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STATISTICAL DISTRIBUTION OF MECHANICAL PROPERTIES FOR THREE GRAPHITE-EPOXY MATERIAL SYSTEMS

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SUMMARY

Graphite-epoxy composites are playing an increasing role as viable alternative materials in structural applications necessitating thorough investigation into the predictability and reproducibility of their material strength properties. This investigation was concerned with tension, compression, and short beam shear coupon testing of large samples from three different material suppliers to determine their statistical strength behavior. The material tested was obtained from NASA Langley in conjunction with an in-flight testing program involving the spoilers on some Boeing 737 aircraft. The material was supplied by three manufacturers: Hercules (3501/type A-P); Union Carbide (Thornel 300/2544); and Narmco (5209/Thornel 300). Two sets of Narmco material were tested to observe the repeatability of mechanical properties for supposedly like materials that were manufactured at different times.

Statistical results indicate that a two Parameter Weibull distribution model provides better overall characterization of material behavior for the graphite-epoxy systems tested than does the standard Normal distribution model that is employed for most design work. While either a Weibull or Normal distribution model provides adequate predictions for average strength values, the Weibull model provides better characterization in the lower tail region where the predictions are of maximum design interest.

The two sets of Narmco material were found to have essentially the same material properties, and indicate that repeatability can be achieved.

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SYMBOLS

a_1	-	Constant in the error function
a_2	-	Constant in the error function
a_3	-	Constant in the error function
a_4	-	Constant in the error function
b	-	Weibull slope (shape function)
C_1	-	Constant in the cumulative probability function
C_2	-	Constant in the cumulative probability function
C_3	-	Constant in the cumulative probability function
C_4	-	Constant in the cumulative probability function
E	-	Elastic modulus
F	-	Cumulative probability function
f	-	Probability density function
F_{cr}	-	Critical buckling load
I	-	Area Moment of Inertia
L	-	Specimen length
N	-	Population size
n	-	Datum rank
P(x)	-	Cumulative probability function
R(n)	-	Median rank
t	-	Specimen thickness
T_F	-	Temperature in degrees Fahrenheit
X	-	Variable
X_c	-	Weibull characteristic value (scale factor)
σ	-	Standard deviation
μ	-	Mean value

CONVERSION FACTORS FOR UNITS

OF MEASUREMENTS

To convert from U.S. Customary Unit	To SI Unit	Multiply by
degree (angle)	radian	1.745×10^{-2}
degree Fahrenheit (°F)	degree Celsius (°C)	$(T_F - 32)/1.8$
foot (ft)	meter (m)	3.048×10^{-1}
inch (in)	meter (m)	2.54×10^{-2}
kips per square inch (ksi)	pascal (Pa)	$6.894\ 757 \times 10^{6}$
pound force (lb or lbf)	newton (N)	4.448 222
pound per square inch (psi)	pascal (Pa)	$6.894\ 757 \times 10^{3}$

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INTRODUCTION

In recent years there has been a tremendous increase in the demand for lightweight, high strength, and high stiffness materials. The increased demand for materials displaying these properties has brought about a shift in the design world, toward composite materials. However, the complexity and the inherent design variability of composite materials has necessitated a review of the traditional rules of design.

Questions regarding a design basis for composite structures must be addressed before maximum utilization of composites can occur. Traditional procedures for establishing design allowables must be changed to reflect the differences that exist between composite material and traditional metal fabrication. The traditional procedures outlined in MIL-HDBK-5 (1) specify that a sample for establishing the design allowable should be restricted to one alloy, one heat treatment, one test temperature, and one measured test parameter and this should include several heats or lots from a majority of the important producers. For composite materials questions such as (1) what is the counterpart to one heat treatment? or (2) what represents one alloy? must be addressed. The entire question of repeatability and reproducibility has not been adequately researched. Likewise, the applicability of failure models and distribution must be considered. The current design allowable concept is based on a normally distributed population and how this concept can be extended to other distributions requires further study.

Inherently, flaws can exist within composite materials and force these materials into a weakest-link mode of failure. In order to fully explain what is meant by a weakest-link mode of failure, consider a group of N links for a chain. If each link were tested independently, a scatter of failure strengths would occur and while the data would be expected to display a central tendency around the mean, actual values would fall on both sides of this mean. However, if all N links were joined together, the weakest link contained in the system would dictate the chain's failure strength.

This weakest-link theory is the basis behind the Weibull distribution, which has found wide applicability as a statistical model for

materials governed by this mode of failure. Initially the Log-normal distribution was considered as a third distribution. However, Reference (2) states that for sample sizes of less than 1000 there is no significant distinction between the Weibull distribution and the Log-normal distribution and for this reason the latter was abandoned. For this reason the Weibull distribution in addition to the Normal distribution is of primary interest as a possible best model for composite material design. It is mandatory that a modeling distribution, for composite materials, be as accurate as possible, especially in the lower tail region.

It is apparent that one of the first steps in establishing a comprehensive design procedure for composite materials requires that many of the questions regarding repeatability and type of distribution must be addressed. The primary purpose of this investigation was to obtain large amounts of failure data for different graphite epoxy material systems and investigate the applicability of Weibull and Normal distributions for this data. As indicated in Reference (3) Boeing conducted a limited study of these graphite-epoxy materials. However, much larger sample sizes were required to facilitate an in depth statistical study. A secondary purpose, studying repeatability of manufacture, was also provided with the inclusion of a supposed duplicate sample manufactured at a different time.

In the course of this investigation three graphite-epoxy material systems were studied using different laminations (unidirectional and crossply) for three types of mechanical behavior (uniaxial tension, uniaxial compression and short beam shear). A duplicate system for one of these material groups was manufactured at a later date and was tested as a fourth material system.

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MATERIALS AND EXPERIMENTAL PROCEDURE

The graphite-epoxy materials supplied by NASA Langley consisted of thirty-six 12 inch by 30 inch panels. The panels were supplied with three lay-up patterns, i.e., eight-ply crossply (0°, -45°, +45°, 90°, 90°, +45°, -45°, 0°), eight-ply unidirectional, and twelve-ply unidirectional panels. Each lay-up was supplied as three panels from each of three manufacturers, i.e., Task III Hercules (3501/type A-S), Task III Union Carbide (Thornel 300/2544), and Task III and IV Narmco (5209/Thornel 300). Twenty-five-ply unidirectional material was supplied from the same manufacturers for investigation into the short beam shear properties. Prior to failure testing of the short beam shear specimens twenty-five coupons were randomly selected from each material supplier for dehydration prior to testing. The Boeing report (2) contains an extensive discussion of the lay-up procedure followed in preparing multi-ply panels. Since the panels received for this investigation were already in a post cure state, specimen preparation and test procedure were of immediate concern and constituted a major portion of the time involved in data acquisition.

As previously mentioned there were some short beam shear tests conducted during this investigation. There is a complete description of the short beam shear test procedure in Reference (4). In the dehydration process 1) the coupons were placed in Silica Gel desiccant jars which were in turn placed in an oven at 160°F, 2) the coupons were periodically removed from the oven and weighed, 3) the process was continued until a steady state weight was achieved (160 days). Following dehydration the specimens were tested in a three-point-bend test fixture using a span to depth ratio of 3.5 to 1. The 3.5 to 1 span to depth ratio was established and discussed in Reference (4). In order to maintain the constant span to depth ratio, the span of the short beam shear test fixture was adjusted to account for thickness variations between specimens.

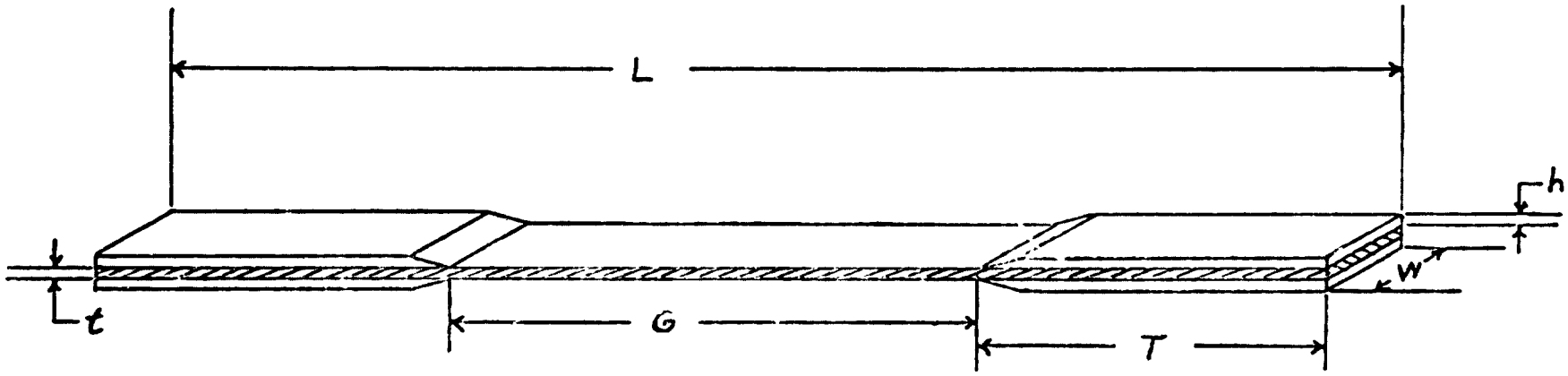
The tension and compression specimen preparation was a very involved process stemming mainly from the requirement that tabs be placed on the specimens at the machine grip locations. The various

dimensions for these specimens are given in Figures 1a and 1b. The procedure used in determining the critical gage length of the compression specimens is given in Appendix A. The 12 by 30 inch panels were cut into smaller panels of 6 by 8 inches for tension and 6 by 4.4 inches for compression. Two inch wide fiberglass tabs were cut and ground along one edge to a taper of approximately 25°. The tabs were then attached to the panels using a room temperature curing epoxy and a uniformly distributed load of twenty pounds per square inch. After six hours the load was removed and the panels were set aside for four days to insure complete curing of the adhesive. The panels were then cut into specimens of the correct width with a diamond wheel cutoff machine.

Approximately twenty-five tension and compression specimens from each group were selected for instrumentation with strain gages. Strain gages were placed on only one side of the tension specimens, while the compression specimens had gages placed on both sides. Dual gages facilitated the detection of bending during initial compression test set up and also canceled any bending effects that occurred in the early stages of loading for the elastic modulus determination.

The compression test fixture, Figure 2, required some adjusting prior to full scale testing. These adjustments involved shimming of the tapered blocks in the two main assemblies, until the Vee grips travelled in a straight line, thus minimizing initial bending of the specimens. Since the compression specimens were symmetrical about their neutral axis, variations in specimen thickness did not require readjustment of the compression test fixture. There was no special fixturing required for the tension testing, because standard flat specimen tension grips were available and provided good alignment.

The testing machines used for this investigation were of the constant strain rate design. The strain rate used for all but the last 66 unidirectional tension specimens, from each manufacturer, was 7.25×10^{-4} in./(in.-min.). This is of the order of magnitude suggested by NASA for the strain rate. The strain rate used on the final tension specimens was 2.60×10^{-3} in./(in.-min.). The primary reason for changing the strain rate in the final stages of testing was the resting time. At the lower strain rate the actual test time was between twelve and twenty minutes. Available data [Reference (5)] indicated that this change in



TEST	LAMINATION	PLIES	t*	G	T	W	L
TENSION	0°	8	.044"	4.0"	2.0"	.50"	8.0"
	(0°, ±45°, 90°)$_s$	8	.044"	4.0"	2.0"	1.00"	8.0"
	0°	12	.066"	4.0"	2.0"	.50"	8.0"
Comp	0°	12	.066"	0.4"	2.0"	.25	4.4"
	(0°, ±45°, 90°)$_s$	8	.044"	0.4"	2.0"	.25	4.4"

t* - Based on ply thickness 5½ ± ½ mil

Figure 1a. Tension and Compression Specimen Dimensions

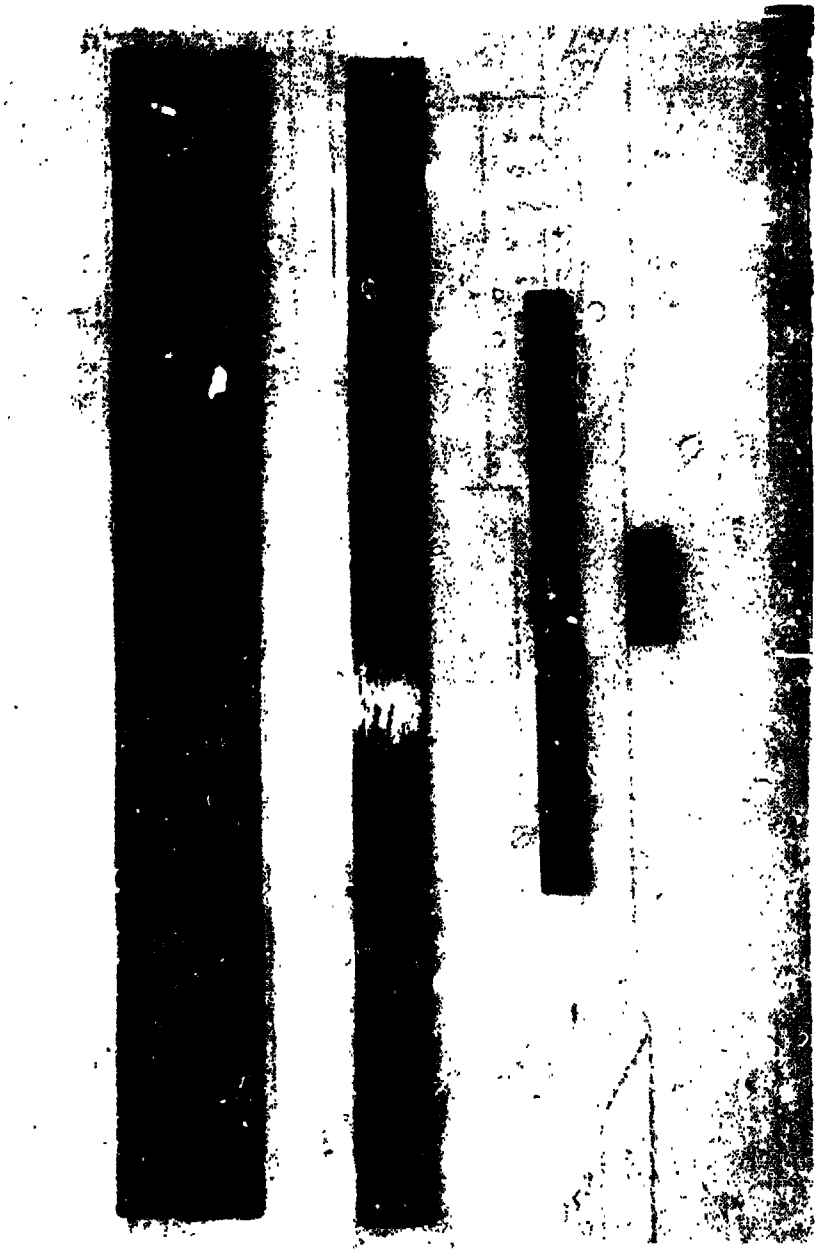


Figure 1b. Photograph of Specimens

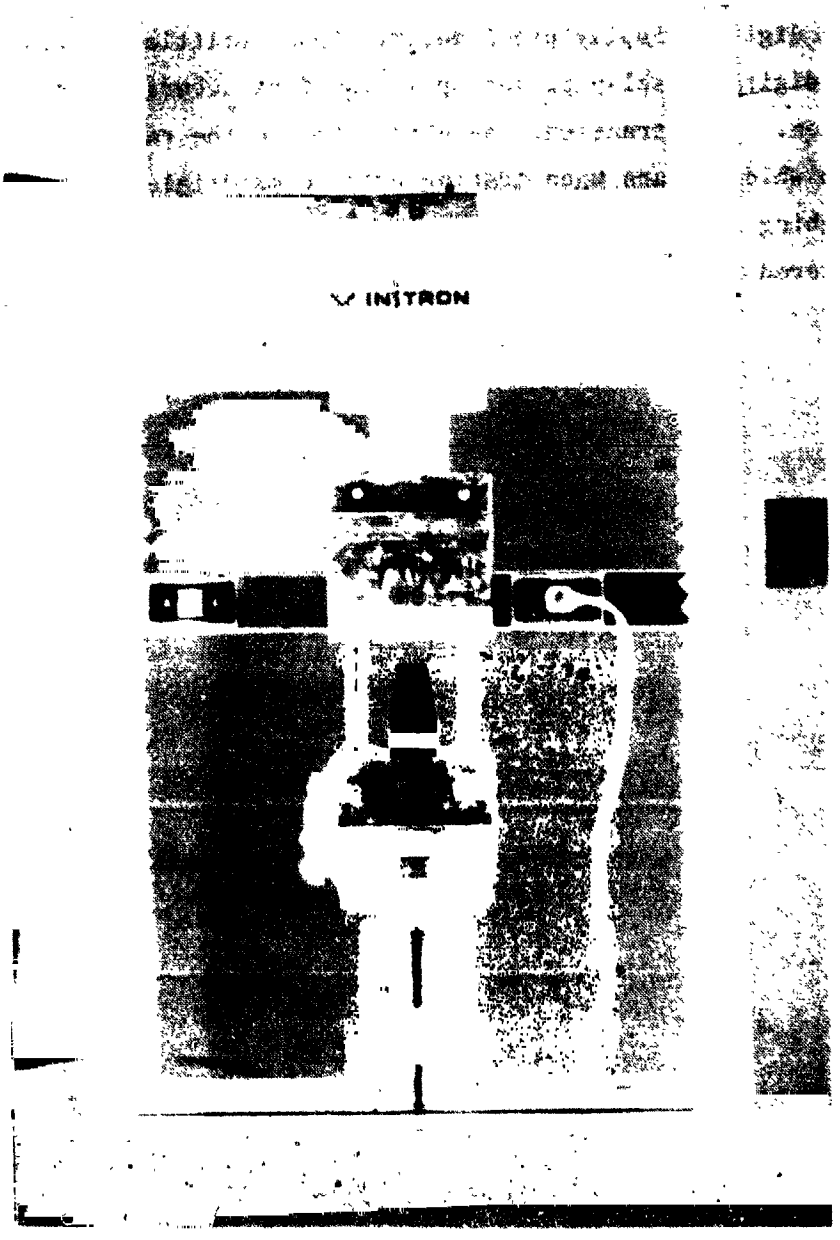


Figure 2. Test Fixture for Compression Loading

strain rate would not have a significant effect on the failure strength of a graphite epoxy composite. When testing began at the higher strain rate one major problem was encountered. This problem involved the use of a digital display panel meter. Upon brittle failure of a specimen the digital display picked up a transient occurring in the weighing system. This transient was attributed to the rapid failure and load drop which occurs when testing brittle materials. For this reason the weighing system was connected to an analog output which successfully filtered out the transient.

DATA REDUCTION

A Tektronix 4051 computer was used exclusively for the data reduction and analysis in this report. By incorporting the graphic capabilities of the Tektronix 4051 the ability to produce statistical plots and stress strain plots was enhanced. The statistical outputs included histograms with and without a moving average, absolute frequency plots with the moving average and fitted with both the Weibull and Normal distributions, cumulative frequency plots with the moving average and fitted with both the Weibull and Normal distributions. The cumulative plots gave the best visual display of the error between the observed data and the expected values generated from the statistical distributions. Following this determination additional cumulative frequency plots were made in an attempt to magnify the error in the lower tail region. This magnification was obtained by plotting the cumulative frequencies for the lower 15% of the data, thus obtaining the lower 15% tail region. An example of the Weibull and Normal cumulative frequency plots for the lower 15% tail region is given in Figure 3.

It was also determined at this point, that it would be inappropriate to continue generating the Normal distribution through the use of the trapezoidal integration technique. This technique works quite well when it is desirable to generate a Normal distribution over an entire population. However, significant errors can show up in the tail regions. For this reason a directly calculable error function was used to generate the lower 15% Normal distribution curves. Since the Weibull distribution was already a directly calculable function, it was unnecessary to alter its form.

The functions incorporated in the statistical computer programs are developed in Appendix B, and include appropriate references. The results of this development are summarized below. The Normal distribution had the following form for the Absolute frequency plots:

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} \exp\left(-(x-\mu)^2/2\sigma^2\right) \qquad -\infty<x<\infty \qquad (1)$$

which was valid over the entire population.

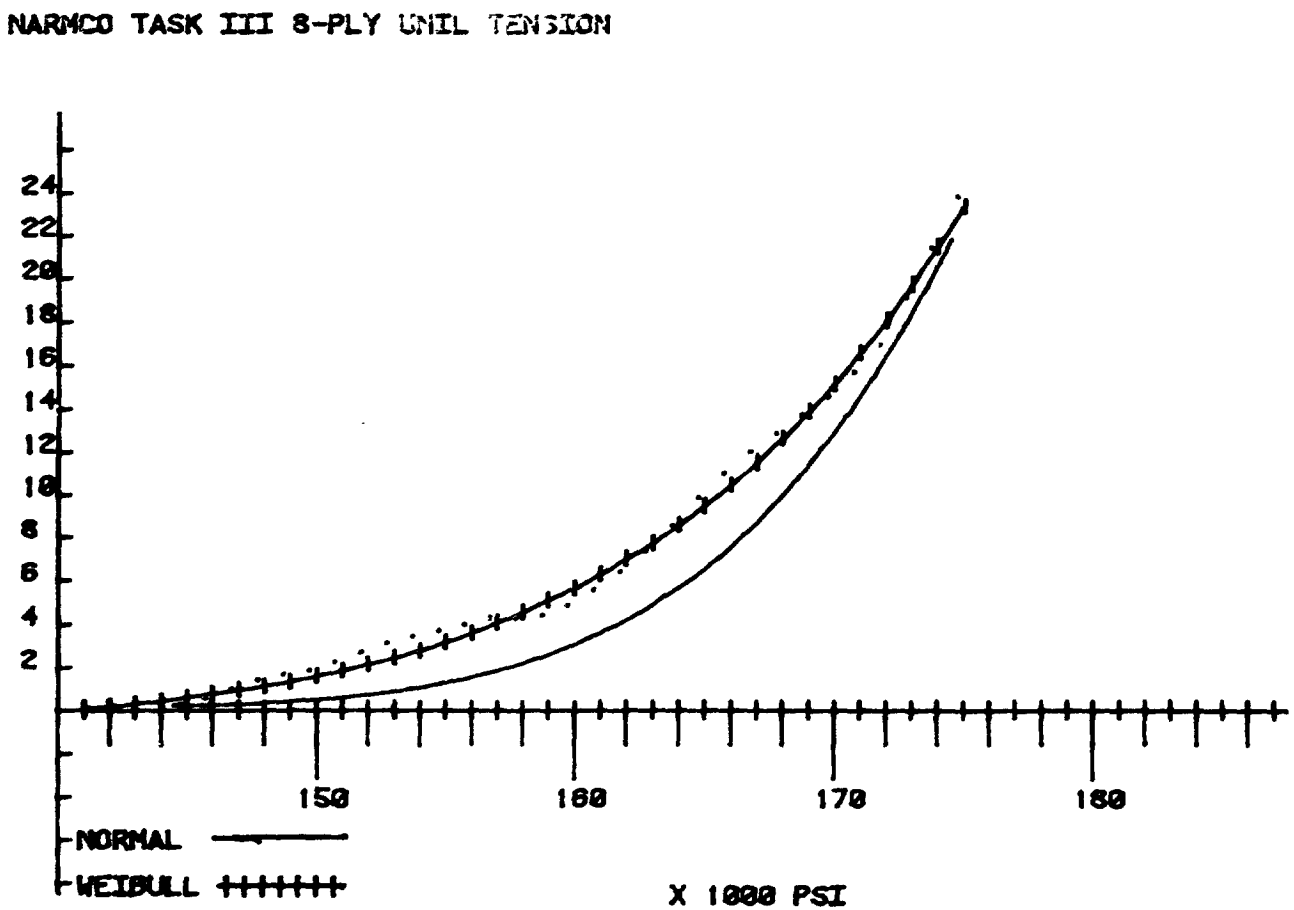


Figure 3. Example of Weibull versus Normal fit on a lower 15% cumulative frequency plot

The Normal distribution (Cumulative frequency) plots, over the entire population, were determined from equation (2).

$$P(x\sqrt{2}) = 1/2 + \frac{\text{erf } x}{2} \tag{2}$$

$$\text{where:} \quad \text{erf } x = 1 - \frac{2}{\sqrt{\pi}} \int_x^{\infty} e^{-t^2} \, dt \tag{3}$$

However, this error function lacked the desired accuracy when generating the distribution for only the lower 15% of the failure values. Therefore, equation (4) was incorporated into the programs when plots of the lower 15% of the data were desired.

$$\text{erf } x = 1 - \frac{1}{(1+a_1x+a_2x^2+a_3x^3+a_4x^4)^4} + e(x) \tag{4}$$

where: $e(x) = 5\text{x}10^{-4}$

$a_1 = .278393$

$a_2 = .230389$

$a_3 = .000972$

$a_4 = .078108$

Equations (5) and (6) represent the method in which the mean and standard deviation values were determined in this report.

$$\mu = \frac{1}{N} \sum_{i=1}^{n} X_i \quad \text{(mean)} \tag{5}$$

$$\sigma = \left[\frac{1}{N-1} \sum_{i=1}^{n} (X_i - \mu)^2\right]^{1/2} \quad \text{(standard deviation)} \tag{6}$$

The two parameter Weibull distribution function for the Absolute frequency plots is given by equation (7)

$$f(x) = \frac{b}{x_c} \left(\frac{x}{x_c}\right)^{b-1} \exp - \left(\frac{x}{x_c}\right)^b \tag{7}$$

and the Cumulative function is represented by equation (8).

$$F(x) = 1-\exp - \left(\frac{x}{x_c}\right)^b \qquad (8)$$

where x_c = scale factor

b = shape factor

Appendix B also contains a description of the method used in determining the shape and scale factors for the Weibull distribution.

As mentioned above a moving average was used on the observed data in order to smooth it. The moving average was basically a summing routine over seven data points with the center or fourth point being the datum being adjusted. In the Reference (4) there was an error in the computer program involving the moving average. The error involved summing over six data points, but still dividing the sum by seven. This resulted in an artificial decrease in the entire failure curves. For this reason the plots were re-done and selected one's are contained in the appendices of this report. It should be pointed out that this error did not in any way affect the statistical values contained in reference (4). However, it does result in a slight adjustment in the graphical visualization of the data.

The stress strain plots were also generated with the Tektronix computer. The main objective here was not the visualization of the data but rather the determination of the elastic modulus using a least squares curve fittings technique. Since two gages were applied to the compression specimens the graphical outputs of their respective strains were useful in the initial set up of the compression test fixture. In determining the elastic modulus, the stress strain programs incorporated a linear least squares curve fit applied to the lower one third of the data. (Note: Any inflections in the curves occurred beyond this lower third of the data.)

DISCUSSION OF RESULTS

The statistical strength results were based on ultimate strength values. Since this material behaves in a brittle manner under normal loading condition, the ultimate failure load for the tension and compression specimens was easily determined. In these two types of tests failure constituted complete fracture or separation of a section of the specimen perpendicular to the axis of loading and was very dynamic. However, this complete separation did not occur in the short beam shear testing. The failure for a short beam shear test was easily defined, but not dynamic as in the other modes of testing. Upon reaching the ultimate load, the load would begin to decrease as a progressive number of layers delaminated. After a short period of time, a severe drop occurred in the test load. The highest load reached was taken as the failure load. It should be pointed out, that testing was performed on constant strain rate machines and therefore, sudden load drops were quite noticeable.

Statistical Results of Coupon Data

The results of the statistical analysis are summarized in Table 1 and consist of the statistical coefficients and goodness of fit values obtained from the computer programs. It should be noted that eight of the representative values for the goodness of fit for the Normal distribution are greater in the lower 15% than for the overall. As explained in the data analysis section, an error function was used to generate the normal distribution for the lower 15% curve fitting. However, the method used in determining the overall normal curves did not incorporate this error function. Rather, a numerical integration technique was used. The numerical integration used was a trapezoidal method that generated sufficiently accurate results for the middle portion of the curves, but became less accurate at both tail regions. Further inspection of Table 1 shows that in 83% of the cases the Weibull distribution had a lower Chi square goodness of fit value for the lower 15% curves than that found for the Normal distribution. This indicates that in general the Weibull distribution is closer to the actual data. For the

Manufacturer	Loading	Number of Plies and Stacking	Number of Specimens	Normal		Weibull		Chi Square Goodness of Fit				Minimum Value
				Mean	Standard Deviation	Scale Factor	Shape Factor	Normal		Weibull		
								Lower 15%	Overall	Lower 15%	Overall	
Hercules Task III	Tension	8 ply crossply	65	59146	7654	62373	9.185	1.903	5.205	1.556	15.88	41958
		8 ply unidirect.	138	203152	20865	212100	11.73	22.30	26.59	3.914	6.876	143434
		12ply unidirect.	118	206354	16371	213602	15.05	53.45	52.34	2.839	3.133	150431
	Compression	8 ply crossply	127	63832	7056	66861	10.79	32.64	31.11	3.183	3.755	42789
		12ply unidirect.	125	157797	11859	163097	15.93	2.968	7.657	5.142	31.04	128275
	Short Beam Shear	25ply unidirect.	359	11220	1198	11728	11.51	32.21	58.27	57.90	178.1	7893
Union Carbide Task III	Tension	8 ply crossply	65	51811	6923	54724	8.852	1.683	8.318	2.166	16.00	37136
		8 ply unidirect.	172	190407	15801	187249	13.88	17.94	18.84	1.059	7.872	129528
		12ply unidirect.	132	191238	13779	197338	16.72	25.88	30.36	5.191	9.743	137482
	Compression	8 ply crossply	126	66306	8220	69902	9.308	35.65	36.68	2.791	4.200	36363
		12ply unidirect.	126	184245	16487	191401	13.52	3.712	11.89	5.980	35.37	148709
	Short Beam Shear	25ply unidirect.	313	13785	727	14107	23.41	51.69	46.95	15.09	33.27	10676
Narmco Task III	Tension	8 ply crossply	66	56548	5478	58911	12.37	.8060	1.189	.7600	8.323	42735
		8 ply unidirect.	169	191583	15143	198232	15.29	42.89	47.87	3.283	4.243	144583
		12ply unidirect.	125	187012	16770	194336	13.37	22.30	31.93	7.921	9.504	142034
	Compression	8 ply crossply	123	65855	6741	68749	11.76	10.06	7.494	.6460	2.407	46717
		12ply unidirect.	127	147923	18894	155911	9.313	12.18	20.88	7.201	9.587	100224
	Short Beam Shear	25ply unidirect.	116	10090	690	10395	17.68	23.96	21.28	1.137	3.744	7862
Narmco Task IV	Tension	8 ply crossply	65	58485	5489	60875	12.67	4.053	5.975	3.850	7.351	46538
		8 ply unidirect.	192	190322	18545	198242	12.54	1.740	5.524	1.239	19.18	140280
		12ply unidirect.	113	199414	14384	205718	14.97	.2970	1.433	1.108	14.03	161459
	Compression	8 ply crossply	126	65877	8638	69738	8.551	116.7	132.6	15.15	19.36	35228
		12ply unidirect.	125	150562	13664	156466	13.35	9.729	5.643	3.562	9.034	110543
	Short Beam Shear	25ply unidirect.	231	10523	665	10816	19.39	36.02	41.11	11.34	13.98	8735
Narmco Task III and Task IV	Tension	8 ply crossply	131	57509	5548	59889	12.59	7.756	5.771	3.104	15.10	42735
		8 ply unidirect.	361	190913	17026	198228	13.76	34.46	38.53	3.473	16.32	140280
		12ply unidirect.	238	192900	16835	200193	13.95	41.82	48.37	5.183	11.66	142034
	Compression	8 ply crossply	249	65866	7744	69255	9.923	180.1	203.7	9.549	12.18	35228
		12ply unidirect.	252	149232	16528	156271	10.91	34.83	38.05	3.438	7.374	100224
	Short Beam Shear	25ply unidirect.	347	10378	703	10686	18.17	82.09	64.93	7.784	14.42	7862

Table 1. Statistical Analysis Results

overall fit (over the entire curve) the Weibull distribution fit 63% of the curves better than the Normal distribution.

The Chi square goodness of fit is a good indicator for this type of testing, in that it is most sensitive to error in the lower tail region of distribution. The Chi square goodness of fit is represented by the following equation:

$$X^2 = \sum \left[\frac{(fo-fe)^2}{fe}\right] \qquad (1)$$

where

fo = observed value

fe = expected value

By inspection it is obvious that if the expected value varies from the observed value by a delta amount, the Chi square value will be greatest if the expected value is smaller than the observed value. This implies that for the same delta error the Chi square value will be greater if the error is on the non-conservative side of the observed data. Thus, even though the Chi square goodness of fit is a good indicator, it is still necessary to inspect the actual curves to determine whether the probability curve generated errors on the high side or low side of the data. By inspecting the lower 15% tail region curves in Appendix E it is obvious that the Weibull curves always predict more conservative design values than do the Normal curves. Furthermore, of the 17% of these curves which the goodness of fit indicates are predicted more closely by the Normal distribution, two are on the unconservative side of the actual data. It should be noted that in general a smaller sample size will dictate a smaller Chi square goodness of fit than a larger sample size, and thus, the actual numbers have no particular significance when comparing different samples.

Short Beam Shear Dehydration Results

The results of the dehydration part of the short beam shear testing are presented in Table 2 and in Figure 4. The plots in Figure 4 indicate the rate of moisture loss for each group of specimens on a day to day basis. The specimens were allowed to dry for 160 days in a cross-

	Hercules Task III		Union Carbide Task III		Narmco Task III		Narmco Task IV	
	Normal	Dehydrated	Normal	Dehydrated	Normal	Dehydrated	Normal	Dehydrated
Normal Distribution								
Mean psi	11220	13245	13785	16104	10090	11696	10523	11369
Standard Deviation	1198	1412	727	889	690	883	665	709
Weibull Distribution								
Shape Factor	11.51	10.37	23.41	20.28	17.68	14.18	19.39	17.95
Scale Factor psi	11728	13885	14107	16520	10395	12117	10816	11692
Minimum Value psi	7893	9459	10676	14838	7862	9510	8735	9991

Table 2. Comparison of Statistical Results Between Normal and Dehydrated Short Beam Shear Coupons

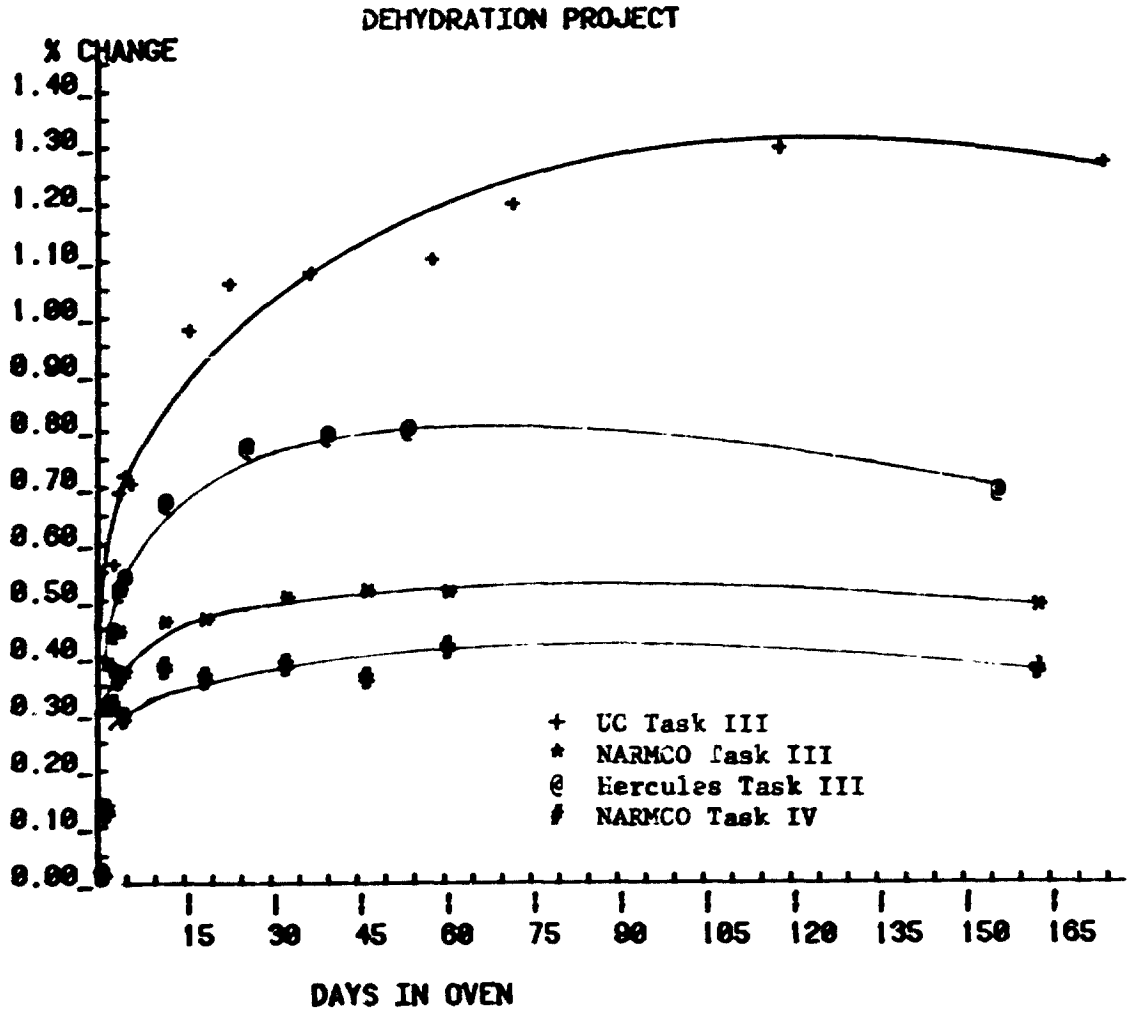


Figure 4. Moisture Loss During Dehydration of Short Beam Shear Specimens

flow electric oven in which the temperature was maintained between 155 and 165 degrees Fahrenheit. The drying time was not predetermined. The specimens were kept in the oven until a steady-state moisture content had been achieved. The series 1000 (Union Carbide) specimens were used as a progress indicator for the dehydration process during the 60 to 165 day portion of the cycle. There was a complete set of weights taken at the 105 day point, but due to operator error the data was not applicable. As was expected the failure values obtained from the dehydrated shear specimens were higher than the values obtained from the normal testing. Table 2 exemplifies this with the statistical values generated from the dehydrated data and from the data obtained from the normal testing. For each series the mean and the scale factor values were higher and the standard deviation and the shape factor values indicated greater dispersion for the dehydrated specimens.

Comparison Between Narmco Task III and IV

Questions always exist concerning the repeatability of fabrication procedure and results when fabricated composite structures are involved. Some of the questions that arise are:

(1) Where are the fabricators on their learning curve?

(2) Are the basic material constituents really the same?

(3) Was the cure procedure maintained?

The Narmco Task III and IV material groups provide a basis for statistically comparing "supposedly" identical materials that were manufactured at different times.

The Task III and IV panels were produced during different production runs, separated by more than a year. Comparisons between the statistical values presented in Table 3 indicate that statistically speaking the specimen data obtained for both production runs are very similar. This indicates that it is possible to consistently produce graphite composites with similar strength properties, thus reducing the amount of coupon testing required to insure consistency between production runs. Once consistent manufacture is established the average failure values should be sufficient to insure quality as in sample testing in the steel industry, and reasonable estimates of average value can be obtained from small samples.

Manufacturer	Loading	Number of Plies and Stacking	Number of Specimens	Normal		Weibull	
				Mean	Standard Deviation	Scale Factor	Shape Factor
Narmco Task III	Tension	8 ply crossply	56	56548	5478	58911	12.37
		8 ply unidirect.	169	191583	15143	198232	15.29
		12ply unidirect.	125	187012	16770	194336	13.37
	Compression	8 ply crossply	123	65855	6741	68749	11.76
		12ply unidirect.	127	147923	18894	155911	9.313
	Short Beam Shear	25ply unidirect.	116	10099	690	10395	17.68
Narmco Task IV	Tension	8 ply crossply	65	58485	5489	60875	12.67
		8 ply unidirect.	192	190322	18545	198242	12.54
		12ply unidirect.	113	199414	14384	205718	16.87
	Compression	8 ply crossply	126	65877	8638	69738	8.551
		12ply unidirect.	125	150562	13604	156466	13.35
	Short Beam Shear	25ply unidirect.	231	10523	665	10816	19.39
Narmco Task III and Task IV	Tension	8 ply crossply	131	57509	5548	59889	12.59
		8 ply unidirect.	361	190913	17026	198228	13.76
		12ply unidirect.	238	192900	16835	200193	13.95
	Compression	8 ply crossply	249	65866	7744	69255	9.923
		12ply unidirect.	252	149232	16528	156271	10.91
	Short Beam Shear	25ply unidirect.	347	10378	703	10686	18.17

Table 5. Statistical Failure Value Comparisons Between Narmco Task III and Task IV Materials

Specimens Not Used in the Statistical Analysis

The following is a reproduction of Table C.1 from Appendix C. The table gives the coding used to indicate the condition of the specimen, prior to testing or some particular test condition.

Coding	Implied Condition
0	Normal Specimen
1	Dynamically loaded or error in the test procedure
2	Tab slippage prior to failure
3	Non-designated number
4	Voids visible along specimen edge
5	Specimen cut from the edge of a panel
6	Loaded while using the digital readout
7	Longitudinal crack in specimen
8	Extreme variation in specimen thickness

The conditions which dictated removal from the parent population prior to statistical analysis are described as follows:

1. Condition one indicates an erroneous test procedure inconsistent with the overall test program.
2. Condition two was a problem that arose when the tab bonding load was excessive during tab installation. This produced an extremely thin layer of epoxy that sheared when the specimens were tested. Since these specimens were not tested to their ultimate load they were excluded from the statistical analysis.
3. Condition three consists of numbers not assigned to a specimen. In other words these specimens never existed.
4. Condition five indicates specimens cut from an edge of a panel. They were generally tapered and were not intended to be used in the statistical analysis.
5. Condition six represents the unidirectional tension specimens that were tested at the higher strain rate prior to the discovery of the error occurring in the digital readout. Since the error in the output was not consistent it was impossible to scale these failure values in such a manner as to make them a subset of the entire population. Therefore, they were excluded from the analysis.

6. Condition seven represents unidirectional specimens with longitudinal cracks. When testing non-homogeneous and non-isotropic materials the specimen dimensions must remain constant and while a specimen with a logitudinal crack has essentially the same overall cross-section some of the coupling effect between fibers has been lost. Therefore, these specimens were also excluded from the statistical analysis.
7. Condition eight represents a single specimen with extreme variation in thickness that was cut from the middle of a panel. This occurred only once and a cross-sectional view through the tab area is presented in Figure 5. While this type of problem could occur in a production run composite member, the failure load occurred when early tab bond failure directed all the load down one side of the member and this would not occur under normal system loading.

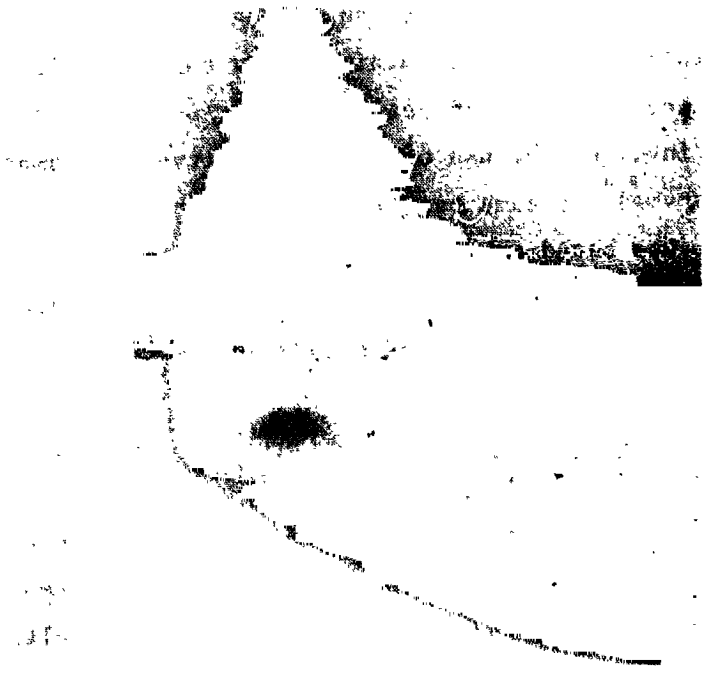


Figure 5. Non-uniform Cross-sectional Thickness

Comparison of Material Properties

The Boeing report (2) contains a table of material properties obtained from the vendors and the values Boeing obtained from limited coupon testing. Table 4 is a reproduction of the Boeing table with the addition of the material properties obtained during this investigation. Some testing performed for the Boeing report was not duplicated in this investigation and these values were not reproduced in Table 4. The material peoperties in Table 4 were based on the average values obtained from coupon testing. The only test results which varied significantly and consistently were the unidirectional compression and short beam shear tests. The compression data obtained during this investigation was consistently higher than the Boeing data and more than likely a direct result of the test fixture incorporated in the testing. Boeing used a Celanese compression test fixture which was designed for a particular specimen thickness and any variations in specimen geometry caused loading alignment problems. Misalignment that would result in early buckling of the specimen during compression testing must be kept to a minimum in order to minimize any superposition of bending stresses in the specimens. Compression testing performed during this investigation involved the use of a different type of compression fixture. It incorporated the same basic principles as the Celanese fixture, except that it was based on tapered rectangular specimen grips, rather than conical grips. Once alignnemt was achieved the new fixture gave consistent results even with varying specimen thickness. It can be seen in Figure 6 (typical compression test) that the compression specimens would eventually exhibit large amounts of bending and this bending could then contribute to early failure.

There is some question whether or not a true uniaxial compression test is ever achieved. This testing might more realistically be termed a buckling test. While the compression test results were consistent throughout this study, it is not realistic to assume that the results would apply to compression where good lateral support is provided along the length of the specimen as in a sandwich construction bending test. However, this compression test data should provide a consistent comparison between the material groups from a statistical distribution standpoint.

	HERCULES			UNION CARBIDE			NARMCO TASK III		
	Project	Boeing	Vendor	Project	Boeing	Vendor	Project	Boeing	Vendor
Compression ultimate ksi.									
0^{o} at RT	157.8	125.5		184.2	124.6	172.0	156.2	129.0	160.0
0^{o} crossply at RT	63.8	65.5		66.3	53.5		65.9	76.0	
Compression modulus ksi									
0^{o} at RT	16.7	14.5		17.7	21.5	22.5	18.2	19.2	17.0
0^{c} crossply at RT	6.4	5.9		7.4	7.1		6.9	7.2	
Tension ultimate ksi									
0^{o} at RT	203.2	190.2	202.0	180.4	194.3	174.0	190.9	161.0	170.0
0^{o} crossply at RT	59.1	56.2		51.8	64.1		57.5	72.0	
Tension modulus ksi									
0^{o} at RT	16.2	18.1	15.5	18.9	23.7	20.5	18.5	17.0	18.0
0^{o} crossply at RT	6.2	7.4		6.9	9.1		6.6	5.4	
Short Beam Shear ksi									
0^{o} at RT	11.2	13.5	13.6	13.8	7.9	15.0	10.1	11.9	14.0
0^{o} dehydration	13.2			16.1			11.5		

Table 4. Comparison of Material Properties

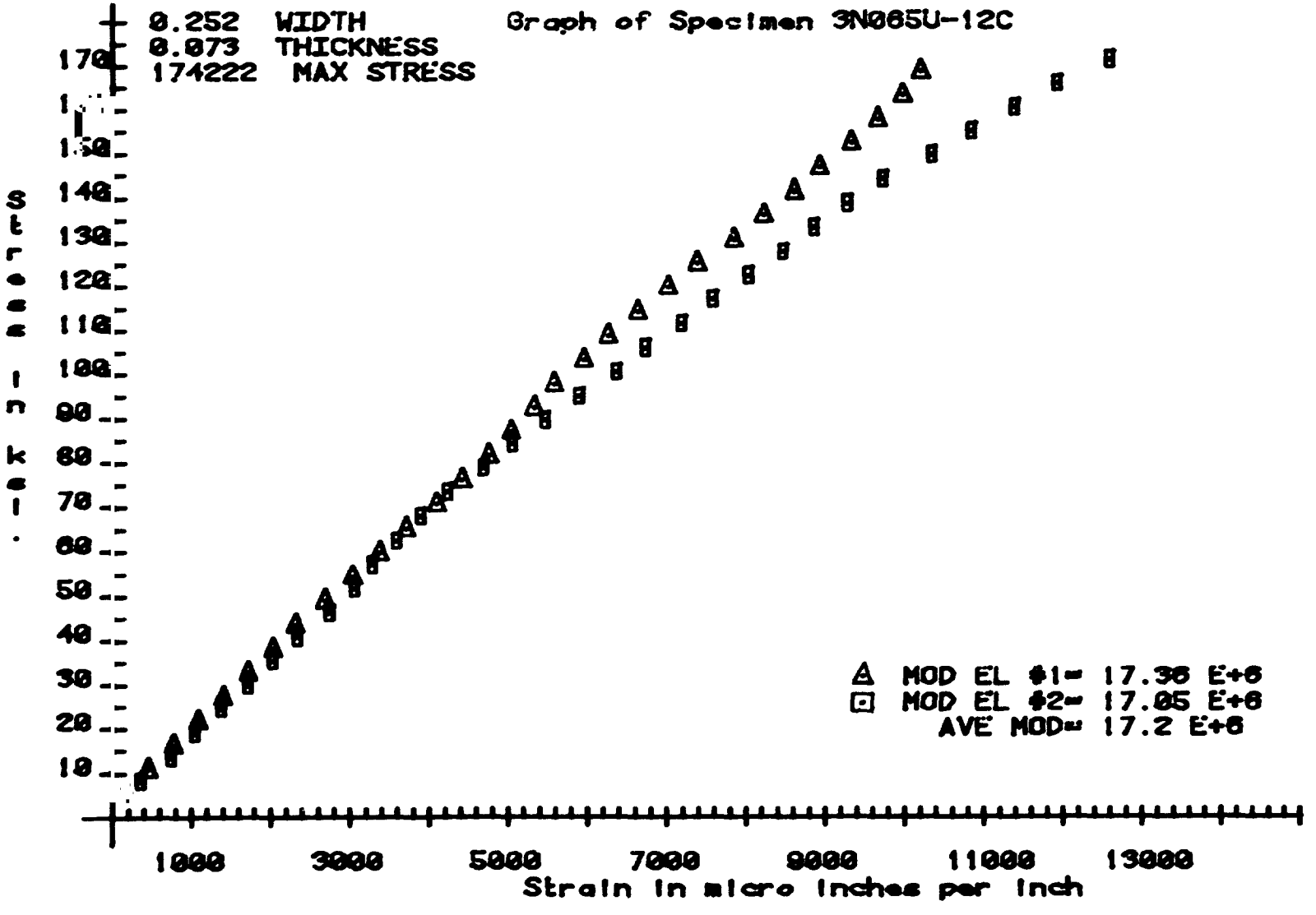


Figure 6. Example of a Stress vs. Strain Plot from a Compression Test

The difference in the short beam shear values was attributed to the difference in the span to depth ratio used by Boeing versus that used for this investigation. An excessive span to depth ratio promotes failure by bending rather than shear. Prior to full scale short beam shear testing, a small number of tests were performed at varying span to depth ratios in order to determine the critical ratio for this material and layup. The nature of failure was easily detected when witnessing these tests. When bending failure occurred, the failure was very dynamic, and accompanied by a loud report. For the shear failure, the failure occurred very slowly with the material holding for several seconds at the maximum load. As reported in Reference (4) the transition in failure modes from bending to shear occurred at a span to depth ratio of 4 to 1. As the ratio was decreased, stabilization of shear failure and a decrease in bending stress occurred. Therefore, it was determined that the ideal span to depth ratio was 3.5 to 1.

Elastic Modulus

The average elastic modulus, determined from each group of specimens, is tabulated in Table 5, along with the corresponding standard deviations. The lower one third of the data for each test was used in determining the modulus. This range of the data was always below any knee in the stress-strain curve. The elastic modulus for the tension specimens was computed by passing a linear least squares curve fit through the stress-stain data excluding the zero load value. However, for the compression data it was necessary to also exclude the data points corresponding to the first strain reading for both sides of the specimen. Initial stress-strain results indicated that the first one or two load increments did not produce colinear points with respect to the rest of the data for each specimen. These variations were attributed to testing machine slack which resulted in an extremely slow strain rate until the slack was overcome. Since a large number of data points were recorded for each instrumented test, deleting the first two data points presented no problem in determining the elastic modulus. Figures 6 and 7 are examples of the stress-strain plots used in the elastic modulus determination.

			Average Modulus $x10^6$ psi	Standard Deviation $x10^4$
Hercules Task III	Tension	8 ply unid	16.2	88.5
		8 ply crossply	6.20	41.0
		12ply unid	17.04	62.9
	Compression	8 ply crossply	6.41	46.0
		12ply unid	16.70	73.9
Union Carbide Task III	Tension	8 ply unid	18.90	85.4
		8 ply crossply	6.90	46.0
		12ply unid	19.43	77.7
	Compression	8 ply crossply	7.38	69.0
		12ply unid	17.73	111.5
Narmco Task III	Tension	8 ply unid	19.02	223.3
		8 ply crossply	6.52	32.7
		12ply unid	18.53	136.8
	Compression	8 ply crossply	6.65	38.1
		12ply unid	18.16	97.7
Narmco Task IV	Tension	8 ply unid	17.90	125.4
		8 ply crossply	6.61	36.5
		12ply unid	18.22	107.5
	Compression	8 ply crossply	7.17	35.2
		12ply unid	18.19	82.2

Table 5. Average Elastic Modulus Values

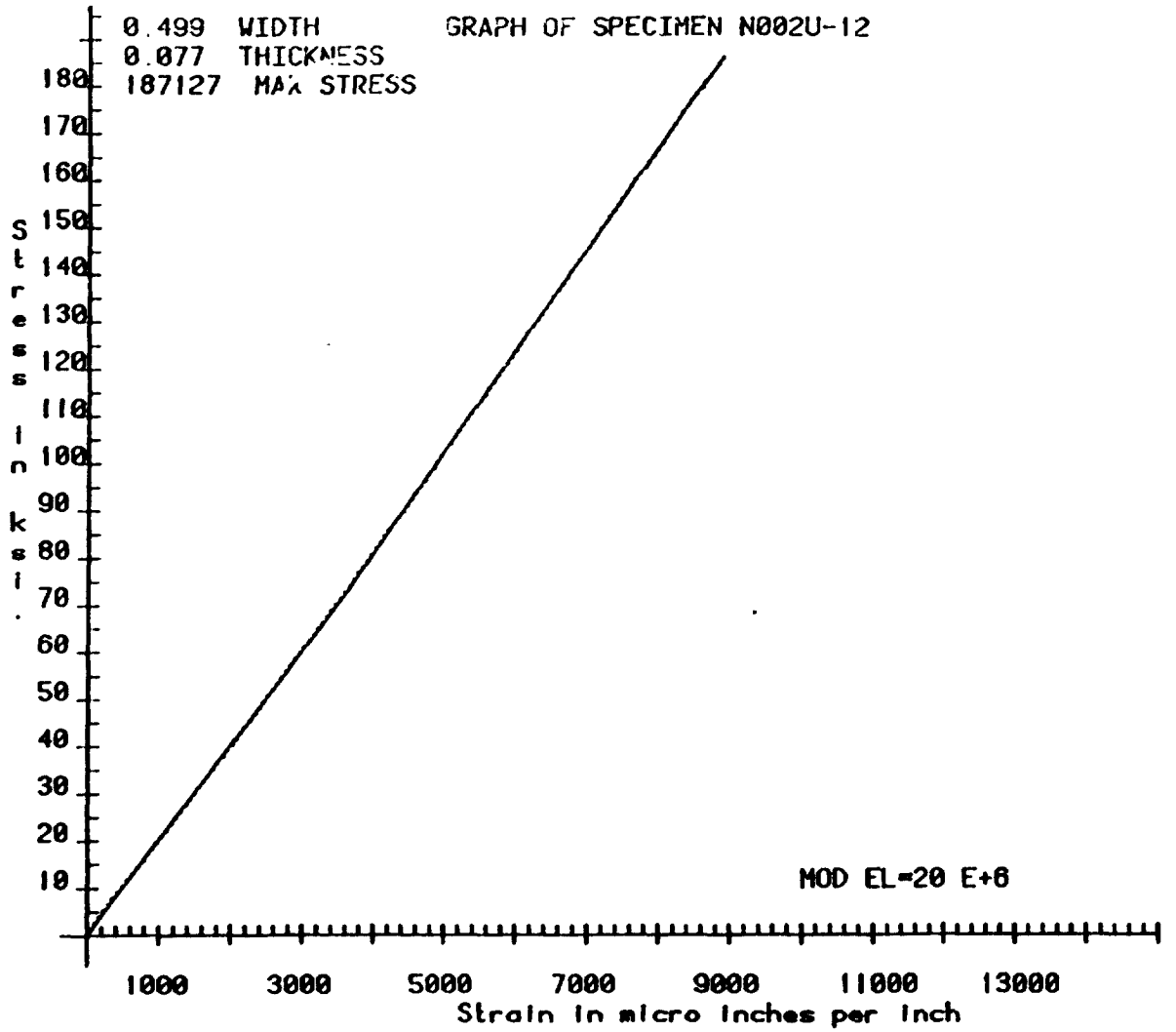


Figure 7. Example of a Stress vs. Strain Plot From a Tension Test

Strain Rate Versus Ultimate Load

As previously mentioned there were 66 tension specimens from each of the unidirectional groups that were tested at a higher strain rate. Reference (4) indicates that an increase in strain rate from 7.55×10^{-4} in/(in-min) to 2.60×10^{-3} in/(in-min) will have virtually no effect on the ultimate strength of a graphite epoxy composite. The results obtained following the strain rate increase were compared statistically with the previously collected data and showed no significant variation in ultimate strength. This indeed supports the strain rate assumption.

Scale Up From Coupon to Spoiler Data

Due to the inherent geometry and method of loading of the spoiler panels tested by NASA (6) it is impractical to attempt to make a direct comparison of strength data between the spoilers and coupon data. However, the NASA report does give the statistical analysis results of the failure loads. This allowed a comparison between the shape factors determined in this investigation and those presented in the NASA Report (6). The spoilers were constructed with Narmco Task IV material. The Weibull shape parameter presented in the report is 14.7 and the values obtained during this investigation are presented in Table 1. This comparison strengthens the statement presented in Reference 6 that:

"The reproducibility of the structural component's strength was better than that of the composite material from which they were built."

It should be noted that large Weibull distribution shape factors represent low data scatter.

CONCLUSIONS

The results of this study should serve in two capacities: 1) the raw data and distributions for each of the material groups can serve as large sample data bases for designs utilizing these materials and 2) the statistical distribution results provide insight for establishing design methodology for graphite composites. To support these objectives, all of the design data and population distributions are included in the Appendices of this report. The reader can thus consult the detailed results as needed for a particular material group.

In support of the statistical findings (item 2) the following observations can be made.

1. In comparing Normal versus Weibull distributions, both serve as adequate predictors of average values (mean value or scale factor) even when based on small sample sizes.
2. For design considerations the lower tail region of the distribution is of major importance, and the Weibull approach provided the best fit in the lower tail region in most instances and provided the more conservative estimate in this region in all cases studied. Thus the Weibull estimates not only were nearer to the actual data but were conservative when compared to Normal estimates. When small samples were randomly selected from the total population tested, Weibull projections were always conservative when compared to Normal projections.
3. As expected, the three different graphite-epoxy material groups in Task III are different in terms of detailed properties and should be treated as such. This is similar to the situation when different alloys exist for the same basic material group.
4. The Narmco Task III and IV material groups represent a test on "supposedly" like materials manufactured at different times and serve as one measure regarding repeatability of mechanical properties. Essentially, the same test results did occur. While it would still be helpful to demonstrate that a totally different fabricator could achieve the same results, the repeatability that

is demonstrated in this study is of considerable importance to the overall understanding of composite behavior.

5. It was verified that the shape factor and minimum value projections are dependent on sample size, however, the degree of the fluctuations do diminish with increased sample size. This is true for both Weibull and Normal distribution estimates.
6. The short beam shear test does provide a repeatable test when the specimens are properly sized (span-to-depth) and the results properly interpreted.
7. The uniaxial compression test is of little quantitative value due to its inherent alignment problems that ultimately result in bending (buckling) of the specimen, and the fact that normal compression design applications provide lateral support (for example when compression occurs for sandwich construction applications as in the spoilers). It does however, provide a form of qualitative comparison between material groups.
8. As was expected, the removal of moisture (dehydration test) did result in an increase in the interlaminar shear strength.

While this investigation does provide insight into many of the questions that surround designing with composite materials, other questions must be addressed. The concept of basing designs on parameters such as the "A" and "B" allowables established from Normal distribution studies is no longer applicable. The entire concept of categorizing materials needs clarification. When is a material the same? Where are the applicable boundaries for applying material data to different applications? Must a complete new set of verification tests be conducted in every instance? The test data from the Narmco Task III and IV materials are very encouraging in that there does appear to be some level of repeatability that could lead to consistent categorizing of advanced composite material properties.

REFERENCES

1. Military Handbook 5B, "Metallic Materials and Elements for Aerospace Vehicle Structures," Chapt. 9, September 1971.

2. Lemon, Glen H., "Statistical Considerations for Structural Reliability Analysis," Lecture Session, Colloquium on Structural Reliability, Carnegie Mellon Institute, October 1972.

3. Stoecklin, R. L., "Development, Manufacturing, and Test of Graphite-Epoxy Composite Spoilers for Flight Service on 737 Transport Aircraft," NASA CR 132682, October 1976.

4. Reese, C. D. and Bringmann, P., "Determination of Shear Strength Distributions for Graphite-Epoxy Composite Materials," NASA CR 155432, January 1978.

5. Chiao, T. T. and Moore, R. L., "Strain Rate Effects on the Ultimate Tensile Stress of Fiber Epoxy Strands," Materials Tech. Series, Vol. 1, pp. 2-5, Technomic Publication, 1974.

6. Howell, W. E. and Reese, C. D., "Reporducibility of Structural Strength and Stiffness for Graphite-Epoxy Aircraft Spoilers," NASA TM 78723, November 1978.

7. Faupel, J. H., "Engineering Design," pp. 498, John Wiley and Sons Inc., 1964.

8. Meyer, S. L., "Data Analysis for Scientists and Engineers," John Wiley and Sons Inc., 1975.

9. Abramowitz, M. and Stegun, I. A., "Handbook of Mathematical Functions," Tenth Printing, pp. 297-299, United States Department of Commerce, December 1972.

10. Bowker, A. H. and Lieberman, G. J., "Engineering Statistics," 2nd Edition, New Jersey, Prentice-Hall, Inc., 1972.

APPENDIX A

Determination of the critical buckling length for graphite epoxy compression specimens.

Euler's buckling equation, as taken from Faupel (7), for a clamp ended beam has the following form:

$$F_{cr} = \frac{4\pi^2 EI}{L^2}$$

where F_{cr} = Critical buckling load

I = Area moment of inertia

E = Elastic Modulus of the material

L = Length

Since it was desirable to have the same gage length for all the compression specimens, the weakest material in buckling was used for the calculations. The Boeing report (3) indicated that the critical buckling material was the 8 ply crossply material. Therefore, the smallest value of E (5.9×10^6 psi) and 2.5 times the largest value of the failure stress (129×10^6 psi) were used with the Euler equation to give a length of .40 inches, well below the critical buckling length of any of the materials tested.

APPENDIX B

Determination of Normal cumulative distribution functions, and Weibull shape and scale parameters.

Cumulative distribution function as obtained from (8):

(1) $\text{erf } x = 2P(X\sqrt{2}) - 1$

Error functions as obtained from (9)

(2) $$\text{erf } x = 1 - \frac{2}{\sqrt{\pi}} \int_x^{\infty} e^{-z^2}\, dz$$

and

(3) $$\text{erf } x = 1 - \frac{1}{(1+a_1x+a_2x^2+a_3x^3+a_4x^4)^4} + e(x)$$

where

$a_1 = .278393$

$a_2 = .230389$

$a_3 = .000972$

$a_4 = .078108$

by rearranging equation (1) we get

(4) $$P(x\sqrt{2}) = \frac{1+\text{erf } x}{2}$$

now we let $z\sqrt{2} = t$

then $dz = \frac{dt}{\sqrt{2}}$ and substituting into equation (2)

(5) $$\text{erf } x = 1 - \frac{2}{\sqrt{\pi}} \int_{x\sqrt{2}}^{\infty} e^{-t^2/2} \frac{dt}{\sqrt{2}}$$

or $$\text{erf } x = 1 - \frac{2}{\sqrt{\pi}} \int_x^{\infty} e^{-t^2/2}\, dt$$

by substituting equation (5) into (4) and (3) into (4) we obtain

(6) $$P(x\sqrt{2}) = 1 - \frac{1}{\sqrt{\pi}} \int_x^{\infty} e^{-t^2/2}\, dt$$ and

$$(7)\quad P(x\sqrt{2}) = \frac{1}{2(1+a_1x+a_2x^2+a_3x^3+a_4x^4)^4}$$

therefore

$$(8)\quad P(x) = 1 - \frac{1}{\sqrt{2\pi}} \int_x^{\infty} e^{-t^2/2}\, dt \qquad \text{and}$$

$$(9)\quad P(x) = 1 - 1/2\ \left(1 + \frac{a_1}{2}x + \frac{a_2}{2}x^2 + \frac{a_c}{2}x^3 + \frac{a_4}{2}x^4\right)^{-4}$$

or

$$(10)\quad P(x) = 1 - \frac{1}{\sigma\sqrt{2\pi}} \int_x^{\infty} e^{-(x-\mu)^2/2m^2} dx \qquad \text{and}$$

$$(11)\quad P(x) = 1 - 1/2\ \left(1 + C_1x + C_2x^2 + C_3x^3 + C_4x^4\right)^{-4}$$

where $C_1 = 0.196854$
$C_2 = 0.115194$
$C_3 = 0.000344$
$C_4 = 0.019527$

By taking the natural logarithm twice, the Weibull cumulative function is transformed into:

$$\ln \ln \left(\frac{1}{1 - F(x)}\right) = b \ln X - b \ln X_c$$

Since b and X_c are constants for a given population, this equation has the form of a straight line with slope b and intercept $-b \ln X_c$. By replacing F(x) with R(n) where R(n) is the median rank associated with the n^{th} datum we get

$$\ln \ln \left(\frac{1}{1 - R(n)}\right) \quad \text{vs.} \quad \ln X_n$$

which may be plotted, and using a linear least squares curve fit, the slope and the intercept of the plot can be calculated. The calculated

slope is the shape factor associated with the data population and the scale factor can be found through

$$X_c = \exp - \left(\frac{I}{b}\right)$$

where I is the calculated intercept.

The media rank

$$R(n) = \frac{n-0.3}{n+0.4}$$

was chosen to rank the sorted data since it is just as likely to err on the high side as on the low side.

APPENDIX C

Specimen Dimensions and Failure Data

Table of Contents for Appendix C

Table C1

Description of coding for the condition of the specimens.

Coding	Implied Condition
0	Normal Specimen
1	Dynamically loaded or error in the test procedure
2	Tab slippage prior to failure
3	Non-designated number
4	Voids visible along specimen edge
5	Specimen cut from the edge of a panel
6	Loaded while using the digital readout
7	Longitudinal crack in specimen
8	Extreme variation in specimen thickness

Table C2

HERCULES 8PLY CROSSPLY TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	0.496	0.041	1082	53206	366	0
2	0.501	0.041	1385	67426	464	0
3	0.505	0.042	1490	70249	484	0
4	0.498	0.043	1455	67946	468	0
5	0.996	0.041	2540	62200	428	0
6	1.002	0.043	2735	63477	437	0
7	0.998	0.043	2990	69674	480	0
8	0.999	0.042	2675	63754	439	0
9	1.002	0.043	2735	63477	437	0
10	0.993	0.044	2975	68090	469	0
11	1.004	0.042	3150	74701	515	0
12	1.002	0.046	2990	64870	447	0
13	1.002	0.044	2420	54890	378	0
14	1.002	0.044	2420	54890	378	0
15	1.002	0.043	2540	58951	406	0
16	1.000	0.044	2140	48636	335	0
17	1.000	0.045	2800	62222	429	0
18	1.002	0.041	2190	53308	367	0
19	1.001	0.041	2140	52142	359	0
20	1.001	0.044	2340	53128	366	0
21	1.000	0.041	2960	72195	497	0
22	1.000	0.043	2280	53023	365	0
23	1.002	0.043	2300	53381	368	0
24	0.000	0.000	0	0	0	3
25	1.001	0.040	1680	41958	289	0
26	1.000	0.041	2530	61707	425	0
27	1.000	0.044	2300	52272	360	0
28	1.000	0.040	2200	55000	379	0
29	1.002	0.043	2050	47579	328	0
30	1.000	0.044	2510	57045	393	0
31	1.000	0.043	2190	50930	351	0
32	1.001	0.040	2020	50449	347	0
33	1.001	0.044	2600	59031	407	0
34	1.001	0.042	2440	58037	400	0
35	1.000	0.042	2460	58571	403	0
36	1.001	0.043	2590	60172	414	0
37	1.001	0.042	3000	71357	492	0
38	1.000	0.042	2660	63333	436	0
39	1.001	0.043	2060	47859	329	0
40	1.001	0.042	2530	60177	414	0

HERCULES 8PLY CROSSPLY TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	1.001	0.043	2430	56455	389	0
42	1.000	0.042	2410	57380	395	0
43	1.001	0.040	2550	63686	439	0
44	1.001	0.043	2420	56222	387	0
45	1.001	0.043	2290	53202	366	0
46	1.001	0.042	2910	69216	477	0
47	1.000	0.043	2020	46976	323	0
48	1.001	0.046	2340	50818	350	0
49	1.001	0.043	2830	65748	453	0
50	1.001	0.041	2830	68955	475	0
51	1.001	0.041	2160	52630	362	0
52	1.000	0.040	2400	60000	413	0
53	1.001	0.042	2770	65886	454	0
54	1.001	0.045	2430	53946	371	0
55	1.001	0.040	2580	64435	444	0
56	1.001	0.043	2610	60637	418	0
57	1.000	0.045	2290	50888	350	0
58	1.001	0.043	3100	72021	496	0
59	1.000	0.044	2310	52500	361	0
60	1.002	0.044	2470	56024	386	0
61	1.000	0.046	2300	50000	344	0
62	1.001	0.045	2820	62604	431	0
63	1.000	0.044	2600	59090	407	0
64	1.001	0.040	2900	72427	499	0
65	1.002	0.042	2130	50613	348	0
66	1.001	0.044	3120	70838	488	0

Table C3

HERCULES 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	0.504	0.040	4540	225198	1552	0
2	0.496	0.043	3640	170667	1176	0
3	0.502	0.038	3970	208114	1434	0
4	0.500	0.040	4160	208000	1434	0
5	0.495	0.040	3240	163636	1128	0
6	0.502	0.040	3575	178037	1227	0
7	0.501	0.046	4830	209580	1445	0
8	0.500	0.040	3900	195000	1344	0
9	0.498	0.041	3950	193456	1333	0
10	0.498	0.043	3490	162977	1123	0
11	0.501	0.044	3960	179640	1238	0
12	0.499	0.044	4370	199034	1372	0
13	0.501	0.039	4325	221352	1526	0
14	0.500	0.044	4425	201136	1386	0
15	0.501	0.042	3810	181066	1248	0
16	0.501	0.041	3910	190351	1312	0
17	0.500	0.040	4030	201500	1389	0
18	0.501	0.046	4250	184413	1271	0
19	0.499	0.045	0	0	0	2
20	0.499	0.042	4290	204695	1411	0
21	0.501	0.045	0	0	0	2
22	0.500	0.039	4765	244358	1684	0
23	0.498	0.040	0	0	0	2
24	0.494	0.041	0	0	0	2
25	0.499	0.038	1815	95717	659	8
26	0.498	0.046	4635	202331	1395	0
27	0.500	0.042	4720	224761	1549	0
28	0.500	0.039	4345	222820	1536	0
29	0.500	0.036	4090	227222	1566	0
30	0.501	0.040	4480	223552	1541	0
31	0.500	0.040	4110	205500	1416	0
32	0.501	0.038	4340	227965	1571	0
33	0.000	0.000	0	0	0	3
34	0.000	0.000	0	0	0	3
35	0.501	0.039	3780	193459	1333	0
36	0.000	0.000	0	0	0	3
37	0.000	0.000	0	0	0	3
38	0.501	0.041	4620	224916	1550	0
39	0.499	0.043	4570	212984	1468	0
40	0.497	0.038	3540	187440	1292	0

HERCULES 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	0.500	0.043	4640	215813	1488	0
42	0.501	0.039	4100	209836	1446	0
43	0.501	0.041	4270	207876	1433	0
44	0.501	0.043	3450	160144	1104	0
45	0.501	0.038	4090	214833	1481	0
46	0.000	0.000	0	0	0	3
47	0.500	0.039	3920	201025	1386	0
48	0.500	0.044	4160	189090	1303	0
49	0.500	0.042	4290	204285	1408	0
50	0.499	0.042	4420	210897	1454	0
51	0.500	0.038	4360	229473	1582	0
52	0.501	0.039	4710	241056	1662	0
53	0.500	0.040	4230	211500	1458	0
54	0.499	0.039	4230	217357	1498	0
55	0.501	0.044	4410	200054	1379	0
56	0.500	0.045	4070	180888	1247	0
57	0.499	0.042	4670	222826	1536	0
58	0.500	0.042	4300	204761	1411	0
59	0.500	0.039	4800	246153	1697	0
60	0.500	0.040	4220	211000	1454	0
61	0.497	0.038	3400	180027	1241	0
62	0.500	0.041	4000	195121	1345	0
63	0.499	0.039	4670	239967	1654	0
64	0.501	0.044	3660	166031	1144	0
65	0.500	0.040	4700	235000	1620	0
66	0.499	0.040	4170	209917	1440	0
67	0.501	0.041	3260	158706	1094	0
68	0.500	0.041	4170	203414	1402	0
69	0.499	0.041	4700	229727	1583	0
70	0.497	0.041	4000	196299	1353	0
71	0.500	0.041	4500	219512	1513	0
72	0.499	0.042	4400	209943	1447	0
73	0.500	0.045	4290	190666	1314	0
74	0.500	0.044	4200	190909	1316	0
75	0.500	0.040	3690	184500	1272	0
76	0.501	0.040	3080	153692	1059	0
77	0.500	0.045	4010	178222	1228	0
78	0.000	0.000	0	0	0	3
79	0.500	0.044	4140	188181	1297	0
80	0.501	0.042	4250	201976	1392	0

HERUCLES 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
81	0.500	0.044	4420	200909	1385	0
82	0.501	0.041	3400	165522	1141	0
83	0.500	0.042	3530	168095	1159	0
84	0.501	0.042	3680	174888	1205	0
85	0.501	0.042	4390	208630	1438	0
86	0.498	0.041	4230	207170	1428	0
87	0.501	0.040	4350	217065	1496	0
88	0.501	0.038	4000	210106	1448	0
89	0.502	0.036	3960	219123	1510	0
90	0.501	0.042	4320	205303	1415	0
91	0.501	0.042	4380	208155	1435	0
92	0.501	0.039	4270	218537	1506	0
93	0.501	0.044	4340	196878	1357	0
94	0.501	0.040	4160	207584	1431	0
95	0.502	0.040	4260	212151	1462	0
96	0.501	0.038	4130	216934	1495	0
97	0.501	0.041	3820	185969	1282	0
98	0.500	0.041	3710	180975	1247	0
99	0.501	0.043	3090	143434	988	0
100	0.501	0.039	4060	207789	1432	0
101	0.501	0.041	4250	206903	1426	0
102	0.501	0.040	4120	205588	1417	0
103	0.501	0.042	4440	211006	1454	0
104	0.501	0.043	4730	219560	1513	0
105	0.501	0.042	3830	182016	1255	0
106	0.501	0.042	3900	185343	1277	0
107	0.501	0.041	3430	166983	1151	0
108	0.500	0.040	4040	202000	1392	0
109	0.500	0.038	4150	218421	1506	0
110	0.499	0.036	3370	187597	1293	0
111	0.500	0.039	4620	236923	1633	0
112	0.501	0.039	3930	201136	1386	0
113	0.500	0.041	3580	174634	1204	0
114	0.499	0.043	4390	204595	1410	0
115	0.501	0.042	4020	191046	1317	0
116	0.501	0.038	3610	189620	1307	0
117	0.501	0.041	4330	210797	1453	0
118	0.502	0.042	4880	231455	1595	0
119	0.501	0.042	4530	215283	1484	0
120	0.502	0.040	4470	222609	1534	0

HERCULES 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
121	0.502	0.039	4540	231892	1598	0
122	0.501	0.040	4030	201097	1386	0
123	0.501	0.040	3880	193612	1334	0
124	0.501	0.040	4380	218562	1506	0
125	0.501	0.042	4950	235243	1622	0
126	0.501	0.040	4250	212075	1462	0
127	0.501	0.040	4310	215069	1482	0
128	0.500	0.041	4140	201951	1392	6
129	0.501	0.038	4530	237945	1640	6
130	0.501	0.040	4860	242514	1672	6
131	0.500	0.040	4685	234250	1615	6
132	0.501	0.043	4710	218632	1507	6
133	0.499	0.040	4135	207164	1428	6
134	0.502	0.041	4330	210378	1450	6
135	0.501	0.041	4685	228080	1572	6
136	0.499	0.040	4270	213927	1475	6
137	0.500	0.040	4490	224500	1547	6
138	0.499	0.042	5075	242150	1669	6
139	0.500	0.041	4595	224146	1545	6
140	0.500	0.041	4695	229024	1579	6
141	0.502	0.040	4655	231822	1598	6
142	0.501	0.040	4705	234780	1618	6
143	0.500	0.039	4245	217692	1500	6
144	0.501	0.036	4025	223164	1538	6
145	0.500	0.038	4550	239473	1651	6
146	0.500	0.040	4505	225250	1553	6
147	0.500	0.040	3935	196750	1356	6
148	0.500	0.041	4510	220000	1516	6
149	0.500	0.040	4755	237750	1639	6
150	0.500	0.041	4175	203658	1404	6
151	0.500	0.040	4755	237750	1639	6
152	0.500	0.043	4615	214651	1480	6
153	0.500	0.041	4080	199024	1372	6
154	0.499	0.042	4260	203263	1401	6
155	0.499	0.043	4370	203663	1404	6
156	0.502	0.042	3855	182840	1260	6
157	0.500	0.039	4675	239743	1653	6
158	0.500	0.039	4445	227948	1571	6
159	0.500	0.042	4385	208809	1439	6
160	0.500	0.043	4325	201162	1387	6

HERCULES 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
161	0.500	0.040	4245	212250	1463	6
162	0.500	0.041	4695	229024	1579	6
163	0.498	0.041	4730	231658	1597	6
164	0.500	0.040	4240	212000	1461	6
165	0.500	0.039	4945	253589	1748	6
166	0.500	0.039	3715	190512	1313	6
167	0.500	0.038	3610	190000	1310	6
168	0.499	0.041	4270	208710	1439	6
169	0.500	0.041	4525	220731	1521	6
170	0.500	0.040	4815	240750	1659	6
171	0.500	0.041	4115	200731	1384	0
172	0.500	0.040	4080	204000	1406	0
173	0.500	0.043	4412	205209	1414	0
174	0.500	0.042	3800	180952	1247	7
175	0.501	0.040	4865	242764	1673	0
176	0.503	0.041	4687	227270	1567	0
177	0.498	0.044	4675	213353	1471	0
178	0.501	0.042	4320	205303	1415	0
179	0.496	0.039	4125	213244	1470	0
180	0.499	0.041	4050	197956	1364	0
181	0.500	0.040	3760	188000	1296	0
182	0.500	0.042	4400	209523	1444	0
183	0.500	0.039	2920	149743	1032	0
184	0.499	0.039	3490	179333	1236	0
185	0.500	0.040	4325	216250	1491	0
186	0.500	0.040	3820	191000	1316	0
187	0.500	0.043	4005	186279	1284	0
188	0.500	0.040	3525	176250	1215	0
189	0.500	0.043	4440	206511	1423	0
190	0.500	0.040	4570	228500	1575	0
191	0.499	0.041	4840	236570	1631	0
192	0.500	0.041	4700	229268	1580	0
193	0.498	0.040	4315	216616	1493	0

Table C4

HERCULES 12PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	0.500	0.062	5910	190645	1314	0
2	0.500	0.060	6230	207666	1431	0
3	0.499	0.060	6890	230126	1586	0
4	0.500	0.061	6320	207213	1428	0
5	0.499	0.061	6320	207628	1431	0
6	0.498	0.060	6410	214524	1479	0
7	0.498	0.061	6960	229113	1579	0
8	0.499	0.061	7050	231610	1596	0
9	0.500	0.059	6410	217288	1498	0
10	0.502	0.062	6860	220408	1519	0
11	0.501	0.061	6450	211053	1455	0
12	0.501	0.062	6560	211190	1456	0
13	0.501	0.060	5660	188290	1298	0
14	0.504	0.064	6650	206163	1421	0
15	0.500	0.059	5670	192203	1325	0
16	0.499	0.056	0	0	0	2
17	0.502	0.056	4540	161496	1113	0
18	0.498	0.056	0	0	0	2
19	0.500	0.057	5400	189473	1306	0
20	0.501	0.057	0	0	0	2
21	0.499	0.055	5700	207688	1432	0
22	0.497	0.063	5280	168630	1162	0
23	0.503	0.062	5950	190790	1315	0
24	0.496	0.062	0	0	0	2
25	0.499	0.060	6390	213426	1471	0
26	0.501	0.058	6220	214054	1475	0
27	0.499	0.058	5600	193490	1334	0
28	0.500	0.055	4990	181454	1251	0
29	0.500	0.059	6150	208474	1437	0
30	0.502	0.061	6040	197243	1359	0
31	0.499	0.065	6580	202867	1398	0
32	0.499	0.059	5720	194286	1339	0
33	0.498	0.058	6000	207727	1432	0
34	0.500	0.062	6810	219677	1514	0
35	0.500	0.059	0	0	0	1
36	0.496	0.060	5550	186491	1285	0
37	0.000	0.000	0	0	0	1
38	0.494	0.064	5920	187246	1291	0
39	0.497	0.060	6000	201207	1387	0
40	0.493	0.057	5940	211380	1457	0

HERCULES 12PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	0.493	0.060	6250	211291	1456	0
42	0.496	0.063	6320	202252	1394	0
43	0.499	0.061	6350	208613	1438	0
44	0.499	0.061	6220	204343	1408	0
45	0.499	0.061	5170	169847	1171	0
46	0.501	0.062	6360	204751	1411	0
47	0.501	0.063	6260	198333	1367	0
48	0.499	0.059	6380	216704	1494	0
49	0.500	0.064	6480	202500	1396	0
50	0.499	0.061	6170	202700	1397	0
51	0.498	0.062	6870	222502	1534	0
52	0.501	0.063	6500	205937	1419	0
53	0.502	0.062	6310	202737	1397	0
54	0.499	0.060	5080	169672	1169	0
55	0.499	0.066	6400	194328	1339	0
56	0.501	0.065	0	0	0	2
57	0.000	0.000	0	0	0	3
58	0.501	0.060	0	0	0	2
59	0.000	0.000	0	0	0	3
60	0.497	0.063	5150	164478	1134	7
61	0.502	0.061	6390	208673	1438	0
62	0.501	0.061	6300	206145	1421	0
63	0.000	0.000	0	0	0	3
64	0.501	0.062	6470	208293	1436	0
65	0.500	0.059	5910	200338	1381	0
66	0.504	0.059	6050	203457	1402	0
67	0.505	0.060	6020	198679	1369	0
68	0.503	0.058	5810	199149	1373	0
69	0.503	0.058	6415	219887	1516	0
70	0.504	0.060	6195	204861	1412	0
71	0.505	0.062	4710	150431	1037	0
72	0.504	0.060	6545	216435	1492	0
73	0.504	0.059	6550	220271	1518	0
74	0.504	0.059	6415	215731	1487	0
75	0.502	0.065	6240	191235	1318	0
76	0.502	0.053	5750	216116	1490	0
77	0.504	0.056	6255	221619	1528	0
78	0.502	0.056	6625	235664	1624	0
79	0.502	0.056	6235	221791	1529	0
80	0.502	0.056	5345	190132	1310	0

HERCULES 12PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
81	0.503	0.055	5780	208928	1440	0
82	0.502	0.058	6630	227709	1570	0
83	0.503	0.059	6615	222899	1536	0
84	0.504	0.063	6485	204239	1408	0
85	0.503	0.061	6340	206629	1424	0
86	0.503	0.061	6170	201088	1386	0
87	0.502	0.062	5875	188761	1301	0
88	0.502	0.062	6840	219766	1515	0
89	0.503	0.064	7280	226143	1559	0
90	0.503	0.059	6250	210600	1452	0
91	0.503	0.056	6205	220285	1518	0
92	0.501	0.056	5515	196571	1355	0
93	0.502	0.058	6550	224962	1551	0
94	0.503	0.059	6615	222899	1536	0
95	0.503	0.061	6455	210377	1450	0
96	0.503	0.061	6585	214613	1479	0
97	0.502	0.062	6600	212055	1462	0
98	0.505	0.061	5895	191365	1319	0
99	0.502	0.060	5905	196049	1351	0
100	0.503	0.063	7060	222790	1536	0
101	0.503	0.063	7105	224210	1545	0
102	0.502	0.060	6495	215637	1486	0
103	0.503	0.061	6835	222761	1535	0
104	0.503	0.061	6620	215754	1487	0
105	0.502	0.062	6745	216713	1494	0
106	0.502	0.062	5900	189564	1307	0
107	0.504	0.061	6430	209146	1442	0
108	0.502	0.061	6190	202142	1393	0
109	0.503	0.065	5560	170056	1172	0
110	0.503	0.063	6850	216163	1490	0
111	0.504	0.062	7140	228494	1575	0
112	0.503	0.060	7065	234095	1614	0
113	0.503	0.060	5240	173624	1197	0
114	0.503	0.061	6030	196525	1355	0
115	0.504	0.061	6530	212399	1464	0
116	0.505	0.062	6635	211913	1461	0
117	0.503	0.062	6975	223658	1542	0
118	0.502	0.062	6670	214304	1477	0
119	0.502	0.060	5420	179946	1240	0
120	0.504	0.059	6275	211023	1455	0

HERCULES 12PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
121	0.503	0.061	5905	192451	1326	0
122	0.506	0.061	6365	206213	1421	0
123	0.504	0.061	5910	192232	1325	0
124	0.504	0.061	6470	210447	1451	0
125	0.505	0.060	5235	172772	1191	0
126	0.504	0.061	7135	232077	1600	0
127	0.500	0.061	7000	229508	1582	0
128	0.503	0.061	6590	214776	1480	0
129	0.503	0.060	7015	232438	1602	0
130	0.502	0.061	6810	222389	1533	0

Table C5

HERCULES 8PLY CROSSPLY COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	0.249	0.040	665	66767	460	0
2	0.249	0.039	635	65389	450	0
3	0.250	0.040	665	66500	458	0
4	0.251	0.039	615	62825	433	0
5	0.250	0.039	640	65641	452	0
6	0.250	0.037	665	71891	495	0
7	0.250	0.038	605	63684	439	0
8	0.250	0.039	770	78974	544	0
9	0.250	0.038	660	69473	479	0
10	0.250	0.038	555	58421	402	0
11	0.250	0.039	605	62051	427	0
12	0.250	0.037	670	72432	499	0
13	0.250	0.038	670	70526	486	0
14	0.249	0.039	690	71053	489	0
15	0.250	0.037	625	67567	465	0
16	0.250	0.039	645	66153	456	0
17	0.250	0.041	660	64390	443	0
18	0.249	0.039	630	64874	447	0
19	0.250	0.037	600	64864	447	0
20	0.250	0.038	655	6[illegible]947	475	0
21	0.249	0.037	615	66753	460	0
22	0.251	0.041	585	56845	391	0
23	0.251	0.040	610	60756	418	0
24	0.251	0.041	570	55388	381	0
25	0.251	0.040	715	71215	491	0
26	0.251	0.039	600	61293	422	0
27	0.250	0.041	690	67317	464	0
28	0.251	0.042	635	60235	415	0
29	0.251	0.038	605	63430	437	0
30	0.250	0.039	660	67692	466	0
31	0.251	0.038	580	60809	419	0
32	0.251	0.038	485	50849	350	0
33	0.251	0.035	530	60330	415	0
34	0.251	0.037	465	50069	345	0
35	0.250	0.037	540	58378	402	0
36	0.251	0.037	670	72143	497	0
37	0.250	0.038	585	61578	424	0
38	0.251	0.038	475	49800	343	0
39	0.251	0.037	545	58684	404	0
40	0.251	0.038	575	60285	415	0

HERCULES 8PLY CROSSPLY COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	0.252	0.039	585	59523	410	0
42	0.251	0.039	450	45969	316	0
43	0.251	0.041	625	60732	418	0
44	0.252	0.038	595	62134	428	0
45	0.253	0.038	505	52527	362	0
46	0.253	0.037	550	58754	405	0
47	0.249	0.037	730	79235	546	0
48	0.252	0.035	625	70861	488	0
49	0.252	0.037	630	67567	465	0
50	0.248	0.037	545	59394	409	0
51	0.250	0.036	630	70000	482	0
52	0.251	0.037	570	61376	423	0
53	0.250	0.036	530	58888	406	0
54	0.249	0.037	595	64582	445	0
55	0.251	0.038	435	45607	314	0
56	0.250	0.038	555	58421	402	0
57	0.249	0.039	540	55607	383	0
58	0.250	0.040	690	69000	475	0
59	0.251	0.039	615	62825	433	0
60	0.250	0.036	500	55555	383	0
61	0.250	0.037	635	68648	473	0
62	0.250	0.038	685	72105	497	0
63	0.250	0.038	615	64736	446	0
64	0.252	0.039	585	59523	410	0
65	0.253	0.041	625	60252	415	0
66	0.252	0.041	485	46941	323	0
67	0.252	0.041	735	71138	490	0
68	0.252	0.042	770	72751	501	0
69	0.252	0.043	665	61369	423	0
70	0.248	0.043	655	61421	423	0
71	0.249	0.041	570	55833	384	0
72	0.251	0.041	610	59275	408	0
73	0.249	0.041	535	52404	361	0
74	0.249	0.038	530	56013	386	0
75	0.249	0.038	675	71337	491	0
76	0.249	0.039	735	75687	521	0
77	0.249	0.039	665	68479	472	0
78	0.248	0.040	685	69052	476	0
79	0.249	0.041	655	64159	442	0
80	0.249	0.041	555	54363	374	0

HERCULES 8PLY CROSSPLY COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
81	0.249	0.040	685	68775	474	0
82	0.248	0.040	625	63004	434	0
83	0.249	0.041	700	68566	472	0
84	0.249	0.043	655	61174	421	0
85	0.248	0.045	645	57795	398	0
86	0.250	0.043	710	66046	455	0
87	0.250	0.042	730	69523	479	0
88	0.250	0.041	670	65365	450	0
89	0.250	0.039	725	74358	512	0
90	0.250	0.039	700	71794	495	0
91	0.250	0.040	0	0	0	1
92	0.250	0.038	610	64210	442	0
93	0.250	0.040	655	65500	451	0
94	0.250	0.040	650	65000	448	0
95	0.249	0.041	705	69056	476	0
96	0.249	0.041	690	67587	466	0
97	0.249	0.041	680	66607	459	0
98	0.249	0.038	715	75565	521	0
99	0.249	0.039	705	72598	500	0
100	0.250	0.037	625	67567	465	0
101	0.249	0.038	645	68167	470	0
102	0.246	0.039	525	54721	377	0
103	0.246	0.038	635	67928	468	0
104	0.248	0.039	655	67721	466	0
105	0.254	0.039	730	73692	508	0
106	0.250	0.040	710	71000	489	0
107	0.246	0.038	400	42789	295	0
108	0.250	0.038	555	58421	402	0
109	0.250	0.040	625	62500	430	0
110	0.250	0.040	540	54000	372	0
111	0.250	0.040	685	68500	472	0
112	0.250	0.041	665	64878	447	0
113	0.250	0.041	740	72195	497	0
114	0.251	0.041	700	68020	468	0
115	0.251	0.040	655	65239	449	0
116	0.251	0.042	670	63555	438	0
117	0.251	0.043	555	51422	354	0
118	0.250	0.038	535	56315	388	0
119	0.250	0.038	605	63684	439	0
120	0.249	0.038	605	63939	440	0

HERCULES 8PLY CROSSPLY COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
121	0.251	0.038	615	64478	444	0
122	0.250	0.039	520	53333	367	0
123	0.250	0.042	755	71904	495	0
124	0.250	0.041	775	75609	521	0
125	0.251	0.039	630	64357	443	0
126	0.251	0.041	730	70935	489	0
127	0.250	0.044	710	64545	445	0
128	0.250	0.042	655	62380	430	0

Table C6

HERCULES 12PLY UNIDIRECTIONAL COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	0.247	0.045	1750	157444	1085	0
2	0.246	0.050	1740	141463	975	0
3	0.247	0.052	1815	141311	974	0
4	0.247	0.052	1865	145203	1001	0
5	0.250	0.054	2010	148888	1026	0
6	0.250	0.054	1965	145555	1003	0
7	0.250	0.053	1970	148679	1025	0
8	0.250	0.052	2000	153846	1060	0
9	0.250	0.053	2250	169811	1170	0
10	0.250	0.052	0	0	0	1
11	0.249	0.052	1895	146354	1009	0
12	0.250	0.050	1805	144400	995	0
13	0.000	0.000	0	0	0	3
14	0.250	0.052	1945	149615	1031	0
15	0.249	0.056	2300	164945	1137	0
16	0.250	0.056	2175	155357	1071	0
17	0.250	0.056	2185	156071	1076	0
18	0.249	0.061	2545	167555	1155	0
19	0.250	0.057	2115	148421	1023	0
20	0.250	0.057	2185	153333	1057	0
21	0.250	0.060	2260	150666	1038	0
22	0.250	0.058	2310	159310	1098	0
23	0.250	0.058	2225	153448	1058	0
24	0.249	0.058	2070	143331	988	0
25	0.250	0.058	2440	168275	1160	0
26	0.249	0.058	2005	138831	957	0
27	0.249	0.058	2165	149909	1033	0
28	0.249	0.060	2315	154953	1068	0
29	0.249	0.060	2515	168340	1160	0
30	0.249	0.059	2300	156558	1079	0
31	0.249	0.051	2095	164973	1137	0
32	0.249	0.052	2025	156394	1078	0
33	0.249	0.058	2295	158911	1095	0
34	0.250	0.058	2240	154482	1065	0
35	0.250	0.058	0	0	0	1
36	0.249	0.058	0	0	0	1
37	0.250	0.058	2110	145517	1003	0
38	0.249	0.059	2335	158940	1095	0
39	0.249	0.058	2045	141600	976	0
40	0.250	0.058	2045	141034	972	0

HERCULES 12PLY UNIDIRECTIONAL COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	CONL
41	0.250	0.059	1990	134915	930	0
42	0.250	0.060	2405	160333	1105	0
43	0.251	0.060	2615	173638	1197	0
44	0.249	0.059	2475	168470	1161	0
45	0.249	0.059	0	0	0	1
46	0.250	0.058	2510	173103	1193	0
47	0.250	0.059	2340	158644	1093	0
48	0.250	0.058	2145	147931	1019	0
49	0.250	0.059	2305	156271	1077	0
50	0.249	0.055	2105	153705	1059	0
51	0.250	0.057	2060	144561	996	0
52	0.250	0.056	2065	147500	1017	0
53	0.250	0.049	1935	157959	1089	0
54	0.250	0.051	2000	156862	1081	0
55	0.250	0.055	2220	161454	1113	0
56	0.250	0.056	2270	162142	1117	0
57	0.249	0.056	2540	182157	1255	0
58	0.250	0.058	2765	190689	1314	0
59	0.249	0.062	2410	156108	1076	0
60	0.250	0.061	2285	149836	1033	0
61	0.250	0.059	2170	147118	1014	0
62	0.248	0.059	2105	143862	991	0
63	0.248	0.060	2200	147849	1019	0
64	0.250	0.058	1860	128275	884	0
65	0.250	0.056	2070	147857	1019	0
66	0.249	0.059	2405	163705	1128	0
67	0.250	0.058	2285	157586	1086	0
68	0.250	0.056	2205	157500	1085	0
69	0.250	0.055	2145	156000	1075	0
70	0.249	0.056	2175	155981	1075	0
71	0.250	0.055	2075	150909	1040	0
72	0.250	0.055	2155	156727	1080	0
73	0.249	0.058	2400	166181	1145	0
74	0.250	0.060	2565	171000	1179	0
75	0.250	0.060	3085	205666	1418	0
76	0.250	0.056	2060	147142	1014	0
77	0.250	0.056	2235	159642	1100	0
78	0.248	0.056	2165	155889	1074	0
79	0.250	0.055	2270	165090	1138	0
80	0.250	0.058	2370	163448	1126	0

HERCULES 12PLY UNIDIRECTIONAL COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
81	0.249	0.056	2070	148450	1023	0
82	0.250	0.059	2470	167457	1154	0
83	0.250	0.061	2920	191475	1320	0
84	0.249	0.059	2605	177319	1222	0
85	0.250	0.059	2505	169830	1170	0
86	0.250	0.059	2670	181016	1248	0
87	0.243	0.059	2235	155890	1074	0
88	0.249	0.062	2710	175540	1210	0
89	0.250	0.062	2940	189677	1307	0
90	0.252	0.062	2580	165130	1138	0
91	0.250	0.060	2380	158666	1094	0
92	0.251	0.060	2280	151394	1043	0
93	0.250	0.058	2205	152068	1048	0
94	0.251	0.059	2360	159362	1098	0
95	0.251	0.058	2285	156958	1082	0
96	0.250	0.058	2510	173103	1193	0
97	0.250	0.058	2570	177241	1222	0
98	0.251	0.057	2200	153770	1060	0
99	0.251	0.057	2205	154120	1062	0
100	0.250	0.059	2470	167457	1154	0
101	0.249	0.060	2470	165327	1139	0
102	0.250	0.060	2320	154666	1066	0
103	0.251	0.059	2300	155310	1070	0
104	0.250	0.059	2260	153220	1056	0
105	0.249	0.058	2340	162027	1117	0
106	0.250	0.058	2465	170000	1172	0
107	0.251	0.060	2405	159694	1101	0
108	0.251	0.057	2240	156566	1079	0
109	0.251	0.057	2165	151324	1043	0
110	0.251	0.057	2105	147130	1014	0
111	0.251	0.057	2465	172293	1187	0
112	0.251	0.057	2240	156566	1079	0
113	0.251	0.057	2275	159013	1096	0
114	0.251	0.056	2145	152603	1052	0
115	0.251	0.058	2060	141502	975	0
116	0.251	0.058	2110	144937	999	0
117	0.251	0.059	2245	151597	1045	0
118	0.250	0.057	2435	170877	1178	0
119	0.250	0.056	2170	155000	1068	0
120	0.251	0.055	2060	149221	1028	0

HERCULES 12PLY UNIDIRECTIONAL COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
121	0.251	0.055	2075	150307	1036	0
122	0.250	0.057	2395	168070	1158	0
123	0.250	0.058	2305	158965	1096	0
124	0.250	0.058	2180	150344	1036	0
125	0.250	0.057	2165	151929	1047	0
126	0.250	0.058	2440	168275	1160	0
127	0.250	0.058	2370	163448	1126	0
128	0.250	0.056	2250	160714	1108	0
129	0.250	0.056	2110	150714	1039	0
130	0.250	0.058	2315	159655	1100	0

Table C7

UNION CARBIDE 8PLY CROSSPLY TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	1.001	0.046	2830	61460	423	0
2	0.998	0.044	2430	55337	381	0
3	1.001	0.046	2760	59940	413	0
4	1.001	0.045	2530	56166	387	0
5	1.001	0.044	2830	64253	443	0
6	1.001	0.044	1790	40641	280	0
7	0.999	0.045	2130	47380	326	0
8	1.000	0.044	2500	56818	391	0
9	1.001	0.045	1900	42180	290	0
10	1.000	0.046	1980	43043	296	0
11	1.002	0.045	2540	56331	388	0
12	1.001	0.047	2520	53563	369	0
13	1.000	0.045	2170	48222	332	0
14	1.002	0.046	2370	51418	354	0
15	1.001	0.045	2530	56166	387	0
16	1.002	0.042	2520	59880	412	0
17	1.001	0.048	2300	47868	330	0
18	1.000	0.046	2370	51521	355	0
19	1.001	0.047	2050	43573	300	0
20	1.000	0.048	2200	45833	316	0
21	1.001	0.047	2270	48249	332	0
22	1.002	0.046	2220	48164	332	0
23	1.000	0.044	2030	46136	318	0
24	1.000	0.045	2070	46000	317	0
25	1.000	0.044	1990	45227	311	0
26	1.000	0.048	2040	42500	293	0
27	1.001	0.045	2750	61050	420	0
28	0.999	0.044	2880	65520	451	0
29	1.000	0.045	2390	53111	366	0
30	0.999	0.044	2570	58467	403	0
31	1.001	0.046	2460	53424	368	0
32	1.001	0.045	2660	59052	407	0
33	1.001	0.046	2650	57551	396	0
34	1.000	0.047	2730	58085	400	0
35	1.002	0.044	2400	54436	375	0
36	1.001	0.048	2590	53904	371	0
37	1.002	0.045	2350	52117	359	0
38	1.001	0.045	1830	40626	280	0
39	0.996	0.046	2730	59586	410	0
40	1.000	0.046	2310	50217	346	0

UNION CARBIDE 8PLY CROSSPLY TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	1.001	0.045	2770	61494	424	0
42	1.000	0.045	2310	51333	353	0
43	1.001	0.044	2700	61302	422	0
44	1.002	0.046	2250	48815	336	0
45	1.000	0.046	2550	55434	382	0
46	1.002	0.046	2070	44910	309	0
47	1.001	0.046	1710	37136	256	0
48	1.000	0.047	2690	57234	394	0
49	1.001	0.046	2970	64500	444	0
50	1.002	0.046	2120	45994	317	0
51	0.999	0.046	1890	41128	283	0
52	1.000	0.045	2140	47555	327	0
53	1.001	0.045	2470	54834	378	0
54	1.001	0.045	2340	51948	358	0
55	1.001	0.047	2110	44843	309	0
56	1.000	0.045	2480	55111	379	0
57	1.000	0.048	2480	51666	356	0
58	1.001	0.048	2660	55361	381	0
59	1.002	0.047	2000	42468	292	0
60	1.001	0.046	2620	56899	392	0
61	1.001	0.046	2100	45606	314	0
62	1.002	0.046	2670	57927	399	0
63	1.001	0.045	2410	53502	368	0
64	1.002	0.047	2150	45653	314	0
65	0.999	0.046	1840	40040	276	0

Table C8

UNION CARBIDE 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	0.499	0.049	0	0	0	1
2	0.498	0.041	3050	149377	1029	0
3	0.498	0.045	3700	165104	1138	0
4	0.500	0.044	4150	188636	1300	0
5	0.500	0.042	3910	186190	1283	0
6	0.500	0.045	3350	148888	1026	0
7	0.500	0.045	3030	134666	928	0
8	0.500	0.042	3540	168571	1162	0
9	0.500	0.045	3720	165333	1139	0
10	0.500	0.040	3960	198000	1365	0
11	0.500	0.043	3850	179069	1234	0
12	0.505	0.043	4100	188809	1301	0
13	0.502	0.042	4130	195883	1350	0
14	0.505	0.042	3530	166430	1147	0
15	0.499	0.044	3400	154855	1067	0
16	0.498	0.044	4270	194870	1343	0
17	0.499	0.044	4070	185370	1278	0
18	0.498	0.046	4290	187270	1291	0
19	0.498	0.044	3820	174333	1202	0
20	0.498	0.043	3700	172784	1191	0
21	0.497	0.044	3950	180629	1245	0
22	0.499	0.043	3470	161718	1115	0
23	0.499	0.043	3780	176166	1214	0
24	0.501	0.045	3410	151253	1042	0
25	0.498	0.041	3420	167499	1154	0
26	0.502	0.044	4200	190148	1311	0
27	0.500	0.042	3730	177619	1224	0
28	0.500	0.043	3985	185348	1277	0
29	0.502	0.045	3540	156706	1080	0
30	0.495	0.043	3820	179469	1237	0
31	0.501	0.041	3580	174285	1201	0
32	0.500	0.044	3300	150000	1034	0
33	0.501	0.042	3940	187244	1291	0
34	0.499	0.046	4110	179053	1234	0
35	0.500	0.047	4380	186382	1285	0
36	0.501	0.046	4190	181810	1253	0
37	0.501	0.046	4640	201336	1388	0
38	0.500	0.044	4050	184090	1269	0
39	0.500	0.045	4300	191111	1317	0
40	0.500	0.045	3950	175555	1210	0

UNION CARBIDE 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	0.501	0.047	3050	129528	893	0
42	0.500	0.045	4500	200000	1378	0
43	0.500	0.045	4520	200888	1385	0
44	0.500	0.042	4040	192380	1326	0
45	0.500	0.045	3920	174222	1201	0
46	0.499	0.043	4050	188749	1301	0
47	0.496	0.044	0	0	0	1
48	0.499	0.045	3940	175462	1209	0
49	0.499	0.043	4270	199002	1372	0
50	0.500	0.044	4280	194545	1341	0
51	0.499	0.045	4200	187040	1289	0
52	0.499	0.048	4365	182239	1256	0
53	0.499	0.047	4340	185050	1275	0
54	0.499	0.045	4080	181696	1252	0
55	0.498	0.041	3150	154275	1063	0
56	0.499	0.042	3880	185132	1276	0
57	0.499	0.043	3530	164515	1134	0
58	0.499	0.040	3330	166833	1150	0
59	0.499	0.044	3740	170340	1174	0
60	0.499	0.043	3890	181292	1250	0
61	0.499	0.040	3440	172344	1188	0
62	0.499	0.042	4135	197299	1360	0
63	0.498	0.042	3260	155861	1074	0
64	0.496	0.040	3520	177419	1223	0
65	0.499	0.046	3470	151171	1042	0
66	0.497	0.043	3990	186701	1287	0
67	0.499	0.043	3500	163116	1124	0
68	0.499	0.045	4380	195056	1344	0
69	0.499	0.045	4560	203072	1400	0
70	0.500	0.047	3960	168510	1161	0
71	0.500	0.045	4320	192000	1323	0
72	0.499	0.043	4390	204595	1410	0
73	0.500	0.043	3920	182325	1257	0
74	0.500	0.044	4260	193636	1335	0
75	0.499	0.043	4120	192011	1323	0
76	0.500	0.043	3680	171162	1180	0
77	0.499	0.044	4350	198123	1366	0
78	0.499	0.044	3930	178994	1234	0
79	0.500	0.044	3980	180909	1247	0
80	0.499	0.041	3580	174984	1206	0

UNION CARBIDE 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
81	0.499	0.044	3960	180360	1243	0
82	0.500	0.043	3620	168372	1160	0
83	0.500	0.042	3710	176666	1218	0
84	0.500	0.045	3710	164888	1136	0
85	0.500	0.044	3630	165000	1137	0
86	0.500	0.042	3300	157142	1083	0
87	0.499	0.044	3670	167152	1152	0
88	0.500	0.042	3850	183333	1264	0
89	0.500	0.040	3690	184500	1272	0
90	0.501	0.040	3350	167165	1152	0
91	0.500	0.040	3260	163000	1123	0
92	0.500	0.038	3520	185263	1277	0
93	0.500	0.046	4290	186521	1286	0
94	0.500	0.044	4330	196318	1357	0
95	0.500	0.041	3890	189756	1308	0
96	0.499	0.041	3440	168141	1159	0
97	0.498	0.040	3570	179216	1235	0
98	0.499	0.040	3330	166833	1150	0
99	0.499	0.044	3970	180816	1246	0
100	0.499	0.044	3960	180360	1243	0
101	0.499	0.044	4050	184459	1271	0
102	0.499	0.043	3960	184555	1272	0
103	0.499	0.041	3670	179383	1236	0
104	0.501	0.046	3900	169226	1166	0
105	0.500	0.044	3730	169545	1169	0
106	0.500	0.045	3710	164888	1136	0
107	0.499	0.044	3020	137547	948	0
108	0.499	0.043	3550	165447	1140	0
109	0.500	0.043	3980	185116	1276	0
110	0.499	0.043	4160	193876	1336	0
111	0.500	0.043	3570	166046	1144	0
112	0.499	0.044	3670	167152	1152	0
113	0.500	0.043	3910	181860	1253	0
114	0.499	0.042	3630	173203	1194	0
115	0.499	0.045	4280	190603	1314	0
116	0.499	0.047	3700	157762	1087	0
117	0.499	0.042	3500	167000	1151	0
118	0.501	0.041	3540	172338	1188	0
119	0.500	0.042	3530	168095	1159	0
120	0.500	0.044	3270	148636	1024	0

UNION CARBIDE 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
121	0.500	0.046	4110	178695	1232	0
122	0.499	0.043	3950	184089	1269	0
123	0.499	0.047	4120	175670	1211	0
124	0.498	0.047	4330	184995	1275	0
125	0.499	0.049	4140	169318	1167	0
126	0.500	0.046	4560	198260	1367	0
127	0.499	0.043	4150	193410	1333	0
128	0.500	0.045	4120	183111	1262	0
129	0.499	0.045	4160	185259	1277	0
130	0.500	0.047	3810	162127	1117	0
131	0.498	0.045	4130	184292	1270	0
132	0.499	0.045	4000	178134	1228	0
133	0.500	0.046	4495	195434	1347	6
134	0.501	0.043	3970	184282	1270	6
135	0.500	0.042	3850	183333	1264	6
136	0.500	0.043	3855	179302	1236	6
137	0.500	0.042	4060	193333	1333	6
138	0.500	0.045	4720	209777	1446	6
139	0.500	0.047	4595	195531	1348	6
140	0.500	0.043	3835	178372	1229	6
141	0.499	0.044	3420	155766	1074	6
142	0.500	0.044	3515	159772	1101	6
143	0.500	0.041	3995	194878	1343	6
144	0.501	0.044	3685	167165	1152	6
145	0.500	0.043	3060	142325	981	6
146	0.500	0.043	3715	172790	1191	6
147	0.500	0.045	4215	187333	1291	6
148	0.500	0.044	3915	177954	1226	6
149	0.500	0.045	4260	189333	1305	6
150	0.502	0.044	3685	166832	1150	6
151	0.498	0.042	3550	169726	1170	6
152	0.500	0.044	4055	184318	1270	6
153	0.500	0.044	4185	190227	1311	6
154	0.498	0.042	4110	196500	1354	0
155	0.498	0.043	4125	192630	1328	0
156	0.501	0.042	3555	168947	1164	0
157	0.502	0.042	3810	180705	1245	0
158	0.501	0.045	4150	184076	1269	0
159	0.501	0.043	3665	170124	1173	0
160	0.502	0.043	4295	198971	1371	0

UNION CARBIDE 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
161	0.501	0.043	4120	191245	1318	0
162	0.502	0.041	4160	202118	1393	0
163	0.500	0.043	3935	183023	1261	0
164	0.500	0.044	3700	168181	1159	0
165	0.503	0.040	4000	198807	1370	0
166	0.502	0.042	3930	186397	1285	0
167	0.503	0.041	3625	175774	1211	0
168	0.502	0.042	4030	191140	1317	0
169	0.502	0.044	3755	170001	1172	0
170	0.501	0.042	4530	215283	1484	0
171	0.502	0.042	4280	202997	1399	0
172	0.502	0.041	4250	206491	1423	0
173	0.503	0.040	3875	192594	1327	0
174	0.502	0.046	4210	182314	1257	0
175	0.505	0.043	4335	199631	1376	0
176	0.507	0.044	4170	186928	1288	0
177	0.504	0.046	4955	213724	1473	0
178	0.505	0.044	4565	205445	1416	0
179	0.505	0.045	4645	204400	1409	0
180	0.501	0.042	4125	196036	1351	0
181	0.502	0.045	4350	192563	1327	0
182	0.500	0.047	4445	189148	1304	0
183	0.497	0.046	4470	195520	1348	0
184	0.495	0.048	3940	165824	1143	0
185	0.501	0.044	4280	194157	1338	0
186	0.501	0.041	3515	171121	1179	0
187	0.501	0.044	4750	215478	1485	0
188	0.501	0.046	3820	165755	1142	0
189	0.500	0.045	4855	215777	1487	0
190	0.502	0.045	4560	201859	1391	0
191	0.489	0.042	4210	204985	1413	0
192	0.503	0.043	4260	196957	1358	0
193	0.500	0.044	4190	190454	1313	0
194	0.502	0.043	3510	162605	1121	0
195	0.492	0.043	4095	193562	1334	0

Table C9

UNION CARBIDE 12PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	0.503	0.065	5830	178314	1229	0
2	0.499	0.066	6480	196757	1356	0
3	0.504	0.065	6510	198717	1370	0
4	0.499	0.060	6275	209585	1445	0
5	0.499	0.063	5700	181315	1250	0
6	0.501	0.062	6450	207649	1431	0
7	0.502	0.066	6395	193015	1330	0
8	0.502	0.065	6830	209316	1443	0
9	0.502	0.067	6370	189391	1305	0
10	0.498	0.064	6030	189194	1304	0
11	0.499	0.066	5490	166697	1149	0
12	0.498	0.065	5960	184121	1269	0
13	0.504	0.069	6130	176270	1215	0
14	0.498	0.067	5935	177875	1226	0
15	0.498	0.068	0	0	0	1
16	0.504	0.067	6800	201374	1388	0
17	0.496	0.062	0	0	0	1
18	0.502	0.061	4210	137482	947	0
19	0.500	0.065	5630	173230	1194	0
20	0.500	0.067	6090	181791	1253	0
21	0.503	0.066	6310	190071	1310	0
22	0.502	0.064	0	0	0	1
23	0.500	0.063	6120	194285	1339	0
24	0.499	0.062	5710	184562	1272	0
25	0.502	0.068	6920	202718	1397	0
26	0.499	0.067	6860	20[illegible]	1414	0
27	0.502	0.065	6910	21[illegible]	1460	0
28	0.499	0.067	6270	187[illegible]	1293	0
29	0.501	0.064	5285	164826	1136	0
30	0.501	0.062	0	0	0	1
31	0.502	0.067	7050	209609	1445	0
32	0.504	0.066	0	0	0	1
33	0.503	0.064	5660	175820	1212	0
34	0.502	0.065	6650	203800	1405	0
35	0.504	0.066	5150	154822	1067	0
36	0.502	0.065	6750	206864	1426	0
37	0.503	0.065	7020	214711	1480	0
38	0.503	0.063	5850	184606	1272	0
39	0.502	0.065	6550	200735	1384	0
40	0.502	0.067	5790	172147	1186	0

UNION CARBIDE 12PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	0.503	0.068	6870	200853	1384	0
42	0.502	0.066	6770	204334	1408	0
43	0.504	0.064	5790	179501	1237	0
44	0.502	0.067	5900	175417	1209	0
45	0.503	0.068	6400	187112	1290	0
46	0.505	0.068	6960	202679	1397	0
47	0.505	0.065	6490	197715	1363	0
48	0.503	0.066	0	0	0	1
49	0.501	0.063	6050	191680	1321	0
50	0.505	0.063	6000	188590	1300	0
51	0.504	0.066	6230	187289	1291	0
52	0.505	0.067	6020	177922	1226	0
53	0.505	0.068	6550	190739	1315	0
54	0.502	0.065	0	0	0	1
55	0.503	0.064	6065	188400	1299	0
56	0.503	0.066	5800	174709	1204	0
57	0.503	0.064	6260	194458	1340	0
58	0.503	0.066	6675	201066	1386	0
59	0.503	0.066	6745	203174	1400	0
60	0.503	0.062	6135	196722	1356	0
61	0.504	0.063	6135	193216	1332	0
62	0.504	0.064	5530	171440	1182	0
63	0.504	0.065	5570	170024	1172	0
64	0.502	0.067	6610	196527	1355	0
65	0.504	0.065	5990	182844	1260	0
66	0.504	0.068	6355	185428	1278	0
67	0.504	0.066	5945	178721	1232	0
68	0.504	0.069	6490	186622	1286	0
69	0.505	0.068	7080	206173	1421	0
70	0.504	0.063	6125	192901	1330	0
71	0.504	0.063	6155	193846	1336	0
72	0.502	0.063	5335	168690	1163	0
73	0.504	0.061	5995	194997	1344	0
74	0.504	0.064	7025	217788	1501	0
75	0.505	0.065	5945	181111	1248	0
76	0.505	0.065	5910	180045	1241	0
77	0.506	0.068	5725	166385	1147	0
78	0.507	0.066	5785	172882	1192	0
79	0.506	0.068	6910	200825	1384	0
80	0.505	0.066	6870	206120	1421	0

UNION CARBIDE 12PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
81	0.506	0.063	5900	185080	1276	0
82	0.506	0.063	6180	193864	1336	0
83	0.506	0.062	5770	183921	1268	0
84	0.506	0.063	6015	188688	1301	0
85	0.504	0.065	6885	210164	1449	0
86	0.505	0.068	6625	192923	1330	0
87	0.506	0.067	6315	186272	1284	0
88	0.505	0.066	5580	167416	1154	0
89	0.505	0.065	6265	190860	1315	0
90	0.504	0.063	6160	194003	1337	0
91	0.506	0.067	6250	184354	1271	0
92	0.505	0.069	6675	191562	1320	0
93	0.505	0.068	6250	182003	1254	0
94	0.506	0.067	5970	176095	1214	0
95	0.505	0.065	5980	182178	1256	0
96	0.502	0.061	6170	201489	1389	0
97	0.502	0.066	6430	194072	1338	0
98	0.503	0.068	7420	216933	1495	0
99	0.503	0.068	6935	202754	1397	0
100	0.504	0.067	6455	191157	1318	0
101	0.503	0.067	6500	192872	1329	0
102	0.503	0.064	5925	184051	1269	0
103	0.503	0.067	6865	203703	1404	0
104	0.504	0.069	7215	207470	1430	0
105	0.503	0.069	7090	204281	1408	0
106	0.503	0.067	6965	206670	1424	0
107	0.504	0.062	5615	179691	1238	0
108	0.504	0.065	6785	207112	1428	0
109	0.503	0.068	7410	216641	1493	0
110	0.504	0.068	6835	199433	1375	0
111	0.503	0.068	6105	178487	1230	0
112	0.504	0.066	6635	199464	1375	0
113	0.503	0.063	6445	203382	1402	0
114	0.503	0.066	6800	204831	1412	0
115	0.503	0.069	6585	189731	1308	0
116	0.504	0.070	7540	213718	1473	0
117	0.503	0.067	6485	192427	1326	0
118	0.504	0.063	6220	195893	1350	0
119	0.505	0.064	6115	189201	1304	0
120	0.503	0.063	6075	191706	1321	0

UNION CARBIDE 12PLY UNIDIRECTIONAL TENSION

SPECIMEN NC.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
121	0.505	0.063	6715	211063	1455	0
122	0.504	0.063	6365	200459	1382	0
123	0.508	0.063	6400	199975	1378	0
124	0.504	0.066	6125	184132	1269	0
125	0.504	0.066	5550	166847	1150	0
126	0.503	0.067	6315	187383	1292	0
127	0.504	0.063	5580	175736	1211	0
128	0.505	0.067	6950	205408	1416	0
129	0.504	0.063	6540	205971	1420	0
130	0.504	0.061	6005	195322	1346	0
131	0.506	0.063	6430	201706	1390	0
132	0.504	0.062	6425	205613	1417	0
133	0.505	0.062	6115	195305	1346	0
134	0.505	0.062	5980	190993	1316	0
135	0.505	0.062	5975	190833	1315	0
136	0.505	0.064	5750	177908	1226	0
137	0.504	0.064	5915	183376	1264	0
138	0.505	0.065	5740	174866	1205	0
139	0.505	0.067	7065	208807	1439	0

Table C10

UNION CARBIDE 8PLY CROSSPLY COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	0.249	0.045	765	68273	470	0
2	0.249	0.042	535	51157	352	0
3	0.250	0.042	530	50476	348	0
4	0.250	0.042	630	60000	413	0
5	0.249	0.041	560	54853	378	0
6	0.250	0.041	655	63902	440	0
7	0.250	0.040	635	63500	437	0
8	0.250	0.042	655	62380	430	0
9	0.250	0.043	725	67441	465	0
10	0.250	0.041	650	63414	437	0
11	0.250	0.042	725	69047	476	0
12	0.250	0.042	645	61428	423	0
13	0.250	0.042	755	71904	495	0
14	0.250	0.042	590	56190	387	0
15	0.250	0.041	625	60975	420	0
16	0.250	0.040	720	72000	496	0
17	0.249	0.041	665	65138	449	0
18	0.249	0.041	545	53384	368	0
19	0.251	0.041	485	47128	324	0
20	0.249	0.042	560	53547	369	0
21	0.249	0.045	635	56671	390	0
22	0.250	0.045	815	72444	499	0
23	0.250	0.044	785	71363	492	0
24	0.249	0.043	770	71915	495	0
25	0.250	0.044	590	53636	369	0
26	0.250	0.044	845	76818	529	0
27	0.250	0.043	785	73023	503	0
28	0.250	0.043	810	75348	519	0
29	0.249	0.045	790	70504	486	0
30	0.250	0.044	560	50909	351	0
31	0.250	0.043	795	73953	509	0
32	0.251	0.044	790	71532	493	0
33	0.250	0.042	740	70476	485	0
34	0.250	0.042	805	76666	528	0
35	0.251	0.042	660	62606	431	0
36	0.250	0.042	730	69523	479	0
37	0.250	0.044	855	77727	535	0
38	0.250	0.043	730	67906	468	0
39	0.250	0.043	825	76744	529	0
40	0.249	0.043	670	62575	431	0

UNION CARBIDE 8PLY CROSSPLY COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	0.250	0.044	750	68181	470	0
42	0.250	0.046	795	69130	476	0
43	0.250	0.046	655	56956	392	0
44	0.250	0.044	745	67727	466	0
45	0.250	0.041	585	57073	393	0
46	0.250	0.042	755	71904	495	0
47	0.250	0.043	725	67441	465	0
48	0.250	0.043	730	67906	468	0
49	0.250	0.043	790	73488	506	0
50	0.250	0.043	695	64651	445	0
51	0.250	0.043	710	66046	455	0
52	0.249	0.044	835	76213	525	0
53	0.249	0.045	865	77197	532	0
54	0.250	0.044	675	61363	423	0
55	0.250	0.044	735	66818	460	0
56	0.250	0.044	755	68636	473	0
57	0.250	0.045	850	75555	520	0
58	0.250	0.046	975	84782	584	0
59	0.250	0.045	795	70666	487	0
60	0.250	0.043	770	71627	493	0
61	0.250	0.045	815	72444	499	0
62	0.251	0.044	765	69268	477	0
63	0.250	0.044	720	65454	451	0
64	0.250	0.043	675	62790	432	0
65	0.249	0.044	700	63891	440	0
66	0.249	0.044	775	70737	487	0
67	0.250	0.044	845	76818	529	0
68	0.250	0.042	775	73809	508	0
69	0.250	0.043	750	69767	481	0
70	0.250	0.043	530	49302	339	0
71	0.250	0.044	660	60000	413	0
72	0.250	0.044	400	36363	250	0
73	0.249	0.044	930	84884	585	0
74	0.250	0.043	685	63720	439	0
75	0.250	0.042	770	73333	505	0
76	0.249	0.043	725	67712	466	0
77	0.250	0.043	740	68837	474	0
78	0.250	0.042	570	54285	374	0
79	0.250	0.043	790	73488	506	0
80	0.250	0.044	525	47727	329	0

UNION CARBIDE 8PLY CROSSPLY COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
81	0.250	0.045	825	73333	505	0
82	0.248	0.045	830	74372	512	0
83	0.249	0.045	825	73627	507	0
84	0.250	0.045	770	68444	471	0
85	0.250	0.045	730	64888	447	0
86	0.250	0.046	610	53043	365	0
87	0.250	0.044	690	62727	432	0
88	0.250	0.044	690	62727	432	0
89	0.250	0.042	655	62380	430	0
90	0.250	0.042	635	60476	416	0
91	0.250	0.043	690	64186	442	0
92	0.250	0.044	700	63636	438	0
93	0.250	0.044	730	66363	457	0
94	0.250	0.044	685	62272	429	0
95	0.250	0.044	765	69545	479	0
96	0.250	0.044	680	61818	426	0
97	0.250	0.044	825	75000	517	0
98	0.250	0.044	675	61363	423	0
99	0.250	0.043	760	70697	487	0
100	0.250	0.044	675	61363	423	0
101	0.250	0.044	765	69545	479	0
102	0.250	0.044	715	65000	448	0
103	0.250	0.044	670	60909	419	0
104	0.251	0.043	750	69489	479	0
105	0.249	0.043	740	69113	476	0
106	0.250	0.044	810	73636	507	0
107	0.250	0.043	755	70232	484	0
108	0.250	0.043	830	77209	532	0
109	0.250	0.042	755	71904	495	0
110	0.250	0.044	525	47727	329	0
111	0.250	0.044	875	79545	548	0
112	0.250	0.045	790	70222	484	0
113	0.250	0.043	805	74883	516	0
114	0.250	0.044	790	71818	495	0
115	0.250	0.041	685	66829	460	0
116	0.250	0.043	765	71162	490	0
117	0.249	0.044	735	67086	462	0
118	0.250	0.045	570	50666	349	0
119	0.250	0.045	655	58222	401	0
120	0.249	0.045	775	69165	476	0

UNION CARBIDE 8PLY CROSSPLY COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
121	0.250	0.045	710	63111	435	0
122	0.249	0.046	835	72900	502	0
123	0.250	0.044	695	63181	435	0
124	0.250	0.044	655	59545	410	0
125	0.249	0.044	755	68912	475	0
126	0.250	0.045	830	73777	508	0

Table C11

UNION CARBIDE 12PLY UNIDIRECTIONAL COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	0.250	0.062	2400	154838	1067	0
2	0.250	0.057	2310	162105	1117	0
3	0.251	0.057	2520	176137	1214	4
4	0.249	0.059	2545	173235	1194	0
5	0.250	0.059	2635	178644	1231	0
6	0.251	0.059	2465	166452	1147	0
7	0.251	0.059	2605	175906	1212	0
8	0.250	0.059	2610	176949	1219	0
9	0.250	0.057	2610	183157	1262	0
10	0.250	0.059	2475	167796	115_	0
11	0.250	0.061	2840	186229	1284	0
12	0.250	0.061	2665	174754	1204	0
13	0.250	0.059	2435	165084	1138	0
14	0.250	0.058	2940	202759	1398	0
15	0.249	0.060	2645	177041	1220	0
16	0.250	0.058	2675	184482	1272	0
17	0.251	0.059	2635	177932	1226	0
18	0.251	0.059	3055	206293	1422	0
19	0.251	0.059	2910	196502	1354	0
20	0.250	0.060	2810	187333	1291	0
21	0.251	0.060	2875	190903	1316	0
22	0.250	0.061	2545	166885	1150	0
23	0.251	0.060	2680	177954	1226	0
24	0.251	0.062	2640	169644	1169	0
25	0.250	0.065	0	0	0	1
26	0.251	0.064	3415	212587	1465	0
27	0.251	0.064	3245	202004	1392	0
28	0.251	0.059	2545	171854	1184	0
29	0.251	0.058	2340	160736	1108	0
30	0.251	0.057	2210	154469	1065	0
31	0.250	0.060	2645	176333	1215	0
32	0.251	0.060	2865	190239	1311	0
33	0.251	0.060	2865	190239	1311	0
34	0.250	0.058	2265	156206	1077	0
35	0.250	0.058	2305	158965	1096	0
36	0.250	0.059	2675	181355	1250	0
37	0.252	0.060	2725	180224	1242	0
38	0.252	0.062	2970	190092	1310	0
39	0.250	0.068	3550	208823	1439	0
40	0.250	0.068	3410	200588	1383	0

UNION CARBIDE 12PLY UNIDIRECTIONAL COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	0.251	0.064	3205	199514	1375	0
42	0.250	0.063	2845	180634	1245	0
43	0.250	0.063	2940	186666	1287	0
44	0.250	0.064	0	0	0	1
45	0.251	0.063	2895	183077	1262	0
46	0.250	0.062	2345	151290	1043	0
47	0.250	0.060	2465	164333	1133	0
48	0.250	0.062	2570	165806	1143	0
49	0.250	0.062	2870	185161	1276	0
50	0.251	0.065	3310	202880	1398	0
51	0.250	0.065	3010	185230	1277	0
52	0.250	0.065	3010	185230	1277	0
53	0.250	0.064	2965	185312	1277	0
54	0.251	0.064	2610	162475	1120	0
55	0.250	0.063	2455	155873	1074	0
56	0.250	0.064	2650	165625	1141	0
57	0.250	0.061	2810	184262	1270	0
58	0.250	0.061	2445	160327	1105	0
59	0.250	0.062	2715	175161	1207	0
60	0.250	0.064	2565	160312	1105	0
61	0.250	0.061	2360	154754	1067	0
62	0.250	0.061	2535	166229	1146	0
63	0.250	0.061	2565	168196	1159	0
64	0.250	0.064	3570	223125	1538	0
65	0.248	0.064	3180	200352	1381	0
66	0.250	0.057	2620	183859	1267	0
67	0.250	0.059	3015	204406	1409	0
68	0.250	0.062	3045	196451	1354	0
69	0.250	0.062	2305	148709	1025	0
70	0.250	0.064	3080	192500	1327	0
71	0.250	0.062	2740	176774	1218	0
72	0.250	0.063	3050	193650	1335	0
73	0.250	0.063	3075	195238	1346	0
74	0.251	0.062	2640	169644	1169	4
75	0.250	0.061	3005	197049	1358	0
76	0.250	0.057	2745	192631	1328	0
77	0.250	0.058	2505	172758	1191	0
78	0.250	0.058	2570	177241	1222	0
79	0.251	0.063	3175	200784	1384	0
80	0.251	0.061	2745	179282	1236	0

UNION CARBIDE 12PLY UNIDIRECTIONAL COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
81	0.249	0.065	3185	196787	1356	0
82	0.250	0.063	3145	199682	1376	0
83	0.251	0.064	3220	200448	1382	0
84	0.249	0.063	2705	172435	1188	0
85	0.250	0.063	2915	185079	1276	0
86	0.251	0.061	2940	192018	1323	0
87	0.250	0.061	3015	197704	1363	0
88	0.250	0.063	3345	212380	1464	0
89	0.250	0.062	3470	223870	1543	0
90	0.251	0.060	2415	160358	1105	0
91	0.250	0.059	2510	170169	1173	0
92	0.251	0.059	2440	164764	1136	0
93	0.250	0.060	2685	179000	1234	0
94	0.250	0.060	2865	191000	1316	0
95	0.250	0.060	2465	164333	1133	0
96	0.251	0.058	2705	185808	1281	0
97	0.250	0.058	2345	161724	1115	0
98	0.250	0.059	3110	210847	1453	0
99	0.251	0.063	3215	203313	1401	0
100	0.250	0.064	3140	196250	1353	0
101	0.250	0.062	2965	191290	1318	0
102	0.250	0.061	2835	185901	1281	0
103	0.250	0.062	2910	187741	1294	0
104	0.250	0.062	2685	173225	1194	0
105	0.250	0.064	2810	175625	1210	0
106	0.251	0.061	2600	169812	1170	0
107	0.250	0.061	2565	168196	1159	0
108	0.249	0.060	3050	204149	1407	0
109	0.250	0.061	2975	195081	1345	0
110	0.251	0.060	2770	183930	1268	0
111	0.250	0.060	2710	180666	1245	0
112	0.250	0.063	3225	204761	1411	0
113	0.251	0.062	2860	183781	1267	0
114	0.251	0.062	2875	184744	1274	0
115	0.250	0.062	3110	200645	1383	0
116	0.250	0.062	3250	209677	1445	0
117	0.251	0.065	3235	198283	1367	0
118	0.251	0.064	3340	207918	1433	0
119	0.251	0.063	3110	196673	1356	0
120	0.250	0.062	3110	200645	1383	0

UNION CARBIDE 12PLY UNIDIRECTIONAL COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
121	0.251	0.061	3160	206387	1423	0
122	0.251	0.060	2970	197211	1359	0
123	0.251	0.061	2945	192345	1326	0
124	0.251	0.061	3040	198550	1369	0
125	0.251	0.062	3065	196954	1357	0
126	0.250	0.061	2915	191147	1317	0
127	0.251	0.000	3400	211653	1459	0
128	0.250	0.065	3305	203384	1402	0

Table C12

NARMCO TASK 3 8PLY CROSSPLY TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	1.002	0.047	2700	57332	395	0
2	1.000	0.052	2810	54038	372	0
3	1.003	0.052	2420	46399	319	0
4	1.002	0.050	2640	52694	363	0
5	1.002	0.052	3180	61031	420	0
6	1.001	0.047	2650	56326	388	0
7	1.001	0.048	2500	52031	358	0
8	1.002	0.048	3010	62583	431	0
9	1.002	0.050	2840	56686	390	0
10	1.002	0.047	2970	63065	434	0
11	0.998	0.050	2810	56312	388	0
12	1.001	0.050	2730	54545	376	0
13	1.002	0.050	3200	63872	440	0
14	1.000	0.048	2810	58541	403	0
15	0.999	0.052	2220	42735	294	0
16	1.002	0.051	3210	62815	433	0
17	1.001	0.052	3310	63590	438	0
18	0.999	0.052	2560	49280	339	0
19	1.001	0.050	2540	50749	349	0
20	1.001	0.050	2940	58741	405	0
21	1.002	0.049	2650	53973	372	0
22	1.001	0.049	3280	66871	461	0
23	1.001	0.051	2690	52692	363	0
24	1.000	0.049	2780	56734	391	0
25	1.001	0.050	3350	66933	461	0
26	1.001	0.051	3080	60331	415	0
27	0.999	0.051	2880	56527	389	0
28	1.001	0.049	2930	59736	411	0
29	1.002	0.050	2800	55888	385	0
30	1.001	0.047	2660	56539	389	0
31	1.002	0.051	2980	58314	402	0
32	1.002	0.053	3180	59880	412	0
33	1.001	0.050	2810	56143	387	0
34	1.001	0.050	2980	59540	410	0
35	1.001	0.050	2620	52347	360	0
36	1.001	0.049	2970	60651	417	0
37	1.001	0.051	2650	51908	357	0
38	1.001	0.048	2550	53071	365	0
39	1.001	0.051	3000	58764	405	0
40	1.001	0.050	2880	57542	396	0

NARMCO TASK 3 8PLY CROSSPLY TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	1.001	0.049	2770	56474	389	0
42	1.002	0.050	2800	55888	385	0
43	1.001	0.050	2530	50549	348	0
44	1.000	0.049	3030	61836	426	0
45	1.000	0.051	2810	55098	379	0
46	1.001	0.048	3270	68056	469	0
47	1.001	0.049	2550	51988	358	0
48	1.002	0.052	2600	49900	344	0
49	1.002	0.049	2530	51529	355	0
50	1.002	0.052	2930	56233	387	0
51	1.001	0.050	2690	53746	370	0
52	1.003	0.052	2940	56369	388	0
53	1.001	0.049	2510	51173	352	0
54	1.002	0.052	2760	52970	365	0
55	1.000	0.049	2640	53877	371	0
56	1.001	0.048	3290	68473	472	0
57	1.000	0.049	2420	49387	340	0
58	1.001	0.051	3250	63661	438	0
59	1.002	0.047	2850	60517	417	0
60	1.001	0.047	2420	51437	354	0
61	1.002	0.047	3060	64976	448	0
62	1.001	0.052	2600	49950	344	0
63	1.001	0.049	3010	61367	423	0
64	1.001	0.051	2360	46228	318	0
65	1.002	0.050	3050	60878	419	0
66	1.002	0.049	2550	51936	358	0

Table C13

NARMCO TASK 3 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	0.499	0.048	4915	205202	1414	0
2	0.499	0.047	4680	199548	1375	0
3	0.499	0.046	5030	219133	1510	0
4	0.498	0.047	4900	209348	1443	0
5	0.499	0.047	4600	196136	1352	0
6	0.493	0.049	4960	205323	1415	0
7	0.499	0.049	4820	197128	1359	0
8	0.499	0.049	4765	194879	1343	0
9	0.498	0.048	4690	196201	1352	0
10	0.498	0.050	4370	175502	1210	0
11	0.499	0.043	3300	153795	1060	0
12	0.498	0.048	5035	210634	1452	0
13	0.499	0.048	4870	203323	1401	0
14	0.498	0.048	4420	184906	1274	0
15	0.499	0.050	4910	196793	1356	0
16	0.499	0.050	4575	183366	1264	0
17	0.499	0.048	4220	176185	1214	0
18	0.499	0.049	4810	196719	1356	0
19	0.499	0.049	5000	204490	1409	0
20	0.499	0.048	4570	190798	1315	0
21	0.498	0.048	4780	199966	1378	0
22	0.499	0.045	4460	198619	1369	5
23	0.496	0.046	4560	199859	1378	0
24	0.499	0.050	5035	201803	1391	0
25	0.498	0.051	4820	189778	1308	0
26	0.499	0.051	5280	207473	1430	0
27	0.499	0.049	4890	199991	1378	0
28	0.498	0.048	4810	201221	1387	0
29	0.493	0.048	4660	194946	1344	0
30	0.498	0.049	5220	213916	1474	0
31	0.499	0.050	4965	198997	1372	0
32	0.499	0.050	4520	181162	1249	0
33	0.499	0.048	5070	211673	1459	0
34	0.000	0.000	0	0	0	1
35	0.498	0.050	4380	175903	1212	0
36	0.499	0.051	4925	193524	1334	0
37	0.499	0.050	4730	189579	1307	0
38	0.499	0.051	4880	191756	1322	0
39	0.496	0.049	4630	190563	1313	0
40	0.498	0.052	4505	173965	1199	0

NARMCO TASK 3 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	0.498	0.051	4970	195684	1349	0
42	0.499	0.050	4910	196793	1356	0
43	0.499	0.049	4915	201014	1385	0
44	0.500	0.052	4510	173461	1196	0
45	0.498	0.052	4420	170682	1176	0
46	0.499	0.051	4120	161892	1116	0
47	0.499	0.050	4590	183967	1268	0
48	0.500	0.051	4800	188205	1297	0
49	0.497	0.051	4450	175563	1210	0
50	0.499	0.047	4200	179081	1234	0
51	0.499	0.050	5000	200400	1381	0
52	0.498	0.051	5110	201196	1387	0
53	0.499	0.049	3750	153367	1057	0
54	0.499	0.050	4830	193587	1334	0
55	0.497	0.048	3470	145456	1002	0
56	0.499	0.049	3650	149278	1029	0
57	0.499	0.051	5000	196471	1354	0
58	0.499	0.052	4235	163211	1125	0
59	0.499	0.053	5500	207963	1433	0
60	0.497	0.051	5050	199234	1373	0
61	0.497	0.05[illegible]	4090	164587	1134	0
62	0.499	0.052	4340	167257	1153	7
63	0.499	0.052	5180	199630	1376	0
64	0.499	0.051	5100	200400	1381	0
65	0.499	0.051	4715	185272	1277	0
66	0.499	0.051	4770	187433	1292	0
67	0.500	0.051	4780	187450	1292	[illegible]
68	0.498	0.051	4770	187810	1294	0
69	0.498	0.051	4680	184266	1270	0
70	0.500	0.050	4650	186000	1282	0
71	0.502	0.049	4940	200829	1384	0
72	0.500	0.042	3500	166666	1149	0
73	0.500	0.051	4830	189411	1305	0
74	0.500	0.049	4960	202448	1395	0
75	0.500	0.050	5160	206400	1423	0
76	0.500	0.049	4820	196734	1356	0
77	0.496	0.049	4240	174456	1202	0
78	0.500	0.050	4670	186800	1287	0
79	0.501	0.050	4970	198403	1367	0
80	0.500	0.052	4680	180000	1241	0

NARMCO TASK 3 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
81	0.501	0.052	5600	214954	1482	0
82	0.496	0.052	4430	171758	1184	0
83	0.500	0.048	3920	163333	1126	0
84	0.499	0.051	4870	191363	1319	0
85	0.500	0.051	5410	212156	1462	0
86	0.500	0.051	5010	196470	1354	0
87	0.502	0.052	5150	197287	1360	0
88	0.499	0.048	5010	209168	1442	0
89	0.500	0.049	3970	162040	1117	0
90	0.501	0.049	4880	198786	1370	0
91	0.500	0.050	4880	195200	1345	0
92	0.501	0.052	4580	175802	1212	0
93	0.500	0.051	4740	185882	1281	0
94	0.501	0.048	4020	167165	1152	0
95	0.501	0.052	4580	175802	1212	0
96	0.500	0.051	5030	197254	1360	0
97	0.501	0.050	4760	190019	1310	0
98	0.500	0.051	4650	182352	1257	0
99	0.495	0.053	4270	162759	1122	0
100	0.500	0.048	3470	144583	996	0
101	0.501	0.049	4860	197971	1365	0
102	0.499	0.047	4540	193578	1334	0
103	0.500	0.051	4530	177647	1224	0
104	0.500	0.050	4470	178800	1232	0
105	0.500	0.046	4300	186956	1289	0
106	0.501	0.051	4820	188642	1300	0
107	0.499	0.050	4900	196392	1354	0
108	0.500	0.048	4480	186666	1287	0
109	0.499	0.048	4710	196643	1355	0
110	0.499	0.049	4910	200809	1384	0
111	0.499	0.046	4070	177311	1222	0
112	0.499	0.050	4330	173547	1196	0
113	0.499	0.047	4770	203385	1402	0
114	0.500	0.048	4360	181666	1252	0
115	0.500	0.049	4770	194693	1342	0
116	0.500	0.045	4190	186222	1284	0
117	0.501	0.050	4800	191616	1321	0
118	0.500	0.049	4820	196734	1356	0
119	0.500	0.049	4730	193061	1331	0
120	0.498	0.048	4230	176957	1220	0

NARMCO TASK 3 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
121	0.500	0.050	4970	198800	1370	0
122	0.500	0.052	5490	211153	1455	0
123	0.499	0.050	4370	175150	1207	0
124	0.500	0.050	4720	188800	1301	0
125	0.500	0.052	4530	174230	1201	0
126	0.498	0.051	4790	188597	1300	0
127	0.500	0.049	4050	165306	1139	0
128	0.503	0.050	4780	190059	1310	0
129	0.500	0.049	4670	190612	1314	0
130	0.500	0.050	4790	191600	1321	0
131	0.000	0.000	0	0	0	3
132	0.500	0.050	5100	204000	1406	0
133	0.492	0.049	4320	179193	1235	0
134	0.486	0.045	4255	194558	1341	6
135	0.499	0.049	4410	180360	1243	6
136	0.500	0.049	5130	209387	1443	6
137	0.501	0.049	4660	189824	1308	6
138	0.500	0.048	4870	202916	1399	6
139	0.500	0.048	4775	198958	1371	6
140	0.500	0.048	4440	185000	1275	6
141	0.501	0.047	4975	211279	1456	6
142	0.501	0.046	4745	205892	1419	6
143	0.500	0.046	4790	208260	1435	6
144	0.500	0.047	4620	196595	1355	6
145	0.498	0.046	4560	199057	1372	6
146	0.500	0.048	5060	210833	1453	6
147	0.500	0.047	5055	215106	1483	6
148	0.500	0.049	5295	216122	1490	6
149	0.500	0.048	4995	208125	1435	6
150	0.500	0.048		0	0	1
151	0.500	0.050	4995	199800	1377	6
152	0.501	0.050	5410	215968	1489	6
153	0.500	0.048	4795	199791	1377	6
154	0.501	0.049	5060	206118	1421	6
155	0.500	0.049	4690	191428	1319	0
156	0.501	0.048	5140	213739	1473	0
157	0.501	0.050	5105	203792	1405	0
158	0.504	0.049	5005	202664	1397	0
159	0.501	0.049	0	0	0	1
160	0.500	0.047	4485	190851	1315	0

NARMCO TASK 3 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
161	0.501	0.050	4745	189421	1306	0
162	0.500	0.050	5345	213800	1474	0
163	0.502	0.048	4690	194638	1342	0
164	0.501	0.049	4890	199193	1373	0
165	0.501	0.048	4640	192947	1330	0
166	0.499	0.047	5385	229608	1583	0
167	0.499	0.051	5110	200793	1384	0
168	0.499	0.050	4665	186973	1289	0
169	0.501	0.050	5355	213772	1473	0
170	0.499	0.051	4320	169751	1170	0
171	0.499	0.048	4135	172636	1190	0
172	0.500	0.050	4700	188000	1296	0
173	0.500	0.050	4880	195200	1345	0
174	0.500	0.050	4975	199000	1372	0
175	0.500	0.050	4805	192200	1325	0
176	0.505	0.050	5040	199603	1376	0
177	0.505	0.050	5260	208316	1436	0
178	0.504	0.052	5475	208905	1440	0
179	0.505	0.051	4905	190448	1313	0
180	0.504	0.051	5100	198412	1368	0
181	0.505	0.048	4815	198638	1369	0
182	0.503	0.051	5190	202315	1394	0
183	0.505	0.052	5395	205445	1416	0
184	0.503	0.052	4960	189631	1307	0
185	0.505	0.051	5185	201320	1388	0
186	0.504	0.045	4865	214506	1479	0
187	0.505	0.048	4890	201732	1390	0
188	0.505	0.048	5335	220090	1517	0
189	0.506	0.049	5260	212148	1462	0
190	0.479	0.043	3740	181579	1251	0
191	0.499	0.048	4670	194973	1344	0
192	0.505	0.046	4855	208996	1441	0
193	0.504	0.049	5320	215419	1485	0
194	0.505	0.049	5225	211153	1455	0
195	0.504	0.048	4975	205646	1417	0

Table C14

NARMCO TASK 3 12PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	0.498	0.073	6850	188424	1299	0
2	0.499	0.077	7190	187127	1290	0
3	0.499	0.075	6940	185437	1278	0
4	0.498	0.080	7550	189508	1306	0
5	0.499	0.080	5670	142034	979	0
6	0.499	0.069	4910	142604	983	0
7	0.499	0.072	6560	182587	1258	0
8	0.499	0.075	5350	142952	985	0
9	0.499	0.071	6950	196166	1352	0
10	0.499	0.071	5450	153828	1060	0
11	0.499	0.070	5670	162324	1119	0
12	0.499	0.070	6240	178643	1231	0
13	0.499	0.078	6170	158522	1093	0
14	0.499	0.074	7130	193088	1331	0
15	0.500	0.074	7500	202702	1397	0
16	0.499	0.073	7030	192988	1330	0
17	0.499	0.071	5870	165683	1142	0
18	0.500	0.077	6570	170649	1176	0
19	0.499	0.077	7360	191551	1320	0
20	0.499	0.07[illegible]	6590	173768	1198	0
21	0.501	0.073	5590	152844	1053	0
22	0.500	0.070	6030	172285	1187	0
23	0.499	0.070	6320	180933	1247	0
24	0.499	0.072	6310	175629	1210	0
25	0.499	0.072	6180	172010	1186	0
26	0.000	0.000	0	0	0	2
27	0.499	0.078	6870	176506	1217	0
28	0.498	0.073	5590	153765	1060	0
29	0.500	0.072	6790	188611	1300	0
30	0.500	0.069	6370	184637	1273	0
31	0.500	0.076	5770	151842	1046	0
32	0.498	0.072	6270	174866	1205	0
33	0.500	0.068	7010	206176	1421	0
34	0.000	0.000	0	0	0	2
35	0.494	0.077	6960	182974	1261	0
36	0.498	0.075	6120	163855	1129	0
37	0.495	0.076	6675	177432	1223	0
38	0.497	0.076	6680	176850	1219	0
39	0.494	0.074	6750	184648	1273	0
40	0.494	0.073	6560	181908	1254	0

NARMCO TASK 3 12PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	0.493	0.073	6870	190891	1316	0
42	0.501	0.074	6760	182338	1257	0
43	0.499	0.075	5805	155110	1069	0
44	0.500	0.075	6270	167200	1152	0
45	0.501	0.076	6920	181741	1253	0
46	0.500	0.075	8090	215733	1487	0
47	0.502	0.075	7260	192828	1329	0
48	0.000	0.000	0	0	0	1
49	0.500	0.073	6770	185479	1278	0
50	0.503	0.072	5360	148000	1020	0
51	0.501	0.075	7100	188955	1302	0
52	0.500	0.076	7360	193684	1335	0
53	0.499	0.075	7080	189178	1304	0
54	0.500	0.070	7200	205714	1418	0
55	0.500	0.075	6490	173066	1193	0
56	0.499	0.076	7030	185370	1278	0
57	0.500	0.077	6840	177662	1224	0
58	0.499	0.077	6670	173593	1196	0
59	0.502	0.076	7460	195533	1348	0
60	0.501	0.076	7000	183842	1267	0
61	0.501	0.076	6670	175175	1207	0
62	0.000	0.000	0	0	0	2
63	0.000	0.000	0	0	0	2
64	0.000	0.000	0	0	0	2
65	0.502	0.072	6260	173196	1194	0
66	0.505	0.065	6950	211728	1459	0
67	0.504	0.071	7050	197015	1358	0
68	0.505	0.073	7430	201546	1389	0
69	0.504	0.074	7915	212221	1463	0
70	0.505	0.073	6970	189068	1303	0
71	0.489	0.070	6175	180397	1243	0
72	0.504	0.072	6790	187114	1290	0
73	0.505	0.073	7195	195171	1345	0
74	0.506	0.072	7305	200510	1382	0
75	0.506	0.074	7485	199898	1378	0
76	0.505	0.071	6575	183377	1264	0
77	0.504	0.073	6900	187540	1293	0
78	0.505	0.073	7360	199647	1376	0
79	0.505	0.073	7545	204665	1411	0
80	0.505	0.073	7845	212803	1467	0

NARMCO TASK 3 12PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
81	0.505	0.073	7415	201139	1386	0
82	0.507	0.074	6640	176981	1220	0
83	0.505	0.070	6390	180763	1246	0
84	0.506	0.075	7620	200790	1384	0
85	0.506	0.075	7705	203030	1399	0
86	0.506	0.074	7215	192687	1328	0
87	0.505	0.070	6810	192644	1328	0
88	0.504	0.068	6290	183531	1265	0
89	0.502	0.074	7000	188435	1299	0
90	0.502	0.076	7095	185966	1282	0
91	0.503	0.077	7235	186601	1287	0
92	0.504	0.074	6815	182727	1259	0
93	0.503	0.072	6335	174922	1206	0
94	0.504	0.074	7220	193586	1334	0
95	0.504	0.074	7330	196535	1355	0
96	0.506	0.076	7295	189697	1307	0
97	0.504	0.075	7365	194841	1343	0
98	0.503	0.074	6720	180538	1244	0
99	0.504	0.068	7020	204831	1412	0
100	0.504	0.073	7430	201946	1392	0
101	0.505	0.075	7870	207788	1432	0
102	0.504	0.073	7215	196102	1352	0
103	0.504	0.073	7480	203305	1401	0
104	0.504	0.071	6420	179409	1237	0
105	0.504	0.075	6820	180423	1244	0
106	0.506	0.074	7925	211649	1459	0
107	0.506	0.075	7750	204216	1408	0
108	0.505	0.074	7595	203237	1401	0
109	0.496	0.072	6975	195312	1346	0
110	0.503	0.069	6675	192324	1326	0
111	0.503	0.071	7830	219247	1511	0
112	0.505	0.073	7620	206700	1425	0
113	0.504	0.074	7455	199887	1378	0
114	0.504	0.072	7815	215360	1484	0
115	0.505	0.070	5825	164780	1136	0
116	0.502	0.074	7175	193146	1331	0
117	0.504	0.073	7330	199228	1373	0
118	0.504	0.072	7620	209986	1447	0
119	0.504	0.072	7565	208471	1437	0
120	0.503	0.069	6220	179214	1235	0

NARMCO TASK 3 12PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
121	0.504	0.073	7100	192976	1330	0
122	0.505	0.073	7695	208734	1439	0
123	0.505	0.073	8040	218093	1503	0
124	0.505	0.073	7585	205750	1418	0
125	0.505	0.073	6780	183914	1268	0
126	0.506	0.067	5490	161937	1116	0
127	0.504	0.072	6795	187251	1291	0
128	0.504	0.072	7620	209986	1447	0
129	0.503	0.077	7425	191706	1321	0
130	0.505	0.071	6960	194115	1338	0
131	0.504	0.066	6140	184583	1272	0

Table C15

NARMCO TASK 3 8PLY CROSSPLY COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	0.252	0.047	745	62901	433	0
2	0.252	0.045	885	78042	538	0
3	0.252	0.046	780	67287	463	0
4	0.252	0.047	830	70077	483	0
5	0.252	0.047	0	0	0	1
6	0.251	0.049	960	78055	538	0
7	0.251	0.049	990	80494	555	0
8	0.252	0.050	835	66269	456	0
9	0.252	0.050	890	70634	487	0
10	0.252	0.049	835	67622	466	0
11	0.252	0.047	690	58257	401	0
12	0.252	0.049	860	69646	480	0
13	0.252	0.050	835	66269	456	0
14	0.252	0.049	930	75315	519	0
15	0.252	0.049	855	69241	477	0
16	0.252	0.049	830	67217	463	0
17	0.252	0.049	930	75315	519	0
18	0.251	0.048	915	75946	523	0
19	0.252	0.047	825	69655	480	0
20	0.252	0.048	790	65310	450	0
21	0.252	0.048	840	69444	478	0
22	0.252	0.051	850	66137	456	0
23	0.252	0.050	795	63095	435	0
24	0.252	0.050	785	62301	429	0
25	0.252	0.051	815	63414	437	0
26	0.252	0.051	745	57967	399	0
27	0.252	0.051	675	52521	362	0
28	0.252	0.050	845	67063	462	0
29	0.252	0.048	755	62417	430	0
30	0.252	0.047	790	66700	459	0
31	0.252	0.046	785	67719	466	0
32	0.251	0.045	655	57990	399	0
33	0.252	0.047	805	67966	468	0
34	0.252	0.049	810	65597	452	0
35	0.252	0.049	630	51020	351	0
36	0.252	0.050	775	61507	424	0
37	0.252	0.051	875	68082	469	0
38	0.252	0.050	945	75000	517	0
39	0.252	0.049	770	62358	429	0
40	0.251	0.048	730	60590	417	0

NARMCO TASK 3 8PLY CROSSPLY COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	0.251	0.049	770	62606	431	0
42	0.252	0.049	790	63977	441	0
43	0.253	0.046	860	73895	509	0
44	0.253	0.044	810	72763	501	0
45	0.253	0.044	660	59288	408	0
46	0.253	0.045	830	72902	502	0
47	0.249	0.047	830	70921	489	0
48	0.249	0.046	815	71154	490	0
49	0.248	0.048	760	63844	440	0
50	0.252	0.047	810	68389	471	0
51	0.252	0.047	840	70921	489	0
52	0.252	0.047	815	68811	474	0
53	0.252	0.047	740	62478	430	0
54	0.251	0.048	835	69306	477	0
55	0.253	0.048	740	60935	420	0
56	0.253	0.047	825	69380	478	0
57	0.252	0.048	810	66964	461	0
58	0.252	0.047	835	70499	486	0
59	0.252	0.046	825	71169	490	0
60	0.251	0.045	790	69942	482	0
61	0.251	0.045	675	59760	412	0
62	0.251	0.046	825	71453	492	0
63	0.252	0.048	930	76884	530	0
64	0.252	0.046	0	0	0	1
65	0.252	0.047	815	68811	474	0
66	0.253	0.046	775	63817	440	0
67	0.253	0.047	745	62652	431	0
68	0.252	0.048	810	66964	461	0
69	0.252	0.047	730	61634	424	0
70	0.252	0.048	795	65724	453	0
71	0.253	0.044	530	47610	328	0
72	0.253	0.046	735	63155	435	0
73	0.253	0.045	0	0	0	1
74	0.252	0.045	670	59082	407	0
75	0.253	0.045	685	60166	414	0
76	0.252	0.046	860	74189	511	0
77	0.252	0.047	855	72188	497	0
78	0.252	0.048	960	79365	547	0
79	0.253	0.048	970	79874	550	0
80	0.254	0.048	830	68077	469	0

NARMCO TASK 3 8PLY CROSSPLY COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
81	0.253	0.048	850	69993	482	0
82	0.253	0.046	830	71318	491	0
83	0.248	0.047	775	66489	458	0
84	0.248	0.047	725	62199	428	0
85	0.248	0.047	630	54049	372	0
86	0.248	0.048	775	65104	448	0
87	0.248	0.049	710	58426	402	0
88	0.248	0.049	740	60895	419	0
89	0.248	0.049	770	63364	436	0
90	0.248	0.049	645	53077	365	0
91	0.248	0.049	735	60483	417	0
92	0.248	0.048	775	65104	448	0
93	0.248	0.045	685	61379	423	0
94	0.248	0.045	670	60035	413	0
95	0.248	0.044	590	54068	372	0
96	0.248	0.046	740	64866	447	0
97	0.248	0.048	805	67624	466	0
98	0.249	0.048	825	69026	475	0
99	0.249	0.049	840	68846	474	0
100	0.248	0.050	810	65322	450	0
101	0.249	0.049	0	0	0	1
102	0.248	0.050	765	61693	425	0
103	0.249	0.049	570	46717	322	0
104	0.249	0.049	750	61470	423	0
105	0.249	0.048	715	59822	412	0
106	0.249	0.048	790	66097	455	0
107	0.250	0.047	830	70638	487	0
108	0.249	0.046	745	65042	448	0
109	0.250	0.047	865	73617	507	0
110	0.249	0.048	830	69444	478	0
111	0.248	0.048	810	68044	469	0
112	0.250	0.047	830	70638	487	0
113	0.250	0.048	895	74583	514	0
114	0.249	0.049	675	55323	381	0
115	0.250	0.048	700	58333	402	0
116	0.250	0.048	640	53333	367	0
117	0.250	0.048	790	65833	453	0
118	0.250	0.048	815	67916	468	0
119	0.250	0.048	650	54166	373	0
120	0.250	0.048	830	69166	476	0

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NARMCO TASK 3 8PLY CROSSPLY COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
121	0.250	0.048	760	63333	436	0
122	0.250	0.048	645	53750	370	0
123	0.249	0.048	850	71117	490	0
124	0.249	0.047	865	73912	509	0
125	0.248	0.047	640	54907	378	0
126	0.250	0.046	850	73913	509	0
127	0.250	0.046	825	71739	494	0

Table C16

NARMCO TASK 3 12PLY UNIDIRECTIONAL COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	0.251	0.068	1835	107511	741	0
2	0.251	0.071	3140	176196	1214	0
3	0.250	0.074	2705	146216	1008	0
4	0.251	0.076	2645	138655	956	0
5	0.251	0.076	2810	147305	1015	0
6	0.251	0.075	2610	138645	955	0
7	0.251	0.077	2505	129611	893	0
8	0.250	0.078	2085	106923	737	4
9	0.251	0.077	2170	112278	774	4
10	0.252	0.072	2600	143298	988	0
11	0.251	0.066	2000	120729	832	4
12	0.251	0.064	1610	100224	691	4
13	0.251	0.068	2810	164635	1135	4
14	0.251	0.069	3295	190253	1311	0
15	0.250	0.071	2940	165633	1142	0
16	0.250	0.070	2665	152285	1050	0
17	0.251	0.070	3020	171883	1185	0
18	0.251	0.070	3050	173591	1196	0
19	0.250	0.069	1900	110144	759	0
20	0.250	0.067	2405	143582	989	0
21	0.251	0.071	1795	100723	694	0
22	0.251	0.070	2050	116676	804	4
23	0.251	0.070	2545	144849	998	0
24	0.251	0.071	2510	140845	971	0
25	0.251	0.072	2845	157425	1085	0
26	0.252	0.071	2440	136373	940	4
27	0.251	0.071	3005	168621	1162	4
28	0.251	0.071	2610	146456	1009	0
29	0.251	0.071	2610	146456	1009	0
30	0.251	0.071	2935	164693	1135	0
31	0.250	0.070	3075	175714	1211	0
32	0.251	0.068	2240	131239	904	0
33	0.251	0.068	2250	131825	908	0
34	0.251	0.070	2545	144849	998	0
35	0.251	0.072	2880	159362	1098	0
36	0.251	0.072	3160	174856	1205	0
37	0.251	0.073	2910	158816	1095	0
38	0.251	0.071	2945	165254	1139	4
39	0.251	0.070	2615	148833	1026	0
40	0.251	0.070	2870	163346	1126	0

NARMCO TASK 3 12PLY UNIDIRECTIONAL COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	0.250	0.070	2450	140000	965	0
42	0.251	0.068	2545	149109	1028	0
43	0.251	0.067	2715	161443	1113	0
44	0.251	0.072	3165	175132	1207	0
45	0.252	0.073	2865	155740	1073	0
46	0.252	0.072	2715	149636	1031	0
47	0.252	0.073	3040	165253	1139	0
48	0.251	0.073	2615	142716	984	0
49	0.251	0.073	2615	142716	984	0
50	0.251	0.074	2475	133250	918	0
51	0.252	0.073	2535	137801	950	0
52	0.251	0.074	2880	155055	1069	0
53	0.251	0.071	2500	140283	967	4
54	0.251	0.070	1835	104439	720	4
55	0.251	0.072	2465	136398	940	0
56	0.251	0.073	2445	133438	920	0
57	0.251	0.074	2105	113330	781	0
58	0.251	0.074	2710	145902	1005	0
59	0.252	0.074	2705	145055	1000	0
60	0.251	0.074	2460	132443	913	0
61	0.251	0.072	2265	125332	864	0
62	0.251	0.071	2365	132708	915	0
63	0.252	0.070	2585	146541	1010	0
64	0.250	0.064	2305	144062	993	0
65	0.252	0.073	3205	174222	1201	0
66	0.251	0.073	3275	178737	1232	0
67	0.251	0.072	2855	157979	1089	0
68	0.252	0.072	2855	157352	1084	0
69	0.252	0.071	2965	165716	1142	0
70	0.251	0.071	2965	166376	1147	0
71	0.251	0.071	3010	168901	1164	0
72	0.252	0.070	2645	149943	1033	0
73	0.252	0.070	3005	170351	1174	4
74	0.251	0.068	2545	149109	1028	4
75	0.252	0.068	2670	155812	1074	0
76	0.250	0.070	2940	168000	1158	0
77	0.251	0.071	2675	150103	1034	0
78	0.252	0.071	2880	160965	1109	0
79	0.251	0.072	2775	153552	1058	0
80	0.251	0.071	2845	159643	1100	0

NARMCO TASK 3 12PLY UNIDIRECTIONAL COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
81	0.251	0.069	3055	176395	1216	0
82	0.251	0.070	2845	161923	1116	0
83	0.250	0.067	2705	161492	1113	0
84	0.251	0.069	2980	172065	1186	0
85	0.250	0.063	2145	136190	939	0
86	0.250	0.071	2225	125352	864	0
87	0.251	0.071	2235	125413	864	4
88	0.251	0.072	2265	125332	864	4
89	0.251	0.072	2245	124225	856	0
90	0.250	0.073	2265	124109	855	0
91	0.251	0.073	2470	134803	929	0
92	0.251	0.074	2845	153171	1056	4
93	0.251	0.073	2545	138896	957	0
94	0.251	0.072	2465	136398	940	0
95	0.251	0.072	2040	112881	778	0
96	0.251	0.070	2465	140295	967	4
97	0.250	0.071	2235	125915	868	4
98	0.251	0.072	2665	147465	1016	0
99	0.250	0.072	2605	144722	997	0
100	0.251	0.072	2500	138335	953	0
101	0.247	0.072	2445	137483	947	0
102	0.250	0.073	2615	143287	987	0
103	0.251	0.073	2745	149811	1032	0
104	0.251	0.072	2715	150232	1035	0
105	0.249	0.069	2230	129794	894	0
106	0.251	0.067	2020	120116	828	0
107	0.252	0.066	2610	156926	1082	0
108	0.253	0.064	2340	144515	996	0
109	0.252	0.068	2850	166316	1146	0
110	0.241	0.070	2840	168346	1160	0
111	0.252	0.072	3005	165619	1141	0
112	0.252	0.072	3090	170304	1174	0
113	0.241	0.074	0	0	0	1
114	0.252	0.074	3215	172404	1188	0
115	0.253	0.072	2940	161396	1112	0
116	0.252	0.071	3315	185278	1277	0
117	0.249	0.069	2670	155404	1071	4
118	0.248	0.068	2575	152692	1052	4
119	0.248	0.070	2455	141417	975	0
120	0.249	0.071	2910	164602	1134	0

NARMCO TASK 3 12PLY UNIDIRECTIONAL COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
121	0.250	0.072	2780	154444	1064	4
122	0.250	0.072	2660	147777	1018	0
123	0.247	0.070	2805	162232	1118	0
124	0.251	0.070	2610	148548	1024	0
125	0.250	0.070	2510	143428	988	0
126	0.249	0.071	2805	158662	1093	0
127	0.247	0.070	3010	174089	1200	0
128	0.252	0.068	2475	144432	995	0

Table C17

NARMCO TASK 4 8PLY CROSSPLY TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	1.001	0.051	3320	65033	448	0
2	1.000	0.052	2420	46538	320	0
3	1.000	0.050	2950	59000	406	0
4	1.002	0.052	2880	55274	381	0
5	1.003	0.049	3120	63483	437	0
6	1.002	0.052	2770	53162	366	0
7	1.001	0.051	3170	62094	428	0
8	0.999	0.051	2650	52012	358	0
9	1.001	0.052	2810	53984	372	0
10	1.003	0.051	3250	63534	438	0
11	1.001	0.051	2440	47795	329	0
12	0.999	0.051	3230	63396	437	0
13	1.000	0.051	2900	56862	392	0
14	1.001	0.051	2900	56805	391	0
15	1.002	0.052	2690	51627	355	0
16	0.999	0.049	3020	61694	425	0
17	1.000	0.049	2760	56326	388	0
18	1.000	0.052	2770	53269	367	0
19	0.995	0.051	3410	67198	463	0
20	1.001	0.048	2680	55777	384	0
21	1.000	0.050	2600	52000	358	0
22	1.000	0.052	3180	61153	421	0
23	0.998	0.052	2600	50100	345	0
24	0.999	0.050	2410	48248	332	0
25	1.000	0.049	2700	55102	379	0
26	1.000	0.052	3050	58653	404	0
27	1.000	0.053	2680	50566	348	0
28	0.999	0.051	3300	64770	446	0
29	0.999	0.051	3130	62415	430	0
30	0.999	0.049	3000	61285	422	0
31	1.001	0.051	2450	47991	330	0
32	1.001	0.052	3100	59555	410	0
33	0.999	0.050	3000	60060	414	0
34	1.000	0.052	2960	56923	392	0
35	1.001	0.050	3060	61138	421	0
36	1.001	0.052	3040	58403	402	0
37	1.002	0.052	3170	60839	419	0
38	1.001	0.046	2670	57985	399	0
39	1.000	0.050	3000	60000	413	0
40	1.000	0.050	2840	56800	391	0

NARMCO TASK 4 8PLY CROSSPLY TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	1.001	0.050	2670	53346	367	0
42	1.001	0.052	3170	60900	419	0
43	1.002	0.050	3100	61876	426	0
44	0.999	0.051	2970	58293	401	0
45	1.000	0.048	3010	62708	432	0
46	1.001	0.048	2960	61605	424	0
47	1.000	0.049	2510	51224	353	0
48	1.000	0.049	3000	61224	422	0
49	1.002	0.047	3360	71346	491	0
50	1.001	0.049	3110	63405	437	0
51	0.999	0.049	3200	65371	450	0
52	1.001	0.046	2770	60157	414	0
53	1.004	0.049	2850	57931	399	0
54	1.000	0.047	2940	62553	431	0
55	1.000	0.051	3030	59411	409	0
56	1.000	0.050	3330	66600	459	0
57	1.002	0.047	2960	62853	433	0
58	1.002	0.047	3090	65613	452	0
59	1.001	0.051	3160	61898	426	0
60	1.002	0.049	2800	57028	393	0
61	1.001	0.051	2540	49754	343	0
62	1.001	0.050	3380	67532	465	0
63	1.003	0.047	2620	55577	383	0
64	1.003	0.050	2600	51844	357	0
65	1.002	0.051	3200	62619	431	0

Table C18

NARMCO TASK 4 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	0.502	0.048	4340	180112	1241	0
2	0.501	0.051	0	0	0	2
3	0.500	0.052	4390	168846	1164	0
4	0.501	0.052	5200	199600	1376	0
5	0.500	0.053	4580	172830	1191	0
6	0.500	0.047	4050	172340	1188	0
7	0.501	0.050	5160	205988	1420	0
8	0.501	0.051	4560	178466	1230	0
9	0.500	0.053	4880	184150	1269	0
10	0.501	0.053	5110	192445	1326	0
11	0.491	0.050	4580	186558	1286	0
12	0.500	0.053	4790	180754	1246	0
13	0.500	0.054	4160	154074	1062	0
14	0.498	0.053	4200	159127	1097	0
15	0.501	0.053	4420	166459	1147	0
16	0.500	0.052	4520	173846	1198	0
17	0.501	0.046	4010	173999	1199	0
18	0.500	0.053	4990	188301	1298	0
19	0.499	0.054	4670	173309	1194	0
20	0.500	0.051	4820	189019	1303	0
21	0.499	0.053	4780	180738	1246	0
22	0.500	0.050	4740	189600	1307	0
23	0.499	0.048	5000	208750	1439	0
24	0.500	0.048	5540	230833	1591	0
25	0.500	0.048	5020	209166	1442	0
26	0.500	0.049	5170	211020	1454	0
27	0.500	0.051	5300	207843	1433	0
28	0.000	0.000	0	0	0	3
29	0.496	0.045	3290	147401	1016	0
30	0.499	0.050	5040	202004	1392	0
31	0.501	0.050	5460	217964	1502	0
32	0.499	0.051	4830	189791	1308	0
33	0.501	0.051	4070	159289	1098	0
34	0.501	0.048	4740	197105	1359	0
35	0.501	0.042	3680	174888	1205	0
36	0.502	0.047	4720	200050	1379	0
37	0.500	0.052	4900	188461	1299	0
38	0.500	0.050	5010	200400	1381	0
39	0.499	0.050	4330	173547	1196	0
40	0.501	0.045	3880	172100	1186	0

NARMCO TASK 4 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	0.500	0.049	4740	193469	1333	0
42	0.500	0.050	5500	220000	1516	0
43	0.500	0.049	5020	204897	1412	0
44	0.500	0.049	5140	209795	1446	0
45	0.501	0.051	5400	211342	1457	0
46	0.500	0.052	5020	193076	1331	0
47	0.500	0.053	5240	197735	1363	0
48	0.500	0.052	4340	166923	1150	0
49	0.500	0.053	5100	192452	1326	0
50	0.500	0.051	4440	174117	1200	0
51	0.500	0.047	4460	189787	1308	0
52	0.499	0.052	4620	178048	1227	0
53	0.500	0.052	4530	174230	1201	0
54	0.500	0.045	4180	185777	1280	0
55	0.500	0.053	4100	154716	1066	0
56	0.499	0.048	4150	173263	1194	0
57	0.500	0.051	4950	194117	1338	0
58	0.500	0.053	5260	198490	1368	0
59	0.500	0.053	4350	164150	1131	0
60	0.498	0.051	4870	191747	1322	0
61	0.499	0.048	4800	200400	1381	0
62	0.500	0.047	3720	158297	1091	0
63	0.500	0.054	5150	190740	1315	0
64	0.501	0.053	4110	154784	1067	0
65	0.500	0.053	4920	185660	1280	0
66	0.500	0.051	5310	208235	1435	0
67	0.500	0.044	4260	193636	1335	0
68	0.499	0.050	4510	180761	1246	0
69	0.502	0.052	4640	177750	1225	0
70	0.498	0.052	4690	181109	1248	0
71	0.500	0.052	4850	186538	1286	0
72	0.499	0.051	5050	198436	1368	0
73	0.499	0.040	3380	169338	1167	0
74	0.499	0.052	5020	193463	1333	0
75	0.499	0.051	4800	188612	1300	0
76	0.500	0.051	4990	195686	1349	0
77	0.499	0.052	5220	201171	1387	0
78	0.499	0.049	4720	193039	1331	0
79	0.000	0.000	0	0	0	3
80	0.000	0.000	0	0	0	3

NARMCO TASK 4 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
81	0.499	0.053	4580	173176	1194	0
82	0.499	0.051	4640	182325	1257	0
83	0.500	0.052	5210	200384	1381	0
84	0.499	0.044	3580	163053	1124	0
85	0.501	0.051	4530	177292	1222	0
86	0.500	0.053	4400	166037	1144	0
87	0.501	0.053	4870	183406	1264	0
88	0.500	0.053	3830	144528	996	0
89	0.499	0.049	4940	202036	1393	0
90	0.499	0.043	3030	141212	973	0
91	0.500	0.049	4620	188571	1300	0
92	0.500	0.050	4440	177600	1224	0
93	0.501	0.051	4080	159680	1100	0
94	0.499	0.049	5190	212261	1463	0
95	0.499	0.043	3010	140280	967	0
96	0.500	0.048	4970	207083	1427	0
97	0.502	0.049	4890	198796	1370	0
98	0.502	0.051	4950	193344	1333	0
99	0.502	0.050	4840	192828	1329	0
100	0.501	0.050	5020	200399	1381	0
101	0.500	0.048	4860	202500	1396	0
102	0.500	0.050	4810	192400	1326	0
103	0.503	0.050	4310	171371	1181	0
104	0.501	0.050	5270	210379	1450	0
105	0.500	0.050	4890	195600	1348	0
106	0.499	0.038	3140	165594	1141	0
107	0.500	0.051	4350	170588	1176	0
108	0.499	0.051	5300	208259	1435	0
109	0.501	0.050	5000	199600	1376	0
110	0.498	0.049	5370	220063	1517	0
111	0.499	0.045	4650	207080	1427	0
112	0.500	0.052	4510	173461	1196	0
113	0.499	0.053	4220	159564	1100	0
114	0.500	0.053	4860	183396	1264	0
115	0.500	0.052	5080	195384	1347	0
116	0.500	0.052	4540	174615	1203	0
117	0.501	0.044	3750	170114	1172	0
118	0.500	0.052	4790	184230	1270	0
119	0.500	0.055	4970	180727	1246	0
120	0.501	0.052	5100	195762	1349	0

NARMCO TASK 4 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
121	0.499	0.052	5200	200400	1381	0
122	0.500	0.051	4680	183529	1265	0
123	0.500	0.050	4320	172800	1191	0
124	0.499	0.052	4260	164174	1131	0
125	0.499	0.052	4550	175350	1209	0
126	0.488	0.054	4410	167349	1153	0
127	0.499	0.053	4460	168639	1162	0
128	0.500	0.048	4080	170000	1172	0
129	0.500	0.051	4570	179215	1235	0
130	0.500	0.053	4950	186792	1287	0
131	0.500	0.052	5200	200000	1378	0
132	0.500	0.054	5040	186666	1287	0
133	0.499	0.053	4900	185276	1277	0
134	0.503	0.049	4920	199618	1376	0
135	0.504	0.050	5240	207936	1433	0
136	0.506	0.048	5290	217803	1501	0
137	0.504	0.050	5580	221428	1526	0
138	0.504	0.049	5325	215621	1486	0
139	0.502	0.043	4175	193412	1333	0
140	0.505	0.050	5715	226336	1560	0
141	0.502	0.051	5350	208968	1440	0
142	0.505	0.049	5220	210951	1454	0
143	0.000	0.000	0	0	0	3
144	0.502	0.043	4650	215417	1485	0
145	0.504	0.041	3985	192847	1329	0
146	0.503	0.049	5500	223150	1538	0
147	0.504	0.051	5300	206193	1421	0
148	0.504	0.050	5810	230555	1589	0
149	0.504	0.049	4840	195983	1351	0
150	0.498	0.043	3790	176987	1220	0
151	0.505	0.048	5040	207920	1433	0
152	0.501	0.049	5250	213857	1474	0
153	0.503	0.049	5295	214833	1481	0
154	0.502	0.050	5670	225896	1557	0
155	0.503	0.050	5345	212524	1465	0
156	0.501	0.049	4870	198378	1367	0
157	0.500	0.053	4605	173773	1198	0
158	0.500	0.052	4710	181153	1249	0
159	0.500	0.051	4885	191568	1320	0
160	0.500	0.054	5110	189259	1304	0

NARMCO TASK 4 8PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
161	0.499	0.047	4265	181853	1253	0
162	0.500	0.051	5070	198823	1370	0
163	0.498	0.053	4730	179207	1235	0
164	0.500	0.052	4930	189615	1307	0
165	0.500	0.051	4385	171960	1185	0
166	0.498	0.048	4925	206032	1420	0
167	0.497	0.050	4600	185110	1276	0
168	0.499	0.052	5535	213311	1470	0
169	0.500	0.051	5060	198431	1368	0
170	0.500	0.053	4955	186981	1289	0
171	0.498	0.050	4625	185742	1280	0
172	0.500	0.046	4100	178260	1229	0
173	0.500	0.050	5325	213000	1468	0
174	0.499	0.050	5005	200601	1383	0
175	0.500	0.051	5220	204705	1411	0
176	0.500	0.053	4565	172264	1187	0
177	0.502	0.043	4345	201287	1387	0
178	0.503	0.052	5355	204733	1411	0
179	0.503	0.051	4995	194714	1342	0
180	0.502	0.050	5210	207569	1431	0
181	0.503	0.049	5440	220716	1521	0
182	0.503	0.043	3665	169448	1168	0
183	0.503	0.050	5270	209542	1444	0
184	0.503	0.051	4895	190815	1315	0
185	0.503	0.053	5040	189054	1303	0
186	0.503	0.050	5125	203777	1405	0
187	0.504	0.048	5350	221147	1524	0
188	0.503	0.050	4855	193041	1331	0
189	0.502	0.052	5355	205140	1414	0
190	0.504	0.052	4365	166552	1148	0
191	0.504	0.050	5380	213492	1472	0
192	0.504	0.047	5565	234929	1619	0
193	0.502	0.044	4050	183357	1264	0
194	0.501	0.051	5345	209189	1442	0
195	0.504	0.052	5400	206043	1420	0
196	0.504	0.050	4955	196626	1355	0
197	0.504	0.050	5300	210317	1450	0
198	0.504	0.044	4745	213970	1475	0

Table C19

NARMCO TASK 4 12PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	0.000	0.000	0	0	0	2
2	0.499	0.073	7330	201224	1387	0
3	0.495	0.075	7910	213063	1469	0
4	0.499	0.078	7830	201171	1387	0
5	0.499	0.077	7250	188089	1301	0
6	0.495	0.071	6250	177834	1226	0
7	0.499	0.071	6180	174433	1202	0
8	0.500	0.073	7750	212328	1464	0
9	0.500	0.075	7220	192533	1327	0
10	0.500	0.075	7670	204533	1410	0
11	0.498	0.074	7430	201617	1390	0
12	0.500	0.071	6600	185915	1281	0
13	0.501	0.073	7280	199053	1372	0
14	0.501	0.072	7690	213184	1469	0
15	0.501	0.074	8330	224685	1549	0
16	0.500	0.071	7360	207323	1429	0
17	0.501	0.065	5930	182097	1255	0
18	0.000	0.000	0	0	0	2
19	0.000	0.000	0	0	0	2
20	0.500	0.071	7730	217746	1501	0
21	0.496	0.071	7070	200761	1384	0
22	0.500	0.065	6500	200000	1378	0
23	0.000	0.000	0	0	0	2
24	0.500	0.071	6420	180845	1246	0
25	0.500	0.071	7190	202535	1396	0
26	0.500	0.075	7100	189333	1305	0
27	0.501	0.072	7220	200155	1380	0
28	0.499	0.069	7240	210275	1449	0
29	0.000	0.000	0	0	0	2
30	0.498	0.072	7120	198572	1369	0
31	0.000	0.000	0	0	0	2
32	0.000	0.000	0	0	0	2
33	0.498	0.070	7090	203384	1402	0
34	0.501	0.071	6890	193697	1335	0
35	0.499	0.072	7090	197339	1360	0
36	0.000	0.000	0	0	0	2
37	0.500	0.072	7600	211111	1455	0
38	0.000	0.000	0	0	0	2
39	0.499	0.071	7440	209997	1447	0
40	0.000	0.000	0	0	0	2

NARMCO TASK 4 12PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	0.502	0.073	6980	190470	1313	0
42	0.000	0.000	0	0	0	2
43	0.502	0.071	7700	216037	1489	0
44	0.500	0.075	7430	198133	1366	0
45	0.500	0.075	6920	184533	1272	0
46	0.498	0.077	6400	166901	1150	0
47	0.000	0.000	0	0	0	2
48	0.000	0.000	0	0	0	2
49	0.500	0.075	6930	184800	1274	0
50	0.501	0.074	6720	181259	1249	0
51	0.500	0.073	6540	179178	1235	0
52	0.500	0.076	7270	191315	1319	0
53	0.500	0.074	6980	188648	1300	0
54	0.498	0.072	6460	180165	1242	0
55	0.495	0.071	7910	225067	1551	0
56	0.500	0.073	6760	185205	1276	0
57	0.500	0.071	7200	202816	1398	0
58	0.501	0.071	7030	197632	1362	0
59	0.500	0.069	7280	211014	1454	0
60	0.500	0.068	6550	192647	1328	0
61	0.498	0.070	6930	198795	1370	0
62	0.501	0.072	0	0	0	2
63	0.500	0.069	6650	192753	1329	0
64	0.501	0.070	7120	203022	1399	0
65	0.502	0.050	5405	215338	1484	5
66	0.503	0.069	7110	204857	1412	0
67	0.502	0.073	7830	213665	1473	0
68	0.503	0.072	8335	230146	1586	0
69	0.503	0.071	8435	236188	1628	0
70	0.502	0.064	6255	194689	1342	0
71	0.504	0.069	7405	212934	1468	0
72	0.504	0.073	8085	219748	1515	0
73	0.504	0.074	7765	208199	1435	0
74	0.503	0.071	8600	240808	1660	0
75	0.503	0.071	7600	212807	1467	0
76	0.504	0.071	6880	192264	1325	0
77	0.504	0.074	8250	221203	1525	0
78	0.502	0.073	7820	213393	1471	0
79	0.502	0.072	7160	198096	1365	0
80	0.504	0.070	0	0	0	1

NARMCO TASK 4 12PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
81	0.503	0.066	5575	167931	1157	0
82	0.501	0.073	7860	214912	1481	0
83	0.503	0.077	7815	201776	1391	0
84	0.503	0.076	8060	210840	1453	0
85	0.501	0.072	7945	220253	1518	0
86	0.504	0.073	7575	205887	1419	0
87	0.503	0.074	7095	190613	1314	0
88	0.504	0.072	6825	188078	1296	0
89	0.503	0.073	7695	209564	1444	0
90	0.504	0.072	7905	217840	1502	0
91	0.505	0.070	7445	210608	1452	0
92	0.503	0.073	7310	199079	1372	0
93	0.505	0.073	7815	211989	1461	0
94	0.503	0.075	7270	192710	1328	0
95	0.505	0.072	7580	208470	1437	0
96	0.503	0.065	7020	214711	1480	0
97	0.503	0.074	6560	176239	1215	0
98	0.504	0.075	8350	220899	1523	0
99	0.504	0.075	7000	185185	1276	0
100	0.504	0.075	7480	197883	1364	0
101	0.504	0.074	7290	195463	1347	0
102	0.504	0.072	6825	188078	1296	0
103	0.504	0.072	7020	193452	1333	0
104	0.504	0.075	6945	183730	1266	0
105	0.505	0.075	7415	195775	1349	0
106	0.503	0.073	6735	183420	1264	0
107	0.503	0.069	7300	210332	1450	0
108	0.505	0.072	7035	193481	1334	0
109	0.504	0.074	7995	214366	1478	0
110	0.505	0.074	7400	198019	1365	0
111	0.504	0.075	6855	181349	1250	0
112	0.505	0.075	7135	188382	1298	0
113	0.504	0.072	6955	191661	1321	0
114	0.505	0.074	7370	197217	1359	0
115	0.504	0.076	7580	197890	1364	0
116	0.505	0.075	6865	181254	1249	0
117	0.503	0.076	7560	197760	1363	0
118	0.504	0.073	7400	201130	1386	0
119	0.502	0.076	7870	206280	1422	0
120	0.502	0.078	7285	186050	1282	0

NARMCO TASK 4 12PLY UNIDIRECTIONAL TENSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
121	0.503	0.075	7055	187011	1289	0
122	0.502	0.075	7300	193891	1336	0
123	0.500	0.075	7765	207066	1427	0
124	0.499	0.076	6935	182865	1260	0
125	0.504	0.077	7475	192614	1328	0
126	0.504	0.078	7550	192053	1324	0
127	0.502	0.076	6160	161459	1113	0
128	0.503	0.073	7905	215283	1484	0
129	0.503	0.068	7050	206116	1421	0

Table C20

NARMCO TASK 4 8PLY CROSSPLY COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	0.253	0.048	515	42407	292	0
2	0.253	0.048	665	54759	377	0
3	0.254	0.047	835	69944	482	0
4	0.250	0.047	685	58297	401	0
5	0.247	0.049	785	64859	447	0
6	0.254	0.049	615	49413	340	0
7	0.251	0.050	760	60557	417	0
8	0.252	0.049	755	61143	421	0
9	0.246	0.049	755	62634	431	0
10	0.252	0.048	710	58697	404	0
11	0.248	0.049	795	65421	451	0
12	0.248	0.050	755	60887	419	0
13	0.251	0.049	755	61387	423	0
14	0.252	0.050	725	57539	396	0
15	0.251	0.048	735	61005	420	0
16	0.252	0.047	735	62056	427	0
17	0.251	0.049	755	61387	423	0
18	0.251	0.050	770	61354	423	0
19	0.251	0.049	730	59354	409	0
20	0.252	0.048	770	63657	438	0
21	0.252	0.047	805	67966	468	0
22	0.252	0.048	790	65310	450	0
23	0.252	0.047	715	60368	416	0
24	0.251	0.047	825	69933	482	0
25	0.252	0.047	785	66278	456	0
26	0.252	0.048	875	72337	498	0
27	0.253	0.047	815	68539	472	0
28	0.253	0.046	745	64014	441	0
29	0.252	0.047	795	67122	462	0
30	0.252	0.044	625	56367	388	0
31	0.252	0.047	700	59101	407	0
32	0.252	0.048	830	68617	473	0
33	0.252	0.048	715	59110	407	0
34	0.252	0.047	785	66278	456	0
35	0.252	0.049	830	67217	463	0
36	0.252	0.048	805	66550	458	0
37	0.253	0.047	895	75267	518	0
38	0.252	0.046	685	59092	407	0
39	0.252	0.047	900	75987	523	0
40	0.252	0.047	825	69655	480	0

NARMCO TASK 4 8PLY CROSSPLY COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	0.252	0.045	770	67901	468	0
42	0.253	0.046	760	65303	450	0
43	0.253	0.045	785	68950	475	0
44	0.251	0.047	825	69933	482	0
45	0.253	0.046	730	62725	432	0
46	0.252	0.047	810	68389	471	0
47	0.252	0.047	785	66278	456	0
48	0.253	0.045	760	66754	460	0
49	0.252	0.046	815	70307	484	0
50	0.252	0.046	855	73757	508	0
51	0.252	0.040	625	62003	427	0
52	0.253	0.040	665	65711	453	0
53	0.252	0.042	775	73223	504	0
54	0.252	0.045	805	70987	489	0
55	0.253	0.047	730	61390	423	0
56	0.252	0.046	830	71601	493	0
57	0.252	0.046	900	77639	535	0
58	0.252	0.047	830	70077	483	0
59	0.251	0.046	855	74051	510	0
60	0.253	0.046	795	68310	470	0
61	0.251	0.046	785	67988	468	0
62	0.252	0.048	915	75644	521	0
63	0.252	0.047	850	71766	494	0
64	0.252	0.045	920	81128	559	0
65	0.252	0.047	785	66278	456	0
66	0.252	0.045	725	63932	440	0
67	0.252	0.046	885	76345	526	0
68	0.252	0.046	860	74189	511	0
69	0.251	0.043	775	71805	495	0
70	0.252	0.043	625	57678	397	0
71	0.252	0.045	910	80246	553	0
72	0.252	0.048	870	71924	495	0
73	0.252	0.047	760	64167	442	0
74	0.253	0.042	690	64935	447	0
75	0.253	0.048	0	0	0	1
76	0.252	0.047	875	73877	509	0
77	0.252	0.047	905	76409	526	0
78	0.252	0.046	965	83247	573	0
79	0.252	0.047	875	73877	509	0
80	0.252	0.047	945	79787	550	0

NARMCO TASK 4 8PLY CROSSPLY COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
81	0.253	0.044	785	70517	486	0
82	0.253	0.042	830	78110	538	0
83	0.247	0.045	740	66576	459	0
84	0.252	0.046	855	73757	508	0
85	0.253	0.046	900	77332	533	0
86	0.252	0.048	975	80605	555	0
87	0.252	0.048	525	43402	299	0
88	0.252	0.049	435	35228	242	0
89	0.253	0.049	845	68161	469	0
90	0.254	0.049	770	61867	426	0
91	0.252	0.050	740	58730	404	0
92	0.252	0.048	545	45056	310	0
93	0.252	0.047	735	62056	427	0
94	0.252	0.049	620	50210	346	0
95	0.253	0.046	865	74325	512	0
96	0.252	0.048	790	65310	450	0
97	0.252	0.048	930	76884	530	0
98	0.252	0.048	855	70684	487	0
99	0.252	0.047	605	51080	352	0
100	0.252	0.047	820	69233	477	0
101	0.252	0.048	855	70684	487	0
102	0.252	0.048	960	79365	547	0
103	0.252	0.047	805	67966	468	0
104	0.253	0.046	835	71747	494	0
105	0.250	0.049	925	75510	520	0
106	0.250	0.049	785	64081	441	0
107	0.250	0.049	775	63265	436	0
108	0.249	0.049	750	61470	423	0
109	0.250	0.049	690	56326	388	0
110	0.250	0.049	660	53877	371	0
111	0.250	0.049	25	67346	464	0
112	0.250	0.049	50	69387	478	0
113	0.250	0.047	825	70212	484	0
114	0.251	0.047	555	47045	324	0
115	0.250	0.046	445	38695	266	0
116	0.251	0.047	825	69933	482	0
117	0.251	0.049	755	61387	423	0
118	0.251	0.048	875	72626	500	0
119	0.250	0.047	840	71489	492	0
120	0.249	0.047	690	58959	406	0

NARMCO TASK 4 8PLY CROSSPLY COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
121	0.249	0.048	855	71536	493	0
122	0.248	0.048	745	62584	431	0
123	0.253	0.049	750	60498	417	0
124	0.249	0.048	795	66516	458	0
125	0.249	0.049	795	65158	449	0
126	0.252	0.047	710	59945	413	0
127	0.252	0.047	845	71344	491	0

Table C21

NARMCO TASK 4 12PLY UNIDIRECTIONAL COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
1	0.245	0.075	2470	134421	926	0
2	0.000	0.000	0	0	0	3
3	0.244	0.073	2605	146249	1008	0
4	0.000	0.000	0	0	0	3
5	0.244	0.070	2160	126463	871	0
6	0.245	0.069	2580	152617	1052	0
7	0.000	0.000	0	0	0	3
8	0.000	0.000	0	0	0	3
9	0.245	0.065	2505	157299	1084	4
10	0.245	0.065	2025	127158	876	4
11	0.248	0.067	2670	160688	1107	0
12	0.244	0.071	2360	136227	939	0
13	0.245	0.073	2510	140341	967	0
14	0.247	0.073	2615	145028	999	0
15	0.243	0.073	2575	145160	1000	0
16	0.244	0.071	2620	151235	1042	0
17	0.253	0.072	2650	145476	1003	0
18	0.253	0.071	2300	128040	882	0
19	0.247	0.069	2340	137299	946	0
20	0.247	0.059	2110	144788	998	0
21	0.250	0.066	2470	149696	1032	0
22	0.250	0.068	2815	165588	1141	0
23	0.250	0.072	2705	150277	1036	0
24	0.252	0.070	2375	134637	928	0
25	0.247	0.070	2310	133603	921	0
26	0.247	0.072	2320	130454	899	0
27	0.247	0.071	2440	139134	959	0
28	0.247	0.072	2560	143949	992	0
29	0.249	0.072	2620	146140	1007	0
30	0.249	0.072	2635	146976	1013	0
31	0.250	0.070	2605	148857	1026	0
32	0.250	0.066	2080	126060	869	0
33	0.251	0.071	1970	110543	762	0
34	0.250	0.073	2950	161643	1114	0
35	0.247	0.072	2740	154071	1062	0
36	0.247	0.073	2650	146969	1013	0
37	0.247	0.073	2575	142809	984	0
38	0.251	0.072	2910	161022	1110	0
39	0.252	0.075	2540	134391	926	0
40	0.250	0.071	2745	154647	1066	0

NARMCO TASK 4 12PLY UNIDIRECTIONAL COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
41	0.249	0.072	2755	153670	1059	0
42	0.250	0.067	2705	161492	1113	0
43	0.250	0.071	2270	127887	881	0
44	0.250	0.072	2405	133611	921	0
45	0.251	0.072	2320	128375	885	0
46	0.251	0.072	2410	133355	919	0
47	0.250	0.072	2305	128055	882	0
48	0.250	0.071	2480	139718	963	0
49	0.250	0.071	2345	132112	910	0
50	0.250	0.071	2560	144225	994	0
51	0.251	0.070	2545	144849	998	0
52	0.252	0.070	2650	150226	1035	0
53	0.251	0.069	2715	156764	1080	0
54	0.252	0.067	2070	122601	845	0
55	0.252	0.068	2045	119339	822	4
56	0.252	0.069	2645	152116	1048	4
57	0.251	0.069	2510	144927	999	0
58	0.250	0.070	2485	142000	979	0
59	0.251	0.070	2865	163062	1124	0
60	0.251	0.070	2575	146556	1010	0
61	0.252	0.070	2755	156179	1076	0
62	0.250	0.069	2545	147536	1017	0
63	0.250	0.068	2580	151764	1046	0
64	0.250	0.060	1965	131000	903	0
65	0.250	0.072	2825	156944	1082	0
66	0.252	0.072	3160	174162	1200	0
67	0.251	0.072	2945	162959	1123	0
68	0.251	0.072	2670	147742	1018	0
69	0.251	0.073	2950	160999	1110	0
70	0.252	0.073	2815	153022	1055	4
71	0.251	0.073	2705	147628	1017	4
72	0.251	0.074	2710	145902	1005	0
73	0.251	0.074	2855	153709	1059	4
74	0.252	0.073	2410	131006	903	4
75	0.251	0.074	2710	145902	1005	0
76	0.251	0.074	3010	162054	1117	0
77	0.251	0.074	2845	153171	1056	0
78	0.251	0.074	2855	153709	1059	0
79	0.251	0.074	2765	148864	1026	0
80	0.251	0.074	2810	151286	1043	0

NARMCO TASK 4 12PLY UNIDIRECTIONAL COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
81	0.251	0.072	2725	150785	1039	0
82	0.251	0.071	2905	163009	1123	0
83	0.252	0.070	2615	148242	1022	0
84	0.252	0.069	2850	163906	1130	0
85	0.252	0.065	2885	176129	1214	0
86	0.251	0.071	2960	166096	1145	0
87	0.251	0.071	2840	159362	1098	0
88	0.251	0.070	2270	129197	890	0
89	0.251	0.071	2675	150103	1034	0
90	0.251	0.070	2600	147979	1020	0
91	0.251	0.069	2640	152433	1051	0
92	0.251	0.070	2745	156232	1077	0
93	0.251	0.070	2725	155093	1069	0
94	0.251	0.070	2545	144849	998	0
95	0.251	0.066	2865	172944	1192	0
96	0.251	0.066	2840	171435	1182	0
97	0.251	0.068	3040	178111	1228	0
98	0.251	0.070	2940	167330	1153	0
99	0.251	0.071	2565	143931	992	0
100	0.251	0.070	2840	161639	1114	0
101	0.251	0.070	2715	154524	1065	0
102	0.251	0.069	2770	159939	1102	0
103	0.251	0.070	2775	157939	1088	0
104	0.251	0.070	2760	157085	1083	0
105	0.250	0.070	2805	160285	1105	0
106	0.251	0.063	2610	165054	1138	0
107	0.252	0.070	2640	149659	1031	0
108	0.251	0.065	2170	133006	917	0
109	0.252	0.065	2345	143162	987	0
110	0.252	0.067	2670	158137	1090	0
111	0.251	0.068	2610	152917	1054	0
112	0.252	0.068	2670	155812	1074	0
113	0.251	0.068	2715	159069	1096	0
114	0.251	0.070	2970	169038	1165	0
115	0.251	0.069	3000	173220	1194	0
116	0.252	0.069	2845	163618	1128	0
117	0.251	0.067	2870	170660	1176	0
118	0.251	0.066	2580	155740	1073	4
119	0.252	0.064	2505	155319	1070	0
120	0.251	0.063	2640	166951	1151	0

NARMCO TASK 4 12PLY UNIDIRECTIONAL COMPRESSION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI.	STRESS MPA.	COND
121	0.251	0.066	2955	178377	1229	0
122	0.251	0.067	2915	173336	1195	0
123	0.251	0.068	2975	174302	1201	0
124	0.251	0.068	2845	166686	1149	0
125	0.251	0.069	2820	162826	1122	0
126	0.251	0.068	2900	169908	1171	0
127	0.251	0.066	2565	154835	1067	0
128	0.252	0.063	2505	157785	1087	0
129	0.251	0.059	2100	141805	977	0
130	0.251	0.042	1395	132327	912	5

TABLE C22

HERCULES 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
1	.7795	.2510	.1405	555	11803	0
2	.7795	.2500	.1420	645	13627	0
3	.7800	.2535	.1350	450	9862	0
4	.7800	.2490	.1450	620	12879	0
5	.7815	.2500	.1430	610	12797	0
6	.7820	.2450	.1485	580	11956	0
7	.7810	.2490	.1430	660	13902	0
8	.7805	.2480	.1445	565	11825	0
9	.7810	.2470	.1445	605	12713	0
10	.7805	.2450	.1420	600	12935	0
11	.7805	.2510	.1435	635	13222	0
12	.7800	.2495	.1425	640	13501	0
13	.7810	.2495	.1430	625	13138	0
14	.7810	.2480	.1405	570	12269	0
15	.7800	.2490	.1465	595	12233	0
16	.7810	.2520	.1485	630	12626	0
17	.7810	.2510	.1500	685	13645	0
18	.7800	.2470	.1445	600	12608	0
19	.7810	.2520	.1445	615	12667	0
20	.7825	.2510	.1495	670	13391	0
21	.7830	.2490	.1525	520	10271	0
22	.7815	.2500	.1470	570	11633	0
23	.7825	.2520	.1490	690	13782	0
24	.7805	.2500	.1365	405	8901	0
25	.7815	.2520	.1460	675	13760	0
26	.7805	.2500	.1460	615	12637	0
27	.7810	.2490	.1490	595	12028	0
28	.7815	.2515	.1475	555	11221	0
29	.7805	.2500	.1480	600	12162	0
30	.7805	.2480	.1370	395	8719	0
31	.7800	.2500	.1425	640	13474	0
32	.7800	.2490	.1465	600	12336	0
33	.7800	.2520	.1425	600	12531	0
34	.7805	.2470	.1435	575	12167	0
35	.7815	.2460	.1475	590	12195	0
36	.7805	.2480	.1480	590	12056	0
37	.7815	.2520	.1480	600	12056	0
38	.7810	.2535	.1440	640	13149	0
39	.7810	.2515	.1410	660	13959	0
40	.7810	.2500	.1435	590	12334	0

HERCULES 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD L. S.	SHEAR STRENGTH PSI	COND
41	.7815	.2450	.1460	575	12056	0
42	.7810	.2490	.1410	595	12710	0
43	.7810	.2525	.1440	690	14233	0
44	.7810	.2500	.1435	580	12125	0
45	.7800	.2510	.1480	590	11912	0
46	.7800	.2500	.1425	635	13368	0
47	.7765	.2520	.1520	655	12825	0
48	.7790	.2510	.1430	540	11284	0
49	.7770	.2520	.1475	700	14124	0
50	.7820	.2500	.1430	635	13322	0
51	.7800	.2520	.1445	460	9474	0
52	.7810	.2490	.1430	600	12638	0
53	.7805	.2520	.1420	605	12680	0
54	.7810	.2480	.1435	660	13809	0
55	.7820	.2515	.1475	585	11827	0
56	.7810	.2515	.1415	640	13488	0
57	.7800	.2525	.1435	645	13351	0
58	.7795	.2510	.1425	630	13210	0
59	.7805	.2530	.1445	585	12001	0
60	.7815	.2485	.1445	675	14098	0
61	.7810	.2470	.1415	675	14485	0
62	.7815	.2480	.1410	635	13620	0
63	.7810	.2470	.1445	590	12398	0
64	.7810	.2500	.1415	570	12095	0
65	.7810	.2510	.1450	700	14425	0
66	.7815	.2530	.1440	670	13793	0
67	.7810	.2510	.1475	605	12256	0
68	.7800	.2505	.1440	650	13515	0
69	.7810	.2475	.1455	605	12600	0
70	.7820	.2515	.1440	620	12840	0
71	.7810	.2510	.1425	675	14154	0
72	.7810	.2470	.1475	660	13587	0
73	.7820	.2520	.1435	610	12651	0
74	.7815	.2520	.1455	660	13500	0
75	.7820	.2530	.1500	575	11364	0
76	.7805	.2415	.1365	390	8873	0
77	.7765	.2520	.1440	650	13434	0
78	.7820	.2510	.1425	695	14573	0
79	.6905	.2495	.1140	405	10679	0
80	.6870	.2515	.1200	430	10686	0

HERCULES 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
81	.6895	.2515	.1200	520	12922	0
82	.6890	.2505	.1205	365	9069	0
83	.6880	.2460	.1170	350	9120	0
84	.6875	.2510	.1190	415	10421	0
85	.6900	.2500	.1200	485	12125	0
86	.6875	.2455	.1180	390	10097	0
87	.6890	.2505	.1190	410	10316	0
88	.6835	.2500	.1185	370	9367	0
89	.6890	.2460	.1200	405	10290	0
90	.6870	.2445	.1165	390	10269	0
91	.6925	.2510	.1195	390	9752	0
92	.6890	.2510	.1140	425	11140	0
93	.6850	.2505	.1195	490	12277	0
94	.6895	.2470	.1240	425	10407	0
95	.6885	.2460	.1200	400	10163	0
96	.6920	.2500	.1240	420	10161	0
97	.6870	.2495	.1220	465	11457	0
98	.6875	.2490	.1190	455	11517	0
99	.6910	.2515	.1170	420	10705	0
100	.6870	.2505	.1195	450	11275	0
101	.6910	.2490	.1205	440	10998	0
102	.6875	.2490	.1130	375	9996	0
103	.6820	.2500	.1180	425	10805	0
104	.6890	.2500	.1215	440	10864	0
105	.6880	.2500	.1205	425	10581	0
106	.6870	.2490	.1165	455	11764	0
107	.6925	.2515	.1195	415	10356	0
108	.6940	.2505	.1170	350	8956	0
109	.6875	.2505	.1210	465	11506	0
110	.6940	.2525	.1180	420	10572	0
111	.6880	.2510	.1200	450	11205	0
112	.6910	.2520	.1190	485	12130	0
113	.6885	.2505	.1225	450	10998	0
114	.6875	.2505	.1185	425	10738	0
115	.6875	.2505	.1235	490	11879	0
116	.6880	.2490	.1190	405	10251	0
117	.6885	.2500	.1140	445	11711	0
118	.6915	.2500	.1125	455	12133	0
119	.6875	.2505	.1205	435	10808	0
120	.6890	.2510	.1195	450	11252	0

HERCULES 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
121	.6875	.2510	.1180	375	9496	0
122	.6890	.2515	.1195	400	9982	0
123	.6905	.2510	.1240	450	10844	0
124	.6900	.2505	.1210	435	10767	0
125	.6875	.2485	.1190	400	10145	0
126	.6885	.2505	.1200	505	12600	0
127	.6920	.2485	.1195	435	10986	0
128	.6870	.2520	.1140	380	9921	0
129	.6900	.2500	.1200	465	11625	0
130	.6895	.2505	.1140	375	9849	0
131	.6875	.2500	.1230	430	10488	0
132	.6880	.2495	.1195	460	11571	0
133	.6895	.2510	.1205	400	9919	0
134	.6885	.2510	.1195	470	11752	0
135	.6890	.2500	.1135	395	10441	0
136	.6890	.2505	.1210	435	10764	0
137	.6905	.2515	.1175	400	10152	0
138	.6900	.2485	.1190	485	12301	0
139	.6880	.2510	.1205	470	11655	0
140	.6890	.2465	.1170	385	10012	0
141	.6835	.2455	.1180	385	9968	0
142	.6880	.2505	.1195	500	12527	0
143	.6885	.2510	.1190	425	10672	0
144	.6895	.2505	.1205	445	11057	0
145	.6900	.2505	.1210	465	11506	0
146	.6900	.2500	.1205	410	10207	0
147	.6745	.2500	.1210	400	9917	0
148	.6875	.2495	.1180	440	11209	0
149	.6930	.2495	.1180	435	11081	0
150	.6910	.2505	.1170	385	9852	0
151	.6875	.2525	.1180	405	10195	0
152	.6895	.2505	.1205	460	11429	0
153	.6960	.2495	.1175	425	10873	0
154	.6860	.2505	.1220	480	11780	0
155	.6875	.2510	.1210	440	10866	0
156	.6890	.2520	.1240	470	11281	0
157	.6895	.2500	.1185	410	10380	0
158	.6890	.2505	.1210	465	11506	0
159	.6900	.2510	.1200	475	11828	0
160	.6940	.2520	.1220	425	10368	0

HERCULES 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
161	.6915	.2505	.1195	515	12903	0
162	.6905	.2490	.1180	410	10466	0
163	.6910	.2490	.1205	445	11123	0
164	.6890	.2505	.1200	465	11602	0
165	.6845	.2500	.1180	435	11059	0
166	.6875	.2495	.1180	350	8916	0
167	.6900	.2465	.1200	420	10649	0
168	.6905	.2535	.1190	425	10566	0
169	.6845	.2500	.1225	405	9918	0
170	.6875	.2490	.1210	465	11575	0
171	.6875	.2510	.1230	490	11904	0
172	.6950	.2500	.1170	420	10769	0
173	.6895	.2475	.1190	460	11714	0
174	.6900	.2510	.1195	420	10592	0
175	.6970	.2495	.1185	435	11035	0
176	.6900	.2500	.1130	370	9823	0
177	.6890	.2505	.1210	465	11506	0
178	.6910	.2500	.1220	405	9959	0
179	.6870	.2495	.1170	410	10534	0
180	.6915	.2480	.1190	385	9784	0
181	.6895	.2530	.1205	395	9717	0
182	.6895	.2510	.1140	365	9567	0
183	.6880	.2500	.1210	400	9917	0
184	.6905	.2500	.1195	455	11423	0
185	.6900	.2500	.1195	455	11423	0
186	.6880	.2500	.1210	480	11901	0
187	.6895	.2515	.1195	475	11854	0
188	.6885	.2505	.1195	435	10899	0
189	.6880	.2500	.1220	450	11066	0
190	.6875	.2510	.1185	405	10212	0
191	.6910	.2470	.1185	390	9993	0
192	.6910	.2500	.1240	435	10524	0
193	.6910	.2505	.1185	425	10738	0
194	.6900	.2490	.1210	435	10828	0
195	.6905	.2515	.1190	390	9773	0
196	.6925	.2510	.1190	425	10672	0
197	.6900	.2495	.1185	415	10549	0
198	.6905	.2490	.1200	405	10166	0
199	.6880	.2495	.1180	475	12100	0
200	.6900	.2520	.1200	425	13021	0

HERCULES 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
201	.6890	.2505	.1205	455	11305	0
202	.6900	.2515	.1145	445	11590	0
203	.6905	.2500	.1135	420	11101	0
204	.6890	.2510	.1140	410	10746	0
205	.6875	.2515	.1195	425	10606	0
206	.6935	.2505	.1175	465	11849	0
207	.6875	.2510	.1225	455	11098	0
208	.6870	.2500	.1195	420	10544	0
209	.6880	.2500	.1200	470	11750	0
210	.6890	.2515	.1135	430	10383	0
211	.6895	.2485	.1190	410	10399	0
212	.6895	.2510	.1140	415	10878	0
213	.6875	.2490	.1200	395	9915	0
214	.6875	.2515	.1195	395	9857	0
215	.6765	.2490	.1160	410	10646	0
216	.6770	.2505	.1155	410	10628	0
217	.6775	.2480	.1200	455	11467	0
218	.6780	.2505	.1185	420	10612	0
219	.6745	.2495	.1165	465	11998	0
220	.6735	.2505	.1175	485	12358	0
221	.6780	.2565	.1165	365	9161	0
222	.6770	.2490	.1160	410	10646	0
223	.6725	.2485	.1165	465	12047	0
224	.6735	.2470	.1175	420	10854	0
225	.6730	.2490	.1185	395	10040	0
226	.6720	.2510	.1160	410	10561	0
227	.6720	.2485	.1160	405	10537	0
228	.6740	.2500	.1205	460	11452	0
229	.6710	.2510	.1180	405	10256	0
230	.6740	.2485	.1170	495	12769	0
231	.6760	.2475	.1200	415	10480	0
232	.6740	.2505	.1165	430	11051	0
233	.6735	.2540	.1180	395	9884	0
234	.6740	.2495	.1155	425	11061	0
235	.6785	.2500	.1145	420	11004	0
236	.6710	.2510	.1155	400	10348	0
237	.6740	.2500	.1175	415	10596	0
238	.6720	.2455	.1160	435	11456	0
239	.6720	.2510	.1175	435	11062	0
240	.6795	.2500	.1175	440	11234	0

HERCULES 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
241	.6725	.2500	.1195	490	12301	0
242	.6725	.2480	.1165	420	10903	0
243	.6775	.2505	.1160	435	11228	0
244	.6720	.2465	.1180	470	12119	0
245	.6745	.2460	.1205	385	9741	0
246	.6790	.2500	.1195	425	10669	0
247	.6785	.2500	.1180	465	11822	0
248	.6715	.2495	.1155	375	10280	0
249	.6810	.2515	.1175	445	11294	0
250	.6760	.2480	.1195	415	10502	0
251	.6740	.2545	.1160	410	10416	0
252	.6735	.2450	.1185	415	10721	0
253	.6740	.2515	.1160	455	11697	0
254	.6740	.2510	.1160	465	11978	0
255	.6795	.2475	.1160	425	11102	0
256	.6760	.2455	.1170	435	11358	0
257	.6740	.2485	.1165	345	9715	0
258	.6735	.2495	.1170	425	10919	0
259	.6740	.2455	.1165	405	10620	0
260	.6770	.2480	.1175	385	9909	0
261	.6740	.2475	.1175	440	11348	0
262	.6735	.2480	.1160	425	11080	0
263	.6740	.2495	.1195	400	10062	0
264	.6730	.2500	.1170	440	11282	0
265	.6735	.2505	.1195	425	10648	0
266	.6765	.2495	.1180	430	10954	0
267	.6720	.2495	.1105	325	8841	0
268	.6730	.2485	.1190	495	12554	0
269	.6720	.2480	.1175	420	10810	0
270	.6810	.2495	.1160	460	11920	0
271	.6735	.2500	.1195	440	11046	0
272	.6735	.2490	.1190	400	10125	0
273	.6720	.2495	.1175	440	11257	0
274	.6755	.2480	.1145	335	10169	0
275	.6775	.2505	.1170	395	10108	0
276	.6735	.2515	.1205	475	11755	0
277	.6725	.2485	.1195	470	11870	0
278	.6760	.2505	.1170	425	10876	0
279	.6730	.2490	.1145	375	9865	0
280	.6725	.2465	.1155	365	9615	0

HERUCLES 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
281	.6715	.2470	.1165	440	11468	0
282	.6730	.2470	.1200	425	10754	0
283	.6725	.2470	.1150	380	10033	0
284	.6725	.2515	.1115	355	9537	0
285	.6740	.2490	.1205	470	11748	0
286	.6800	.2505	.1175	400	10192	0
287	.6735	.2440	.1200	410	10502	0
288	.6790	.2475	.1170	400	10360	0
289	.6770	.2500	.1115	355	9552	0
290	.6730	.2500	.1175	410	10468	0
291	.6740	.2510	.1205	470	11655	0
292	.6740	.2485	.1165	375	9715	0
293	.6735	.2485	.1160	430	11188	0
294	.6735	.2505	.1160	415	10711	0
295	.6740	.2520	.1180	440	11098	0
296	.6730	.2485	.1175	415	10660	0
297	.6725	.2520	.1150	400	10352	0
298	.6735	.2495	.1180	435	11081	0
299	.6775	.2465	.1150	395	10451	0
300	.6735	.2510	.1195	445	11127	0
301	.6715	.2500	.1155	415	10779	0
302	.6740	.2480	.1155	435	11390	0
303	.6735	.2470	.1170	400	10381	0
304	.6755	.2490	.1155	415	10823	0
305	.6765	.2500	.1205	435	10830	0
306	.6780	.2485	.1155	440	11498	0
307	.6745	.2495	.1205	450	11226	0
308	.6715	.2490	.1175	490	12561	0
309	.6795	.2500	.1170	425	10897	0
310	.6735	.2495	.1195	510	12829	0
311	.6730	.2490	.1185	465	11819	0
312	.6780	.2495	.1155	410	10671	0
313	.6815	.2515	.1160	395	10155	0
314	.6715	.2495	.1180	410	10445	0
315	.6730	.2485	.1175	410	10531	0
316	.6730	.2460	.1170	465	12117	0
317	.6740	.2485	.1210	410	10227	0
318	.6740	.2480	.1150	450	11834	0
319	.6785	.2490	.1170	385	9911	0
320	.6730	.2510	.1160	485	12493	0

HERCULES 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
321	.6740	.2485	.1170	415	10705	0
322	.6775	.2505	.1180	480	12179	0
323	.6745	.2545	.1165	430	10877	0
324	.6780	.2490	.1170	430	11070	0
325	.6730	.2500	.1195	410	10293	0
326	.6725	.2500	.1175	455	11617	0
327	.6740	.2495	.1100	345	9428	0
328	.6730	.2450	.1105	430	11912	0
329	.6735	.2485	.1190	450	11413	0
330	.6735	.2480	.1165	455	11811	0
331	.6740	.2505	.1175	475	12103	0
332	.6740	.2480	.1155	440	11521	0
333	.6740	.2490	.1185	420	10676	0
334	.6735	.2465	.1190	445	11378	0
335	.6760	.2500	.1170	475	12179	0
336	.6725	.2485	.1190	420	10652	0
337	.6795	.2500	.1205	445	11079	0
338	.6725	.2465	.1180	420	10830	0
339	.6760	.2480	.1170	420	10856	0
340	.6725	.2495	.1170	435	11176	0
341	.6795	.2485	.1160	365	9497	0
342	.6755	.2495	.1205	455	11351	0
343	.6720	.2480	.1170	435	11244	0
344	.6730	.2490	.1135	350	9288	0
345	.6805	.2515	.1185	440	11073	0
346	.6725	.2480	.1180	450	11533	0
347	.6745	.2490	.1170	450	11585	0
348	.6640	.2500	.1140	390	10263	4
349	.6890	.2445	.1235	425	10556	4
350	.6770	.2505	.1100	290	7893	4
351	.6720	.2490	.1150	390	10215	4
352	.6775	.2495	.1175	390	9977	4
353	.6735	.2495	.1175	400	10233	4
354	.6775	.2500	.1140	380	10000	.
355	.6745	.2500	.1180	385	9788	.
356	.6770	.2465	.1150	350	9260	4
357	.6745	.2525	.1175	390	9859	4
358	.6740	.2510	.1170	380	9705	4
359	.6725	.2510	.1070	330	9215	4

TABLE C23

UNION CARBIDE 25-PLY UNIDIRECTIONAL SHORT BEAM

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
1	.7480	.2495	.1385	685	14867	0
2	.7425	.2500	.1395	645	13871	0
3	.7440	.2495	.1420	675	14289	0
4	.7465	.2500	.1430	695	14580	0
5	.7435	.2495	.1435	725	15187	0
6	.7445	.2500	.1430	695	14580	0
7	.7465	.2500	.1340	660	14776	0
8	.7450	.2505	.1360	710	15631	0
9	.7440	.2490	.1445	700	14591	0
10	.7465	.2500	.1455	695	14330	0
11	.7410	.2505	.1450	725	14970	0
12	.7460	.2505	.1460	715	14662	0
13	.7405	.2505	.1480	690	13959	0
14	.7360	.2500	.1430	675	14161	0
15	.7415	.2510	.1430	545	12433	0
16	.7480	.2500	.1450	650	13448	0
17	.7465	.2495	.1430	655	13769	0
18	.7435	.2495	.1395	595	12821	0
19	.7460	.2500	.1405	500	10676	0
20	.7445	.2495	.1465	705	14466	0
21	.7470	.2500	.1405	645	13772	0
22	.7430	.2495	.1340	625	14021	0
23	.7455	.2510	.1465	695	14195	0
24	.7430	.2500	.1465	695	14232	0
25	.7450	.2495	.1465	675	13850	0
26	.7460	.2495	.1440	650	13569	0
27	.7435	.2495	.1415	645	13702	0
28	.7435	.2485	.1395	645	13955	0
29	.7455	.2500	.1380	550	11957	0
30	.7430	.2510	.1450	710	14631	0
31	.7400	.2495	.1450	685	14201	0
32	.7455	.2505	.1430	675	14133	0
33	.7415	.2505	.1440	680	14138	0
34	.7440	.2500	.1470	700	14286	0
35	.7450	.2485	.1445	680	14203	0
36	.7365	.2490	.1430	670	14112	0
37	.7455	.2500	.1420	670	14155	0
38	.7420	.2495	.1410	665	14177	0
39	.7430	.2475	.1340	565	12777	0
40	.7480	.2480	.1320	685	15694	0

UNION CARBIDE 25-PLY UNIDIRECTIONAL SHORT BEAM

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	FAILURE THICK IN.	SHEAR LOAD LBS.	STRENGTH PSI	COND
41	.7375	.2500	.1420	660	13944	0
42	.7440	.2520	.1430	650	13528	0
43	.7450	.2500	.1450	645	13345	0
44	.7440	.2490	.1425	670	14162	0
45	.7430	.2490	.1460	710	14648	0
46	.7450	.2495	.1360	670	14809	0
47	.7445	.2495	.1435	680	14245	0
48	.7450	.2490	.1340	640	14386	0
49	.7455	.2500	.1445	655	13599	0
50	.7440	.2505	.1440	730	15178	0
51	.7460	.2500	.1480	705	14291	0
52	.7450	.2480	.1330	645	14666	0
53	.7460	.2510	.1470	665	13517	0
54	.7430	.2510	.1430	605	12642	0
55	.7475	.2490	.1420	680	14424	0
56	.7460	.2490	.1425	700	14796	0
57	.7445	.2500	.1440	690	14375	0
58	.7435	.2490	.1410	675	14419	0
59	.7400	.2500	.1465	725	14846	0
60	.7415	.2480	.1420	660	14056	0
61	.7430	.2470	.1440	710	14971	0
62	.7390	.2505	.1460	690	14150	0
63	.7445	.2490	.1450	675	14022	0
64	.7455	.2495	.1460	670	13795	0
65	.7405	.2500	.1470	655	13367	0
66	.7425	.2490	.1420	690	14636	0
67	.7450	.2485	.1445	665	13890	0
68	.7440	.2500	.1445	655	13599	0
69	.7435	.2505	.1430	690	14447	0
70	.7445	.2505	.1430	685	14342	0
71	.7445	.2505	.1480	710	14363	0
72	.7340	.2500	.1480	680	13784	0
73	.7430	.2505	.1440	690	14346	0
74	.7445	.2510	.1435	695	14472	0
75	.7445	.2490	.1380	660	14405	0
76	.7480	.2550	.1390	670	14177	0
77	.7455	.2505	.1445	700	14504	0
78	.7425	.2500	.1420	675	14261	0
79	.7430	.2450	.1360	690	15531	0
80	.7405	.2495	.1450	680	14097	0

UNION CARBIDE 25-PLY UNIDIRECTIONAL SHORT BEAM

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
81	.7460	.2495	.1400	620	13312	0
82	.7435	.2500	.1340	525	11754	0
83	.7410	.2485	.1440	685	14357	0
84	.7425	.2510	.1445	720	14889	0
85	.7435	.2495	.1460	650	13383	0
86	.7440	.2490	.1430	615	12928	0
87	.7435	.2500	.1430	670	14056	0
88	.7460	.2500	.1450	690	14276	0
89	.7440	.2470	.1350	665	14957	0
90	.7440	.2310	.1420	665	15205	0
91	.7445	.2510	.1440	660	13695	0
92	.7445	.2500	.1435	705	14739	0
93	.7455	.2500	.1440	720	15000	0
94	.7450	.2490	.1460	735	15163	0
95	.7455	.2520	.1440	600	12401	0
96	.7440	.2500	.1440	665	13854	0
97	.7445	.2510	.1430	675	14104	0
98	.7380	.2500	.1430	735	15420	0
99	.7440	.2530	.1430	650	13475	0
100	.7440	.2480	.1450	670	13974	0
101	.7880	.2525	.1360	610	13323	0
102	.7875	.2545	.1355	685	14245	0
103	.7875	.2535	.1420	615	12814	0
104	.7880	.2505	.1360	635	13979	0
105	.7870	.2490	.1345	645	14444	0
106	.7880	.2535	.1455	625	12709	0
107	.7880	.2525	.1350	615	13531	0
108	.7885	.2520	.1445	630	12976	0
109	.7870	.2500	.1400	605	12964	0
110	.7880	.2520	.1355	650	14277	0
111	.7880	.2520	.1325	575	12916	0
112	.7860	.2525	.1345	670	14796	0
113	.7885	.2545	.1355	665	14463	0
114	.7865	.2515	.1345	610	13525	0
115	.7880	.2540	.1335	670	14819	0
116	.7885	.2540	.1330	585	12988	0
117	.7830	.2545	.1380	670	14308	0
118	.7875	.2535	.1355	600	13101	0
119	.7890	.2525	.1310	610	13831	0
120	.7895	.2555	.1275	595	13699	0

UNION CARBIDE 25-PLY UNIDIRECTIONAL SHORT BEAM

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
121	.7850	.2490	.1440	645	13491	0
122	.7890	.2550	.1355	620	13458	0
123	.7885	.2530	.1350	660	14493	0
124	.7830	.2555	.1435	685	14012	0
125	.7880	.2525	.1315	620	14004	0
126	.7875	.2490	.1305	620	14426	0
127	.7855	.2435	.1330	635	14706	0
128	.7885	.2490	.1400	615	13231	0
129	.7885	.2525	.1355	625	13701	0
130	.7880	.2515	.1340	635	14132	0
131	.7895	.2515	.1315	640	14514	0
132	.7865	.2520	.1360	615	13459	0
133	.7860	.2565	.1405	680	14152	0
134	.7865	.2490	.1355	620	13782	0
135	.7840	.2520	.1350	635	13999	0
136	.7865	.2500	.1320	575	13068	0
137	.7880	.2530	.1245	565	13453	0
138	.7875	.2550	.1365	620	13359	0
139	.7880	.2535	.1345	585	12868	0
140	.7865	.2500	.1320	620	14091	0
141	.7890	.2500	.1335	595	13371	0
142	.7865	.2545	.1355	630	13702	0
143	.7870	.2545	.1350	660	14407	0
144	.7865	.2525	.1340	640	14186	0
145	.7890	.2525	.1320	600	13501	0
146	.7845	.2515	.1430	635	13242	0
147	.7880	.2535	.1335	640	14183	0
148	.7835	.2555	.1355	625	13540	0
149	.7850	.2550	.1365	650	14006	0
150	.7880	.2550	.1365	685	14760	0
151	.7870	.2475	.1425	650	13822	0
152	.7885	.2550	.1440	675	13787	0
153	.7850	.2525	.1375	665	14365	0
154	.7865	.2500	.1350	670	14889	0
155	.7875	.2530	.1450	685	14004	0
156	.7880	.2530	.1345	680	14987	0
157	.7880	.2540	.1330	600	13321	0
158	.7860	.2525	.1340	660	14630	0
159	.7875	.2560	.1305	610	13694	0
160	.7890	.2490	.1335	650	14665	0

UNION CARBIDE 25-PLY UNIDIRECTIONAL SHORT BEAM

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
161	.7880	.2540	.1450	620	12626	0
162	.7840	.2530	.1350	580	12736	0
163	.7860	.2510	.1340	640	14271	0
164	.7845	.2520	.1350	645	14220	0
165	.7875	.2505	.1300	645	14855	0
166	.7830	.2525	.1265	625	14675	0
167	.7870	.2525	.1280	610	14155	0
168	.7885	.2500	.1345	660	14721	0
169	.7880	.2540	.1365	675	14602	0
170	.7870	.2530	.1370	635	13740	0
171	.7875	.2525	.1355	605	13262	0
172	.7880	.2535	.1355	645	14083	0
173	.7890	.2530	.1310	620	14030	0
174	.7890	.2535	.1345	640	14078	0
175	.7880	.2495	.1405	590	12623	0
176	.7890	.2520	.1340	630	13993	0
177	.7850	.2530	.1310	640	14483	0
178	.7855	.2520	.1340	645	14326	0
179	.7910	.2515	.1300	600	13764	0
180	.7890	.2540	.1350	645	14108	0
181	.7885	.2505	.1365	615	13490	0
182	.7875	.2535	.1395	590	12513	0
183	.7890	.2540	.1360	620	13461	0
184	.7840	.2520	.1350	635	13999	0
185	.7870	.2535	.1340	655	14462	0
186	.7880	.2540	.1340	655	14433	0
187	.7880	.2540	.1345	645	14160	0
188	.7890	.2530	.1240	625	14942	0
189	.7880	.2525	.1440	680	14026	0
190	.7880	.2530	.1360	620	13514	0
191	.7860	.2540	.1340	635	13993	0
192	.7880	.2500	.1360	640	14118	0
193	.7875	.2530	.1430	630	13060	0
194	.7865	.2485	.1360	625	13870	0
195	.7870	.2520	.1355	650	14277	0
196	.7875	.2515	.1325	650	14629	0
197	.7900	.2525	.1335	575	12793	0
198	.7880	.2480	.1360	605	13453	0
199	.7890	.2515	.1435	680	14131	0
200	.7845	.2535	.1410	630	13219	0

UNION CARBIDE 25-PLY UNIDIRECTIONAL SHORT BEAM

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
201	.7875	.2540	.1340	655	14433	0
202	.7840	.2530	.1365	615	13356	0
203	.7885	.2545	.1350	645	14080	0
204	.7875	.2525	.1355	620	13591	0
205	.7880	.2525	.1345	630	13913	0
206	.7890	.2510	.1290	575	13319	0
207	.7875	.2530	.1260	645	15175	0
208	.7845	.2530	.1365	630	13682	0
209	.7860	.2525	.1340	570	12635	0
210	.7895	.2510	.1310	630	14370	0
211	.7880	.2520	.1425	645	13471	0
212	.7895	.2545	.1250	595	14028	0
213	.7920	.2565	.1535	690	13144	0
214	.7870	.2560	.1515	685	13246	0
215	.7850	.2530	.1545	730	14007	0
216	.7850	.2505	.1540	700	13609	0
217	.7880	.2520	.1540	635	12272	0
218	.7875	.2495	.1525	650	12813	0
219	.7925	.2510	.1535	655	12750	0
220	.7880	.2510	.1535	690	13432	0
221	.7855	.2520	.1530	715	13908	0
222	.7845	.2490	.1535	675	13245	0
223	.7870	.2525	.1525	680	13245	0
224	.7880	.2530	.1525	690	13413	0
225	.7905	.2530	.1560	730	13872	0
226	.7850	.2545	.1530	680	13098	0
227	.7770	.2560	.1530	740	14170	0
228	.7845	.2510	.1520	680	13368	0
229	.7860	.2490	.1540	605	13789	0
230	.7860	.2545	.1555	710	13456	0
231	.7860	.2510	.1545	710	13731	0
232	.7870	.2515	.1520	675	13243	0
233	.7850	.2500	.1535	700	13681	0
234	.7850	.2525	.1530	645	12522	0
235	.7875	.2505	.1525	600	11780	0
236	.7785	.2560	.1545	700	13274	0
237	.7860	.2560	.1555	760	14319	0
238	.7845	.2520	.1540	630	12175	0
239	.7855	.2520	.1550	805	15457	0
240	.7860	.2520	.1525	690	13466	0

UNION CARBIDE 25-PLY UNIDIRECTIONAL SHORT BEAM

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
241	.7860	.2550	.1545	710	13516	0
242	.7730	.2560	.1530	630	11872	0
243	.7880	.2545	.1530	680	13038	0
244	.7865	.2505	.1525	685	13449	0
245	.7860	.2510	.1530	680	13280	0
246	.7725	.2485	.1530	675	13315	0
247	.7860	.2510	.1540	740	14358	0
248	.7860	.2530	.1530	715	13853	0
249	.7875	.2510	.1530	760	13085	0
250	.7845	.2495	.1525	705	13897	0
251	.7870	.2515	.1535	680	13211	0
252	.7860	.2510	.1535	690	13432	0
253	.7875	.2545	.1540	630	12056	0
254	.6860	.2525	.1535	660	12771	0
255	.7850	.2520	.1540	690	13335	0
256	.7865	.2560	.1550	675	12758	0
257	.7890	.2540	.1530	710	13702	0
258	.7875	.2495	.1535	715	14002	0
259	.7880	.2510	.1540	675	13485	0
260	.7870	.2530	.1530	675	13078	0
261	.7790	.2465	.1515	670	13456	0
262	.7845	.2570	.1545	730	13789	0
263	.7870	.2530	.1530	645	13078	0
264	.7760	.2550	.1540	725	13846	0
265	.7840	.2515	.1523	685	13395	0
266	.7865	.2520	.1560	680	12973	0
267	.7840	.2510	.1525	690	13520	0
268	.7870	.2540	.1545	700	13378	0
269	.7860	.2450	.1540	685	13616	0
270	.7845	.2525	.1540	660	12897	0
271	.7855	.2520	.1520	625	12238	0
272	.7850	.2515	.1540	670	12974	0
273	.7865	.2550	.1505	675	13191	0
274	.7870	.2510	.1525	695	13618	0
275	.7855	.2500	.1540	660	12857	0
276	.7740	.2555	.1560	700	13172	0
277	.7855	.2565	.1545	675	12775	0
278	.7870	.2490	.1530	640	12599	0
279	.7855	.2540	.1535	735	14139	0
280	.7875	.2565	.1550	700	13205	0

UNION CARBIDE 25-PLY UNIDIRECTIONAL SHORT BEAM

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
281	.7865	.2550	.1540	715	13655	0
282	.7860	.2540	.1530	700	13509	0
283	.7820	.2550	.1535	690	13221	0
284	.7750	.2520	.1520	690	13510	0
285	.7875	.2520	.1525	670	13076	0
286	.7860	.2525	.1535	725	14029	0
287	.7860	.2520	.1550	690	13249	0
288	.7800	.2490	.1530	700	13781	0
289	.7850	.2510	.1535	720	14016	0
290	.7855	.2520	.1540	680	13142	0
291	.7840	.2520	.1525	655	12783	0
292	.7865	.2555	.1505	680	13263	0
293	.7850	.2535	.1540	745	14313	0
294	.7805	.2500	.1525	700	13770	0
295	.7860	.2560	.1550	710	13420	0
296	.7840	.2500	.1530	695	13627	0
297	.7860	.2550	.1545	700	13326	0
298	.7790	.2520	.1525	700	13661	0
299	.7750	.2565	.1550	680	12828	0
300	.7865	.2555	.1540	710	13533	0
301	.7855	.2520	.1540	680	13142	0
302	.7870	.2510	.1555	680	13067	0
303	.7850	.2555	.1520	685	13229	0
304	.7845	.2500	.1540	690	13442	0
305	.7860	.2515	.1540	640	12393	0
306	.7860	.2565	.1550	750	14148	0
307	.7840	.2520	.1525	710	13856	0
308	.7860	.2530	.1535	690	13325	0
309	.7870	.2550	.1510	680	13245	0
310	.7770	.2520	.1525	700	13661	0
311	.7865	.2530	.1500	700	13843	0
312	.7890	.2495	.1470	670	13701	4
313	.7800	.2555	.1535	675	12908	4

TABLE C24

NARMCO TASK 3 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
1	.8445	.2575	.1657	625	10986	4
2	.8445	.2530	.1580	580	10882	4
3	.8445	.2585	.1615	615	11048	0
4	.8455	.2575	.1500	515	10000	0
5	.8445	.2570	.1610	585	10604	4
6	.845	.2575	.1633	620	11058	0
7	.845	.2595	.1650	635	11123	0
8	.8435	.2585	.1657	580	10156	0
9	.845	.255	.1660	610	10808	0
10	.8437	.258	.1678	625	10828	4
11	.8443	.2555	.1713	635	10881	4
12	.8433	.2583	.1700	635	10846	4
13	.845	.2585	.1685	625	10762	0
14	.8445	.2583	.1690	600	10309	0
15	.8465	.2585	.1663	575	10032	0
16	.8462	.259	.1675	610	10546	0
17	.8465	.258	.1673	615	10686	0
18	.8466	.259	.1730	555	9290	4
19	.8460	.2587	.1730	625	10474	0
20	.8468	.259	.1680	630	10859	0
21	.8464	.259	.1695	575	9823	4
22	.8461	.2555	.1740	625	10544	4
23	.8456	.258	.1690	635	10923	4
24	.8458	.2567	.1720	625	10617	4
25	.8458	.2555	.1675	615	10778	0
26	.8461	.258	.1650	610	10747	4
27	.8457	.2563	.1635	575	10291	0
28	.8456	.2570	.1680	575	9988	0
29	.8461	.2585	.1730	640	10733	4
30	.8468	.2590	.1725	605	10156	0
31	.8454	.2585	.1720	630	10627	0
32	.8460	.2593	.1728	630	10545	4
33	.8457	.2583	.1718	630	10648	0
34	.8465	.2585	.1705	580	9870	0
35	.8460	.2595	.1710	555	9380	4
36	.8455	.2575	.1700	600	10280	4
37	.8477	.2578	.1700	620	10623	4
38	.8467	.2573	.1695	600	10318	0
39	.8470	.2565	.1655	600	10601	4
40	.8480	.2565	.1650	590	10455	4

NARMCO TASK 3 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
41	.8455	.2565	.1715	640	10912	0
42	.8457	.2583	.1660	590	10320	4
43	.8473	.2575	.1652	630	11107	0
44	.8477	.2535	.1665	600	10662	0
45	.8475	.2575	.1685	630	10890	0
46	.8470	.257	.1705	615	10526	0
47	.8468	.2565	.1665	635	11152	0
48	.8445	.258	.1710	625	10625	0
49	.8470	.258	.1733	635	10652	0
50	.8435	.258	.1725	630	10617	0
51	.8460	.258	.1720	650	10986	0
52	.8465	.2535	.1730	605	10346	4
53	.8460	.257	.1690	630	10879	0
54	.8460	.2565	.1658	600	10581	4
55	.8455	.254	.1625	610	11084	0
56	.8410	.2550	.1710	590	10148	0
57	.8410	.2430	.1750	560	9877	4
58	.8395	.2505	.1755	560	9554	4
59	.8400	.2515	.1595	540	10096	0
60	.8410	.2525	.1670	505	8982	0
61	.8405	.2545	.1665	555	9823	0
62	.8340	.2460	.1665	550	10071	0
63	.8395	.2540	.1745	550	9307	0
64	.8375	.2540	.1520	520	10102	0
65	.8355	.2510	.1520	570	11205	4
66	.8425	.2530	.1750	580	9825	4
67	.8395	.2570	.1750	550	9172	0
68	.8335	.2515	.1635	580	10579	4
69	.8405	.2510	.1710	540	9436	0
70	.8405	.2515	.1650	460	8314	4
71	.8410	.2480	.1720	560	9846	0
72	.8405	.2580	.1700	585	10003	0
73	.8415	.2495	.1745	510	8785	4
74	.8345	.2465	.1710	575	10231	0
75	.8365	.2500	.1590	470	8868	4
76	.8415	.2520	.1725	575	9921	4
77	.8390	.2425	.1735	555	9893	4
78	.8385	.2495	.1740	590	10193	0
79	.8385	.2500	.1750	560	9600	0
80	.8400	.2490	.1645	570	10437	0

NARMCO TASK 3 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
81	.8420	.2520	.1740	535	9151	4
82	.8415	.2475	.1755	530	9151	4
83	.8410	.2525	.1745	575	9788	4
84	.8370	.2500	.1670	545	9790	4
85	.8380	.2470	.1720	585	10327	0
86	.8410	.2430	.1740	525	9312	4
87	.8400	.2525	.1700	570	9959	0
88	.8405	.2530	.1720	555	9565	0
89	.8405	.2435	.1745	550	9708	4
90	.8380	.2465	.1710	580	10320	4
91	.8405	.2510	.1655	485	8757	4
92	.8390	.2530	.1710	550	9535	0
93	.8400	.2515	.1690	580	10234	0
94	.8410	.2535	.1705	565	9804	0
95	.8405	.2515	.1660	520	9342	4
96	.8380	.2530	.1650	525	9432	0
97	.8375	.2520	.1660	560	10040	0
98	.8415	.2520	.1750	535	9099	4
99	.8405	.2520	.1590	420	7862	4
100	.8400	.2515	.1580	470	8871	4
101	.8400	.2520	.1700	595	10417	4
102	.8415	.2505	.1695	560	9892	0
103	.8375	.2540	.1590	450	8357	4
104	.8370	.2515	.1675	530	10326	0
105	.8415	.2475	.1650	550	10101	0
106	.8395	.2540	.1740	545	9249	0
107	.8395	.2525	.1730	555	9529	0
108	.8410	.2515	.1730	570	9825	4
109	.8405	.2505	.1715	560	9776	4
110	.8415	.2540	.1750	590	9955	4
111	.8400	.2520	.1645	570	10313	0
112	.8420	.2520	.1695	545	9569	4
113	.8165	.2515	.1725	560	9681	4
114	.8395	.2530	.1525	460	8942	0
115	.8430	.2540	.1690	555	9697	0
116	.8410	.2540	.1270	390	9068	4

TABLE C25

NARMCO TASK 4 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
1	.8345	.2545	.1550	858	11122	0
2	.8280	.2510	.1670	580	10378	0
3	.8245	.2515	.1650	555	10031	0
4	.8350	.2510	.1660	560	10726	0
5	.8285	.2545	.1685	600	10494	0
6	.8350	.2535	.1700	515	8963	0
7	.8340	.2495	.1535	535	10477	0
8	.8335	.2530	.1580	545	10225	0
9	.8345	.2510	.1575	480	9106	0
10	.8350	.2520	.1675	525	9328	0
11	.8340	.2525	.1560	500	9520	0
12	.8350	.2520	.1600	530	9859	0
13	.8345	.2535	.1520	530	10316	0
14	.8345	.2485	.1640	570	10490	0
15	.8340	.2520	.1695	570	10008	0
16	.8305	.2535	.1710	550	9516	0
17	.8340	.2515	.1635	540	9849	0
18	.8245	.2520	.1675	590	10483	0
19	.8340	.2500	.1675	580	10388	0
20	.8335	.2510	.1700	565	9931	0
21	.8340	.2515	.1580	480	9060	0
22	.8340	.2520	.1675	580	10306	0
23	.8340	.2500	.1700	505	8912	0
24	.8330	.2535	.1590	500	9304	0
25	.8340	.2500	.1555	520	10032	0
26	.8345	.2520	.1610	530	9797	0
27	.8330	.2520	.1580	505	9513	0
28	.8345	.2520	.1700	530	9279	0
29	.8340	.2515	.1655	515	9280	0
30	.8345	.2520	.1675	540	9595	0
31	.8310	.2525	.1610	585	10793	0
32	.8325	.2540	.1590	525	9750	0
33	.8235	.2525	.1670	580	10316	0
34	.8245	.2500	.1575	510	9714	0
35	.8350	.2520	.1685	545	9626	0
36	.8345	.2510	.1665	590	10588	0
37	.8330	.2520	.1665	595	10636	0
38	.8350	.2505	.1670	580	10398	0
39	.8315	.2550	.1700	560	9680	0
40	.8320	.2525	.1700	500	8736	0

NARMCO TASK 4 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
41	.8345	.2495	.1605	560	10488	0
42	.8345	.2525	.1650	580	10441	0
43	.8295	.2540	.1700	590	10248	0
44	.8350	.2465	.1645	565	10450	0
45	.8300	.2520	.1690	600	10566	0
46	.8330	.2540	.1680	615	10809	0
47	.8335	.2535	.1675	540	9538	0
48	.8345	.2520	.1685	510	9008	0
49	.8330	.2525	.1525	530	10323	0
50	.8340	.2505	.1645	595	10829	0
51	.8345	.2535	.1595	585	10851	0
52	.8270	.2515	.1555	525	10068	0
53	.8270	.2525	.1640	540	9780	0
54	.8350	.2510	.1655	580	10472	0
55	.8345	.2500	.1630	580	10675	0
56	.8335	.2540	.1695	580	10104	0
57	.8335	.2530	.1675	530	9380	0
58	.8345	.2540	.1560	570	10789	0
59	.8350	.2540	.1685	510	8937	0
60	.8350	.2535	.1670	525	9301	0
61	.8350	.2500	.1655	540	9789	0
62	.8340	.2495	.1695	545	9665	0
63	.8340	.2515	.1655	585	10541	0
64	.8340	.2550	.1635	580	10434	0
65	.8335	.2535	.1625	565	10287	0
66	.8260	.2510	.1600	540	10085	0
67	.8340	.2550	.1690	570	10212	0
68	.8335	.2535	.1575	465	9262	0
69	.8255	.2515	.1630	580	8735	0
70	.8345	.2530	.1590	590	11000	0
71	.8345	.2515	.1650	545	9850	0
72	.8330	.2525	.1680	620	10962	0
73	.8265	.2530	.1585	530	9913	0
74	.8340	.2560	.1670	600	10526	0
75	.8260	.2525	.1675	520	9221	0
76	.8335	.2535	.1675	580	10245	0
77	.8305	.2500	.1640	600	10976	4
78	.8315	.2480	.1610	550	10331	4
79	.8290	.2475	.1605	505	9535	0
80	.8315	.2480	.1570	570	10980	0

NARMCO TASK 4 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
81	.8325	.2445	.1585	540	10451	4
82	.8315	.2510	.1595	550	10304	0
83	.8295	.2450	.1635	585	10953	4
84	.8290	.2485	.1610	600	11248	0
85	.8255	.2495	.1610	610	11389	0
86	.8310	.2495	.1605	570	10676	0
87	.8315	.2500	.1615	500	9288	4
88	.8315	.2450	.1590	570	10974	4
89	.8315	.2490	.1595	555	10481	0
90	.8275	.2500	.1640	585	10701	0
91	.8240	.2505	.1620	550	10165	4
92	.8325	.2505	.1600	600	11228	4
93	.8305	.2475	.1600	595	11269	4
94	.8275	.2495	.1595	565	8764	0
95	.8270	.2500	.1620	580	10741	0
96	.8310	.2505	.1600	540	10105	4
97	.8300	.2470	.1610	600	11316	0
98	.8280	.2440	.1630	580	10937	4
99	.8300	.2500	.1615	570	10588	0
100	.8310	.2510	.1615	545	10084	0
101	.8230	.2510	.1580	550	10401	4
102	.8300	.2505	.1615	570	10567	4
103	.8275	.2505	.1565	583	11192	0
104	.8330	.2475	.1585	570	10898	0
105	.8295	.2460	.1625	605	11351	0
106	.8275	.2490	.1645	565	10345	4
107	.8310	.2500	.1605	550	10280	0
108	.8325	.2495	.1615	540	10051	4
109	.8310	.2490	.1610	530	9915	0
110	.8305	.2495	.1630	590	10881	4
111	.8310	.2490	.1600	575	10825	0
112	.8280	.2490	.1605	550	10322	0
113	.8285	.2495	.1620	585	10855	4
114	.8315	.2480	.1590	550	10461	0
115	.8290	.2495	.1550	550	10660	0
116	.8305	.2490	.1590	550	10419	0
117	.8310	.2440	.1600	580	11142	0
118	.8315	.2505	.1590	58[illegible]	10922	0
119	.8285	.2485	.1600	58[illegible]	10941	0
120	.8325	.2510	.1595	57[illegible]	10678	4

NARMCO TASK 4 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
121	.8290	.2490	.1610	585	10944	0
122	.8315	.2515	.1625	550	10093	4
123	.8305	.2500	.1620	600	11111	0
124	.8300	.2490	.1615	550	10258	0
125	.8310	.2480	.1595	555	10523	0
126	.8315	.2490	.1615	540	10071	0
127	.8250	.2475	.1615	530	9945	4
128	.8270	.2505	.1620	530	9795	4
129	.8295	.2495	.1615	610	11354	0
130	.8335	.2510	.1550	560	10796	0
131	.8315	.2475	.1610	570	10728	0
132	.8295	.2500	.1620	580	10741	4
133	.814	.248	.163	590	10946	0
134	.817	.251	.160	545	10178	0
135	.817	.245	.159	580	11032	0
136	.815	.249	.162	555	10319	0
137	.816	.240	.151	600	12417	0
138	.816	.250	.161	565	10528	0
139	.817	.250	.159	580	10943	0
140	.816	.241	.158	565	11128	0
141	.814	.249	.163	600	11087	0
142	.815	.235	.156	550	11252	0
143	.813	.247	.164	590	10924	0
144	.312	.249	.156	510	9847	0
145	.818	.245	.164	590	11013	0
146	.815	.248	.164	580	10695	0
147	.813	.250	.155	590	11419	0
148	.815	.250	.161	585	10901	0
149	.816	.249	.160	530	9977	0
150	.814	.250	.160	585	10969	0
151	.816	.245	.158	550	10656	0
152	.816	.249	.161	575	10757	0
153	.814	.247	.156	565	10997	0
154	.817	.250	.162	600	11111	0
155	.816	.243	.152	570	11574	0
156	.815	.250	.155	575	11129	0
157	.815	.244	.154	530	10579	0
158	.816	.249	.159	565	10703	0
159	.818	.250	.157	570	10892	0
160	.814	.253	.152	610	11897	0

NARMCO TASK 4 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
161	.813	.247	.163	570	10618	0
162	.816	.245	.157	575	11211	0
163	.816	.249	.158	510	9722	0
164	.813	.248	.156	570	11050	0
165	.819	.251	.160	605	11299	0
166	.816	.250	.164	600	10976	0
167	.819	.245	.161	600	11408	0
168	.816	.249	.164	550	10101	0
169	.816	.247	.163	590	10991	0
170	.815	.249	.161	585	10944	0
171	.816	.249	.162	580	10784	0
172	.815	.249	.157	590	11319	0
173	.815	.245	.160	580	11097	0
174	.818	.247	.159	600	11458	0
175	.816	.249	.162	565	10505	0
176	.814	.248	.156	575	11147	0
177	.815	.250	.154	600	11688	0
178	.815	.248	.162	535	9987	0
179	.816	.248	.153	590	11662	0
180	.816	.246	.161	535	10131	0
181	.815	.251	.163	560	10266	0
182	.814	.247	.164	600	11109	0
183	.819	.250	.160	535	10031	0
184	.814	.245	.161	570	10838	0
185	.816	.247	.159	595	11363	0
186	.814	.248	.158	590	11293	0
187	.817	.249	.158	575	10962	0
188	.814	.250	.160	545	10219	0
189	.814	.249	.159	565	10703	0
190	.815	.251	.164	575	10476	0
191	.818	.248	.163	590	10946	0
192	.813	.250	.157	545	10414	0
193	.813	.249	.157	540	10360	0
194	.815	.251	.161	610	11321	0
195	.814	.250	.161	570	10621	0
196	.813	.251	.156	580	11109	0
197	.816	.251	.156	510	9769	0
198	.816	.249	.162	530	10784	0
199	.816	.251	.158	570	11158	0
200	.815	.245	.162	600	11338	0

NARMCO TASK 4 25-PLY UNIDIRECTIONAL SHORT BEAM SHEAR

SPECIMEN NO.	LENGTH IN.	WIDTH IN.	THICK IN.	FAILURE LOAD LBS.	SHEAR STRENGTH PSI	COND
201	.813	.249	.161	605	11319	0
202	.814	.248	.160	580	10963	0
203	.813	.246	.161	585	11078	0
204	.815	.247	.162	590	11059	0
205	.816	.248	.161	595	11176	0
206	.818	.251	.160	550	10271	0
207	.816	.248	.157	555	10691	0
208	.815	.248	.163	570	10575	0
209	.815	.248	.158	585	11197	0
210	.814	.248	.159	560	10651	0
211	.815	.250	.160	595	11156	0
212	.815	.245	.126	600	11338	0
213	.815	.251	.162	600	11067	0
214	.815	.248	.156	605	11728	0
215	.814	.247	.162	600	11246	0
216	.819	.251	.161	600	11136	0
217	.814	.248	.164	585	10788	0
218	.815	.250	.158	565	10728	0
219	.815	.249	.164	600	11020	0
220	.814	.251	.159	570	10712	0
221	.816	.251	.162	540	9960	0
222	.815	.249	.158	580	11057	0
223	.815	.249	.160	555	10448	0
224	.816	.251	.162	595	10975	0
225	.814	.248	.169	565	10419	0
226	.815	.247	.161	620	11693	0
227	.814	.250	.164	600	10976	0
228	.816	.247	.158	590	11339	0
229	.833	.252	.164	580	10558	4
230	.835	.255	.169	510	8893	4
231	.827	.249	.161	600	11225	4

TABLE C26
HERCULES SHORT BEAM SHEAR DEHYDRATION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI	STRESS MPA.	COND
1	0.250	0.143	450	9459	65	0
2	0.248	0.141	625	13452	92	0
3	0.248	0.142	745	15922	109	0
4	0.251	0.146	595	12243	84	0
5	0.249	0.143	560	11860	81	0
6	0.250	0.143	612	12839	88	0
7	0.252	0.142	625	13171	90	0
8	0.251	0.144	695	14471	99	0
9	0.250	0.142	620	13124	90	0
10	0.251	0.143	622	13042	89	0
11	0.251	0.146	600	12346	85	0
12	0.250	0.142	580	12278	84	0
13	0.253	0.143	610	12670	87	0
14	0.250	0.151	695	13853	95	0
15	0.250	0.143	755	15839	109	0
16	0.248	0.144	600	12644	87	0
17	0.252	0.143	635	13262	91	0
18	0.250	0.147	640	13061	90	0
19	0.249	0.142	670	14240	98	0
20	0.253	0.143	635	13209	91	0
21	0.253	0.150	580	11485	79	0
22	0.247	0.147	655	13529	93	0
23	0.250	0.148	564	11432	78	5
24	0.252	0.141	722	15294	105	0
25	0.252	0.151	735	14563	100	0

TABLE C27
UNION CARBIDE SHORT BEAM SHEAR DEHYDRATION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI	STRESS MPA.	COND
1	0.250	0.143	715	15000	103	0
2	0.249	0.144	760	15896	109	0
3	0.250	0.146	750	15410	106	0
4	0.249	0.134	700	15766	108	0
5	0.250	0.145	720	14896	102	0
6	0.248	0.145	710	14838	102	0
7	0.250	0.145	790	16344	112	0
8	0.250	0.143	745	15715	108	0
9	0.250	0.145	750	15570	107	5
10	0.251	0.145	730	15073	103	5
11	0.251	0.142	785	16551	114	0
12	0.250	0.137	775	16970	117	5
13	0.250	0.143	828	17370	119	0
14	0.249	0.148	792	16118	111	0
15	0.250	0.143	720	15104	104	0
16	0.250	0.142	840	17746	122	0
17	0.250	0.144	760	15920	109	0
18	0.250	0.147	795	16257	112	0
19	0.250	0.144	778	16264	112	0
20	0.251	0.145	740	15332	105	0
21	0.251	0.143	825	17238	118	0
22	0.248	0.142	830	17712	122	0
23	0.249	0.147	780	15982	110	0
24	0.249	0.146	755	15629	107	0
25	0.250	0.144	825	17187	118	0

TABLE C28

NARMCO TASK III SHORT BEAM SHEAR DEHYDRATION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI	STRESS MPA.	COND
1	0.259	0.163	655	11637	80	0
2	0.256	0.154	680	12911	89	0
3	0.257	0.157	678	12626	87	0
4	0.259	0.163	680	12080	83	4
5	0.259	0.163	645	11516	79	4
6	0.258	0.168	735	12720	87	0
7	0.260	0.168	738	12696	87	0
8	0.259	0.168	550	9509	65	0
9	0.260	0.166	662	11546	79	0
10	0.255	0.153	560	10800	74	5
11	0.259	0.156	575	10661	73	5
12	0.259	0.151	555	10663	73	5
13	0.258	0.171	700	11899	82	4
14	0.259	0.172	720	12121	83	4
15	0.258	0.171	578	9914	67	4
16	0.256	0.169	675	11694	80	4
17	0.259	0.153	562	10683	73	5
18	0.259	0.167	620	10738	74	5
19	0.258	0.170	655	11200	77	4
20	0.258	0.166	700	12280	84	4
21	0.256	0.158	600	11125	76	5
22	0.258	0.170	680	11662	80	4
23	0.258	0.170	670	11479	79	0
24	0.257	0.173	662	11199	77	4
25	0.254	0.167	655	11617	80	0

TABLE C29
NARMCO TASK IV SHORT BEAM SHEAR DEHYDRATION

SPECIMEN NO.	WIDTH IN.	THICK IN.	LOAD LB.	STRESS PSI	STRESS MPA.	COND
1	0.248	0.161	560	10551	72	4
2	0.248	0.162	625	11727	80	0
3	0.252	0.155	620	11904	82	5
4	0.250	0.161	665	12416	85	0
5	0.250	0.151	637	12697	87	5
6	0.247	0.161	600	11313	78	0
7	0.248	0.162	585	10976	75	0
8	0.252	0.152	535	10530	72	5
9	0.244	0.148	470	9761	67	5
10	0.251	0.157	610	11646	80	0
11	0.251	0.160	615	11508	79	0
12	0.252	0.162	595	10986	75	0
13	0.250	0.143	590	12445	85	5
14	0.251	0.162	540	9990	68	4
15	0.250	0.153	650	12812	88	5
16	0.250	0.161	630	11739	80	0
17	0.251	0.148	510	10296	70	5
18	0.244	0.163	650	12295	84	0
19	0.245	0.160	575	11035	76	0
20	0.249	0.148	595	12109	83	5
21	0.250	0.161	575	10714	73	0
22	0.250	0.150	490	9800	67	5
23	0.246	0.139	475	10456	72	5
24	0.252	0.158	650	12268	84	0
25	0.244	0.142	495	10736	74	5

APPENDIX D

Normal and Weibull Cumulative Frequency Plots

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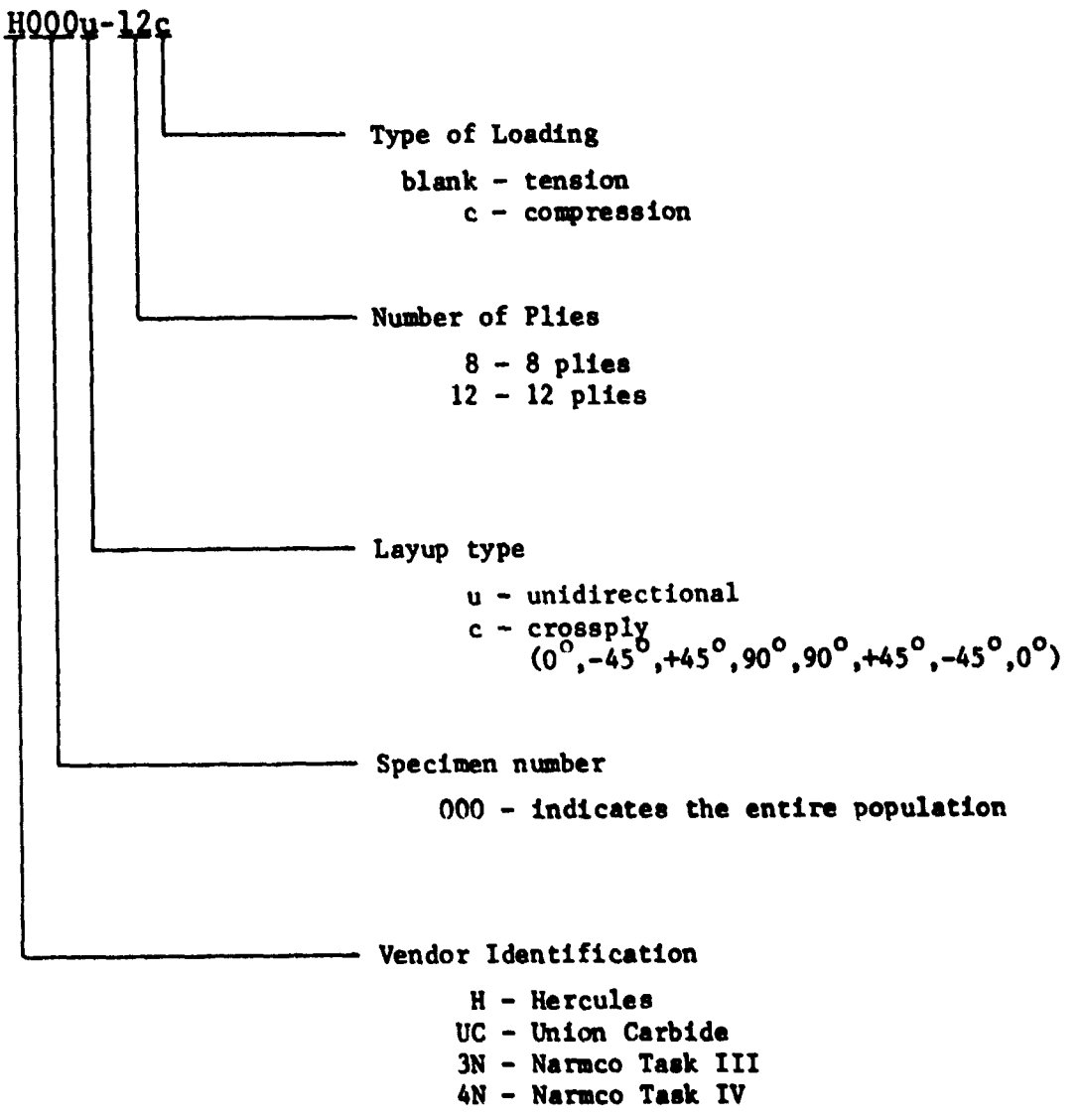
Table D1. Tension and Compression Specimen Coding



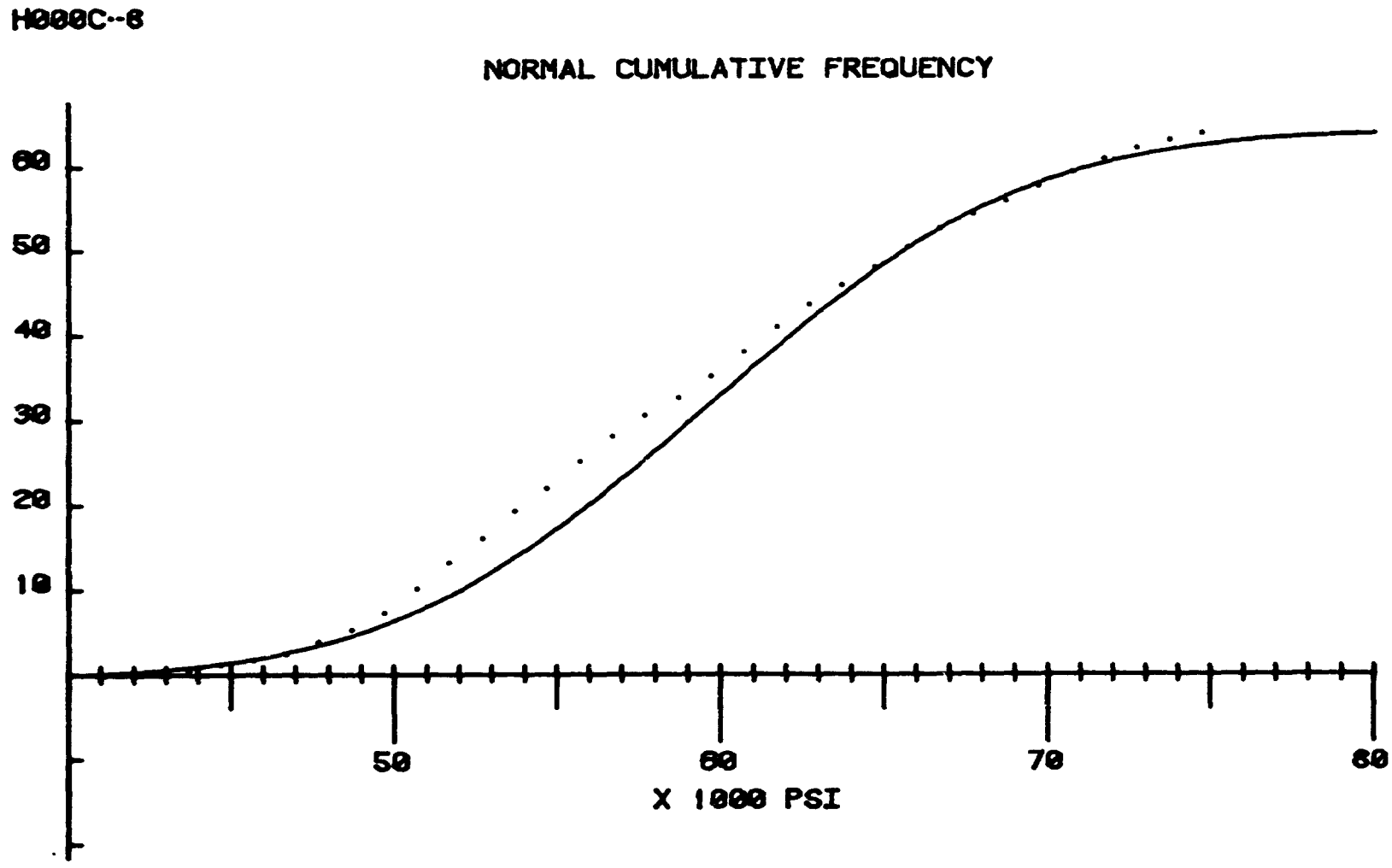


Figure D1. Normal Hercules Tension 8-ply Crossply

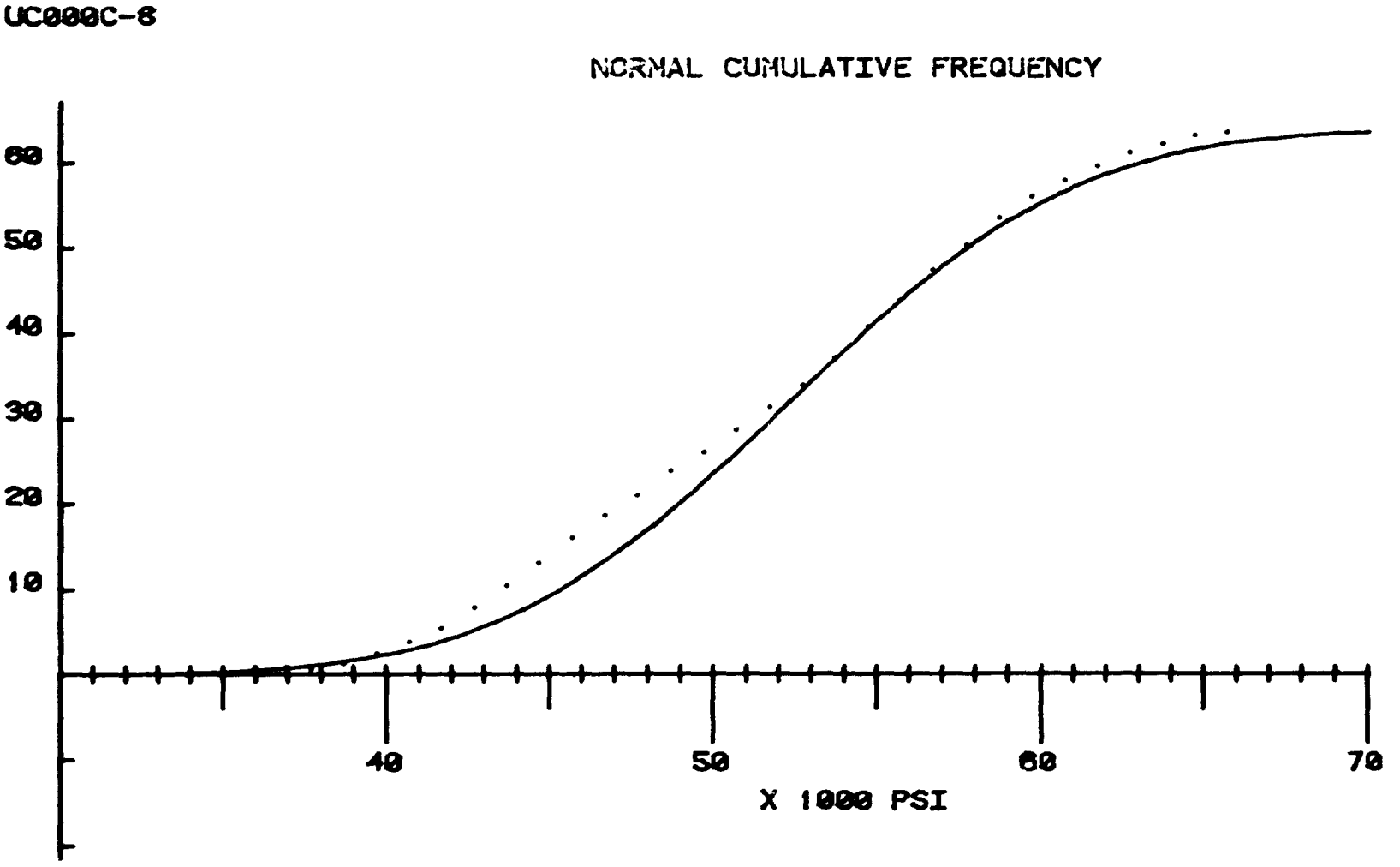


Figure D2. Normal Union Carbide Tension 8-ply Crossply

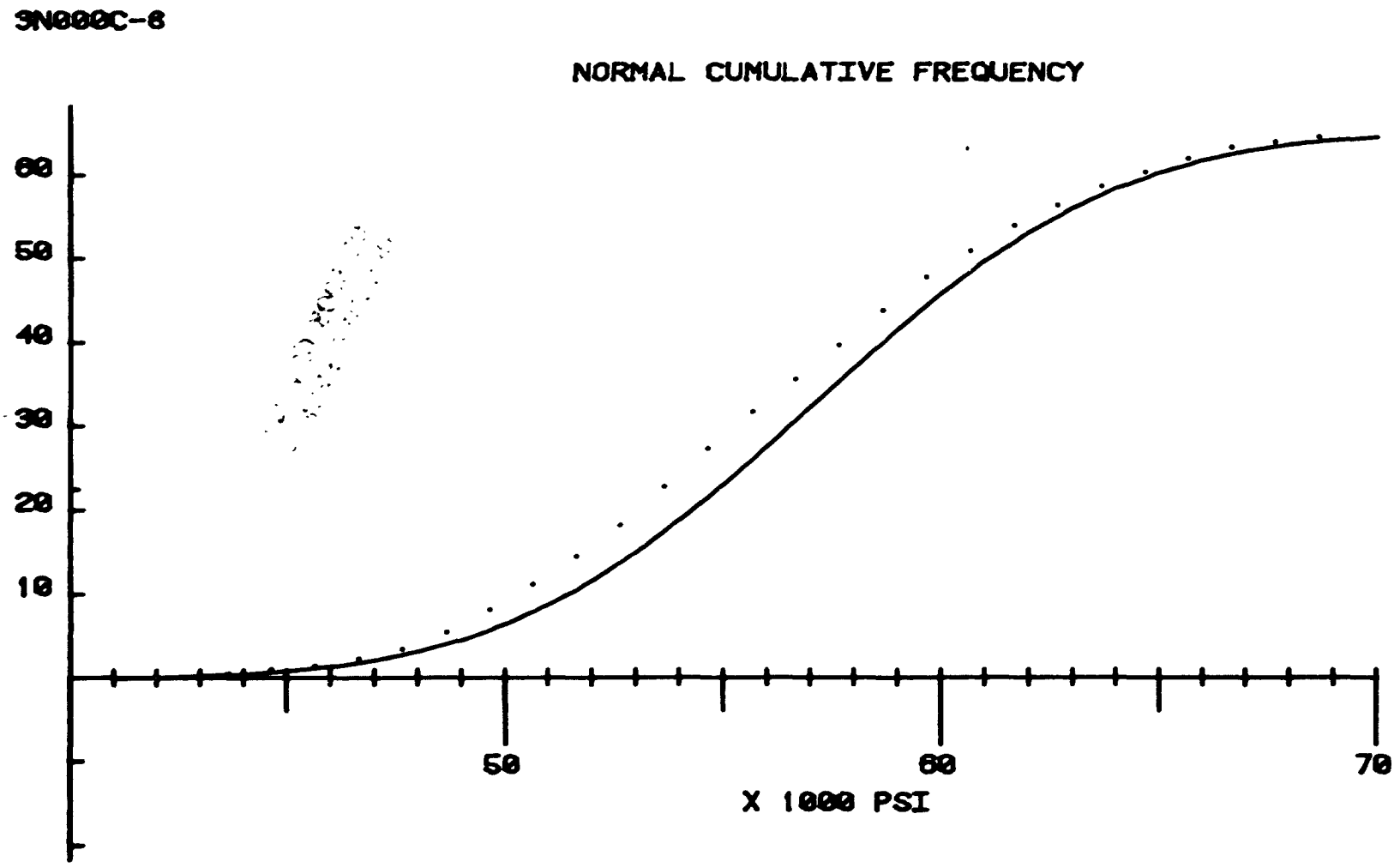


Figure D3. Normal Narmco Task 3 Tension 8-ply Crossply

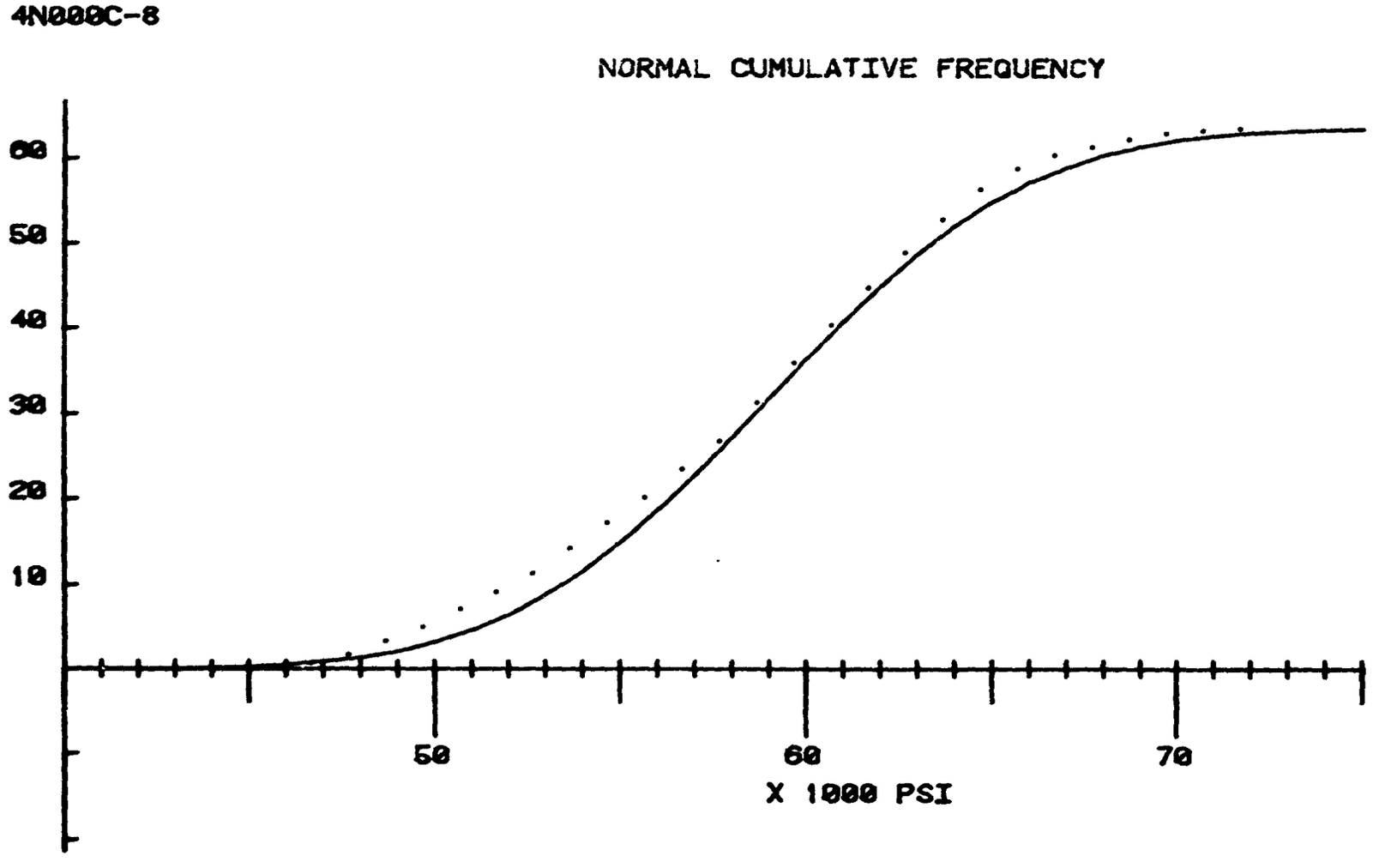


Figure D4. Normal Narmco Task 4 Tension 8-ply Crossply

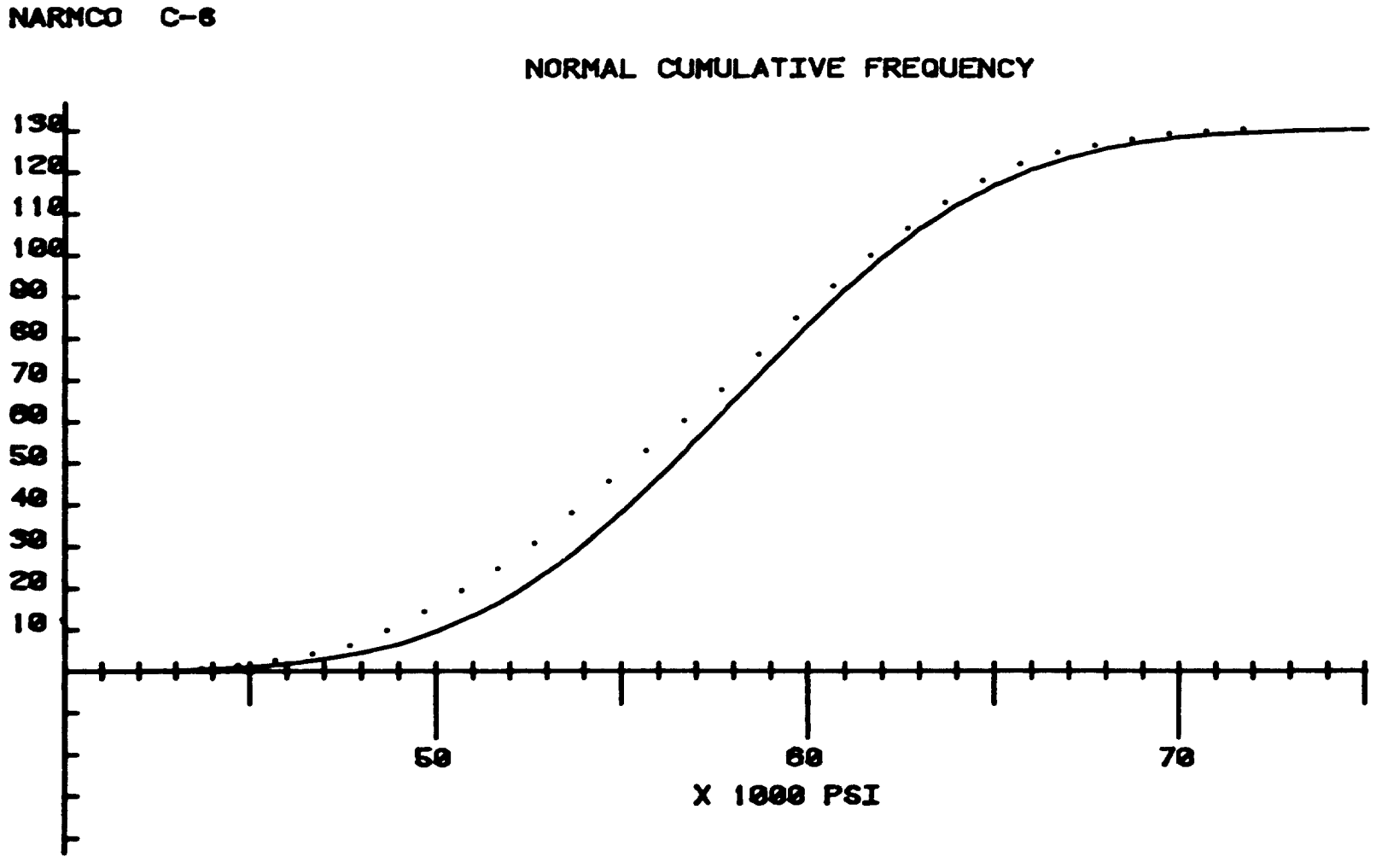


Figure D5. Normal Combined Narmco Task 3 and 4 Tension 8-ply Crossply

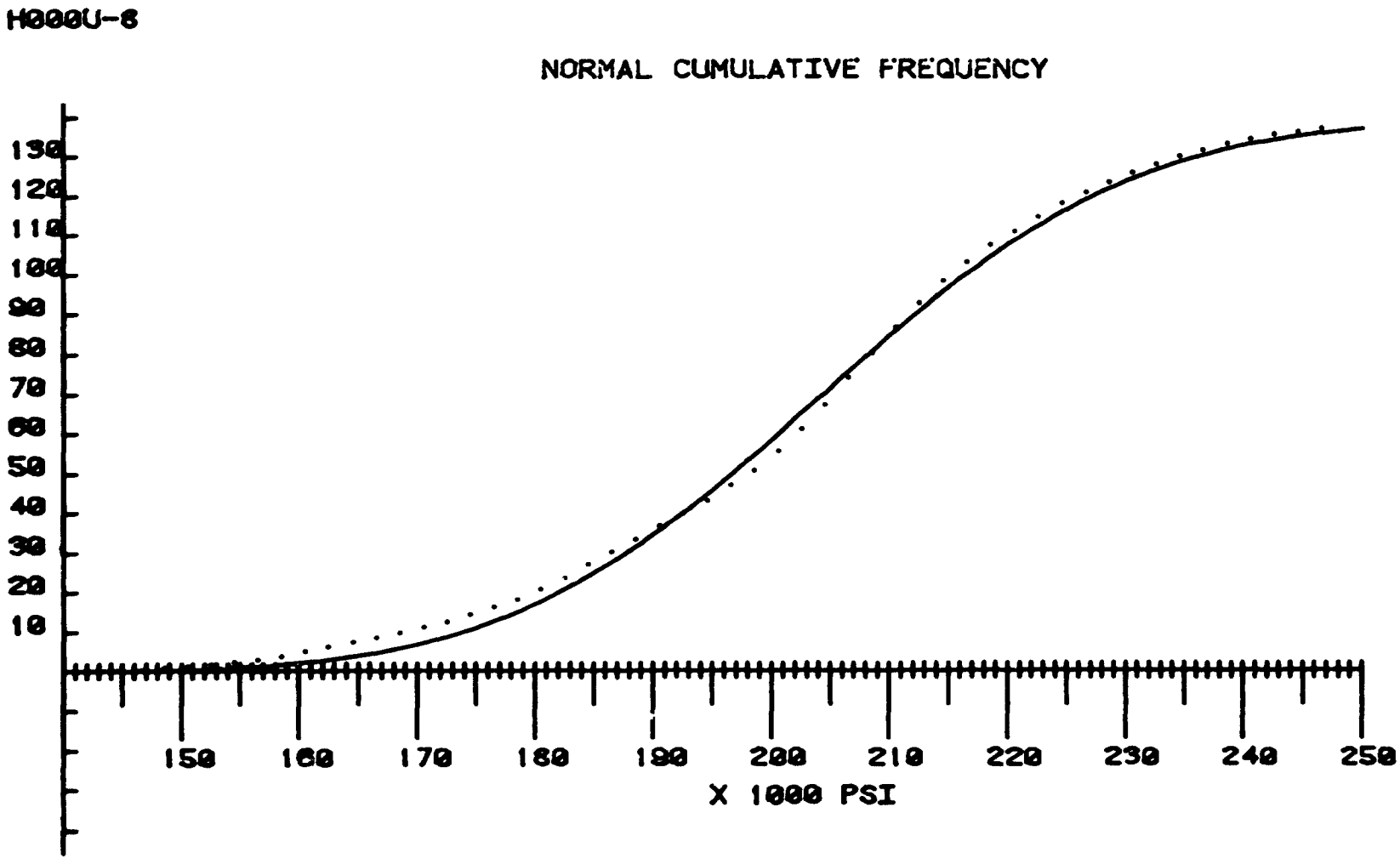


Figure D6. Normal Hercules Tension 8-ply Unidirectional

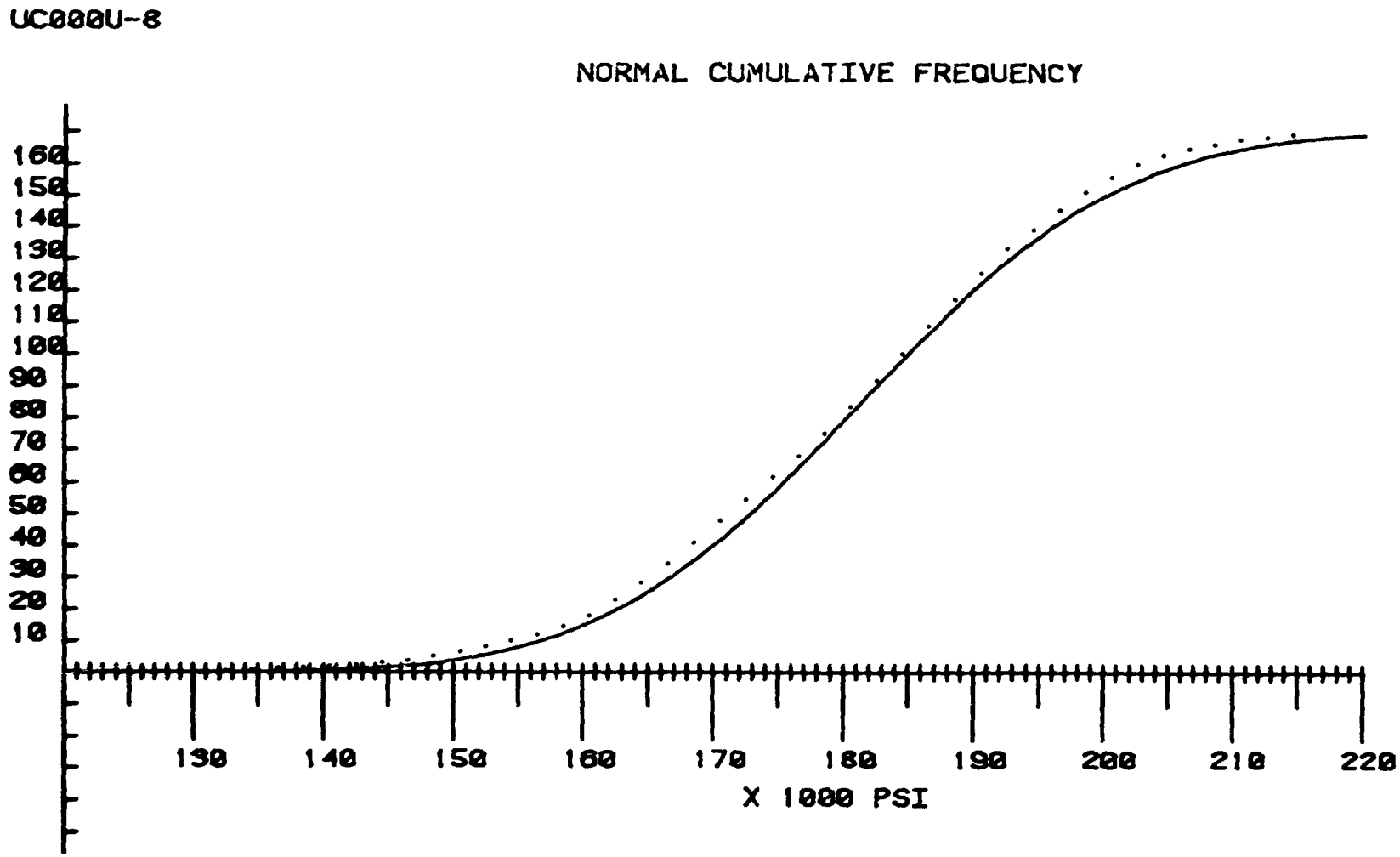


Figure D7. Normal Union Carbide Tension 8-ply Unidirectional

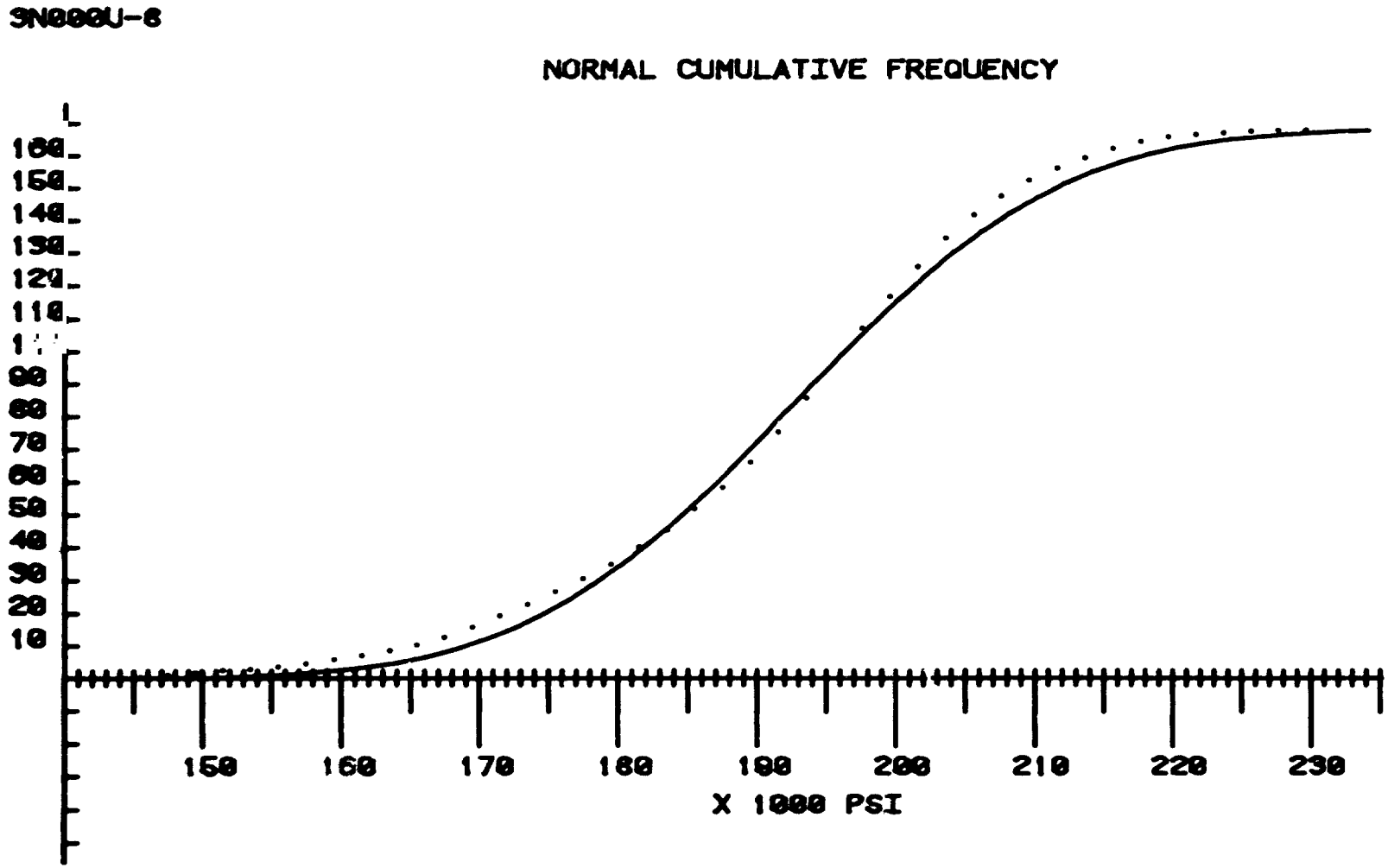


Figure D8. Normal Narmco Task 3 Tension 8-ply Unidirectional

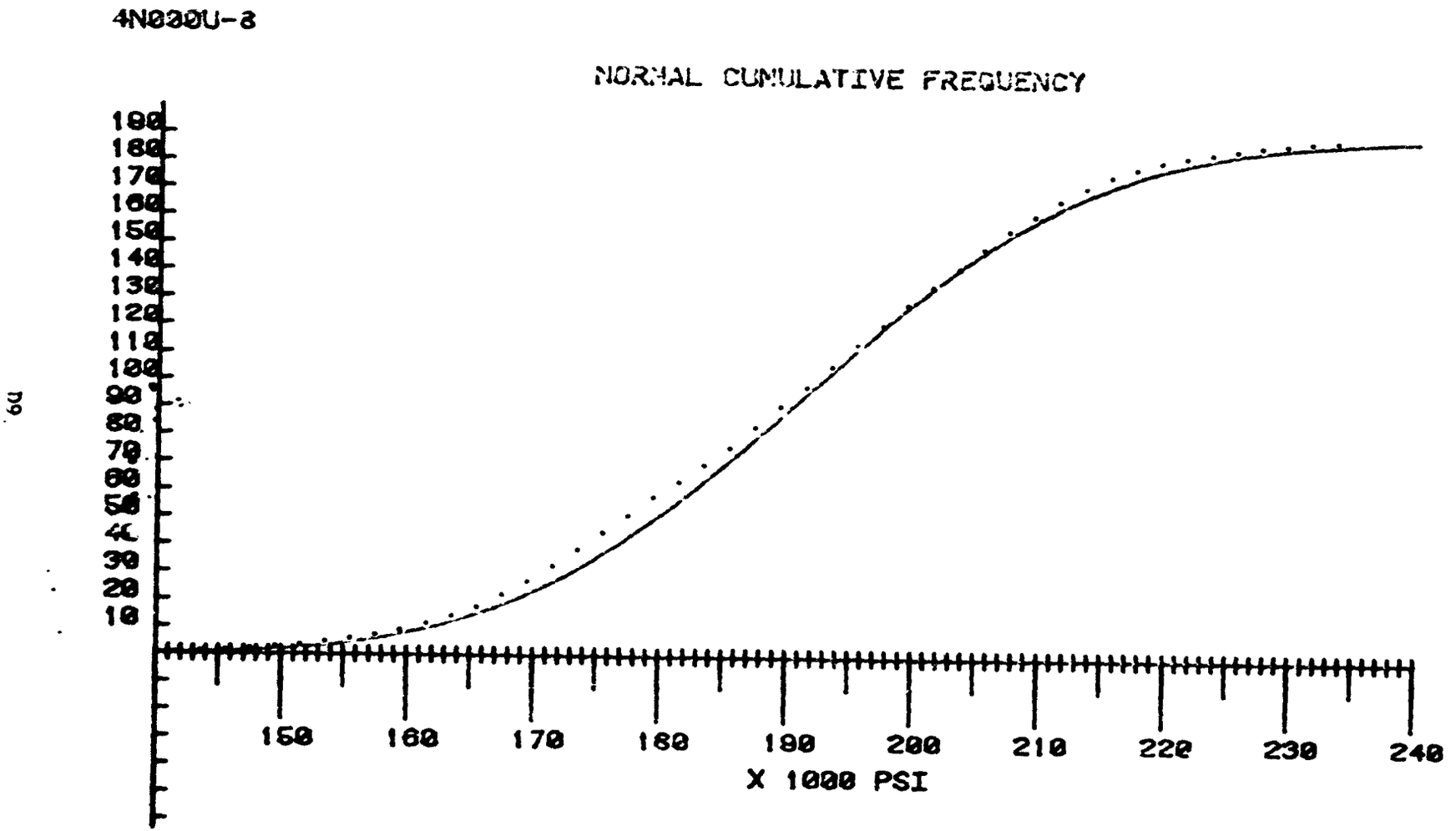


Figure D9. Normal Na---o Task 4 Tension 8-ply Unidirectional

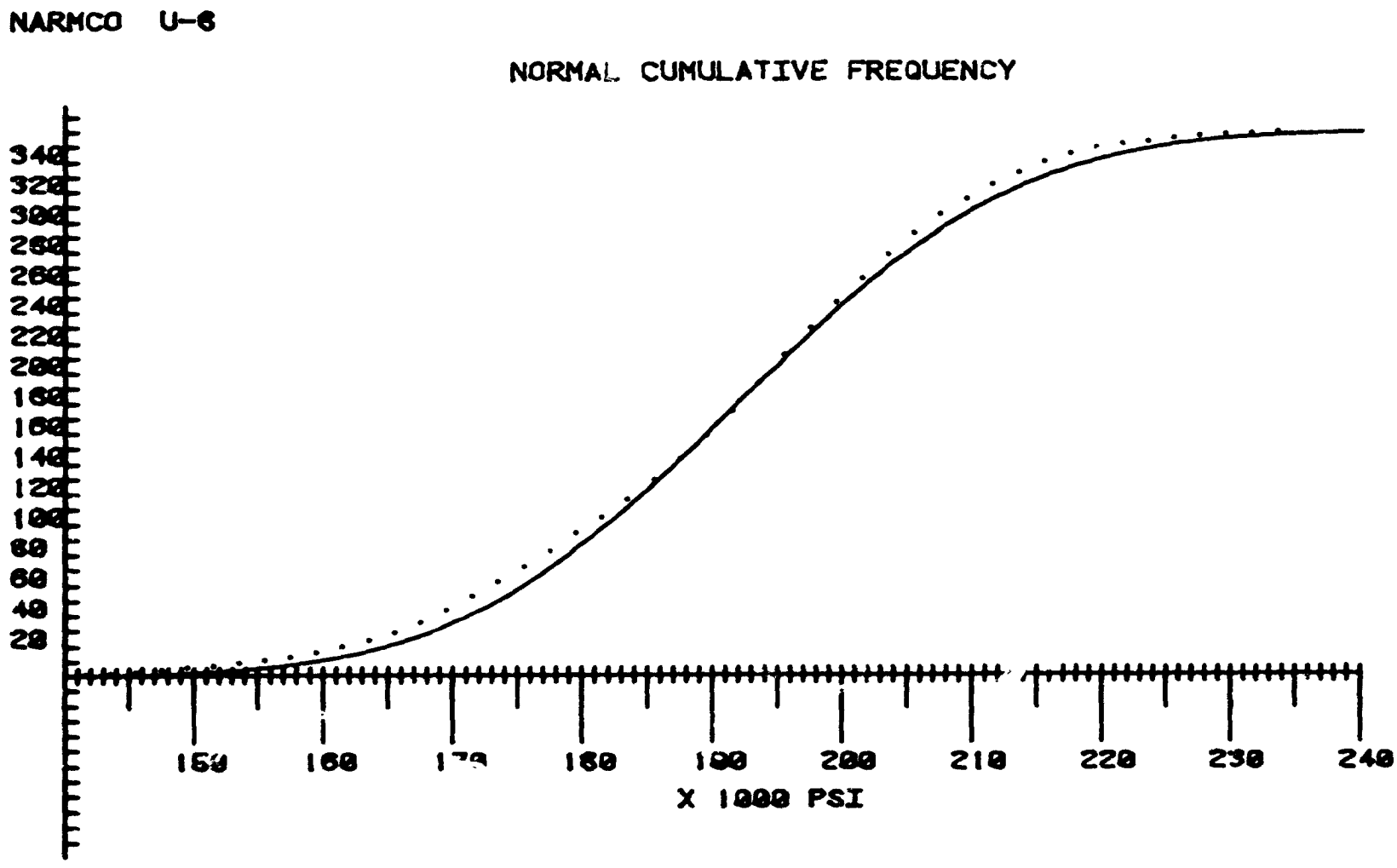


Figure D10. Normal Combined Narmco Task 3 and 4 Tension 8-ply Unidirectional

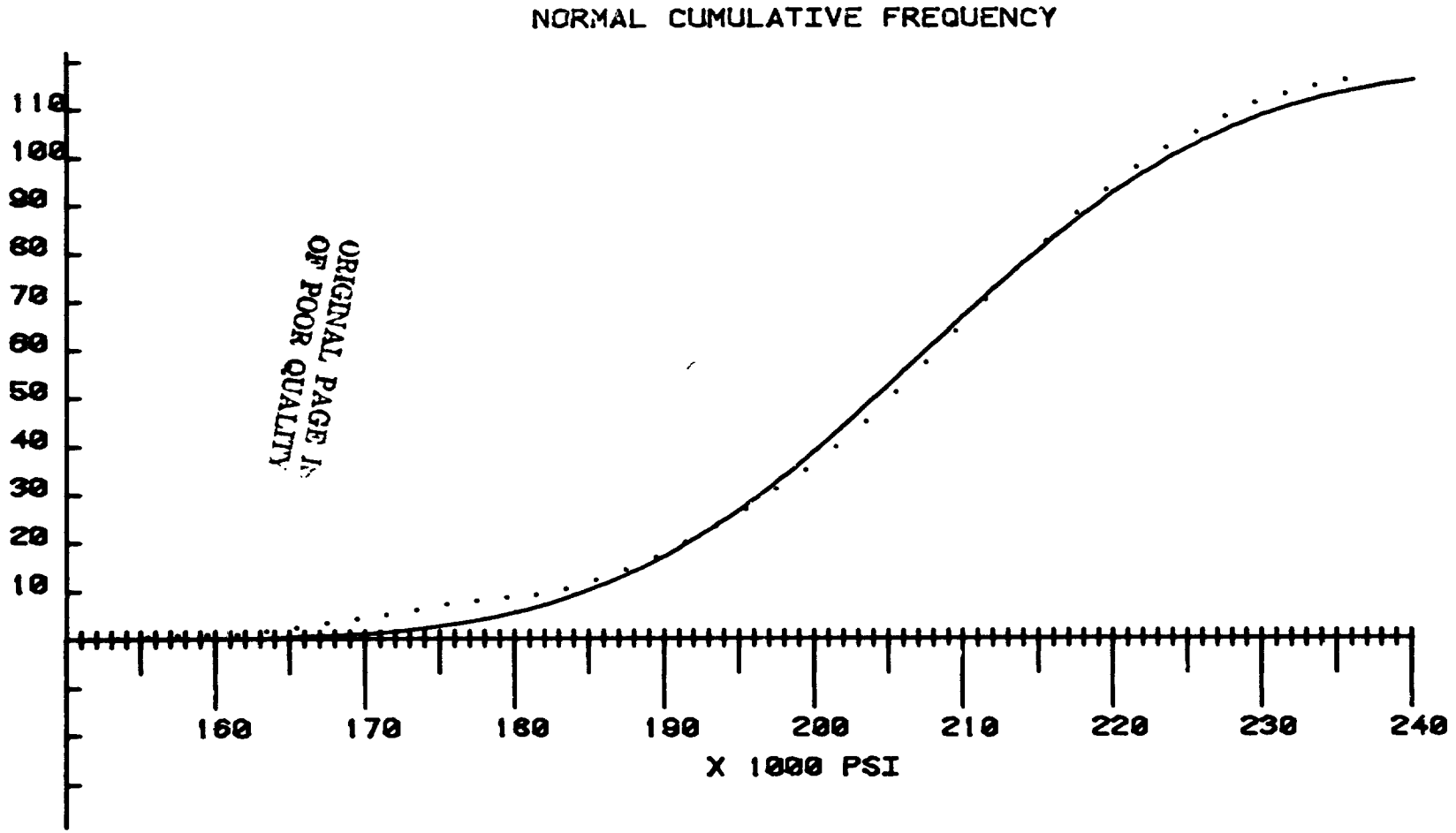


Figure D11. Normal Hercules Tension 12-ply Unidirectional

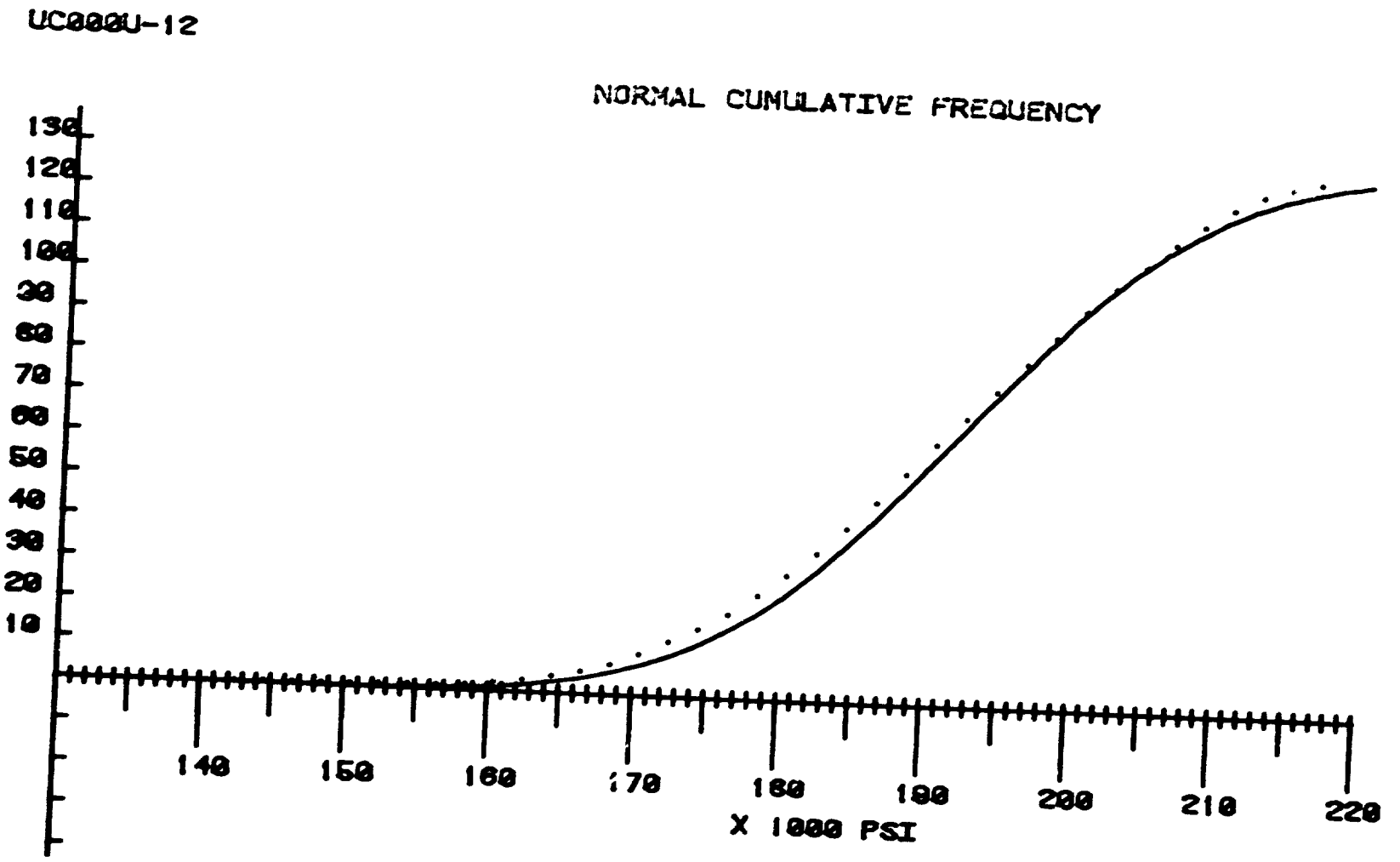


Figure D12. Normal Union Carbide Tension 12-ply Unidirectional

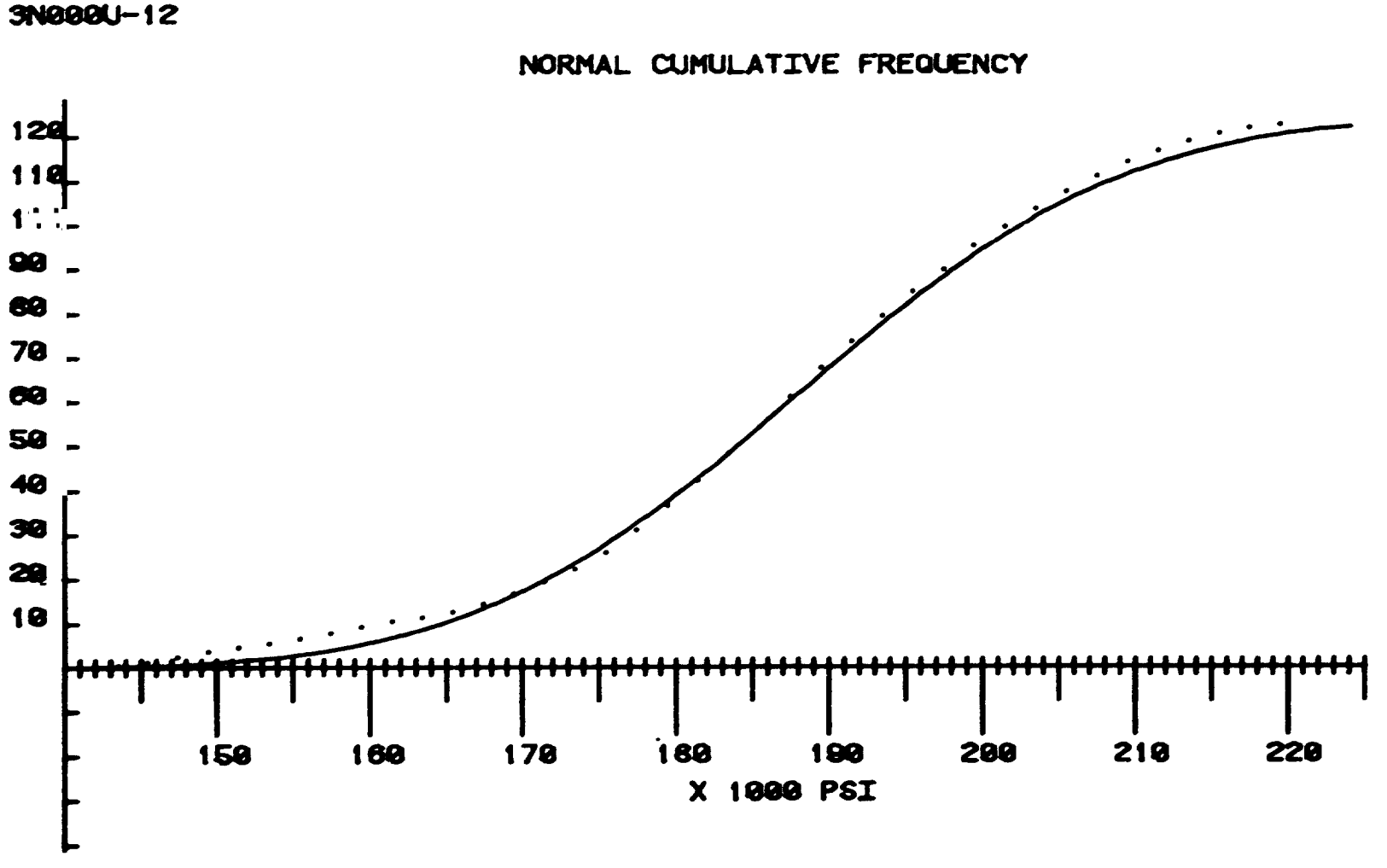


Figure D13. Normal Narmco Task 3 Tension 12-ply Unidirectional

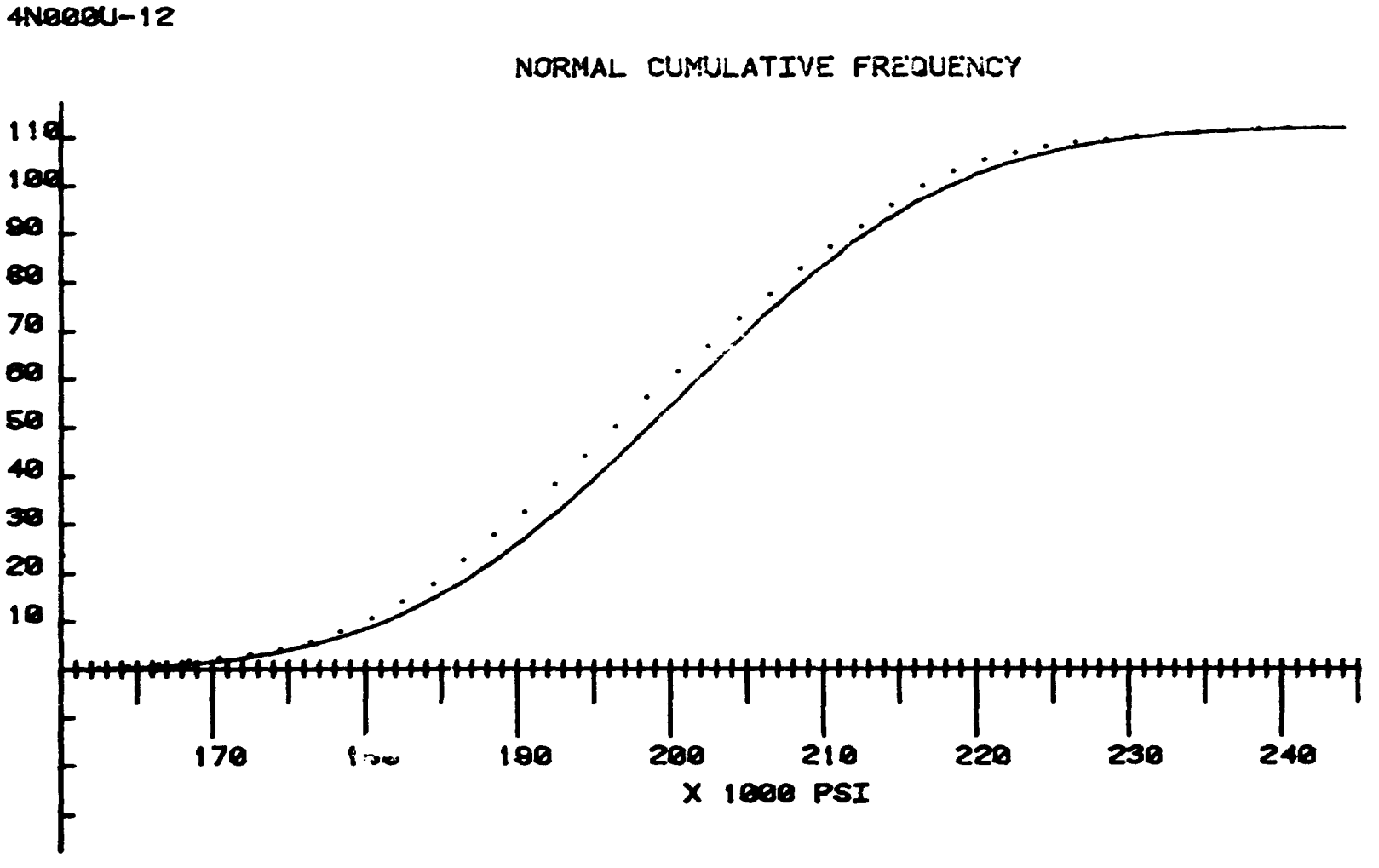


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Figure D14. Normal Narmco Task 4 Tension 12-ply Unidirectional

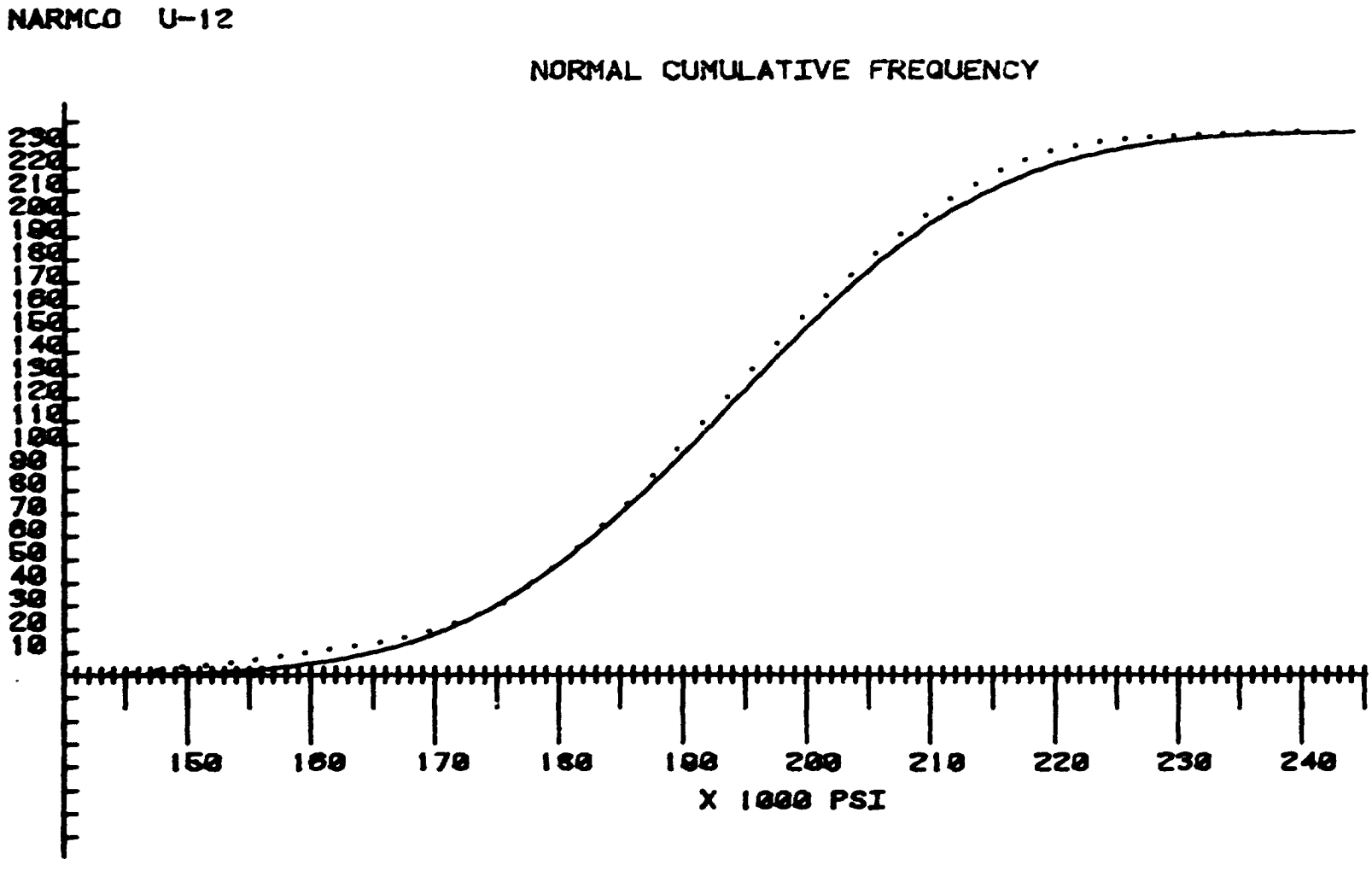

Figure D15. Normal Combined Narmco Task 3 and 4 Tension 12-ply Unidirectional

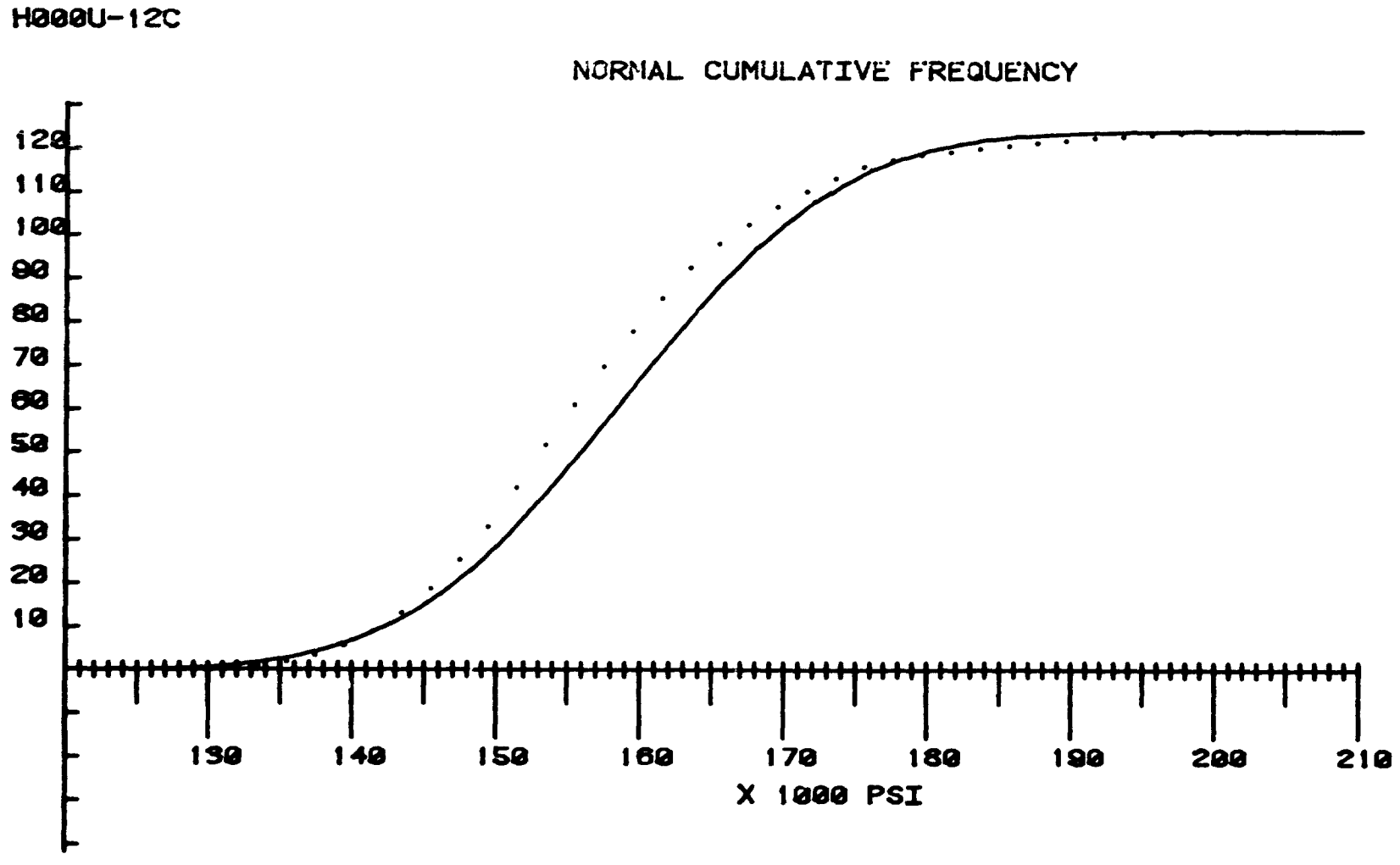

Figure D16. Normal Hercules Compression 12-ply Unidirectional

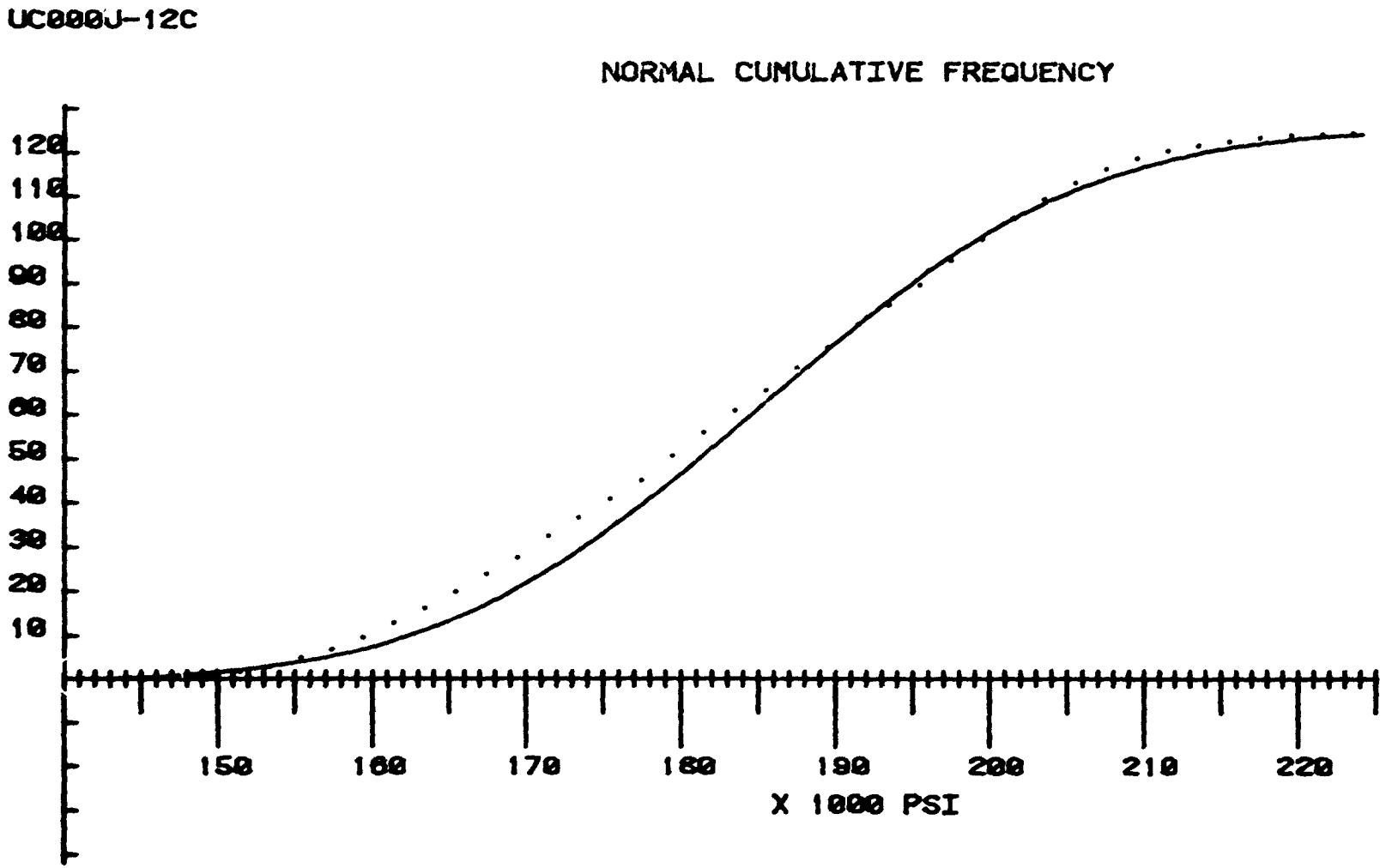

Figure D17. Normal Union Carbide Compression 12-ply Unidirectional

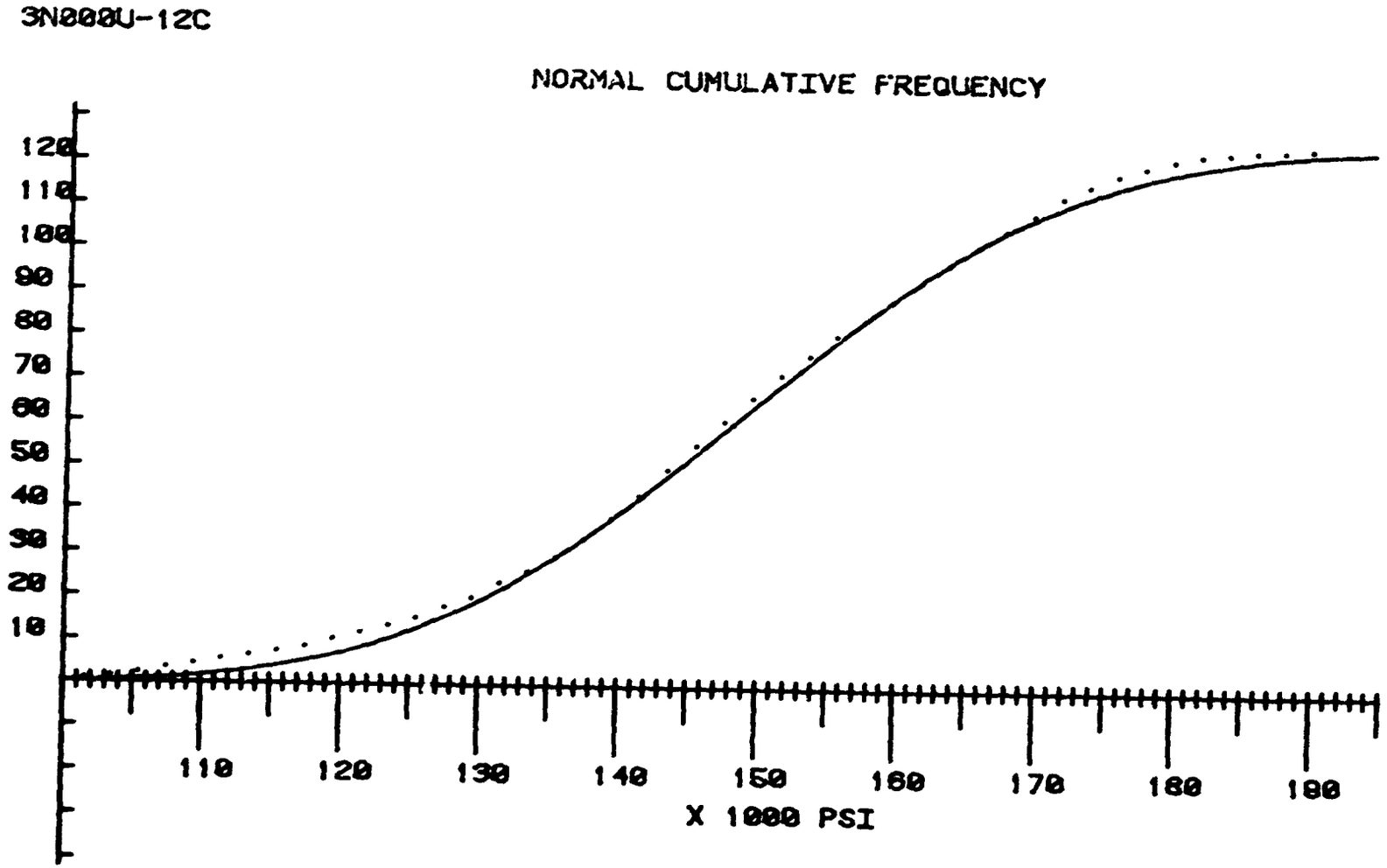

Figure D18. Normal Narmco Task 3 Compression 12-ply Unidirectional

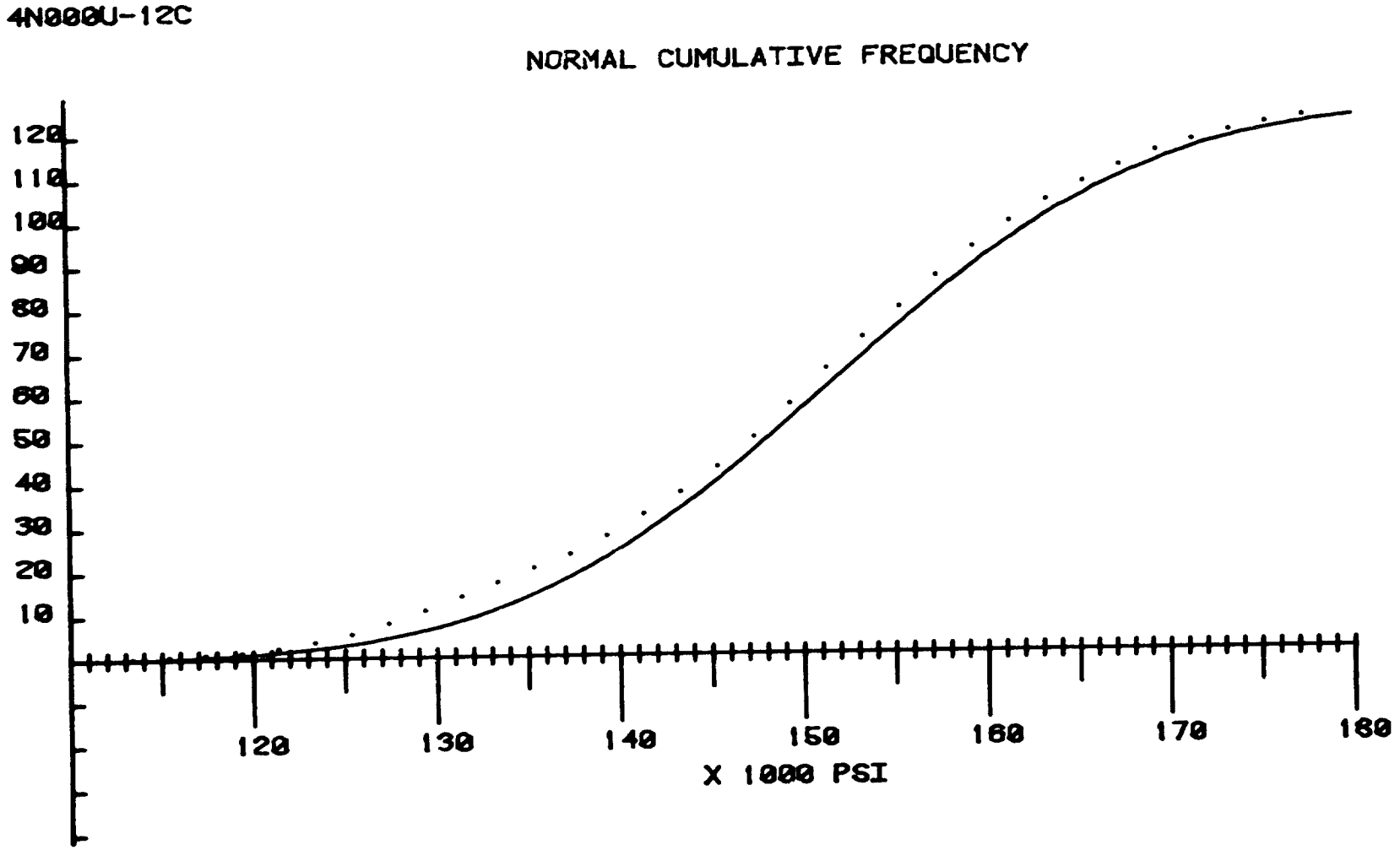

Figure D19. Normal Narmco Task 4 Compression 12-ply Unidirectional

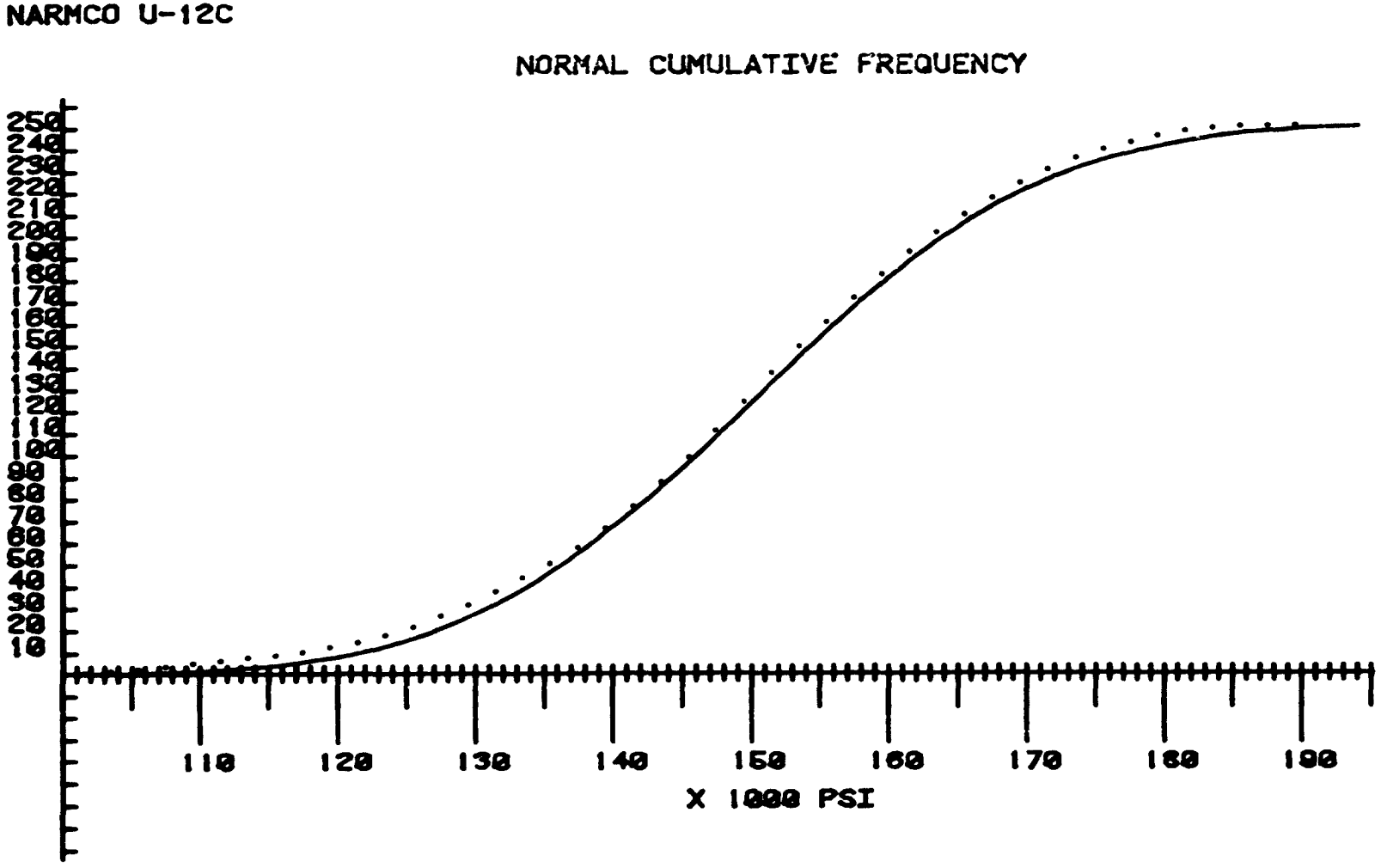

Figure D20. Normal Combined Narmco Task 3 and 4 Compression 12-ply Unidirectional

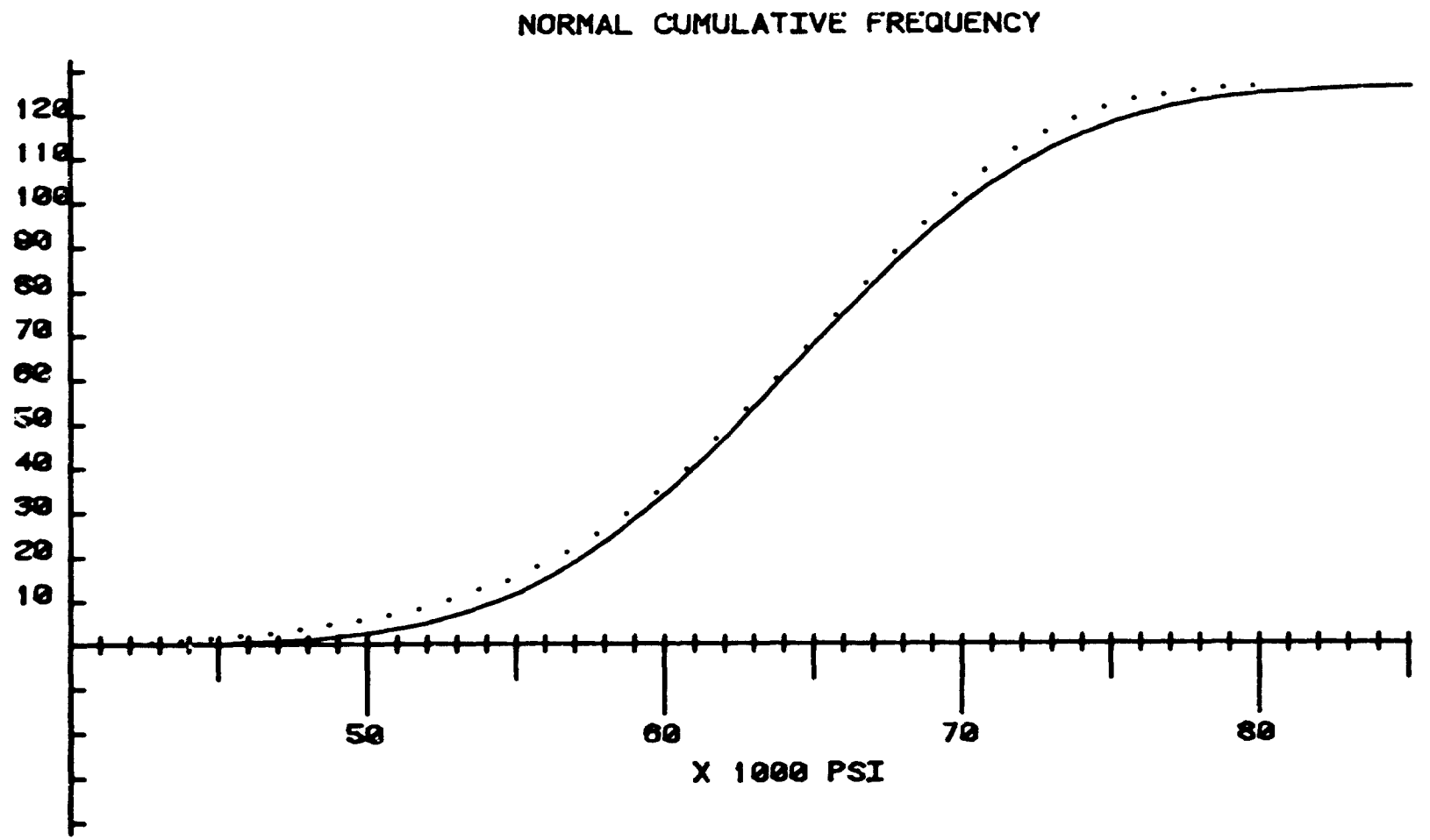

Figure D21. Normal Hercules Compression 8-ply Crossply

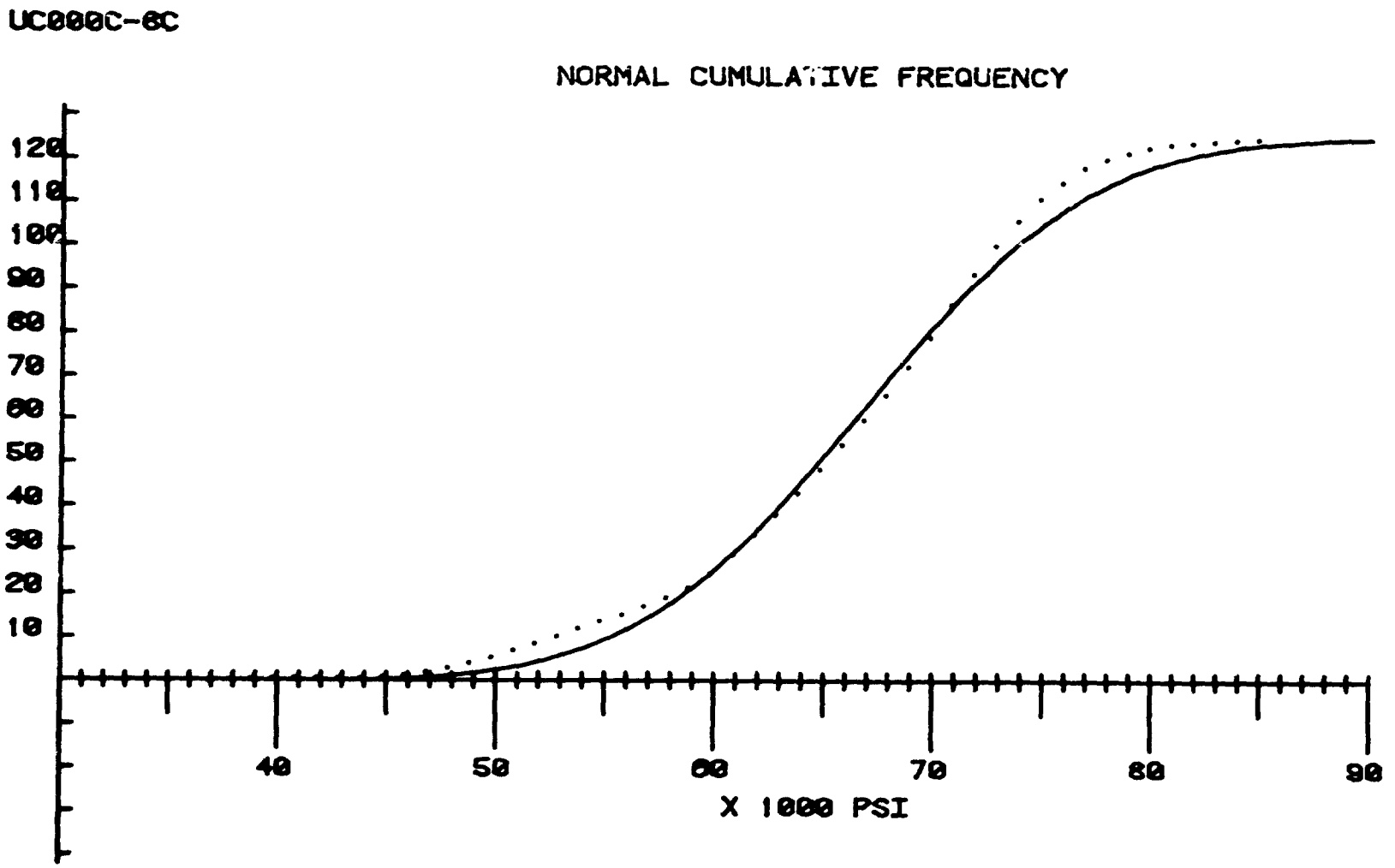

Figure D22. Normal Union Carbide Compression 8-ply Crossply

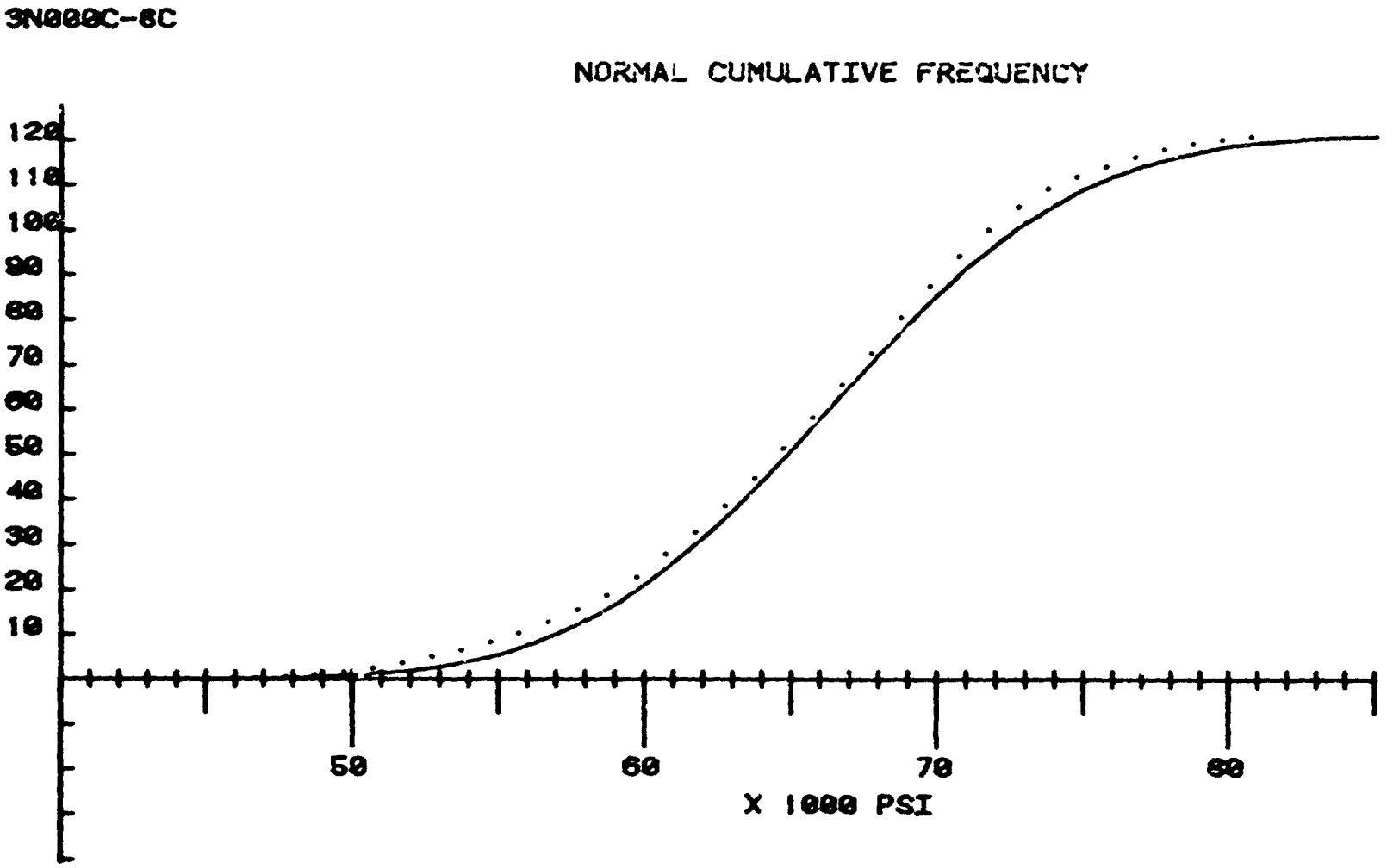

Figure D23. Normal Narmco Task 3 Compression 8-ply Crossply

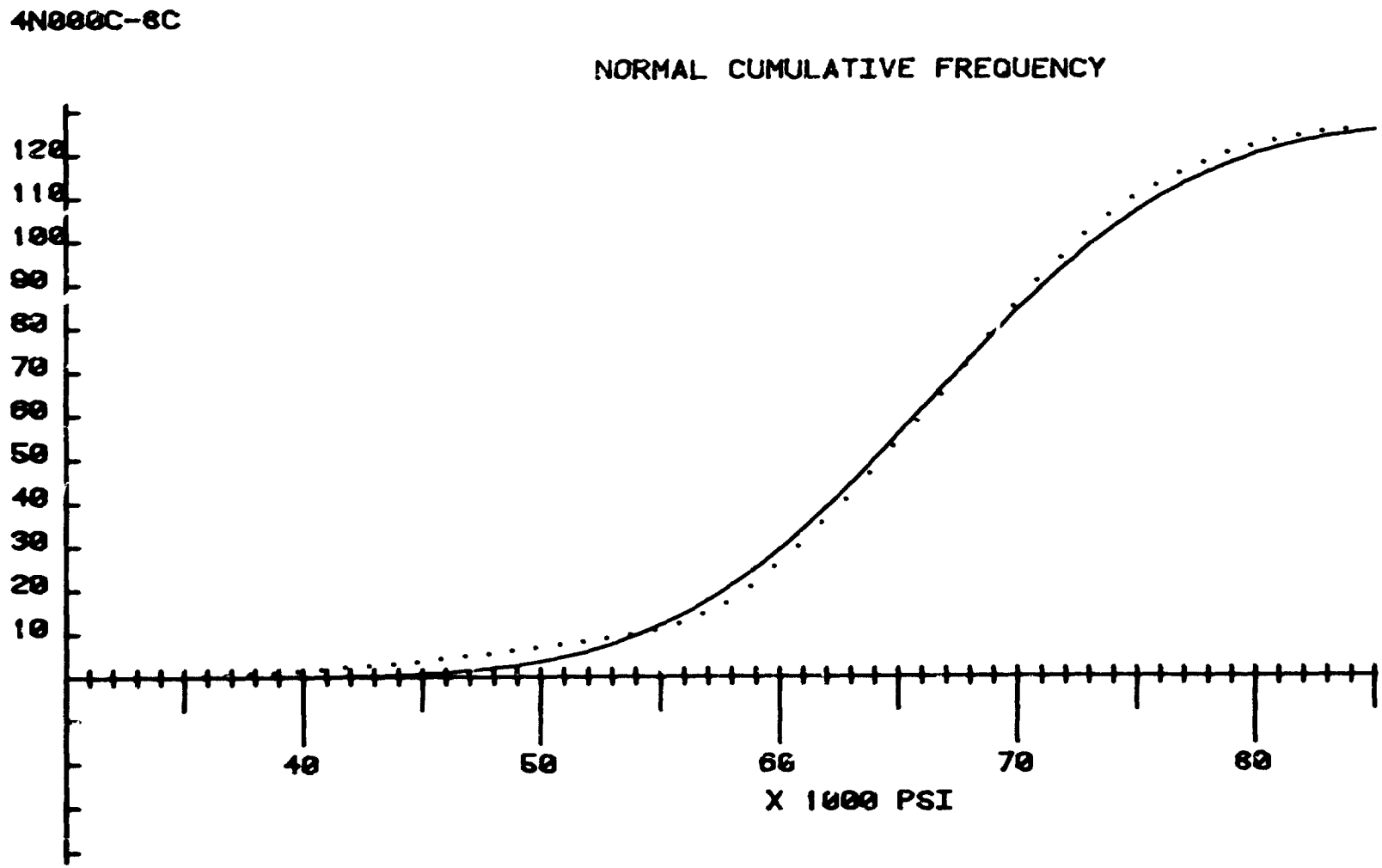

Figure D24. Normal Narmco Task 4 Compression 8-ply Crossply

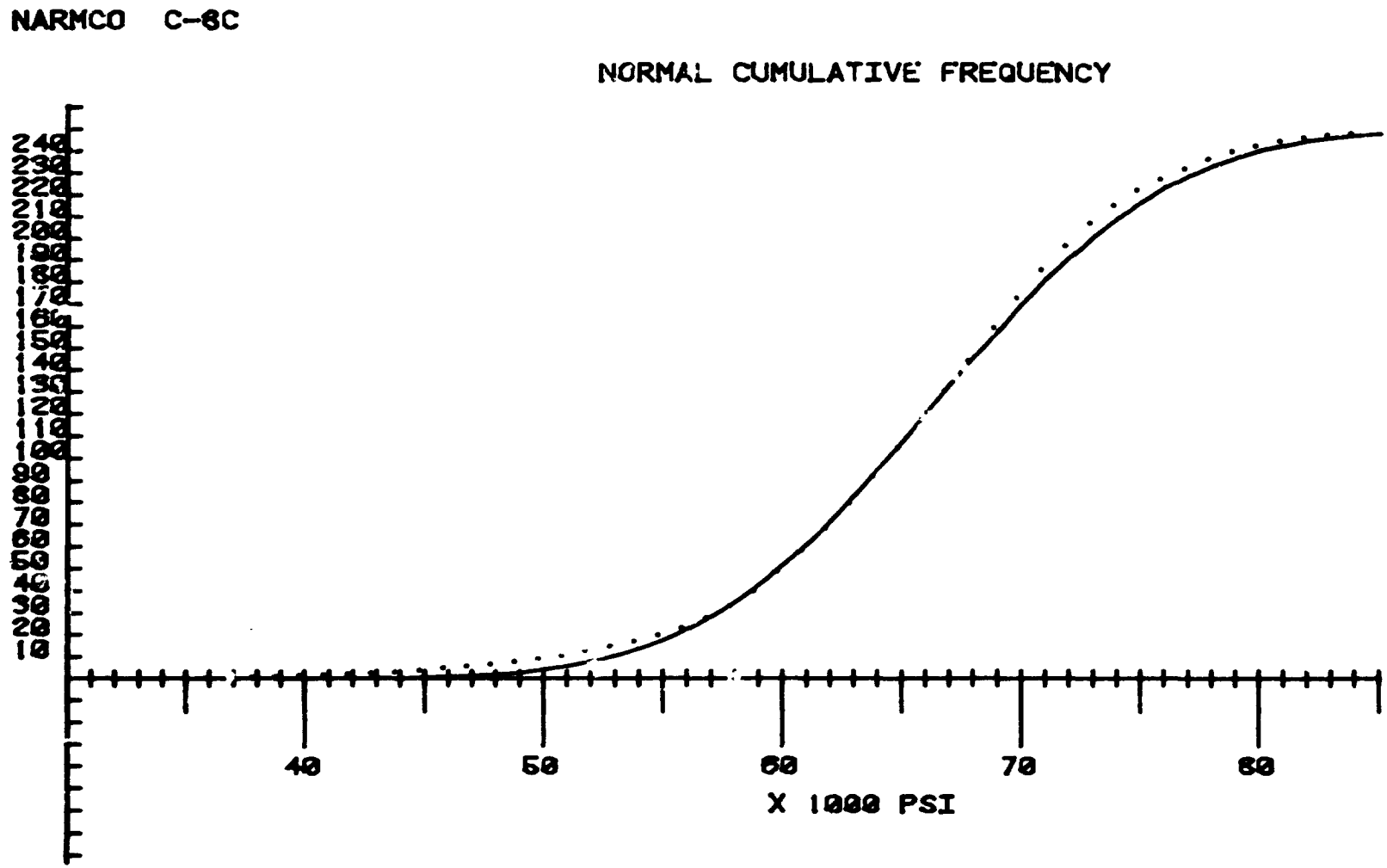

Figure D25. Normal Combined Narmco Task 3 and 4 Compression 8-ply Crossply

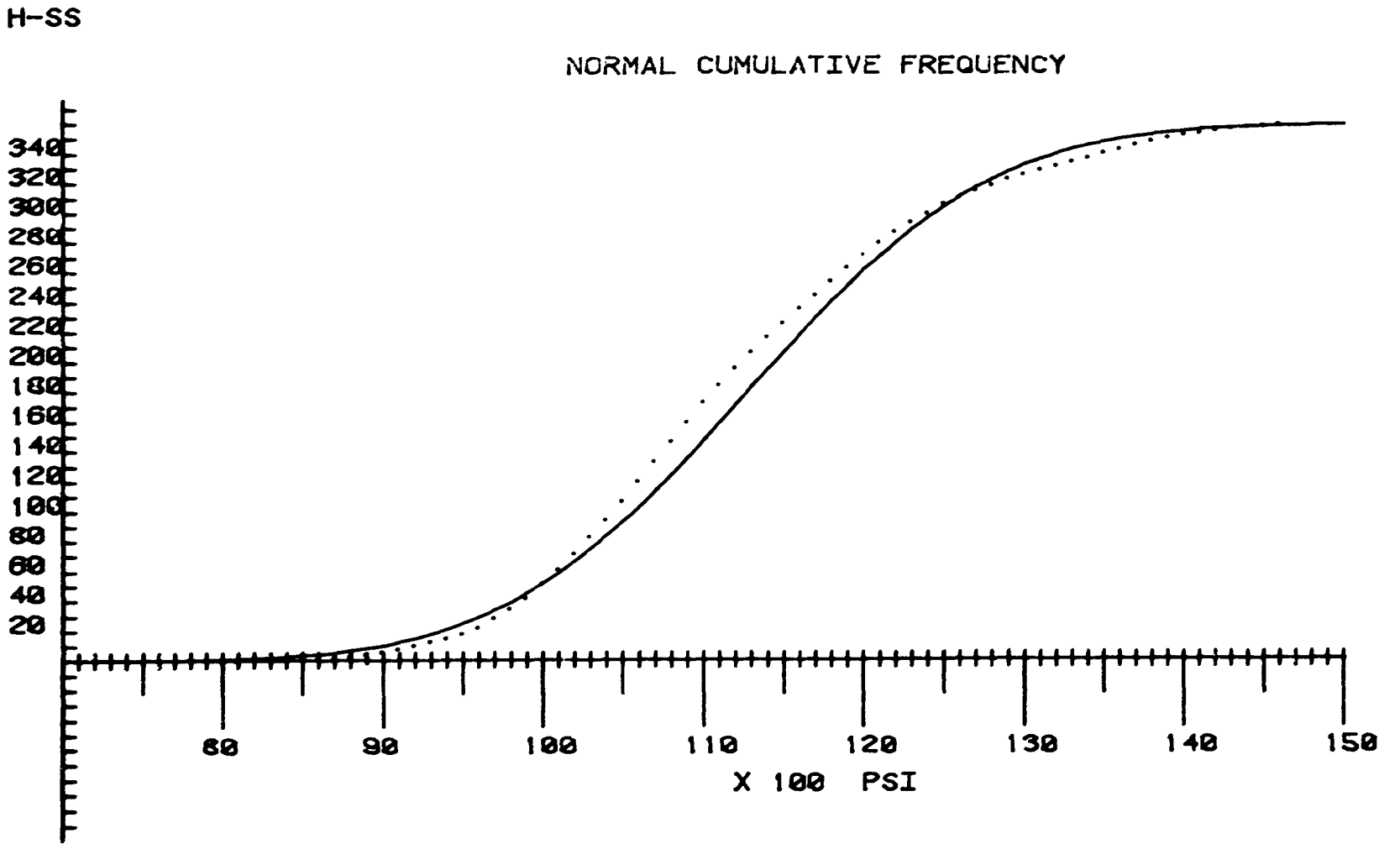

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Figure D26. Normal Hercules Short Beam Shear

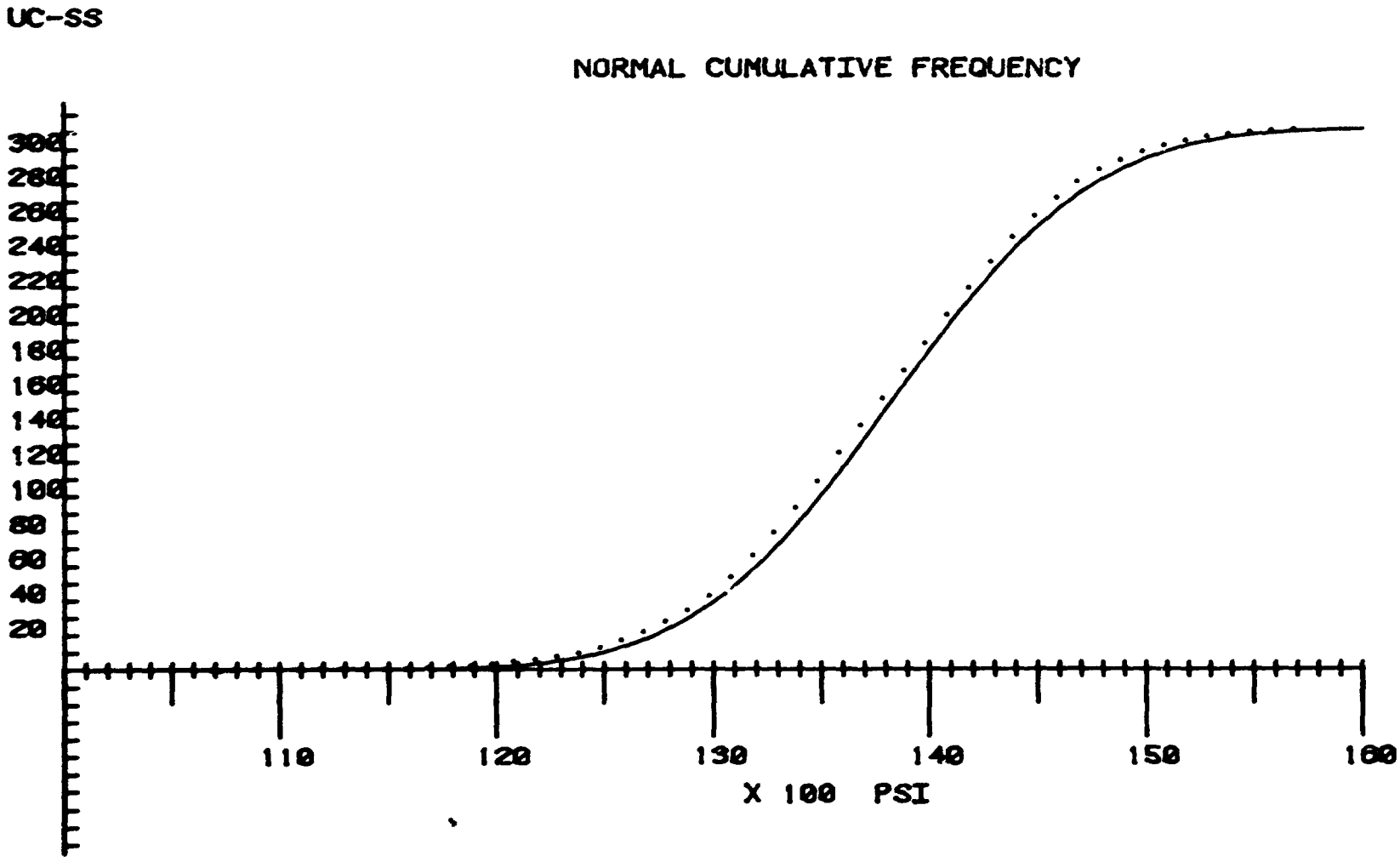

Figure D27. Normal Union Carbide Short Beam Shear

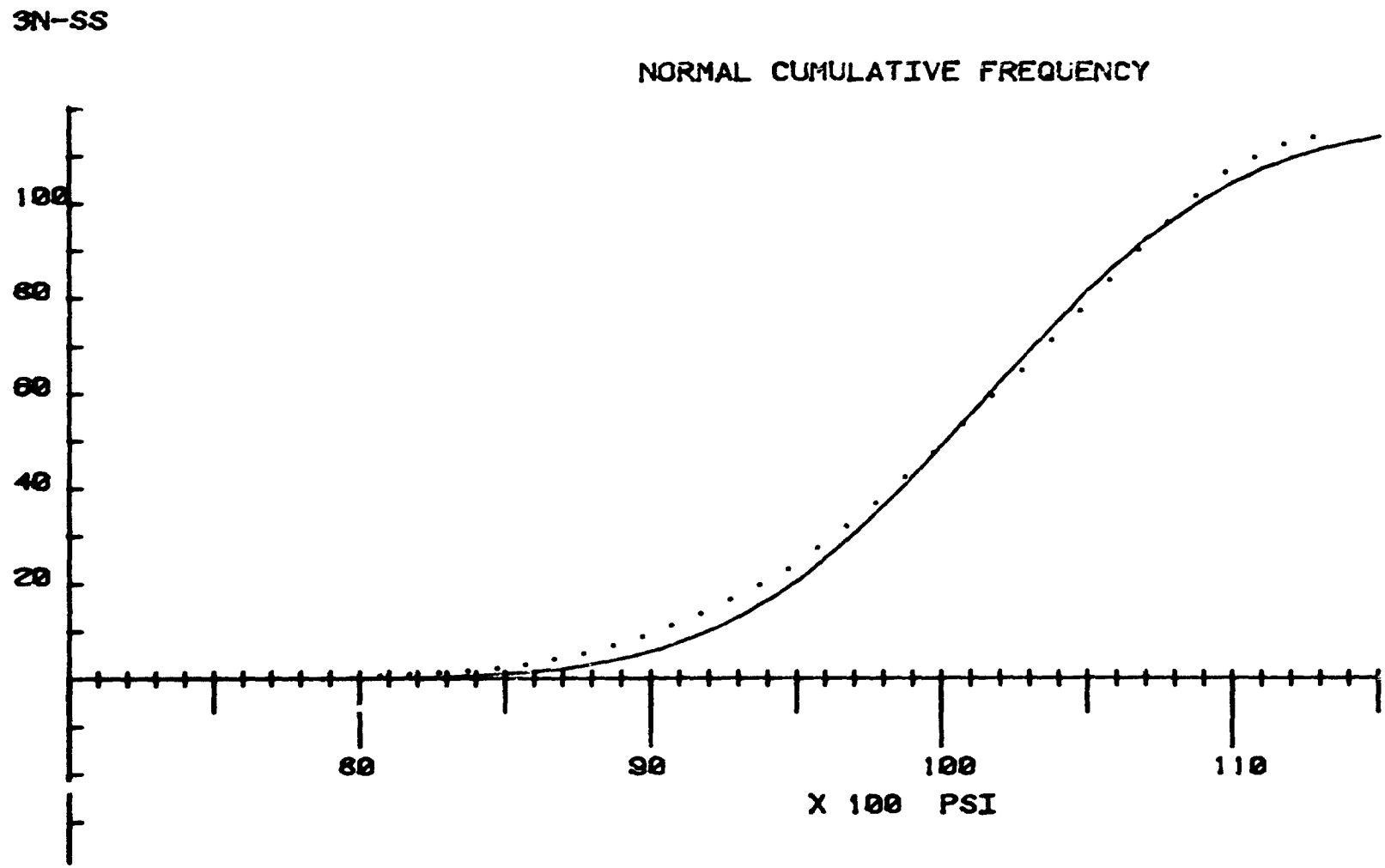

Figure D28. Normal Narmco Task 3 Short Beam Shear

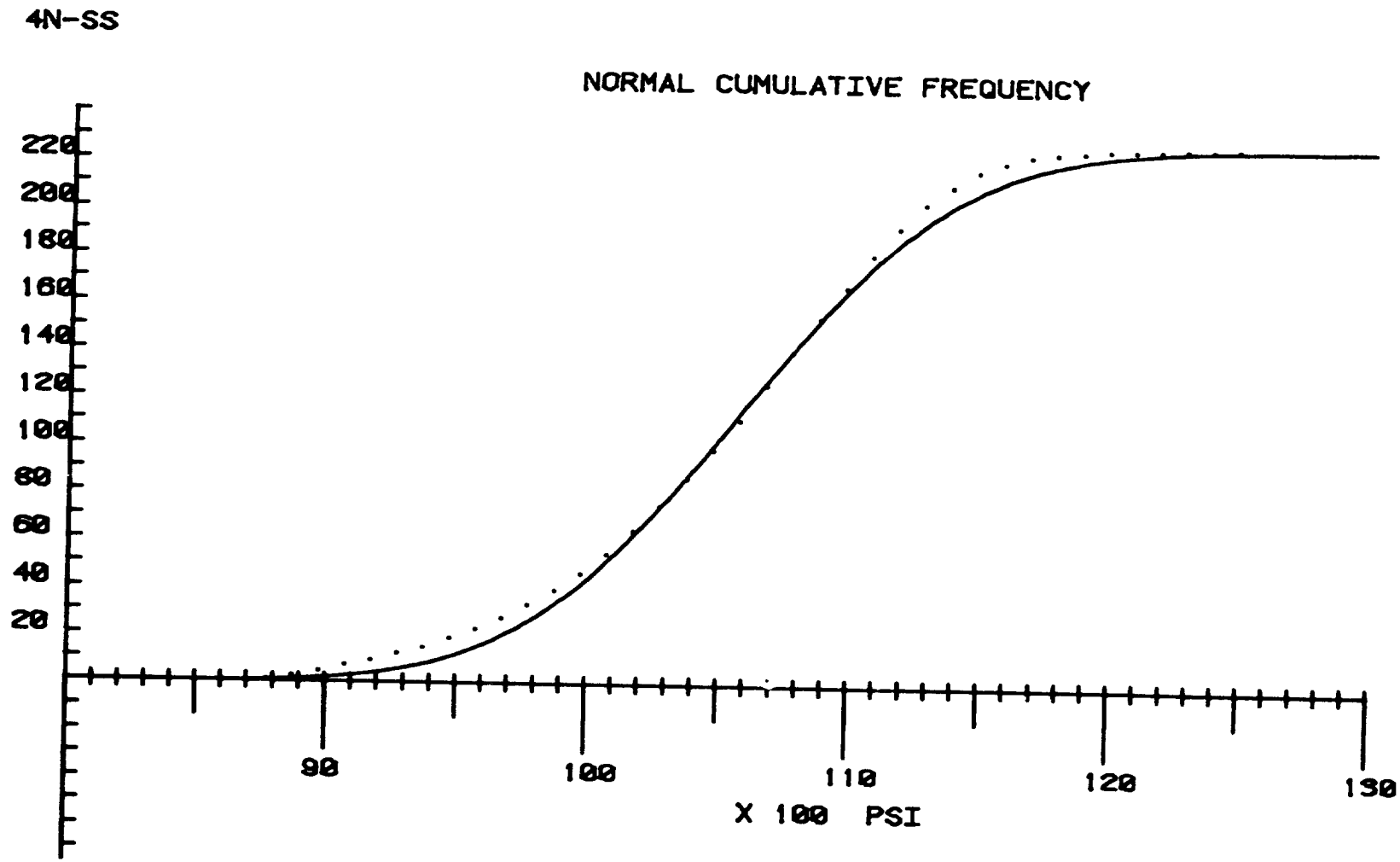

Figure D29. Normal Narmco Task 4 Short Beam Shear

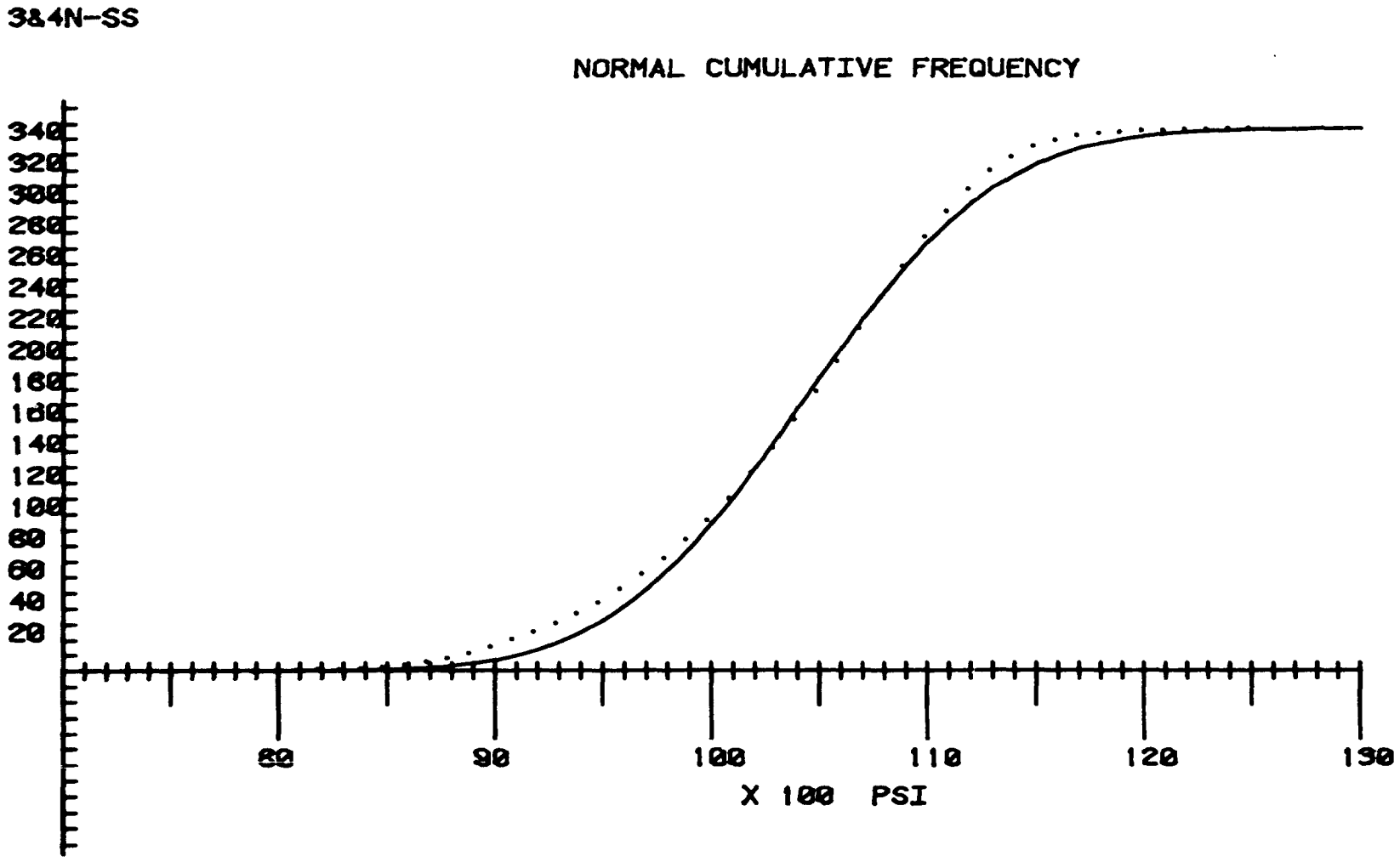

Figure D30. Normal Combined Narmco Task 3 and 4 Short Beam Shear

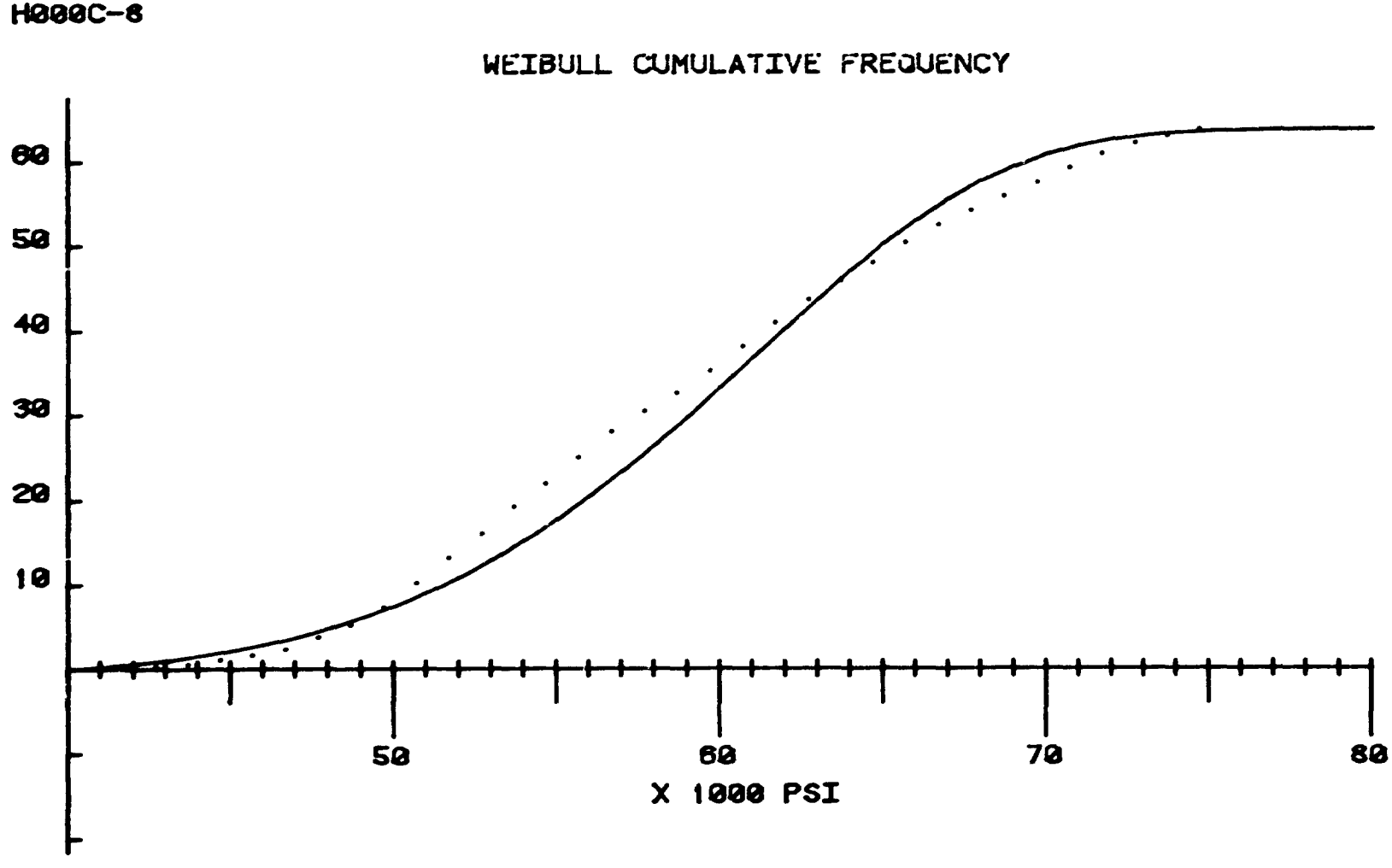

Figure D31. Weibull Hercules Tension 8-ply Crossply

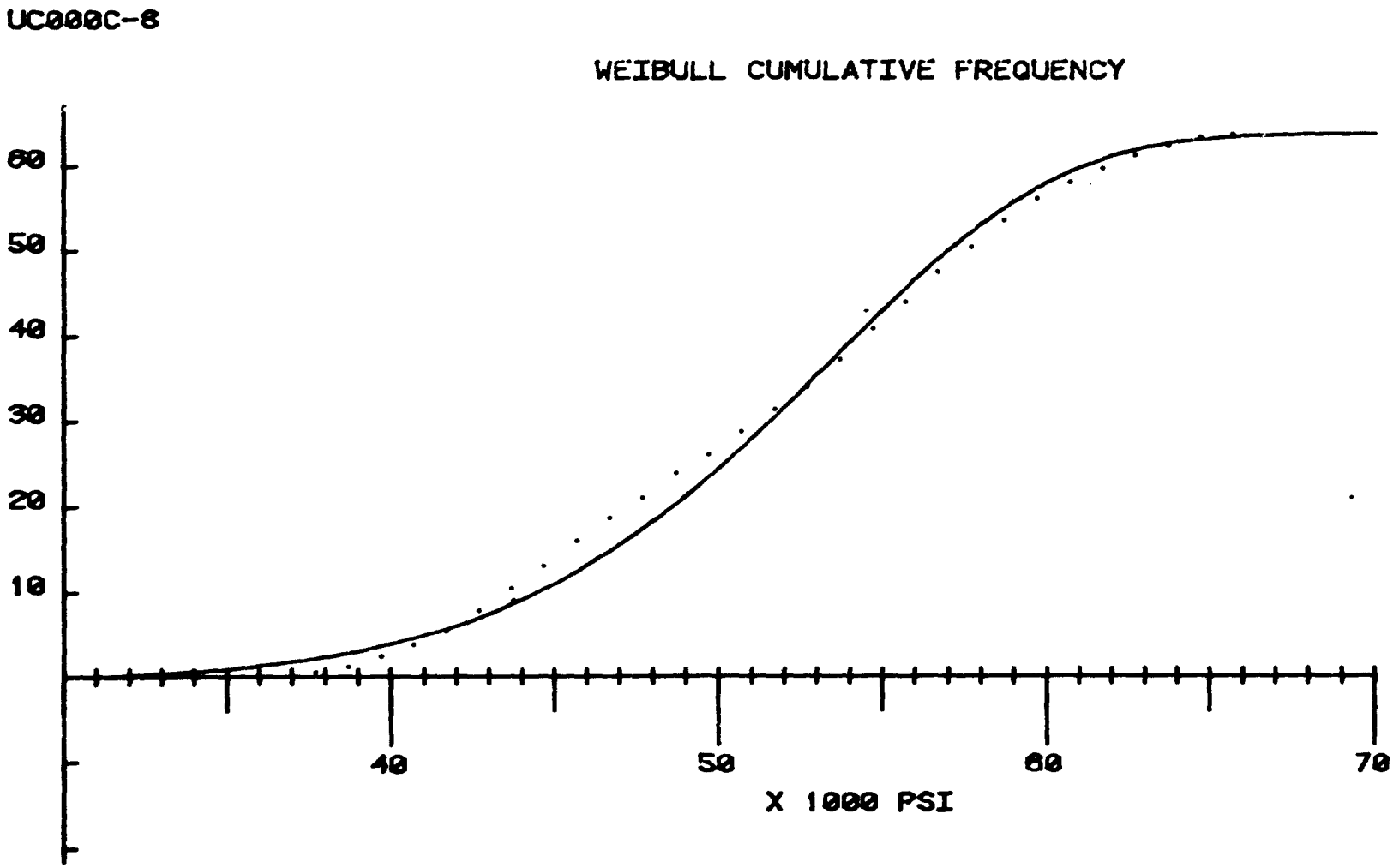

Figure D32. Weibull Union Carbide Tension 8-ply Crossply

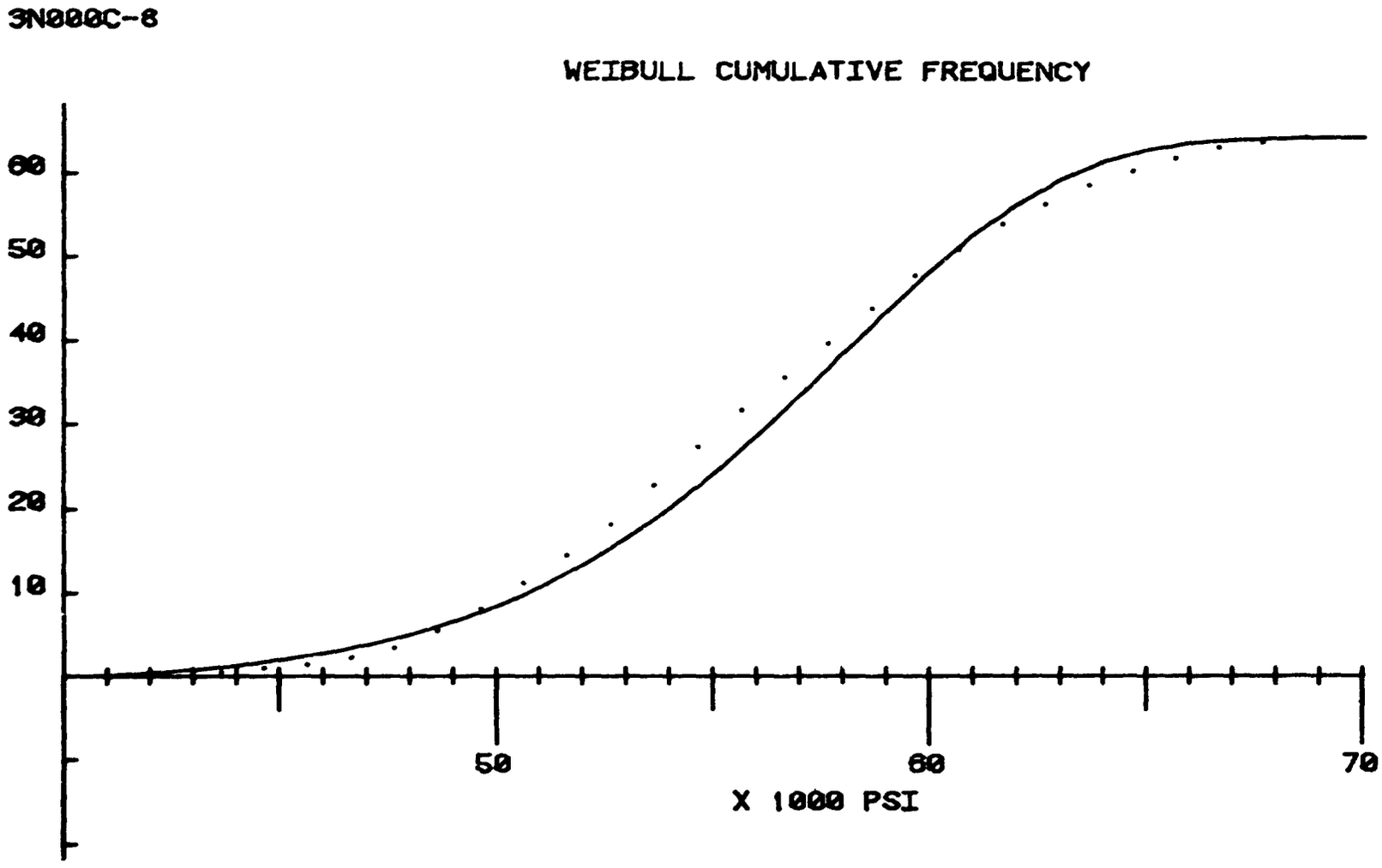

Figure D33. Weibull Narmco Task 3 Tension 8-ply Crossply

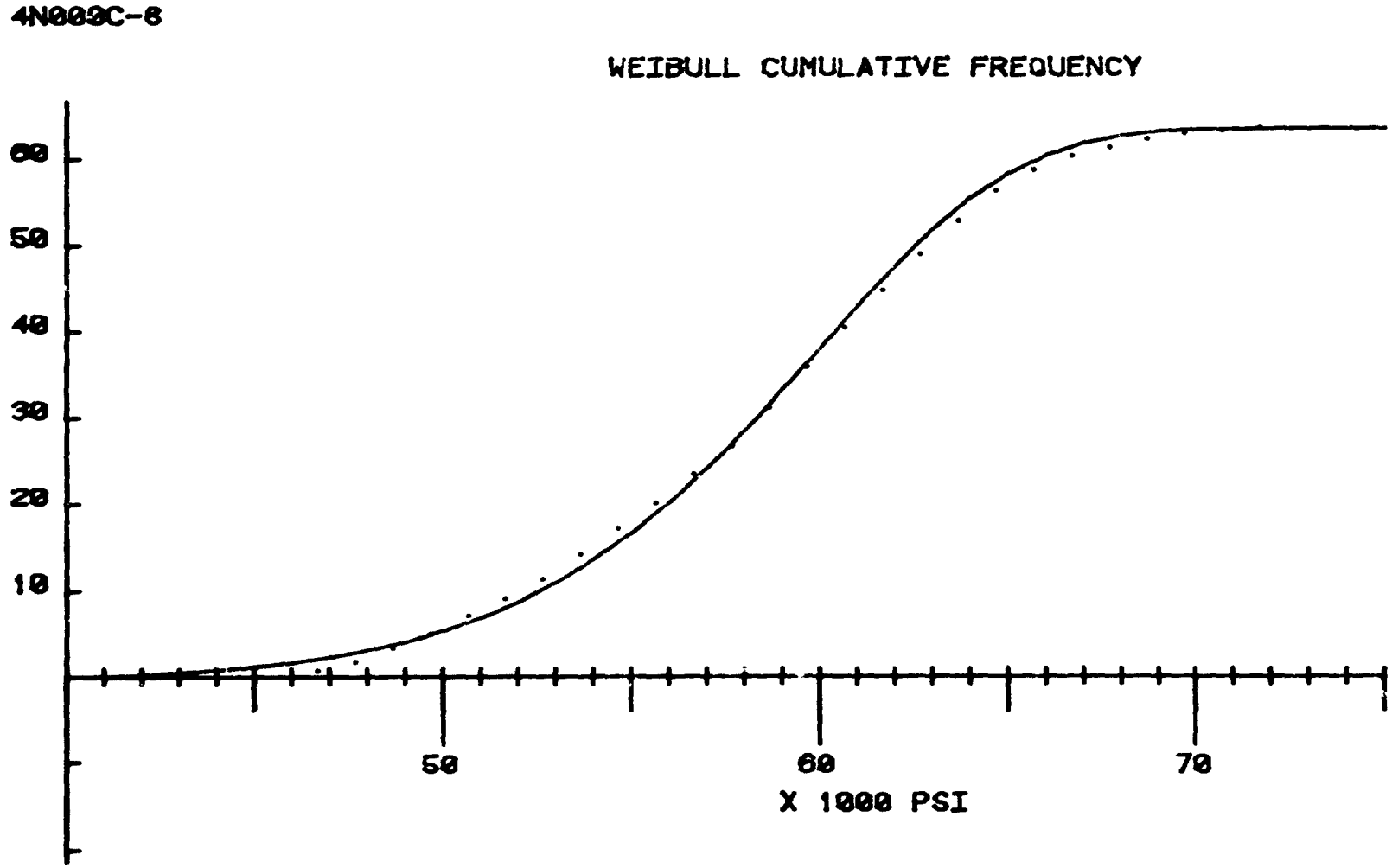

Figure D34. Weibull Narmco Task 4 Tension 8-ply Crossply

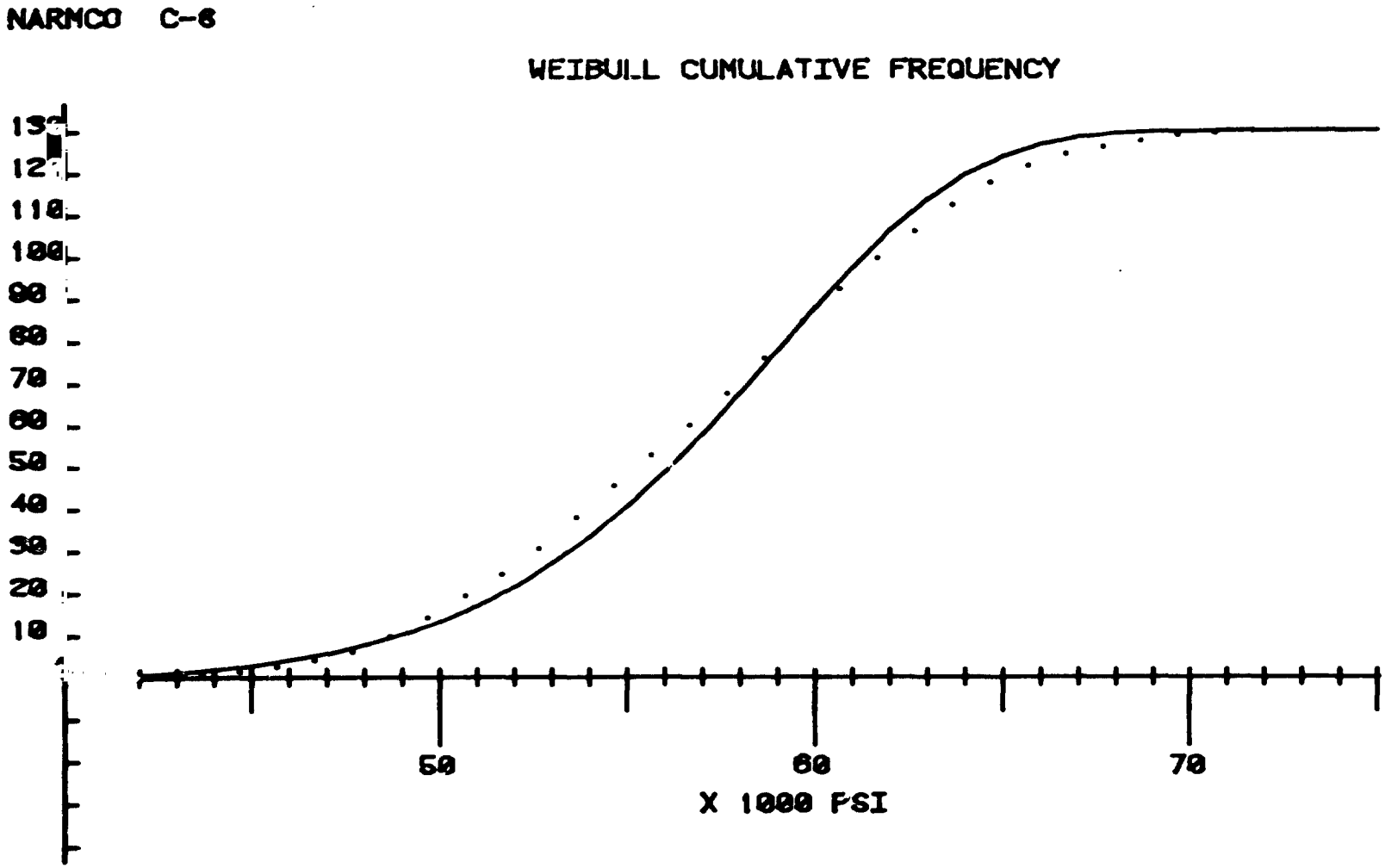

Figure D35. Weibull Combined Narmco Task 3 and 4 Tension 8-ply Crossply

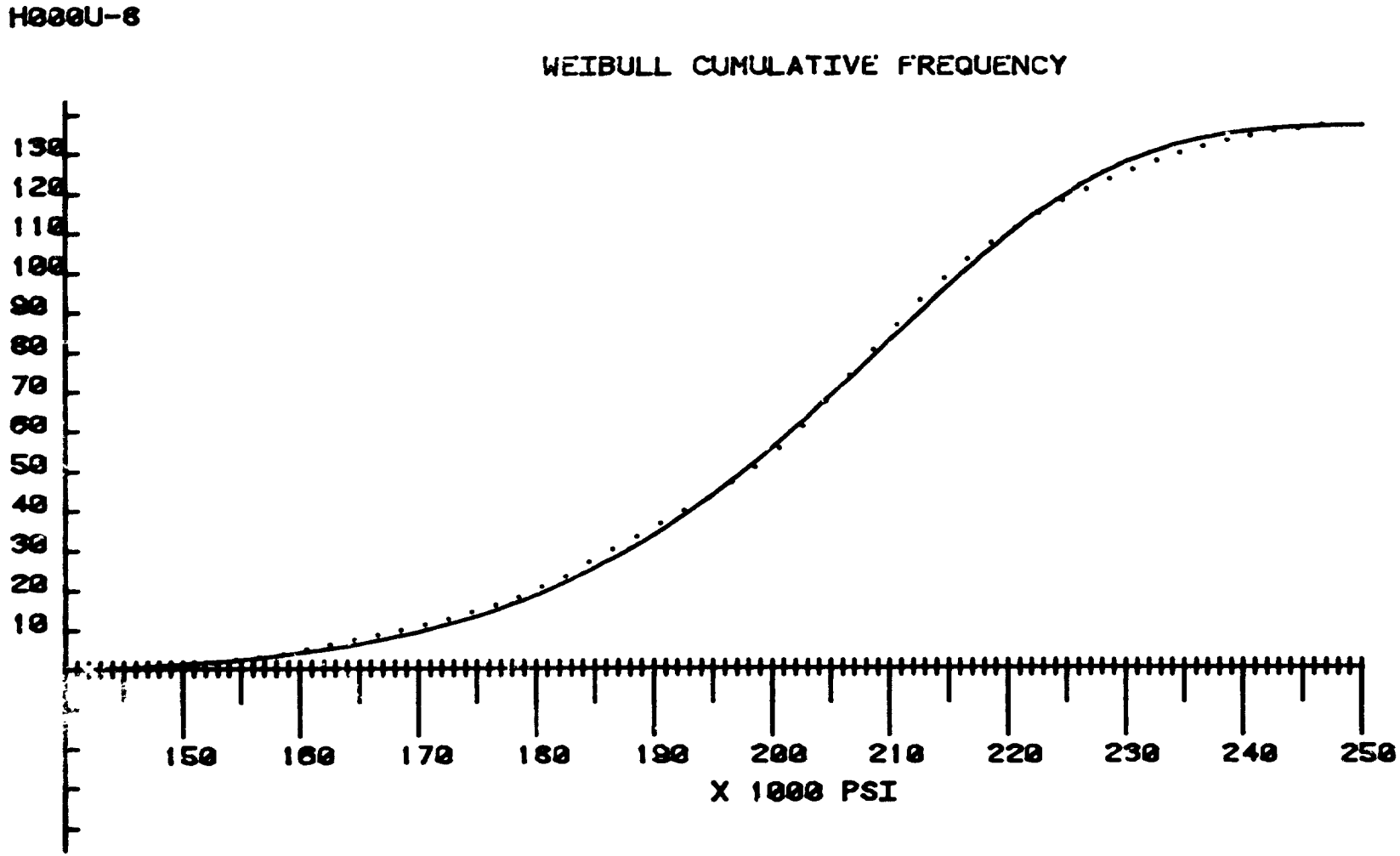

Figure D36. Weibull Hercules Tension 8-ply Unidirectional

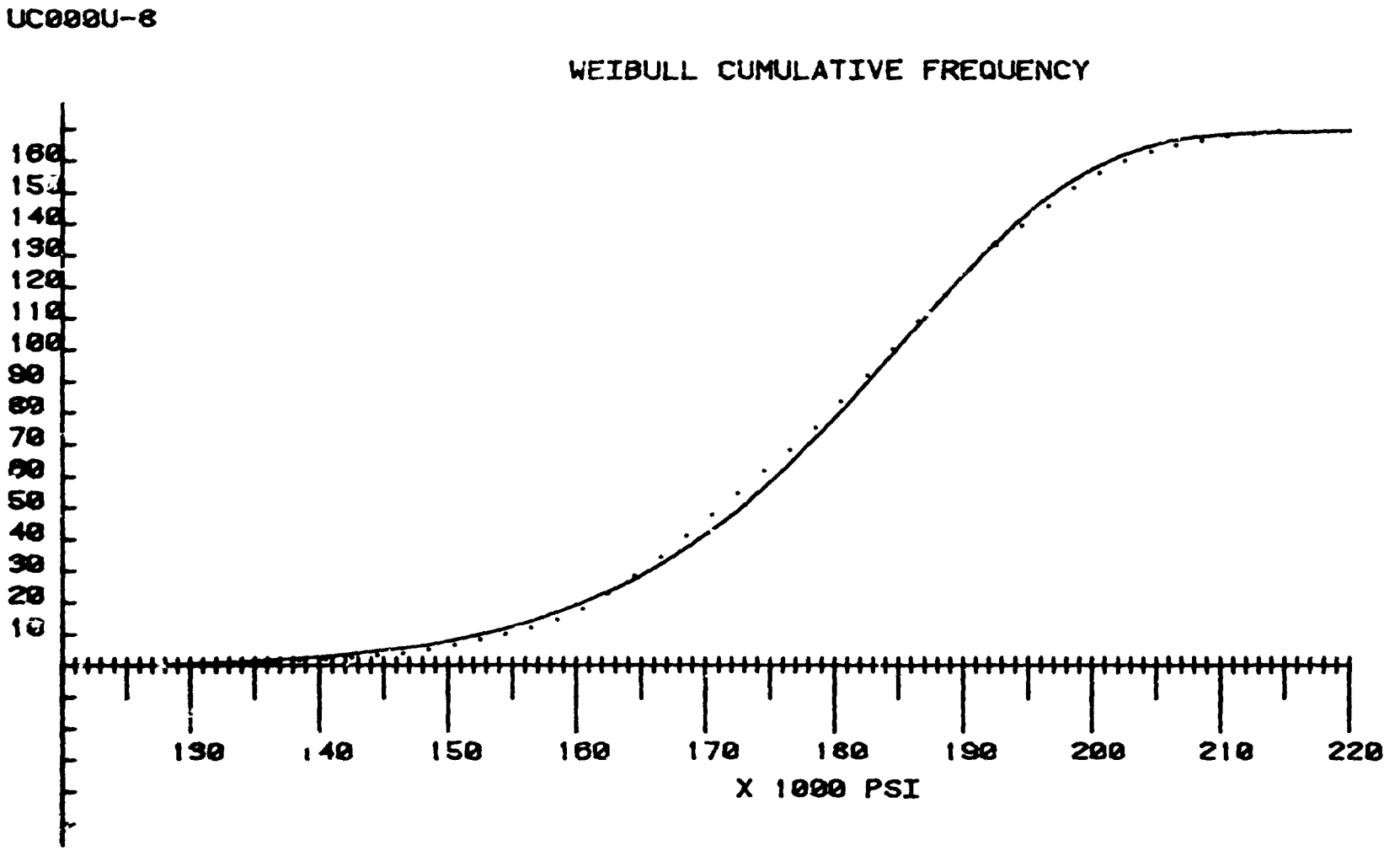

Figure D37. Weibull Union Carbide Tension 8-ply Unidirectional

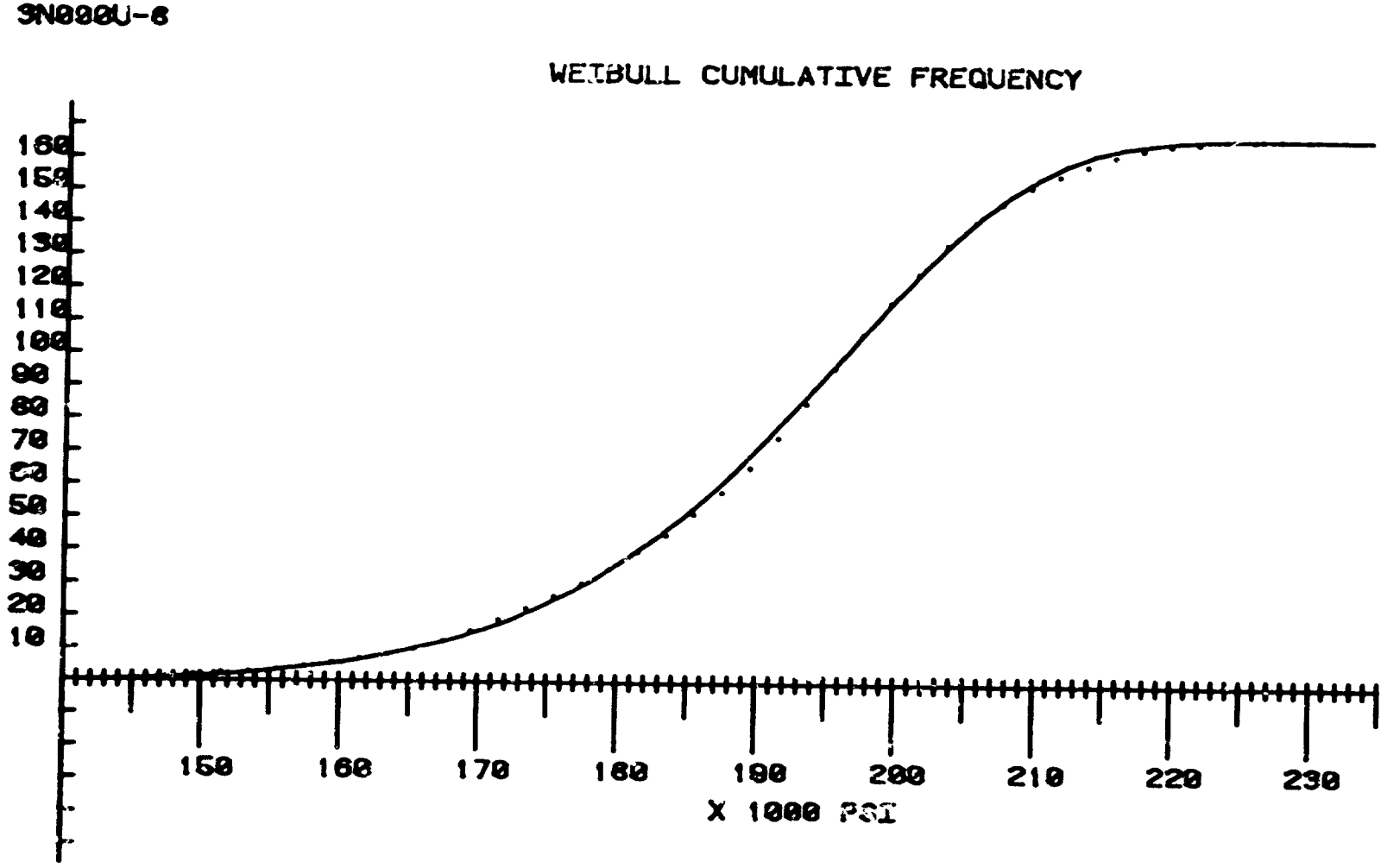

Figure D38. Weibull Narmco Task 3 Tension 8-ply Unidirectional

4N000U-8

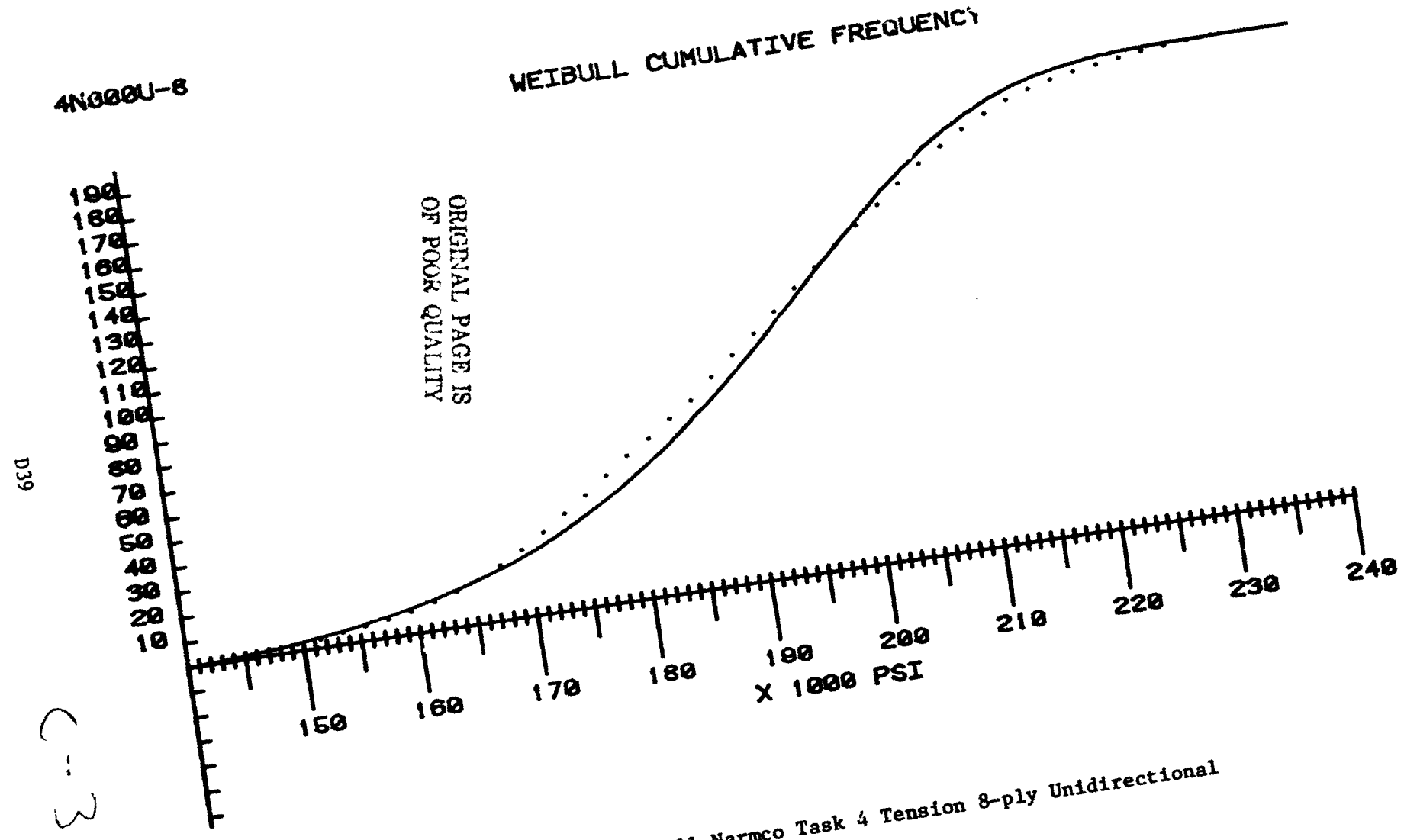

Figure D39. Weibull Narmco Task 4 Tension 8-ply Unidirectional

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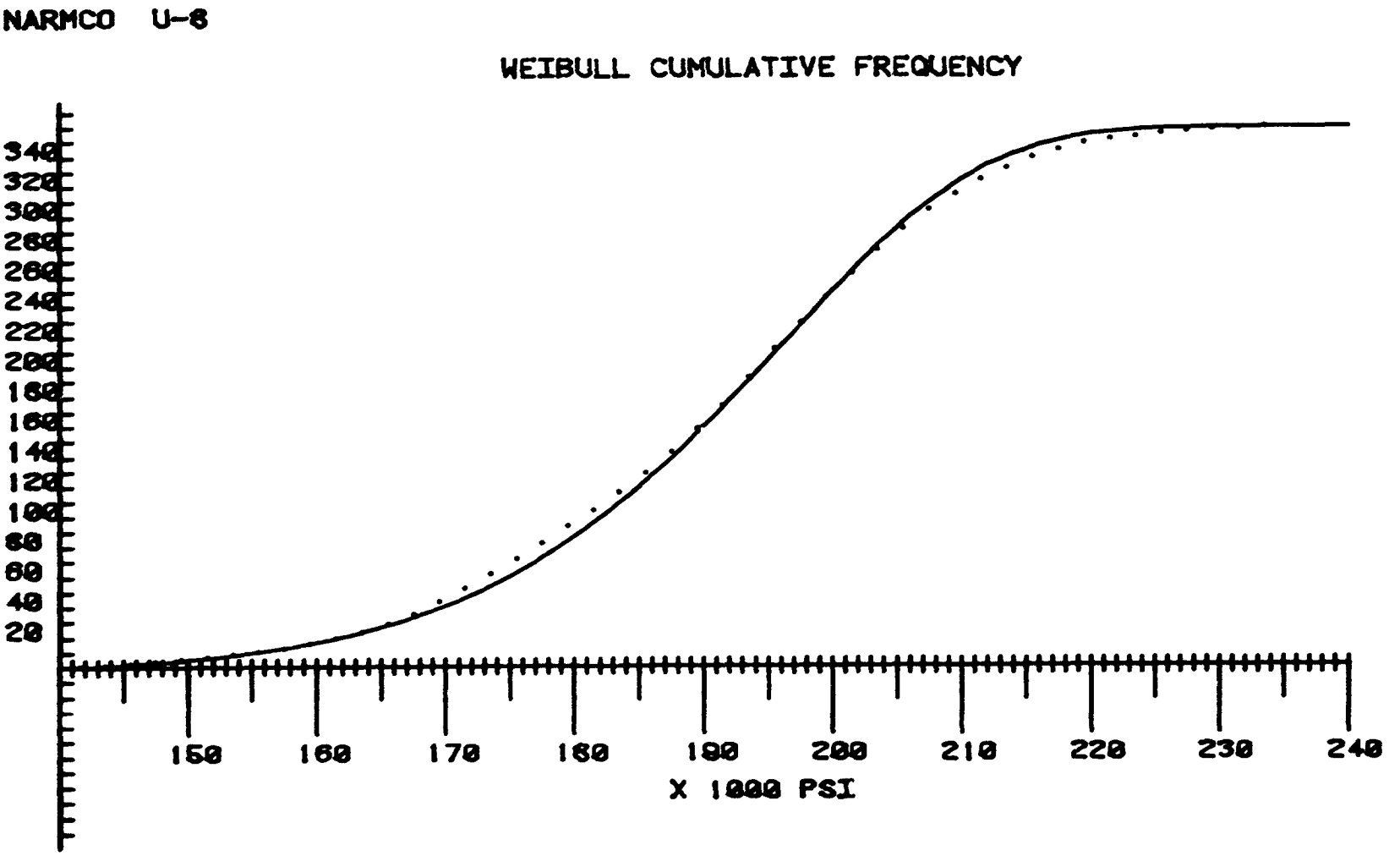


Figure D40. Weibull Combined Narmco Task 3 and 4 Tension 8-ply Unidirectional

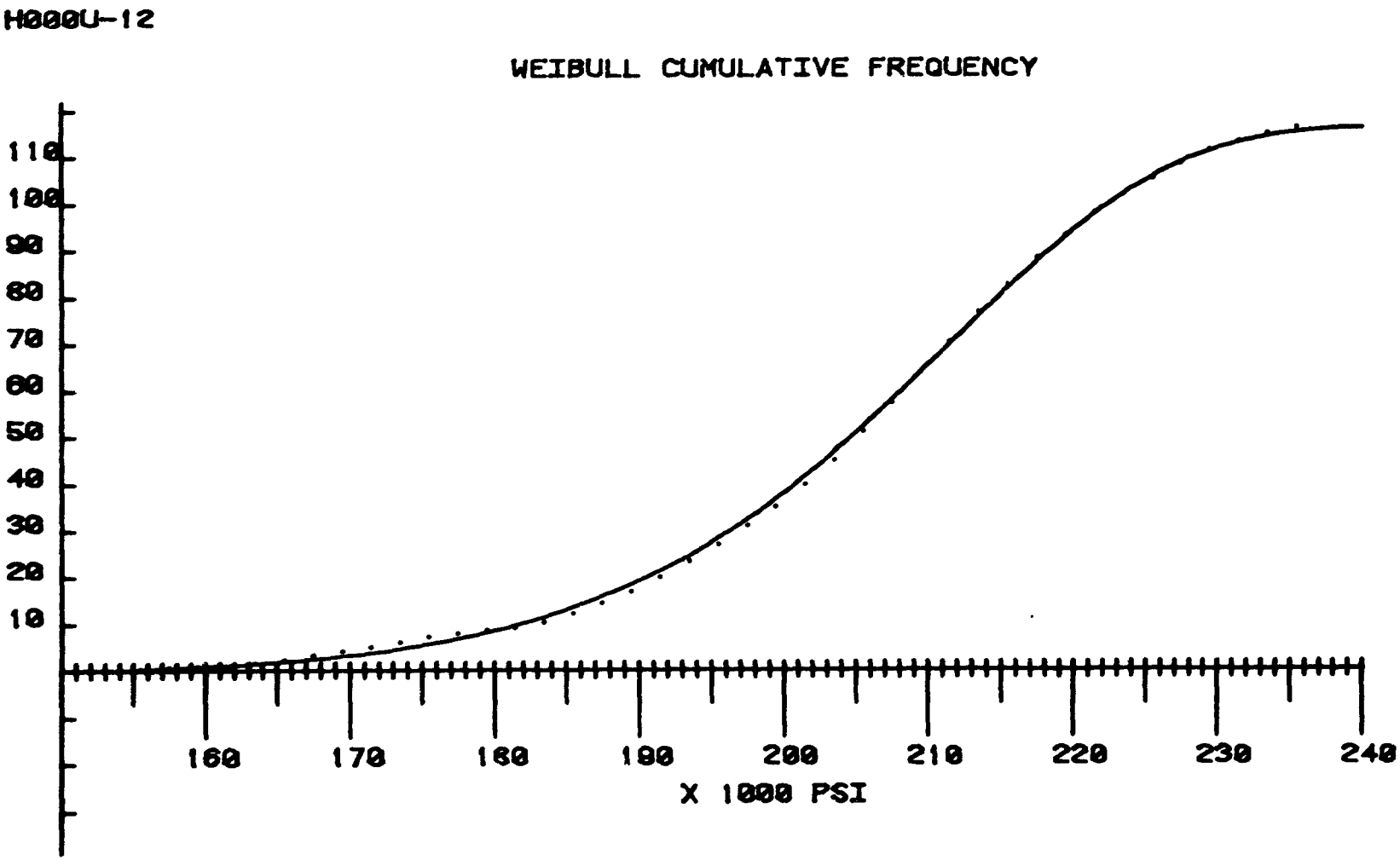


Figure D41. Weibull Hercules Tension 12-ply Unidirectional

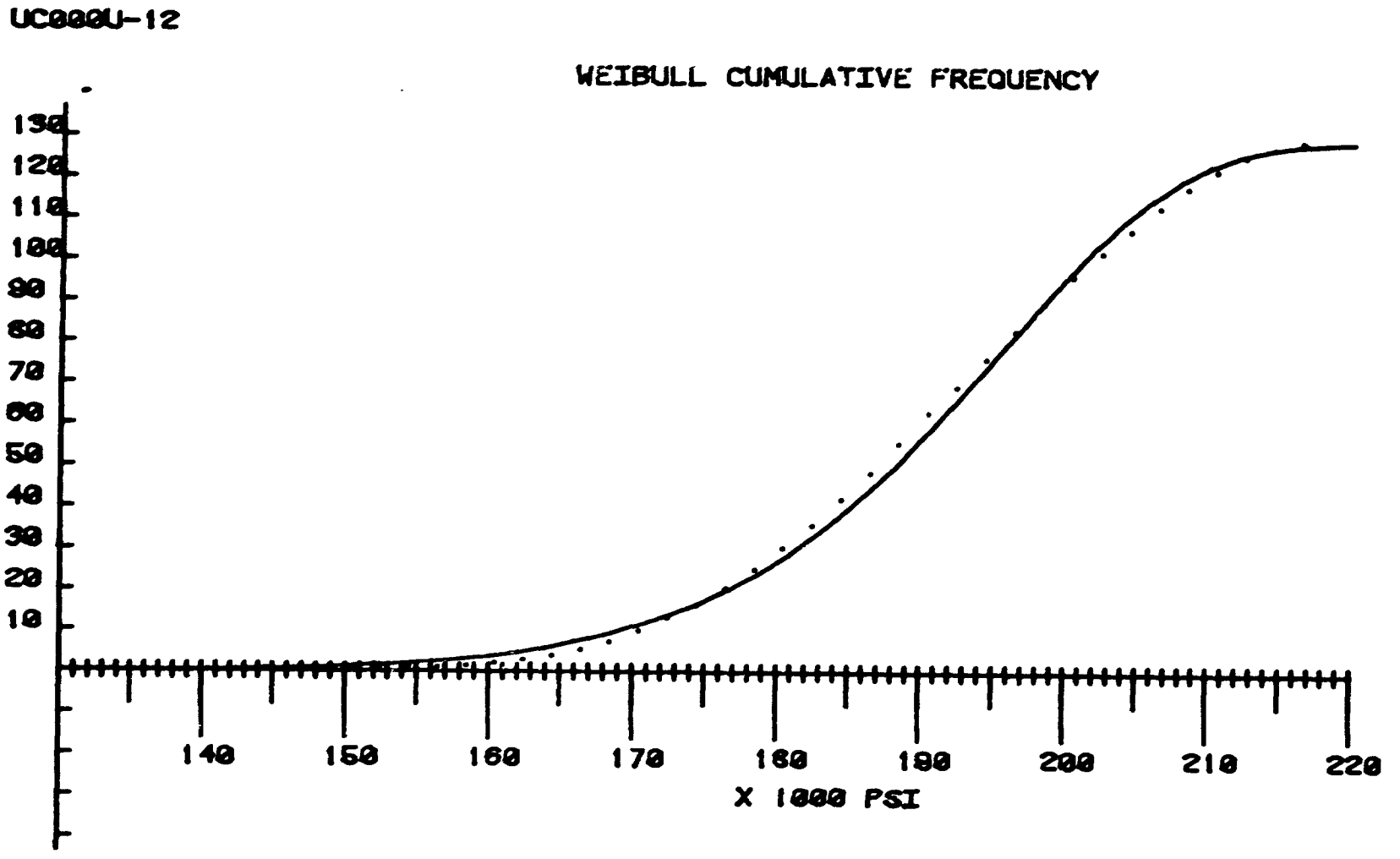


Figure D42. Weibull Union Carbide Tension 12-ply Unidirectional

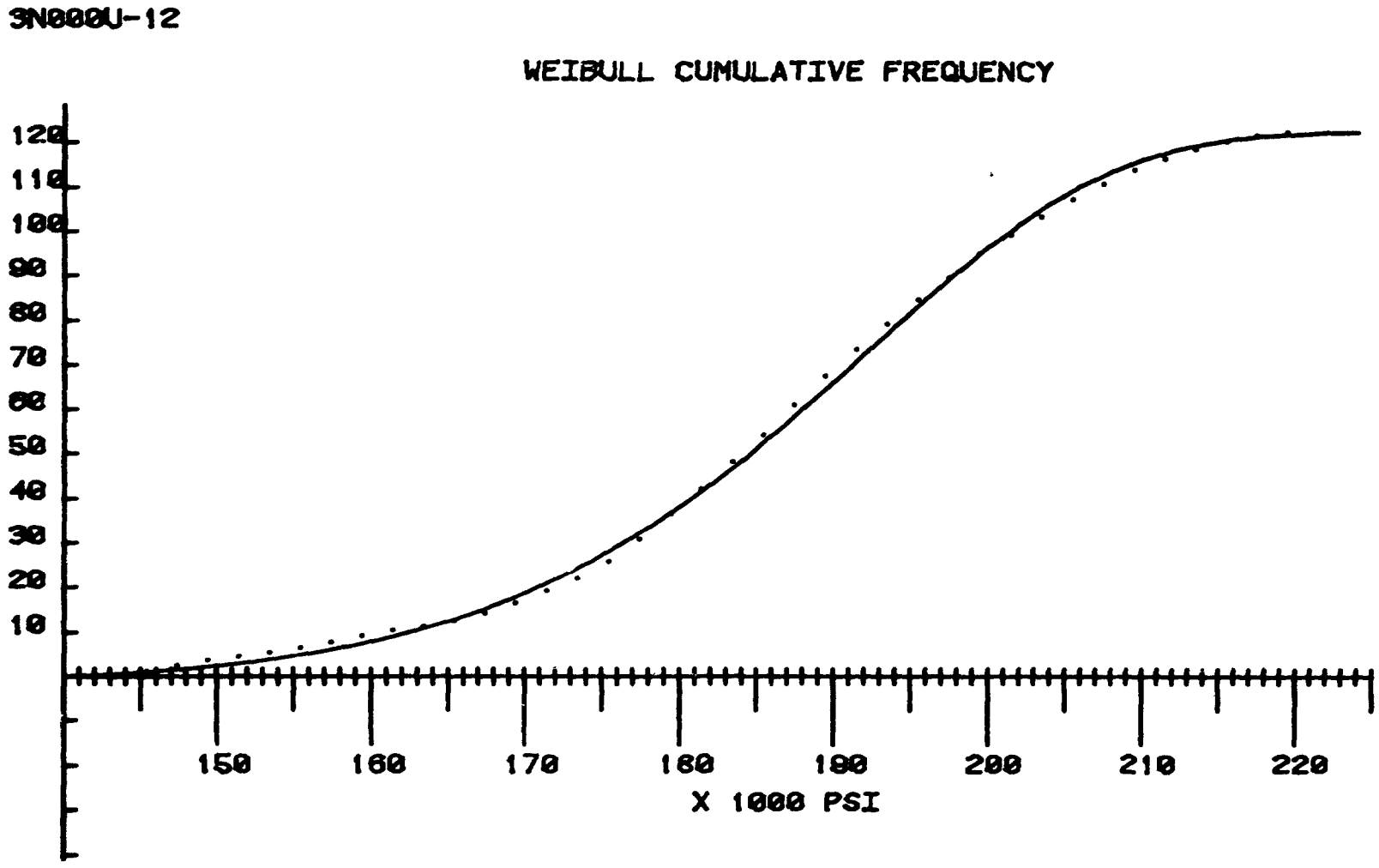


Figure D43. Weibull Narmco Task 3 Tension 12-ply Unidirectional

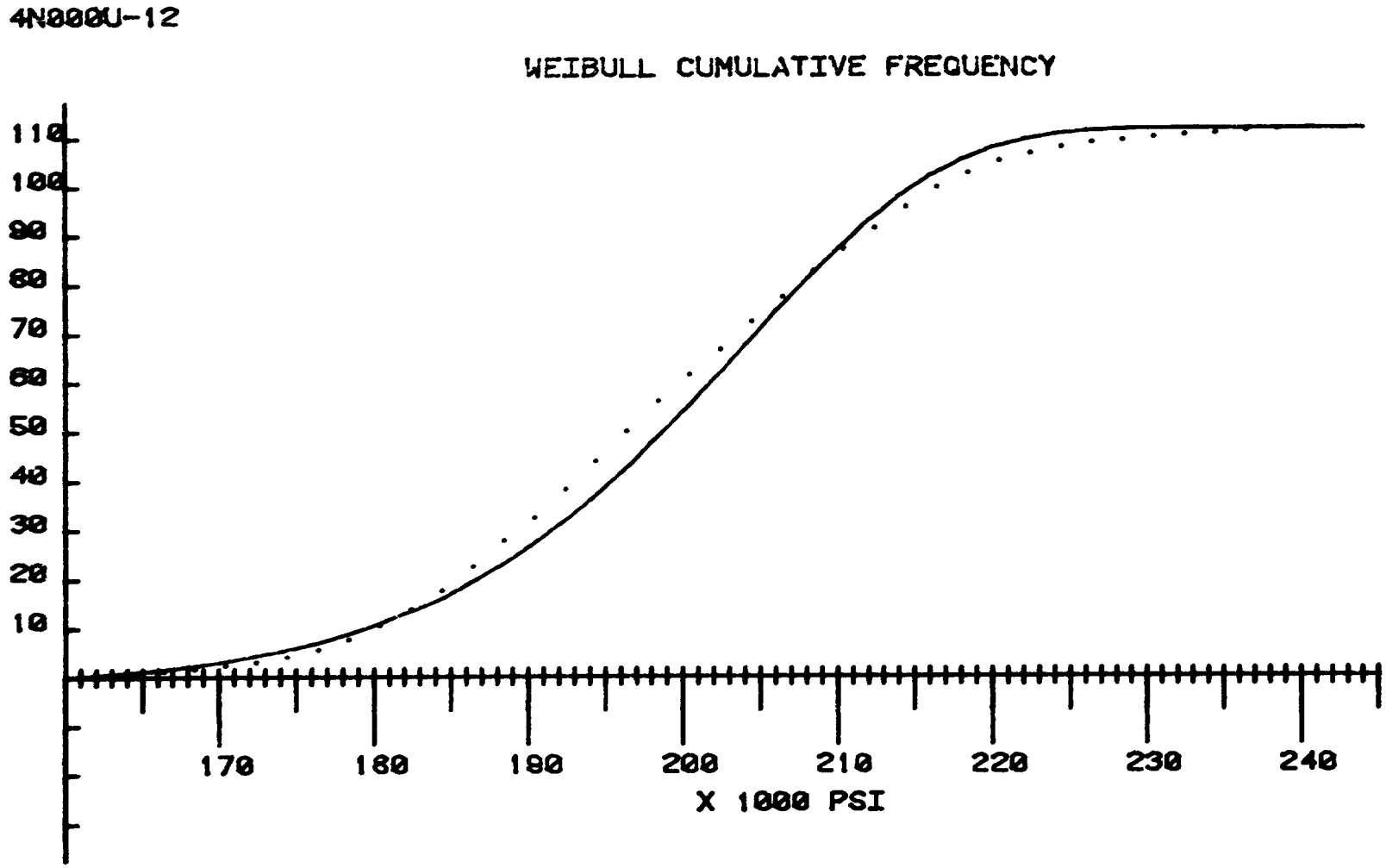


Figure D44. Weibull Narmco Task 4 Tension 12-ply Unidirectional

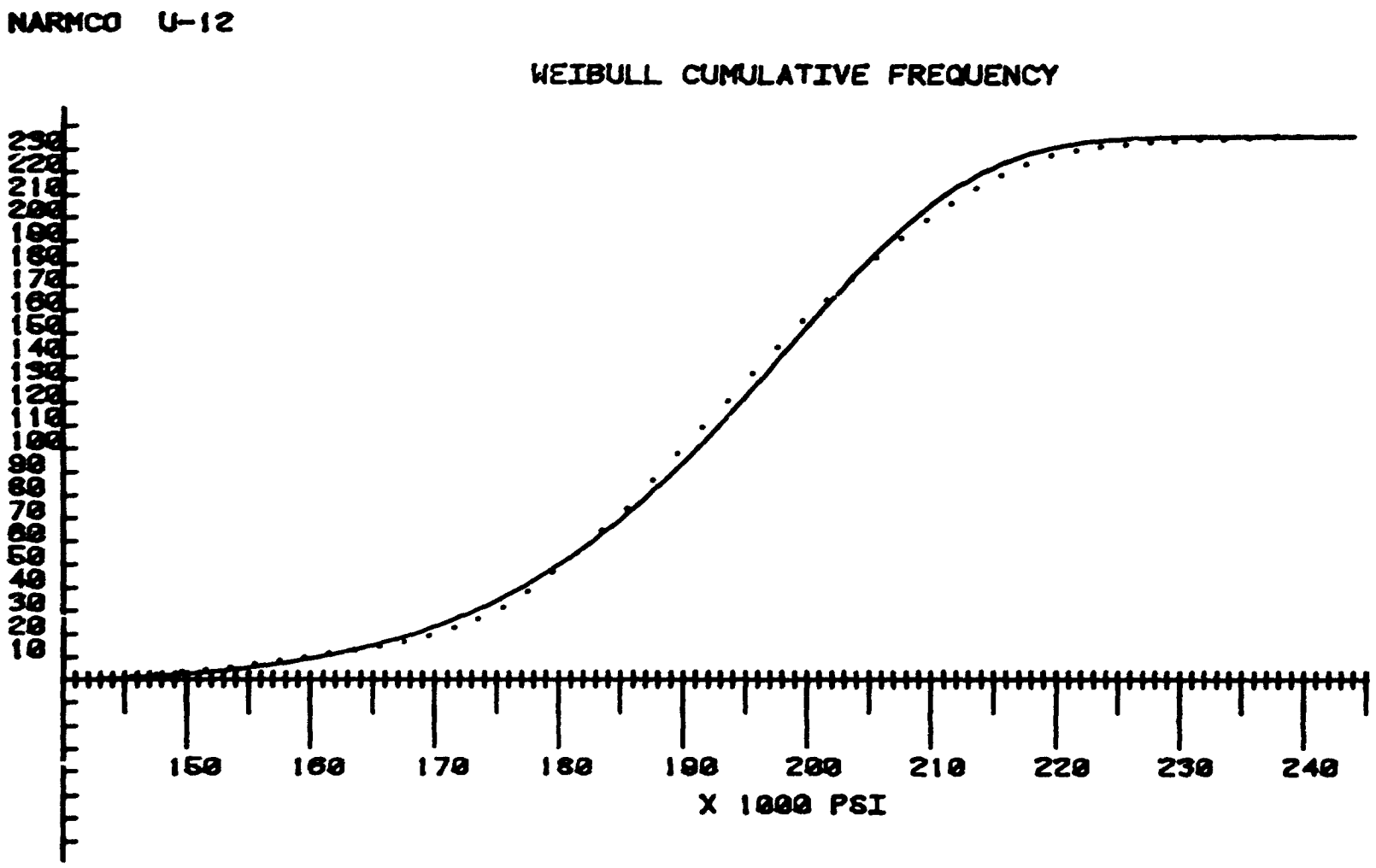


Figure D45. Weibull Combined Narmco Task 3 and 4 Tension 12-ply Unidirectional

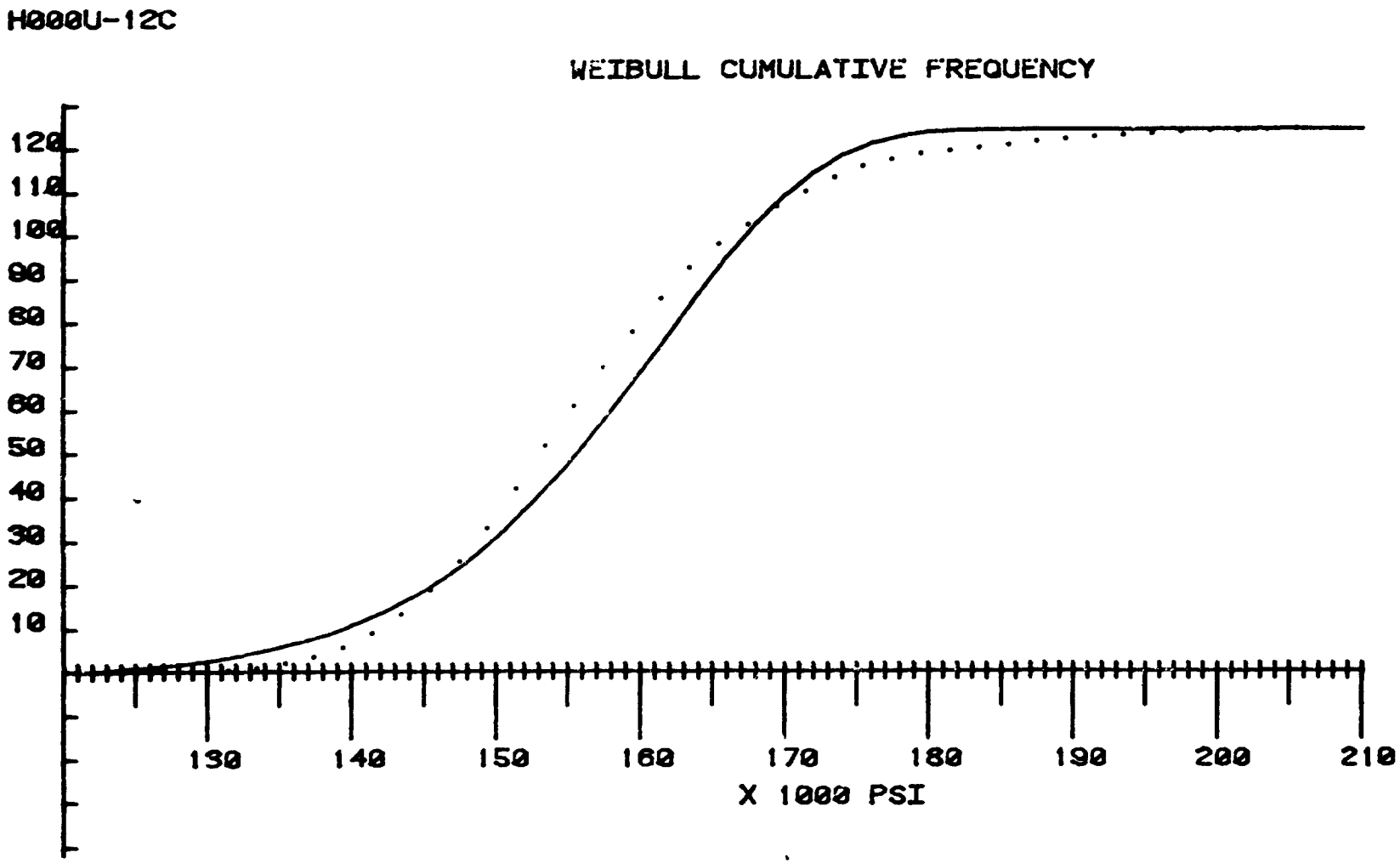


Figure D46. Weibull Hercules Compression 12-ply Unidirectional

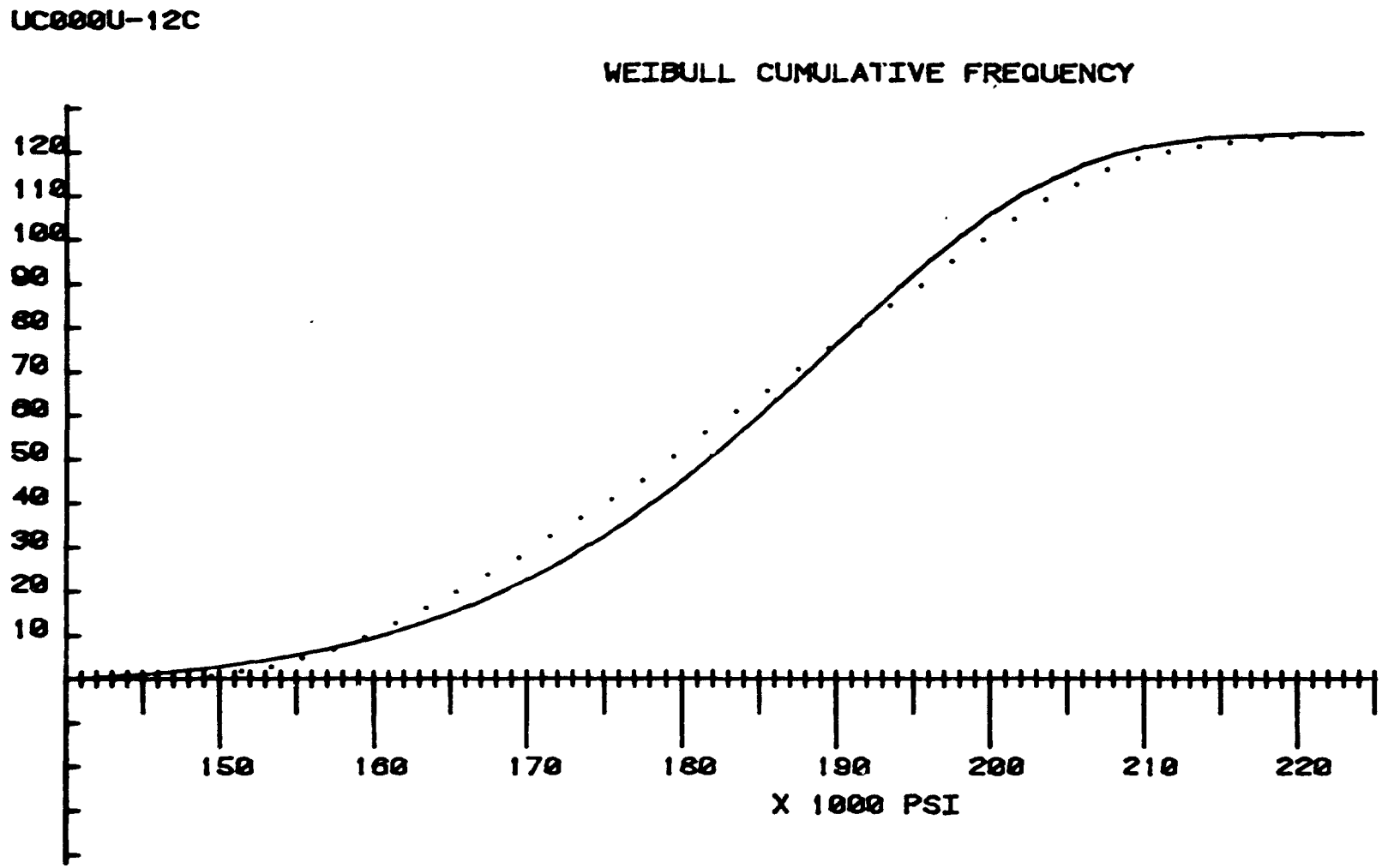


Figure D47. Weibull Union Carbide Compression 12-ply Unidirectional

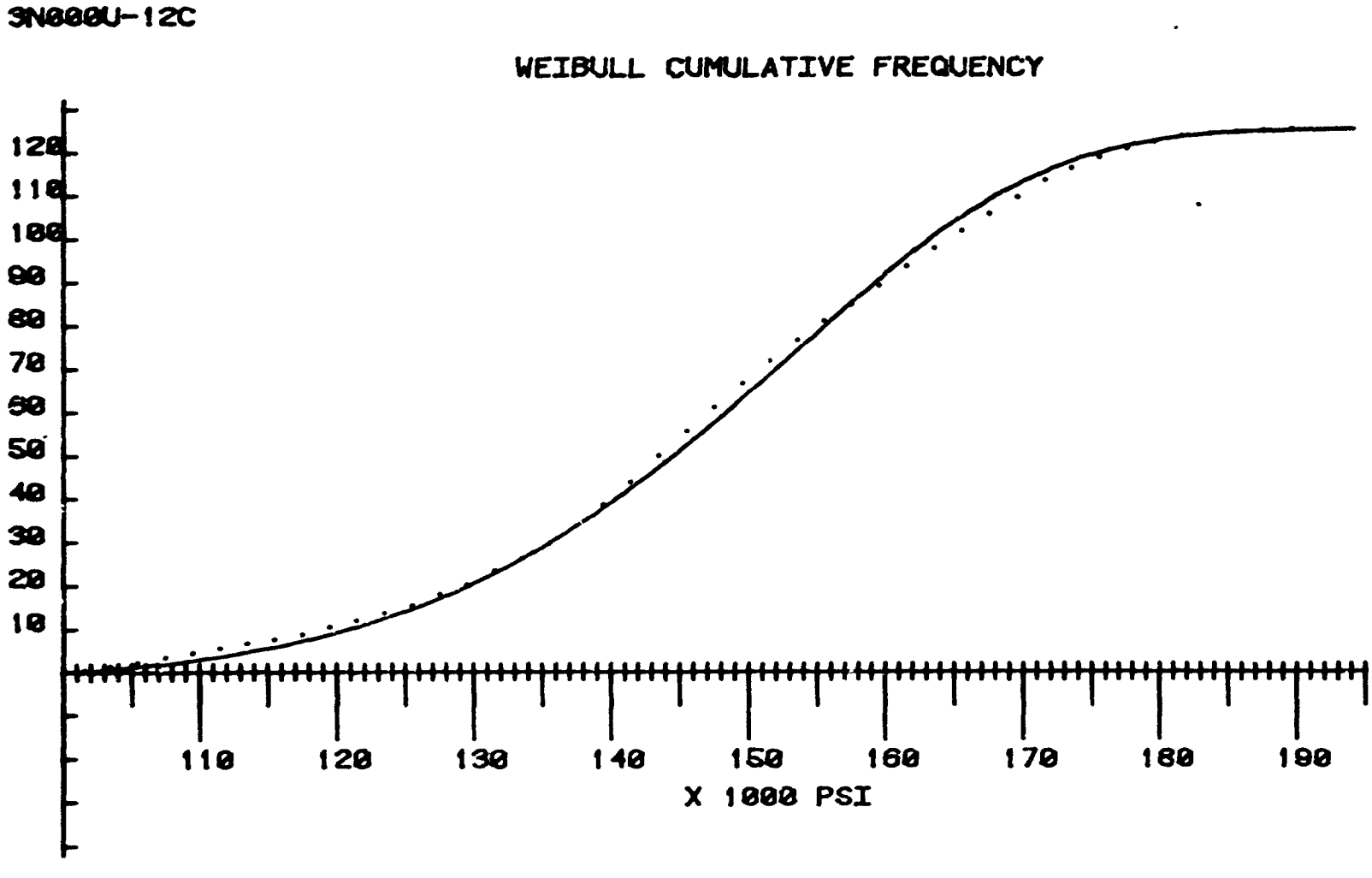


Figure D48. Weibull Narmco Task 3 Compression 12-ply Unidirectional

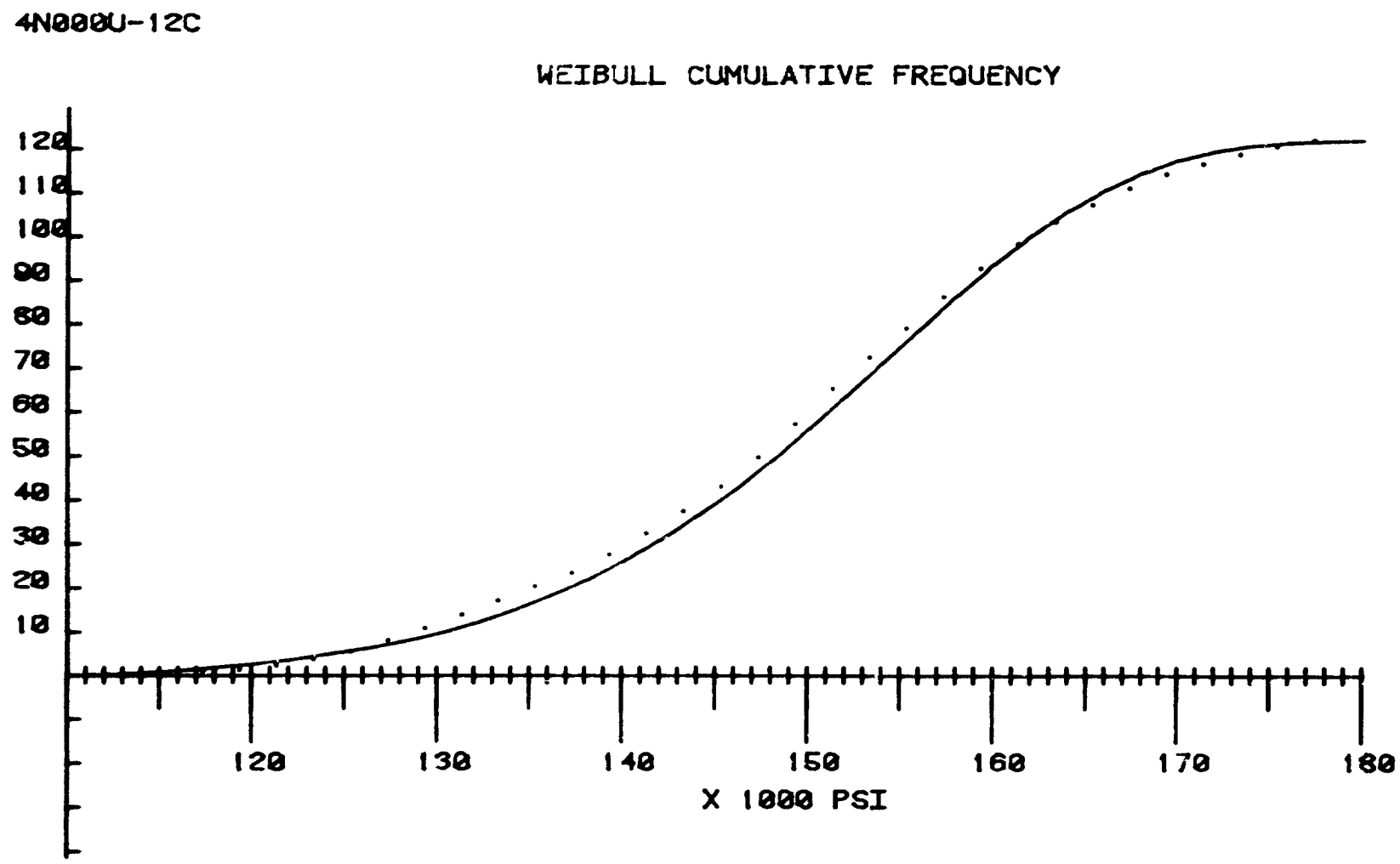


Figure D49. Weibull Narmco Task 4 Compression 12-ply Unidirectional

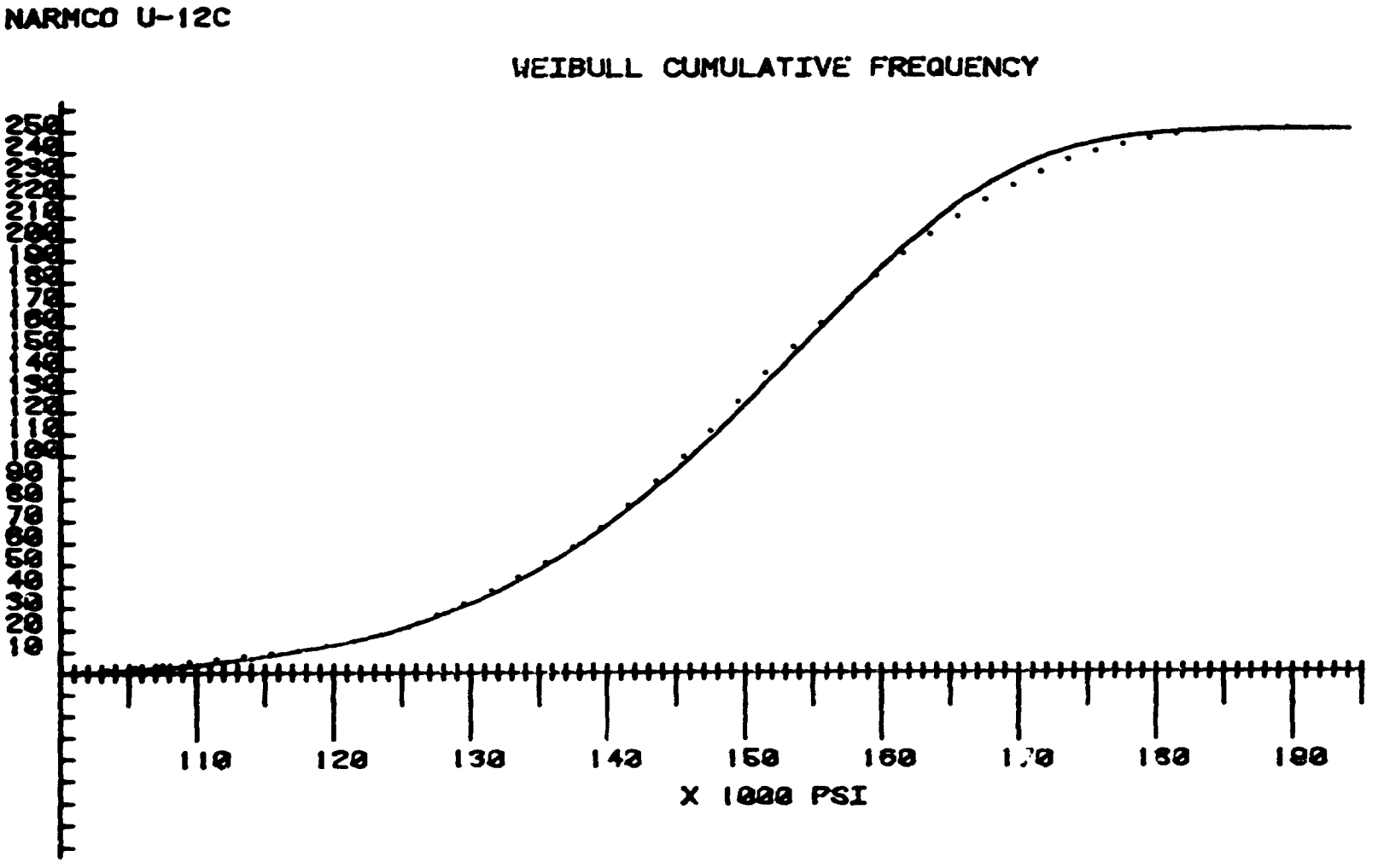


Figure D50. Weibull Combined Narmco Task 3 and 4 Compression 12-ply Unidirectional

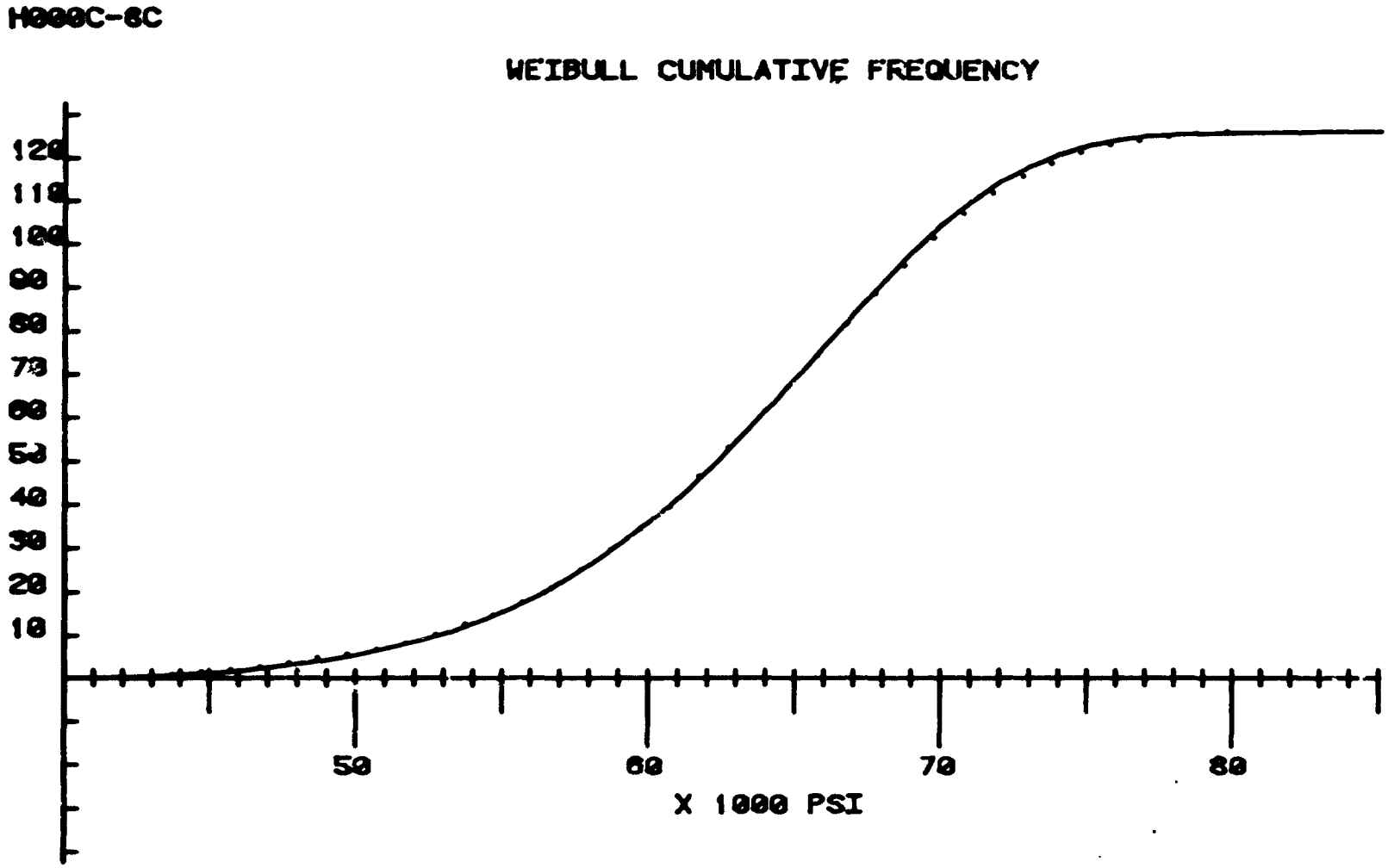


Figure D51. Weibull Hercules Compression 8-ply Crossply

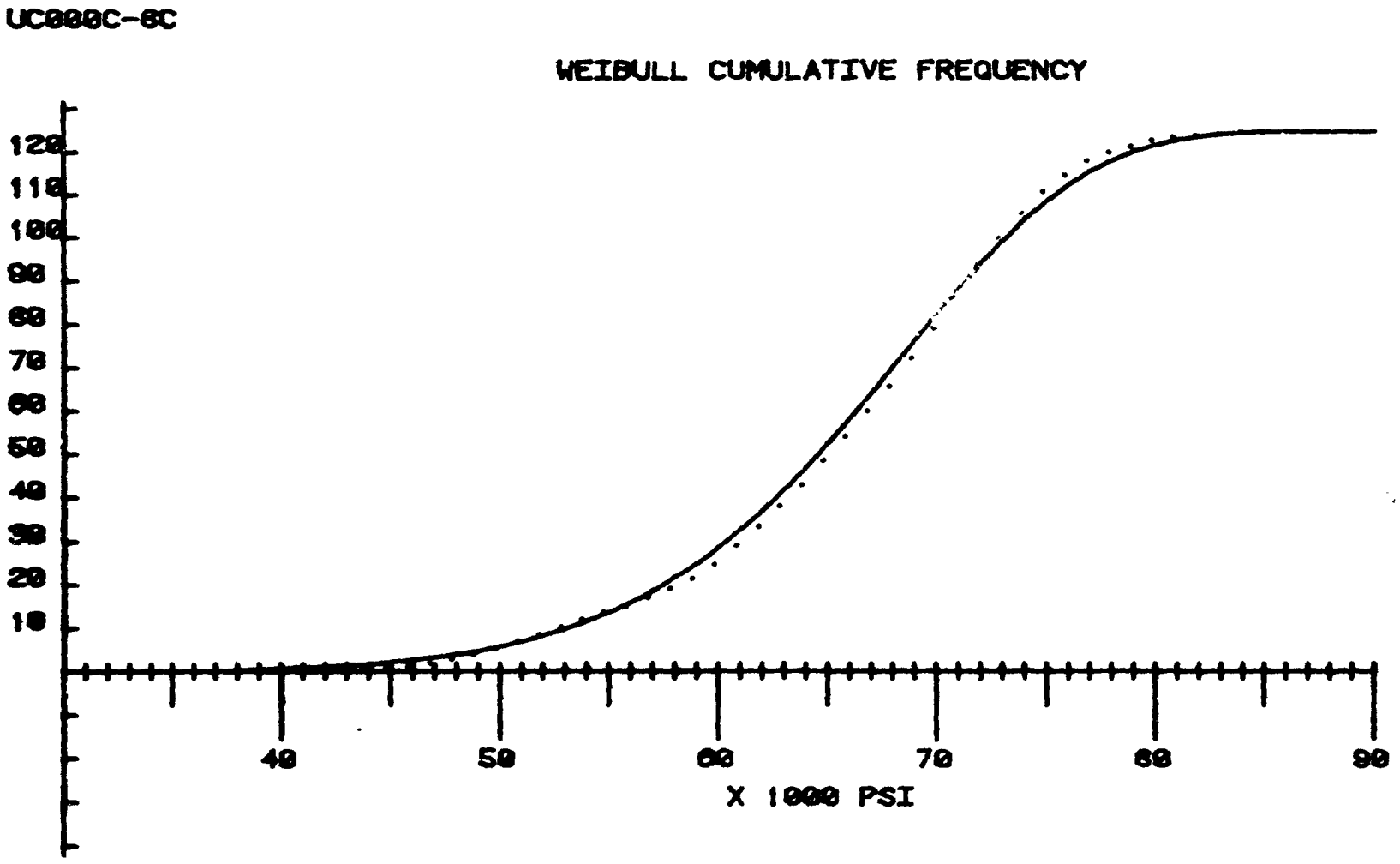


Figure D52. Weibull Union Carbide Compression 8-ply Crossply

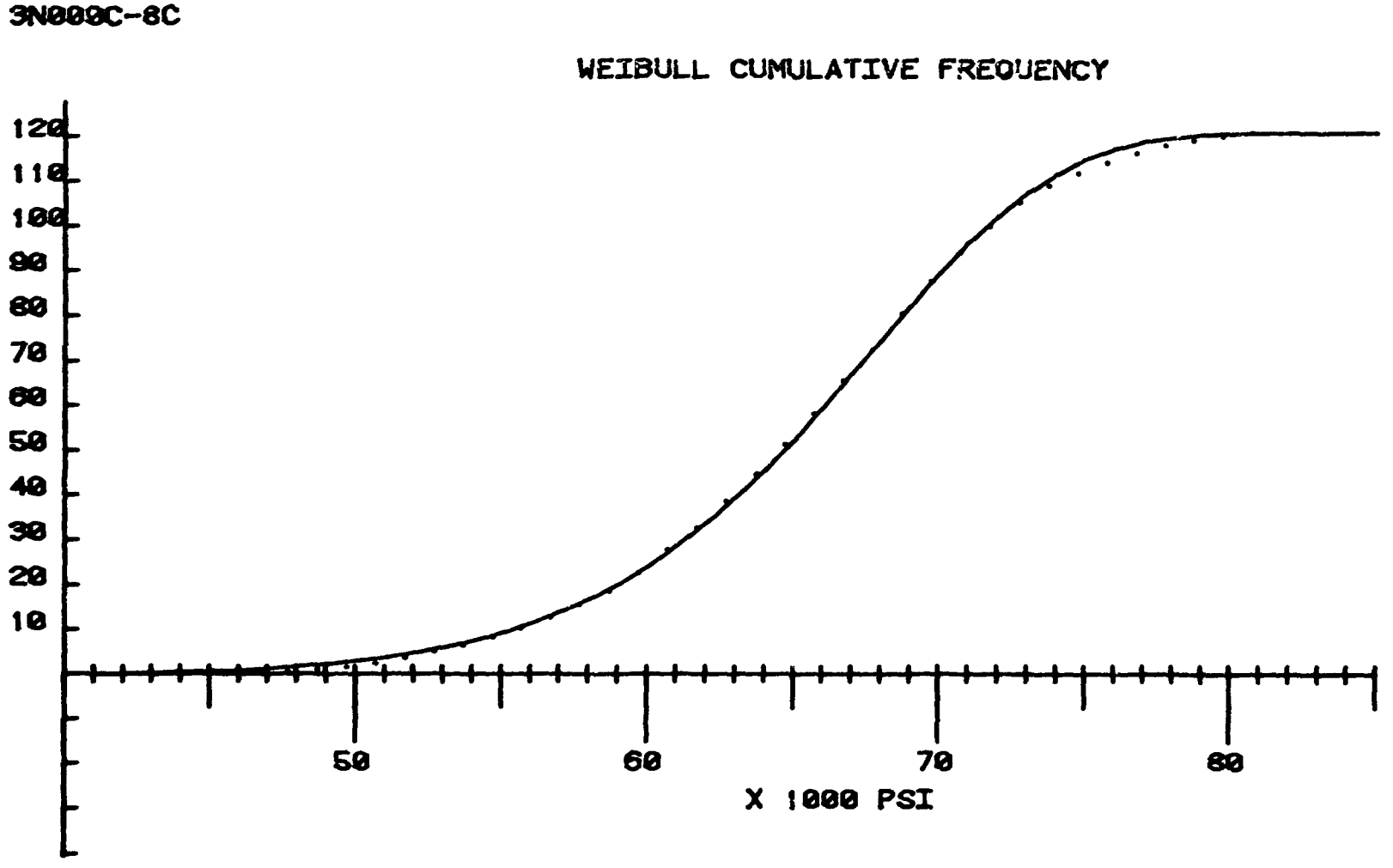
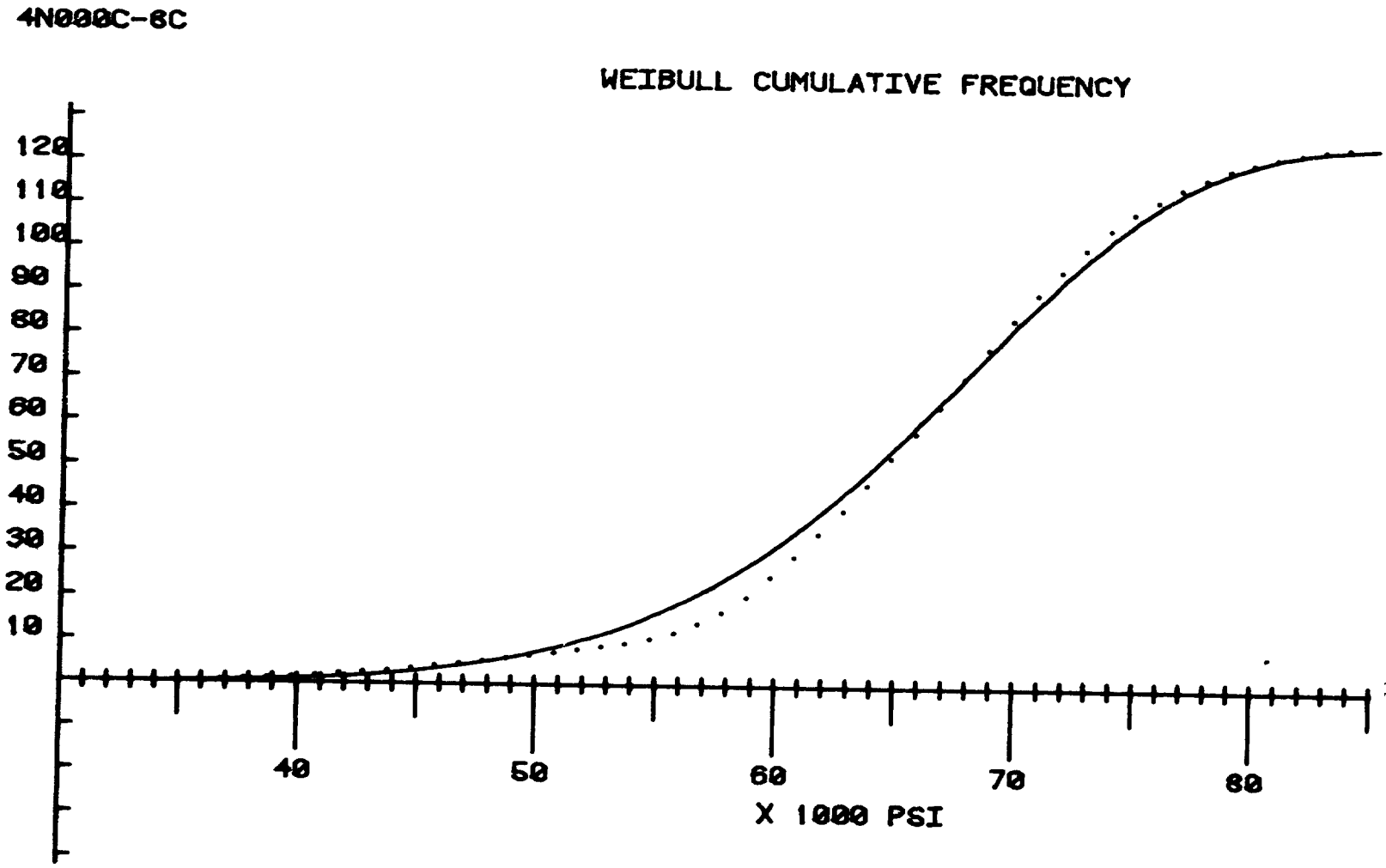


Figure D53. Weibull Narmco Task 3 Compression 8-ply Crossply



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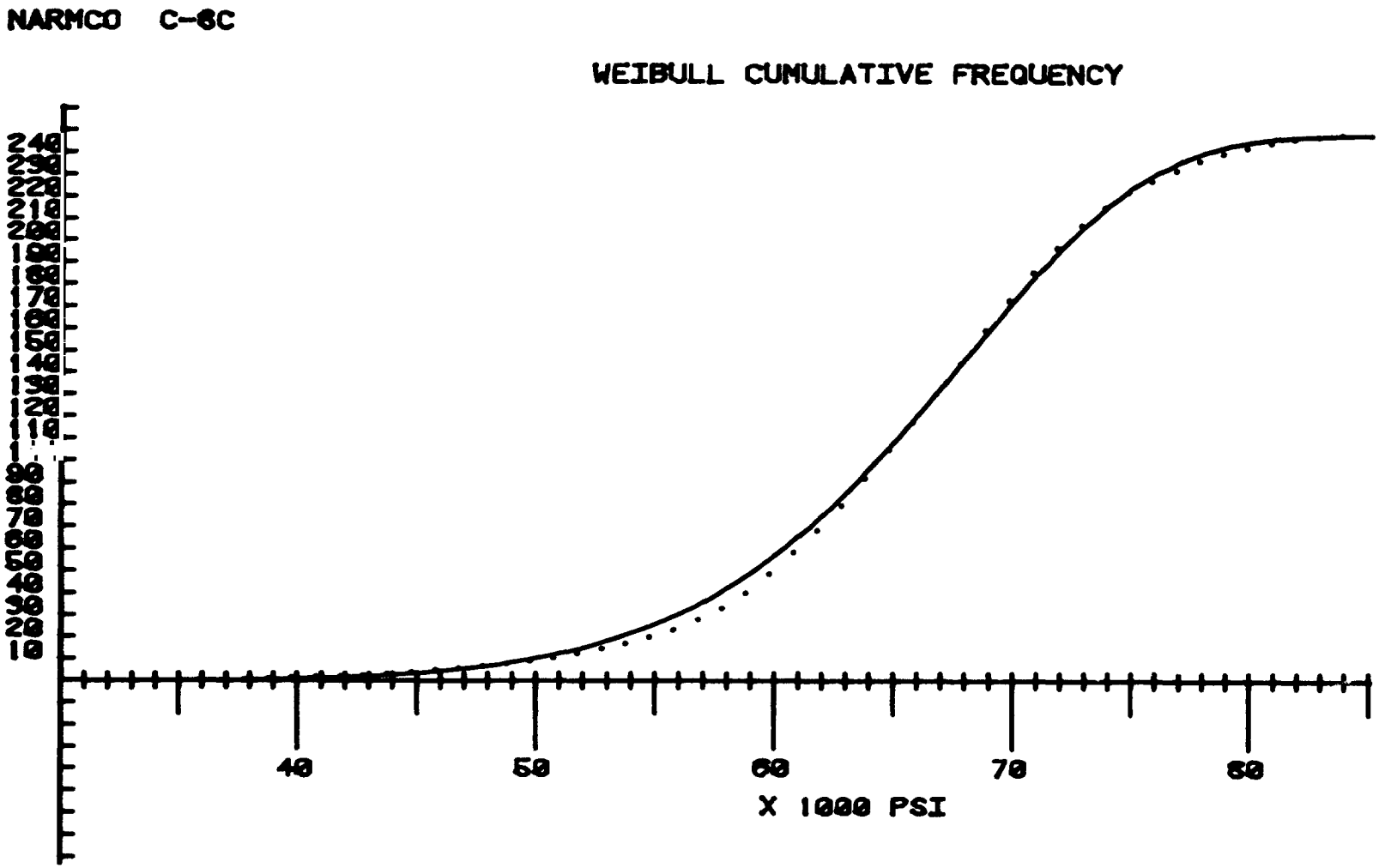

Figure D55. Weibull Combined Narmco Task 3 and 4 Compression 8-ply Crossply

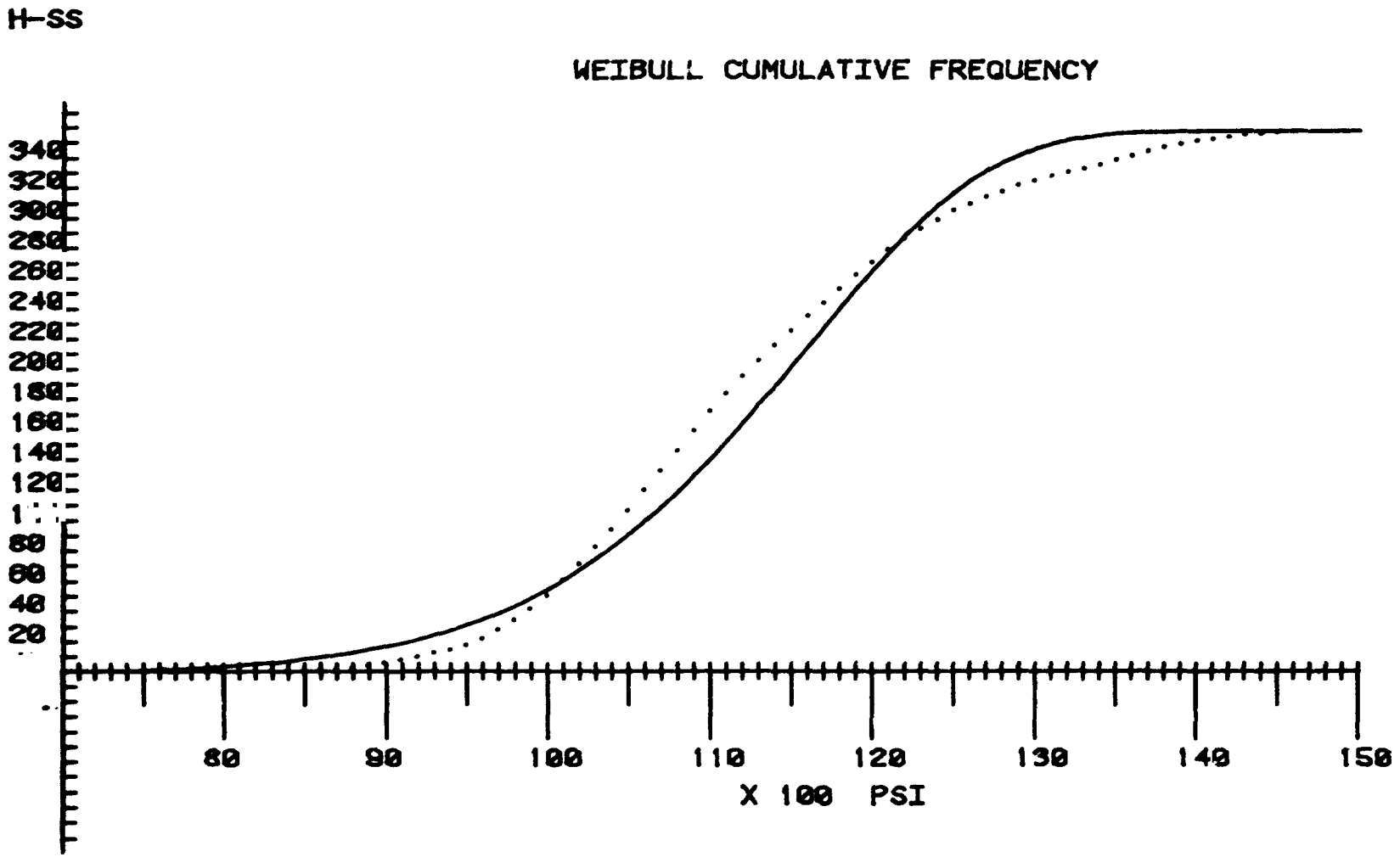

Figure D56. Weibull Hercules Short Beam Shear

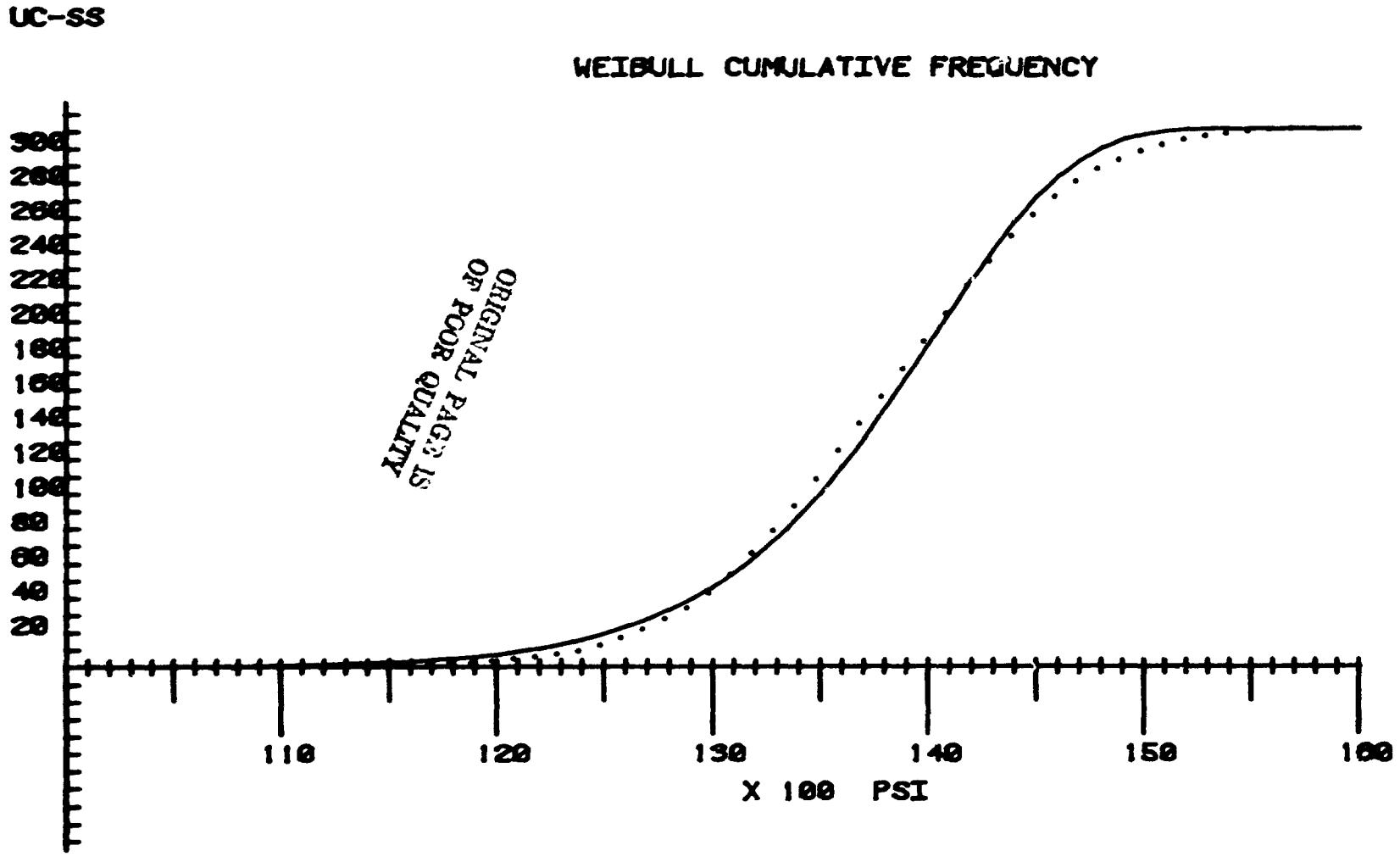

Figure D57. Weibull Union Carbide Short Beam Shear

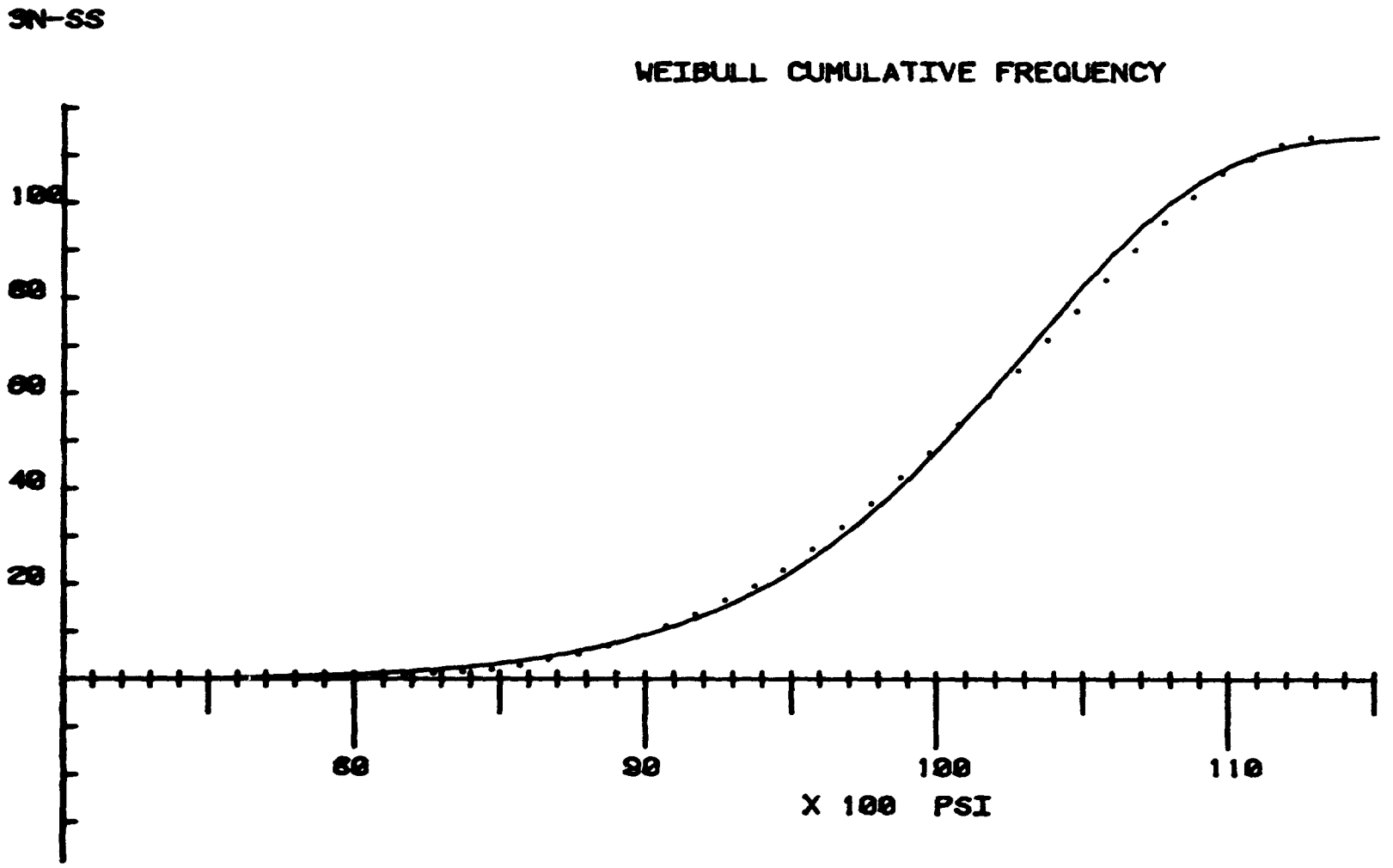

Figure D58. Weibull Narmco Task 3 Short Beam Shear

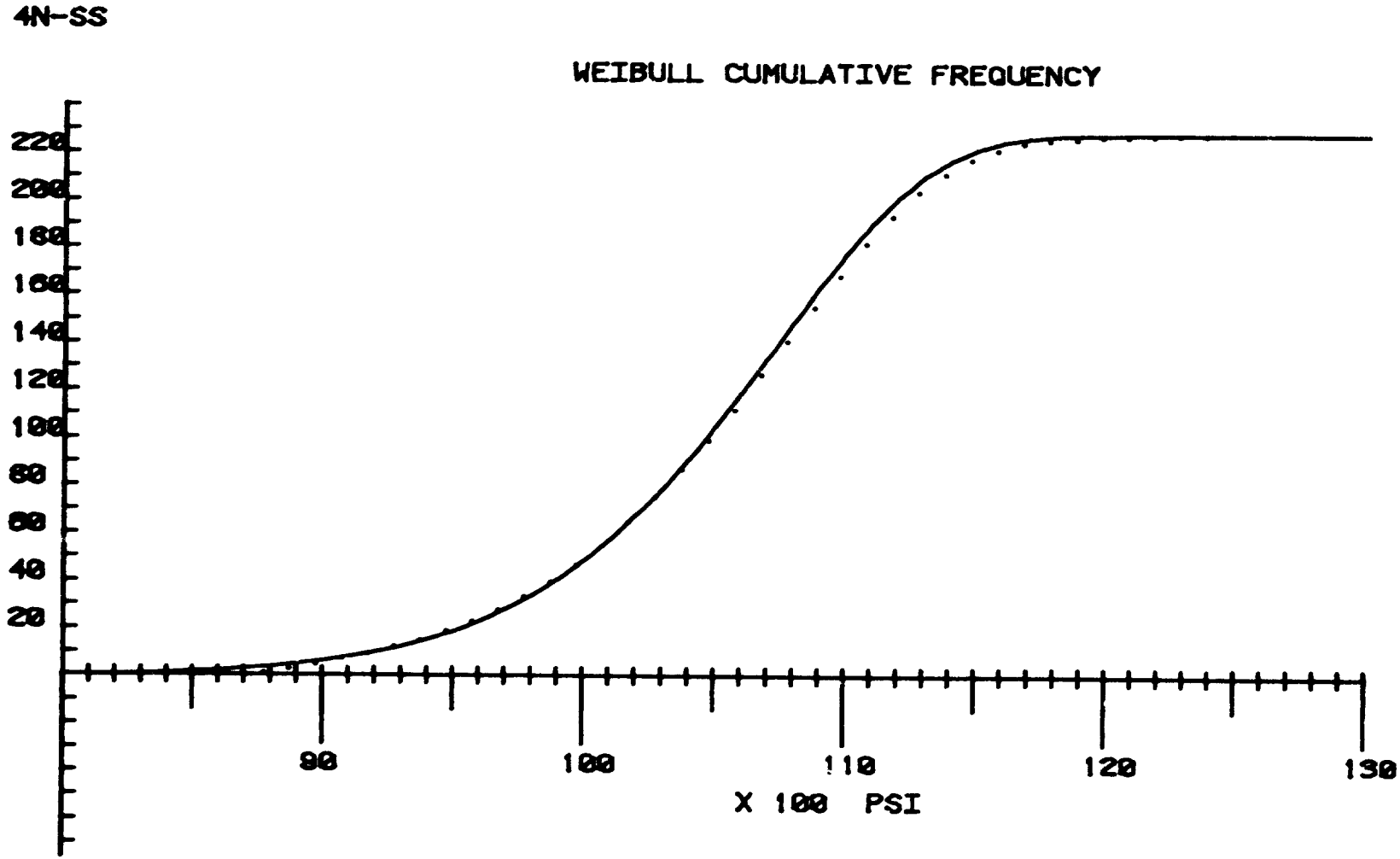

Figure D59. Weibull Narmco Task 4 Short Beam Shear

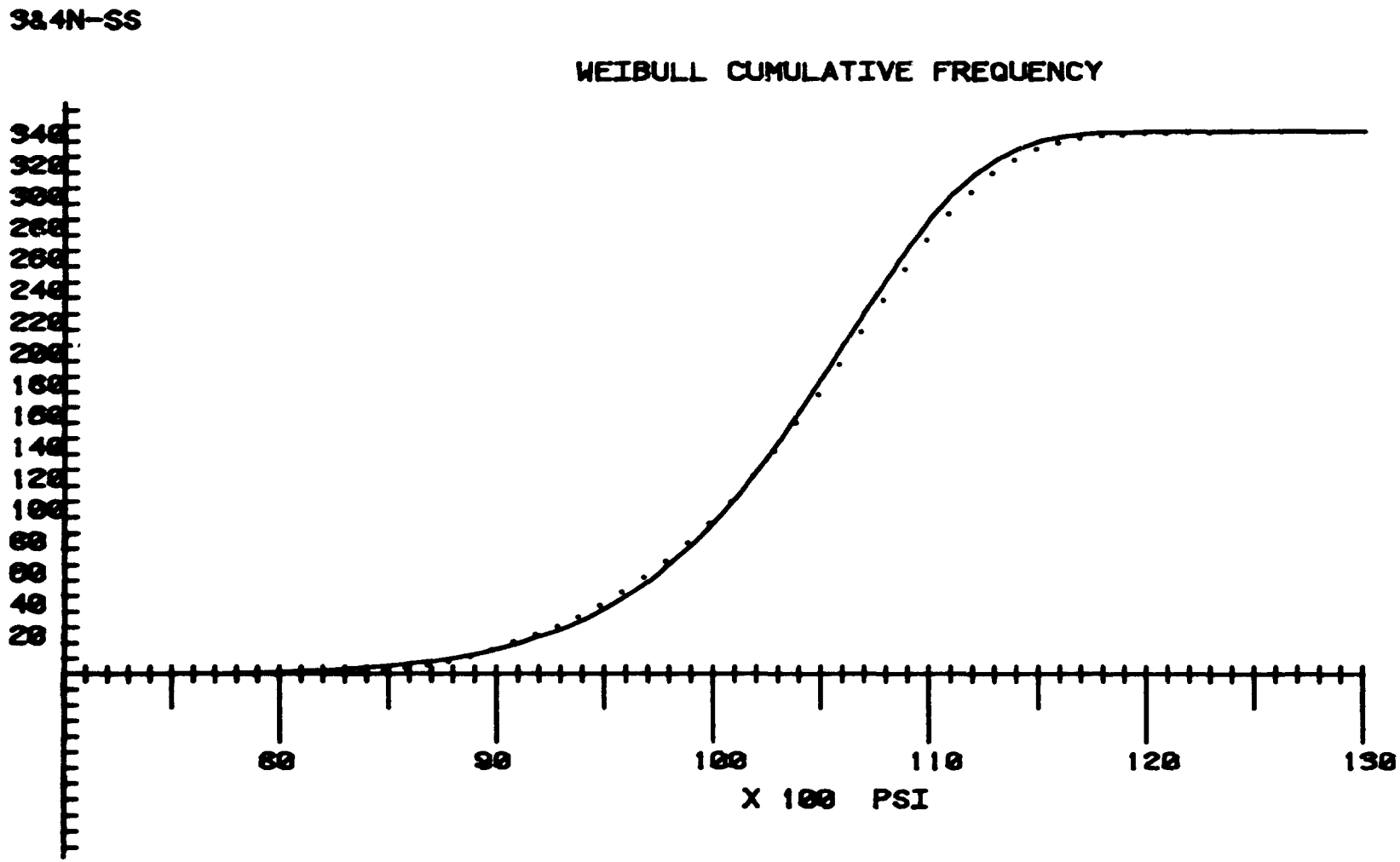

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Figure D60. Weibull Combined Narmco Task 3 and 4 Short Beam Shear

APPENDIX E

Normal and Weibull Cumulative Frequency Plots of the Lower 15% Tail Regions

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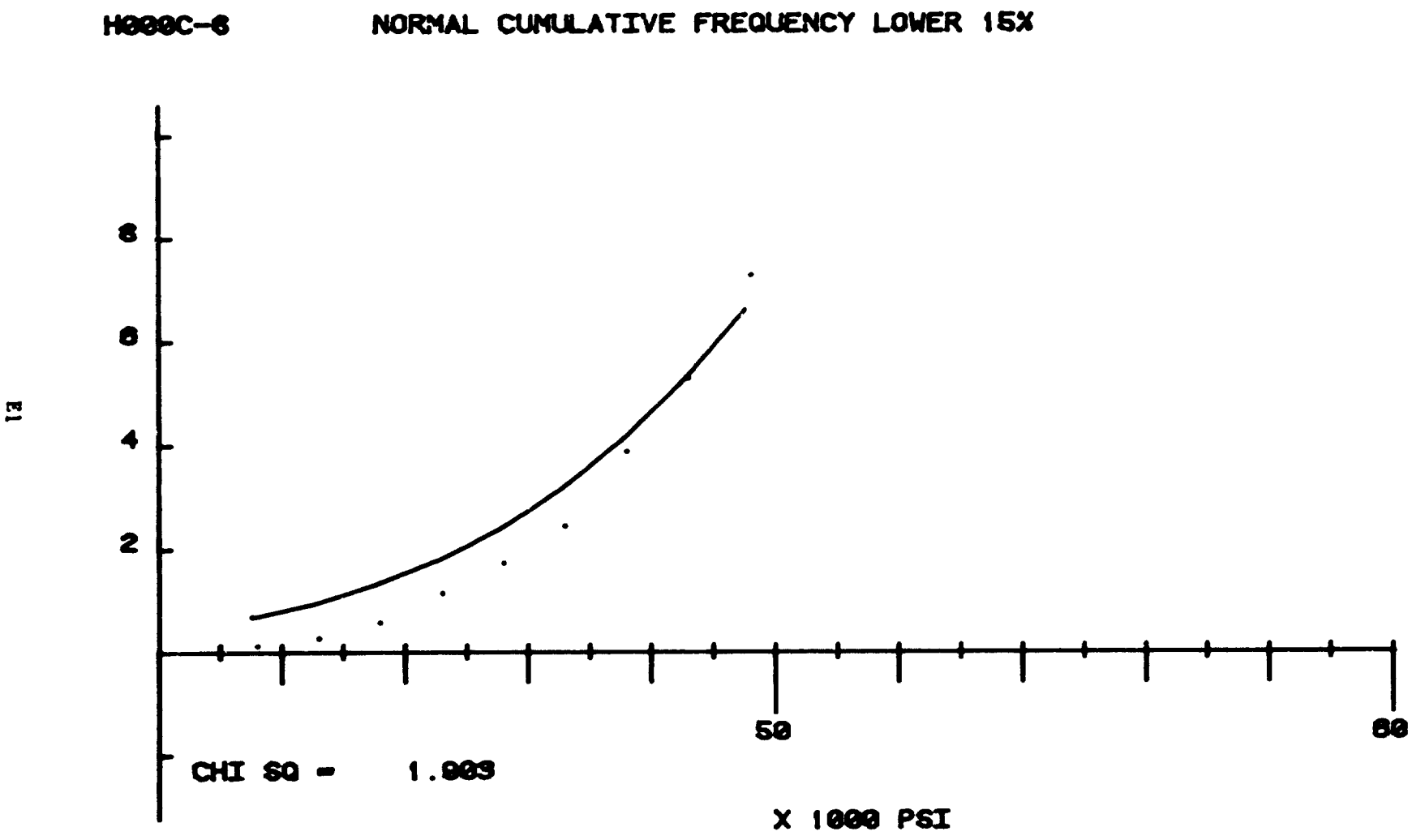


Figure E1. Normal Hercules Tension 8-ply Crossply

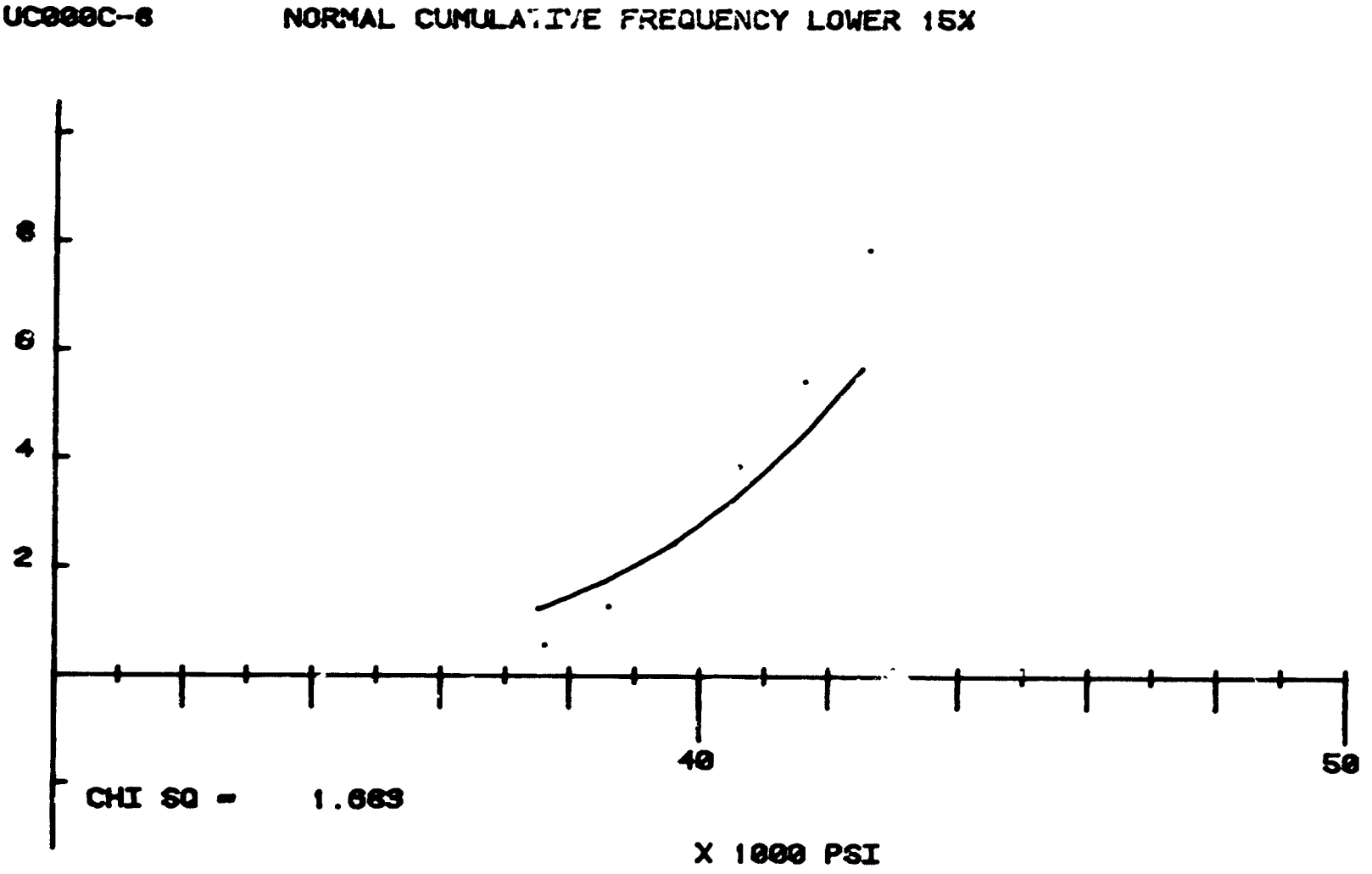


Figure E2. Normal Union Carbide Tension 8-ply Crossply

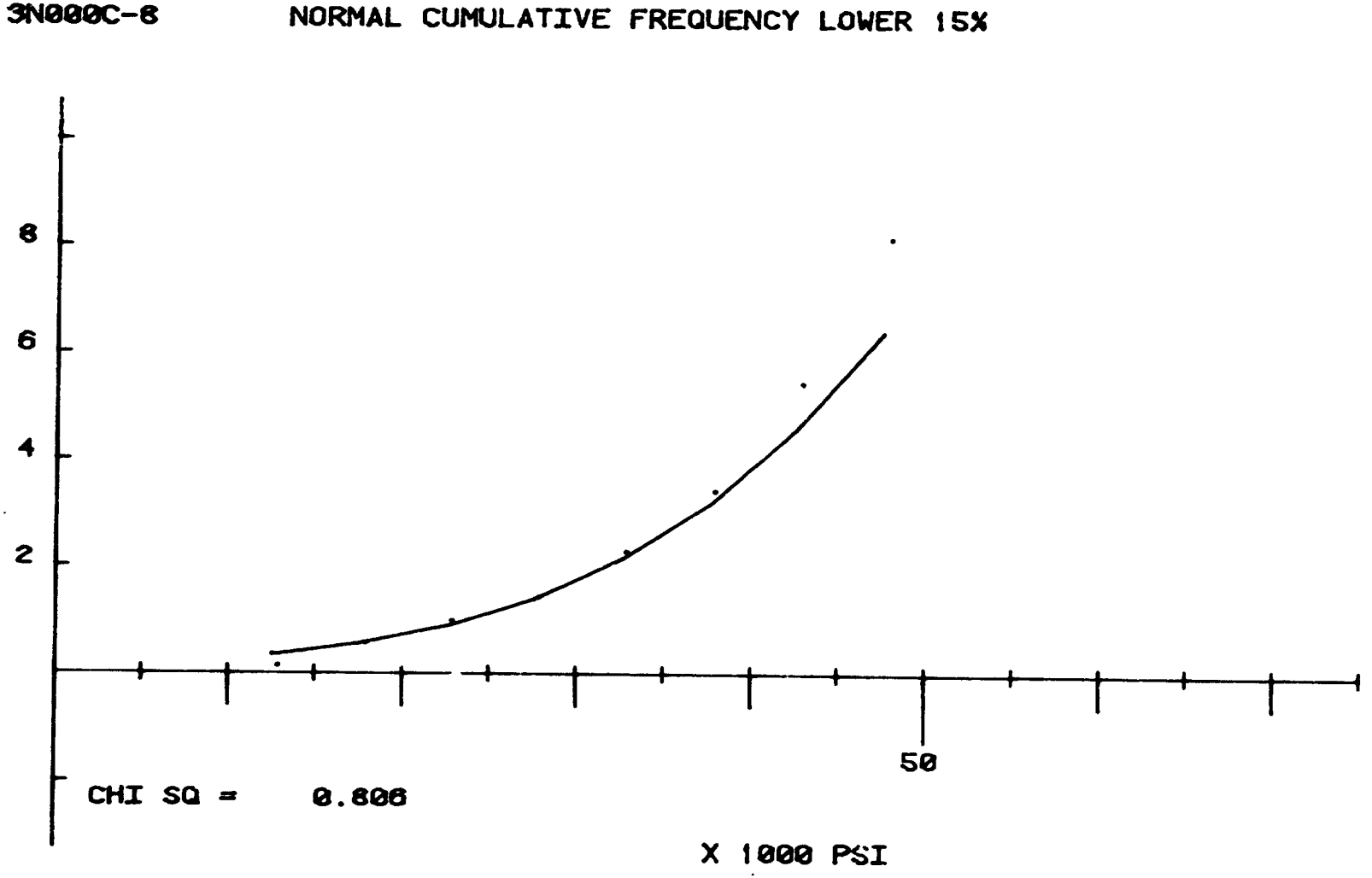


Figure E3. Normal Narmco Task 3 Tension 8-ply Crossply

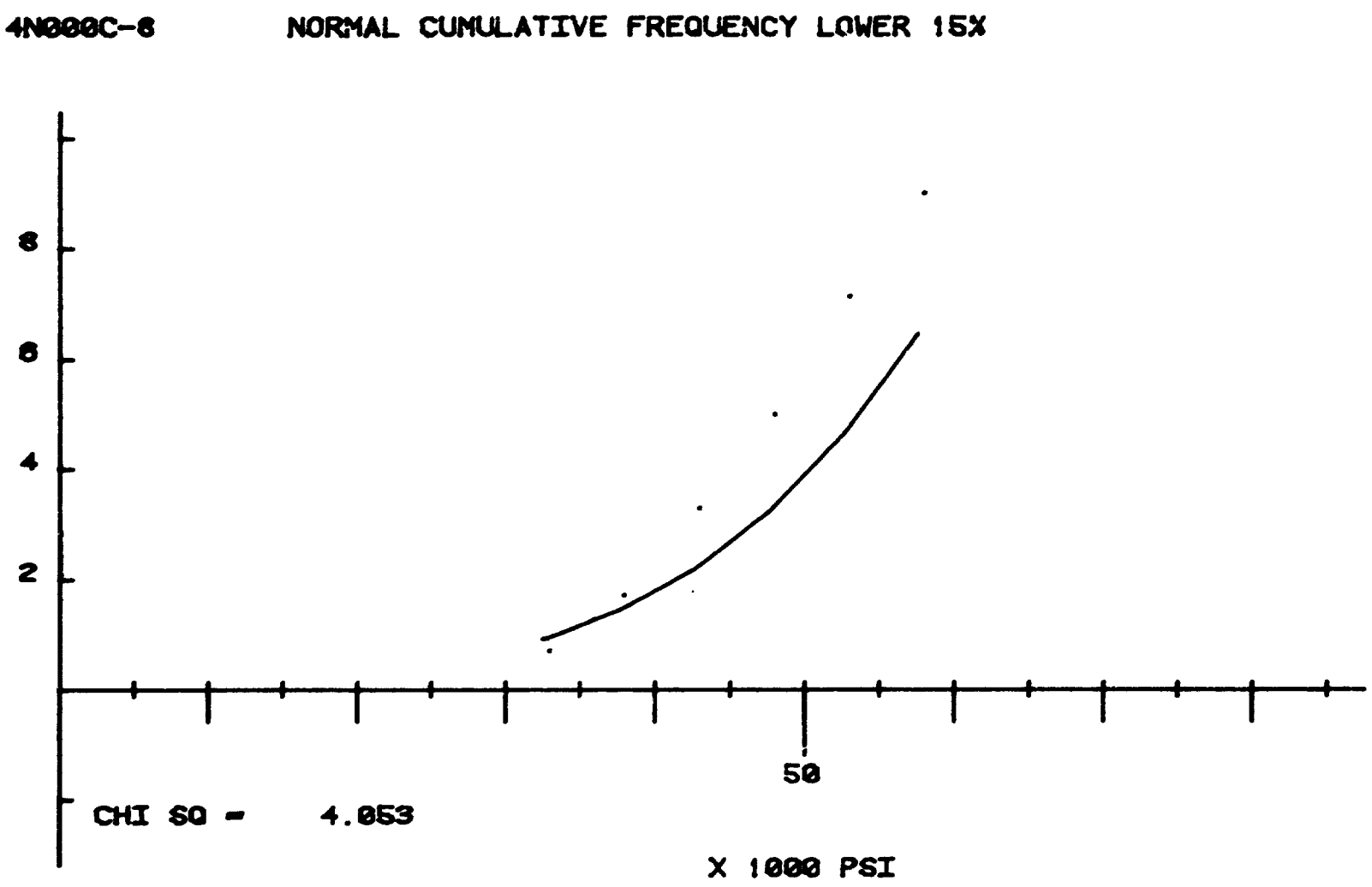


Figure E4. Normal Narmco Task 4 Tension 8-ply Crossply

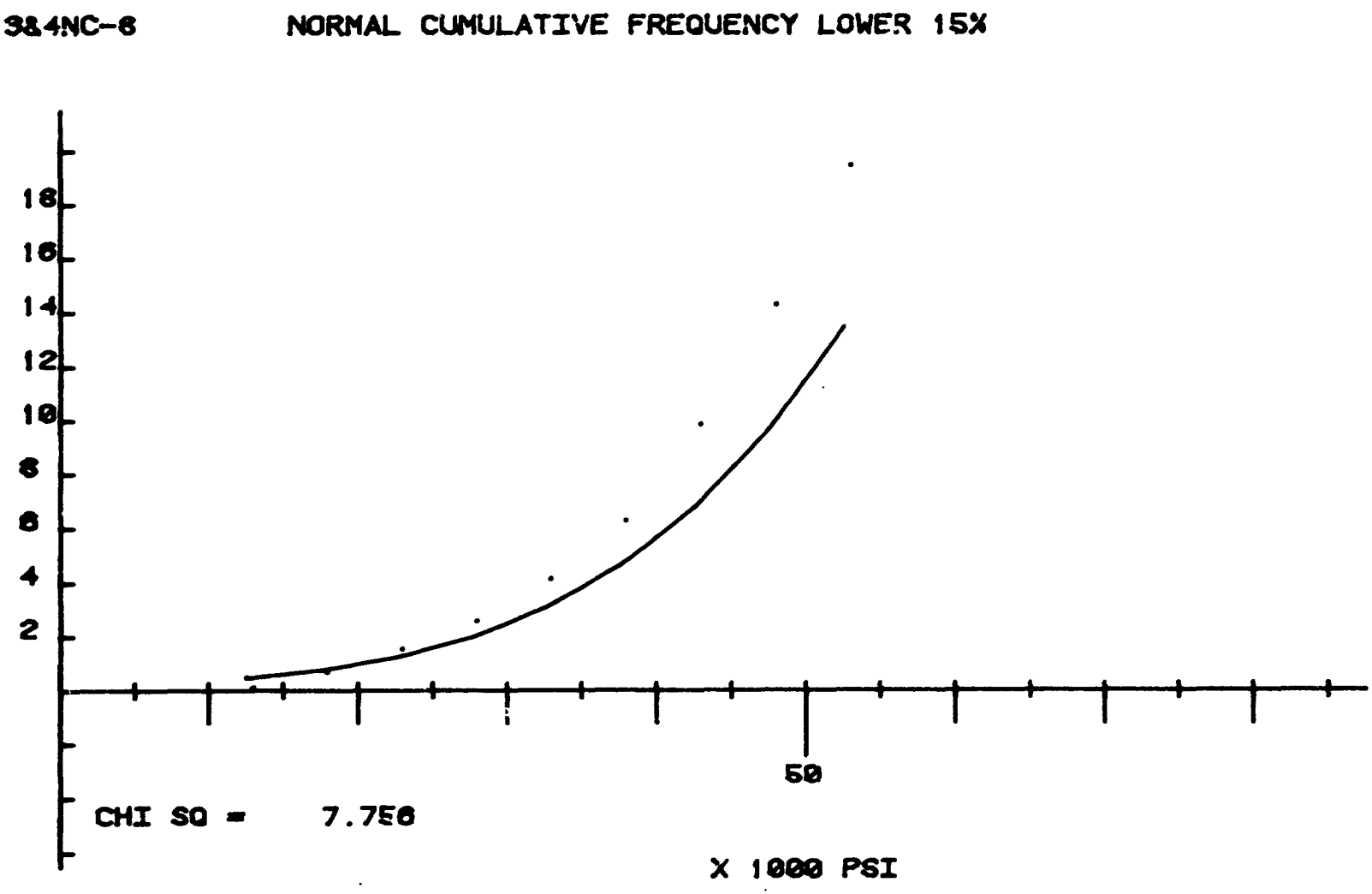


Figure E5. Normal Combined Narmco Task 3 and 4 Tension 8-ply Crossply

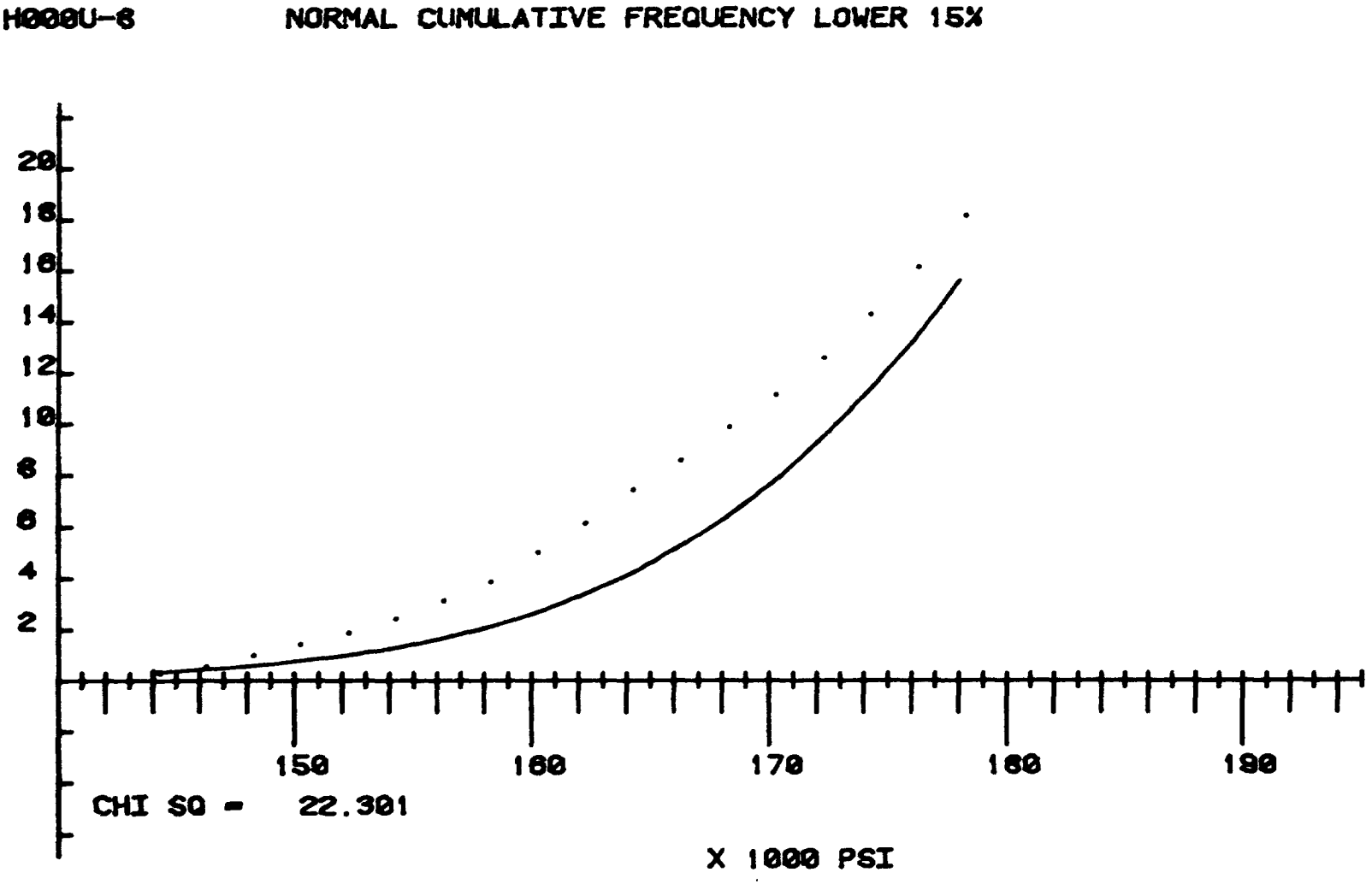


Figure E6. Normal Hercules Tension 8-ply Unidirectional

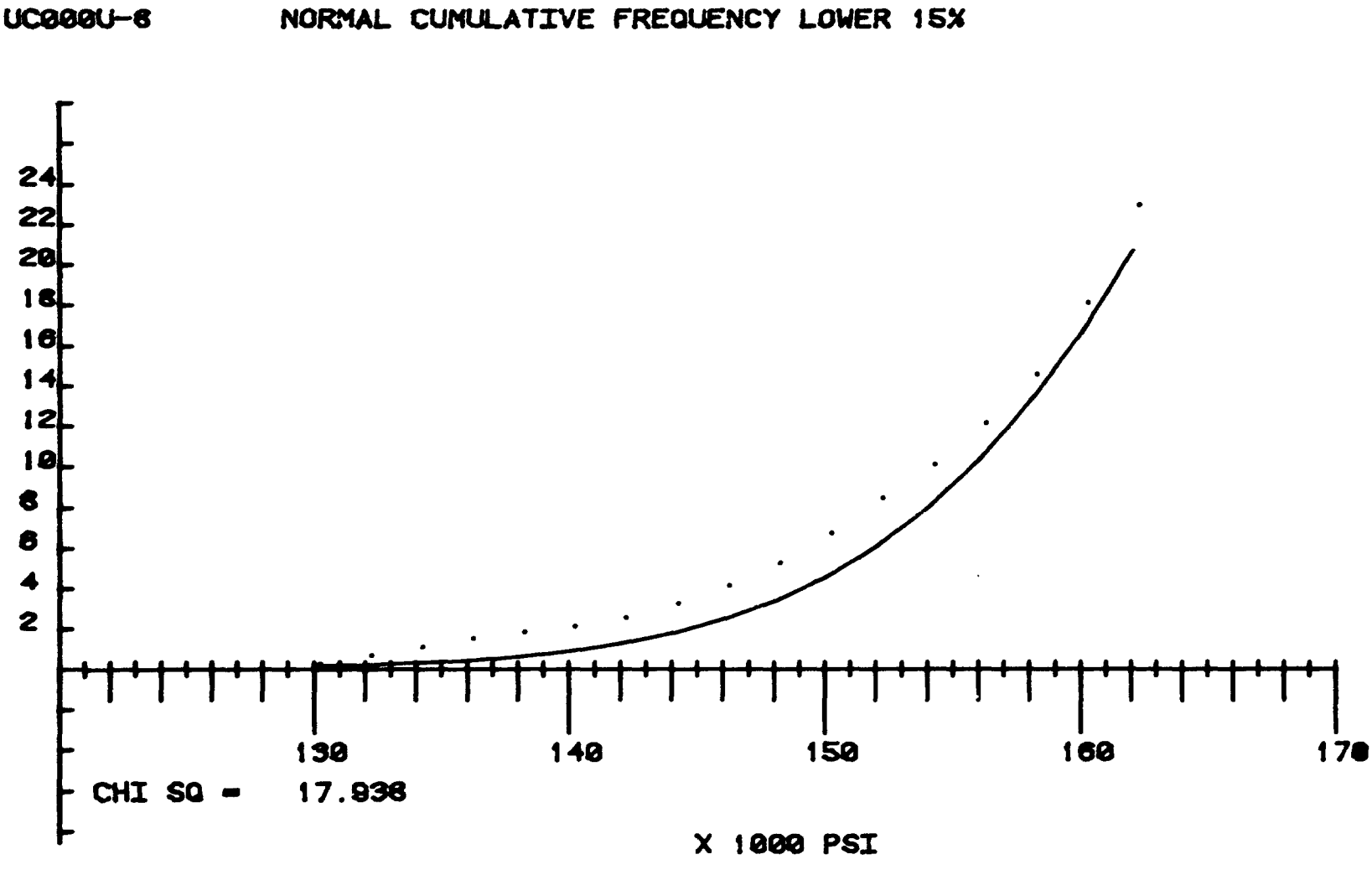
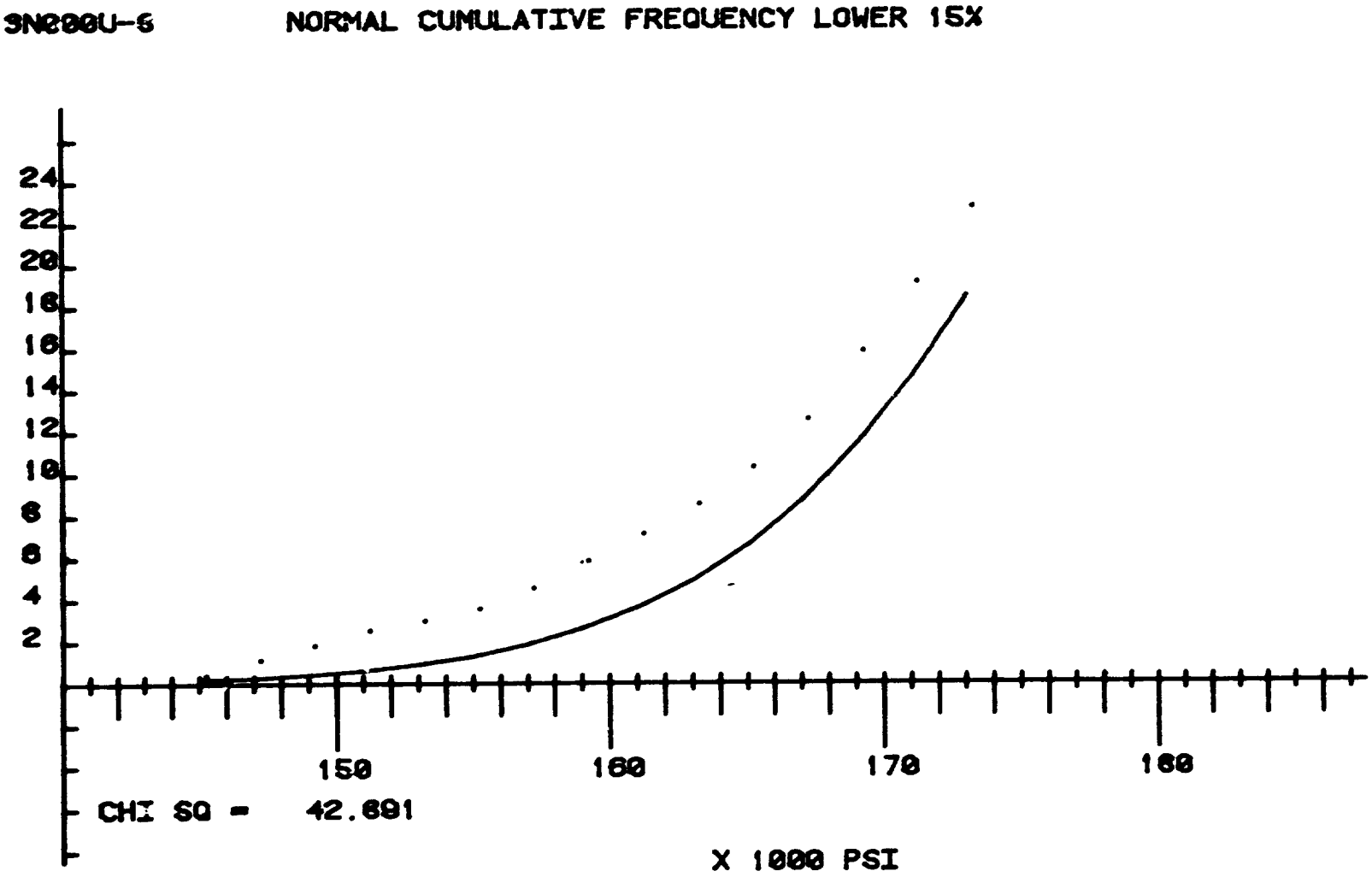


Figure E7. Normal Union Carbide Tension 8-ply Unidirectional



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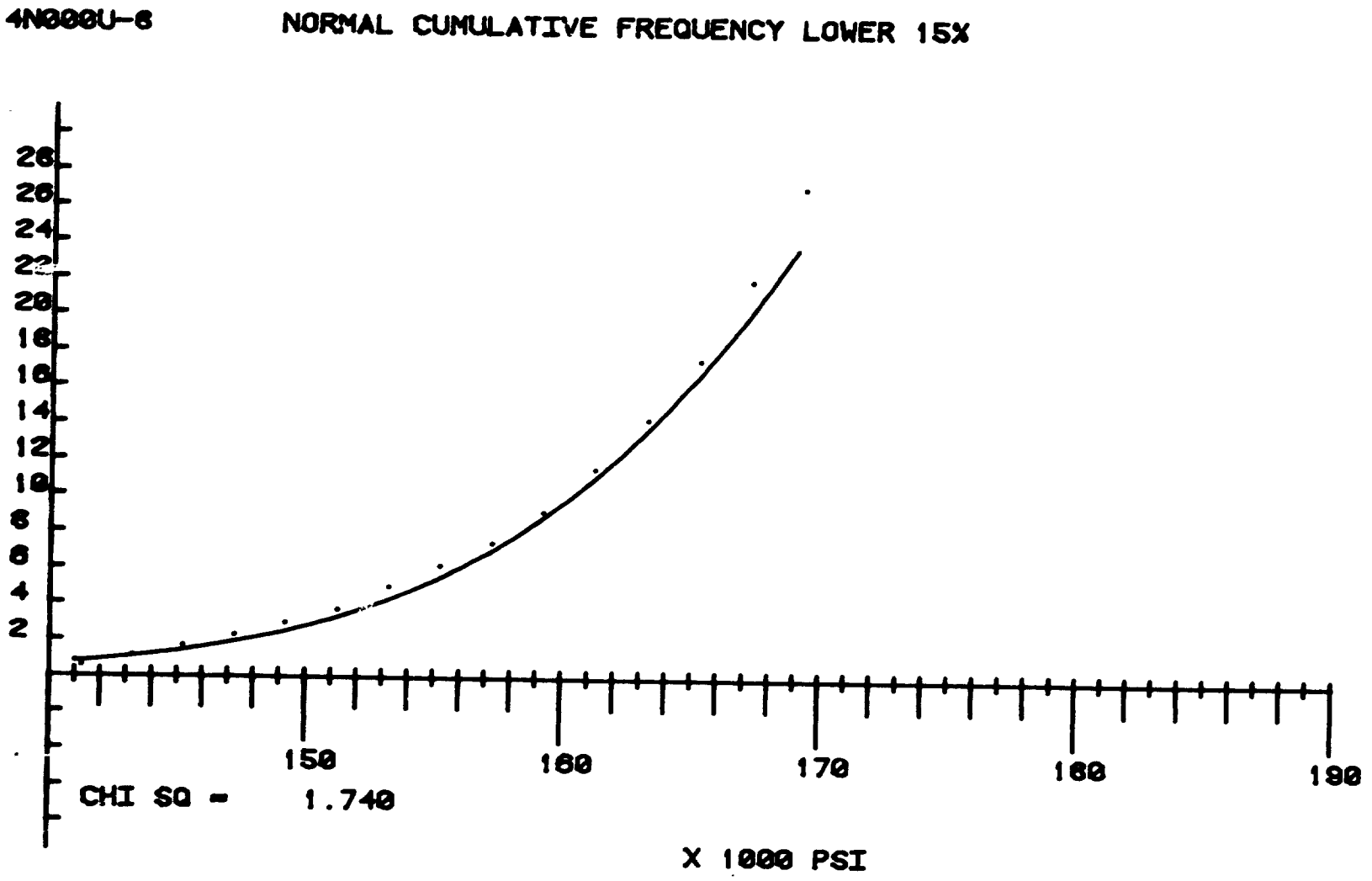

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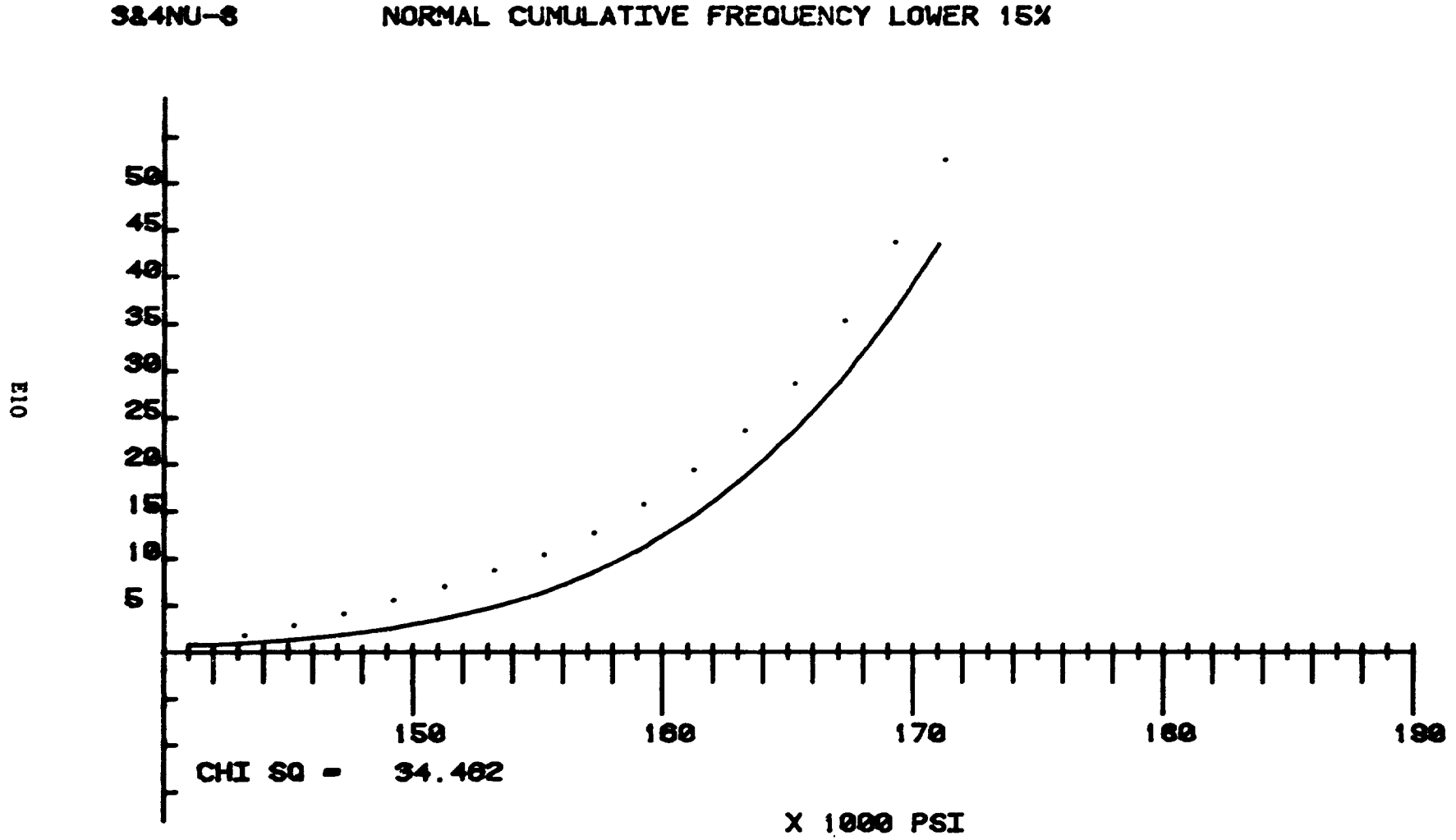

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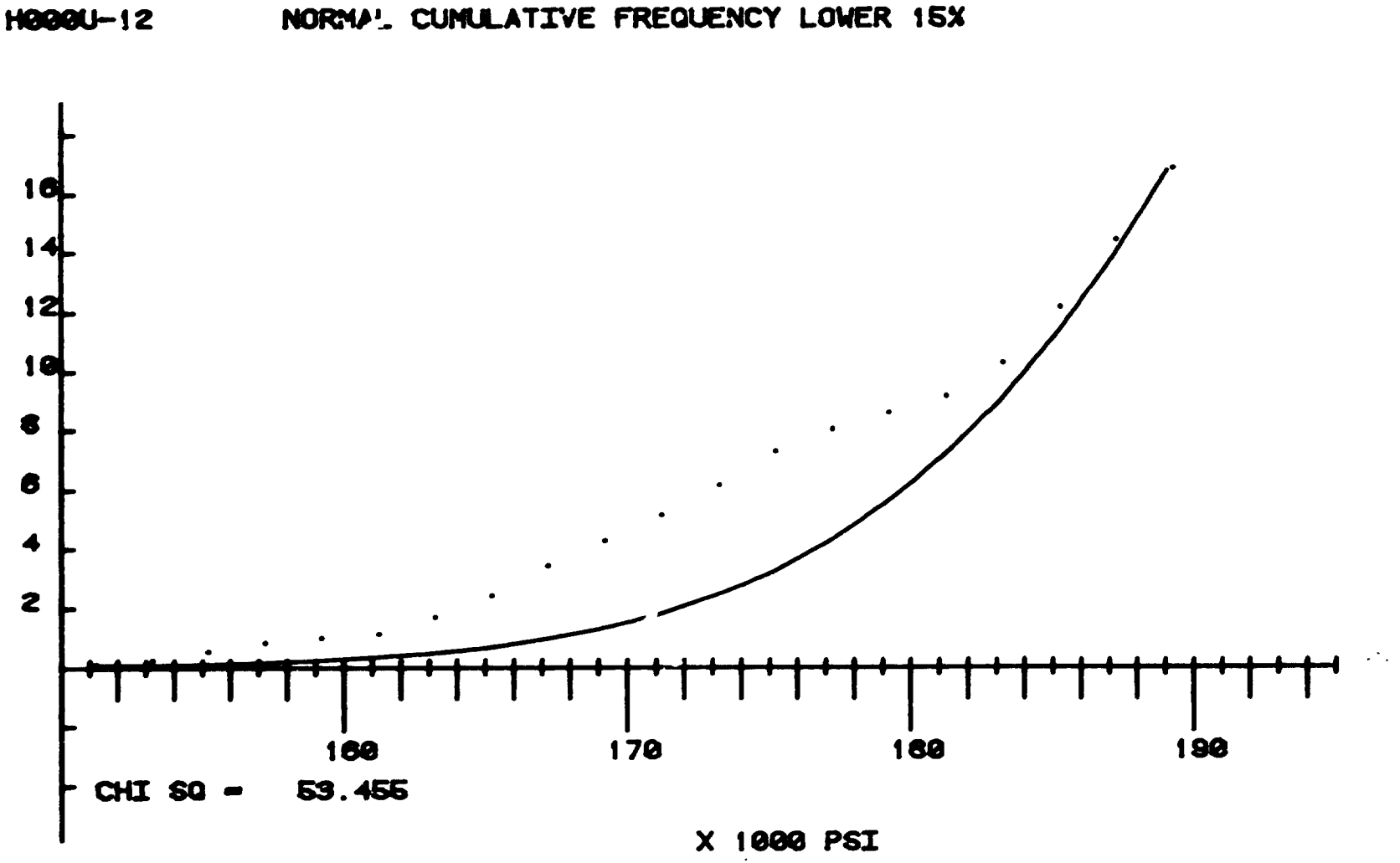
Figure E10. Normal Combined Narmco Task 3 and 4 Tension 8-ply Unidirectional



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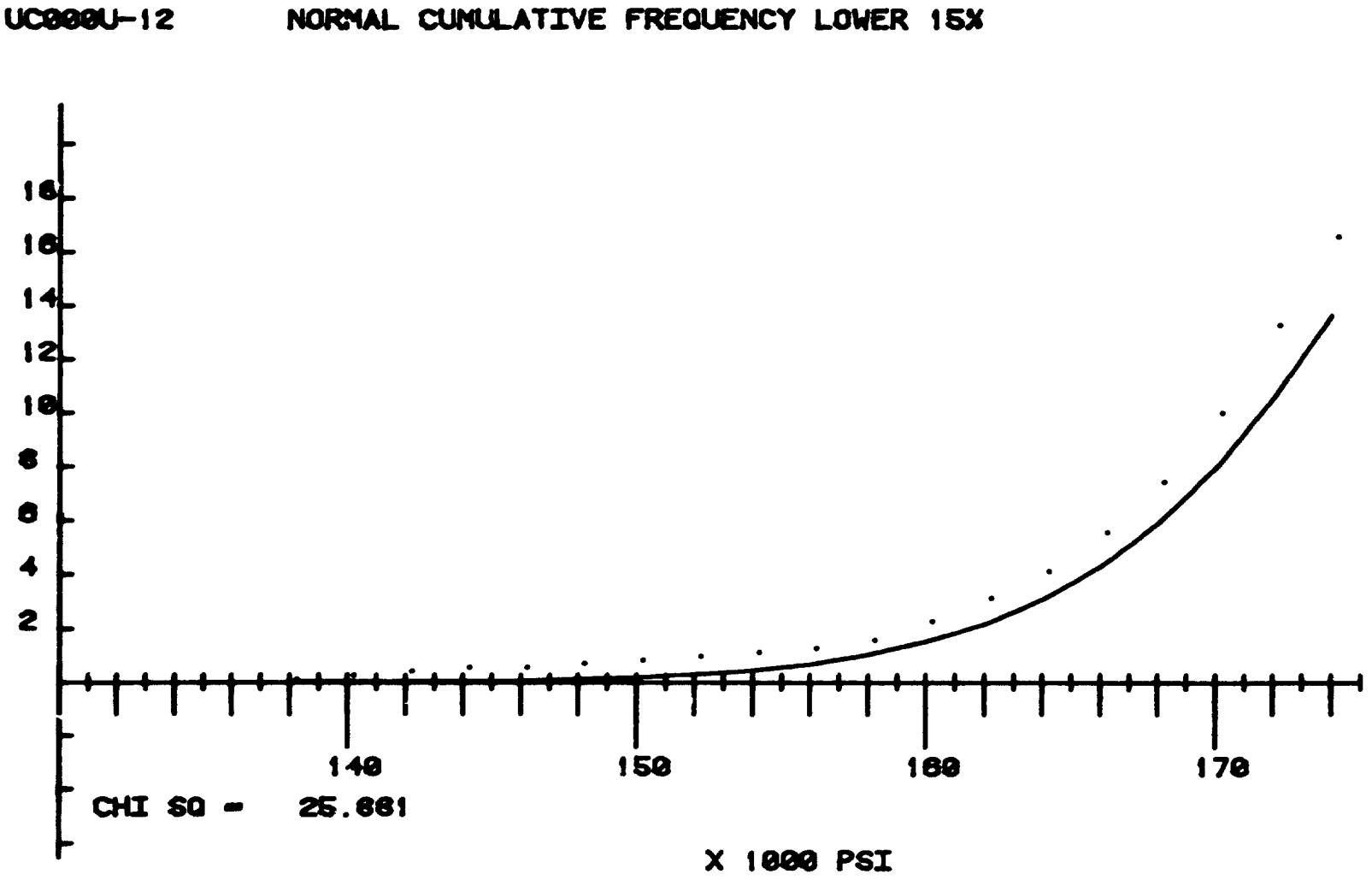


Figure E12. Normal Union Carbide Tension 12-ply Unidirectional

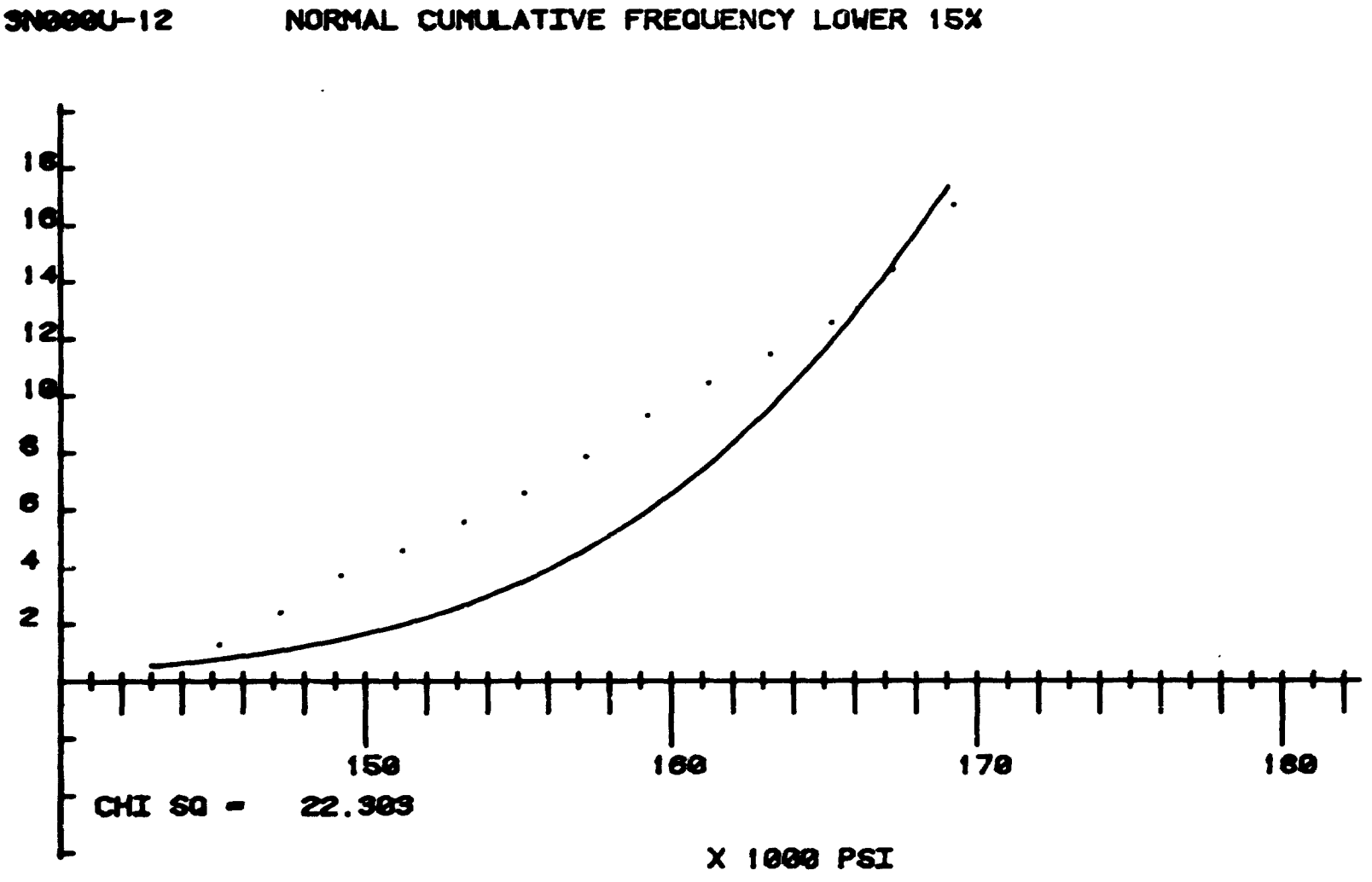
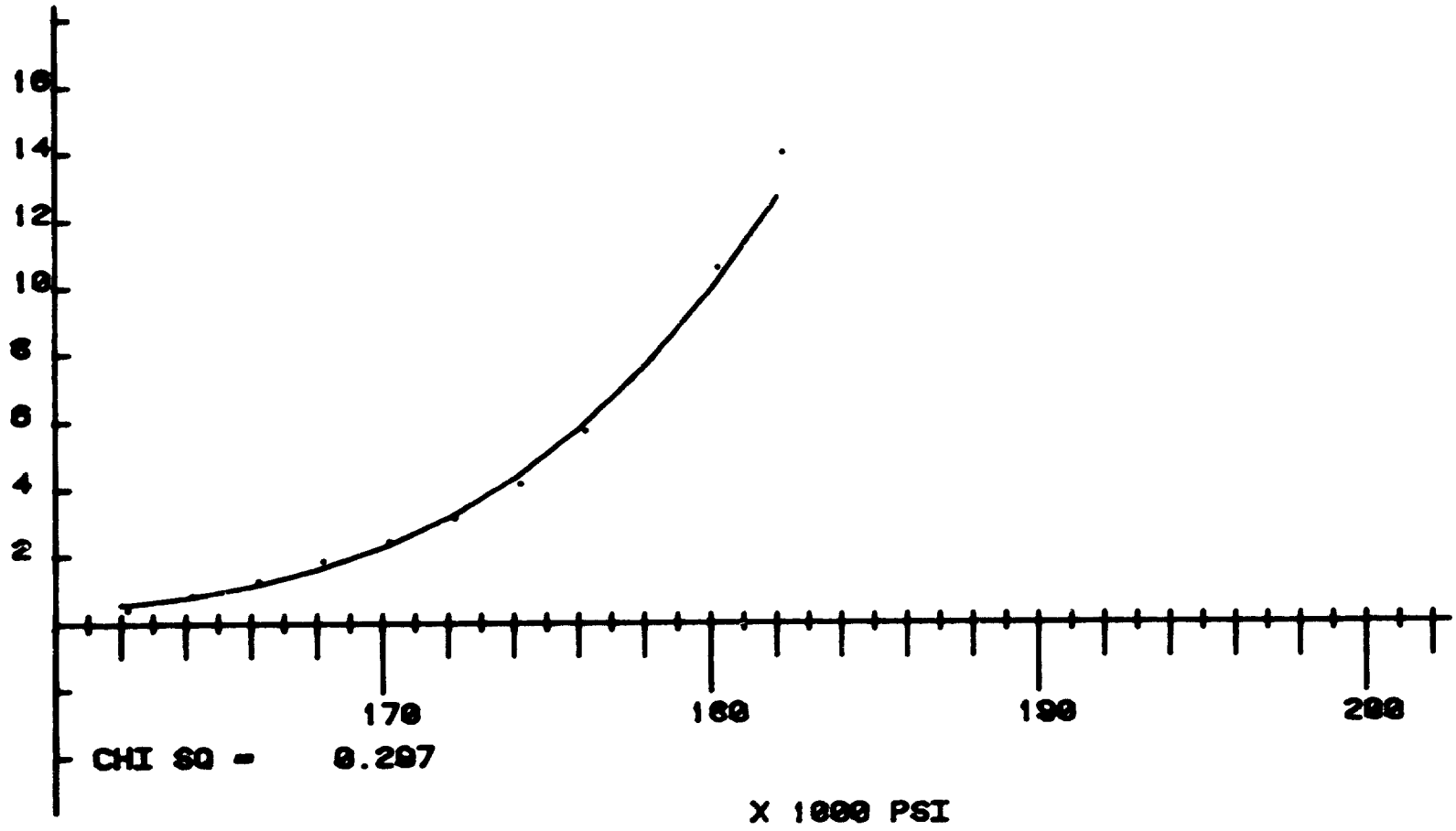


Figure E13. Normal Narmco Task 3 Tension 12-ply Unidirectional



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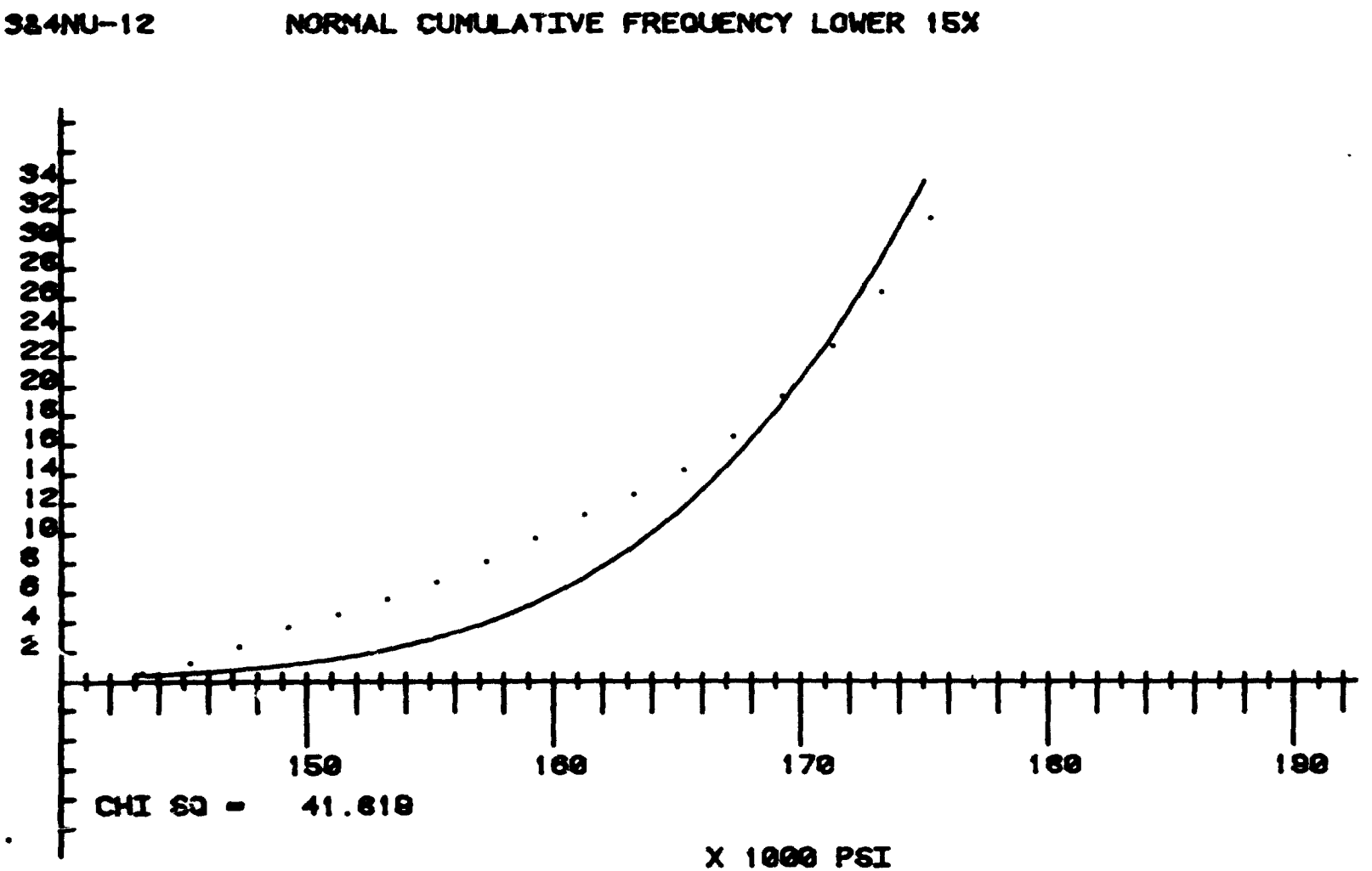

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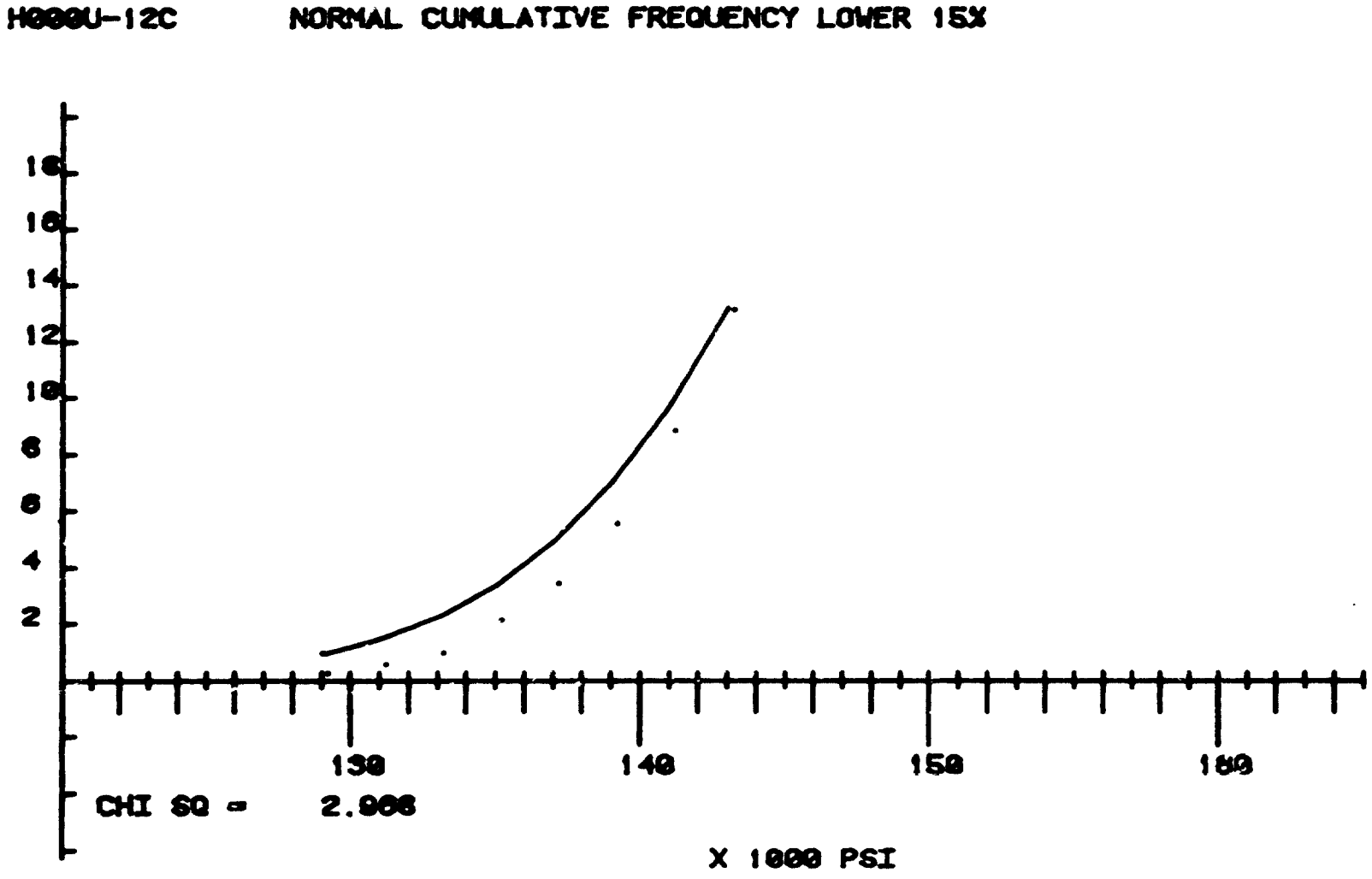

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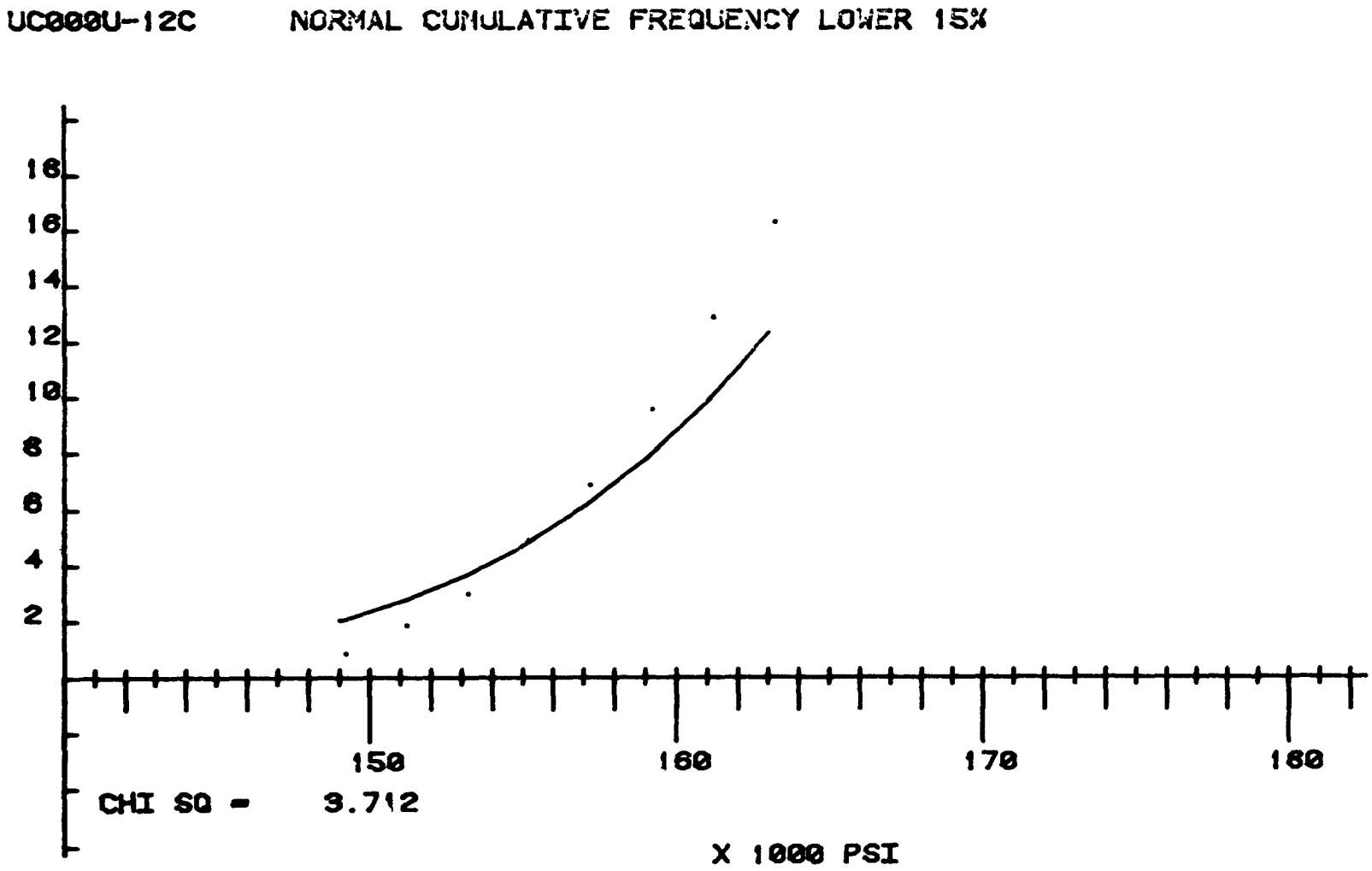

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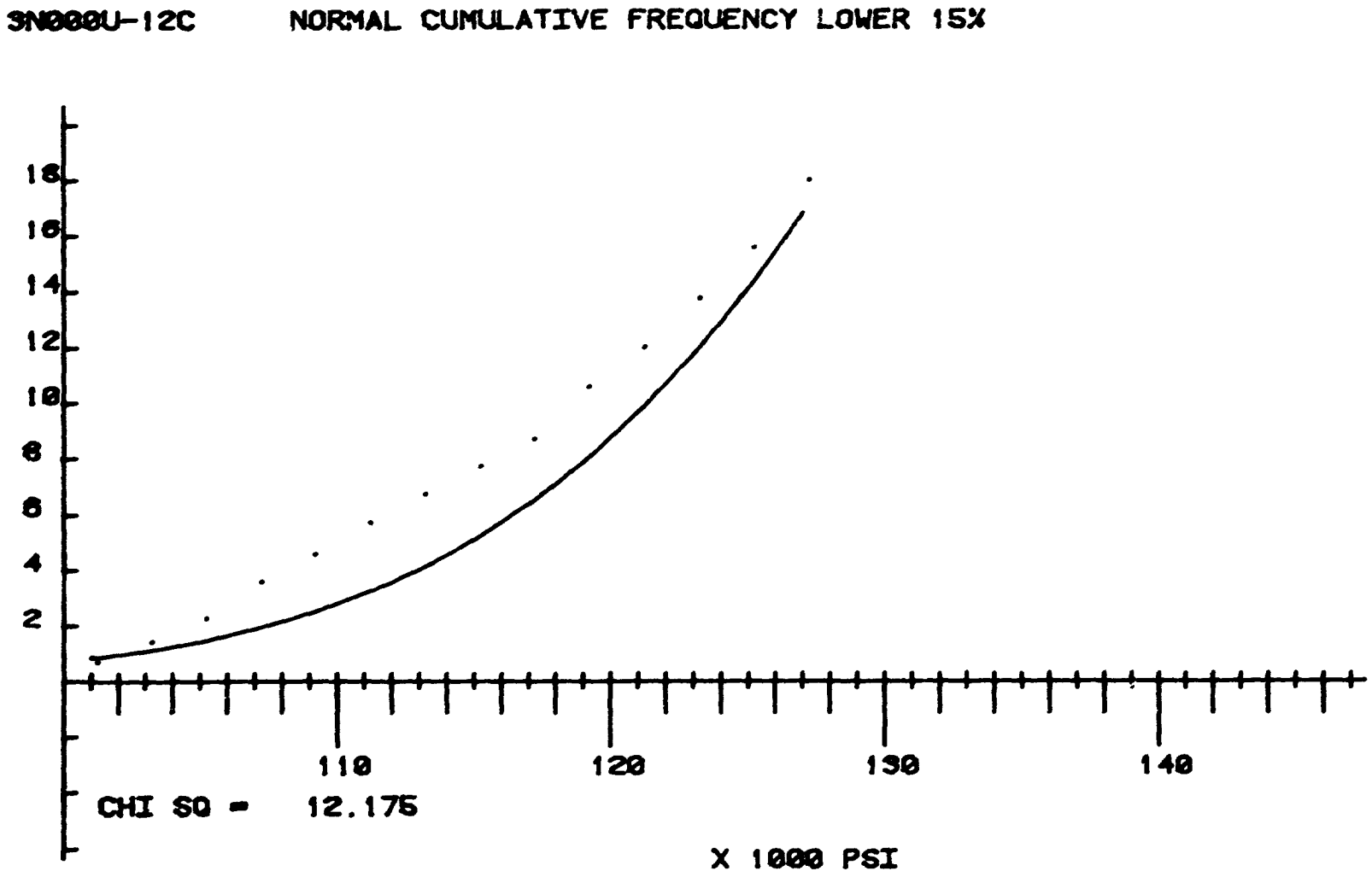

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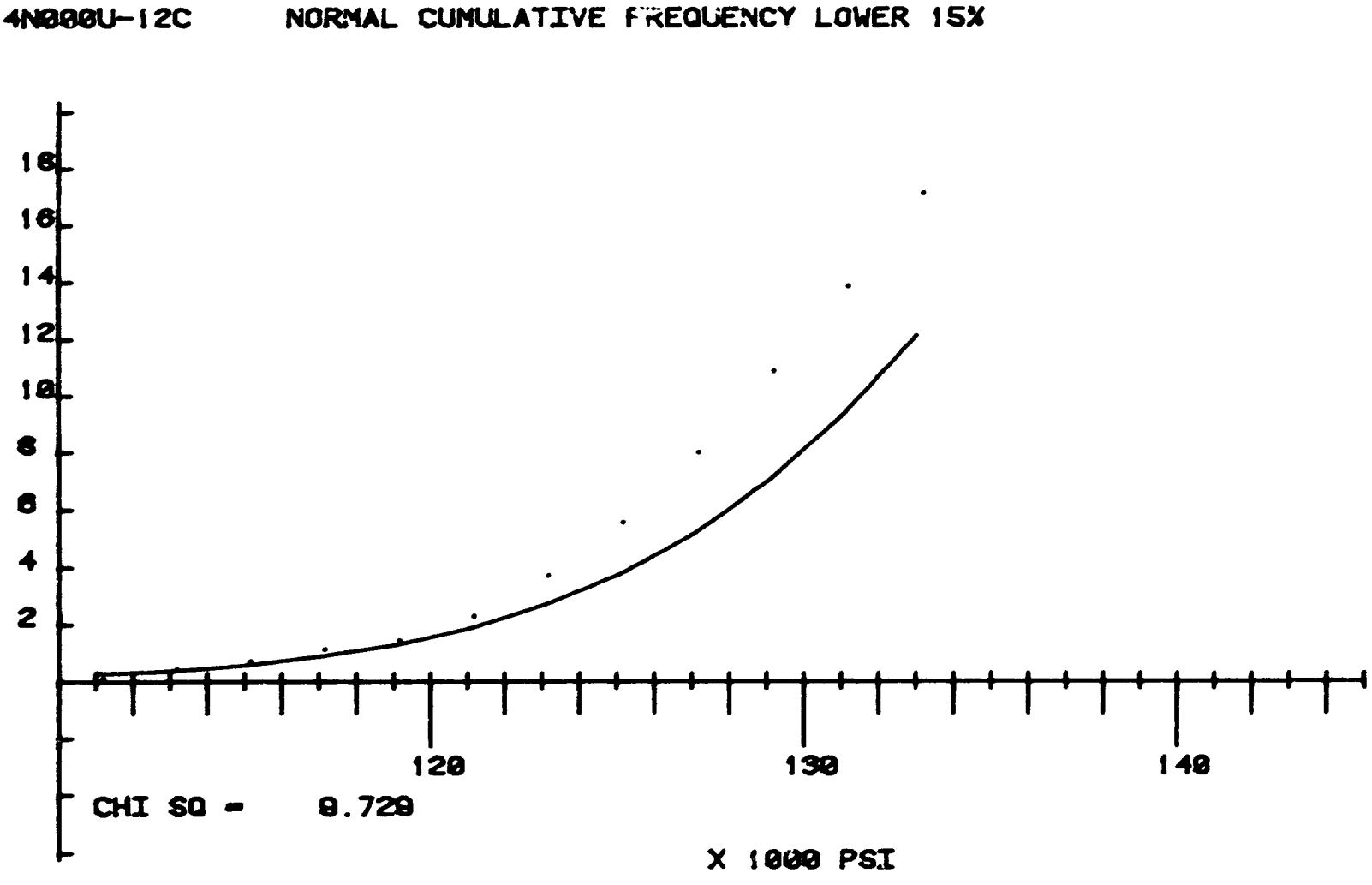

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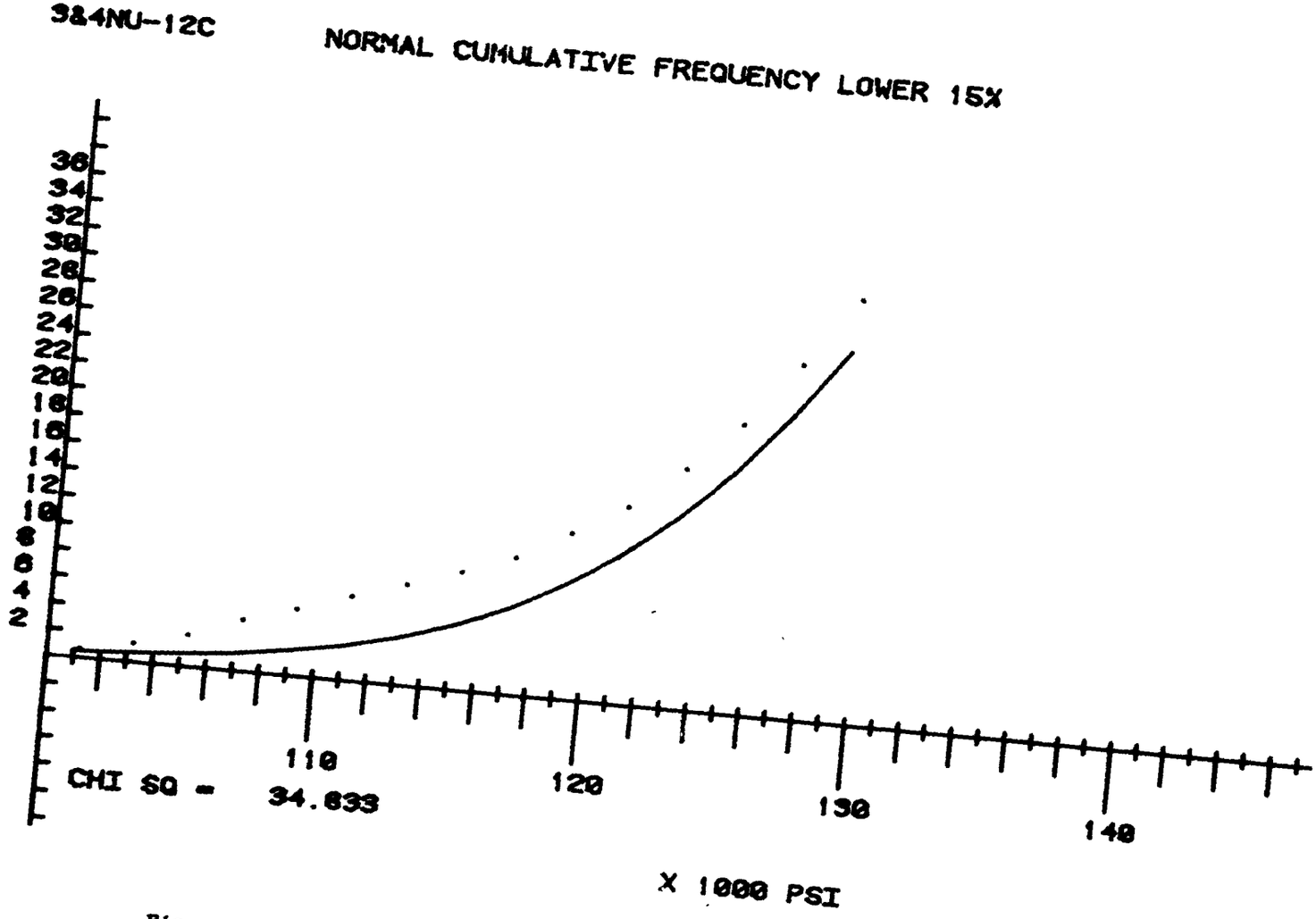

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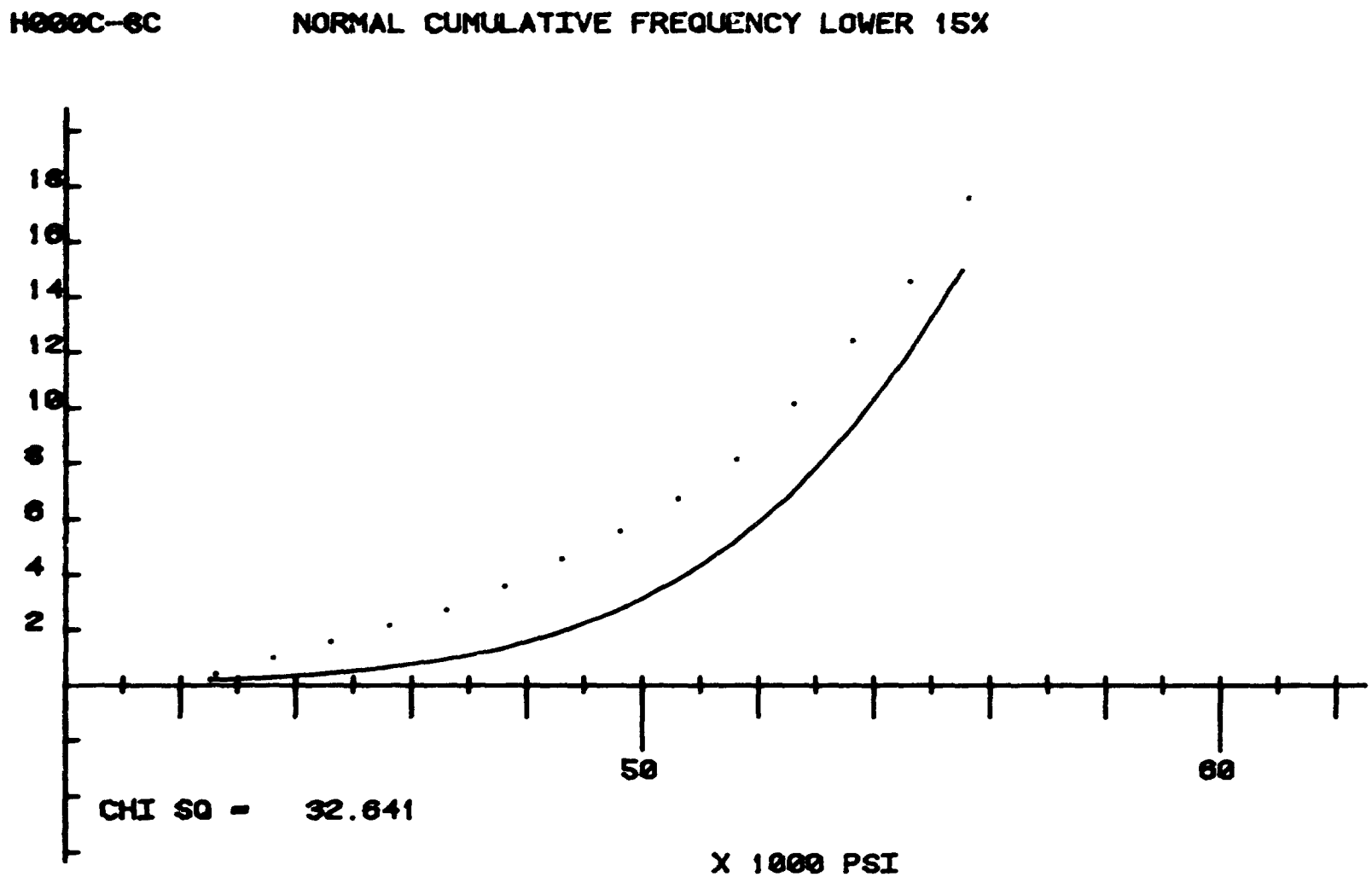


Figure E21. Normal Hercules Compression 8-ply Crossply

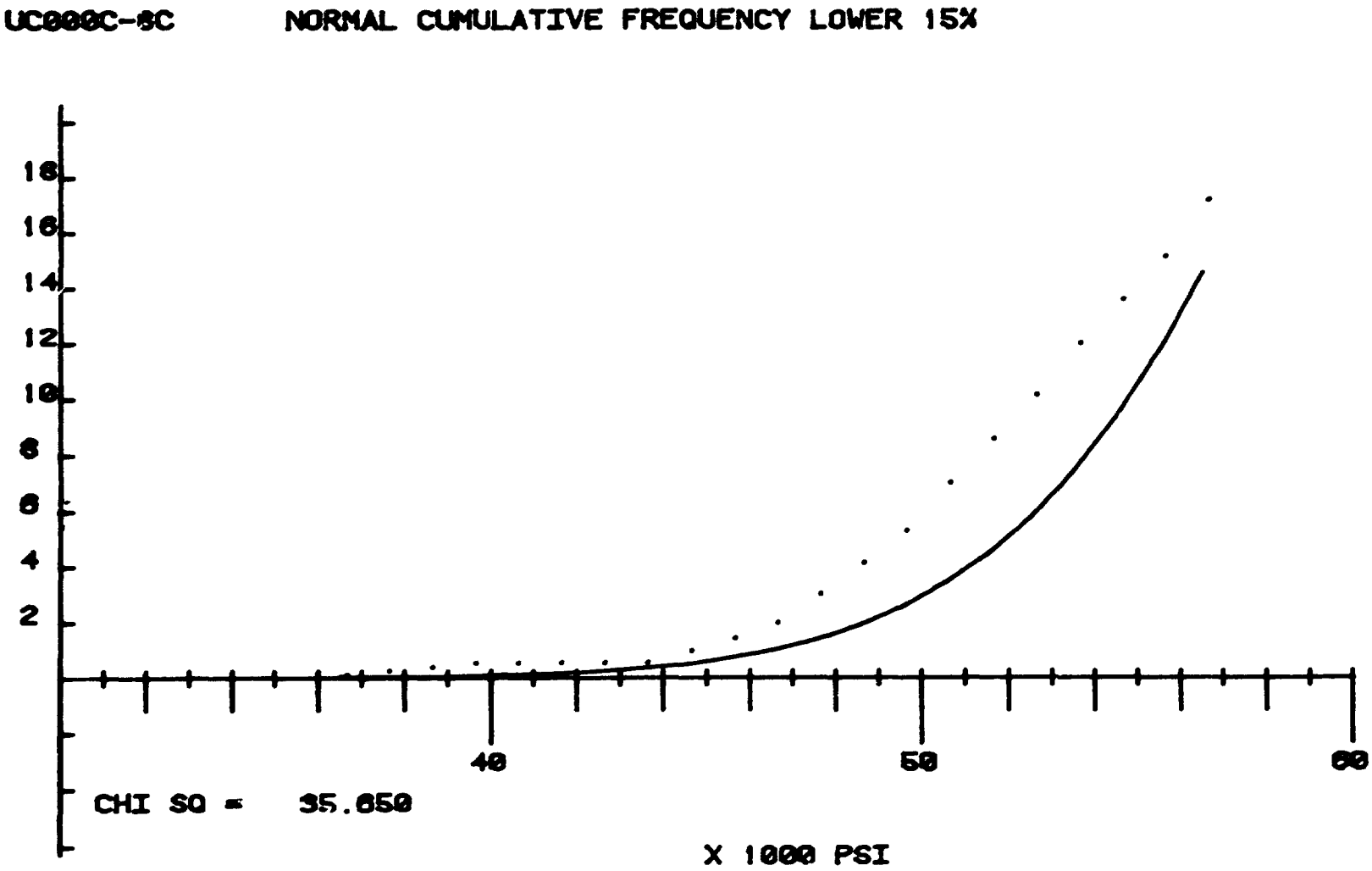


Figure E22. Normal Union Carbide Compression 8-ply Crossply

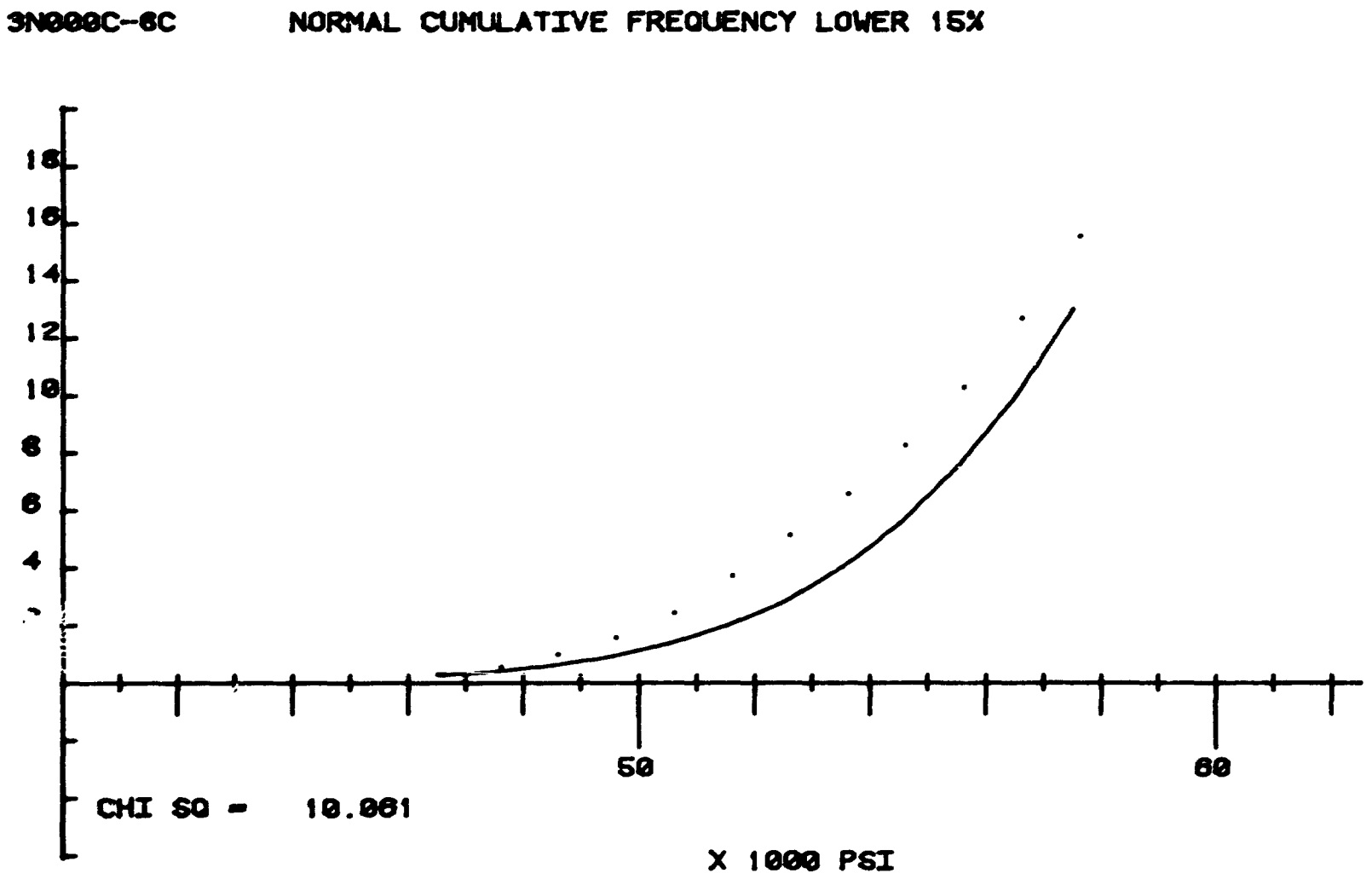
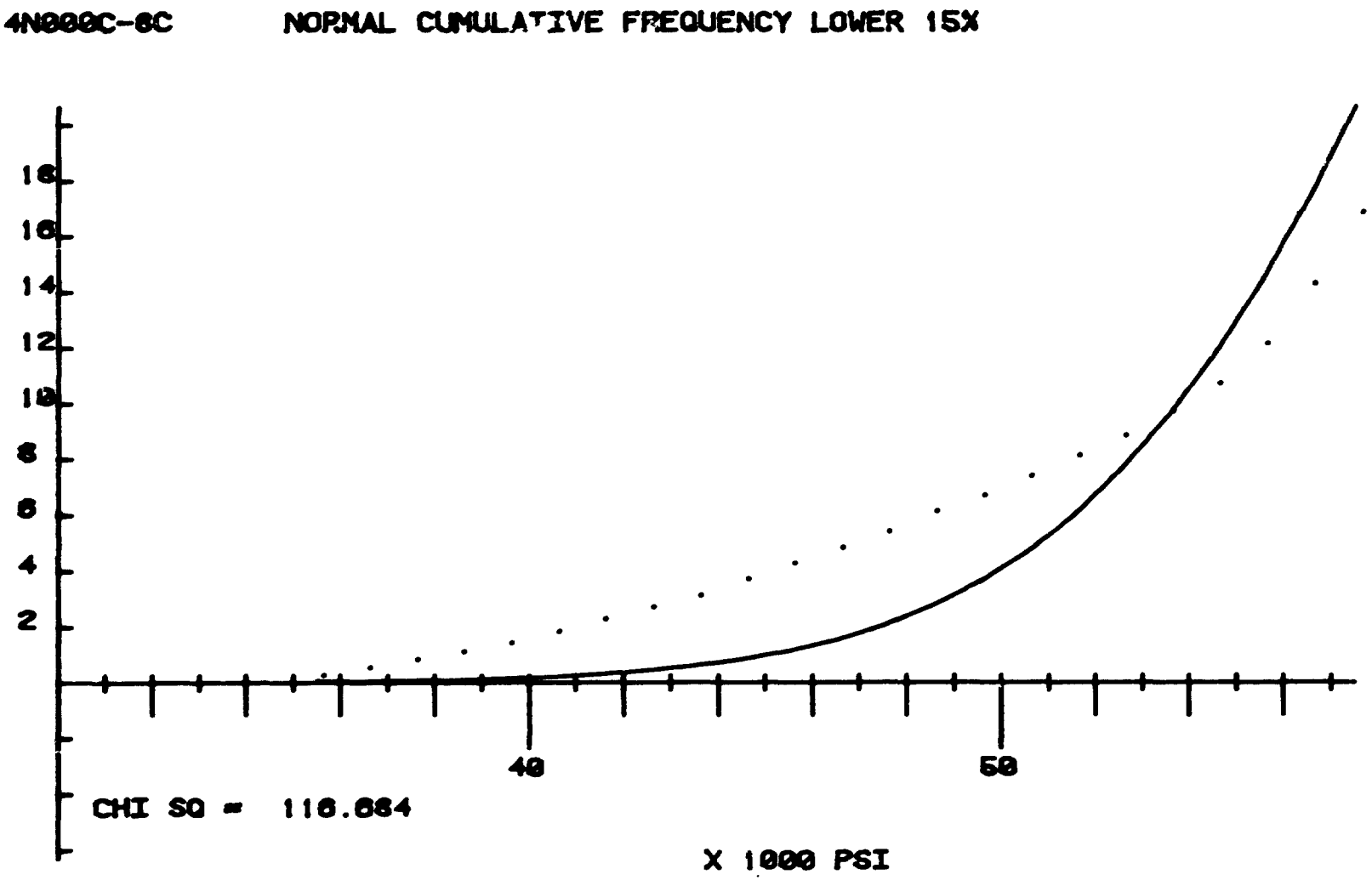


Figure E23. Normal Narmco Task 3 Compression 8-ply Crossply



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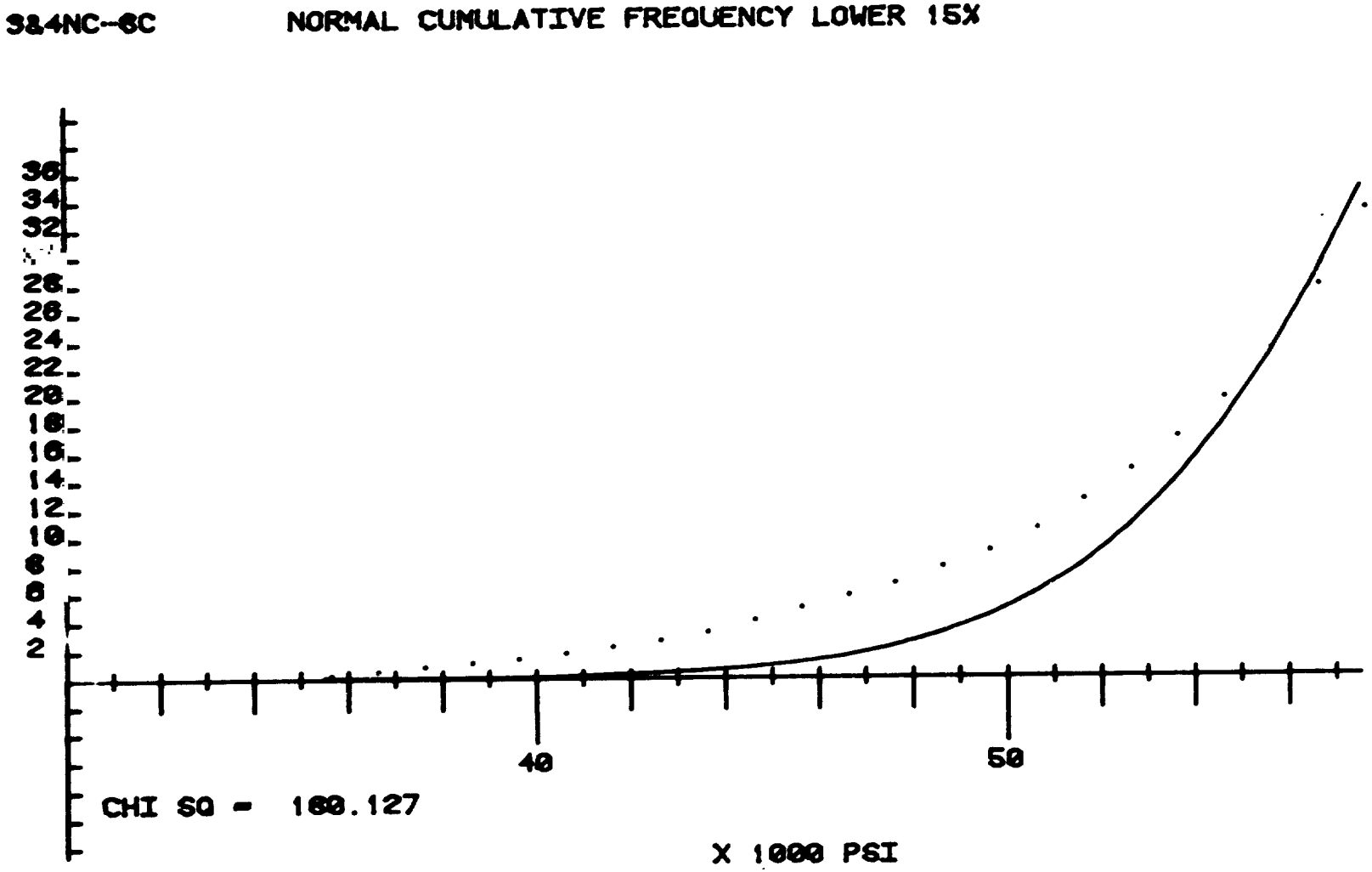

Figure E25. Normal Combined Narmco Task 3 and 4 Compression 8-ply Crossply

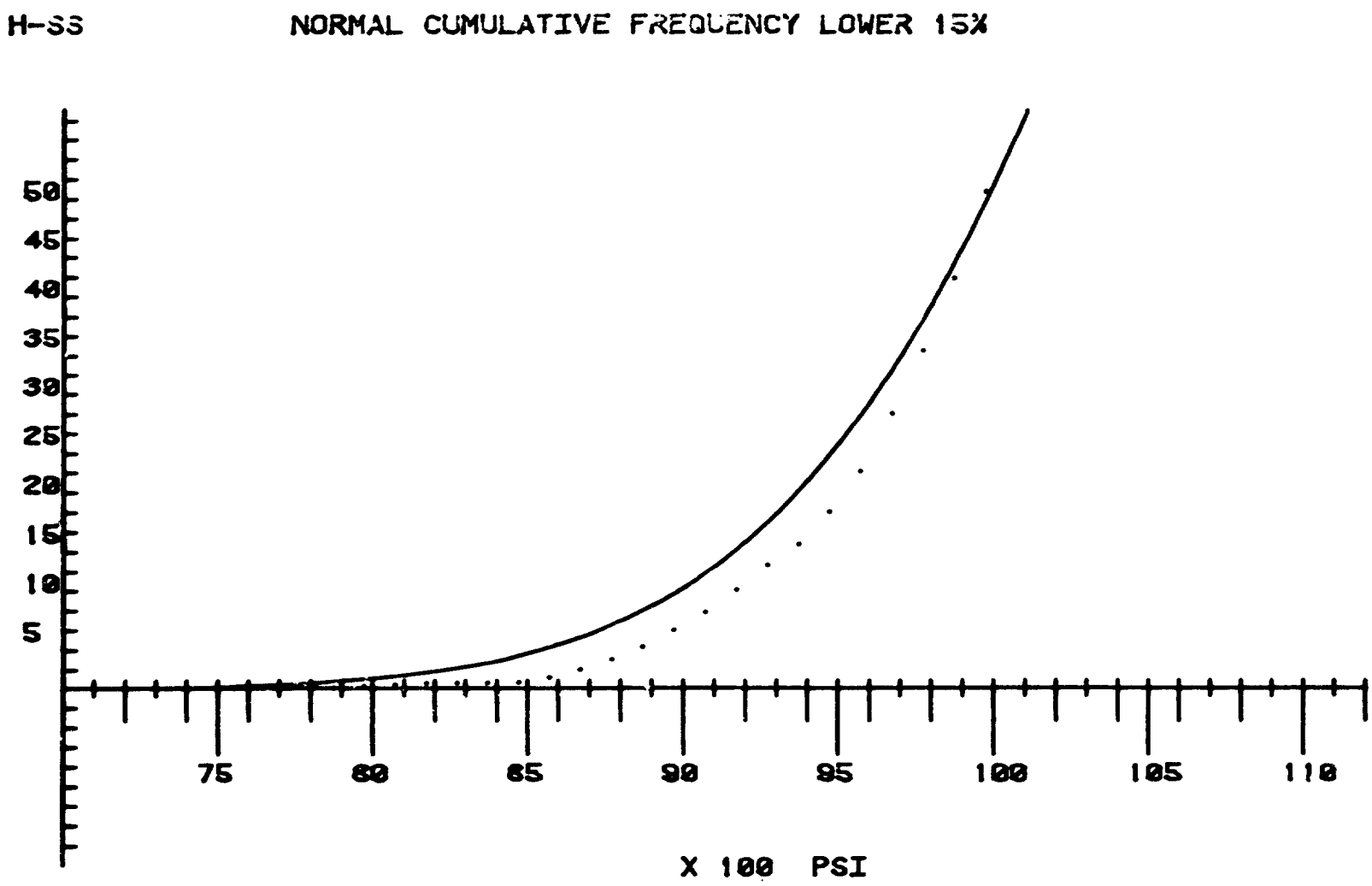

Figure E26. Normal Hercules Short Beam Shear

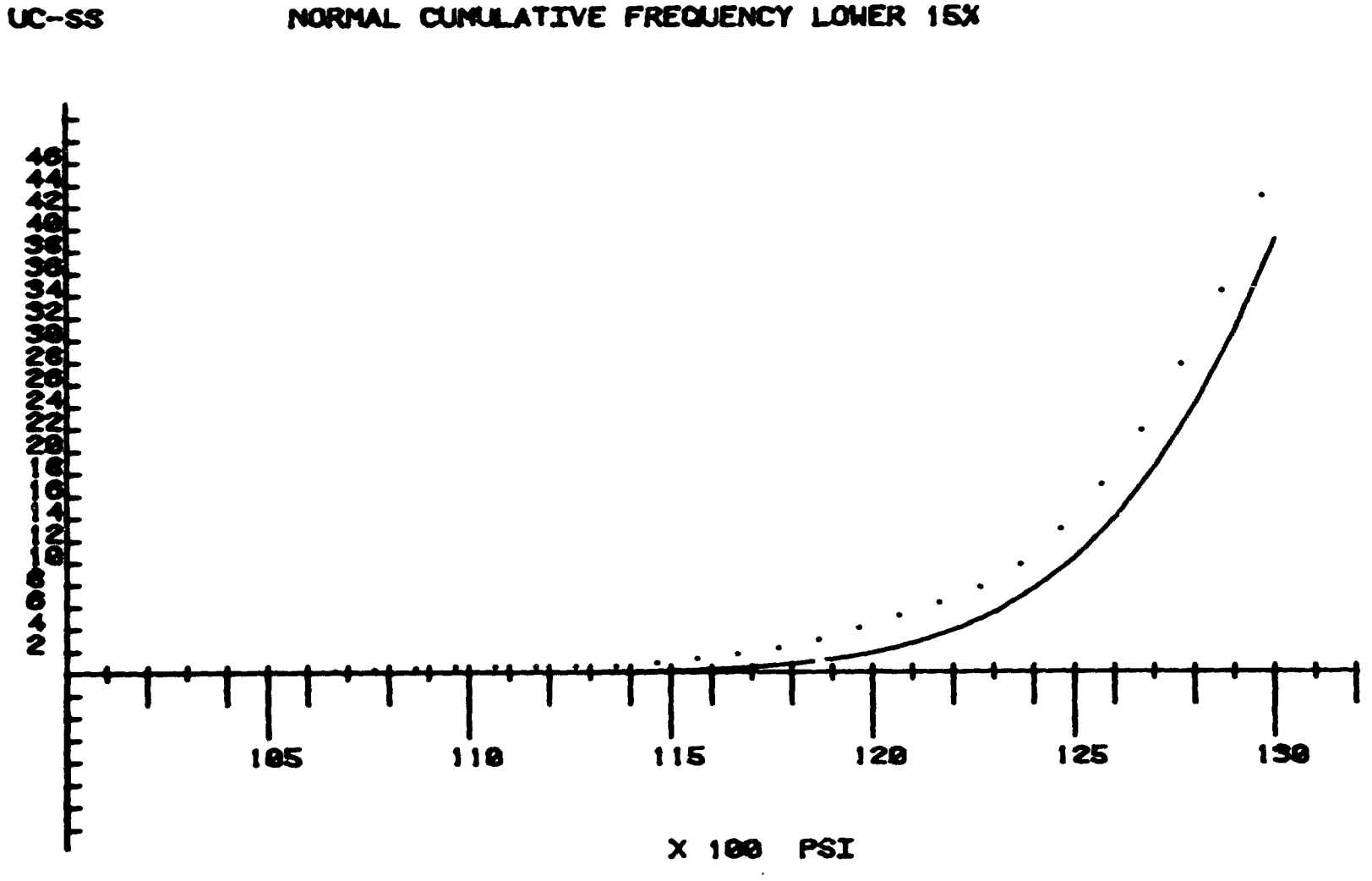

Figure E27. Normal Union Carbide Short Beam Shear

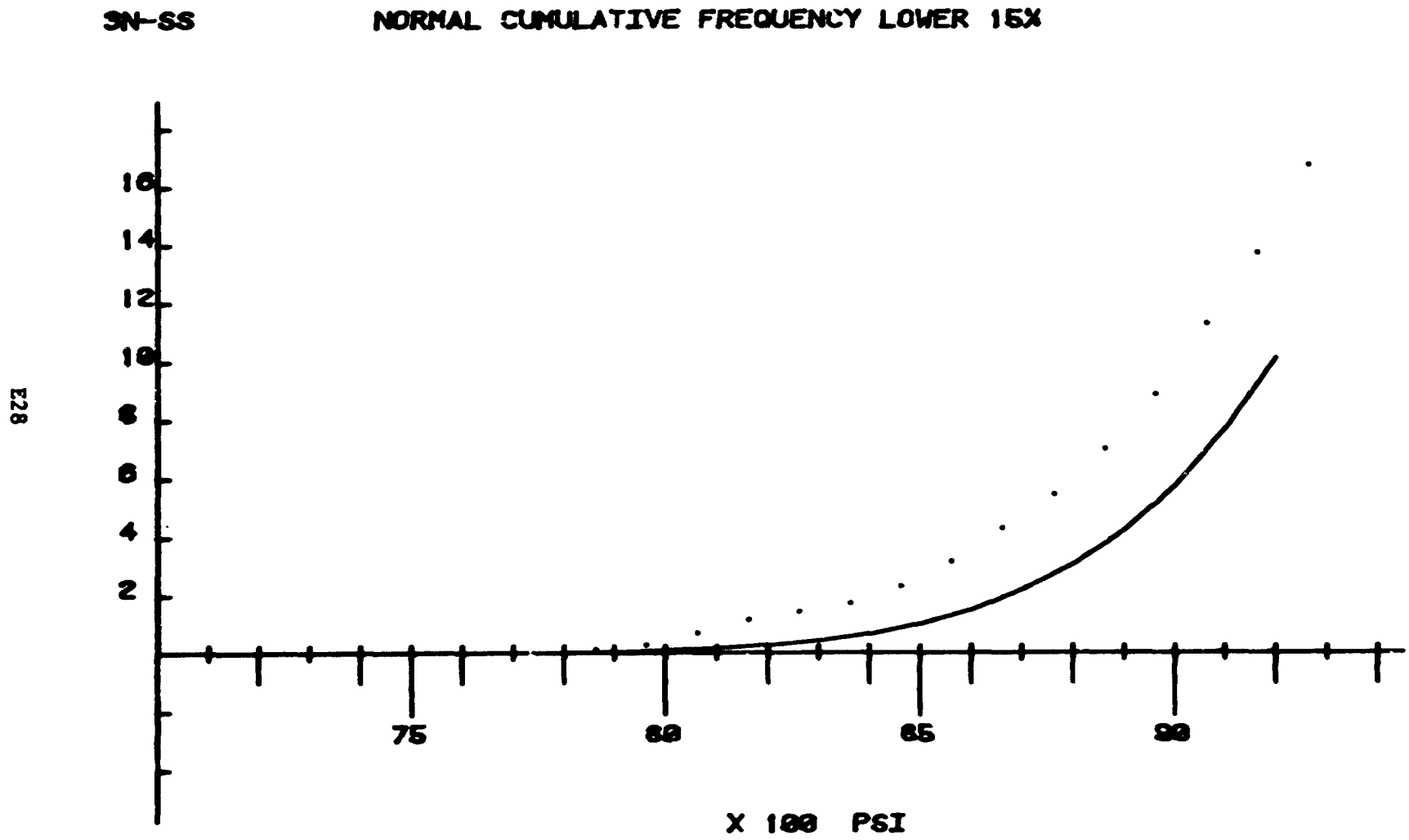

Figure E28. Normal Narmco Task 3 Short Beam Shear

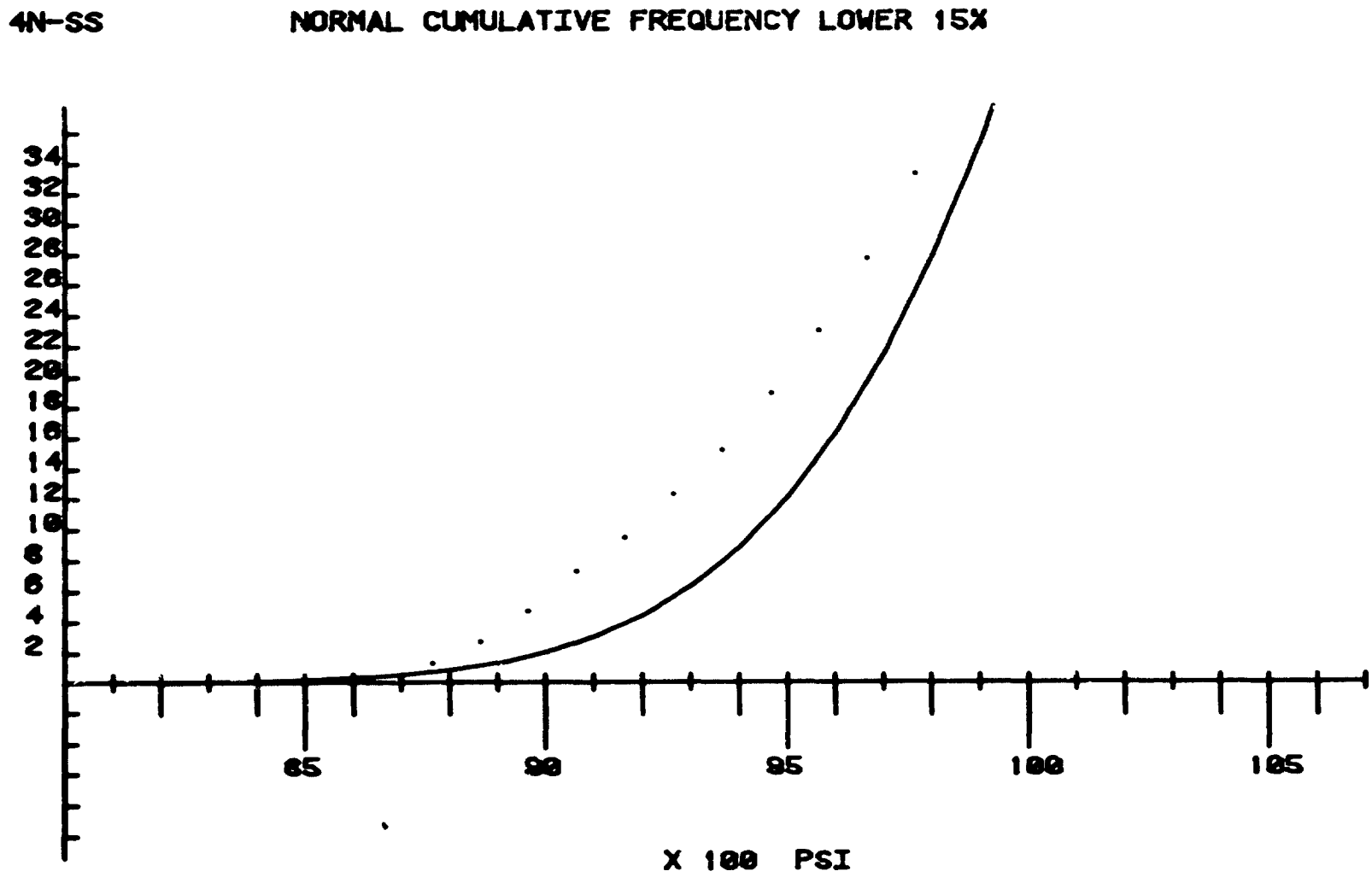

Figure E29. Normal Naraco Task 4 Short Beam Shear

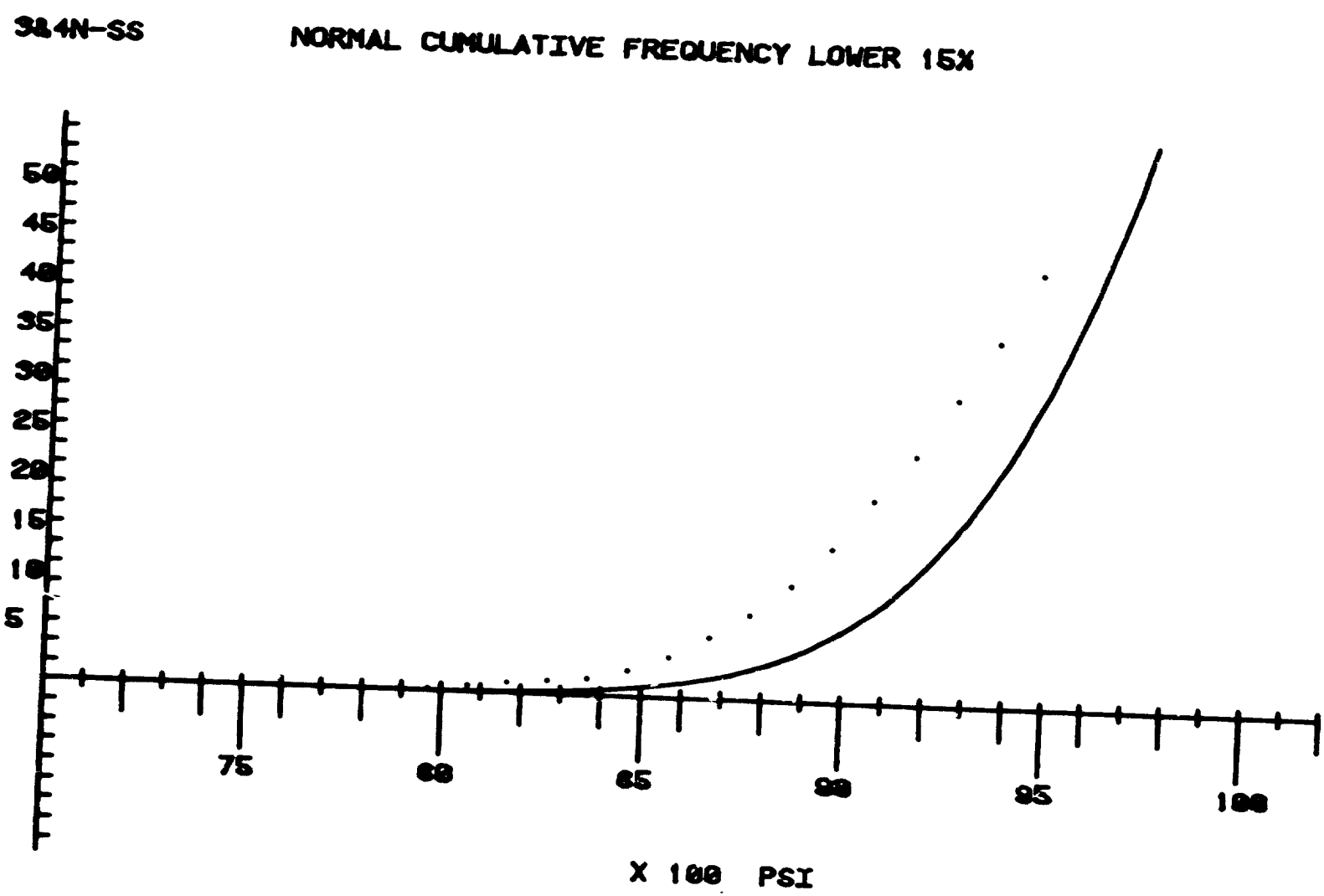

Figure E30. Normal Combined Nareco Task 3 and 4 Short Beam Shear

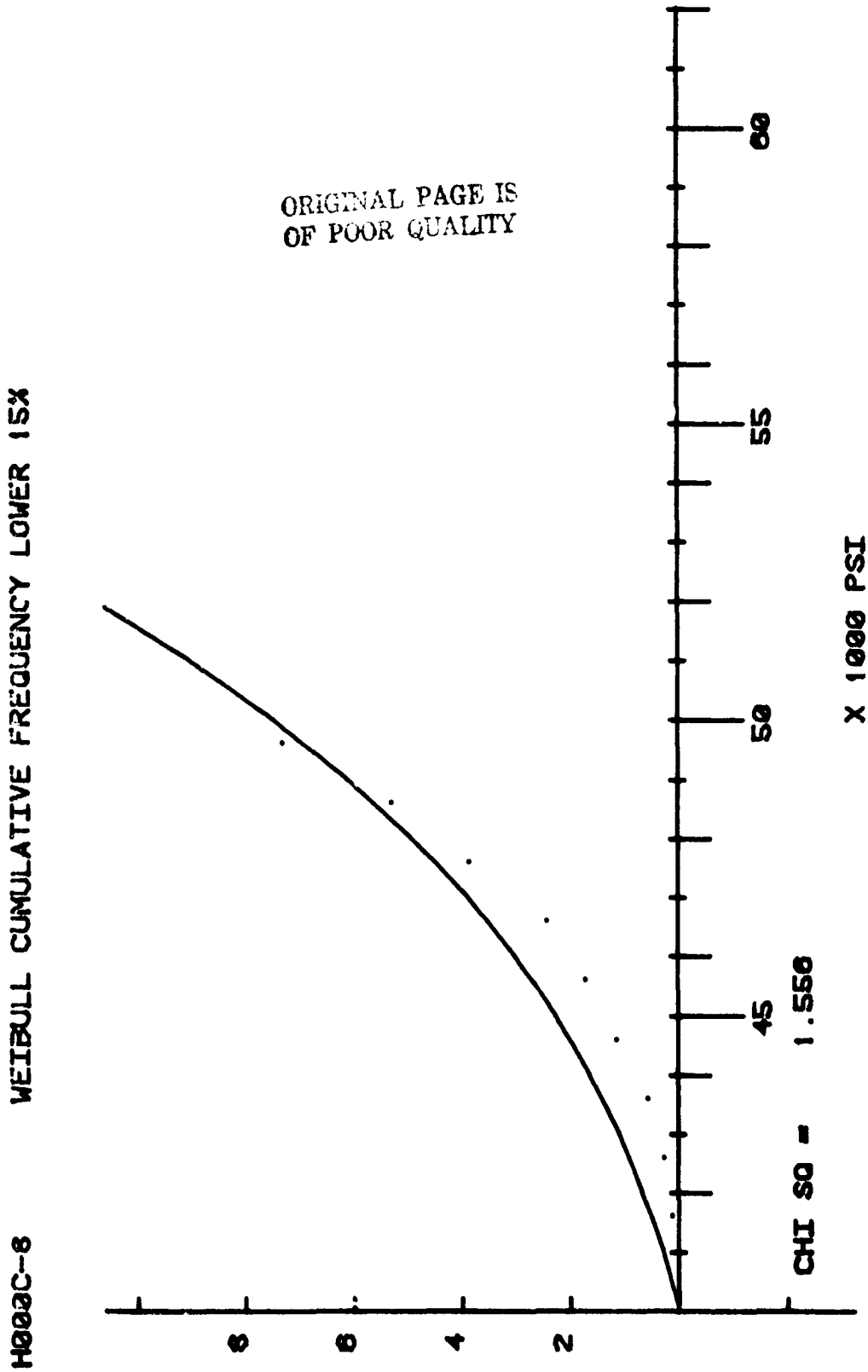

Figure E31. Weibull Hercules Tension 8-ply Crossply

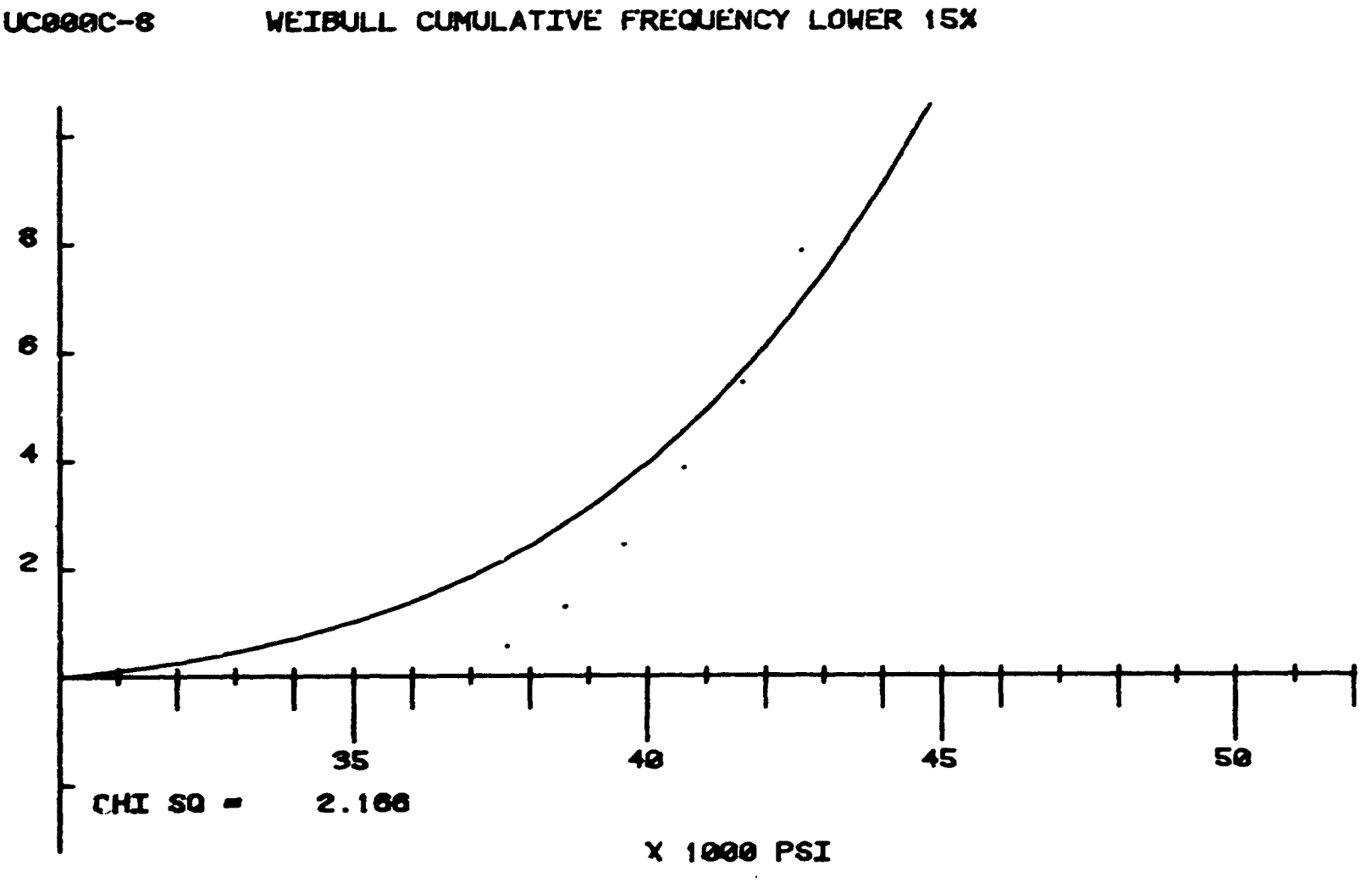

Figure E32. Weibull Union Carbide Tension 8-ply Crossply

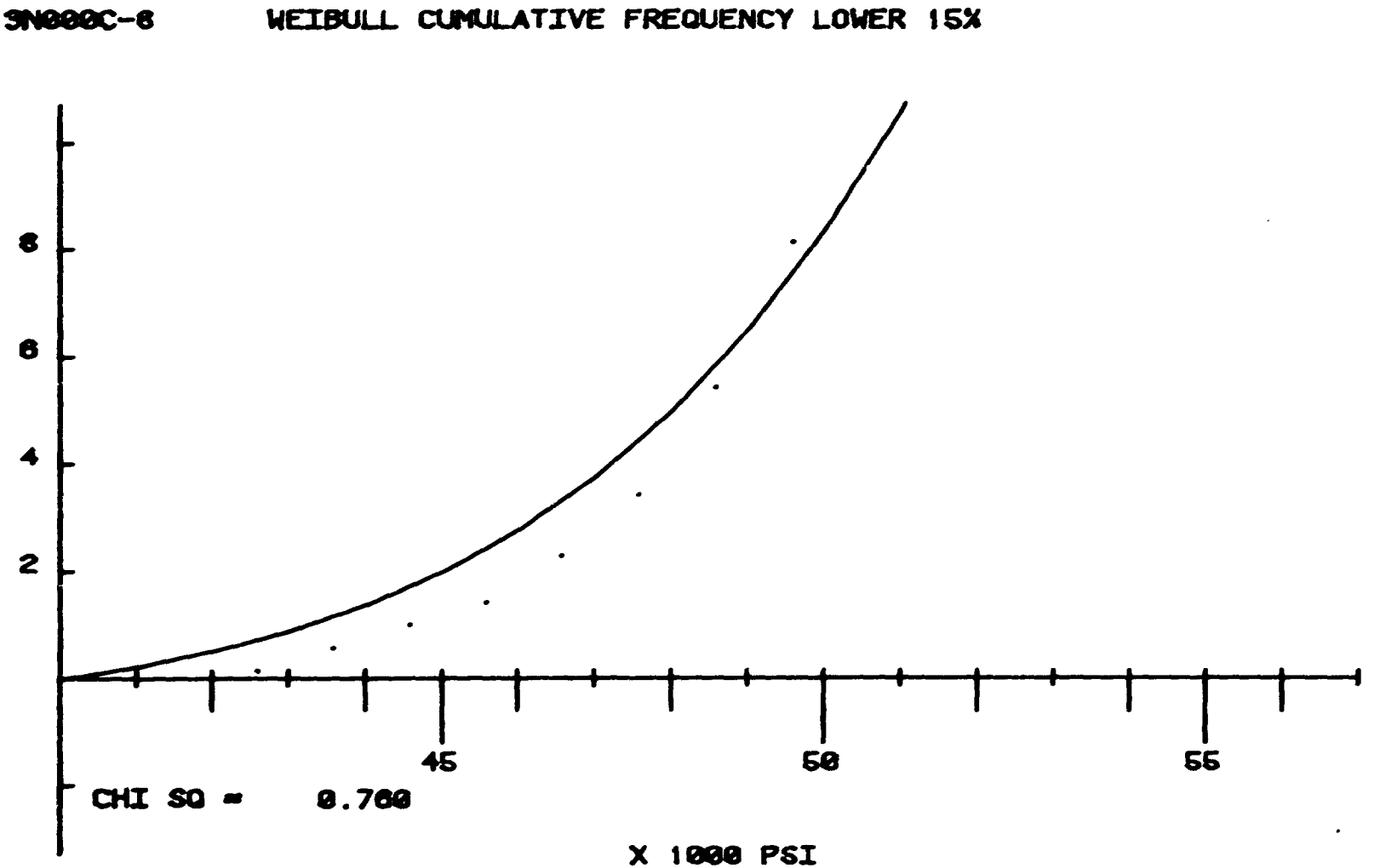

Figure E33. Weibull Narmco Task 3 Tension 8-ply Crossply

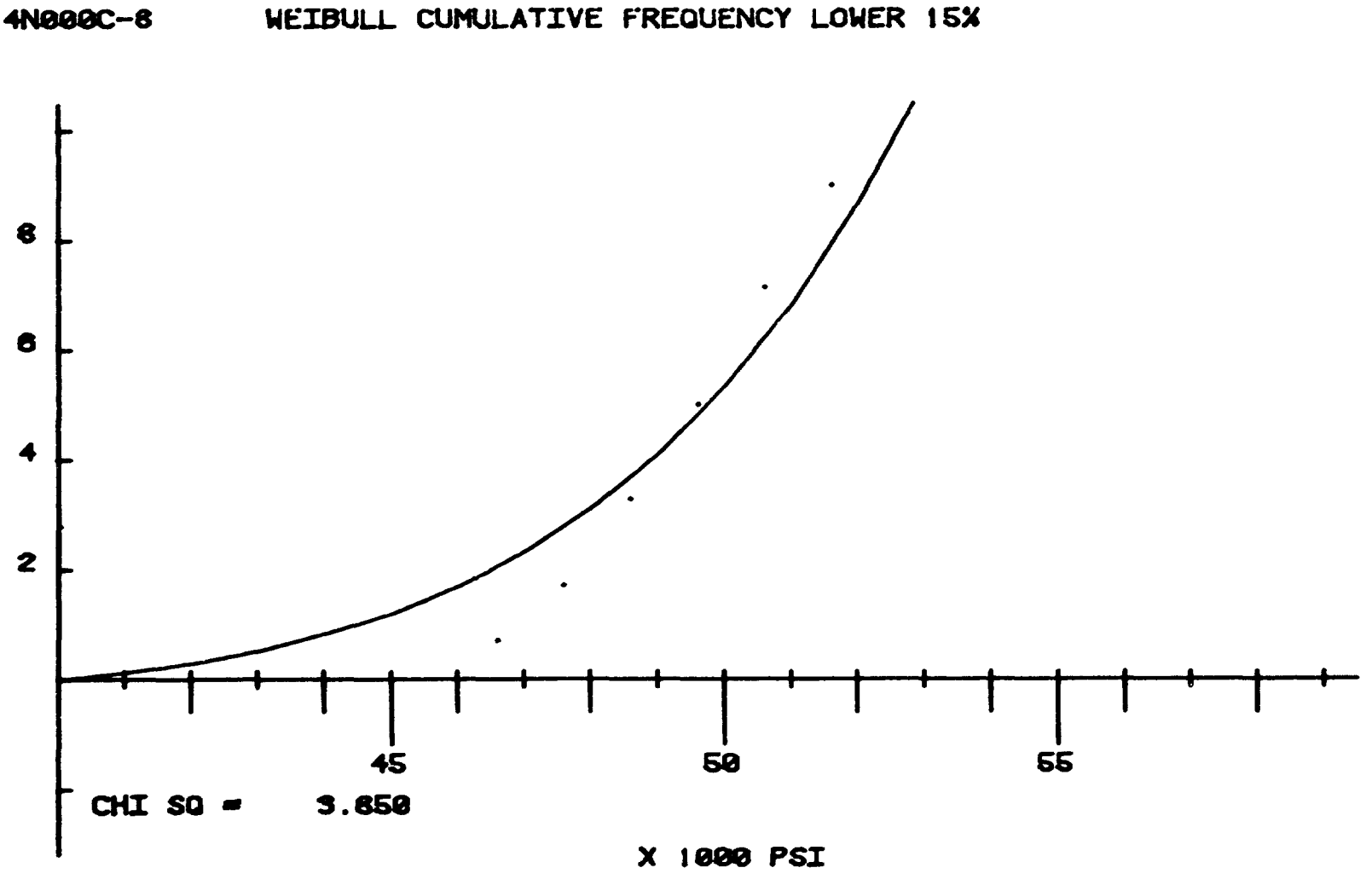

Figure E34. Weibull Naraco Task 4 Tension 8-ply Crossply

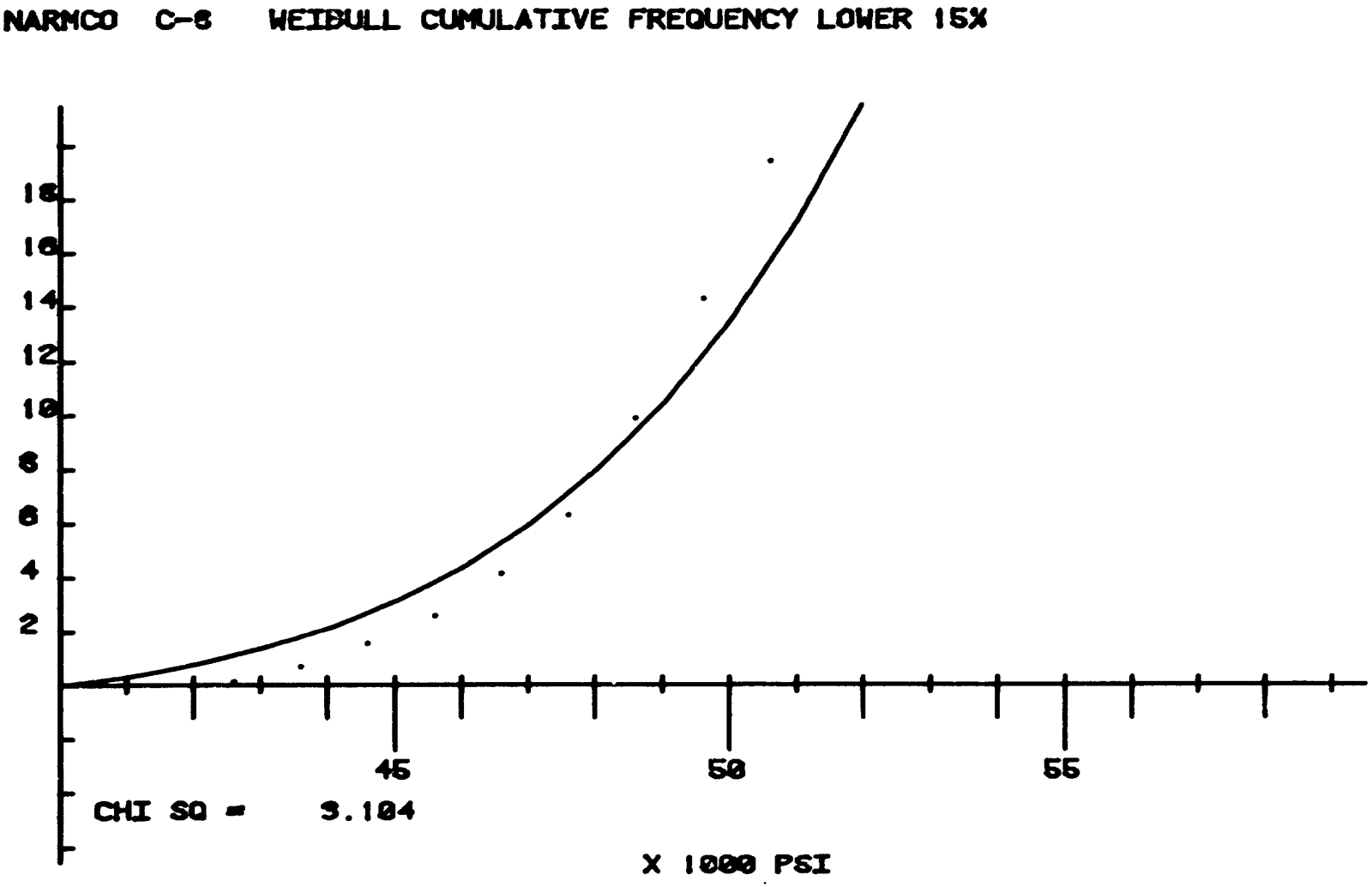

Figure E35. Weibull Combined Narmco Task 3 and 4 Tension 8-ply Crossply

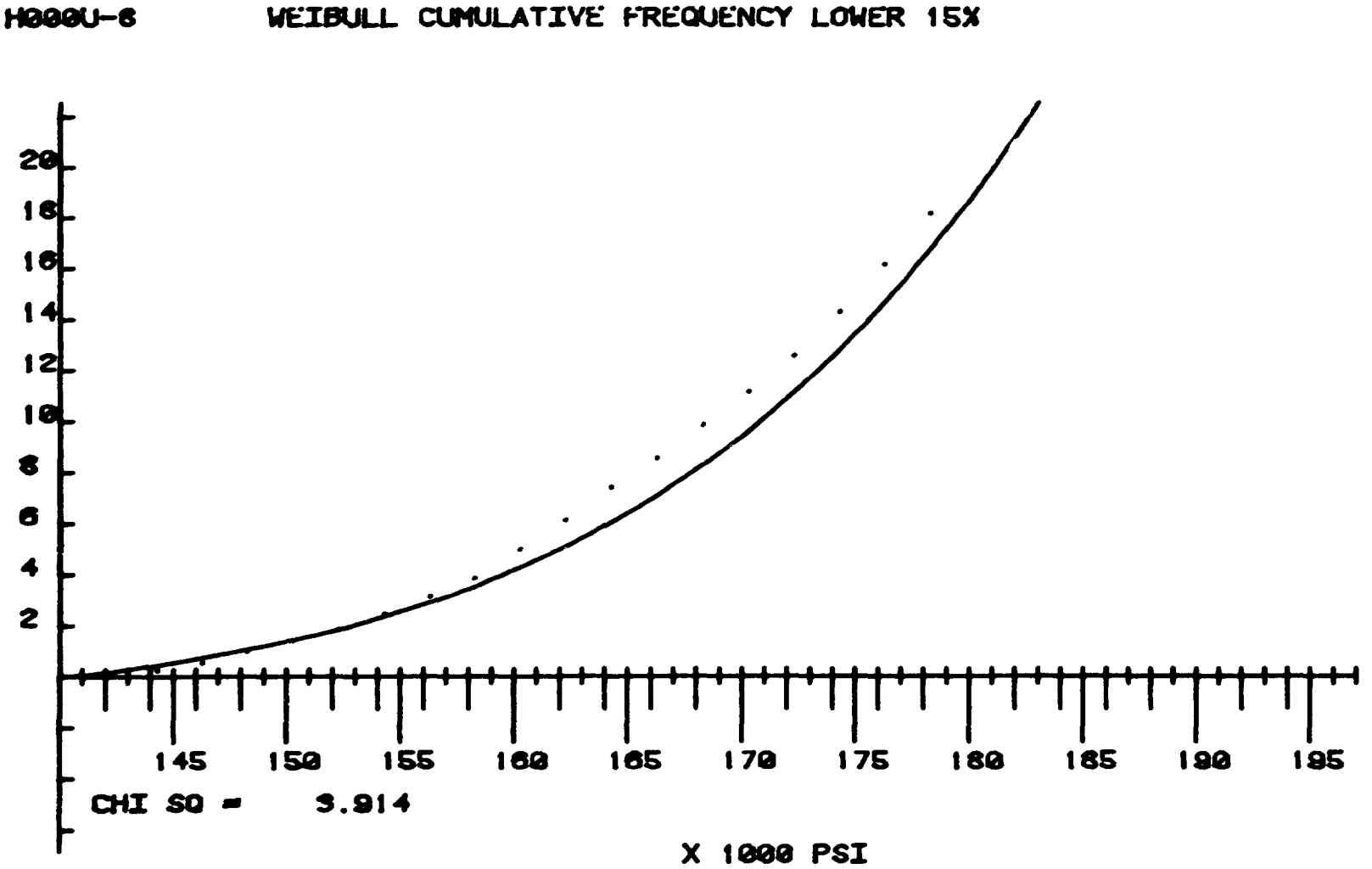

Figure E36. Weibull Hercules Tension 8-ply Unidirectional

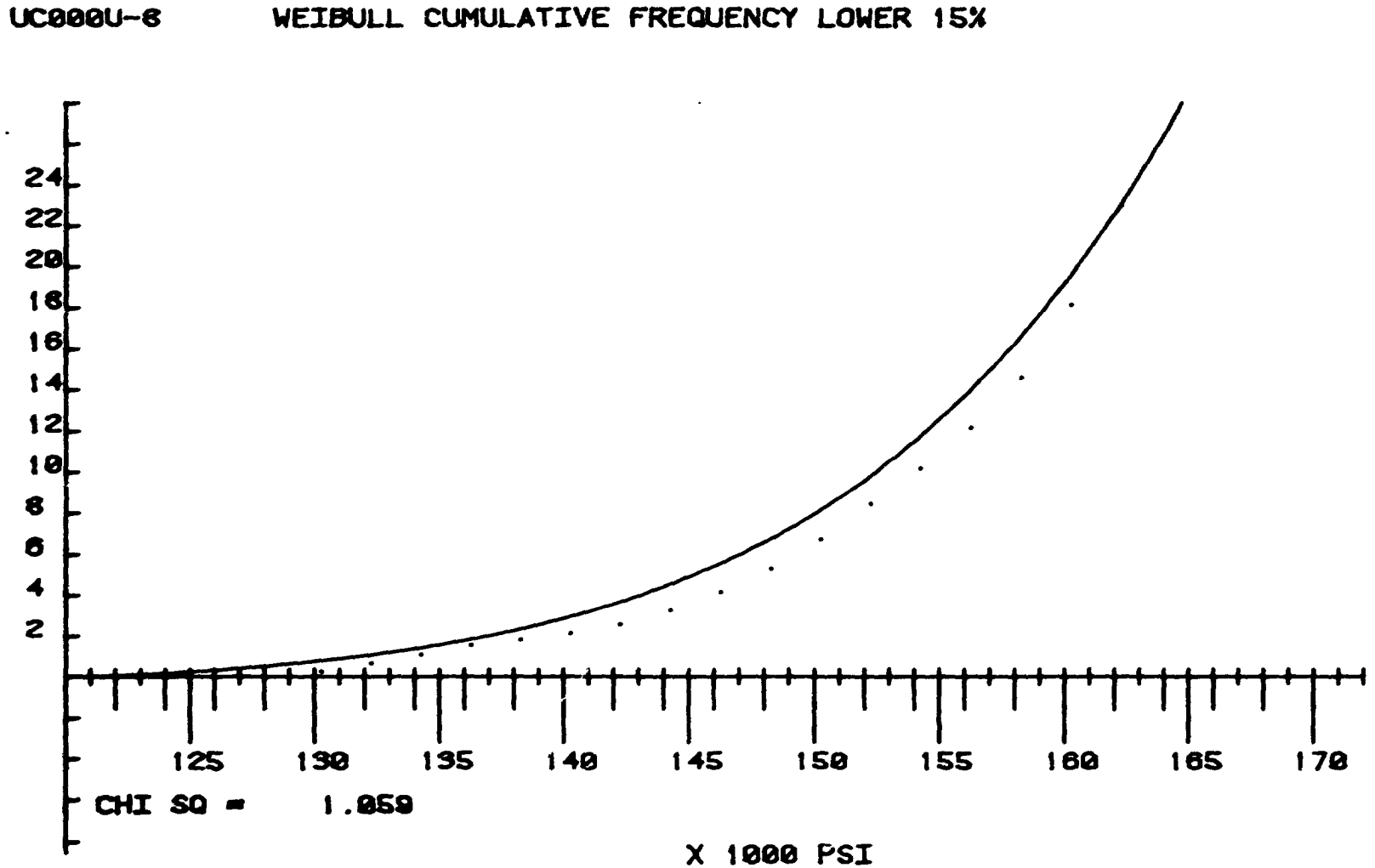

Figure E37. Weibull Union Carbide Tension 8-ply Unidirectional

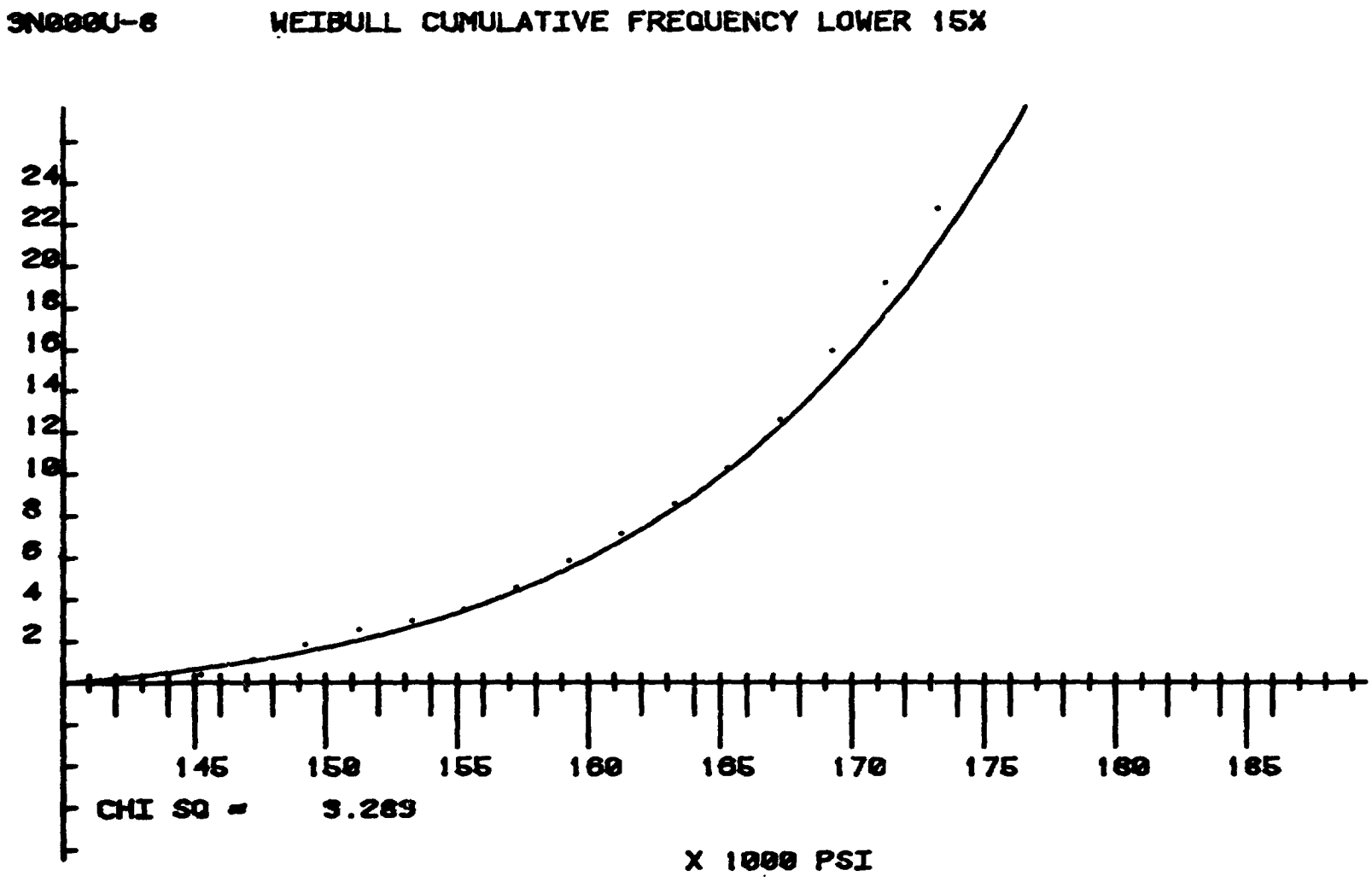

Figure E38. Weibull Narmco Task 3 Tension 8-ply Unidirectional

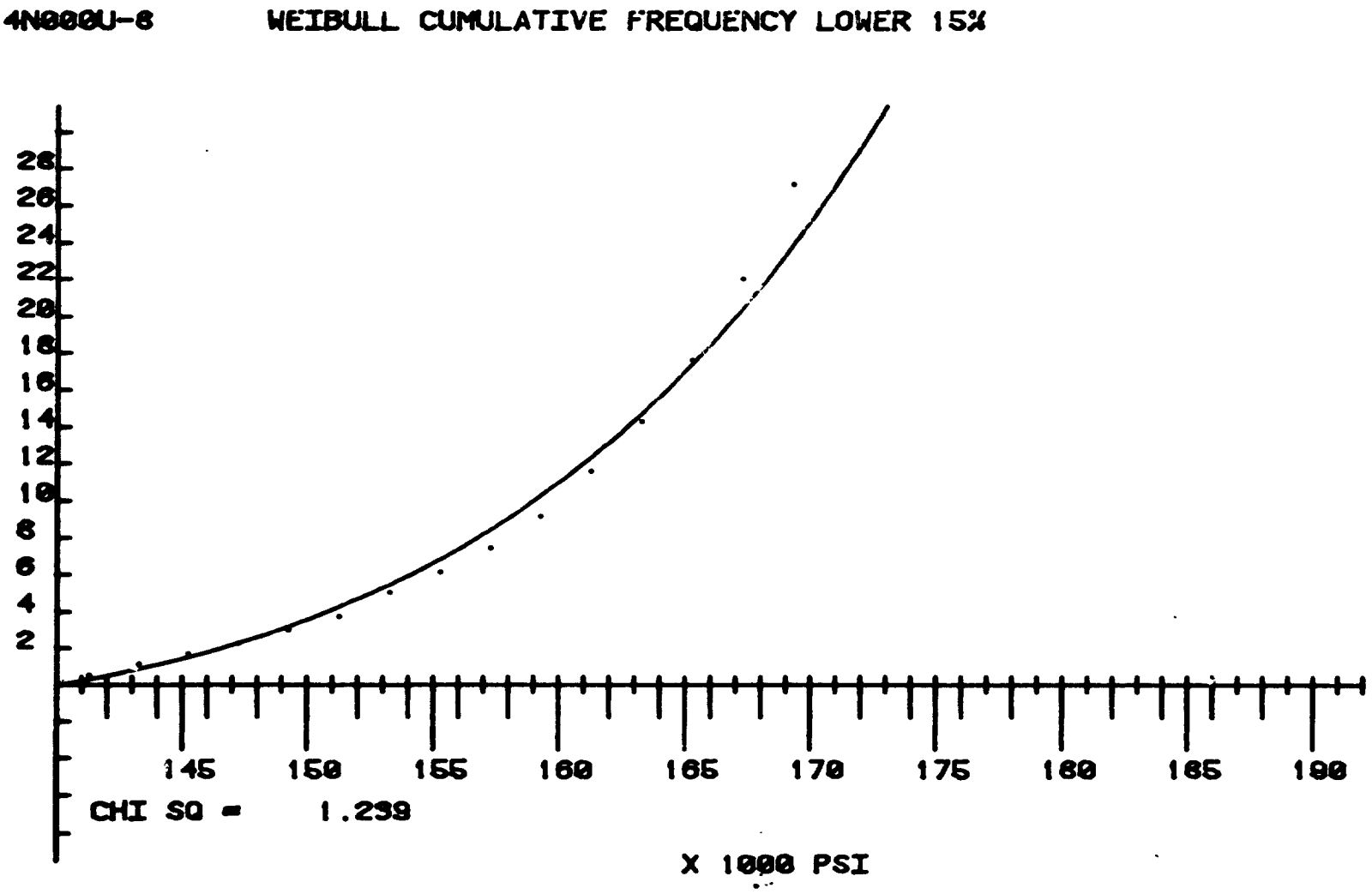

Figure E39. Weibull Narmco Task 4 Tension 8-ply Unidirectional

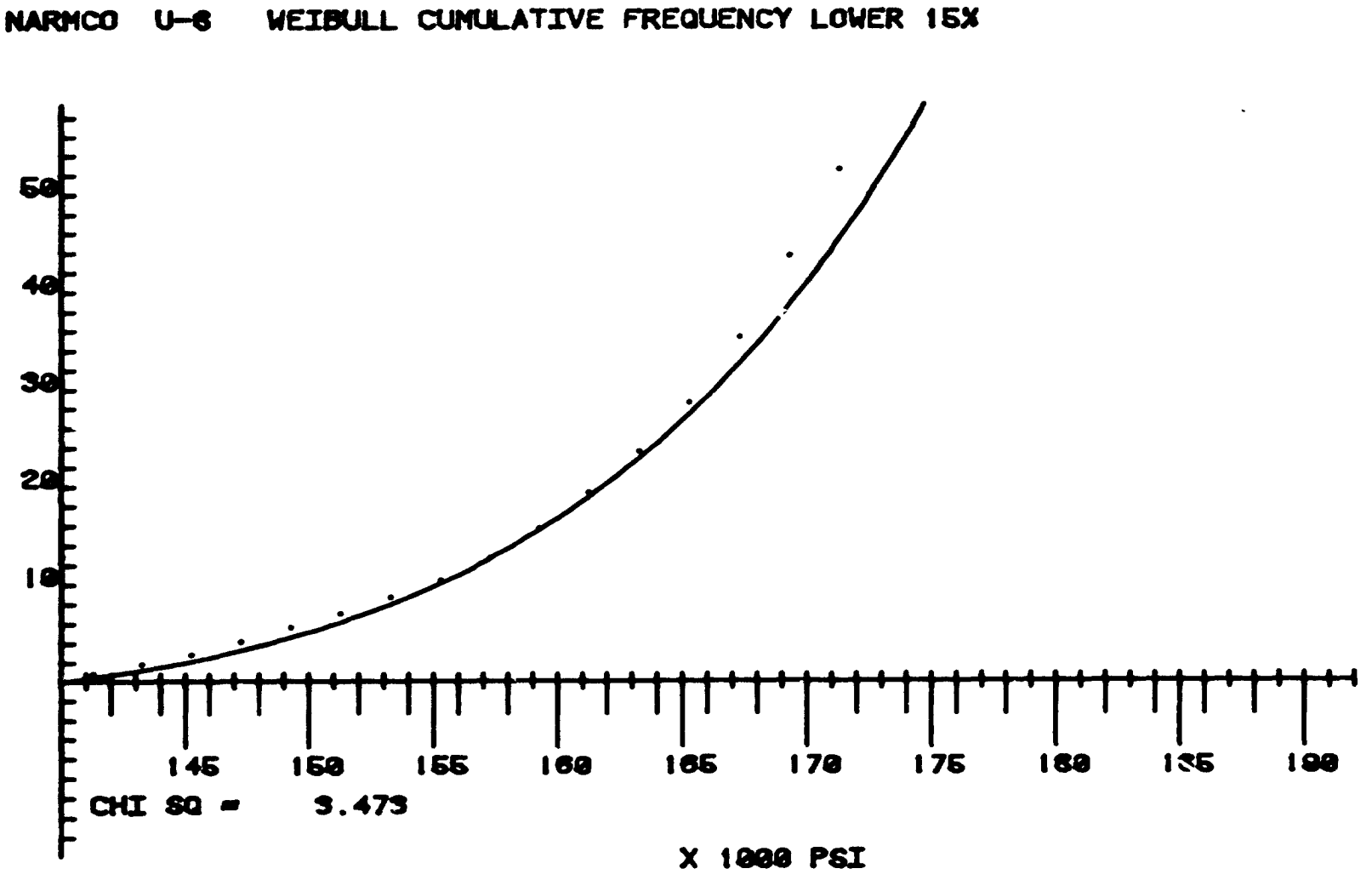

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Figure E40. Weibull Combined Narmco Task 3 and 4 Tension 8-ply Unidirectional

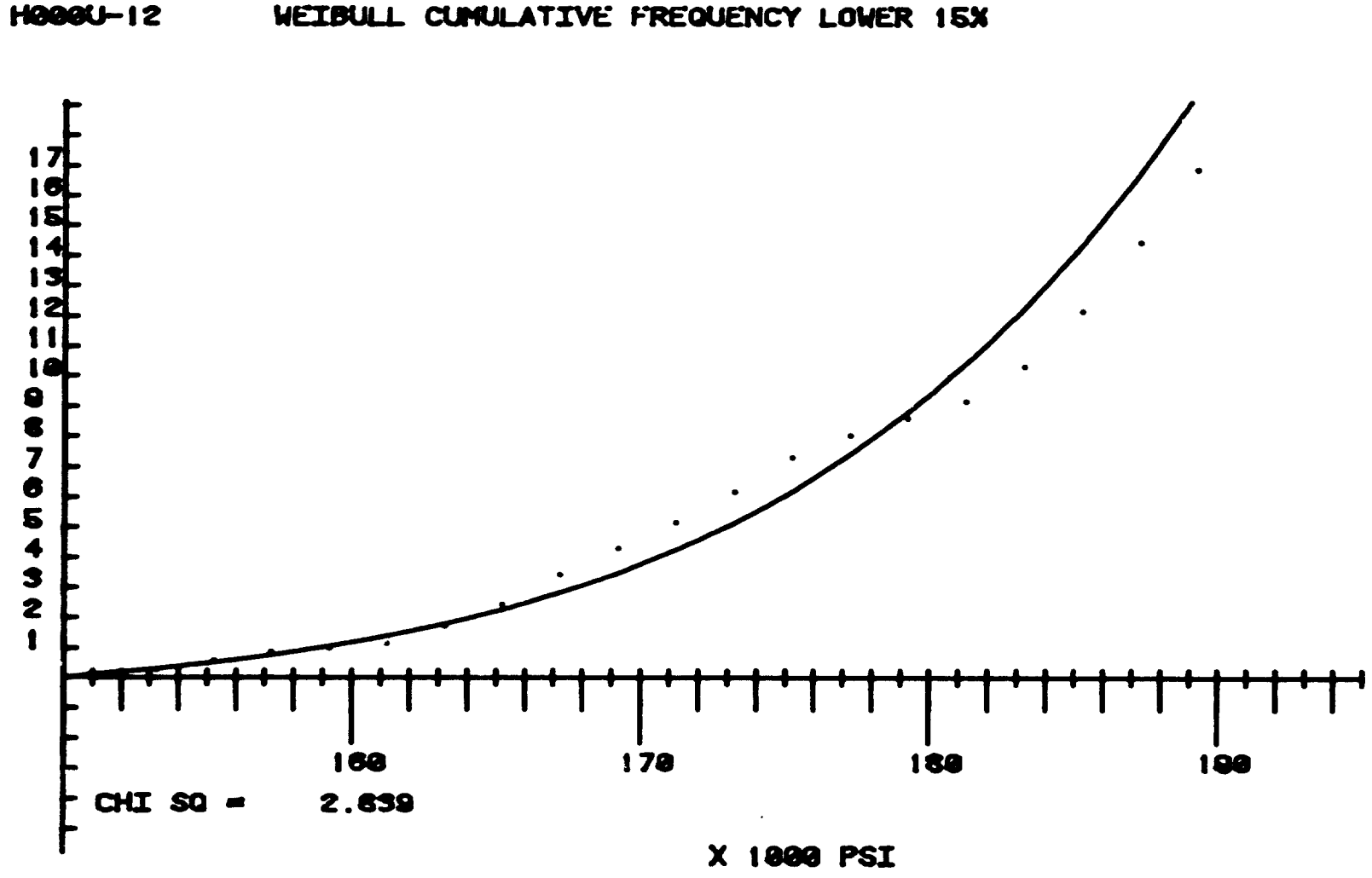

Figure E41. Weibull Hercules Tension 12-ply Unidirectional

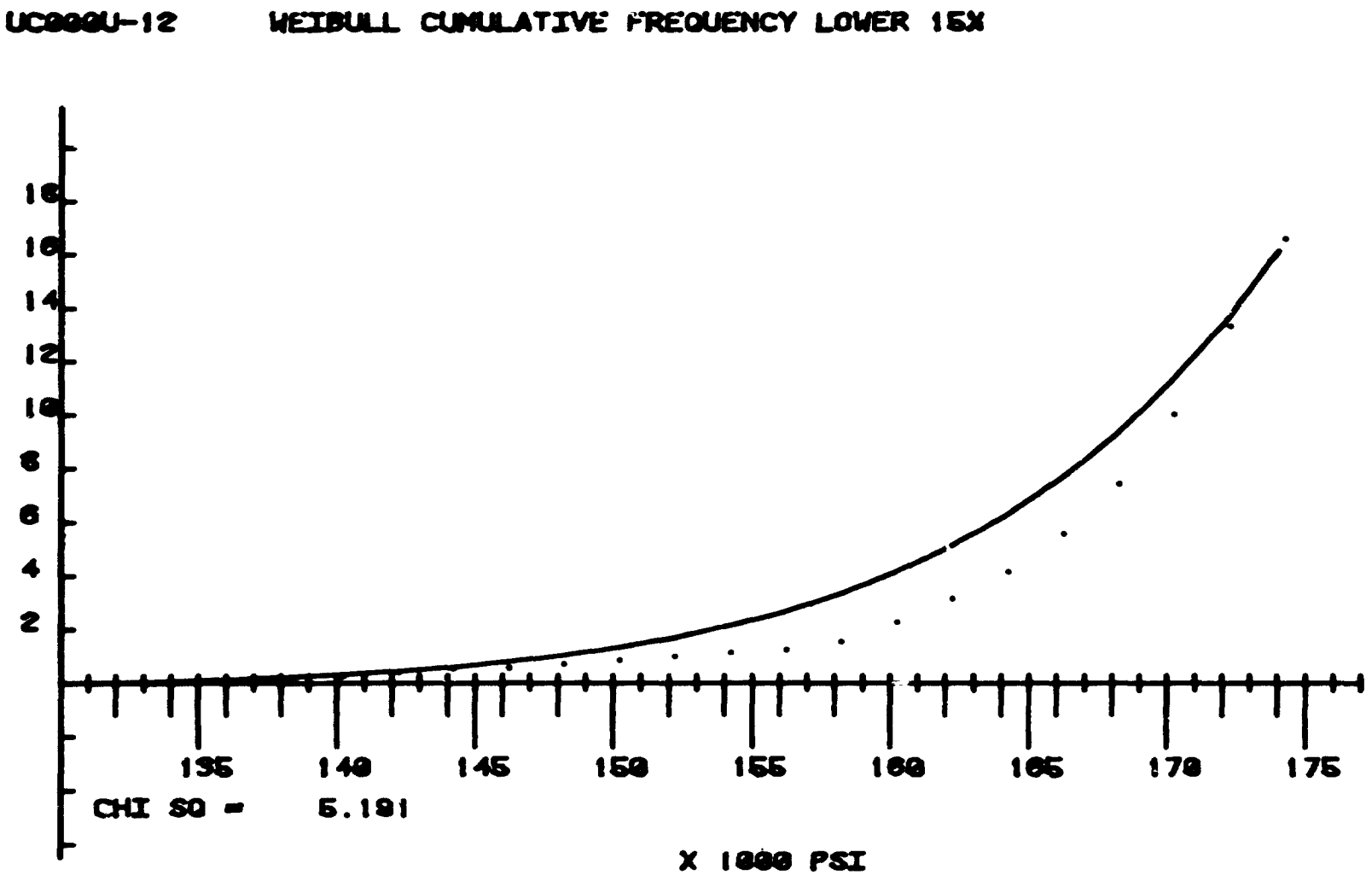

Figure E42. Weibull Union Carbide Tension 12-ply Unidirectional

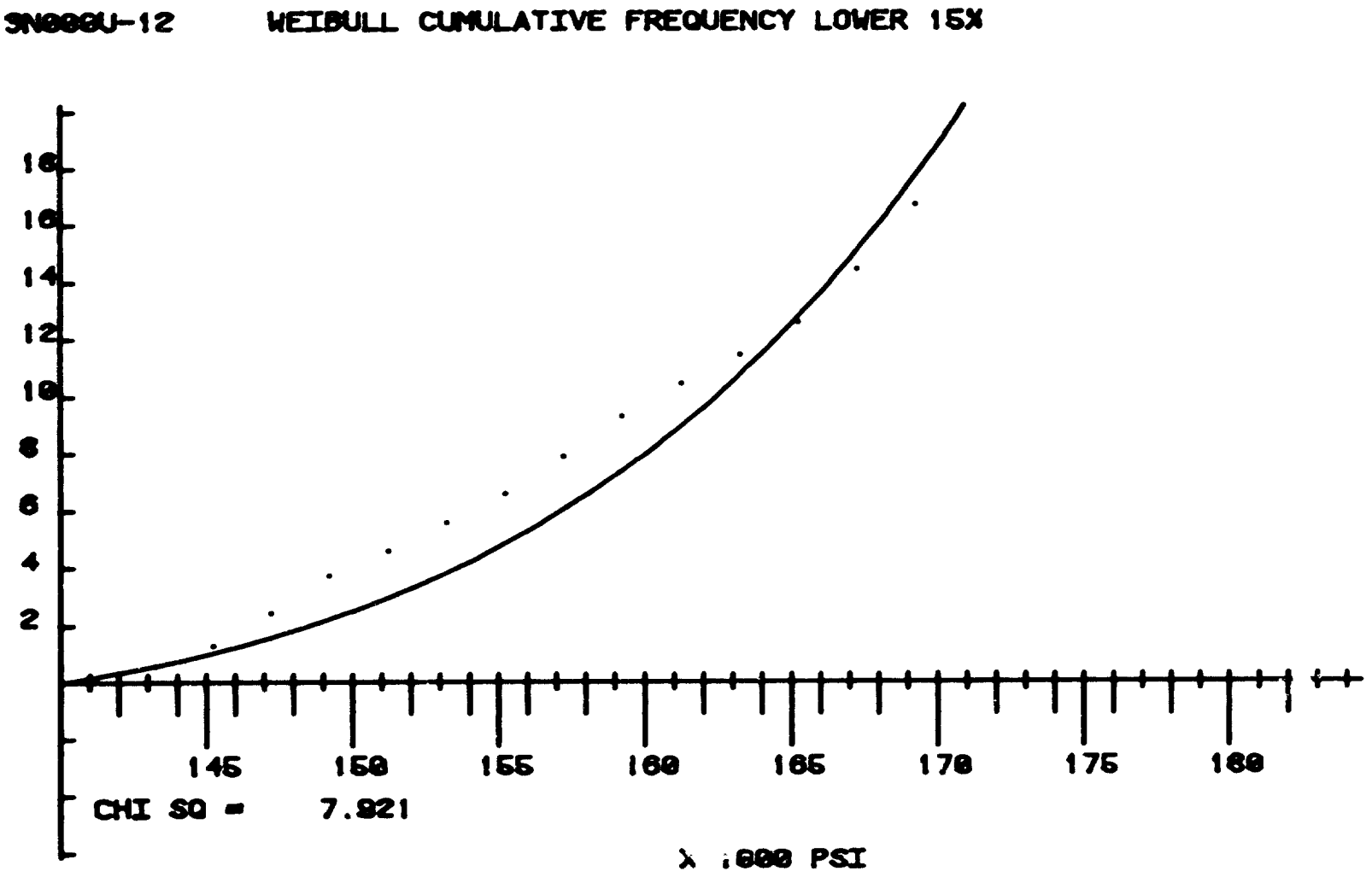

Figure E43. Weibull Narmco Task 3 Tension 12-ply Unidirectional

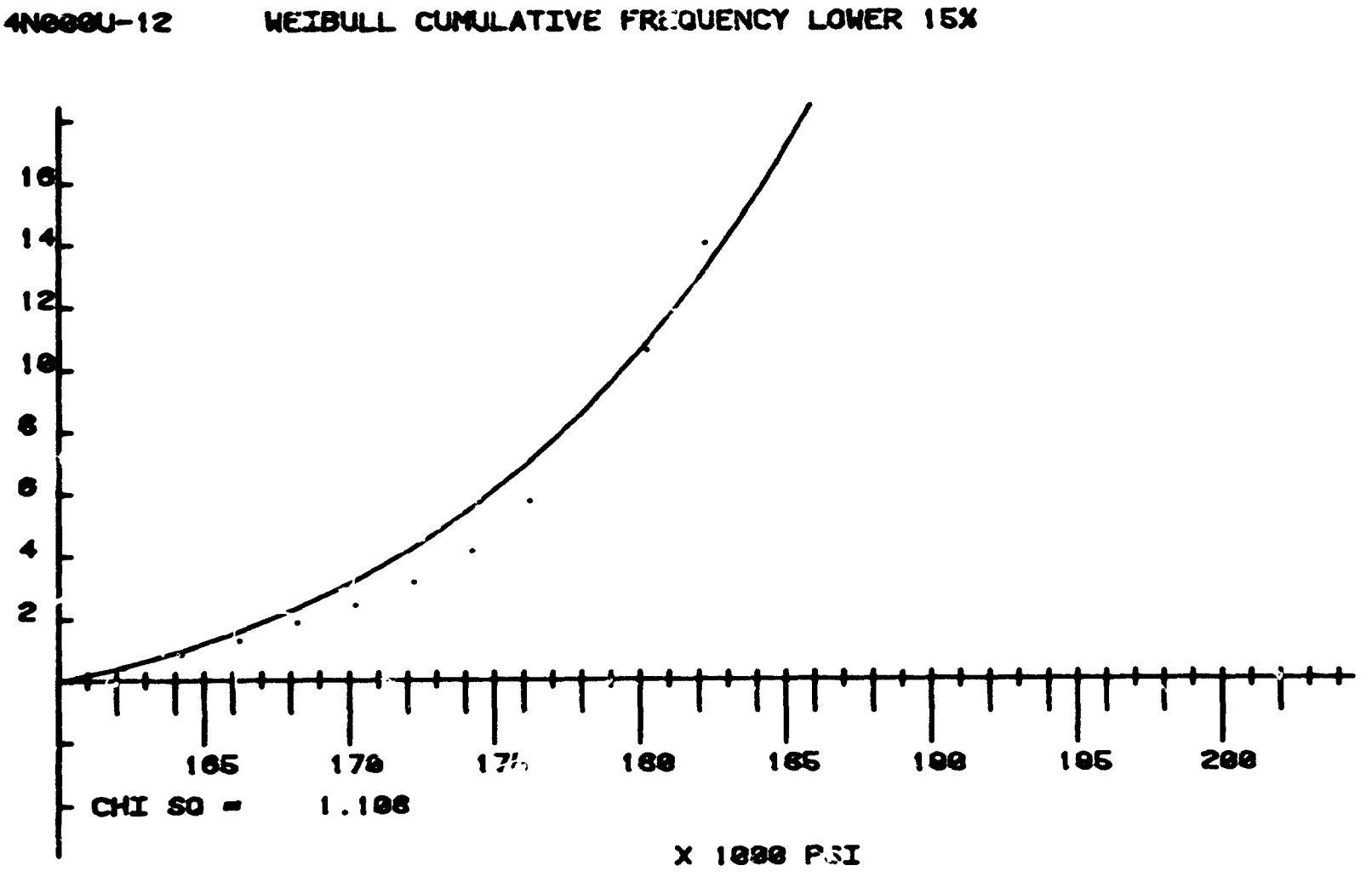

Figure E44. Weibull Narmco Task 4 Teusion 12-ply Unidirectional

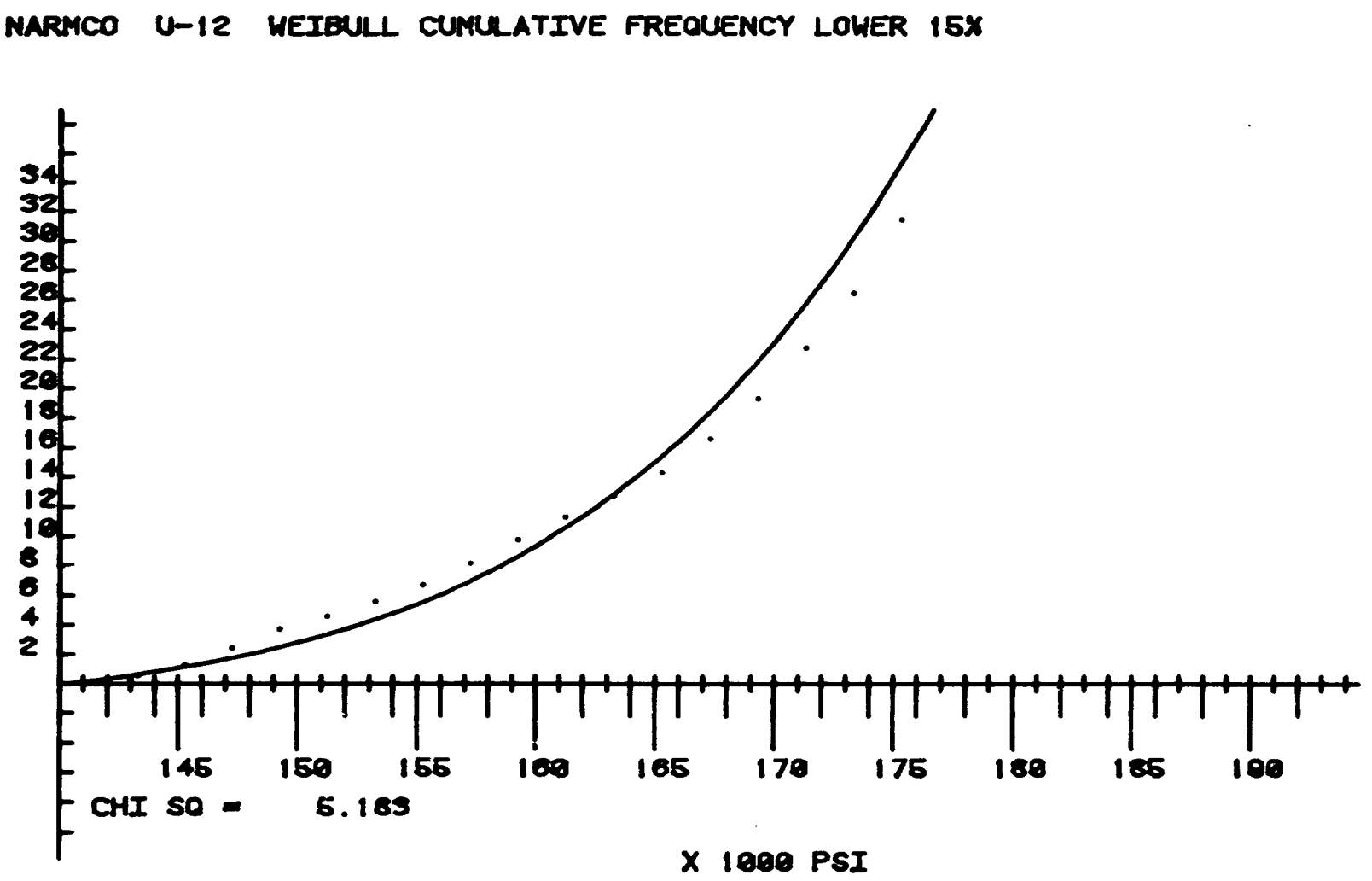

Figure E45. Weibull Combined Narmco Task 3 and 4 Tension 12-ply Unidirectional

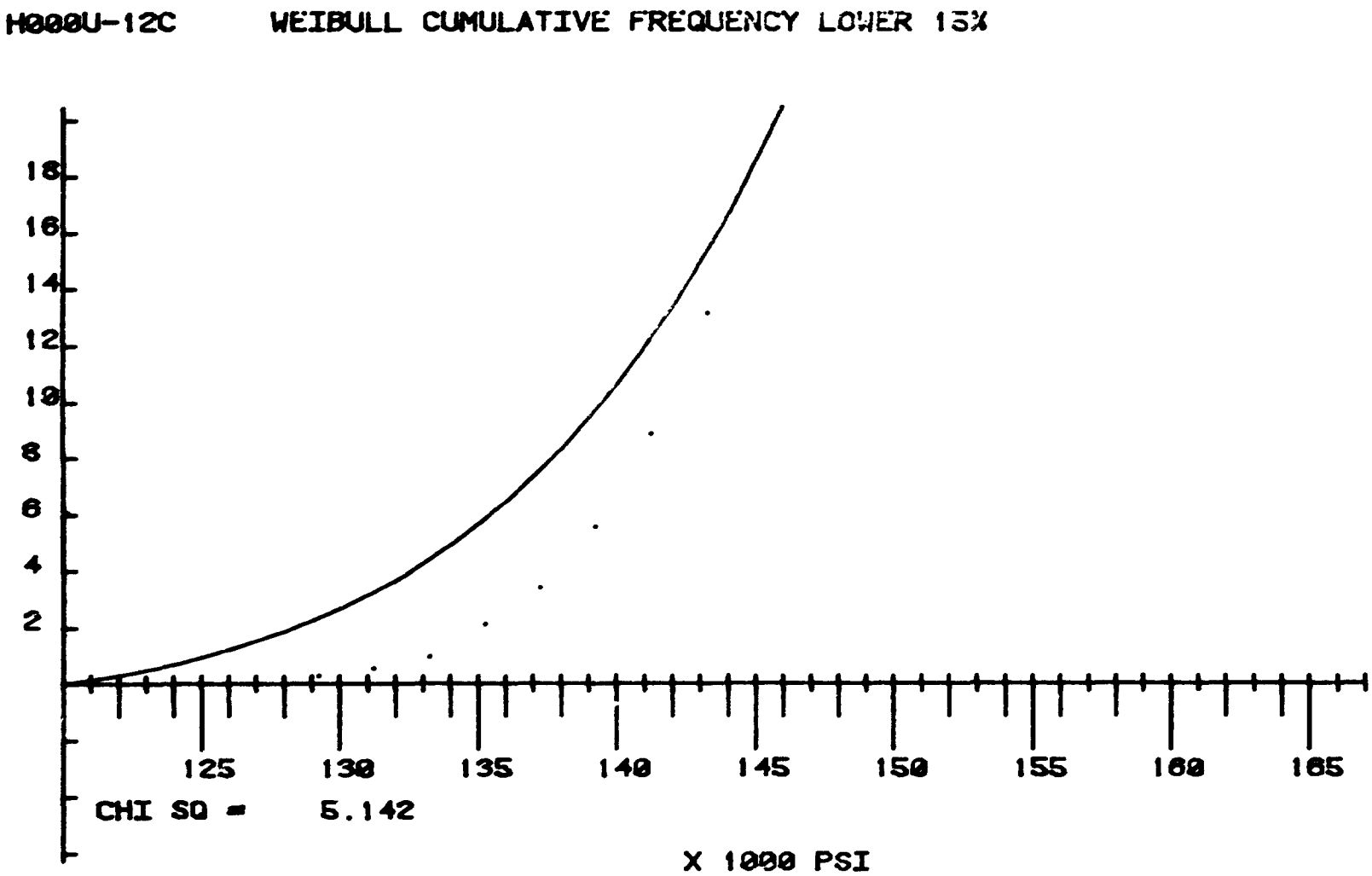

Figure E46. Weibull Hercules Compression 12-ply Unidirectional

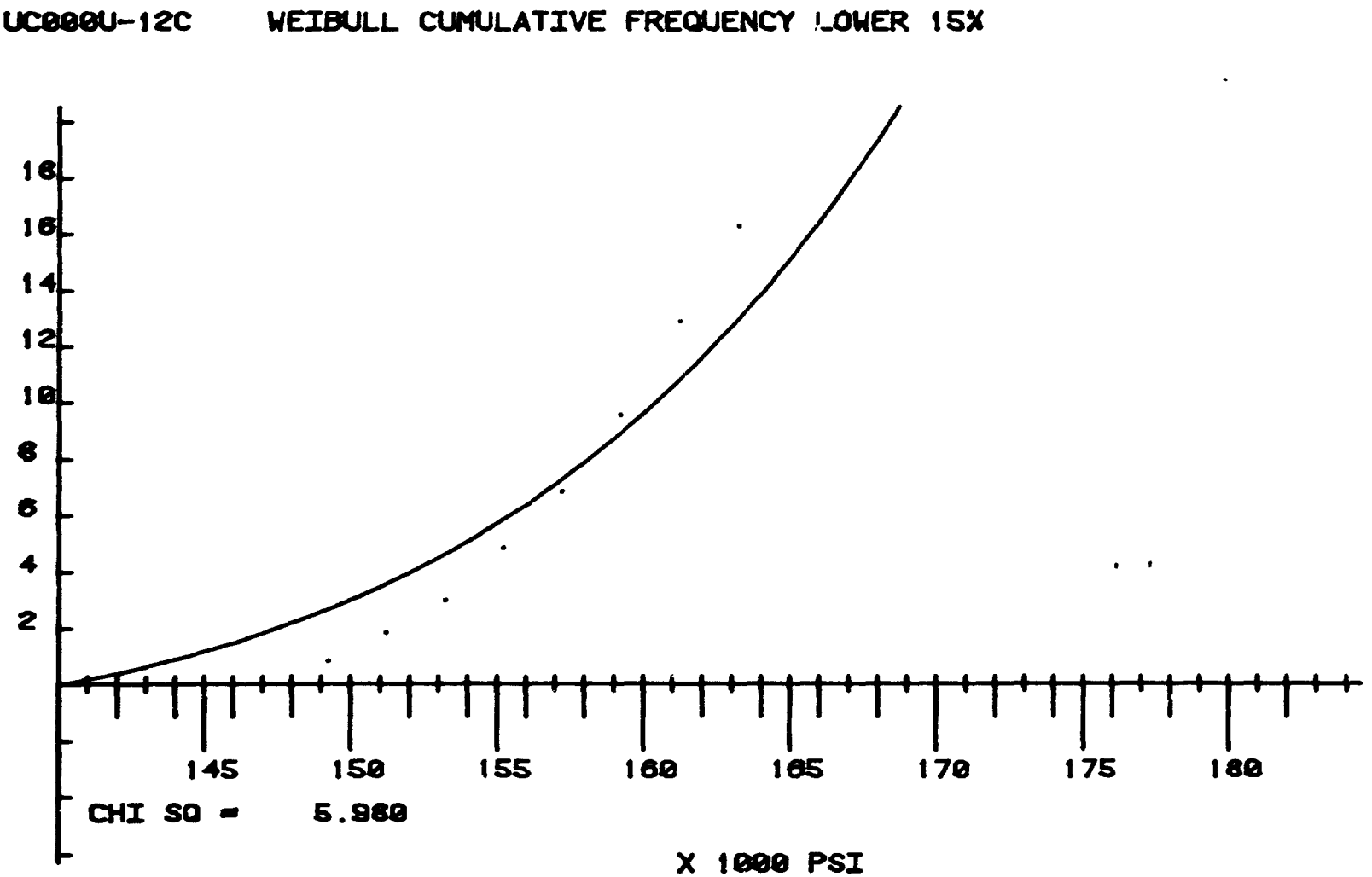

Figure E47. Weibull Union Carbide Compression 12-ply Unidirectional

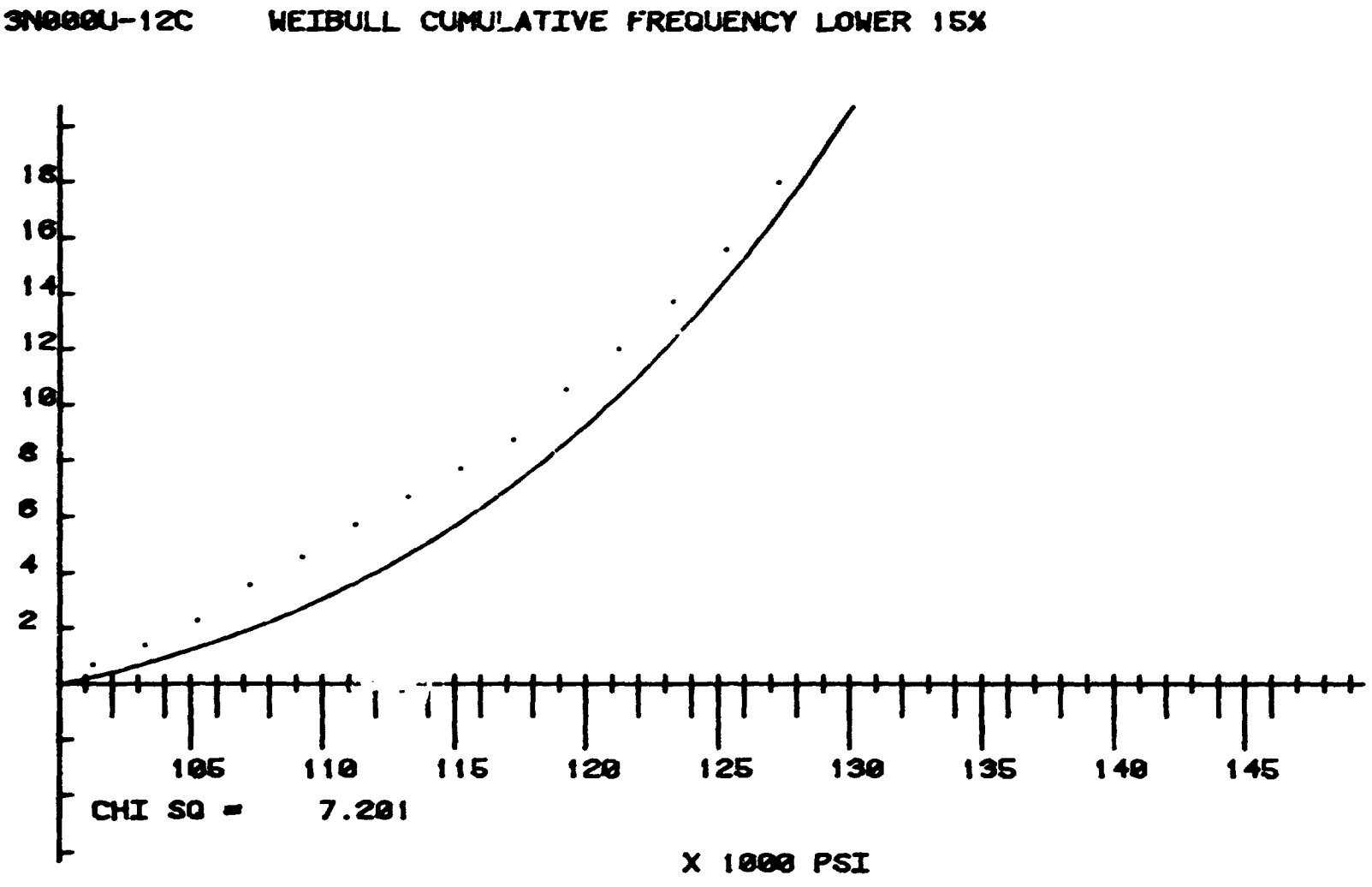

Figure E48. Weibull Narmco Task 3 Compression 12-ply Unidirectional

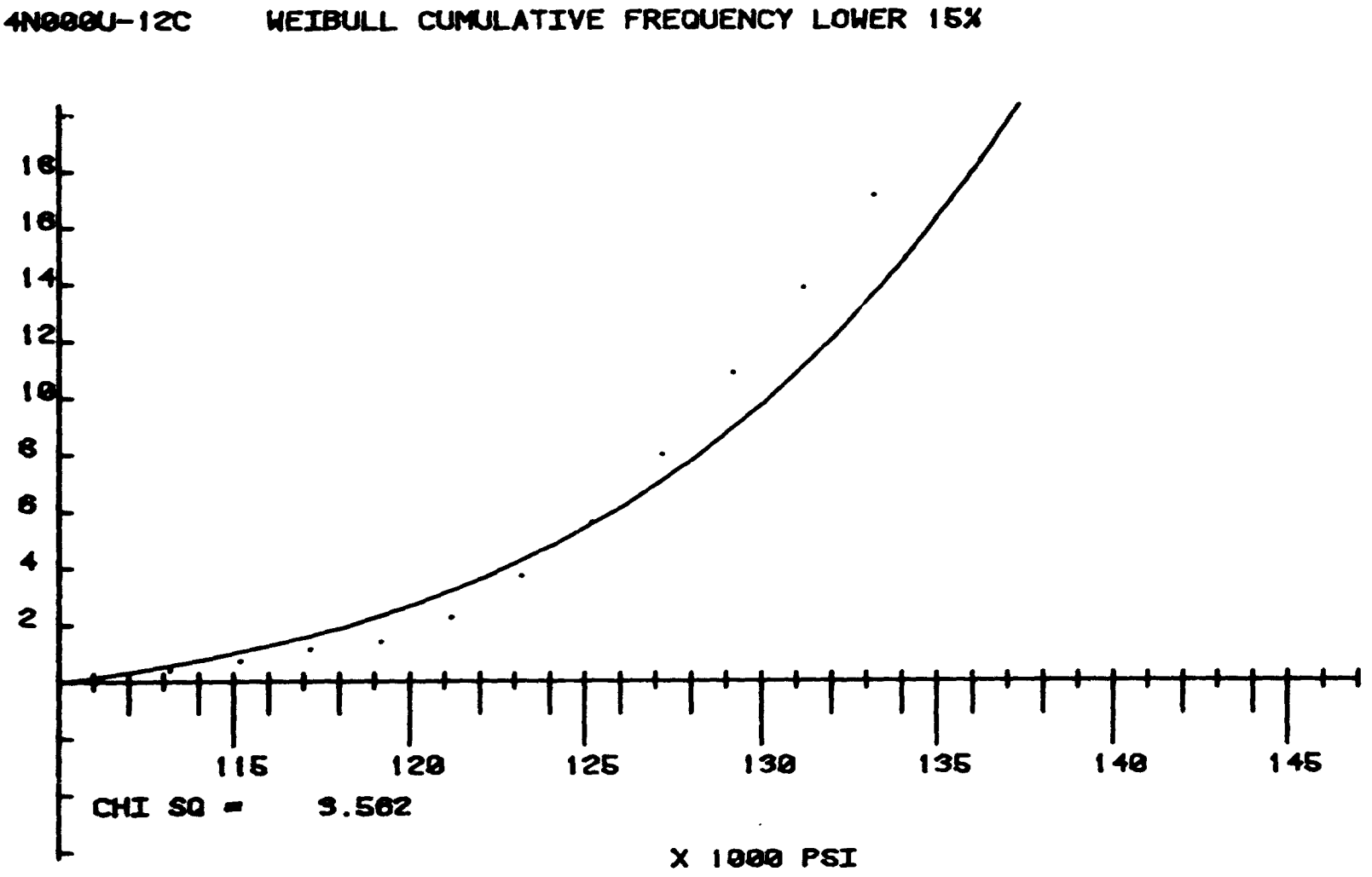

Figure E49. Weibull Narmco Task 4 Compression 12-ply Unidirectional

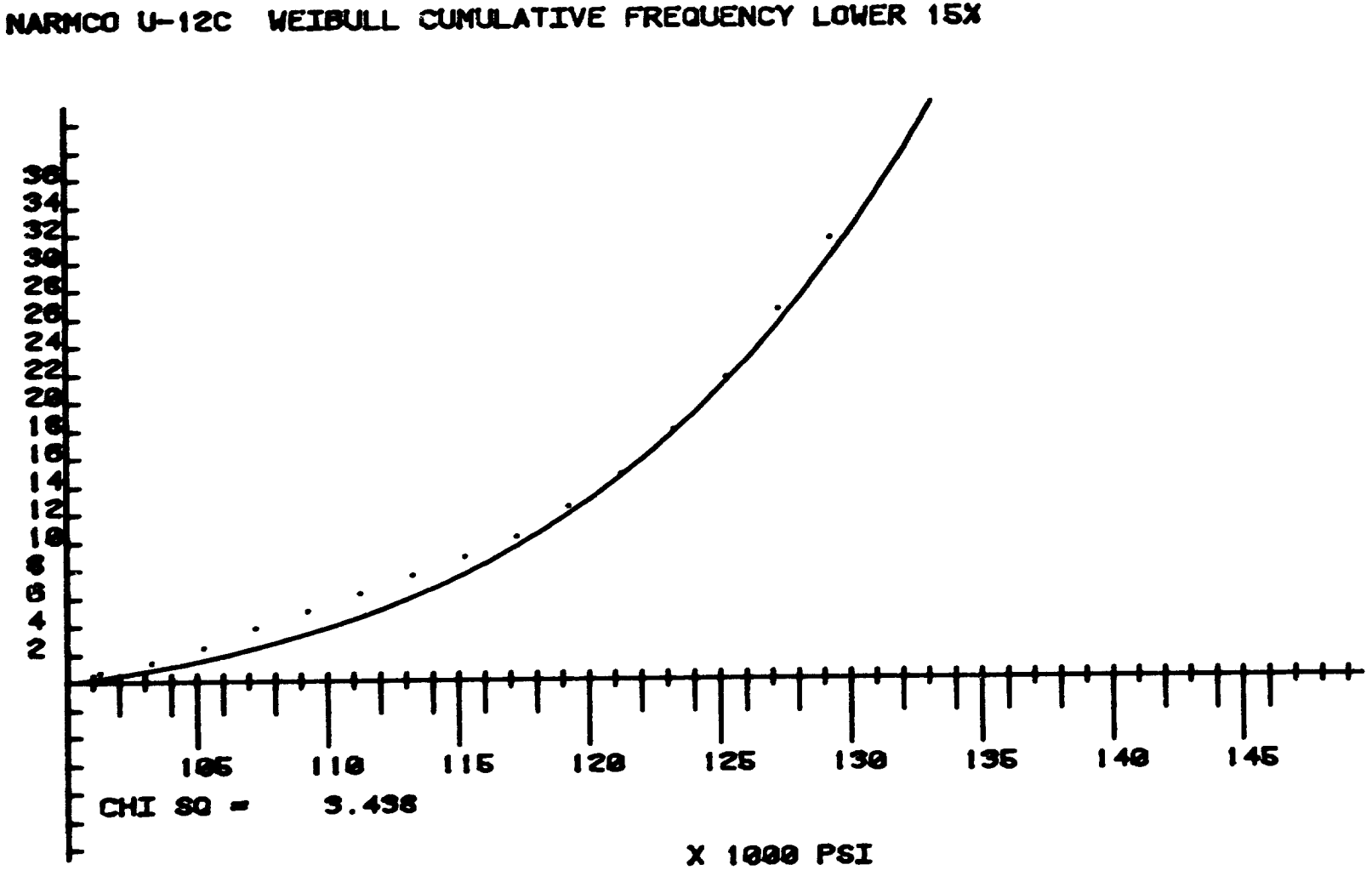

Figure E50. Weibull Combined Narmco Task 3 and 4 Compression 12-ply Unidirectional

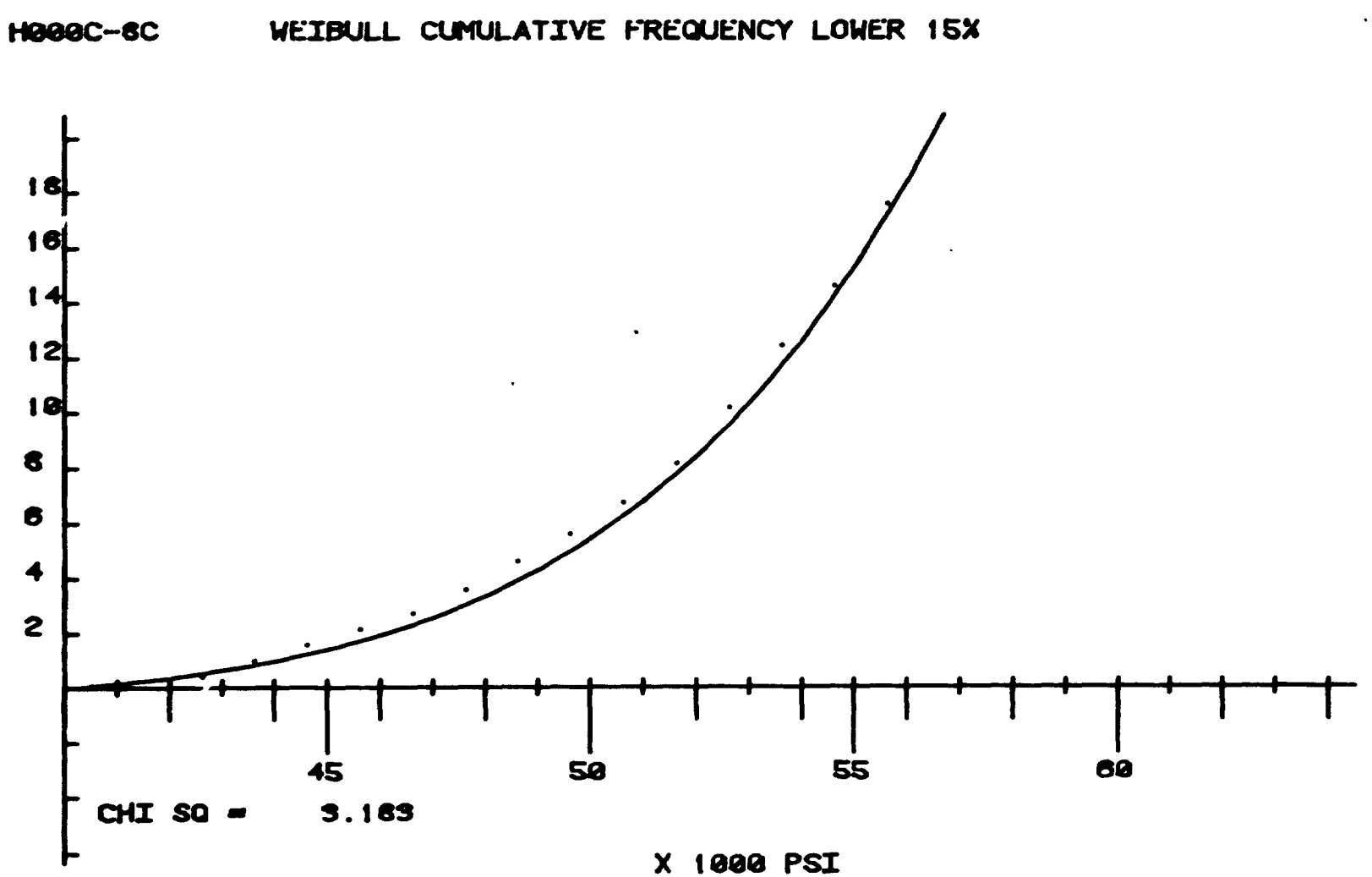

Figure E51. Weibull Hercules Compression 8-ply Crossply

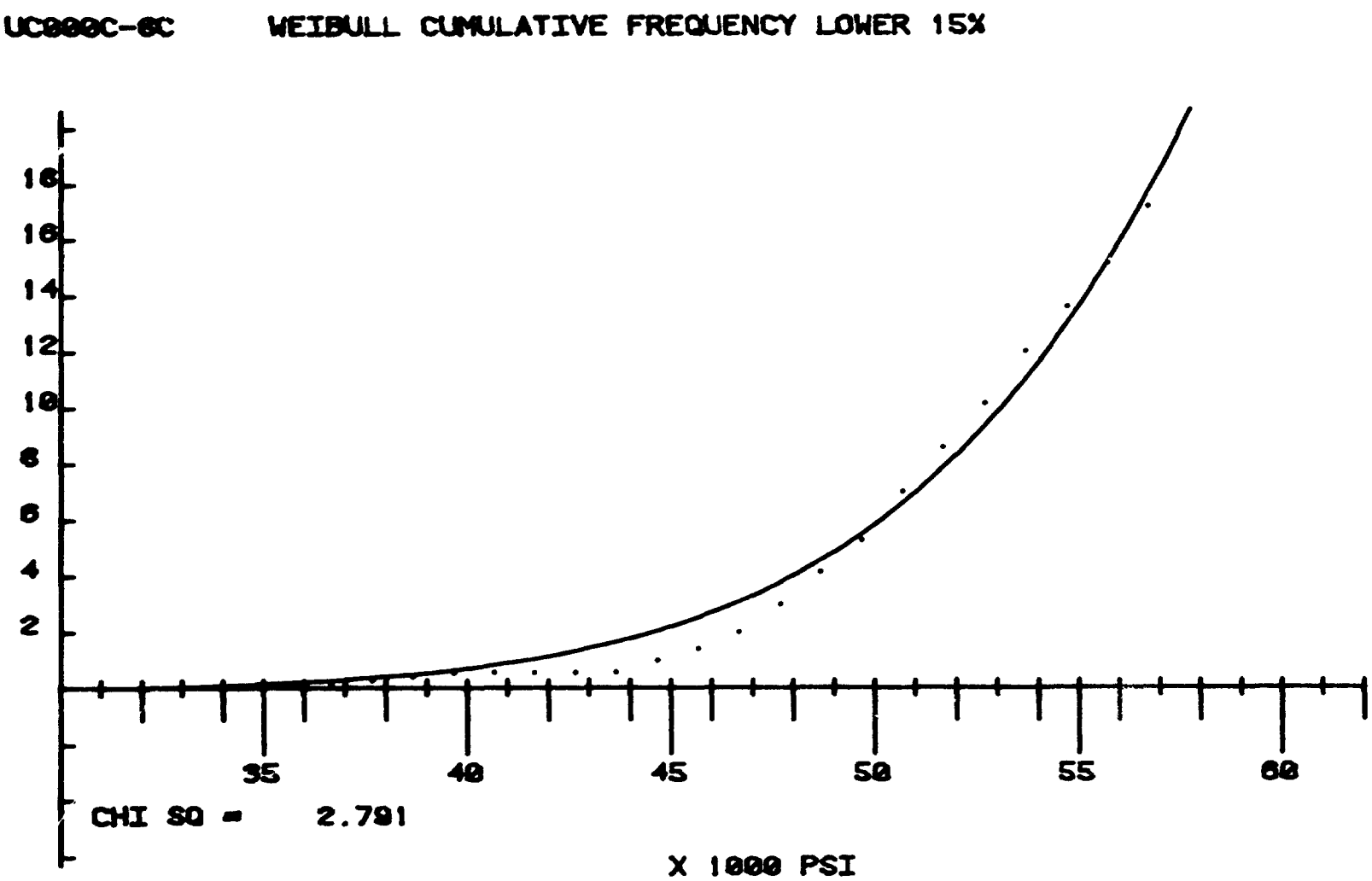

Figure E52. Weibull Union Carbide Compression 8-ply Crossply

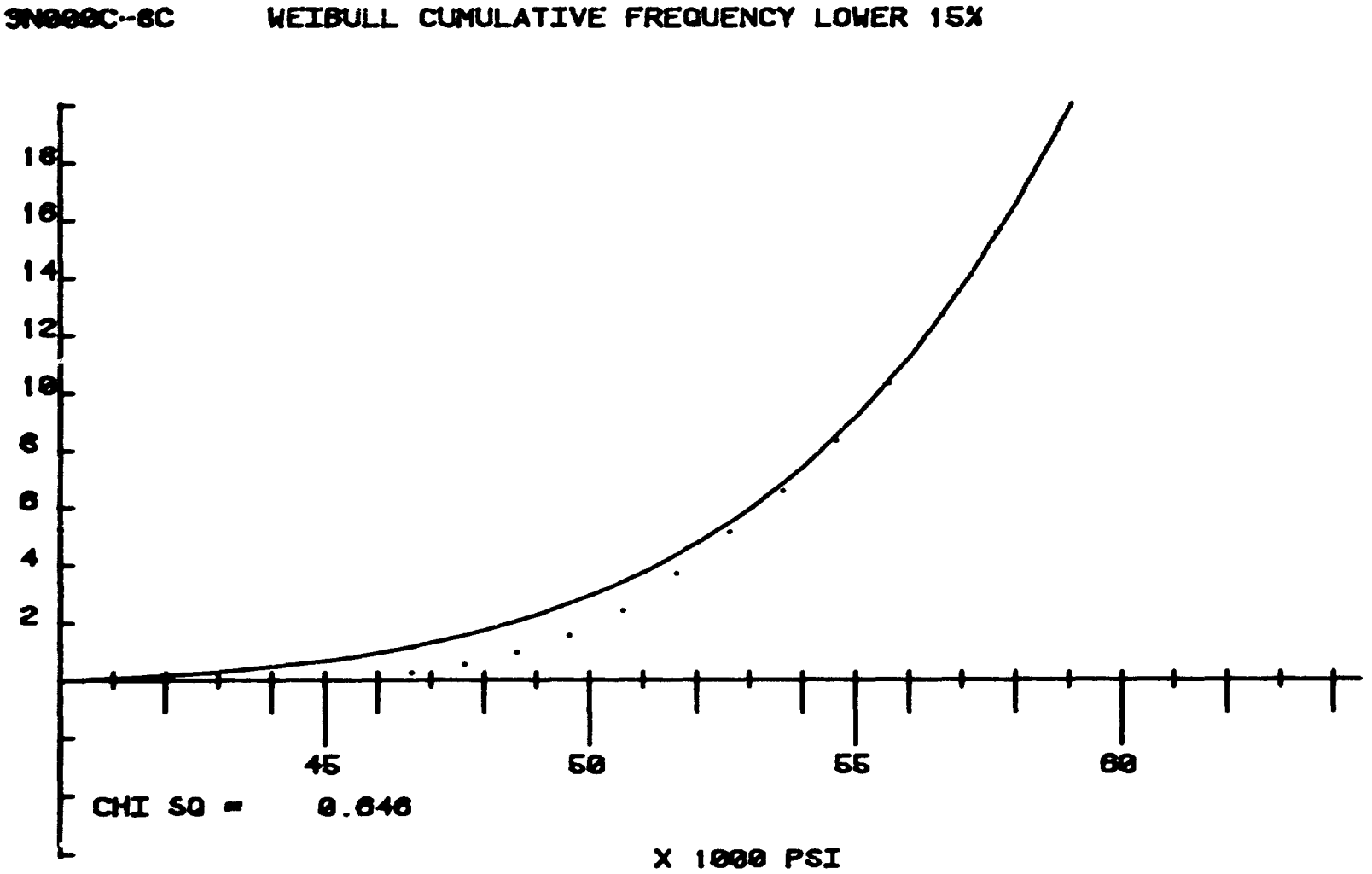

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Figure E53. Weibull Narmco Task 3 Compression 8-ply Crossply

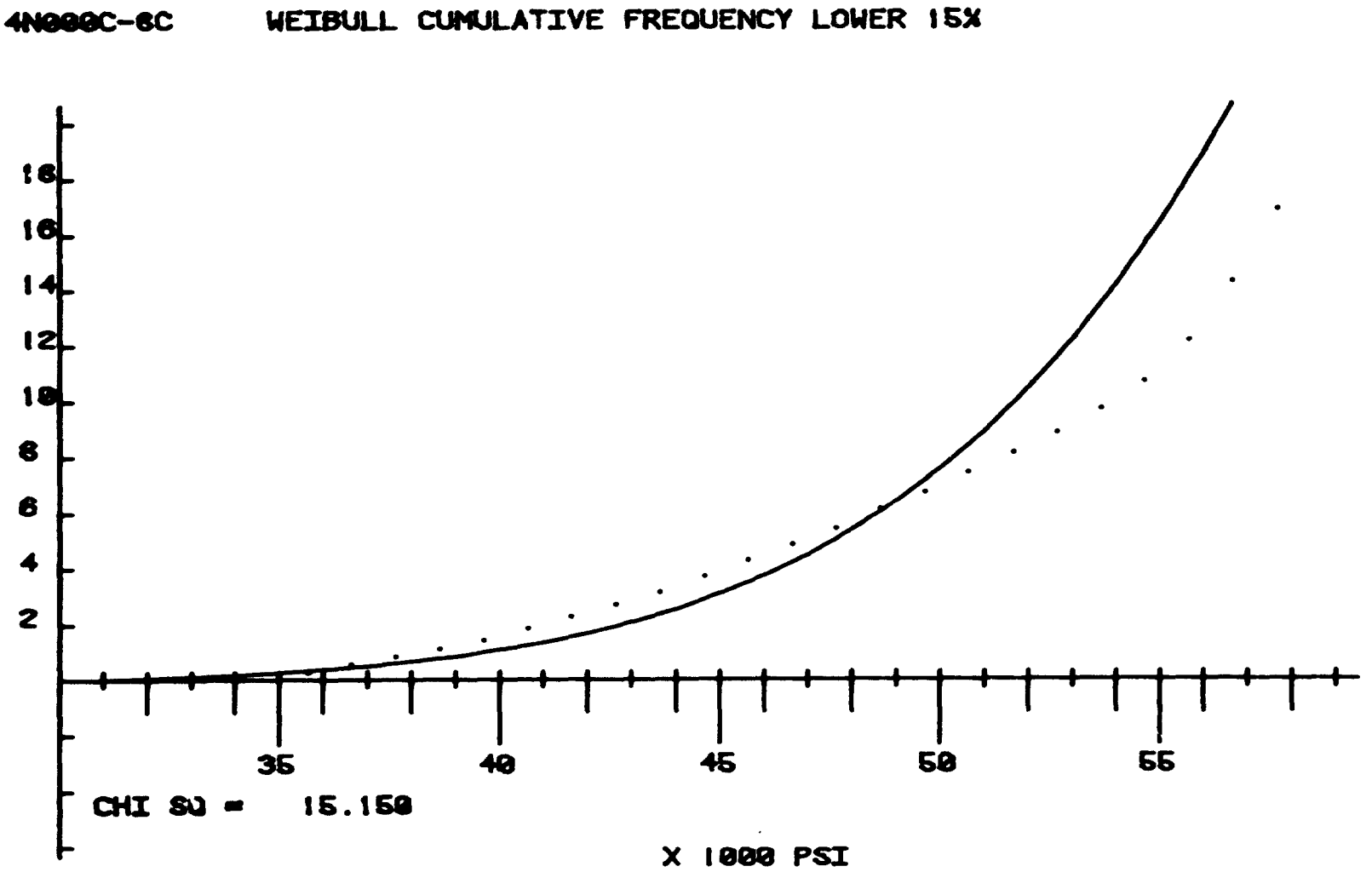


Figure E54. Weibull Narmco Task 4 Compression 8-ply Crossply

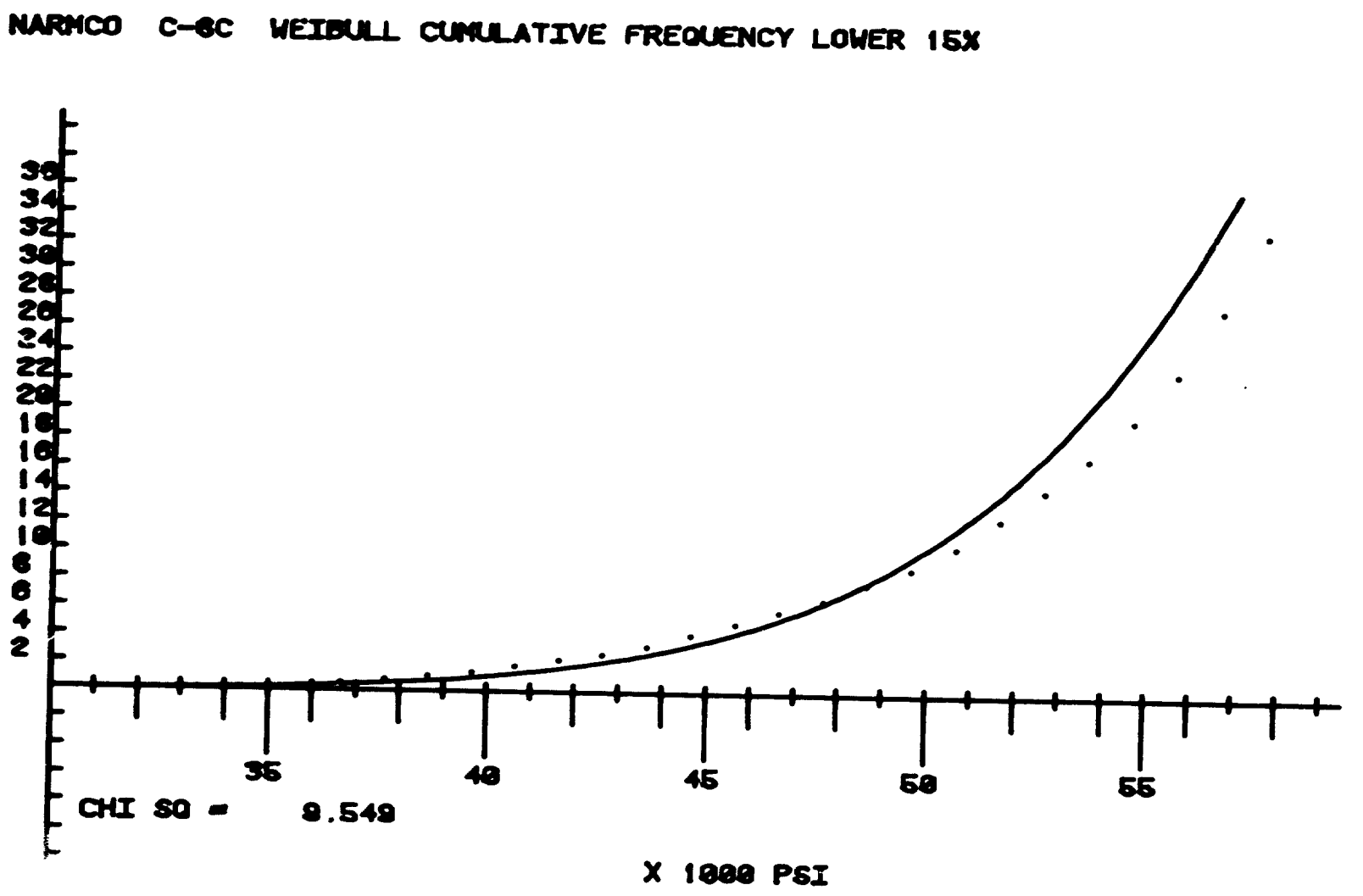
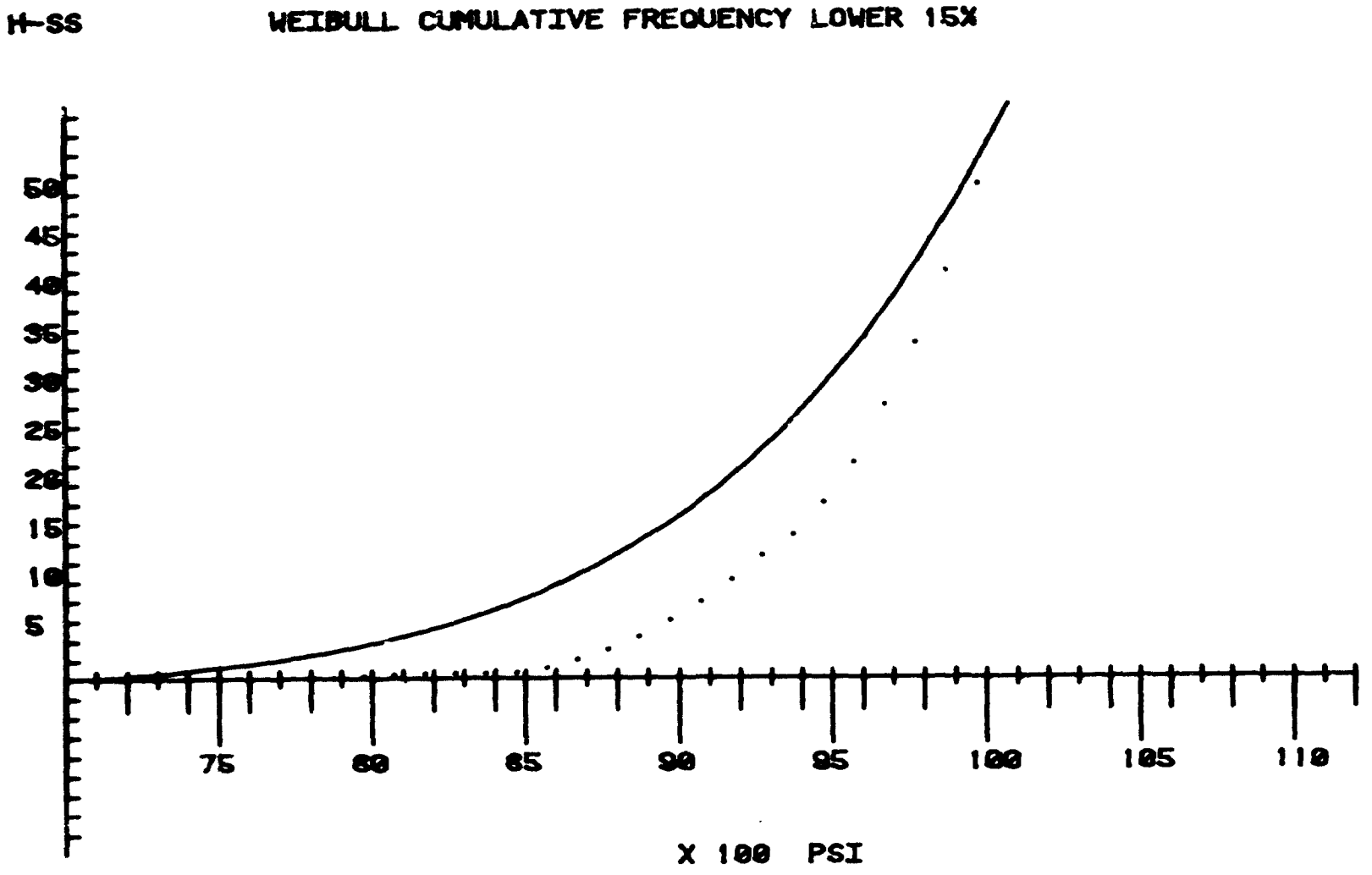


Figure E55. Weibull Combined Narmco Task 3 and 4 Compression 8-ply Crossply



E56

Figure E56. Weibull Hercules Short Beam Shear

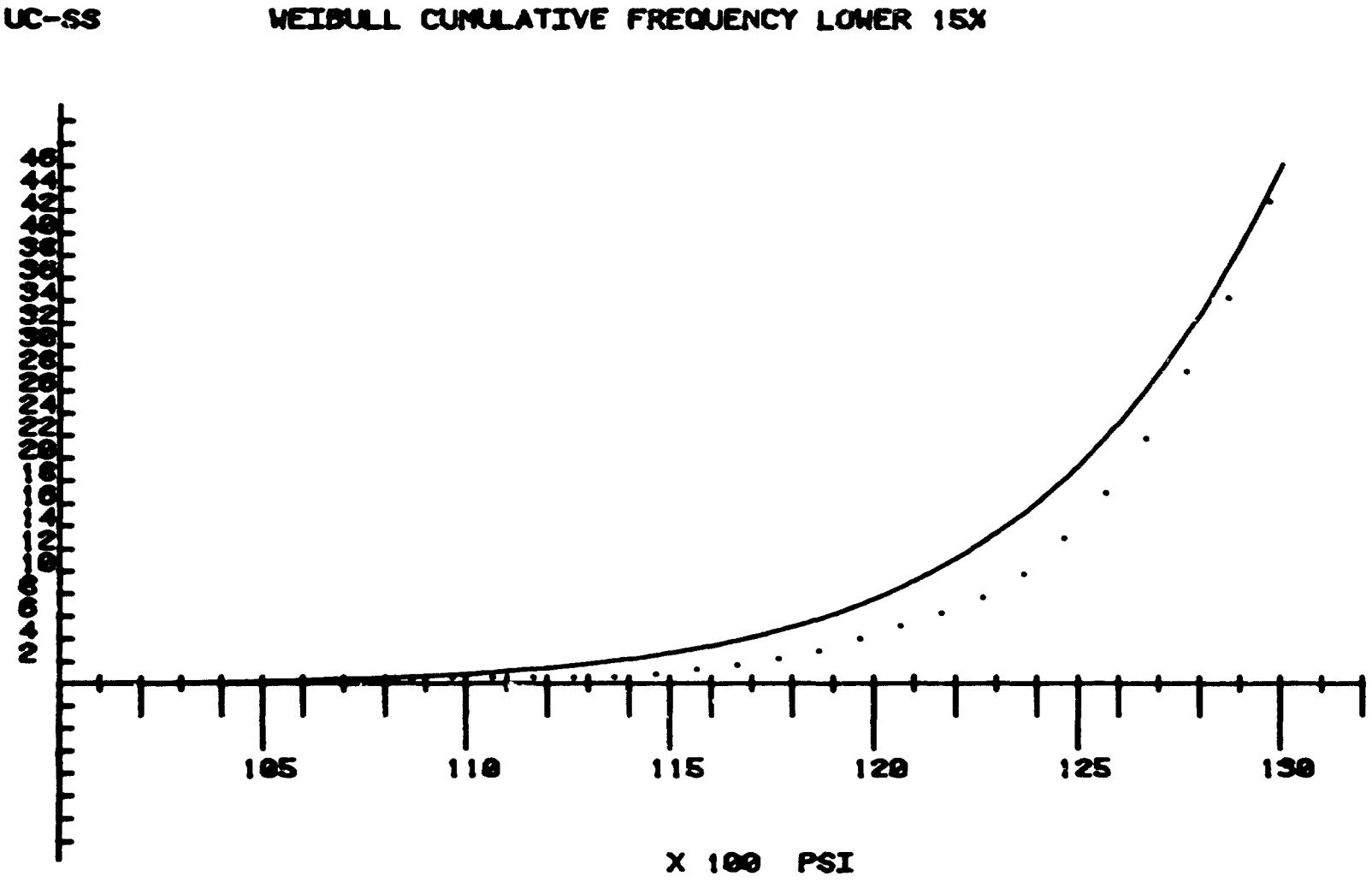


Figure E57. Weibull Union Carbide Short Beam Shear

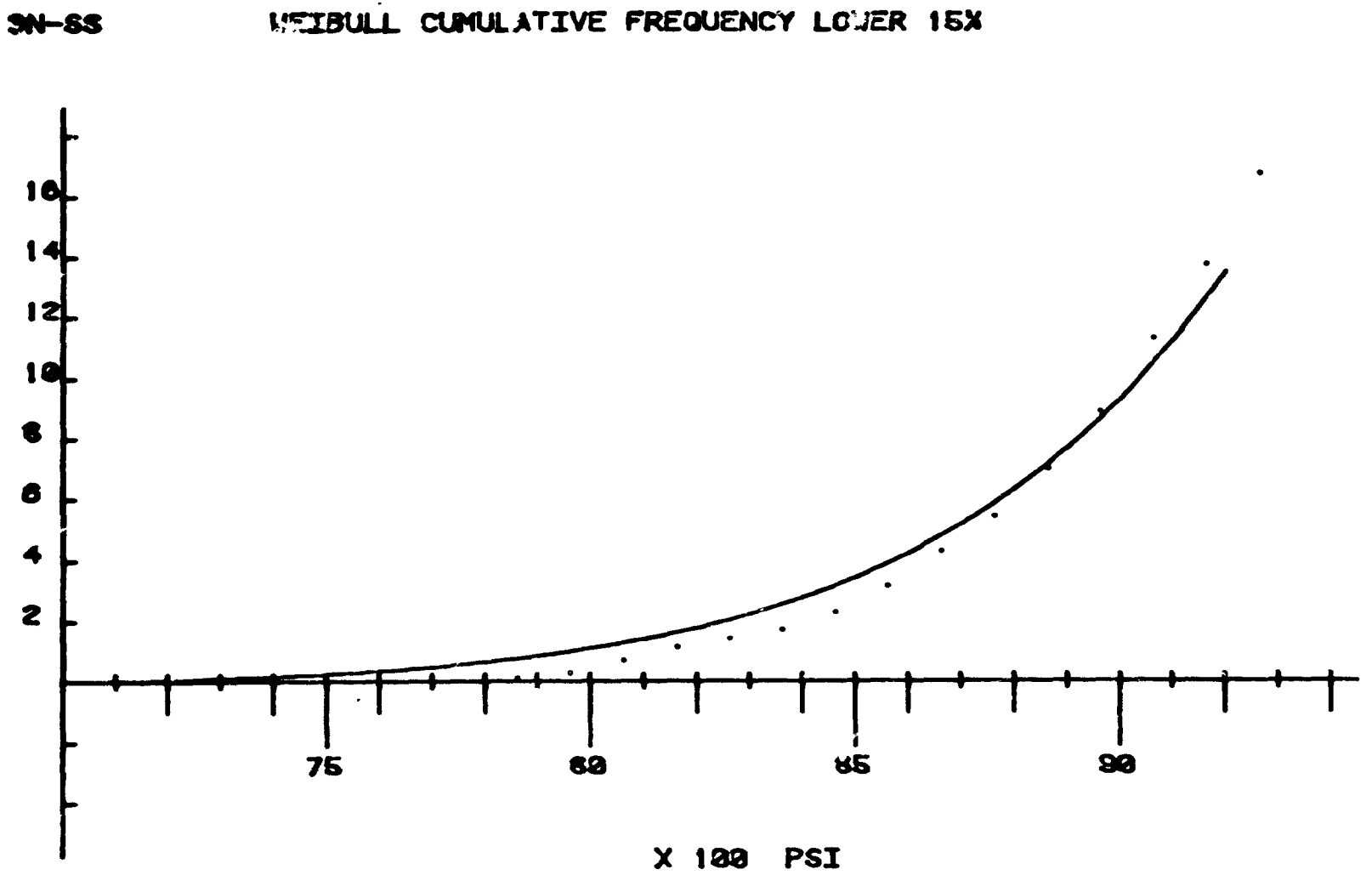


Figure E58. Weibull Narmco Task 3 Short Beam Shear

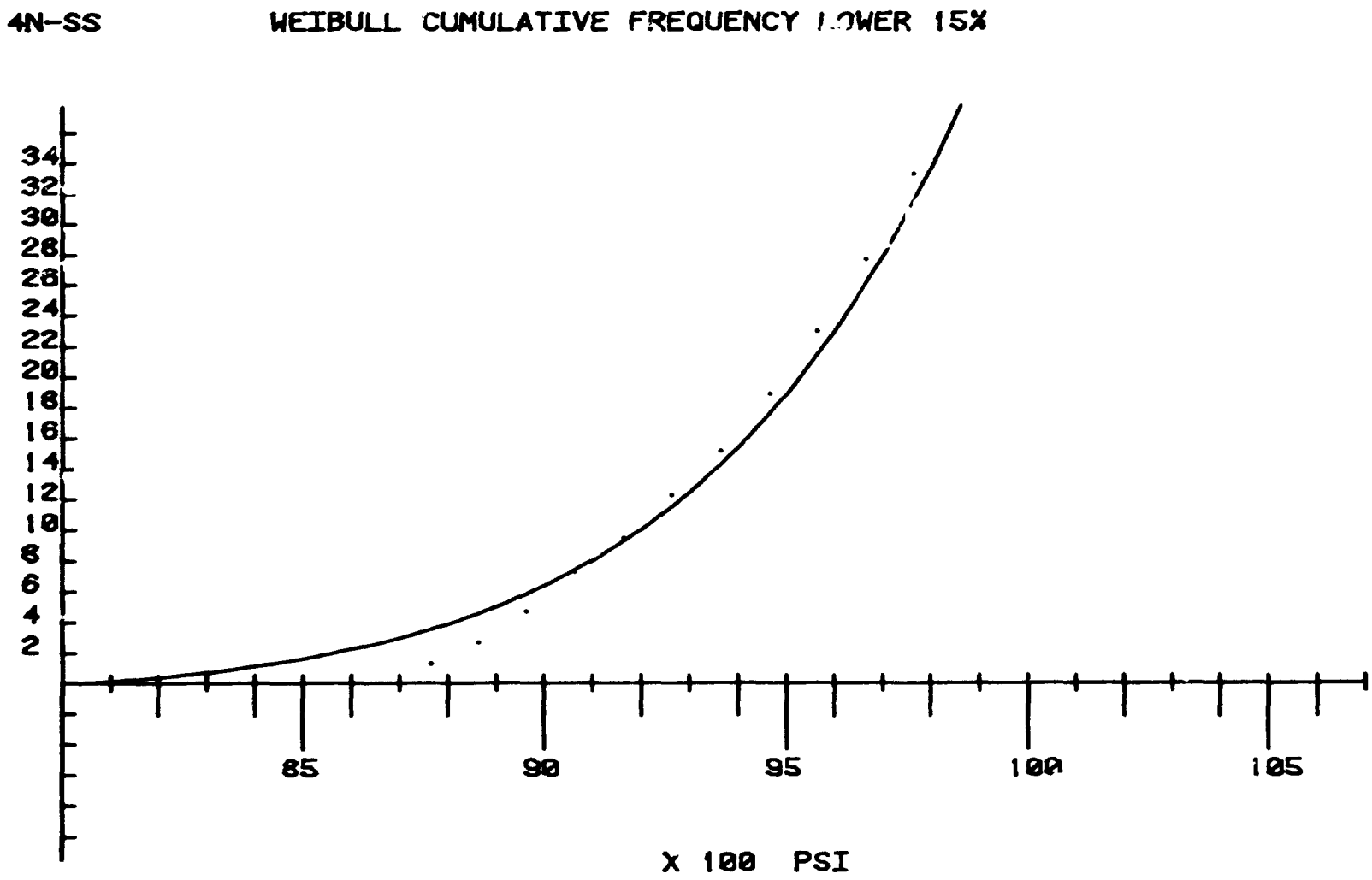


Figure E59. Weibull Narmco Task 4 Short Beam Shear

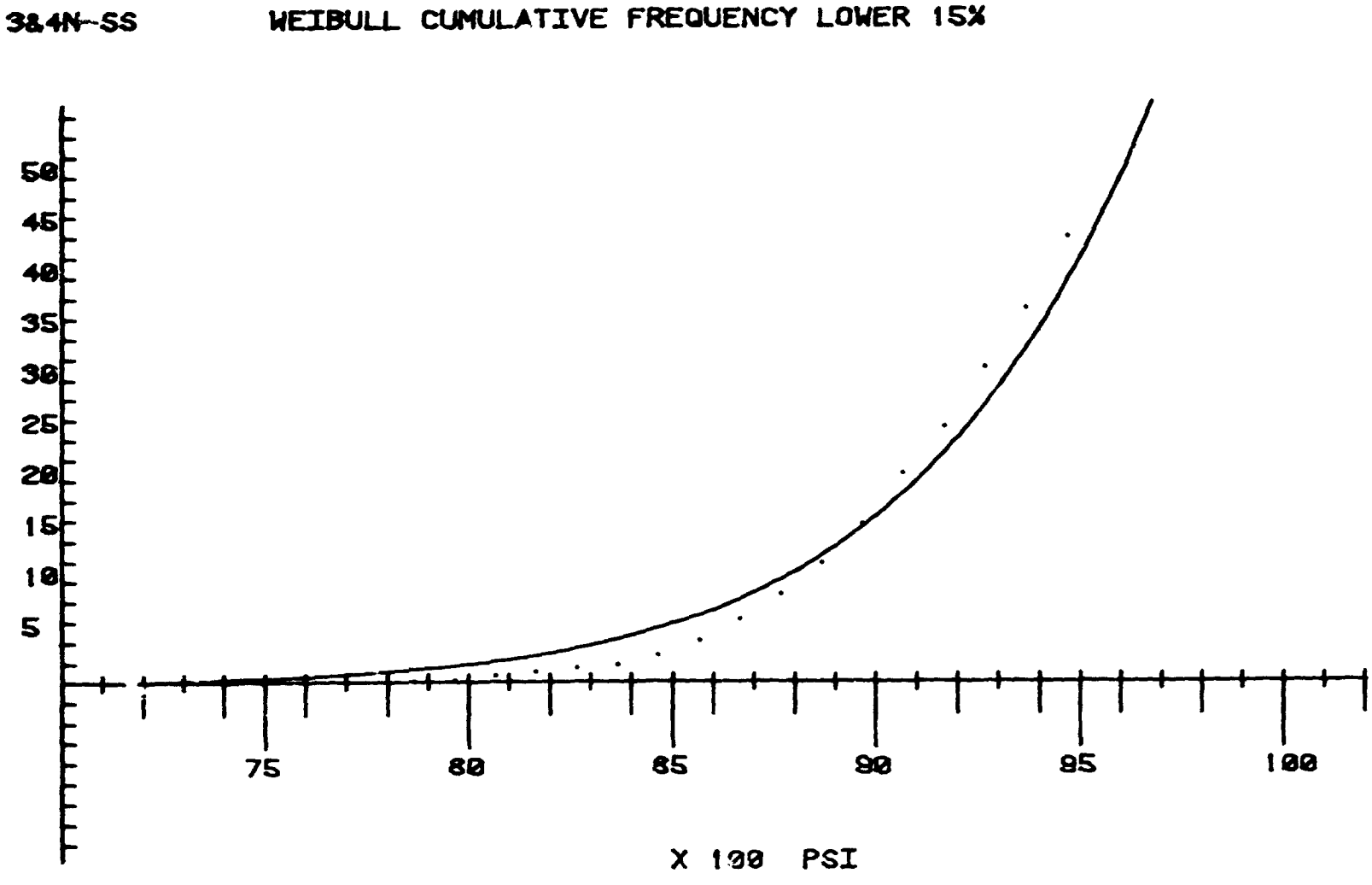


Figure E60. Weibull Combined Narmco Task 3 and 4 Short Beam Shear