ELECTRO-MOTIVE

M.I. 928
*Rev. A

MAINTENANCE INSTRUCTION

LUBRICATING OIL COOLER SERVICE LIMITS

INTRODUCTION

During normal operation, restrictions eventually build up within the cores of lube oil coolers. These restrictions greatly reduce cooler efficiency, therefore coolers should be checked periodically to verify adequate cooling capacity. This instruction contains testing procedures, performance baselines for oil coolers that are clean, and tables that indicate the maximum allowable deviation from the performance baselines. The tables also relate cooler and locomotive models to the applicable performance baselines.

PROCEDURE

In order to obtain a valid indication of lube oil cooler performance, the locomotive must be operated at its full rated load and engine speed while oil and water temperatures are allowed to stabilize.

1. To obtain water inlet temperature (out of oil cooler), locate the thermometer well in the water pump discharge elbow, Fig. 1, and fill it with engine oil. Place a tube-type thermometer into the well.

2. To obtain temperature of oil into the engine (out of oil cooler), remove the square cover from the engine mounted lube oil strainer and hang a caged thermometer in the overflow compartment of the strainer housing. Ensure that the thermometer bulb is well below the surface of the oil and is kept submerged while readings are taken.

3. Set up engine loading apparatus capable of taking the full rated load of the locomotive. Refer to the Load Testing section of the appropriate Locomotive Service Manual for instructions covering the load testing setup.

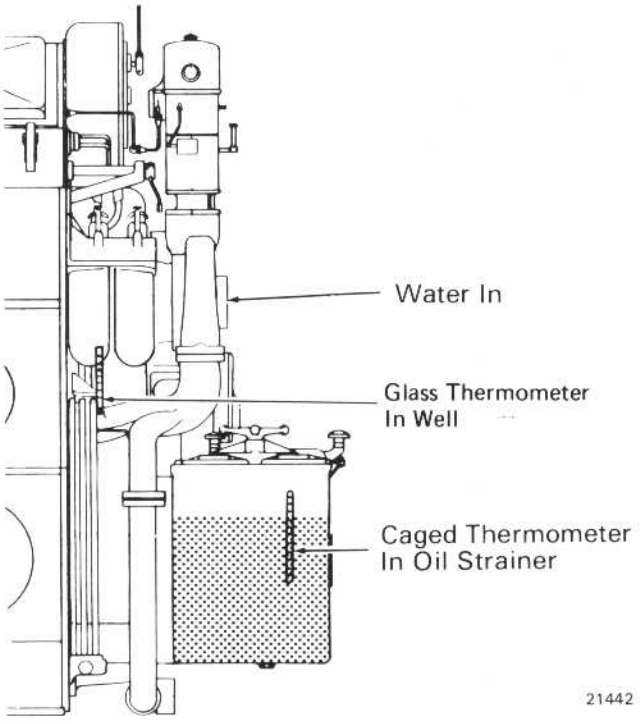

Fig. 1 – Location Of Thermometers To Determine Oil And Water Temperature Differential

CAUTION

Many standard load boxes are not of sufficient capacity to fully load the locomotive.

4. Operate the engine and apply load. Do not operate above throttle position No. 3 until water temperature is above 54.5° C (130° F). Operate at full load and full engine speed until engine water inlet temperature is stabilized. It may be necessary to energize or de-energize cooling fan contactors, fan clutch magnet valves, or shutter control magnet valves as applicable and needed to maintain constant engine water inlet temperature within the range of 70° C to 80° C (160° F to 175° F).

*This bulletin is revised and supersedes previous issues of this number.

NOTE

Consecutive readings taken 15 minutes apart and showing no change in oil and water temperature indicate stable conditions.

5. Record temperature readings and compare them with the performance baseline applicable to the locomotive being tested.

   a. Locate the specific model of the locomotive listed in the third column of table shown in Fig. 2 or 3. A letter (or letters) given in the first column of the table identifies the performance baseline applicable to that locomotive model.

   b. Locate the applicable performance baseline on the graph appearing in Fig. 4, and on that graph, plot the point determined by intersection of the temperatures obtained in the test.

   c. From the plotted point, count the number of degrees vertically down to the applicable performance baseline. If this value is greater than the service limit given in the second column of the table applicable to the particular locomotive model, the lube oil cooler should be disassembled and cleaned, then reassembled and tested.

DOMESTIC LOCOMOTIVE APPLICATIONS

PERFORMANCE BASELINES	SERVICE LIMIT °C	SERVICE LIMIT °F	LOCO. MODEL	ENGINE TYPE	LOCO. H.P.	OIL COOLER ASSEMBLY	OIL COOLER CORE / HEAT EXCHANGER
A	5.5	10	Alco.-Pass.	16-567C	1750	8183064	8183063 or 3129515
B	5.5	10	SW900	8-567C	900	8137460	8137408 or 3125274
B	5.5	10	SW1200	12-567C	1200	8137460	8137408 or 3125274
B	5.5	10	RS1325	12-567C	1325	8137460	8137408 or 3125274
B	5.5	10	E9	12-567C	2400	8137460	8137408 or 3125274
B	5.5	10	SD9	16-567C	1750	8183064	8183063 or 3129515
B	5.5	10	Bald. Sw.	8-567C	900	8137460	8137408 or 3125274
C	8.3	15	SW600	6-567C	600	8137460	8137408 or 3125274
C	8.3	15	E9	12-567C	2400	8224518	8183063 or 3129515
C	8.3	15	F2 F3 F7 FP7	16-567B	1500	8080381 or 8228791	8228373 or 3136028
C	8.3	15	GP7	16-567B	1500	8080381 or 8228791	8228373 or 3136028
C	8.3	15	BL1 BL2	16-567B	1500	8080381 or 8228791	8228373 or 3136028
C	8.3	15	SD7	16-567B	1500	8183064	8183063 or 3129515
C	8.3	15	E8	12-567B	2250	8137460	8137408 or 3125274
C	8.3	15	Alco.-Pass.	12-567C	2000	8224518	8183063 or 3129515
C	8.3	15	Alco.-Frgt.	16-567C	1500	8183064	8183063 or 3129515
C	8.3	15	Alco. Sw.	12-567C	1000	8137460	8137408 or 3125274
C	8.3	15	Bald. Trans.	12-567C	2000	8137460	8137408 or 3125274
C	8.3	15	Bald. Sw.	12-567C	1000	8137460	8137408 or 3125274
C	8.3	15	Bald. Sw.	8-567C	660	8137460	8137408 or 3125274
D	8.3	15	Bald. Pass.	16-567C	1500	8220899	8220899
D	8.3	15	F.M. Frgt.	16-567C	1750	8225657	8225657
D	8.3	15	F.M. Rd. Sw.	16-567C	1500	8255946	8255946
E	8.3	15	F9 FP9 FL9	16-567C	1750	8259413	8228373 or 3136028
E	8.3	15	GP9	16-567C	1750	8250727	8228373 or 3136028
E	8.3	15	GP18	16-567D1	1800	8250727	8228373 or 3136028
E	8.3	15	SD18	16-567D1	1800	8250727	8228373 or 3136028
E	8.3	15	Alco. Rd. Sw.	16-567C	1500	8250727	8228373 or 3136028
E	8.3	15	Bald. Rd. Sw.	16-567C	1500	8250727	8228373 or 3136028
R	8.3	15	GP38	16-645E	2000	8364030	8228373 or 3136028
R	8.3	15	SD38	16-645E	2000	8364030	8228373 or 3136028
G	5.5	10	GP30	16-567D3	2250	8272136	8318804 or 3146250
G	5.5	10	SD24	16-567D3	2400	8272136	8318804 or 3146250
D	5.5	10	GP20	16-567D2	2000	8250727	8228373 or 3136028
D	5.5	10	GP9M	16-567D2	2000	8250727	8228373 or 3136028

25745

Fig.2 – Oil Cooler Data For Domestic Locomotives (Sheet 1 Of 2)

DOMESTIC LOCOMOTIVE APPLICATIONS - CONT'D.

PERFORMANCE BASELINES	SERVICE LIMIT °C	SERVICE LIMIT °F	LOCO. MODEL	ENGINE TYPE	LOCO. H.P.	OIL COOLER ASSEMBLY	OIL COOLER CORE/ HEAT EXCHANGER
D	8.3	15	SD45	20-645E3	3600	8364235	8318804 or 3146250
N	11.1	20	DDA40X	16-645E3A	6600	8422327	8393169
L	11.1	20	SD40	16-645E3	3000	8364235	8318804 or 3146250
L	11.1	20	GP40	16-645E3	3000	8364235	8318804 or 3146250
G	11.1	20	GP39	12-645E3	2300	8412061	8318804 or 3146250
G	11.1	20	SD39	12-645E3	2300	8412061	8318804 or 3146250
N	11.1	20	GP35	16-567D3	2500	8272136	8318804 or 3146250
BB	5.5	10	SW1000	8-645E	1000		8225303 or 8373360
BB	5.5	10	SW1001	8-645E	1000		8225303 or 8373360
BB	5.5	10	SW1500	12-645E	1500		8365865 or 8373361
BB	5.5	10	MP15	12-645E	1500		8365865 or 8373361
CC	8.3	15	GP15-1	12-645E	1500		8365865 or 8373361
CC	8.3	15	MP15AC	12-645E	1500		8365865 or 8373361
CC	8.3	15	GP38-2	16-645E	2000	8461393	8228373 or 3146028
CC	8.3	15	SD38-2	16-645E	2000	8461393	8228373 or 3146028
FF	11.1	20	GP39-2	12-645E3	2300	8412061	3146250 or 8318804
FF	11.1	20	GP39-2	12-645E3B	2300	8412061	9514842 or 8393169
EE	11.1	20	GP40-2	16-645E3	3000	8412061	3146250 or 8318804
EE	11.1	20	GP40-2	16-645E3B	3000	8412061	9514842 or 8393169
EE	11.1	20	SD40-2	16-645E3	3000	8412061	3146250 or 8318804
EE	11.1	20	SD40-2	16-645E3B	3000	8412061	9514842 or 8393169
EE	11.1	20	GP40P-2	16-645E3	3000	8412061	3146250 or 8318804
EE	11.1	20	SDP40F	16-645E3	3000	8412061	3146250 or 8318804
EE	11.1	20	SD40-2 (Tunnel Mod.)	16-645E3	3000	8466728	3146250 or 8318804
EE	11.1	20	SD40-2 (Tunnel Mod.)	16-645E3B	3000	8466728	9514842 or 8393169
DD	8.3	15	F40C	16-645E3A	3200	8494450	3146250 or 8318804
DD	8.3	15	SD45-2	20-645E3	3600	8412061	3146250 or 8318804
DD	8.3	15	SD45-2 (Tunnel Mod.)	20-645E3	3600	8466728	3146250 or 8318804
EE	11.1	20	F40PH	16-645E3	3000	8412061	8318804 or 8393169
EE	11.1	20	F40PH-2	16-645E3B	3200	8494450	9514842 or 8393169
GG	11.1	20	GP39X	12-645F3	2600	9523367	9514842
FF	11.1	20	GP40X	16-645F3	3500	8412061	9514842 or 8393169
FF	11.1	20	GP50	16-645F3	3500	9523367	9514842
FF	11.1	20	GP50 (Tunnel Mod.)	16-645F3	3500	9523367	9514842
FF	11.1	20	SD40X	16-645F3	3500	9523367	9514842
FF	11.1	20	SD50	16-645F3	3500	9523367	9514842
FF	11.1	20	SD50 (Tunnel Mod.)	16-645F3	3500	9523367	9514842
FF	11.1	20	SD50S	16-645F3	3500	9523367	9514842

25746

Fig.2 - Oil Cooler Data For Domestic Locomotives (Sheet 2 Of 2)

EXPORT LOCOMOTIVE APPLICATIONS

PERFORMANCE BASELINES	SERVICE LIMIT °C	SERVICE LIMIT °F	LOCO. MODEL	ENGINE TYPE	LOCO. H.P.	OIL COOLER ASSEMBLY	OIL COOLER CORE / HEAT EXCHANGER
A	5.5	10	G16	16-567C	1800	8183064	8183063 or 3129515
C	5.5	10	G8	8-567C	875	6917905	8183063 or 3129515
C	5.5	10	G12	12-567C	1310	6917905	8183063 or 3129515
C	5.5	10	GR12	12-567C	1310	6917905	8183063 or 3129515
K	8.3	15	GM6	6-567C	600		8225303
K	8.3	15	GA8	8-567C	800		8225303
K	8.3	15	GL8	8-567C	875		8225303
K	8.3	15	JL8	8-567C	875		8225303
L	11.1	20	GA12	12-567C	1200		8307025
G	5.5	10	GT16	16-567D3	2400	8272136	8318804 or 3146250
BB	5.5	10	G18	8-645E	1000		8225303
BB	5.5	10	GA18	8-645E	1000		8225303
BB	5.5	10	G22	12-645E	1500		8365865 or 8373361
BB	5.5	10	G22C	12-645E	1500		8365865 or 8373361
BB	5.5	10	SW1002	8-645E	1000		8225303
BB	5.5	10	SW1504	12-645E	1500		8365865 or 8373361
AA	5.5	10	G26C	16-645E	2000		8365864 or 8373362
BB	5.5	10	GT18MC	8-645E3	1425		8365865
CC	8.3	15	GT18MC	8-645E3B	1425		8365865
FF	11.1	20	GT22C	12-645E3	2250	8412061	8318804 or 3146250
FF	11.1	20	GT22CU	12-645E3B	2250	8412061	9514842 or 8393169
FF	11.1	20	GT22CW	12-645E3B	2250	8412061	9514842 or 8393169
FF	11.1	20	GT22LC	12-645E3B	2250	8412061	9514842 or 8393169
EE	11.1	20	GT26	16-645E3	3000	8412061	8318804 or 3146250
EE	11.1	20	GT26MC	16-645E3	2600	8454514	3146250
EE	11.1	20	GT26M2C	16-645E3	2911	8454514	3146250
EE	11.1	20	GT26CU-2	16-645E3	2700	8412061	8318804 or 3146250
EE	11.1	20	GT26CU-2	16-645E3B	2700	8412061	9514842 or 8393169
EE	11.1	20	GT26CW	16-645E3B	3000	8412061	9514842 or 8393169
EE	11.1	20	GT26CW-2	16-645E3	3000	8412061	8318804 or 3146250
EE	11.1	20	GT26CW-2	16-645E3B	3000	8412061	9514842 or 8393169
DD	8.3	15	DDM45	20-645E3	3600	8364235	8318804 or 3146250
CC	8.3	15	JT22CW	12-645E3	2200		8365865 or 8373361
BB	5.5	10	JT22CW-2	12-645E3B	2250		8365864

25747

Fig.3 - Oil Cooler Data For Export Locomotives

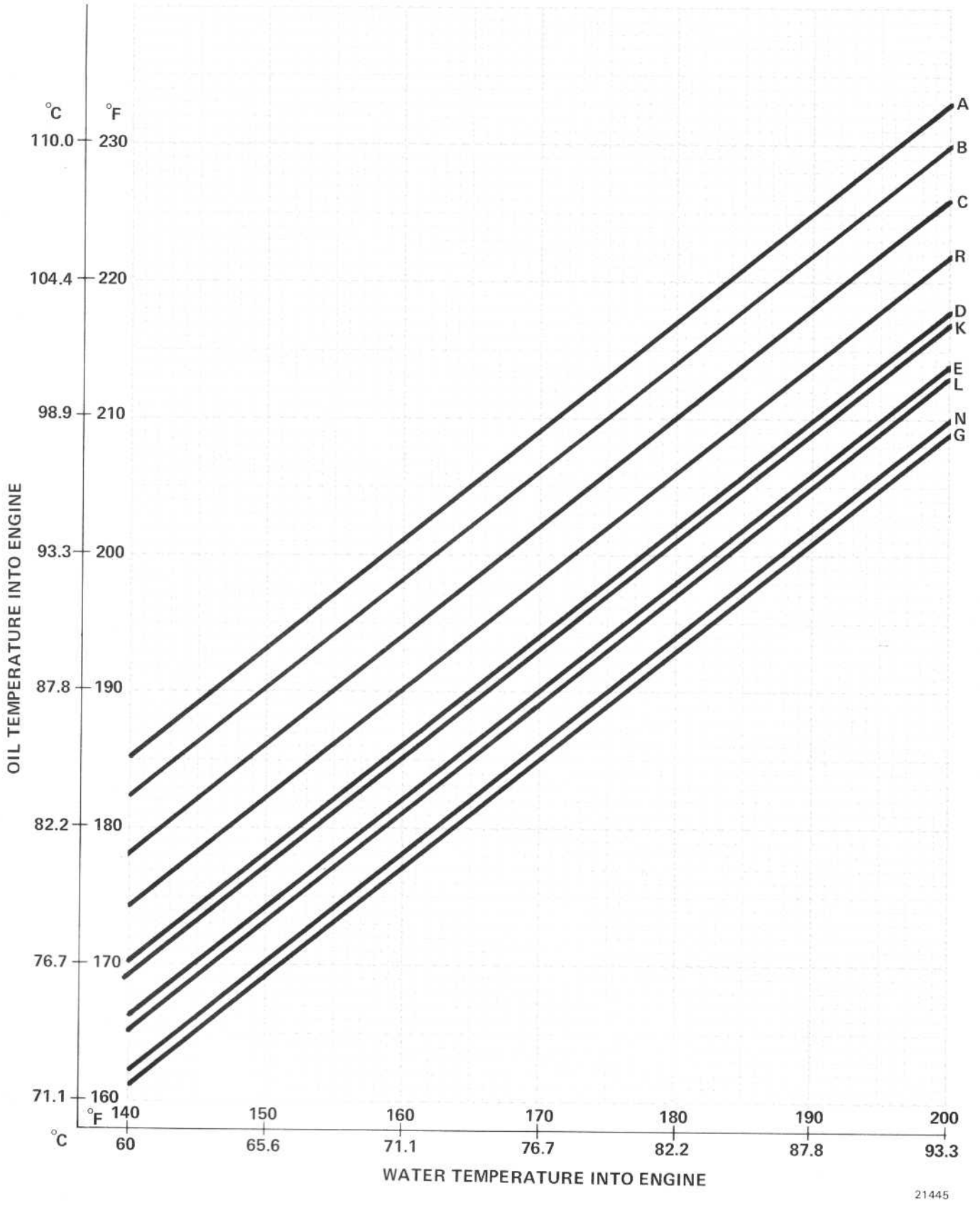

Fig.4 – Clean Oil Cooler Performance Baseline Graph (Sheet 1 Of 2)

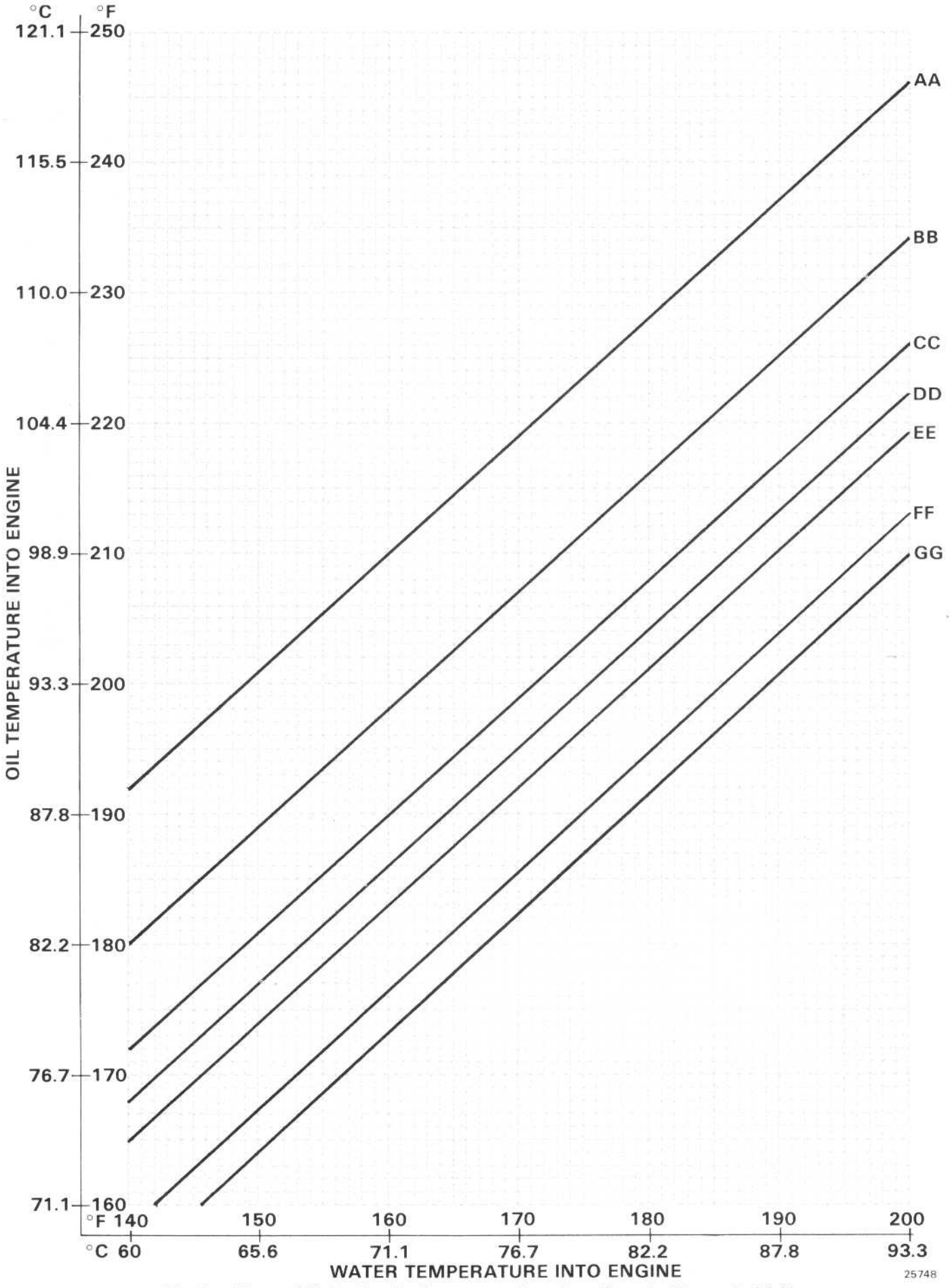

Fig.4 – Clean Oil Cooler Performance Baseline Graph (Sheet 2 Of 2)

SERVICE DATA

RELATED MAINTENANCE INSTRUCTION

Lube Oil Coolers . . . . . M.I. 927

EQUIPMENT LIST

Thermometer Well, 1/4" NPT 8268162
Caged Thermometer - Nominal Range 65-120° C (150-250° F)
Tube-type Thermometer - Nominal Range 50-100° C (122-212° F)

Litho In U.S.A.