

S7F BODY TONGUE & GROOVE DIMENSIONS OF VALVES CHANGED ABOUT 1962. BODIES ARE NOT INTER-CHANGEABLE.



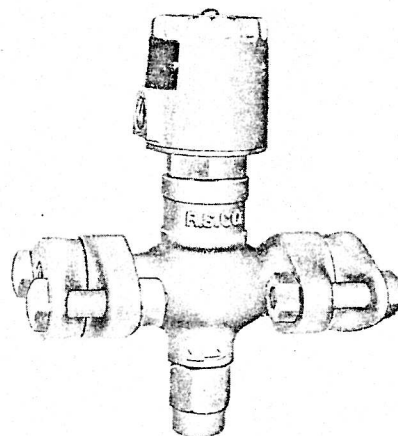
SOLENOID VALVE

PORT: 3/4", 1"

for AMMONIA
and R-12, R-22, R-500, R-502

TYPE
S7F

BULLETIN 30-92
June, 1966



TYPE S7F
Drawing No. 5004
Instructions and Parts List

FEATURES —

- Rugged • Heavy Duty • Pilot Operated
- Positive lift, held open electrically
- Requires no pressure drop to hold open
- Manual opening stem • Flanged
- Solenoid coil is same as used on all R/S refrigerant solenoid valves

275# MOPD

12/15/75 DWGS FOR STA RELEASED TO SHOP. 3/4" BODY WILL HAVE SAME DIMENSIONS AS 1" NEW 1" BODY IS 3/8" LONGER THAN OLD 3/4". NUT ON BOTTOM CAPACITIES OF NEW 3/4" STA PISTON CATALOG NO. IS LARGE TO GIVE SLIGHTLY LESS CAPACITY.

PORT AND TYPE	REFRIGERANT TYPE	LIQUID LINE • TONS			SUCTION LINE • TONS			
		PRESSURE DROP			PRESSURE DROP — 1 PSI			
		2 PSI	3 PSI	4 PSI	40°	20°	0°	-20°
3/4" S7F	R-12	32	35	39	3.6	3.0	2.3	1.8
	R-22	36	45	49	5.5	4.4	3.6	2.8
	AMMONIA	70	85	95	13	11	9.0	7.0
1" S7F	R-12	40	48	56	5.0	4.0	3.2	2.5
	R-22	50	60	68	7.5	6.1	4.9	3.8
	AMMONIA	130	150	180	17	14	11	9.0

AVAILABLE CONNECTIONS	CATALOG NUMBER
7/8", 1-1/8", 1-3/8" ODS	F13415
3/4", 1/2", 1" FPT	13414
3/4", 1/2", 1" WELDING	13412
1-1/8", 1-3/8", 1-5/8" ODS	F13446
1", 1-1/4" FPT	13444
1", 1-1/4" WELDING	13445

FOR R-500, apply 1.1 Multiplier to R-12 liquid line capacities. FOR R-500, apply 1.2 Multiplier to R-12 suction line capacities. FOR R-502, apply .86 Multiplier to R-12 liquid line capacities. FOR R-502, apply 1.2 Multiplier to R-12 suction line capacities. WHEN YOU ORDER: Please specify catalog number, connection size and style, volts, cycles, with or without strainer.

DESCRIPTION

This All Purpose, heavy-duty, pilot-operated, positive lift, semi-steel bodied Solenoid Valve is suitable for Ammonia, R-12, R-22, R-500, R-502, and other refrigerants for Liquid Lines from Condenser, Suction Lines, Hot Gas Defrost Lines, Compressor Unloader Lines, Liquid or Gas Legs of Gravity Flooded Systems, Liquid Refrigerant Drain Lines, Gas Equalizer Lines, and other uses. Valve is usually ordered with its close-coupled, 100 mesh stainless steel screen Strainer.

PURPOSE —

Controls flow of refrigerant liquid or gas. Like all solenoid valves, this valve is not modulating: When electrically energized, it opens wide; when de-energized, the main valve seat promptly closes to stop all flow. Since in this valve the piston-main valve is held up and open mechanically by the solenoid, this valve is useful for draining or equalization or for pulsating lines or similar applications which might result in too much pressure drop or in chatter for the more common solenoid valve design having a free-floating piston-main valve which is not held open mechanically.

This S7F Valve in 3/4" and 1" port sizes is an ALL PURPOSE refrigerant solenoid valve. It is useful for control of liquid line feed to thermal expansion valves, float valves, and hand expansion valves; for automatic shut-off of main suction lines or branch suction lines to individual evaporators, either direct-expansion, flooded, or recirculating; for control of hot gas defrosting lines; for partial or full unloading of compressor discharge lines during starting or for capacity

reduction; for gas leg or liquid leg of small gravity flooded recirculating systems; for refrigerant liquid drain lines; for purge lines; for gas equalizer lines; for refrigerant oil lines; for other refrigerant uses.

INSTALLATION —

Protect inside of valve from dirt and chips during installation. Mount on horizontal pipe line with electrical coil at the top. On a liquid line the solenoid valve should be near the inlet to the expansion valve. Allow 4" space above valve for removal of Coil Housing and Coil, and allow 3" space below valve for removal of #26 Seal Cap covering the #21 manual Seat Lift Stem. Unless a refrigerant system is unusually clean, it is generally advisable to install its companion close-coupled Strainer ahead of this S7F Solenoid Valve for protection against chips and dirt. This S7F Solenoid Valve or its Strainer are easily removable for cleaning or repairing without disturbing threaded, welded or soldered joints. To remove valve, merely unscrew the flange bolts and spread the flanges slightly apart.

PARTS LIST - 3/4" PORT AND 1" PORT TYPE S7F SOLENOID VALVE

ITEM NO.	DESCRIPTION	3/4" PORT SIZE			1" PORT SIZE		
		PART NO.	QTY.		PART NO.	QTY.	
1 To 25	COMPLETE VALVE ASSEMBLY	30-0003-12			30-0003-11		
2 To 11	PLUNGER-PILOT-MAIN VALVE ASSEMBLY	30-0154-00			30-0154-00		
1	VALVE BODY	B-1372D	1		B-1372A	1	
2A	PISTON MAIN VALVE DISC HOLDER						
3A	MAIN VALVE DISC						
4A	RETAINING NUT						
5A	SOLENOID PLUNGER						
6A	PILOT VALVE NEEDLE <i>STAINLESS STEEL</i>						
7A	MAIN VALVE LIFT PLUG						
8A	SPRING						
9A	PILOT VALVE GUIDE						
10A	RETAINER RING						
11	GASKET FOR BONNET - TUBE ASSEMBLY	G-15	1		G-15	1	
12	BONNET - TUBE ASSEMBLY	A-1365	1		A-1365	1	
13	COIL SUPPORT PLATE	A-981-2	1		A-981-2	1	
14	COIL TENSION SPRING	S-36	1		S-36	1	
15	SOLENOID COIL (SPECIFY VOLTAGE & CYCLES)	30-0030-	1		30-0030-	1	
16	COIL HOUSING	A-320-D	1		A-320-D	1	
17	COIL HOUSING SCREW <i>STAINLESS STEEL</i>	SC-5-3	1		SC-5-3	1	
18	LOCKWASHER	W-1-1	1		W-1-1	1	
19	ELECTRIC CURRENT PLATE	30-1016-00	1		30-1016-00	1	
20	NAME PLATE	30-1095-00	1		30-1020-00	1	
21	SEAT LIFT STEM	A-1368	1		A-1368	1	
22	STUFFING BOX WASHER	A-396	1		A-396	1	
23	PACKING RING	A-289	1		A-289	1	
24	STUFFING BOX SCREW	A-338	1		A-338	1	
25	SEALING CAP GASKET	G-14	1		G-14	1	
26	SEALING CAP	A-336-1	1		A-336-1	1	
27	FLANGE GASKETS	G-3	2		G-4	2	
28	FLANGE BOLTS	SC-8-2	4		SC-8-5	4	
29	FLANGE BOLT NUTS	SC-1-3	4		SC-1-3	4	
30*	MALE FLANGES (F.P.T.)	P-5-	2		P-5-	2	
31*	MALE FLANGES (SOCKET WELD)	P-5-	2		P-5-	2	
32*	MALE FLANGES (SOLDER)	30-0137-	2		30-0108-	2	
33*	MALE FLANGES (WELD NECK)	P-5-89	2		P-5-91	2	

* SPECIFY SIZE & TYPE OF FLANGES - ITEM 30, 31, 32 OR 33

▲ THESE ITEMS ARE PART OF THE PLUNGER-PILOT-MAIN VALVE ASSEMBLY & SOLD ONLY AS AN ASSEMBLY.

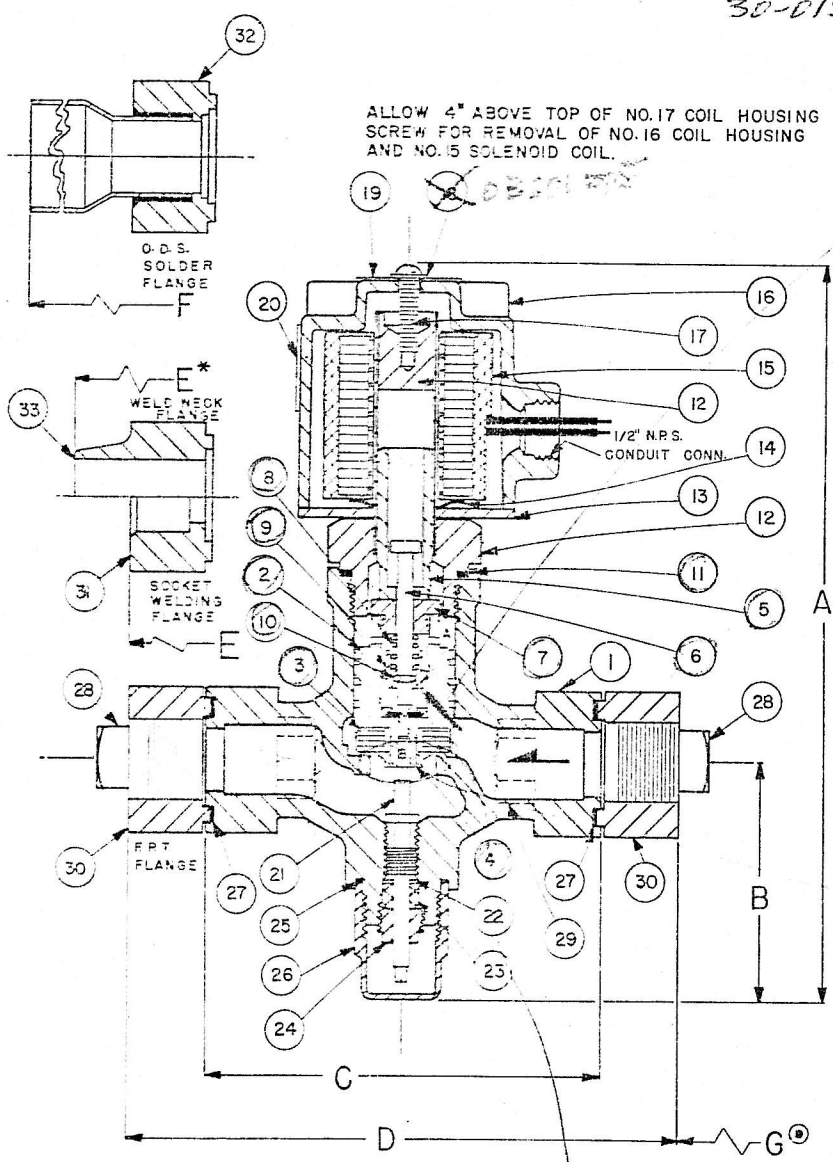
FLANGE, BOLT, & GASKET DATA						
PORT SIZE	TYPE FLANGE	BOLT CENTER	FLANGE BOLTS		FLANGE GASKETS	
			NO. REQ.	DIMENSION	PART NO.	DIMENSIONS
3/4"	OVAL	2-3/4	4	5/8-11 x 2-3/4 LG.	G-3	1-51/64 x 1-5/16 x 1/16
1"	OVAL	3-1/8	4	5/8-11 x 3 LG.	G-4	2-7/64 x 1-5/8 x 1/16

TABLE OF NET WEIGHTS			
PORT SIZE	VALVE WITH F.P.T. CFB & G	STRAINER WITH B & G	COMBINED VALVE & STRAINER
3/4"	13#	8#	21#
1"	17#	10#	27#

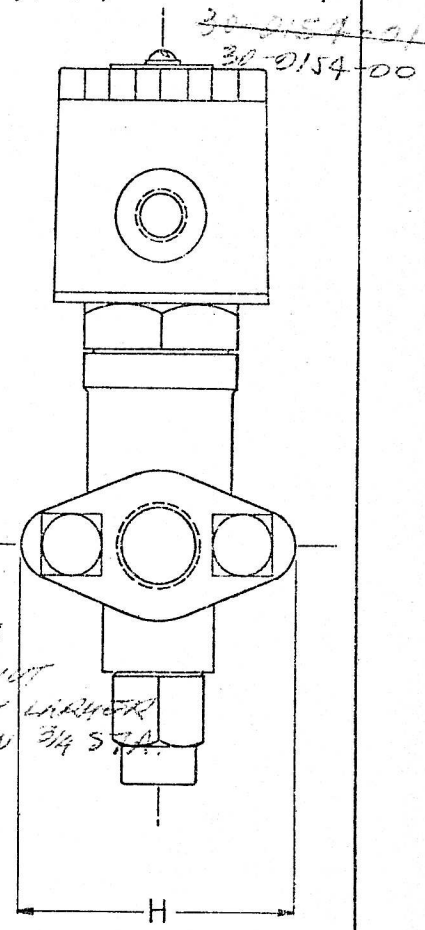
REV. B 5-12-66
REFRIGERATING SPECIALTIES CO.
PARTS LIST FOR DWG. 5004

OPENS WITH REVERSE FLOW AT 1 PSI ΔP

6/1/77 HI SPEED PLUNGER IS STANDARD.
~~30-0154-00 & 30-0154-01 REPLACES~~
~~BY 30-0154-00~~ 30-0154-00 REPLACES
 30-0154-01



0.046" φ
 HOLE DRILLED
 FOR J.E. WATKINS.
 HIGH SPEED PISTON
 PLUNGER ASSEMBLY



12/15/75:
 THIS PART
 SLIGHTLY LARGER
 ON NEW 3/4 STA.

ALLOW 1" BELOW BOTTOM OF NO.26
 SEALING CAP TO OPERATE NO.21 SEAT
 LIFT STEM.

ADDITIONAL WIDTH FOR
 STRAINER

6/10/75:
 DIBC ONLY
 30-1193-00 6.00 LIST EA.

PIPING & LAYOUT TABLE FOR TYPE S7F SOLENOID VALVES

PORT SIZE	A DIM.	B DIM.	C DIM.	PIPE DIM.	FPT. D	WELD		SOLDER		G φ	H
						NECK E*	SOCKET E	TUBE	F		
3/4"	10-7/8	3-1/2	5-3/4	1/2	7-1/2	7-1/2	7/8	10	5-3/4	4-1/8	
				3/4	7-1/2	9-5/8	7-1/2	1-1/8	10-1/4	5-3/4	4-1/8
1"	10-7/8	3-1/2	6-1/8	1	8-1/4	8-1/4	1-1/8	11	6-1/8	4-1/2	
				1-1/4	8-1/4	8-1/4	1-3/8	10-3/8	6-1/8	4-1/2	

⊙ G DIMENSION: FOR FLANGED STRAINER BOLTED BETWEEN INLET
 FLANGE AND INLET OF VALVE BODY, ADD TO DIMENSION D, E, OR F.

VALVE IS ELECTRICALLY OPENED
 NORMALLY CLOSED.

VALVE MUST BE INSTALLED ON
 HORIZONTAL PIPE LINE WITH
 COIL HOUSING AT TOP.

FOR R-12, R-22, R-500, R-502, & AMMONIA

REFRIGERATING SPECIALTIES CO.
 2445 SO. 25TH AVE.
 BROADVIEW, ILL., U.S.A.

SOLENOID VALVES - PILOT UNLOADED
 MAIN VALVE PISTON-ELECTRICALLY LIFTED

DRAWN BY R.D.H. TYPE: S7F 3/4" 8 1"
 APPROV BY R.L.B. DATE: 6-2-66 DRS. NO. 5004

This S7F Solenoid Valve must be installed with the arrow on the valve body in the direction of controlled fluid flow through the valve. If installed backwards, the fluid flow will not be stopped when the solenoid valve is electrically de-energized. Like all solenoid valves, this S7F valve can stop flow only in the direction of the arrow. If a reversal of pressure occurs in the system so the pressure downstream of the arrow exceeds the pressure upstream, then the #2 Piston-Main Valve will be blown upwards from its seat and backward flow will occur. If a system has this type of pressure reversal (perhaps as in some hot gas defrost systems), a check valve in series with the solenoid valve will prevent flow reversal.

ELECTRICAL —

The electrical coil must be connected to electrical lines of the same voltage and cycles as printed on the coil. Supply wires must be large enough that full voltage exists at the coil leads even when other electrical equipment is operating. Where possible, it is advisable to protect the coil with a 1 ampere fuse.

MANUAL OPENING STEM —

If it is desired to open the S7F Solenoid Valve without energizing the coil, remove #26 Seal Cap cautiously and turn the #21 Seat Lift Stem inward, thereby lifting the #2 Piston-Main Valve from its seat and permitting fluid flow through the valve. To resume automatic operation, back out the #21 Seat Lift Stem until it stops and replace #26 Seal Cap.

PRINCIPLES OF OPERATION —

This is a pilot operated solenoid valve whose Piston-Main Valve, once initially opened by its pilot, is held open mechanically by the pull of the electrical solenoid coil. Consequently, no pressure drop across the valve or flow through the valve is needed to keep the Piston-Main Valve opened wide.

Operation in detail is as follows, starting with a closed valve: When electrically energized, #15 Solenoid Coil forms a magnetic field which pulls #5 Solenoid Plunger upward, striking #8 Pilot Valve Needle and pulling it up from its seat at the pilot port inside of #2 Piston-Main Valve. This permits fluid to travel from Chamber A above the Piston-Main Valve and out through Orifice B in the Piston-Main Valve to the downstream side of the S7F Solenoid Valve. When the pressure in Chamber A has dropped almost to the downstream pressure, the higher upstream pressure acting on the annular portion of the Piston-Main Valve outside of the seat bead will lift the Piston-Main Valve from its seat and the contact of #9 Pilot Valve Guide against #7 Main Valve Lift Plug will cause the #2 Piston-Main Valve to be held wide open by the magnetic pull.

Closing operation is as follows: When the electrical circuit to the S7F valve is broken, #15 Solenoid Coil is electrically de-energized, allowing #5 Solenoid Plunger to drop and #6 Pilot Valve Needle to close the pilot port inside of #2 Piston-Main Valve. At the same time, #9 Pilot Valve Guide is lowered so it no longer is lifting #7 Main Valve Lift Plug nor #2 Piston-Main Valve. With the pilot port closed, liquid and gas

leakage through the clearance area around #2 Piston-Main Valve cause rapid pressure build-up in Chamber A, which combines with the weight force of the Piston-Main Valve to force the Piston-Main Valve to drop tight against its seat bead and stop all liquid flow.

SERVICE POINTERS —

1. Failure to Open: (a) Coil of improper voltage (check line voltage measured at valve against voltage printed on coil). (b) Abnormally low voltage at coil (check wiring). (c) Failure to electrically energize (check control circuit). (d) Stuck Piston-Main Valve (Disassemble valve and remove every trace of dirt from piston and cylinder using fine emery cloth to remove burrs if necessary. Thoroughly clean inside of valve and clean strainer). (e) Solenoid Coil is burned out (replace; also check for Piston-Main Valve being stuck closed by dirt; this could cause coil burnout). (f) Pressure differences too high (valve will open against a maximum of 275# pressure difference at normal voltages). (g) Combination of subcooled liquid and high pressure difference may cause more leakage around the piston than can escape through the pilot port, thereby slowing or preventing valve opening. This is generally found only in certain 2-stage low temperature applications on high pressure, subcooled liquid lines. (Best remedy is to replace this S7F solenoid valve with one of our special S5C4 solenoid valves which operates on a different principle).

2. Failure to Close: (a) Electrical control circuit is not opening properly (check wiring and controls). (b) There are chips, dirt or burrs on the #2 Piston-Main Valve (thoroughly clean piston, using fine emery cloth to remove any burrs or roughness. Clean all dirt from inside of valve body and strainer. Re-assemble with light film of oil on piston). (c) #3 Main Valve Disc or #6 Pilot Valve Needle is worn out and thereby leaking (advisable to replace entire #2 to #11 Plunger-Pilot-Main Valve assembly, Part #30-0154-00.) (d) The #21 manual Seat Lift Stem is turned all or partly in, thereby holding the #2 Piston-Main Valve open and permitting flow through the valve even when de-energized. (e) The valve is so greatly undersized that very high fluid velocity is holding the #2 Piston-Main Valve open (size valves in accordance with our recommendations). (f) The valve may be actually closing tight on a liquid line but the evaporator pressure rises naturally due to liquid refrigerant in a warming evaporator.

3. Leakage Through Valve: See 2. (Above).

4. Overheating. This electrical coil is designed to operate hot and is constructed of high temperature Formvar wire accordingly. Unless troubled with actual coil burnouts, high temperature of the coil should be ignored. Persistent burnouts indicate improper voltage or jammed Main Valve.

FACTORY REPAIR AND REBUILDING —

For the convenience of our customers we have a standard factory repair and re-building service. Repairable returned Solenoid Valves are disassembled, cleaned, sand-blasted, worn parts replaced, re-assembled, and repainted. For quickest service, it is advisable that this be done during the winter months.

GENERAL SPECIFICATIONS

For Architects and Engineers (Check Appropriate Blank)

Furnish and install a Refrigerating Specialties Co. 3/4" Port _____, 1" Port _____
 Type S7F Solenoid Valve for liquid line _____, suction line _____, hot gas supply
 line _____. Strainer is required. Yes _____, No _____. Current characteristics
 Volts _____ Cycles _____. The Solenoid Valve shall have positive lift and be held
 open electrically requiring no pressure drop to hold valve open. The valve shall also have a
 manual opening stem and shall be supplied with a solenoid coil which is common to all R/S
 refrigerant solenoid valves.

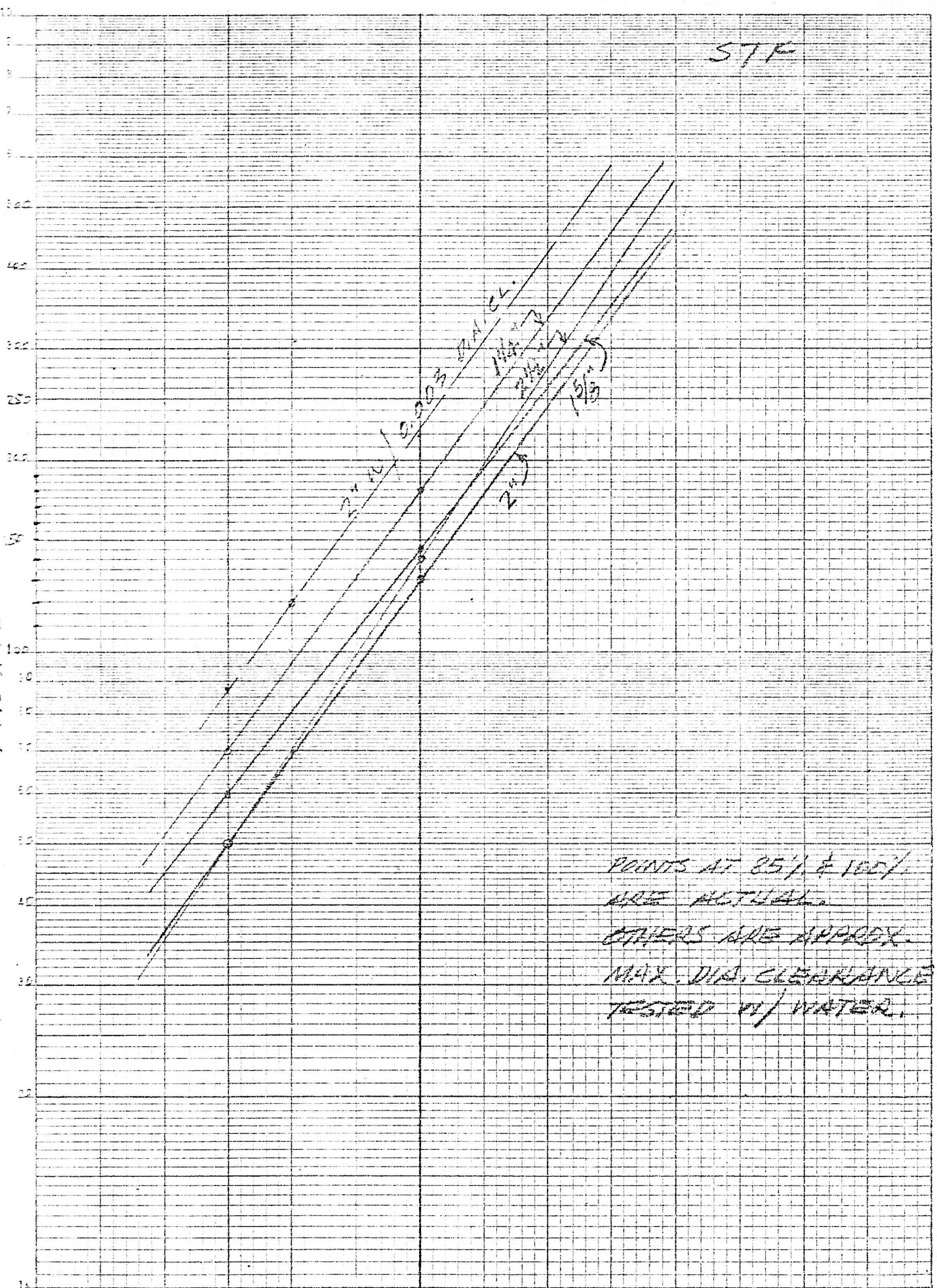


REFRIGERATING SPECIALTIES COMPANY

2445 SO. 25TH AVENUE • BROADVIEW, ILLINOIS 60153

M.O.A.D.

STF



POINTS AT 85% & 100%
 ARE ACTUAL.
 OTHERS ARE APPROX.
 MAX. DIA. CLEARANCE
 TESTED IN WATER.

80 85 90 95 100 105 110 115 120

1/10/49