APPENDIX A

FIXED END-ANCHOR BEARING PLATE TEST REPORT BY

PRESCON CORPORATION

STATIC TEST ON BEARING PLATE

TEST NO. 1100H186-2

TABLE OF CONTENTS

TEST ON A 186-WIRE DEAD-END ANCHOR

Test Site: THE PRESCON CORPORATION
905 Cantwell Drive
Corpus Christi, Texas 78408

Test Date: April 30, 1969

Test Witnesses:

ARKANSAS POWER AND LIGHT COMPANY

John Anderson

BECHTEL CORPORATION

Roland Marsh
Girish Shah

THE PRESCON CORPORATION

Glenn T. Johnson
Clyde Bickley
Larry Mills
Clyde Ruckman
Ray Bien
Chester Bosworth
Mark K. Rust

TEST PURPOSE

The purpose of this test was to show that the bearing plates, which will be used in the base slab of the Russellville Reactor Unit #1, perform adequately. The test was conducted as a tendon tensile test. The bearing plate performance is judged by deflection criteria. Tendon and anchor plate performance is included in this test, but as the only concern is to the bearing plate, these results are not discussed in this report.

ACCEPTANCE CRITERIA:

Successful completion of the following requirement will be considered as proof of the adequacy of the bearing plate.

The bearing plate should have elastic behavior after the initial set has occurred.

CONCLUSION

The test showed an elastic behavior of the bearing plate under loads as high as 96% of the tendons' guaranteed ultimate strength.

The bearing plate design and performance proved to be adequate.

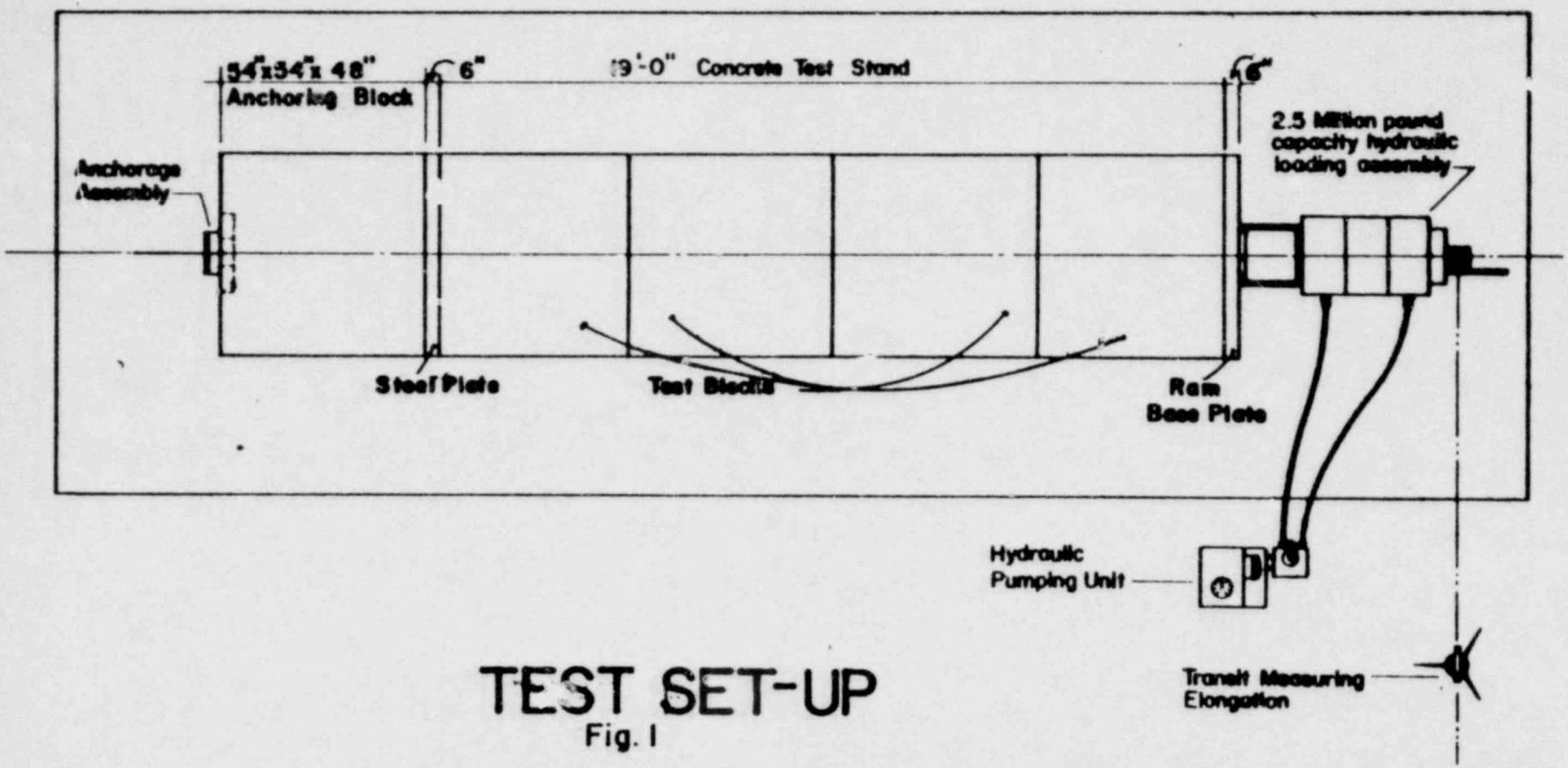
TEST FACILITY: Five (5) million pound testing stand (see Fig. 1).

TEST ARRANGEMENT: The test arrangement consists of the following components:

1. Concrete test blocks 48" x 48", total length 19 feet.
2. Anchoring block 54" x 54" x 48".
3. Ram base plate.
4. Stressing unit, with two (2) 625 ton rams, pull rod and stressing nut.
5. Pumping unit.
6. 186-wire (1/4" Ø) test tendon with non-stressing end anchor on the anchoring block and an internally threaded anchor head on the other end. (Min. Guaranteed Ultimate Strength = 2,192 K).
7. Dial indicators on anchor plate and bearing plate (see Fig. 7).

EQUIPMENT:

1. Ram: 2 two-way acting hydraulic rams.
   Capacity - approximately 1250 tons at 10,000 psi hydraulic pressure.
   Effective ram area - 120.0 + 129.3 = 249.3 sq. in.
   Travel - 12 inches.
2. Pump: High pressure hydraulic pump, maximum pressure 10,000 psi.
   Dial range - 10,000 psi.
   Accuracy of pressure readings - ± 25 psi.



TEST SET-UP

Fig. 1

PRESCON DETAIL RD-5700

3. Dial Indicators: Dial range 0.4 in.
   Accuracy of deformation readings - ± 0.00025".

4. Scale Bar: Attached to the ram to measure the elongation.
   Accuracy of elongation readings - ± 0.005".

TENDON INSTALLATION:

The anchoring block is reinforced according to Fig. 6. The trumpet-bearing plate assembly is bolted to the formwork. The tendon is completely shop fabricated with anchors on both ends. The anchor head is pulled through the test blocks and coupled to the pull rod. The test anchor plate is bolted to the bearing plate.

The tendon and its hardware are fabricated according to Figs. 2, 3, 4, and 5. They undergo our standard quality control.

TEST PROCEDURE :

Concrete cylinders were taken at the time of placing. Strength and Modulus Tests on cylinders were done by TETCO Testing Laboratories according to the enclosed report. The results are plotted in strength-time and modulus-time curves respectively.

Preceeding the test set-up, the bearing plate and the anchor plate were provided with a 2" grid on their outer surface. These two surfaces were profiled with a dial indicator on a specially designed "profiling frame", which provides a true three-point-bearing for any profiling sample. This method provides a higher accuracy in profiling the large bearing plates.

Dial indicators, located as shown on Fig. 7, were mounted on the bearing and anchor plate. They were set to zero prior to and after the first

loading cycle. They were removed after completion of the third loading cycle.

The Loading Sequence was as follows:

First Loading Cycle:

The tendon was stressed in stages to a pressure reading of 5,000 psi, released to 500 psi, and loaded again to 5,000 psi. A 1,500,000 lb. load cell was used to give some indication of the relationship between pressure reading and actual force.

Second Loading Cycle:

The tendon was stressed in stages to the overstressing force of 77% of the guaranteed ultimate strength and released again. This loading was repeated twice.

Third Loading Cycle:

The tendon was loaded gradually up to 96% of its guaranteed ultimate strength and then unloaded again. This loading was repeated three (3) times.

Fourth Loading Cycle:

The tendon was stressed to failure. The test was concluded after nine (9) wire breaks. It was apparant that elongation was obtained without increasing the load.

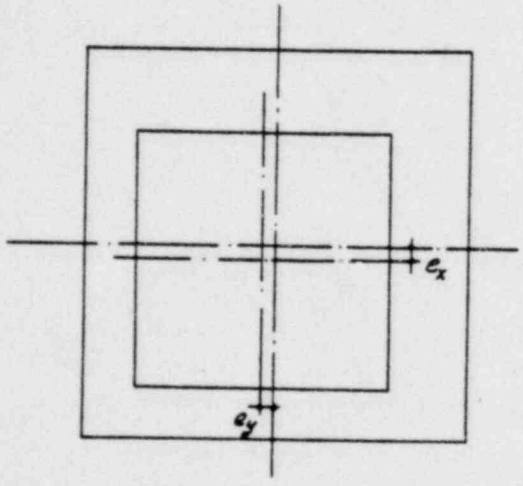
The load stages were set at pressure readings mentioned on pages 38 - 40. For each stage, pressure, elongation, and the deflections were read carefully.

After the test, the bearing and anchor plate were removed from the test specimen and profiled in the same way as done prior to testing.

TEST SPECIMEN

(A) ANCHOR COMPONENTS

The dimensions and tolerances on the anchor component drawings correspond to the measurements given on the shop drawings. Dimensions in parenthesis indicate measur. values on the actual test piece. A small eccentricity of the anchor plate relative to the bearing plate was provided in the test anchor.

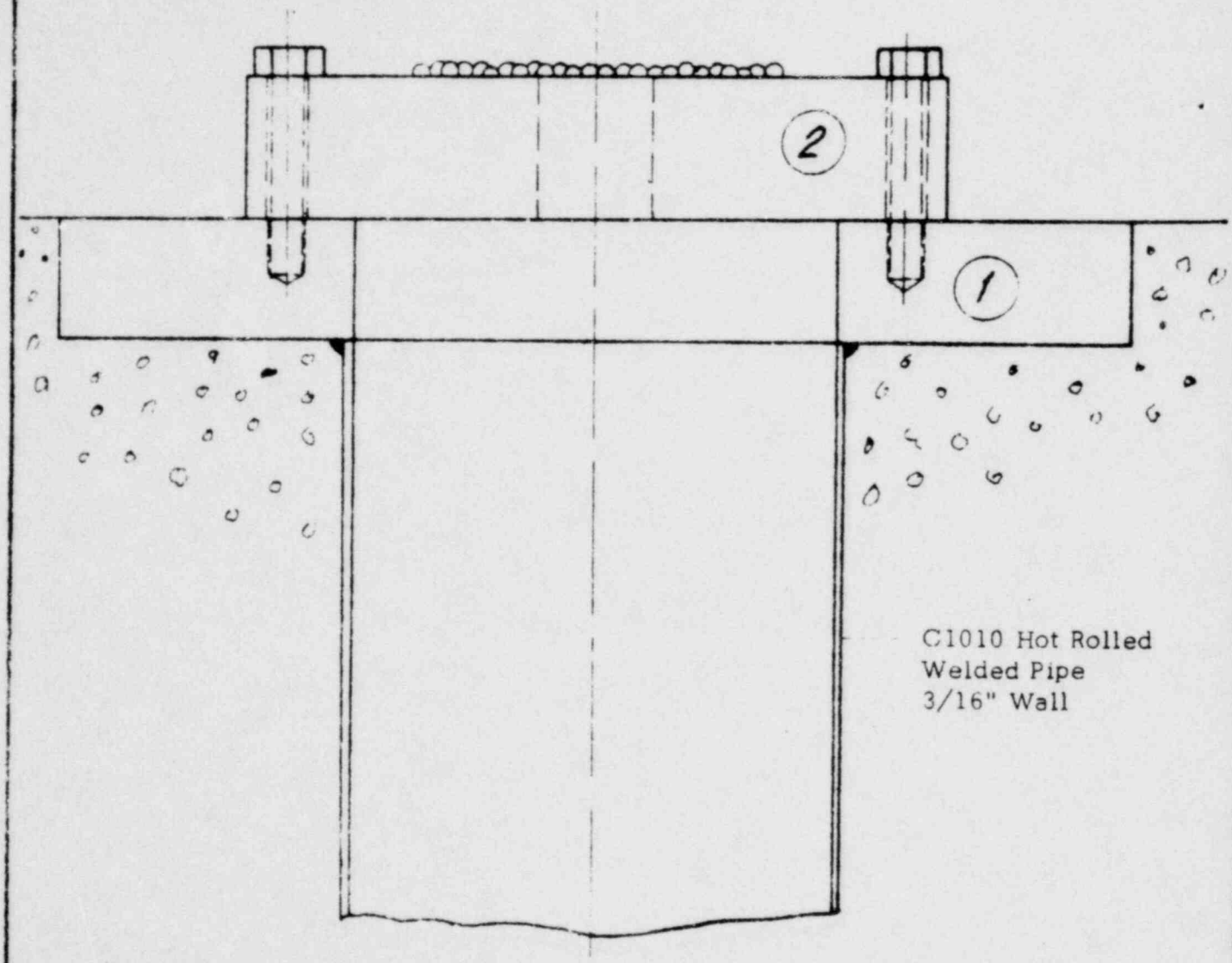


Maximum eccentricity for anchors in the structure:

$e_{x_{max}} = e_{y_{max}}$

Location of center line bearing plate	± 1/16"
Location of center line anchor plate	± 1/16"
Location of bolt holes in bearing plate	± 1/32"
Location of bolt holes in anchor plate	± 1/32"
Eccentricity due to oversize of bolt holes	± 1/8"
Absolute Maximum Eccentricity	± 10/32"

Test Set-Up: $e_x = 3/16"$ $e_y = 1/8"$



Part 1: Bearing Plate

Part 2: Anchor Plate

Fig. 2

TEST ANCHOR ASSEMBLY

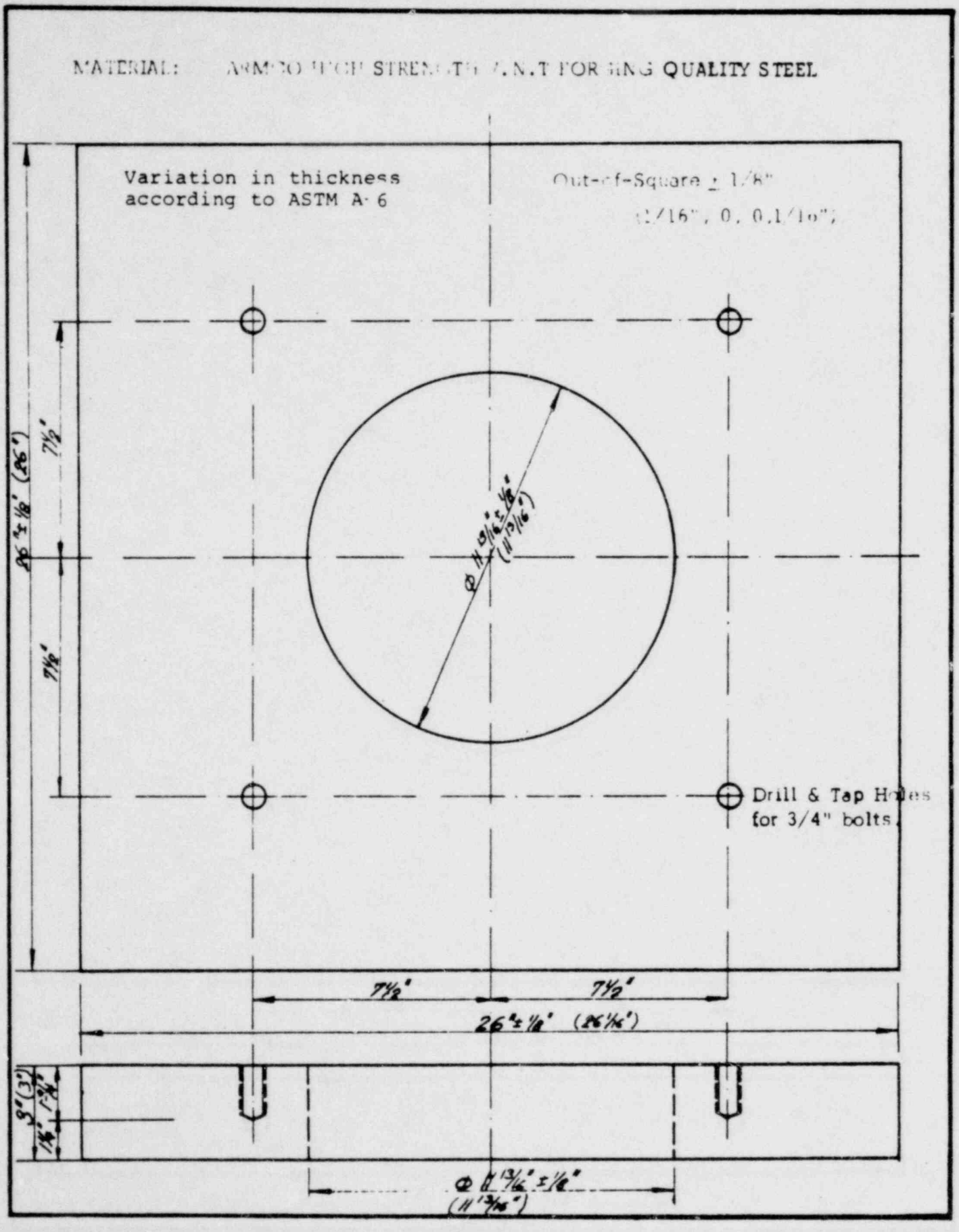


Fig. 3

TEST BEARING PLATE

BEARING PLATE MATERIAL

CERTIFICATE OF TESTS

ARMCO

Armco Steel Corporation
P. O. Box 1367, Houston, Texas 77001

OUR ORDER NO	CUST. ORDER NO	SHIPPED VIA	CAR INITIAL AND NO.	DATE SHIPPED	SHIPPING LIST (RECAP) NO
THS 7054	47 RECD MAR 20 1969	truck		3-14-69	7006109

DESCRIPTION	BAR OR PLATE No.	No. PCS.	YIELD PSI	TENSILE PSI	% ELONG.	% REDUCT.	BEND TEST	HOMO. TEST	BHN	IMPACT: TYPE ORIEN.	IMPACT: TYPE TEMP.
H.R.CARBON STEEL PLATES ARMCO HI STRENGTH VNT FORGING QUALITY NORMALIZED AND FLATTENED HEAT LOT DROP WEIGHT TEST PER E-208 W/NO BREAK AT -30°F 60000 PSI MINUMUM YIELD 80/100000 PSI TENSILE AND 23 PERCENT MINUMUM ELONGATION IN 2"					2"						
HEAT 57153 3" Normalizing temperature: 1650°F DWT @-30°F- NO BREAK			61500	84700	30.0		ok				

HEAT	C	Mn	P	S	Si	Cr	Ni	Mo	Cu	Ti	V	B	Cb	Al
57153	.20	1.48	.011	.021	.23	.04	.08	.02	.19		.088	N2/.019		

THE CHEMICAL, PHYSICAL OR MECHANICAL TESTS
ARE CORRECT AS CONTAINED IN THE RECORDS O

SIGNED J. O. Roberts
METALLURGICAL DEPT

PRESTRESSTING INDUSTRIES
1338 N W. W. WHITE ROAD
SAN ANTONIO, TEXAS 78219.

"THIS CERTIFIED TEST REPORT HAS BEEN DELIVERED TO
CHASED FROM ARMCO STEEL CORPORATION. TO AVOID T
THE REDELIVERY OF THIS REPORT TO A THIRD PARTY IT M
THE NAME OF SUCH CONSIGNEE."

A REV. 9/67

Test No. 1100H186-2

Quality Control Manual

Properties of Bearing Plates:

Physical Properties:

Tensile Strength, psi (Minimum)	80,000
Yield Point, psi (Minimum)	60,000
Elongation - 8 inches, percent (Minimum)	18
Elongation - 2 inches, percent (Minimum)	23

Chemical Properties: (Ladle Analysis in Percent)

Carbon (Maximum)	0.22
Manganese	1.15 / 1.50
Phosphorus (Maximum)	0.35
Sulphur (Maximum)	0.04
Silicon	0.15 / 0.30
Vanadium	0.04 / 0.11
Nitrogen	0.01 / 0.02

AISI Steel Products Manual

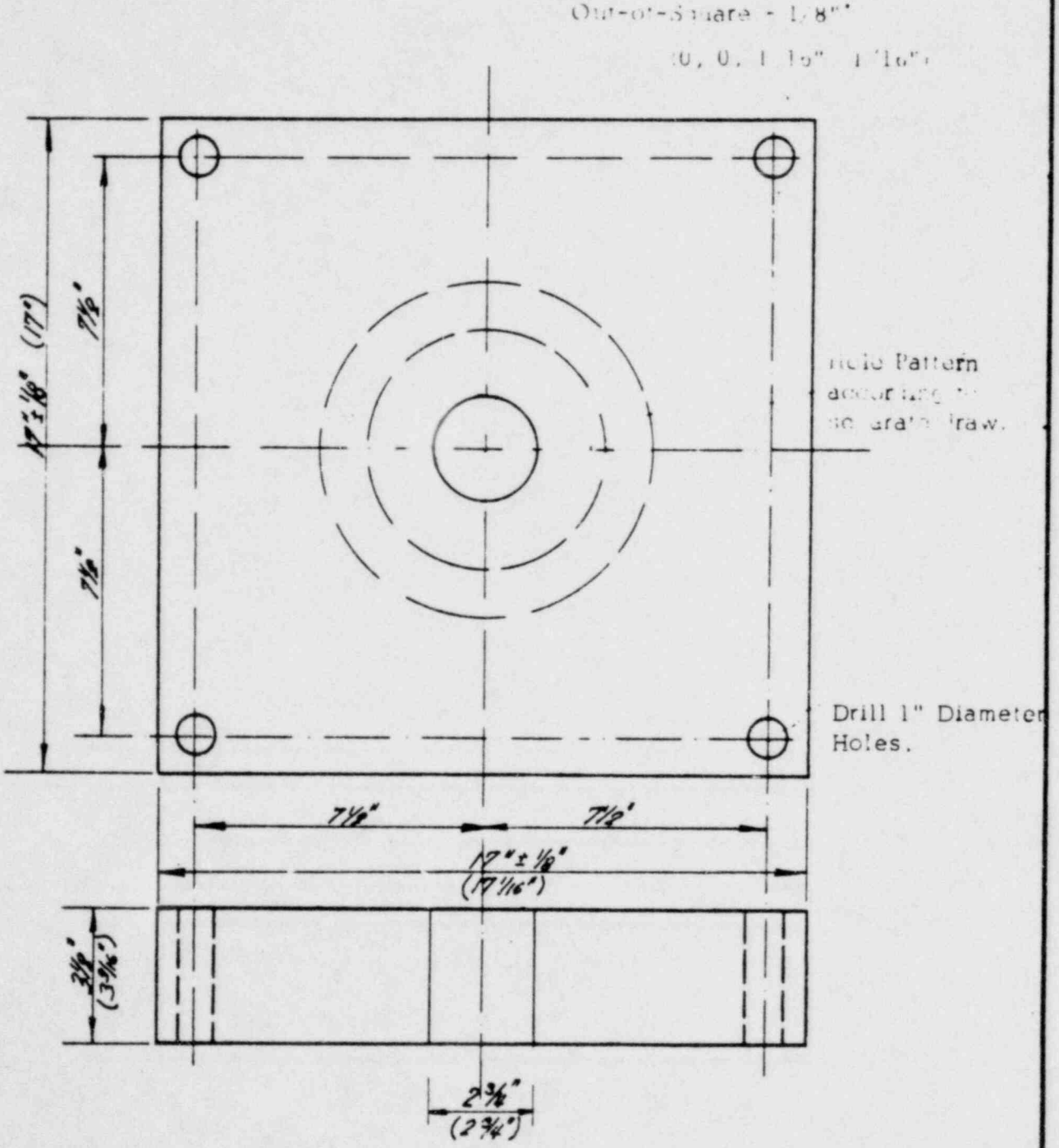
Section Carbon Steel Plate:

In all Carbon Steel, small quantities of certain residual elements, such as Cr, Ni, Mo, Cu are unavoidably retained from the raw materials. These elements are considered as incidental.

NOTE:

Normally, these elements are not reported except on request at additional cost. As the plate is a test sample, the full analysis was requested.

Material: 4142 Heat Treated to 60,000 psi Yield Strength.
Stress-Strain Curve was run prior to the test.



TEST ANCHOR PLATE

Fig. 4

PAR

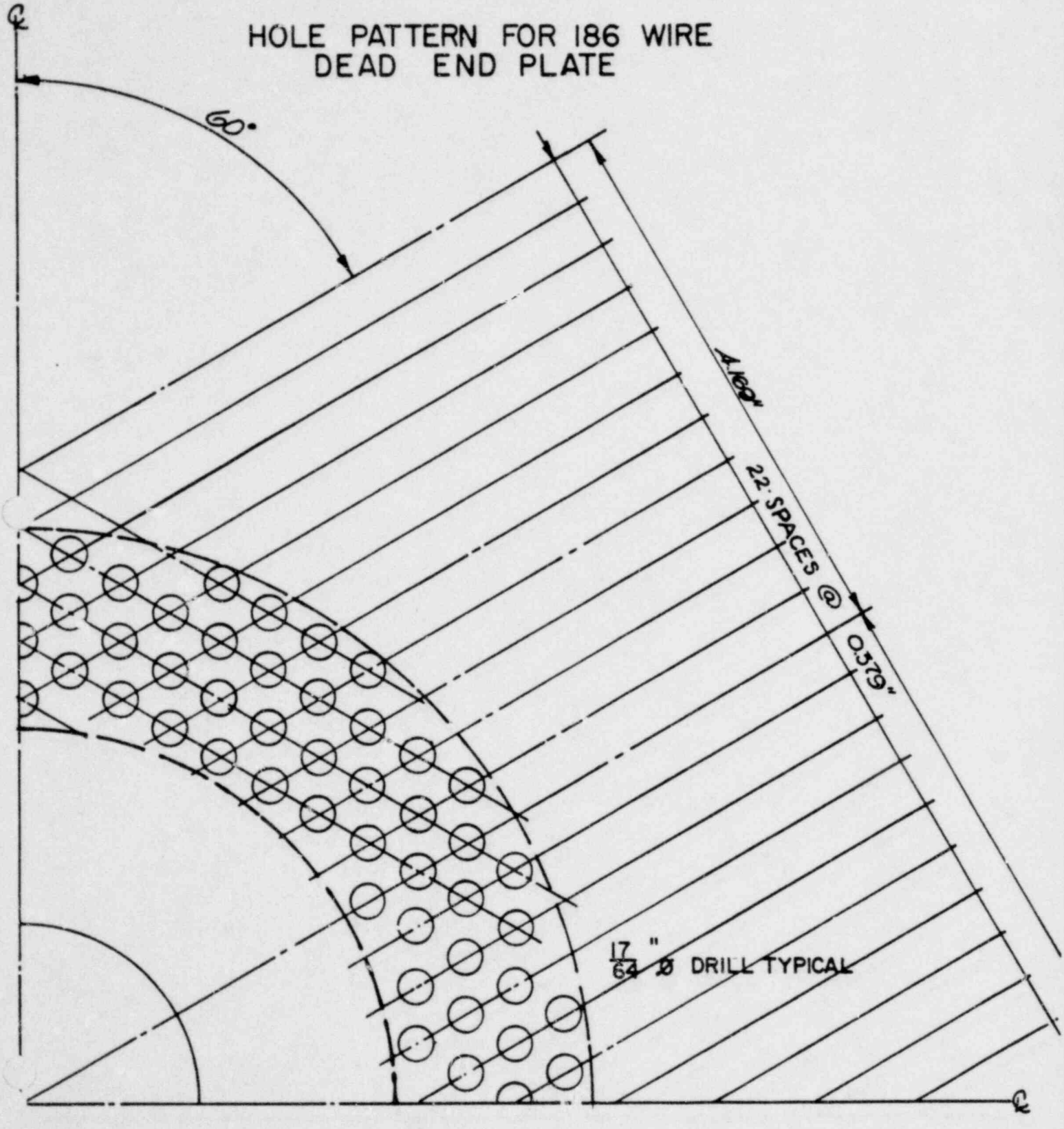

HOLE PATTERN FOR 186 WIRE
DEAD END PLATE
60°
4.169"
22 SPACES @ 0.379"
17/64 Ø DRILL TYPICAL

Fig 5

April 7, 1969

ANCHOR PLATE MATERIAL

FORM 81

EARLE M. JORGENSEN CO.
STEEL

CERTIFIED TEST REPORT

PRESTRESSING INDUSTRIES
DIV OF TEXSTAR CONST CO
1338 N WW WHITE ROAD
SAN ANTONIO, TEXAS 78219

DATE	YOUR ORDER NUMBER	OUR INVOICE NUMBER
JANUARY 30,1969	470	25019-H

	MILL SOURCE	DESCRIPTION & SPECIFICATIONS	QUANTITY & SIZE
1	~~ARMCO~~	~~4142 F/C HEAT TREATED~~	~~2 PCS 3" CUT 26" X 26" WITH 11-3/4"~~ ID IN CENTER
2	ARMCO	4142 F/C HEAT TREATED	2 PCS 3-1/2" CUT 17" X 17"
3			

CHEMICAL ANALYSIS

	HEAT NO.	C	MN	PHOS	SUL	SIL	NI	CR	CU	MO	CO	G/S	AMS 2301 F	AMS 2301 S
1	47323	.38	.80	.010	.021	.26		.96		.18				
2	56180	.41	.80	.010	.019	.24		1.00		.20				
3														

MECHANICAL PROPERTIES

		YIELD THOUSAND LBS/SQ. IN.	TENSILE STRENGTH THOUSAND LBS/SQ. IN.	ELONG. % IN ___IN.	RED. OF AREA %	BRINELL	ROCK. WELL	BEND	EMB	MACRO	MICRO	DECARB	HARDENABILITY
1		57,000	105,500	21.5	46.9								
2		62,000	109,000	24.5	52.8								
3													

We hereby certify that the material covered by this report has been inspected in accordance with, and has been found to meet, the requirements described herein, including any specifications forming a part of the description, and test results are on file subject to examination.

SUBSCRIBED AND SWORN TO BEFORE ME

THIS 30 TH DAY OF JANUARY 19 69

Jean Ruby Goss NOTARY PUBLIC

MY COMMISSION EXPIRES 6/1/69

CERTIFIED TEST REPORT
EARLE M. JORGENSEN CO.

BY J. E. Bray
STOCK RECORDS SUPERVISOR

Test No. 1100H186-2

AVERAGE BEARING STRESSES

Bearing Plate / Concrete:

Maximum allowable average bearing stress at anchoring load according to the ACI Code:

$$f_{cp} = 0.6\, f'_{ci} \sqrt[3]{A'_b / A_b}$$

$f'_{ci} = 4{,}000$ psi

$A_b = 26^2 - 12.25^2 \pi/4 = 558.14$ in.^{2}

minimum anchor spacing - 34"

$A'_b = 34^2 = 1156$ in.^{2}

$f_{cp} = 0.6 \cdot 4000 \cdot 1.275 = 3060$ psi

Maximum allowable average bearing stress at ultimate load:

$f_{cp} = f'_{ci} = 4000$ psi

Anchoring Load $0.7\, F'_{ult} = 1{,}534{,}300$ lbs.

Bearing Stress $f = 0.7\, F'_{ult} / A_b = 2{,}750$ psi

Overstressing Load $0.8\, F'_{ult} = 1{,}753{,}500$ lbs.

Bearing Stress $f = 0.8\, F'_{ult} / A_b = 3{,}140$ psi

Ultimate Load $F'_{ult} = 2{,}191{,}800$ lbs.

Bearing Stress $f = F'_{ult} / A_b = 3{,}930$ psi

Anchor Plate / Bearing Plate:

average bearing stress $f = F / (17^2 - 12.25^2) \frac{\pi}{4}$

at Anchoring Load $f = 14{,}050$ psi

at Overstressing Load $f = 16{,}100$ psi

at Ultimate Load $f = 20{,}100$ psi

(B) WIRE

The tendon was fabricated from one coil of wire. Six wire samples, three from the beginning and three from the end of the coil, were tested prior to the tendon test.

Sample No.	Force (lbs)	Strength (psi)
1	12,150	247,400
2	12,100	246,400
3	12,100	246,400
4	12,150	247,400
5	12,100	246,400
6	12,150	247,400
Average	12,125	246,900

The cutting length was 26'0".

The button-heads were according to Prescon's specifications and were subjected to the standard fabrication quality control.

Inspection Certificate

Uncoated Stress-Relieved Wire For Prestressed Concrete

SUZUKI METAL INDUSTRY CO., LTD

HEAD OFFICE & AKABANE WORKS — NO. 2-1420 FUKURO-MACHI KITA-KU, TOKYO, JAPAN

NARASHINO WORKS — NO. 2-750 HIGASHINARASHINO NARASHINO, CHIBA, JAPAN

Order No.

Quantity 163 coils 177,253 lbs.

Destination Los Angeles.

Inspection Date December. 12 , 1968

Shipping Mark (Orange line. 1-16, Yellow line. 17-163)

ST-5194	ST-5209(1)
NIDA-(2453)10	NIDA-2403
SC-2678	SC-2692
LOS ANGELES	J-2575
MADE IN JAPAN	NO. 17-100 , 101-163
HEAT NO. A-47230	MADE IN JAPAN
NO. 1-16	HEAT NO. A-45274, A-45954

P. P. Manager, Inspection Dept.

620-13-MS , 620-17-MS
ALY-00-260,014

1 Specification: A.S.T.M ~~A421-59T~~ A421-65

(1) Chemical Composition

Carbon		:	0.72~0.93%
Manganese		:	0.40~1.10%
Phosphorus	max.	:	0.040%
Sulfur	max.	:	0.050%
Silicon		:	0.10~0.35%

(2) Wire

Nominal Diameter	:		1/4	inch
Tolerance of Diameter	:		+0.002, −0.001	inch
Application	:	Type	B A. ~~W/A~~	
Tensile Strength	:	min.	240,000	psi
Yield Strength	:	min.	210,000	psi
Elongation in 10"	:	min.	4.0	%
Cast	:	Laid free on a substantially flat surface. shall form an arc of a circle not less than 12 feet in diameter.		

2 Test Results

(1) Chemical Composition

%

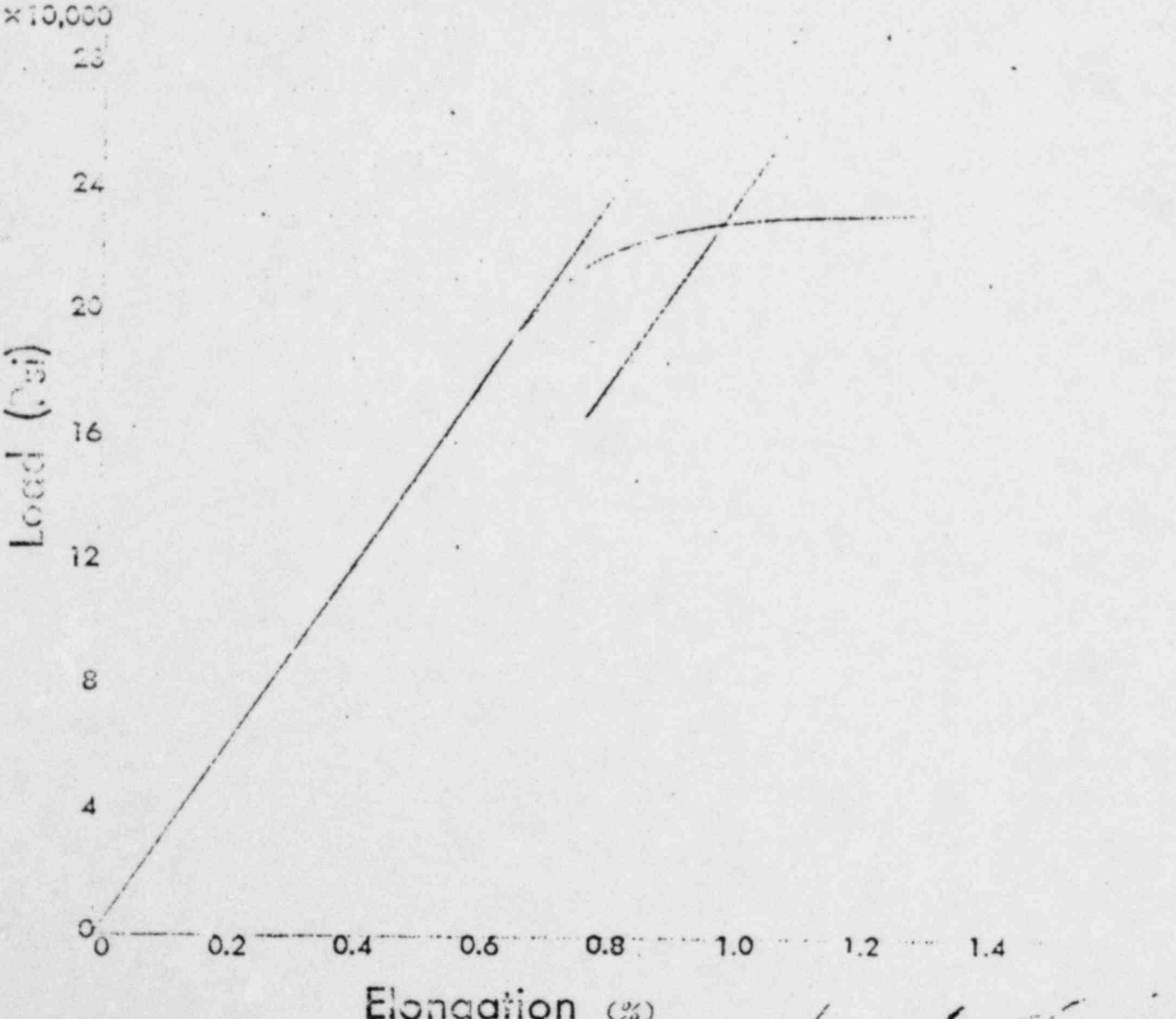
Composition / Charge No.	C.	Mn.	Si.	S.	P.	Remarks Inspection NO.
A-47230	0.75	0.83	0.25	0.018	0.015	1- 16
A-45274	0.76	0.75	0.23	0.013	0.012	17-100
A-45954	0.74	0.80	0.16	0.018	0.017	101-163

[illegible] CO., LTD
[illegible] 2-CHOME [illegible]KURO-MACHI,
[illegible], TOKYO, JAPAN

[illegible] (Wire Material)

Fig ______

[illegible]	.02600 in	[illegible]	[illegible]
[illegible]	250000 psi	[illegible]	[illegible]
[illegible] extension	220000 psi	Y.S/T.S × 100	[illegible] %
Elongation (G.L 10")	[illegible] %	Modulus of Elasticity	[illegible] psi



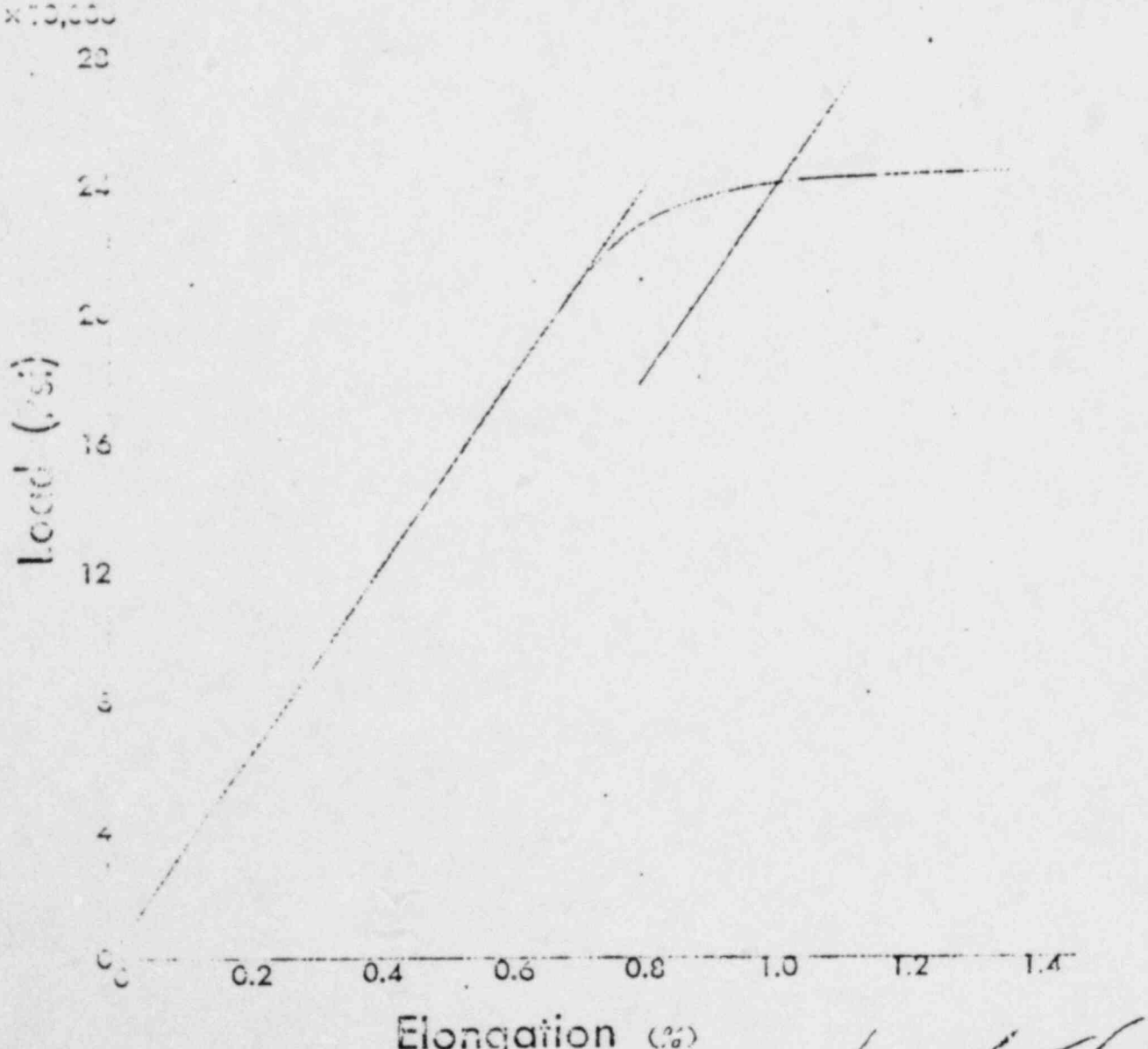
Date

Signed ________

[illegible] CO., LTD
[illegible] FUKUOKA-MACHI,
KITA-KU, TOKYO, JAPAN

Stress-Strain [illegible] (Wire Material)

Diameter	[illegible] inch	Heat No.	[illegible]
Tensile strength	[illegible] psi	Inspection No.	[illegible]
Y.P. at 0.5% extension	[illegible] psi	Y.S/T.S × 100	[illegible] %
Elongation (G.L [illegible]")	[illegible] %	Modulus of Elasticity	[illegible] psi



Date

Signed [illegible]

(C) ANCHORING BLOCK

CONCRETE MIXTURE

(for Anchoring Block)

Cement	588 lbs.
Sand	1,127 lbs.
3/4" Aggregate	944 lbs.
1-1/2" Aggregate	974 lbs.
Poz. 8	0.25 with air
Water (19 gallons) per cu. yd.	

ANCHORING BLOCK REINFORCING

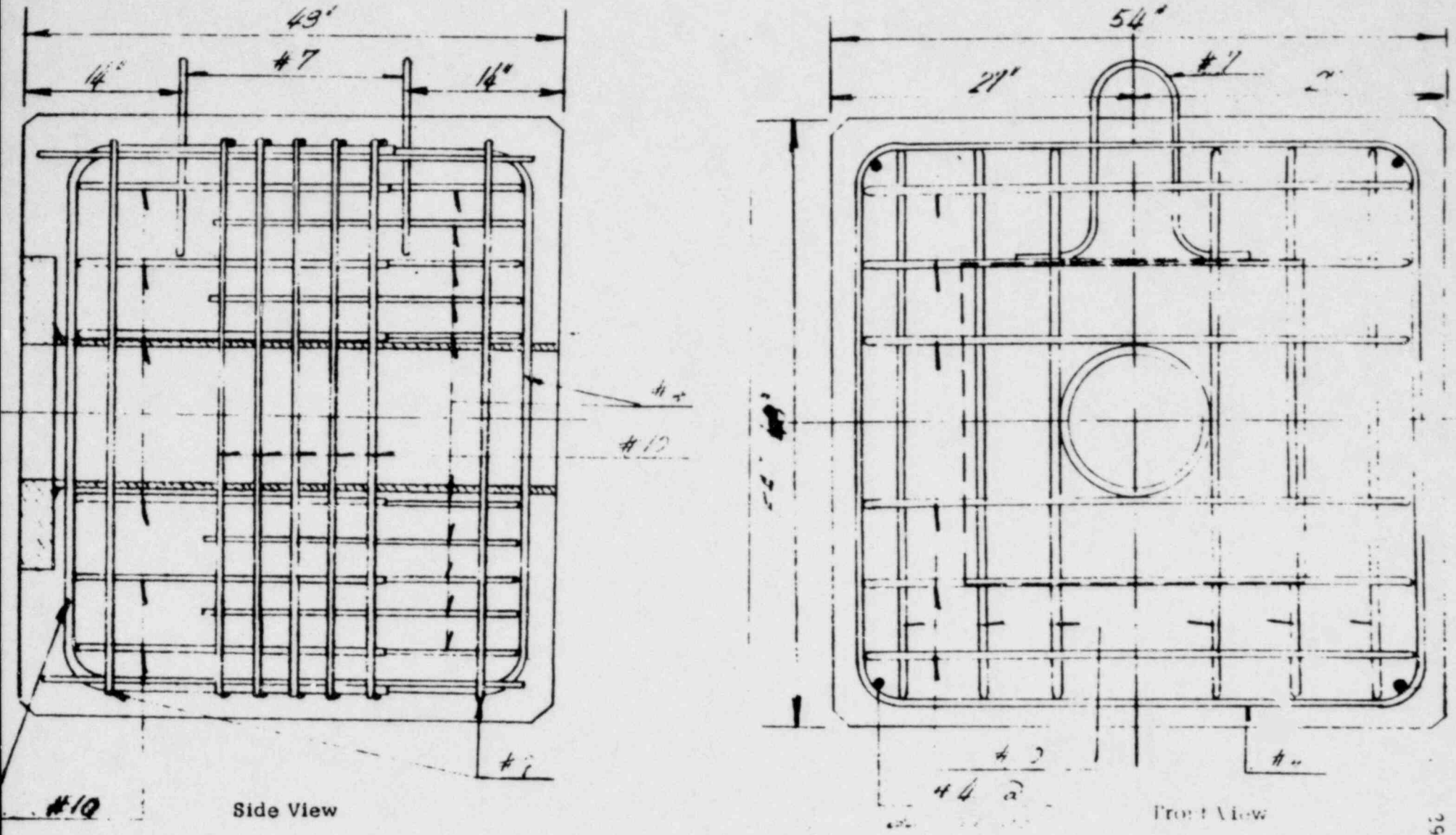
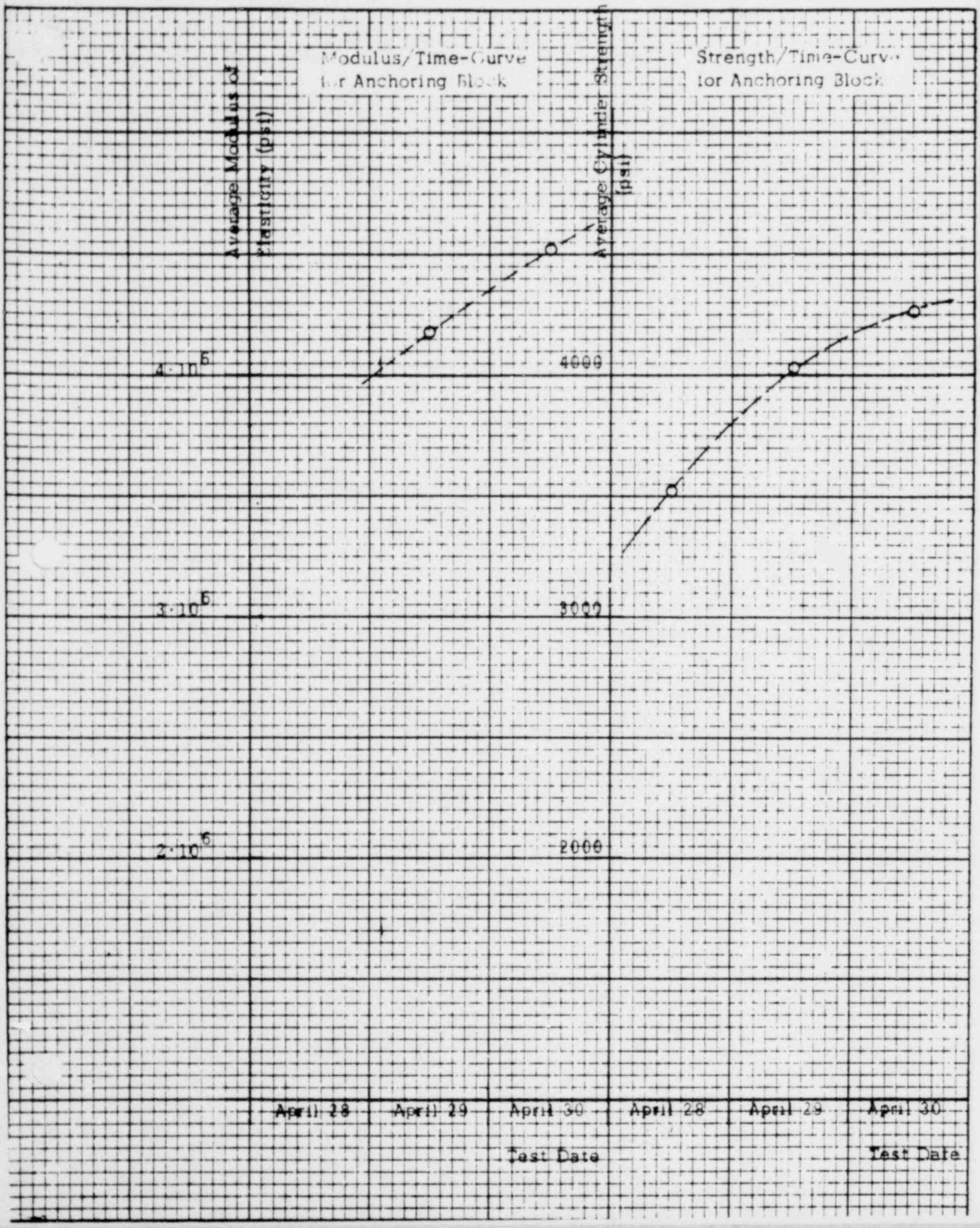


Fig. 6


Modulus/Time-Curve for Anchoring Block
Strength/Time-Curve for Anchoring Block
Average Modulus of Elasticity (psi)
Average Cylinder Strength (psi)
4·10^6
3·10^6
2·10^6
4000
3000
2000
April 28
April 29
April 30
Test Date
April 28
April 29
April 30
Test Date

TETCO Corpus Christi, TEXAS

RECEIVED MAY - 7 1969

TO: The Prescon Corporation
905 Cantwell
Corpus Christi, Texas

DATE April 30, 1969

REPORT NO. 69100

FILE NO.

PROJECT: Test Block No. 1100 H 186-2A.

The following results were obtained from standard 6" x 12" concrete cylinders molded April 25, 1969, and job cured until tested:

Cylinder Number	Date Tested	Age (Days)	Compressive Strength	Chord Modulus of Elasticity	Pounds/ Cu. Ft.
PC 21-24	4-28-69	3	3511 (Avg)	------	-----
PC 25-26	4-29-69	4	4033 (Avg)	------	148.2
PC 27	4-29-69	4	-------	4.091×10^6	148.2
PC 28	4-29-69	4	-------	4.273×10^6	148.2
PC 29	4-30-69	5	(4174) *	4.363×10^6	148.3
PC 30	4-30-69	5	4227	------	148.3
PC 31	4-30-69	5	4262	------	148.0
PC 32	4-30-69	5	(4383) *	4.636×10^6	148.1
PC 33	4-30-69	5	4369	------	148.0
PC 34	4-30-69	5	4191	------	147.6
PC 35	4-30-69	5	(4245) *	4.545×10^6	148.2

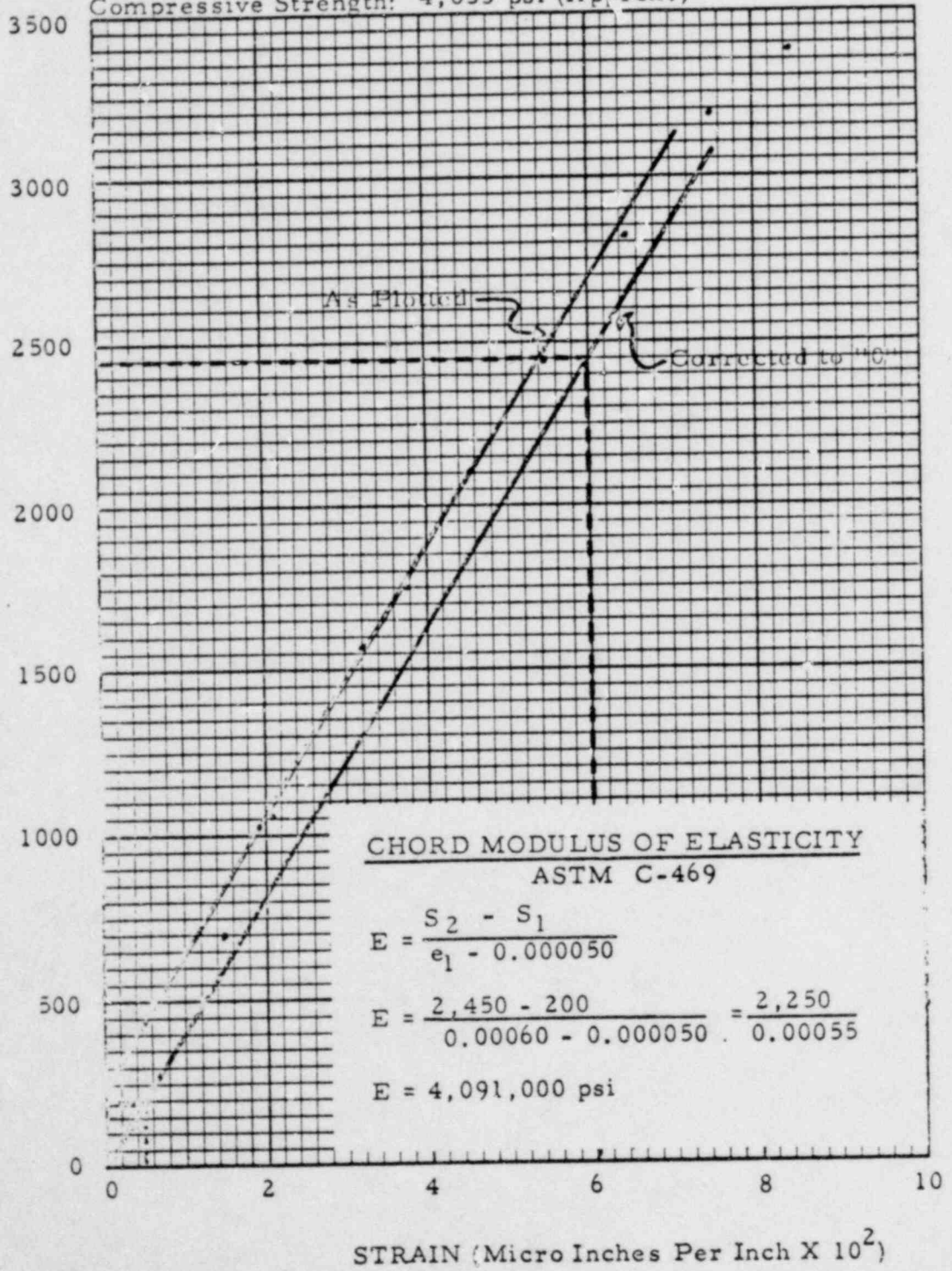
(*) Compressive strength determined after compressometer was disassembled from test cylinder.

COPIES TO: 5 - The Prescon Corp.

Gene Dugger

The Prescon Corporation
905 Cantwell
Corpus Christi, Texas

Test Block # 1100 H186-2A
Cylinder No. PC-27
Date Molded: April 25, 1969
Date Tested: April 29, 1969
Unit Weight: 148.2 lbs./cu.ft.
Compressive Strength: 4,033 psi (Approx.)



CHORD MODULUS OF ELASTICITY
ASTM C-469

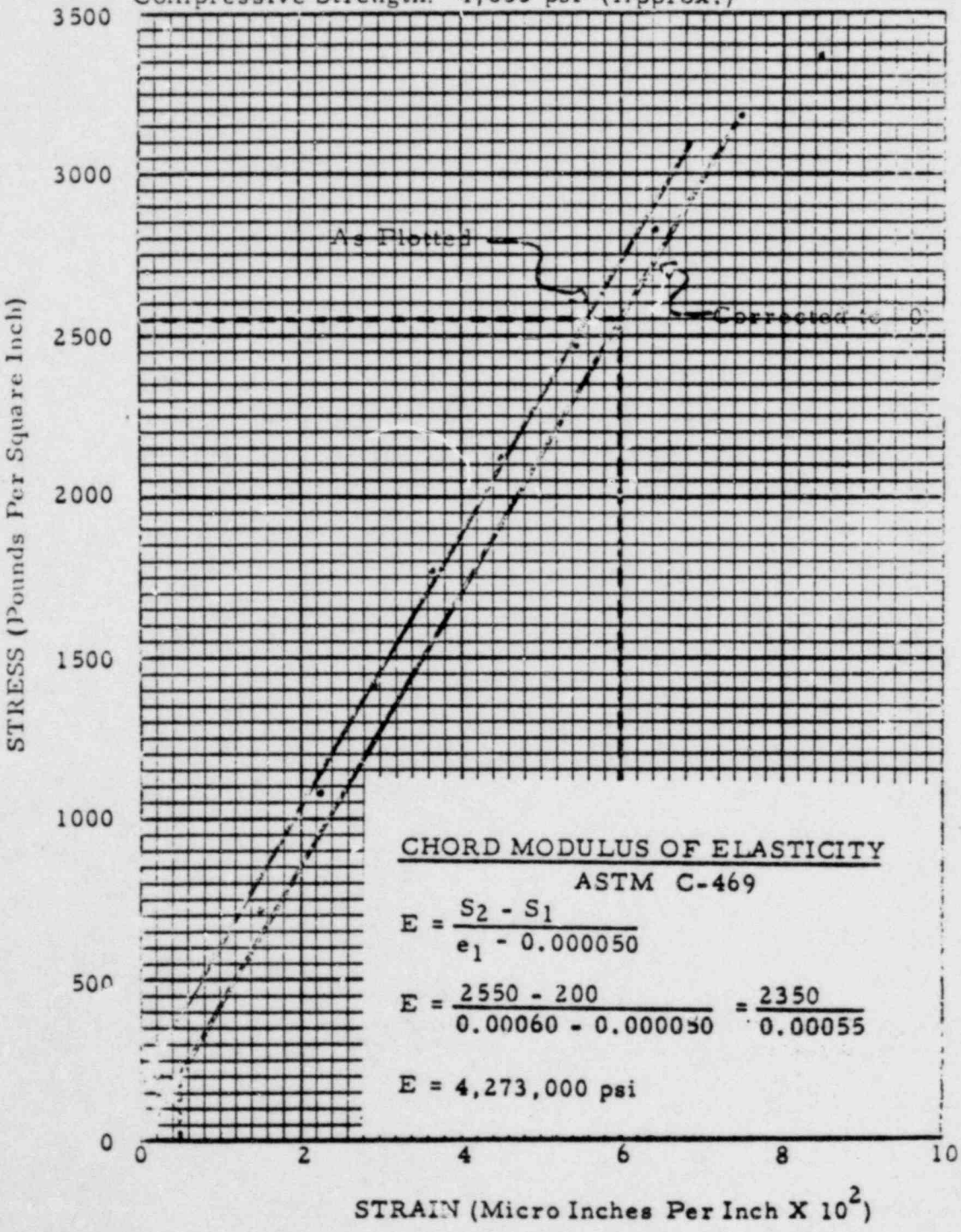
$$E = \frac{S_2 - S_1}{e_1 - 0.000050}$$

$$E = \frac{2,450 - 200}{0.00060 - 0.000050} = \frac{2,250}{0.00055}$$

E = 4,091,000 psi

The Prescon Corporation
905 Cantwell
Corpus Christi, Texas

Test Block # 1100 H186-2A
Cylinder No. PC-28
Date Molded: April 25, 1969
Date Tested: April 29, 1969
Unit Weight: 148.2 lbs./cu. ft.
Compressive Strength: 4,033 psi (Approx.)



CHORD MODULUS OF ELASTICITY
ASTM C-469

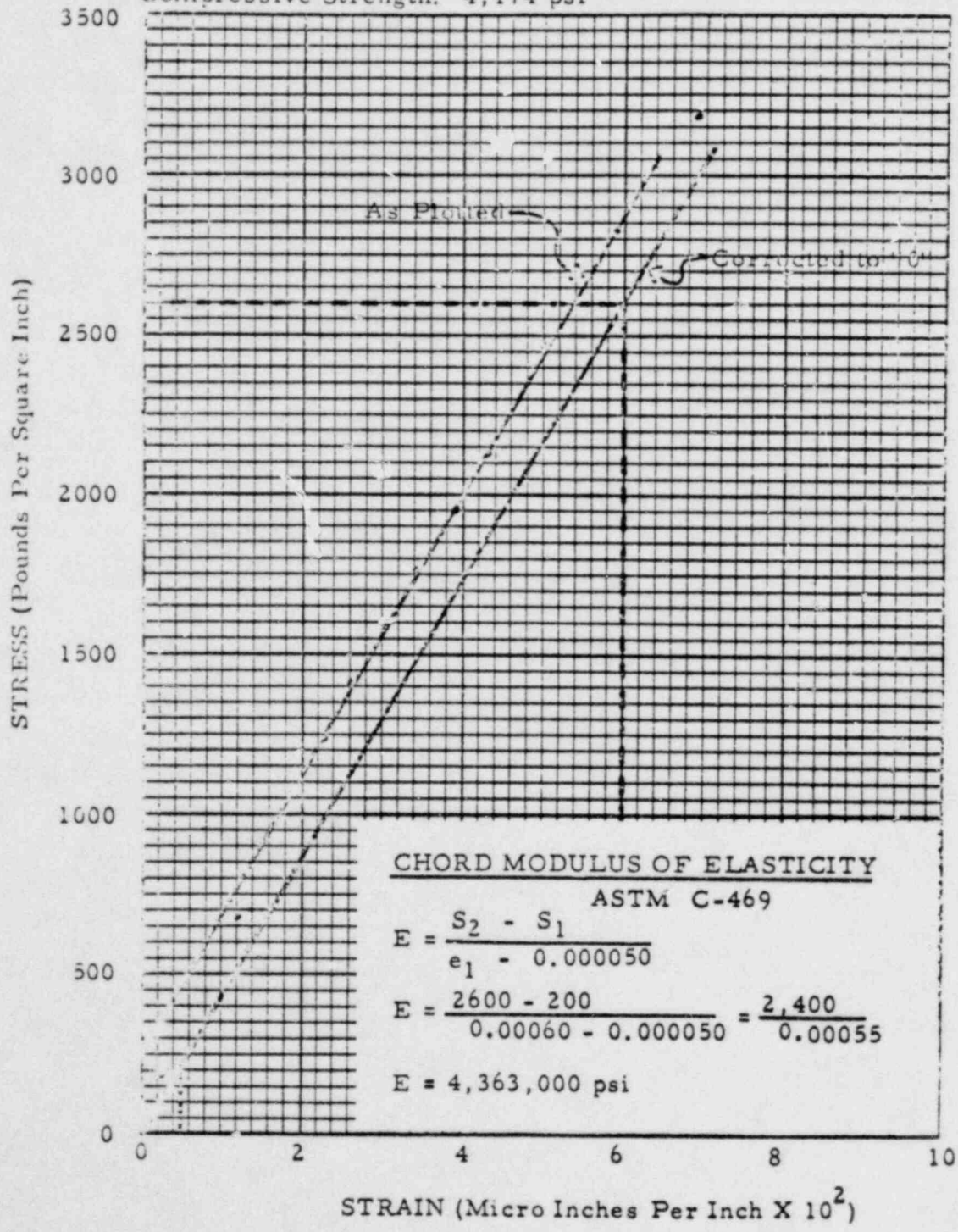
$$E = \frac{S_2 - S_1}{e_1 - 0.000050}$$

$$E = \frac{2550 - 200}{0.00060 - 0.000050} = \frac{2350}{0.00055}$$

E = 4,273,000 psi

The Prescon Corporation
905 Cantwell
Corpus Christi, Texas

Test Block #1100 H186-2A
Cylinder No. PC-29
Date Molded: April 25, 1969
Date Tested: April 30, 1969
Unit Weight: 148.3 lbs./cu. ft.
Compressive Strength: 4,174 psi



CHORD MODULUS OF ELASTICITY
ASTM C-469

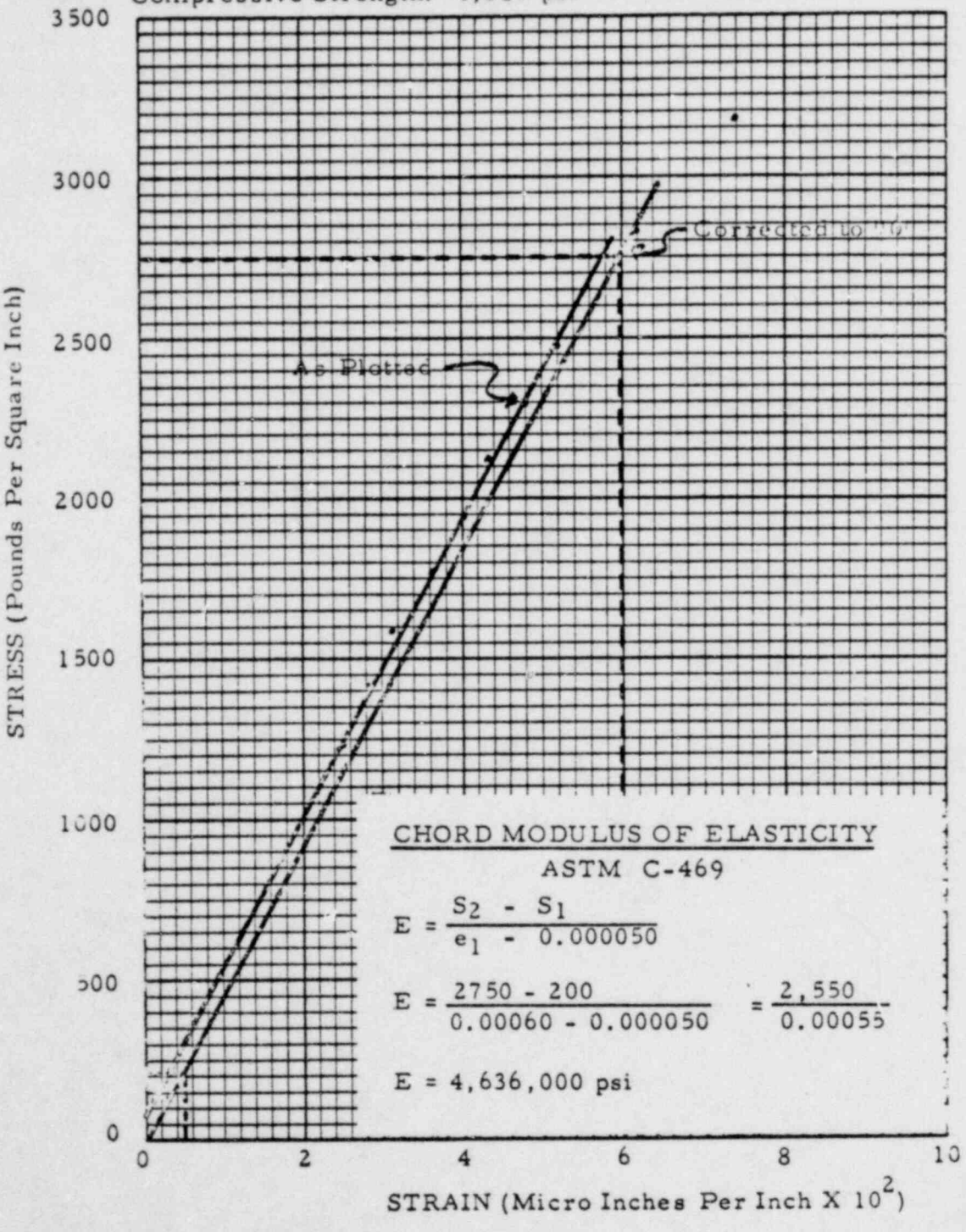
$$E = \frac{S_2 - S_1}{e_1 - 0.000050}$$

$$E = \frac{2600 - 200}{0.00060 - 0.000050} = \frac{2,400}{0.00055}$$

E = 4,363,000 psi

The Prescon Corporation
905 Cantwell
Corpus Christi, Texas

Test Block #1100 H186-2A
Cylinder No. PC-32
Date Molded: April 25, 1969
Date Tested: April 30, 1969
Unit Weight: 148.1 lbs./cu. ft.
Compressive Strength: 4,386 psi



CHORD MODULUS OF ELASTICITY
ASTM C-469

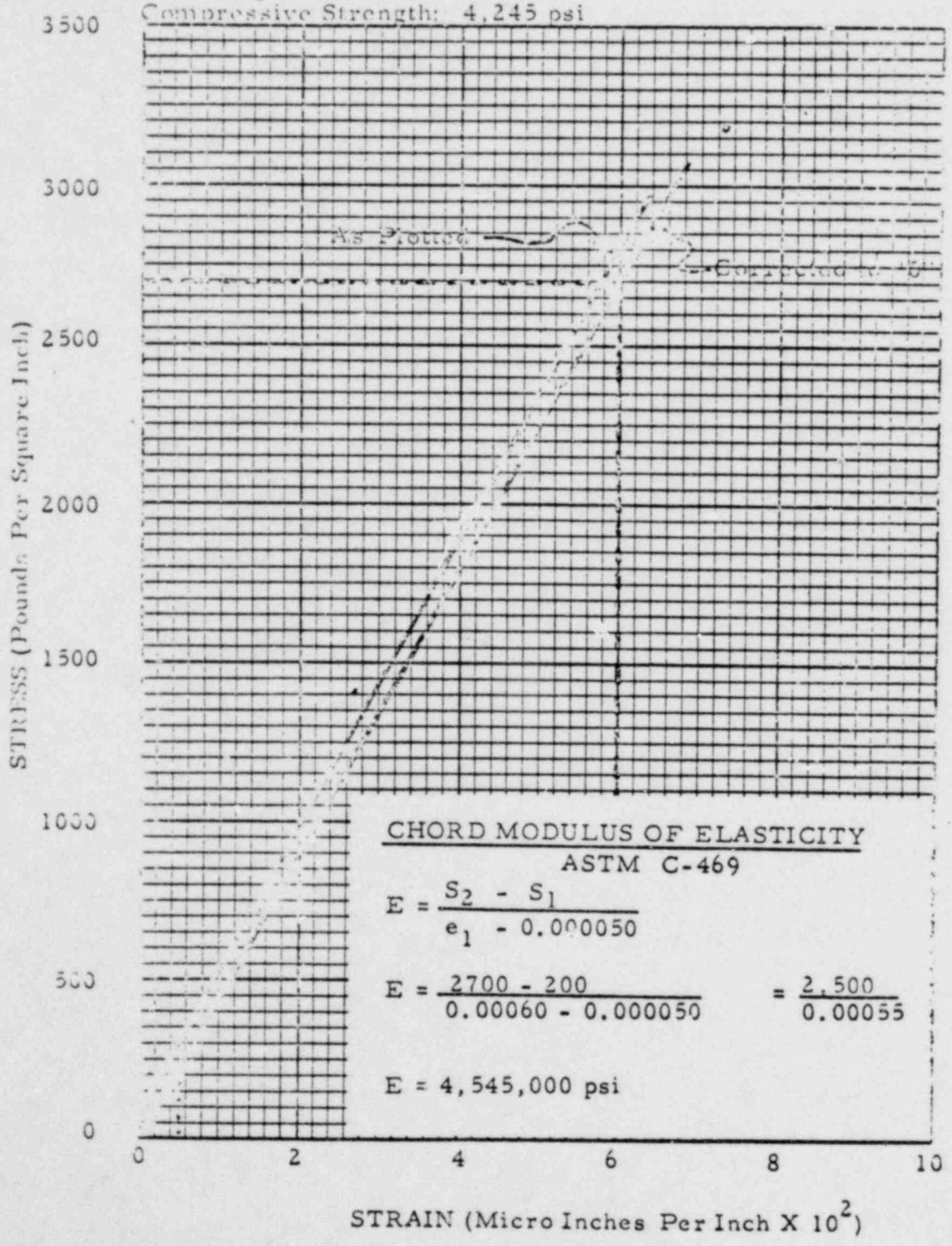
$$E = \frac{S_2 - S_1}{e_1 - 0.000050}$$

$$E = \frac{2750 - 200}{0.00060 - 0.000050} = \frac{2,550}{0.00055}$$

E = 4,636,000 psi

The Prescon Corporation
905 Cantwell
Corpus Christi, Texas

Test Block #1100 H186-2A
Cylinder No. PC-35
Date Molded: April 25, 1969
Date Tested: April 30, 1969
Unit Weight: 148.2 lbs./cu.ft.
Compressive Strength: 4,245 psi



CHORD MODULUS OF ELASTICITY
ASTM C-469

$$E = \frac{S_2 - S_1}{e_1 - 0.000050}$$

$$E = \frac{2700 - 200}{0.00060 - 0.000050} = \frac{2,500}{0.00055}$$

E = 4,545,000 psi

TEST READINGS

Stage	Hydr. Pressure Calc. (psi)	Hydr. Pressure Obs. (psi)	Stress in Wire (ksi)	Axial Load See Pg. 52 for Calcs. (kips)	Elongation Reading Scale Bar (ins.)	Elongation Observed (ins)	Remarks Load Cell Reading
1	500	500	13.1	120	15.00	0	6090 Dial Ind. zeroed
2	3000	3000	78.8	720	14.14	0.86	47880
3	4000	4000	105.1	960	13.78	1.22	64610
4	4500	4500	118.3	1080	13.62	1.38	72380
5	5000	5000	131.4	1200	13.45	1.55	80400
6	500	500	13.1	120	14.93	0.07	6530
7	3000	3000	78.8	720	14.10	0.90	47820
8	4000	4000	105.1	960	13.78	1.22	64100
9	4500	4500	118.3	1080	13.59	1.41	73100
10	5000	5000	131.4	1200	13.45	1.55	80000
11	500	500	13.1	120	15.00	0	Dial Ind. zeroed
12	3000	3000	78.8	720	14.22	0.88	
13	5000	5000	131.4	1200	13.61	1.39	
14	6150	6150	161.6	1476	13.23	1.77	
15	7000	7000	184.0	1680	12.91	2.09	
16	500	500	13.1	120	14.95	0.05	
17	3000	3000	78.8	720	14.14	0.86	
18	5000	5000	131.4	1200	13.54	1.46	
19	6150	6150	161.6	1476	13.17	1.83	
20	7000	7000	184.0	1680	12.90	2.10	
21	500	500	13.1	120	14.95	0.05	
22	3000	3000	78.8	720	14.14	0.86	
23	5000	5000	131.4	1200	13.52	1.48	
24	6150	6150	161.6	1476	13.17	1.83	
25	7000	7000	184.0	1680	12.89	2.11	
26	500	500	13.1	120	14.94	0.06	
27	3000	3000	78.8	720	14.13	0.87	
28	5000	5000	131.4	1200	13.52	1.48	

PI TENDONS

TEST READINGS

PRESTRESSING INDUSTRIES

A DIVISION OF THE TEXTAR CORPORATION

PREPARED BY	DATE
CHECKED BY	SHEET NO
JOB NO. Test No. 1100H186-2	OF

P. I. - 14

Stage	Hydr. Pressure Calc. (psi)	Hydr. Pressure Obs. (psi)	Stress in Wire (ksi)	Axial Load See Pg. 52 for Calcs. (kips)	Elongation Reading Scale Bar (ins)	Elongation Observed (ins)	Remarks
29	6150	6150	161.6	1476	13.17	1.83	
30	7000	7000	184.0	1680	12.90	2.10	
31	7500	7500	197.1	1800	12.70	2.30	
32	7750	7750	203.7	1860	12.57	2.43	
33	8000	8000	210.2	1920	12.42	2.58	
34	8250	8250	216.8	1980	12.26	2.74	
35	8500	8500	223.4	2040	11.93	3.07	
36	8750	8750	230.0	2100	11.42	3.58	
37	500	500	13.1	120	14.09	0.91	
38	6150	6150	161.6	1476	12.23	2.77	
39	7000	7000	184.0	1680	11.95	3.05	
40	7500	7500	197.1	1800	11.77	3.23	
41	7750	7750	203.7	1860	11.67	3.33	
42	8000	8000	210.2	1920	11.60	3.40	
43	8250	8250	216.8	1980	11.47	3.53	
44	8500	8500	223.4	2040	11.37	3.63	
45	8750	8750	230.0	2100	11.07	3.93	
46	500	500	13.1	120	13.79	1.21	
47	6150	6150	161.6	1476	11.91	3.09	
48	8000	8000	210.2	1920	11.26	3.74	
49	8250	8300	218.1	1992	11.11	3.89	
50	8500	8500	223.4	2040	11.04	3.96	
51	8750	8750	230.0	2100	10.87	4.13	
52	500	500	13.1	120	13.60	1.40	
53	6150	6150	161.6	1476	11.75	3.25	
54	8750	8750	230.0	2100	10.72	4.28	

PI TENDONS

TEST READINGS

PRESTRESSING INDUSTRIES

A DIVISION OF THE TEXSTAR CORPORATION

PREPARED BY	DATE
CHECKED BY	SHEET NO
	OF

P. I. - 14

Gage	Hydr. Pressure Calc.	Hydr. Pressure Obs.	Stress (ksi)	Axial Load (See Pg. 52 for Calcs. Kips)	Elongation Reading (Scale Bar ins)	Elongation (Dial Gage ins)	Remarks
55	6500	6500	173.1	1320	13.44	1.56	Dial Indicator removed
56	6900	6900	174.0	1380	11.29	3.71	
57	7000	7000	191.1	1800	11.10	3.90	
58	7250	7250	193.3	1860	11.03	3.97	
59	7400	7400	210.3	1920	10.93	4.07	
60	8250	8250	216.8	1980	10.83	4.17	
61	8500	8500	223.4	2040	10.73	4.27	
62	8750	8750	230.0	2100	10.60	4.40	
63	9000		236.5	2136	9.02	5.98	
64		9250	243.2	2142	8.82	6.18	One (1) wire break
65		9500	249.8	2136	8.58	6.42	
66		9750	255.9	2142	8.42	6.58	One (1) wire break
67		9750	257.1	2142	8.22	6.78	Two (2) wire breaks
68		9750	257.7	2124	7.88	7.12	Three (3) wire breaks
69		9750	257.6	2088	7.62	7.38	Two (2) wire breaks
70		9750	238.9	2076	7.22	7.78	

PRESTRESSING INDUSTRIES
A DIVISION OF THE TEXSTAR CORPORATION

TEST READINGS

PREPARED BY	DATE
CHECKED BY	SHEET NO
JOB NO. Test No. 1100H186-2	OF

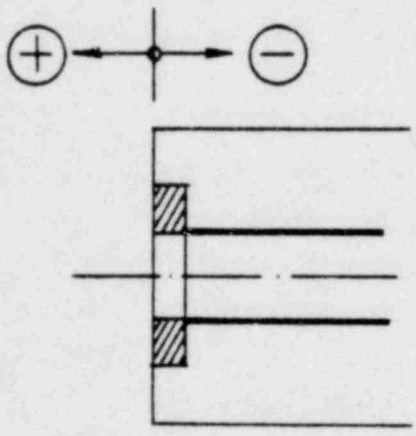
P 1 - 14

DIAL INDICATOR READINGS

All readings are in thousandths of an inch. For example, 5 means 0.005".

Sign convention:

A positive reading reflects an outward deflection and a negative reading an inward deflection.



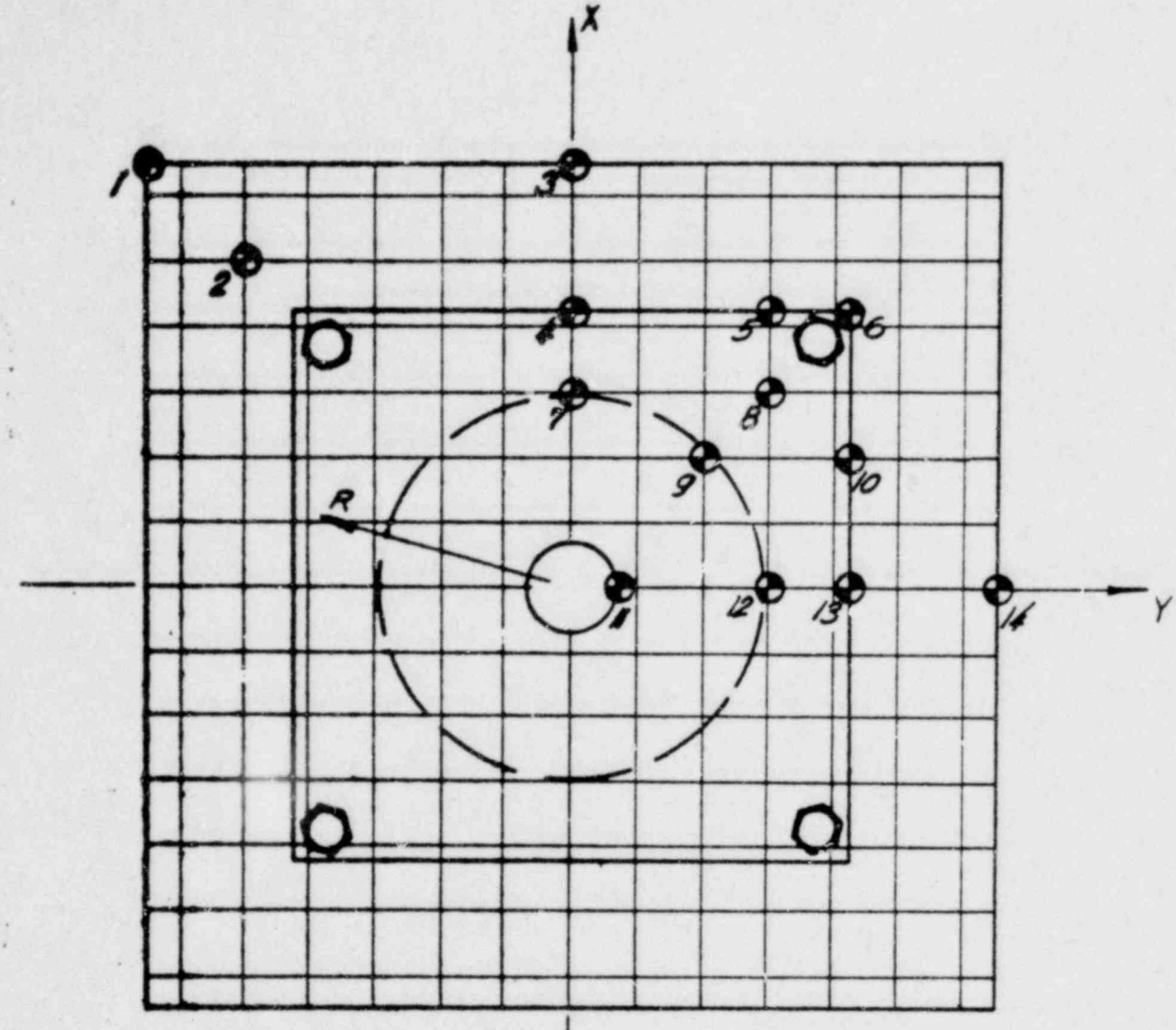


Fig. 7

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
X (ins)	13	10	13	8.5	8.5	8.5	6	6	4	4	0	0	0	
Y (ins)	-13	-10	0	0	6	8.5	0	6	4	8.5	1.5	6	8.5	13
R (ins)	18.4	14.14	13.0	8.5	10.4	12.05	6.0	8.5	5.65	9.4	1.5	6.0	8.5	13.

DIAL INDICATORS LOCATIONS

PRESTRESSING INDUSTRIES

A DIVISION OF THE TEXSTAR CORPORATION

PREPARED BY MKR	DATE
CHECKED BY	SHEET NO
JOB NO Test No	
1100 H 186-	OF

Stage	Dial Indicator Readings 1	2	3	4	5	6	7	Pressure Gage Readings (lbs/sq. in
1	0	0	0	0	0	0	0	500
2	0	0	0	- 3	- 2	0	- 7	3000
3	1	-1	-1	- 4	- 3	0	-10	4000
4	1	-1	-1	- 5	- 4	0	-12	4500
5	1	-1	-1	- 6	- 5	0	-14	5000
6	0	0	0	- 2	- 2	-1	- 3	500
10	1	-1	-1	- 7	- 5	-1	-14	5000
11	0	0	0	0	0	0	0	500
12	0	0	0	- 4	- 3	-1	- 8	3000
13	1	-1	-1	- 6	- 4	-1	-13	5000
14	2	-2	-1	- 8	- 5	-1	-18	6150
15	3	-2	-1-1/2	-11	- 6	-2	-23	7000
16	2	0	0	- 4	- 2	-2	- 5	500
17	2	-1	-1	- 8	- 4	-3	-13	3000
18	3	-1	-1-1/2	-10	- 5	-3	-19	5000
19	3	-2	-1-1/2	-11	- 7	-2	-22	6150
20	4	-2	-2	-12	- 7	-3	-25	7000
21	2	0	-1/2	- 4	- 2	-2	- 5	500
22	2	-1	-1	- 8	- 5	-3	-14	3000
23	3	-2	-1-1/2	-10	- 6	-2	-20	5000
24	4	-2	-2	-12	- 7	-3	-23	6150
25	4	-2	-2	-13	- 7	-4	-25	7000
26	2	0	-1	- 5	- 4	-3	- 8	500
27	3	-1	-1-1/2	- 9	- 6	-4	-15	3000
28	4	-2	-2	-12	- 7	-4	-21	5000
29	4	-2	-2	-13	- 8	-4	-23	6150

TEST READINGS

THE PRESCON CORPORATION

Test No. 1100H186-2

Stage	Dial Indicator Readings							Pressure Gage Readings (lbs. sq. in.)
	1	2	3	4	5	6	7	
30	5	-2	-2	-14	- 8	-4	-26	7000
31	5	-2	-3	-15	- 9	-3	-28	7500
32	5	-3	-3	-16	- 9	-3	-30	7750
33	5	-3	-3	-17	-10	-4	-32	8000
34	5	-3	-3	-18	- 9	-3	-34	8250
35	5	-3	-4	-19	-10	-3	-36	8500
36	6	-3	-4	-20	-10	-3	-38	8750
37	4	0	-2	- 8	- 4	-2	-14	500
38	6	-2	-3	-18	- 9	-3	-32	6150
39	6	-2	-3-1/2	-19	-10	-3	-34	7000
40	6	-2	-4	-20	-10	-3	-36	7500
41	6	-2	-4	-21	-10	-3	-38	7750
42	6	-2	-4	-21	-10	-4	-38	8000
43	6	-3	-5	-22	-10	-4	-39	8250
44	6	-3	-4	-22	-11	-4	-40	8500
45	7	-3	-4-1/2	-23	-11	-4	-42	8750
46	5	0	-2	- 9	- 3	-2	-14	500
47	7	-2	-4	-20	-10	-4	-34	6150
48	8	-3	-4-1/2	-23	-11	-4	-40	8000
49	8	-3	-4-1/2	-24	-11	-4	-41	8300
50	8	-3	-5	-24	-12	-4	-42	8500
51	8	-3	-5	-25	-12	-4	-43	8750
52	5	0	-2	-10	- 5	-3	-17	500
53	7	-1-1/2	-4	-21	-11	-4	-35-1/2	6150
54	8	-2	-5	-25	-12	-5	-43-1/2	8750
55	5	0	-3	-11	- 5	-3	-18	500

TEST READINGS

PRESTRESSING INDUSTRIES
A DIVISION OF THE TEXSTAR CORPORATION

PREPARED BY	DATE
CHECKED BY	SHEET NO
JOB NO. Test No. 1100H186-2	OF

Stage	Dial Indicator Readings							Pressure Gage Readings (lbs/sq. in)
	8	9	10	11	12	13	14	
1	0	0	0	0	0	0	0	500
2	- 3-1/2	- 8-1/2	- 3	-14	- 8	- 3	0	3000
3	- 5	-13	- 4-1/2	-20-1/2	-10	- 5	0	4000
4	- 6	-15	- 5-1/2	-25	-13	- 5	0	4500
5	- 8	-17	- 6	-29-1/2	-15	- 6	0	5000
6	- 2	- 3	- 2	- 5	- 4	- 2	0	500
10	- 8	-17	- 7	-30	-15	- 7	0	5000
11	0	0	0	0	0	0	0	500
12	- 5	-12	- 4-1/2	-16	- 9	- 4	0	3000
13	- 7	-18	- 6	-27	-15	- 6	0	5000
14	- 9	-23	- 9	-40	-19	- 9	-1/2	6150
15	-13	-29	-11	-56	-25	-12	-1	7000
16	- 4	- 7	- 3	-18	- 6	- 4	0	500
17	- 8	-17	- 7	-23	-14	- 7	0	3000
18	-11	-23	- 9	-45	-20	-10	-1	5000
19	-12	-27	-10-1/2	-52	-23	-11-1/2	-1	6150
20	-14	-30	-12	-58	-26	-13	-1	7000
21	- 4	- 7	- 3	-18	- 5	- 3-1/2	0	500
22	- 9	-18	- 8	-35	-15	- 8	-1/2	3000
23	-12	-25	-10	-47	-21	-11	-1	5000
24	-13	-28	-11	-54	-25	-13	-1	6150
25	-15	-32	-12	-60	-27	-14	-1-1/2	7000
26	- 5	- 9	- 4-1/2	-21	- 8	- 5	-1/2	500
27	-10	-19	- 8-1/2	-37-1/2	-16	- 9	-1	3000
28	-13	-25	-11	-50	-22	-12	-1	5000
29	-14	-29	-12	-56	-25	-14	-1	6150

TEST READINGS

PRESTRESSING INDUSTRIES
A DIVISION OF THE TEXSTAR CORPORATION

PREPARED BY	DATE
CHECKED BY	SHEET NO
JOB NO Test No.	
1100H186-2	OF

P I - 14

Stage	Dial Indicator Readings							Pressure Gage Readings (lbs/sq. in
	8	9	10	11	12	13	14	
30	-16	-32	-13	-61	-28	-15	-1	7000
31	-16	-33	-14	-63	-30	-15	-1	7500
32	-18	-36	-14	-73-1/2	-31	-16	-1-1/2	7750
33	-19	-38	-15	-80	-34	-18	-1-1/2	8000
34	-20	-40	-16	-86	-36	-18	-2	8250
35	-20	-42	-16	-95	-38	-19-1/2	-2	8500
36	-22	-44	-18	-102	-40	-20-1/2	-2	8750
37	- 8	-15	- 6	-50	-13	- 8	-1	500
38	-18	-37	-15	-86	-33	-18	-2	6150
39	-20	-40	-	-92	-36	-19	-2	7000
40	-20	-42	-16	-95	-38	-20	-2	7500
41	-21	-43	-17	-96	-39	-20	-2	7750
42	-21	-43	-17	-98	-39	-20-1/2	-2	8000
43	-22	-44	-18	-101	-41	-21	-2	8250
44	-22	-45	-18	-103	-42	-21-1/2	-2	8500
45	-23	-47	-19	-107	-43	-22	-2	8750
46	- 8	-17	- 6	-53	-14	- 8	-1	500
47	-19	-39	-16	-91-1/2	-36	-19	-2	6150
48	-23	-46	-19	-105	-42	-22	-2	8000
49	-23	-47	-19	-108	-43	-22-1/2	-2	8300
50	-24	-48	-19	-108	-44	-23	-2-1/2	8500
51	-25	-48	-19-1/2	-120	-45	-23-1/2	-2-1/2	8750
52	- 9-1/2	-18	- 7-1/2	-47	-16	- 9-1/2	-1	500
53	-21	-40	-17	-85	-37	-20	-2	6150
54	-25	-50	-20	-104	-45	-24	-3	8750
55	-10	-19	- 8	-50	-16	-10	-1	500

PI TENDONS

TEST READINGS

PRESTRESSING INDUSTRIES
A DIVISION OF THE TEXSTAR CORPORATION

PREPARED BY	DATE
CHECKED BY	SHEET NO
JOB NO. Test No. 1100H18b-3	OF

BEFORE TESTING

Y / X	-8.5	-8	-6	-4	-2	0	2	4	6	8	8.5	Y / X
8.5	-52	-49	-30	-18	- 8	2	14	21	23	30	27	8.5
8	-49	-43	-27	-15	- 4	7	17	23	29	32	26	8
6	-34	-29	-15	- 4	5	14	24	32	42	45	46	6
4	-22	-16	- 5	4	16	X	33	41	47	52	51	4
2	-11	- 6	5	14	24	31	39	46	51	57	55	2
0	0	3	13	X	30	X	45	X	56	61	60	0
-2	4	12	21	29	40	44	51	55	61	65	63	-2
-4	7	16	26	33	42	X	55	59	64	68	66	-4
-6	14	23	32	40	47	53	58	64	68	72	70	-6
-8	10	26	38	45	51	56	61	65	69	71	66	-8
-8.5	5	26	37	45	50	54	60	64	67	68	63	-8.5
X / Y	-8.5	-8	-6	-4	-2	0	2	4	6	8	8.5	X

READINGS IN THOUSANDTHS OF AN INCH

ANCHOR PLATE PROFILE

PRESTRESSING INDUSTRIES

A DIVISION OF THE TENSTAR CORPORATION

PREPARED BY: MKR

CHECKED BY:

SHEET NO

Test No.

1100 H 186-2

AFTER TESTING

X \ Y	-8.5	-8	-6	-4	-2	0	2	4	6	8	8.5	Y / X
8.5	-46	-41	-31	-22	-14	- 7	3	12	17	27	32	8.5
8	-41	-38	-27	-19	-12	- 2	7	15	21	33	31	8
6	-33	-29	-21	-13	-10	- 1	10	20	29	37	38	6
4	-26	-21	-15	-12	- 8	X	9	22	33	41	41	4
2	-17	-13	- 9	- 7	-42	-34	-24	23	35	47	45	2
0	- 8	- 7	- 2	X	-39	X	-21	X	39	49	48	0
-2	- 2	0	5	6	-32	-23	-15	34	46	56	53	-2
-4	3	7	12	15	19	X	33	44	52	62	61	-4
-6	12	17	22	26	33	38	44	54	61	68	67	-6
-8	16	23	31	36	42	47	53	60	67	71	64	-8
-8.5	10	25	32	37	42	47	52	60	66	69	67	-8.5
X / Y	-8.5	-8	-6	-4	-2	0	2	4	6	8	8.5	Y \ X

READINGS IN THOUSANDTHS OF AN INCH

ANCHOR PLATE PROFILE

PRESTRESSING INDUSTRIES

A DIVISION OF THE TEXSTAR CORPORATION

PREPARED BY MKR	DATE
CHECKED BY	SHEET NO
Test No. 1100 H 186-2	OF

BEFORE TESTING

X \ Y	-13	-12	-10	-8	-6	-4	-2	0	2	4	6	8	10	12	13	Y \ X
13	0	3	0	1	14	9	-14	-16	-15	-12	-9	-5	-6	2	0	13
12	-26	-25	-26	-19	-9	-8	-20	-23	-19	-14	-13	-10	-6	0	3	12
10	-49	-46	-40	-29	-21	-15	-21	-22	-23	-18	-16	-12	-8	-3	-1	10
8	-50	-50	-42	-32	-28	-21	-24	-26	-23	-20	-19	-15	-10	-7	-3	8
6	-54	-54	-43	-37	-28	-25	-28	-27	-26	-22	-20	-16	-13	-9	-6	6
4	-53	-52	-44	-35	-27	-22				-23	-21	-17	-14	-9	-6	4
2	-51	-51	-43	-35	-28						-18	-16	-14	-9	-7	2
0	-50	-48	-40	-34	-23						-18	-16	-12	-7	-5	0
-2	-46	-46	-37	-29	-19						-16	-14	-10	-7	-3	-2
-4	-46	-47	-34	-26	-19	-16				-17	-15	-11	-9	-4	-1	-4
-6	-41	-39	-32	-22	-14	-13	-17	-19	-16	-14	-12	-8	-5	-1	1	-6
-8	-37	-34	-27	-18	-3	-10	-14	-16	-14	-10	-7	-5	-3	2	4	-8
-10	-31	-30	-21	-8	-4	-4	-8	-10	-8	-4	-4	-1	1	6	9	-10
-12	-28	-27	-17	-5	0	2	-4	-6	-6	0	2	5	7	11	12	-12
-13	-22	-23	-15	-4	5	4	-1	1	-3	1	3	5	8	13	29	-13
X \ Y	-13	-12	-10	-8	-6	-4	-2	0	2	4	6	8	10	12	13	X \ Y

READINGS IN THOUSANDTHS OF AN INCH

PI TENDONS

BEARING PLATE PROFILE

PRESTRESSING INDUSTRIES

A DIVISION OF THE TEXSTAR CORPORATION

PREPARED BY	DATE
CHECKED BY	SHEET NO
JOB NO	
	OF

AFTER TESTING

X \ Y	-13	-12	-10	-8	-6	-4	-2	0	2	4	6	8	10	12	13	Y \ X
13	0	7	2	5	19	11	-12	-18	-16	-19	-24	-8	-10	1	0	13
12	-25	-18	-18	-10	-3	-3	-18	-18	-18	-15	-15	-10	-7	-3	2	12
10	-40	-39	-33	-24	-15	-13	-20	-21	-21	-19	-15	-12	-8	-5	0	10
8	-50	-44	-39	-29	-23	-20	-23	-25	-22	-21	-18	-14	-10	-6	-1	8
6	-55	-50	-42	-33	-26	-24	-25	-24	-23	-23	-19	-15	-12	-8	-3	6
4	-54	-51	-43	-35	-27	-24				-23	-21	-15	-11	-7	-2	4
2	-53	-54	-44	-36	-28						-18	-14	-10	-6	-1	2
0	-44	-52	-44	-36	-26						-18	-12	-9	-6	1	0
-2	-48	-53	-44	-34	-24						-15	-11	-7	-1	4	-2
-4	-53	-57	-43	-32	-25	-19				-14	-13	-8	-3	4	7	-4
-6	-51	-51	-42	-31	-22	-18	-20	-20	-16	-13	-12	-3	1	7	11	-6
-8	-48	-48	-39	-28	-22	-17	-18	-18	-13	-5	-4	1	5	13	18	-8
-10	-48	-46	-35	-21	-14	-12	-13	-12	-9	-3	0	3	11	18	24	-10
-12	-43	-45	-34	-13	-11	-5	-10	-8	-4	4	6	15	18	24	26	-12
-13	-37	-42	-30	-16	-6	-4	-5	1	-2	3	9	15	21	29	38	-13
X \ Y	-13	-12	-10	-8	-6	-4	-2	0	2	4	6	8	10	12	13	X \ Y

READINGS IN THOUSANDTHS OF AN INCH

BEARING PLATE PROFILE

PRESTRESSING INDUSTRIES

A DIVISION OF THE TEXSTAR CORPORATION

PREPARED BY	DATE
CHECKED BY	SHEET NO
JOB NO	

TEST RESULTS

(A) FORCE-STRAIN CURVE (TENDON)

Relationship between Pressure Reading and Tendon Force:

R	=	Pressure Reading (lbs./sq. in.)
A	=	Total Ram Area - 249.3 sq. in.
K	=	Correction Factor
T	=	True Tendon Force (lbs.)
L	=	Load Cell Reading
C	=	Load Cell Correction
F	=	Load Cell Scale Factor - 15.0
K·R·A	=	(L + C) F = T
K	=	(L + C) F/R·A

R (psi)	L	C	K
500	6090	180	0.752
3000	47880	190	0.964
4000	64610	- 80	0.971
4500	72380	-190	0.965
5000	80400	-400	0.962
500	6530	200	0.808
3000	47820	180	0.963
4000	64100	-100	0.963
4500	73100	-200	0.974
5000	80000	-400	0.957

$K_{average}$ for $R \geqslant 3000 = 0.963$

True Load $T = K \cdot R \cdot A = 0.963 \cdot 249.3 \cdot R = 240 \cdot R$

The Forces in the test reading tables are based on this relationship, assuming that the True Load - Pressure Reading Curve is a straight line through the whole force range (which is not necessarily true, but is as close as possible).

Relationship between observed Elongation and True Elongation:

The measured elongations include concrete shortening and pull rod elongation.

f = Stress in the tendon (lbs./sq. in.)

e = True Elongation (in.)

e_o = Observed Elongation (in.)

e_c = Concrete Shortening (in.)

e_p = Pull rod Elongation (in.)

$$e = e_o - e_c - e_p$$

Concrete Shortening:

$$e_c = \frac{f_{c1} \ell_{c1}}{E_{c1}} + \frac{f_{c2} \ell_{c2}}{E_{c2}}$$

Test Stand: $f_{c1} = 186 \cdot 0.0491 f / (48^2 - 7.25^2 \pi) = 0.00427f$

$\ell_{c1} = 228"$

$E_{c1} = 6 \cdot 10^6$ psi

Anchoring Block: $f_{c2} = 186 \cdot 0.0491\ f / (52^2 - 6^2 \pi) = 0.00352f$

$\ell_{c2} = 48"$

$E_{c2} = 4.5 \cdot 10^6$ psi

$e_c = (0.162 + 0.042) \cdot 10^{-6} f = 0.204 \cdot 10^{-6} f$

Pull rod Elongation:

$$e_p = f_p L_p / E_p$$

$$f_p = 186 \cdot 0.0491 \cdot f / 3.75^2 \pi = 0.2067f$$

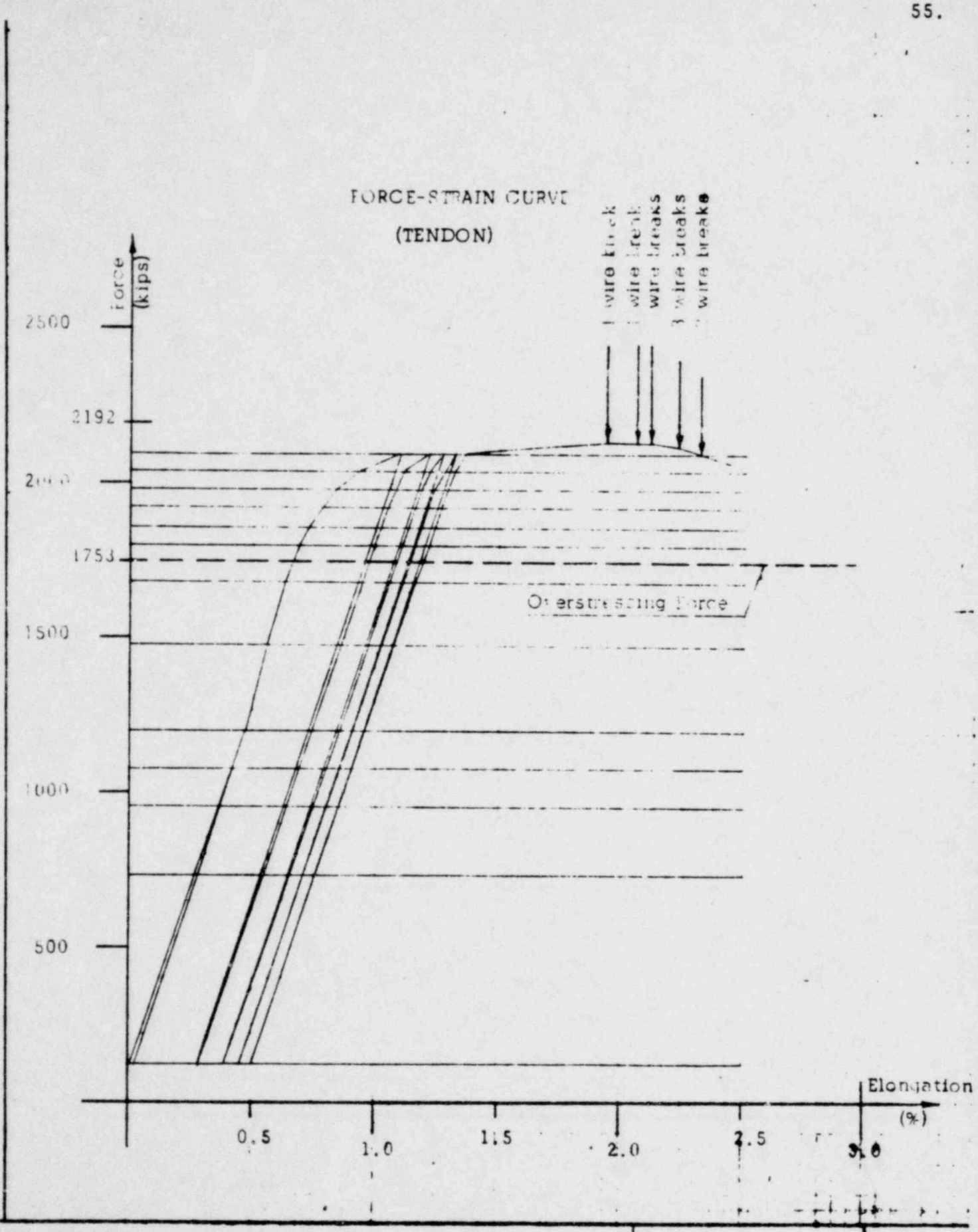
$$l_p = 72"$$

$$E_p = 30 \cdot 10^6 \text{ psi}$$

$$e_p = 0.496 \cdot 10^{-6} f$$

$$e = e_o - 0.7 \cdot 10^{-6} f$$

The Force-Strain Curve for the Tendon is shown on page 55.



THE PRESCON CORPORATION

SUBJECT

JOB NO.

FILE NO.

DATE

BY

SHEET NO.

(B) LOAD-DEFLECTION CURVES
(TEST ANCHOR)

DIAL INDICA . READINGS

Pressure Reading	500	3000	4000	4500	5000	6150	7000	7500	7750	8000	8250	8500	8750
1 to 5	0	0	1	1	1								
6 to 10	0				1								
11 to 15	0	0			1	2	3						
16 to 20	2	2			3	3	4						
21 to 25	2	2			3	4	4						
26 to 36	2	3			4	4	5	5	5	5	5	5	6
37 to 45	4					6	6	6	6	6	6	6	7
46 to 51	5					7				8	8	8	8
52 to 54	5					7							8
55	5												

DIAL INDICATOR READINGS

Pressure Reading	500	3000	4000	4500	5000	6150	7000	7500	7750	8000	8250	8500	8750
1 to 5	0	0	-1	-1	-1								
6 to 10	0				-1								
11 to 15	0	0			-1	-2	-2						
16 to 20	0	-1			-1	-2	-2						
21 to 25	0	-1			-2	-2	-2						
26 to 36	0	-1			-2	-2	-2	-2	-3	-3	-3	-3	-3
37 to 45	0					-2	-2	-2	-2	-2	-3	-3	-3
46 to 51	0					-2				-3	-3	-3	-3
52 to 54	0					-1-1/2							-2
55	0												

DIAL INDICATOR READINGS

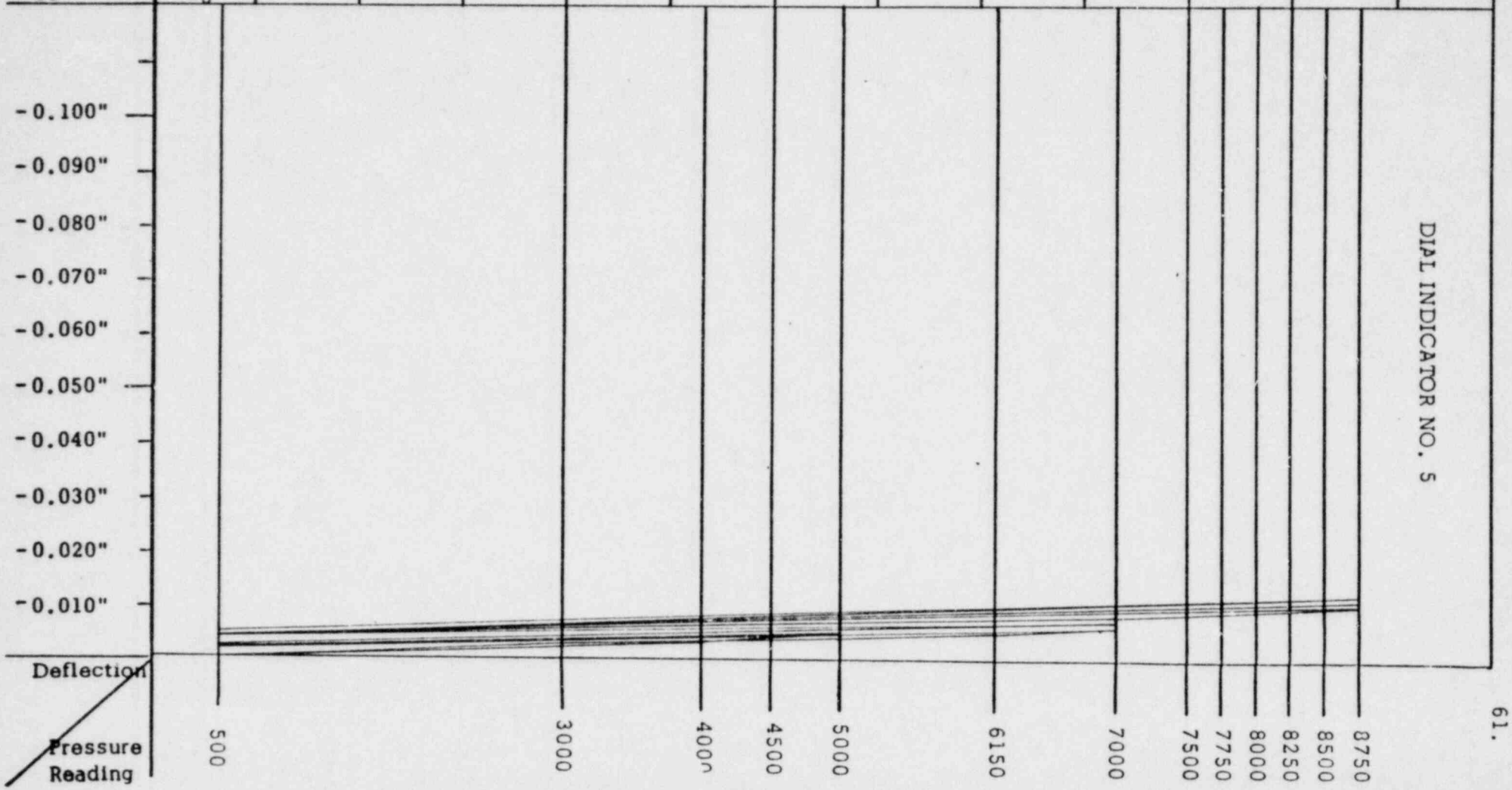
Pressure Reading	500	3000	4000	4500	5000	6150	7000	7500	7750	8000	8250	8500	8750
1 to 5	0	0	-1	-1	-1								
6 to 10	0				-1								
11 to 15	0	0			-1	-1	-1-1/2						
16 to 20	0	-1			-1-1/2	-1-1/2	-2						
21 to 25	-1/2	-1			-1-1/2	-2	-2						
26 to 36	-1	-1-1/2			-2	-2	-2	-3	-3	-3	-3	-4	-4
37 to 45	-2					-3	-3-1/2	-4	-4	-4	-5	-4	-4-1/2
46 to 51	-2					-4				-4-1/2	-4-1/2	-5	-5
52 to 54	-2					-4							-5
55	-3												

DIAL INDICATOR READINGS

Pressure Reading	500	3000	4000	4500	5000	6150	7000	7500	7750	8000	8250	8500	8750
1 to 5	0	-3	-4	-5	- 6								
6 to 10	-2				- 7								
11 to 15	0	-4			- 6	- 8	-11						
16 to 20	-4	-8			-10	-11	-12						
21 to 25	-4	-8			-10	-12	-13						
26 to 36	-5	-9			-12	-13	-14	-15	-16	-17	-18	-19	-20
37 to 45	-8					-18	-19	-20	-21	-21	-22	-22	-23
46 to 51	-9					-20				-23	-24	-24	-25
52 to 54	-10					-21							-25
55	-11												

DIAL INDICAT READINGS

Pressure Reading	500	3000	4000	4500	5000	6150	7000	7500	7750	8000	8250	8500	8750
1 to 5	0	-2	-3	-4	-5								
6 to 10	-2				-5								
11 to 15	0	-3			-4	-5	- 6						
16 to 20	-2	-4			-5	-7	- 7						
21 to 25	-2	-5			-6	-7	- 7						
26 to 36	-4	-6			-7	-8	- 8	- 9	- 9	-10	- 9	-10	-10
37 to 45	-4					-9	-10	-10	-10	-10	-10	-11	-11
46 to 51	-3					-10				-11	-11	-12	-12
52 to 54	-5					-11							-12
55	-5												

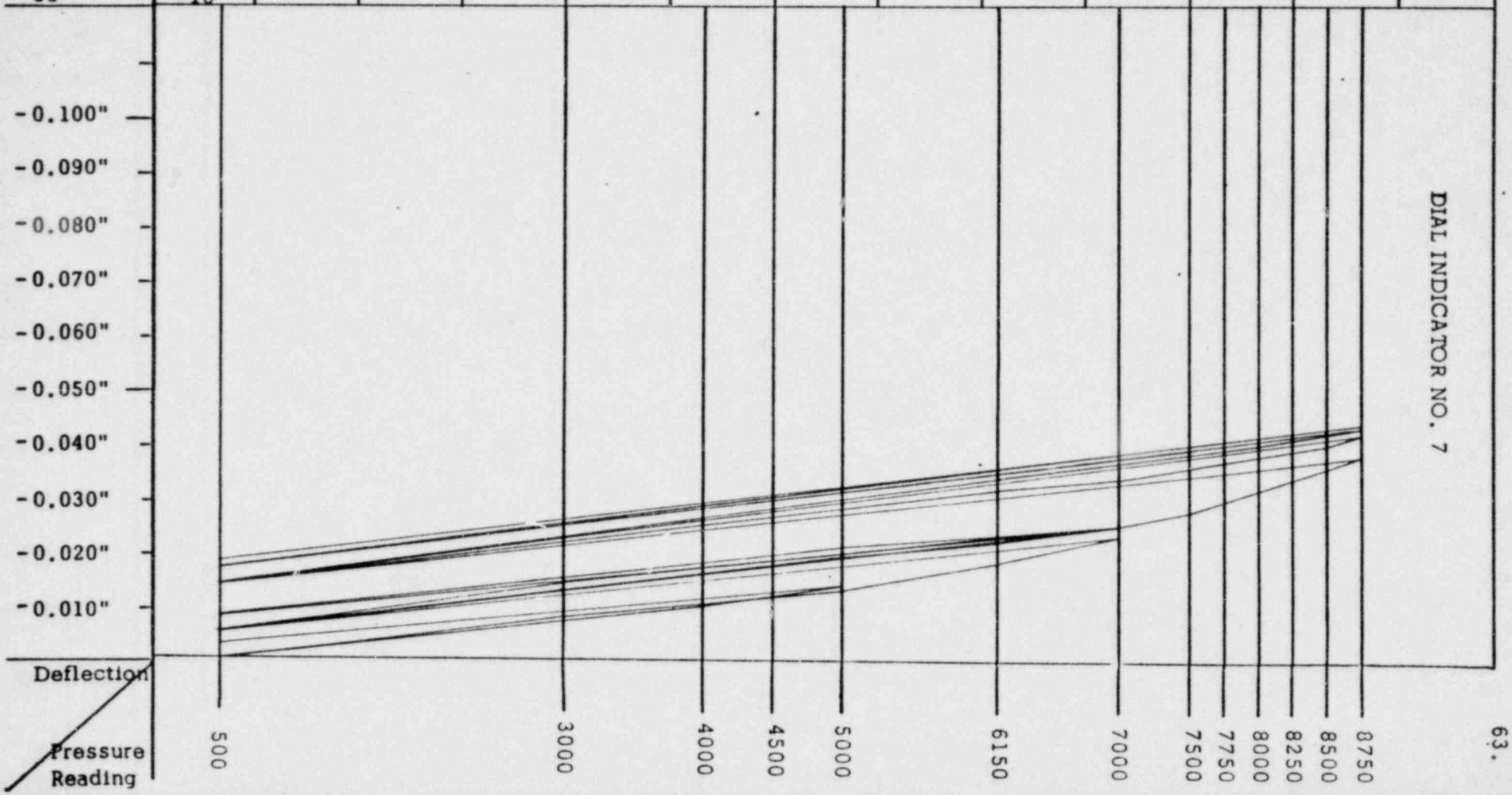


DIAL INDICAT.. READINGS

Pressure Reading	500	3000	4000	4500	5000	6150	7000	7500	7750	8000	8250	8500	8750
1 to 5	0	0	0	0	0								
6 to 10	-1				-1								
11 to 15	0	-1			-1	-1	-2						
16 to 20	-2	-3			-3	-2	-3						
21 to 25	-2	-3			-2	-3	-4						
26 to 36	-3	-4			-4	-4	-4	-3	-3	-4	-3	-3	-3
37 to 45	-2					-3	-3	-3	-3	-4	-4	-4	-4
46 to 51	-2					-4				-4	-4	-4	-4
52 to 54	-3					-4							-5
55	-3												

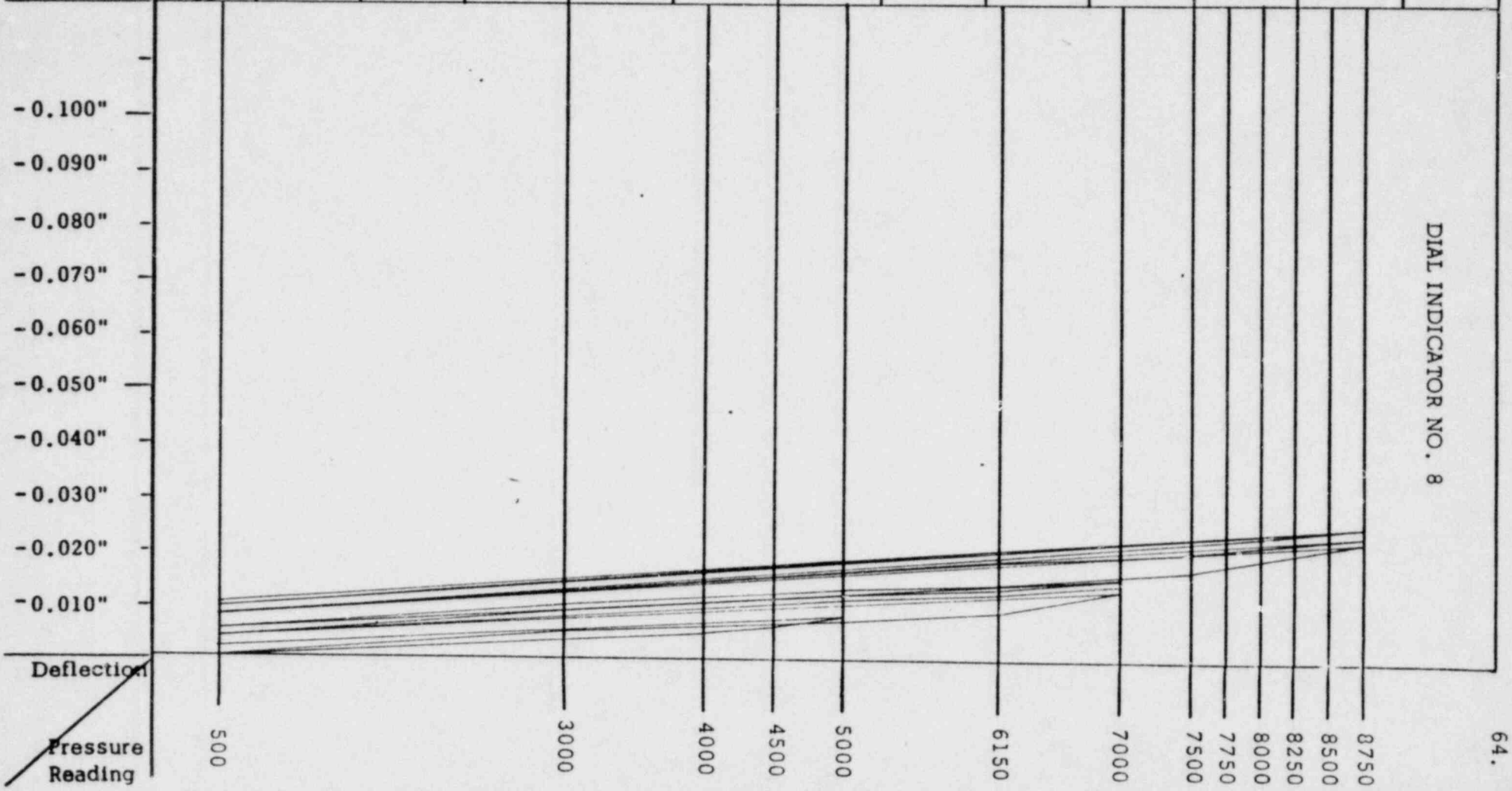
DIAL INDICATOR READINGS

Pressure Reading	500	3000	4000	4500	5000	6150	7000	7500	7750	8000	8250	8500	8750
1 to 5	0	- 7	-10	-12	-14								
6 to 10	- 3				-14								
11 to 15	0	- 8			-13	-18	-23						
16 to 20	- 5	-13			-19	-22	-25						
21 to 25	- 5	-14			-20	-23	-25						
26 to 36	- 8	-15			-21	-23	-26	-28	-30	-32	-34	-36	-38
37 to 45	-14					-32	-34	-36	-38	-38	-39	-40	-42
46 to 51	-14					-34				-40	-41	-42	-43
52 to 54	-17					-35-1/2							-43-1/2
55	-18												



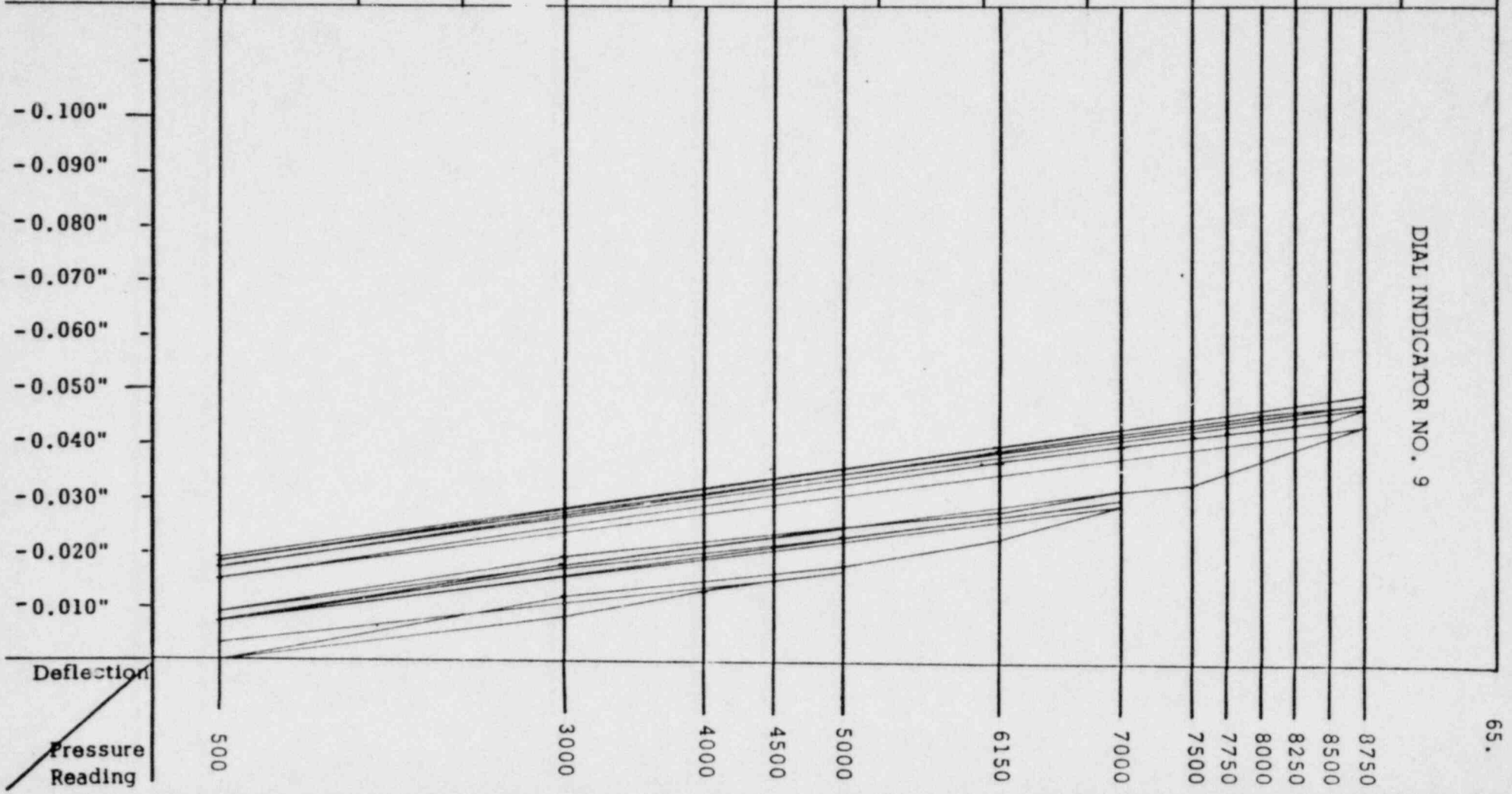
DIAL INDICAT READINGS

Pressure Reading	500	3000	4000	4500	5000	6150	7000	7500	7750	8000	8250	8500	8750
1 to 5	0	-3-1/2	-5	-6	- 8								
6 to 10	-2				- 8								
11 to 15	0	-5			- 7	- 9	-13						
16 to 20	-4	-8			-11	-12	-14						
21 to 25	-4	-9			-12	-13	-15						
26 to 36	-5	-10			-13	-14	-16	-16	-18	-19	-20	-20	-22
37 to 45	-8					-18	-20	-20	-21	-21	-22	-22	-23
46 to 51	-8					-19				-23	-23	-24	-25
52 to 54	-9-1/2					-21							-25
55	-10												



DIAL INDICATOR READINGS

Pressure Reading	500	3000	4000	4500	5000	6150	7000	7500	7750	8000	8250	8500	8750
1 to 5	0	-8-1/2	-13	-15	-17								
6 to 10	- 3				-17								
11 to 15	0	-12			-18	-23	-29						
16 to 20	- 7	-17			-23	-27	-30						
21 to 25	- 7	-18			-25	-28	-32						
26 to 36	- 9	-19			-25	-29	-32	-33	-36	-38	-40	-42	-44
37 to 45	-15					-37	-40	-42	-43	-43	-44	-45	-47
46 to 51	-17					-39				-46	-47	-48	-48
52 to 54	-18					-40							-50
55	-19												

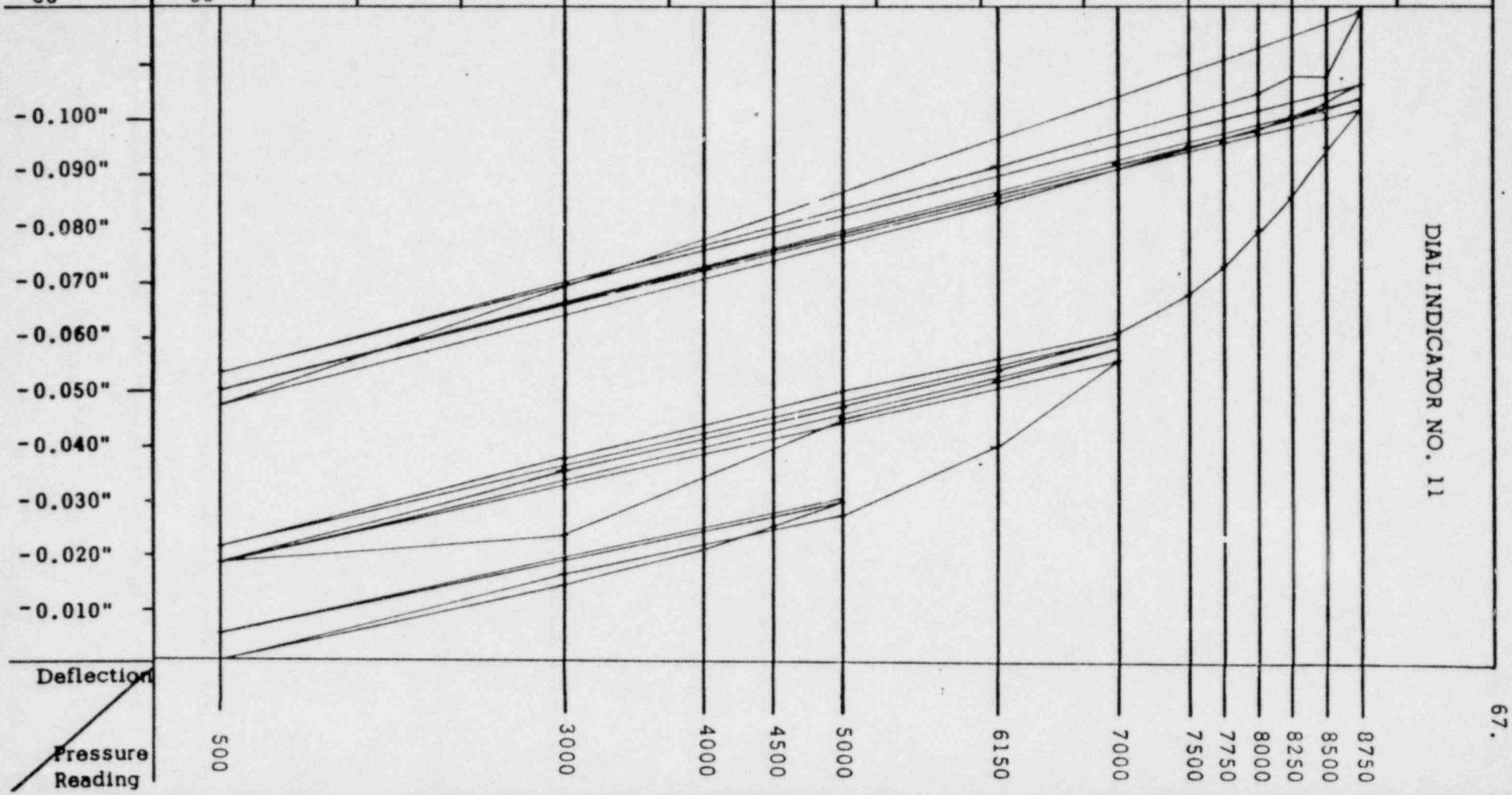


DIAL INDICAT READINGS

Pressure Reading	500	3000	4000	4500	5000	6150	7000	7500	7750	8000	8250	8500	8750
1 to 5	0	-3	-4-1/2	-5-1/2	- 6								
6 to 10	-2				- 7								
11 to 15	0	-4-1/2			- 6	- 9	-11						
16 to 20	-3	-7			- 9	-10-1/2	-12						
21 to 25	-3	-8			-10	-11	-12						
26 to 36	-4-1/2	-8-1/2			-11	-12	-13	-14	-14	-15	-16	-16	-18
37 to 45	-6					-15	-16	-16	-17	-17	-18	-18	-19
46 to 51	-6					-16				-19	-19	-19	-19-1/2
52 to 54	-7-1/2					-17							-20
55	-8												

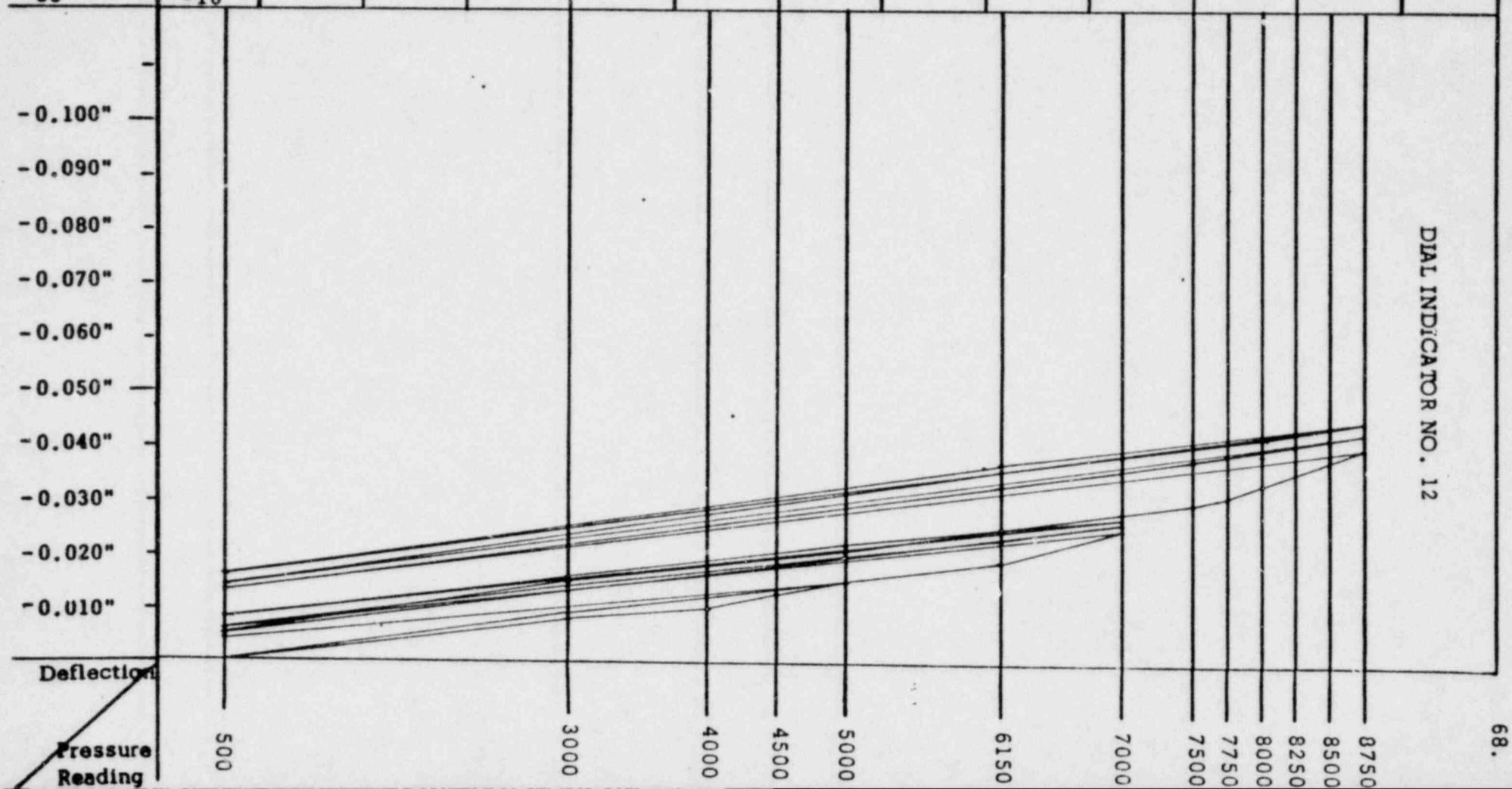
DIAL INDICAT... READINGS

Pressure Reading	500	3000	4000	4500	5000	6150	7000	7500	7750	8000	8250	8500	8750
1 to 5	0	-14	-20-1/2	-25	-29-1/2								
6 to 10	- 5				-30								
11 to 15	0	-16			-27	-40	-56						
16 to 20	-18	-23			-45	-52	-58						
21 to 25	-18	-35			-47	-54	-60						
26 to 36	-21	-37-1/2			-50	-56	-61	-68	-73-1/2	- 80	- 86	- 95	-102
37 to 45	-50					-86	-92	-95	-96	- 98	-101	-103	-107
46 to 51	-53					-91-1/2				-105	-108	-108	-120
52 to 54	-47					-85							-104
55	-50												



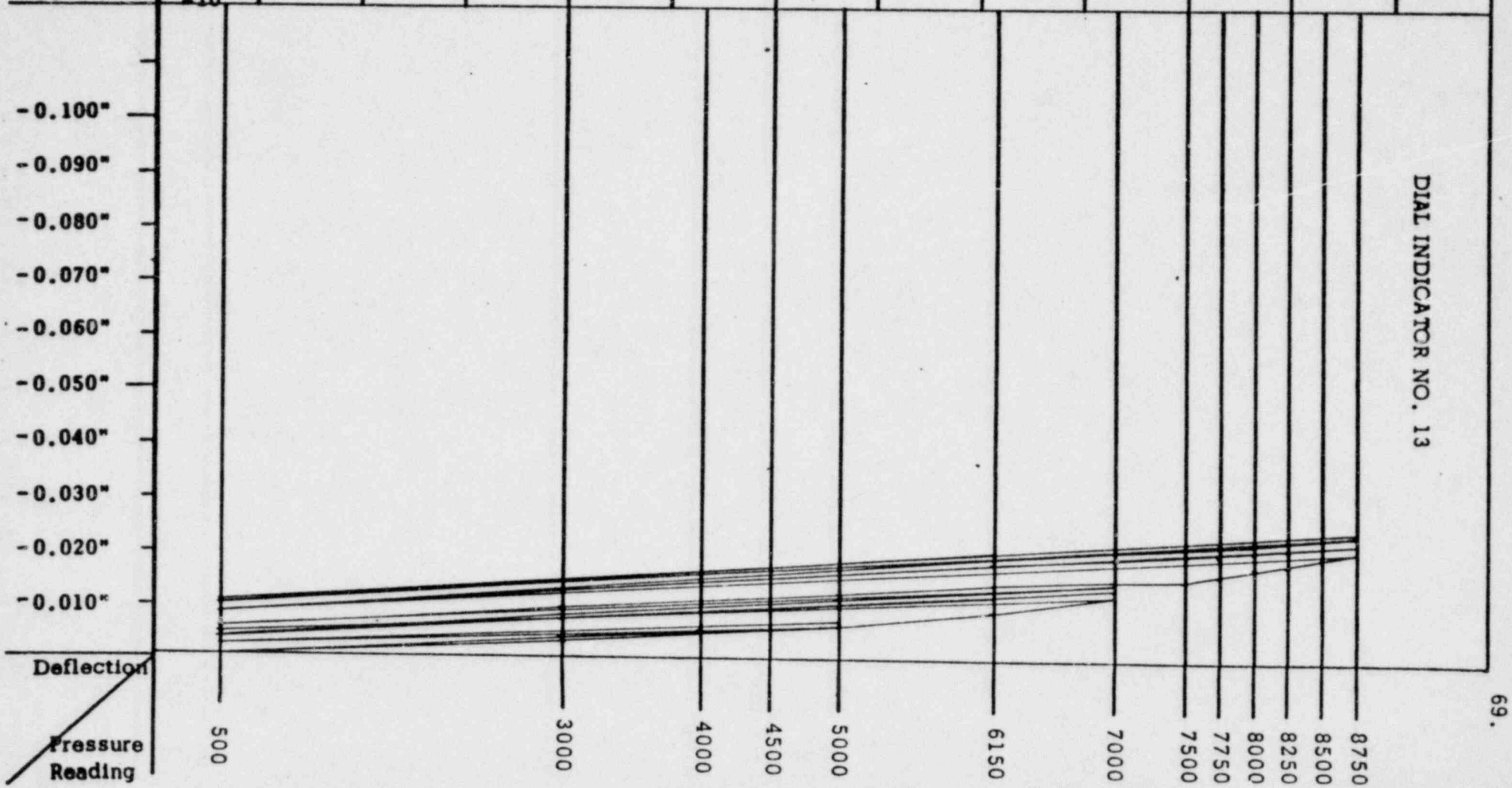
DIAL INDICATOR READINGS

Pressure Reading	500	3000	4000	4500	5000	6150	7000	7500	7750	8000	8250	8500	8750
1 to 5	0	- 8	-10	-13	-15								
6 to 10	- 4				-15								
11 to 15	0	- 9			-15	-19	-25						
16 to 20	- 6	-14			-20	-23	-26						
21 to 25	- 5	-15			-21	-25	-27						
26 to 36	- 8	-16			-22	-25	-28	-30	-31	-34	-36	-38	-40
37 to 45	-13					-33	-36	-38	-39	-39	-41	-42	-43
46 to 51	-14					-36				-42	-43	-44	-45
52 to 54	-16					-37							-45
55	-16												



DIAL INDICATOR READINGS

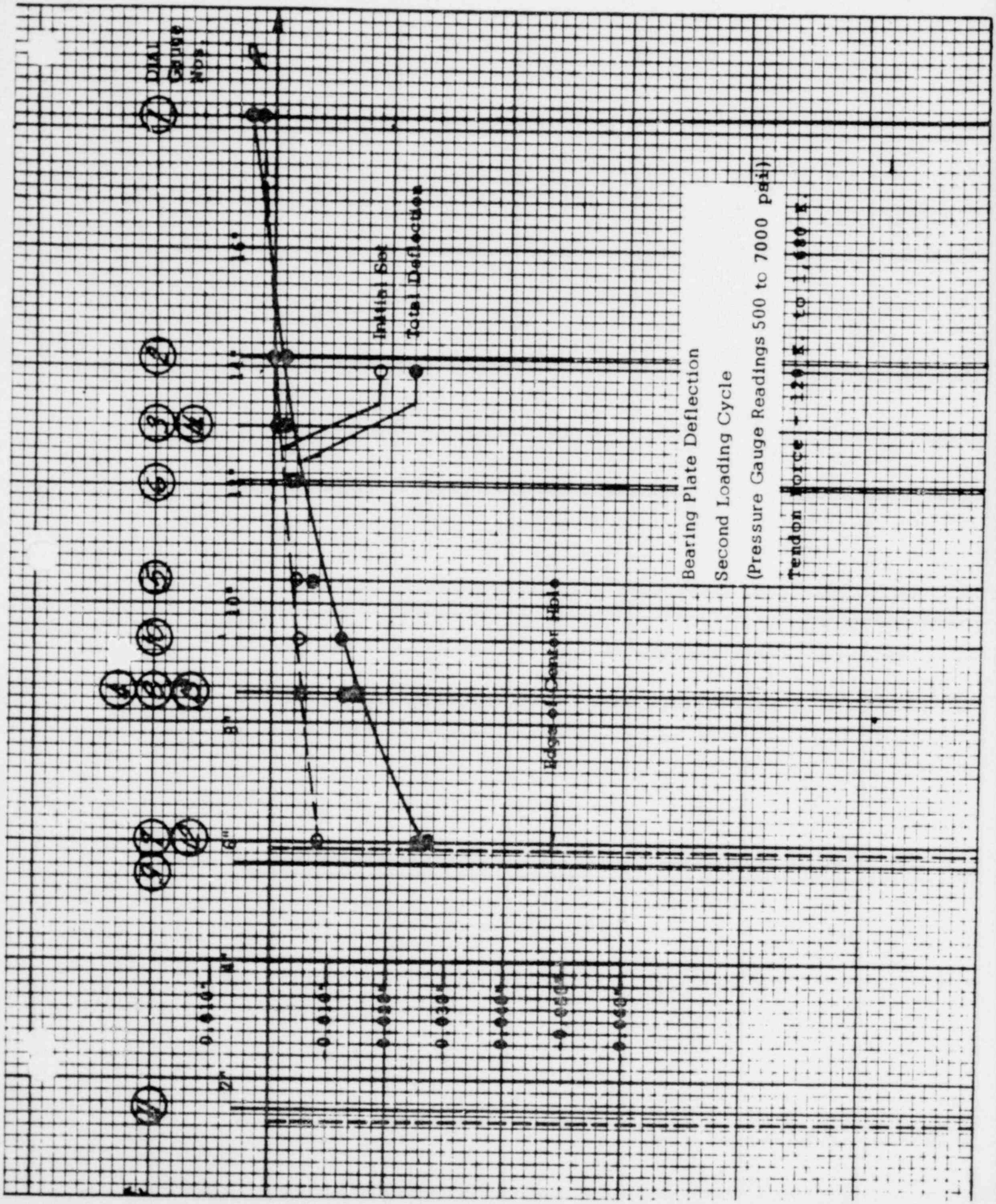
Pressure Reading	500	3000	4000	4500	5000	6150	7000	7500	7750	8000	8250	8500	8750
1 to 5	0	-3	-5	-5	- 6								
6 to 10	-2				- 7								
11 to 15	0	-4			- 6	- 9	-12						
16 to 20	-4	-7			-10	-11-1/2	-13						
21 to 25	-3-1/2	-8			-11	-13	-14						
26 to 36	-5	-9			-12	-14	-15	-15	-16	-18	-18	-19-1/2	-20-1/2
37 to 45	-8					-18	-19	-20	-20	-20-1/2	-21	-21-1/2	-22
46 to 51	-8					-19				-22	-22-1/2	-23	-23-1/2
52 to 54	-9-1/2					-20							-24
55	-10												

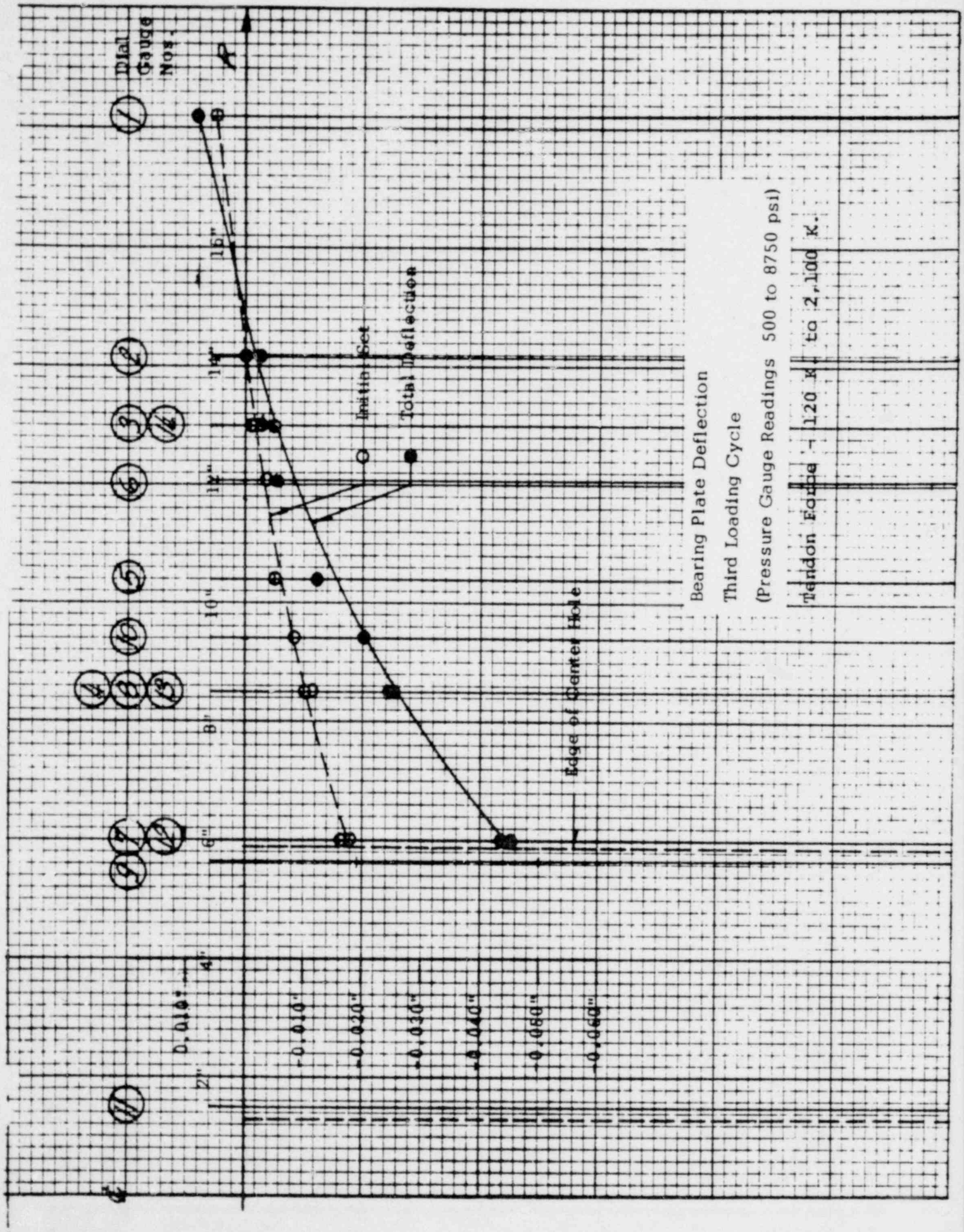


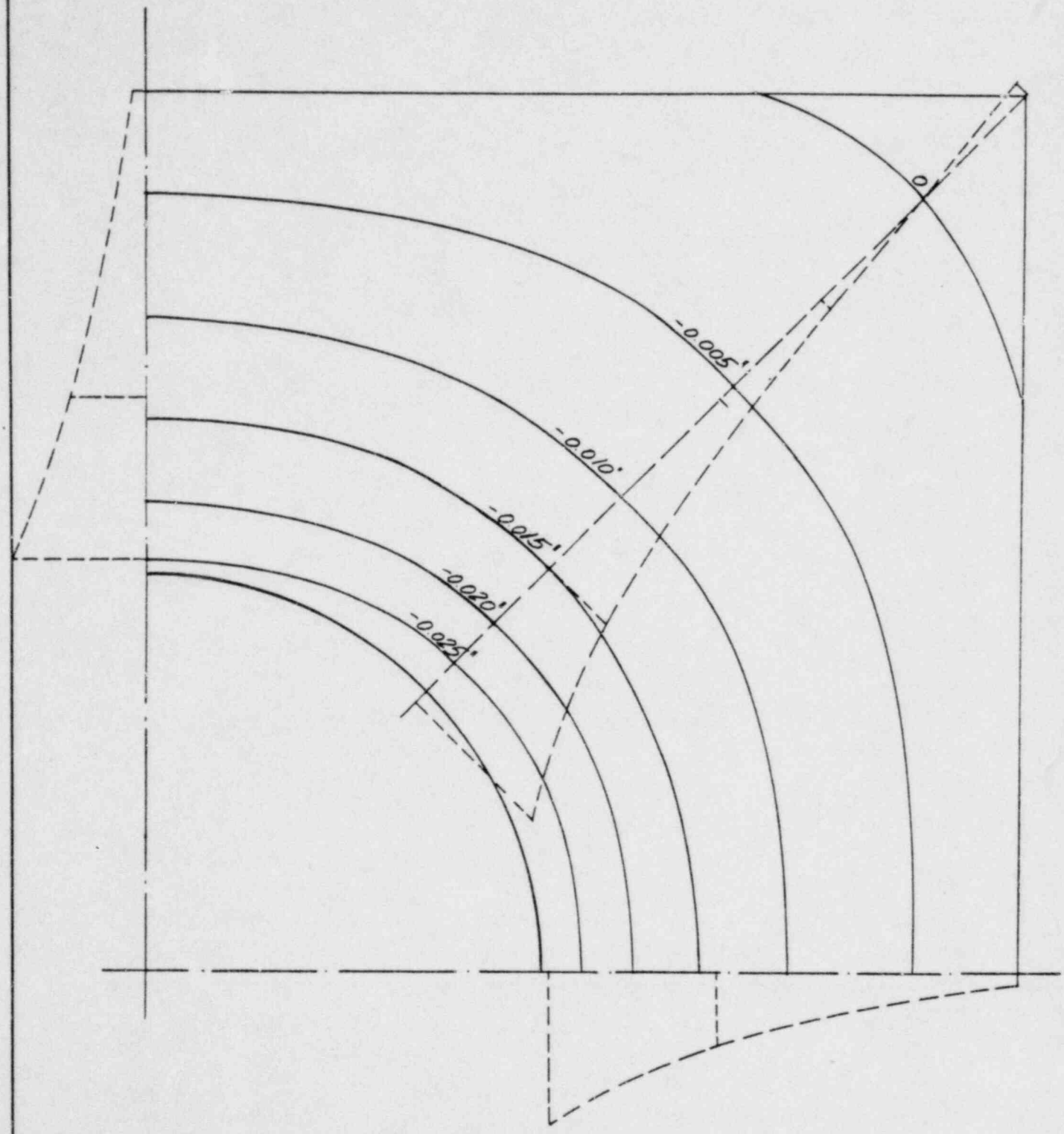
DIAL INDIC. READINGS

Pressure Reading	500	3000	4000	4500	5000	6150	7000	7500	7750	8000	8250	8500	8750
1 to 5	0	0	0	0	0								
6 to 10	0				0								
11 to 15	0	0			0	-1/2	-1						
16 to 20	0	0			-1	-1	-1						
21 to 25	0	-1/2			-1	-1	-1-1/2						
26 to 36	-1/2	-1			-1	-1	-1	-1	-1-1/2	-1-1/2	-2	-2	-2
37 to 45	-1					-2	-2	-2	-2	-2	-2	-2	-2
46 to 51	-1					-2				-2	-2	-2	-2-1/2
52 to 54	-1					-2							-3
55	-1												

The deflection readings on the dial indicators for corresponding pressure stages converge after initial set has occurred. This ensures an elastic behavior of the bearing plate.


Bearing Plate Deflection
Second Loading Cycle
(Pressure Gauge Readings 500 to 7000 psi)
Tendon Force = 120 K to 1,000 K
Initial Set
Total Deflection
Edge of Center Hole
DIAL Gauge Nos.
0.010"
0.020"
0.030"
0.040"
0.050"
0.060"
2"
4"
6"
8"
10"
12"
14"


Bearing Plate Deflection
Third Loading Cycle
(Pressure Gauge Readings 500 to 8750 psi)
Tendon Force = 120 K to 2,100 K.
Dial Gauge Nos.
Total Deflection
Edge of Center Hole
15"
12"
10"
8"
6"
4"
2"
0.010"
0.020"
0.030"
0.040"
0.050"
0.060"



The bearing plate elastic deflections as shown above correspond to the increase of load in the tendon from 5.5% (120 K) to 96% (2,100 K) of its minimum guaranteed ultimate strength.

(C) PERMANENT DEFORMATIONS IN ANCHOR COMPONENTS

NOTE:

As the tables show the deformations relative to an arbitrary level, which is not necessarily identical with the zero-level in the anchoring block, the profiles give a picture of the difference in deformation for any two points of the plate but not the true absolute deformations. However, for the anchor plate, the profiling level was adjusted to the test zero level according to the initial set readings on the dial indicators. The bearing plate profiles are recorded "as read".

PERMANENT DEFORMATIONS

X \ Y	-8.5	-8	-6	-4	-2	0	2	4	6	8	8.5	Y / X
8.5	6	8	- 1	- 4	- 6	- 9	-11	- 9	- 6	- 3	5	8.5
8	8	5	0	- 4	- 8	- 9	-10	- 8	- 5	1	5	8
6	1	0	- 6	- 9	-15	-15	-14	-12	-13	- 8	- 8	6
4	-4	- 5	-10	-16	-24	X	-24	-19	-14	- 9	-10	4
2	-6	- 7	-14	-21	-66	-65	-63	-23	-16	-10	-10	2
0	-8	-10	-15	X	-69	X	-66	X	-17	-12	-12	0
-2	-6	-12	-16	-23	-72	-67	-66	-21	-15	- 9	-10	-2
-4	-4	- 9	-14	-18	-23	X	-22	-15	-12	- 6	- 5	-4
-6	-2	- 6	-10	-14	-14	-15	-14	-10	- 7	- 4	- 3	-6
-8	6	- 3	- 7	- 9	- 9	- 9	- 8	- 5	- 2	0	1	-8
-8.5	5	- 1	- 5	- 8	- 8	- 7	- 8	- 4	- 1	1	4	-8.5
X / Y	-8.5	-8	-6	-4	-2	0	2	4	6	8	8.5	X / Y

READINGS IN THOUSANDTHS OF AN INCH

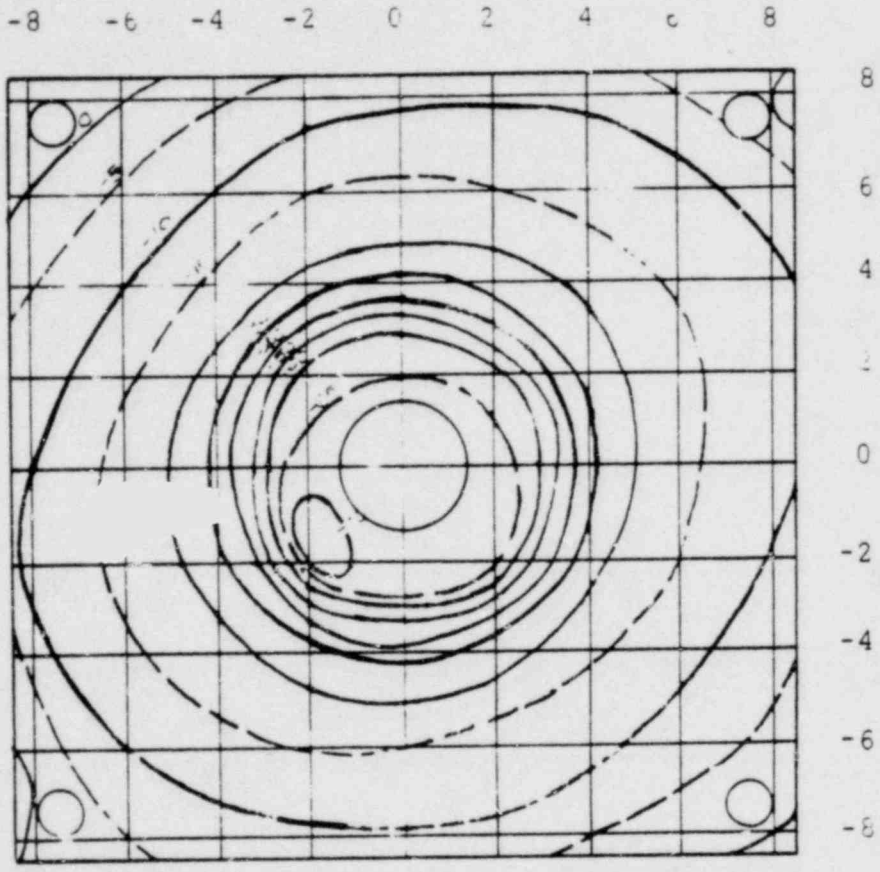
PI TENDONS

ANCHOR PLATE PROFILE

PRESTRESSING INDUSTRIES

A DIVISION OF THE TYSTAR CORPORATION

PREPARED BY	DATE
MKR	
CHECKED BY	SHEET NO
Test No.	
1100 II 18[illegible]	9



ANCHOR PLATE PERMANENT DEFORMATIONS

PRESTRESSING INDUSTRIES
A DIVISION OF THE TEXSTAR CORPORATION

PREPARED BY	DATE
CHECKED BY	SHEET NO
JOB NO Test No. 1100H186-2	OF

P 1 - 14

PERMANENT DEFORMATIONS

Y / X	-13	-12	-10	- 8	- 6	- 4	- 2	0	2	4	6	8	10	12	13	Y / X
13	0	4	2	4	5	2	2	- 2	- 1	- 7	-15	- 3	- 4	- 1	0	13
12	1	7	8	9	6	5	2	5	1	- 1	- 2	0	- 1	- 3	- 1	12
10	9	7	7	5	6	2	1	1	2	- 1	1	0	0	- 2	1	10
8	0	6	3	3	5	1	1	1	1	- 1	1	1	0	1	2	8
6	- 1	4	1	4	2	1	3	3	3	- 1	1	1	1	1	3	6
4	- 1	1	1	0	0	- 2				0	0	2	3	2	4	4
2	- 2	- 3	- 1	- 1	0						0	2	4	3	6	2
0	6	- 4	- 4	- 2	- 3						0	4	3	1	6	0
- 2	- 2	- 7	- 7	- 5	- 5						1	3	3	6	7	- 2
- 4	- 7	-10	- 9	- 6	- 6	- 3				3	2	3	6	8	8	- 4
- 6	-10	-12	-10	- 9	- 8	- 5	- 3	- 1	0	1	0	5	6	8	10	- 6
- 8	-11	-14	-12	-10	-19	- 7	- 4	- 2	1	5	3	6	8	11	14	- 8
-10	-17	-16	-14	-13	-10	- 8	- 5	- 2	- 1	1	4	4	10	12	15	-10
-12	-15	-18	-17	- 8	-11	- 7	- 6	- 2	2	4	4	10	11	13	24	-12
-13	-15	-19	-15	-12	-11	- 8	- 4	0	1	2	6	10	13	16	9	-13
X / Y	-13	-12	-10	- 8	- 6	-4	- 2	0	2	4	6	8	10	12	13	X / Y

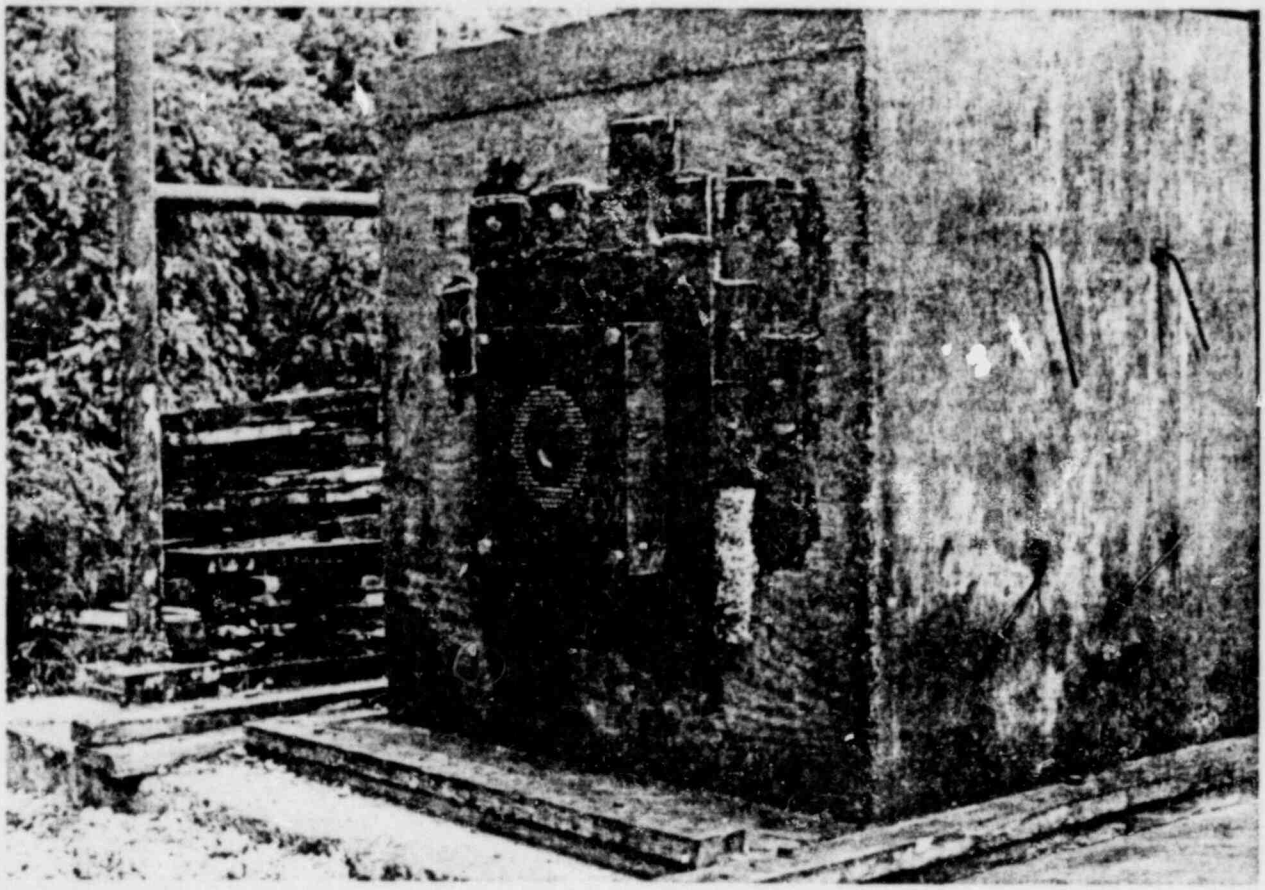
READINGS IN THOUSANDTHS OF AN INCH

PRESTRESSING INDUSTRIES
A DIVISION OF THE TEXSTAR CORPORATION

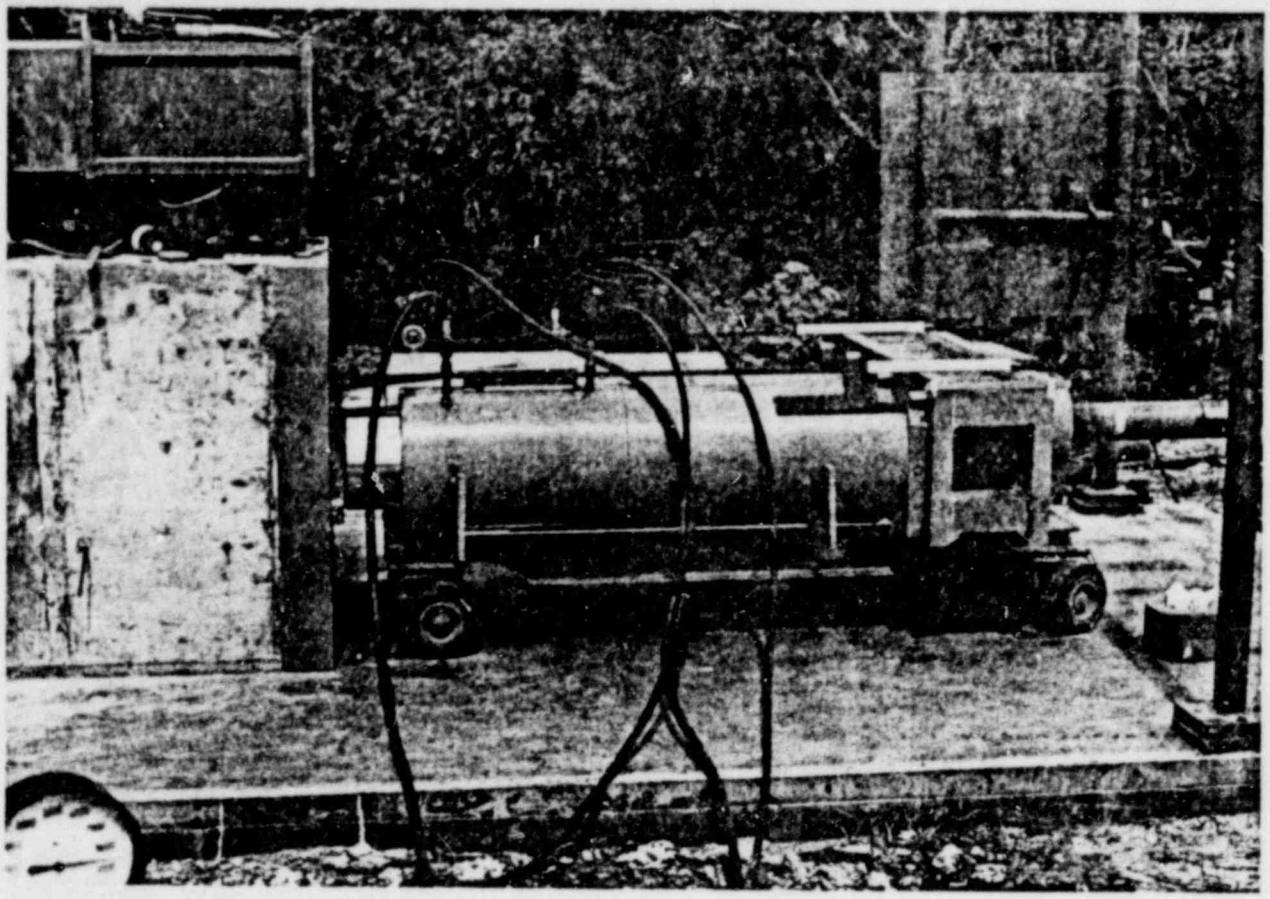
BEARING PLATE PROFILE

PREPARED BY	DATE
CHECKED BY	SHEET NO
JOB NO	
	OF

APPENDIX

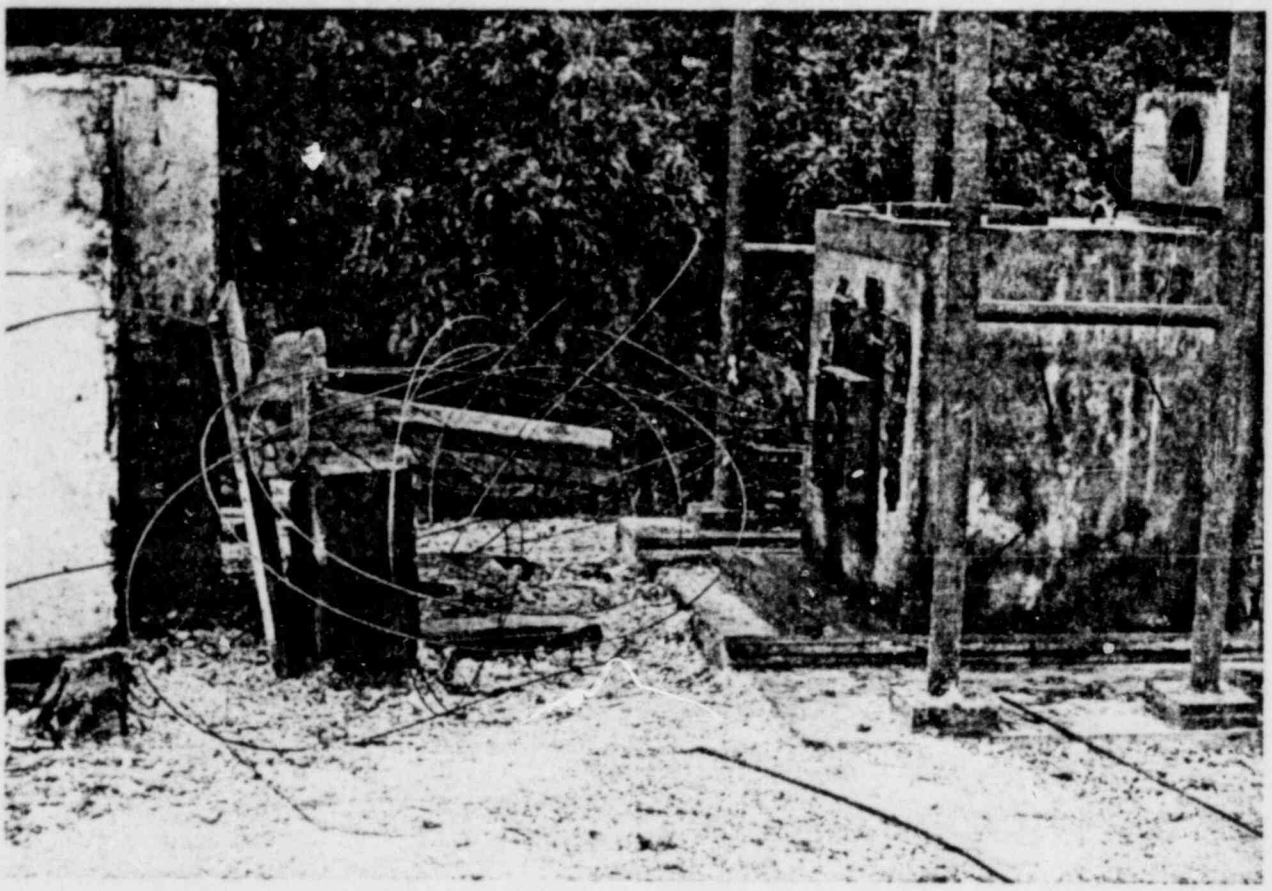


TEST ANCHORAGE ASSEMBLY



2.5 MILLION POUND CAPACITY HYDRAULIC LOADING ASSEMBLY

DIAL INDICATORS ON TEST ANCHORAGE



TEST END AFTER TEST