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MAIER,J.E. Rochester Gas & Electric Corp.
RECIP.NAME RECIPIENT AFFILIATION
CRUTCHFIELD,D. Operating Reactors Branch 5

SUBJECT: Forwards addl info in response to auxiliary feedwater sys Safety Evaluation re 48-h endurance test of main motor driven auxiliary feedwater pumps A & B.

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JOHN E. MAIER
Vice President

TELEPHONE
AREA CODE 716 546-2700

January 8, 1982

Director of Nuclear Reactor Regulation
Attention: Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch No. 5
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: NRC requirements for Auxiliary Feedwater Systems
R.E. Ginna Nuclear Power Plant
Docket No. 50-244

Dear Mr. Crutchfield:

This letter provides additional information in response to the Safety Evaluation Report (SER) for Auxiliary Feedwater System following implementation of recommendation in NUREG-0611. Specifically, the letter addresses the requirement for 48 hour endurance test of Auxiliary Feedwater Pumps as stated in the Additional Short Term Recommendation number 2 section of the SER sent to RG&E by your letter dated January 29, 1981.

Enclosed is a report of the 48 hour endurance test of the Main Motor Driven Auxiliary Feedwater Pumps A and B. Results of tests of the Turbine Driven Pump and Standby Auxiliary Feedwater Pumps C and D were provided in letters dated June 8, 1981 and May 28, 1980 respectively.

Very Truly Yours,

John E. Maier

A001
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1/1

Attachment

ROCHESTER GAS AND ELECTRIC CORPORATION

Motor Driven Auxiliary Feedwater Pumps A and B 48 Hour Endurance Test

The 48 hour Endurance Test of the "A" and "B" Motor Driven Auxiliary Feedwater Pump have been completed to meet the requirements of additional short term recommendation 2 of NUREG-0611. The "A" pump test was conducted on October 9, 10, and 11, 1981. The "B" pump test was conducted on November 6, 7, and 8, 1981.

"A" and "B" Motor Driven Auxiliary Feedwater Pump Data:

Manufacturer:	Worthington (pump curves Fig. 1&2)
Design Total Head:	1247 psig @ 200 gpm
Design Pump Rating:	200 gpm
Design Bearing Oil Temperature:	60°F - 165°F
Bearing Vibration: (ANSI Guide Specifications)	0 - 1.5 mils
Supply Tank Bladder Design:	130°F
Liquid Pumped:	32°F - 120°F for condensate (or Lake Ontario Water)
Environmental Condition Design:	
Temperature:	60°F - 120°F
Humidity:	20% - 80%

Description of Test Method:

The flow path for the test in the recirculation mode is as follows: (RG&E Drawing 33013-545)

Pump suction is from the Condensate Storage Tanks and the discharge is through the recirculation valve back to the Condensate Storage Tanks. This flow path was utilized during the entirety of the test. Following the 48 hour test run in the recirculation mode, the pump was shut down and allowed to cool to ambient temperature for an 8 hour period. Immediately following the cooldown period, the pump was started again in the recirculation mode and operated for one hour. The Condensate Storage Tanks temperature and pump room humidity were read and recorded hourly as was pump suction and discharge pressure. The pump and motor bearings were continuously monitored by thermocouples placed in an existing well of the respective bearing.

Plots of Bearing/Bearing Oil Temperatures vs. Time:

Thermocouples provided the input to the multi-point Leeds and Northrup roll chart recorder. During the entire test period, the pump and motor bearing temperatures remained below the manufacturers design limits.

Copies of roll chart recorder data for the "A" and "B" Motor Driven Auxiliary Feedwater Pumps are included as Attachments I and II, respectively. The points measured for both tests are as listed in Table I.

TABLE I

Points Monitored

	0	1	2	3	4	5
"A" Pump	Amb. East Temp.	Amb. West Temp.	Pump Inbd Temp.	Pump Outbd Temp.	Motor Inbd Temp.	Motor Outbd Temp.
"B" Pump	Amb. East Temp.	Amb. West Temp.	Pump Inbd Temp.	Pump Outbd Temp.	Motor Inbd Temp.	Motor Outbd Temp.

Plots of Condensate Storage Tanks Temperature, Pump Room Humidity, and Pump Suction and Discharge Pressure:

Hourly readings were recorded throughout the test for relative humidity condensate storage tank temperature and pump suction and discharge pressure as shown on Table II. The humidity and temperature were within the environmental design criteria limits. The pump suction and discharge pressures were also within the design limits throughout the entire test.

Pump Vibration:

Pump bearing vibration data for the "A" and "B" Motor Driven Auxiliary Feedwater Pumps are shown on Table III. The pump bearings vibrations were well within allowable limits.

Discussion:

The 48 hour endurance tests for the "A" and "B" Motor Driven Auxiliary Feedwater Pumps were performed under the conditions specified by the NRC in their test requirements and in accordance with PT-16.4, "Motor Driven Auxiliary Feedwater Pumps Recirculation Flow Endurance Test."

Both pumps met the conditions specified as described in the pump specific sections of this report.

At the onset of both pump tests, it was noted on the temperature recorder that the cooling water supply to the pump outboard bearing was throttled. The valve was repositioned and the bearing temperature decreased to a lower steady state value. The throttled valve position was measured following the completion of each individual test, and valve alignment procedures were revised to provide the necessary throttling, to assure that sufficient cooling water is continually available.

An additional cooling water valve adjustment was made on the "B" pump outboard bearing at 0130, 11/8/81. The test technician on duty opened the valve an additional 1/4 turn to lower the bearing temperature to what he considered a more acceptable value. Subsequent discussion with the entire test group following a review of the temperature roll chart, yielded a concensus opinion that the technician's actions were unnecessary. The difference in time required for the bearing temperature to reach a steady state condition warrants some discussion. The "A" pump required approximately 10 hours to stabilize, and the "B" pump approximately 2 hours. The majority of the difference in the observed times can be attributed to the throttling of cooling water valves already mentioned in this report. The "A" pump cooling valves were throttled most and required more adjustment than the "B". Also, the experience gained in positioning the "A" pump cooling valves assisted the test technicians in stabilizing the "B" pump more rapidly. In neither case did the bearing temperature exceed the design limits.

1) <u>"A" Motor Driven Auxiliary Feedwater Pump:</u>

In the recirculation mode, the pump developed a discharge pressure of 1450.0 psig with a suction pressure of 9.0 psig. The discharge pressure at this reduced flow condition compared favorably with the expected pressure based upon a discharge pressure of 1210.0 psig obtained in a previous test with normal flow of 200 gpm directly into the steam generators.

The two pump bearing oil temperatures increased from 63° and 77°F to a maximum of 73°F and 103°F from the time of test initiation until a time approximately 10 hours later, at which time the temperatures reached essentially a steady level. Temperatures remained at these levels until the conclusion of the 48 hour run.

The two motor bearing oil temperatures increased from 74°F and 76°F to a maximum of 133°F and 120°F from the time of test initiation until a time approximately 10 hours later, at which time the temperatures reached essentially a steady level. Temperatures remained at these levels until the conclusion of the 48 hour run.

All pump and motor bearing temperatures were well within the pump manufacturers upper design limit of 165°F. All throughout the test, temperature and humidity conditions were well within the environmental design conditions.

The pump bearing vibrations were monitored by means of an IRD Mechanalysis vibration instrument at 15 minute intervals for the first hour and at 1 hour intervals thereafter. Throughout the test period vibrations were well within the allowable limits of 0-1.5 mils. The pump bearing vibration readings ranged as follows:

TABLE III

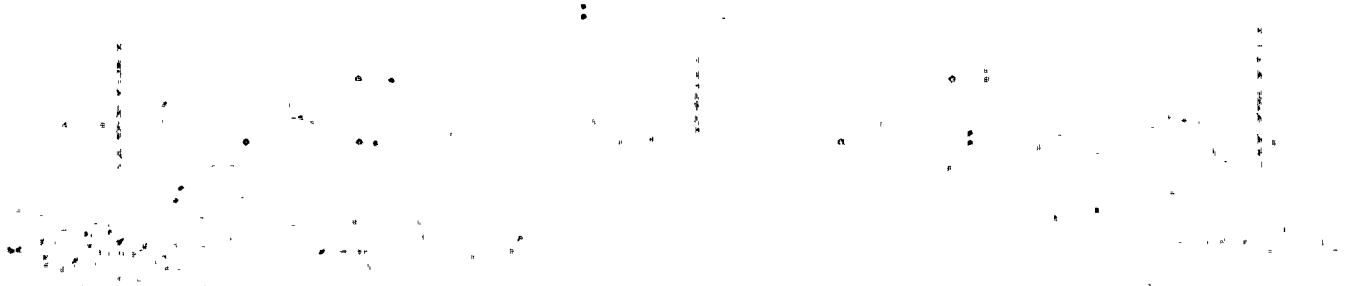
Pump Vibrations:	
Inboard Vertical: .07 to .09 mils	Inboard Horizontal: .07 to .12 mils
Outboard Vertical:.09 to .155 mils	Outboard Horizontal:.07 to .12 mils

At the completion of the 48 hour test interval, the "A" Motor Driven Auxiliary Feedwater Pump was shutdown and allowed to cool to ambient temperature for a period of 8 hours. Temperature decreased from 97°F and 72°F to 80°F and 53°F respectively, on the pump inboard and outboard bearings. The pump was then restarted and successfully operated for one additional hour as per test requirements.

2) "B" Motor Driven Auxiliary Feedwater Pump:

In the recirculation mode, the pump developed a discharge pressure of 1435.0 psig with a suction pressure of 10.8 psig. The discharge pressure at this reduced flow condition compared favorably with the expected pressure based upon a discharge pressure of 1180.0 psig obtained in a previous test with normal flow of 200 gpm directly into the steam generators.

The two pump bearing oil temperatures increased from 77°F and 76°F to a maximum of 102°F and 115°F from the time of test initiation until a time approximately 2 hours later, at which time the temperatures reached essentially a steady state level. Temperatures remained at these levels until the conclusion of the 48 hour run.



The two motor bearing oil temperatures increased from 78°F and 78°F to a maximum of 115°F and 122°F from the time of test initiation to approximately 2 hours later, at which time the temperatures essentially reached a steady level. Temperatures remained at these levels until the cooling water valve was readjusted by the technician at 13 1/2 hours into the test.

All pump and motor bearing temperatures were well within the pump manufacturers upper design limit of 165°F. All throughout the test, temperature and humidity conditions were well within the Environmental Conditions Design.

The pump bearing vibrations were monitored by means of an IRD Mechanalysis vibration instrument at 15 minute intervals for the first hour and at 1 hour intervals thereafter. Throughout the test period, vibrations were well within the allowable limits of 0-1.5 mils. The pump bearing vibration readings ranged as follows:

TABLE IV

Pump Vibrations	
Inboard Vertical:.07 to .105 mils	Inboard Horizontal: .06 to .10 mils
Outboard Vertical:.13 to .23 mils	Outboard Horizontal:.075 to .12 mils

At the completion of the 48 hour test interval, the "B" Motor Driven Auxiliary Feedwater Pump was shutdown and allowed to cool to ambient temperature for a period of 8 hours. Temperature decreased from 97°F and 78°F to 77°F and 46°F respectively, on the pump inboard and outboard bearings. The pump was then restarted and successfully operated for one additional hour as per test requirements.

Conclusion:

Both motor driven Auxiliary Feedwater Pumps A and B can be operated within their design conditions for periods of at least 48 hours and will perform their intended functions during extended operating periods.

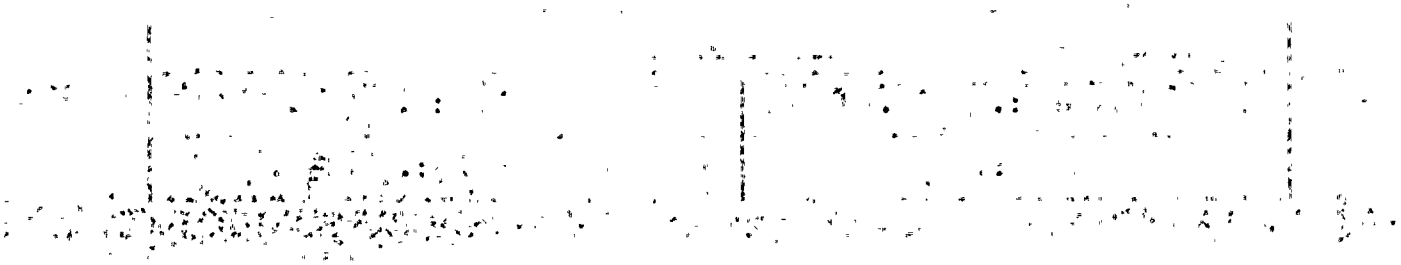
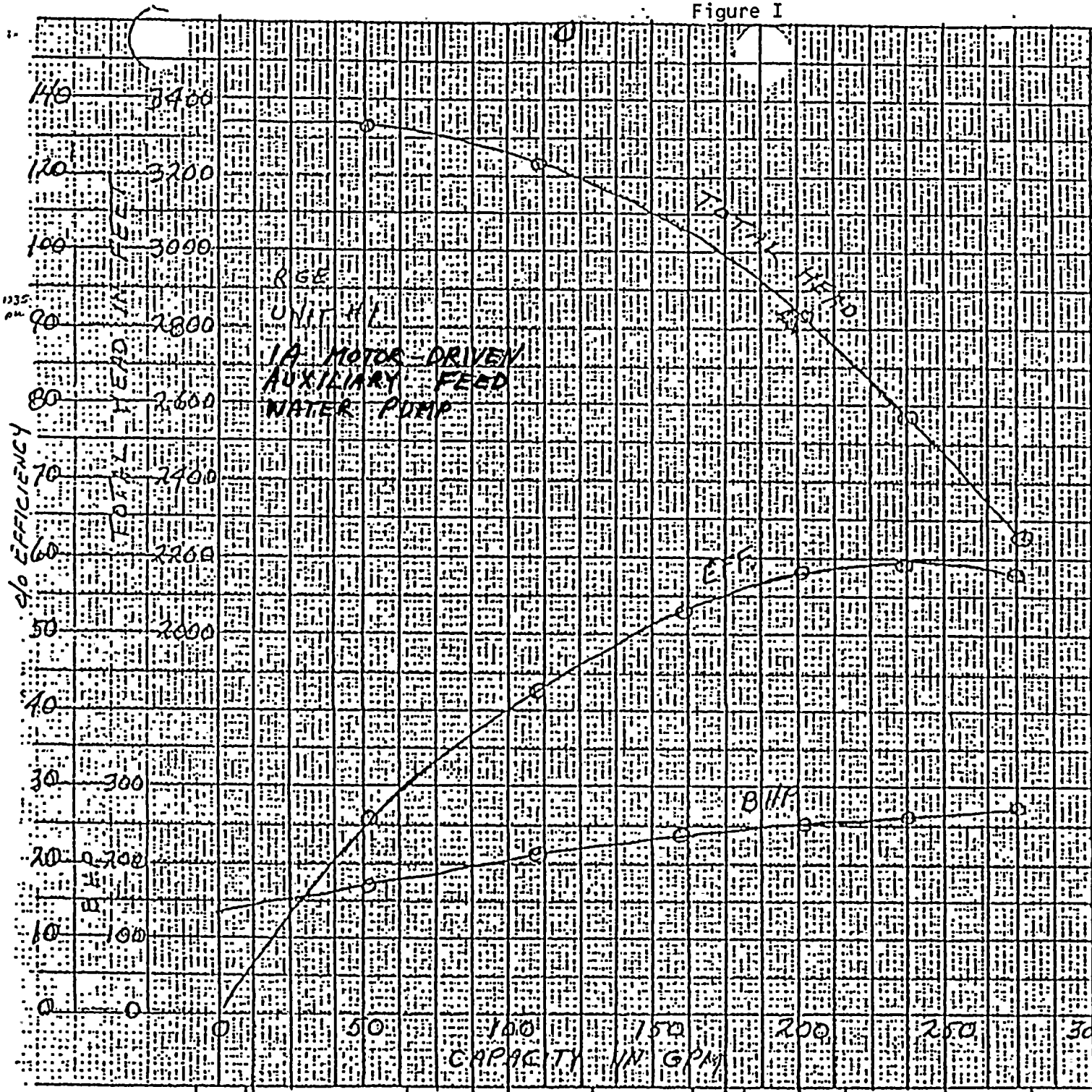


Figure I



WORTHINGTON CORPORATION
PUMP TEST DATA

RPM	GPM	HD.	BHP.	EFF.
3562	155.0	1657	111.4	58.2
3558	182.0	1500	116.4	57.3
3557	211.0	1322	121.6	57.9
3564	123.0	1807	106.2	52.8
3569	85.0	1902	96.4	42.4
3571	39.5	1966	76.1	25.8
3581	0	1979	60.9	0

CASING DATA

5% chr		
MATERIAL	FINISH	TONGUE

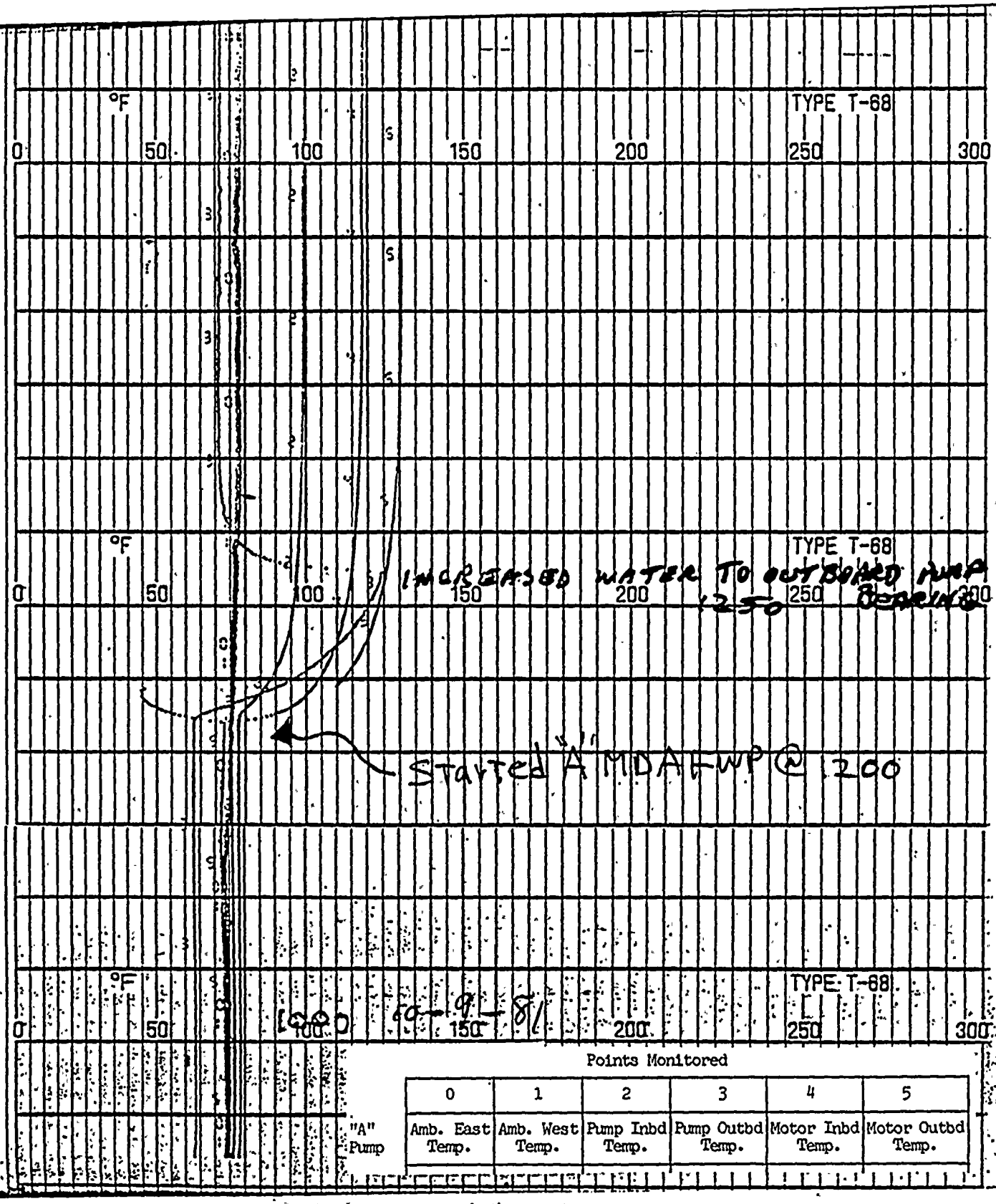
IMPELLER DATA

13% chr	1	1/4
MATERIAL	FINISH	DISC. TIPS
UB-1801A	A-1	8 1/8"
PATT. NO.	COMB. NO.	DIA.

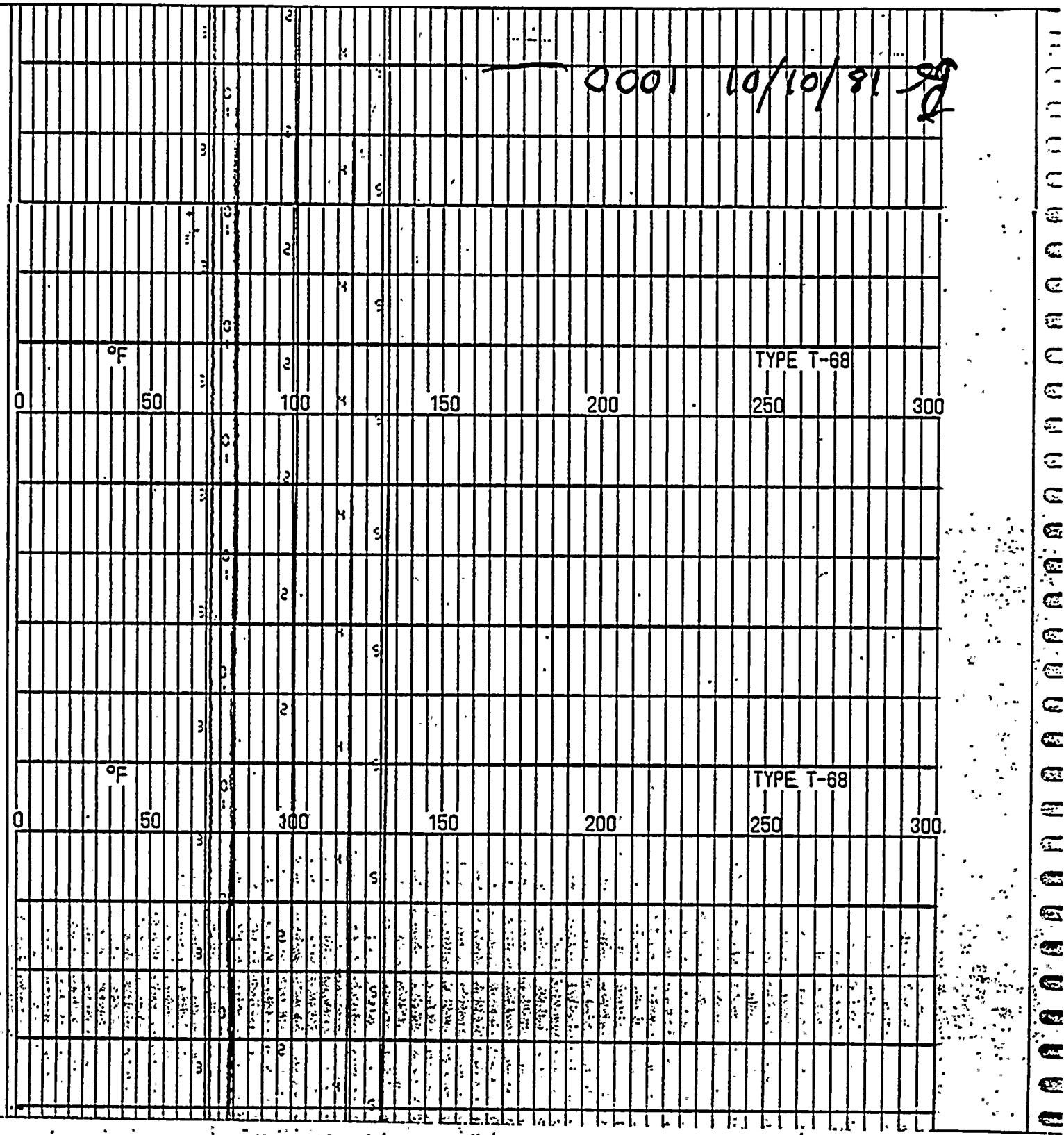
PUMP	STAGES	ORDER NO.	SERIAL NO.	DATE TESTED	TEST	APPROVED	TEST DRIVER	VENTURI	PLOTTED AT	CURVE NO.
2 WTF-87	7	P-450448	1,614,812	2-11-68		WQ	100 HP T/MOTOR	SSA	4650	E-195764

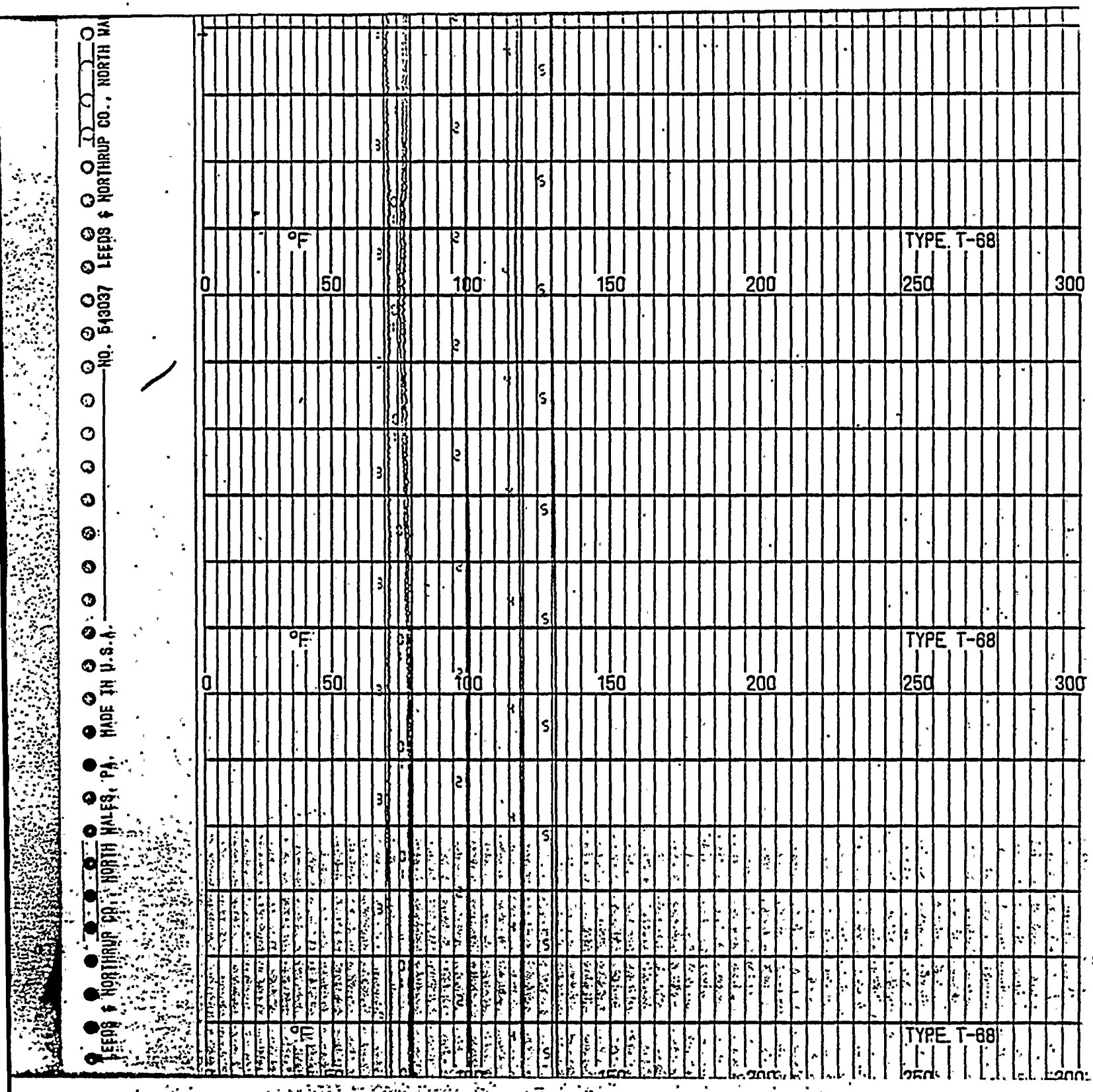
ATTACHMENT I

"A" MDAFWP



Points Monitored					
0	1	2	3	4	5
"A" Pump	Amb. East Temp.	Amb. West Temp.	Pump Inbd Temp.	Pump Outbd Temp.	Motor Inbd Temp.	Motor Outbd Temp.


0001 10/10/81
°F
TYPE T-68
0
50
100
150
200
250
300
°F
TYPE T-68
0
50
300
150
200
250
300


LEEDS & NORTHRUP CO., NORTH WALES, PA. MADE IN U.S.A. NO. 543037 LEEDS & NORTHRUP CO., NORTH WA
°F
0
50
100
150
200
250
300
TYPE T-68
°F
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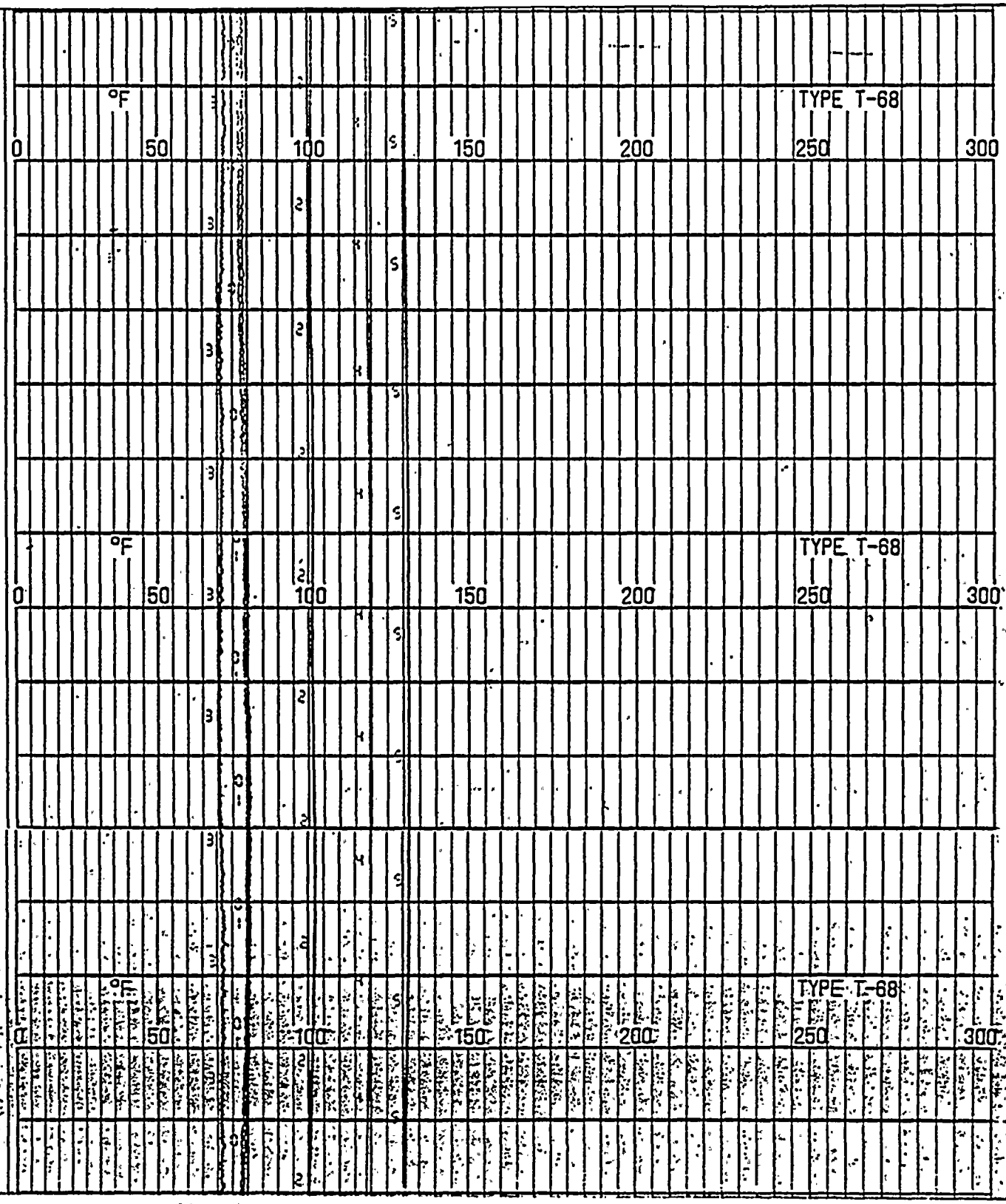
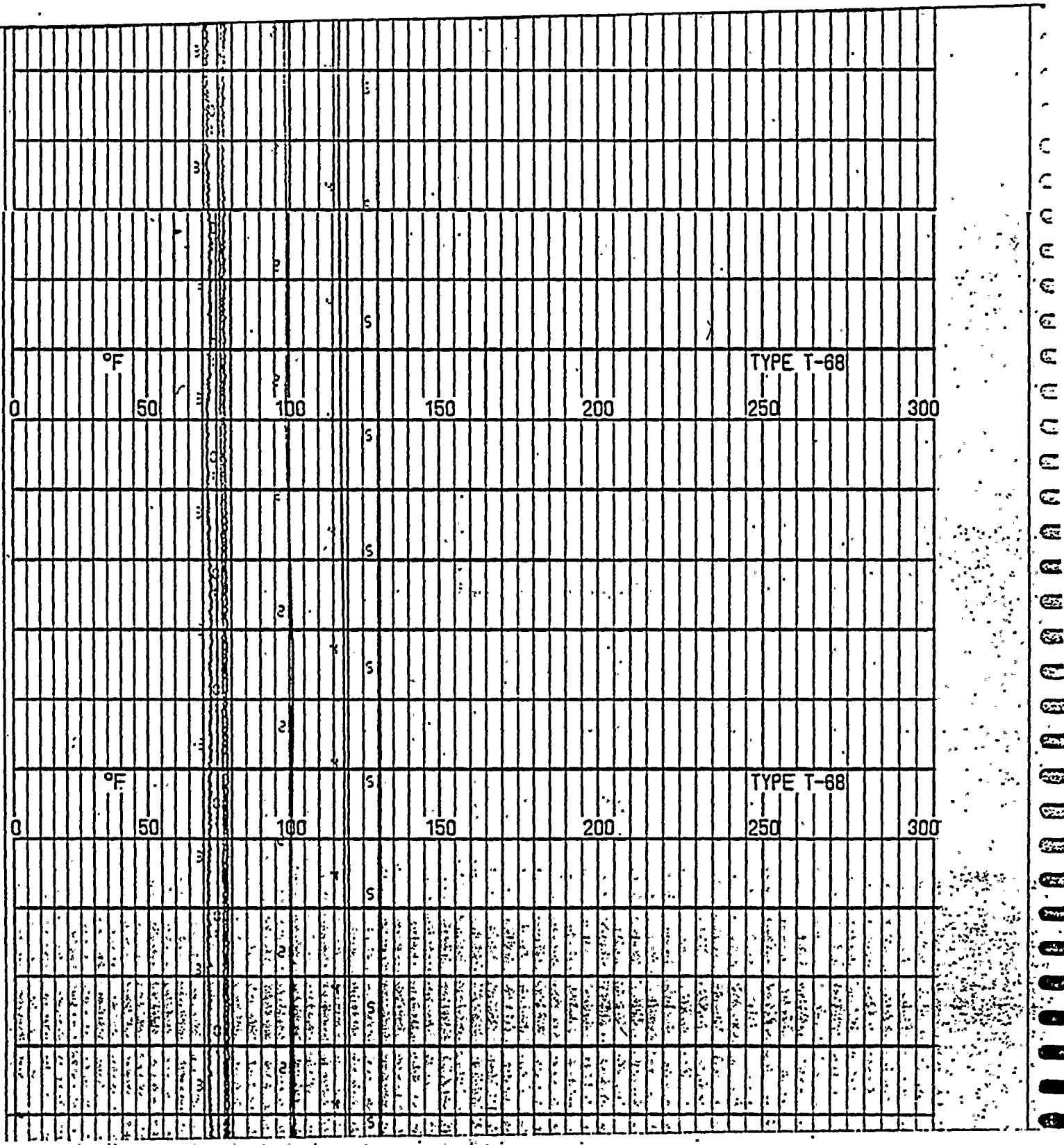
50
100
150
200
250
300
TYPE T-68
TYPE T-68



"A" Pump


°F
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TYPE T-68
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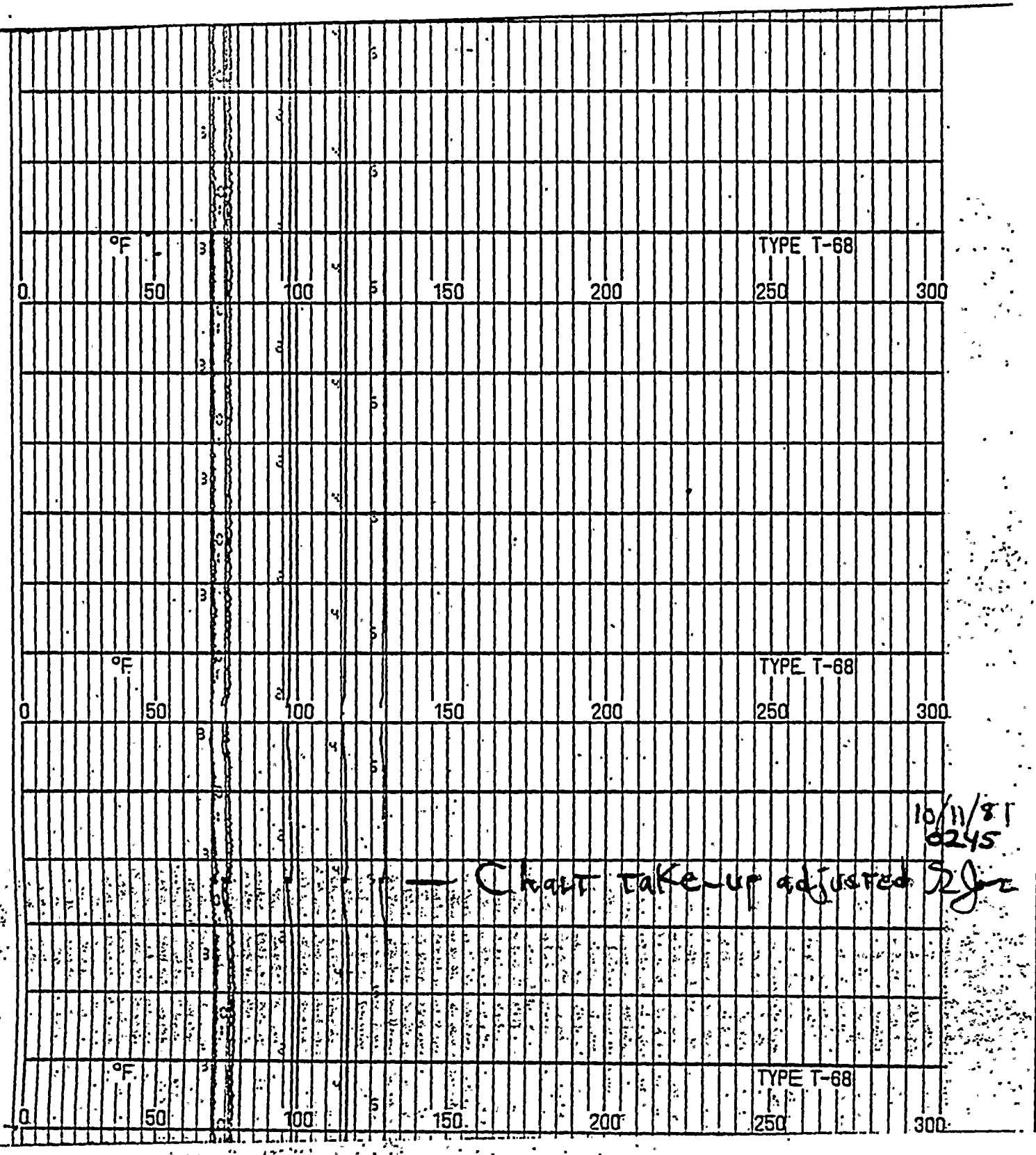
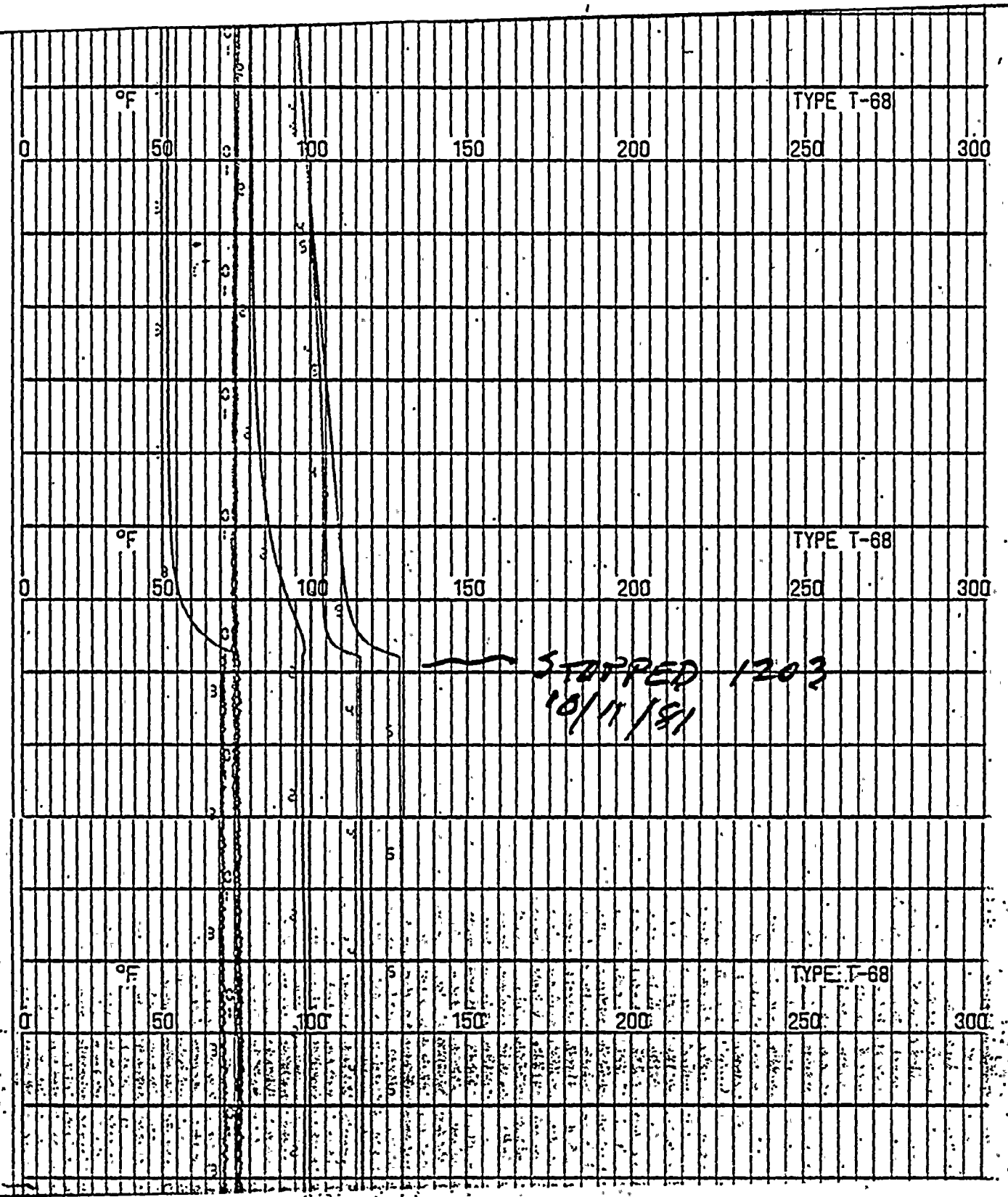


10/11/81
0245
— Chart take-up adjusted SJ


°F
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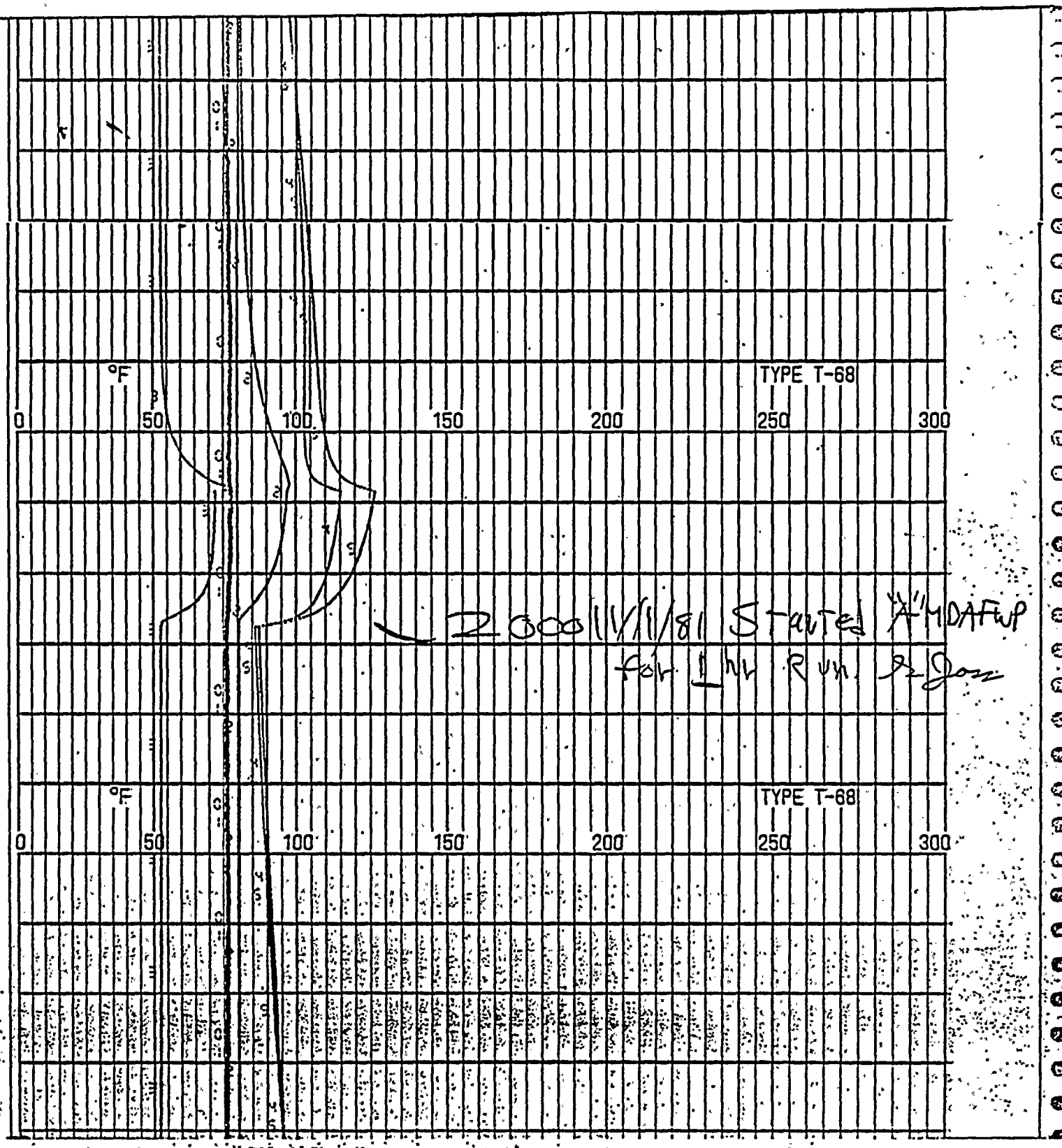
150
200
250
300
STOPPED 1203
10/11/81


°F
TYPE T-68
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50
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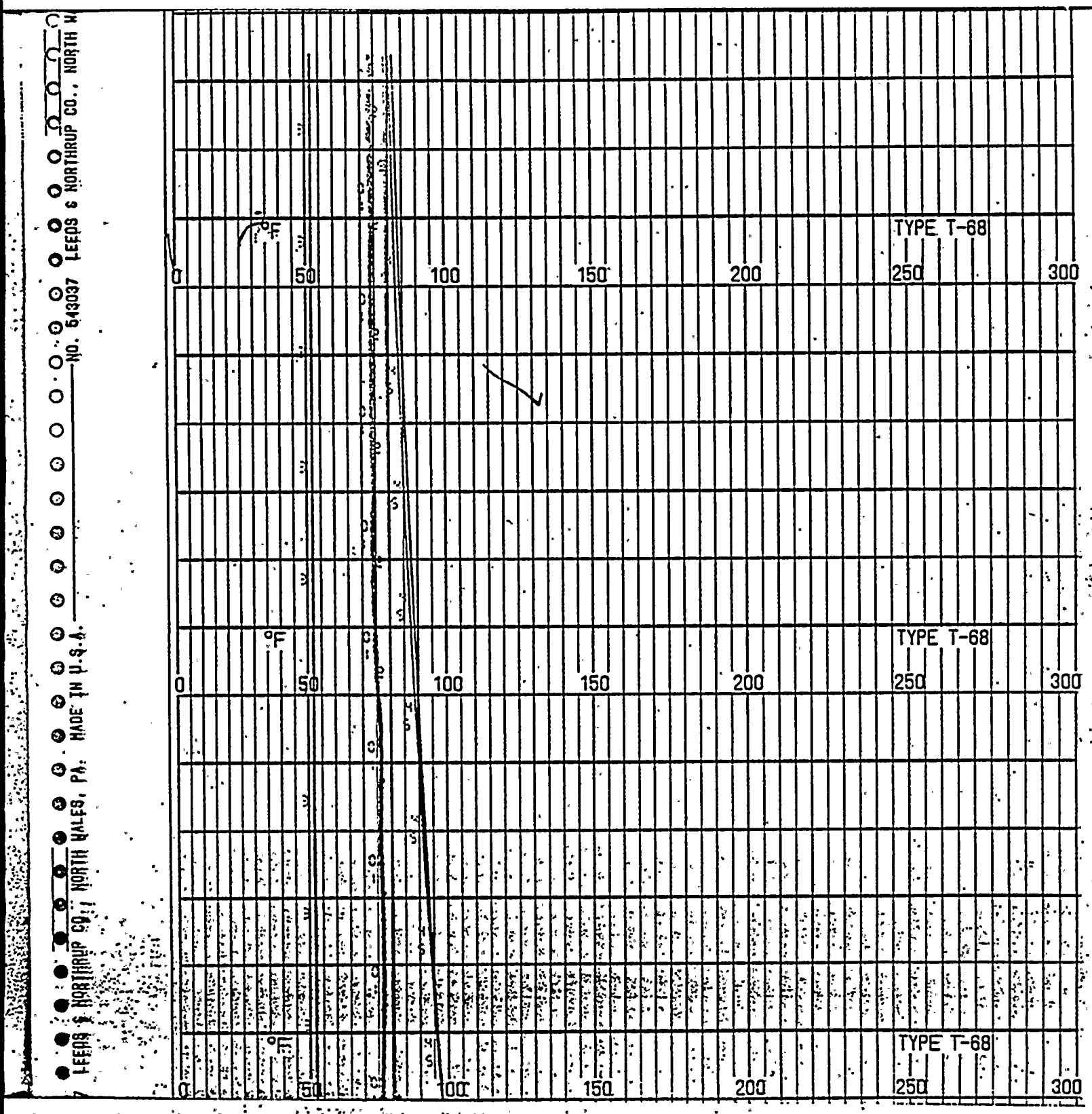
150
200
250
300
2000 11/11/81 Started "A" MDAFWP
for 1 hr Run. S.G.
°F
TYPE T-68
0
50
100
150
200
250
300


LEEDS & NORTHRUP CO., NORTH WALES, PA. MADE IN U.S.A.
NO. 643037 LEEDS & NORTHRUP CO., NORTH W
°F
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50
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TYPE T-68
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250
300
TYPE T-68
°F
0
50
100
150
200
250
300
TYPE T-68

TIME	Temp.	% Humidity	C.S.T. TEMP.	SUCTION PRESS.	DISCH. PRESS.
10/9/81 1200	NA	30	75	9.5	1450
1300		29	75	8.9	1450
1400		29	74	9.0	1450
1500		29	74	9.5	1450
1600		29	75	9.0	1450
1700		27	76	9.2	1450
1800		27	76	9.2	1450
1900		27	76	9.2	1450
2000		28	76	9.2	1450
2100		28	77	9.0	1450
2200		28	77	9.0	1450
2300		28	76	9.0	1450
10/10/81					
0000		28	76	9.0	1450
0100		29	77	9.0	1450
0200		29	77	9.0	1450
0300		29	78	9.0	1450
0400		29	79	9.0	1450
0500		29	79	9.0	1450
0600		29	80	9.0	1450
0700		29	80	9.0	1450
0800		29	80	9.0	1450
0900		29	80	9.2	1450
1000		29	81	9.0	1450
1100		28	82	9.0	1450
1200		28	80	9.5	1450
1300		29	82	9.0	1450

TIME	Temp.	% Humidity	C.S.T. TEMP.	SUCTION PRESS.	DISCH. PRESS.
1500	N/A	29	83	9.	1450
1600		29	84	9	1450
1700		30	84	9	1450
1800		29	83	9	1450
1900		29	84	9	1450
2000		29	84	9	1450
2100		29	84	9	1450
2200		29	84	9	1450
2300		29	84	9	1450
10/11/81 0000		29	84	9	1450
0100		29	84	9	1450
0200		29	85	9	1450
0300		29	85	9	1450
0400		29	83	9	1450
0500		28	82	9	1450
0600		28	80	9	1450
0700		29	80	9	1450
0800		29	82	9	1450
0900		29	83	8.5	1450
1000		30	82	9	1450
1100		31	78	9	1450
1200		31	80	9	1450
2000		30	80	9.3	1450
2100		30	80	9.1	1450

"A" MDAFWP TABLE III

PT-16.4:7

PT-16.4

PUMP BEARING VIBRATION DATA SHEET

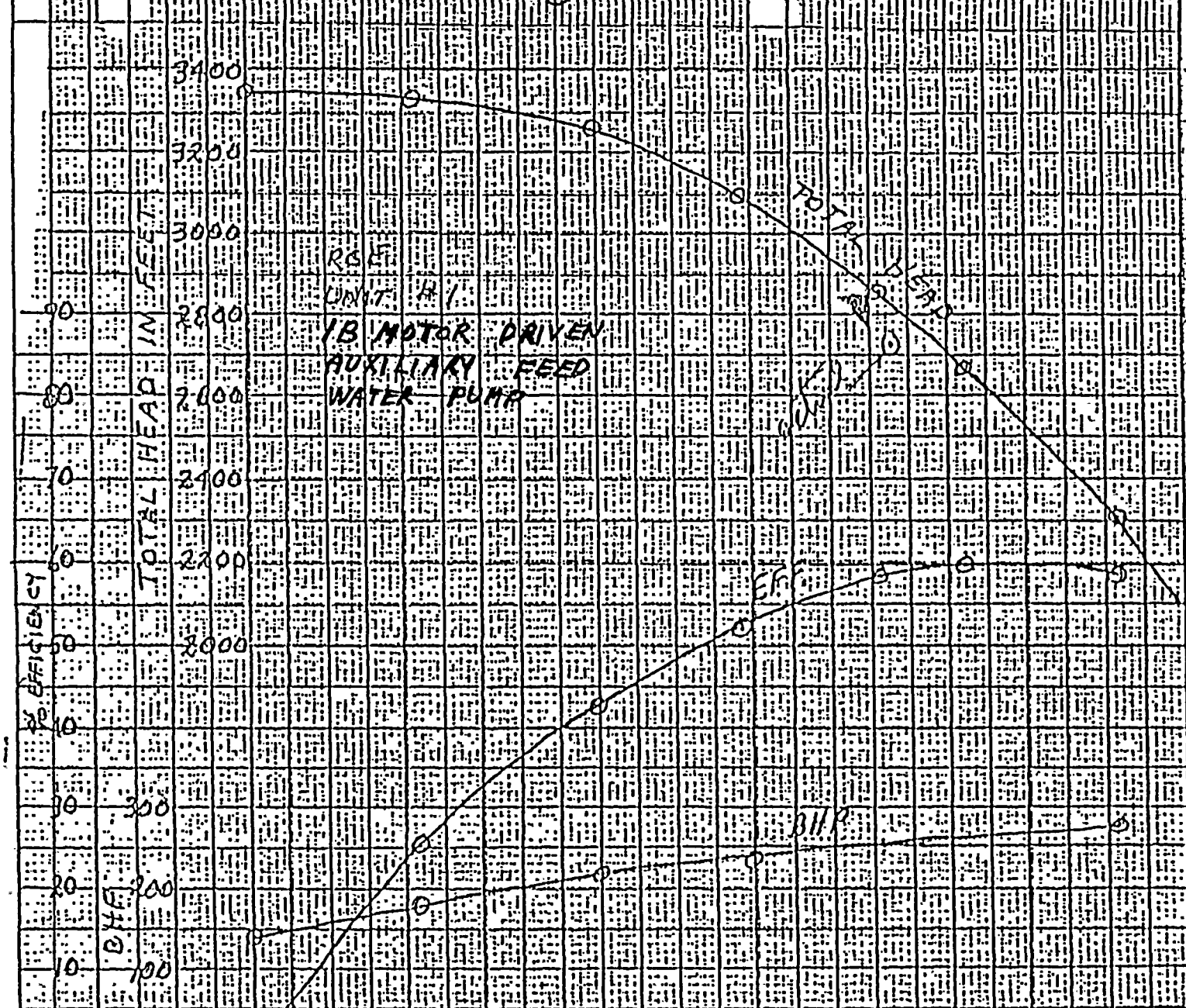
10/9/81 TIME	Vertical INBOARD	Vertical OUTBOARD	TIME	Horizontal INBOARD	Horizontal OUTBOARD
1200	.08	.09		.09	.05
1215	.08	.13		.09	.11
1230	.08	.12		.09	.10
1245	.08	.13		.08	.10
1300	.07	.135		.09	.09
1400	.08	.12		.10	.10
1500	.075	.12		.08	.11
1600	.07	.12		.10	.08
1700	.08	.125		.10	.075
1800	.085	.15		.07	.09
1900	.08	.155		.075	.095
2000	.08	.14		.075	.08
2100	.075	.16		.08	.07
2200	.08	.14		.085	.08
2300	.08	.09		.08	.08
10/10/81					
0000	.08	.10		.08	.09
0100	.09	.10		.08	.09
0200	.09	.10		.08	.09
0300	.09	.11		.08	.08
0400	.08	.09		.11	.11
0500	.09	.09		.10	.09
0600	.09	.09		.10	.10
0700	.09	.09		.10	.11
0800	.09	.09		.09	.11
0900	.07	.11		.085	.10
1000	.075	.12		.085	.11
1100	.08	.125		.10	.095
1200	.075	.12		.10	.10
1300	.08	.12		.09	.09
1400	.08	.11		.10	.09
1500	.075	.12		.09	.10
1600	.075	.13		.08	.09
1700	.08	.13		.11	.09
1800	.08	.13		.11	.10
1900	.08	.11		.11	.09
2000	.08	.11		.11	.09
2100	.09	.10		.12	.11
2200	.08	.09		.11	.12
2300	.09	.10		.11	.11
10/11/81					.12
0000	.08	.10		.08	.11
0100	.08	.09		.10	.11
0200	.09	.11		.11	.10
0300	.09	.10		.11	.11

"A" MDAFWP Table III
PT-16.4

PUMP BEARING VIBRATION DATA SHEET

	Vertical	Vertical		Horizontal	Horizontal
TIME	INBOARD	OUTBOARD	TIME	INBOARD	OUTBOARD
0400	.09	.10		.11	.11
0500	.08	.125		.085	.10
0600	.08	.12		.09	.11
0700	.09	.11		.10	.10
0800	.10	.13		.09	.12
0900	.085	.135		.085	.10
1000	.075	.13		.12	.09
1100	.08	.14		.09	.10
1200	.08	.13		.085	.10
10/11/81					
2000	.09	.09		.10	.12
2015	.09	.09		.11	.11
2030	.09	.09		.12	.11
2045	.09	.10		.11	.11
2100	.09	.11		.11	.11
~~2200~~					

Figure 2



WORTHINGTON CORPORATION
PUMP TEST DATA

RPM	GPM	HD.	BHP	EFF
3564	155.0	1680	112.5	58
3562	175.8	1569	116.8	59
3562	212.9	1354	124.5	58
3567	121.9	1818	107.7	52
3571	86.0	1926	98.2	42
3578	41.0	1970	80.0	25
3580	0	1990	6	0

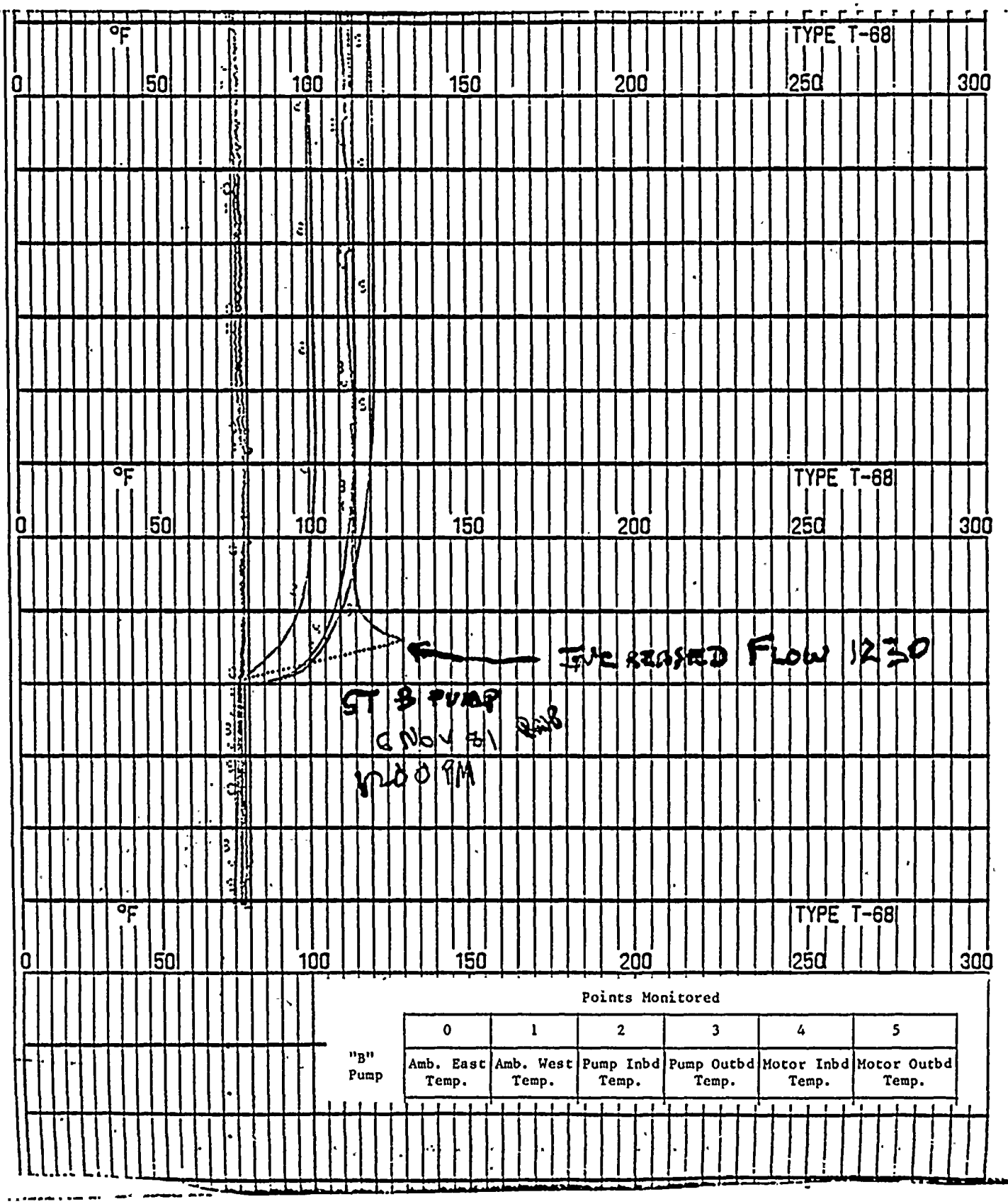
CASING DATA

5% Chr		
MATERIAL	FINISH	TONGUE

IMPELLER DATA

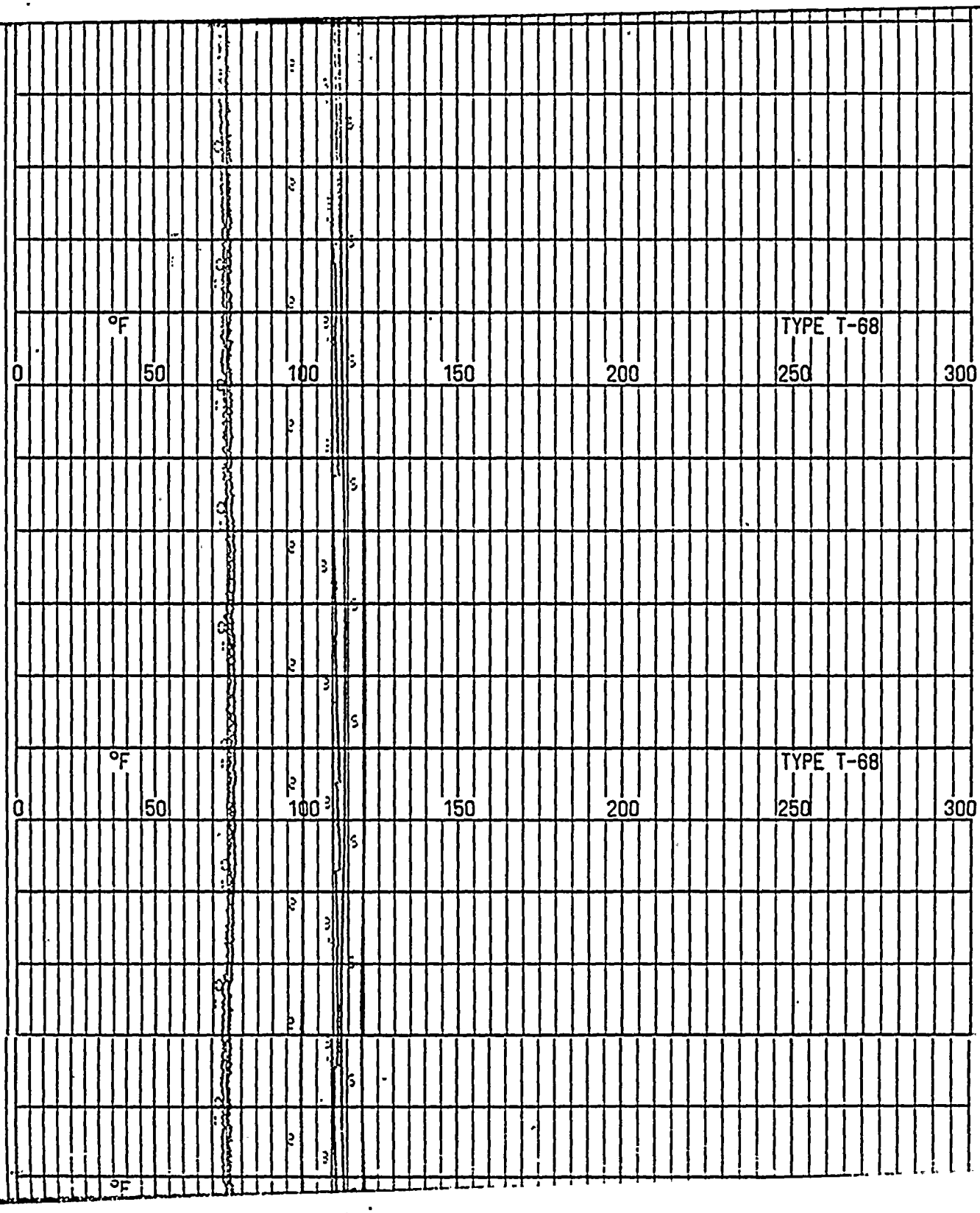
13% Chr	1	¼
MATERIAL	FINISH	DISC. TIP
CB-480 1A	A-1	8 1/8
PATT. NO.	COMB. NO.	DIA.

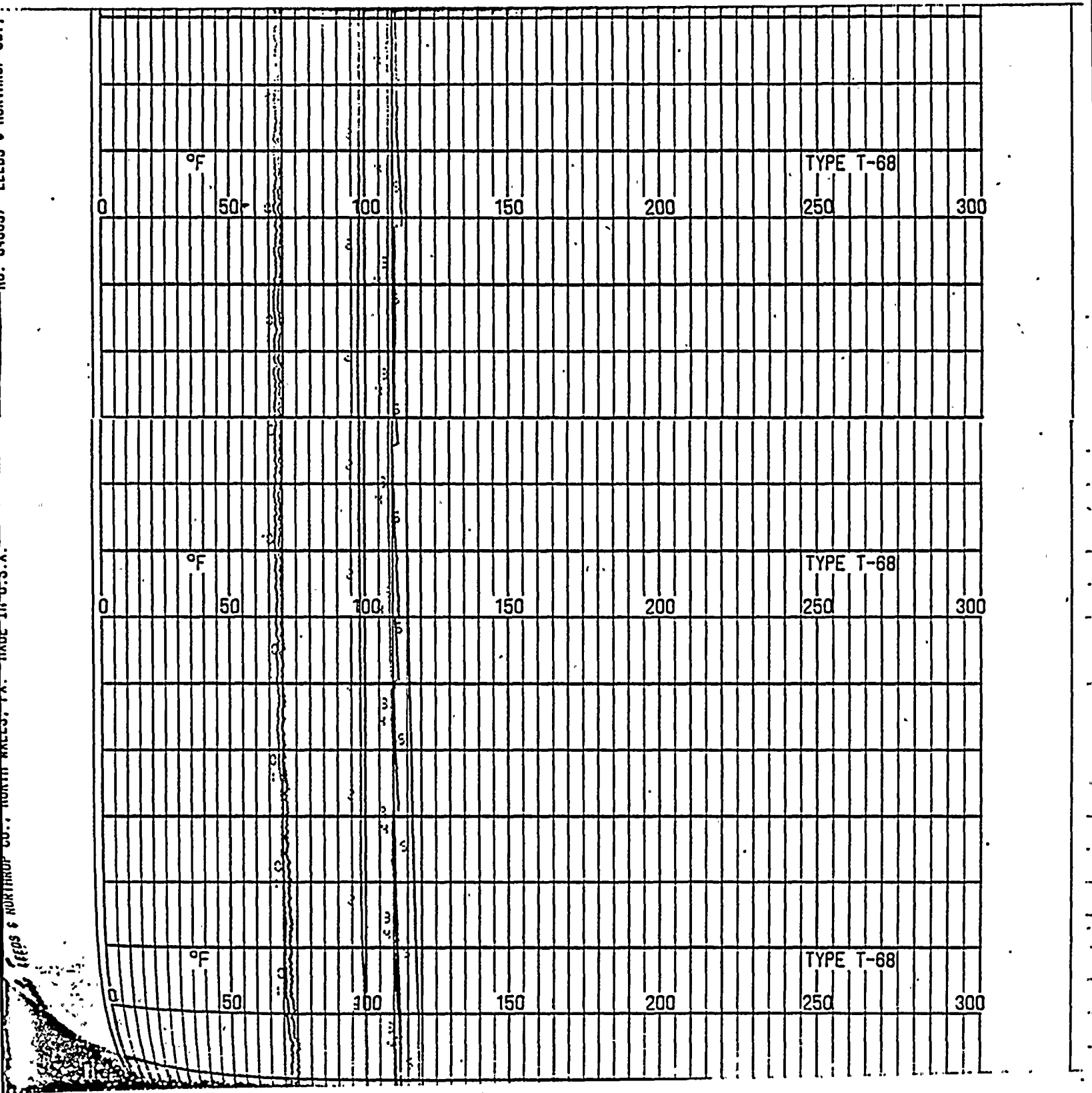
2 WTF-87	7	P-450448	1,614,811	2-15-68		wa	100 HP T/MOTOR	SSA	4650	E-19576
PUMP	STGS	ORDER NO.	SERIAL NO	DATE	TEST	APPROVED	TEST POWER			

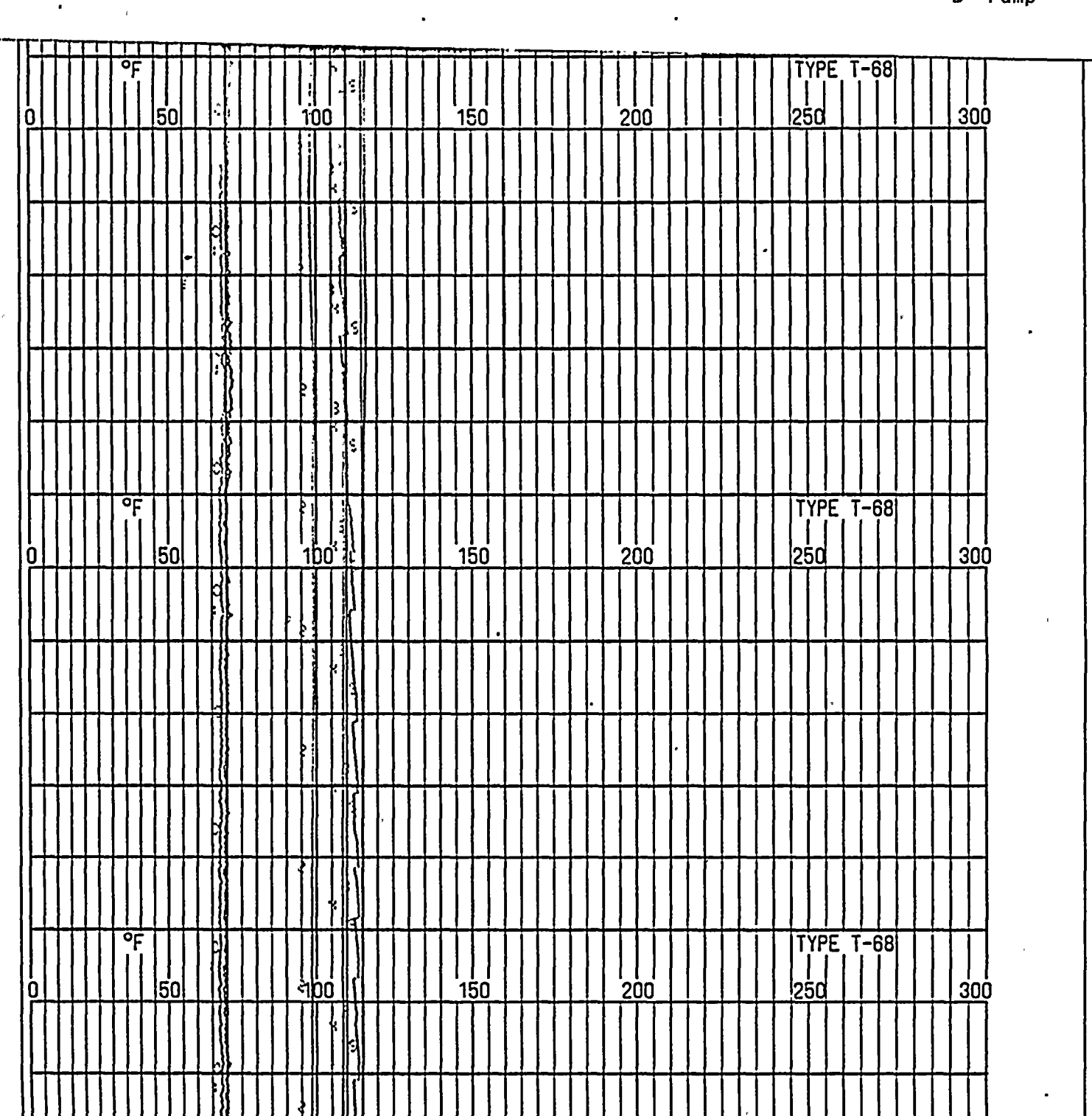


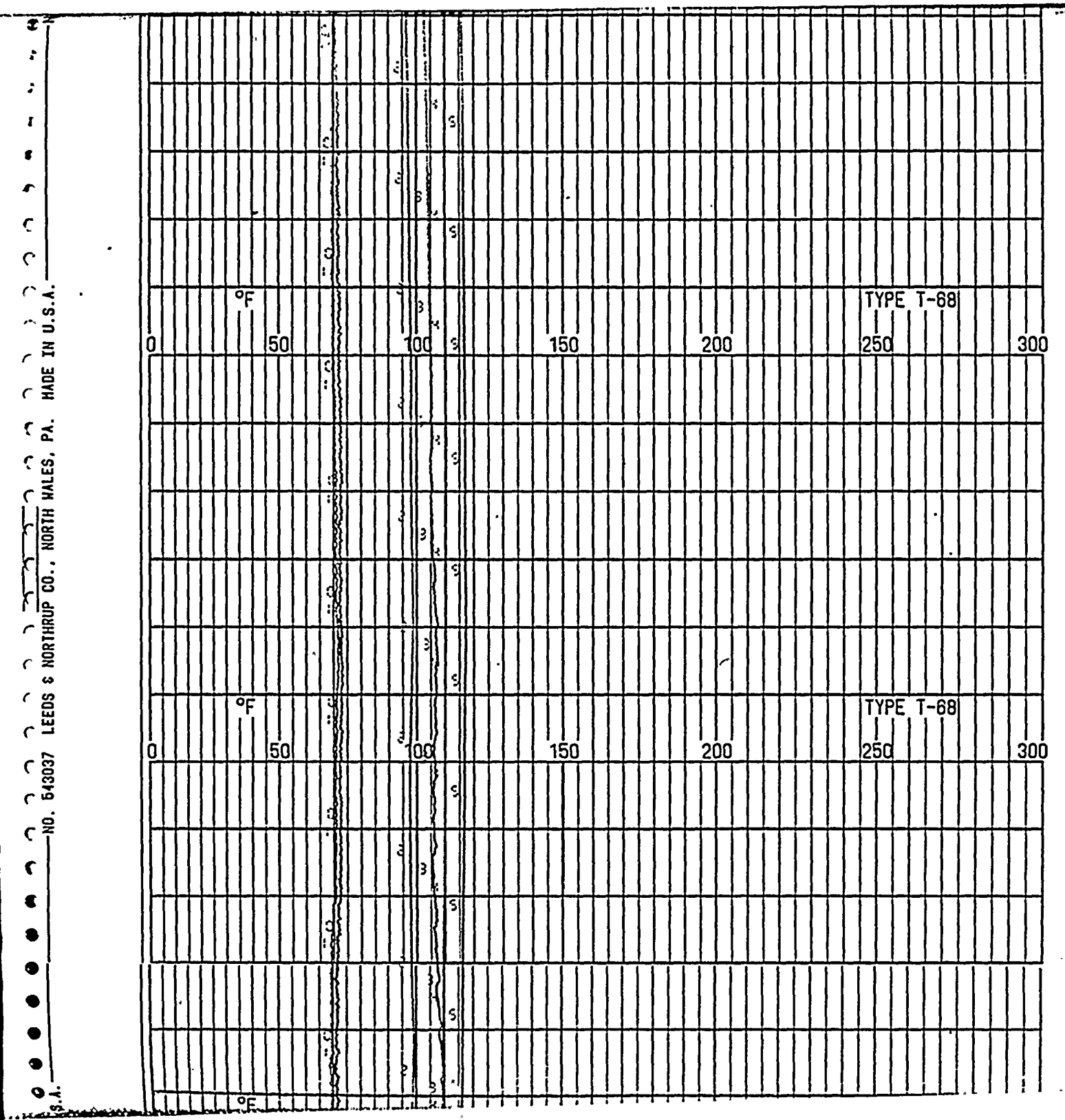
Points Monitored

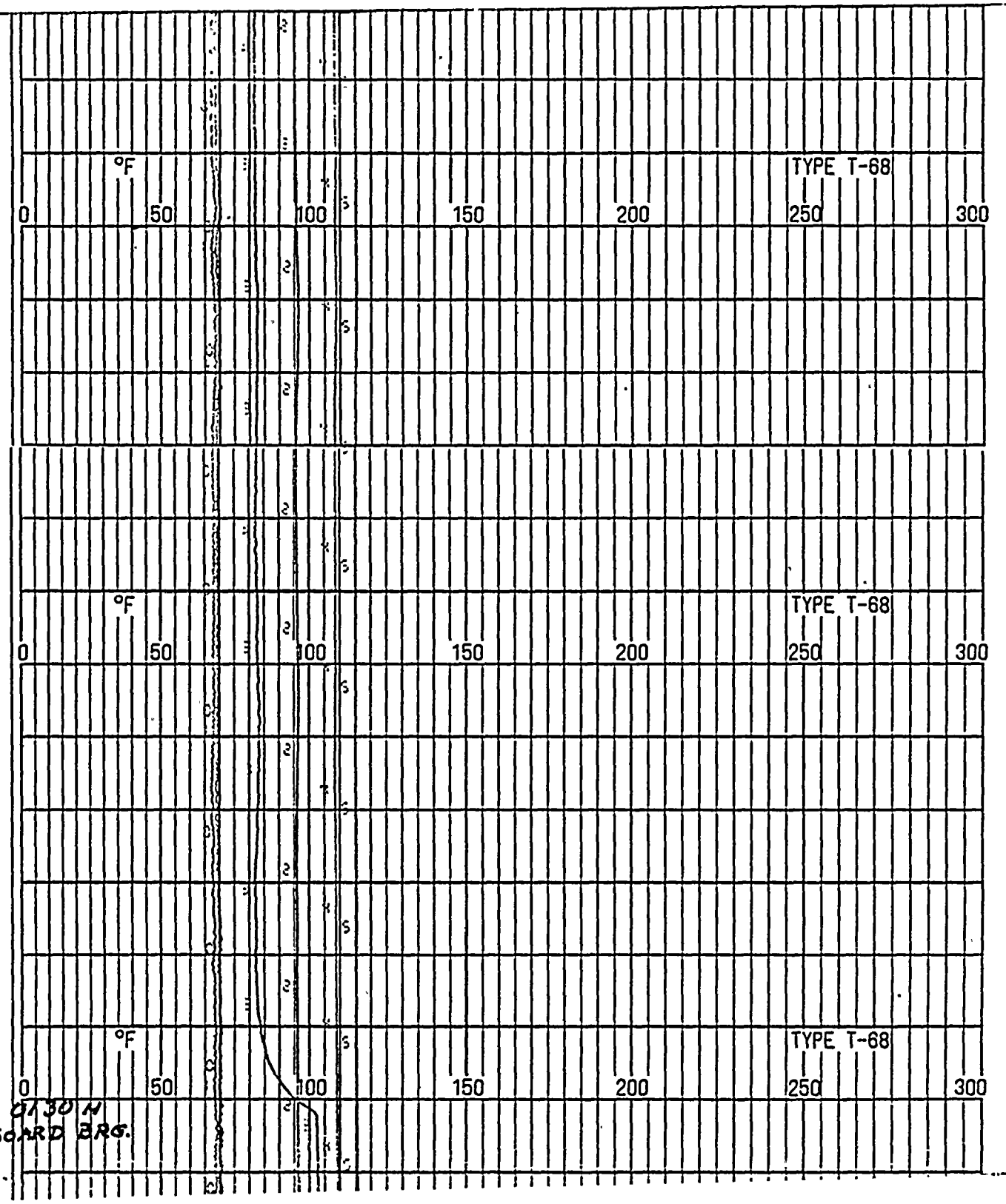
"B" Pump	0	1	2	3	4	5
	Amb. East Temp.	Amb. West Temp.	Pump Inbd Temp.	Pump Outbd Temp.	Motor Inbd Temp.	Motor Outbd Temp.





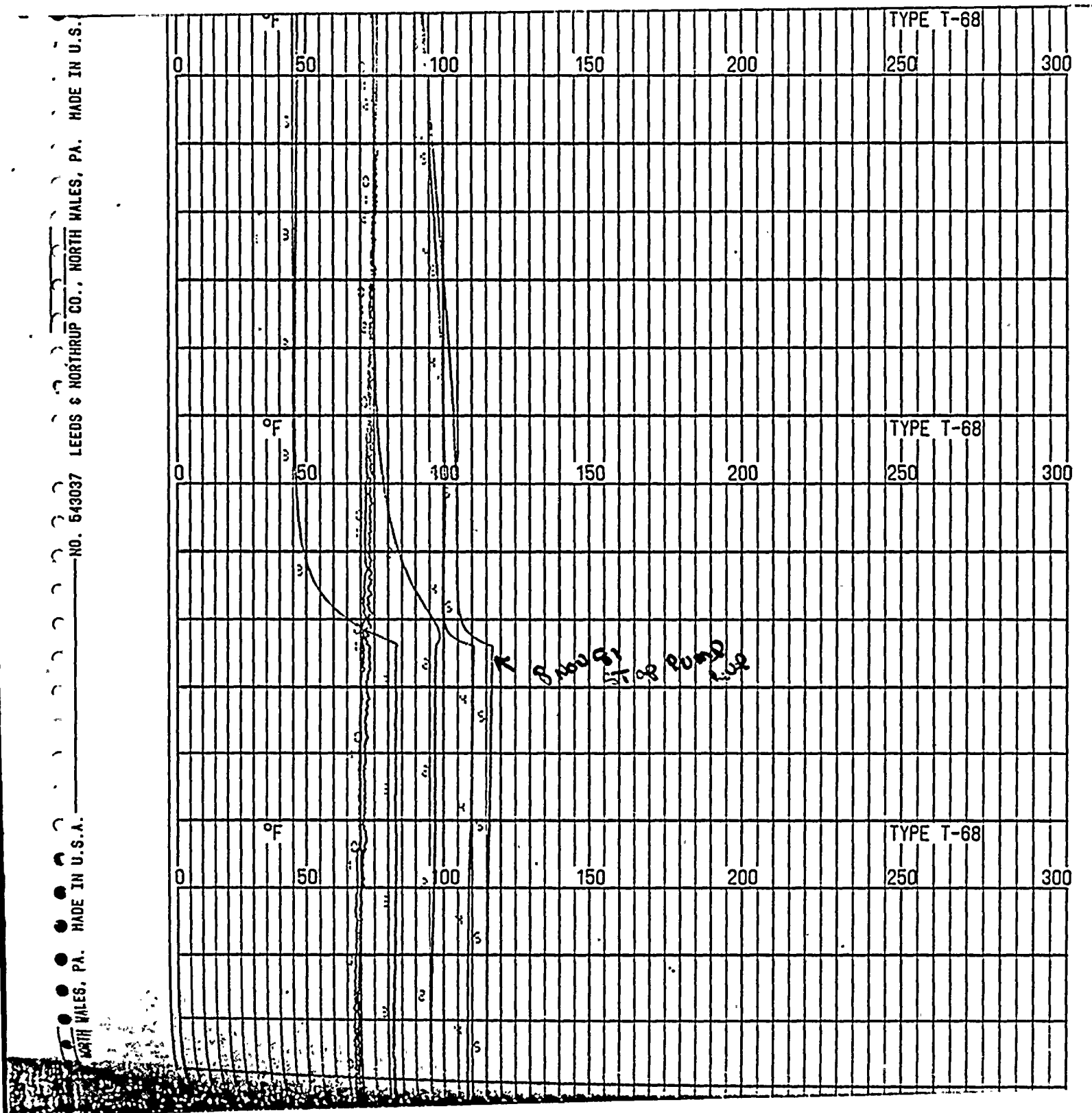



°F
0
50
100
150
200
250
300
TYPE T-68
°F
0
50
100
150
200
250
300
TYPE T-68
°F
NO. 643037 LEEDS & NORTHRUP CO., NORTH WALES, PA. MADE IN U.S.A.



>H20 @130 N
OUTBOARD BRG.

NO. 643037 LEEDS & NORTHRUP CO., NORTH WALES, PA. MADE IN U.S.A. NO. 643037 LEEDS & NORTHRUP CO.


°F
TYPE T-68
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250
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°F
TYPE T-68
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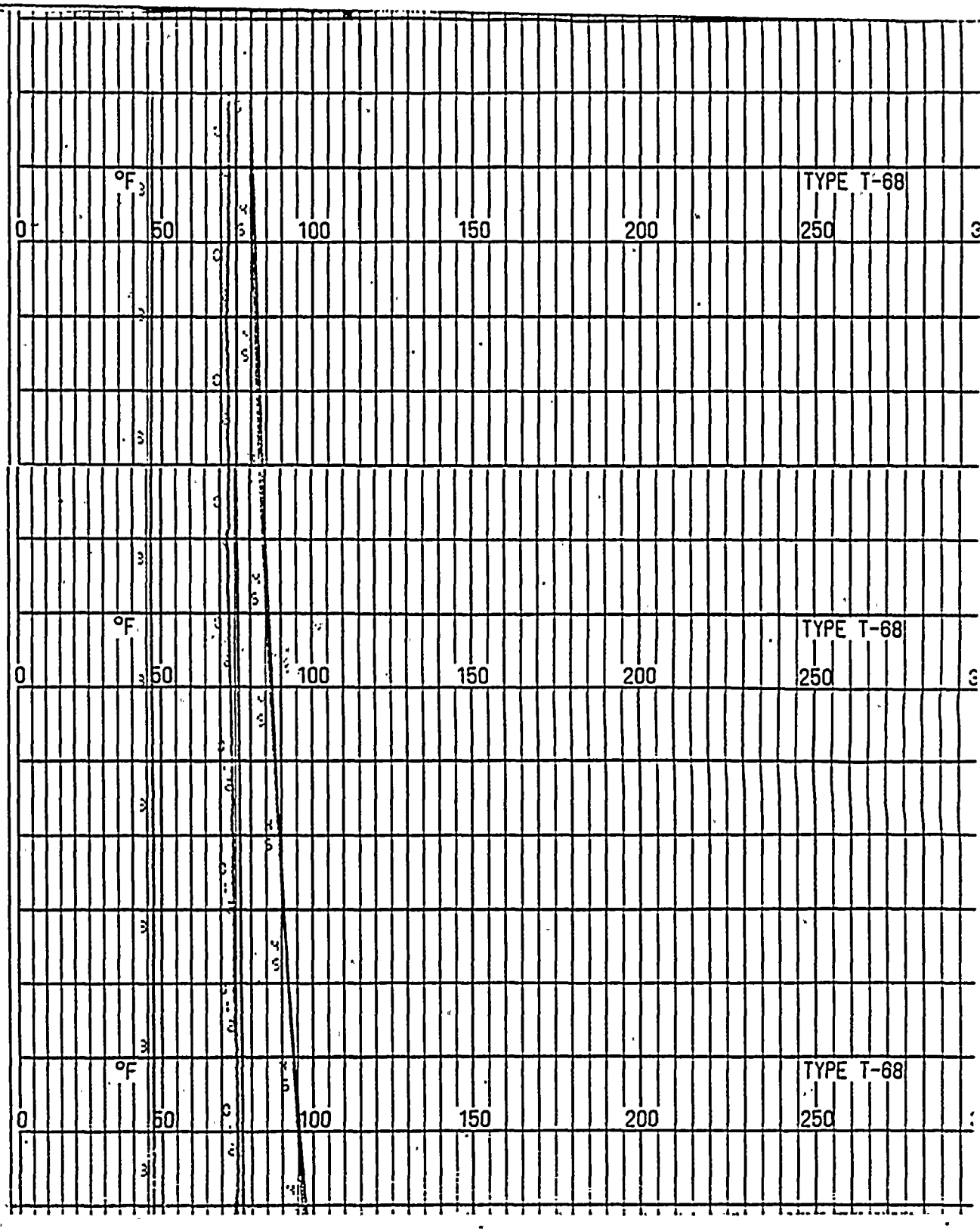
°F
TYPE T-68
0
50
100
150
200
250
300
NO. 643037 LEEDS & NORTHRUP CO., NORTH WALES, PA. MADE IN U.S.A.
NORTH WALES, PA. MADE IN U.S.A.

"B" Pump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TYPE T-68
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50
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250
°F
TYPE T-68
0
50
100
150
200
250
°F
TYPE T-68
0
50
100
150
200
250
NO. 643037 LEEDS & NORTHRUP CO., NORTH WALES, PA. MADE IN U.S.A.
NO. 643037 · LEEDS & NORTHRUP CO.,

	TIME	~~TEMP~~	% Humidity	C.S.T. TEMP. °F	SUCTION PRESS.	DISCH. PRESS.
1/6/81 Friday	1200		RWP ~~78~~ 90 35	84°	11.2	1437
	1300		35	84°	11.0	1435
	1400		34	84°	11.0	1435
	1500		34	RWP ~~84~~ 84°	10.8	1435
	1600		34	82°	10.7	RWP ~~1430~~ 1435
	1700		34	82°	11.0	1435
	1800		34	82°	10.7	1435
	1900		34	82°	10.7	1435
	2000		34	83°	10.7	1435
	2100		34	83°	11	1435
	2200		34	81	11	1435
	2300		34	84°	10.7	1435
	2400		34	84	10.2	1435
11/7/81 Sat.	0100		34	85°	10.3	1435
	0200		34	84°	10.8	1435
	0300		34	84	10.8	1435
	0400		35	86	10.5	1433
	0500		35	87	10.2	1432
	0600		35	87	10.4	1432
	0700		35	88	10.0	1431
	0800		34	89	10.0	1430
	0900		34	90	9.9	1430
	1000		34	90	9.9	1430
	1100		34	90	9.9	1430
	1200		34	90	9.9	1430
	1300		34	92	10.1	1432
	1400		34	92	10.8	1435
	1500		34	92	10.9	1435

	TIME	Temp.	% Humidity	C.S.T. TEMP.	SUCTION PRESS.	DISCH. PRESS.
	1600		35	92	10.8	1435
	1700		35	92	10.8	1435
	1800		35	92	10.8	1435
	1900		34	92	11.0	1437
	2000		34	92	10.2	1435
	2100		34	92	10.3	1438
	2200		34	92	10.3	1438
	2300		34	92	10.2	1440
	2400		35	90	10.3	1440
11/8/81 Sunday	0100		34.5	91	10.5	1440
	0200		34.5	89	10.7	1440
	0300		34	89	11.0	1440
	0400		35	91	10.8	1440
	0500		35	84	11.0	1440
	0600		35	85	10.8	1440
	0700		35	85	10.1	1440
	0800		35	84	10.5	1440
	0900		35	82	10.8	1440
	1000		36	86	10.3	1438
	1100		36	86	10.8	1438
	1200		36	86	11.0	1439
11/8/81	2008		34	85	11.0	1437
	2023		34	85	10.8	1436
	2038		34	85	11.0	1436
	2053		35	85	11.0	1438
	2108		35	85	11.1	1436

"B" MDAFWP Table III
PT-16.4

PUMP BEARING VIBRATION DATA SHEET

	TIME	Vertical INBOARD	Vertical OUTBOARD	~~TIME~~	Horizontal INBOARD	Horizontal OUTBOARD
Start 11/6/81 Friday	1200	.070	.17		.060	.085
	1215	.070	.170		.060	.085
	1230	.105	.17		.070	.10
	1245	.09	.17		.075	.12
	1300	.07	.17		.075	.10
	1400	.09	.17		.08	.11
	1500	.105	.17		.08	.10
	1600	.09	.17		.09	.11
	1700	.09	.17		.10	.11
	1800	.09	.17		.10	.11
	1900	.09	.17		.10	.11
	2000	.09	.17		.10	.11
	2100	.09	.16		.10	.11
	2200	.10	.16		.07	.085
	2300	.08	.16		.09	.09
	2400	.085	.19		.068	.09
Saturday	11/7/81	.08	.18		.09	.09
	0100	.09	.16		.085	.095
	0200	.085	.165		.09	.09
	0300	.085	.22		.09	.095
	0400	.09	.23		.072	.105
	0500	~~.10~~	.18		.08	.1
	0600	.095	.18		.065	.075
	0700	.085	.16		.075	.095
	0800	.085	.16		.075	.095
	0900	.09	.17		.08	.10
	1000	.08	.16		.085	.11
	1100	.09	.15		.075	.11
	1200	.09	.16		.08	.11
	1300	.09	.15		.085	.11
	1400	.09	.15		.075	.11
	1500	.085	.16		.08	.11
	1600	.09	.14		.07	.11
	1700	.09	.13		.075	.11
	1800	.09	.15		.07	.11
	1900	.095	.17		.082	.095
	2000	.090	.17		.070	.10
	2100	.09	.16		.075	.10
	2200	.09	.18		.06	.10
	2300	.09	.17		.08	.12
	2400	.09	.17		.07	.11
Sunday	11/8/81	~~.1~~	~~.15~~		~~.09~~	~~.1~~ .90
	0100	.1	.15		.08	.11
	0200	.1	.15		.09	.10
	0300	.9	.15		.065 SB	.9

"B" MDAFWP Table III

PT-16.4

PT-16.4:7"A"
(con't)

PUMP BEARING VIBRATION DATA SHEET

	TIME	Vertical INBOARD	Vertical OUTBOARD	~~TIME~~	Horizontal INBOARD	Horizontal OUTBOARD
	0400	.10	.15		.085	.11
	0500	.10	.15		.09	.11
	0600	.085	.15		.07	.12
	0700	.09	.15		.075	.11
	0800	.09	.14		.08	.11
	0900	.09	.14		.10	.11
	1000	.09	.14		.09	.11
	1100	.09	.15		.09	.11
Stop 11/8/81	1200	.08	.16		.08	.11
Start 11/8/81	2008	.10	.17		.09	.10
	2023	.10	.17		.09	.10
	2038	.10	.16		.075	.09
	2053	.10	.16		.08	.10
Stop 11/8/81 Sunday	2108	.10	.16		.09	.10