AD-A156 088 DISSECTED MOTORS/PROPELLANTS MOTOR NUMBER STM-012 PHASE XV SURVEILLANCE R..(U) OGDEN AIR LOGISTICS CENTER HILL AFB UT PROPELLANT ANALYSIS LA.. J A THOMPSON APR 85 1/2

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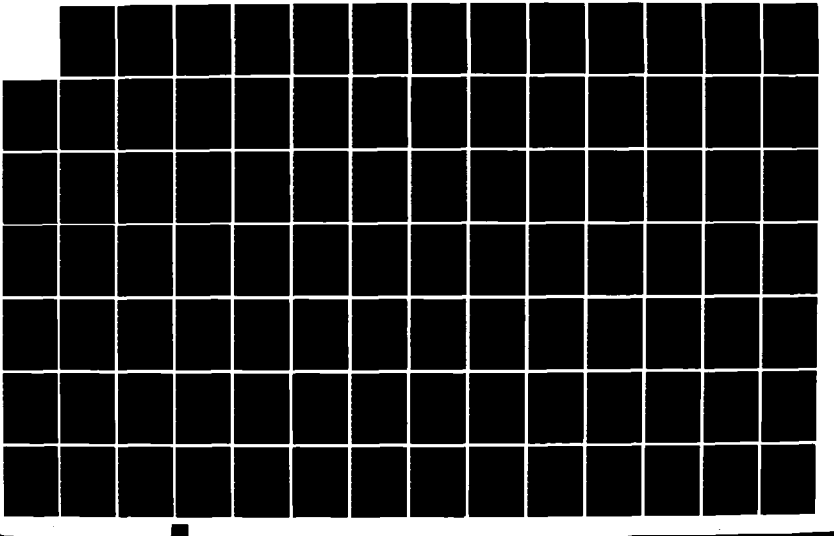

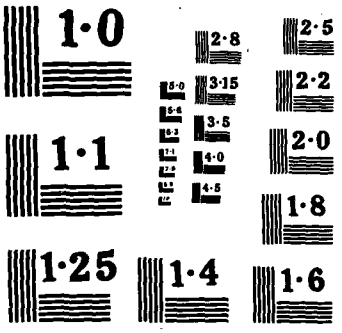

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MICROCOPY RESOLUTION TEST CHART

HEADQUARTERS

OGDEN AIR LOGISTICS CENTER

UNITED STATES AIR FORCE

HILL AIR FORCE BASE, UTAH 84056-5149

(FINAL)
SURVEILLANCE REPORT
STAGE I
DISSECTED MOTORS/PROPELLANTS
MOTOR NUMBER STM-012
PHASE XV

PROPELLANT ANALYSIS LABORATORY

MANPA REPORT NR
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April 1985

MANPA REPORT NR-506(85)
MMWRM PROJECT M46288C

(FINAL)

SURVEILLANCE REPORT

STAGE I DISSECTED MOTOR STM-012

PHASE XV PROPELLANT & COMPONENT TESTING

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ABSTRACT

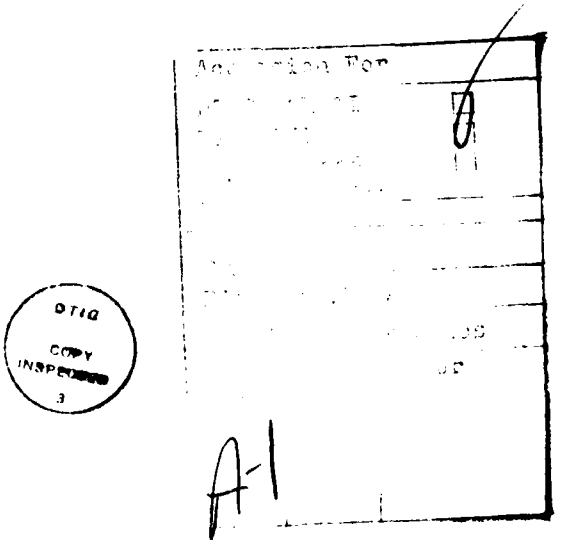
This is the final report for Dissected Motor STM-012 and covers propellant and case bond test data. Planned dissection of additional selected motors will provide samples for continued component test and analysis for future evaluation.

Testing was performed to determine the useful shelf/service life for LGM-30 Stage I Rocket Motors. A three year storage program for propellant and components was started in May 1961. This program was then extended to a ten year study and later continued indefinitely to assure that a deterioration in motor physical characteristics could be detected in time to take some corrective actions before the weapon system performance deteriorated below an acceptable level.

The data is presented in the form of regression analysis and the trends are projected 24 months beyond the last test date.

From the statistical analysis of all data tested to date, significant degradation of the propellant does not appear likely for at least two years past the oldest data point.

Future testing and reporting will be conducted on individual dissected motors.



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GLOSSARY OF TERMS AND ABBREVIATIONS

Aging Trend	A change in properties or performance resulting from aging of material or component
CSA	Cross Sectional Area
DB	Dogbone
Degradation	Gradual deterioration of properties or performance
E	Modulus (psi), defined as stress divided by strain along the initial linear portion of the curve.
EB	End Bonded
EGL	Effective Gage Length
em	Strain at maximum stress
er	Strain at rupture
"F" ratio	The ratio of the variance accounted for by the regression function to the random unexplained variance. The regression function having the most significant "F" ratio is used for plotting data. The ratio is also used in detecting significant changes in random variation between succeeding time points
JANNAF	Joint Army, Navy, NASA, Air Force Committee
MANPA	Propellant Lab Section at Ogden Air Logistics Center
Ogden ALC	Ogden Air Logistics Center, Air Force Logistics Command
r or R	The Correlation Coefficient is a measure of the degree of closeness of the linear relationship between two variables
Regression Equation	The general form of the regression equation is $Y = a + bx$
Regression Line	Line representing mean test values with respect to time
S_b	Standard error of estimate of the regression coefficient

GLOSSARY OF TERMS AND ABBREVIATIONS (cont)

S_e or $S_{Y.X}$	Standard deviation of the data about the regression line
Sm	Maximum Stress
Sr	Stress at rupture
Standard Deviation (S_y)	Square root of variance
Strain Rate	Crosshead speed divided by the EGL
"t" test	A statistical test used to detect significant differences between a measured parameter and an expected value of the parameter (determines if regression slope differs from zero at the 95% confidence level)
Variance	The sum of squares of deviations of the test results from the mean of the series after division by one less than the total number of test results
3 Sigma Band	The area between the upper and lower 3 sigma limit. It can be expected that 99.73% of the inventory represented by the test samples would fall within this range assuming that the population is normally distributed.
90-90 Band	It can be stated with 90% confidence that 90% of the inventory represented by the test samples would fall within this range assuming that the population is normally distributed

INTRODUCTION

A. PURPOSE:

This report contains test data from samples of LGM-30 Stage I, Wing II, TP-H1011 propellant and case bond materials obtained from dissected motor STM-012. Testing was performed by the Propellant Analysis Laboratory (MANPA) for the Minuteman Motor Engineers (MMGR) under Project M46288C. This report is the fifteenth in this series. Data from this test period and propellant test data from the fourteen previous reports were entered into the G085 computer for regression analysis. The regressions, along with the combined motor regressions, are shown in this report.

B. TEST PROGRAM:

The LGM-30 laboratory and component program includes the testing of materials used in the main case and main grain propellant. Table 1 outlines the test program.

C. HISTORICAL BACKGROUND:

In May 1961, Thiokol began a three year LGM-30 laboratory storage and test program to determine the rate of degradation with age for Stage I materials. During June 1962 and again in August 1963, additional samples were included. New samples were added in July and August 1964 when the surveillance test program was extended to ten years (Test Plan 0717-62-0967,53-8). The samples added to the inventory in 1964 were considered to be a new population, but were combined in regression analysis with the three dissected motors.

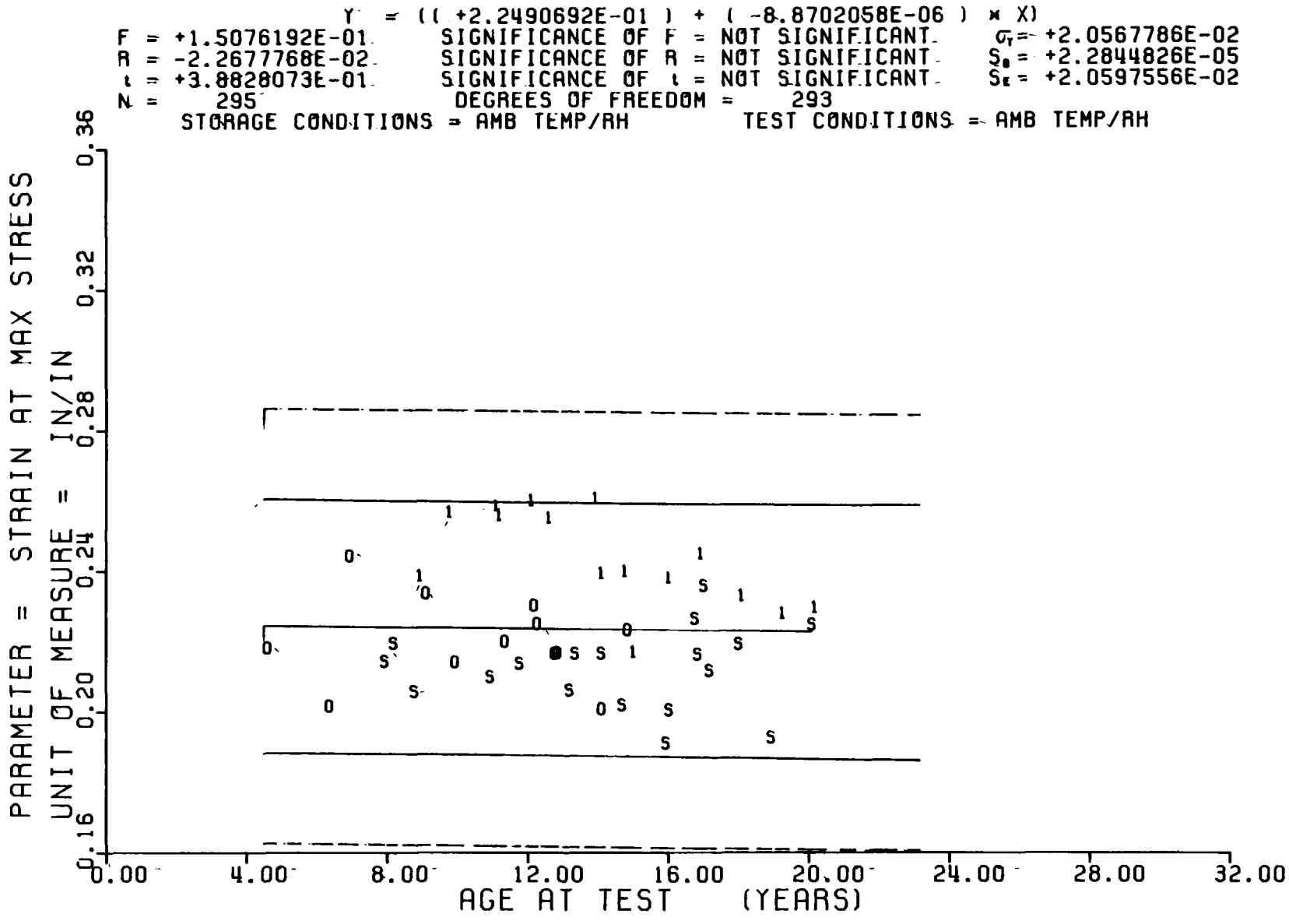
The history of testing of these materials is found in MQQP Report Nrs. 109A(67), 144(68), 208(71), MANCP Report Nr. 358(76) and MANPA Report Nr. 82(82). Physical transfer of the specimens fron Thiokol to Ogden ALC was made in June 1967.

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
94.0	16	+2.1278083E-01	+5.0823445E-03	+2.2349995E-01	+2.0269995E-01	+2.1026396E-01
97.0	2	+2.1799993E-01	+2.5455903E-02	+2.3599994E-01	+1.9999998E-01	+2.1032762E-01
104.0	5	+2.0419996E-01	+7.6603983E-03	+2.1299999E-01	+1.9199997E-01	+2.1047616E-01
130.0	5	+2.0839995E-01	+5.5924323E-03	+2.1499997E-01	+2.0399999E-01	+2.1102780E-01
140.0	5	+2.1219992E-01	+5.0685630E-03	+2.2099995E-01	+2.0899999E-01	+2.1123999E-01
157.0	3	+2.0463329E-01	+4.5805734E-03	+2.0989996E-01	+2.0159995E-01	+2.1160066E-01
159.0	4	+2.1512448E-01	+3.1337724E-03	+2.1999996E-01	+2.0799994E-01	+2.1164309E-01
163.0	5	+2.1513992E-01	+1.4097279E-02	+2.2719997E-01	+1.9199997E-01	+2.1183401E-01
175.0	3	+2.0042479E-01	+4.3063575E-03	+2.0539999E-01	+1.9299995E-01	+2.1198254E-01
178.0	3	+1.8963330E-01	+4.9797061E-03	+1.9289994E-01	+1.8389999E-01	+2.1230083E-01
181.0	5	+1.9903993E-01	+2.8567740E-03	+2.0139998E-01	+1.9489997E-01	+2.1232205E-01
200.0	3	+2.2506660E-01	+9.1139310E-03	+2.3349994E-01	+2.1539998E-01	+2.1251296E-01
201.0	3	+2.1493327E-01	+2.5547123E-03	+2.1779996E-01	+2.1289998E-01	+2.1253418E-01
203.0	5	+2.3439979E-01	+1.2393562E-02	+2.4319994E-01	+2.1269994E-01	+2.1257662E-01
206.0	3	+2.1023327E-01	+3.4222277E-03	+2.1339994E-01	+2.0659995E-01	+2.1261906E-01
219.0	8	+2.1787476E-01	+2.3035589E-03	+2.2099995E-01	+2.1379995E-01	+2.1283125E-01
226.0	8	+1.9127476E-01	+9.6271194E-03	+2.0639997E-01	+1.7999994E-01	+2.1306461E-01
240.0	8	+2.2337472E-01	+1.2596108E-02	+2.3069995E-01	+1.9369995E-01	+2.1336168E-01
254.0	3	+2.2659993E-01	+2.3246981E-03	+2.2849994E-01	+2.2399997E-01	+2.1365869E-01

STAGE 1 DISSECTED MOTOR=STM-012,LOW RATE CHS=2.0 IN/MIN,STRAIN MAX STRESS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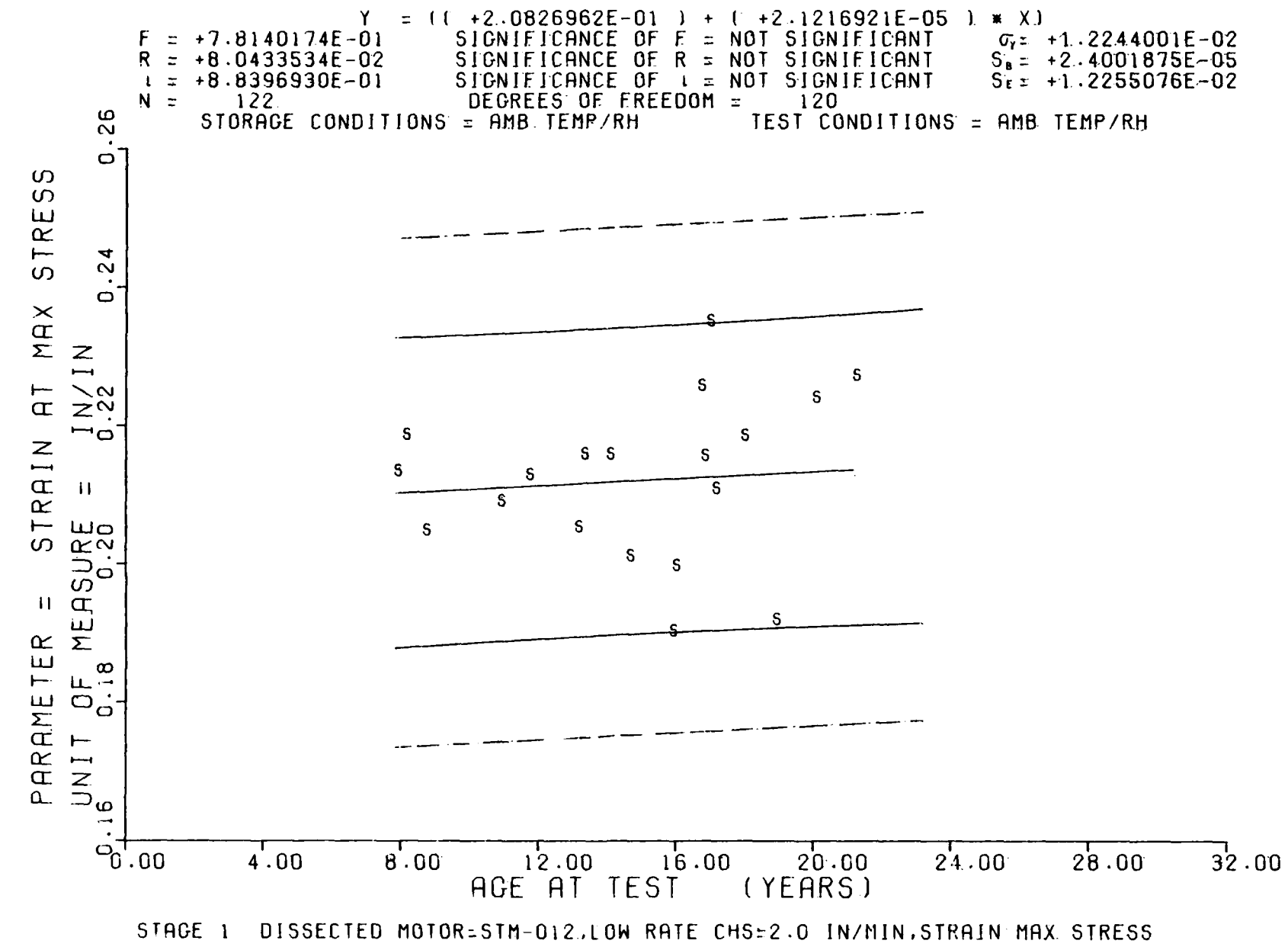
F = +1.5076192E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σr = +2.0567786E-02
R = -2.2677768E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT Sθ = +2.2844826E-05
t = +3.8828073E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Sε = +2.0597556E-02
N = 295 DEGREES OF FREEDOM = 293
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT MAX STRESS
UNIT OF MEASURE = IN/IN
0.36
0.32
0.28
0.24
0.20
0.16
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISSECTED MOTORS,LOW RATE CHS=2.0 IN/MIN,STRAIN MAX STRESS

Figure 1A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R = +8.0433534E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +2.4001875E-05
ι = +8.8396930E-01 SIGNIFICANCE OF ι = NOT SIGNIFICANT Sε = +1.2255076E-02
N = 122 DEGREES OF FREEDOM = 120
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT MAX STRESS
UNIT OF MEASURE = IN/IN
0.26
0.24
0.22
0.20
0.18
0.16
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISSECTED MOTOR=STM-012,LOW RATE CHS=2.0 IN/MIN,STRAIN MAX STRESS

Figure 1

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

A. TENSILE SUMMARY:

For those regressions where statistically significant trends are seen, the changes are gradual and no problems are indicated for at least two years beyond the last test date. These regressions show the same general trend as seen in the block propellant and other dissected motor test data. The propellant regressions show less strain capability and higher tensile strength as the age increases. The case bond regression shows a gradual decrease in capability as the age increases.

B. THERMAL AND COMBUSTION SUMMARY:

From the analysis, the thermal properties are also showing a gradual change as the age increases.

C. CONCLUSIONS:

The test results for both the individual and combined motor regressions show that, under present storage conditions, some of the physical and combustion properties of the propellant along with case bond testing indicate statistically significant aging trends. However, where a significant trend is indicated, the slope of the trend line is gradual and no operational problems are expected.

Although some aging trends have been observed, it does not appear that significant degradation will occur in the propellant and case bond in the next two years.

D. RECOMMENDATIONS:

It is recommended that a Stage I Minuteman Motor be selected for dissection and testing to ensure that no drastic changes are occurring in the propellant and case bond physical and thermal properties.

TABLE 2 (cont)

Test	Motor STM-012	Composite Motor
Case Bond Tensile	S(-)	S(-)
Constant Strain	S(-)	S(-)
Hardness, Shore A, 77°F, 10 sec	NS	S(-)
Tear Energy, 0.1 in/min	S(+)	NS
SOL GEL		
% Extractables	S(+)	S(+)
Weight Swell Ratio	S(+)	S(+)
Density	S(-)	S(-)
Crosslink Density	NS	NS
Burning Rate		
500 psi	NS	NS
1000 psi	S(-)	S(+)
Heat of Explosion	S(+)	S(+)
Differential Thermal Analysis		
Endotherm	NS	S(-)
Exotherm	S(-)	NS
Ignition Temperature	S(+)	NS

NS = Non-significant trend line from a line of zero slope

\+ = Significant slope in a positive direction

\- = Significant slope in a negative direction

NOTE: All testing performed at the 5% significance level.

TABLE 2

REGRESSION TREND LINE SUMMARY

Test	Motor STM-012	Composite Motor
Low Rate Tensile, 77°F, 2.0 in/min		
Strain at Max Stress	NS	NS
Maximum Stress	NS	S(+)
Strain at Rupture	S(-)	NS
Stress at Rupture	S(+)	S(+)
Modulus	NS	NS
Low Rate Tensile, 77°F, 20.0 in/min		
Strain at Max Stress	NS	S(-)
Maximum Stress	S(+)	S(+)
Strain at Rupture	NS	S(-)
Stress at Rupture	S(+)	NS
Modulus	NS	S(+)
High Rate Tensile, 77°F, 1750 in/in/min		
Strain at Max Stress	NS	NS
Maximum Stress	S(-)	NS
Strain at Rupture	S(-)	S(-)
Stress at Rupture	NS	NS
Modulus	NS	S(-)
High Rate Triaxial Tensile, 77°F, 1750 CHS, 600 psi		
Strain at Max Stress	S(+)	S(+)
Maximum Stress	S(+)	S(+)
Strain at Rupture	S(+)	S(+)
Stress at Rupture	S(+)	S(+)
Modulus	S(-)	S(-)
Creep, 10 lb Load, 10 sec	NS	S(-)
20 sec	S(-)	S(-)
1000 sec	NS	S(-)
10,000 sec	S(-)	S(-)
Creep, 12 lb Load, 10 sec	S(-)	S(-)
20 sec	S(-)	S(-)
1000 sec	S(-)	S(-)
% Strain at Rupture	NS	S(+)
Stress Relaxation, 3% Strain, 10 sec	S(+)	S(+)
50 sec	S(+)	S(+)
100 sec	S(+)	S(+)
1000 sec	S(+)	NS
Stress Relaxation, 5% Strain, 10 sec	S(+)	S(+)
50 sec	S(+)	S(+)
100 sec	S(+)	S(+)
1000 sec	S(+)	NS

I. HEAT OF EXPLOSION:

The regression shows a statistically significant increasing trend line (figure 47).

The regression plot for the combined motors is shown in figure 47A.

J. DIFFERENTIAL THERMAL ANALYSIS (DTA):

The endotherm regression shows a non-significant trend line, the exotherm regression shows a statistically significant negative trend line and the ignition temperature regression shows a statistically significant increasing trend line (figures 48 thru 50).

The combined motor regressions are shown in figures 48A thru 50A.

D. CONSTANT STRAIN:

The regression trend line shows a statistically significant decrease (figure 38).

The combined motor regression is shown in figure 38A.

E. HARDNESS:

The 10 second regression is not significant (figure 39).

The combined motor regression is show in figure 39A.

F. TEAR ENERGY:

A statistically significant increase is shown in the regression (figure 40).

The combined motor regression is shown in figure 40A.

G. SOL GEL:

The regression trend lines for percent extractables and weight swell ration show a statistically significant increase (figures 41 and 42). The density regression shows a statistically significant decrease (figure 43). The crosslink density regression is non-significant (figure 44).

The combined motor regressions are shown in figures 41A thru 44A.

H. BURNING RATE:

The 500 psi regression shows a non-significant trend line (figure 45). This regression required an indepth data analysis. If the most recent data from the last five or six test dates were used without the early data, the resultant regression line would indicate a serious aging propellant change.

The 1000 psi regression has a statistically significant negative slope (figure 45).

The combined motor regressions are shown in figures 45A and 46A.

The combined motor regressions are shown in figures 11A thru 15A.

4. High Rate Triaxial Tensile at 600 psi (1000 in/in/min):

Strain at maximum stress, maximum stress, strain at rupture, and stress at rupture regressions show a statistically significant increase (figures 16, 17, 18 and 19). The modulus regression (figure 20) shows a statistically significant decrease.

The combined regressions are shown in figures 16A thru 20A.

5. Case Bond Tensile:

The regression trend line shows a statistically significant decrease (figure 21).

The regression for the combined motors is shown in figure 21A.

B. CREEP:

For the 10 pound load test, the 10 and 1000 second regressions do not show a significant trend line (figures 22 and 24). The 20 and 10,000 second regressions show a statistically significant decrease (figures 23 and 25).

The respective combined motor regressions are show in figures 22A thru 25A.

The 12 pound load regression at 10, 20 and 1000 seconds show a statistically significant decreasing trend line (figures 26 thru 28). The regression trend line for % strain at rupture has a non-significant slope direction (figure 29).

The combined motor regressions are shown in figures 26A thru 29A.

C. STRESS RELAXATION:

The stress relaxation modulus regressions for the 3% and 5% strain show a statistically significant positive trend at 10, 50, 100 and 1000 seconds (figures 30 thru 37).

The combined motor regressions are shown in figures 30A thru 37A.

TEST RESULTS

Regression analysis is the method of evaluation used in the analysis of STM-012 test results. The regressions are presented in this report. In addition, regressions for the three dissected motors combined are presented in this report for visual comparison only to motor STM-012.

A. TENSILE:

1. Low Rate Tensile (2.0 in/min):

The strain at maximum stress, maximum stress and modulus show a non-significant trend (figures 1, 2 and 5). Strain at rupture shows a statistically significant decrease (figure 3). A statistically significant increasing trend line is shown for stress at rupture (figure 4).

The respective combined motor regressions are shown in figures 1A thru 5A.

2. Low Rate Tensile (20 in/min):

The strain at maximum stress, strain at rupture and modulus regressions are not significant (figures 6, 8 and 10). Maximum stress and stress at rupture show a statistically significant increase (figures 7 and 9).

The combined motor regressions are shown in figures 6A thru 10A.

3. High Rate Tensile (1000 in/in/min):

Strain at maximum stress, stress at rupture and modulus regressions are not significant (figures 11, 14 and 15). The maximum stress and strain at rupture regressions show a statistically significant decreasing slope (figures 12 and 13). This regression required an indepth data analysis. If the most recent data from the last five or six test dates were used without the early data, the resultant regression trend line would indicate a serious aging propellant change.

TABLE 1

TEST PROGRAM

Test	Conditions	Config-uration	Nr Specimen	Total Specimens
Tensile, Low Rate	77°, 2 & 20 in/min	JANNAF Dogbone	5	40
Creep	77°, 10 & 12 lb Load	JANNAF Dogbone	3	24
Stress Relaxation	77°, 3 & 5% Strain	1/2"x1/2"x4"	3	24
Hardness	77°, Init & 10 sec	Dogbone Ends	5	40
HOE	77°	1/2"x3/8"x1"	5	40
DTA	77° Start	0.040" Wafers	3	12
Sol Gel	77°	1/2"x1/2"x1/2"	6	24
High Rate Tensile	77°, 1000 in/in/min	3/4" GL Dogbones	5	15
Triaxial High Rate	77°, 1000 in/in/min	3/4" GL Rail	3	9
Dynamic Response	77°, 70 gm ct. wt.	3.3"x.33"x690" Disc	3	9
Biaxial Constant Strain	77°	3/4" GL Rail	3	9
Tear Energy	77°F ± 2°	0.1"x1.18"x3"	8	16
Poisson's Ratio (Strain Dilatation) 10, 15, 20, 25, 30%	77°F ± 2°	0.50"x0.50"x4"	6	30

three motors (0012099, 0012199, and STM 012) were statistically combined. The combined data has been analyzed using a multi-symbol regression program that displays unique plot codes for each motor. This method of data plotting allows a visual display of the overall relationship between motors and their relationship with the combined least squared aging trend line. The combined motor composite regressions indicate that data masking of individual motor trends may be inprocess and a closer investigation is required.

Each dissected motor will be individually analyzed using linear regressions. The individual motor regressions were then analyzed for compatibility using the Analysis of Covariance. At this time, using the 5% significance level, these three motors are not statistically combinable.

As previously recommended, each motor will be individually plotted and analyzed to eliminate errors and provide more accurate regressions.

This report contains data and analysis for motor S/N STM-012. The analysis will be based on this motor only. The regression summaries can be found in table 2. The three motor combined composite regression plots, which also included motor S/N STM-012, has also been included to allow a visual display of the overall relationship between motors (results can also be found in table 2). The combined motor regressions should not be used for any purpose other than visual display only. The symbols used for each of the three motors in combined regressions are as follows:

0012099 = 0

0012199 = 1

STM-012 = S

Data variation within mean values are largely due to the inconsistency of the sample size numbers.

STATISTICAL ANALYSIS

The objective of this statistical analysis is to determine the effect aging has on Stage I propellant from motor S/N STM-012. This analysis will assist Service Engineering in predicting Stage I serviceability.

The method used to accomplish this analysis was regression analysis. The linear equation $Y = a + bX$ was found to be the best fit model for this data. The unique mathematical regression equations are on the top of each plot. Each point on a regression plot represents a data mean value at its particular age at test. The sample sizes for the mean values may vary in the number of specimens tested at each test period. The sample size at a particular test period can be found in the Sample Size Summaries. All regressions are calculated on individual data values.

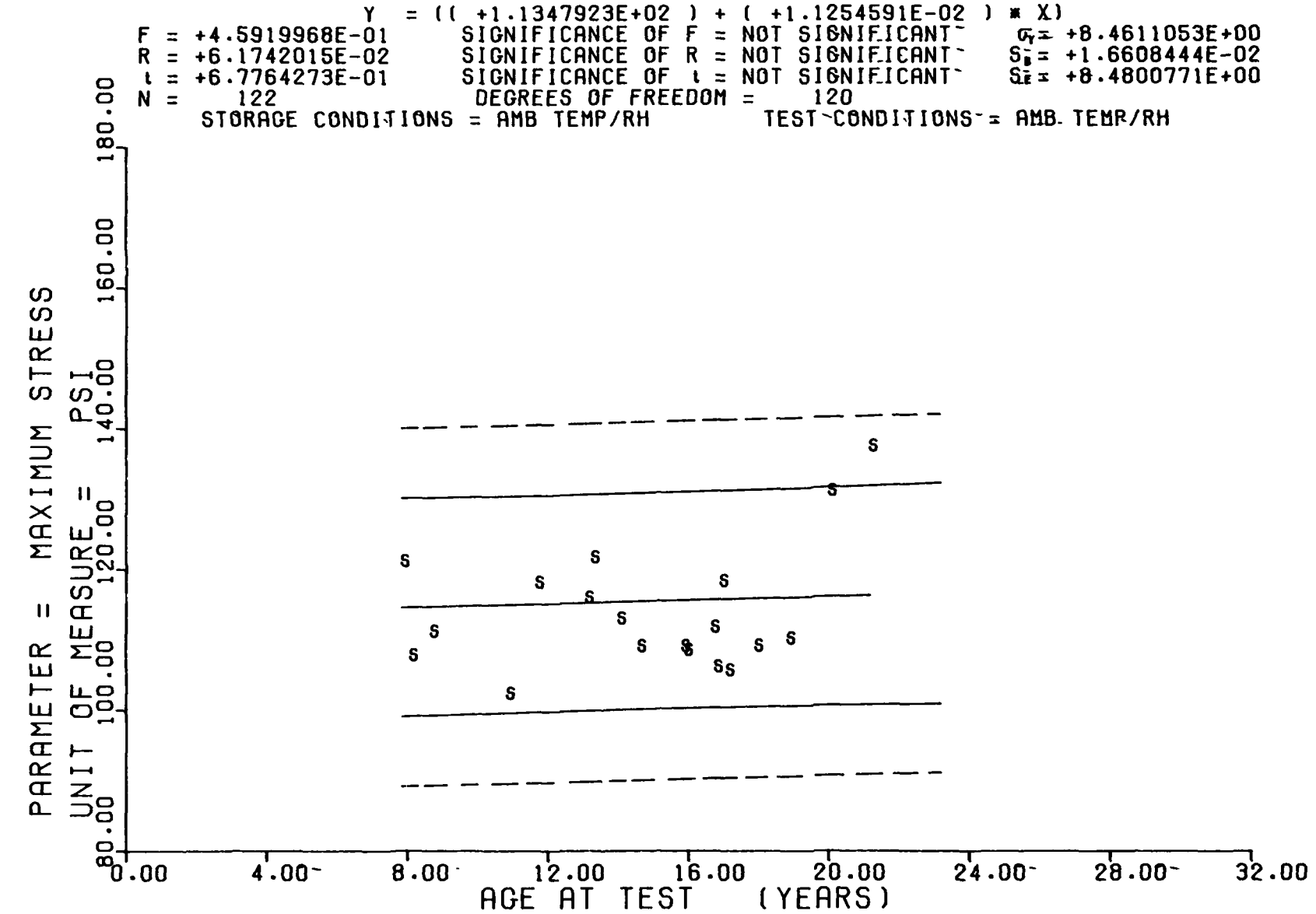
The variance about each regression trend line was used to compute a tolerance interval such that at 90% confidence 90% of the sample distribution will fall within this interval. This tolerance interval is extrapolated 24 months beyond the age of the last test date.

The 't' value and the significance of this statistic will be given as an indication of the "statistical significance" of the slope of the trend lines as it is compared to a line of zero slope. When a regression slope is labeled as significant, it should be noted that the slope of the trend line is significant from a statistical standpoint and a change over time is occurring. A significant indication does not necessarily mean that the change in test values obtained during testing is significant in regards to motor fleet operational performance.

In 1961, a program was undertaken to determine the rate of degradation for the propellant used in Stage I Minuteman Motors (TP-H1011). With the use of TP-H1011 propellant, obtained from dissected Stage I motors, a normal distribution population was assumed for each motor and the data from

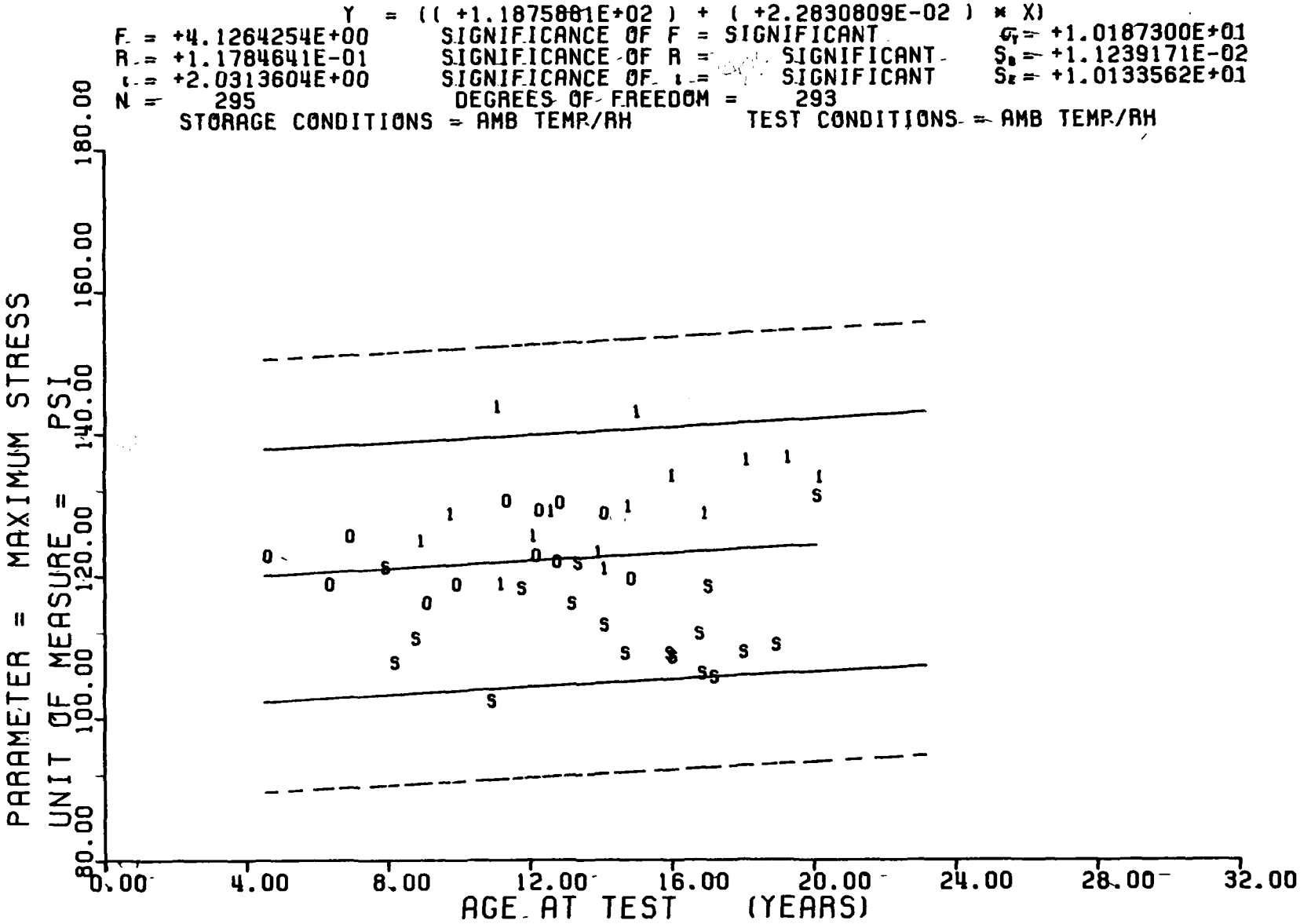
Until 1982, due to a limited number of dissected motor samples, data from all motors were combined for statistical analyses. In 1982, key LRS LA parameters were reported for individual motors (MANPA Report Nr. 470(82).

In 1985, the first individual motor S/N 0012199 was analyzed independently from the other dissected motors. The results were presented in MANPA Report Nr. 503(85).



STAGE 1,DISSECTED MOTOR=STM-012,LOW RATE CHS=2.0 IN/MIN,MAXIMUM STRESS.

Figure 2



STAGE 1 DISSECTED MOTORS, LOW RATE CHS=2.0 IN/MIN, MAXIMUM STRESS

Figure 2A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
94.0	16	+1.2037864E+02	+1.6523139E+00	+1.2301998E+02	+1.1846998E+02	+1.1453715E+02
97.0	2	+1.0700000E+02	+0.0000000E+07	+1.0700000E+02	+1.0700000E+02	+1.1457092E+02
104.0	5	+1.1039999E+02	+3.9115214E+00	+1.1700000E+02	+1.0800000E+02	+1.1464970E+02
130.0	5	+1.0159999E+02	+2.0736441E+00	+1.0500000E+02	+1.0000000E+02	+1.1494232E+02
140.0	5	+1.1739999E+02	+1.6733200E+00	+1.2000000E+02	+1.1600000E+02	+1.1505487E+02
157.0	3	+1.1524990E+02	+8.3549929E-01	+1.1604998E+02	+1.1440998E+02	+1.1524620E+02
159.0	24	+1.2095825E+02	+1.5888095E+00	+1.2339999E+02	+1.1819999E+02	+1.1526870E+02
168.0	5	+1.1227191E+02	+3.2977788E+00	+1.1529998E+02	+1.0741999E+02	+1.1536999E+02
175.0	8	+1.0831991E+02	+3.8427441E+00	+1.1215998E+02	+1.0195999E+02	+1.1544877E+02
190.0	3	+1.0832331E+02	+5.1118762E+00	+1.1357998E+02	+1.0336999E+02	+1.1561759E+02
191.0	5	+1.0779394E+02	+1.6248957E+00	+1.1026998E+02	+1.0618998E+02	+1.1562884E+02
200.0	3	+1.1106665E+02	+5.2820752E+00	+1.1425999E+02	+1.0496998E+02	+1.1573014E+02
201.0	3	+1.0542993E+02	+4.2769519E+00	+1.1002999E+02	+1.0157998E+02	+1.1574139E+02
203.0	5	+1.1762792E+02	+2.2933756E+00	+1.2000000E+02	+1.1526998E+02	+1.1576390E+02
205.0	3	+1.0492324E+02	+2.4227728E+00	+1.0770999E+02	+1.0336999E+02	+1.1578642E+02
215.0	8	+1.0842489E+02	+3.5649083E+00	+1.1487998E+02	+1.0353999E+02	+1.1589895E+02
226.0	8	+1.0946118E+02	+2.1997633E+00	+1.1289999E+02	+1.0676998E+02	+1.1602276E+02
240.0	8	+1.3043362E+02	+4.7714894E+00	+1.3918998E+02	+1.2353999E+02	+1.1618032E+02
254.0	3	+1.3679663E+02	+3.7727464E+00	+1.3919999E+02	+1.3244999E+02	+1.1633789E+02

STAGE I,DISSECTED MOTOR=STM-012,LOW RATE CHS=2.0 IN/MIN,MAXIMUM STRESS.

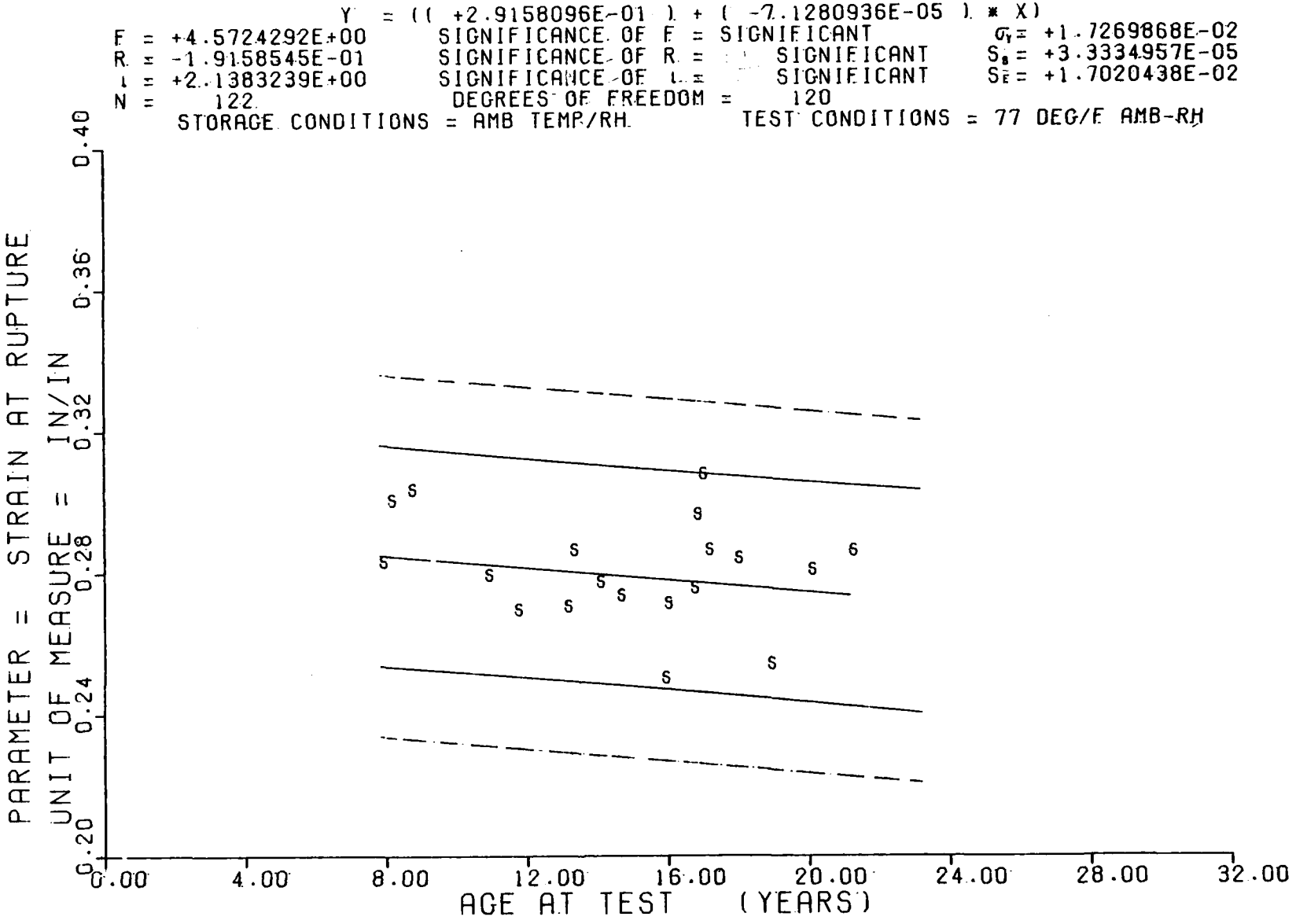

Y = ((+2.9158096E-01) + (-7.1280936E-05) * X)
F = +4.5724292E+00 SIGNIFICANCE OF F = SIGNIFICANT σ = +1.7269868E-02
R = -1.9158545E-01 SIGNIFICANCE OF R = SIGNIFICANT S = +3.3334957E-05
I = +2.1383239E+00 SIGNIFICANCE OF I = SIGNIFICANT S = +1.7020438E-02
N = 122 DEGREES OF FREEDOM = 120
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 77 DEG/F AMB-RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.40
0.36
0.32
0.28
0.24
0.20
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISSECTED MOTOR=STM-012,LOW RATE CHS=2.0 IN/MIN,STRAIN AT RUPTURE

Figure 3

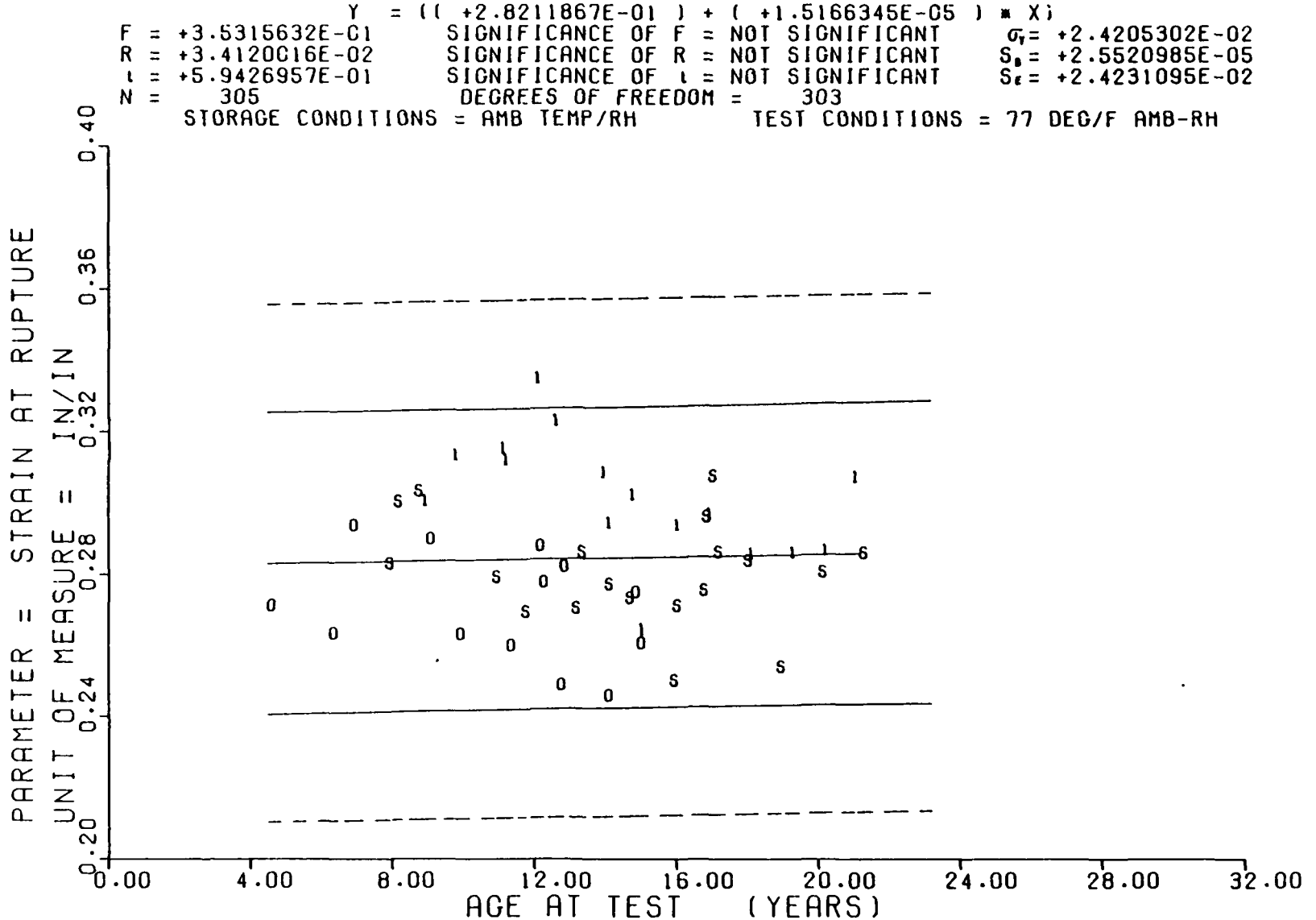

Y = ((+2.8211867E-01) + (+1.5166345E-05) * X)
F = +3.5315632E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σY = +2.4205302E-02
R = +3.4120016E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +2.5520985E-05
t = +5.9426957E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Se = +2.4231095E-02
N = 305 DEGREES OF FREEDOM = 303
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 77 DEG/F AMB-RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.40
0.36
0.32
0.28
0.24
0.20
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISSECTED MOTORS,LOW RATE CHS=2.0 IN/MIN,STRAIN AT RUPTURE

Figure 3A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (HOURS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
[illegible]	16	+2.8151828E-01	+1.1740377E-02	+3.0009996E-01	+2.5069999E-01	+2.8488051E-01
[illegible]	2	+2.9899996E-01	+3.9597414E-02	+3.2699996E-01	+2.7099996E-01	+2.8466665E-01
104.0	5	+3.0199980E-01	+1.6780696E-02	+3.1399995E-01	+2.7299994E-01	+2.8416770E-01
120.0	5	+2.7779978E-01	+3.5806959E-03	+2.8399997E-01	+2.7499997E-01	+2.8231441E-01
149.0	5	+2.8799964E-01	+8.6428625E-03	+2.7599996E-01	+2.5399994E-01	+2.8160160E-01
157.0	3	+2.6903325E-01	+7.2957681E-03	+2.7469998E-01	+2.6079994E-01	+2.8038984E-01
159.0	24	+2.8487449E-01	+9.6126739E-03	+3.0099999E-01	+2.6699995E-01	+2.8024727E-01
163.0	5	+2.7587985E-01	+8.8430847E-03	+2.8749996E-01	+2.6579999E-01	+2.7960574E-01
175.0	3	+2.7203726E-01	+1.1928799E-02	+2.9099994E-01	+2.5069999E-01	+2.7910679E-01
190.0	3	+2.4873328E-01	+3.9362799E-02	+2.7259999E-01	+2.0329999E-01	+2.7803754E-01
191.0	5	+2.6981979E-01	+1.1147492E-02	+2.8209996E-01	+2.5219994E-01	+2.7796626E-01
200.0	3	+2.7413326E-01	+1.7961785E-02	+2.9289996E-01	+2.5709998E-01	+2.7732473E-01
201.0	5	+2.9496657E-01	+1.0891752E-02	+3.0749994E-01	+2.8779995E-01	+2.7725344E-01
208.0	5	+3.0627971E-01	+9.7521312E-03	+3.1779998E-01	+2.9439997E-01	+2.7711093E-01
209.0	3	+2.8489995E-01	+1.0771493E-02	+2.9309999E-01	+2.7269995E-01	+2.7696835E-01
215.0	3	+2.8252470E-01	+1.3199057E-02	+3.0219995E-01	+2.6569998E-01	+2.7625554E-01
236.0	8	+2.5268721E-01	+1.0843379E-02	+2.7399998E-01	+2.3799997E-01	+2.7547144E-01
240.0	8	+2.7932476E-01	+1.2214534E-02	+2.9549998E-01	+2.6349997E-01	+2.7447348E-01
264.0	3	+2.3463327E-01	+2.5688809E-03	+2.3699994E-01	+2.8189998E-01	+2.7347558E-01

STAGE 1 DISSECTED MOTOR=STM-012,LOW RATE CHS=2.0 IN/MIN,STRAIN AT RUPTURE

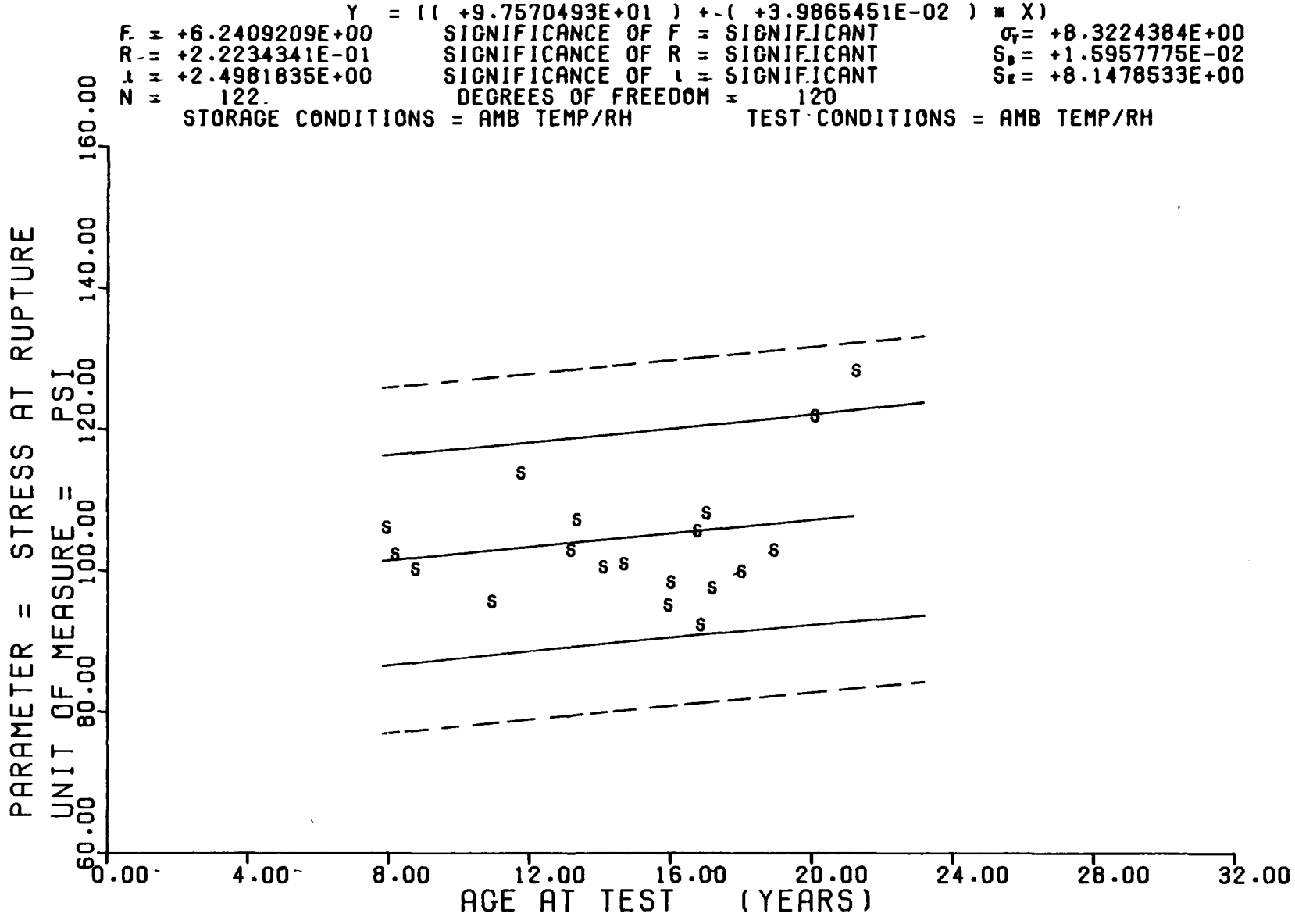

Y = ((+9.7570493E+01) +-(+3.9865451E-02) * X)
F = +6.2409209E+00 SIGNIFICANCE OF F = SIGNIFICANT σY = +8.3224384E+00
R = +2.2234341E-01 SIGNIFICANCE OF R = SIGNIFICANT Sβ = +1.5957775E-02
t = +2.4981835E+00 SIGNIFICANCE OF t = SIGNIFICANT Sε = +8.1478533E+00
N = 122. DEGREES OF FREEDOM = 120
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRESS AT RUPTURE
UNIT OF MEASURE = PSI
160.00
140.00
120.00
100.00
80.00
60.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1.DISSECTED MOTOR=STM-012.LOW RATE CHS=2.0 IN/MIN.STRESS AT RUPTURE.

Figure 4

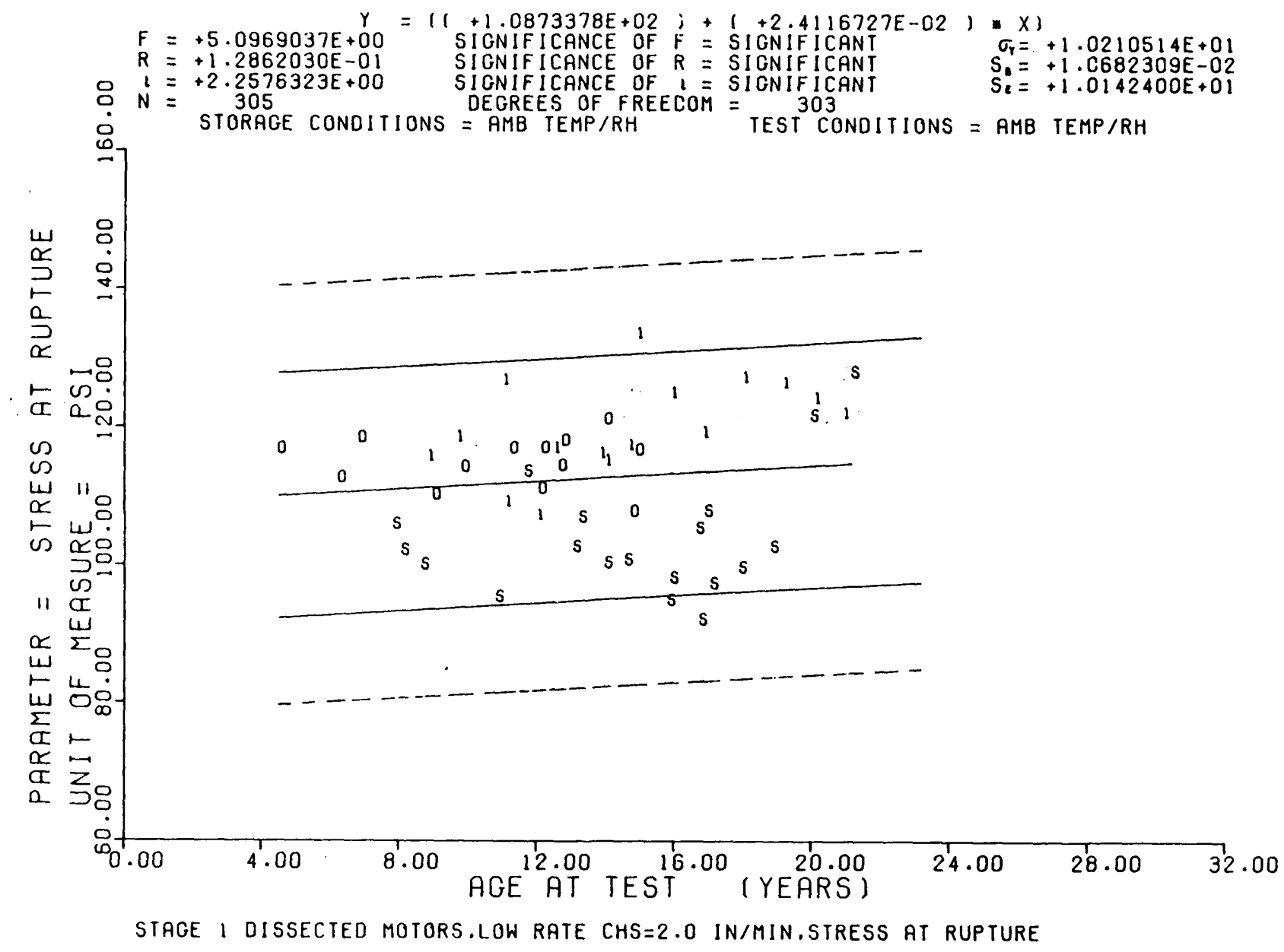

Y = ((+1.0873378E+02) + (+2.4116727E-02) * X)
F = +5.0969037E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = +1.2862030E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +2.2576323E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 305 DEGREES OF FREEDOM = 303
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRESS AT RUPTURE
UNIT OF MEASURE = PSI
160.00
140.00
120.00
100.00
80.00
60.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISSECTED MOTORS.LOW RATE CHS=2.0 IN/MIN.STRESS AT RUPTURE

Figure 4A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
94.0	16	+1.0529550E+02	+3.8522038E+00	+1.1226998E+02	+9.9119995E+01	+1.0131784E+02
97.0	2	+1.0150000E+02	+2.1213203E+00	+1.0300000E+02	+1.0000000E+02	+1.0143743E+02
104.0	5	+9.9399993E+01	+4.9295030E+00	+1.0800000E+02	+9.6000000E+01	+1.0171649E+02
130.0	5	+9.4799987E+01	+1.7883543E+00	+9.6000000E+01	+9.2000000E+01	+1.0275299E+02
140.0	5	+1.1300000E+02	+3.7416573E+00	+1.1900000E+02	+1.1000000E+02	+1.0315164E+02
157.0	3	+1.0203994E+02	+7.0228950E-01	+1.0263999E+02	+1.0127999E+02	+1.0382936E+02
159.0	24	+1.0635824E+02	+3.3689112E+00	+1.1100000E+02	+9.7799987E+01	+1.0390908E+02
168.0	5	+9.9683929E+01	+5.0906463E+00	+1.0480999E+02	+9.1869995E+01	+1.0426788E+02
175.0	8	+1.0012615E+02	+5.1843473E+00	+1.0697999E+02	+9.2799987E+01	+1.0454693E+02
190.0	3	+9.4266601E+01	+3.2561280E+00	+9.7859985E+01	+9.1519989E+01	+1.0514492E+02
191.0	5	+9.7513854E+01	+1.7972156E+00	+1.0055999E+02	+9.6049987E+01	+1.0518478E+02
200.0	3	+1.0477326E+02	+9.0221917E+00	+1.1068998E+02	+9.4389999E+01	+1.0554357E+02
201.0	3	+9.1473297E+01	+8.3279875E+00	+1.0061999E+02	+8.4329986E+01	+1.0558343E+02
203.0	5	+1.0728938E+02	+2.4280780E+00	+1.1039999E+02	+1.0413999E+02	+1.0566317E+02
205.0	3	+9.6719970E+01	+2.6907325E+00	+9.9819992E+01	+9.5009994E+01	+1.0574290E+02
215.0	8	+9.9062408E+01	+3.1393552E+00	+1.0478099E+02	+9.4859985E+01	+1.0614155E+02
226.0	8	+1.0205865E+02	+1.5894908E+00	+1.0400000E+02	+1.0007998E+02	+1.0658007E+02
240.0	8	+1.2106240E+02	+6.2438093E+00	+1.3026998E+02	+1.1009999E+02	+1.0713819E+02
254.0	3	+1.2742324E+02	+1.0312874E+00	+1.2819999E+02	+1.2626998E+02	+1.0769630E+02

STAGE 1,DISSECTED MOTOR=STM-012,LOW RATE CHS=2.0 IN/MIN,STRESS AT RUPTURE.

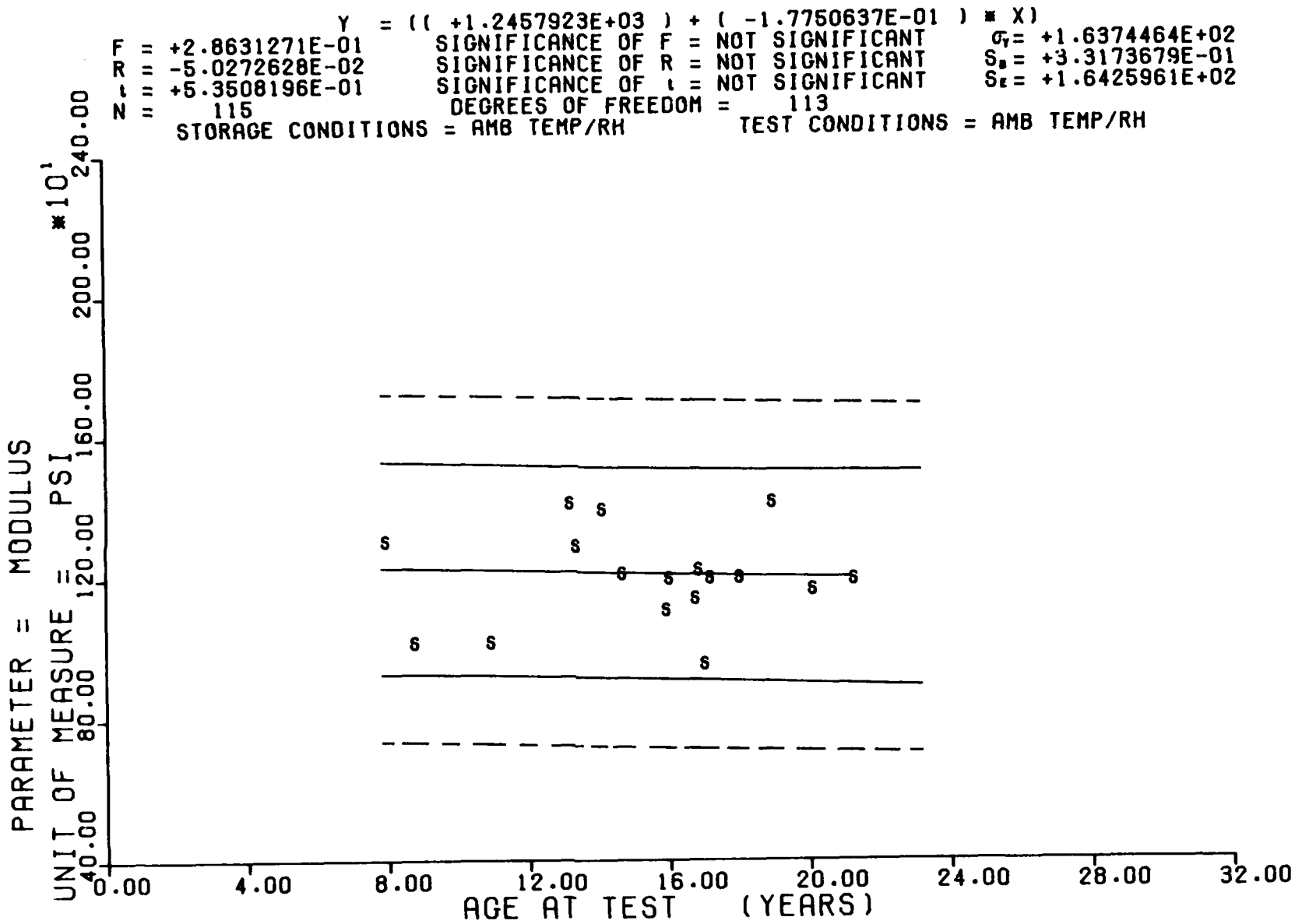

Y = ((+1.2457923E+03) + (-1.7750637E-01) * X)
F = +2.8631271E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σT= +1.6374464E+02
R = -5.0272628E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT Sa= +3.3173679E-01
t = +5.3508196E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Se= +1.6425961E+02
N = 115 DEGREES OF FREEDOM = 113
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI *10¹
240.00
200.00
160.00
120.00
80.00
40.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISSECTED MOTOR=STM-012,LOW RATE CHS=2.0 IN/MIN,MODULUS.

Figure 5

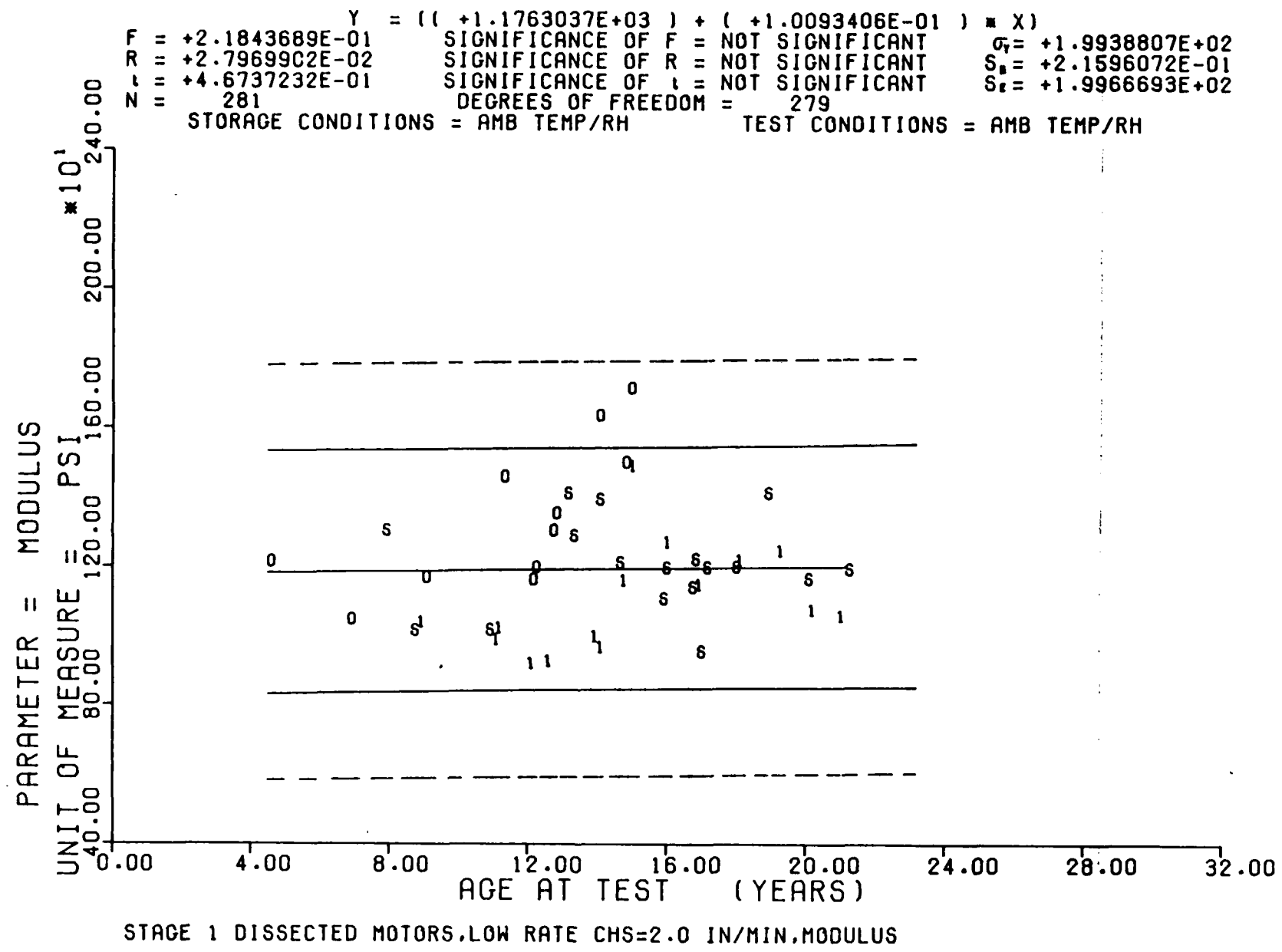

Y = ((+1.1763037E+03) + (+1.0093406E-01) * X)
F = +2.1843689E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σY= +1.9938807E+02
R = +2.7969902E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb= +2.1596072E-01
t = +4.6737232E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Se= +1.9966693E+02
N = 281 DEGREES OF FREEDOM = 279
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI *10¹
240.00
200.00
160.00
120.00
80.00
40.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISSECTED MOTORS,LOW RATE CHS=2.0 IN/MIN,MODULUS

Figure 5A

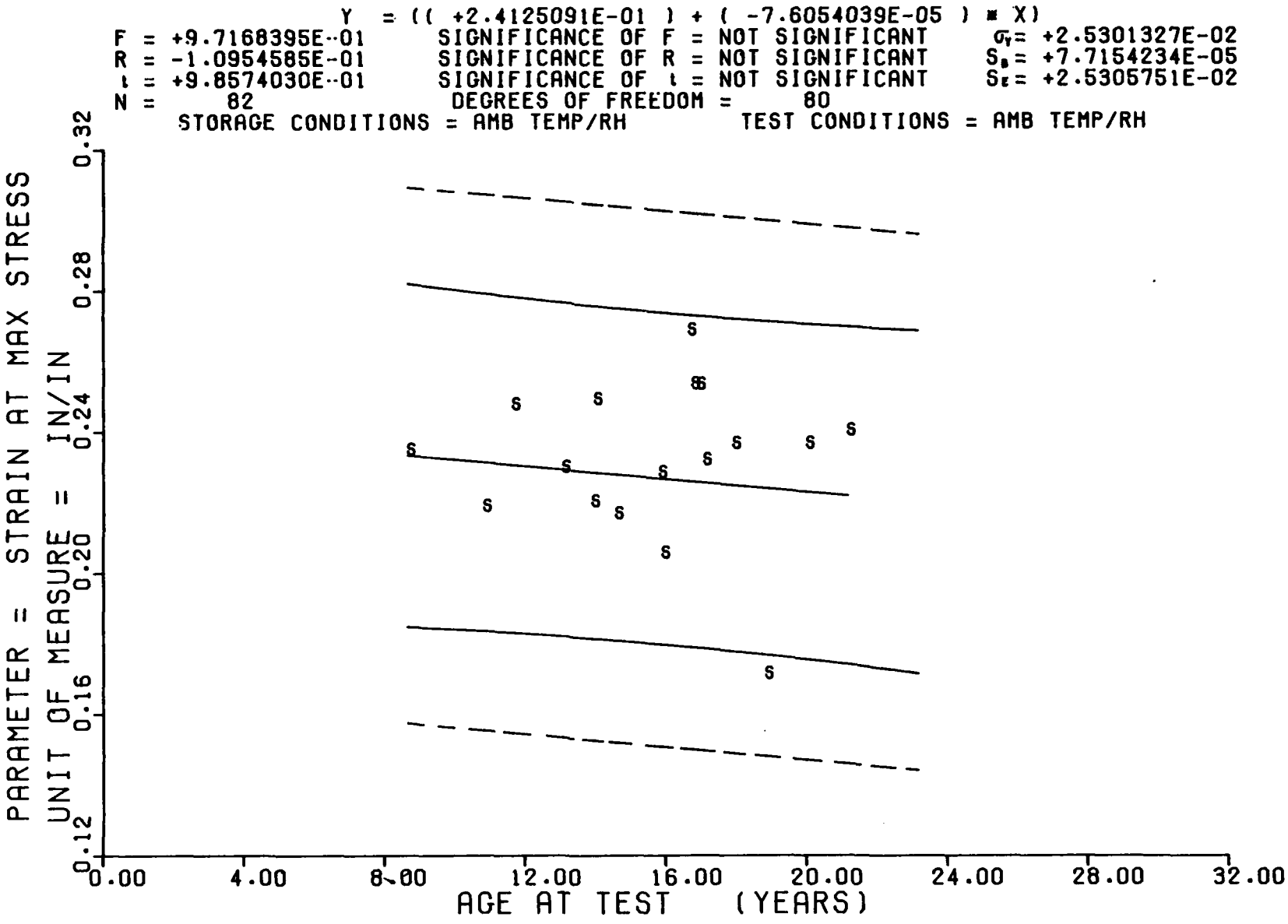

Y = ((+2.4125091E-01) + (-7.6054039E-05) * X)
F = +9.7168395E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σy= +2.5301327E-02
R = -1.0954585E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb= +7.7154234E-05
t = +9.8574030E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Se= +2.5305751E-02
N = 82 DEGREES OF FREEDOM = 80
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT MAX STRESS
UNIT OF MEASURE = IN/IN
0.32
0.28
0.24
0.20
0.16
0.12
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISSECTED MOTOR=STM-012,LOW RATE CHS=20.0 IN/MIN,STRAIN MAX STRESS

Figure 6

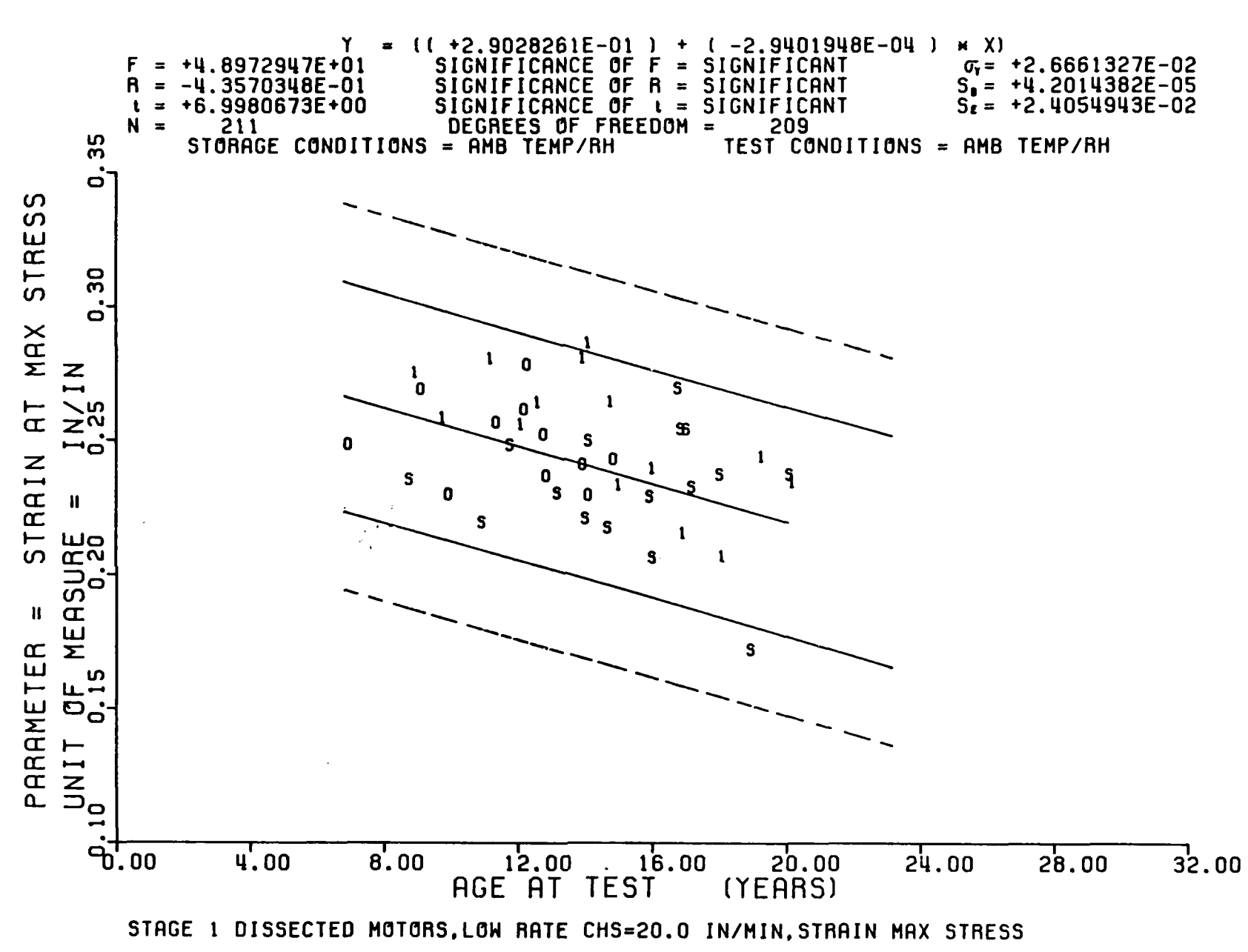

Y = ((+2.9028261E-01) + (-2.9401948E-04) * X)
F = +4.8972947E+01 SIGNIFICANCE OF F = SIGNIFICANT σ_Y = +2.6661327E-02
R = -4.3570348E-01 SIGNIFICANCE OF R = SIGNIFICANT S_B = +4.2014382E-05
t = +6.9980673E+00 SIGNIFICANCE OF t = SIGNIFICANT S_E = +2.4054943E-02
N = 211 DEGREES OF FREEDOM = 209
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT MAX STRESS
UNIT OF MEASURE = IN/IN
0.35
0.30
0.25
0.20
0.15
0.10
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISSECTED MOTORS,LOW RATE CHS=20.0 IN/MIN,STRAIN MAX STRESS

Figure 6A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
104.0	2	+2.3349994E-01	+9.1910938E-03	+2.3999994E-01	+2.2699999E-01	+2.3334127E-01
130.0	5	+2.1759986E-01	+1.3447714E-02	+2.3199999E-01	+1.9999998E-01	+2.3136383E-01
143.0	5	+2.4039987E-01	+1.0735631E-02	+2.5999999E-01	+2.3499995E-01	+2.3060333E-01
157.0	7	+2.2857117E-01	+9.4219184E-03	+2.4029999E-01	+2.1199995E-01	+2.2931039E-01
167.0	2	+2.1899998E-01	+5.6530715E-03	+2.2299998E-01	+2.1499997E-01	+2.2854983E-01
198.0	3	+2.4793326E-01	+5.1617781E-03	+2.5139999E-01	+2.4199998E-01	+2.2847378E-01
175.0	8	+2.1554970E-01	+9.2319653E-03	+2.2959995E-01	+2.0669996E-01	+2.2794145E-01
196.0	3	+2.2719997E-01	+3.8940080E-03	+2.3049998E-01	+2.2289997E-01	+2.2680062E-01
191.0	5	+2.0443987E-01	+6.2886454E-03	+2.1069997E-01	+1.9589996E-01	+2.2672456E-01
200.0	3	+2.6756662E-01	+7.5076987E-03	+2.7209997E-01	+2.5889998E-01	+2.2604006E-01
201.0	3	+2.5229996E-01	+1.1819096E-02	+2.6549994E-01	+2.4269998E-01	+2.2596400E-01
203.0	5	+2.5217968E-01	+6.9295123E-03	+2.6019996E-01	+2.4379998E-01	+2.2581189E-01
205.0	3	+2.3073327E-01	+9.6406698E-03	+2.3629999E-01	+2.1959996E-01	+2.2565978E-01
215.0	9	+2.3541074E-01	+3.7669140E-03	+2.4109995E-01	+2.3059999E-01	+2.2489929E-01
226.0	8	+1.7021226E-01	+7.7522854E-03	+1.8349999E-01	+1.6299998E-01	+2.2406268E-01
240.0	8	+2.3538720E-01	+2.0244540E-02	+2.5039994E-01	+2.0259994E-01	+2.2299790E-01
264.0	3	+2.3899996E-01	+5.1943791E-03	+2.4199998E-01	+2.3299998E-01	+2.2193318E-01

STAGE 1 DISSECTED MOTOR=STM-012,LOW RATE CHS=20.0 IN/MIN,STRAIN MAX STRESS

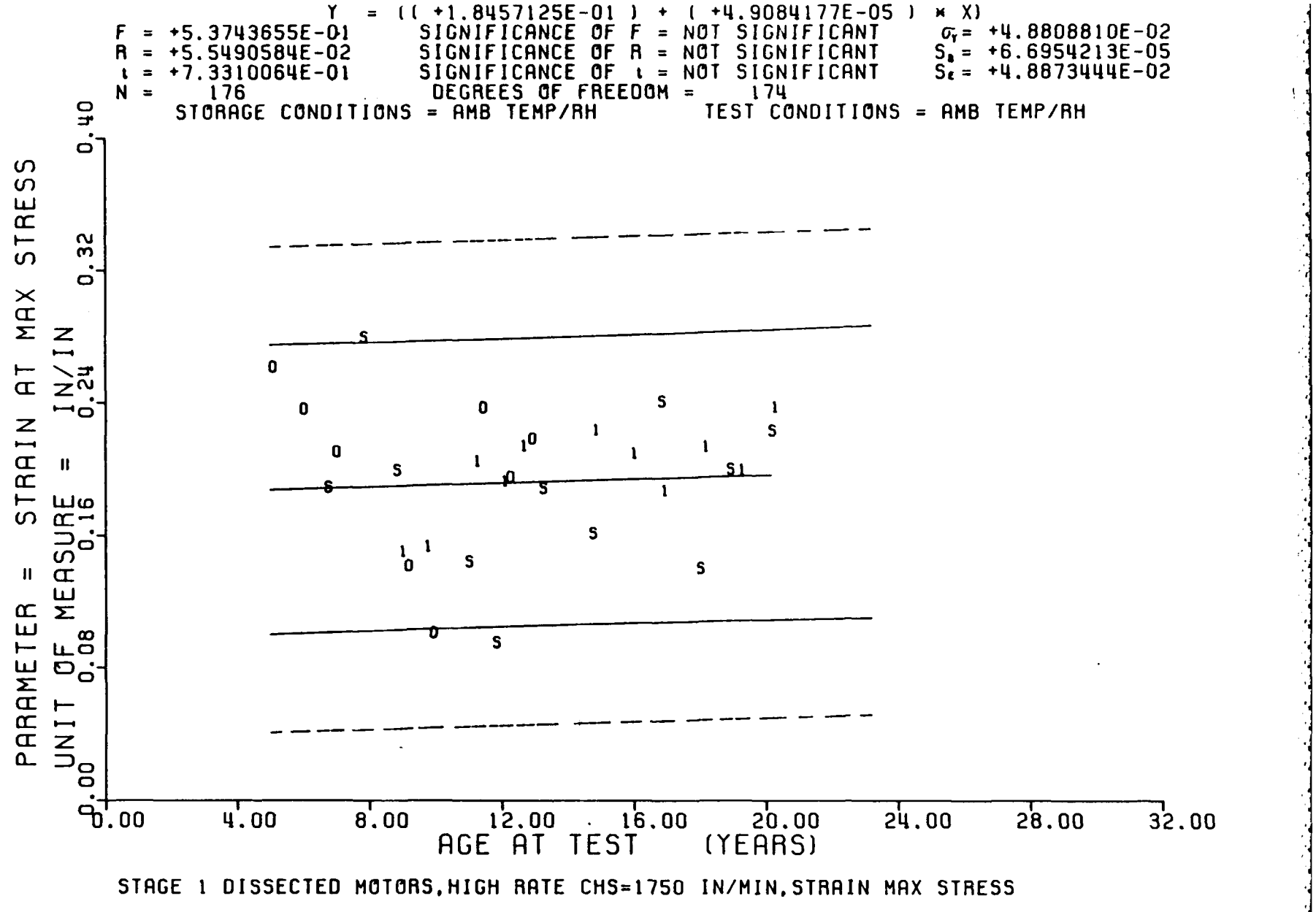

Y = ((+1.8457125E-01) + (+4.9084177E-05) * X)
F = +5.3743655E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σY = +4.8808810E-02
R = +5.5490584E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +6.6954213E-05
t = +7.3310064E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Sε = +4.8873444E-02
N = 176 DEGREES OF FREEDOM = 174
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT MAX STRESS
UNIT OF MEASURE = IN/IN
0.00
0.08
0.16
0.24
0.32
0.40
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISSECTED MOTORS,HIGH RATE CHS=1750 IN/MIN,STRAIN MAX STRESS

Figure 11A

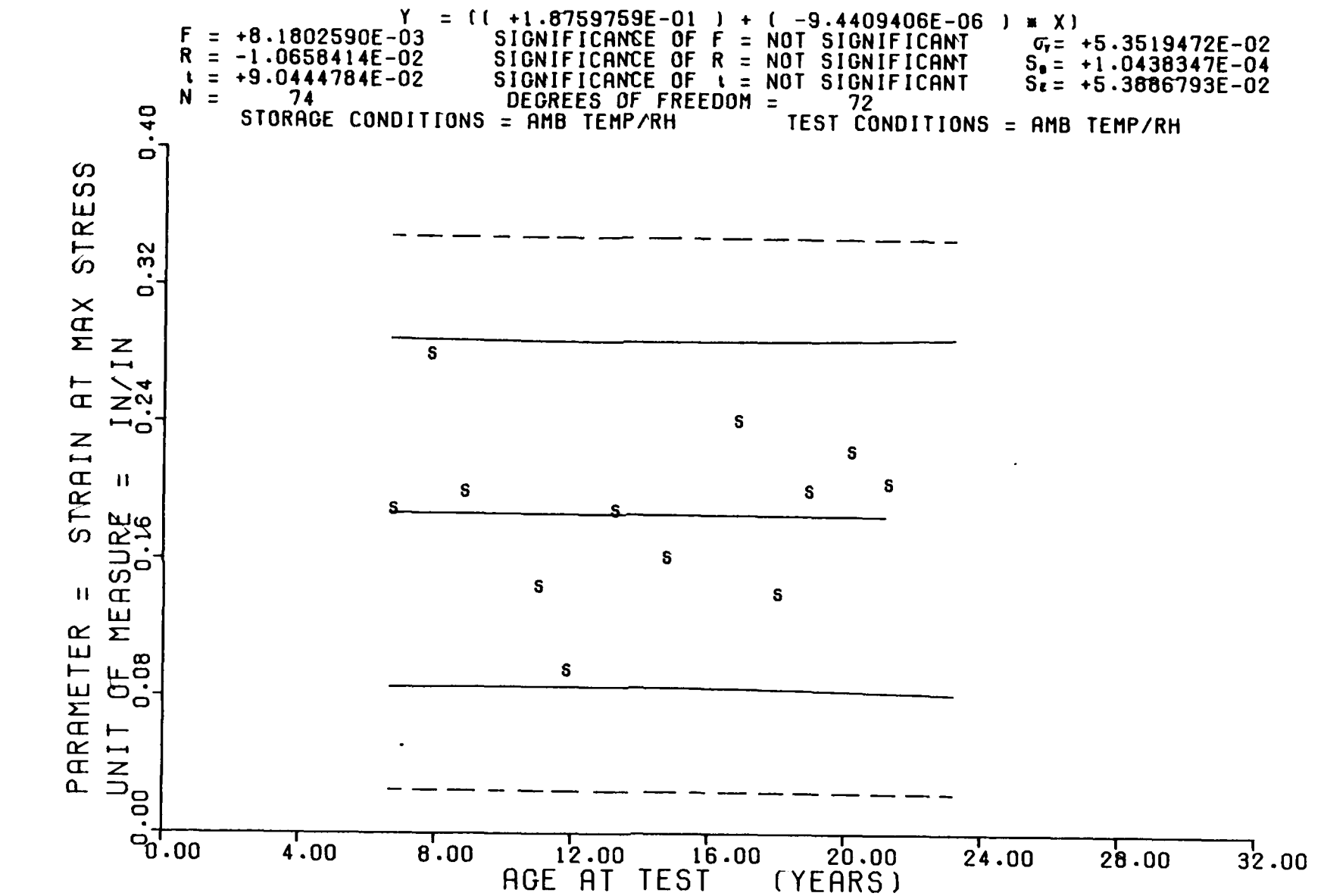

Y = ((+1.8759759E-01) + (-9.4409406E-06) * X)
F = +8.1802590E-03 SIGNIFICANCE OF F = NOT SIGNIFICANT σy= +5.3519472E-02
R = -1.0658414E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb= +1.0438347E-04
t = +9.0444784E-02 SIGNIFICANCE OF t = NOT SIGNIFICANT Se= +5.3886793E-02
N = 74 DEGREES OF FREEDOM = 72
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT MAX STRESS
UNIT OF MEASURE = IN/IN
0.00
0.08
0.16
0.24
0.32
0.40
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1.DISSECTED MOTOR=STM-012.HIGH RATE CHS=1750 IN/MIN.STRAIN MAX STRESS.

Figure 11

****** LINEAR REGRESSION ANALYSIS ******

***** ANALYSIS OF TIME SERIES *****

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
164.0	2	+1.8365000E+03	+2.4112341E+02	+2.0070000E+03	+1.6660000E+03	+1.6188684E+03
167.0	7	+2.1624284E+03	+1.5967817E+02	+2.3520000E+03	+1.9050000E+03	+1.8055729E+03
167.5	2	+1.7250000E+03	+1.3031475E+02	+1.8180000E+03	+1.6330000E+03	+1.8408002E+03
168.0	3	+1.5426665E+03	+9.9082457E+01	+1.6280000E+03	+1.4340000E+03	+1.8443229E+03
178.5	8	+1.7797500E+03	+3.8470461E+02	+2.1540000E+03	+1.2930000E+03	+1.8689821E+03
190.0	3	+1.2543332E+03	+1.3868429E+01	+1.2660000E+03	+1.2390000E+03	+1.9218229E+03
191.0	5	+2.0781999E+03	+7.5894334E+01	+2.1910000E+03	+1.9830000E+03	+1.9253457E+03
200.0	3	+1.2980000E+03	+6.7734776E+01	+1.3760000E+03	+1.2540000E+03	+1.9570502E+03
201.0	3	+1.3230000E+03	+1.1999999E+01	+1.3350000E+03	+1.3110000E+03	+1.9605729E+03
203.0	5	+1.6515998E+03	+1.1021932E+02	+1.8180000E+03	+1.5210000E+03	+1.9676186E+03
205.0	3	+1.8700000E+03	+9.2190021E+01	+1.9680000E+03	+1.7850000E+03	+1.9746640E+03
215.0	9	+2.2850000E+03	+7.3022042E+02	+2.9670000E+03	+1.1740000E+03	+2.0098913E+03
226.0	8	+2.9341250E+03	+2.8430262E+02	+3.3020000E+03	+2.5170000E+03	+2.0486413E+03
240.0	8	+1.5256250E+03	+7.6107888E+01	+1.5860000E+03	+1.3550000E+03	+2.0979594E+03
254.0	5	+2.4663532E+03	+6.7881060E+02	+3.2100000E+03	+1.8800000E+03	+2.1472778E+03

STAGE 1,DISSECTED MOTOR=STM-012,LOW RATE CHS=20.0 IN/MIN,MODULUS.

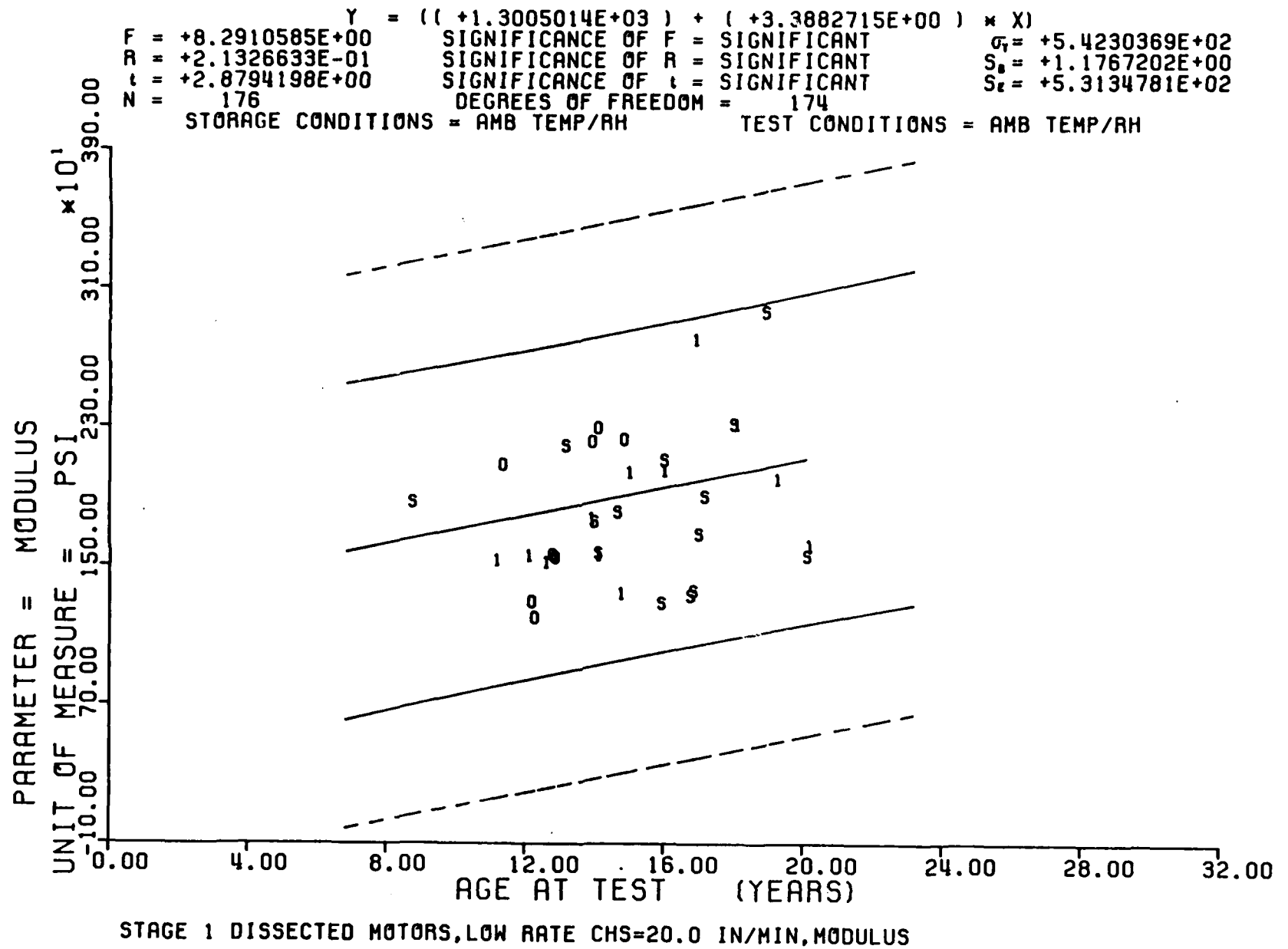

Y = ((+1.3005014E+03) + (+3.3882715E+00) * X)
F = +8.2910585E+00 SIGNIFICANCE OF F = SIGNIFICANT σT = +5.4230369E+02
R = +2.1326633E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +1.1767202E+00
t = +2.8794198E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +5.3134781E+02
N = 176 DEGREES OF FREEDOM = 174
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI *10¹
390.00
310.00
230.00
150.00
70.00
-10.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISSECTED MOTORS,LOW RATE CHS=20.0 IN/MIN,MODULUS

Figure 10A

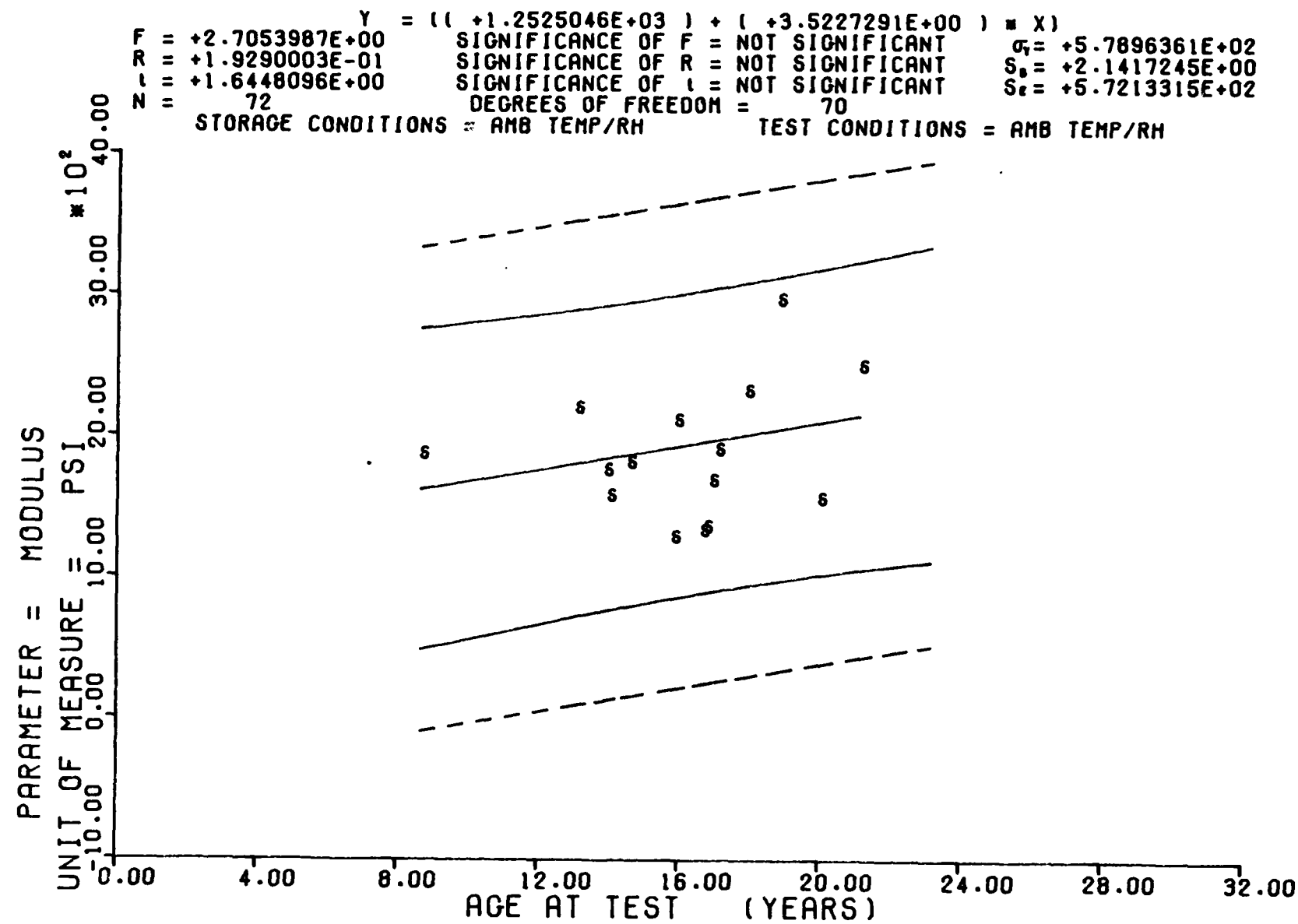

Y = ((+1.2525046E+03) + (+3.5227291E+00) * X)
F = +2.7053987E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σ = +5.7896361E+02
R = +1.9290003E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT S = +2.1417245E+00
t = +1.6448096E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Se = +5.7213315E+02
N = 72 DEGREES OF FREEDOM = 70
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI *10²
40.00
30.00
20.00
10.00
0.00
-10.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1.DISSECTED MOTOR=STM-012.LOW RATE CHS=20.0 IN/MIN.MODULUS.

Figure 10

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
104.0	2	+1.2500000E+02	+0.0000000E+07	+1.2500000E+02	+1.2500000E+02	+1.2229287E+02
130.0	5	+1.1879998E+02	+3.3666002E-01	+1.2000000E+02	+1.1800000E+02	+1.2397575E+02
140.0	5	+1.4219999E+02	+1.3038404E+00	+1.4300000E+02	+1.4000000E+02	+1.2462303E+02
157.0	7	+1.2817849E+02	+3.9613120E+00	+1.3404998E+02	+1.2400000E+02	+1.2572337E+02
167.0	2	+1.2579998E+02	+2.0492002E-02	+1.2579998E+02	+1.2579998E+02	+1.2637063E+02
168.0	5	+1.2472329E+02	+5.1210355E+00	+1.2980999E+02	+1.1956999E+02	+1.2643536E+02
175.0	8	+1.2551867E+02	+3.3672642E+00	+1.3000000E+02	+1.2056999E+02	+1.2688844E+02
190.0	3	+1.2007991E+02	+5.3123336E+00	+1.2620999E+02	+1.1690998E+02	+1.2785934E+02
191.0	5	+1.2067993E+02	+3.9157692E+00	+1.2670999E+02	+1.1685998E+02	+1.2792407E+02
200.0	3	+1.2401660E+02	+2.6137363E+00	+1.2702999E+02	+1.2246998E+02	+1.2850660E+02
201.0	3	+1.1442658E+02	+4.7134151E+00	+1.1919999E+02	+1.0977999E+02	+1.2857133E+02
203.0	5	+1.3829394E+02	+3.7028688E-01	+1.3869999E+02	+1.3783999E+02	+1.2870079E+02
205.0	3	+1.1921997E+02	+1.5114883E+00	+1.2016999E+02	+1.1747999E+02	+1.2883024E+02
215.0	9	+1.2864770E+02	+6.2290330E+00	+1.3833999E+02	+1.1959999E+02	+1.2947750E+02
226.0	6	+1.1661367E+02	+4.8190598E+00	+1.2650000E+02	+1.1033999E+02	+1.3018949E+02
240.0	8	+1.4152490E+02	+8.4170628E+00	+1.5029998E+02	+1.2569999E+02	+1.3109563E+02
254.0	3	+1.5253320E+02	+1.9272173E+00	+1.5409999E+02	+1.5039999E+02	+1.3200183E+02

STAGE 1,DISSECTED MOTOR=STM-012,LOW RATE CHS=20.0 IN/MIN,STRESS AT RUPTURE.

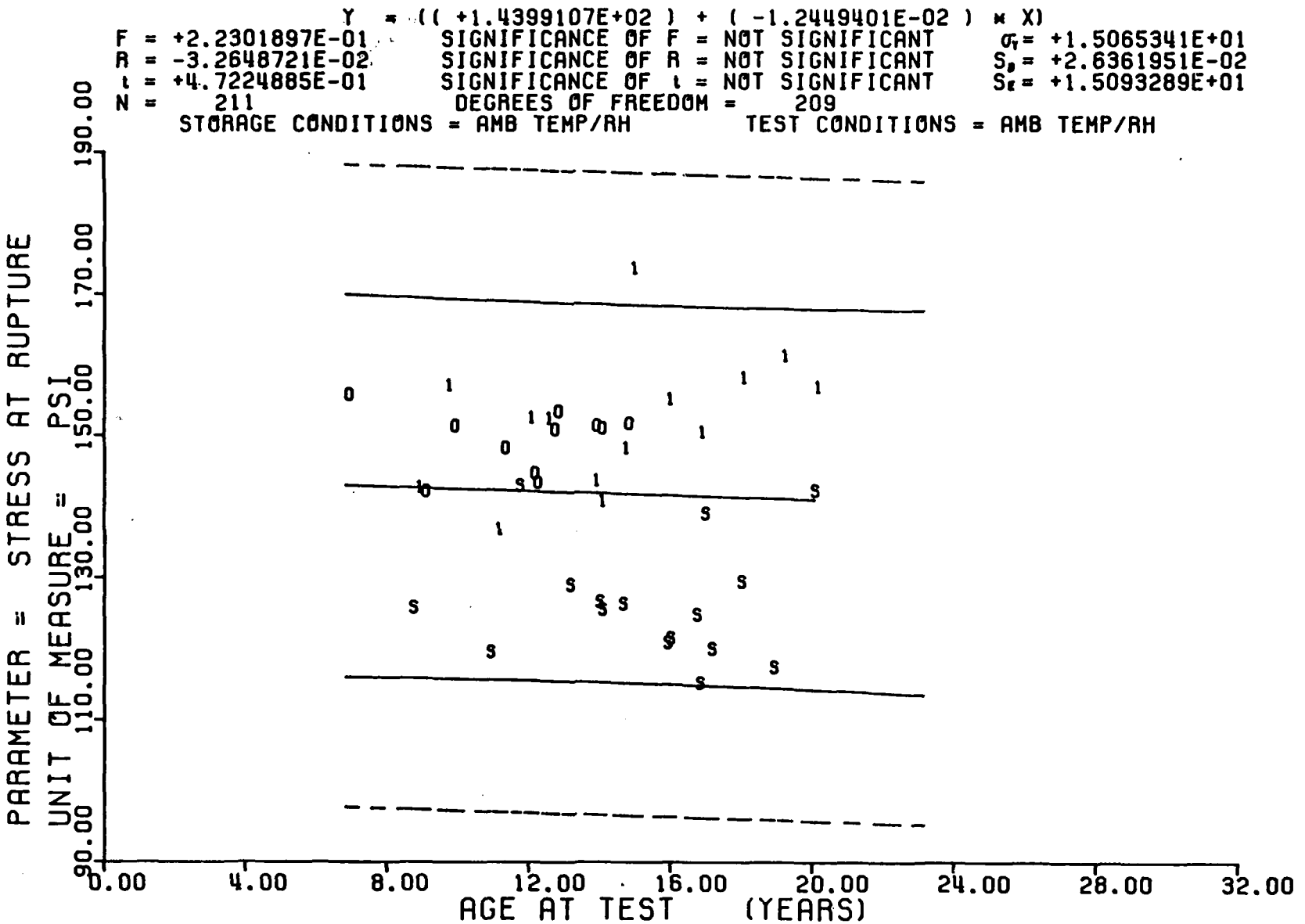

Y = ((+1.4399107E+02) + (-1.2449401E-02) * X)
F = +2.2301897E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σ_Y = +1.5065341E+01
R = -3.2648721E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT S_β = +2.6361951E-02
t = +4.7224885E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT S_ε = +1.5093289E+01
N = 211 DEGREES OF FREEDOM = 209
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRESS AT RUPTURE
UNIT OF MEASURE = PSI
190.00
170.00
150.00
130.00
110.00
90.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISSECTED MOTORS,LOW RATE CHS=20.0 IN/MIN,STRESS AT RUPTURE

Figure 9A

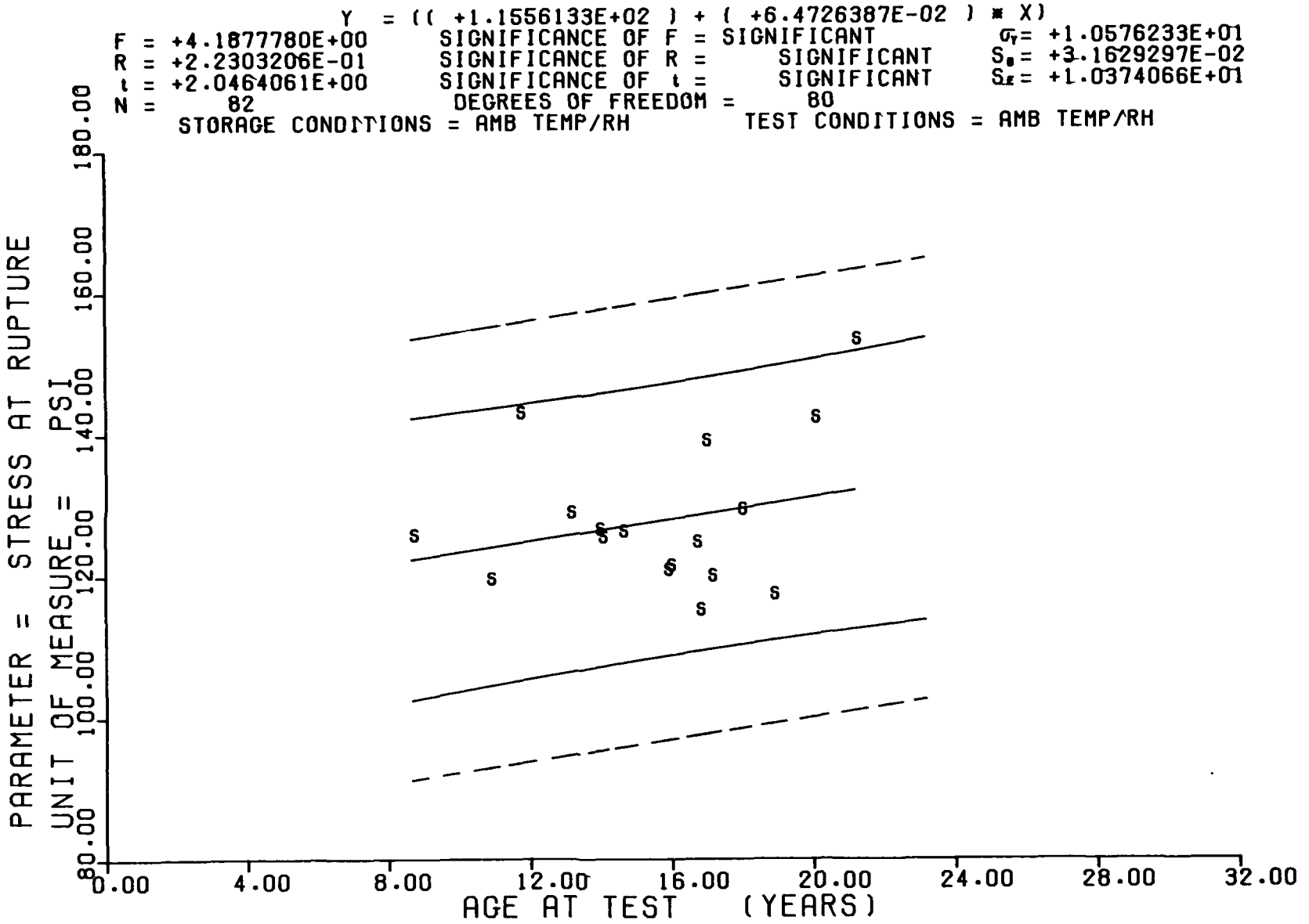

Y = ((+1.1556133E+02) + (+6.4726387E-02) * X)
F = +4.1877780E+00 SIGNIFICANCE OF F = SIGNIFICANT σr= +1.0576233E+01
R = +2.2303206E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb= +3.1629297E-02
t = +2.0464061E+00 SIGNIFICANCE OF t = SIGNIFICANT Sε= +1.0374066E+01
N = 82 DEGREES OF FREEDOM = 80
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRESS AT RUPTURE
UNIT OF MEASURE = PSI
80.00
100.00
120.00
140.00
160.00
180.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISSECTED MOTOR=STM-012,LOW RATE CHS=20.0 IN/MIN,STRESS AT RUPTURE.

Figure 9

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
104.0	2	+3.1649994E-01	+4.9465439E-03	+3.1999999E-01	+3.1299996E-01	+3.1659811E-01
130.0	5	+3.1119990E-01	+1.3084446E-02	+3.2399994E-01	+2.9199999E-01	+3.1422340E-01
140.0	5	+3.1419980E-01	+4.5602991E-03	+3.1899994E-01	+3.0699998E-01	+3.1331002E-01
157.0	7	+3.0827111E-01	+1.7002064E-02	+3.2499998E-01	+2.7999997E-01	+3.1175732E-01
167.0	2	+3.0999994E-01	+1.2727327E-02	+3.1899994E-01	+3.0099999E-01	+3.1084400E-01
168.0	3	+3.2073330E-01	+1.2873238E-02	+3.2899999E-01	+3.0589997E-01	+3.1075263E-01
175.0	8	+3.1199967E-01	+3.8529187E-03	+3.1699997E-01	+3.0589997E-01	+3.1011331E-01
190.0	3	+3.2719993E-01	+1.0916417E-02	+3.3379995E-01	+3.1459999E-01	+3.0874329E-01
191.0	5	+3.0149972E-01	+1.2037007E-02	+3.1629997E-01	+2.8669995E-01	+3.0865192E-01
200.0	3	+3.2829993E-01	+7.1091997E-03	+3.3389997E-01	+3.2029998E-01	+3.0782991E-01
201.0	3	+3.3353328E-01	+1.3037339E-02	+3.4419995E-01	+3.1899994E-01	+3.0773860E-01
203.0	5	+3.0417972E-01	+9.5088577E-03	+3.1349998E-01	+2.9049998E-01	+3.0755591E-01
205.0	3	+3.2403326E-01	+1.0702260E-03	+3.2509994E-01	+3.2299995E-01	+3.0737322E-01
215.0	9	+2.9926645E-01	+1.8039770E-02	+3.3559995E-01	+2.7999997E-01	+3.0645990E-01
220.0	8	+2.8173722E-01	+1.6601775E-02	+2.9679995E-01	+2.3699998E-01	+3.0545520E-01
240.0	8	+3.2349967E-01	+1.5703862E-02	+3.3999997E-01	+2.9899996E-01	+3.0417650E-01
254.0	3	+3.2299995E-01	+1.0390603E-02	+3.2899999E-01	+3.1099998E-01	+3.0289781E-01

STAGE 1 DISSECTED MOTOR=STM-012,LOW RATE CHS=20.0 IN/MIN,STRAIN AT RUPTURE

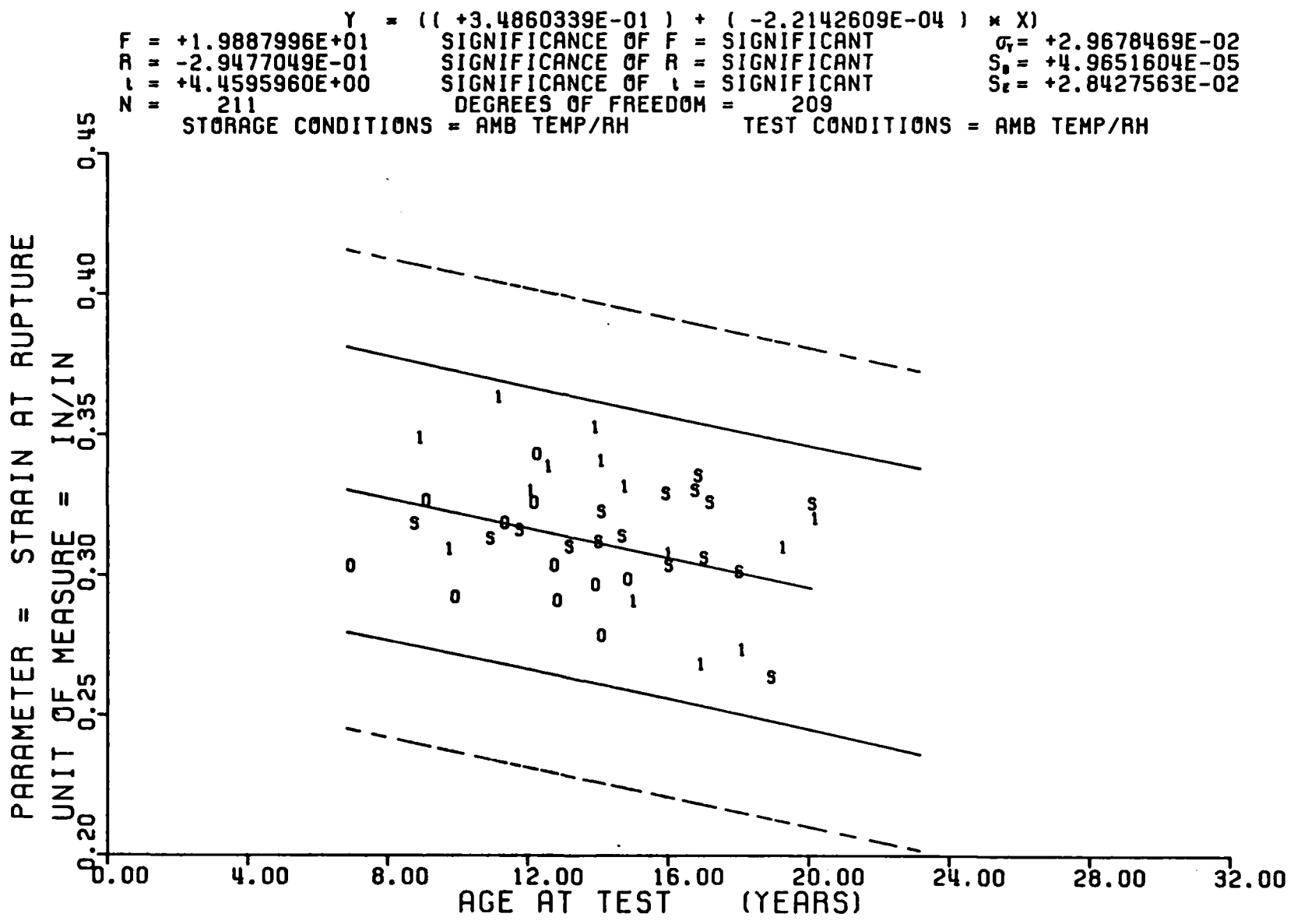

Y = ((+3.4860339E-01) + (-2.2142609E-04) * X)
F = +1.9887996E+01 SIGNIFICANCE OF F = SIGNIFICANT σY = +2.9678469E-02
R = -2.9477049E-01 SIGNIFICANCE OF R = SIGNIFICANT SB = +4.9651604E-05
t = +4.4595960E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +2.8427563E-02
N = 211 DEGREES OF FREEDOM = 209
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.45
0.40
0.35
0.30
0.25
0.20
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISSECTED MOTORS,LOW RATE CHS=20.0 IN/MIN,STRAIN AT RUPTURE

Figure 8A

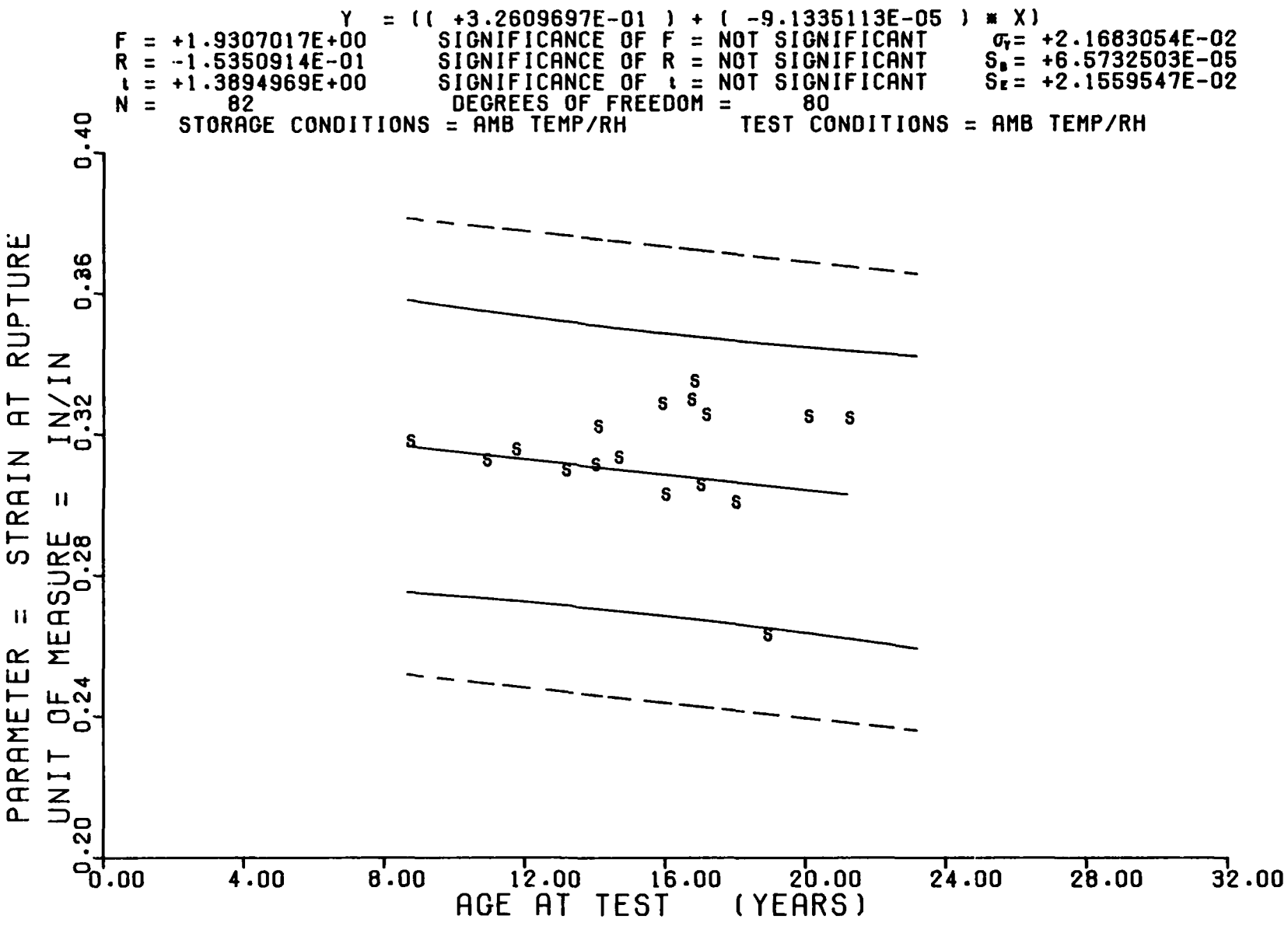

Y = ((+3.2609697E-01) + (-9.1335113E-05) * X)
F = +1.9307017E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σY= +2.1683054E-02
R = -1.5350914E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb= +6.5732503E-05
t = +1.3894969E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Se= +2.1559547E-02
N = 82 DEGREES OF FREEDOM = 80
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.40
0.36
0.32
0.28
0.24
0.20
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISSECTED MOTOR=STM-012,LOW RATE CHS=20.0 IN/MIN,STRAIN AT RUPTURE

Figure 8

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
104.0	2	+1.3000000E+02	+0.0000000E+07	+1.3000000E+02	+1.3000000E+02	+1.2717686E+02
130.0	5	+1.2479998E+02	+1.7888543E+00	+1.2700000E+02	+1.2300000E+02	+1.3038375E+02
140.0	5	+1.4619999E+02	+1.3038404E+00	+1.4800000E+02	+1.4500000E+02	+1.3161718E+02
157.0	7	+1.4203421E+02	+2.2092891E+00	+1.4445999E+02	+1.3977999E+02	+1.3371400E+02
167.0	2	+1.3619995E+02	+1.9858188E+00	+1.3759999E+02	+1.3479998E+02	+1.3494741E+02
168.0	3	+1.3584985E+02	+2.7728758E+00	+1.3826998E+02	+1.3283999E+02	+1.3507077E+02
175.0	8	+1.3477737E+02	+3.9092396E+00	+1.3983999E+02	+1.2934999E+02	+1.3593415E+02
190.0	3	+1.3228987E+02	+4.1210839E+00	+1.3703999E+02	+1.2978999E+02	+1.3778428E+02
191.0	5	+1.3077787E+02	+3.1066215E+00	+1.3610998E+02	+1.2840998E+02	+1.3790763E+02
200.0	3	+1.3164321E+02	+4.8507499E+00	+1.3722999E+02	+1.2855999E+02	+1.3901771E+02
201.0	3	+1.2425325E+02	+2.3529991E+00	+1.2677999E+02	+1.2213999E+02	+1.3914105E+02
203.0	5	+1.4070790E+02	+7.8781300E-01	+1.4175999E+02	+1.3979998E+02	+1.3938774E+02
205.0	3	+1.2534326E+02	+1.0090001E+00	+1.2646998E+02	+1.2457998E+02	+1.3963442E+02
215.0	9	+1.3591654E+02	+4.5253171E+00	+1.4325000E+02	+1.2947999E+02	+1.4086784E+02
220.0	8	+1.3313989E+02	+4.4193492E+00	+1.4181999E+02	+1.2602999E+02	+1.4222460E+02
240.0	3	+1.5613735E+02	+7.4749529E+00	+1.6426998E+02	+1.4326998E+02	+1.4395140E+02
254.0	3	+1.6916658E+02	+3.0051428E+00	+1.7089999E+02	+1.6569999E+02	+1.4567819E+02

STAGE 1,DISSECTED MOTOR=STM-012,LOW RATE CHS=20.0 IN/MIN,MAX STRESS.

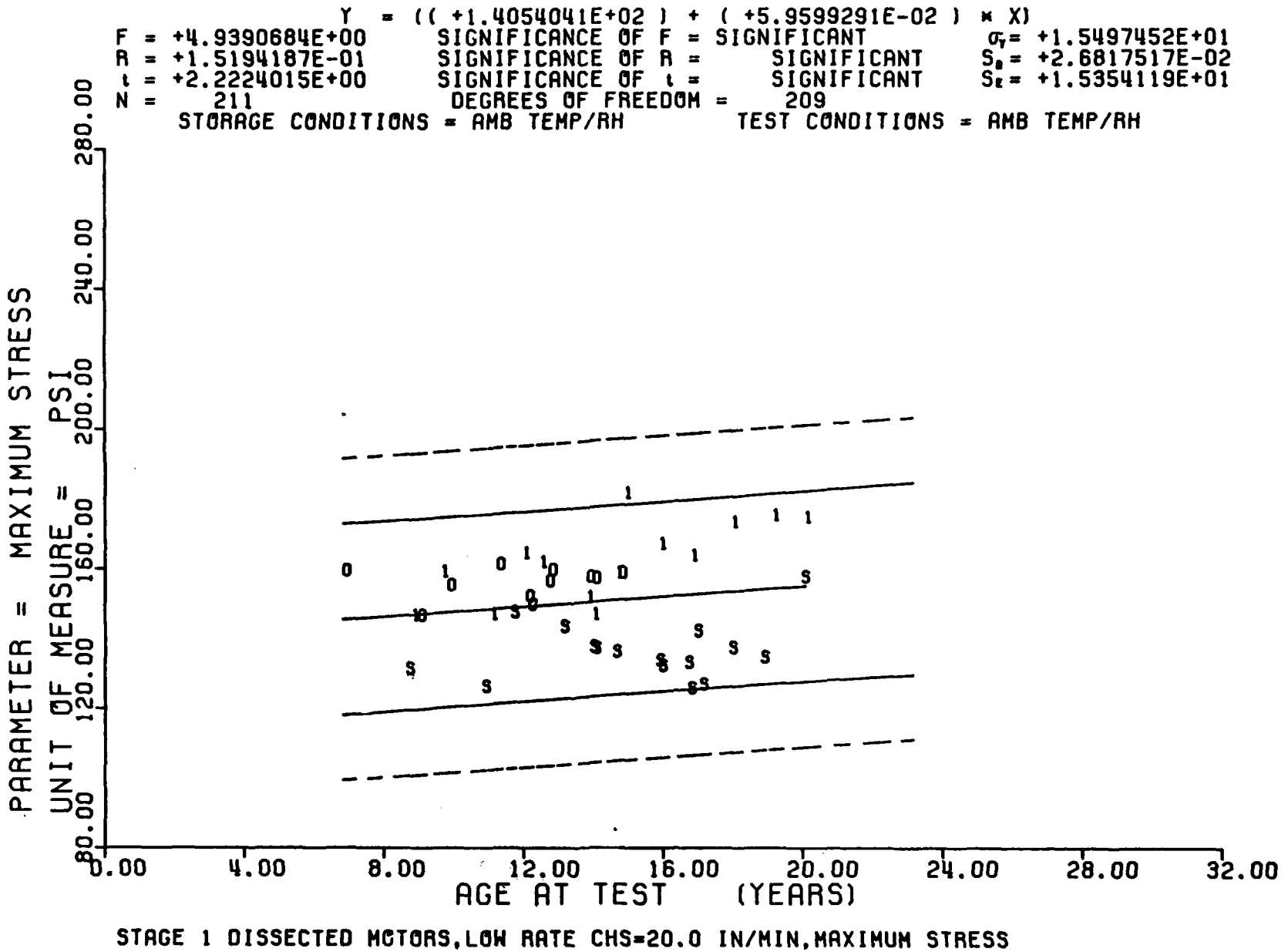
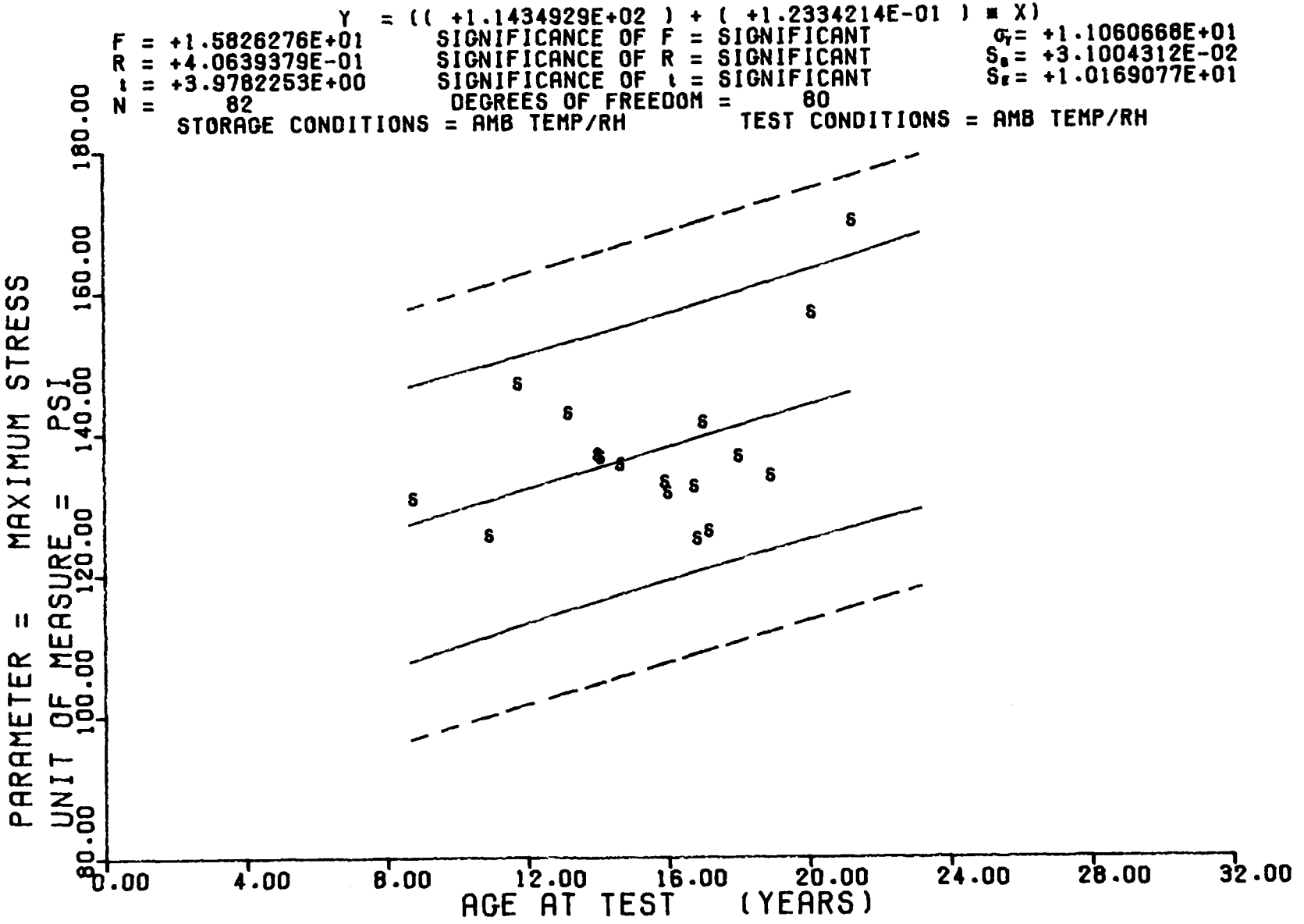

Y = ((+1.4054041E+02) + (+5.9599291E-02) * X)
F = +4.9390684E+00 SIGNIFICANCE OF F = SIGNIFICANT σT = +1.5497452E+01
R = +1.5194187E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +2.6817517E-02
t = +2.2224015E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +1.5354119E+01
N = 211 DEGREES OF FREEDOM = 209
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
80.00
120.00
160.00
200.00
240.00
280.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISSECTED MOTORS,LOW RATE CHS=20.0 IN/MIN,MAXIMUM STRESS

Figure 7A



STAGE 1,DISSECTED MOTOR=STM-012,LOW RATE CHS=20.0 IN/MIN,MAX STRESS.

Figure 7

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
80.0	16	+1.8612468E-01	+5.4923764E-02	+2.4899995E-01	+8.2999944E-02	+1.8684226E-01
93.0	6	+2.7066646E-01	+8.2923049E-03	+2.8599995E-01	+2.6399999E-01	+1.8671953E-01
105.0	6	+1.9649982E-01	+3.1272230E-02	+2.3799997E-01	+1.5599995E-01	+1.8660628E-01
131.0	5	+1.4119994E-01	+1.2132350E-02	+1.5799999E-01	+1.2999999E-01	+1.8636077E-01
141.0	6	+9.2166602E-02	+6.8324932E-03	+9.7999989E-02	+8.3999991E-02	+1.8626642E-01
158.0	5	+1.8541997E-01	+5.6734901E-03	+1.9309997E-01	+1.7739999E-01	+1.8610590E-01
176.0	5	+1.5813994E-01	+1.8607483E-02	+1.8829995E-01	+1.3719999E-01	+1.8593597E-01
201.0	5	+2.3779982E-01	+1.6086467E-02	+2.5199997E-01	+2.1299999E-01	+1.8569993E-01
215.0	5	+1.3701993E-01	+2.3591227E-02	+1.6289997E-01	+1.1879998E-01	+1.8556773E-01
226.0	6	+1.9703322E-01	+1.8035512E-02	+2.1449995E-01	+1.6299998E-01	+1.8546390E-01
241.0	6	+2.2023308E-01	+8.0185056E-03	+2.3069995E-01	+2.1019995E-01	+1.8532228E-01
254.0	3	+2.0139992E-01	+1.5074052E-02	+2.1049994E-01	+1.8399995E-01	+1.8519955E-01

STAGE 1,DISSECTED MOTOR=STM-012,HIGH RATE CHS=1750 IN/MIN,STRAIN MAX STRESS.

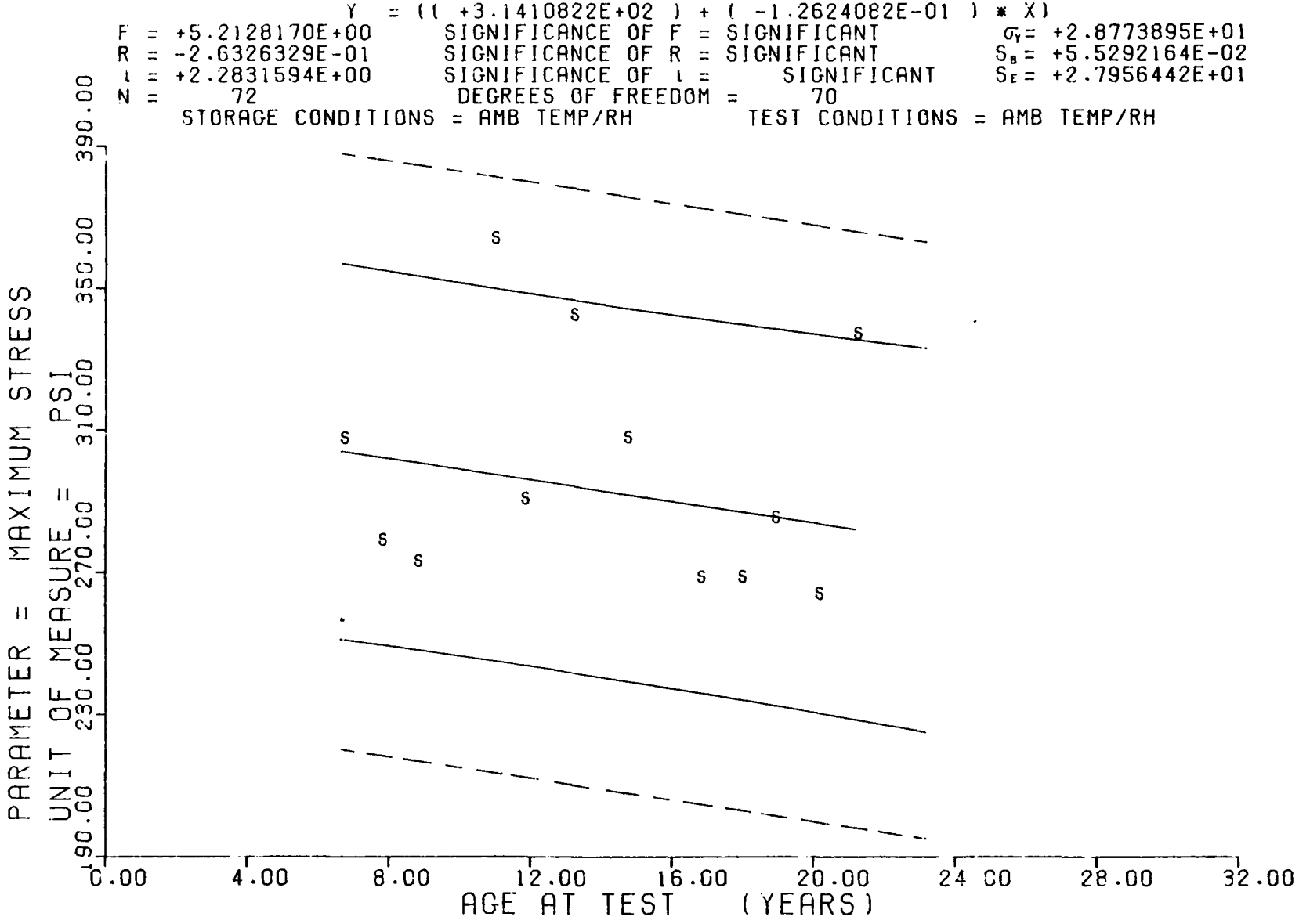

Y = ((+3.1410822E+02) + (-1.2624082E-01) * X)
F = +5.2128170E+00 SIGNIFICANCE OF F = SIGNIFICANT σY = +2.8773895E+01
R = -2.6326329E-01 SIGNIFICANCE OF R = SIGNIFICANT SB = +5.5292164E-02
t = +2.2831594E+00 SIGNIFICANCE OF t = SIGNIFICANT SE = +2.7956442E+01
N = 72 DEGREES OF FREEDOM = 70
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
390.00
350.00
310.00
270.00
230.00
190.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISSECTED MOTOR=STM-012,HIGH RATE CHS=1750 IN/MIN,MAXIMUM STRESS.

Figure 12

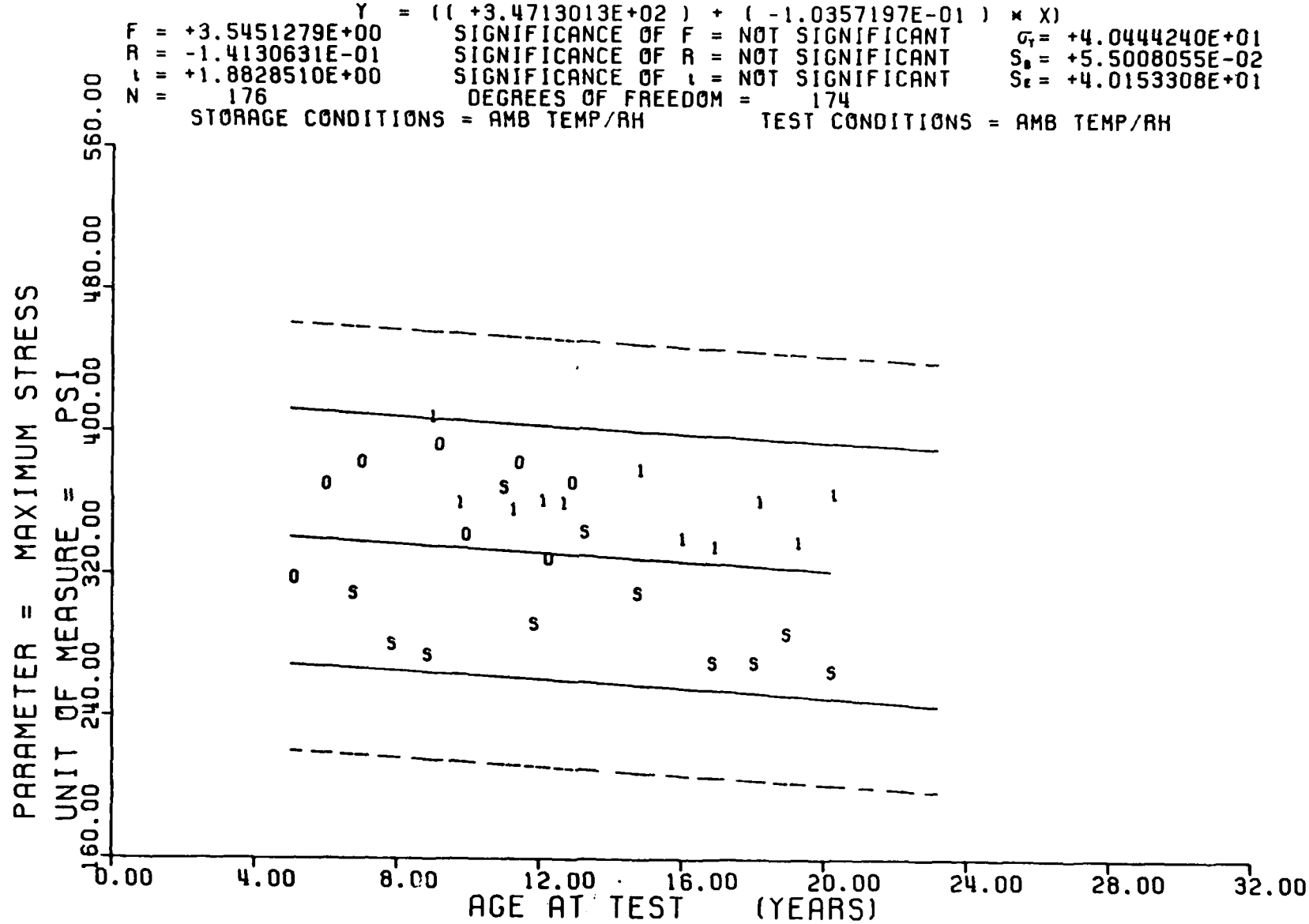

Y = ((+3.4713013E+02) + (-1.0357197E-01) × X)
F = +3.5451279E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σT = +4.0444240E+01
R = -1.4130631E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +5.5008055E-02
t = +1.8828510E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Se = +4.0153308E+01
N = 176 DEGREES OF FREEDOM = 174
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
560.00
480.00
400.00
320.00
240.00
160.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISSECTED MOTORS, HIGH RATE CHS=1750 IN/MIN, MAXIMUM STRESS

Figure 12A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
80.0	16	+3.0625000E+02	+4.9999999E+00	+3.1000000E+02	+3.0000000E+02	+3.0400878E+02
93.0	6	+2.7766650E+02	+1.3633292E+01	+2.9100000E+02	+2.5600000E+02	+3.0236767E+02
105.0	6	+2.7166650E+02	+1.6020819E+01	+2.9000000E+02	+2.5000000E+02	+3.0085278E+02
131.0	4	+3.6250000E+02	+4.9999999E+00	+3.6500000E+02	+3.5500000E+02	+2.9757055E+02
141.0	6	+2.8916650E+02	+5.8452259E+00	+2.9500000E+02	+2.8000000E+02	+2.9630810E+02
158.0	5	+3.4085986E+02	+4.0593744E+00	+3.4657983E+02	+3.3680981E+02	+2.9416210E+02
176.0	5	+3.0644775E+02	+4.2384912E+00	+3.0988989E+02	+2.9931982E+02	+2.9188964E+02
201.0	5	+2.6718774E+02	+2.3570392E+00	+2.6986987E+02	+2.6383984E+02	+2.8873364E+02
215.0	5	+2.6723974E+02	+5.9898158E+00	+2.7735986E+02	+2.6222998E+02	+2.8696630E+02
228.0	6	+2.8393310E+02	+1.2012368E+01	+2.9522998E+02	+2.6975976E+02	+2.8557763E+02
241.0	6	+2.6254980E+02	+4.8995562E+00	+2.7096997E+02	+2.5764990E+02	+2.8368408E+02
254.0	2	+3.3571972E+02	+4.7094551E+00	+3.3903979E+02	+3.3239990E+02	+2.8204296E+02

STAGE 1,DISSECTED MOTOR=STM-C12,HIGH RATE CHS=1750 IN/MIN,MAXIMUM STRESS.

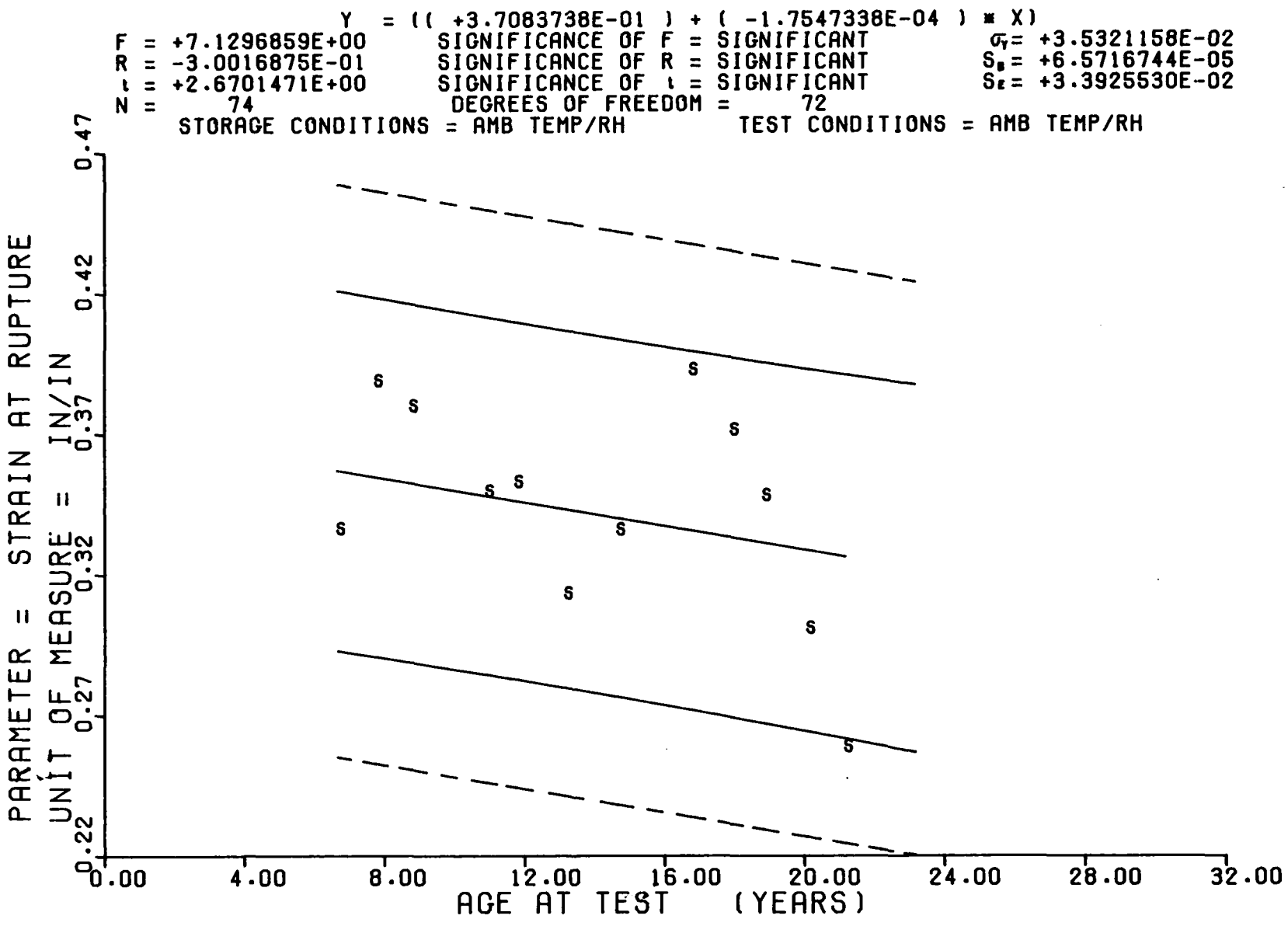

Y = ((+3.7083738E-01) + (-1.7547338E-04) * X)
F = +7.1296859E+00 SIGNIFICANCE OF F = SIGNIFICANT σY= +3.5321158E-02
R = -3.0016875E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +6.5716744E-05
t = +2.6701471E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +3.3925530E-02
N = 74 DEGREES OF FREEDOM = 72
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.47
0.42
0.37
0.32
0.27
0.22
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1.DISSECTED MOTOR=STM-012.HIGH RATE CHS=1750 IN/MIN.STRAIN AT RUPTURE.

Figure 13

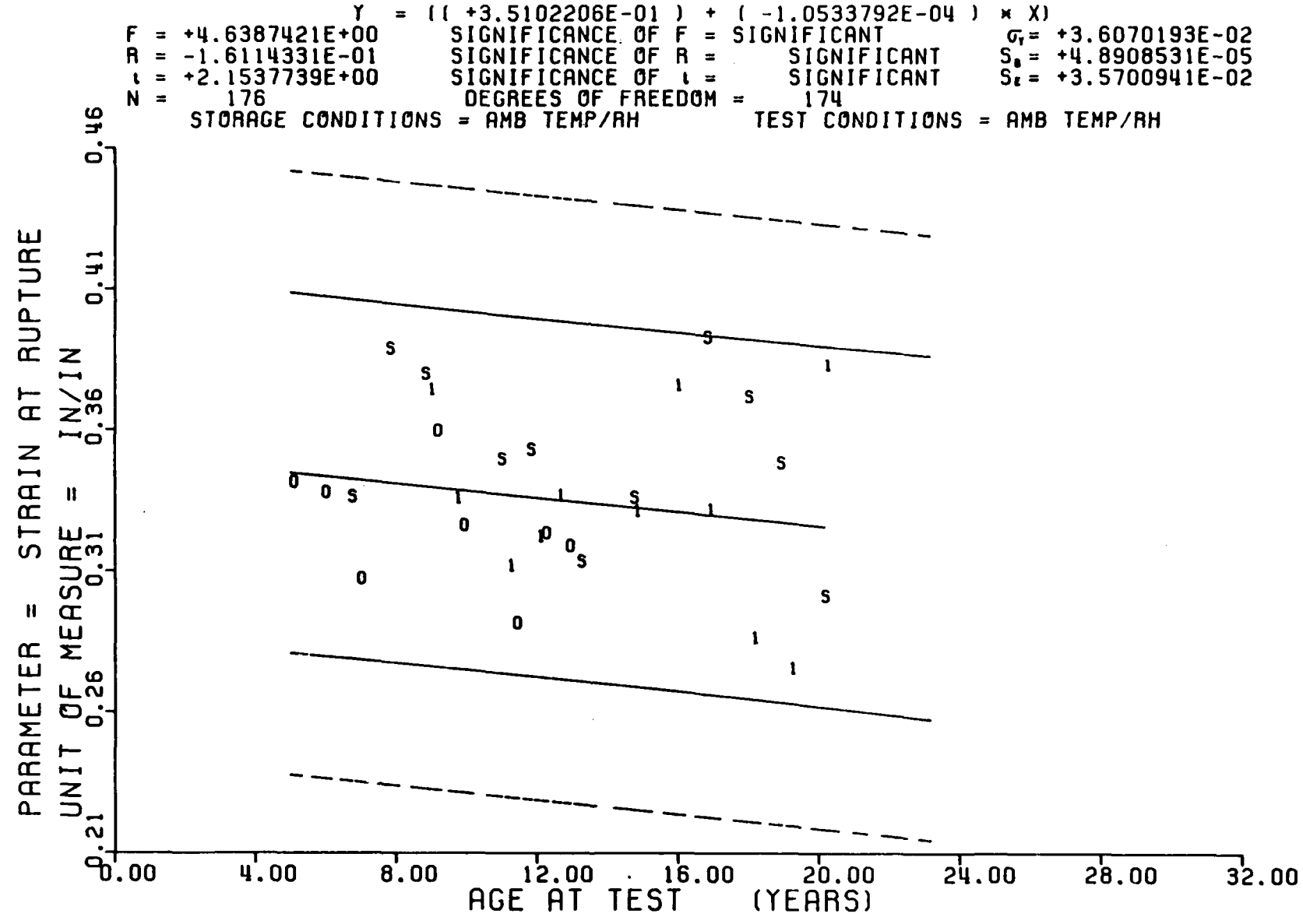

Y = ((+3.5102206E-01) + (-1.0533792E-04) * X)
F = +4.6387421E+00 SIGNIFICANCE OF F = SIGNIFICANT σr = +3.6070193E-02
R = -1.6114331E-01 SIGNIFICANCE OF R = SIGNIFICANT Sa = +4.8908531E-05
t = +2.1537739E+00 SIGNIFICANCE OF t = SIGNIFICANT Sε = +3.5700941E-02
N = 176 DEGREES OF FREEDOM = 174
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.46
0.41
0.36
0.31
0.26
0.21
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISSECTED MOTORS,HIGH RATE CHS=1750 IN/MIN,STRAIN AT RUPTURE

Figure 13A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (CENTER)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
[illegible]	16	+3.[illegible]443713E-01	+1.1204737E-02	+3.5499995E-01	+3.1499999E-01	+3.5679948E-01
[illegible]	8	+3.[illegible]099972E-01	+9.4228371E-03	+3.9599996E-01	+3.7299996E-01	+3.5451835E-01
1[illegible]	7	+3.7799960E-01	+1.1233094E-02	+3.9099997E-01	+3.6399996E-01	+3.5241264E-01
1[illegible]	5	+3.4779947E-01	+1.2413058E-02	+3.6599999E-01	+3.3099997E-01	+3.4785032E-01
141.0	6	+3.3116624E-01	+2.5598571E-02	+3.7099999E-01	+3.0099999E-01	+3.4609562E-01
1[illegible]	5	+3.1149977E-01	+1.1090998E-02	+3.2399994E-01	+2.9549998E-01	+3.4311252E-01
17[illegible]	5	+3.3407974E-01	+3.5137916E-02	+3.6999994E-01	+2.8409999E-01	+3.3995401E-01
201.0	5	+3.6091968E-01	+1.4379522E-02	+4.0489995E-01	+3.7299996E-01	+3.3556717E-01
21[illegible]	5	+3.6971963E-01	+1.9146416E-02	+3.9849996E-01	+3.4599995E-01	+3.3311057E-01
2[illegible]	6	+3.4033284E-01	+8.8663420E-03	+3.5899996E-01	+3.3299994E-01	+3.3118039E-01
2[illegible]	6	+2.9916632E-01	+1.5936078E-02	+3.2599997E-01	+2.8399997E-01	+3.2854825E-01
2[illegible]	3	+2.5699996E-01	+5.5666491E-03	+2.6299995E-01	+2.5199997E-01	+3.2626712E-01

STAGE 1,DISSECTED MOTOR=STM-012,HIGH RATE CHS=1750 IN/MIN,STRAIN AT RUPTURE.

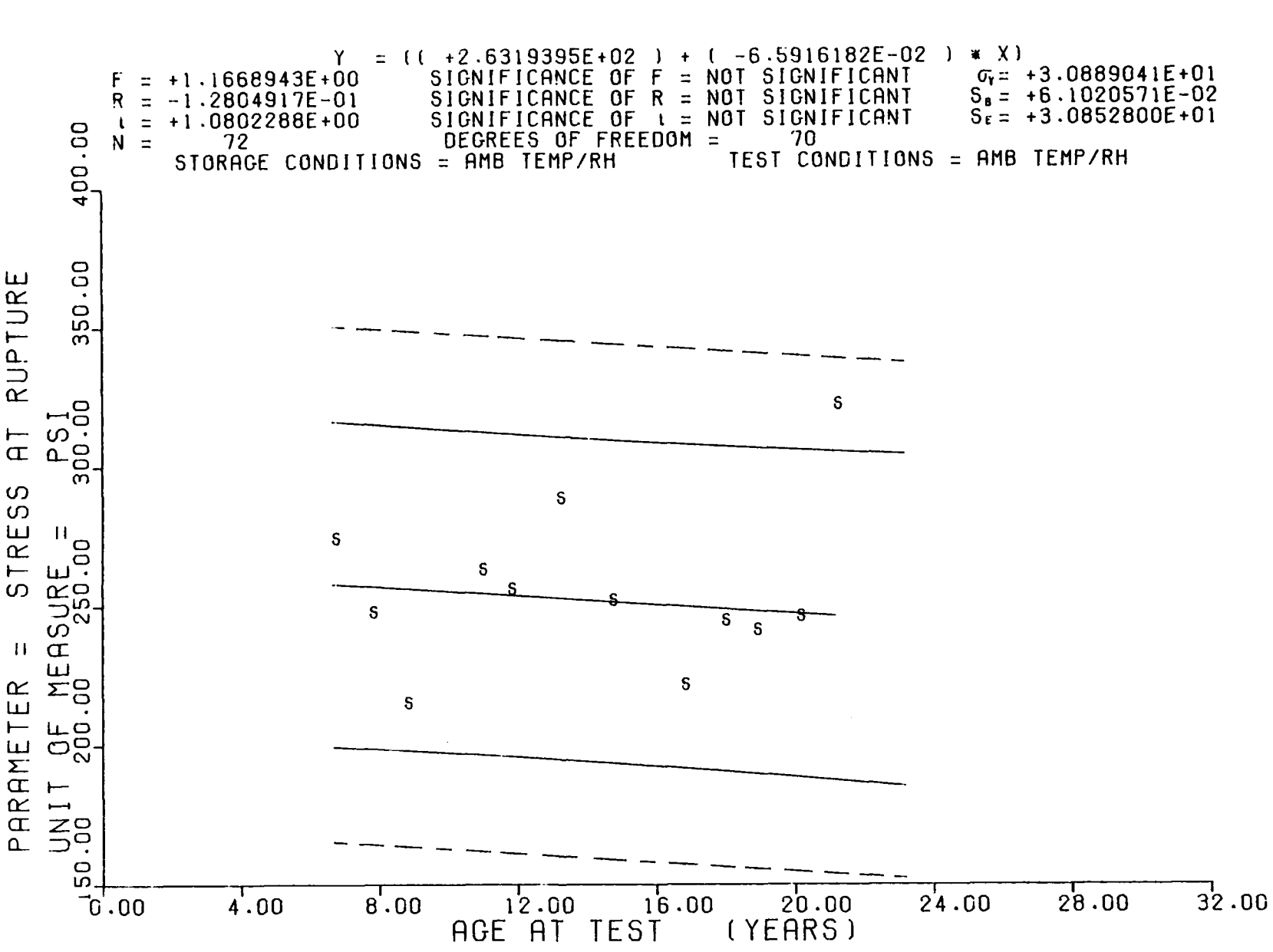

Y = ((+2.6319395E+02) + (-6.5916182E-02) * X)
F = +1.1668943E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σY = +3.0889041E+01
R = -1.2804917E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT SB = +6.1020571E-02
t = +1.0802288E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT SE = +3.0852800E+01
N = 72 DEGREES OF FREEDOM = 70
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRESS AT RUPTURE
UNIT OF MEASURE = PSI
400.00
350.00
300.00
250.00
200.00
150.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISSECTED MOTOR=STM-012,HIGH RATE CHS=1750 IN/MIN,STRESS AT RUPTURE.

Figure 14

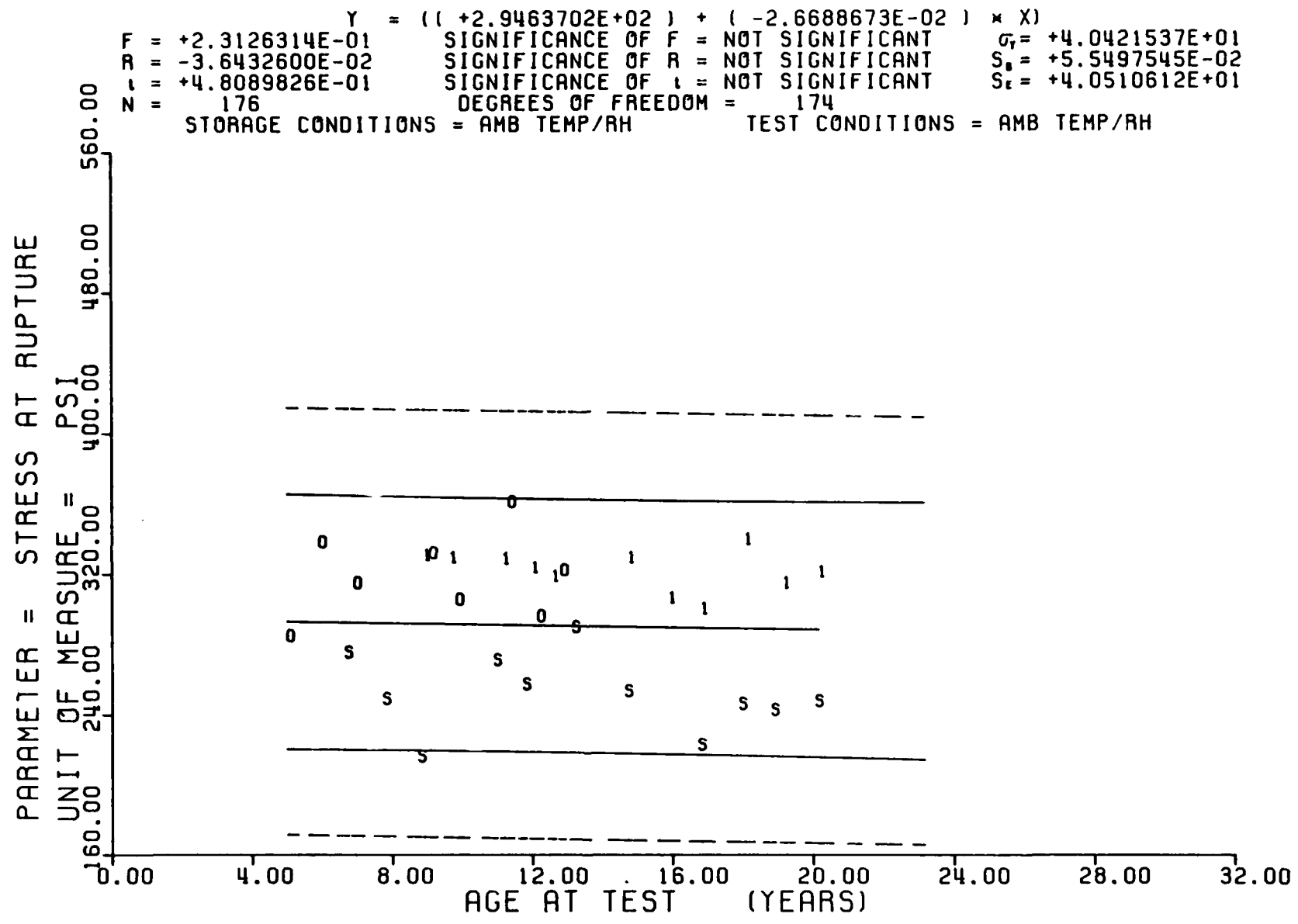

Y = ((+2.9463702E+02) + (-2.6688673E-02) * X)
F = +2.3126314E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σr = +4.0421537E+01
R = -3.6432600E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +5.5497545E-02
t = +4.8089826E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Se = +4.0510612E+01
N = 176 DEGREES OF FREEDOM = 174
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRESS AT RUPTURE
UNIT OF MEASURE = PSI
560.00
480.00
400.00
320.00
240.00
160.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISSECTED MOTORS,HIGH RATE CHS=1750 IN/MIN,STRESS AT RUPTURE

Figure 14A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
80.0	10	+2.7250000E+02	+3.9749213E+01	+3.7000000E+02	+2.4000000E+02	+2.5792065E+02
93.0	6	+2.4600000E+02	+7.2663608E+00	+2.5400000E+02	+2.3600000E+02	+2.5706372E+02
105.0	6	+2.1333332E+02	+5.1639777E+00	+2.2000000E+02	+2.1000000E+02	+2.5627270E+02
131.0	4	+2.6125000E+02	+1.4361406E+01	+2.8000000E+02	+2.5000000E+02	+2.5455892E+02
141.0	6	+2.5416665E+02	+1.0206207E+01	+2.7000000E+02	+2.4000000E+02	+2.5389976E+02
158.0	5	+2.8682177E+02	+1.0668822E+01	+3.0073999E+02	+2.7484985E+02	+2.5277919E+02
176.0	5	+2.5029388E+02	+2.2104945E+01	+2.8416992E+02	+2.2429998E+02	+2.5159269E+02
201.0	5	+2.1987591E+02	+5.9425797E+00	+2.2759999E+02	+2.1239999E+02	+2.4994479E+02
215.0	5	+2.4300985E+02	+7.8426994E+00	+2.5518998E+02	+2.3505999E+02	+2.4902197E+02
226.0	6	+2.3961657E+02	+1.3532374E+01	+2.5800000E+02	+2.2009999E+02	+2.4829689E+02
241.0	6	+2.4446658E+02	+7.7621929E+00	+2.5819995E+02	+2.3729998E+02	+2.4730815E+02
254.0	2	+3.2054980E+02	+4.3216213E+00	+3.2359985E+02	+3.1750000E+02	+2.4645123E+02

STAGE 1,DISSECTED MOTOR=STM-012,HIGH RATE CHS=1750 IN/MIN,STRESS AT RUPTURE.

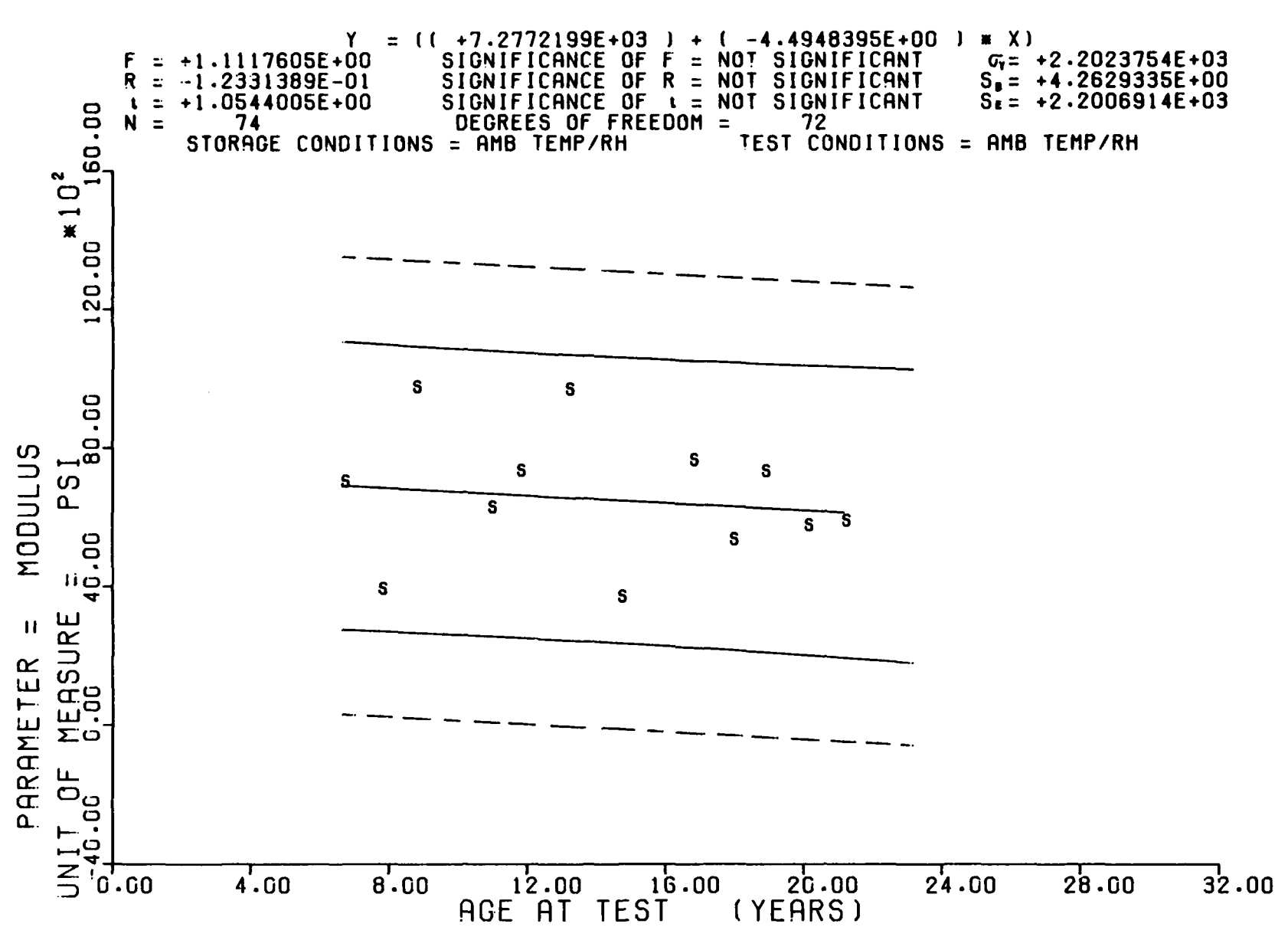
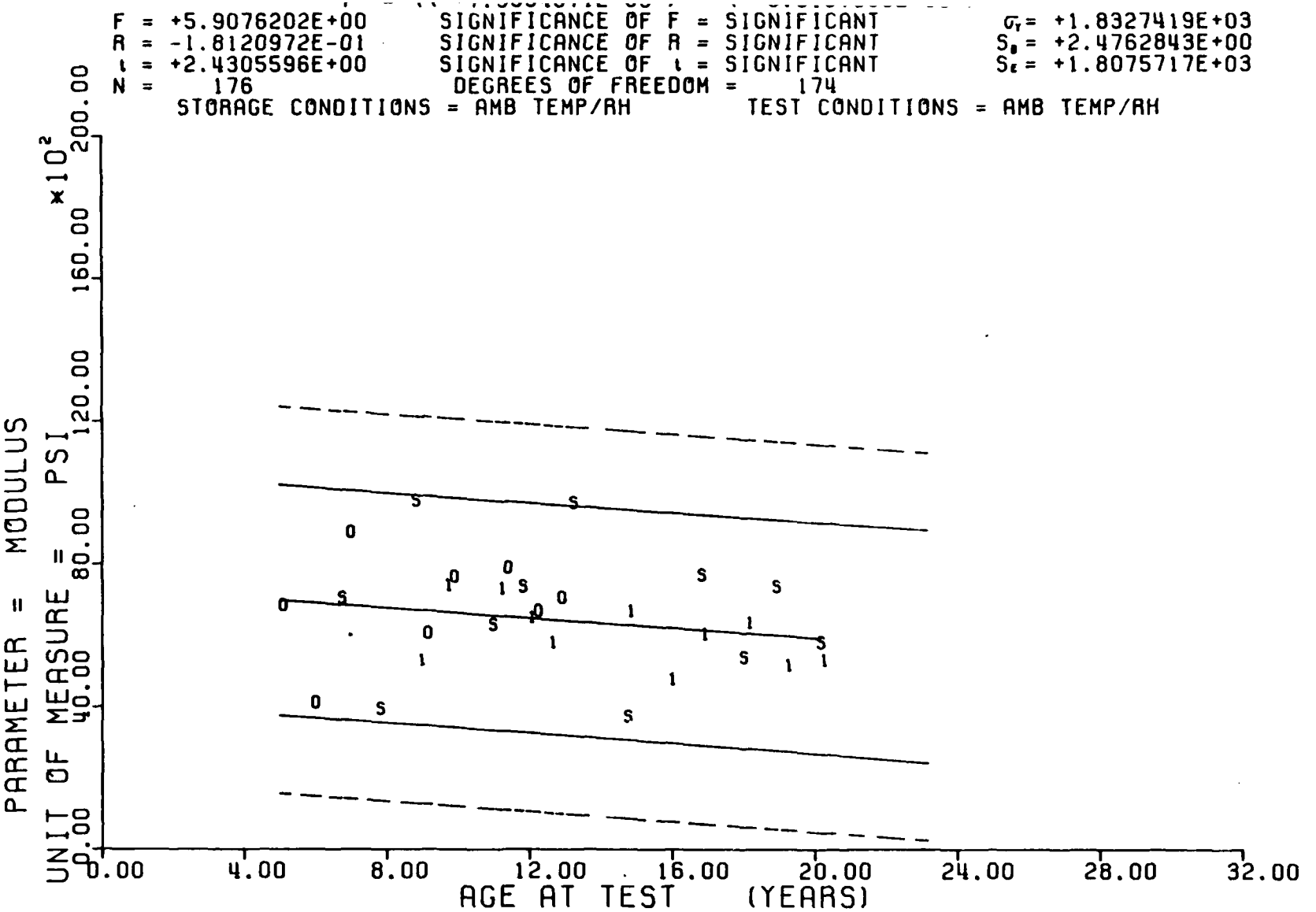

Y = ((+7.2772199E+03) + (-4.4948395E+00) * X)
F = +1.1117605E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σT = +2.2023754E+03
R = -1.2331389E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT SB = +4.2629335E+00
t = +1.0544005E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT SE = +2.2006914E+03
N = 74 DEGREES OF FREEDOM = 72
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI *10²
160.00
120.00
80.00
40.00
0.00
-40.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISSECTED MOTOR=STM-012,HIGH RATE CHS=1750 IN/MIN,MODULUS.

Figure 15



STAGE 1 DISSECTED MOTORS, HIGH RATE CHS=1750 IN/MIN, MODULUS

Figure 15A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
80.0	10	+6.8937500E+03	+1.8255440E+03	+8.6000000E+03	+2.3000000E+03	+6.9176289E+03
93.0	6	+3.7866665E+03	+2.9261487E+02	+4.2200000E+03	+3.4900000E+03	+6.8591992E+03
105.0	6	+9.6166640E+03	+2.9949375E+03	+1.3200000E+04	+6.4000000E+03	+6.8052617E+03
131.0	5	+6.1400000E+03	+3.7815340E+02	+6.4000000E+03	+5.5000000E+03	+6.6883945E+03
141.0	6	+7.2000000E+03	+4.4719928E+02	+8.0000000E+03	+6.7000000E+03	+6.6434453E+03
158.0	5	+9.5353984E+03	+1.2243527E+03	+1.0746000E+04	+7.6680000E+03	+6.5670351E+03
176.0	5	+3.5625998E+03	+2.2952897E+02	+3.8850000E+03	+3.3260000E+03	+6.4861250E+03
201.0	5	+7.5103984E+03	+2.2494685E+03	+9.4290000E+03	+4.5160000E+03	+6.3737539E+03
215.0	5	+5.2067968E+03	+1.5218390E+03	+6.2940000E+03	+2.7420000E+03	+6.3108281E+03
226.0	6	+7.1841640E+03	+5.6127280E+02	+8.0910000E+03	+6.6850000E+03	+6.2613828E+03
241.0	6	+5.6233320E+03	+2.2615982E+02	+6.0130000E+03	+5.3620000E+03	+6.1939609E+03
254.0	3	+5.7526640E+03	+1.2799739E+02	+5.8800000E+03	+5.6240000E+03	+6.1355273E+03

STAGE 1,DISSECTED MOTOR=STM-012,HIGH RATE CHS=1750 IN/MIN,MODULUS.

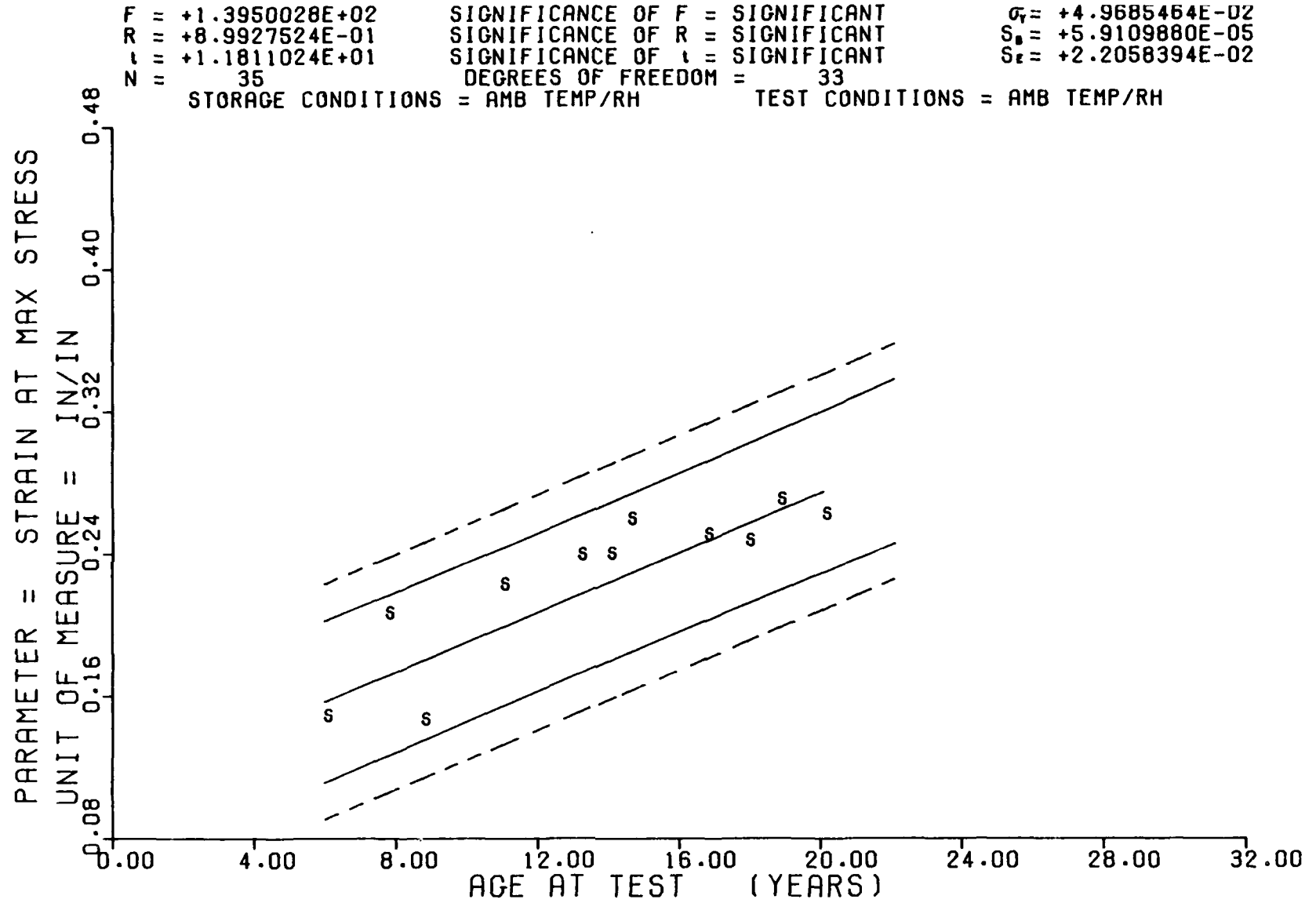

F = +1.3950028E+02
SIGNIFICANCE OF F = SIGNIFICANT
σ_Y = +4.9685464E-02
R = +8.9927524E-01
SIGNIFICANCE OF R = SIGNIFICANT
S_a = +5.9109880E-05
t = +1.1811024E+01
SIGNIFICANCE OF t = SIGNIFICANT
S_ε = +2.2058394E-02
N = 35
DEGREES OF FREEDOM = 33
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT MAX STRESS
UNIT OF MEASURE = IN/IN
0.08
0.16
0.24
0.32
0.40
0.48
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISCTED MOTOR=STM-012,TRIAXIAL CHS=1750 IN/MIN,600 PSI,STRAIN MAX STRS.

Figure 16

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
72.0	8	+8.2970000E+03	+1.8207235E+03	+1.0323000E+04	+4.7410000E+03	+7.7195664E+03
93.0	2	+5.9950000E+03	+9.8287639E+02	+6.6900000E+03	+5.3000000E+03	+7.3577265E+03
105.0	2	+8.4000000E+03	+2.8284271E+02	+8.6000000E+03	+8.2000000E+03	+7.1509609E+03
152.0	2	+6.5000000E+03	+1.4142135E+02	+6.6000000E+03	+6.4000000E+03	+6.6857382E+03
156.0	2	+6.0375000E+03	+6.7103762E+02	+6.5120000E+03	+5.5630000E+03	+6.2377460E+03
168.0	2	+5.2665000E+03	+4.9143412E+02	+5.6140000E+03	+4.9190000E+03	+6.0654414E+03
175.0	3	+3.8186665E+03	+4.8614126E+02	+4.3740000E+03	+3.4700000E+03	+5.9448281E+03
201.0	3	+4.3816640E+03	+2.2967767E+02	+4.5800000E+03	+4.1300000E+03	+5.4968398E+03
215.0	3	+5.3886640E+03	+5.1575123E+02	+5.9810000E+03	+5.0390000E+03	+5.2556132E+03
228.0	3	+5.4603320E+03	+1.6614401E+02	+5.6480000E+03	+5.3320000E+03	+5.0660781E+03
241.0	5	+6.0315976E+03	+6.7662973E+02	+6.8350000E+03	+5.0900000E+03	+4.8076210E+03

STAGE 1,DISCTED MOTOR=STM-012,TRIAXIAL CHS=1750 IN/MIN,600 PSI,MODULUS.

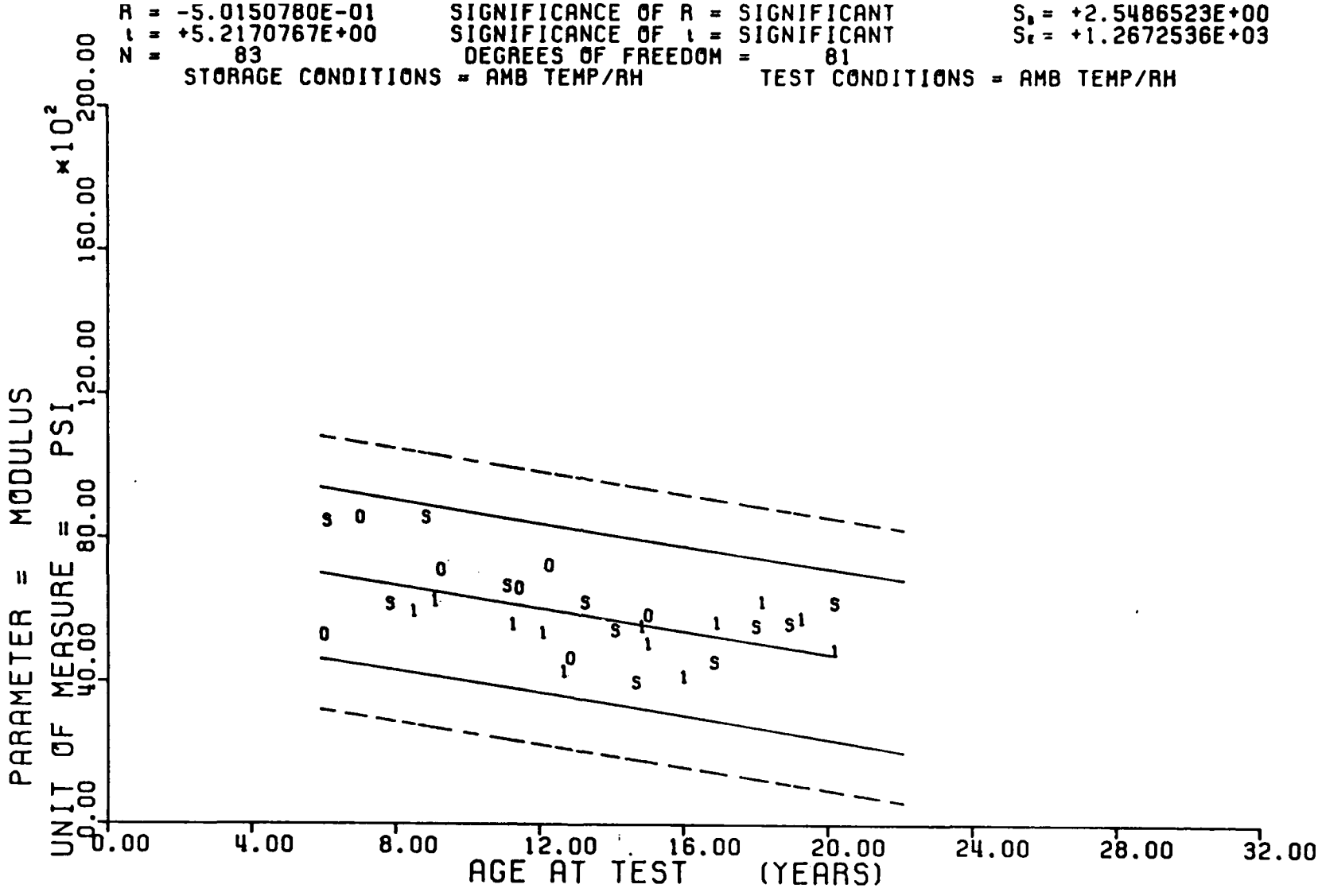

R = -5.0150780E-01
SIGNIFICANCE OF R = SIGNIFICANT
S_b = +2.5486523E+00
t = +5.2170767E+00
SIGNIFICANCE OF t = SIGNIFICANT
S_t = +1.2672536E+03
N = 83
DEGREES OF FREEDOM = 81
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI
×10²
200.00
160.00
120.00
80.00
40.00
0.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
DISSECTED TP-H1011,H.R.TRIAXIAL CHS=1750 IN/MIN,600 PSI,MODULUS

Figure 20A

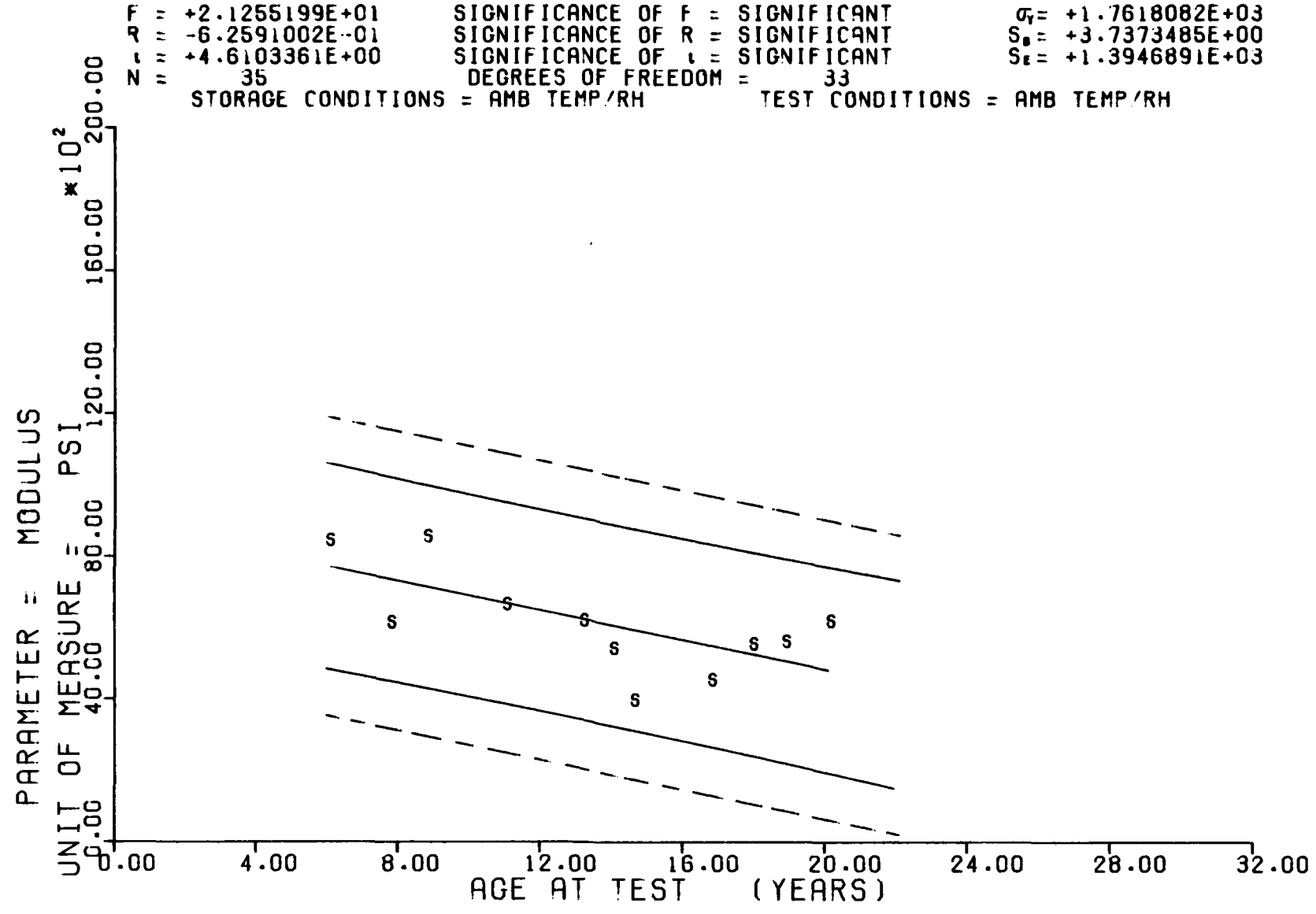

F = +2.1255199E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = -6.2591002E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +4.6103361E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 35 DEGREES OF FREEDOM = 33
σY = +1.7618082E+03
SB = +3.7373485E+00
SE = +1.3946891E+03
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MODULUS
UNIT OF MEASURE = PSI *10²
0.00
40.00
80.00
120.00
160.00
200.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISCTED MOTOR=STM-012,TRIAXIAL CHS=1750 IN/MIN,600 PSI,MODULUS.

Figure 20

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
72.0	8	+5.0625000E+02	+1.7152675E+01	+5.3800000E+02	+4.8500000E+02	+5.1243286E+02
93.0	2	+5.6150000E+02	+7.7781745E+00	+5.6700000E+02	+5.5600000E+02	+5.1970898E+02
135.0	2	+4.9500000E+02	+4.9497474E+01	+5.3000000E+02	+4.6000000E+02	+5.2386669E+02
132.0	2	+5.3000000E+02	+2.1213203E+01	+5.4500000E+02	+5.1500000E+02	+5.3322192E+02
158.0	2	+6.3344995E+02	+1.3509486E+01	+6.4300000E+02	+6.2389990E+02	+5.4223046E+02
168.0	2	+5.2448974E+02	+1.0338696E+00	+5.2514990E+02	+5.2382983E+02	+5.4569531E+02
175.0	3	+5.3796313E+02	+1.6222616E+01	+5.5069995E+02	+5.1969995E+02	+5.4812060E+02
201.0	3	+5.2279663E+02	+6.9636838E+00	+5.2838989E+02	+5.1500000E+02	+5.5712915E+02
215.0	3	+5.4028637E+02	+4.5512368E+00	+5.4375976E+02	+5.3515991E+02	+5.6197998E+02
226.0	3	+5.7290649E+02	+1.4739058E+01	+5.8711987E+02	+5.5769995E+02	+5.6579125E+02
241.0	5	+5.8443579E+02	+3.4988374E+01	+6.2409985E+02	+5.5289990E+02	+5.7098852E+02

STAGE 1,DISCTED MOTOR=STM-012,TRIAXIAL CHS=1750 IN/MIN,600 PSI,STRESS AT RUPT.

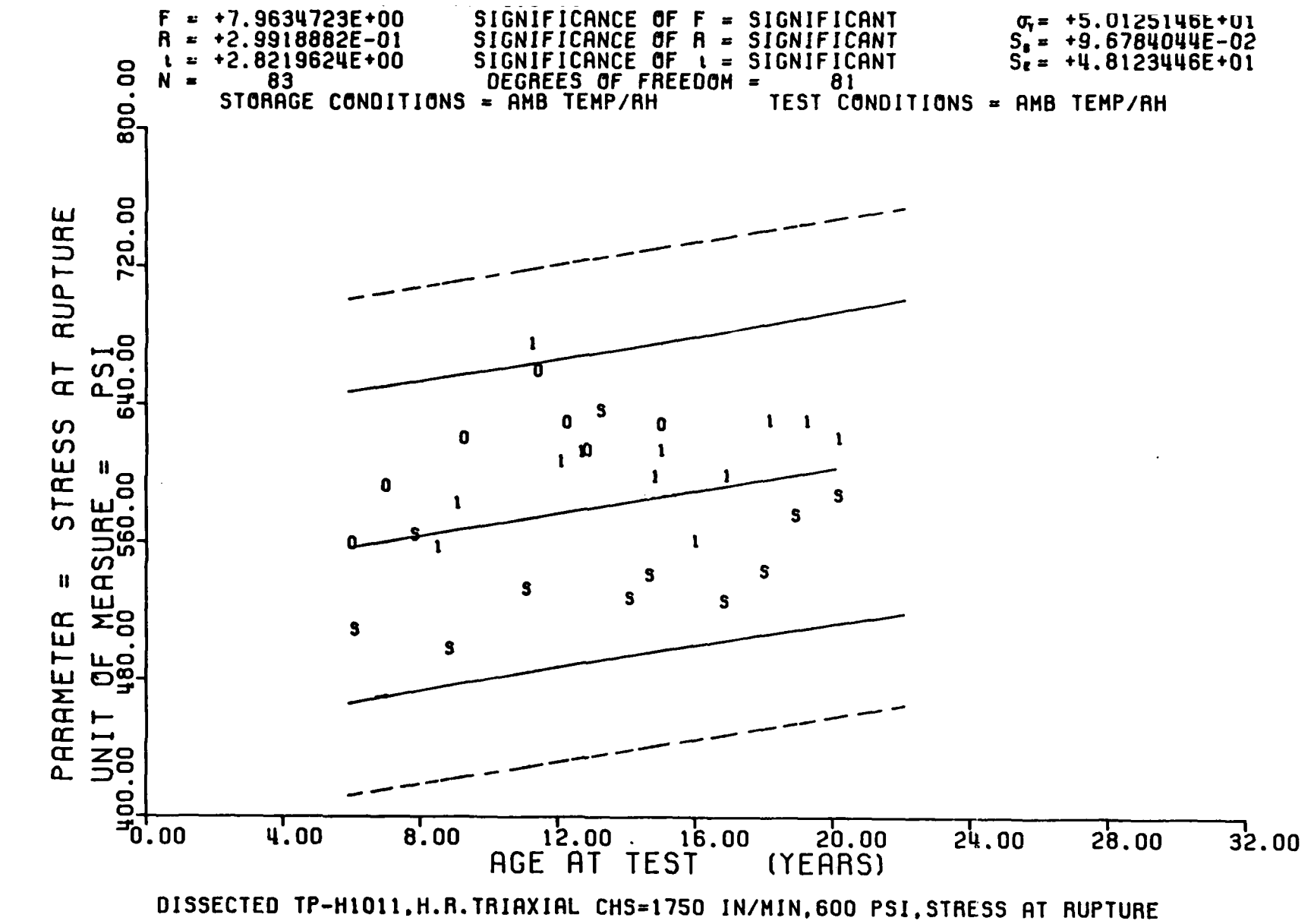

F = +7.9634723E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = +2.9918882E-01 SIGNIFICANCE OF R = SIGNIFICANT
ι = +2.8219624E+00 SIGNIFICANCE OF ι = SIGNIFICANT
N = 83 DEGREES OF FREEDOM = 81
σ = +5.0125146E+01
S = +9.6784044E-02
S = +4.8123446E+01
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRESS AT RUPTURE
UNIT OF MEASURE = PSI
400.00
480.00
560.00
640.00
720.00
800.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
DISSECTED TP-H1011,H.R.TRIAXIAL CHS=1750 IN/MIN,600 PSI,STRESS AT RUPTURE

Figure 19A

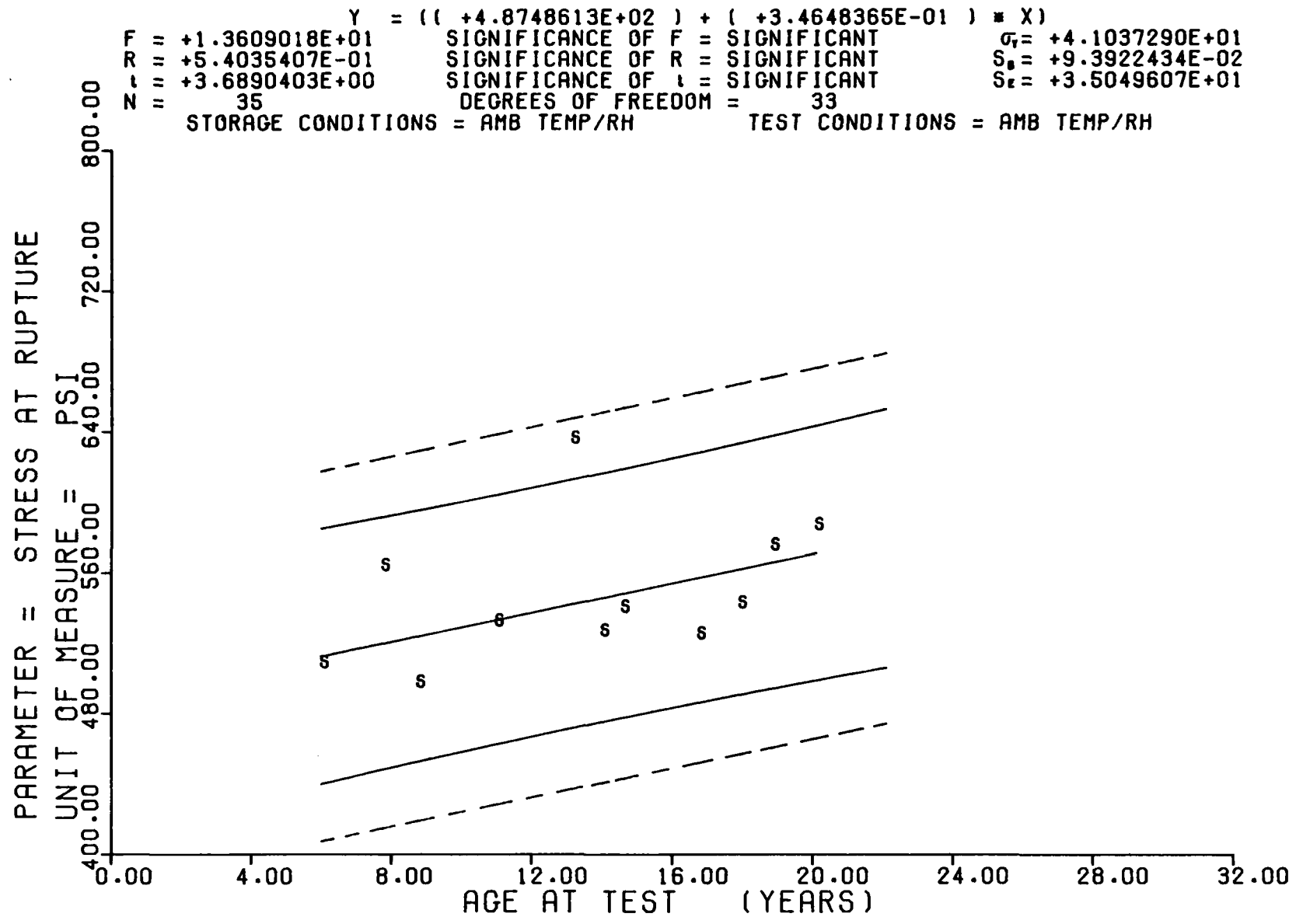

Y = ((+4.8748613E+02) + (+3.4648365E-01) * X)
F = +1.3609018E+01 SIGNIFICANCE OF F = SIGNIFICANT σY= +4.1037290E+01
R = +5.4035407E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb= +9.3922434E-02
t = +3.6890403E+00 SIGNIFICANCE OF t = SIGNIFICANT Se= +3.5049607E+01
N = 35 DEGREES OF FREEDOM = 33
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRESS AT RUPTURE
UNIT OF MEASURE = PSI
400.00
480.00
560.00
640.00
720.00
800.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISCTED MOTOR=STM-012,TRIAXIAL CHS=1750 IN/MIN,600 PSI,STRESS AT RUPT.

Figure 19

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
72.0	8	+2.1122467E-01	+2.3542655E-02	+2.5369995E-01	+1.6789996E-01	+2.2674101E-01
93.0	2	+3.0049997E-01	+4.9488467E-03	+3.0399996E-01	+2.9699999E-01	+2.3821711E-01
105.0	2	+2.4799996E-01	+1.1510189E-04	+2.4799996E-01	+2.4799996E-01	+2.4477493E-01
132.0	2	+2.4099999E-01	+2.3302426E-04	+2.4099999E-01	+2.4099999E-01	+2.5952994E-01
158.0	2	+2.5949996E-01	+1.9092567E-02	+2.7299994E-01	+2.4599999E-01	+2.7373850E-01
168.0	2	+2.5714995E-01	+6.3919207E-05	+2.5729998E-01	+2.5699999E-01	+2.7920335E-01
175.0	3	+3.0399996E-01	+2.8354823E-02	+3.3599996E-01	+2.8199994E-01	+2.8302872E-01
201.0	3	+3.0399996E-01	+1.0011189E-03	+3.0499994E-01	+3.0299997E-01	+2.9723727E-01
215.0	3	+3.1403326E-01	+1.3075683E-02	+3.2659995E-01	+3.0049997E-01	+3.0488801E-01
226.0	3	+3.0579996E-01	+9.8853960E-03	+3.1199997E-01	+2.9439997E-01	+3.1089931E-01
241.0	5	+3.0457973E-01	+2.9336972E-02	+3.2509994E-01	+2.5599998E-01	+3.1909656E-01

STAGE 1,DISCTED MOTOR=STM-012,TRIAXIAL CHS=1750 IN/MIN,600 PSI,STRAIN AT RUPT.

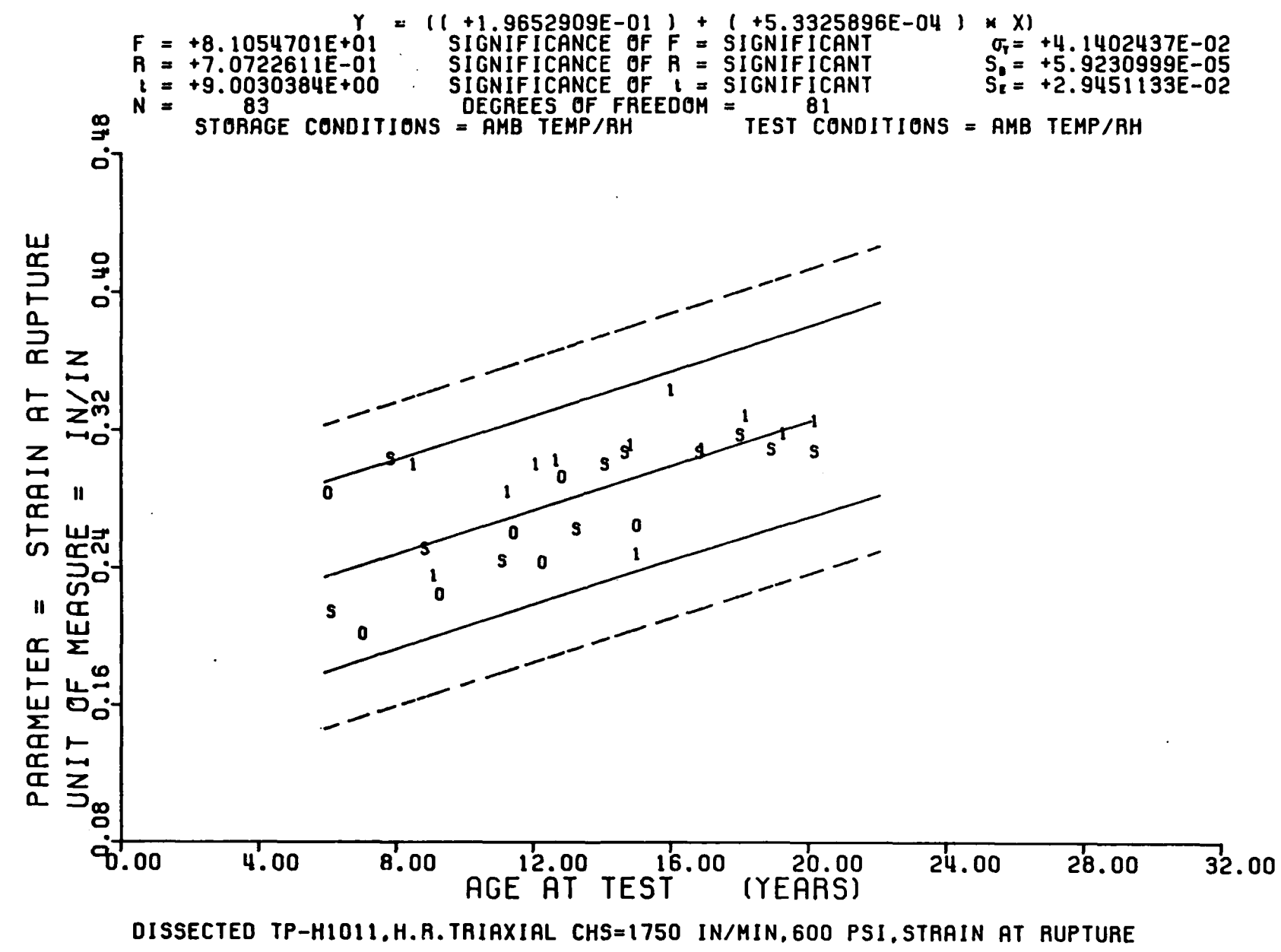

Y = ((+1.9652909E-01) + (+5.3325896E-04) * X)
F = +8.1054701E+01 SIGNIFICANCE OF F = SIGNIFICANT σr = +4.1402437E-02
R = +7.0722611E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +5.9230999E-05
t = +9.0030384E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +2.9451133E-02
N = 83 DEGREES OF FREEDOM = 81
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.08
0.16
0.24
0.32
0.40
0.48
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
DISSECTED TP-H1011,H.R.TRIAXIAL CHS=1750 IN/MIN,600 PSI,STRAIN AT RUPTURE

Figure 18A

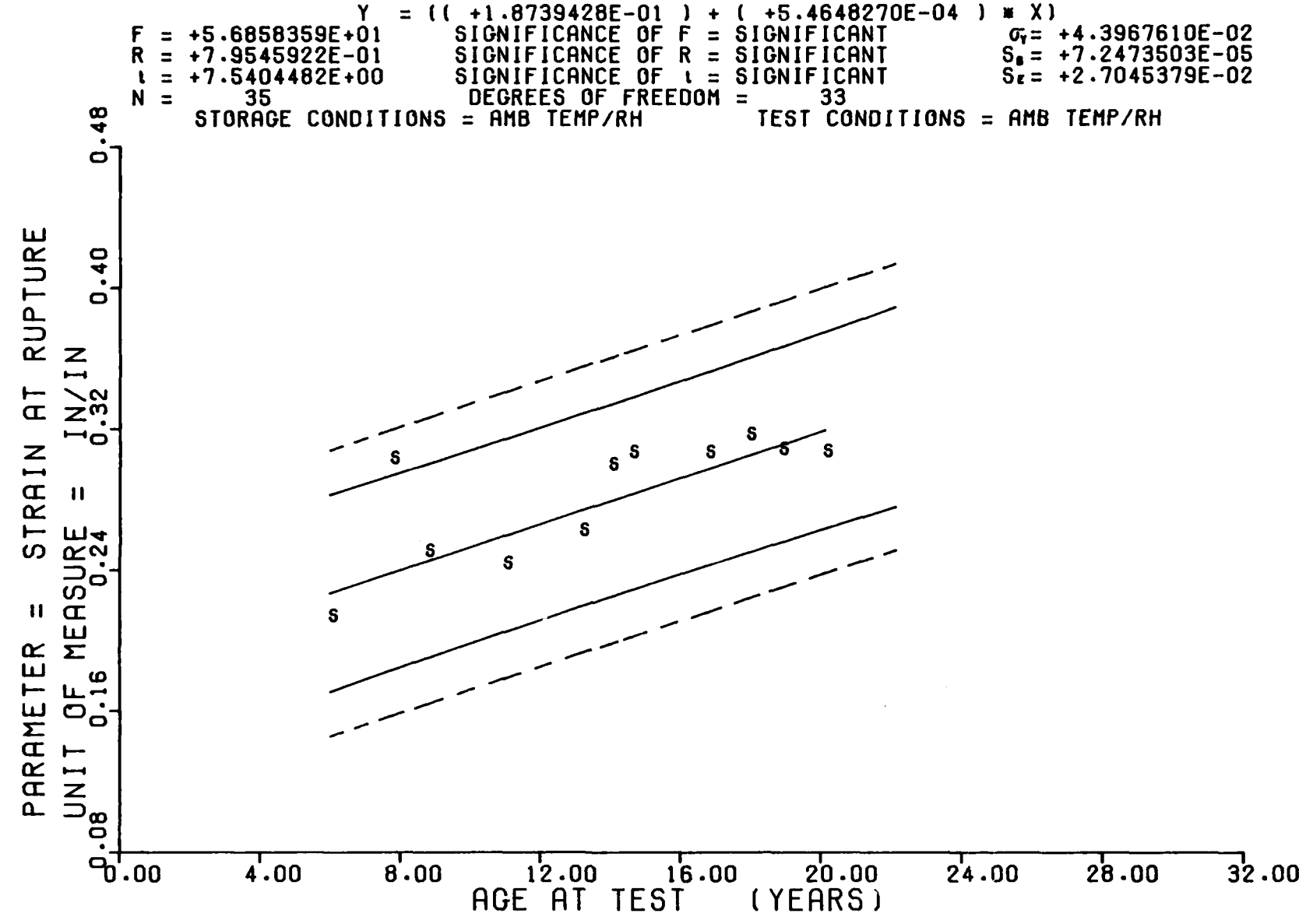

Y = ((+1.8739428E-01) + (+5.4648270E-04) * X)
F = +5.6858359E+01 SIGNIFICANCE OF F = SIGNIFICANT σY = +4.3967610E-02
R = +7.9545922E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +7.2473503E-05
t = +7.5404482E+00 SIGNIFICANCE OF t = SIGNIFICANT Sε = +2.7045379E-02
N = 35 DEGREES OF FREEDOM = 33
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = IN/IN
0.08
0.16
0.24
0.32
0.40
0.48
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISCTED MOTOR=STM-012,TRIAXIAL CHS=1750 IN/MIN,600 PSI,STRAIN AT RUPT.

Figure 18

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

NO. (CYCLES)	NO. OF CHECKS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
72.0	[illegible]	+5.5612500E+02	+4.5649088E+01	+6.3000000E+02	+5.0000000E+02	+5.5069213E+02
[illegible]	2	+5.7250000E+02	+7.7781745E+00	+5.7800000E+02	+5.6700000E+02	+5.5505590E+02
1[illegible].0	2	+5.1000000E+02	+4.2426406E+01	+5.4000000E+02	+4.8000000E+02	+5.5754971E+02
1[illegible].0	2	+5.4000000E+02	+1.4142135E+01	+5.5000000E+02	+5.3000000E+02	+5.6315991E+02
1[illegible].0		+6.4459985E+02	+1.2152666E+01	+6.5319995E+02	+6.3600000E+02	+5.6856259E+02
1[illegible].0	[illegible]	+5.4474975E+02	+2.1542959E+00	+5.4623999E+02	+5.4325976E+02	+5.7064038E+02
177.0	3	+5.5907641E+02	+1.5117451E+01	+5.7470996E+02	+5.4453979E+02	+5.7209497E+02
201.0	3	+5.5298315E+02	+5.0866580E+00	+5.5689990E+02	+5.4725000E+02	+5.7749755E+02
215.0	3	+5.7251077E+02	+4.7440098E+00	+5.7633984E+02	+5.6721997E+02	+5.8040673E+02
[illegible]	3	+5.8407641E+02	+1.2352845E+01	+5.9560986E+02	+5.7105981E+02	+5.8269238E+02
[illegible]41.0	5	+6.0153589E+02	+3.4159136E+01	+6.3869995E+02	+5.6905981E+02	+5.8580932E+02

[illegible] 1,DISCTED MOTOR=STM-012,TRIAXIAL CHS=1750 IN/MIN,600 PSI,MAXIMUM STRESS.

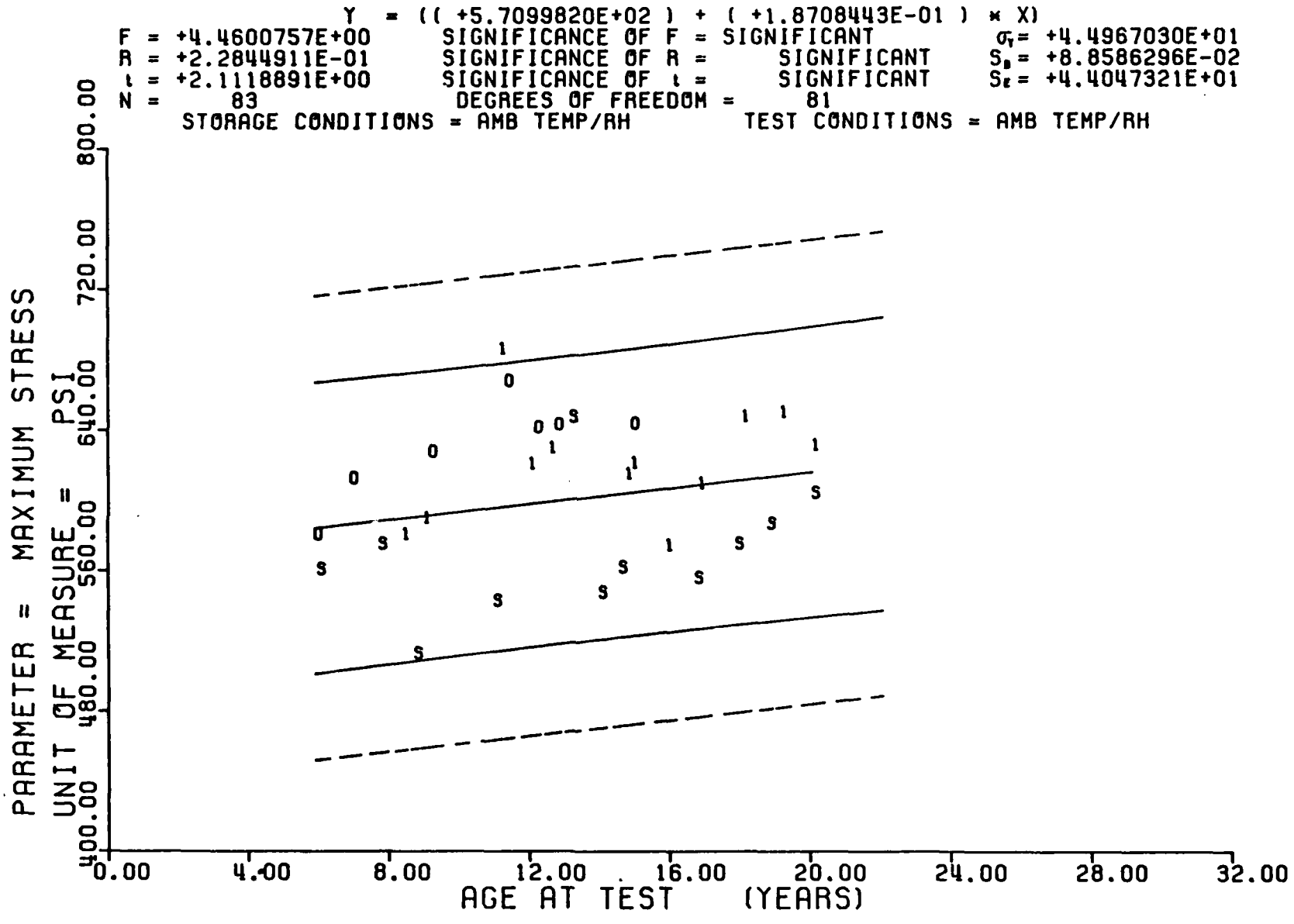

Y = ((+5.7099820E+02) + (+1.8708443E-01) * X)
F = +4.4600757E+00 SIGNIFICANCE OF F = SIGNIFICANT σ_Y = +4.4967030E+01
R = +2.2844911E-01 SIGNIFICANCE OF R = SIGNIFICANT S_B = +8.8586296E-02
t = +2.1118891E+00 SIGNIFICANCE OF t = SIGNIFICANT S_E = +4.4047321E+01
N = 83 DEGREES OF FREEDOM = 81
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
800.00
720.00
640.00
560.00
480.00
400.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
DISSECTED TP-H1011,H.R.TRIAXIAL CHS=1750 IN/MIN,600 PSI,MAXIMUM STRESS

Figure 17A

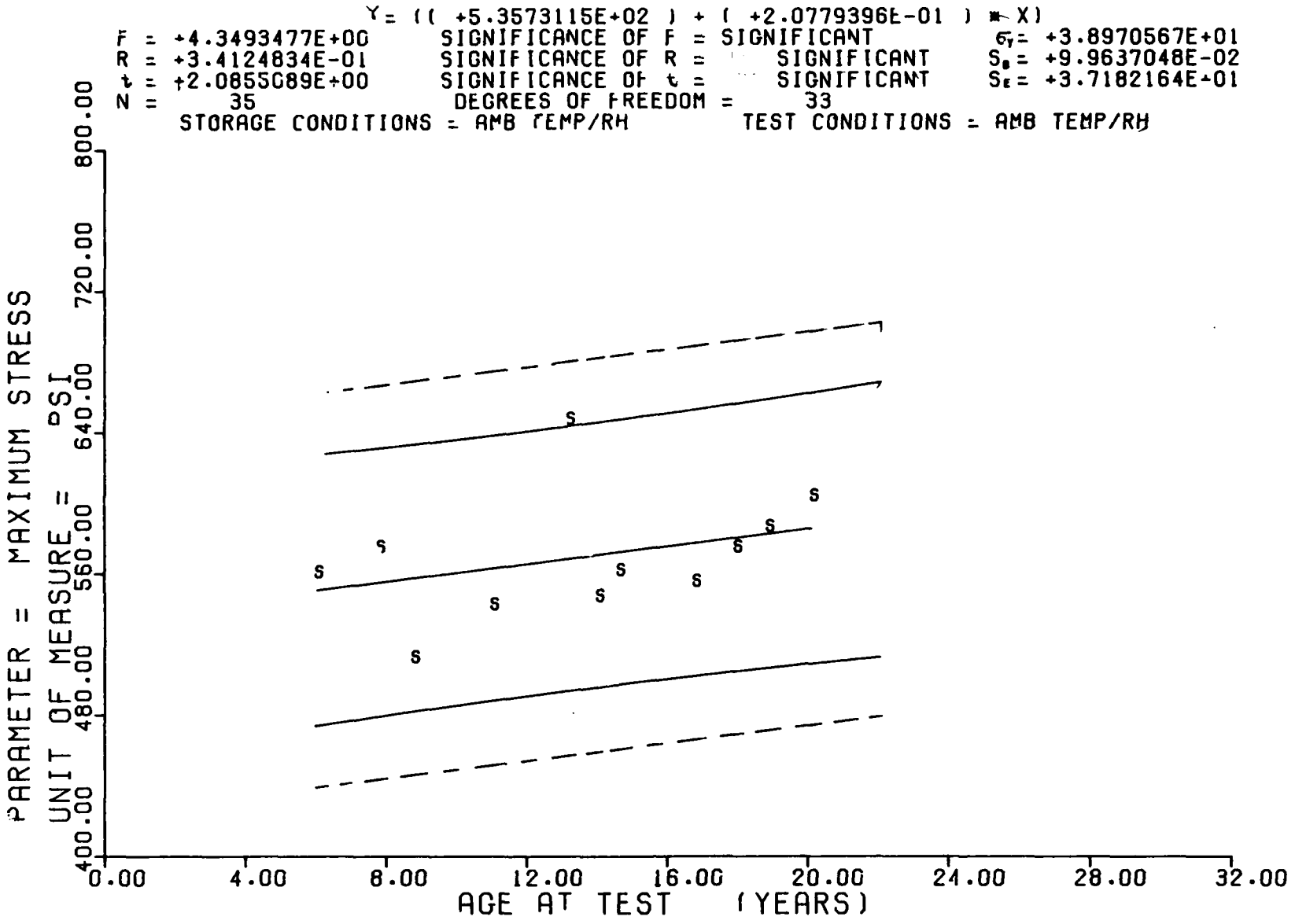

Y= ((+5.3573115E+02) + (+2.0779396E-01) * X)
F = +4.3493477E+00 SIGNIFICANCE OF F = SIGNIFICANT σT= +3.8970567E+01
R = +3.4124834E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +9.9637048E-02
t = +2.0855089E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +3.7182164E+01
N = 35 DEGREES OF FREEDOM = 33
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
800.00
720.00
640.00
560.00
480.00
400.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1.DISCTED MOTOR=STM-012.TRIAXIAL CHS=1750 IN/MIN.600 PSI.MAXIMUM STRESS.

Figure 17

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
72.0	8	+1.4608740E-01	+1.8257508E-02	+1.7989999E-01	+1.2679994E-01	+1.5686565E-01
93.0	2	+2.0399993E-01	+1.1313009E-02	+2.1199995E-01	+1.9599997E-01	+1.7152678E-01
105.0	2	+1.4399993E-01	+9.9003718E-03	+1.5099996E-01	+1.3699996E-01	+1.7990458E-01
132.0	2	+2.1999996E-01	+5.5242734E-05	+2.1999996E-01	+2.1999996E-01	+1.9875454E-01
158.0	2	+2.3649996E-01	+9.1923832E-03	+2.4299997E-01	+2.2999995E-01	+2.1690642E-01
168.0	2	+2.3724997E-01	+8.4158866E-03	+2.4319994E-01	+2.3129999E-01	+2.2388792E-01
175.0	3	+2.5686663E-01	+1.7221287E-02	+2.7669996E-01	+2.4569994E-01	+2.2877496E-01
201.0	3	+2.4799996E-01	+5.1924256E-03	+2.5099998E-01	+2.4199998E-01	+2.4692678E-01
215.0	3	+2.4453330E-01	+8.7539981E-03	+2.5309997E-01	+2.3559999E-01	+2.5670087E-01
226.0	3	+2.6769995E-01	+6.5183142E-03	+2.7199995E-01	+2.6019996E-01	+2.6438051E-01
241.0	5	+2.5959986E-01	+1.4155029E-02	+2.7699995E-01	+2.4799996E-01	+2.7485275E-01

STAGE 1.DISCTED MOTOR=STM-012.TRIAXIAL CHS=1750 IN/MIN.600 PSI.STRAIN MAX STRS.

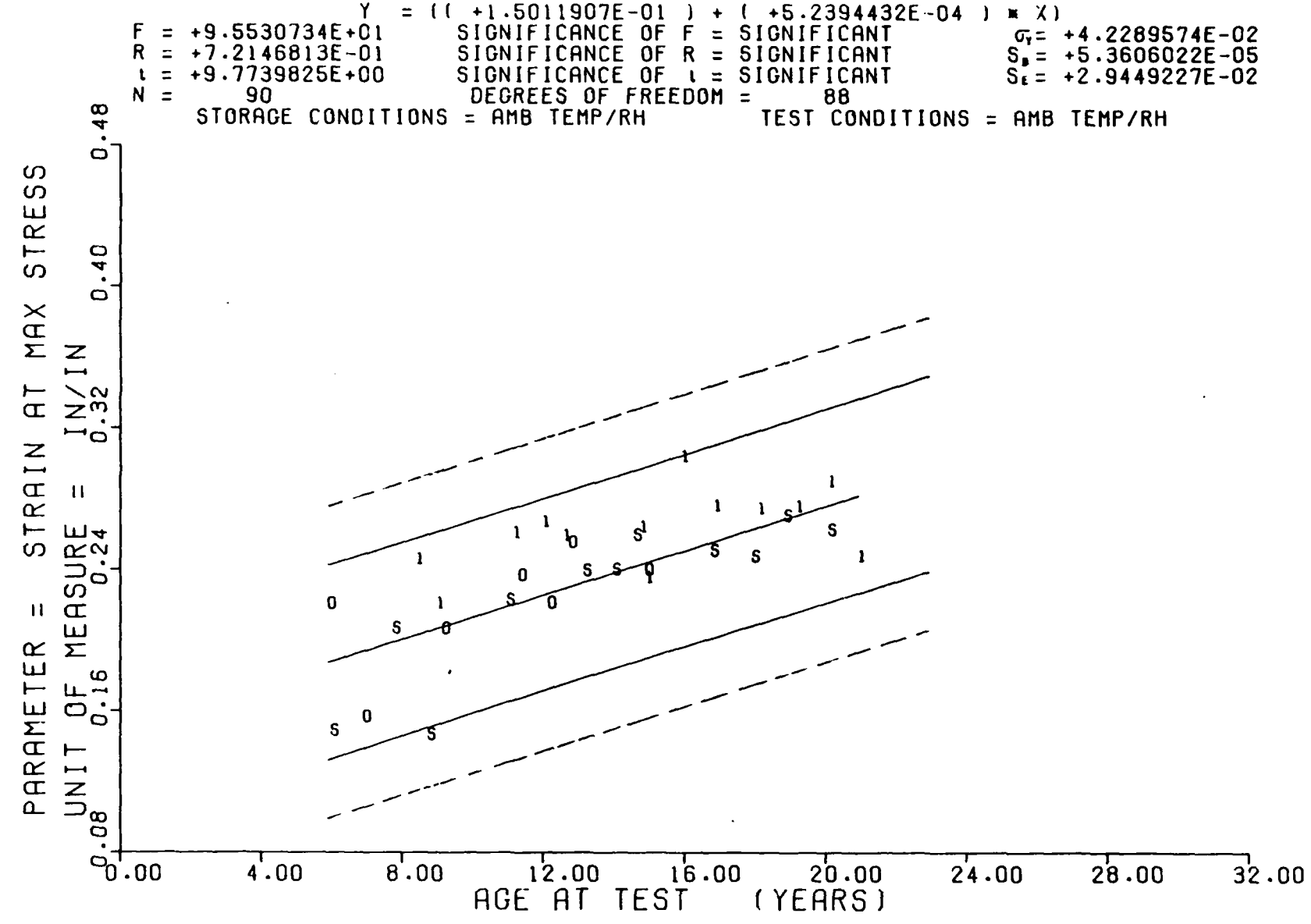

Y = ((+1.5011907E-01) + (+5.2394432E-04) * X)
F = +9.5530734E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +7.2146813E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +9.7739825E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 90 DEGREES OF FREEDOM = 88
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT MAX STRESS
UNIT OF MEASURE = IN/IN
0.08
0.16
0.24
0.32
0.40
0.48
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
DISSECTED TP-H1011.H.R.TRIAXIAL CHS=1750 IN/MIN.600 PSI.STRAIN MAX STRS.

Figure 16A

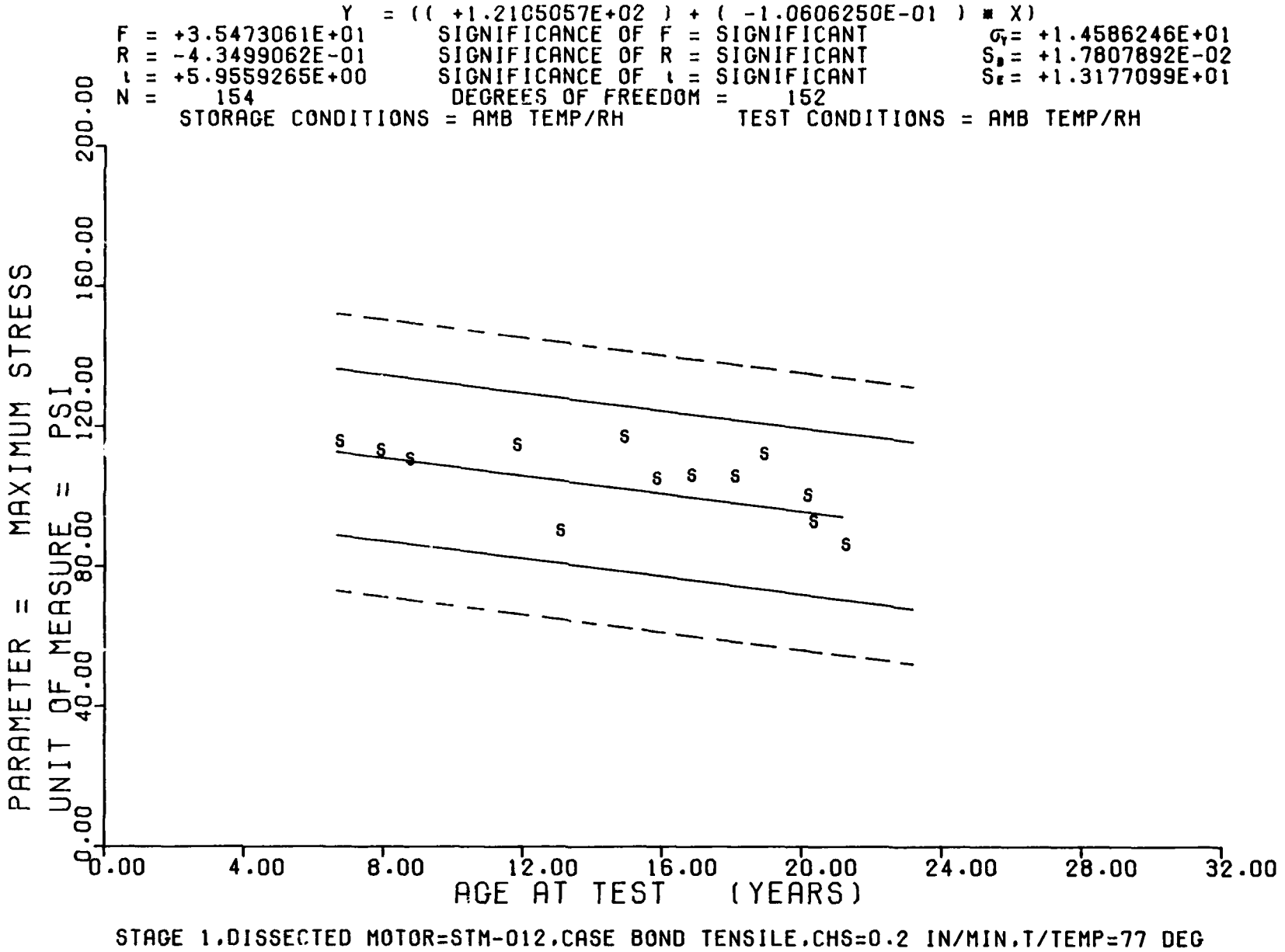

Y = ((+1.2105057E+02) + (-1.0606250E-01) * X)
F = +3.5473061E+01 SIGNIFICANCE OF F = SIGNIFICANT σy = +1.4586246E+01
R = -4.3499062E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +1.7807892E-02
t = +5.9559265E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +1.3177099E+01
N = 154 DEGREES OF FREEDOM = 152
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
0.00
40.00
80.00
120.00
160.00
200.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISSECTED MOTOR=STM-012,CASE BOND TENSILE,CHS=0.2 IN/MIN,T/TEMP=77 DEG

Figure 21

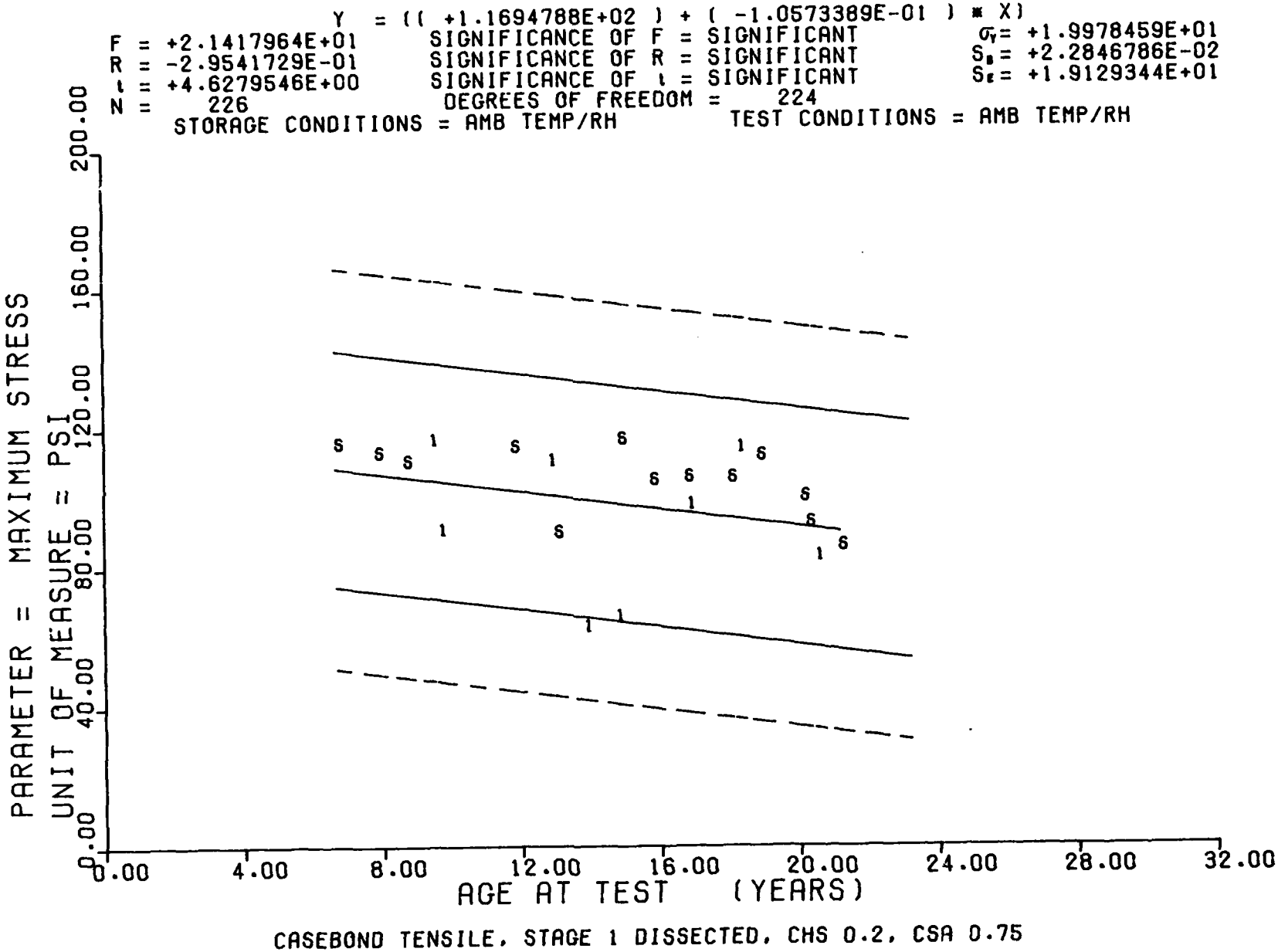

Y = ((+1.1694788E+02) + (-1.0573389E-01) * X)
F = +2.1417964E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = -2.9541729E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +4.6279546E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 226 DEGREES OF FREEDOM = 224
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
σT = +1.9978459E+01
SB = +2.2846786E-02
Sε = +1.9129344E+01
PARAMETER = MAXIMUM STRESS
UNIT OF MEASURE = PSI
0.00
40.00
80.00
120.00
160.00
200.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
CASEBOND TENSILE, STAGE 1 DISSECTED, CHS 0.2, CSA 0.75

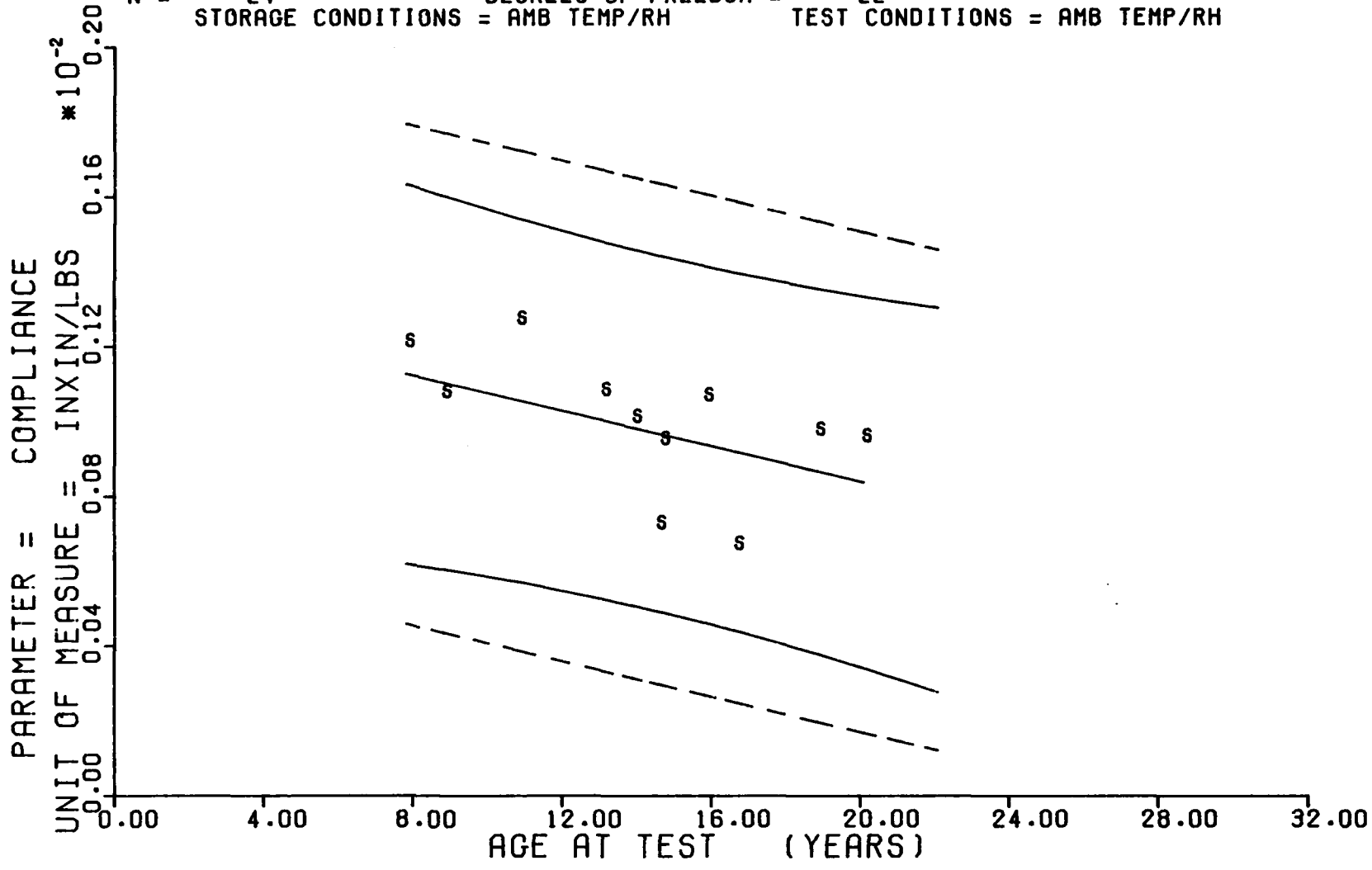
Figure 21A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

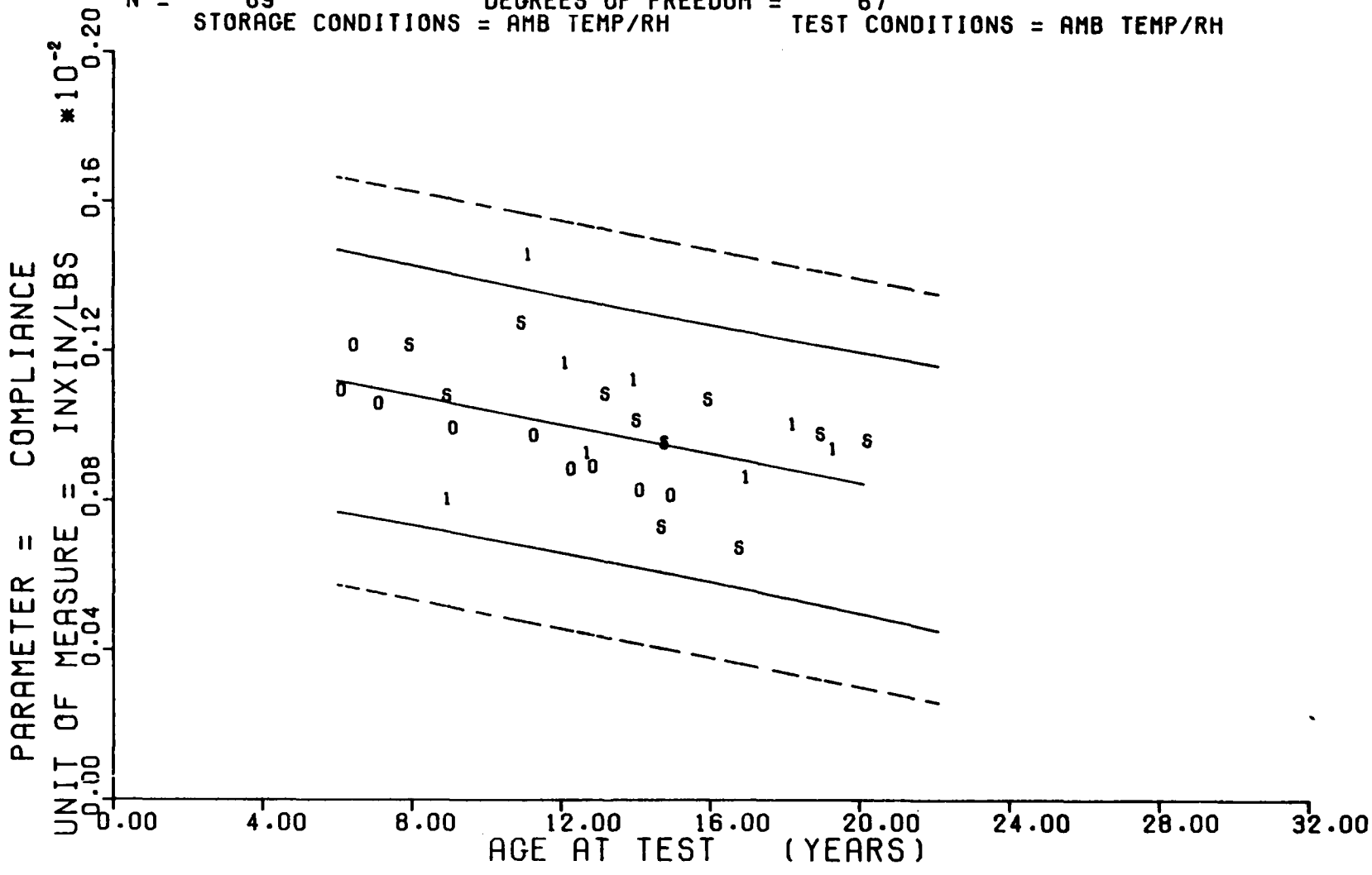
AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
60.0	27	+1.1415544E+02	+7.3554707E+00	+1.2750000E+02	+1.0019999E+02	+1.1256556E+02
94.0	2	+1.1159999E+02	+7.1983463E+01	+1.6250000E+02	+6.0699996E+01	+1.1108068E+02
104.0	10	+1.0909999E+02	+1.0514011E+01	+1.2000000E+02	+8.1000000E+01	+1.1002006E+02
141.0	11	+1.1316352E+02	+4.0409860E+00	+1.1839999E+02	+1.0879998E+02	+1.0609574E+02
156.0	22	+8.8616775E+01	+2.2961742E+00	+9.2000000E+01	+8.5000000E+01	+1.0450482E+02
178.0	6	+1.1547241E+02	+6.3186383E+00	+1.2297999E+02	+1.0453999E+02	+1.0217144E+02
189.0	11	+1.0357351E+02	+8.9002027E+00	+1.1869999E+02	+8.9299987E+01	+1.0100476E+02
201.0	12	+1.0448907E+02	+6.4760867E+00	+1.1179998E+02	+8.8899993E+01	+9.9732009E+01
210.0	10	+1.0423492E+02	+6.9828566E+00	+1.1737998E+02	+9.1889999E+01	+9.8141067E+01
220.0	10	+1.1057989E+02	+4.8293509E+00	+1.1589999E+02	+1.0139999E+02	+9.7080444E+01
241.0	9	+9.3788757E+01	+3.8530957E+00	+1.0829998E+02	+9.6000000E+01	+9.5489501E+01
243.0	5	+9.1321914E+01	+2.7938967E+01	+1.1164999E+02	+4.2619995E+01	+9.5277374E+01
264.0	17	+8.4664011E+01	+8.9678805E+00	+1.1019999E+02	+7.3799987E+01	+9.4110687E+01

STAGE 1,DISSECTED MOTOR=STM-012,CASE BOND TENSILE,CHS=0.2 IN/MIN,T/TEMP=77 DEG



STAGE 1,DISCTED MOTOR=STM-012,CREEP 10 LB LOAD,COMPLIANCE AT 10 SEC.

Figure 22



DISSECTED MOTOR TP-H1011,CREEP 10 LB LOAD,COMPLIANCE AT 10 SEC.

Figure 22A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
94.0	2	+1.1999998E-03	+2.1213078E-04	+1.3499998E-03	+1.0499998E-03	+1.1260141E-03
106.0	2	+1.0649997E-03	+1.0606633E-04	+1.1399998E-03	+9.8999985E-04	+1.1024142E-03
130.0	1	+1.2599998E-03	+0.0000000E+07	+1.2599998E-03	+1.2599998E-03	+1.0552140E-03
157.0	1	+1.0699999E-03	+0.0000000E+07	+1.0699999E-03	+1.0699999E-03	+1.0021138E-03
167.0	4	+9.9999923E-04	+2.6558373E-04	+1.3099999E-03	+7.4999989E-04	+9.8244706E-04
175.0	2	+7.1499985E-04	+5.0204537E-04	+1.0699999E-03	+3.5999994E-04	+9.6671376E-04
176.0	1	+9.3999993E-04	+0.0000000E+07	+9.3999993E-04	+9.3999993E-04	+9.6474704E-04
190.0	3	+1.0566664E-03	+2.3070038E-05	+1.0699999E-03	+1.0299999E-03	+9.3721365E-04
200.0	3	+6.5999990E-04	+1.0440365E-04	+7.2999997E-04	+5.3999992E-04	+9.1754691E-04
226.0	2	+9.6499989E-04	+2.4748722E-04	+1.1399998E-03	+7.8999996E-04	+8.6641358E-04
241.0	3	+9.4666634E-04	+2.3089617E-05	+9.5999985E-04	+9.1999978E-04	+8.3691347E-04

STAGE 1,DISCTED MOTOR=STM-012,CREEP 10 LB LOAD,COMPLIANCE AT 10 SEC.

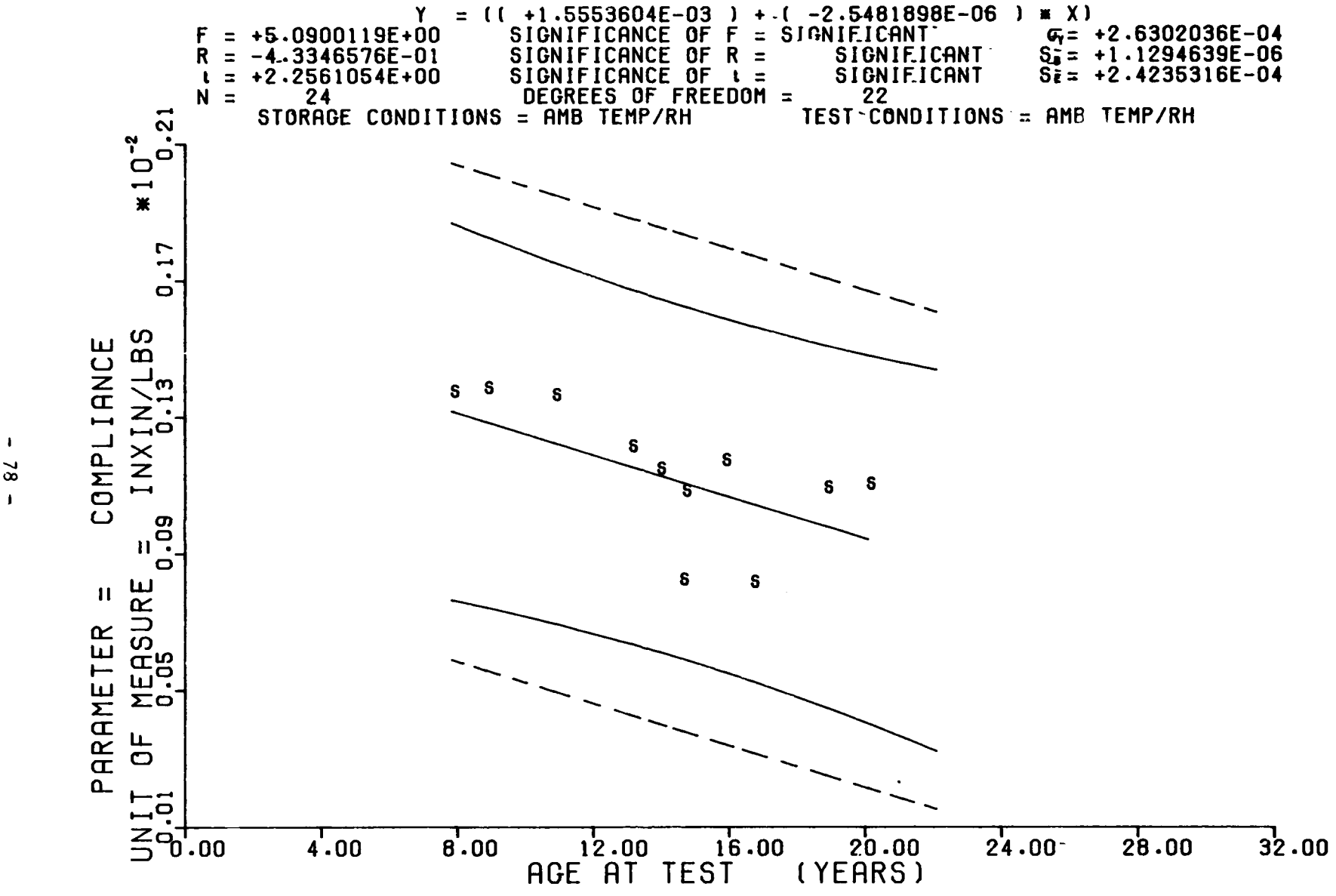
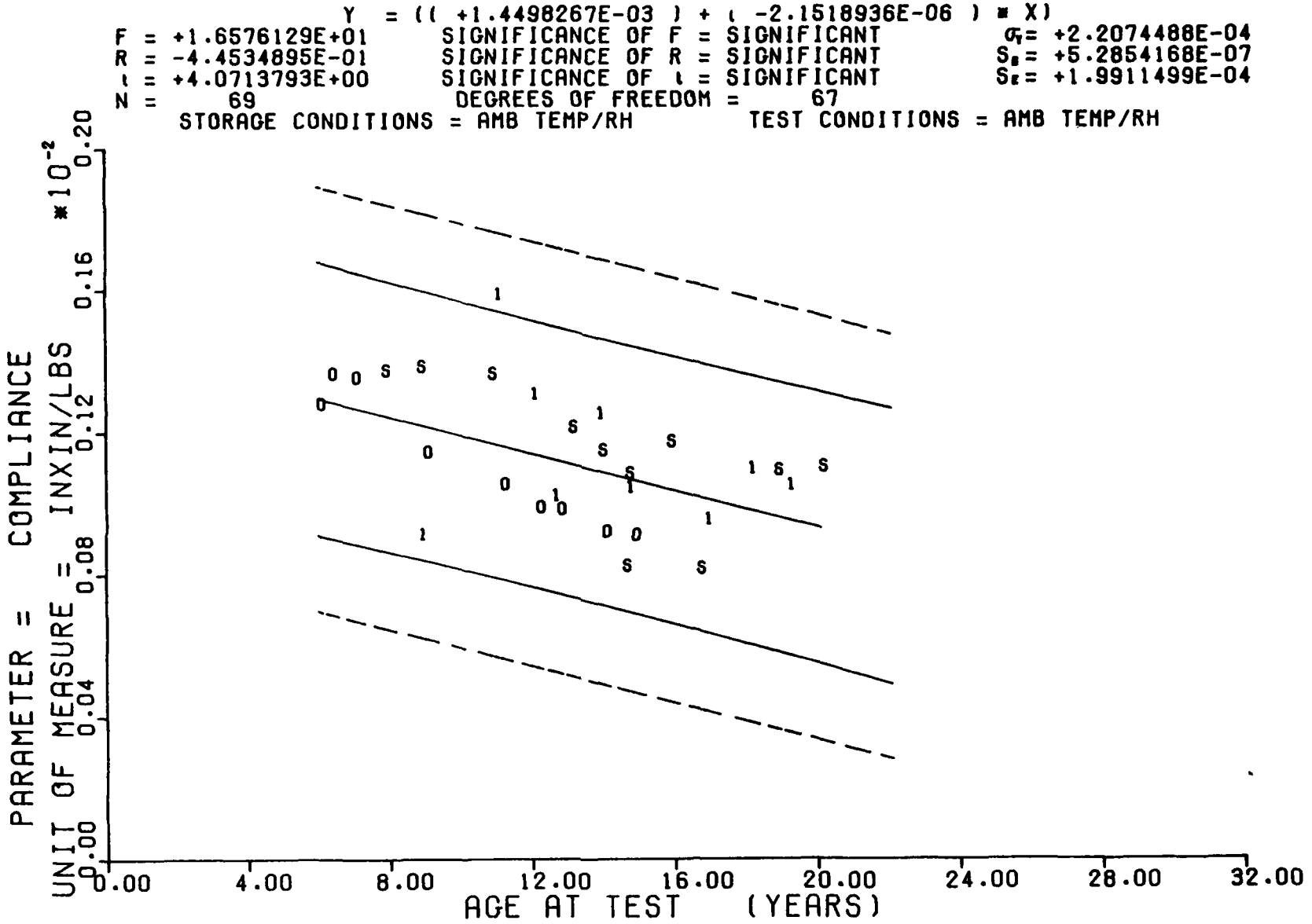

Y = ((+1.5553604E-03) + (-2.5481898E-06) * X)
F = +5.0900119E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = -4.3346576E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +2.2561054E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 24 DEGREES OF FREEDOM = 22
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = COMPLIANCE
UNIT OF MEASURE = INXIN/LBS *10-2
0.21
0.17
0.13
0.09
0.05
0.01
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISCTED MOTOR=STM-012,CREEP 10 LB LOAD,COMPLIANCE AT 20 SEC.

Figure 23



DISSECTED MOTOR TP-H1011,CREEP 10 LB LOAD,COMPLIANCE AT 20 SEC.

Figure 23A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
94.0	2	+1.3599998E-03	+1.9799095E-04	+1.4999997E-03	+1.2199999E-03	+1.3158305E-03
106.0	2	+1.3699999E-03	+1.2727363E-04	+1.4599999E-03	+1.2799999E-03	+1.2852521E-03
130.0	1	+1.3499998E-03	+0.0000000E+07	+1.3499998E-03	+1.3499998E-03	+1.2240957E-03
157.0	1	+1.1999998E-03	+0.0000000E+07	+1.1999998E-03	+1.1999998E-03	+1.1552944E-03
167.0	4	+1.1349990E-03	+3.2254526E-04	+1.4999997E-03	+8.2999980E-04	+1.1298125E-03
175.0	2	+8.0999988E-04	+5.7982713E-04	+1.2199999E-03	+3.9999978E-04	+1.1094270E-03
176.0	1	+1.0699999E-03	+0.0000000E+07	+1.0699999E-03	+1.0699999E-03	+1.1068789E-03
190.0	3	+1.1599997E-03	+1.9983605E-05	+1.1799999E-03	+1.1399998E-03	+1.0712041E-03
200.0	3	+8.0333300E-04	+3.0545402E-05	+8.2999980E-04	+7.6999980E-04	+1.0457222E-03
226.0	2	+1.0799998E-03	+2.8284197E-04	+1.2799999E-03	+8.7999994E-04	+9.7946939E-04
241.0	3	+1.0899999E-03	+3.4627292E-05	+1.1299999E-03	+1.0699999E-03	+9.4124651E-04

STAGE 1,DISCTED MOTOR=STM-012,CREEP 10 LB LOAD,COMPLIANCE AT 20 SEC.

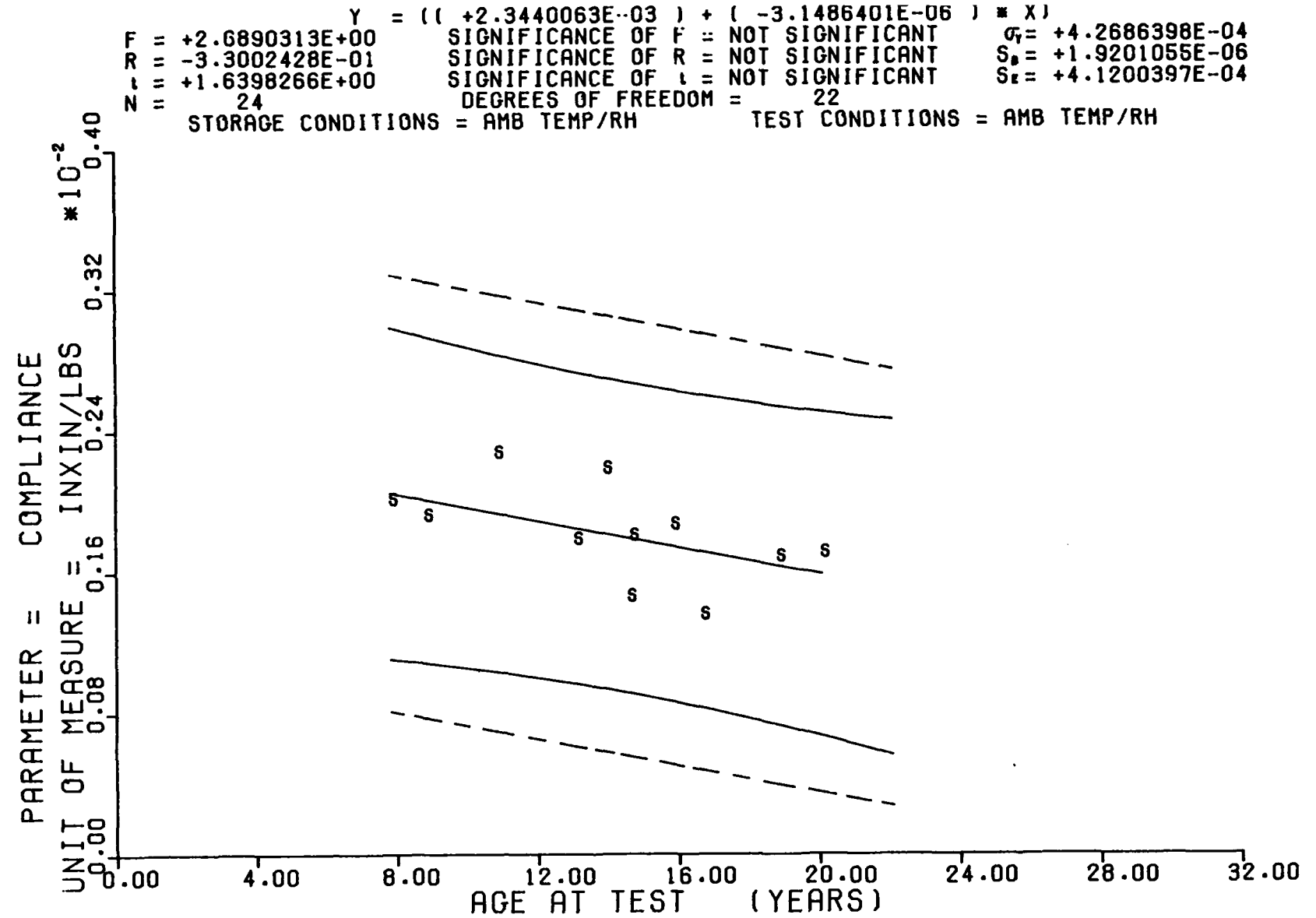

Y = ((+2.3440063E-03) + (-3.1486401E-06) * X)
F = +2.6890313E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σT = +4.2686398E-04
R = -3.3002428E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +1.9201055E-06
t = +1.6398266E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Se = +4.1200397E-04
N = 24 DEGREES OF FREEDOM = 22
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = COMPLIANCE
UNIT OF MEASURE = INXIN/LBS *10-2
0.00
0.08
0.16
0.24
0.32
0.40
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISCTED MOTOR=STM-012,CREEP 10 LB LOAD,COMPLIANCE AT 1000 SEC.

Figure 24

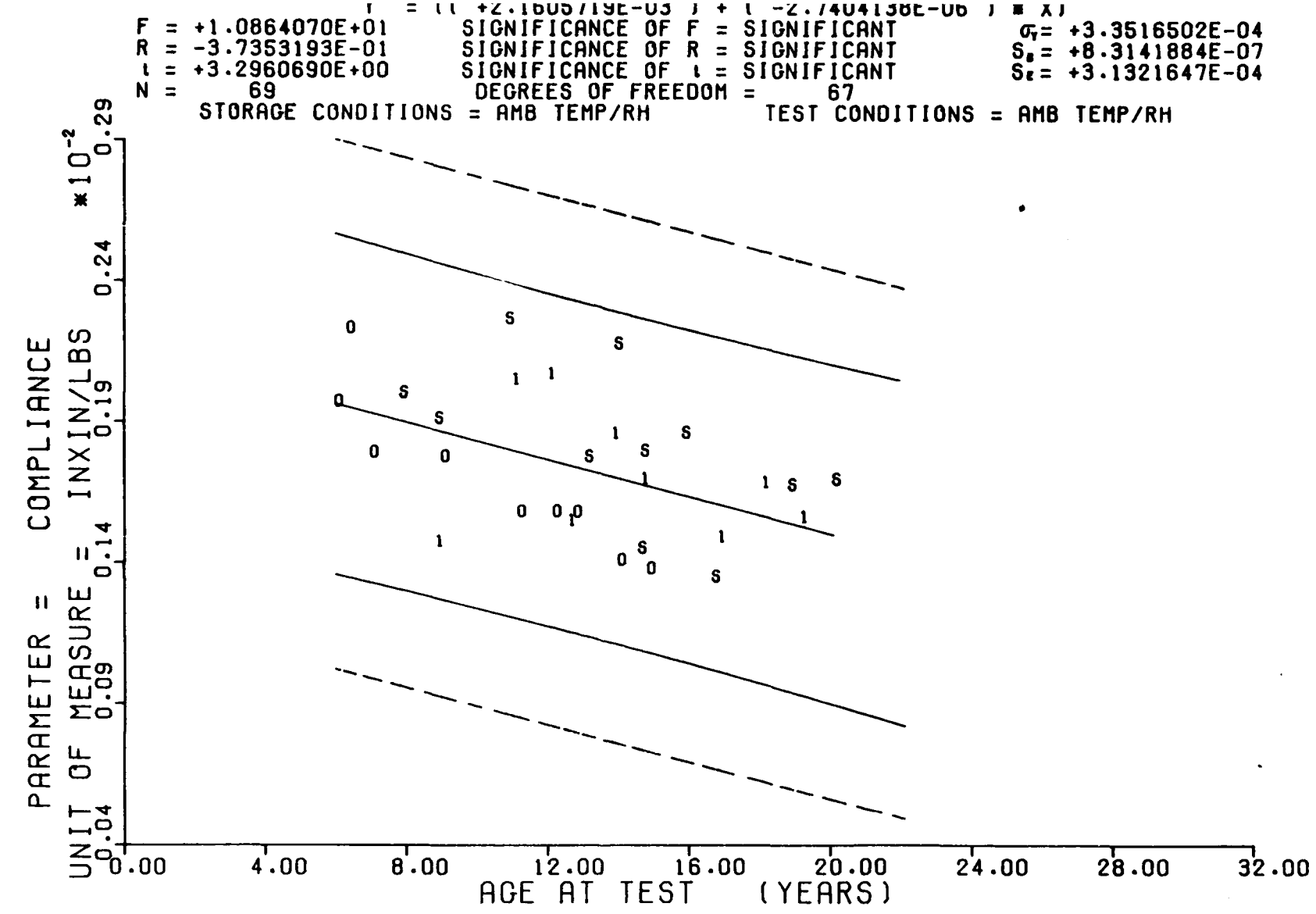

Y = (+2.1605719E-03) + (-2.7404136E-06) * X)
F = +1.0864070E+01 SIGNIFICANCE OF F = SIGNIFICANT σT= +3.3516502E-04
R = -3.7353193E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb= +8.3141884E-07
t = +3.2960690E+00 SIGNIFICANCE OF t = SIGNIFICANT Se= +3.1321647E-04
N = 69 DEGREES OF FREEDOM = 67
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = COMPLIANCE
UNIT OF MEASURE = IN/LBS *10-2
0.29
0.24
0.19
0.14
0.09
0.04
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
DISSECTED MOTOR TP-H1011,CREEP 10 LB LOAD,COMPLIANCE AT 1000 SEC.

Figure 24A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
94.0	2	+1.9849985E-03	+2.8993104E-04	+2.1899999E-03	+1.7799998E-03	+2.0480339E-03
106.0	2	+1.8949997E-03	+1.9919962E-04	+2.0299998E-03	+1.7599998E-03	+2.0102504E-03
130.0	1	+2.2499999E-03	+0.0000000E+07	+2.2499999E-03	+2.2499999E-03	+1.9346829E-03
157.0	1	+1.7599998E-03	+0.0000000E+07	+1.7599998E-03	+1.7599998E-03	+1.8496697E-03
167.0	4	+2.1599987E-03	+6.0183269E-04	+2.7199999E-03	+1.6099999E-03	+1.8181833E-03
175.0	2	+1.4349997E-03	+9.6873651E-04	+2.1199998E-03	+7.4999989E-04	+1.7929943E-03
176.0	1	+1.7799998E-03	+0.0000000E+07	+1.7799998E-03	+1.7799998E-03	+1.7898455E-03
190.0	3	+1.8433332E-03	+7.6376462E-05	+1.9099998E-03	+1.7599998E-03	+1.7457646E-03
200.0	3	+1.3333321E-03	+2.0527159E-04	+1.5599997E-03	+1.1599999E-03	+1.7142782E-03
226.0	2	+1.6599998E-03	+3.5355438E-04	+1.9099998E-03	+1.4099997E-03	+1.6324135E-03
241.0	3	+1.6799990E-03	+7.0027737E-05	+1.7599998E-03	+1.6299998E-03	+1.5851838E-03

STAGE 1,DISCTED MOTOR=STM-012,CREEP 10 LB LOAD,COMPLIANCE AT 1000 SEC.

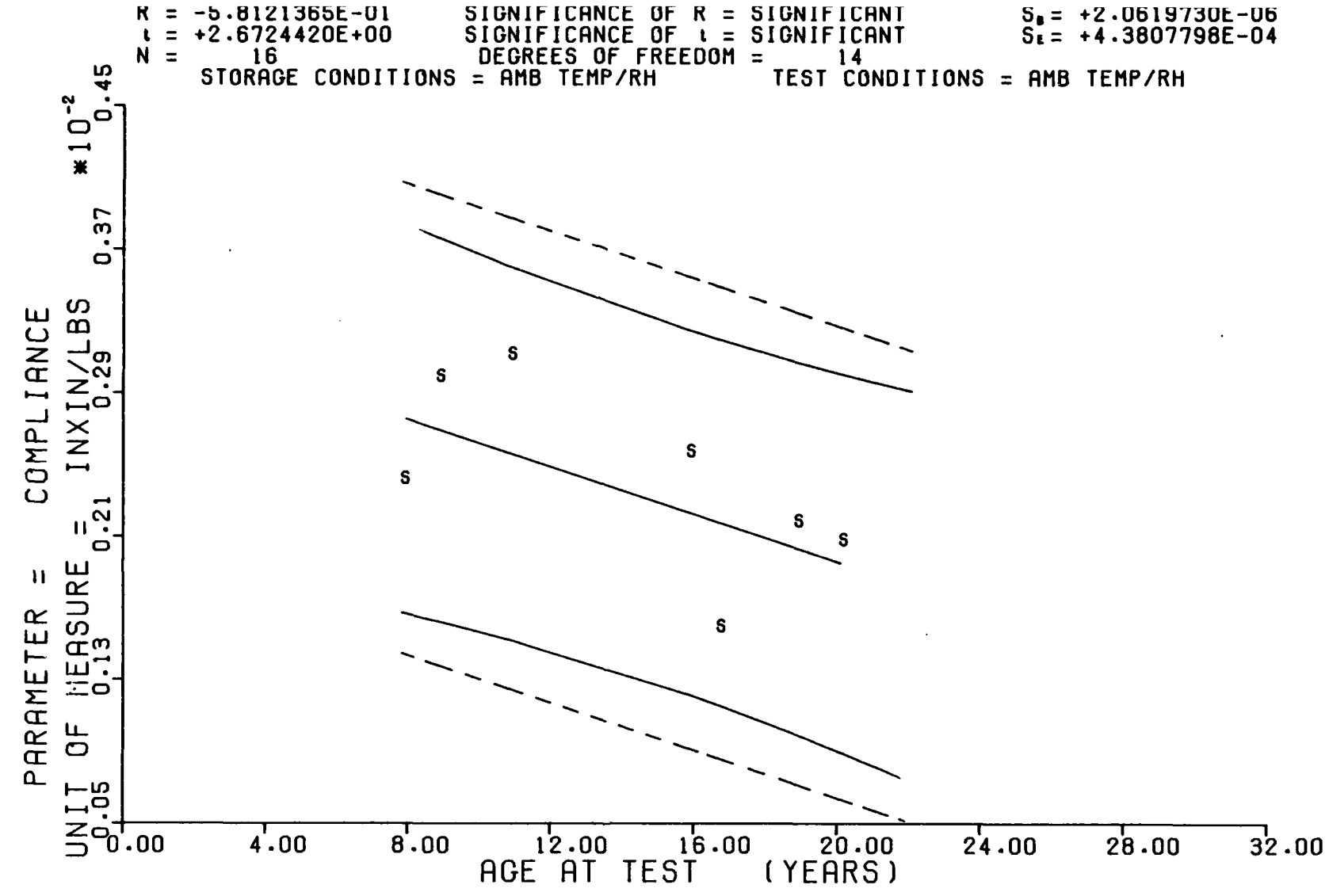
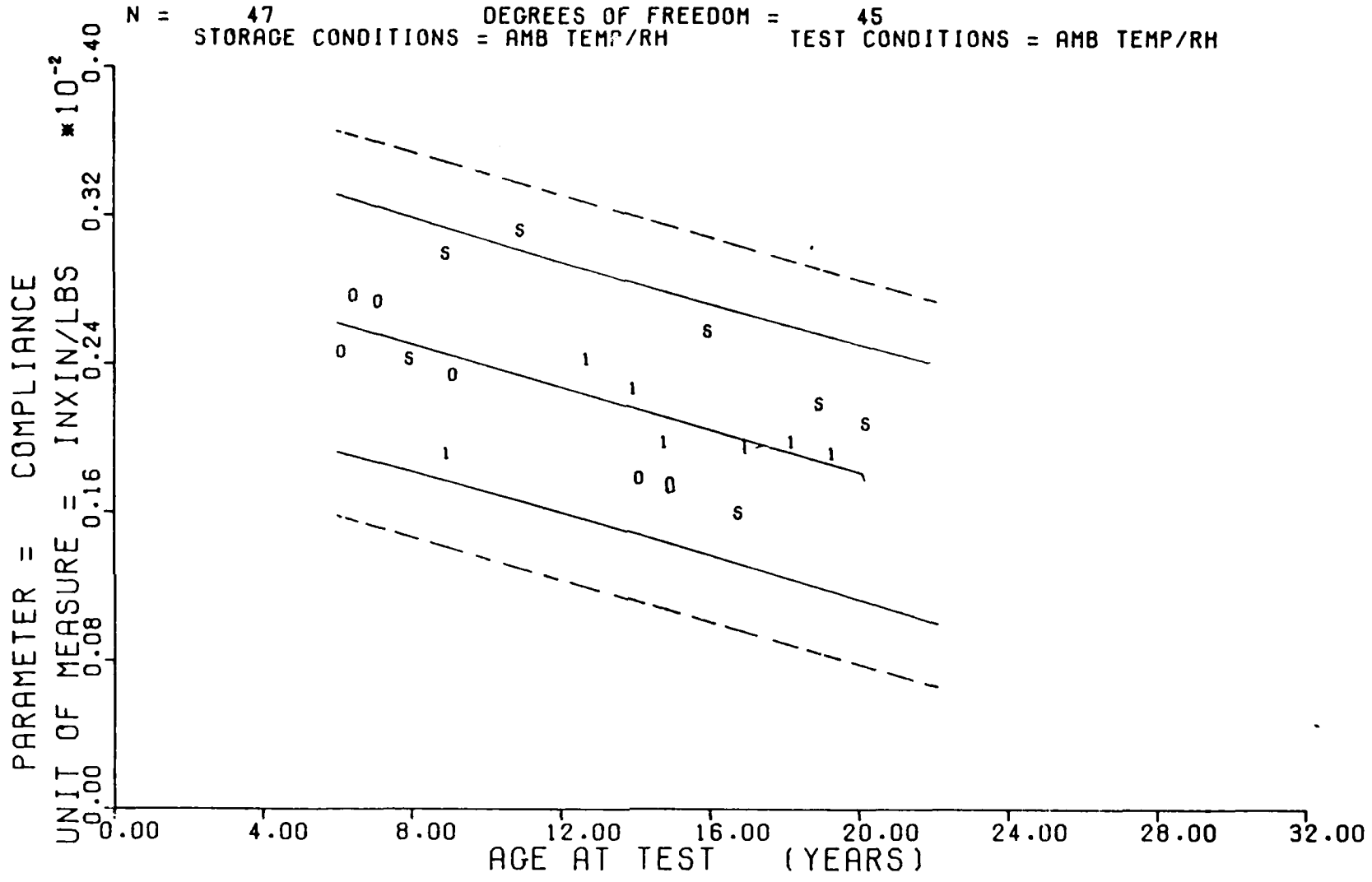

R = -5.8121365E-01
SIGNIFICANCE OF R = SIGNIFICANT
S_B = +2.0619730E-06
t = +2.6724420E+00
SIGNIFICANCE OF t = SIGNIFICANT
S_E = +4.3807798E-04
N = 16
DEGREES OF FREEDOM = 14
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
PARAMETER = COMPLIANCE
UNIT OF MEASURE = INXIN/LBS *10^{-2}
0.45
0.37
0.29
0.21
0.13
0.05
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1.DISCTED MOTOR=STM-012.CREEP 10 LB LOAD.COMPLIANCE AT 10.000 SEC.

Figure 25

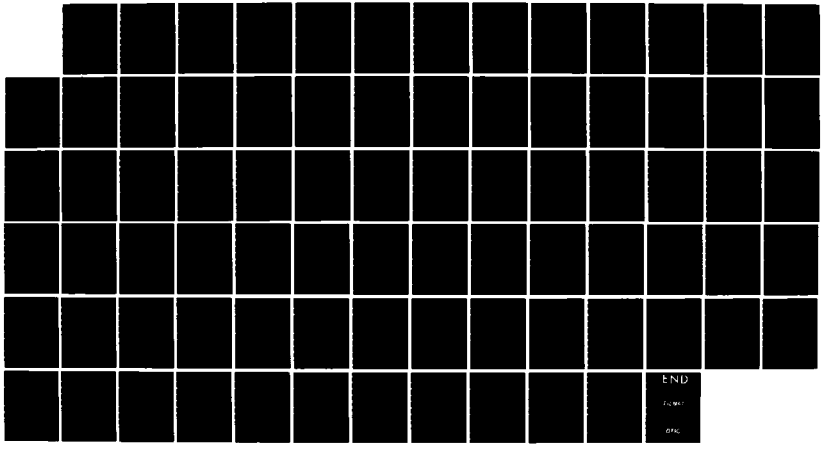


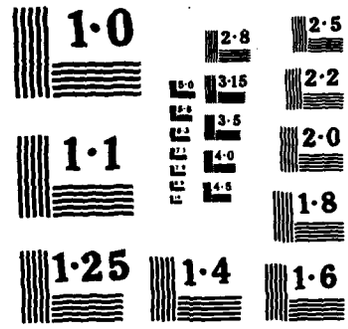
DISSECTED MOTOR TP-H1011,CREEP 10 LB LOAD,COMPLIANCE AT 10.000 SEC.

Figure 25A

AD-A156 088 DISSECTED MOTORS/PROPELLANTS MOTOR NUMBER STM-012 PHASE XV SURVEILLANCE R..(U) OGDEN AIR LOGISTICS CENTER HILL AFB UT PROPELLANT ANALYSIS LA.. J A THOMPSON APR 85 2/2

UNCLASSIFIED MANPA-506(85) F/G 21/8.2 NL



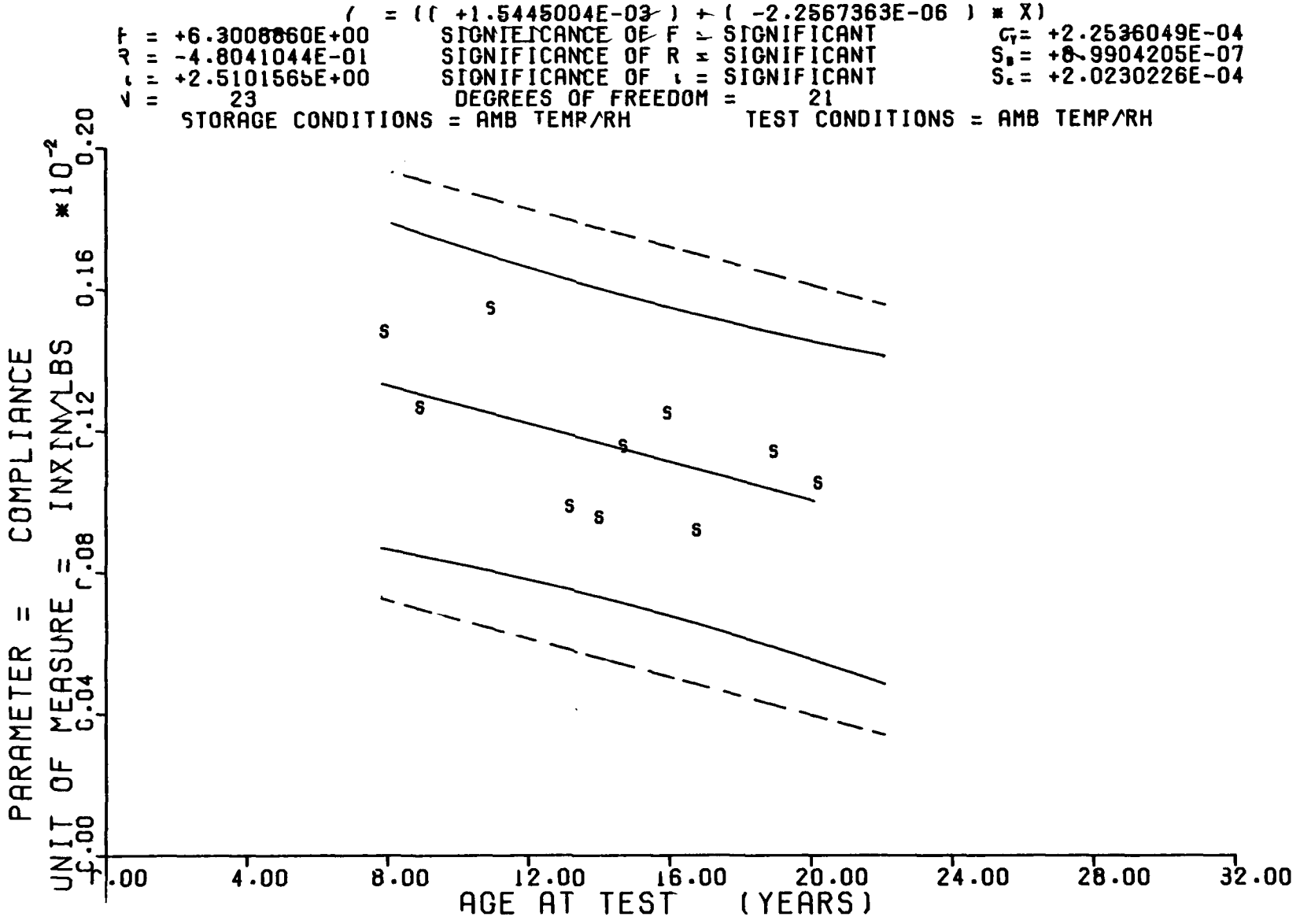


**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
94.0	2	+2.3949984E-03	+3.3236062E-04	+2.6299997E-03	+2.1599999E-03	+2.7621812E-03
100.0	2	+2.9649995E-03	+3.7476604E-04	+3.2299999E-03	+2.6999998E-03	+2.6960549E-03
150.0	1	+3.0899997E-03	+0.0000000E+07	+3.0899997E-03	+3.0899997E-03	+2.5638029E-03
190.0	3	+2.5466654E-03	+1.2741781E-04	+2.6299997E-03	+2.3999998E-03	+2.2331727E-03
200.0	3	+1.5699986E-03	+1.3116957E-04	+1.6899998E-03	+1.4299999E-03	+2.1780678E-03
238.0	2	+2.1599996E-03	+4.5255047E-04	+2.4799997E-03	+1.8399998E-03	+2.0347947E-03
241.0	3	+2.0533327E-03	+5.8615700E-05	+2.1199998E-03	+2.0099999E-03	+1.9521370E-03

STAGE 1,DISCTED MOTOR=STM-012,CREEP 10 LB LOAD,COMPLIANCE AT 10.000 SEC.



STAGE 1,DISCTED MOTOR=STM-012,CREEP 12 LB LOAD,COMPLIANCE AT 10 SEC.

Figure 26

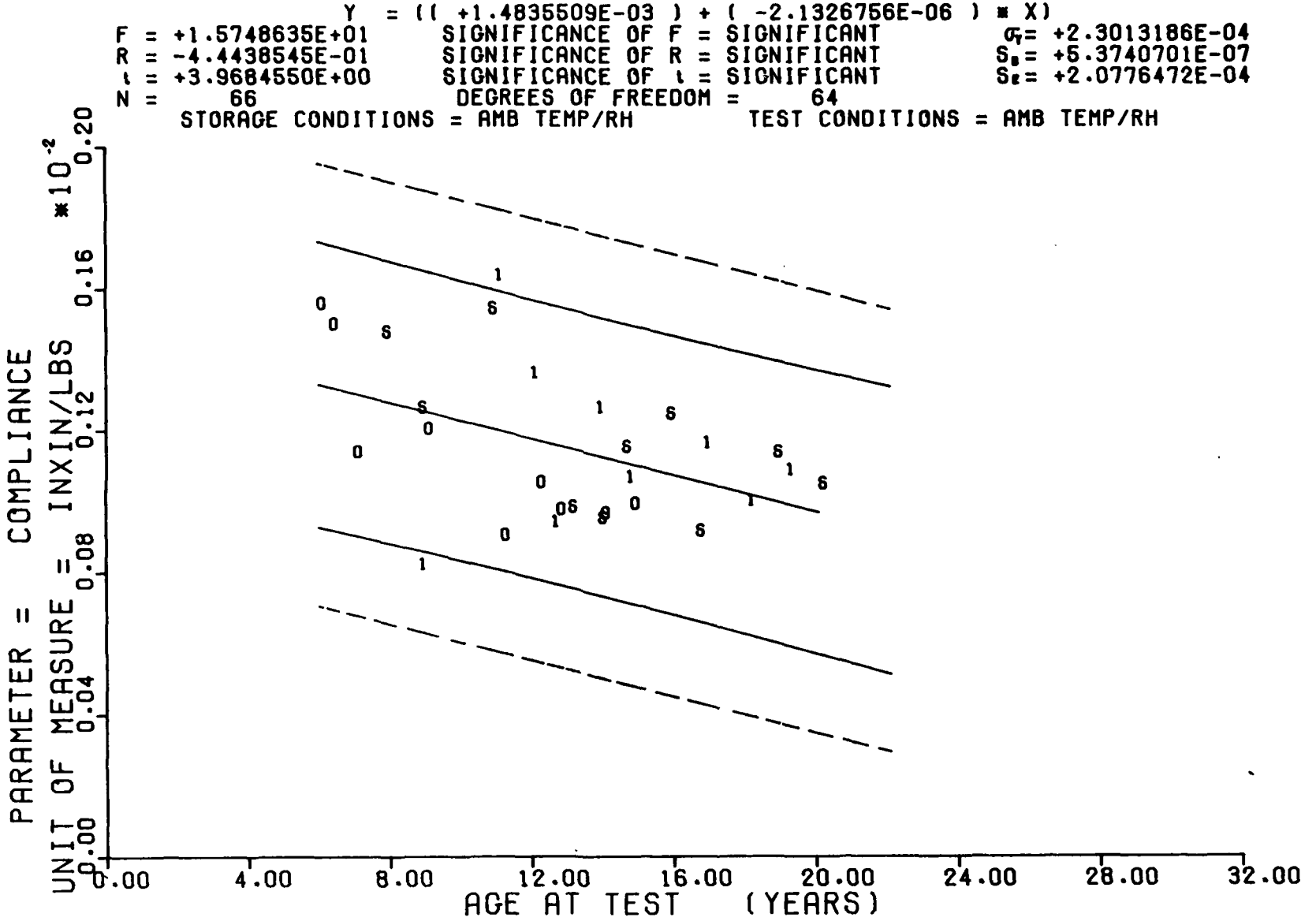

Y = ((+1.4835509E-03) + (-2.1326756E-06) * X)
F = +1.5748635E+01 SIGNIFICANCE OF F = SIGNIFICANT σT= +2.3013186E-04
R = -4.4438545E-01 SIGNIFICANCE OF R = SIGNIFICANT Sa= +5.3740701E-07
t = +3.9684550E+00 SIGNIFICANCE OF t = SIGNIFICANT Se= +2.0776472E-04
N = 66 DEGREES OF FREEDOM = 64
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = COMPLIANCE
UNIT OF MEASURE = INXIN/LBS *10-2
0.00
0.04
0.08
0.12
0.16
0.20
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
DISSECTED MOTOR TP-H1011,CREEP 12 LB LOAD,COMPLIANCE AT 10 SEC.

Figure 26A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
74.0	2	+1.4o49999E-03	+4.7376064E-04	+1.7999999E-03	+1.1299999E-03	+1.3323670E-03
106.0	2	+1.2499999E-03	+1.2372798E-06	+1.2499999E-03	+1.2499999E-03	+1.3052863E-03
130.0	1	+1.5299997E-03	+0.0000000E+07	+1.5299997E-03	+1.5299997E-03	+1.2511245E-03
137.0	2	+9.6999993E-04	+8.4851797E-05	+1.0299999E-03	+9.0999994E-04	+1.1901927E-03
167.0	1	+9.3999993E-04	+0.0000000E+07	+9.3999993E-04	+9.3999993E-04	+1.1676254E-03
175.0	2	+1.1399996E-03	+2.2627260E-04	+1.2999998E-03	+9.7999977E-04	+1.1495715E-03
190.0	3	+1.2333332E-03	+1.5267235E-05	+1.2499999E-03	+1.2199999E-03	+1.1157204E-03
200.0	3	+9.0333307E-04	+1.1930179E-04	+9.9999993E-04	+7.6999980E-04	+1.0931531E-03
220.0	4	+1.1249994E-03	+1.6545912E-04	+1.2799999E-03	+9.0999994E-04	+1.0344779E-03
241.0	3	+1.0366663E-03	+1.0214354E-04	+1.1099998E-03	+9.1999978E-04	+1.0006269E-03

STAGE 1,DISCTED MOTOR=STM-012,CREEP 12 LB LOAD,COMPLIANCE AT 10 SEC.

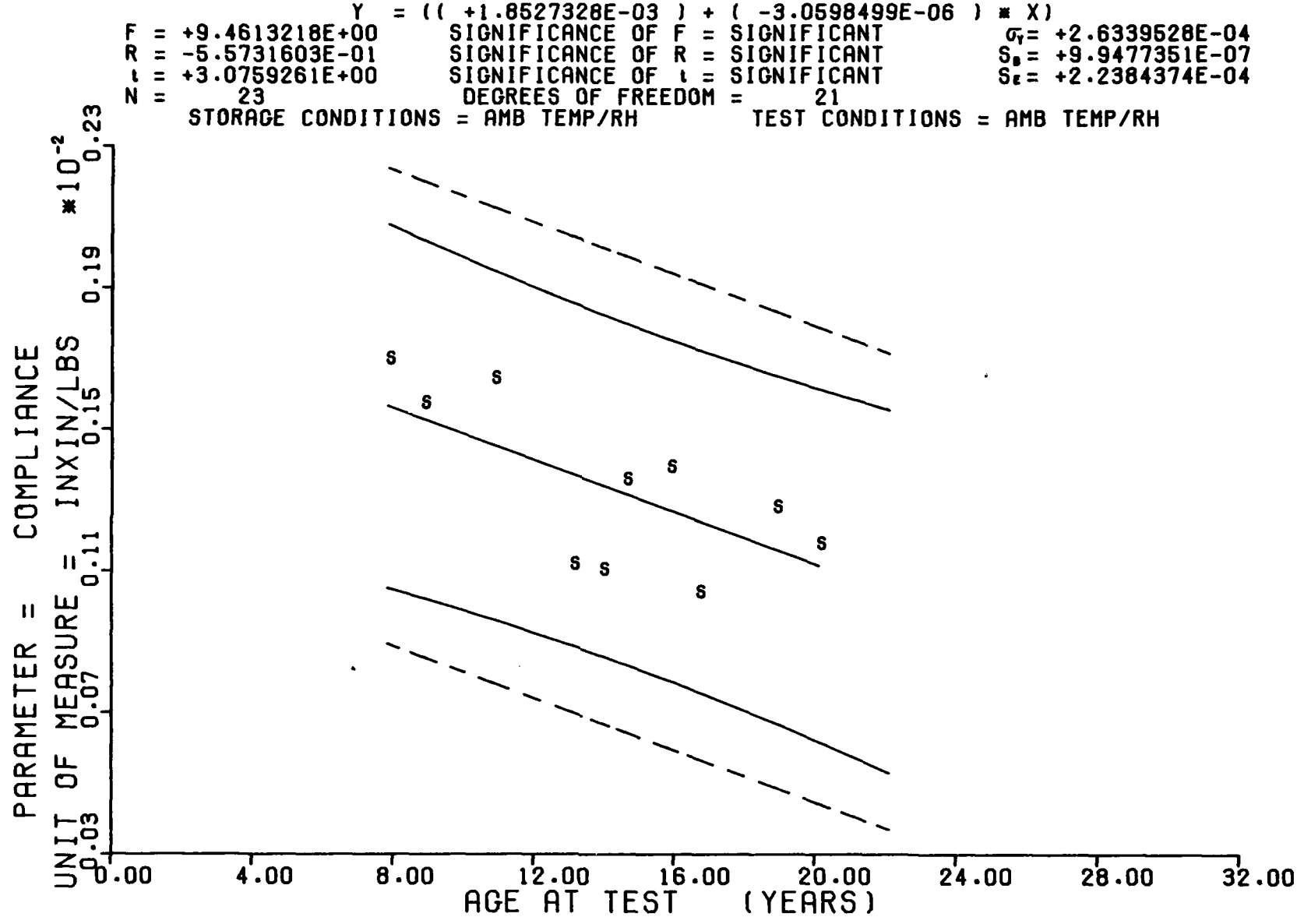
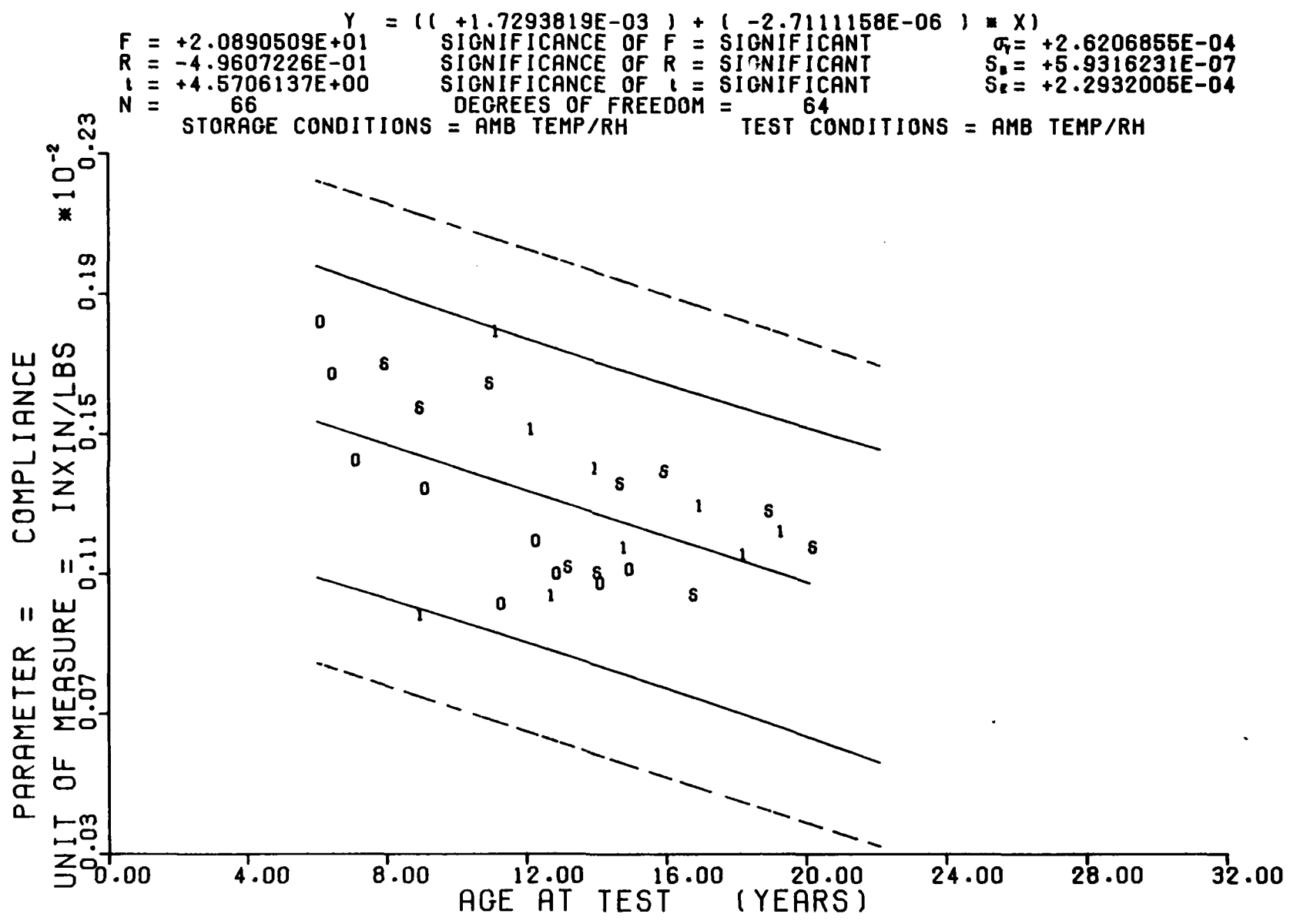

Y = ((+1.8527328E-03) + (-3.0598499E-06) * X)
F = +9.4613218E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = -5.5731603E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +3.0759261E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 23 DEGREES OF FREEDOM = 21
σY= +2.6339528E-04
SB= +9.9477351E-07
Sε= +2.2384374E-04
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
PARAMETER = COMPLIANCE
UNIT OF MEASURE = INXIN/LBS *10-2
0.23
0.19
0.15
0.11
0.07
0.03
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISCTED MOTOR=STM-012,CREEP 12 LB LOAD,COMPLIANCE AT 20 SEC.

Figure 27



DISSECTED MOTOR TP-H1011.CREEP 12 LB LOAD.COMPLIANCE AT 20 SEC.

Figure 27A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
94.0	2	+1.6849997E-03	+5.7275576E-04	+2.0899998E-03	+1.2799999E-03	+1.5651069E-03
106.0	2	+1.5599997E-03	+7.2227293E-07	+1.5599997E-03	+1.5599997E-03	+1.5283885E-03
130.0	1	+1.6299998E-03	+0.0000000E+07	+1.6299998E-03	+1.6299998E-03	+1.4549521E-03
157.0	2	+1.1049997E-03	+7.7775862E-05	+1.1599999E-03	+1.0499998E-03	+1.3723364E-03
167.0	1	+1.0899999E-03	+0.0000000E+07	+1.0899999E-03	+1.0899999E-03	+1.3417378E-03
175.0	2	+1.3449997E-03	+2.6162792E-04	+1.5299997E-03	+1.1599999E-03	+1.3172589E-03
190.0	3	+1.3799988E-03	+1.7416958E-05	+1.3899998E-03	+1.3599998E-03	+1.2713612E-03
200.0	3	+1.0266664E-03	+1.3316534E-04	+1.1399998E-03	+8.7999994E-04	+1.2407628E-03
226.0	4	+1.2674992E-03	+1.7270442E-04	+1.4199998E-03	+1.0199998E-03	+1.1612067E-03
241.0	3	+1.1633331E-03	+1.2219998E-04	+1.2699998E-03	+1.0299999E-03	+1.1153088E-03

STAGE 1,DISCTED MOTOR=STM-012,CREEP 12 LB LOAD,COMPLIANCE AT 20 SEC.

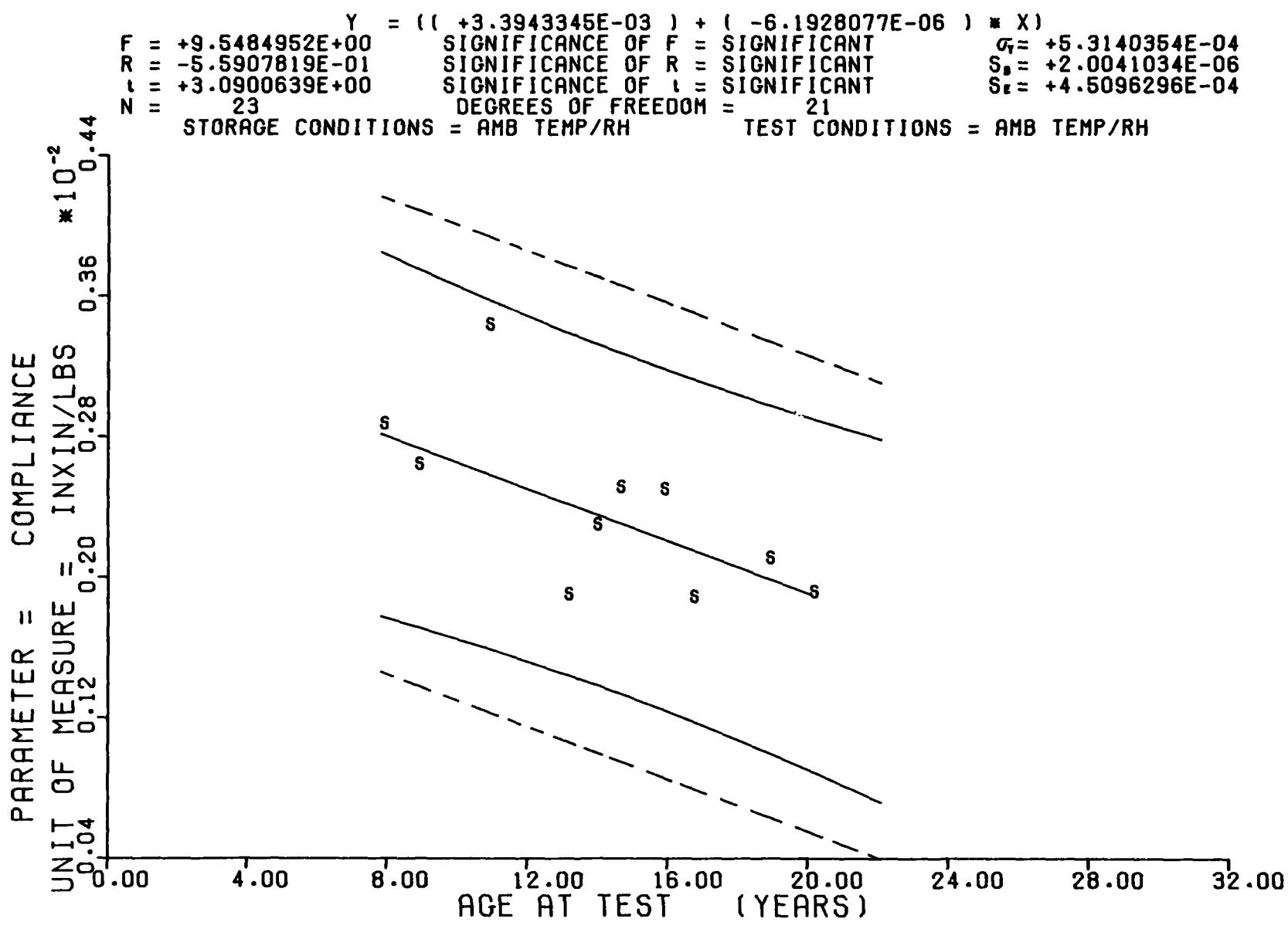

Y = ((+3.3943345E-03) + (-6.1928077E-06) * X)
F = +9.5484952E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = -5.5907819E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +3.0900639E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 23 DEGREES OF FREEDOM = 21
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = COMPLIANCE
UNIT OF MEASURE = INXIN/LBS *10-2
0.44
0.36
0.28
0.20
0.12
0.04
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISCTED MOTOR=STM-012,CREEP 12 LB LOAD,COMPLIANCE AT 1000 SEC.

Figure 28

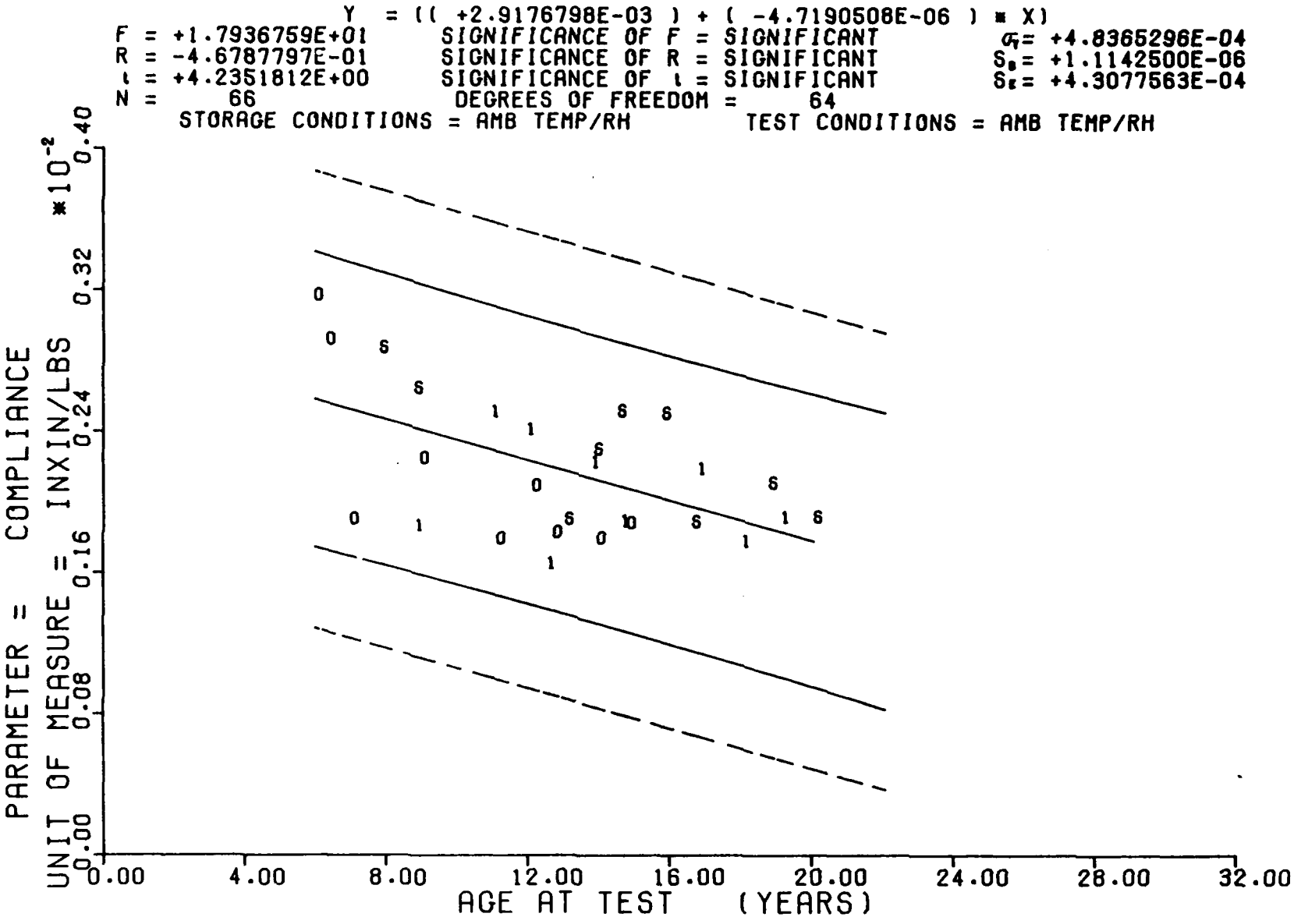

Y = ((+2.9176798E-03) + (-4.7190508E-06) * X)
F = +1.7936759E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = -4.6787797E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +4.2351812E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 66 DEGREES OF FREEDOM = 64
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = COMPLIANCE
UNIT OF MEASURE = INXIN/LBS *10-2
0.00
0.08
0.16
0.24
0.32
0.40
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
DISSECTED MOTOR TP-H1011,CREEP 12 LB LOAD,COMPLIANCE AT 1000 SEC.

Figure 28A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
94.0	2	+2.8449986E-03	+1.1667285E-03	+3.6699997E-03	+2.0199997E-03	+2.8122104E-03
100.0	2	+2.8149991E-03	+2.7578426E-04	+3.0099999E-03	+2.4199998E-03	+2.7378967E-03
150.0	1	+3.4099993E-03	+0.0000000E+07	+3.4099998E-03	+3.4099998E-03	+2.5892693E-03
157.0	2	+1.8749998E-03	+1.0606047E-04	+1.9499999E-03	+1.7999999E-03	+2.4220636E-03
167.0	1	+2.2699993E-03	+0.0000000E+07	+2.2699998E-03	+2.2699998E-03	+2.3601355E-03
175.0	2	+2.4849995E-03	+6.5761153E-04	+2.9499998E-03	+2.0199997E-03	+2.3105931E-03
190.0	3	+2.4733319E-03	+6.8099155E-05	+2.5499998E-03	+2.4199998E-03	+2.2177009E-03
200.0	3	+1.8599987E-03	+1.7001579E-04	+2.0299998E-03	+1.6899998E-03	+2.1557728E-03
220.0	4	+2.0824987E-03	+3.5566273E-04	+2.2799998E-03	+1.5499999E-03	+1.9947597E-03
241.0	3	+1.8899985E-03	+2.0001664E-04	+2.0899998E-03	+1.6899998E-03	+1.9018677E-03

STAGE 1,DISCTED MOTOR=STM-012,CREEP 12 LB LOAD,COMPLIANCE AT 1000 SEC.

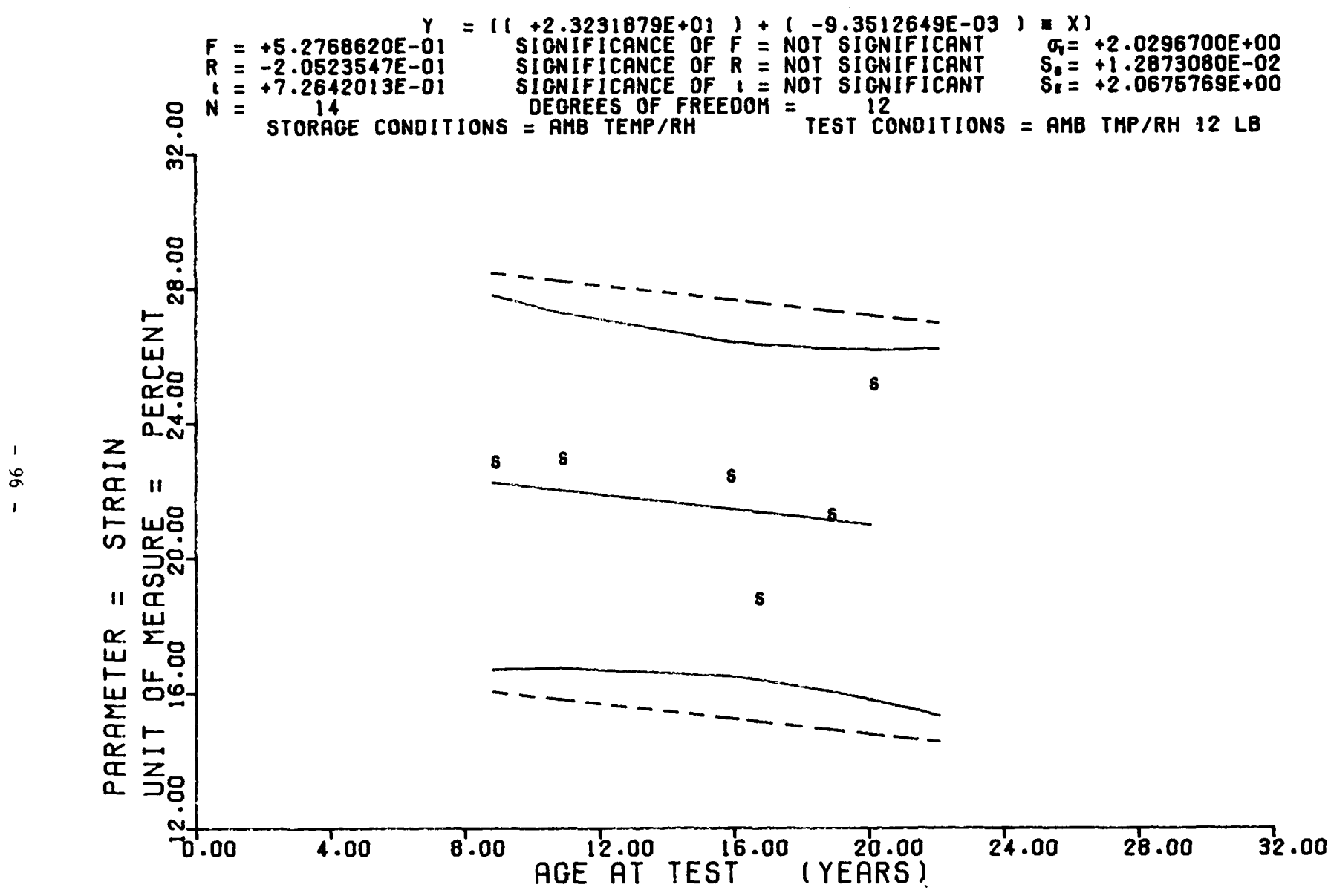
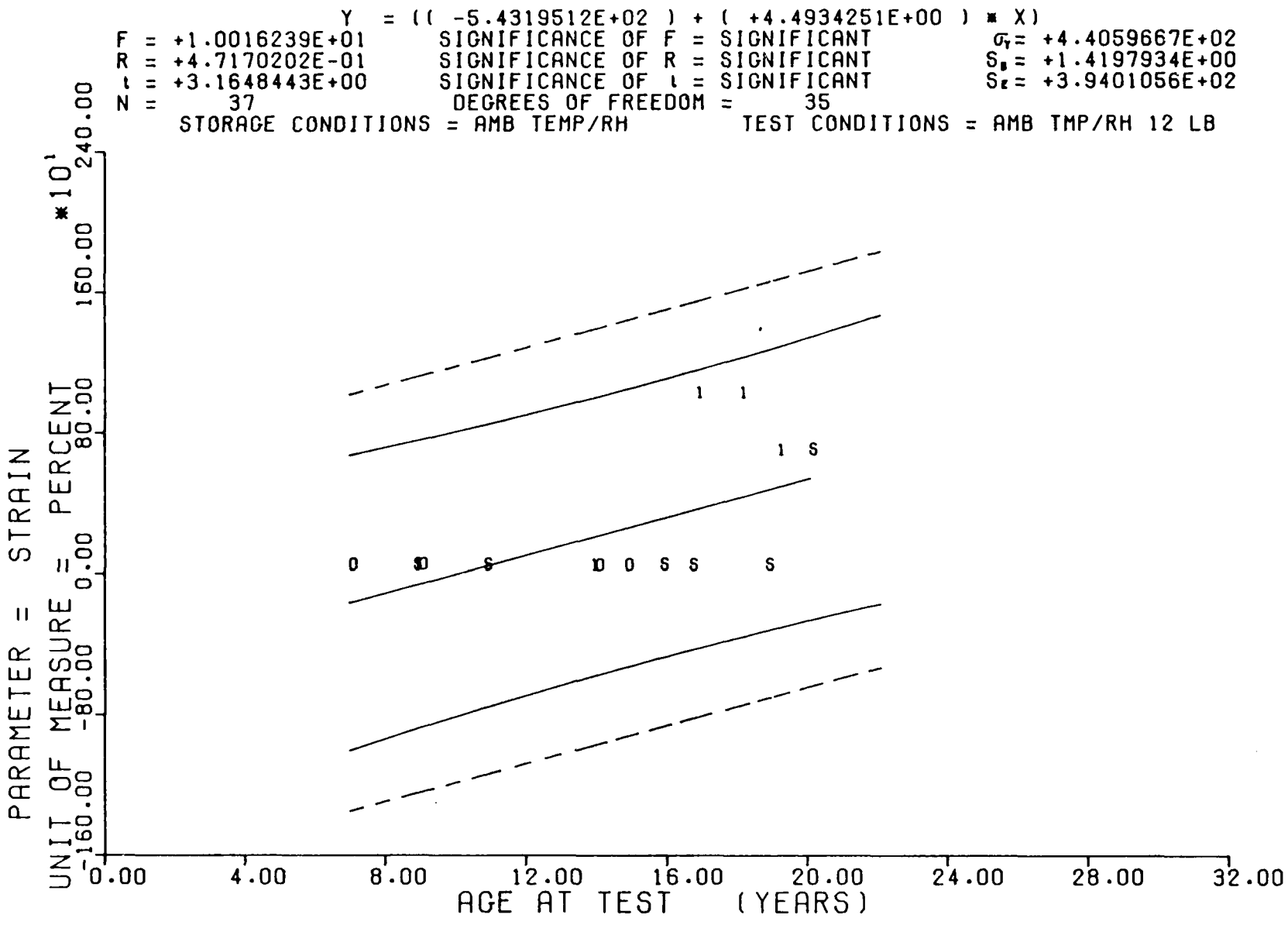

Y = ((+2.3231879E+01) + (-9.3512649E-03) ∗ X)
F = +5.2768620E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σ1= +2.0296700E+00
R = -2.0523547E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb= +1.2873080E-02
t = +7.2642013E-01 SIGNIFICANCE OF t = NOT SIGNIFICANT Sr= +2.0675769E+00
N = 14 DEGREES OF FREEDOM = 12
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TMP/RH 12 LB
PARAMETER = STRAIN
UNIT OF MEASURE = PERCENT
12.00
16.00
20.00
24.00
28.00
32.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISCTED MOTOR=STM-012,CREEP 12 LB LOAD,COMPLIANCE AT % STRAIN AT RUPT.

Figure 29



TP-H1011 DISSECTED MOTORS, CREEP, % STRAIN AT RUPTURE, 12 LB LOAD

Figure 29A

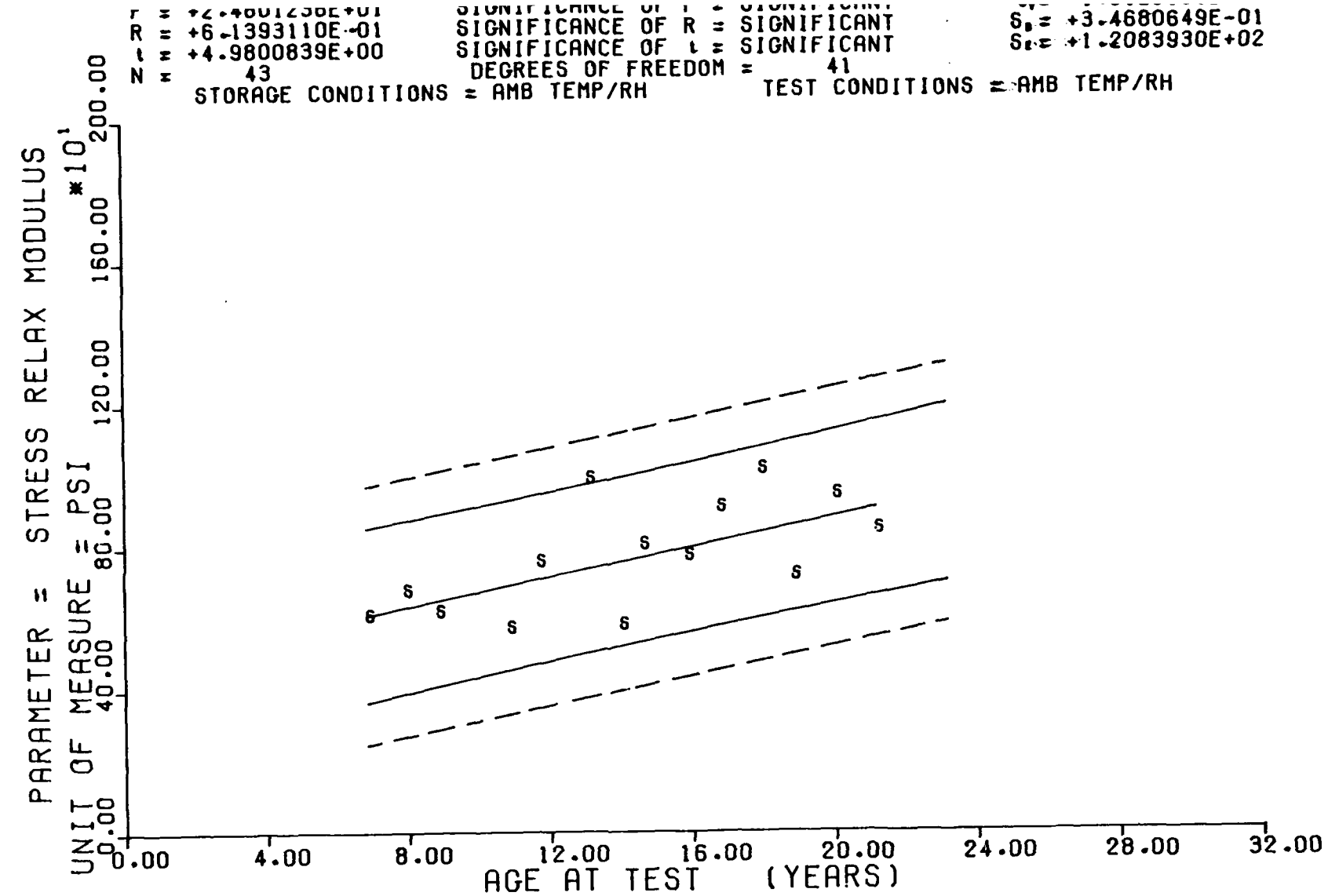

F = +2.4601238E+01
R = +6.1393110E-01
t = +4.9800839E+00
N = 43
SIGNIFICANCE OF F = SIGNIFICANT
SIGNIFICANCE OF R = SIGNIFICANT
SIGNIFICANCE OF t = SIGNIFICANT
DEGREES OF FREEDOM = 41
S_b = +3.4680649E-01
S_E = +1.2083930E+02
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRESS RELAX MODULUS
UNIT OF MEASURE = PSI *10¹
0.00
40.00
80.00
120.00
160.00
200.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1.DISCTED MOTOR=STM-012.STRESS RELAXATION MODULUS.5 % STRAIN AT 10 SEC.

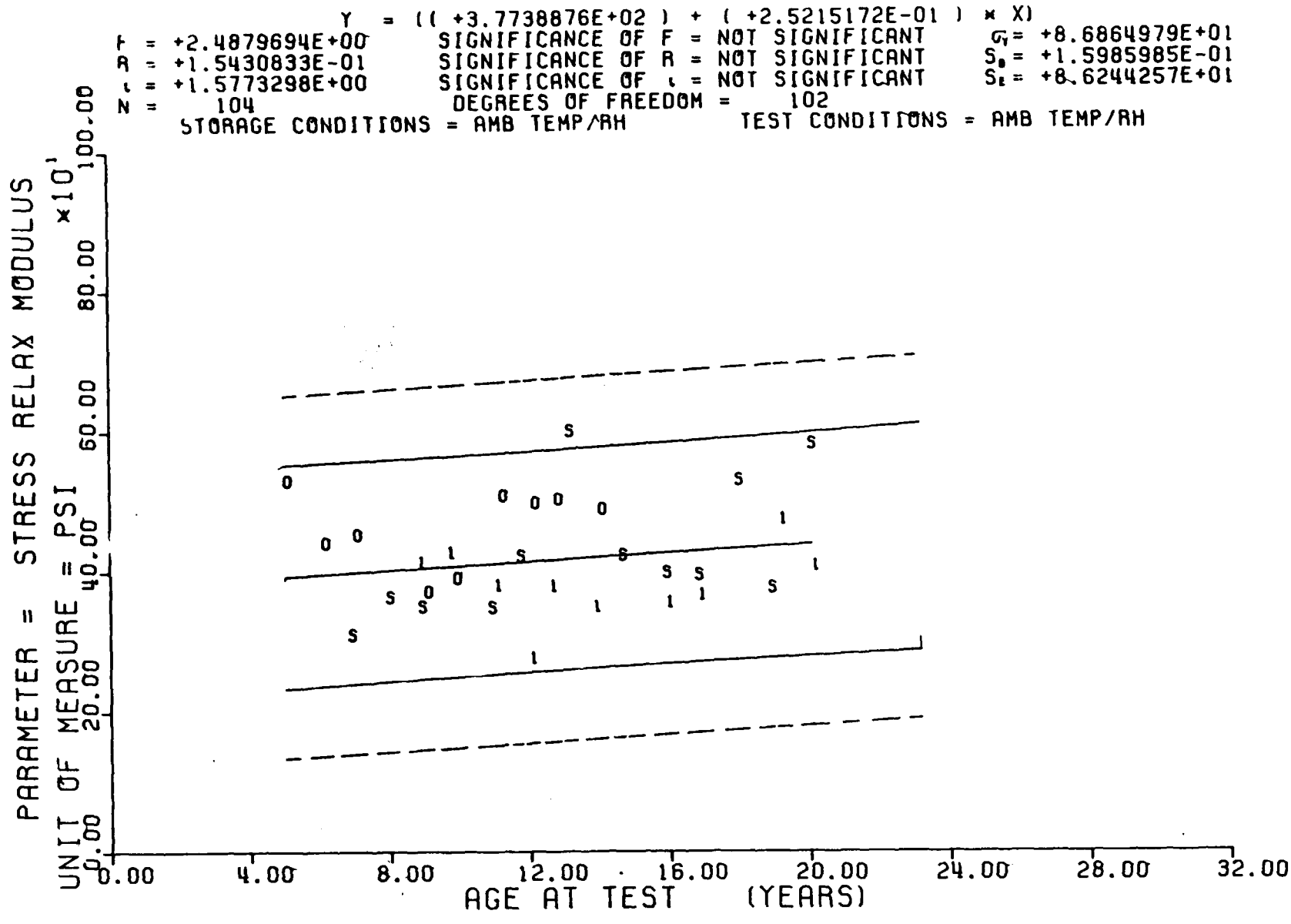
Figure 34

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
82.0	3	+3.0200000E+02	+2.0297783E+01	+3.2000000E+02	+2.8000000E+02	+3.3540332E+02
95.0	4	+3.5550000E+02	+2.6299556E+01	+3.8300000E+02	+3.3300000E+02	+3.4673950E+02
108.0	3	+3.4200000E+02	+1.7088007E+01	+3.6000000E+02	+3.2600000E+02	+3.5633154E+02
130.0	3	+3.4100000E+02	+1.1532562E+01	+3.5300000E+02	+3.3000000E+02	+3.7725952E+02
140.0	3	+4.1433325E+02	+5.1316014E+00	+4.2000000E+02	+4.1000000E+02	+3.8597949E+02
157.0	2	+5.7350000E+02	+9.1923881E+00	+5.8000000E+02	+5.6700000E+02	+4.0080346E+02
175.0	3	+4.1466650E+02	+1.6623276E+01	+4.3000000E+02	+3.9700000E+02	+4.1649951E+02
190.0	3	+3.9000000E+02	+6.9999999E+00	+3.9700000E+02	+3.8300000E+02	+4.2957958E+02
201.0	3	+3.8666650E+02	+8.1193185E+01	+4.3700000E+02	+2.9300000E+02	+4.3917163E+02
219.0	3	+5.2233325E+02	+5.3153864E+01	+5.7300000E+02	+4.6700000E+02	+4.5137963E+02
226.0	3	+3.6800000E+02	+1.9052558E+01	+3.9000000E+02	+3.5700000E+02	+4.6097167E+02
240.0	3	+5.7333325E+02	+2.3288051E+01	+6.0000000E+02	+5.5700000E+02	+4.7317968E+02
254.0	3	+4.3000000E+02	+4.3347433E+01	+4.5700000E+02	+3.8000000E+02	+4.8538769E+02

STAGE 1.DISCTED MOTOR=STM-012,STRESS RELAXATION MODULUS,3 % STRAIN AT 1000 SEC.



TP-H1011 DISSECTED MTRS, STRESS RELAXATION MODULUS, 3 PERCENT STRAIN, 1000 SEC

Figure 33A

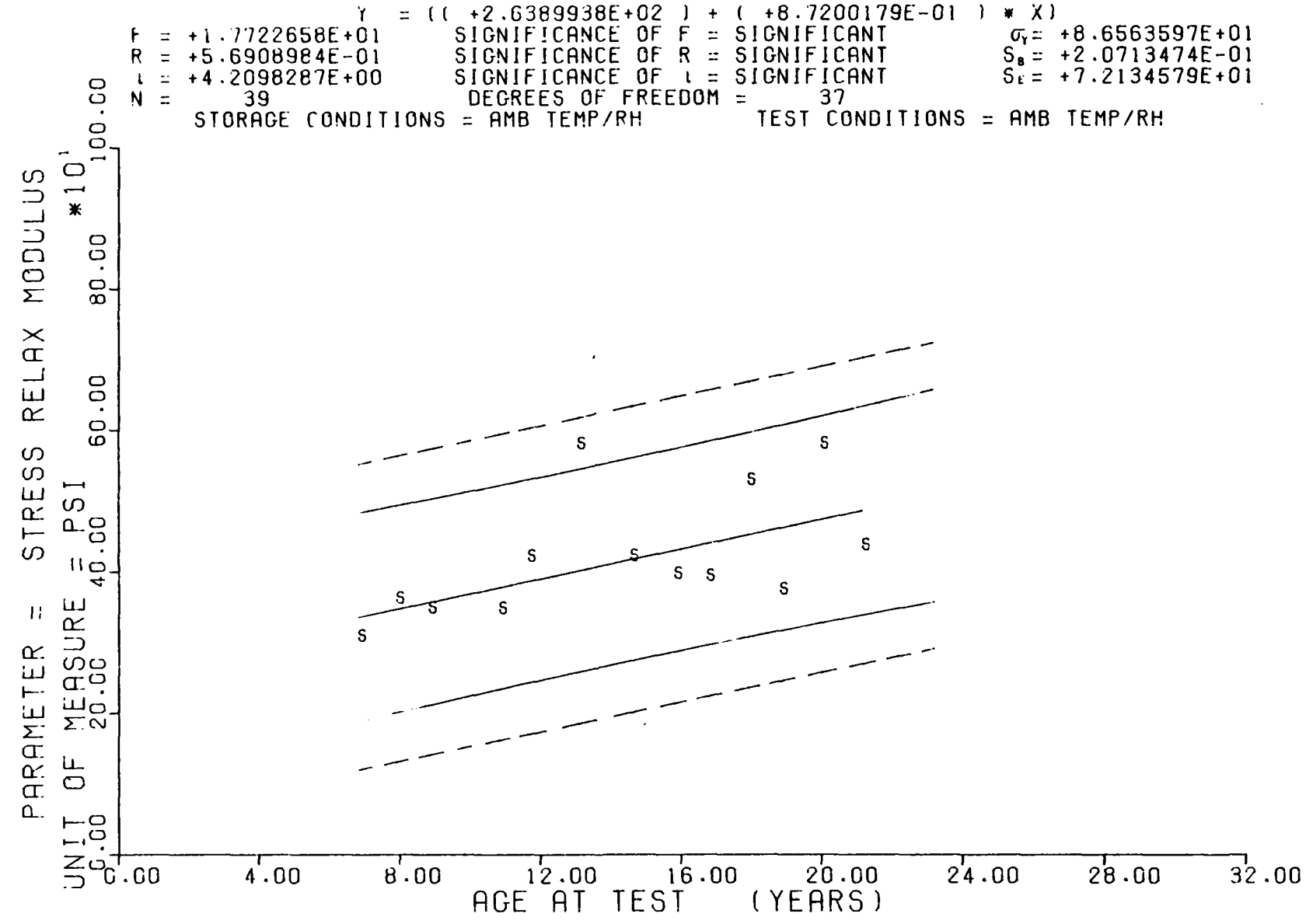

Y = ((+2.6389938E+02) + (+8.7200179E-01) * X)
F = +1.7722658E+01 SIGNIFICANCE OF F = SIGNIFICANT σY = +8.6563597E+01
R = +5.6908984E-01 SIGNIFICANCE OF R = SIGNIFICANT Sa = +2.0713474E-01
t = +4.2098287E+00 SIGNIFICANCE OF t = SIGNIFICANT Sε = +7.2134579E+01
N = 39 DEGREES OF FREEDOM = 37
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRESS RELAX MODULUS
UNIT OF MEASURE = PSI *10¹
100.00
80.00
60.00
40.00
20.00
0.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISCTED MOTOR=STM-012,STRESS RELAXATION MODULUS,2 % STRAIN AT 1000 SEC.

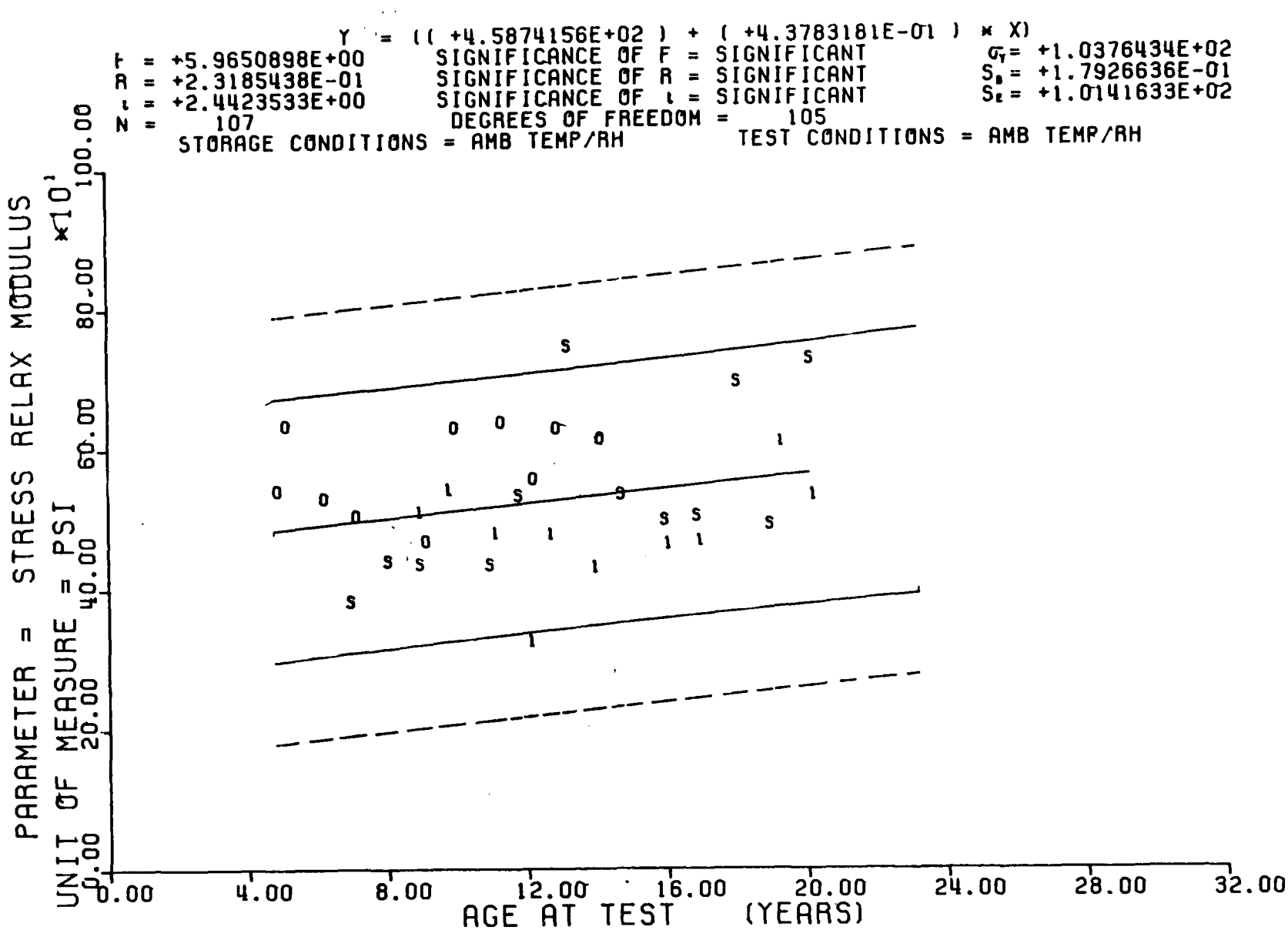
Figure 33

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
82.0	3	+3.7400000E+02	+2.7073972E+01	+3.9300000E+02	+3.4300000E+02	+4.1364990E+02
95.0	4	+4.3225000E+02	+3.5055907E+01	+4.7300000E+02	+4.0300000E+02	+4.2950073E+02
106.0	3	+4.2766650E+02	+1.3650396E+01	+4.4000000E+02	+4.1300000E+02	+4.4291284E+02
130.0	3	+4.2633325E+02	+2.0550750E+01	+4.5000000E+02	+4.1300000E+02	+4.7217553E+02
140.0	3	+5.2533325E+02	+1.0785793E+01	+5.3300000E+02	+5.1300000E+02	+4.8436840E+02
157.0	2	+7.1350000E+02	+4.9497474E+00	+7.1700000E+02	+7.1000000E+02	+5.0509619E+02
179.0	3	+5.2666650E+02	+1.6502525E+01	+5.4300000E+02	+5.1000000E+02	+5.2704345E+02
193.0	3	+4.9000000E+02	+1.2999999E+01	+5.0300000E+02	+4.7700000E+02	+5.4533276E+02
201.0	3	+4.9566650E+02	+1.0023139E+02	+5.5700000E+02	+3.8000000E+02	+5.5874487E+02
215.0	3	+6.8666650E+02	+9.3660735E+01	+7.7700000E+02	+5.9000000E+02	+5.7581469E+02
226.0	3	+4.8333325E+02	+2.3094010E+01	+5.1000000E+02	+4.7000000E+02	+5.8922680E+02
240.0	3	+7.1966650E+02	+2.0816659E+01	+7.4300000E+02	+7.0300000E+02	+6.0629687E+02
254.0	3	+5.4100000E+02	+6.1587336E+01	+5.8000000E+02	+4.7000000E+02	+6.2336694E+02

STAGE 1,DISCTED MOTOR=STM-012,STRESS RELAXATION MODULUS,3 % STRAIN AT 100 SEC.



TP-H1011 DISSECTED MTRS, STRESS RELAXATION MODULUS, 3 PERCENT STRAIN, 100 SEC

Figure 32A

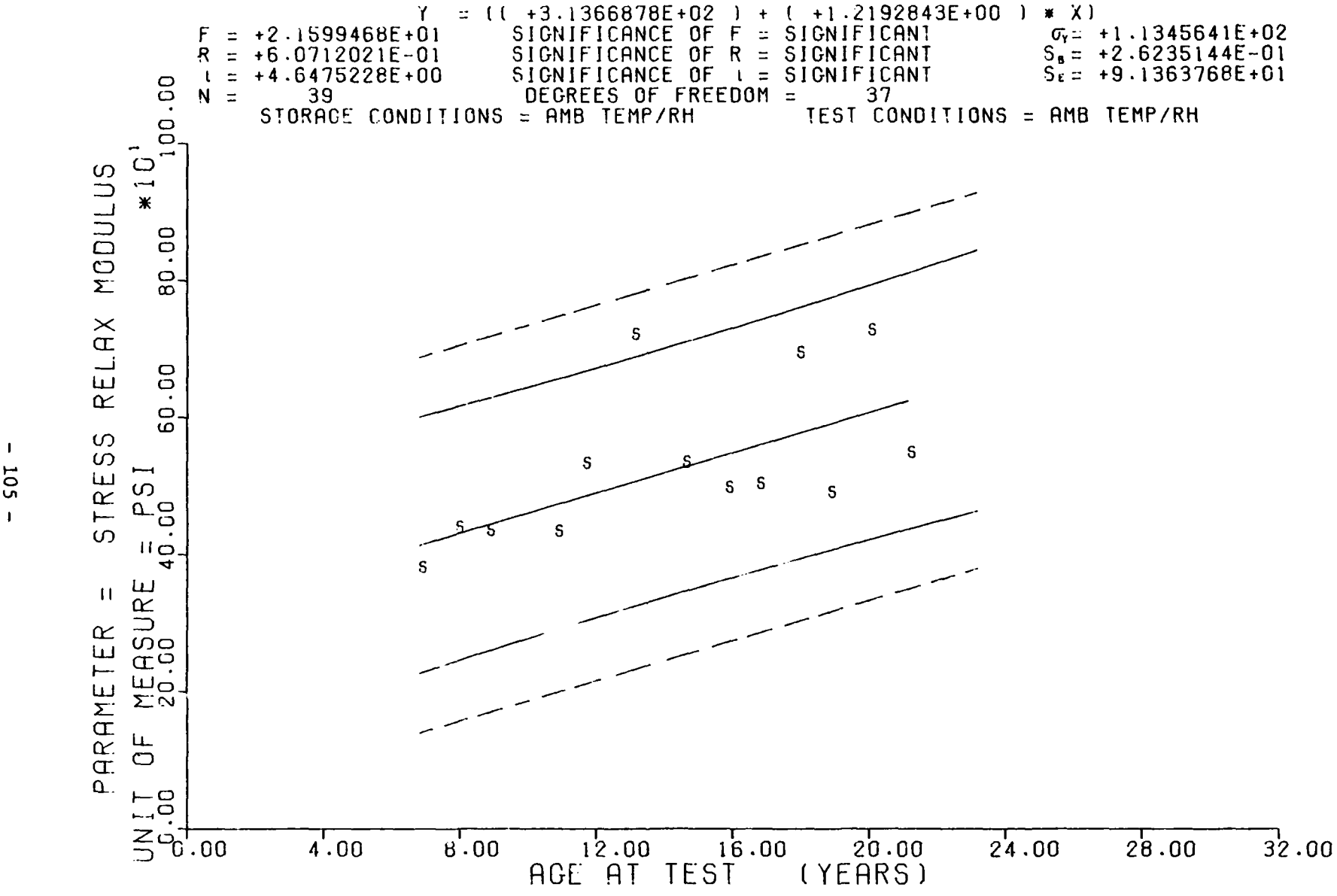

Y = ((+3.1366878E+02) + (+1.2192843E+00) * X)
F = +2.1599468E+01 SIGNIFICANCE OF F = SIGNIFICANT σY = +1.1345641E+02
R = +6.0712021E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +2.6235144E-01
ι = +4.6475228E+00 SIGNIFICANCE OF ι = SIGNIFICANT Sε = +9.1363768E+01
N = 39 DEGREES OF FREEDOM = 37
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRESS RELAX MODULUS
UNIT OF MEASURE = PSI *10¹
100.00
80.00
60.00
40.00
20.00
0.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISCTED MOTOR=STM-012,STRESS RELAXATION MODULUS,3 % STRAIN AT 100 SEC.

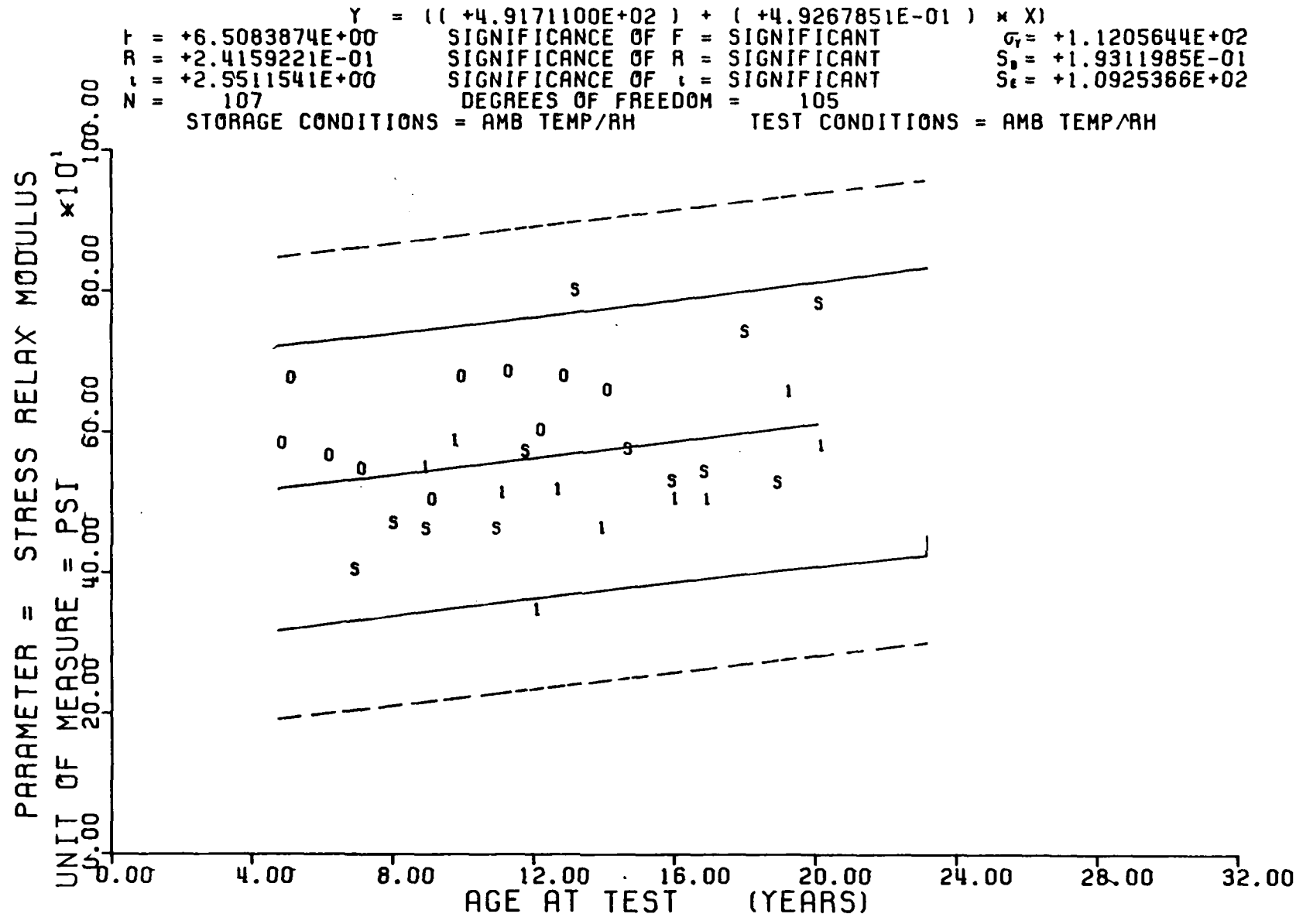
Figure 32

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
82.0	3	+3.9733325E+02	+2.8023799E+01	+4.2000000E+02	+3.6600000E+02	+4.4142773E+02
95.0	4	+4.6375000E+02	+3.6727600E+01	+5.0600000E+02	+4.3300000E+02	+4.5887280E+02
106.0	3	+4.5533325E+02	+1.3613718E+01	+4.6600000E+02	+4.4000000E+02	+4.7363378E+02
130.0	3	+4.5533325E+02	+2.1361959E+01	+4.8000000E+02	+4.4300000E+02	+5.0584008E+02
140.0	3	+5.6533325E+02	+1.3613718E+01	+5.7600000E+02	+5.5000000E+02	+5.1925927E+02
157.0	2	+7.6650000E+02	+4.9497474E+00	+7.7000000E+02	+7.6300000E+02	+5.4207202E+02
175.0	3	+5.0900000E+02	+1.8520259E+01	+5.8700000E+02	+5.5000000E+02	+5.6622680E+02
190.0	3	+5.2333325E+02	+1.3503086E+01	+5.3700000E+02	+5.1000000E+02	+5.8635571E+02
201.0	3	+5.3666650E+02	+1.0710897E+02	+6.0000000E+02	+4.1300000E+02	+6.0111694E+02
215.0	3	+7.3433325E+02	+9.7289944E+01	+8.2700000E+02	+6.3300000E+02	+6.1990380E+02
220.0	3	+5.2133325E+02	+2.4820061E+01	+5.5000000E+02	+5.0700000E+02	+6.3466503E+02
240.0	3	+7.7466650E+02	+1.9655363E+01	+7.9700000E+02	+7.6000000E+02	+6.5345190E+02
254.0	3	+5.8533325E+02	+7.1388607E+01	+6.3000000E+02	+5.0300000E+02	+6.7223901E+02

STAGE 1,DISCTED MOTOR=STM-012,STRESS RELAXATION MODULUS,3 % STRAIN AT 50 SEC.



TP-H1011 DISSECTED MTRS, STRESS RELAXATION MODULUS, 3 PERCENT STRAIN, 50 SEC

Figure 31A

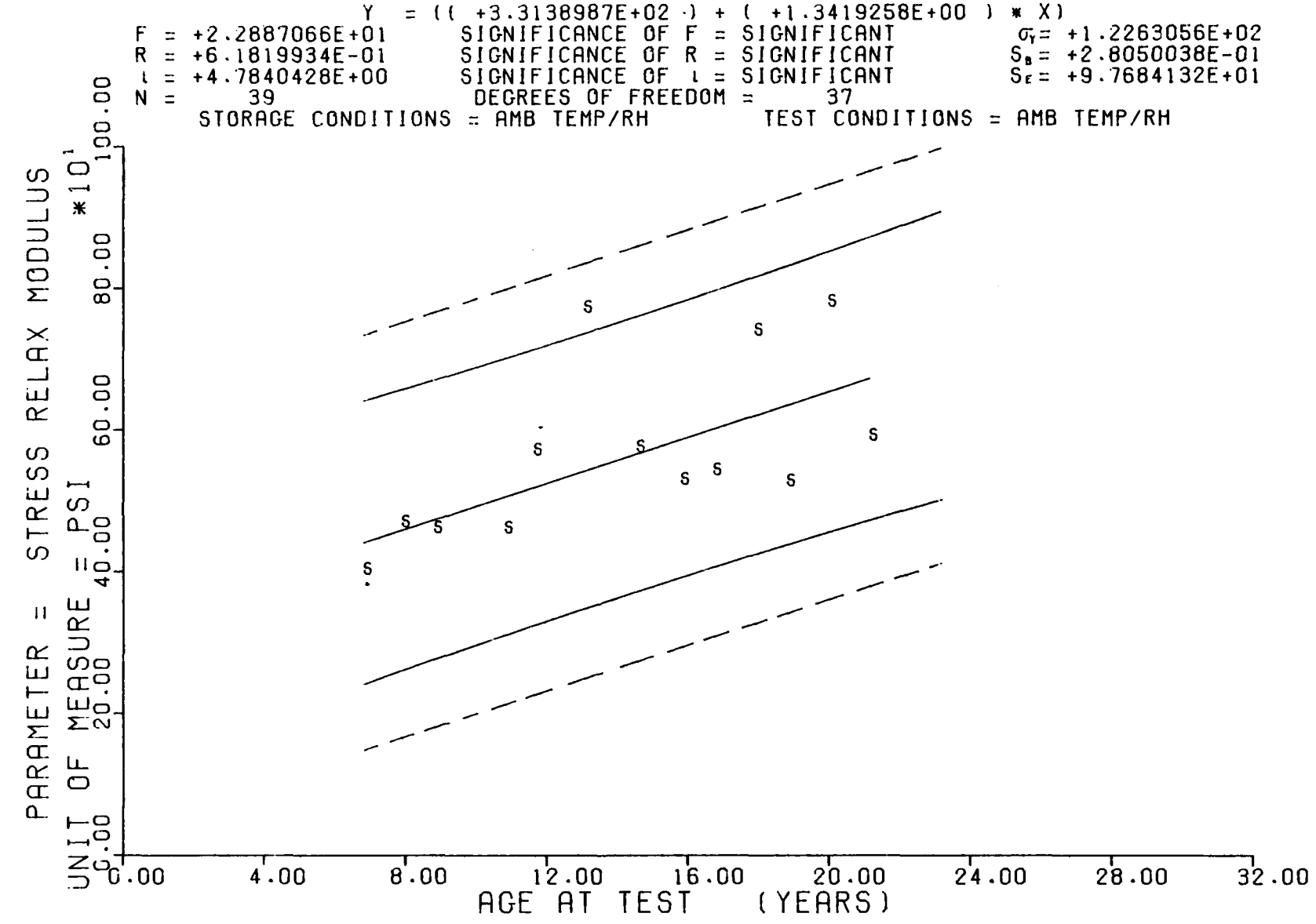

Y = ((+3.3138987E+02) + (+1.3419258E+00) * X)
F = +2.2887066E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +6.1819934E-01 SIGNIFICANCE OF R = SIGNIFICANT
ι = +4.7840428E+00 SIGNIFICANCE OF ι = SIGNIFICANT
N = 39 DEGREES OF FREEDOM = 37
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
σγ = +1.2263056E+02
Sβ = +2.8050038E-01
Sε = +9.7684132E+01
PARAMETER = STRESS RELAX MODULUS
UNIT OF MEASURE = PSI *10¹
0.00
20.00
40.00
60.00
80.00
100.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISCTED MOTOR=STM-012,STRESS RELAXATION MODULUS,3 % STRAIN AT 50 SEC.

Figure 31

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (HUNTED)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
82.0	3	+4.9600000E+02	+3.4641016E+01	+5.1600000E+02	+4.5600000E+02	+5.6608081E+02
95.0	4	+5.9725000E+02	+4.6671725E+01	+6.5000000E+02	+5.5600000E+02	+5.8874633E+02
165.0	3	+6.0200000E+02	+3.0049958E+01	+6.3300000E+02	+5.7300000E+02	+6.0792480E+02
170.0	3	+5.9866650E+02	+2.7135462E+01	+6.3000000E+02	+5.8300000E+02	+6.4976904E+02
140.0	3	+7.2633325E+02	+2.0816659E+01	+7.4300000E+02	+7.0300000E+02	+6.6720410E+02
157.0	2	+9.7000000E+02	+4.2426406E+00	+9.7300000E+02	+9.6700000E+02	+6.9684375E+02
175.0	3	+7.4000000E+02	+2.2999999E+01	+7.6300000E+02	+7.1700000E+02	+7.2822680E+02
190.0	3	+6.4566650E+02	+2.2030282E+01	+6.6700000E+02	+6.2300000E+02	+7.5437939E+02
201.0	3	+6.8800000E+02	+1.3081666E+02	+7.6700000E+02	+5.3700000E+02	+7.7355786E+02
215.0	3	+9.4200000E+02	+1.0522832E+02	+1.0430000E+03	+8.3300000E+02	+7.9796704E+02
220.0	3	+6.7233325E+02	+2.1571586E+01	+6.9700000E+02	+6.5700000E+02	+8.1714550E+02
240.0	3	+9.8866650E+02	+1.5044378E+01	+1.0030000E+03	+9.7300000E+02	+8.4155468E+02
254.0	3	+7.7666650E+02	+8.1193185E+01	+8.2700000E+02	+6.8300000E+02	+8.6596386E+02

STAGE 1,DISCTED MOTOR=ST4-012,STRESS RELAXATION MODULUS,3 % STRAIN AT 10 SEC.

Y = ((+6.2563659E+02) + (+7.0853632E-01) * X)

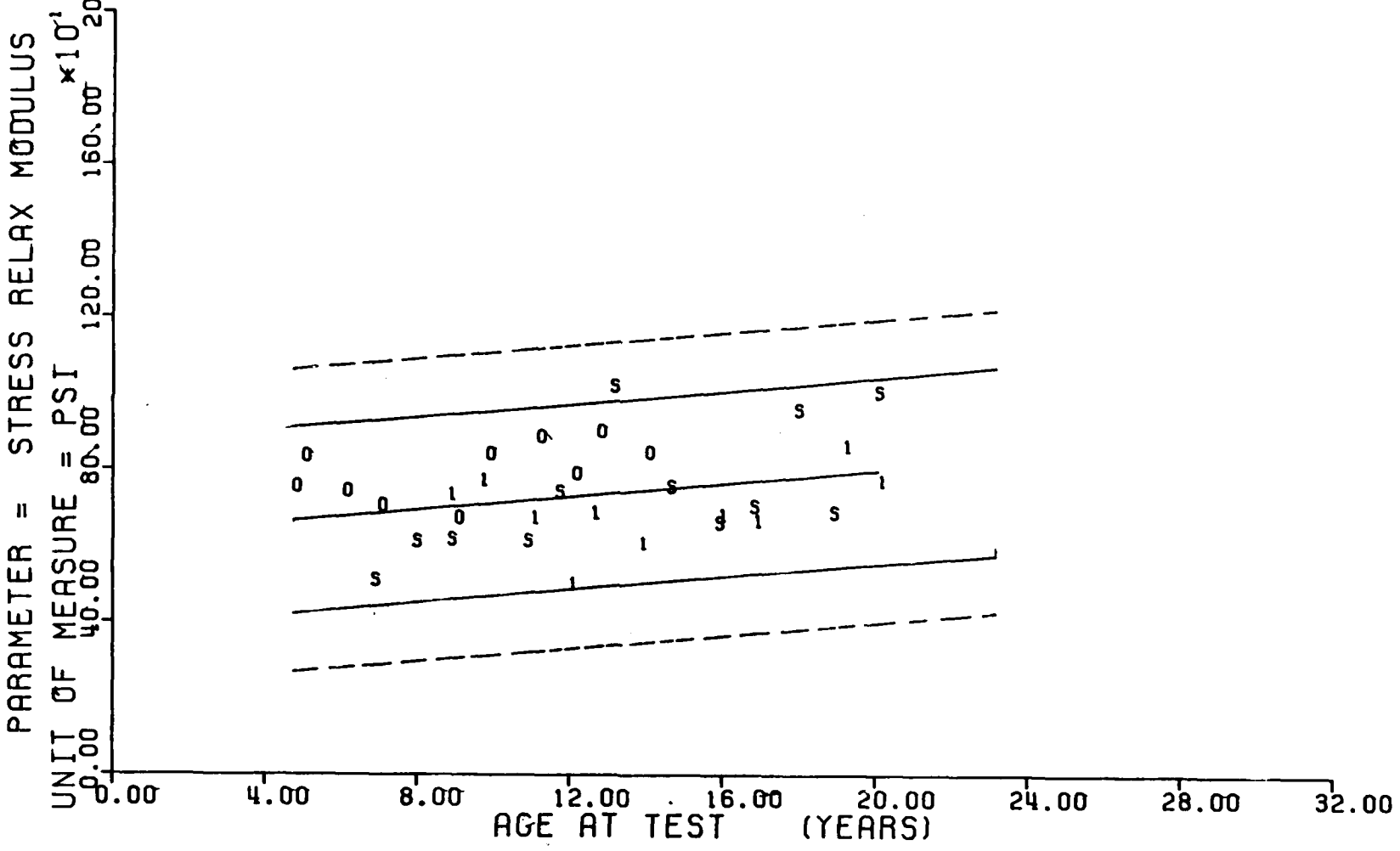
F = +9.2220363E+00 SIGNIFICANCE OF F = SIGNIFICANT σ_Y = +1.3701868E+02

R = +2.8414398E-01 SIGNIFICANCE OF R = SIGNIFICANT S_b = +2.3331824E-01

t = +3.0367805E+00 SIGNIFICANCE OF t = SIGNIFICANT S_E = +1.3199509E+02

N = 107 DEGREES OF FREEDOM = 105

STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



TP-H1011 DISSECTED MTRS, STRESS RELAXATION MODULUS, 3 PERCENT STRAIN, 10 SEC

Figure 30A

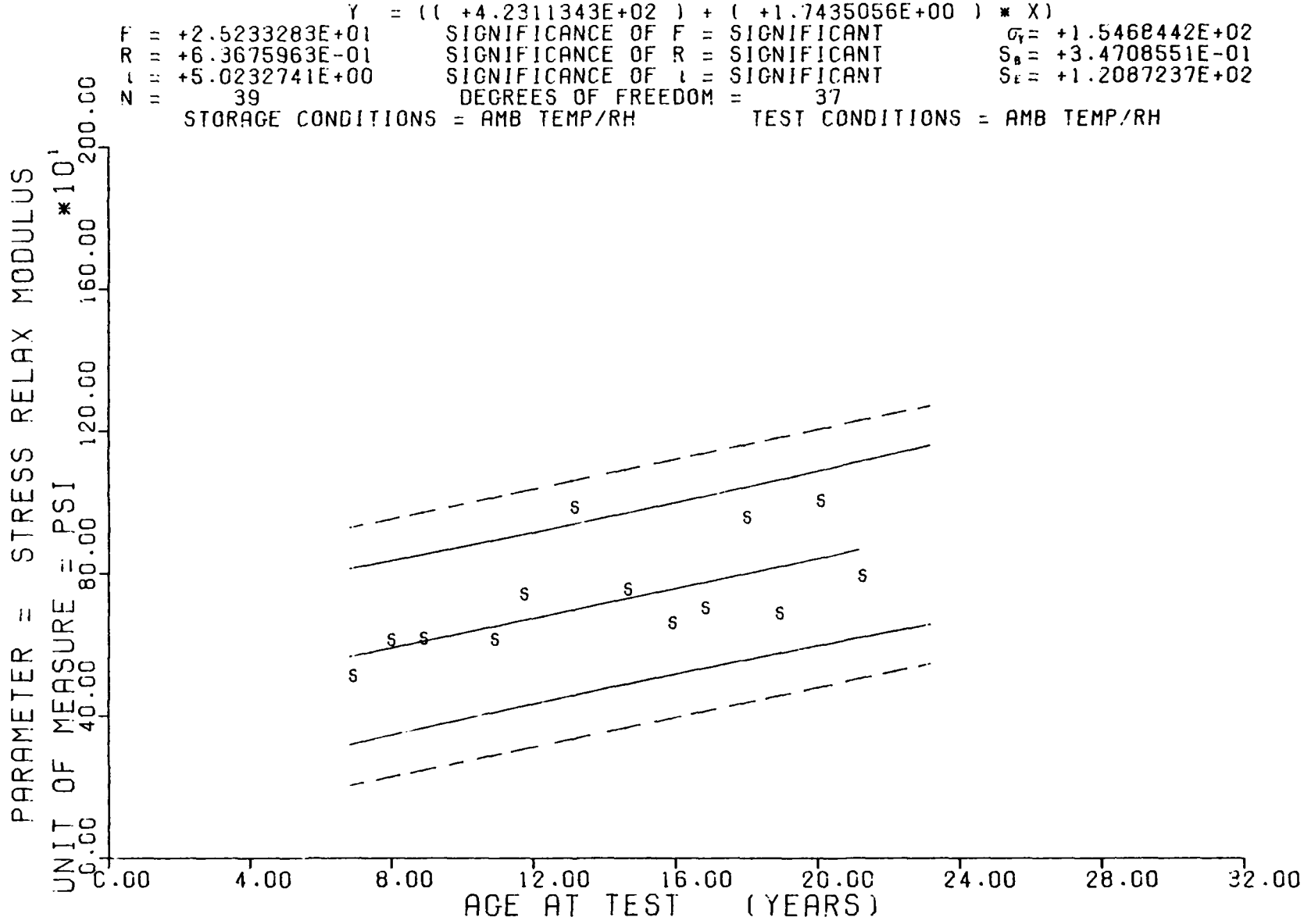

Y = ((+4.2311343E+02) + (+1.7435056E+00) * X)
F = +2.5233283E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +6.3675963E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +5.0232741E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 39 DEGREES OF FREEDOM = 37
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
σ_Y = +1.5468442E+02
S_B = +3.4708551E-01
S_E = +1.2087237E+02
PARAMETER = STRESS RELAX MODULUS
UNIT OF MEASURE = PSI *10¹
0.00
40.00
80.00
120.00
160.00
200.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISCTED MOTOR=STM-012,STRESS RELAXATION MODULUS,3 % STRAIN AT 10 SEC.

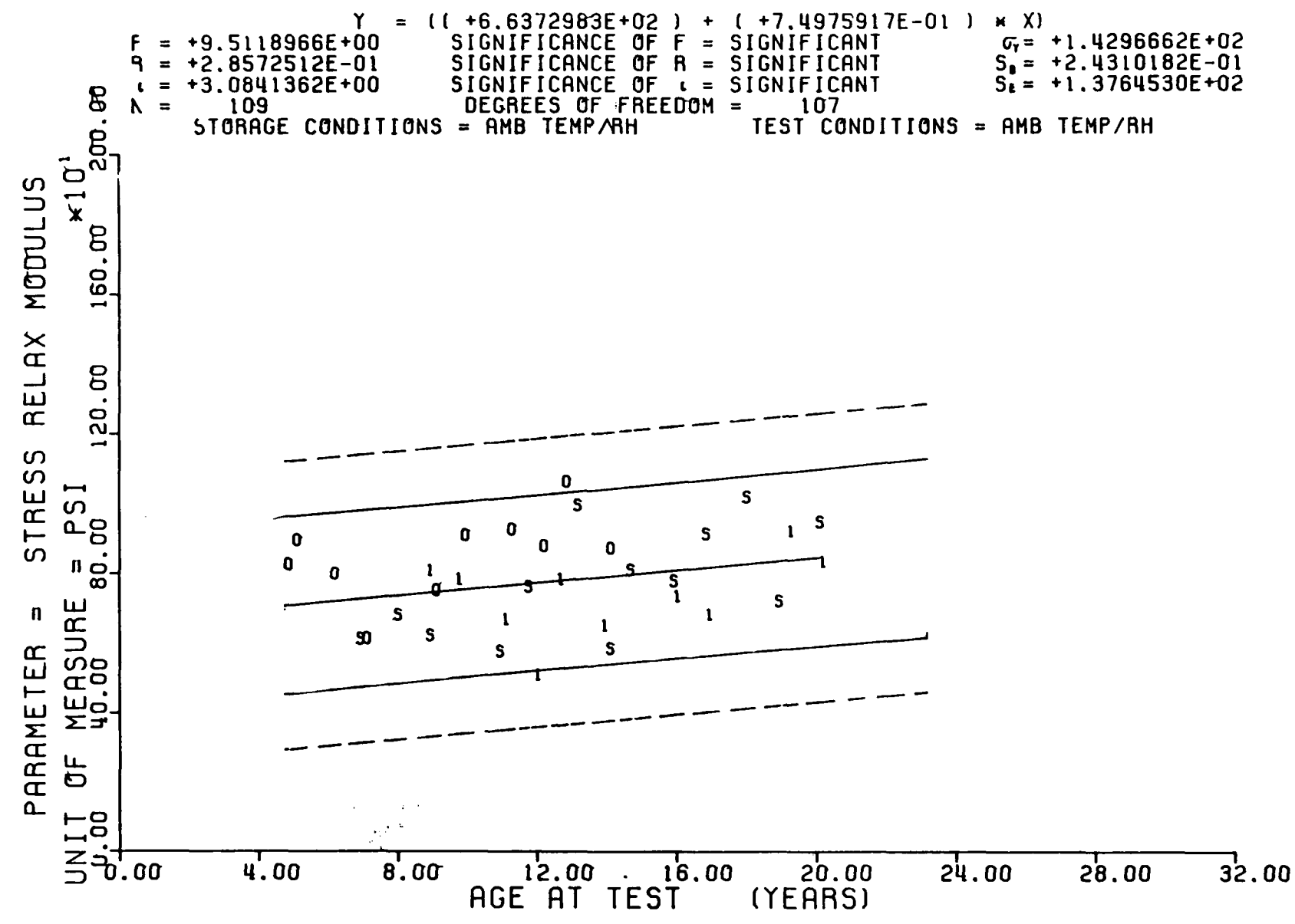
Figure 30

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
106.0	2	+2.2699996E+01	+2.8317699E-01	+2.2899993E+01	+2.2500000E+01	+2.2240631E+01
130.0	1	+2.2799987E+01	+0.0000000E+07	+2.2799987E+01	+2.2799987E+01	+2.2016204E+01
190.0	3	+2.2266647E+01	+6.1127474E-01	+2.2799987E+01	+2.1599990E+01	+2.1455123E+01
200.0	3	+1.8633316E+01	+1.7214824E+00	+2.0599990E+01	+1.7399993E+01	+2.1361618E+01
226.0	4	+2.1124984E+01	+1.0047203E+00	+2.2000000E+01	+1.9799987E+01	+2.1118484E+01
241.0	1	+2.5000000E+01	+0.0000000E+07	+2.5000000E+01	+2.5000000E+01	+2.0978210E+01

STAGE 1,DISCTED MOTOR=STM-G12,CREEP 12 LB LOAD,COMPLIANCE AT % STRAIN AT RUPT.



TP-H1011 DISSECTED MTRS, STRESS RELAXATION MODULUS, 5 PERCENT STRAIN, 10 SEC

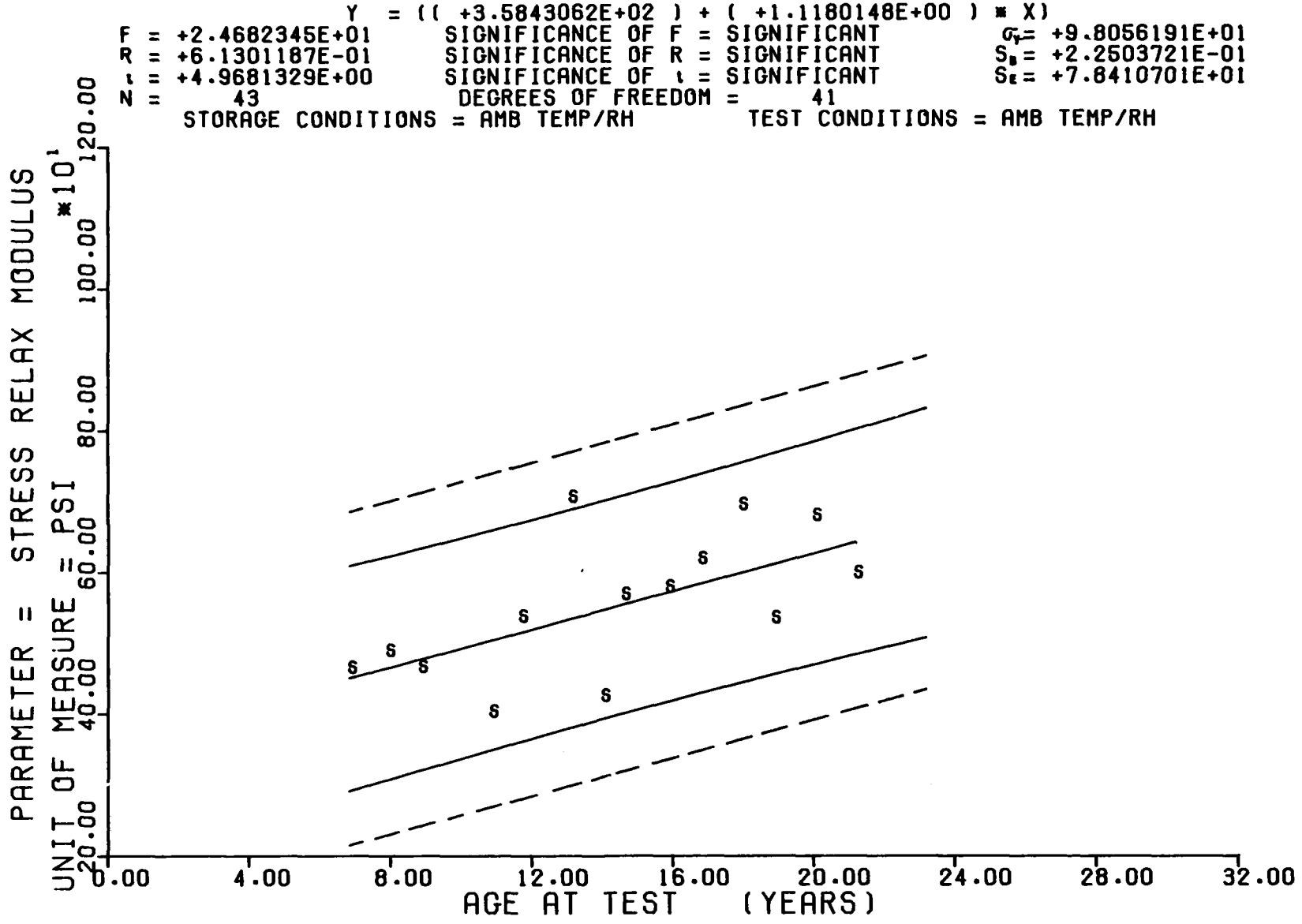
Figure 34A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

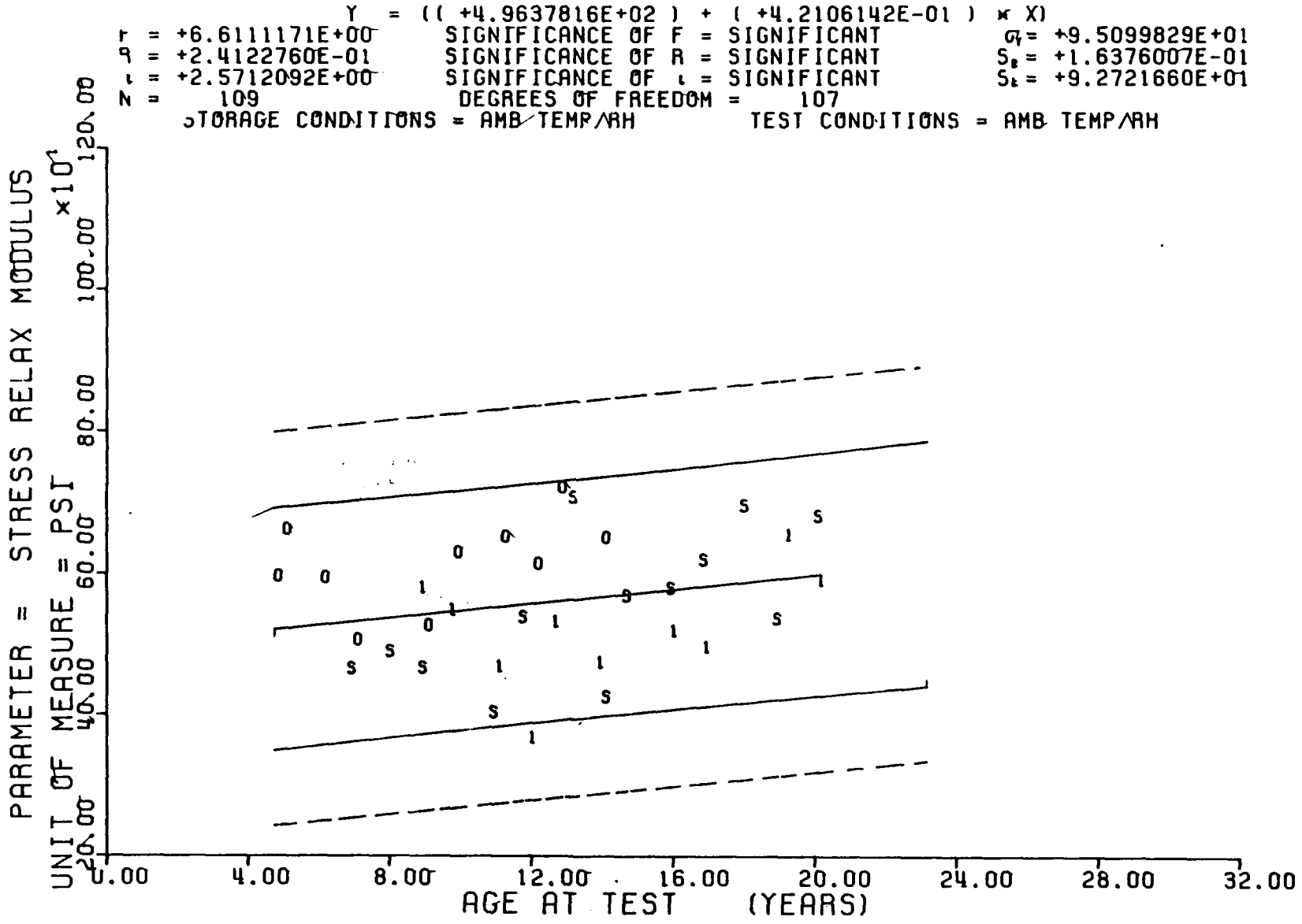
AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
82.0	3	+5.9666650E+02	+1.5275252E+01	+6.1000000E+02	+5.8000000E+02	+6.0961083E+02
95.0	4	+6.6600000E+02	+4.1279534E+01	+7.1000000E+02	+6.2000000E+02	+6.3206347E+02
106.0	3	+6.0666650E+02	+3.7806525E+01	+6.3600000E+02	+5.6400000E+02	+6.5106176E+02
130.0	3	+5.6066650E+02	+1.8475208E+01	+5.8200000E+02	+5.5000000E+02	+6.9251293E+02
140.0	3	+7.4600000E+02	+3.4117444E+01	+7.7400000E+02	+7.0800000E+02	+7.0978417E+02
157.0	3	+9.7866650E+02	+2.9687258E+01	+1.0040000E+03	+9.4600000E+02	+7.3914526E+02
168.0	3	+5.6933325E+02	+7.0237691E+00	+5.7600000E+02	+5.6200000E+02	+7.5814355E+02
175.0	3	+7.9400000E+02	+2.0880613E+01	+8.0800000E+02	+7.7000000E+02	+7.7023364E+02
190.0	3	+7.6200000E+02	+1.2165525E+01	+7.7600000E+02	+7.5400000E+02	+7.9614038E+02
201.0	3	+8.9733325E+02	+3.1770006E+01	+9.3400000E+02	+8.7800000E+02	+8.1513891E+02
215.0	3	+1.0033332E+03	+1.1631566E+02	+1.0840000E+03	+8.7000000E+02	+8.3931860E+02
226.0	3	+7.0466650E+02	+2.1197484E+01	+7.2400000E+02	+6.8200000E+02	+8.5831689E+02
240.0	3	+9.3133325E+02	+5.7838856E+01	+9.7600000E+02	+8.6600000E+02	+8.8249658E+02
254.0	3	+8.3266650E+02	+2.0033305E+01	+8.5200000E+02	+8.1200000E+02	+9.0667651E+02

STAGE 1,DISCTED MOTOR=STM-012,STRESS RELAXATION MODULUS,5 % STRAIN AT 10 SEC.



STAGE 1.DISCTED MOTOR=STM-012.STRESS RELAXATION MODULUS.5 % STRAIN AT 50 SEC.

Figure 35



TP-H1011 DISSECTED MTRS, STRESS RELAXATION MODULUS, 5 PERCENT STRAIN, 50 SEC

Figure 35A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
82.0	3	+4.5800000E+02	+9.9999999E+00	+4.6800000E+02	+4.4800000E+02	+4.5010766E+02
95.0	4	+4.8250000E+02	+2.5735837E+01	+5.1000000E+02	+4.5000000E+02	+4.6464184E+02
106.0	3	+4.5933325E+02	+1.9008769E+01	+4.7800000E+02	+4.4000000E+02	+4.7694018E+02
130.0	3	+3.9600000E+02	+1.5999999E+01	+4.1200000E+02	+3.8000000E+02	+5.0377246E+02
140.0	3	+5.3066650E+02	+2.1939310E+01	+5.4800000E+02	+5.0600000E+02	+5.1495263E+02
157.0	3	+6.9933325E+02	+2.8023799E+01	+7.2200000E+02	+6.6800000E+02	+5.3395874E+02
168.0	3	+4.1800000E+02	+5.9999999E+00	+4.2400000E+02	+4.1200000E+02	+5.4625708E+02
175.0	3	+5.6133325E+02	+2.2300971E+01	+5.7800000E+02	+5.3600000E+02	+5.5408300E+02
190.0	3	+5.7200000E+02	+1.2165525E+01	+5.8000000E+02	+5.5800000E+02	+5.7085327E+02
201.0	3	+6.1200000E+02	+1.1135528E+01	+6.2400000E+02	+6.0200000E+02	+5.8315136E+02
215.0	3	+6.8866650E+02	+6.9923768E+01	+7.3200000E+02	+6.0800000E+02	+5.9880371E+02
226.0	3	+5.2866650E+02	+1.6165807E+01	+5.4600000E+02	+5.1400000E+02	+6.1110180E+02
240.0	3	+6.7333325E+02	+3.9310727E+01	+6.9800000E+02	+6.2800000E+02	+6.2675415E+02
254.0	3	+5.9200000E+02	+1.3114877E+01	+6.0600000E+02	+5.8000000E+02	+6.4240625E+02

STAGE 1,DISCTED MOTOR=STM-012,STRESS RELAXATION MODULUS,5 % STRAIN AT 50 SEC.

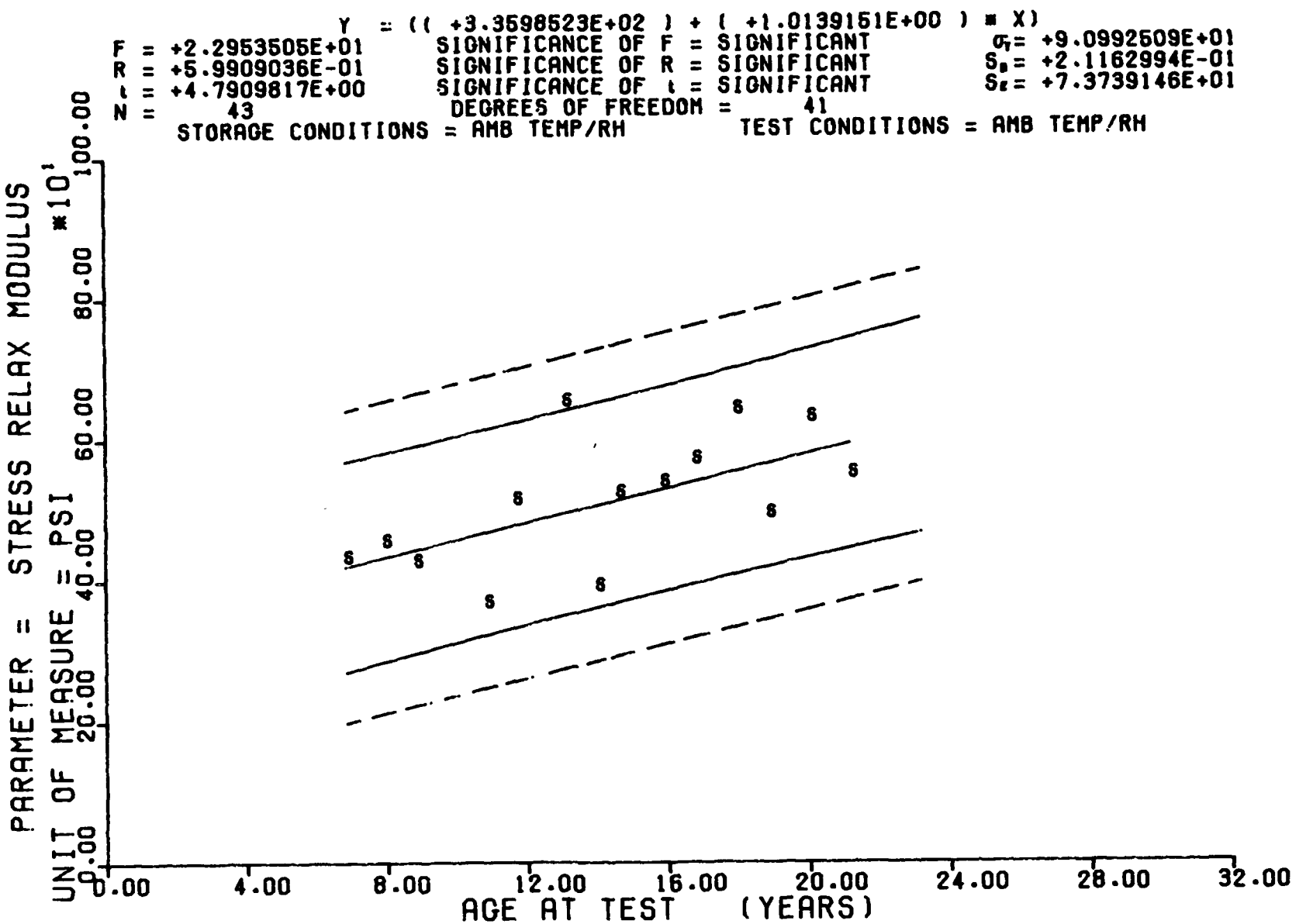

Y = ((+3.3698523E+02) + (+1.0139151E+00) * X)
F = +2.2953505E+01 SIGNIFICANCE OF F = SIGNIFICANT σY= +9.0992509E+01
R = +5.9909036E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb= +2.1162994E-01
t = +4.7909817E+00 SIGNIFICANCE OF t = SIGNIFICANT Se= +7.3739146E+01
N = 43 DEGREES OF FREEDOM = 41
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRESS RELAX MODULUS
UNIT OF MEASURE = PSI *10¹
0.00
20.00
40.00
60.00
80.00
100.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISCTED MOTOR=STM-012,STRESS RELAXATION MODULUS,5 % STRAIN AT 100 SEC.

Figure 36

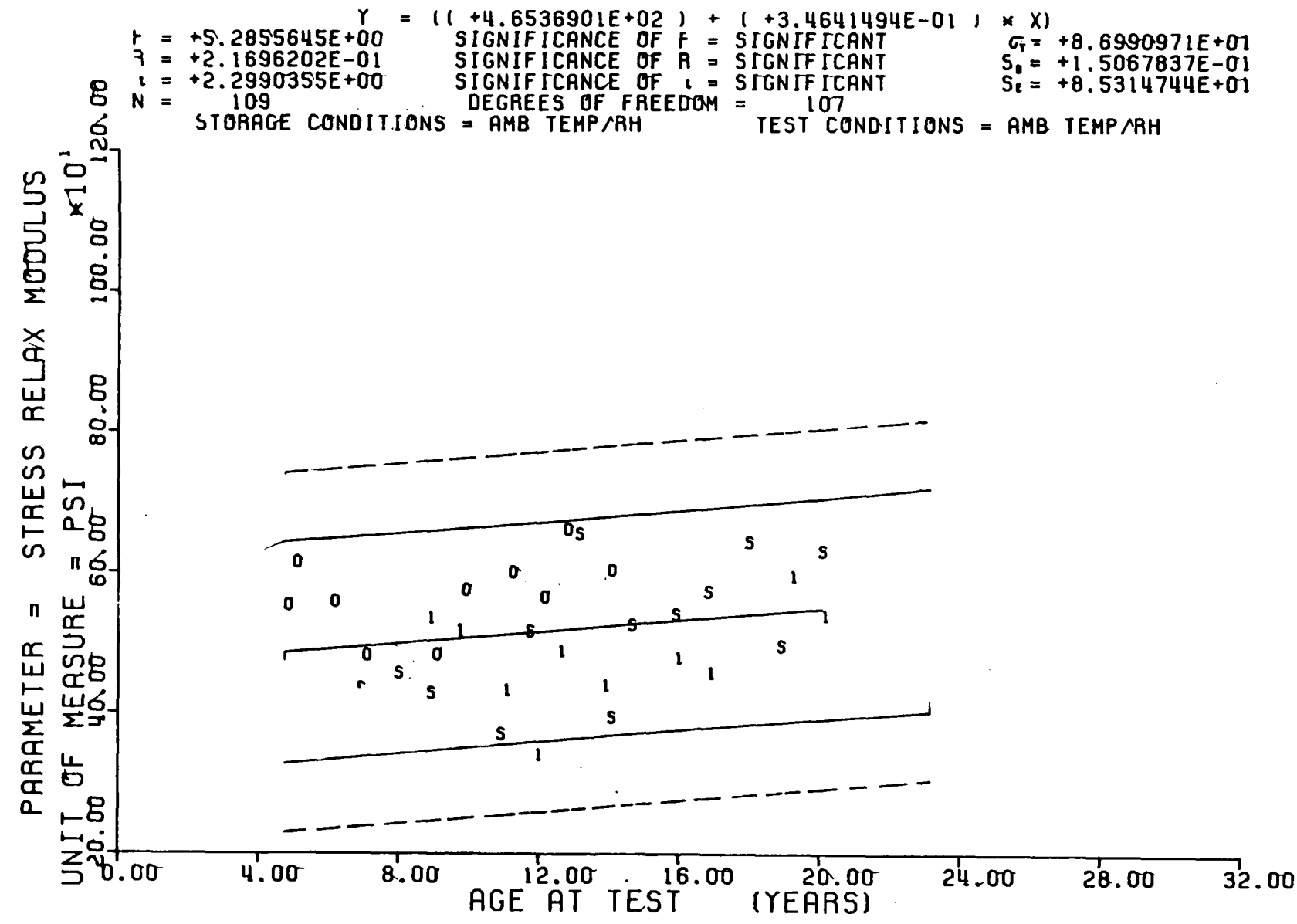

Y = ((+4.6536901E+02) + (+3.4641494E-01) * X)
F = +5.2855645E+00 SIGNIFICANCE OF F = SIGNIFICANT σ = +8.6990971E+01
R = +2.1696202E-01 SIGNIFICANCE OF R = SIGNIFICANT S_B = +1.5067837E-01
t = +2.2990355E+00 SIGNIFICANCE OF t = SIGNIFICANT S_t = +8.5314744E+01
N = 109 DEGREES OF FREEDOM = 107
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRESS RELAX MODULUS
UNIT OF MEASURE = PSI *10^1
120.00
100.00
80.00
60.00
40.00
20.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
TP-H1011 DISSECTED MTRS, STRESS RELAXATION MODULUS, 5 PERCENT STRAIN, 100 SEC

Figure 36A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
82.0	3	+4.2666650E+02	+1.1372481E+01	+4.3600000E+02	+4.1400000E+02	+4.1912622E+02
95.0	4	+4.4900000E+02	+2.4303634E+01	+4.7600000E+02	+4.2000000E+02	+4.3230712E+02
106.0	3	+4.2066650E+02	+1.7243356E+01	+4.3600000E+02	+4.0200000E+02	+4.4346020E+02
130.0	3	+3.6266650E+02	+1.6165807E+01	+3.8000000E+02	+3.4800000E+02	+4.6779418E+02
140.0	3	+5.0866650E+02	+1.8583146E+01	+5.2400000E+02	+4.8800000E+02	+4.7793334E+02
157.0	3	+6.4733325E+02	+2.4193663E+01	+6.6600000E+02	+6.2000000E+02	+4.9516992E+02
168.0	3	+3.8600000E+02	+5.9999999E+00	+3.9200000E+02	+3.8000000E+02	+5.0632275E+02
175.0	3	+5.1800000E+02	+1.9697715E+01	+5.3400000E+02	+4.9600000E+02	+5.1342016E+02
190.0	3	+5.3266650E+02	+1.2858201E+01	+5.4200000E+02	+5.1800000E+02	+5.2862890E+02
201.0	3	+5.6533325E+02	+1.1015141E+01	+5.7600000E+02	+5.5400000E+02	+5.3978198E+02
215.0	3	+6.3600000E+02	+6.4156059E+01	+6.7600000E+02	+5.6200000E+02	+5.5397680E+02
226.0	3	+4.8866650E+02	+1.5534906E+01	+5.0600000E+02	+4.7600000E+02	+5.6512988E+02
240.0	3	+6.2400000E+02	+3.8157568E+01	+6.4800000E+02	+5.8000000E+02	+5.7932470E+02
254.0	3	+5.4466650E+02	+1.0263202E+01	+5.5600000E+02	+5.3600000E+02	+5.9351953E+02

STAGE 1,DISCTED MOTOR=STM-012,STRESS RELAXATION MODULUS,5 % STRAIN AT 100 SEC.

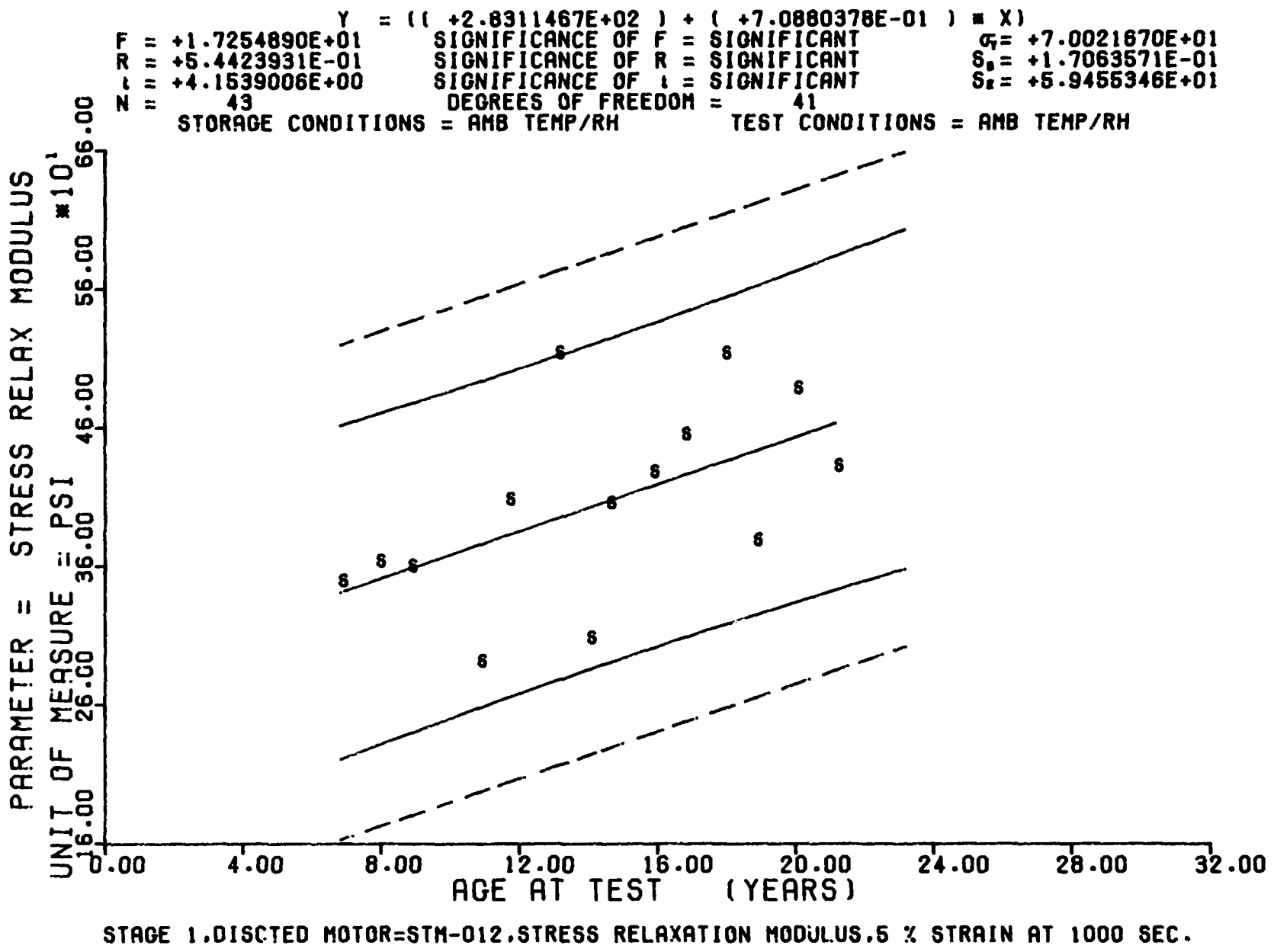
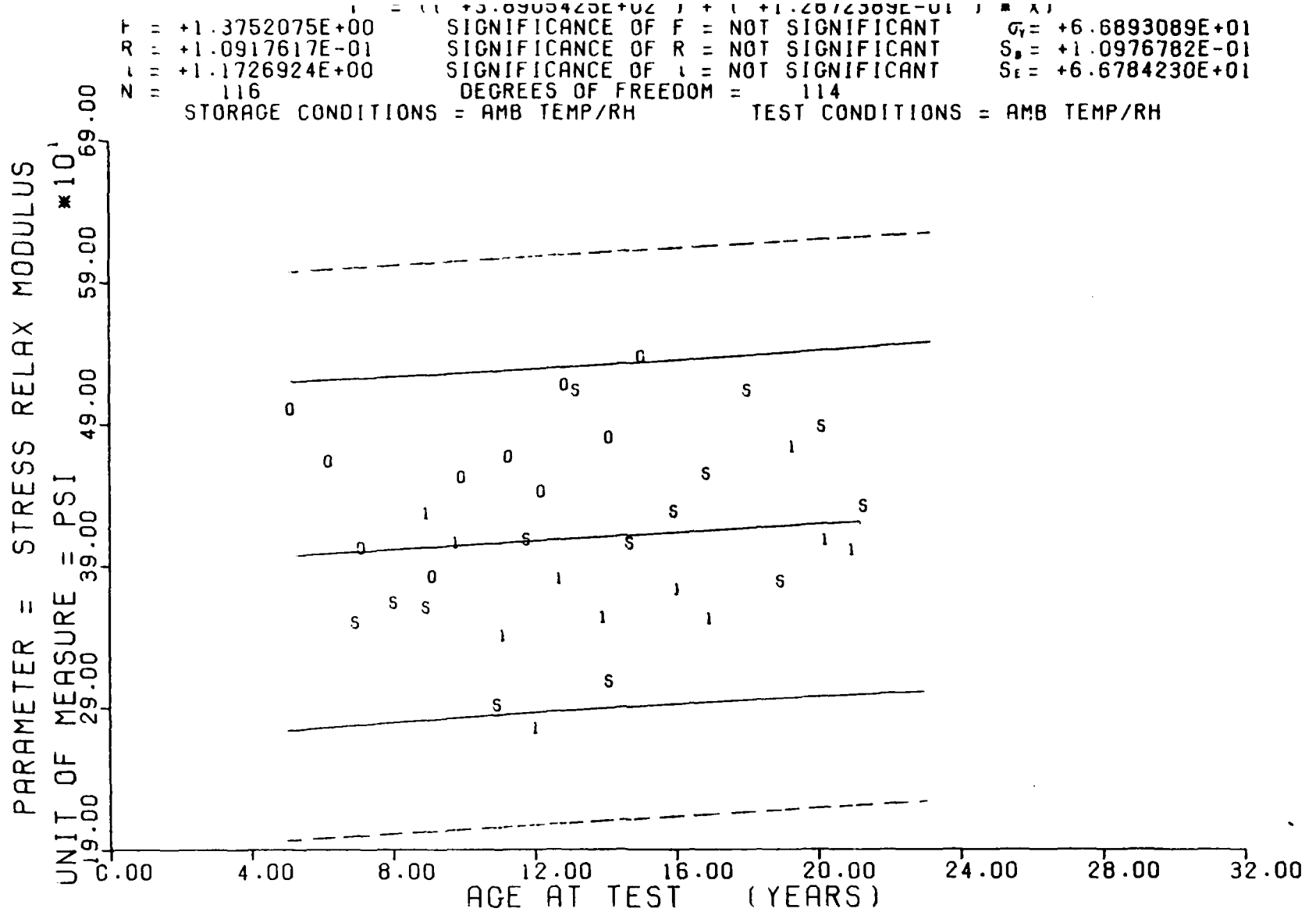

Y = ((+2.8311467E+02) + (+7.0880378E-01) * X)
F = +1.7254890E+01 SIGNIFICANCE OF F = SIGNIFICANT σr= +7.0021670E+01
R = +5.4423931E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb= +1.7063571E-01
t = +4.1539006E+00 SIGNIFICANCE OF t = SIGNIFICANT Se= +5.9455346E+01
N = 43 DEGREES OF FREEDOM = 41
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRESS RELAX MODULUS
UNIT OF MEASURE = PSI *10¹
16.00
26.00
36.00
46.00
56.00
66.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1.DISCTED MOTOR=STM-012.STRESS RELAXATION MODULUS.5 % STRAIN AT 1000 SEC.

Figure 37



TP-H1011 DISSECTED MTRS. STRESS RELAXATION MODULUS. 5 PERCENT STRAIN. 1000 SEC

Figure 37A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
82.0	3	+3.4600000E+02	+6.9282032E+00	+3.5000000E+02	+3.3800000E+02	+3.4123657E+02
95.0	4	+3.6000000E+02	+2.1725560E+01	+3.8400000E+02	+3.3400000E+02	+3.5045092E+02
106.0	3	+3.5666650E+02	+4.1633319E+00	+3.6000000E+02	+3.5200000E+02	+3.5824780E+02
130.0	3	+2.8800000E+02	+1.3114877E+01	+3.0000000E+02	+2.7400000E+02	+3.7525903E+02
140.0	3	+4.0466650E+02	+1.6653327E+01	+4.1800000E+02	+3.8600000E+02	+3.8234716E+02
157.0	3	+5.1000000E+02	+2.0880613E+01	+5.2400000E+02	+4.8600000E+02	+3.9439672E+02
168.0	3	+3.0466650E+02	+4.1633319E+00	+3.0800000E+02	+3.0000000E+02	+4.0219360E+02
175.0	3	+4.0200000E+02	+1.7999999E+01	+4.2000000E+02	+3.8400000E+02	+4.0715527E+02
190.0	3	+4.2466650E+02	+1.2858201E+01	+4.3400000E+02	+4.1000000E+02	+4.1778735E+02
201.0	3	+4.5133325E+02	+8.3266639E+00	+4.5800000E+02	+4.4200000E+02	+4.2558422E+02
215.0	3	+5.1000000E+02	+5.0239426E+01	+5.4000000E+02	+4.5200000E+02	+4.3550732E+02
226.0	3	+3.7533325E+02	+1.4742229E+01	+3.9200000E+02	+3.6400000E+02	+4.4330419E+02
240.0	3	+4.8466650E+02	+3.1895663E+01	+5.0600000E+02	+4.4800000E+02	+4.5322753E+02
254.0	3	+4.2866650E+02	+1.2055427E+01	+4.4000000E+02	+4.1600000E+02	+4.6315063E+02

STAGE 1,DISCTED MOTOR=STM-012,STRESS RELAXATION MODULUS,5 % STRAIN AT 1000 SEC.

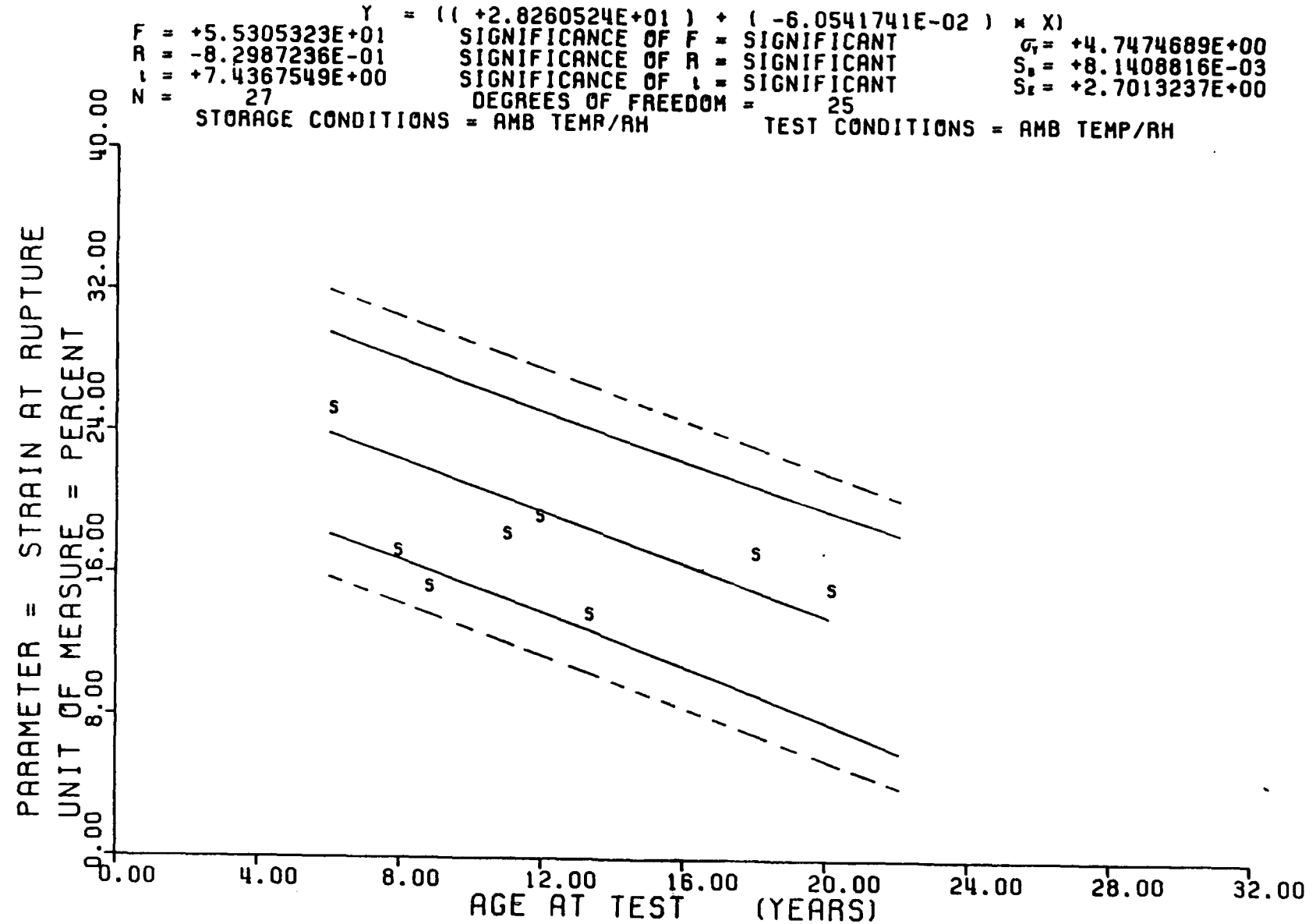

Y = ((+2.8260524E+01) + (-6.0541741E-02) * X)
F = +5.5305323E+01 SIGNIFICANCE OF F = SIGNIFICANT σr = +4.7474689E+00
R = -8.2987236E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +8.1408816E-03
t = +7.4367549E+00 SIGNIFICANCE OF t = SIGNIFICANT Sε = +2.7013237E+00
N = 27 DEGREES OF FREEDOM = 25
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = PERCENT
0.00
8.00
16.00
24.00
32.00
40.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
S
STAGE 1,DSSCTD MTR=STM-012,CONTANT STRAIN,STRAIN 0.1 INIT & 0.01 EVERY 48 HRS.

Figure 38

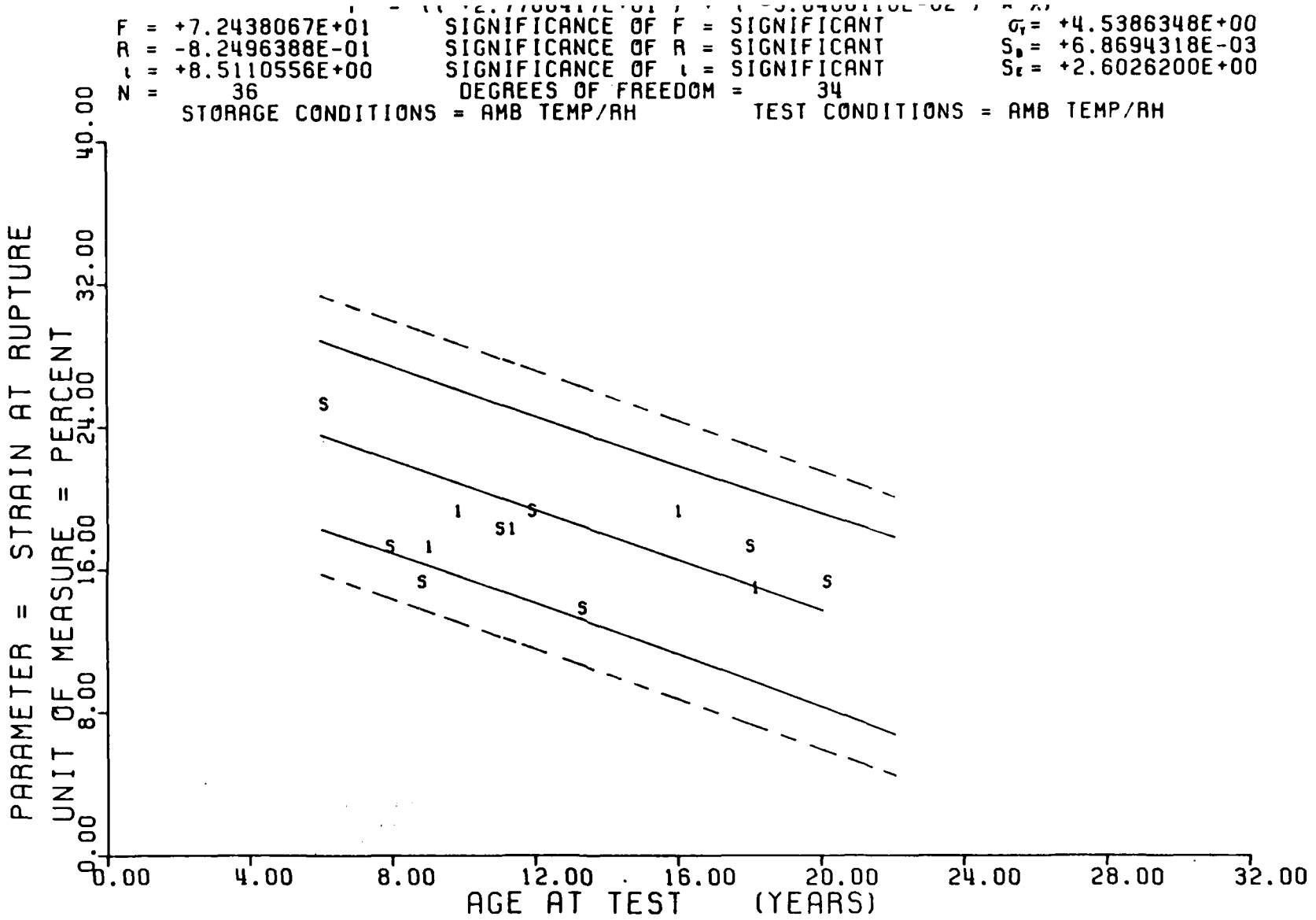

F = +7.2438067E+01
SIGNIFICANCE OF F = SIGNIFICANT
σT = +4.5386348E+00
R = -8.2496388E-01
SIGNIFICANCE OF R = SIGNIFICANT
Sb = +6.8694318E-03
ι = +8.5110556E+00
SIGNIFICANCE OF ι = SIGNIFICANT
Sε = +2.6026200E+00
N = 36
DEGREES OF FREEDOM = 34
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
PARAMETER = STRAIN AT RUPTURE
UNIT OF MEASURE = PERCENT
0.00
8.00
16.00
24.00
32.00
40.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DSSCTD MTR COMBINED,CONTANT STRAIN,STRAIN 0.1 INIT & 0.01 EVERY 48 HRS.

Figure 38A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (HOURS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
72.0	15	+2.5000000E+01	+0.0000000E+07	+2.5000000E+01	+2.5000000E+01	+2.3901504E+01
94.0	1	+1.7000000E+01	+0.0000000E+07	+1.7000000E+01	+1.7000000E+01	+2.2569595E+01
105.0	1	+1.5000000E+01	+0.0000000E+07	+1.5000000E+01	+1.5000000E+01	+2.1903640E+01
121.0	1	+1.8000000E+01	+0.0000000E+07	+1.8000000E+01	+1.8000000E+01	+2.0329544E+01
142.0	1	+1.9000000E+01	+0.0000000E+07	+1.9000000E+01	+1.9000000E+01	+1.9663529E+01
154.0	2	+1.3500000E+01	+3.5355339E+00	+1.6000000E+01	+1.1000000E+01	+1.8634384E+01
216.0	3	+1.7000000E+01	+0.0000000E+07	+1.7000000E+01	+1.7000000E+01	+1.5244049E+01
241.0	3	+1.5000000E+01	+0.0000000E+07	+1.5000000E+01	+1.5000000E+01	+1.3669963E+01

STAGE 1,DSSCTD MTR=STM-012,CONTANT STRAIN,STRAIN 0.1 INIT & 0.01 EVERY 48 HRS.

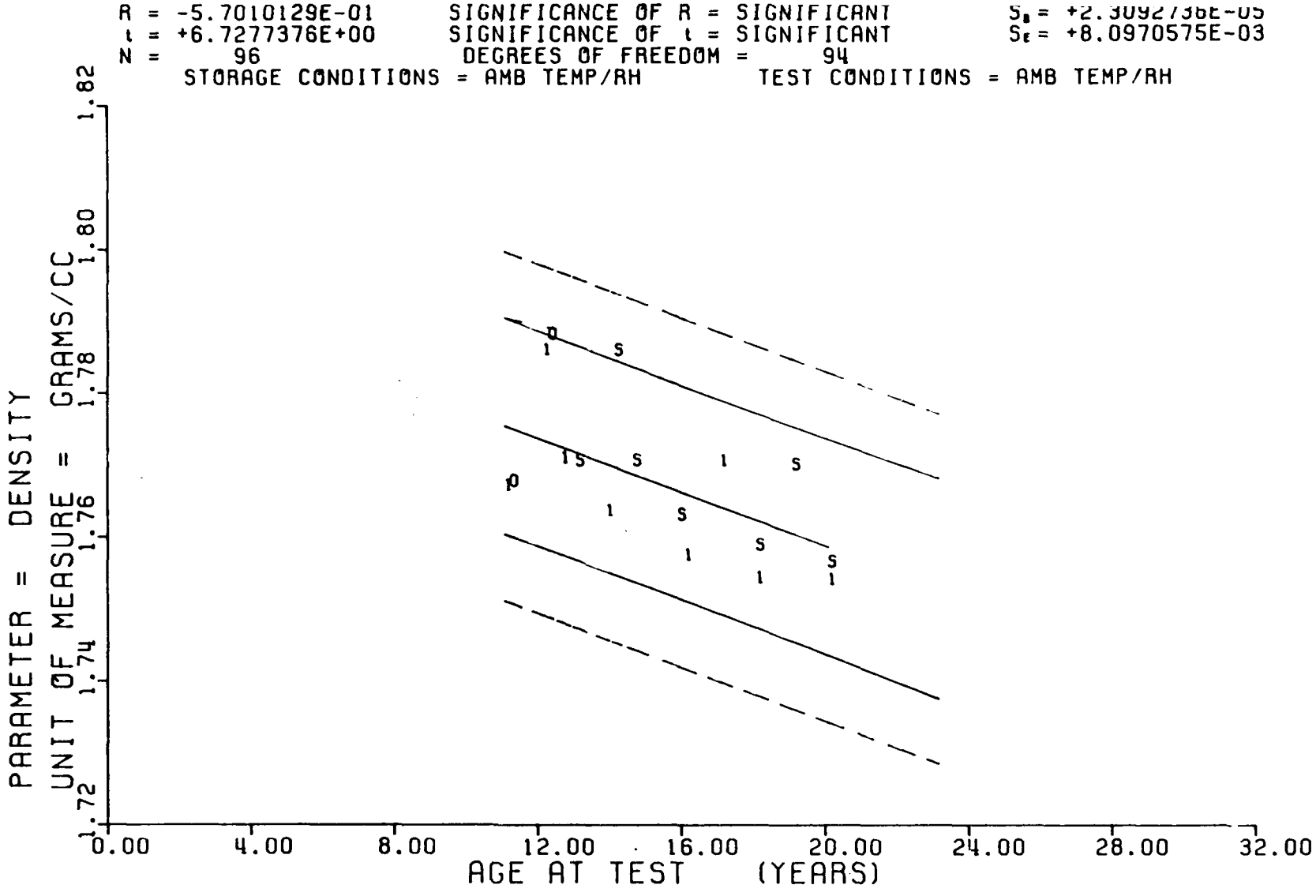

R = -5.7010129E-01
SIGNIFICANCE OF R = SIGNIFICANT
S_a = +2.3092736E-05
t = +6.7277376E+00
SIGNIFICANCE OF t = SIGNIFICANT
S_t = +8.0970575E-03
N = 96
DEGREES OF FREEDOM = 94
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
PARAMETER = DENSITY
UNIT OF MEASURE = GRAMS/CC
1.82
1.80
1.78
1.76
1.74
1.72
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1, DISSECTED MTRS= (0) 0012099, (1) 0012199, (S) STM-012, SOL GEL DENSITY.

Figure 43A

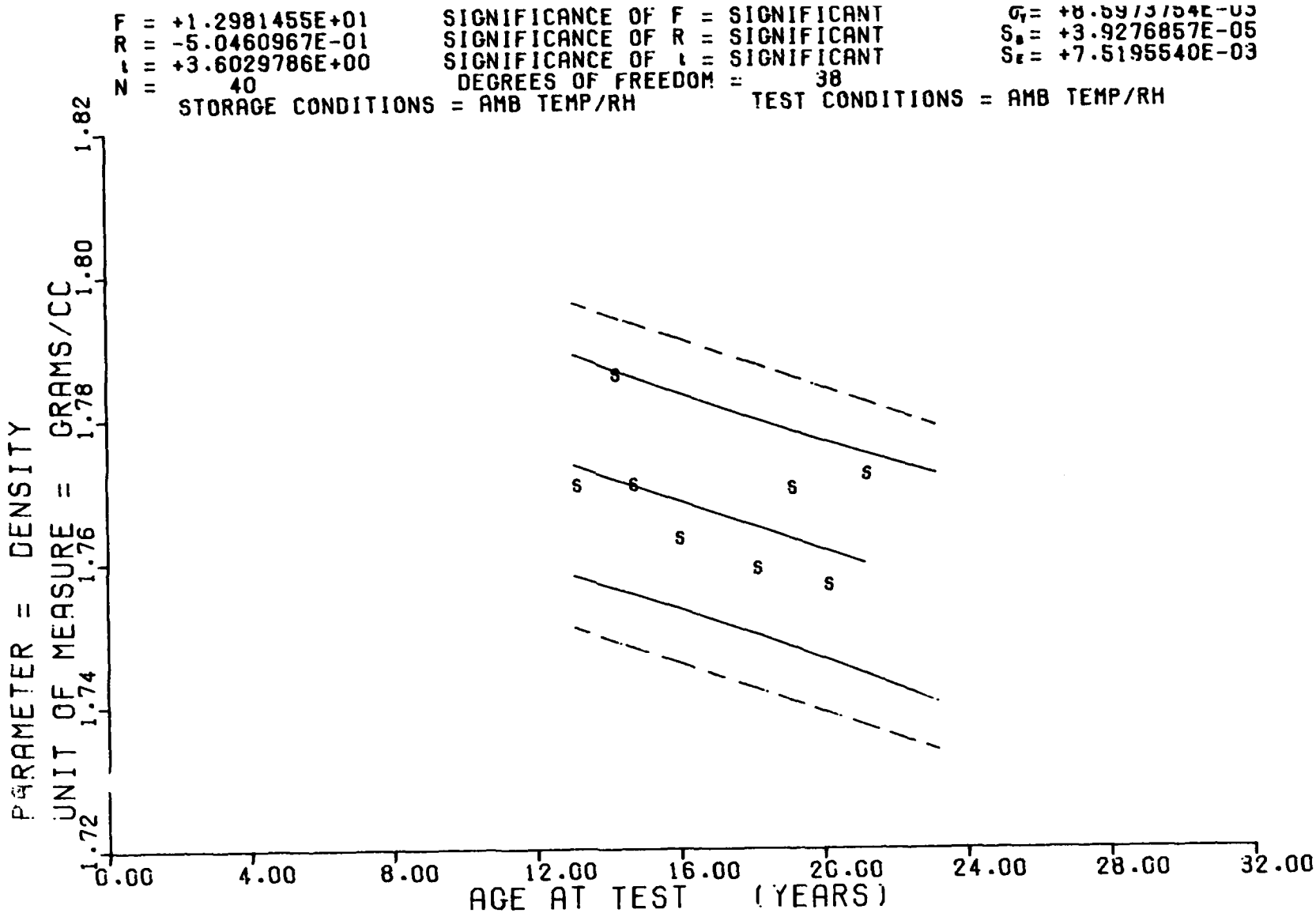

F = +1.2981455E+01
R = -5.0460967E-01
t = +3.6029786E+00
N = 40
SIGNIFICANCE OF F = SIGNIFICANT
SIGNIFICANCE OF R = SIGNIFICANT
SIGNIFICANCE OF t = SIGNIFICANT
DEGREES OF FREEDOM = 38
S_T = +8.5973754E-03
S_a = +3.9276857E-05
S_e = +7.5195540E-03
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
PARAMETER = DENSITY
UNIT OF MEASURE = GRAMS/CC
1.82
1.80
1.78
1.76
1.74
1.72
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1, DISSECTED MTRS, SOL GEL, DENSITY, MOTOR=STM-012.

Figure 43

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
157.0	4	+3.7633989E+00	+3.3138662E-02	+3.7929992E+00	+3.7264995E+00	+3.5649566E+00
170.0	4	+3.6726236E+00	+6.2143551E-02	+3.7327995E+00	+3.5857992E+00	+3.6268224E+00
178.0	4	+3.6408491E+00	+1.3909798E-02	+3.6618995E+00	+3.6160993E+00	+3.6553764E+00
191.0	6	+3.5270309E+00	+6.7716831E-02	+3.5963993E+00	+3.4614992E+00	+3.7267599E+00
217.0	6	+3.7592134E+00	+5.0301778E-02	+3.8257999E+00	+3.6848993E+00	+3.8504915E+00
229.0	8	+3.8343209E+00	+5.5551254E-02	+3.9553995E+00	+3.8113994E+00	+3.9075984E+00
241.0	6	+4.1214771E+00	+2.9972506E-02	+4.1523990E+00	+4.0897998E+00	+3.9647045E+00
254.0	2	+4.0596990E+00	+5.9415445E-02	+4.1017999E+00	+4.0175991E+00	+4.0265703E+00

DISSECTED MTR, STAGE 1, TP-H1011, SOL GEL, WT SWELL RATIO MOTOR=STM-012.

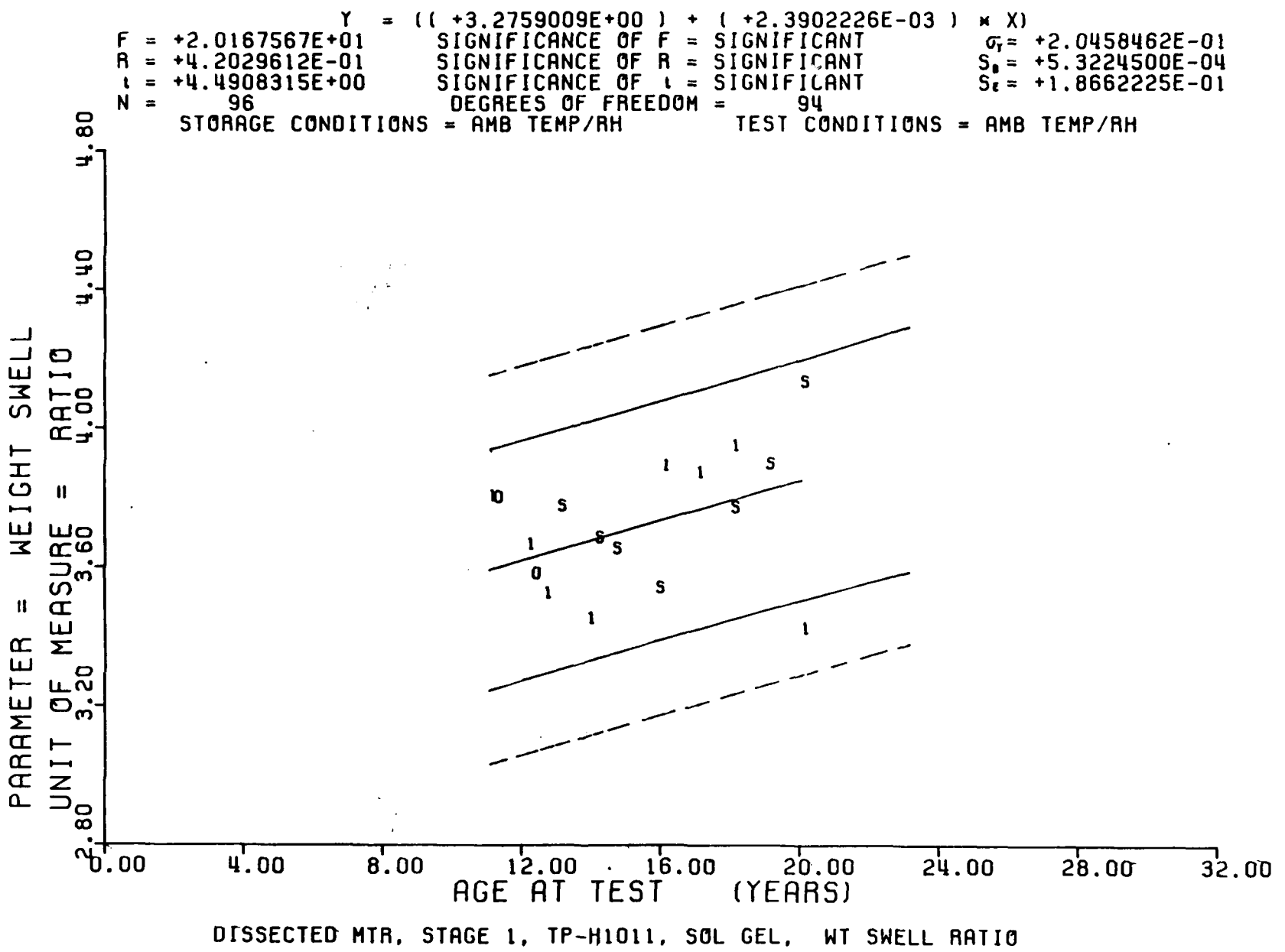

Y = ((+3.2759009E+00) + (+2.3902226E-03) * X)
F = +2.0167567E+01 SIGNIFICANCE OF F = SIGNIFICANT σr = +2.0458462E-01
R = +4.2029612E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +5.3224500E-04
t = +4.4908315E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +1.8662225E-01
N = 96 DEGREES OF FREEDOM = 94
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = WEIGHT SWELL
UNIT OF MEASURE = RATIO
4.80
4.40
4.00
3.60
3.20
2.80
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
DISSECTED MTR, STAGE 1, TP-H1011, SOL GEL, WT SWELL RATIO

Figure 42A

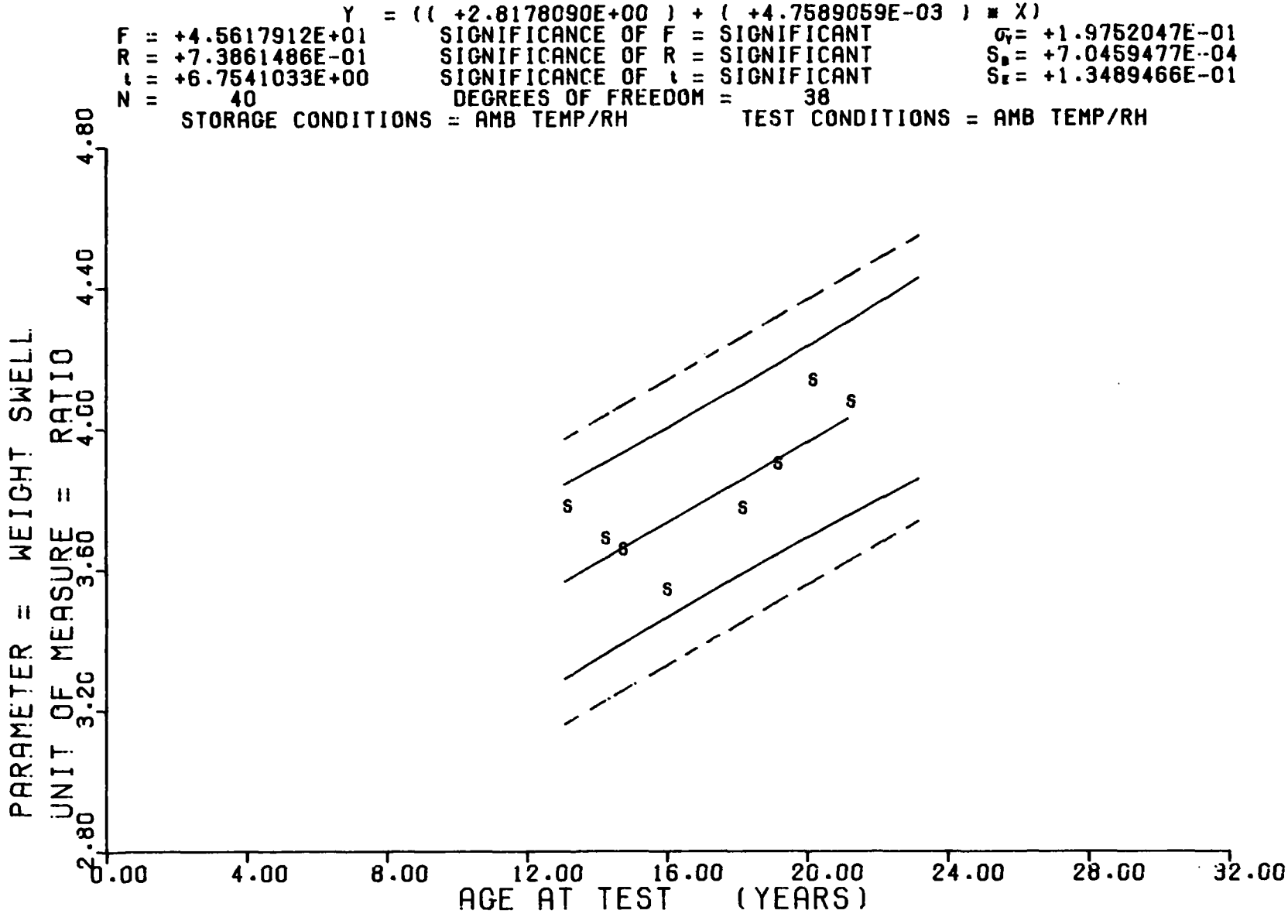

Y = ((+2.8178090E+00) + (+4.7589059E-03) * X)
F = +4.5617912E+01 SIGNIFICANCE OF F = SIGNIFICANT σY= +1.9752047E-01
R = +7.3861486E-01 SIGNIFICANCE OF R = SIGNIFICANT SB= +7.0459477E-04
t = +6.7541033E+00 SIGNIFICANCE OF t = SIGNIFICANT SE= +1.3489466E-01
N = 40 DEGREES OF FREEDOM = 38
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = WEIGHT SWELL
UNIT OF MEASURE = RATIO
2.80
3.20
3.60
4.00
4.40
4.80
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
DISSECTED MTR, STAGE 1, TP-H1011, SOL GEL, WT SWELL RATIO MOTOR=STM-012.

Figure 42

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
157.0	4	+7.7567443E+00	+1.1949960E-02	+7.7619991E+00	+7.7489995E+00	+7.1326837E+00
170.0	4	+7.2764968E+00	+7.6578197E-02	+7.3759994E+00	+7.1979999E+00	+7.1991558E+00
176.0	4	+6.6809959E+00	+3.1191806E-02	+6.7039995E+00	+6.6389999E+00	+7.2298355E+00
191.0	6	+7.0579957E+00	+6.3261923E-02	+7.1250000E+00	+6.9559993E+00	+7.3065338E+00
217.0	6	+7.3196611E+00	+3.8742176E-02	+7.3519992E+00	+7.2489995E+00	+7.4394779E+00
229.0	8	+7.5669937E+00	+1.0249095E-01	+7.7199993E+00	+7.4479999E+00	+7.5008373E+00
241.0	6	+7.6958284E+00	+1.4760366E-01	+7.9419994E+00	+7.5479993E+00	+7.5621957E+00
254.0	2	+7.7629995E+00	+4.4829708E-01	+8.0799999E+00	+7.4459991E+00	+7.6286678E+00

DISSECTED MTR, STAGE 1, TP-H1011, SOL GEL, PERCENT EXTRACTABLES, MOTOR=STM-012.

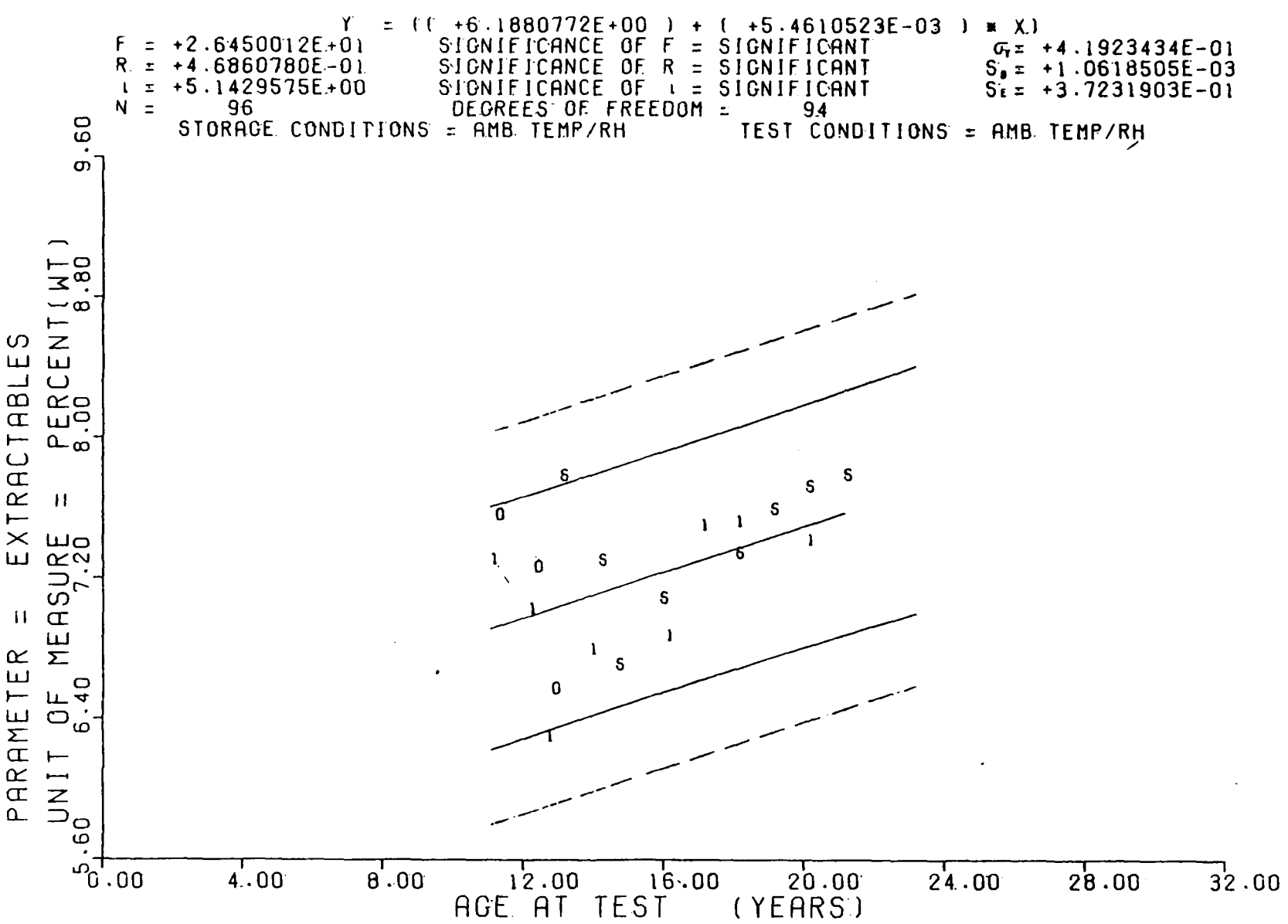

Y = ((+6.1880772E+00) + (+5.4610523E-03) * X)
F = +2.6450012E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +4.6860780E-01 SIGNIFICANCE OF R = SIGNIFICANT
N = 96 DEGREES OF FREEDOM = 94
STORAGE CONDITIONS = AMB. TEMP/RH TEST CONDITIONS = AMB. TEMP/RH
PARAMETER = EXTRACTABLES
UNIT OF MEASURE = PERCENT(WT)
9.60
8.80
8.00
7.20
6.40
5.60
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
DISSECTED MTR, STAGE 1, TP-H1011, SOL GEL, PERCENT EXTRACTABLES

Figure 41A

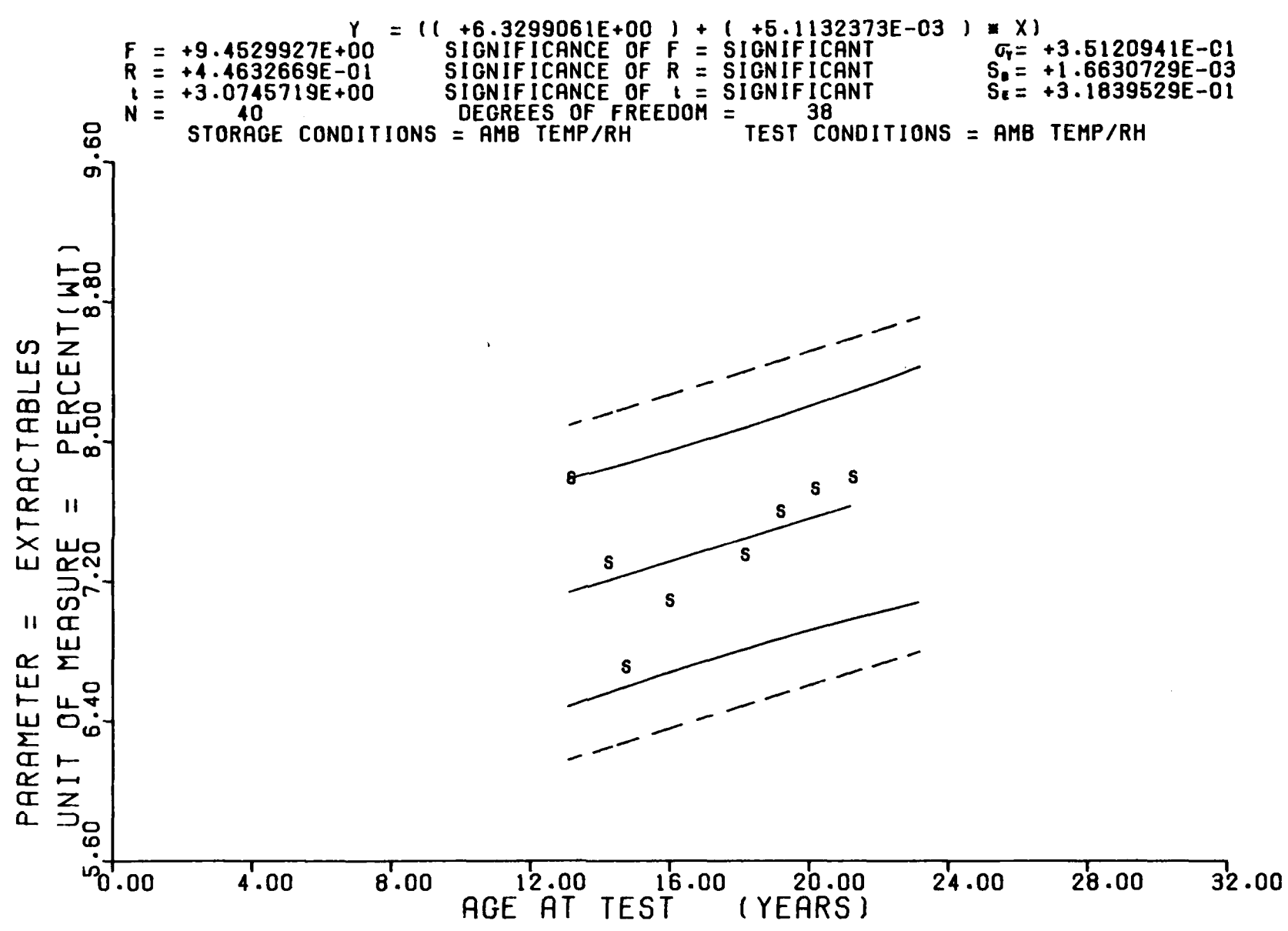

Y = ((+6.3299061E+00) + (+5.1132373E-03) * X)
F = +9.4529927E+00 SIGNIFICANCE OF F = SIGNIFICANT
R = +4.4632669E-01 SIGNIFICANCE OF R = SIGNIFICANT
t = +3.0745719E+00 SIGNIFICANCE OF t = SIGNIFICANT
N = 40 DEGREES OF FREEDOM = 38
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = EXTRACTABLES
UNIT OF MEASURE = PERCENT(WT)
9.60
8.80
8.00
7.20
6.40
5.60
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
DISSECTED MTR, STAGE 1, TP-H1011, SOL GEL, PERCENT EXTRACTABLES,MOTOR=STM-012.

Figure 41

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
168.0	11	+9.6794497E-01	+2.0235784E-01	+1.4064998E+00	+7.3359996E-01	+9.3113327E-01
192.0	10	+1.1526089E+00	+1.0828795E-01	+1.3053998E+00	+9.8869997E-01	+1.0480937E+00
201.0	9	+7.5659948E-01	+2.1949490E-01	+1.0121994E+00	+2.2769999E-01	+1.0919542E+00
216.0	9	+1.4923877E+00	+1.1989330E-01	+1.6449995E+00	+1.3080997E+00	+1.1650552E+00
227.0	18	+1.0534200E+00	+1.2911712E-01	+1.3265991E+00	+8.6729997E-01	+1.2186622E+00
241.0	8	+1.5624866E+00	+2.0363030E-01	+1.9228992E+00	+1.3248996E+00	+1.2868900E+00
254.0	10	+1.2893486E+00	+2.0876053E-01	+1.5529994E+00	+9.7789996E-01	+1.3502435E+00

STAGE 1,DISSECTED MOTOR=STM-012,TEAR ENERGY,CHS=0.1 IN/MIN,T/TEMP=77 DEG.

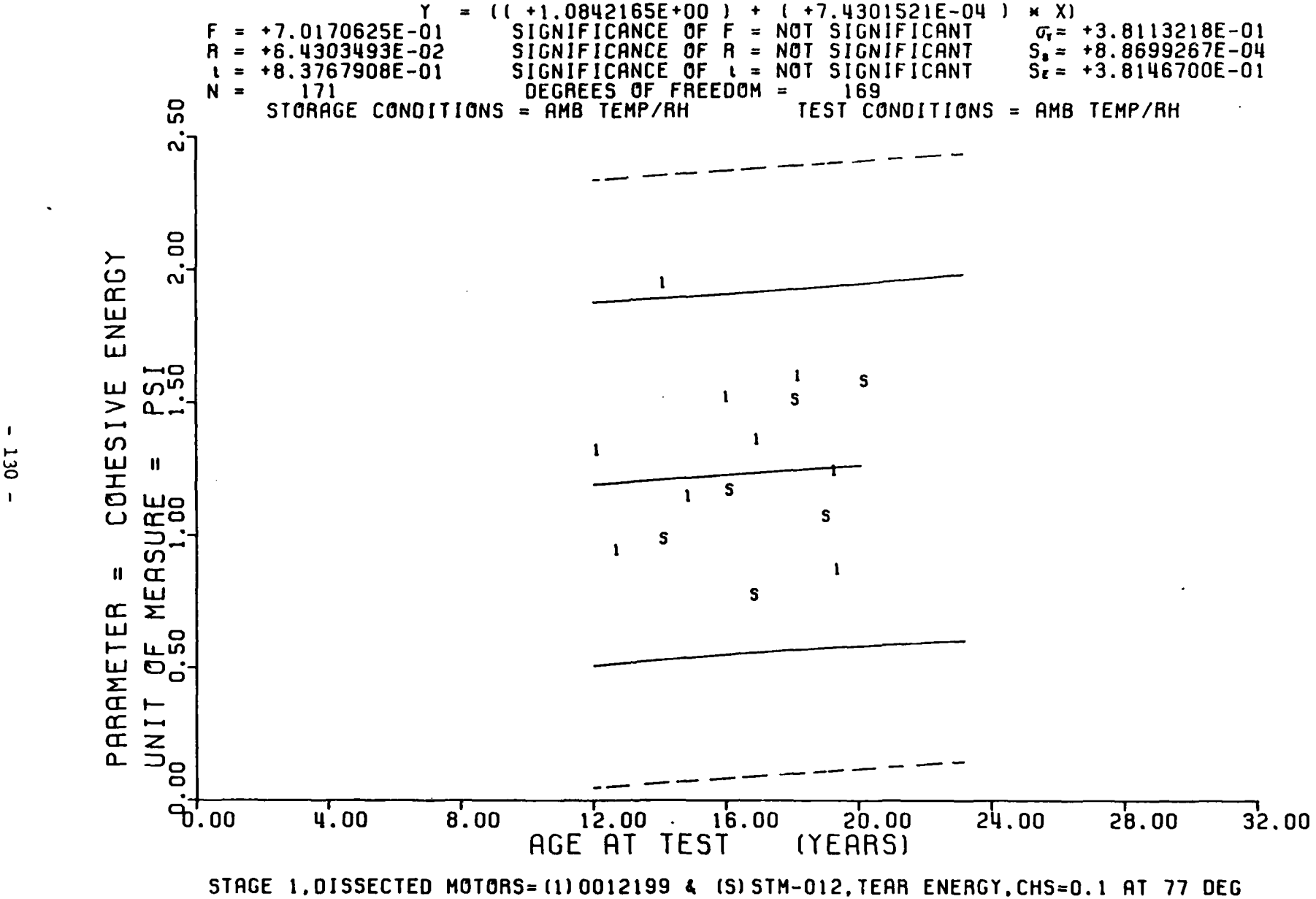

Y = ((+1.0842165E+00) + (+7.4301521E-04) × X)
F = +7.0170625E-01 SIGNIFICANCE OF F = NOT SIGNIFICANT σ = +3.8113218E-01
R = +6.4303493E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT S = +8.8699267E-04
ι = +8.3767908E-01 SIGNIFICANCE OF ι = NOT SIGNIFICANT S = +3.8146700E-01
N = 171 DEGREES OF FREEDOM = 169
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = COHESIVE ENERGY
UNIT OF MEASURE = PSI
0.00
0.50
1.00
1.50
2.00
2.50
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1, DISSECTED MOTORS= (1) 0012199 & (S) STM-012, TEAR ENERGY, CHS=0.1 AT 77 DEG

Figure 40A

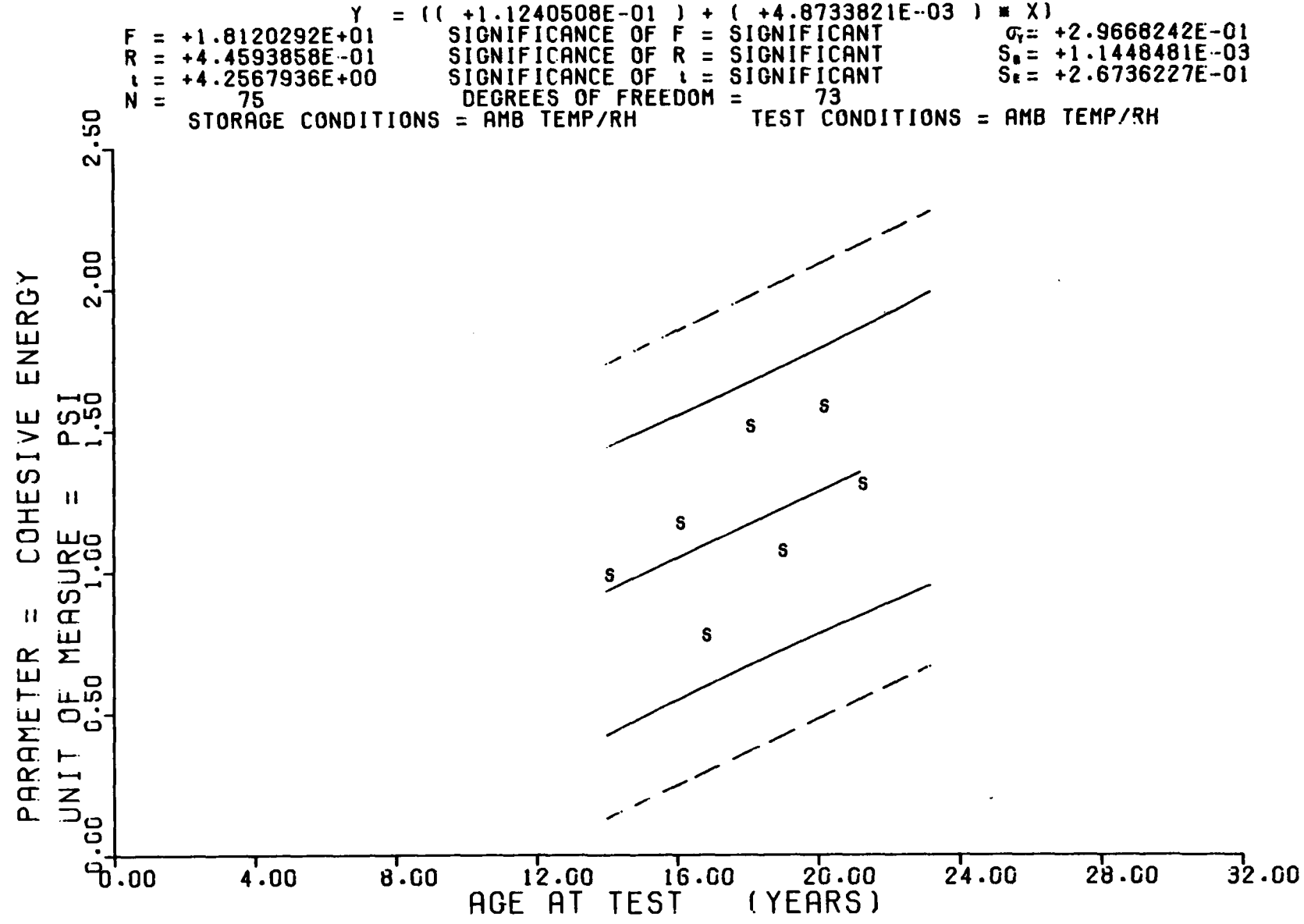

Y = ((+1.1240508E-01) + (+4.8733821E-03) * X)
F = +1.8120292E+01 SIGNIFICANCE OF F = SIGNIFICANT
R = +4.4593858E-01 SIGNIFICANCE OF R = SIGNIFICANT
N = 75 DEGREES OF FREEDOM = 73
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = COHESIVE ENERGY
UNIT OF MEASURE = PSI
0.00
0.50
1.00
1.50
2.00
2.50
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISSECTED MOTOR=STM-012,TEAR ENERGY,CHS=0.1 IN/MIN,T/TEMP=77 DEG.

Figure 40

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
93.0	1	+6.4799987E+01	+0.0000000E+07	+6.4799987E+01	+6.4799987E+01	+6.5200759E+01
104.0	5	+6.5399993E+01	+8.9442719E-01	+6.6000000E+01	+6.4000000E+01	+6.5179565E+01
130.0	5	+6.4799987E+01	+8.3666002E-01	+6.6000000E+01	+6.4000000E+01	+6.5129501E+01
140.0	5	+6.7199996E+01	+8.3666002E-01	+6.8000000E+01	+6.6000000E+01	+6.5110229E+01
167.0	3	+6.2666656E+01	+5.7735026E-01	+6.3000000E+01	+6.2000000E+01	+6.5058227E+01
175.0	5	+6.3000000E+01	+1.5811388E+00	+6.5000000E+01	+6.1000000E+01	+6.5042831E+01
188.0	10	+6.5500000E+01	+7.0710678E-01	+6.7000000E+01	+6.5000000E+01	+6.5017791E+01
189.0	10	+6.5099990E+01	+8.7559503E-01	+6.6000000E+01	+6.3000000E+01	+6.5015853E+01
216.0	50	+6.4839996E+01	+2.1699242E+00	+6.8000000E+01	+6.0000000E+01	+6.4963851E+01
226.0	10	+6.5599990E+01	+3.4327404E-01	+6.7000000E+01	+6.4000000E+01	+6.4944595E+01
242.0	10	+6.5099990E+01	+8.7559503E-01	+6.6000000E+01	+6.3000000E+01	+6.4913772E+01

STAGE 1, DISSECTED MOTOR=(S)STM-C12, SHORE-A HARDNESS, 10 SECOND.

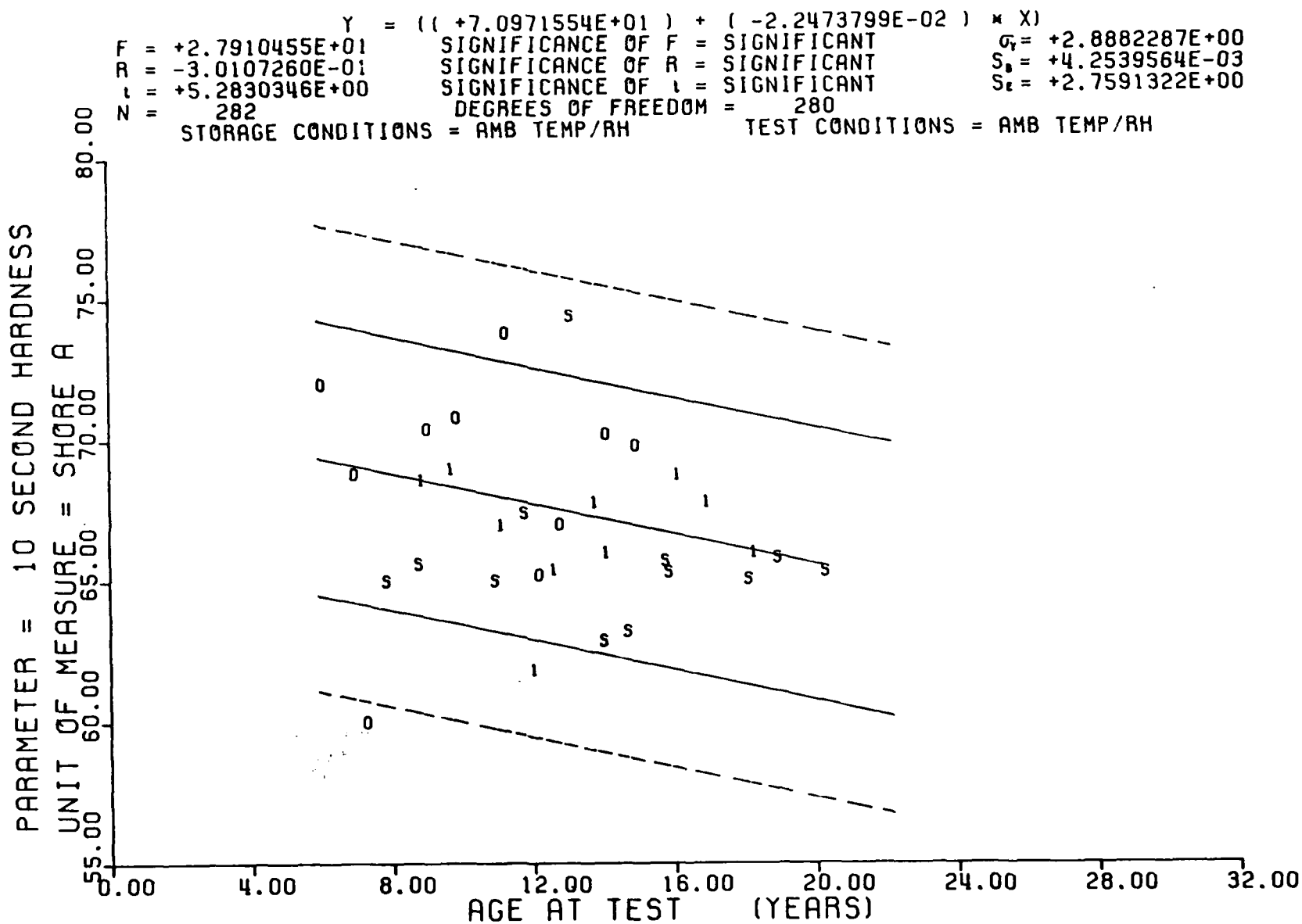
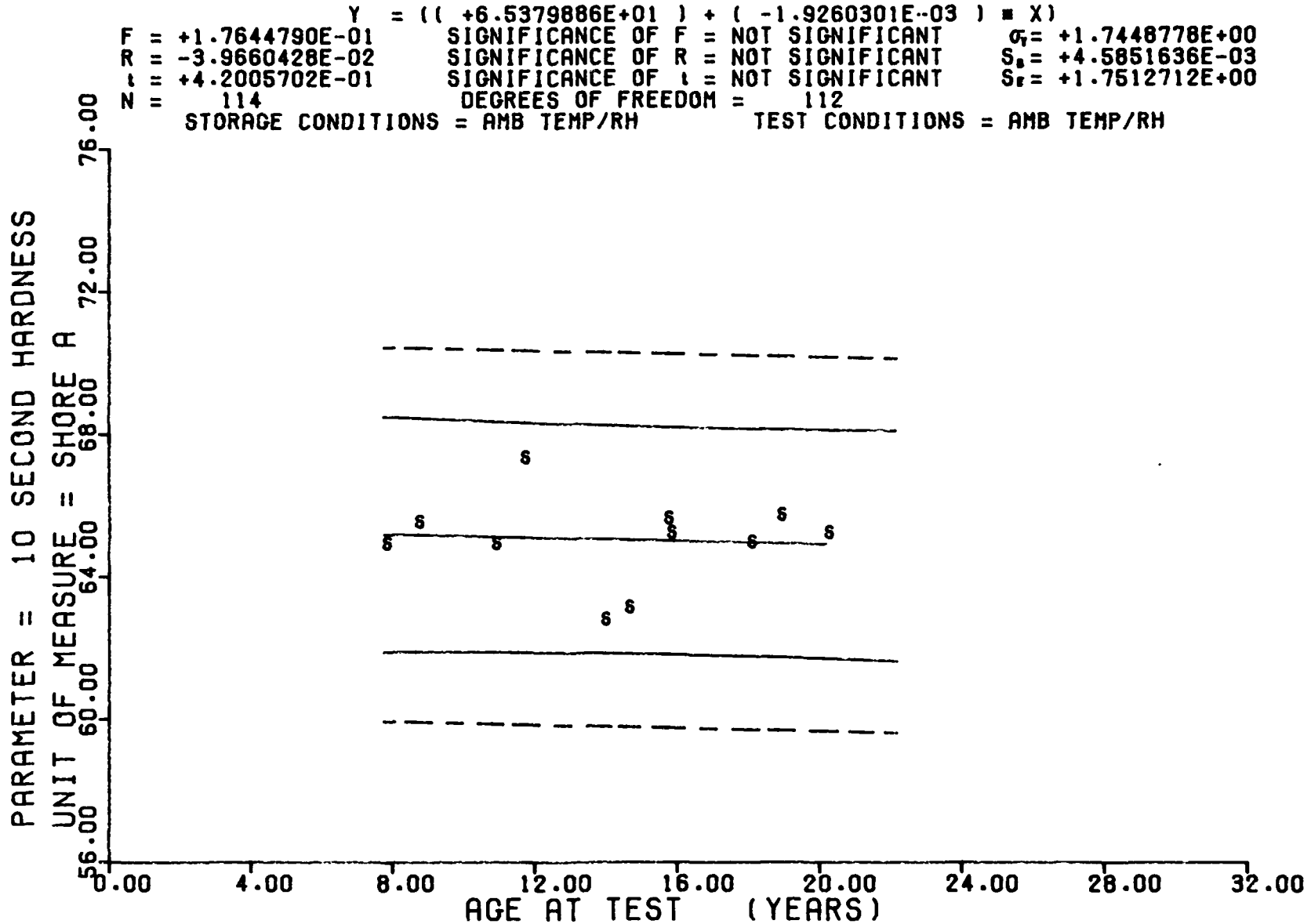

Y = ((+7.0971554E+01) + (-2.2473799E-02) * X)
F = +2.7910455E+01 SIGNIFICANCE OF F = SIGNIFICANT σ_Y = +2.8882287E+00
R = -3.0107260E-01 SIGNIFICANCE OF R = SIGNIFICANT S_B = +4.2539564E-03
t = +5.2830346E+00 SIGNIFICANCE OF t = SIGNIFICANT S_E = +2.7591322E+00
N = 282 DEGREES OF FREEDOM = 280
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = 10 SECOND HARDNESS
UNIT OF MEASURE = SHORE A
80.00
75.00
70.00
65.00
60.00
55.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISCTED MOTORS= (0) 12099, (1) 12199, (S) STM012, HARDNESS, SHORE A 10-SEC.

Figure 39A



STAGE 1, DISSECTED MOTOR=(S)STM-012, SHORE-A HARDNESS, 10 SECOND.

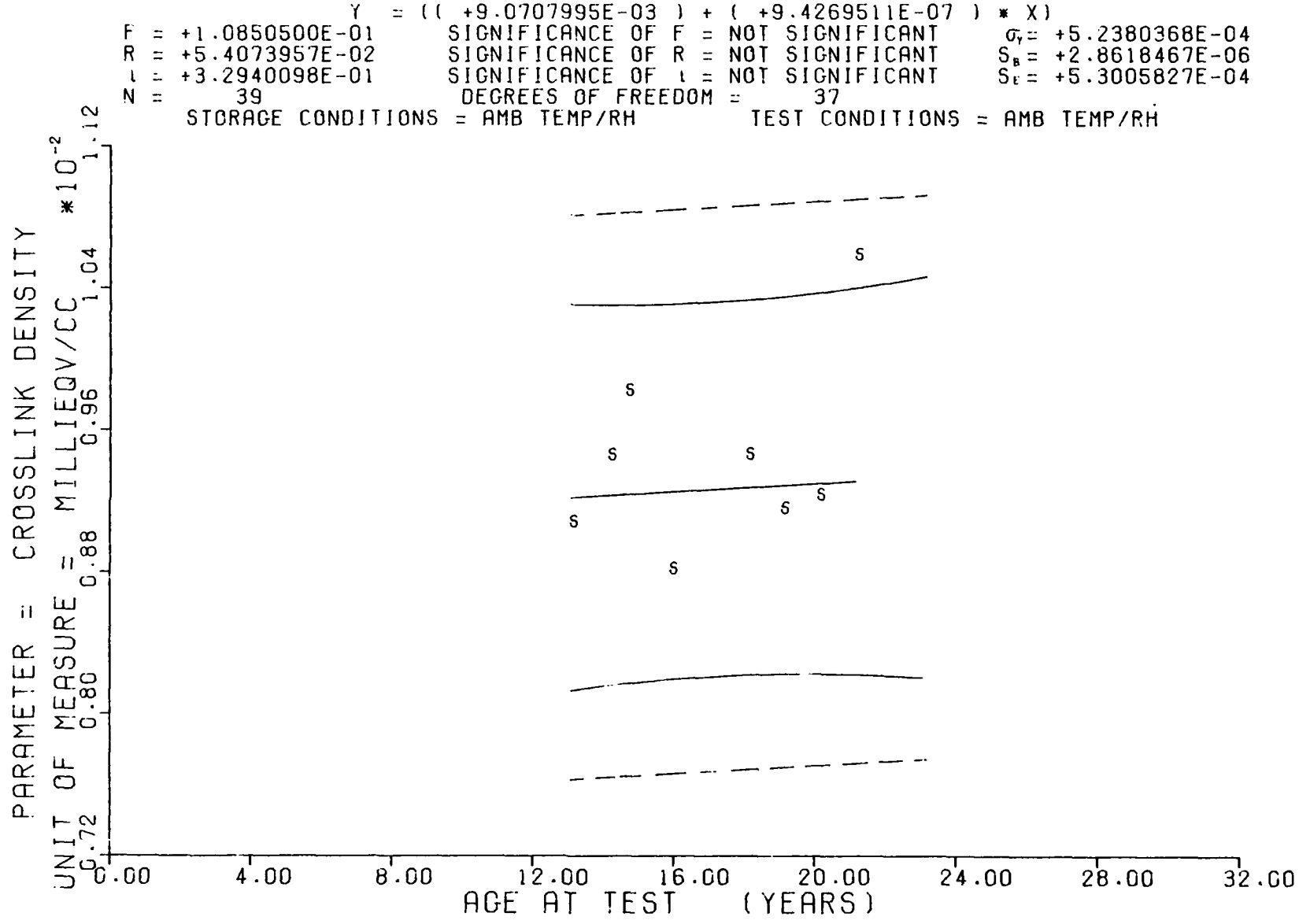
Figure 39

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
157.0	4	+1.7698488E+00	+2.3563534E-03	+1.7715997E+00	+1.7675991E+00	+1.7734069E+00
170.0	4	+1.7852745E+00	+1.6013188E-03	+1.7861995E+00	+1.7841997E+00	+1.7715673E+00
176.0	4	+1.7699995E+00	+1.1775037E-03	+1.7699995E+00	+1.7699995E+00	+1.7707185E+00
181.0	6	+1.7624492E+00	+8.5959775E-04	+1.7641992E+00	+1.7614994E+00	+1.7685956E+00
217.0	6	+1.7582330E+00	+3.2840221E-03	+1.7648992E+00	+1.7562999E+00	+1.7649164E+00
229.0	8	+1.7694492E+00	+1.0307327E-03	+1.7702999E+00	+1.7685995E+00	+1.7632188E+00
241.0	6	+1.7558822E+00	+2.2360656E-04	+1.7564992E+00	+1.7549991E+00	+1.7615203E+00
254.0	2	+1.7712993E+00	+3.0257824E-03	+1.7728996E+00	+1.7696990E+00	+1.7596807E+00

STAGE 1, DISSECTED MTRS, SOL GEL, DENSITY, AUTOR=STM-012.



DISSECTED MTR, STAGE 1, TP-H1011, SOL GEL, CROSSLINK DENSITY, MOTOR=STM-012.

Figure 44

Y = (+1.0994496E-02) + (+7.2035647E-07) * X)

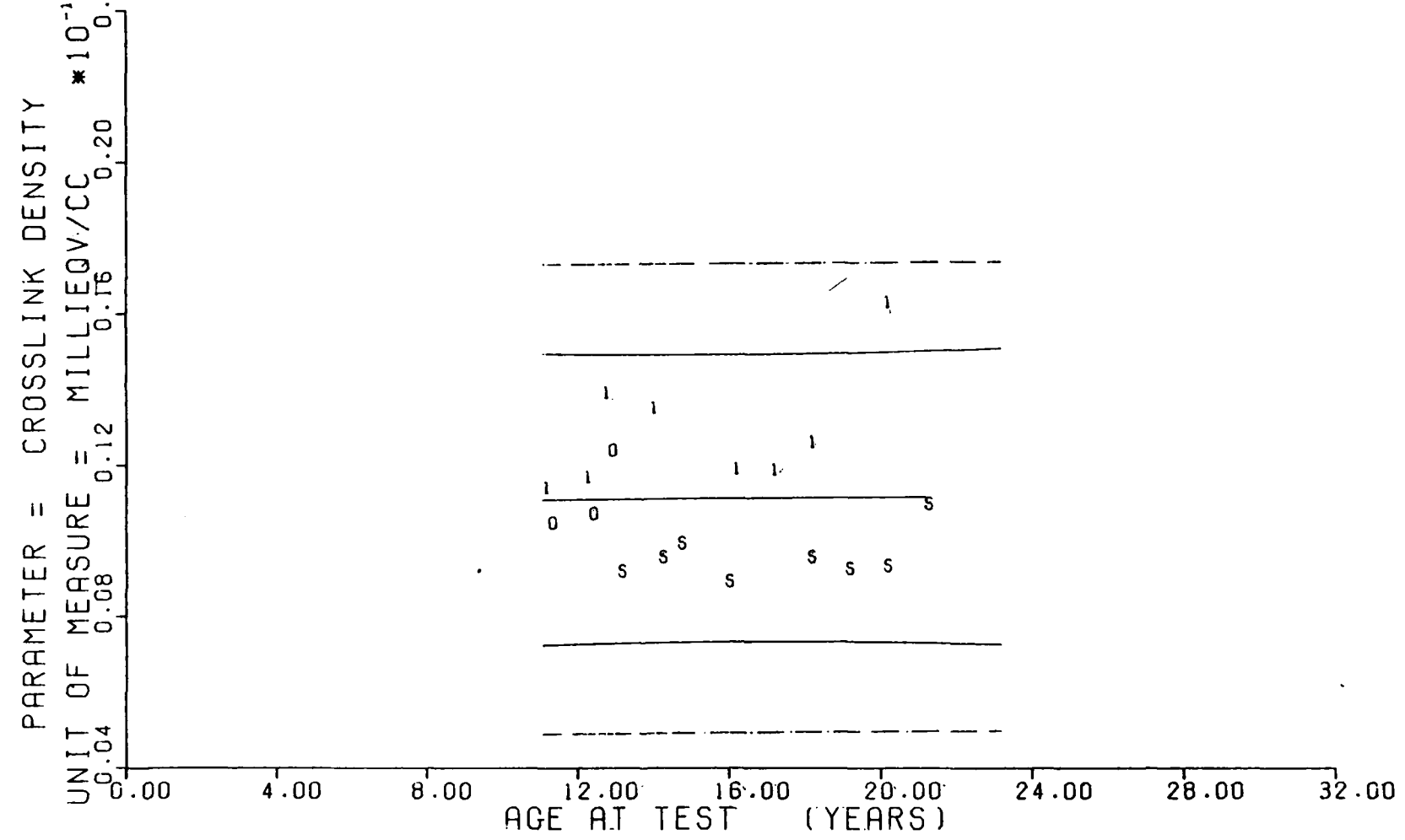
F = +1.4898971E-02 SIGNIFICANCE OF F = NOT SIGNIFICANT σ_Y = +2.0585323E-03

R = +1.2588668E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT S_B = +5.9015939E-06

ρ = +1.2206134E-01 SIGNIFICANCE OF ρ = NOT SIGNIFICANT S_E = +2.0692890E-03

N = 96 DEGREES OF FREEDOM = 94

STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



DISSECTED MTR, STAGE 1, TP-H1011, SOL GEL, CROSSLINK DENSITY

Figure 44A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
157.0	4	+9.0554952E-03	+4.1128907E-04	+9.5279999E-03	+8.6019970E-03	+9.2188008E-03
170.0	4	+9.4309970E-03	+7.7353530E-04	+1.0321997E-02	+8.7229982E-03	+9.2310570E-03
176.0	4	+9.7937472E-03	+1.9277871E-04	+9.9879987E-03	+9.5269978E-03	+9.2367120E-03
191.0	6	+8.7896622E-03	+1.3075956E-04	+8.9789964E-03	+8.6049996E-03	+9.2508532E-03
217.0	6	+9.4343982E-03	+6.2291154E-04	+1.0313998E-02	+8.5949972E-03	+9.2753618E-03
229.0	8	+9.1300383E-03	+3.6519599E-04	+9.6693970E-03	+8.7160989E-03	+9.2866756E-03
241.0	6	+9.2048309E-03	+2.3492950E-04	+9.5205977E-03	+8.8405981E-03	+9.2979855E-03
254.0	1	+1.0560397E-02	+0.0000000E+07	+1.0560397E-02	+1.0560397E-02	+9.3102417E-03

DISSECTED MTR. STAGE 1. TP-H1011. SOL GEL. CROSSLINK DENSITY.MOTOR=STM-012.

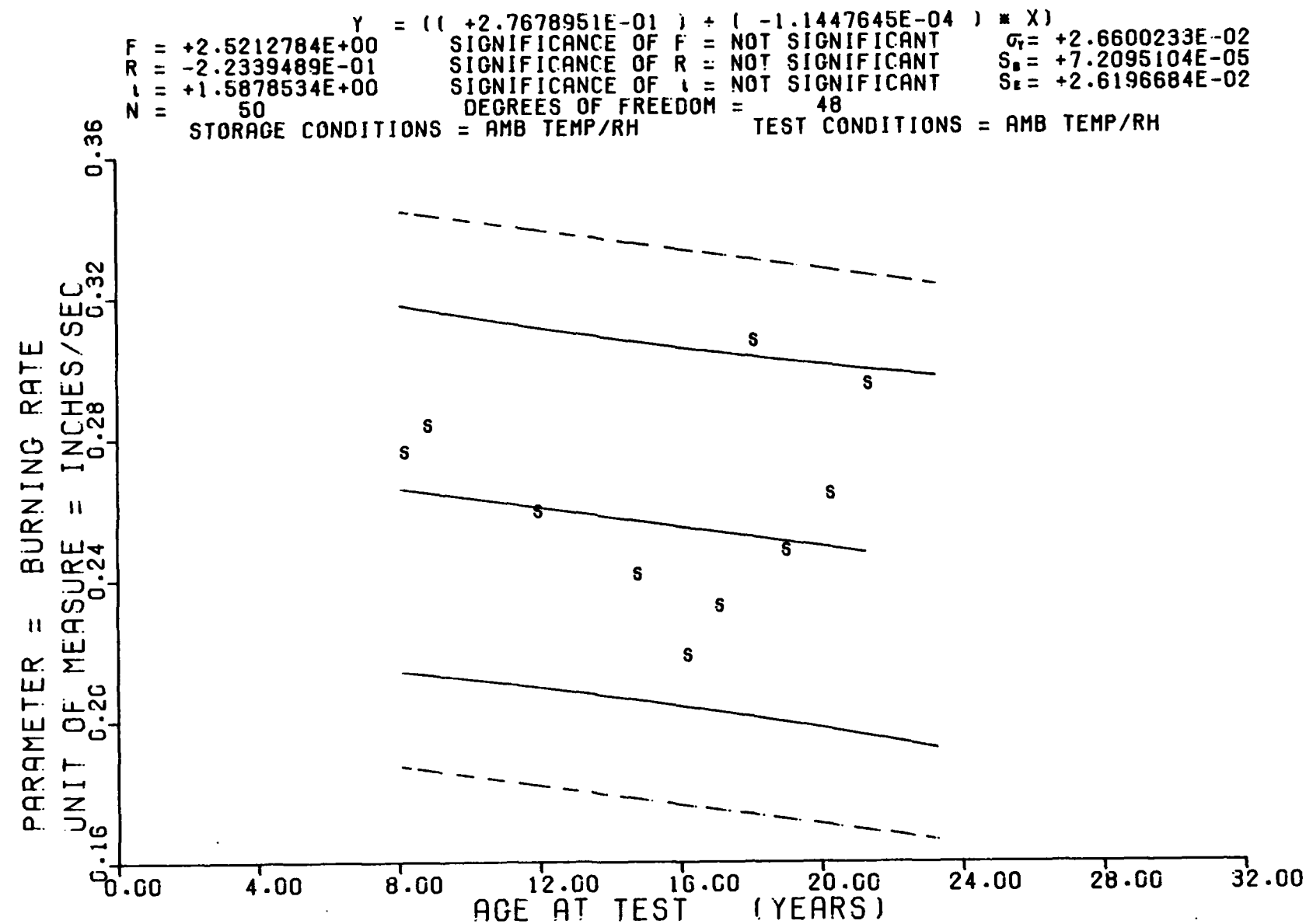

Y = ((+2.7678951E-01) + (-1.1447645E-04) * X)
F = +2.5212784E+00
R = -2.2339489E-01
N = 50
SIGNIFICANCE OF F = NOT SIGNIFICANT
SIGNIFICANCE OF R = NOT SIGNIFICANT
DEGREES OF FREEDOM = 48
σr = +2.6600233E-02
Sa = +7.2095104E-05
Se = +2.6196684E-02
STORAGE CONDITIONS = AMB TEMP/RH
TEST CONDITIONS = AMB TEMP/RH
PARAMETER = BURNING RATE
UNIT OF MEASURE = INCHES/SEC
0.36
0.32
0.28
0.24
0.20
0.16
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISSECTED MOTOR=(S)STM-012,BURNING RATE AT 500 PSI INITIAL PRESSURE.

Figure 45

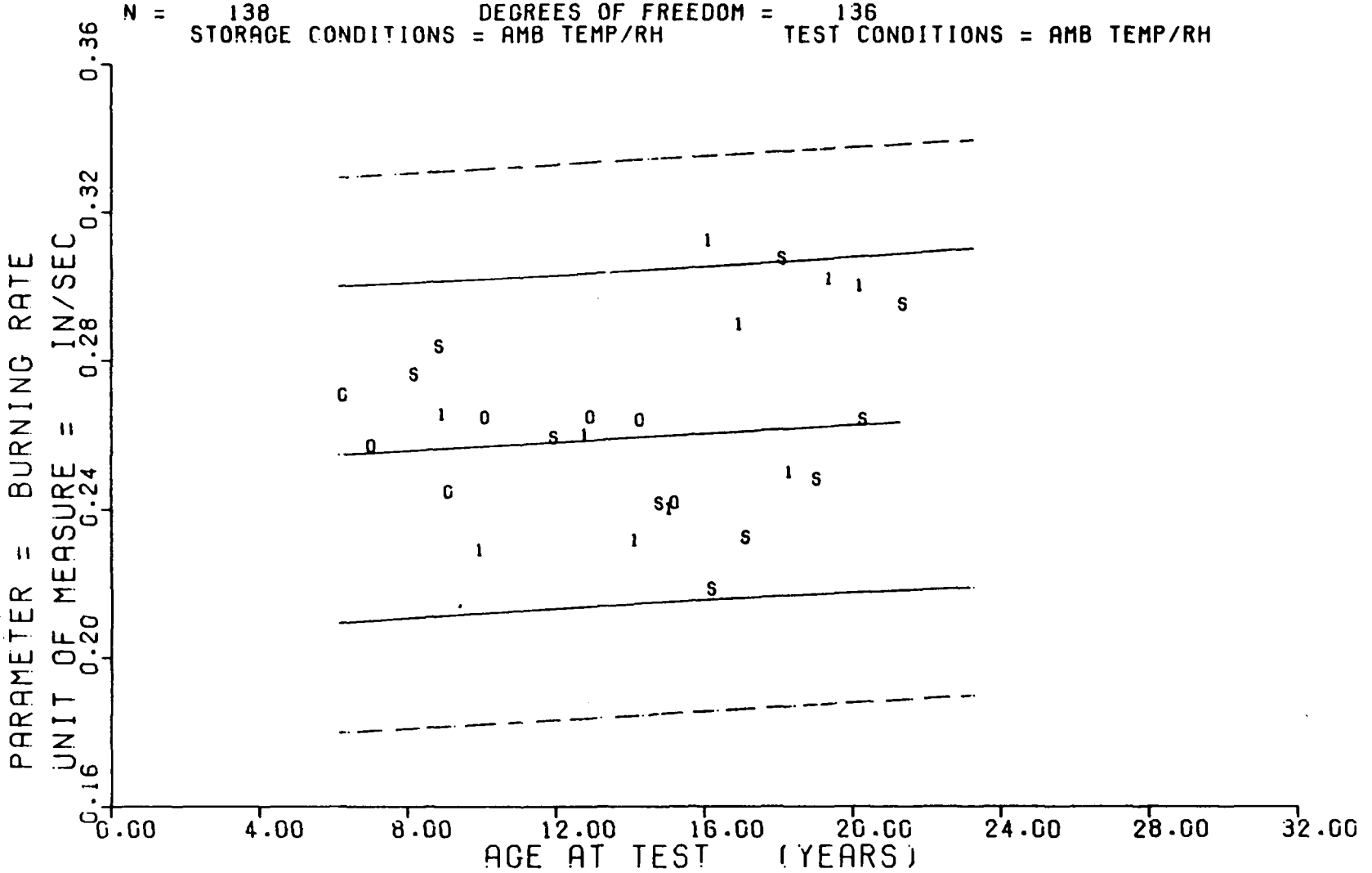

Y = (+2.5095226E-01) + (+4.9172293E-05) * X)
F = +1.3598129E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σY= +2.4941273E-02
R = +9.9496945E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb= +4.2167792E-05
t = +1.1661102E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT St= +2.4908585E-02
N = 138 DEGREES OF FREEDOM = 136
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = BURNING RATE
UNIT OF MEASURE = IN/SEC
0.36
0.32
0.28
0.24
0.20
0.16
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISCTED MTRS=(0)GO12099,(1)GO12199,(S)STM-012,BURNING RATE AT 500 PSI.

Figure 45A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
97.0	6	+2.7466630E-01	+1.2953320E-03	+2.7599996E-01	+2.7299994E-01	+2.6568526E-01
105.0	6	+2.8216648E-01	+1.2081834E-03	+2.8399997E-01	+2.8099995E-01	+2.6476943E-01
142.0	5	+2.5779986E-01	+5.1203901E-03	+2.6399999E-01	+2.5199997E-01	+2.6053380E-01
176.0	6	+2.3999989E-01	+1.1593225E-02	+2.6299995E-01	+2.3199999E-01	+2.5664162E-01
193.0	6	+2.1699982E-01	+2.9754429E-03	+2.2199994E-01	+2.1399998E-01	+2.5469553E-01
204.0	6	+2.3099994E-01	+7.4838925E-03	+2.4199998E-01	+2.2299998E-01	+2.5343626E-01
216.0	5	+3.0603325E-01	+3.0503724E-03	+3.0899995E-01	+3.0289995E-01	+2.5206255E-01
227.0	6	+2.4666643E-01	+7.6928405E-03	+2.5399994E-01	+2.3199999E-01	+2.5080335E-01
242.0	3	+2.6266664E-01	+1.0115051E-02	+2.6899999E-01	+2.5099998E-01	+2.4908620E-01
256.0	3	+2.9366660E-01	+5.6851903E-04	+2.9399996E-01	+2.9299998E-01	+2.4759799E-01

STAGE 1,DISSECTED MOTOR=(S)STM-012,BURNING RATE AT 500 PSI INITIAL PRESSURE.

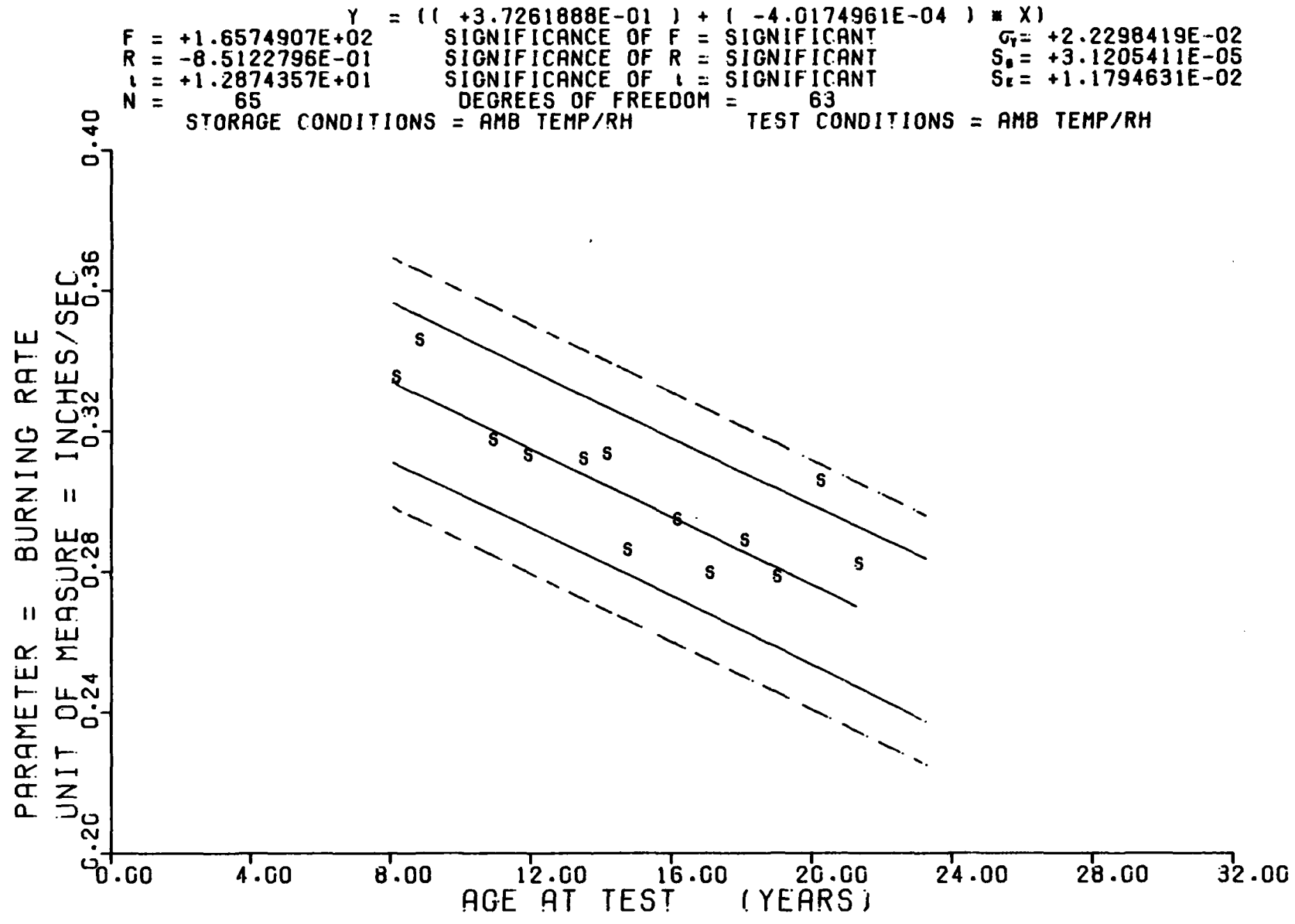

Y = ((+3.7261888E-01) + (-4.0174961E-04) * X)
F = +1.6574907E+02 SIGNIFICANCE OF F = SIGNIFICANT σY = +2.2298419E-02
R = -8.5122796E-01 SIGNIFICANCE OF R = SIGNIFICANT Sβ = +3.1205411E-05
t = +1.2874357E+01 SIGNIFICANCE OF t = SIGNIFICANT Sε = +1.1794631E-02
N = 65 DEGREES OF FREEDOM = 63
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = BURNING RATE
UNIT OF MEASURE = INCHES/SEC
0.40
0.36
0.32
0.28
0.24
0.20
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1,DISSECTED MOTOR=(S)STM-012,BURNING RATE AT 1000 PSI INITIAL PRESSURE.

Figure 46

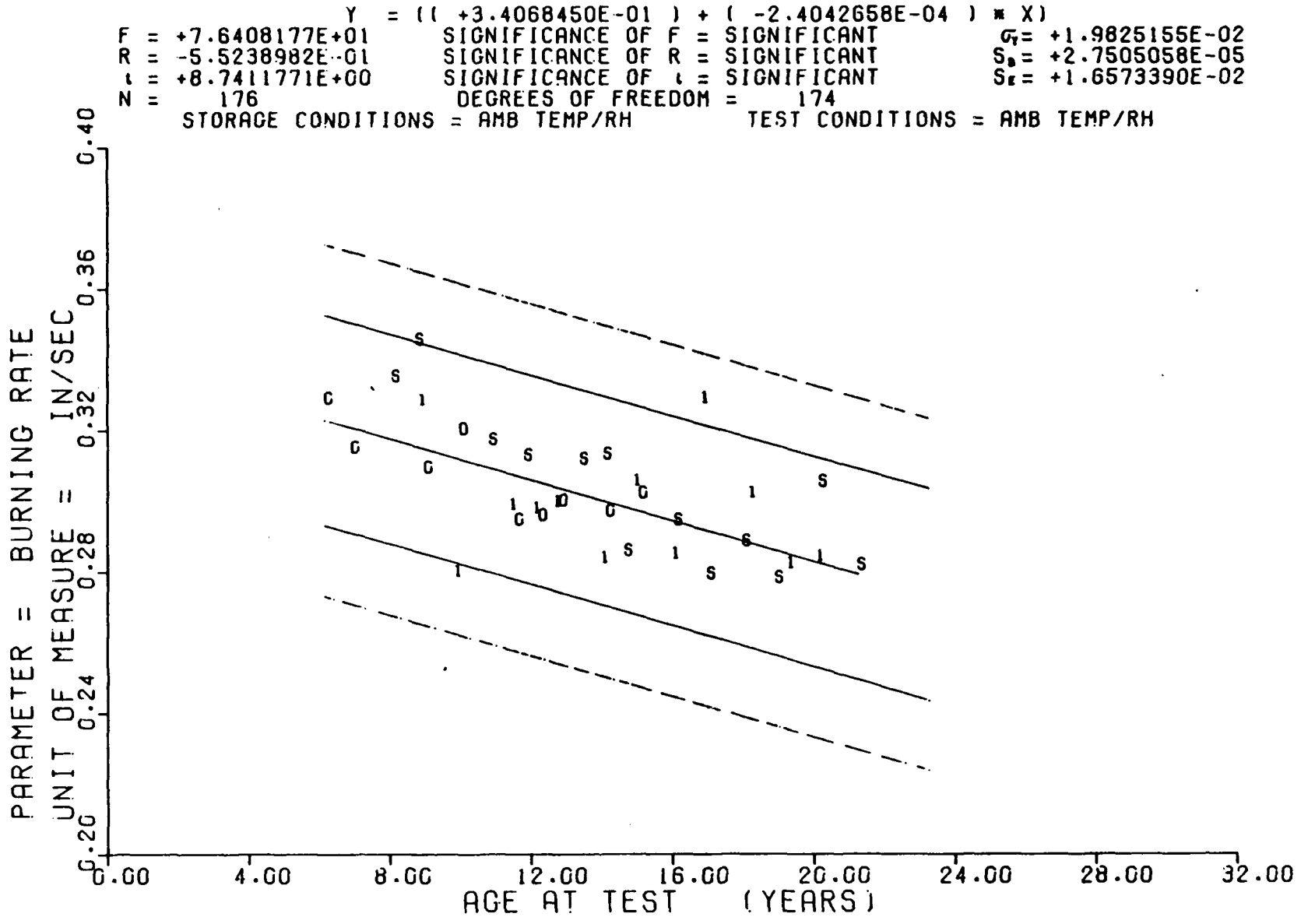

Y = ((+3.4068450E-01) + (-2.4042658E-04) * X)
F = +7.6408177E+01 SIGNIFICANCE OF F = SIGNIFICANT σT= +1.9825155E-02
R = -5.5238982E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb= +2.7505058E-05
t = +8.7411771E+00 SIGNIFICANCE OF t = SIGNIFICANT Se= +1.6573390E-02
N = 176 DEGREES OF FREEDOM = 174
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = BURNING RATE
UNIT OF MEASURE = IN/SEC
0.40
0.36
0.32
0.28
0.24
0.20
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1 DISCTED MTRS=(0)C012099,(1)C012199,(S)STM-012,BURNING RATE AT 1000 PSI.

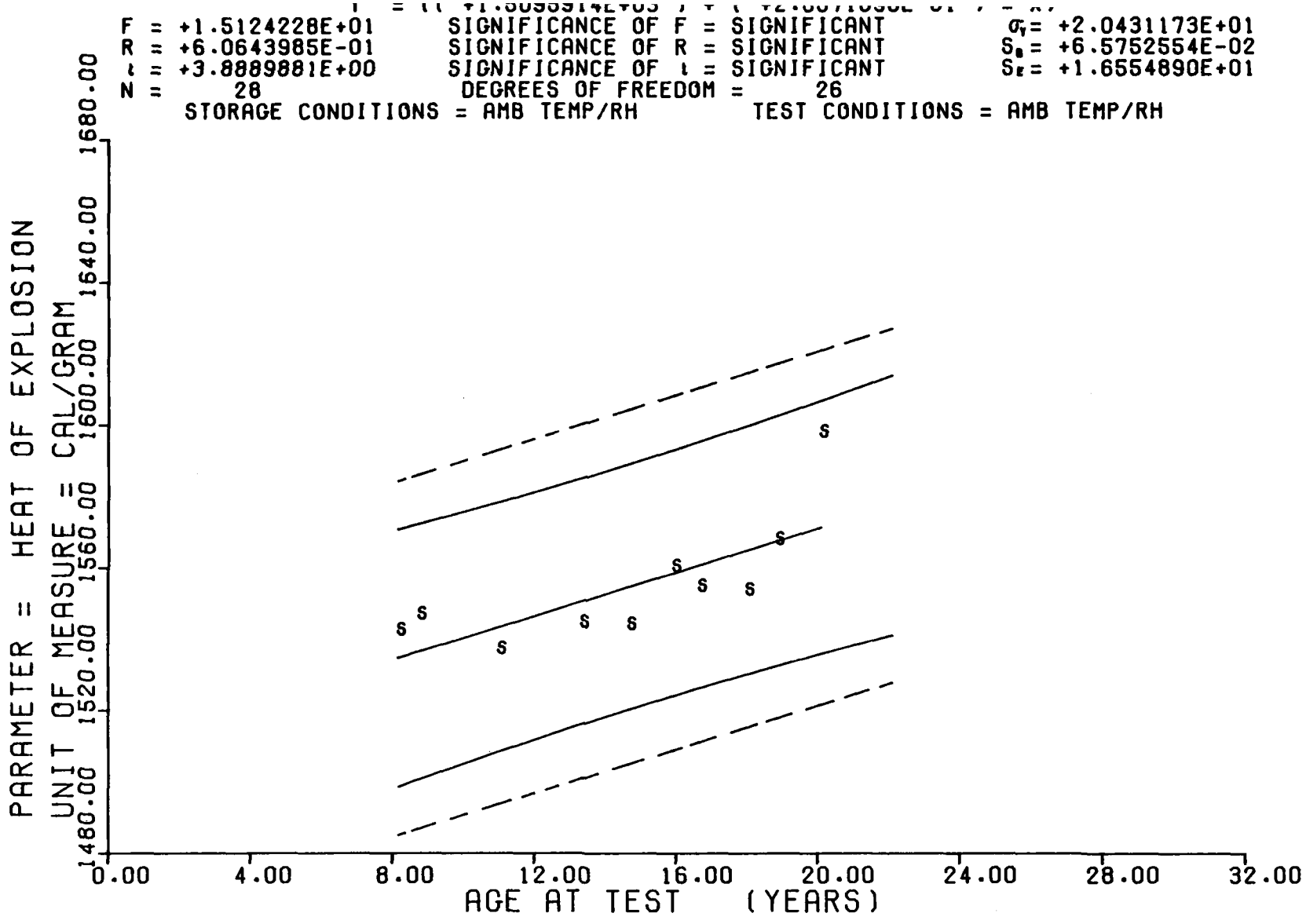
Figure 46A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

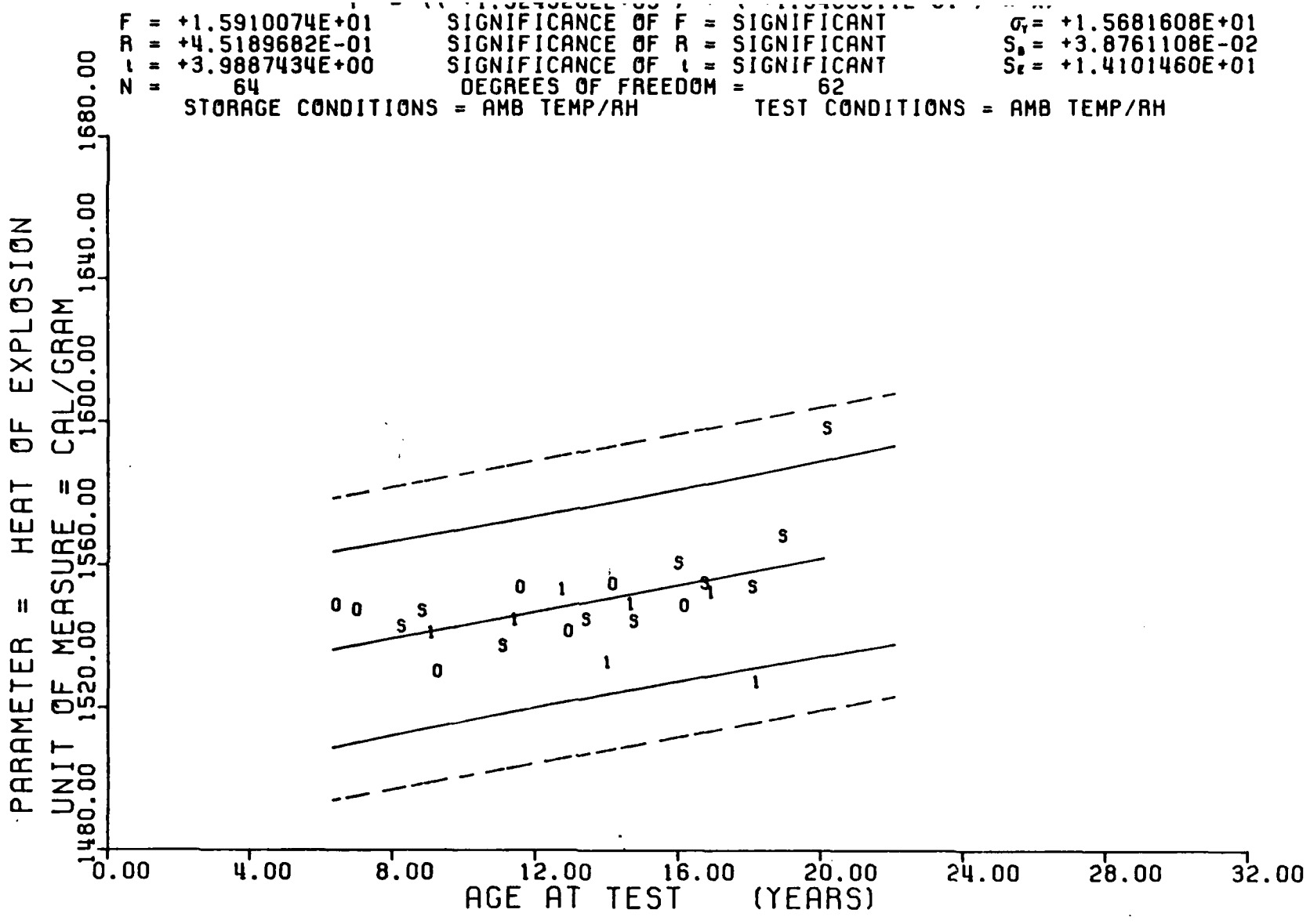
AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
97.0	6	+3.3383303E-01	+2.4394404E-03	+3.3599996E-01	+3.2999998E-01	+3.3364915E-01
105.0	6	+3.4433299E-01	+1.7047385E-03	+3.4599995E-01	+3.4199994E-01	+3.3043515E-01
130.0	5	+3.1599974E-01	+2.9386167E-03	+3.1799995E-01	+3.1099998E-01	+3.2039141E-01
142.0	5	+3.1159973E-01	+3.2366172E-03	+3.1699997E-01	+3.0899995E-01	+3.1557041E-01
161.0	5	+3.1059968E-01	+2.5491319E-03	+3.1399995E-01	+3.0699998E-01	+3.0793714E-01
169.0	5	+3.1199967E-01	+6.7227430E-03	+3.1899994E-01	+3.0299997E-01	+3.0472314E-01
176.0	6	+2.8466635E-01	+7.2957564E-03	+2.9499995E-01	+2.7899998E-01	+3.0191093E-01
193.0	6	+2.9333305E-01	+7.7220566E-03	+3.0499994E-01	+2.8699994E-01	+2.9508119E-01
204.0	6	+2.7816641E-01	+7.8154497E-03	+2.9399996E-01	+2.7399998E-01	+2.9066193E-01
216.0	3	+2.8743326E-01	+2.3747679E-03	+2.8999996E-01	+2.8529995E-01	+2.8584092E-01
227.0	6	+2.7699977E-01	+6.5814722E-03	+2.8699994E-01	+2.6999998E-01	+2.8142172E-01
242.0	3	+3.0433326E-01	+1.1531947E-03	+3.0499994E-01	+3.0299997E-01	+2.7539545E-01
255.0	3	+2.8066658E-01	+1.1450699E-03	+2.8199994E-01	+2.7999997E-01	+2.7017271E-01

STAGE 1,DISSECTED MOTOR=(S)STM-012,BURNING RATE AT 1000 PSI INITIAL PRESSURE.



STAGE 1, DISSECTED MOTOR=STM-012, HEAT RELEASED AT IGNITION.

Figure 47



STAGE 1 DISSECTED MOTORS, HEAT OF EXPLOSION

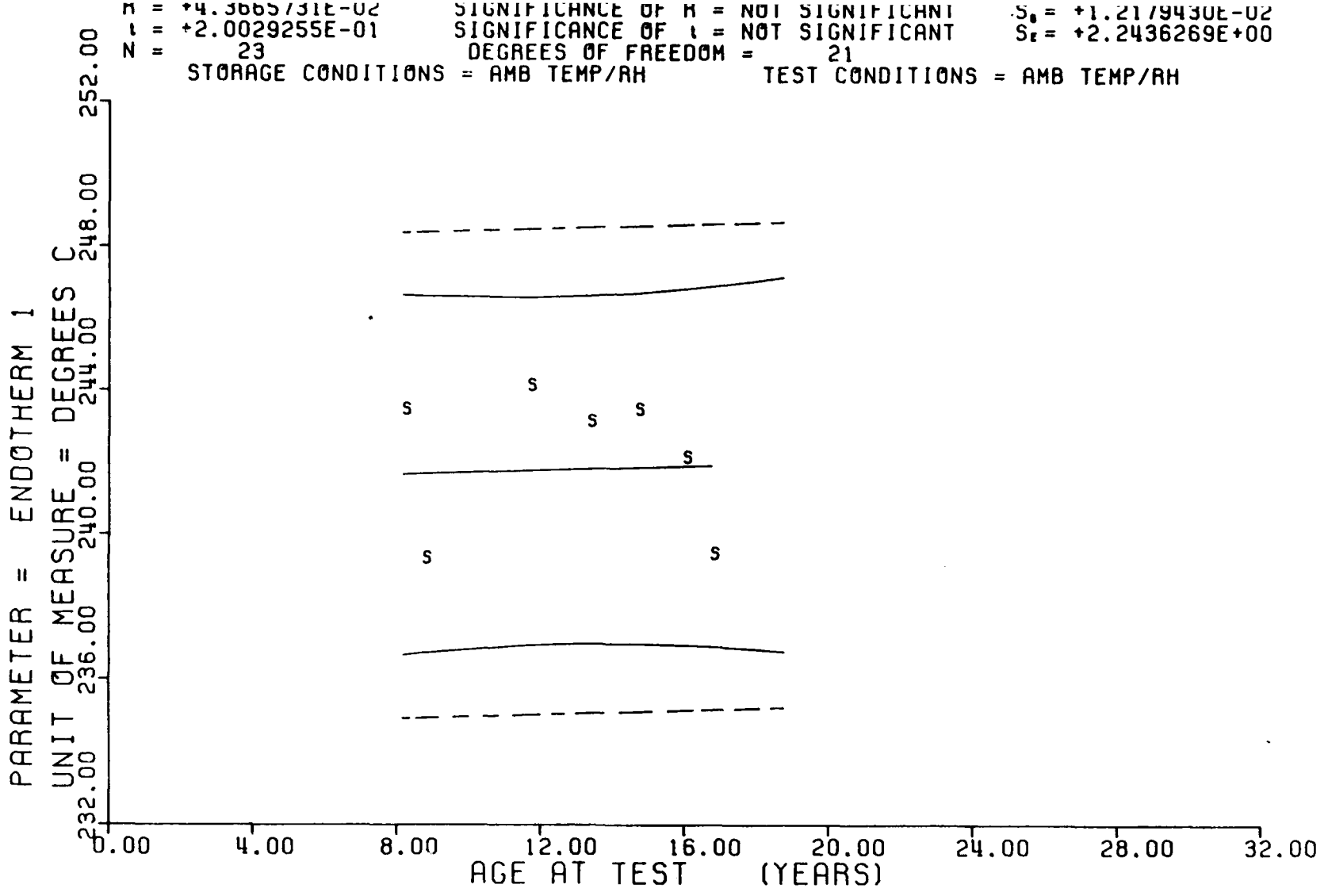
Figure 47A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
98.0	3	+1.5412993E+03	+1.9680652E+00	+1.5421999E+03	+1.5396999E+03	+1.5346511E+03
105.0	3	+1.5456665E+03	+3.0550504E+00	+1.5490000E+03	+1.5430000E+03	+1.5364409E+03
132.0	1	+1.5358999E+03	+0.0000000E+07	+1.5358999E+03	+1.5358999E+03	+1.5433452E+03
160.0	3	+1.5433657E+03	+2.3697253E+00	+1.5450998E+03	+1.5422998E+03	+1.5505051E+03
176.0	3	+1.5428320E+03	+3.6034738E+00	+1.5458999E+03	+1.5403999E+03	+1.5545964E+03
191.0	3	+1.5590324E+03	+2.1558114E+01	+1.5775998E+03	+1.5355000E+03	+1.5584321E+03
200.0	3	+1.5534321E+03	+2.6782103E+00	+1.5545000E+03	+1.5513999E+03	+1.5607336E+03
216.0	3	+1.5523996E+03	+5.0072759E+00	+1.5571999E+03	+1.5472998E+03	+1.5648249E+03
226.0	3	+1.5665664E+03	+3.2581316E+01	+1.5868999E+03	+1.5290000E+03	+1.5673820E+03
241.0	3	+1.5966665E+03	+1.4171567E+01	+1.6070000E+03	+1.5805000E+03	+1.5712177E+03

STAGE 1, DISSECTED MOTOR=STM-012, HEAT RELEASED AT IGNITION.



STAGE 1, DISSECTED MTR= (S) STM-012, DTA, ENDOTHERM 1, 12 DEG C RISE/MIN.

Figure 48

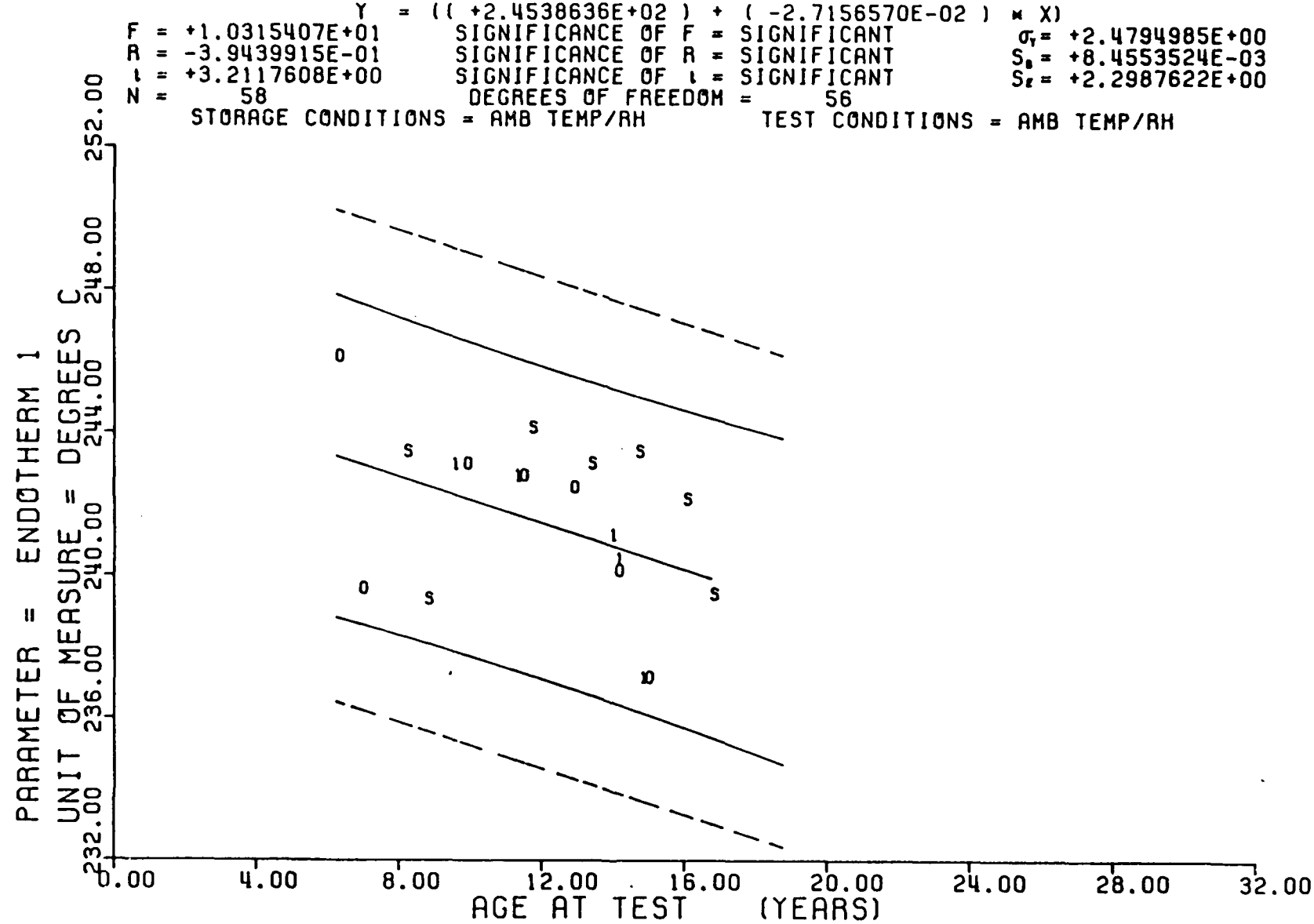

Y = ((+2.4538636E+02) + (-2.7156570E-02) * X)
F = +1.0315407E+01 SIGNIFICANCE OF F = SIGNIFICANT σr = +2.4794985E+00
R = -3.9439915E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +8.4553524E-03
t = +3.2117608E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +2.2987622E+00
N = 58 DEGREES OF FREEDOM = 56
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = ENDOTHERM 1
UNIT OF MEASURE = DEGREES C
252.00
248.00
244.00
240.00
236.00
232.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1, DSCTD MTRS= (0) 0012099, (1) 0012199, (S) STM-012, DTA, 12 DEG C RISE/MIN.

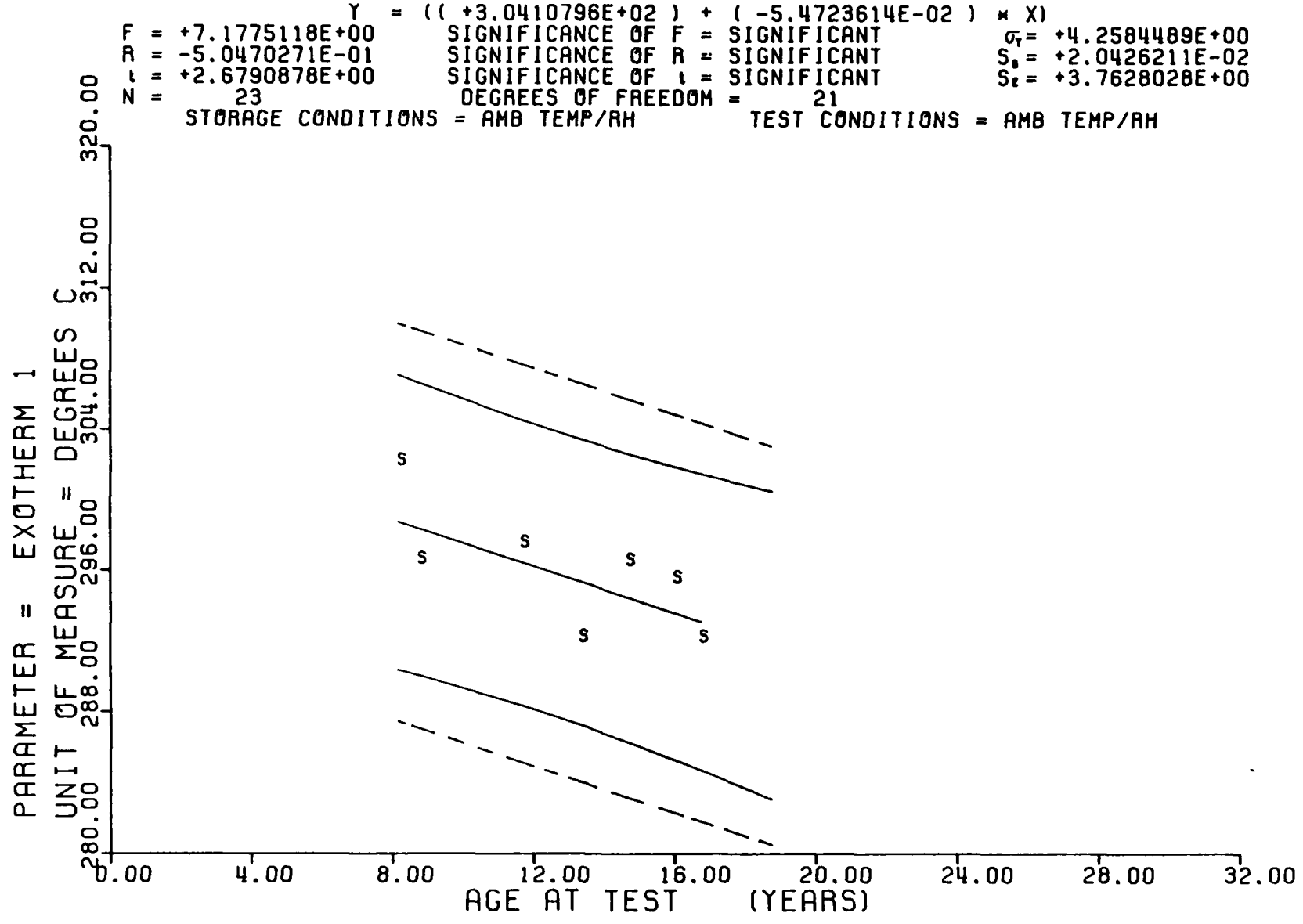
Figure 48A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
98.0	3	+2.4333332E+02	+2.0816659E+00	+2.4500000E+02	+2.4100000E+02	+2.4165829E+02
105.0	5	+2.3919999E+02	+1.3038404E+00	+2.4000000E+02	+2.3700000E+02	+2.4167536E+02
140.0	3	+2.4400000E+02	+1.0000000E+00	+2.4500000E+02	+2.4300000E+02	+2.4176075E+02
160.0	3	+2.4300000E+02	+1.0000000E+00	+2.4400000E+02	+2.4200000E+02	+2.4180953E+02
176.0	3	+2.4333332E+02	+5.7735026E-01	+2.4400000E+02	+2.4300000E+02	+2.4184857E+02
192.0	3	+2.4200000E+02	+0.0000000E+07	+2.4200000E+02	+2.4200000E+02	+2.4188760E+02
201.0	3	+2.3933332E+02	+5.7735026E-01	+2.4000000E+02	+2.3900000E+02	+2.4190956E+02

STAGE 1,DISSECTED MTR=(S)STM-012,DTA,ENDOTHERM 1, 12 DEG C RISE/MIN.



STAGE 1,DISSECTED MTR=(S)STM-012,DTA,EXOTHERM 1, 12 DEG C RISE/MIN.

Figure 49

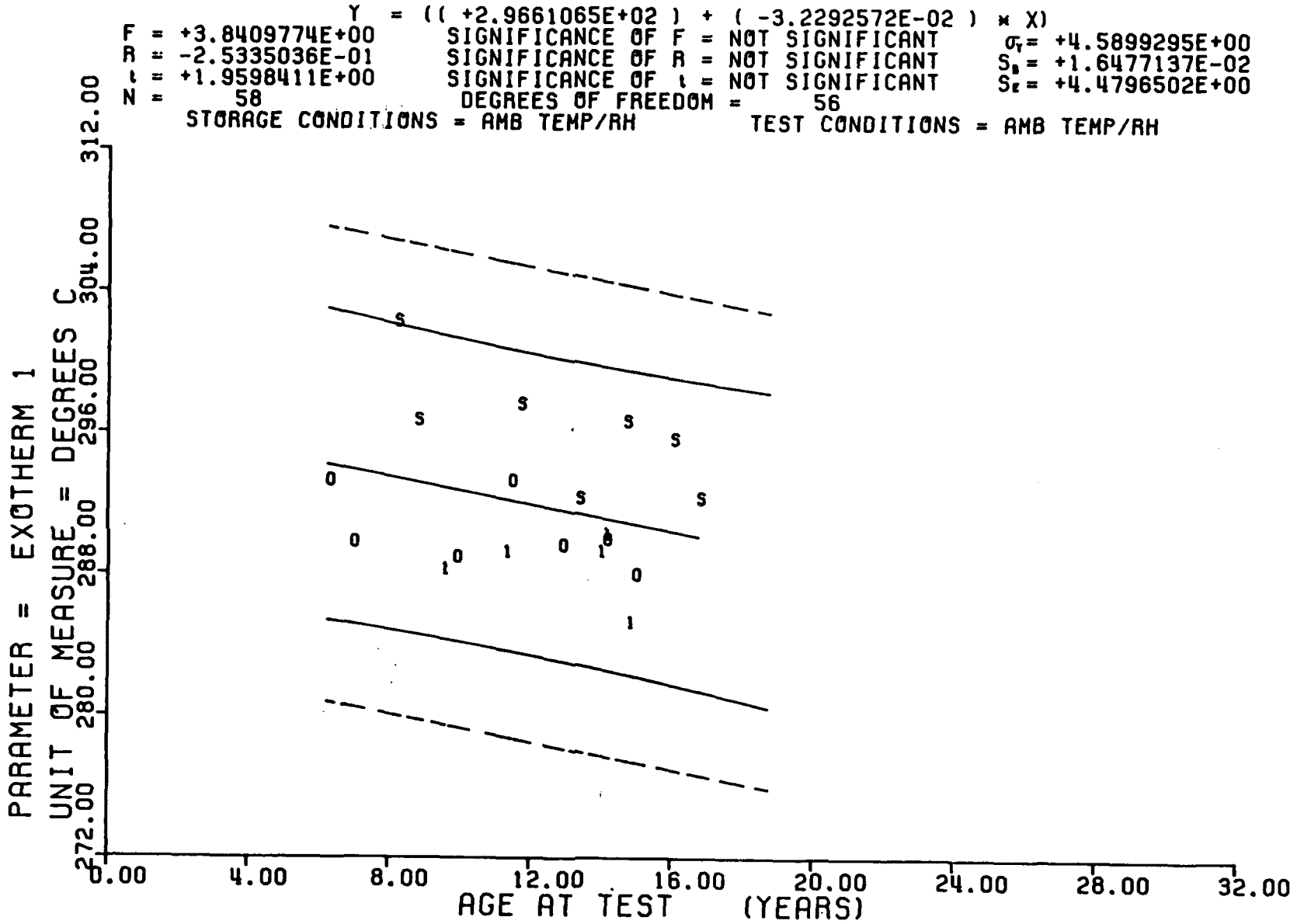

Y = ((+2.9661065E+02) + (-3.2292572E-02) * X)
F = +3.8409774E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σY = +4.5899295E+00
R = -2.5335036E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +1.6477137E-02
t = +1.9598411E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Sε = +4.4796502E+00
N = 58 DEGREES OF FREEDOM = 56
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = EXOTHERM 1
UNIT OF MEASURE = DEGREES C
312.00
304.00
296.00
288.00
280.00
272.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1, DSCTD MTRS= (0) 0012099, (1) 0012199, (S) STM-012.DTA, 12 DEG C RISE/MIN.

Figure 49A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
98.0	3	+3.0200000E+02	+6.0827625E+00	+3.0600000E+02	+2.9500000E+02	+2.9874487E+02
105.0	5	+2.9639990E+02	+4.9295030E+00	+3.0100000E+02	+2.8900000E+02	+2.9836181E+02
140.0	3	+2.9733325E+02	+5.7735026E-01	+2.9800000E+02	+2.9700000E+02	+2.9644653E+02
160.0	3	+2.9200000E+02	+0.0000000E+07	+2.9200000E+02	+2.9200000E+02	+2.9535205E+02
176.0	3	+2.9633325E+02	+1.5275252E+00	+2.9800000E+02	+2.9500000E+02	+2.9447656E+02
192.0	3	+2.9533325E+02	+1.5275252E+00	+2.9700000E+02	+2.9400000E+02	+2.9360083E+02
201.0	3	+2.9200000E+02	+1.7320508E+00	+2.9300000E+02	+2.9000000E+02	+2.9310839E+02

STAGE 1,DISSLCTED MTR=(S)STM-012,DTA,EXOTHERM 1, 12 DEG C RISE/MIN.

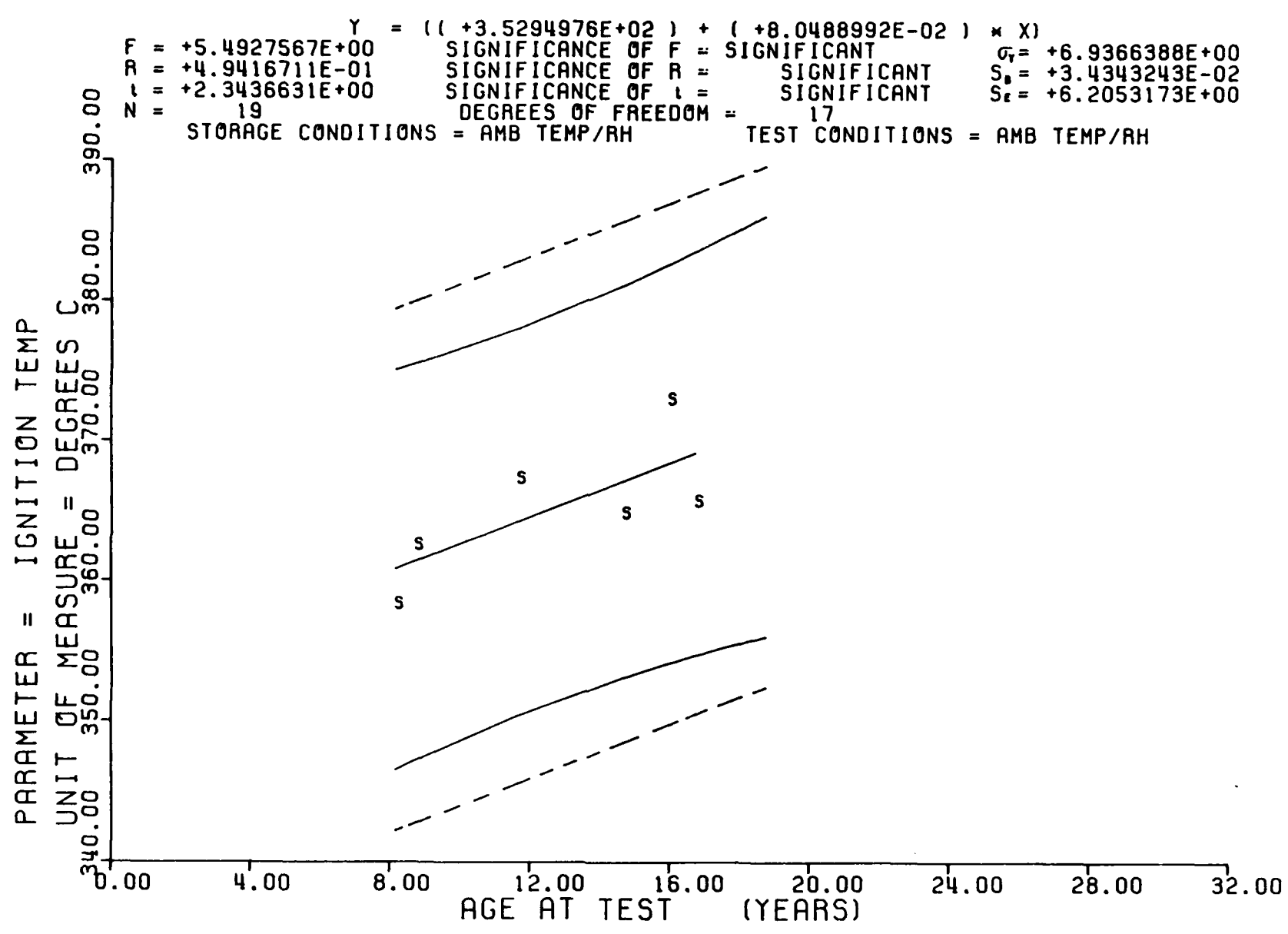

Y = ((+3.5294976E+02) + (+8.0488992E-02) * X)
F = +5.4927567E+00 SIGNIFICANCE OF F = SIGNIFICANT σY = +6.9366388E+00
R = +4.9416711E-01 SIGNIFICANCE OF R = SIGNIFICANT Sb = +3.4343243E-02
t = +2.3436631E+00 SIGNIFICANCE OF t = SIGNIFICANT Se = +6.2053173E+00
N = 19 DEGREES OF FREEDOM = 17
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = IGNITION TEMP
UNIT OF MEASURE = DEGREES C
340.00
350.00
360.00
370.00
380.00
390.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
S
STAGE 1,DISSECTED MTR=(S)STM-012,DTA,IGNITION TEMP,12 DEG C RISE/MIN.

Figure 50

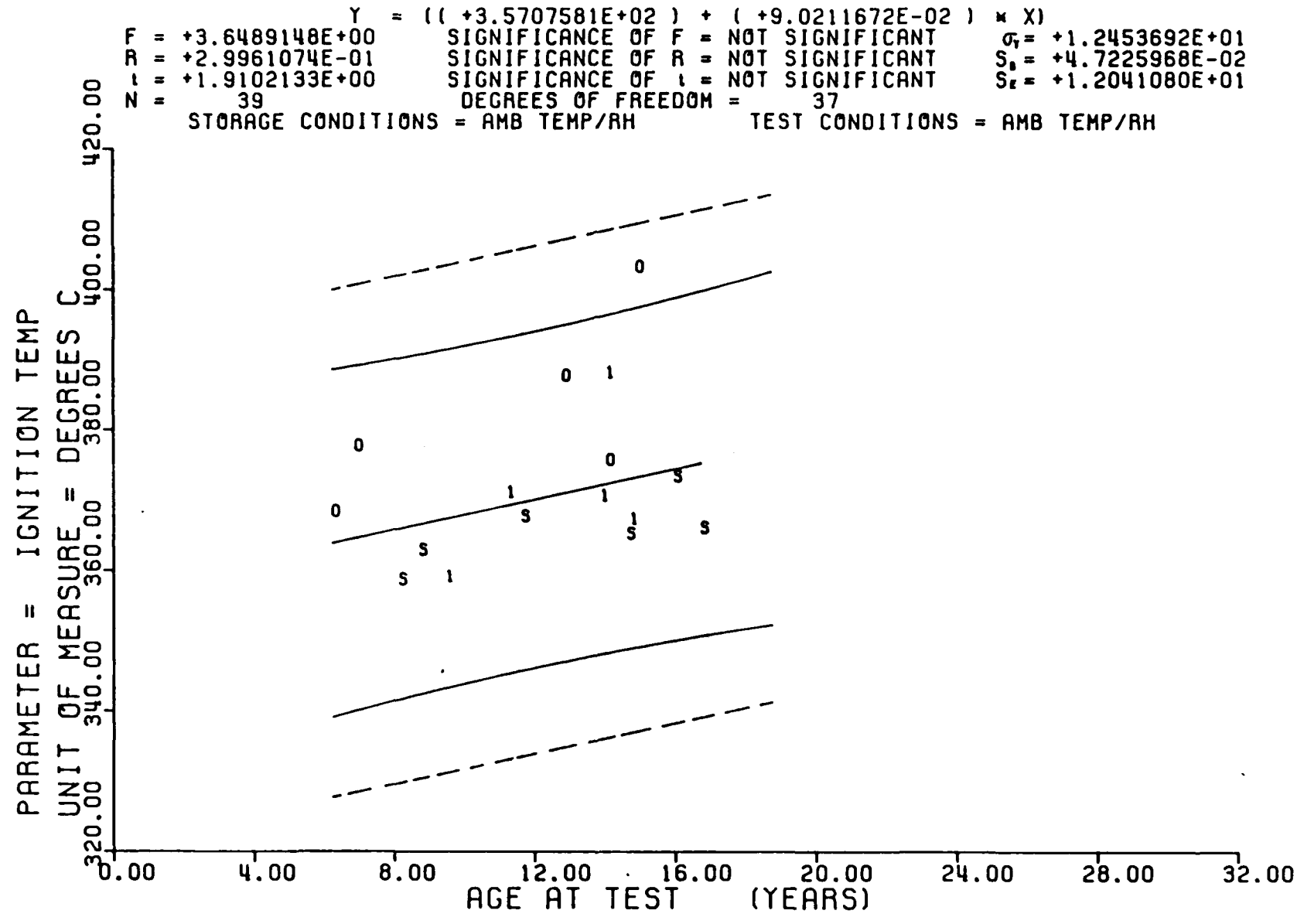

Y = ((+3.5707581E+02) + (+9.0211672E-02) * X)
F = +3.6489148E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT σT = +1.2453692E+01
R = +2.9961074E-01 SIGNIFICANCE OF R = NOT SIGNIFICANT Sb = +4.7225968E-02
t = +1.9102133E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT Se = +1.2041080E+01
N = 39 DEGREES OF FREEDOM = 37
STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH
PARAMETER = IGNITION TEMP
UNIT OF MEASURE = DEGREES C
320.00
340.00
360.00
380.00
400.00
420.00
0.00
4.00
8.00
12.00
16.00
20.00
24.00
28.00
32.00
AGE AT TEST (YEARS)
STAGE 1, DSCTD MTRS= (0) 0012099, (1) 0012199, (S) STM-012, DTA, 12 DEG C RISE/MIN.

Figure 50A

**** LINEAR REGRESSION ANALYSIS ****

*** ANALYSIS OF TIME SERIES ***

AGE (MONTHS)	SPECIMENS PER GROUP	MEAN Y	STANDARD DEVIATION	MAXIMUM Y	MINIMUM Y	REGRESSION Y
98.0	3	+3.5800000E+02	+3.9999999E+00	+3.6200000E+02	+3.5400000E+02	+3.6083764E+02
105.0	5	+3.6219995E+02	+9.0388052E+00	+3.7800000E+02	+3.5600000E+02	+3.6140087E+02
140.0	3	+3.6700000E+02	+3.6055512E+00	+3.7000000E+02	+3.6300000E+02	+3.6421801E+02
176.0	2	+3.6450000E+02	+3.5355339E+00	+3.6700000E+02	+3.6200000E+02	+3.6711572E+02
192.0	3	+3.7266650E+02	+5.5075705E+00	+3.7800000E+02	+3.6700000E+02	+3.6840356E+02
201.0	3	+3.6533325E+02	+4.1633319E+00	+3.7000000E+02	+3.6200000E+02	+3.6912792E+02

STAGE 1,DISSECTED MTR=(S)STM-012,DTA,IGNITION TEMP,12 DEG C RISE/MIN.

DISTRIBUTION

	NR COPIES
OOALC	
MMG(5)	1
MMWRAM	1
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Minuteman
Solid Propellant
Dissected Motor

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This is the final report for Dissected Motor STM-012 and covers propellant and case bond test data. Planned dissection of additional selected motors will provide samples for continued component test and analysis for future evaluation.

Testing was performed to determine the useful shelf/service life for LGM-30 Stage I Rocket Motors. A three year storage program for propellant and components was started in May 1961. This program was then extended to a ten year study and later continued indefinitely to assure that a deterioration in motor physical

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haracteristics could be detected in time to take some corrective actions fore the weapon system performance deteriorated below an acceptable level.

The data is presented in the form of regression analysis and the trends e projected 24 months beyond the last test data.

From the statistical analysis of all data tested to date, significant gradation of the propellant does not appear likely for at least two years st the oldest data point.

Future testing and reporting will be conducted on individual dissected tors. Originator Supplied Key Words Include:

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