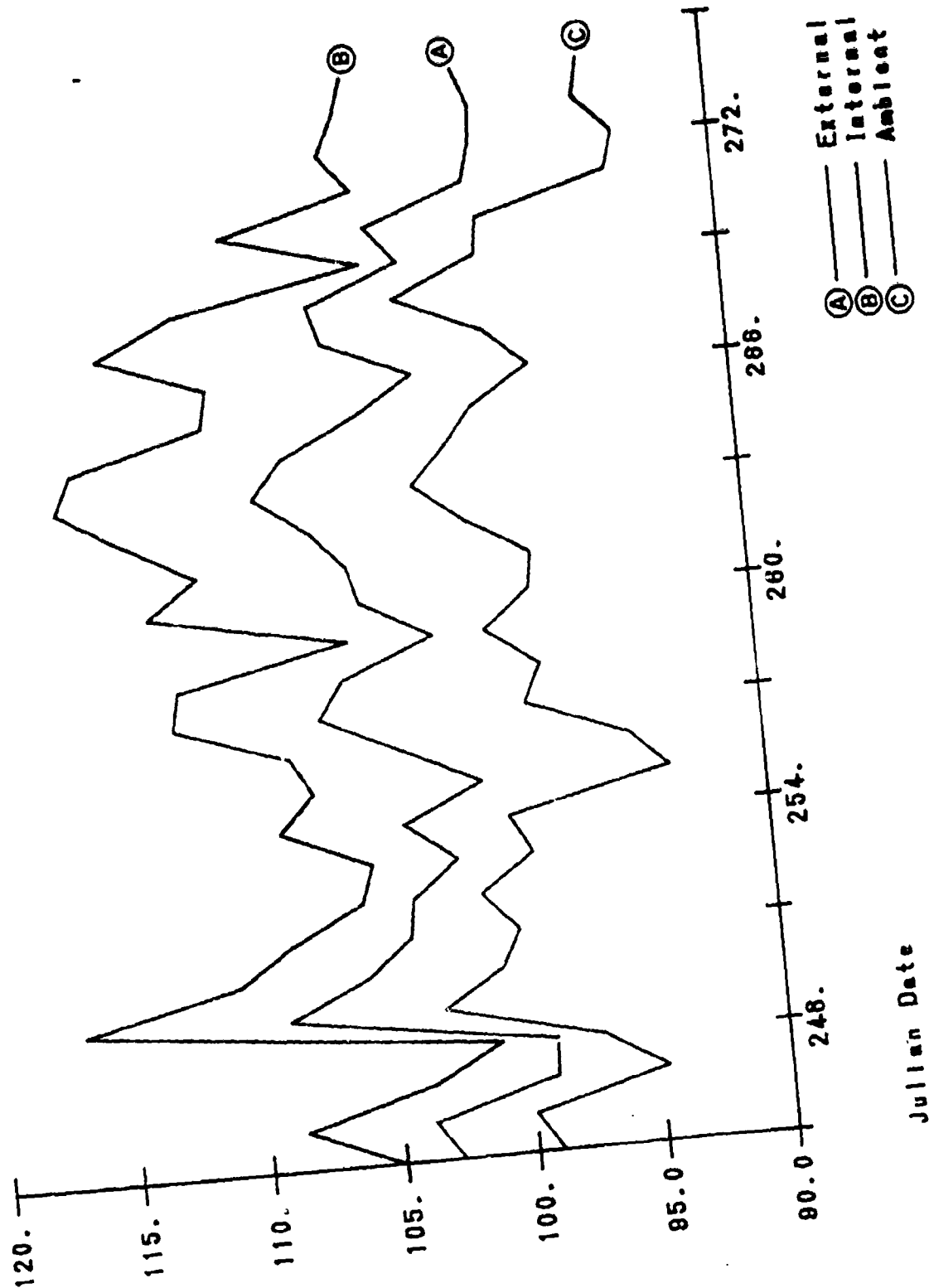
ITEM: PROJ. 81N HE RAP M650
 DDDIC: D624, LOT #: 10P88U050-001
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: July 19 - September 1, 1991



ITEM: PROJ, 8IN HE RAP M650
 DODIC: D624, LOT #: 10P88U050-001
 35-8
 Degrees Fahrenheit

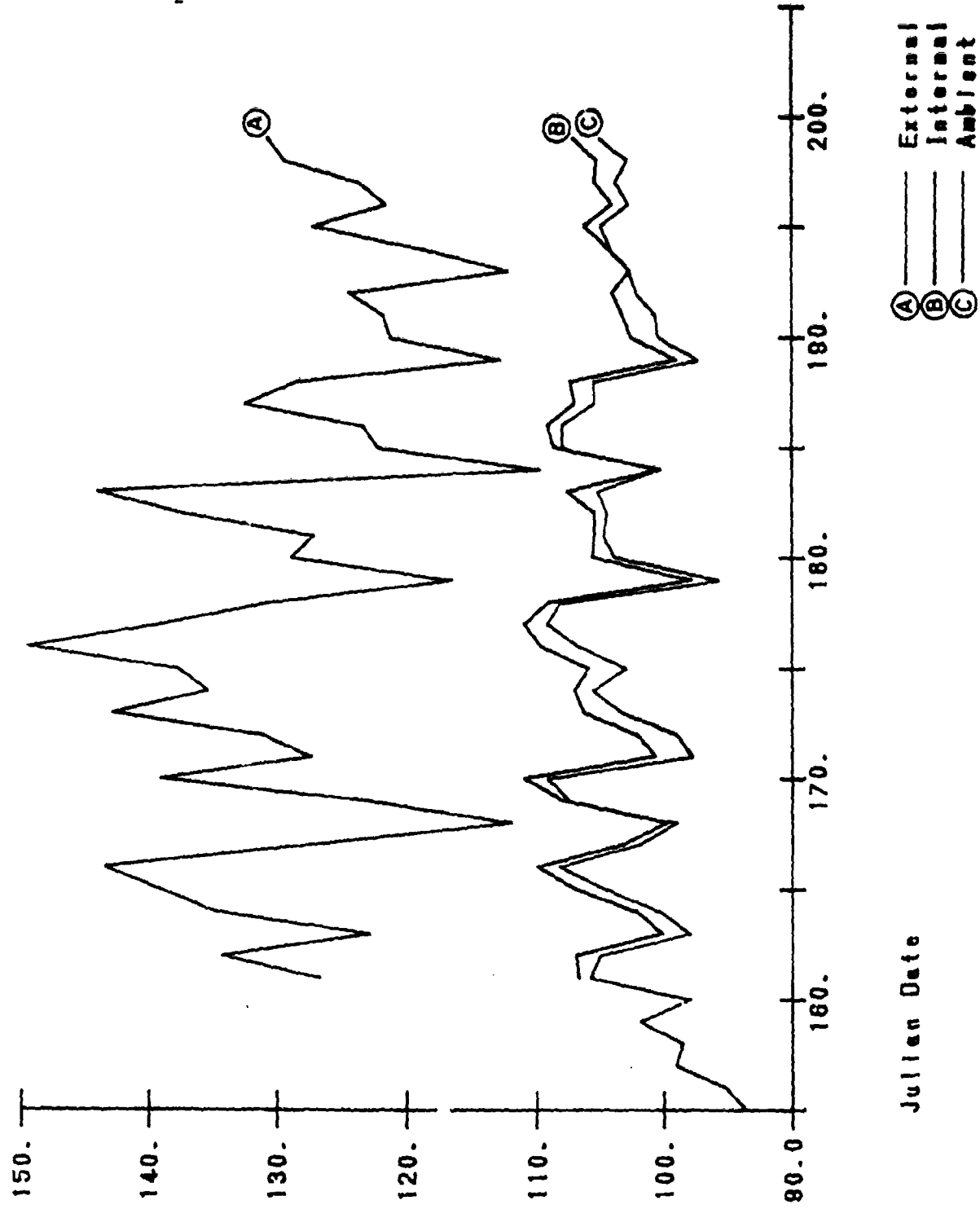
Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: September 2 - October 1, 1991



ITEM: PROJ. 81N HE RAP M650
 DODIC: D624, LOT #: 10P88U050-001
 Degrees Fahrenheit

55-8
 ITEM: CHG, PROP 81N WB M188A1 W/O PRIMER
 DODIC: D662, LOT #: 1NDB5D-070342
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: June 4 - July 18, 1981



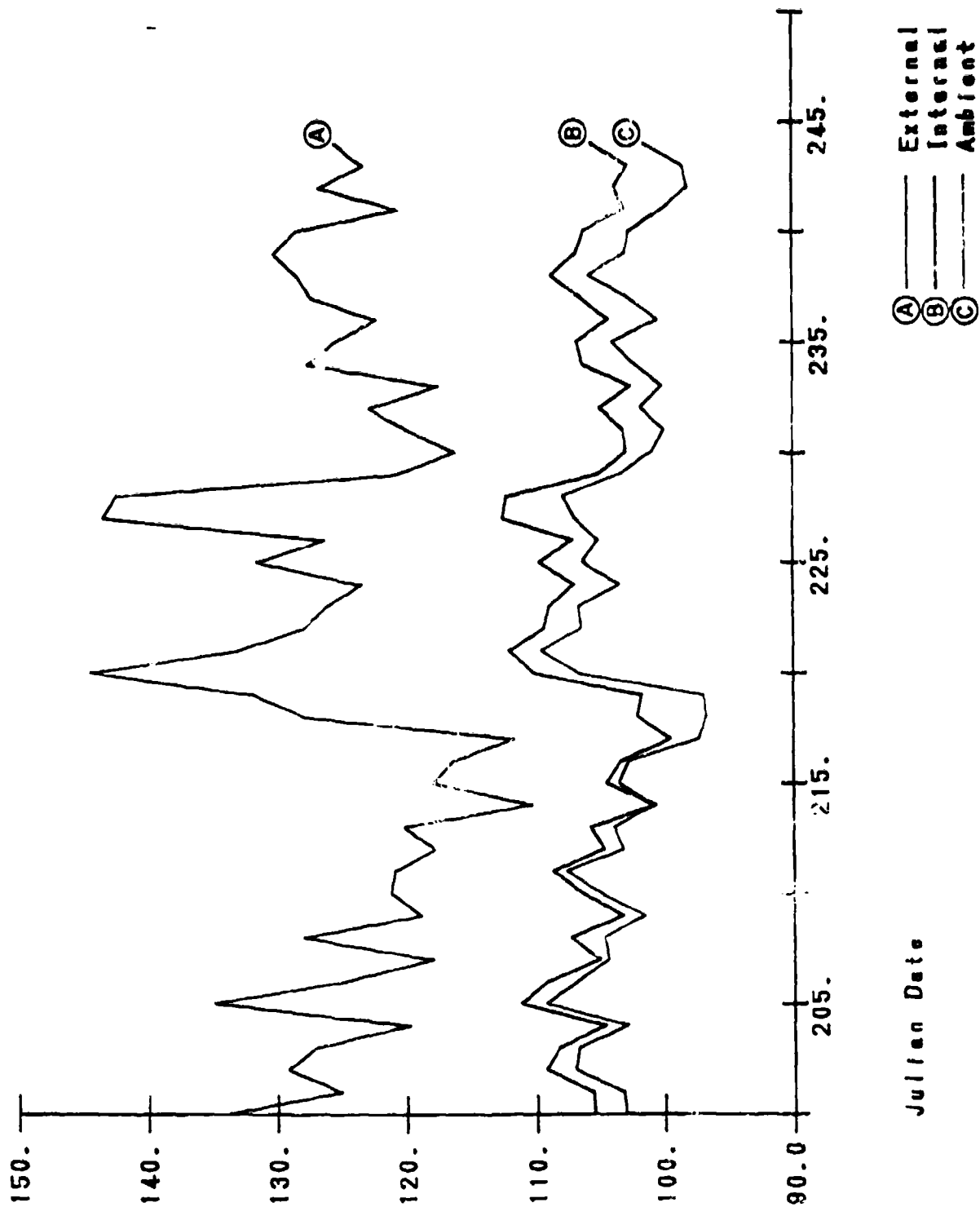
(A) External
 (B) Internal
 (C) Ambient

Julian Date

ITEM: CHG, PROP 8IN WB M188A1 W/O PRIMER
 DDP1C: D662, LOT #: IND85D-070342
 Degrees Fahrenheit

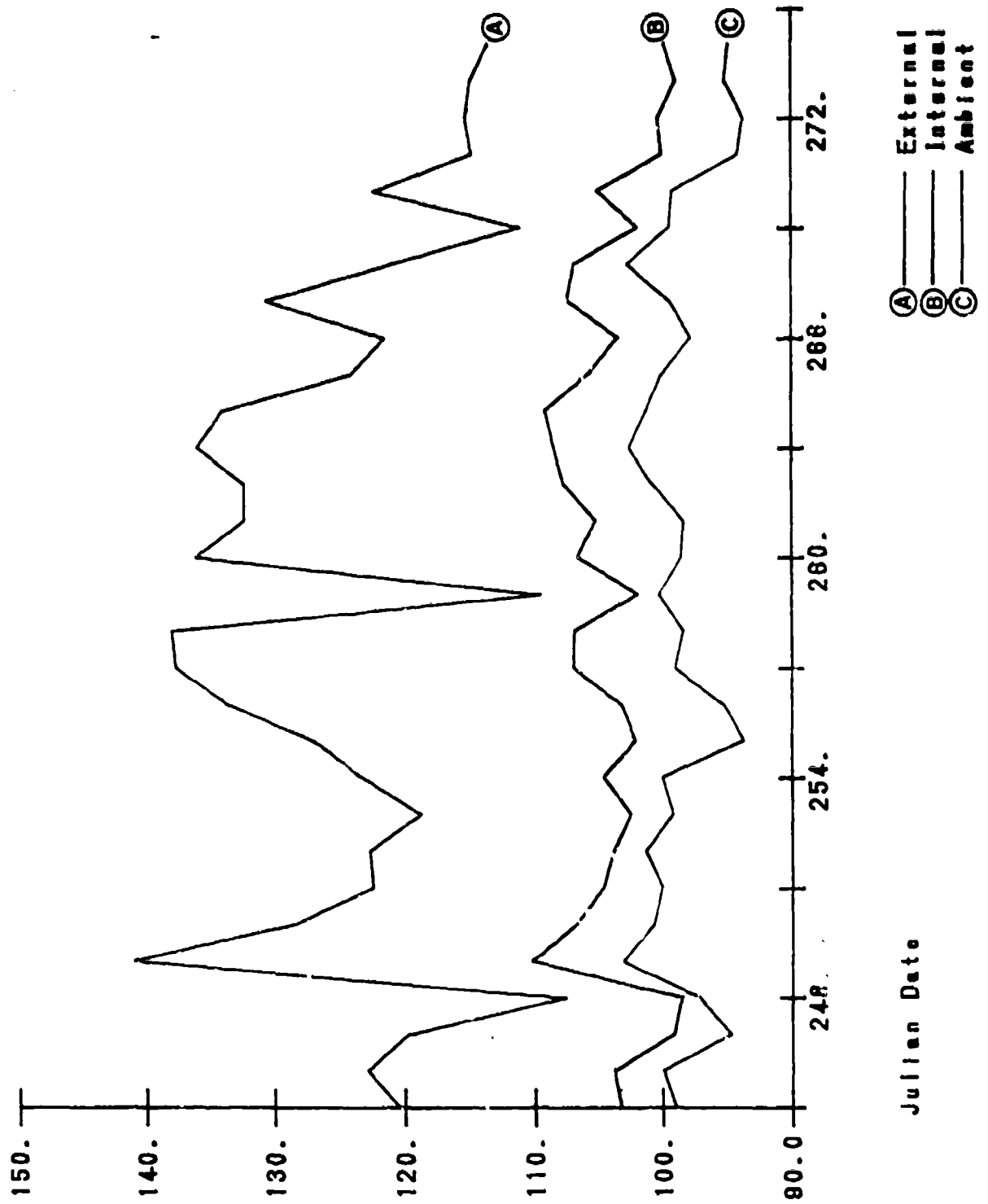
95-8

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: July 19 - September 1, 1991

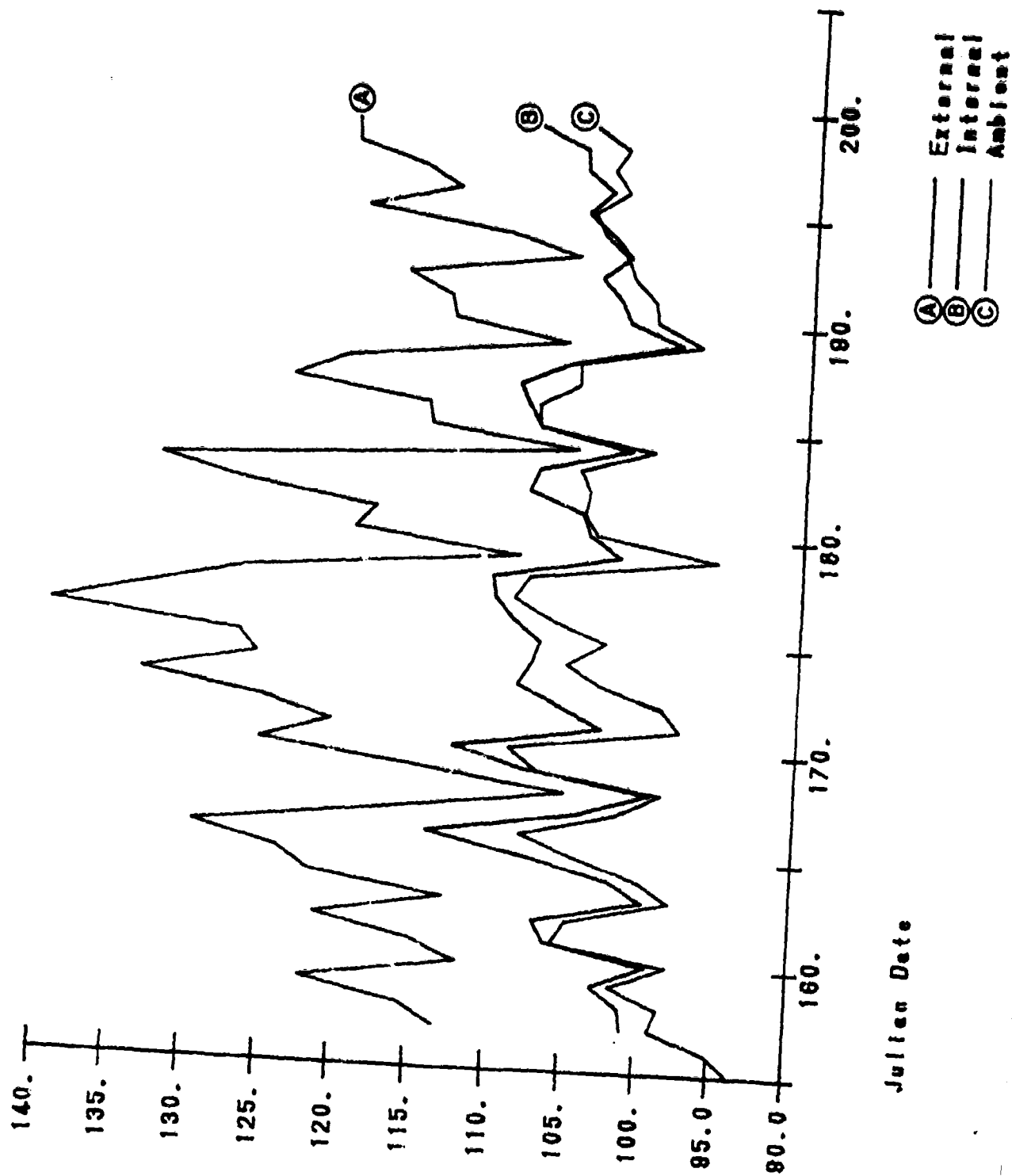


ITEM: CHG, PROP 8IN WB M188A1 W/O PRIMER
 LODIC: D662, LOT #: IND85D-070342
 Degree Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: September 2 - October 1, 1991



Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: June 4 - July 18, 1991

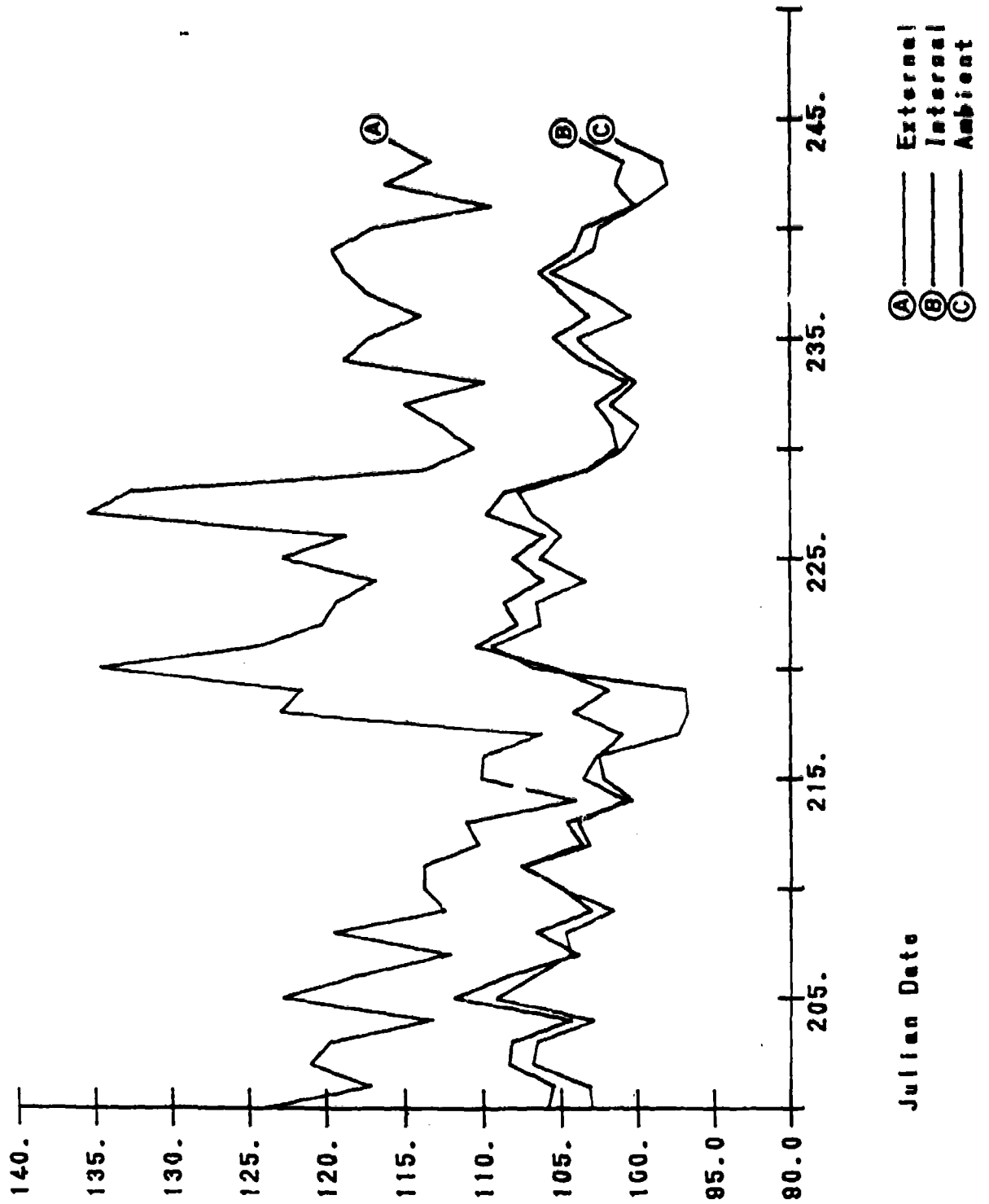


85-8
 ITEM: FUZE, MISO MS77/ MS77A1 W/O BOOSTER
 DODIC: N285, LOT #: BMV-7-14
 Degrees Fahrenheit

ITEM: FUZE, MTSQ M577/ M577A1 W/O BOOSTE
 DODIC: N285, LOT #: BWV-7-14
 Degree Fahrenheit

65-8

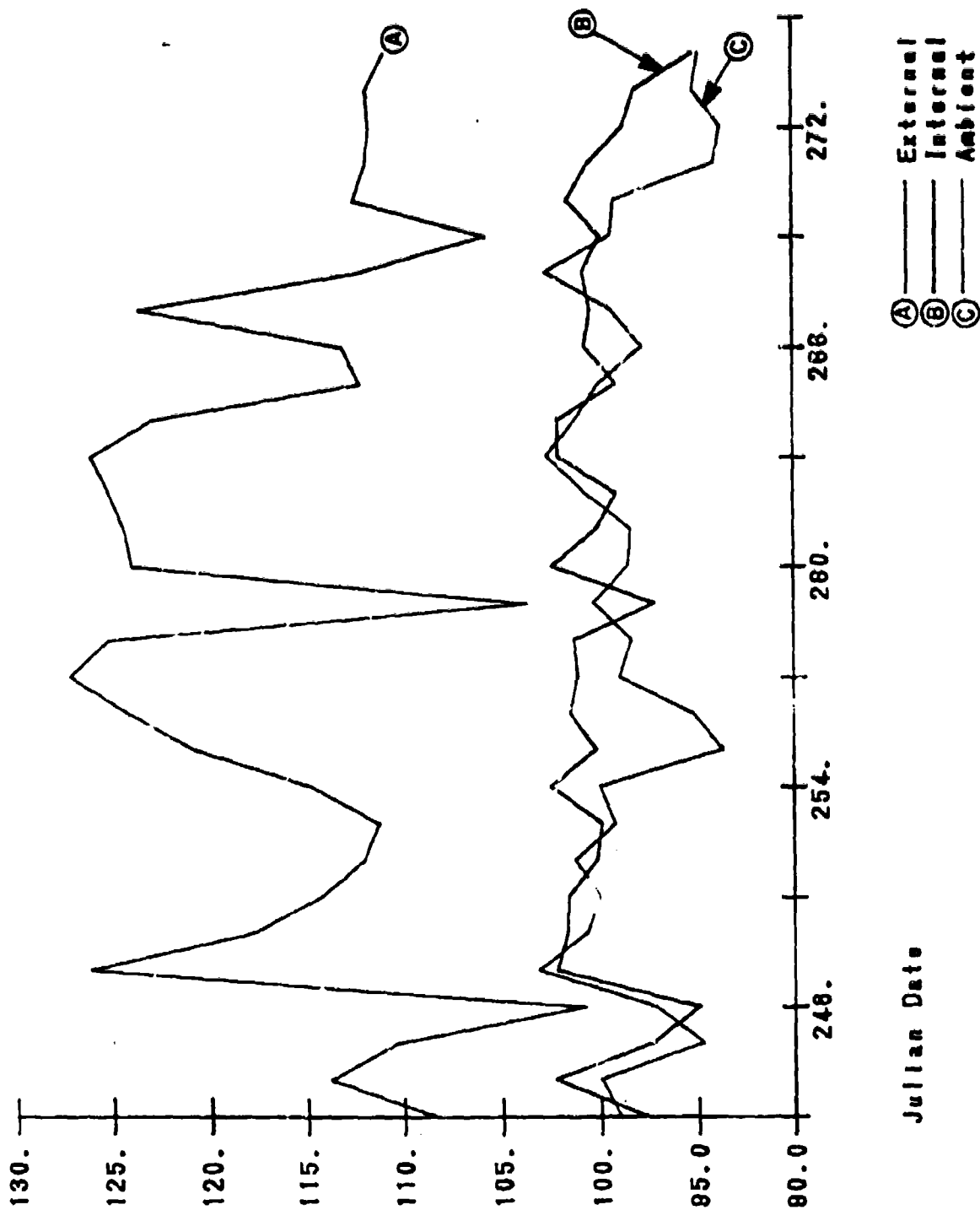
Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: July 18 - September 1, 1991



ITEM: FUZE, M190 M577/ M577A1 W/O BOOSTER
 DODIC: N285, LOT #: BWV-7-14
 Degrees Fahrenheit

09-8

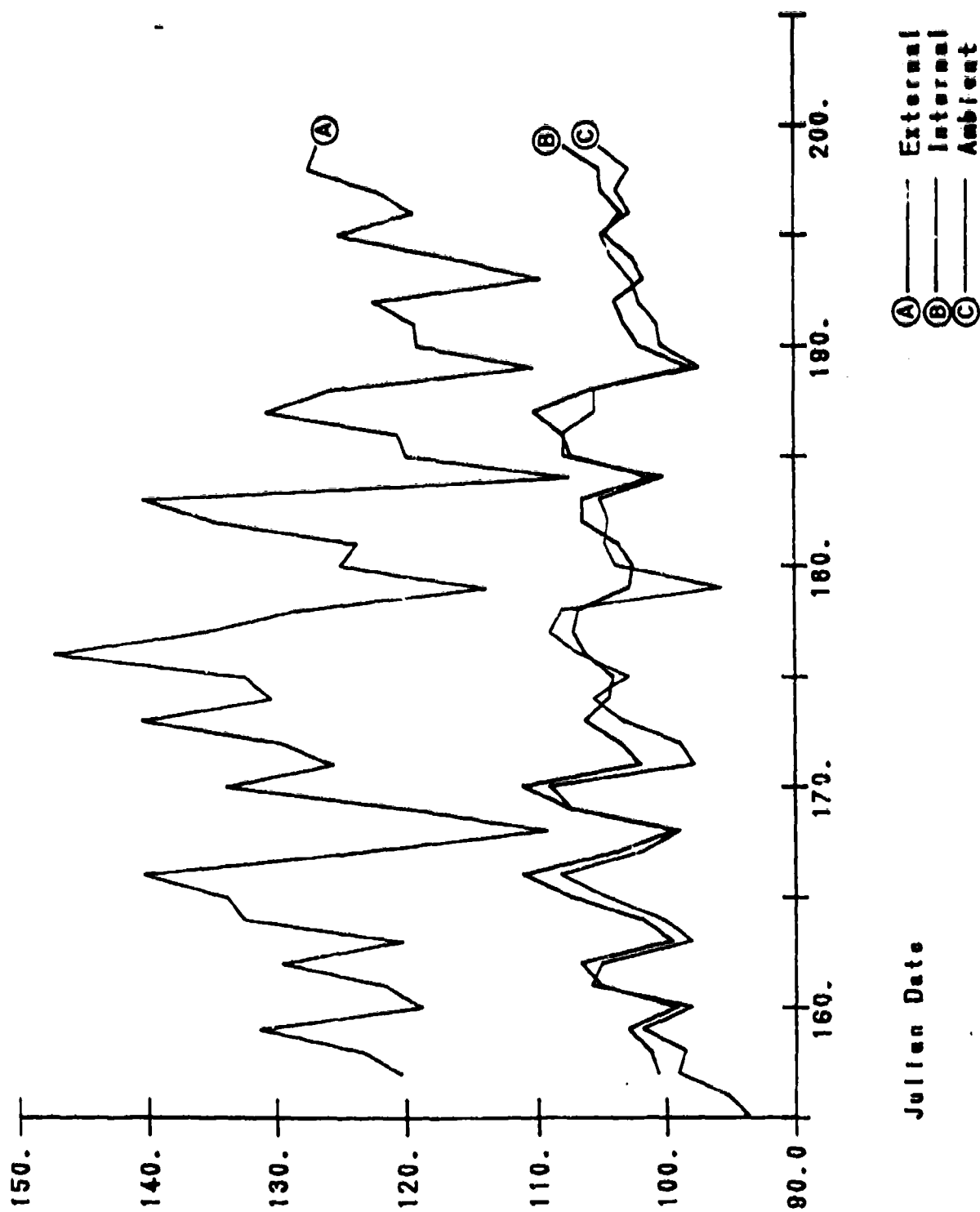
Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: September 2 - October 1, 1991



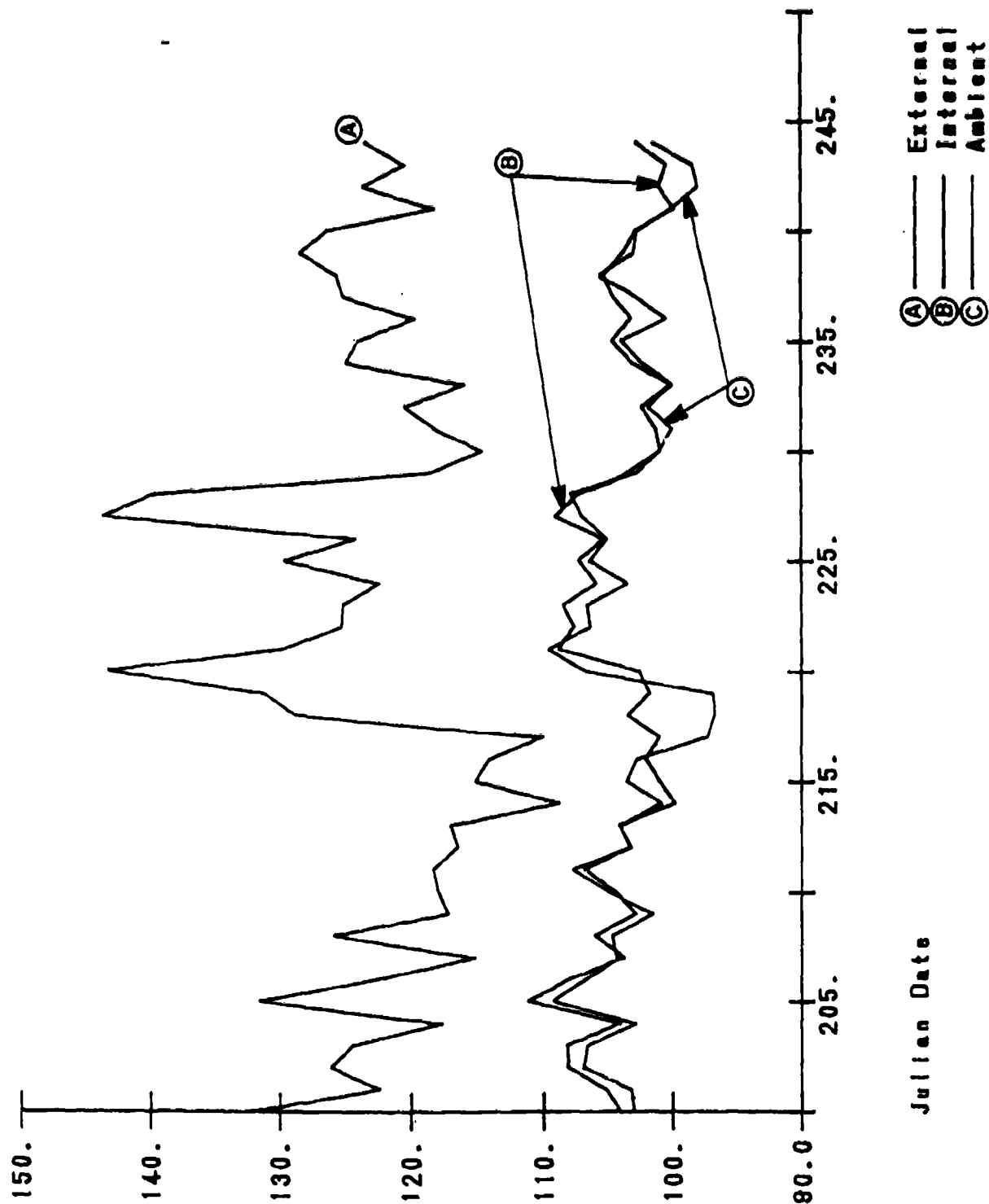
ITEM: FUZE, M190 M577/ M577A1 W/O BOOSTER
 DDDIC: N285, LOT #: BWV82C012-017
 Degrees Fahrenheit

19-8

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: June 4 - July 18, 1991



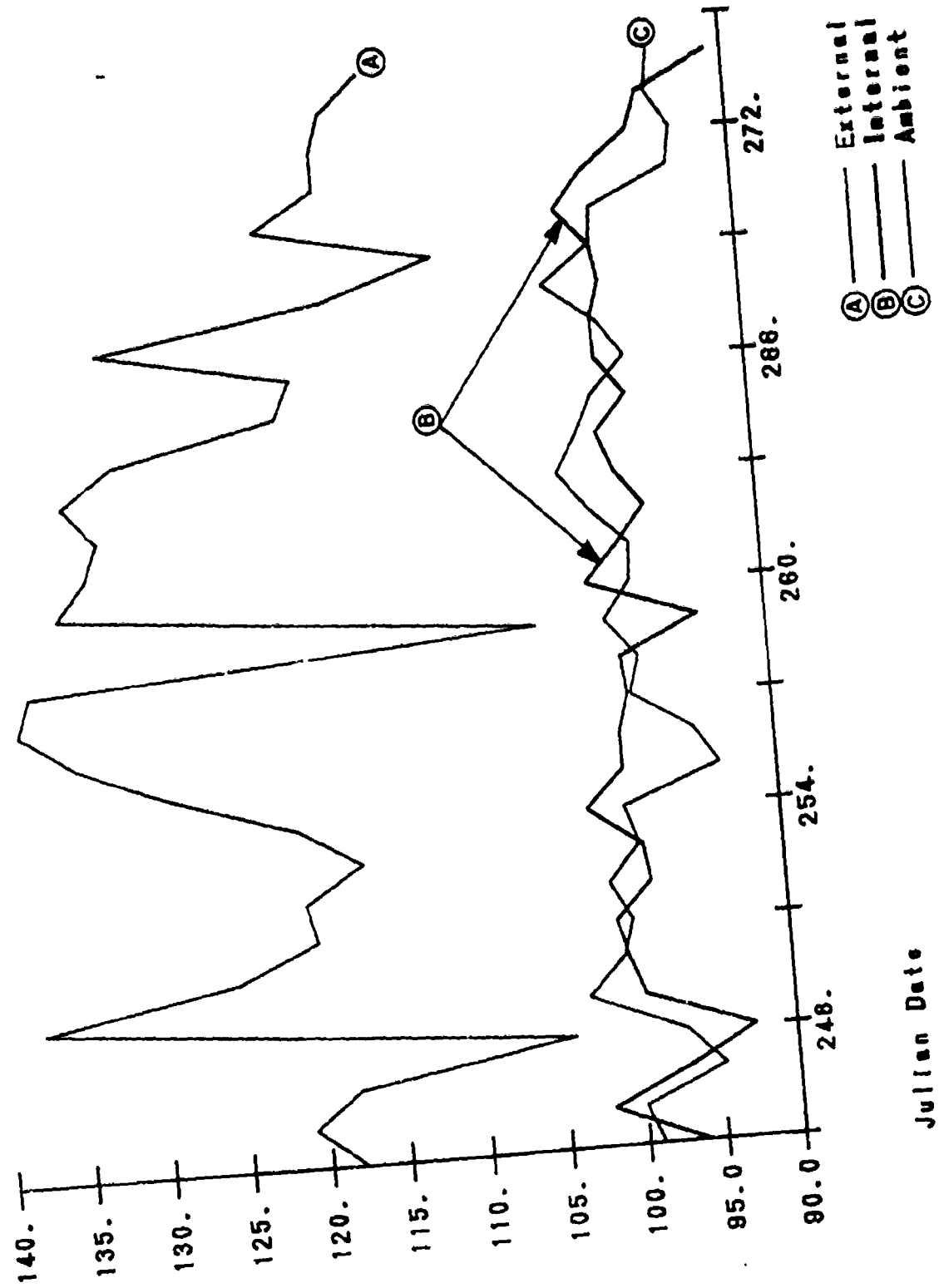
Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: July 18 - September 1, 1981



ITEM: FUZE, M150 M577/ M577A1 W/O BOOSTER
 DODIC: N285, LOT #: BWV82C012-017
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1

Date: September 2 - October 1, 1991

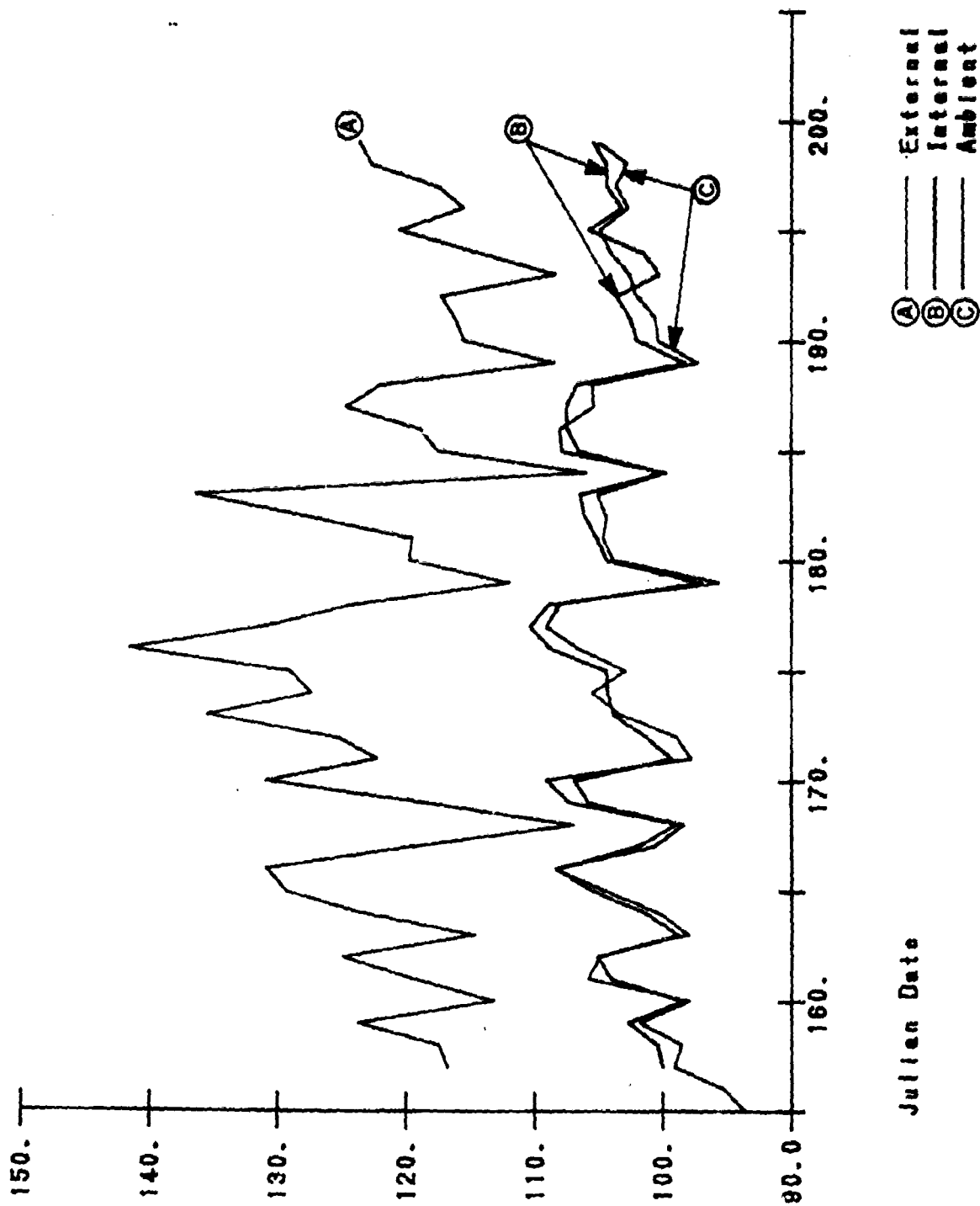


ITEM: FUZE, MTSQ M577/ M577A1 W/O BOOSTER
 DODIC: N285, LOT #: BMV82C012-017
 Degrees Fahrenheit

ITEM: FUZE, PROX M732 NON-PROP PKG
 DDDIC: N484, LOT #: LS-83L013-003
 Degrees Fahrenheit

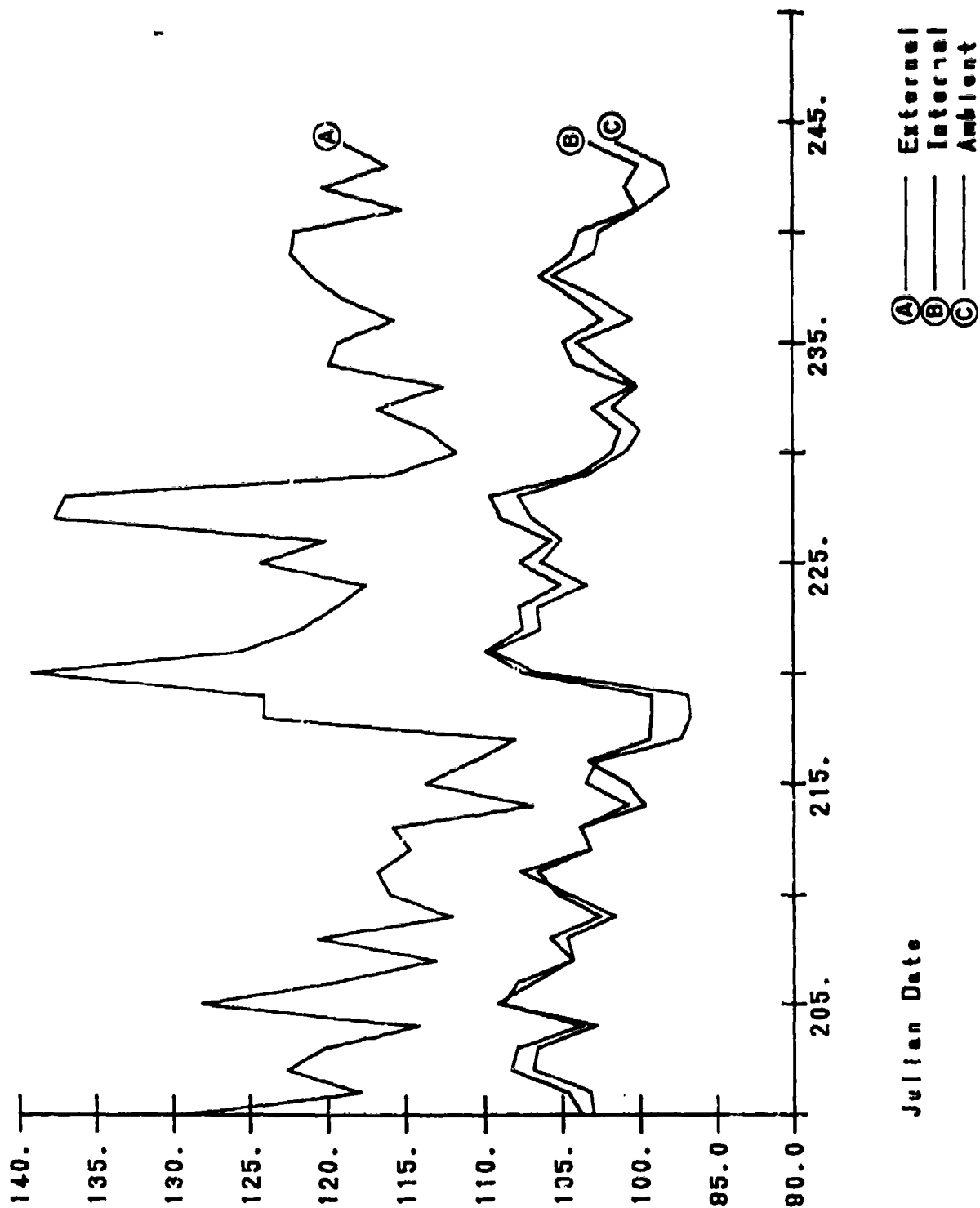
8-64

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: June 4 - July 18, 1981



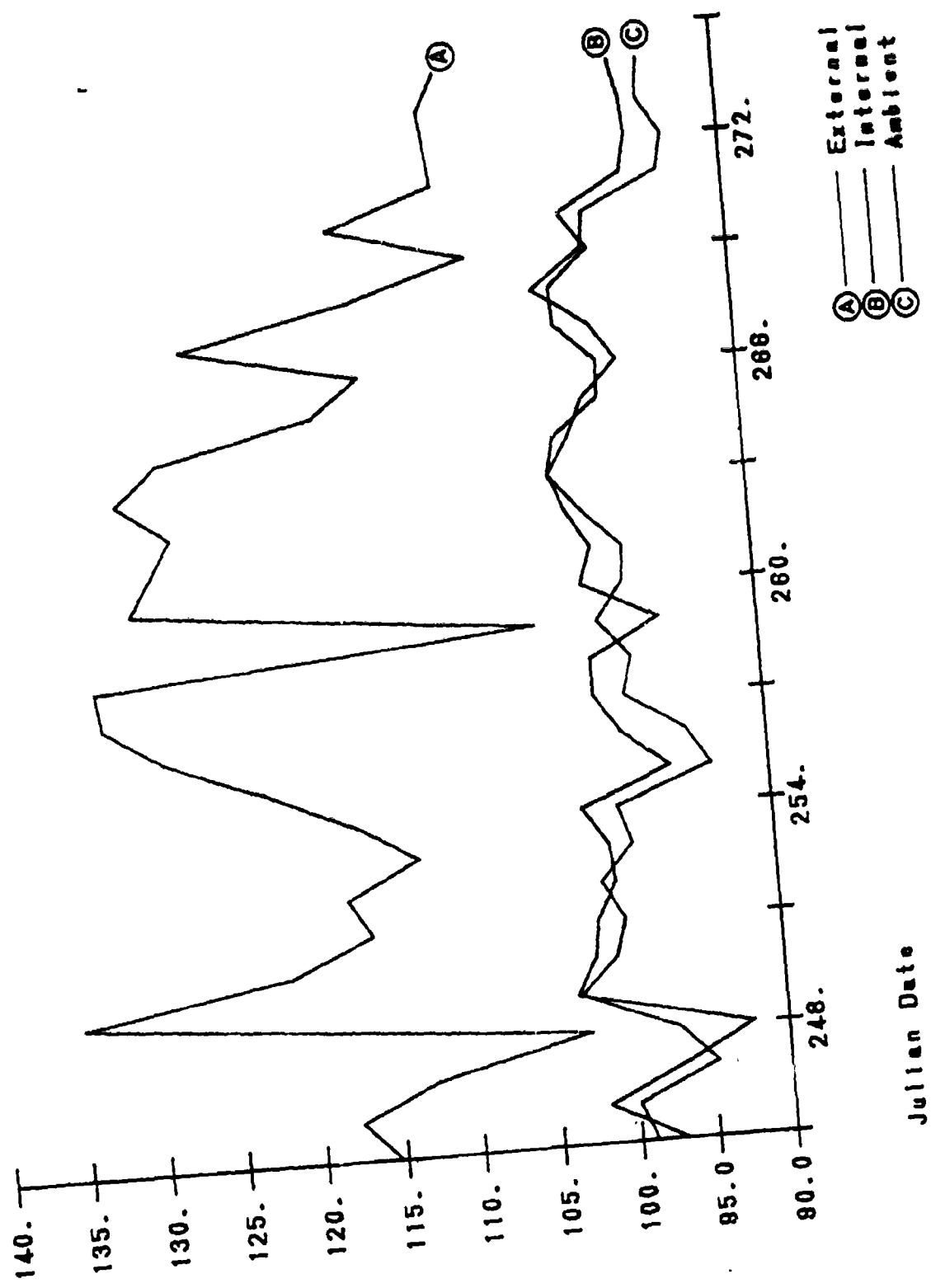
ITEM: FUZE, PROX M732 NON-PROP PKG
 CODIC: N484, LOT #: L9-83L013-003
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: July 18 - September 1, 1991



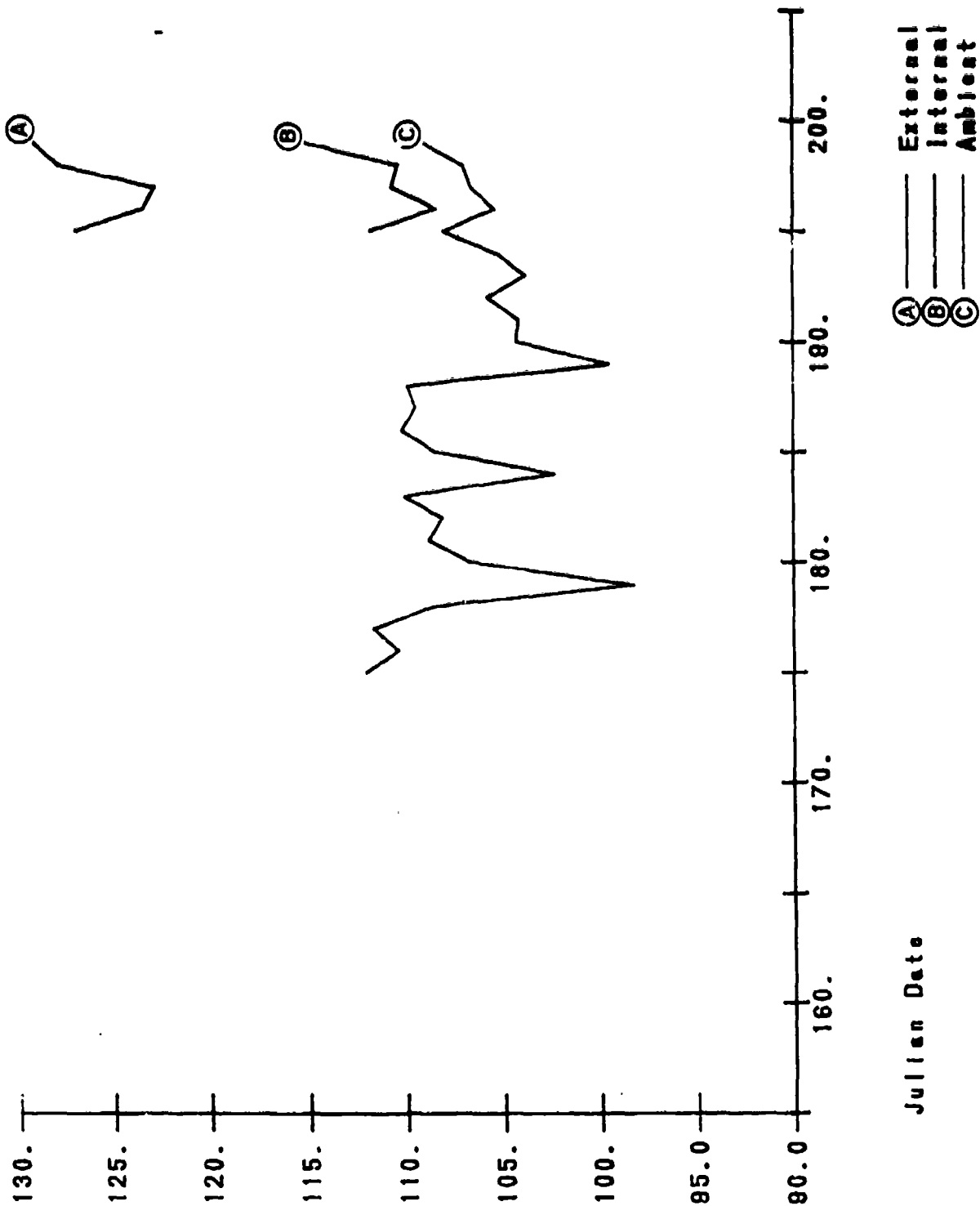
ITEM: FUZE, PROX M732 NON-PROP PKG
DODIC: N464, LOT #: LS-83L013-003
Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
Date: September 2 - October 1, 1991

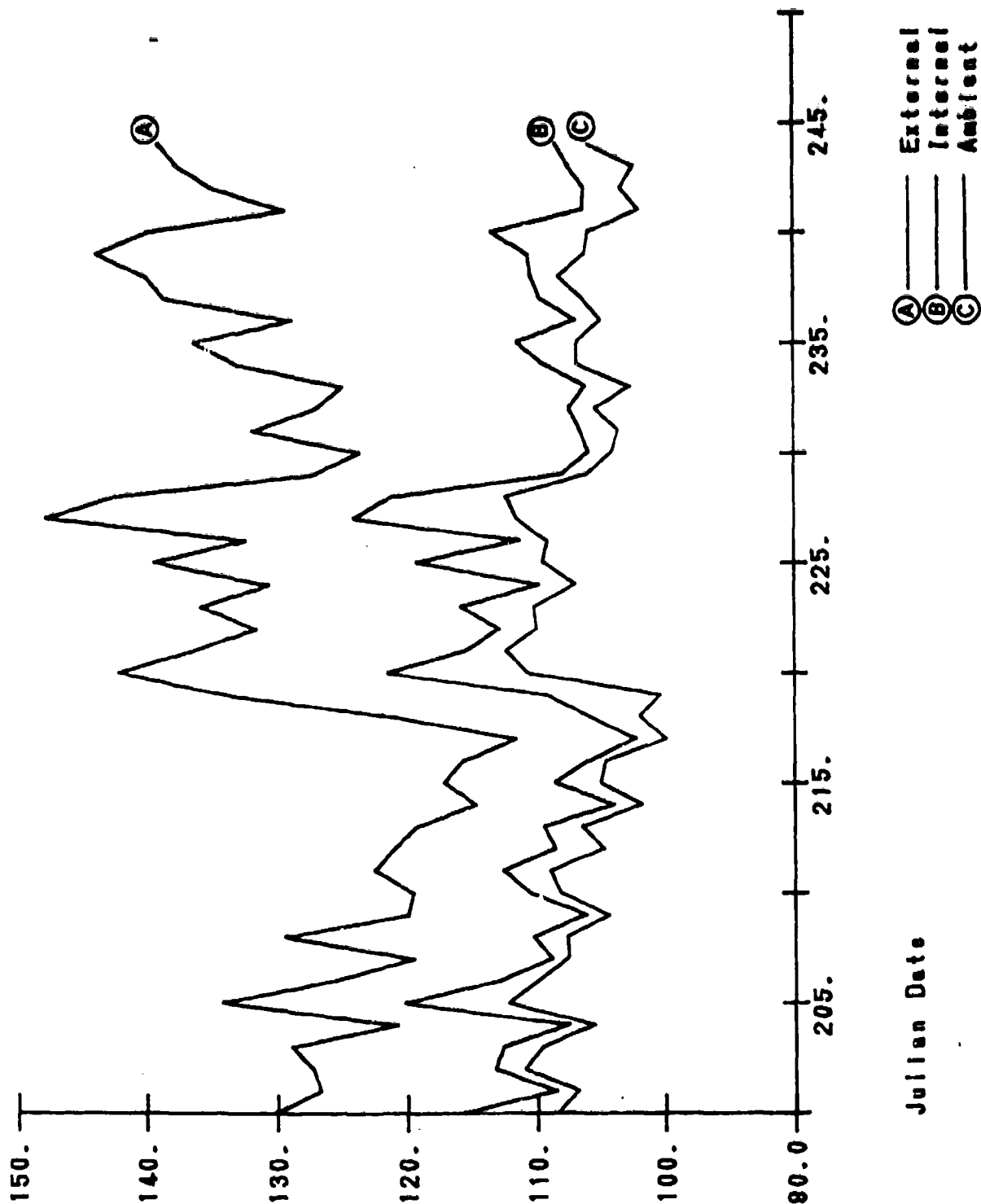


ITEM: Shilleagh Missile
 DODIC: PA45, LOT #: PH1-8-31C
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: June 4 - July 18, 1991



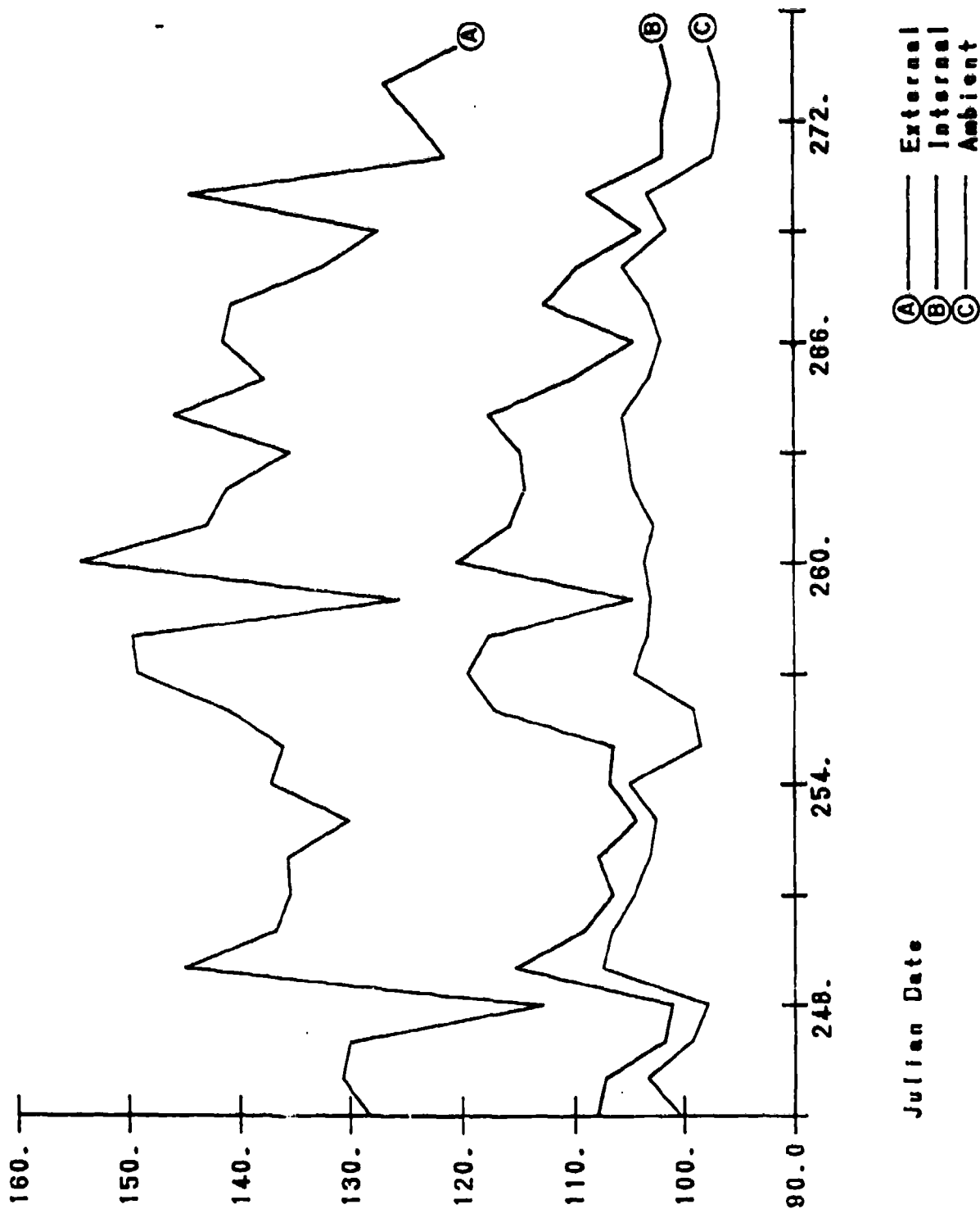
Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: July 19 - September 1, 1981



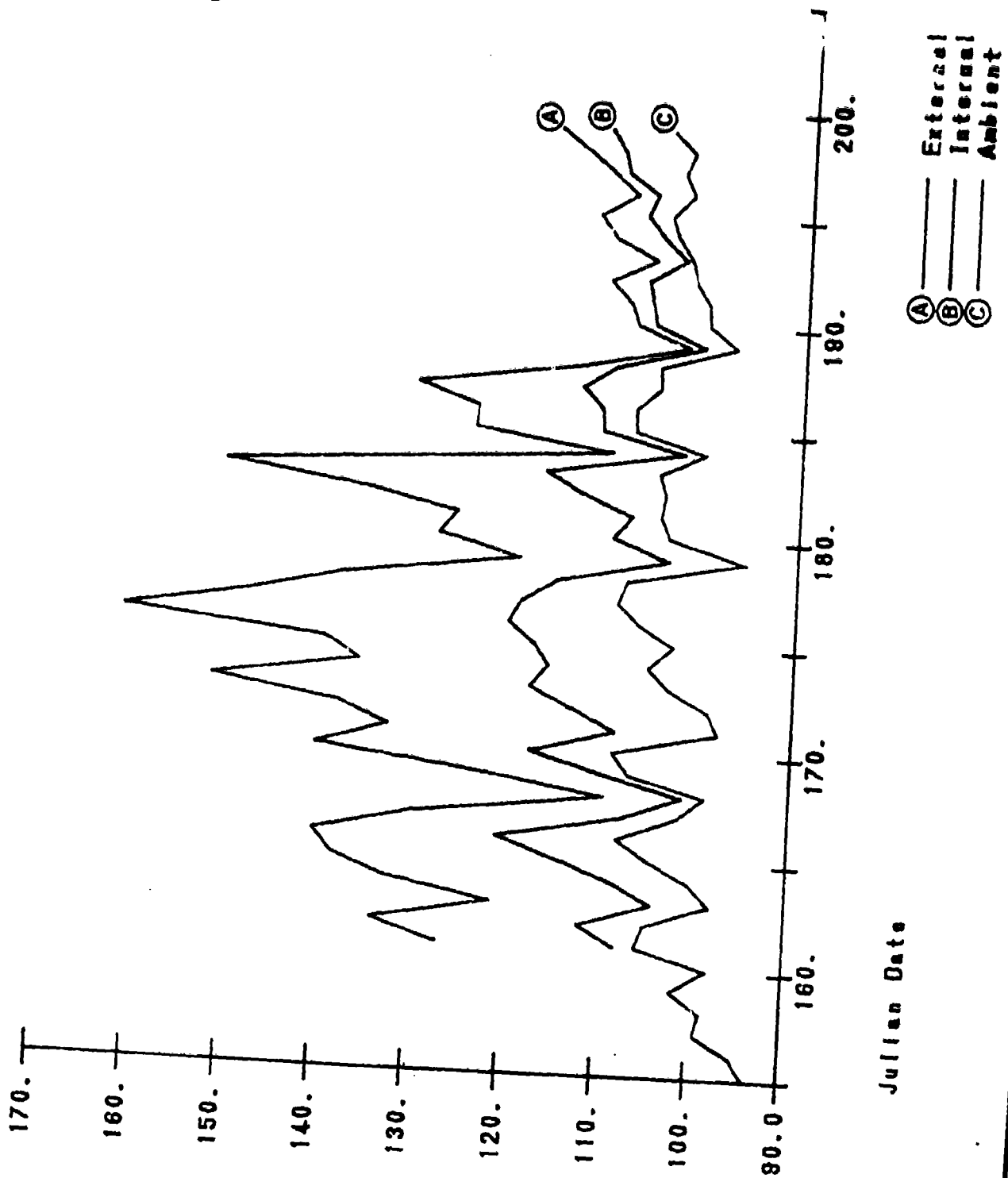
ITEM: Shilleagh Missile
 DDIC: PA45, LOT #: PH1-8-31C
 Degrees Fahrenheit

ITEM: Shillagh Missile
 DODIC: PA45, LOT #: PH1-8-31C
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #1 at TSA 1
 Date: September 2 - October 1, 1991



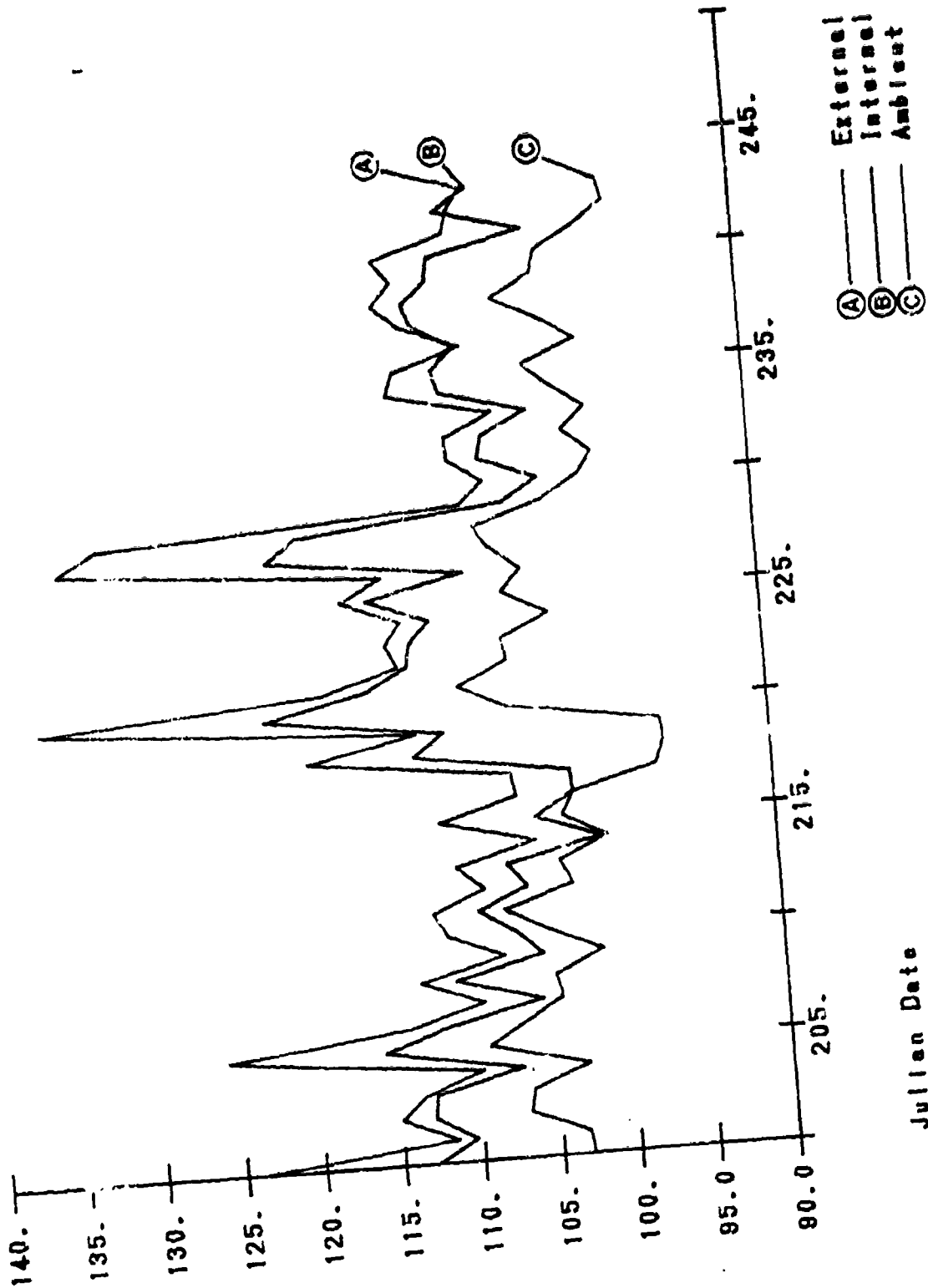
Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: June 4 - July 18, '99



ITEM: TOW 2
 DDDIC: PB93, LOT #: HAO-3148-4
 Degrees Fahrenheit

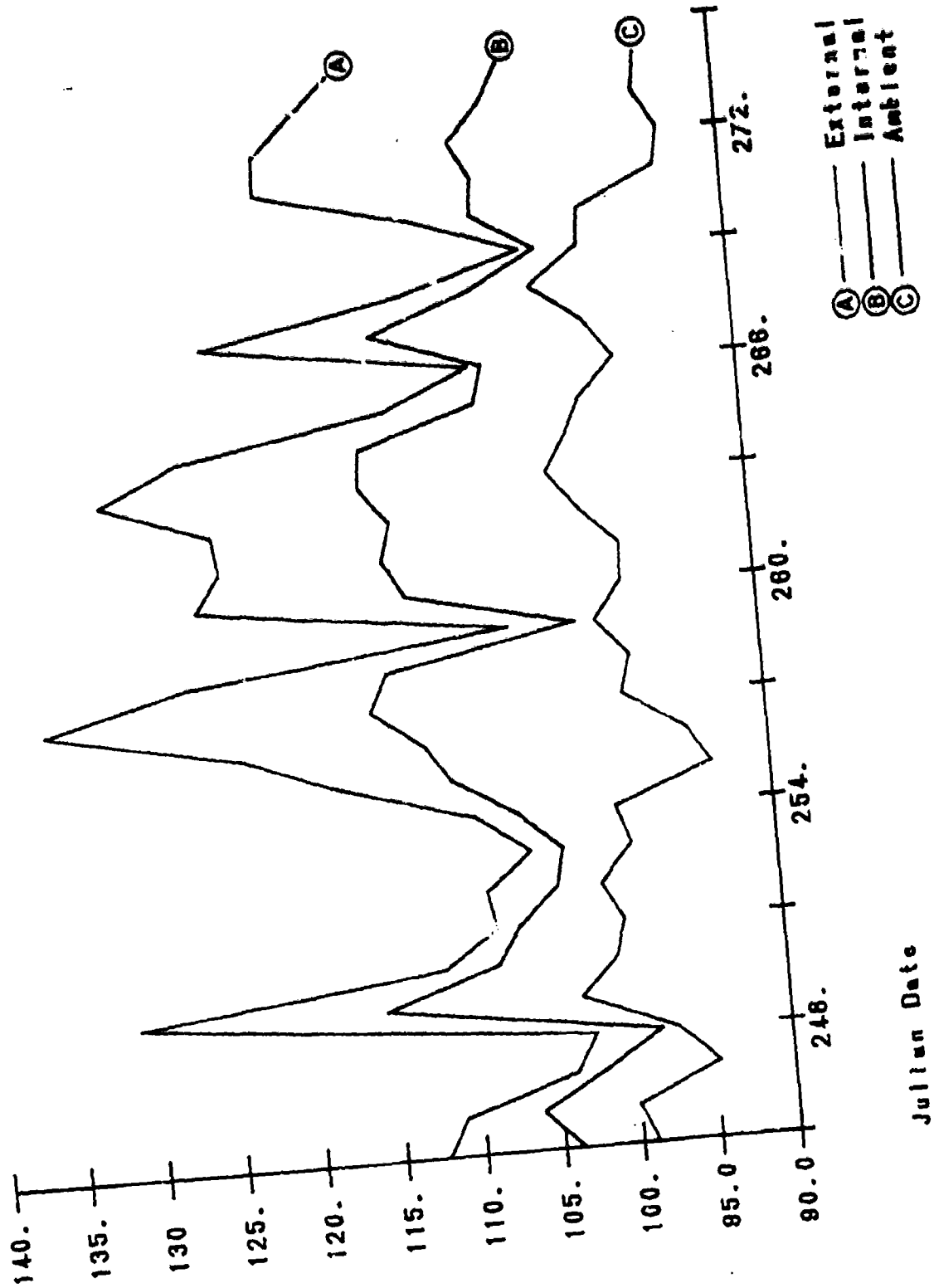
ITEM: TOM 2
 DODIC: PB93, LOT #: HAO-3148-4
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TCA 1
 Date: July 19 - September 1, 1991

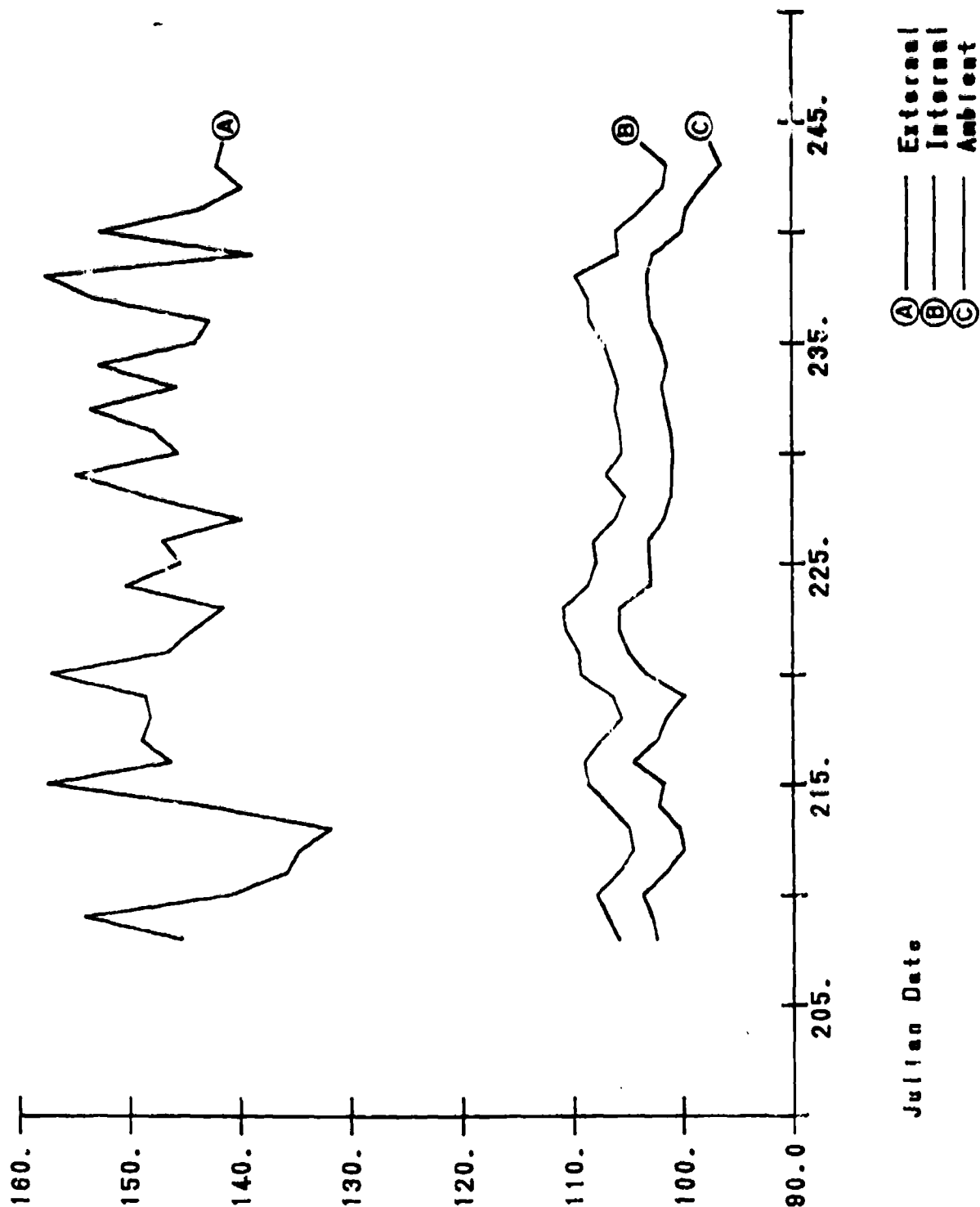


ITEM: TOW 2
 DODIC: PB93, LOT #: HAO-3148-4
 Degrees Fahrenheit

Daily Peak Environmental Data From Weather Station #2 at TSA 1
 Date: September 2 - October 1, 1991



Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: July 19 -- September 1, 1981

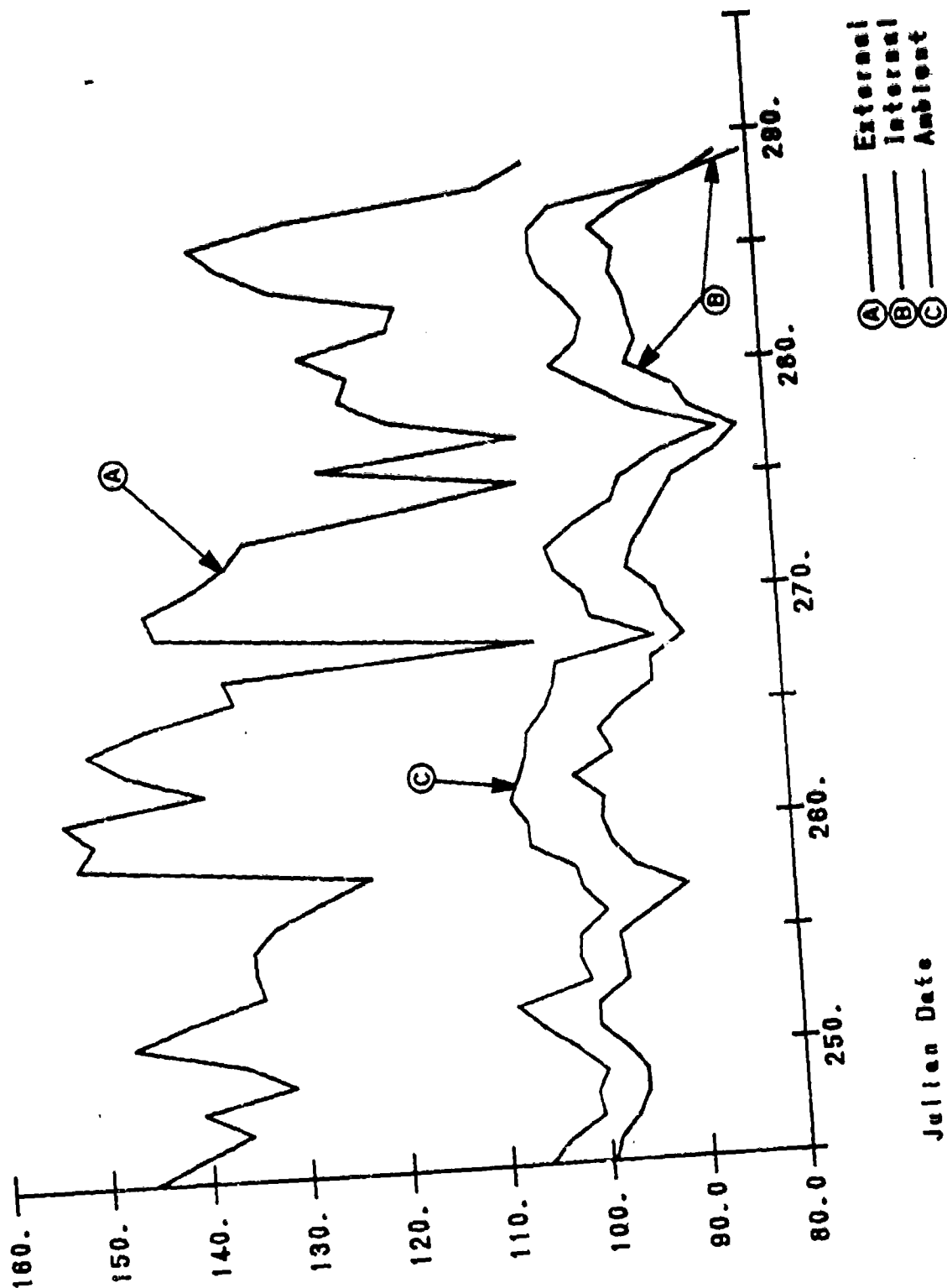


ITEM: CTG, 4.2IN SMK WP M328A1 W/PD FUZE
 DDDIC: C708, LOT #: RD-4-7A
 Degrees Fahrenheit

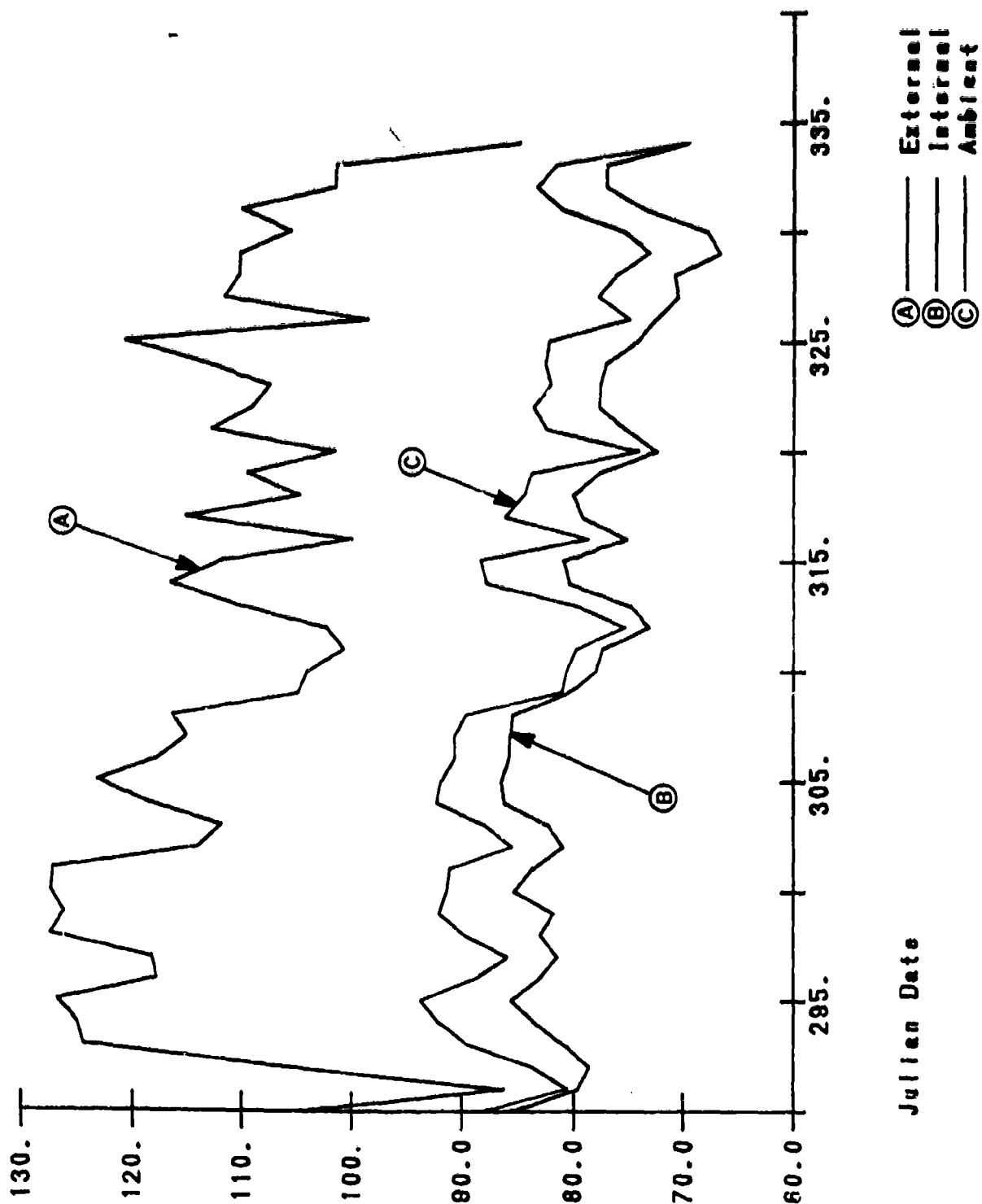
ITEM: CTG. 4.21N SMK WP M328A1 W/PD FUZE
 DODIC: C708, LOT #: RD-4-7A
 Degrees Fahrenheit

47-8

Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: September 2 - October 16, 1981

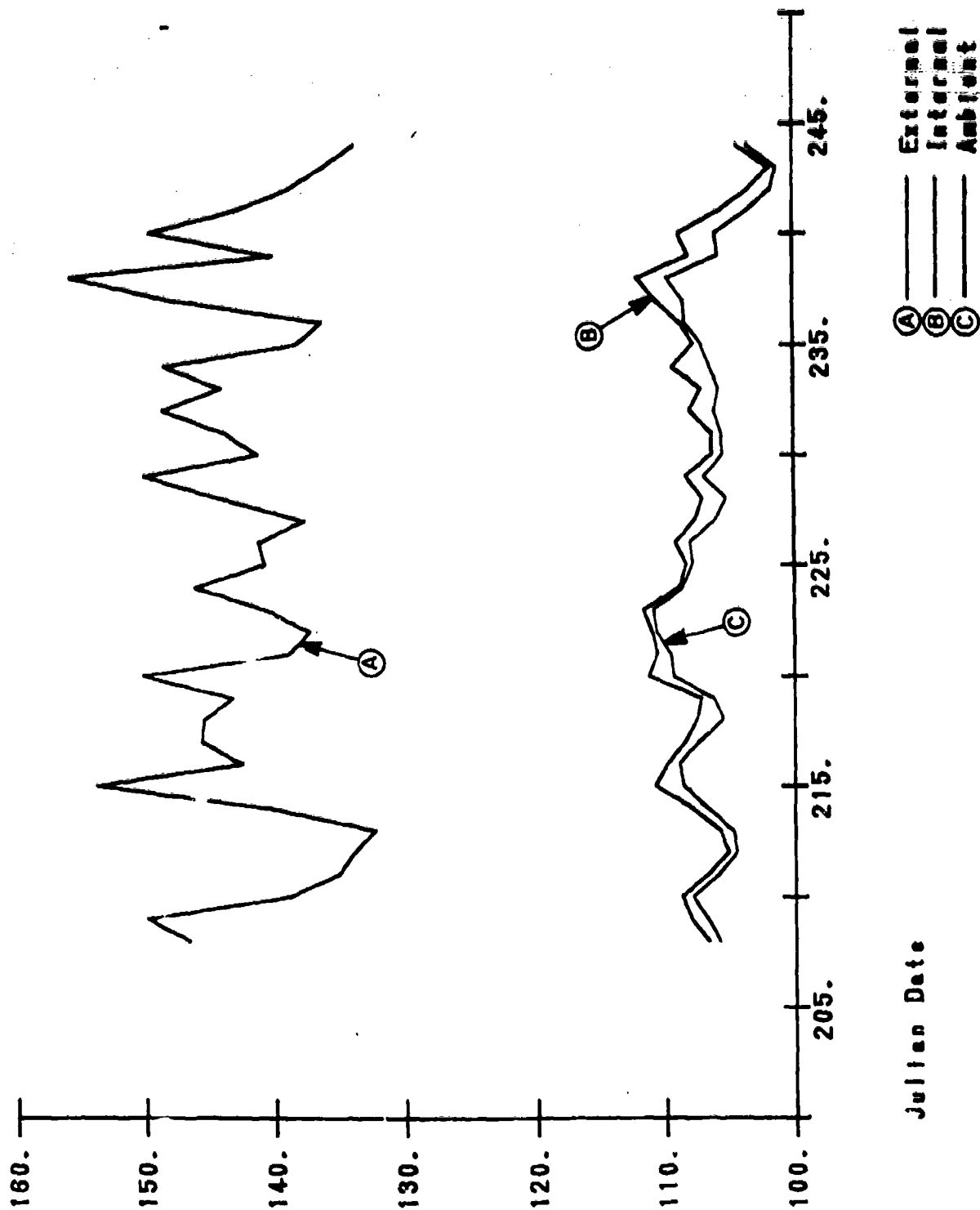


Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: October 17 - November 30, 1991



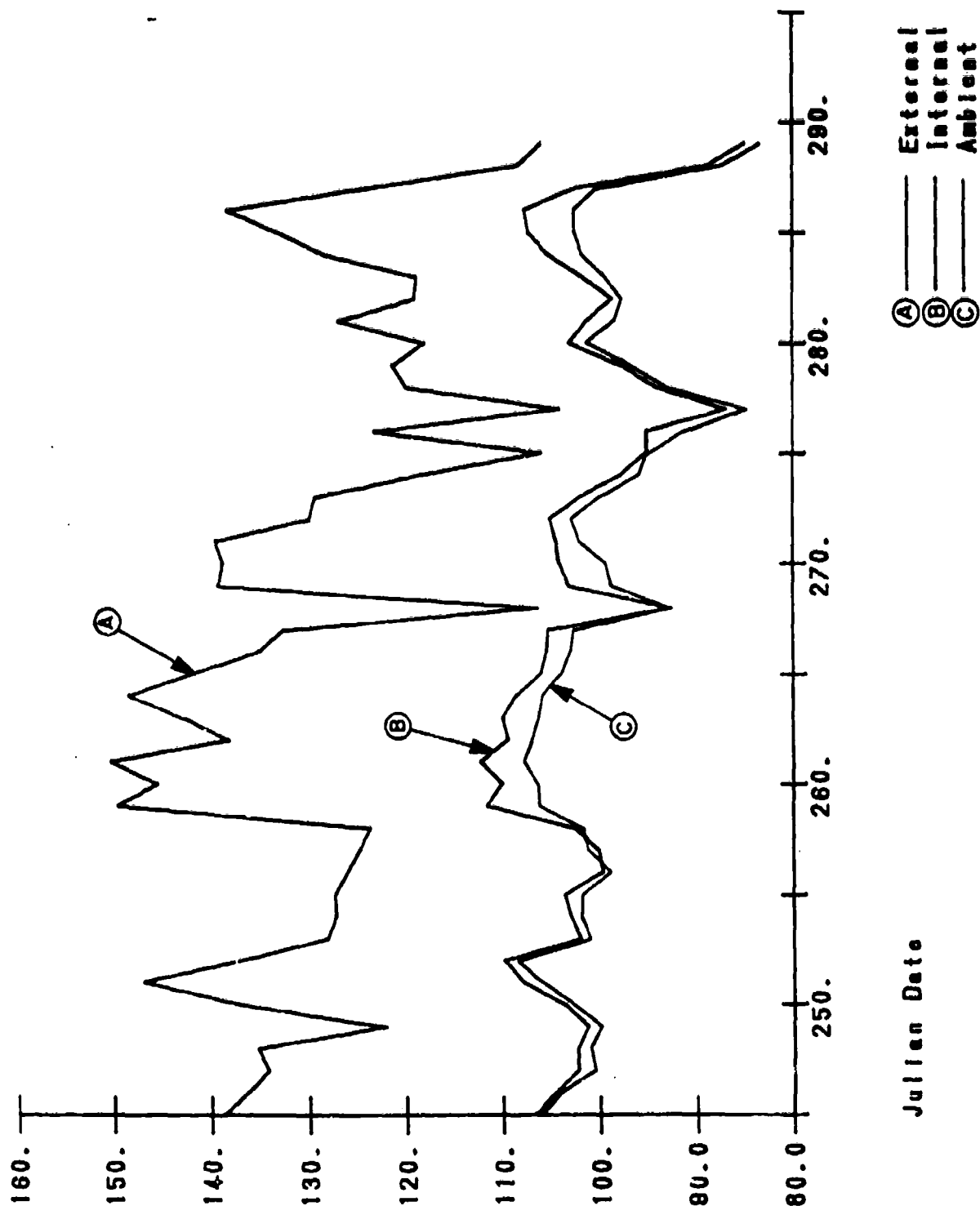
ITEM: CTG, 4.2IN SMK WP M328A1 W/PD FUZE
 DDDIC: C708, LOT #: RD-4-7A
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: July 18 - September 1, 1981



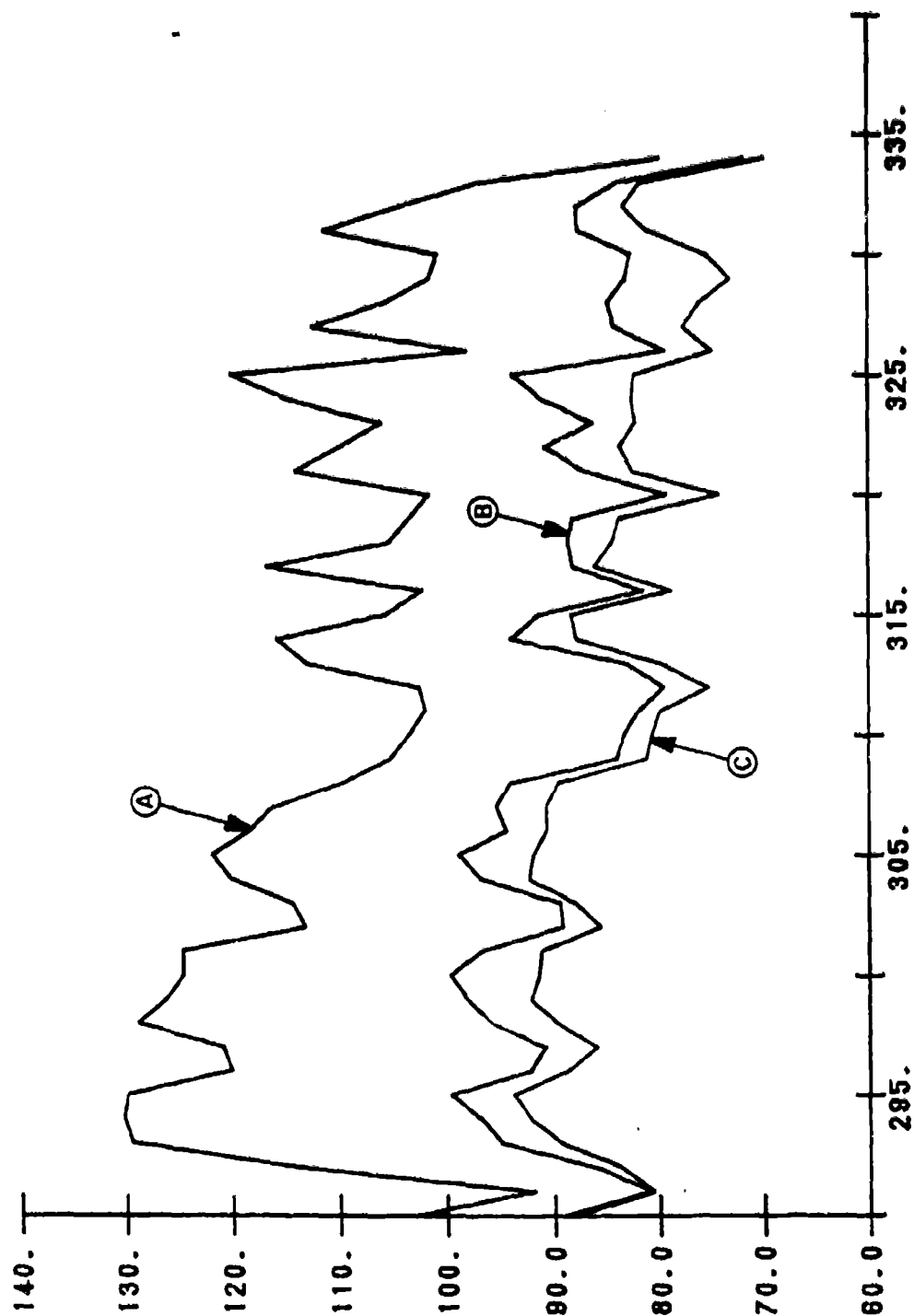
ITEM: CTG, 120MM HEAT-MP-T M830
 DOPIC: C787, LOT #: MM-898-501-003
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: September 2 - October 18, 1991



ITEM: CTG, 120MM HEAT-MP-T M830
 DODIC: C787, LOT #: MM-896-501-003
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: October 17 - November 30, 1981

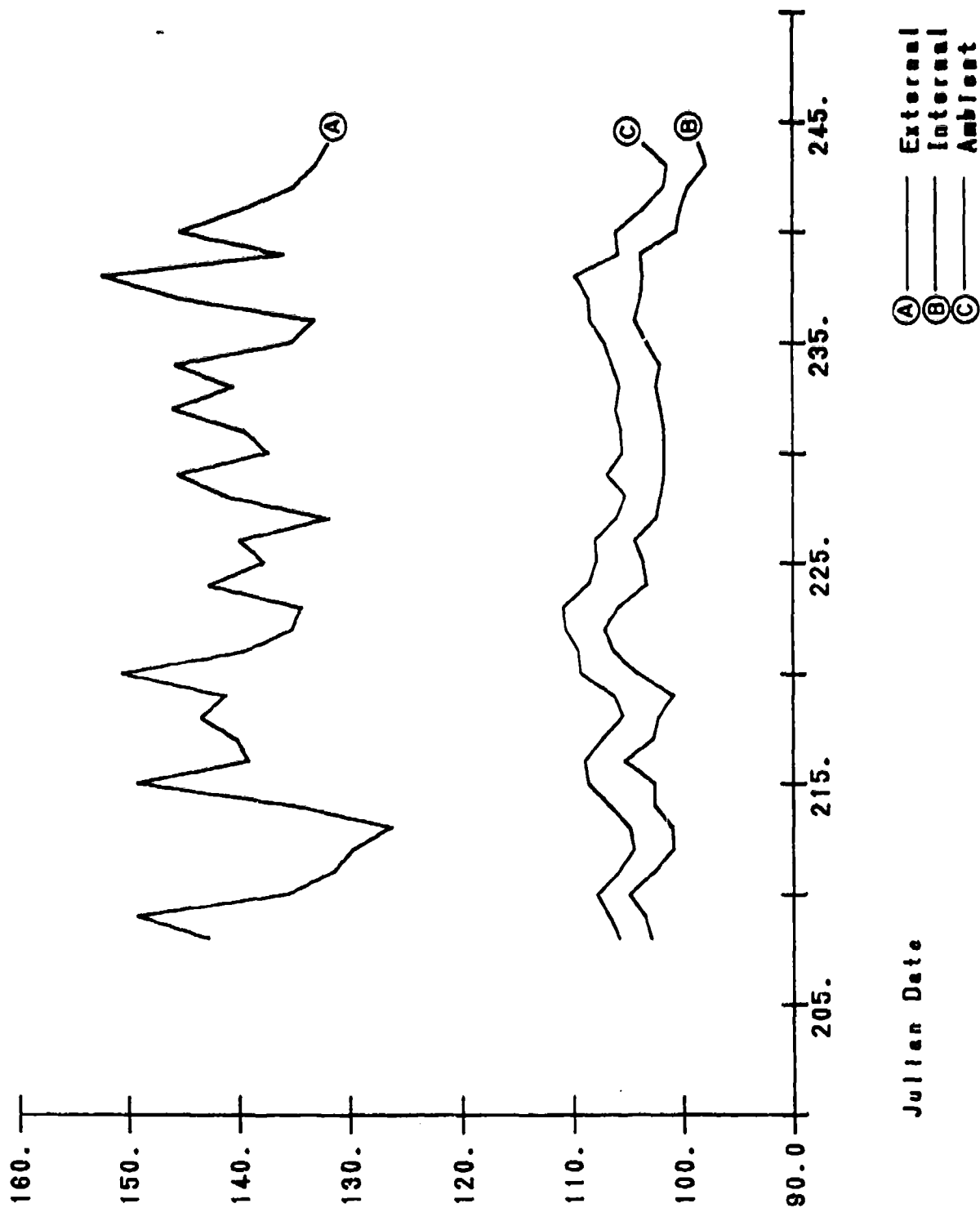


(A) — External
 (B) — Internal
 (C) — Ambient

Julian Date

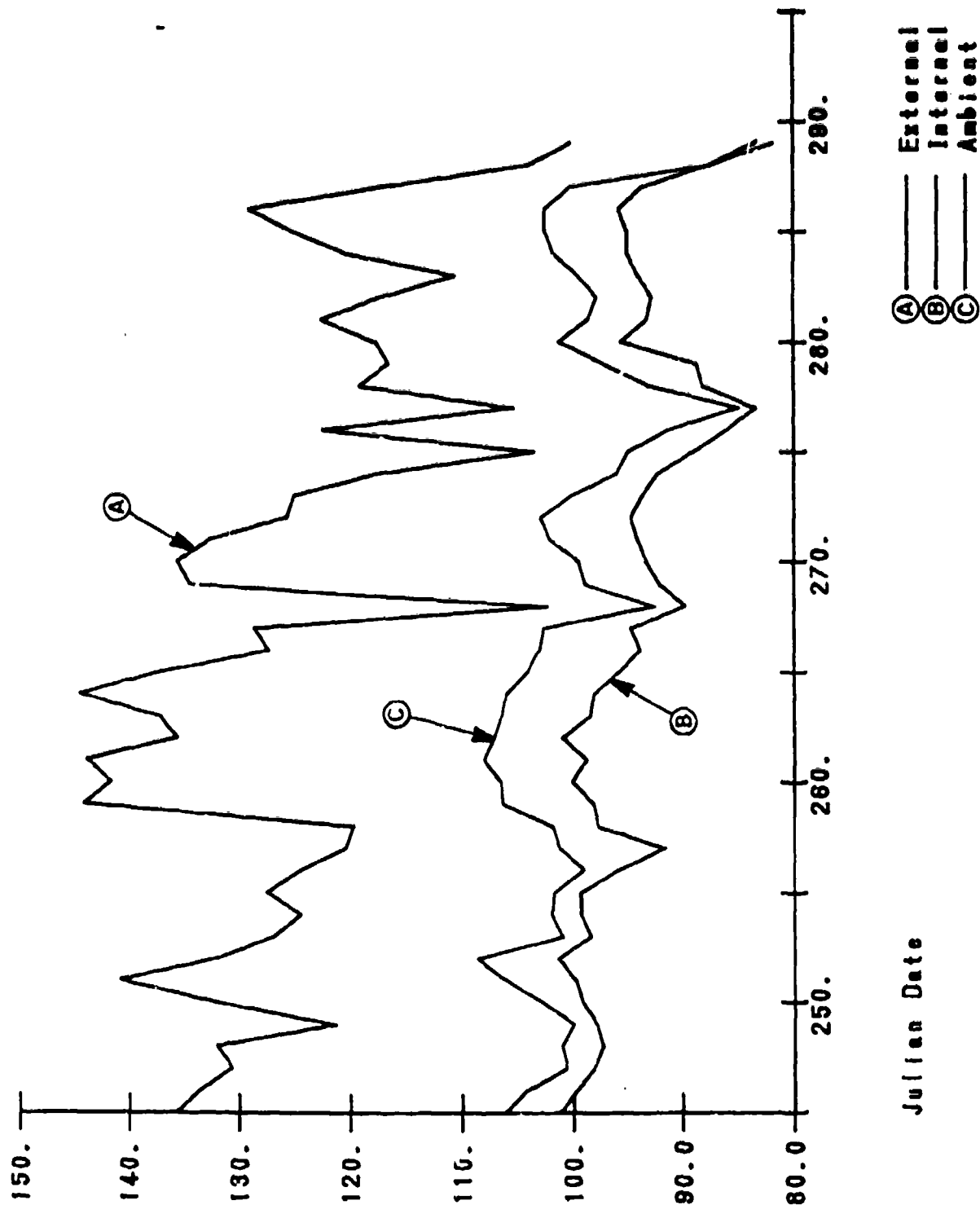
ITEM: CTG, 120MM HEAT-MP-T M830
 DODIC: C787, LOT #: MM-888-501-003
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: July 19 - September 1, 1991



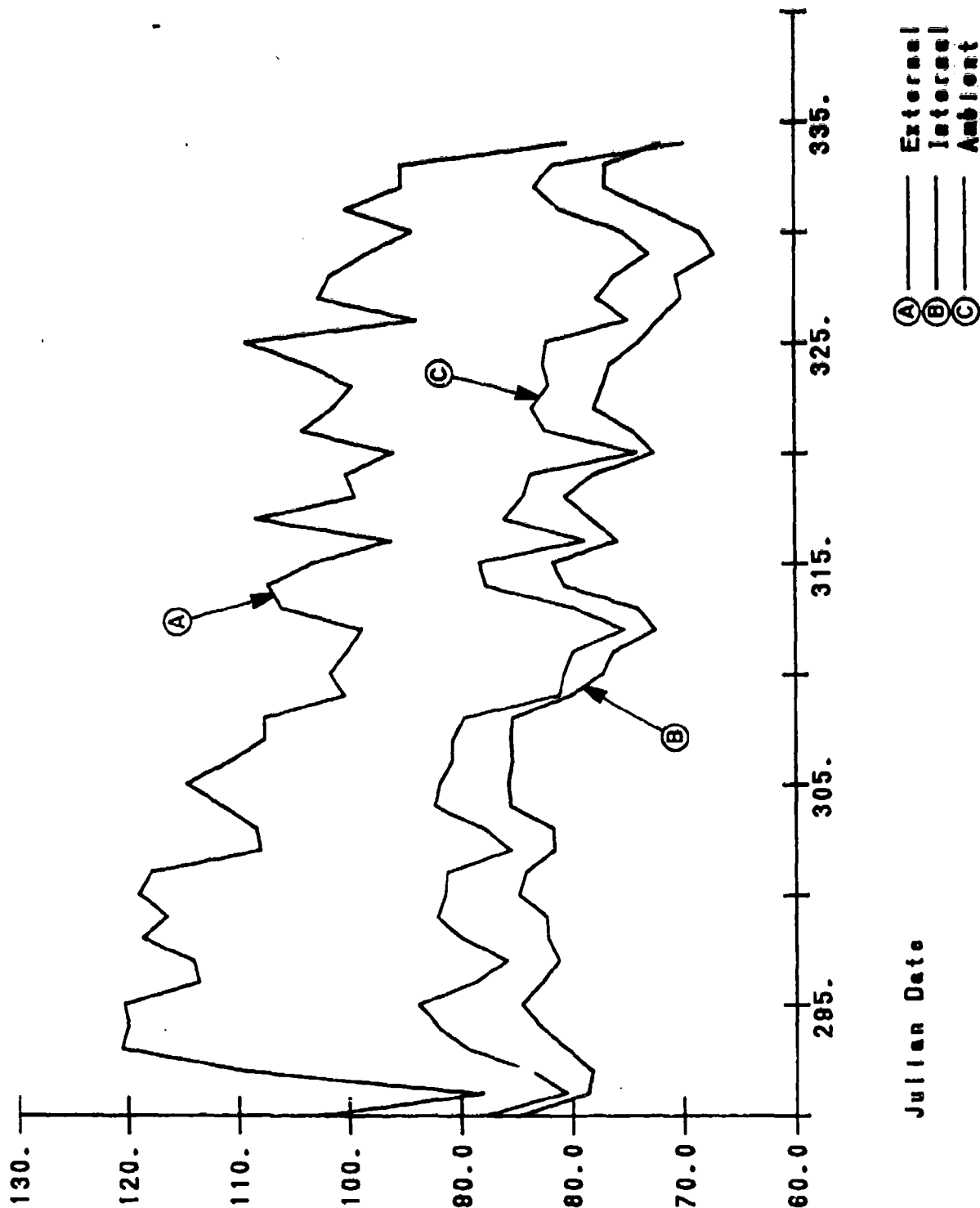
ITEM: CHG, PROP 155MM GB M3A1
 DODIC: D540, LOT #: RAD-69169-73
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: September 2 - October 16, 1991



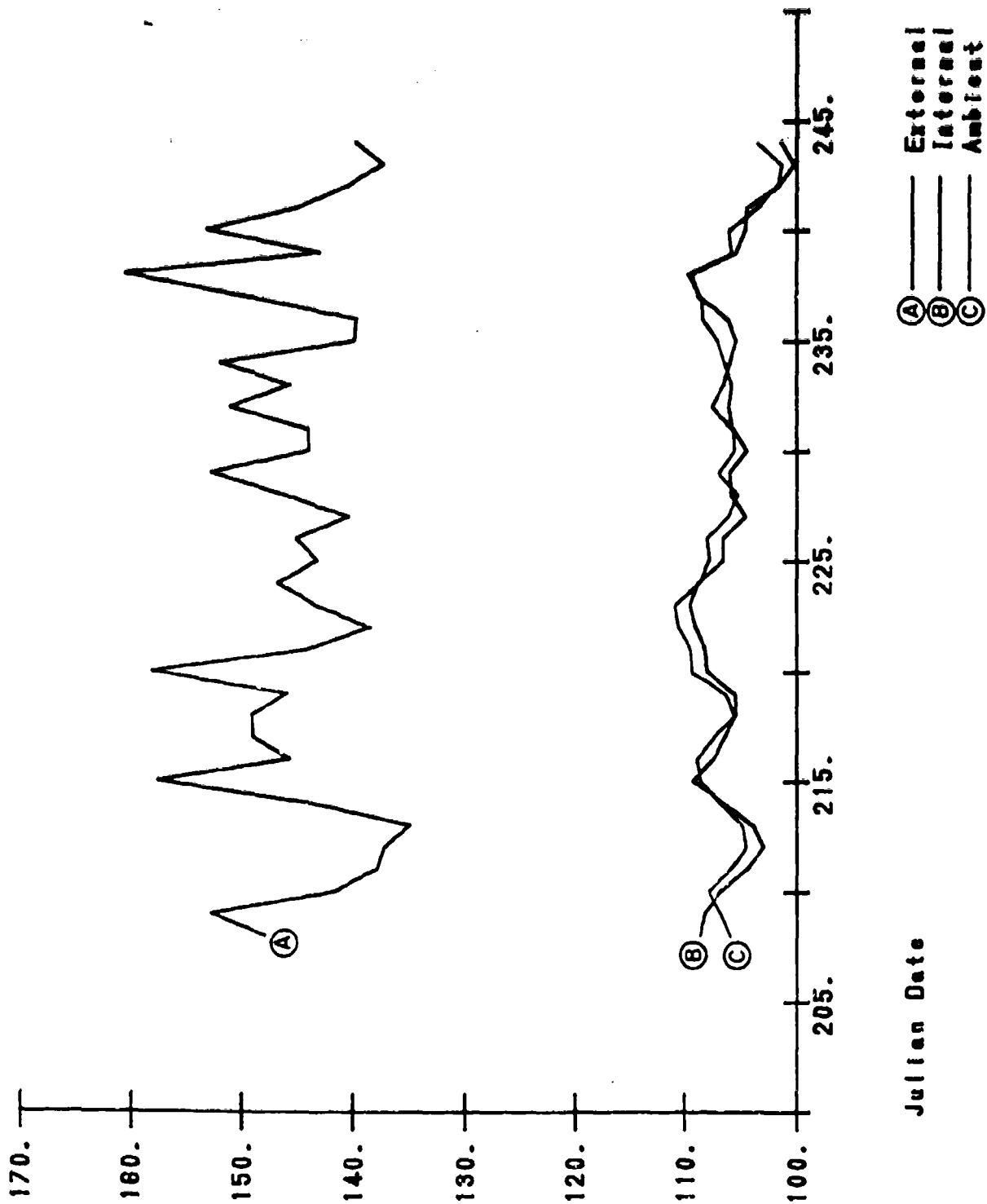
ITEM: CHQ, PROP 155MM QB M3A1
 DODIC: D540, LOT #: RAD-69169-73
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: October 17 - November 30, 1981



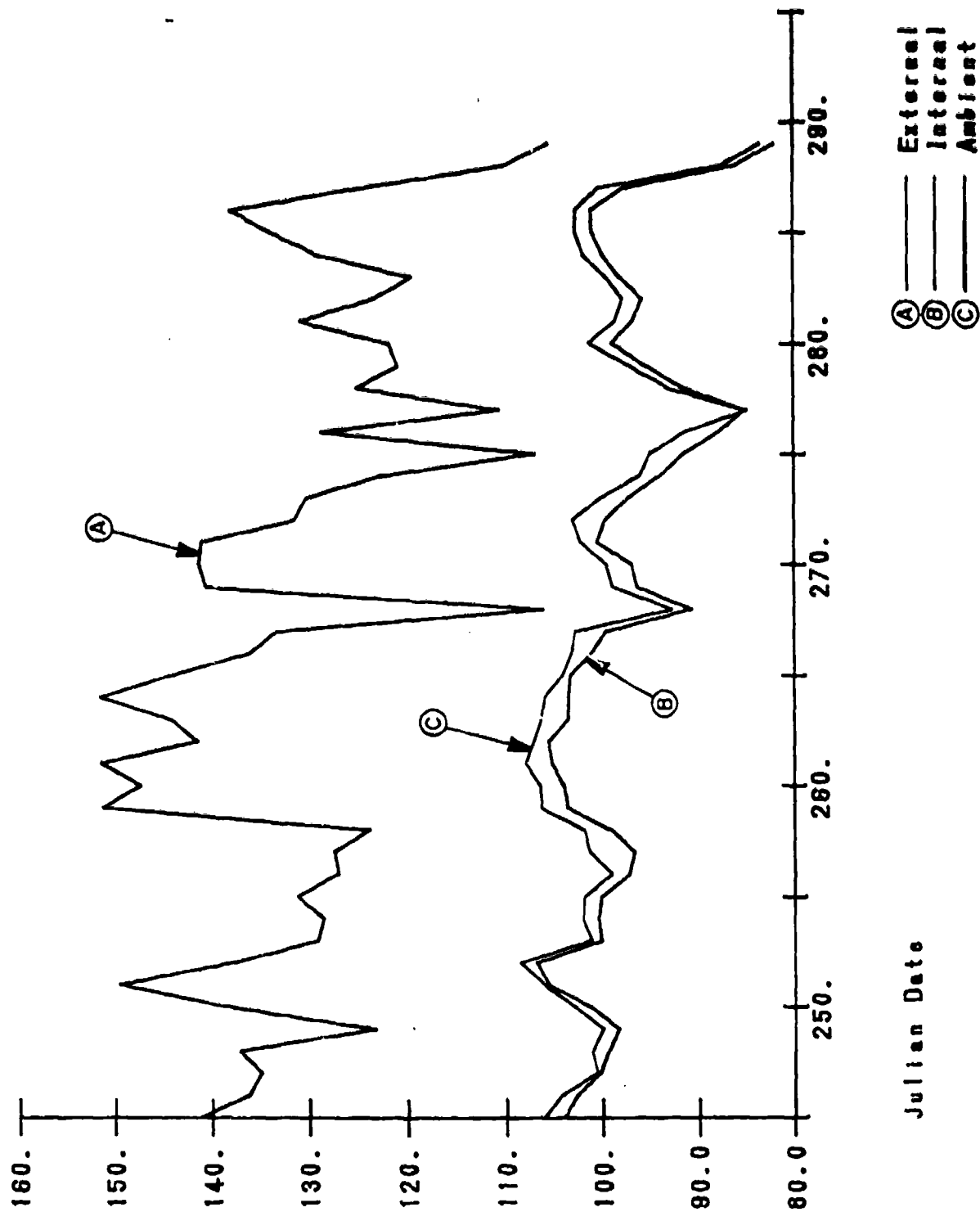
ITEM: CHG, PROP 155MM GB M3A1
 DODIC: D540, LOT #: RAD-69169-73
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: July 18 - September 1, 1991



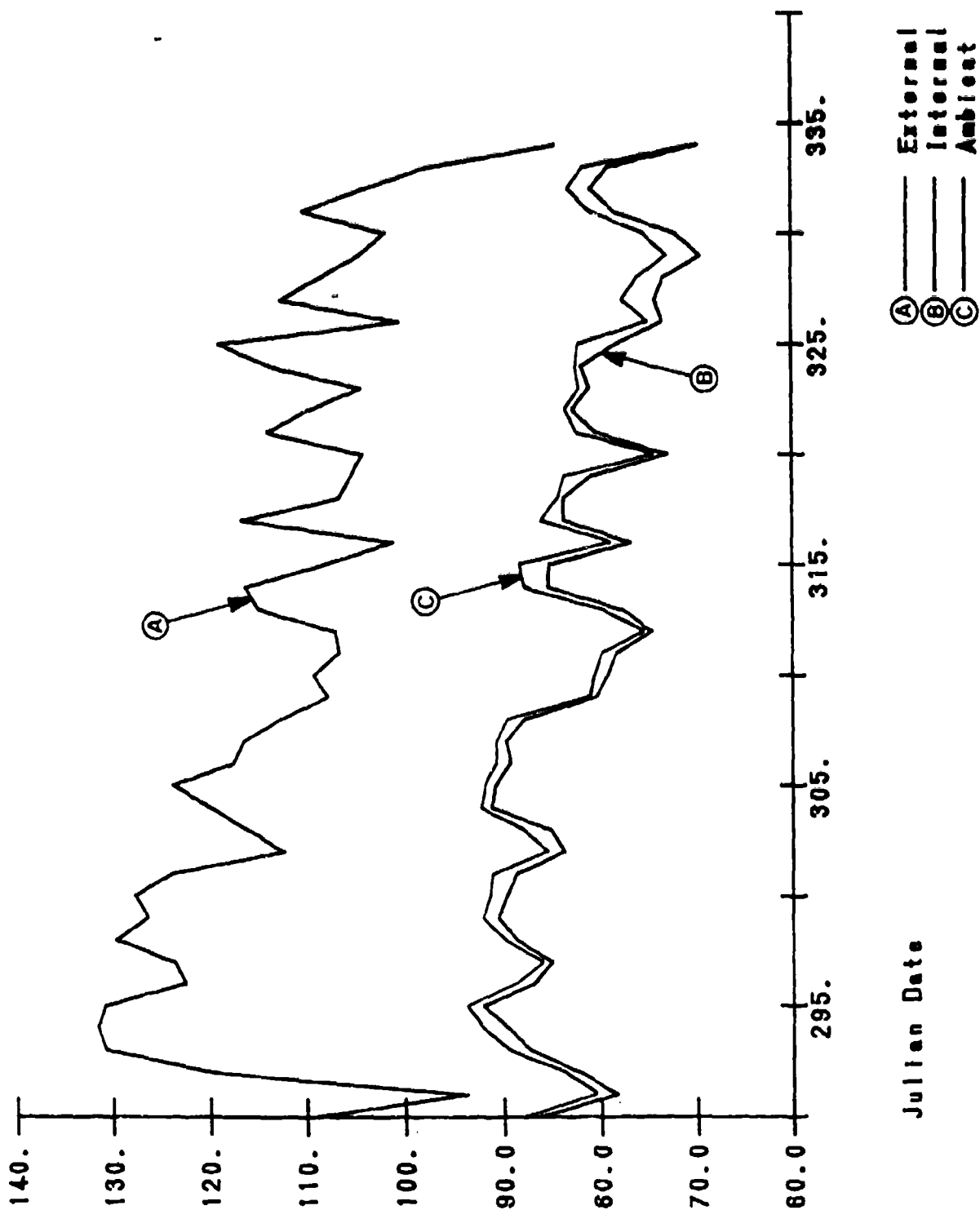
ITEM: PROJ. 155MM HE RAP M549A1, COMP B
 DODIC: D578, LOT #: 10P86B034-010A
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: September 2 - October 18, 1991



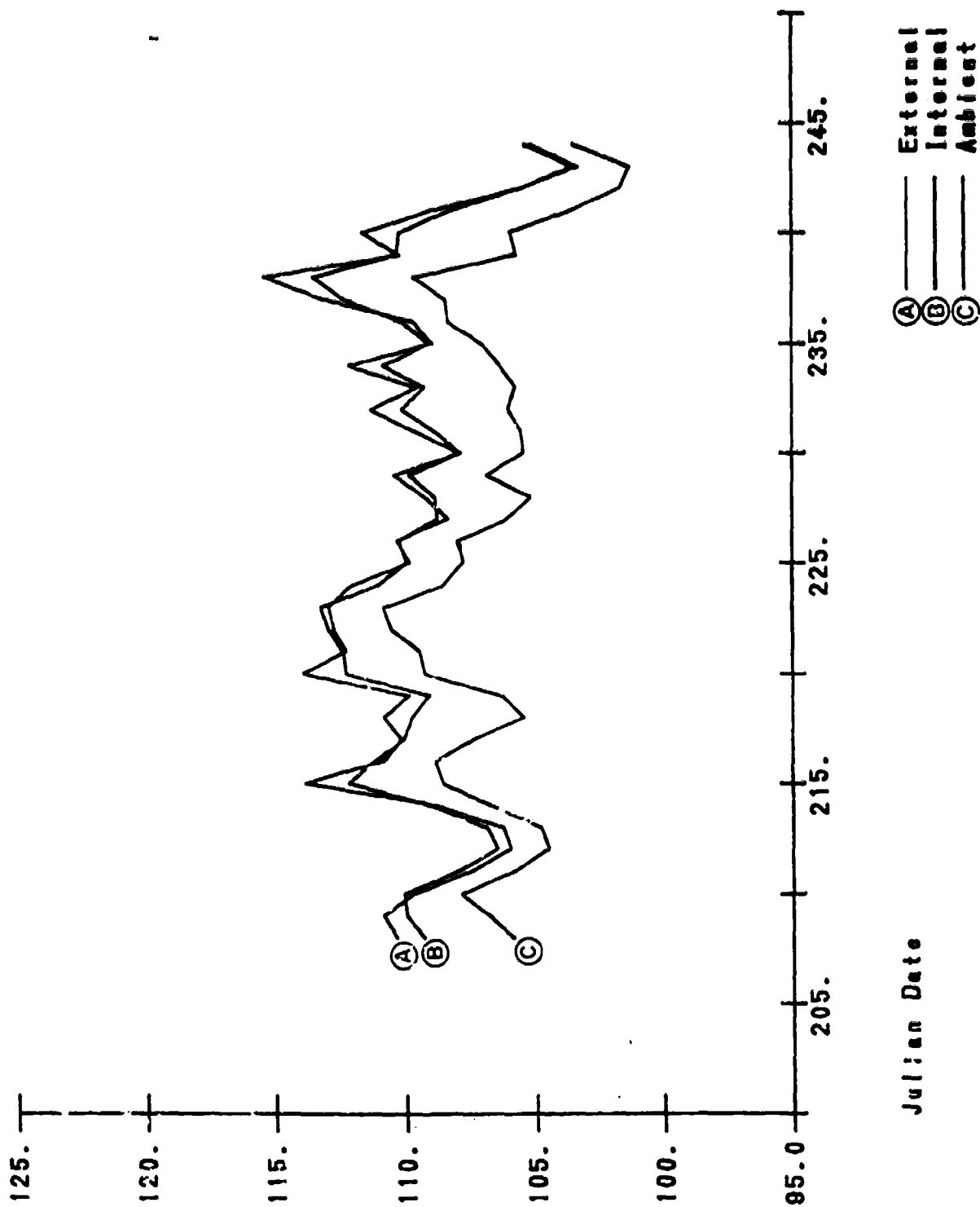
ITEM: PROJ. 155MM HE RAP M549A1, COMP B
 DODIC: D579, LOT #: 10P88B034-010A
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: October 17 - November 30, 1991



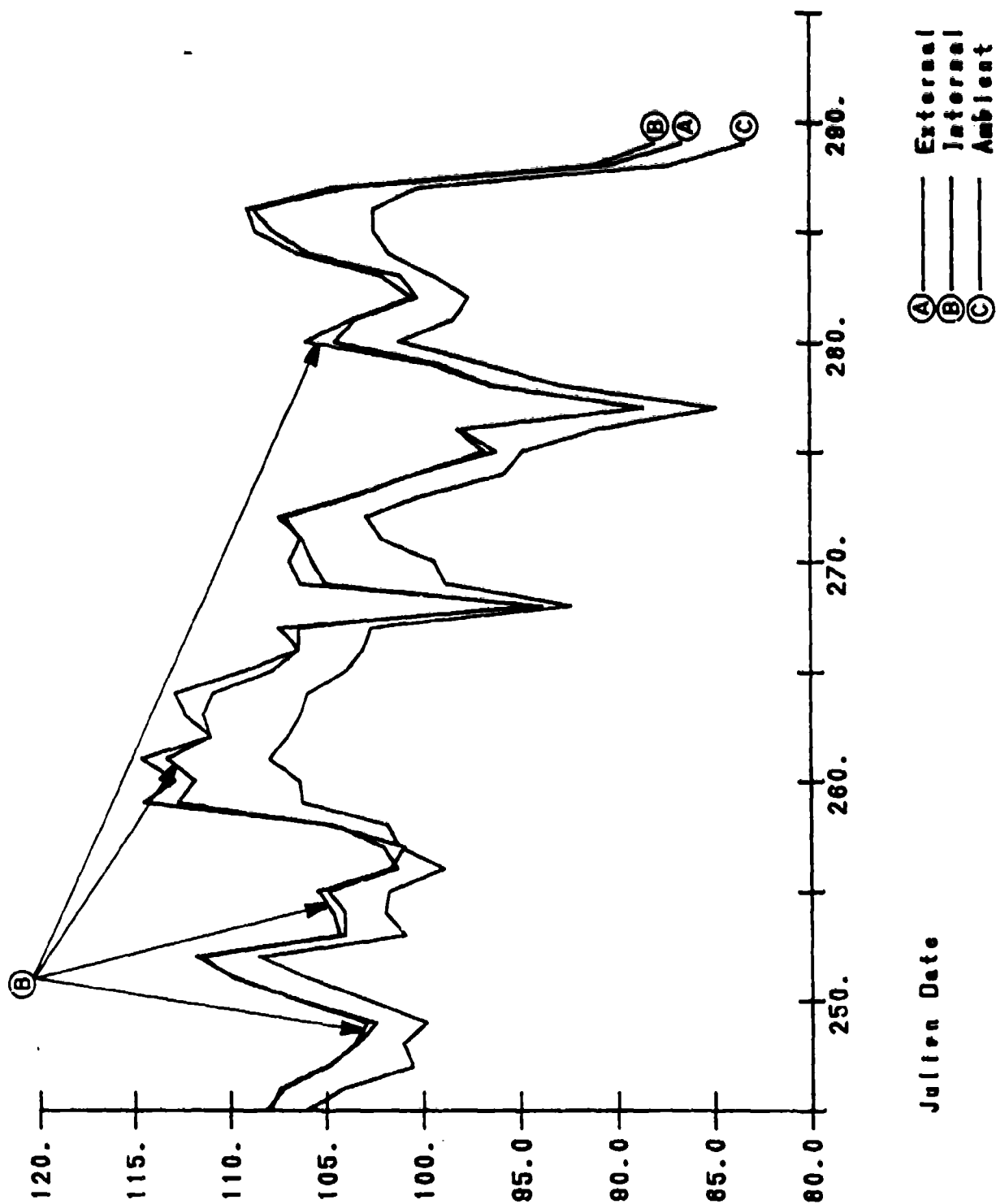
ITEM: PROJ. 155MM HE RAP M549A1, COMP B
 DODIC: D578, LOT #: 10P86B034-010A
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: July 18 - September 1, 1981



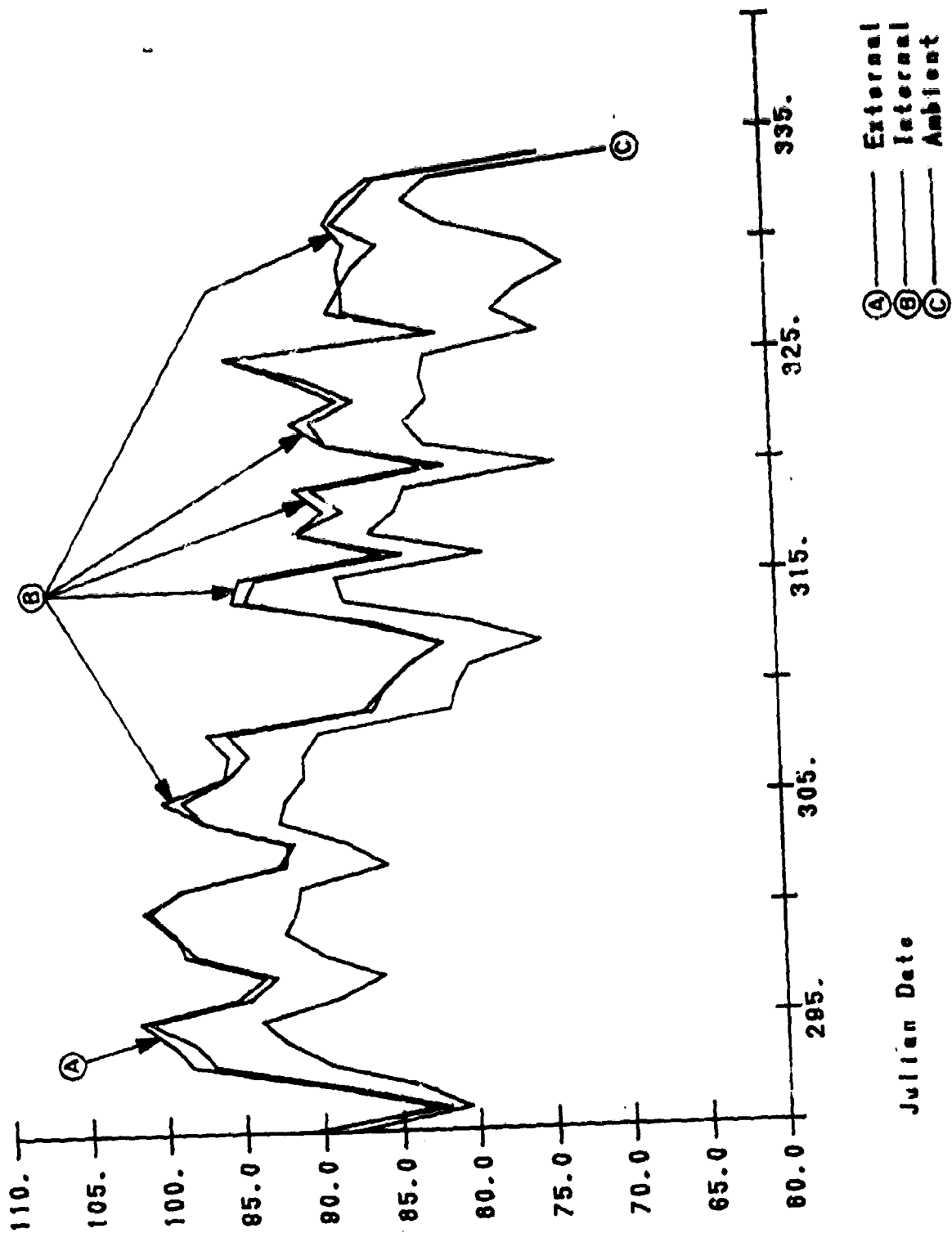
ITEM: GRENADE, HAND FRAG M67
 DODIC: 0881, LOT #: LS-56-3C
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: September 2 - October 18, 1981



ITEM: GRENADE, HAND FRAQ M67
 DODIC: 0881, LOT #: LS-58-3C
 Degrees Fahrenheit

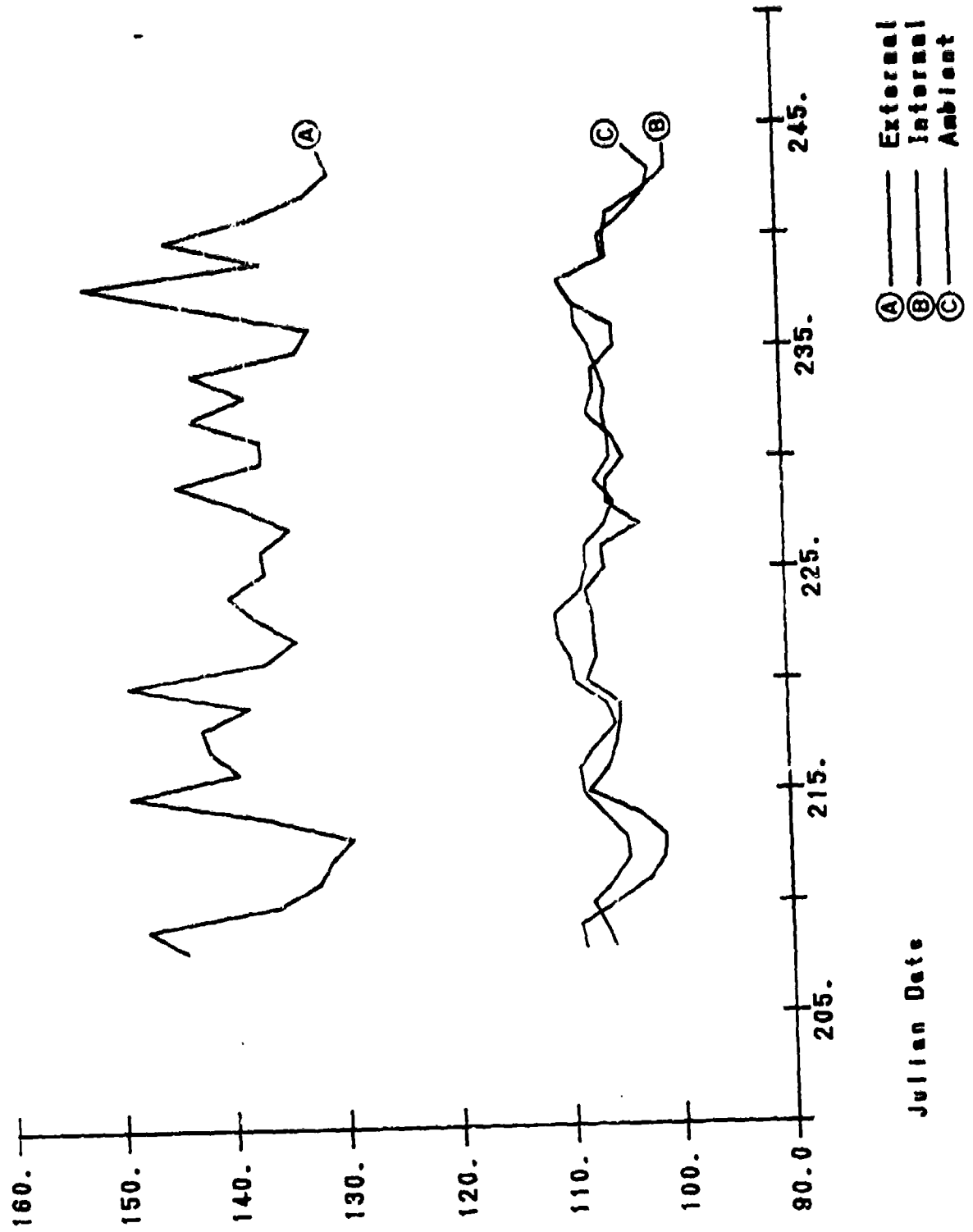
Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: October 17 - November 30, 1991



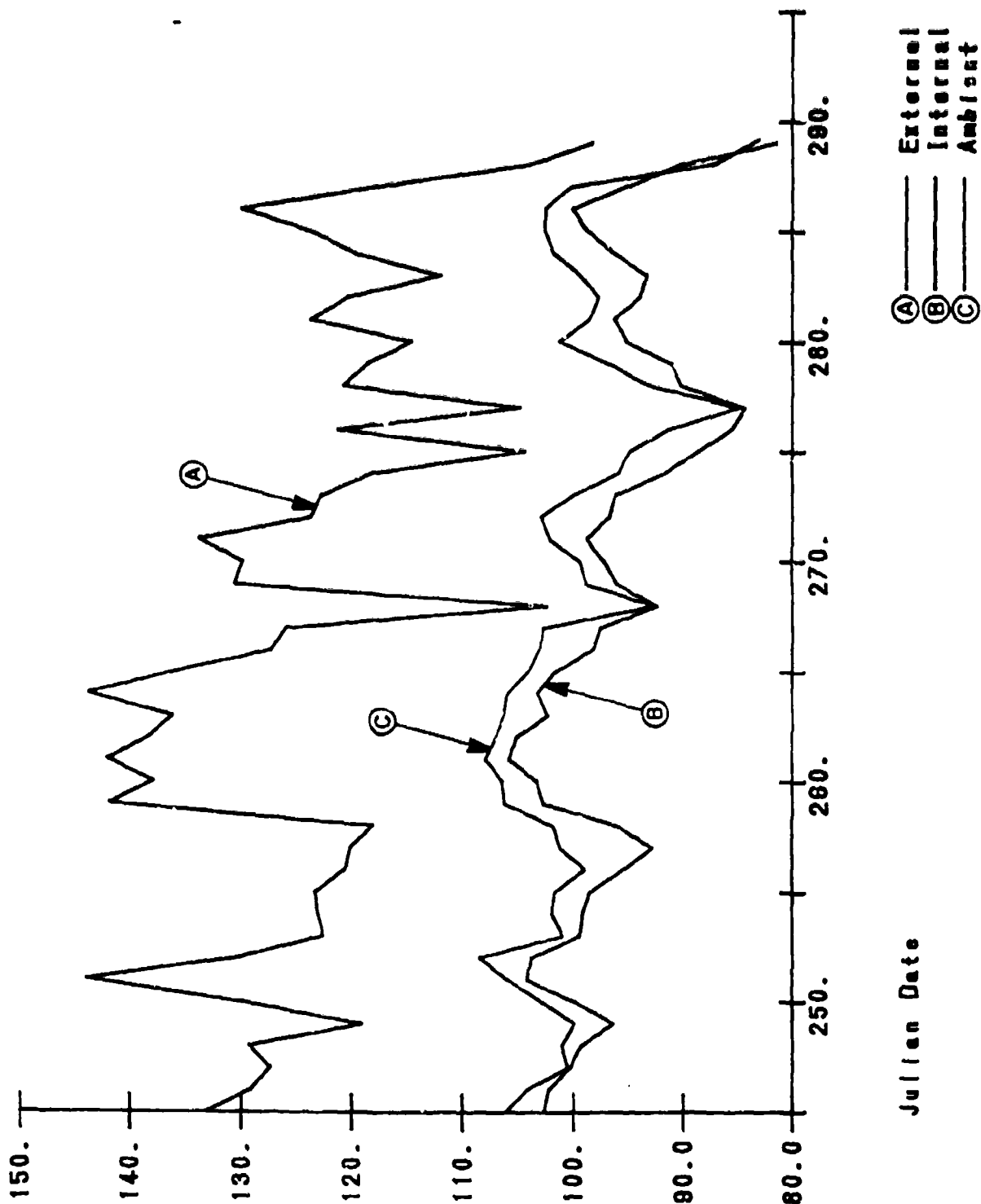
ITEM: GRENADE, HAND FRAG M67
 DODIC: 0881, LOT #: LS-56-3C
 Degrees Fahrenheit

ITEM: MINE, AT HEAVY M75 (GEMSS)
 DODIC: K184, LOT #: 10P80D007-003
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: July 19 - September 1, 1981

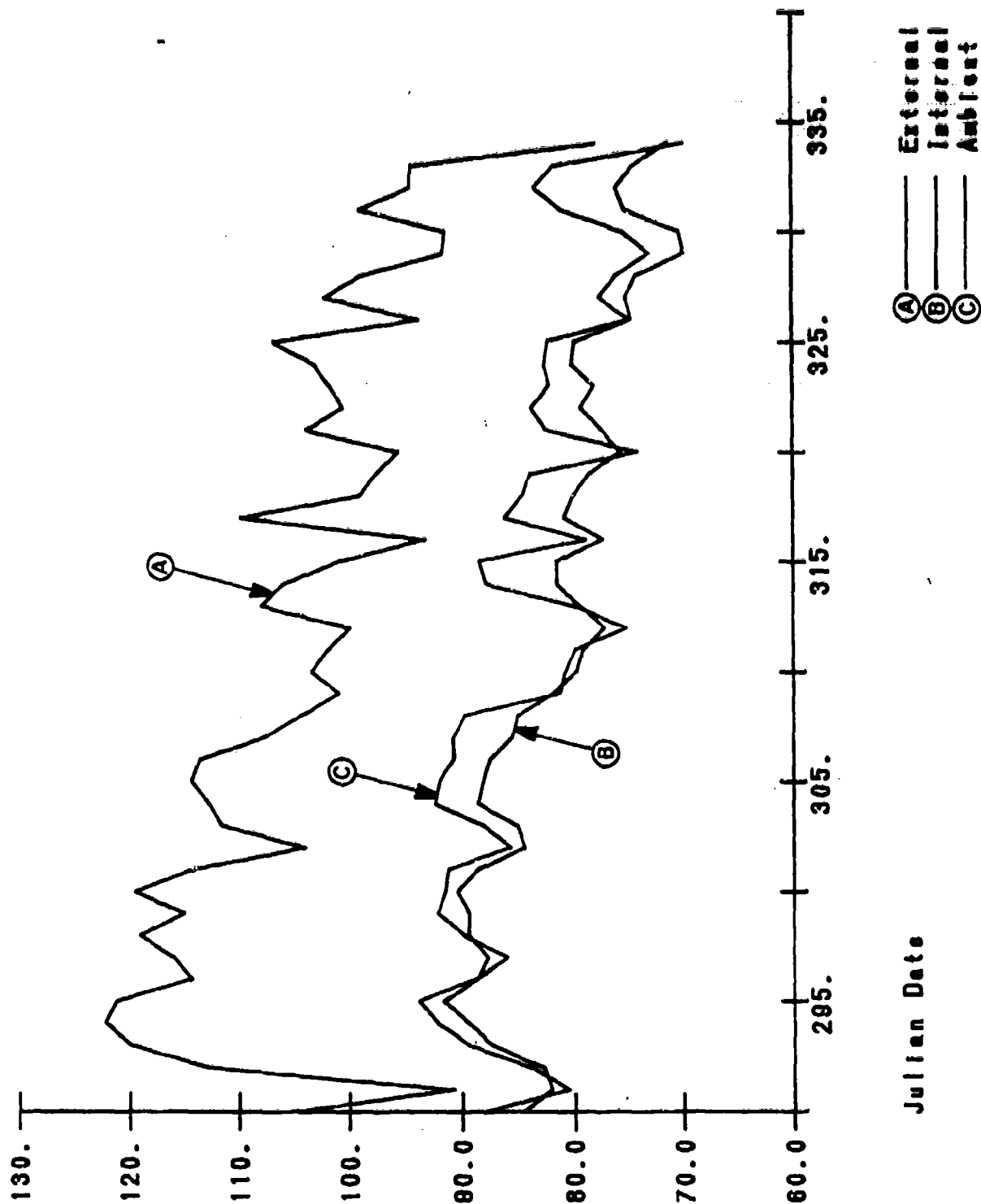


Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: September 2 - October 18, 1991



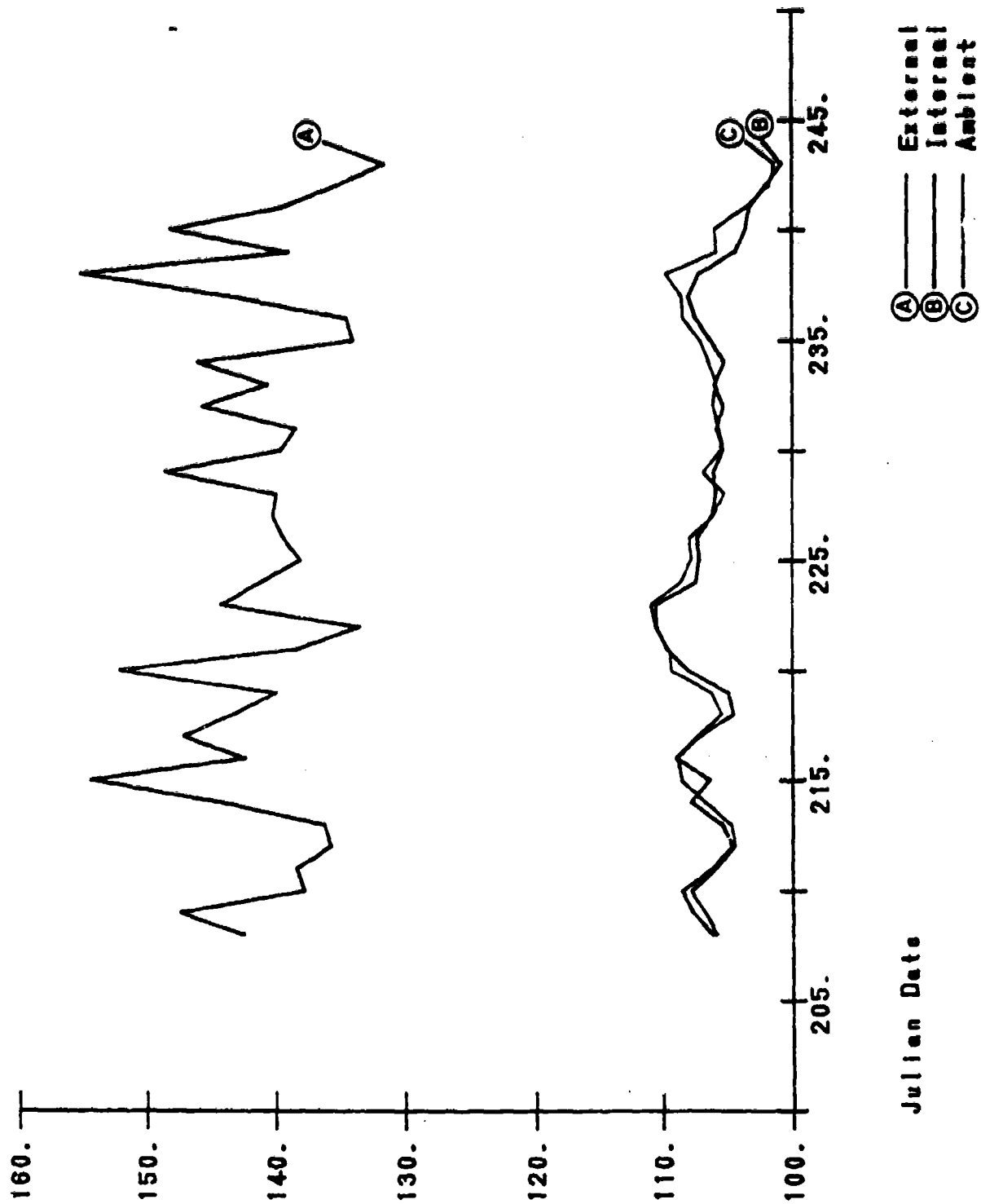
ITEM: MINE, AT HEAVY M75 (GEMSS)
 DODIC: K184, LOT #: IOP800007-003
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: October 17 - November 30, 1981



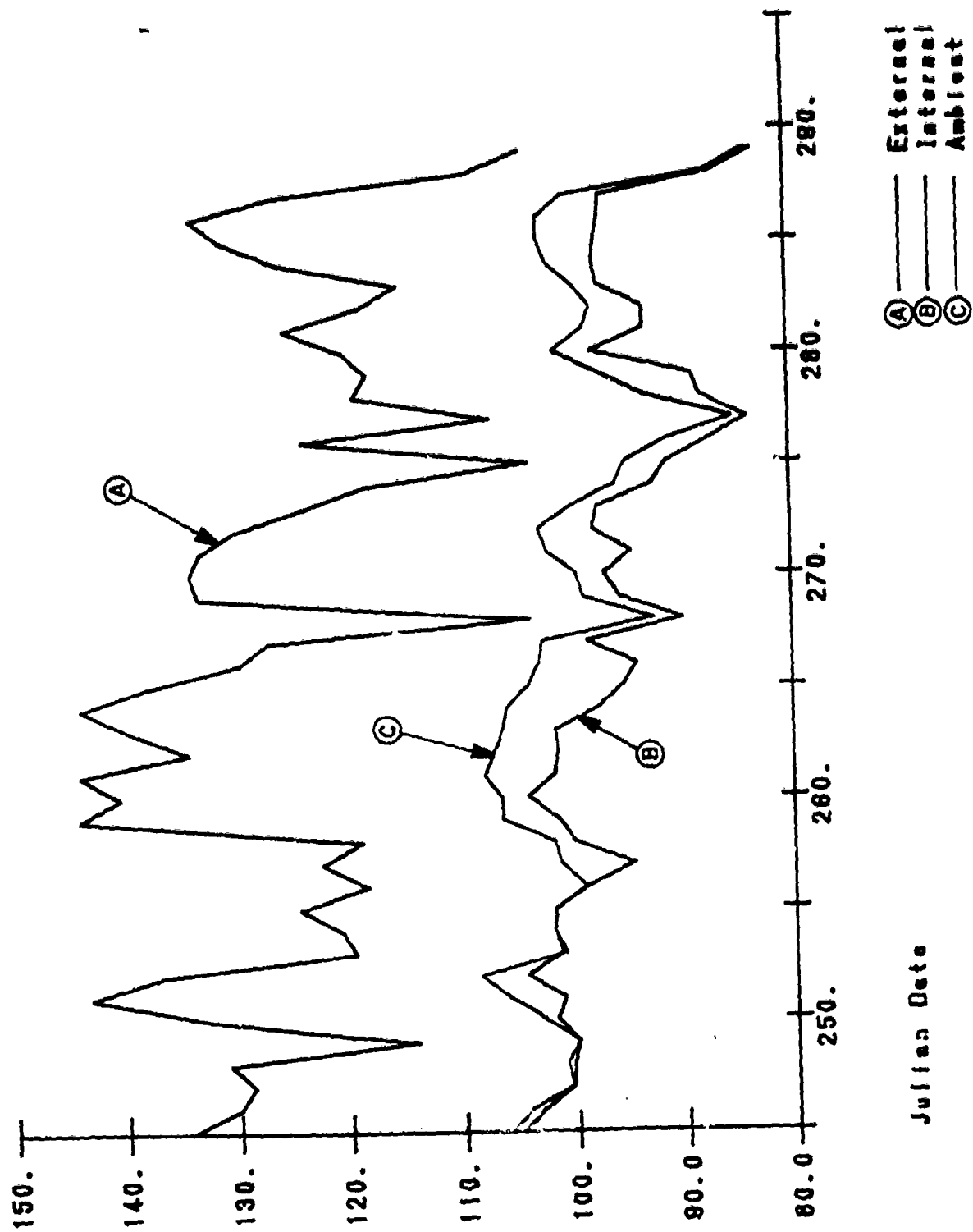
ITEM: MINE, AT HEAVY M75 (GEMSS)
 DODIC: K184, LOT #: 10P80D007-003
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: July 18 - September 1, 1981



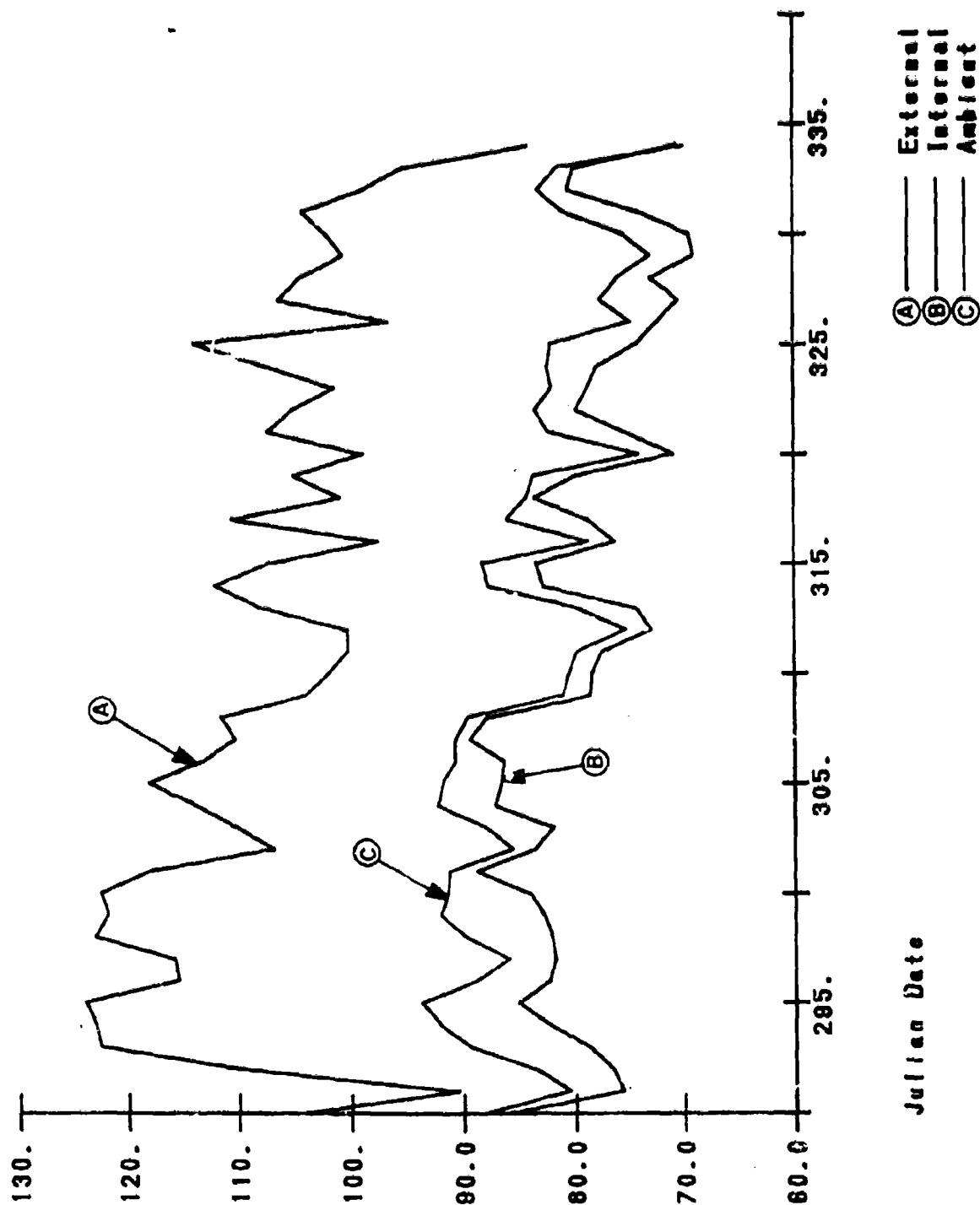
ITEM: FUZE, PROX M732 NON-PROP PKG
 DODIC: N484, LOT #: L9-84B013-007
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: September 2 - October 18, 1991



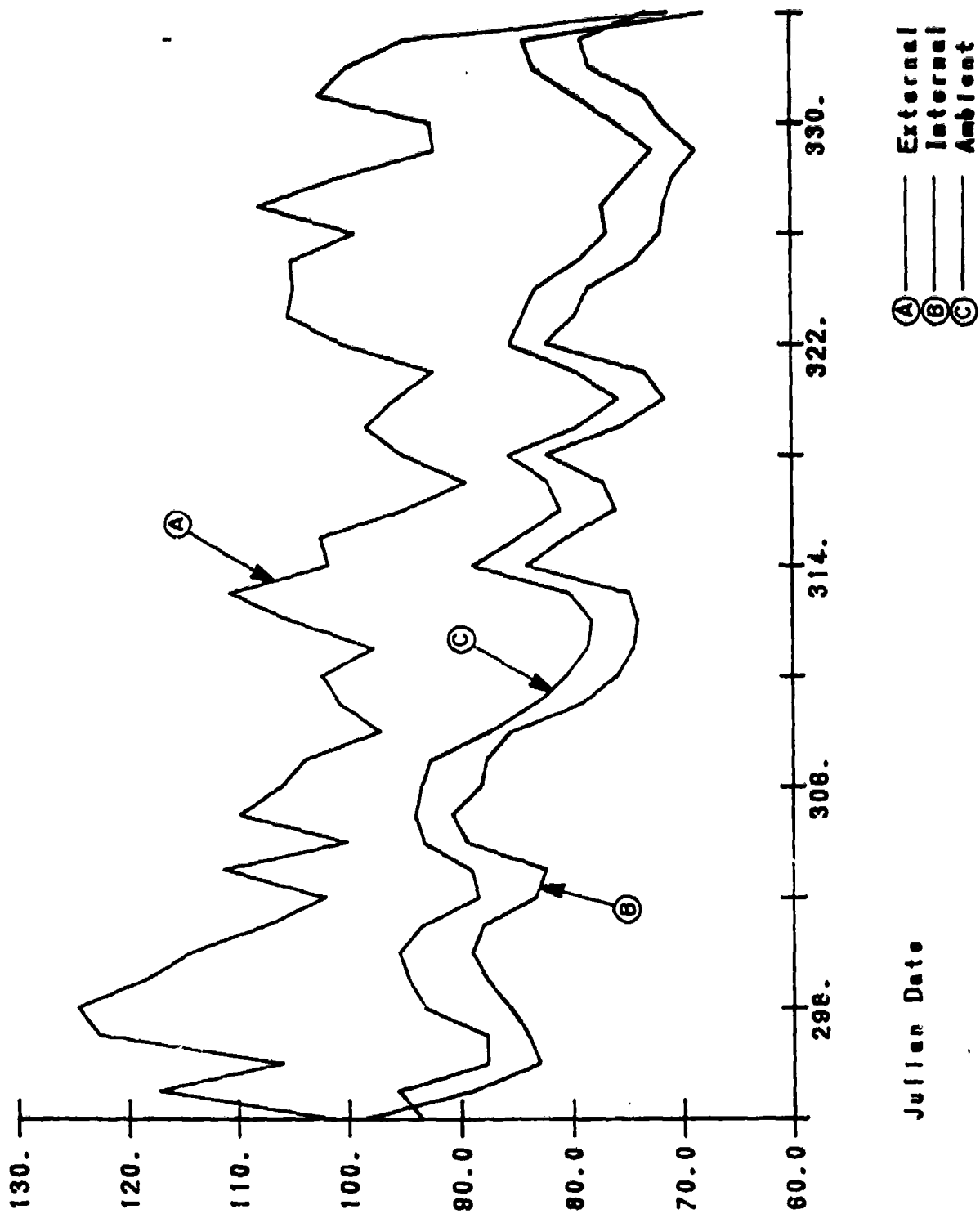
ITEM: FUZE, PROX M732 NON-PROP PKG
 DODIC: N484, LOT #: LS-848013-007
 26-8
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #2 at TSA 5
 Date: October 17 - November 30, 1991



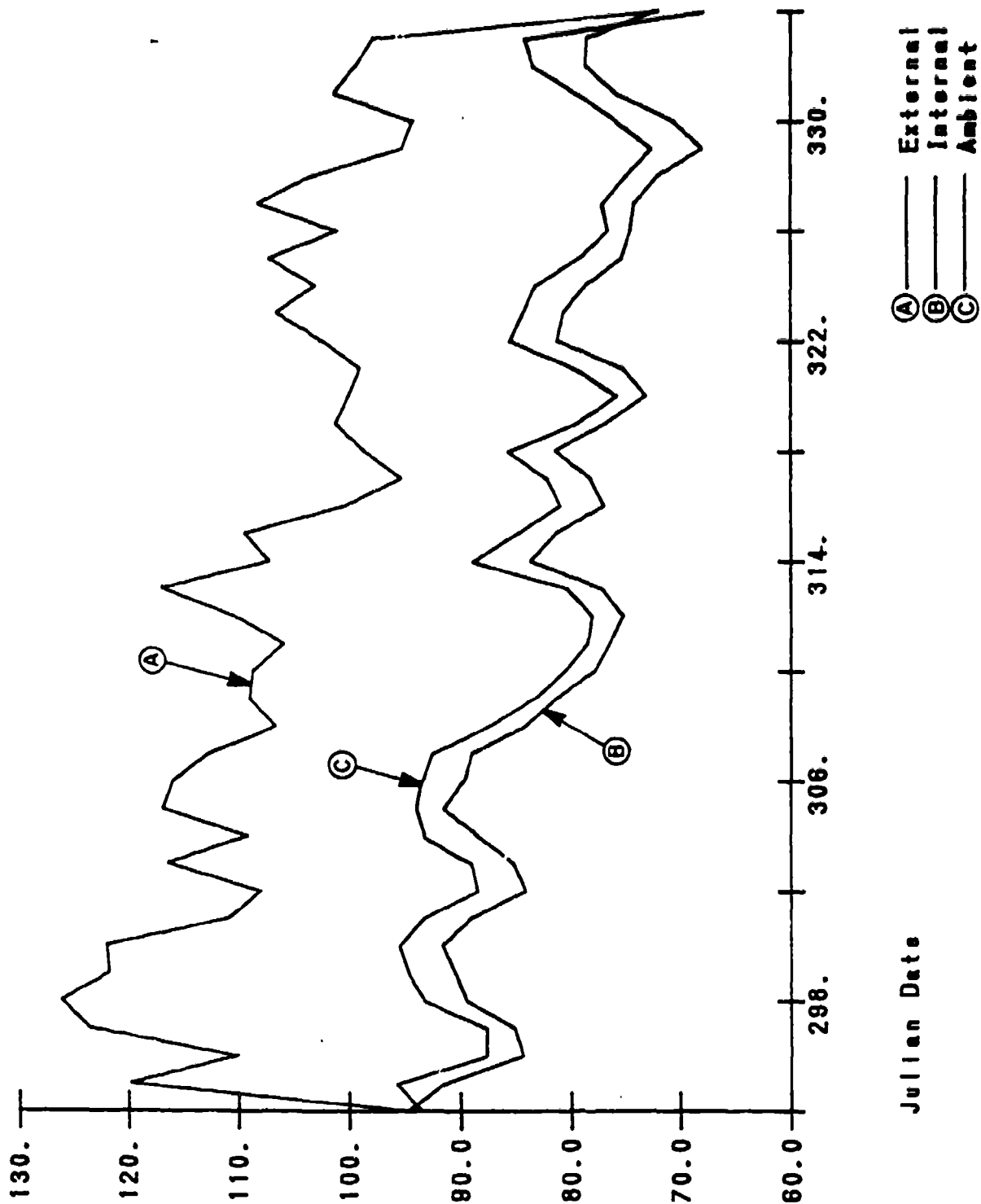
ITEM: FUZE, PROX M732 NON-PROP PKG
 DODIC: N464, LOT #: LS-84B013-007
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #3 at TSA 4
 Date: October 17 - November 30, 1991



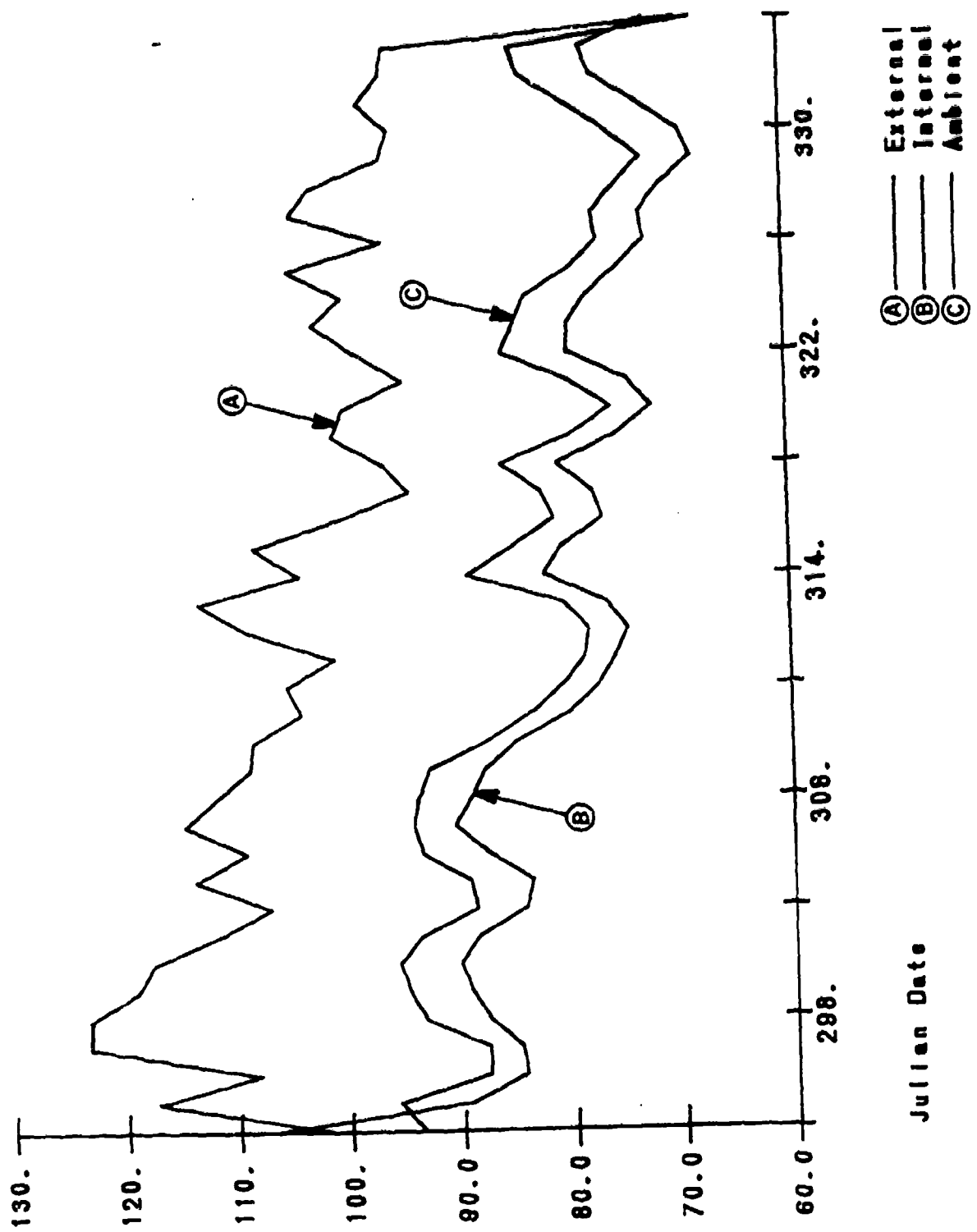
ITEM: CTG, 80MM SMK WP M302A1
 DODIC: B630, LOT #: PB-3-2
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #3 at TSA 4
 Date: October 17 - November 30, 1991



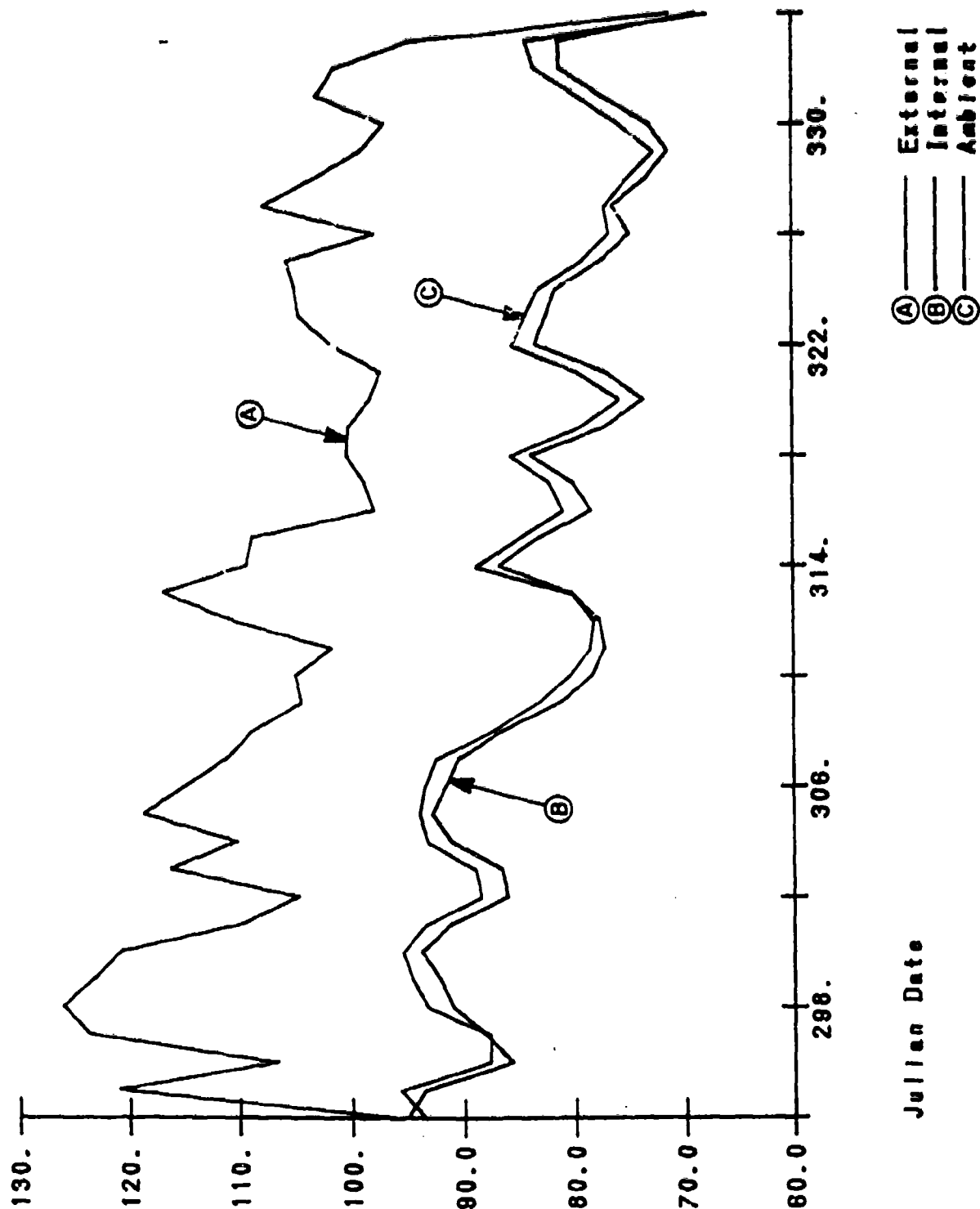
ITEM: CTG, 105MM HEAT-T M456A2
 DODIC: C508, LOT #: MA-87J145-008
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #3 at TSA 4
 Date: October 17 - November 30, 1991



ITEM: CTG, 4.2IN HE M329A1 W/O FUZE
 DODIC: C705, LOT #: 10P-7-198
 Degrees Fahrenheit

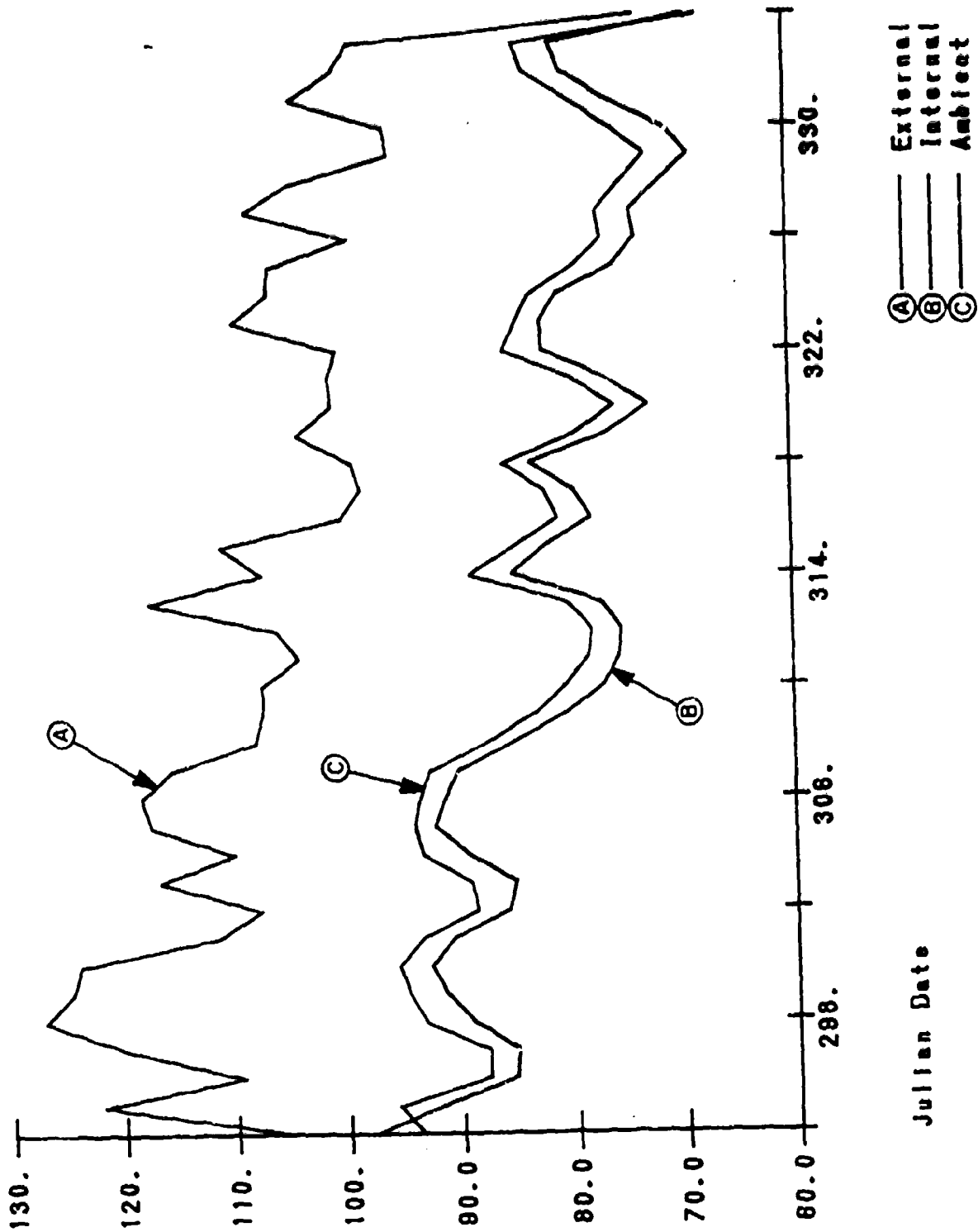
Daily Peak Environmental Data From Campbell Logger #3 at TSA 4
 Date: October 17 - November 30, 1981



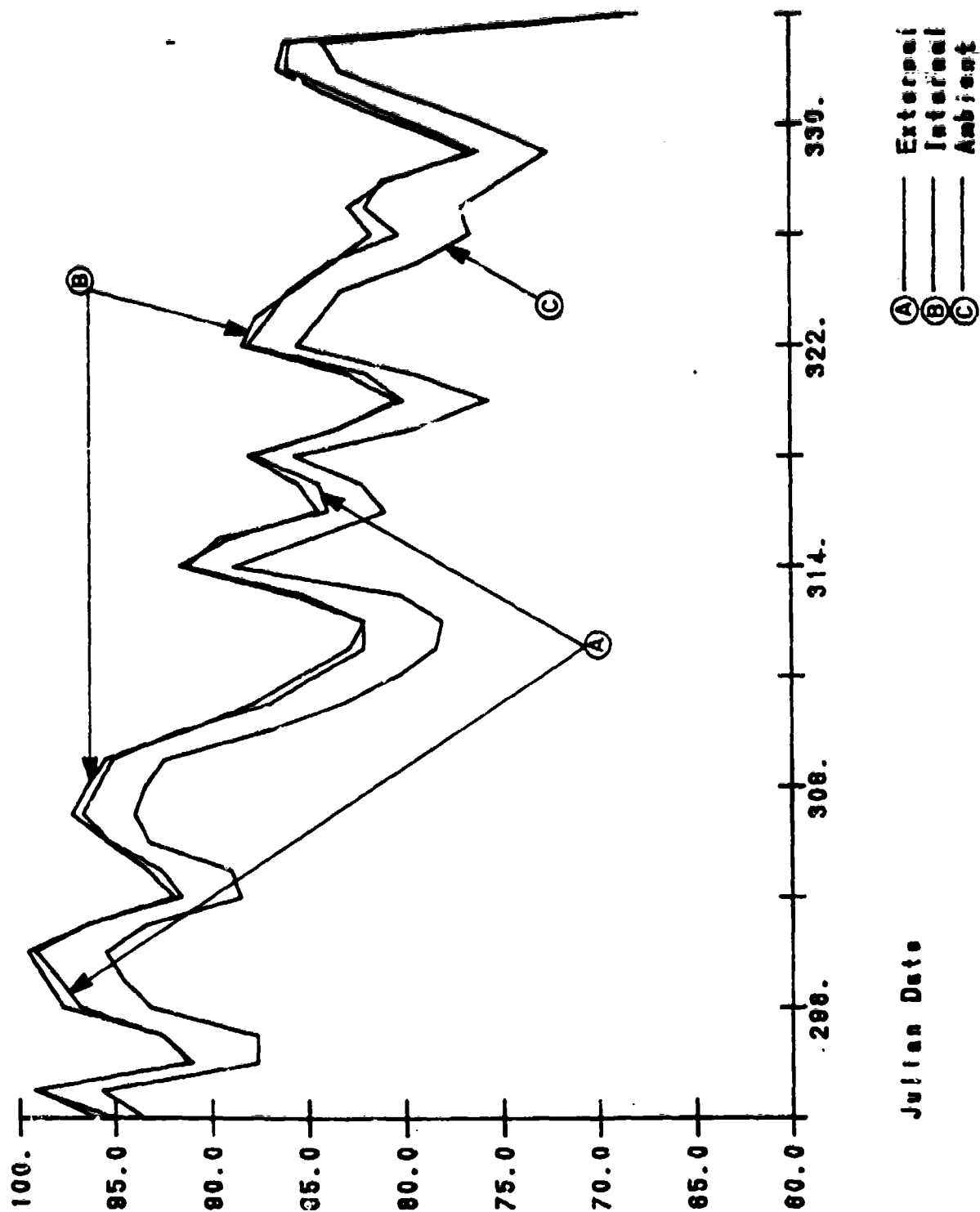
ITEM: CTG, 120MM APFSDS-T M828
 DDDIC: C786, LOT #: MHM89C060-002
 Degree Fahrenheit

ITEM: CHG, PROP 155MM RB M203
 DODIC: D532, LOT #: IND90D-071280
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #3 at TSA 4
 Date: October 17 - November 30, 1991

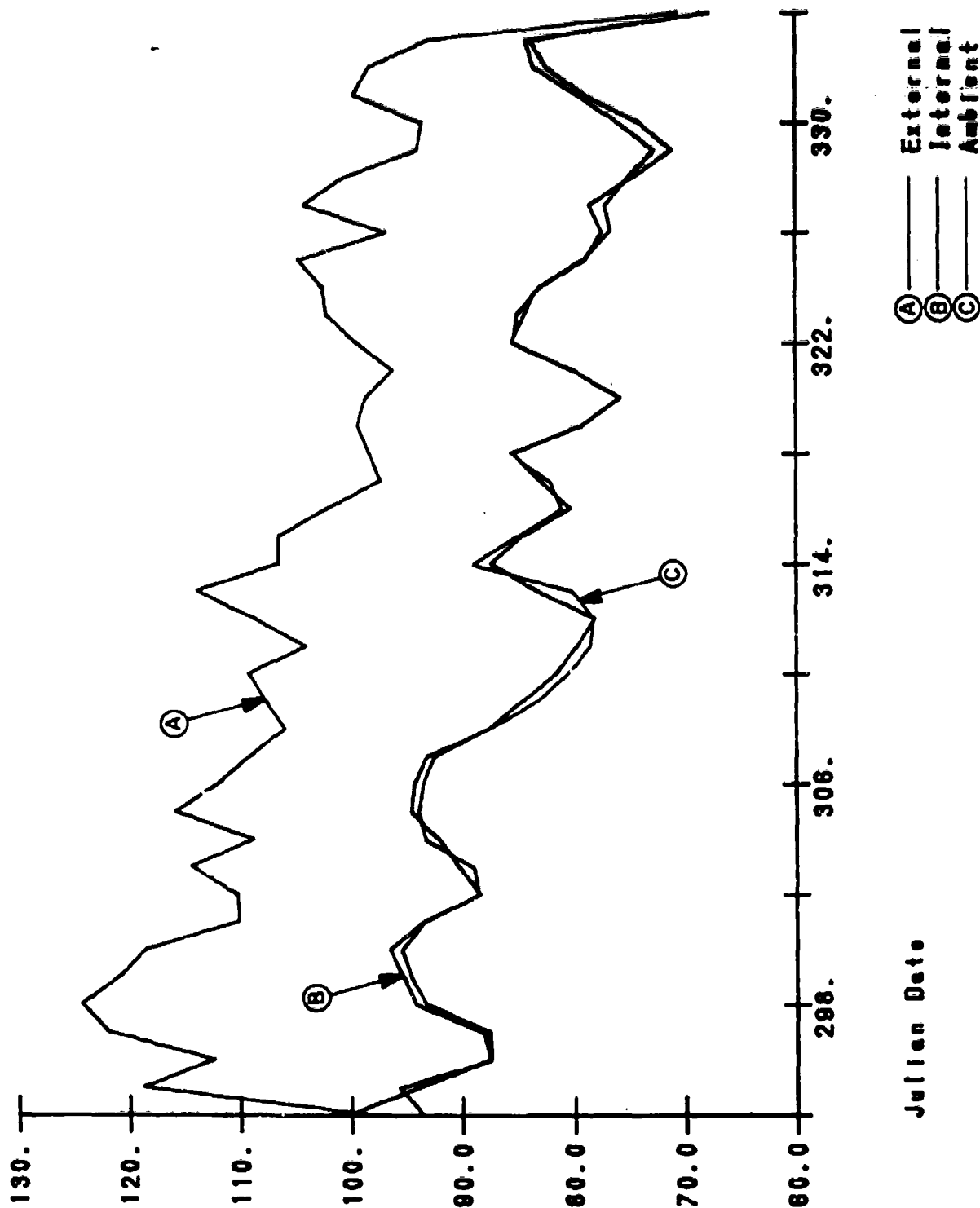


Daily Peak Environmental Data From Campbell Logger #3 at TSA 4
 Date: October 17 - November 30, 1991



ITEM: PROJ, 155MM HE RAP M549A1 (COMP B)
 DODIC: D579, LOT #: 10P85A033-008A
 Degrees Fahrenheit

Daily Peak Environmental Data From Campbell Logger #3 at TSA 4
 Date: October 17 - November 30, 1991



ITEM: FUZE, M190 M577/*M577A1 W/O BOOSTER
 DODIC: N285, LOT #: HAT84J014-004
 Degrees Fahrenheit