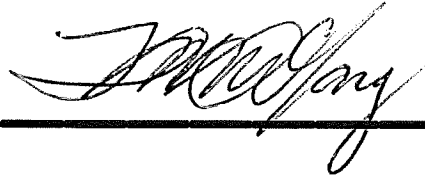


All MTR's meet

section II 2021 ed.

Job# 7441-A & B

Verified by: 

Heater Coils QC 7441 – A & B

PARTIAL

A# 700938

Manufactured By: Priority Projects Ltd. 1603-8 Street Nisku Alberta T9E 7S7

Manufactured For: Lovat Gas Solutions Ltd. PO Box 68129, Crowfoot Postal Calgary, Ab. T3G 3N8

Ultimate Owner: Lovat Gas Solutions Ltd. PO Box 68129 Crowfoot Postal Calgary, Ab. T3G 3N8

Location of Installation: Stock Equipment

Manufacturer's Serial No.	Construction Drawing No.	CODE: ASME B31.3	Year Built
7441-A	7441-300 Rev. 0	Edition 2020	2022

CONSTRUCTION

Coil ID/Purpose	Design Pressure	Design Temp	Design Minimum Temp	Corrosion Allowance	Registered Drawing No.	CRN
a 1.939' Preheat	3170 psig.	400°F	-20°F	0	Coil chart	F-3086.23
b 1.939' Reheat	3170 psig.	400°F	-20°F	0	Coil chart	F-3086.23
c						
d 0.957' Preheat	5280 psig.	400°F	-20°F	0	Coil chart	F-3317.23
e						

COIL

	Tubes			End Closures				Openings		
	Mat'l Spec.	Diameter	Thickness	Return Bend Mat'l Spec.	Return Bend Thickness	Flanges Mat'l Spec.	Flanges Rating	Mat'l Spec.	Size/Type	Rating
a	SA-333-6	2.375" OD	0.218"	SA234WPB	0.218"	SA-350LF2	CL1500			
b	SA-333-6	2.375" OD	0.218"	SA234WPB	0.218"	SA-350LF2	CL1500			
c										
d	SA-333-6	1.315" OD	0.179"	SA234WPB	0.179"	SA-350LF2	CL2500			
e										

HEADERS/MANIFOLDS

	Purpose	Size	Shell		Ends			Openings		
			Mat'l Spec.	Thickness	Mat'l Spec.	Thickness	No	Mat'l Spec.	Size/Type	Rating
f										
g										

TEST PRESSURE, NDE, POSTWELD HEAT TREATMENT AND SIZE

	Hydrostatic Test Pressure	Radiography (100% or % Random)	Other NDE (MT) (PT) (UT)	Postweld Heat Treatment		Overall Length	Heating Surface	Volume
				Temp.	Time			
a	4755 psig.	10%	Visual	None	N/A	129.5"	25.1 sq. ft.	0.83 cu. ft.
b	4755 psig.	10%	Visual	None	N/A	129.5"	25.1 sq. ft.	0.83 cu. ft.
c								
d	7920 psig.	10%	Visual	None	N/A	129.5"	7.5 sq. ft.	0.10 cu. ft.
e								
f								
g								

IMPACT TESTING: Impact exemption per. Para. 323.2.2b

REMARKS:

CERTIFICATE OF COMPLIANCE

We certify that the statements in this report are correct and that all details of design, material, construction, and workmanship of this coil bundle are in accordance with the above Provincial Registered Design.

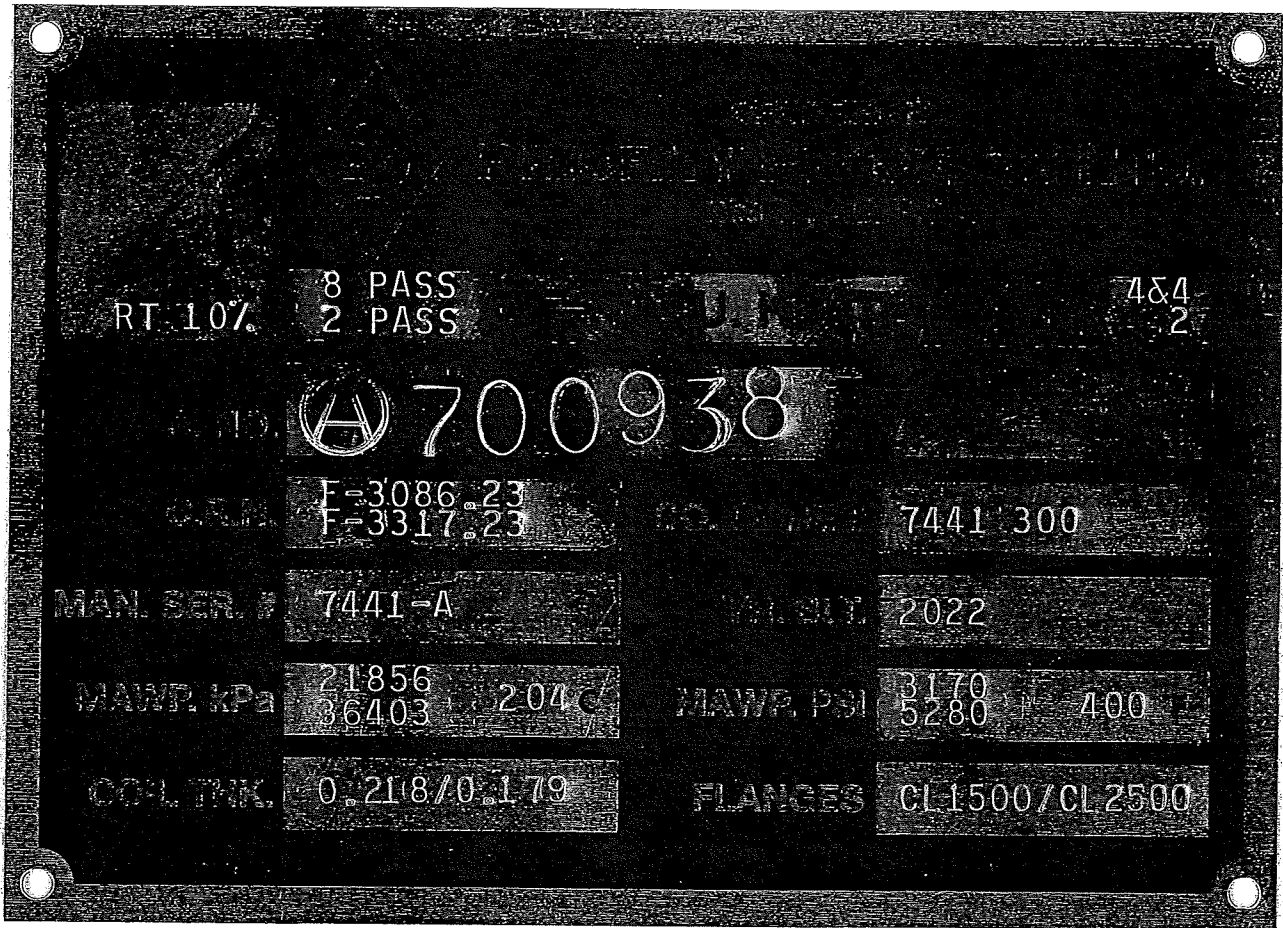
Date 1-9-22 Signed [Signature] For Priority Projects Ltd.
(Representative) (Manufacturer)

CERTIFICATE OF SHOP INSPECTION

I, the undersigned, a duly authorized boiler and pressure vessel inspector employed by Alberta Boilers Safety Association (ABSA) of Alberta have inspected the above Heater Coils and state that, to the best of my knowledge and belief, the constructed is in accordance with the Alberta Safety Codes Act and Regulations. By signing this certificate, neither the inspector nor his or her employer makes any warranty, expressed or implied, concerning the vessel described in this manufacturer's data report. Furthermore, neither the inspector nor his or her employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date SEP 01 2022 Signed [Signature]
NB 16576 AB-467
D00009640
Safety Codes Officer

INDUSTRIAL MANUFACTURING



RT 10%
8 PASS
2 PASS

4&4
2

(A) 700938

F-3086.23
F-3317.23

7441 300

MAN. SER. # 7441-A

W. S. T. 2022

MAWP. kPa 21856
36403 204C

MAWP. PSI 3170
5280 400

COIL THK. 0.2118/0.179

FLANGES CL1500/CL2500

RT 10%

8 PASS
2 PASS

4&4
2

(A) 700938

F-3086.23
F-3317.23

7441 300

MAN. SER. #

7441-A

AN. SER.

2022

MAWP. kPa

21856
36403 204

MAWP. PSI

3170
5280 400

CCFL THK.

0.218/0.179

FLANGES

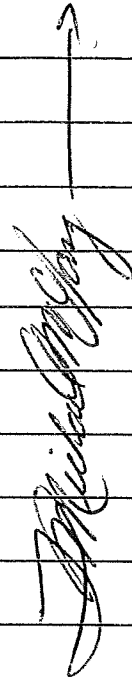
CL1500/CL2500

PRIORITY PROJECTS LTD.

HEATER COILS

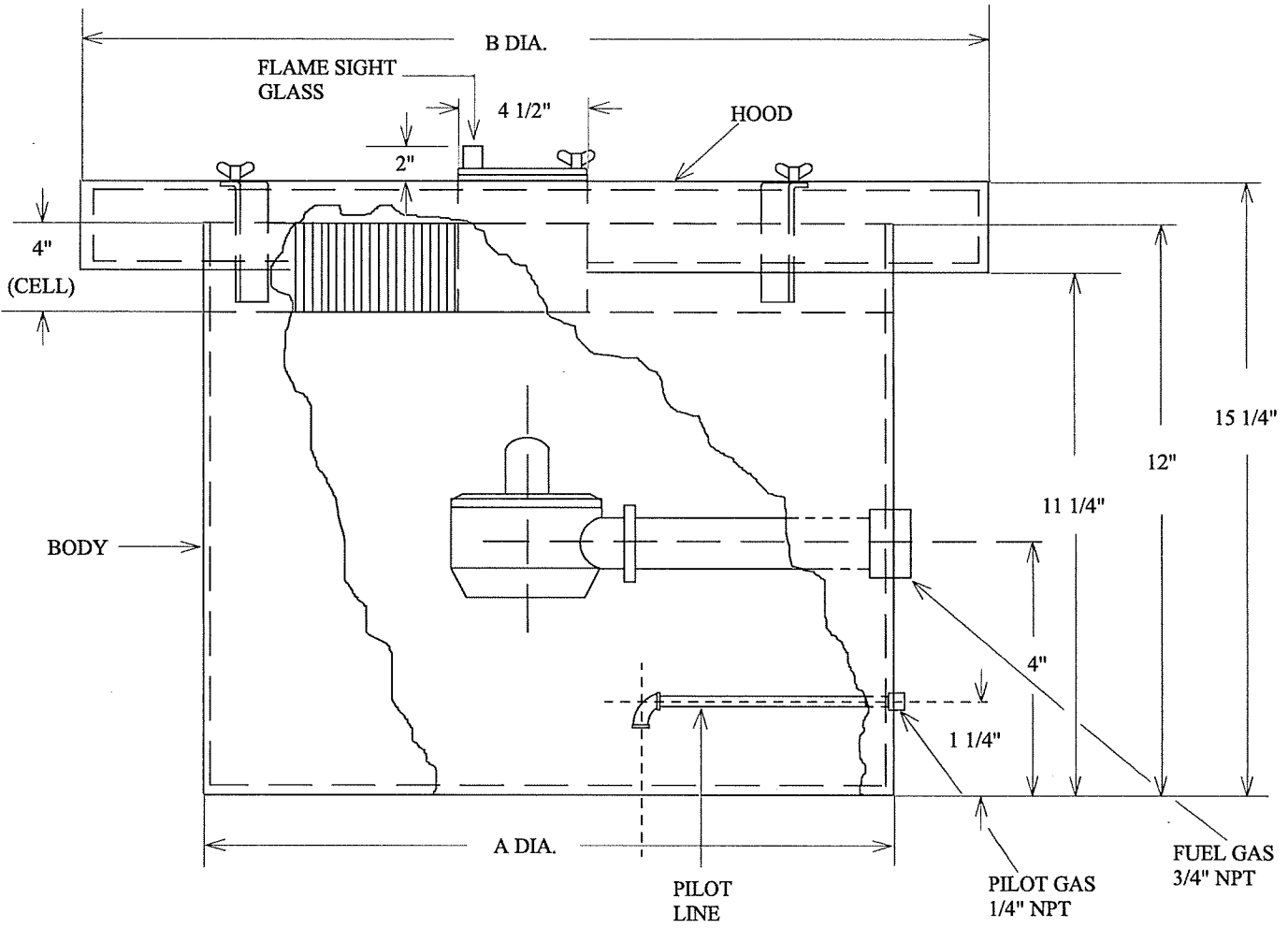
JOB. NO.	7441-A
CRN F3317.25	F3086.23
DATE	8-8-22

DRAWING NUMBER: 7441-300 REV 0 Exhibit 4B

OPERATION	DRAWING NUMBER: <u>7441-300 REV 0</u> Exhibit 4B			
	Q.C PERSONNEL	DATE	A.I.	DATE
DRAWINGS REVIEWED BY ABSA		26-3-85	JL	SEP 01 2022
MATERIAL CHECKED AGAINST DRAWING		9-8-22	JL	SEP 01 2022
MILL TEST CHECKED		9-8-22	JL	SEP 01 2022
PIPING LAYOUT		19-8-22		
PIPE ORIENTATION & FITTINGS RATINGS		19-8-22		
RADIOGRAPHY AND OTHER N.D.E.		10-8-22	JL	SEP 01 2022
EXTERNAL AFTER COMPLETION OF ALL WELDING		26-8-22	JL	SEP 01 2022
WELDERS I.D. & WELD SIZE <i>WPS</i>		26-8-22	JL	SEP 01 2022
P.W.H.T.				
HYDROSTATIC TEST		1-9-22	JL	SEP 01 2022
NAME PLATE		1-9-22	JL	SEP 01 2022
DATA REPORTS		1-9-22	JL	SEP 01 2022

	SPEC	HEAT NUMBER	THICKNESS
FITTING MATERIAL <i>2" LRRB</i>	SA234WPB	64F00M137 ↓	.218"
FITTING MATERIAL <i>1" 90°</i>	SA234WPB	0X1M28X ↓	.179"
FITTING MATERIAL			
FLANGE MATERIAL <i>2" 1500</i>	SA350LF2	021801086 ↓	.218"
FLANGE MATERIAL <i>1" 2500</i>	SA350LF2	TL10030416 ↓	.179"
FLANGE MATERIAL			
PIPE MATERIAL <i>2" XH</i>	SA333-6	13832 ↓	.218"
PIPE MATERIAL <i>1" XH</i>	SA333-6	634051 ↓	.179"
PIPE MATERIAL			
FLANGE MATERIAL <i>COIL SHEET G40</i>		543131	.250"

PRS# 7446 A+B



DIMENSION AND SIZE SCHEDULE		
BURNER BODY SIZE	A	B
FAB 16 - XXA	16 1/4"	20 1/4"

FLAMECO INDUSTRIES, INC.
 FLAME ARRESTED GAS BURNER
 NS - ONE PIECE
 P.O. BOX 4303
 TULSA, OK 74159
 DWG. NO.
 NS - 1 - S - 4



Eclipse Mixer Adjustment Instructions

NOTE: Before starting this process, ensure that the fuel gas and pilot gas are shut off and that all flames have been extinguished.

1. Remove the hand hole port by first removing the four wing nuts holding it in place.
2. Remove the cap that surrounds the fuel adjusting pin.
3. Loosen the air shutter locknut, and the adjusting pin locknut.
4. Ensure that all adjustments are "bottomed out." The fuel adjusting pin should be screwed in all the way, without touching the locknut, and the primary air shutter should be completely shut.
5. Using a slotted screwdriver, back out the fuel adjusting pin between 7.5 and 8 complete revolutions. The pin should not be removed.
6. Back out the primary air shutter 2 complete revolutions. This should be easily adjusted by hand.
7. Set the fuel gas pressure to a maximum of 10 psi and light the burner using your company's burner lighting procedures.

If you do not have gas pressure in excess of 10 psi, skip step 8

8. Increase your fuel pressure to between 13 and 15 psi. Eclipse mixers work best at 14 psi.
9. Monitor the way your burner is running. It should have a sound similar to an acetylene torch and should not be cycling or "woofing." The flame should be blue with orange tips.

If your burner sounds like it is running smoothly, go to step 12. If your burner has a "woofing" sound to it, carry on to the next paragraph.

When a burner makes a "woofing" sound, it indicates one of two things. (1.) The mixture is running too lean (too much primary air). This is normally the case with burners that have high fuel gas pressures. (2.) The fuel gas does not have enough velocity to shoot the flame out the end of the nozzle and is probably burning back into the pipe nipple. This is more common with burners that are running on lower fuel gas pressures.

10. The primary air can be decreased by slowly screwing in the primary air shutter. This must be done slowly and the burner must be given a few seconds to react to the new adjustment.
11. The fuel gas velocity can be increased by screwing in the fuel gas adjusting pin. This is similar to holding your thumb over the end of a garden hose. The velocity of the water is increased, but the volume is decreased.
12. Tighten up the adjusting pin locknut, the air shutter locknut and reinstall the cap. Your burner should now be adjusted properly.
13. Close up the burner and reattach the hand-hole port with the 4 wing nuts. Check the burner periodically to make sure everything is operating correctly.

Please contact ZIRCO if you need any more information. (403) 259-3303



FIREBOX FLAME ARRESTOR OPERATING AND MAINTENANCE INSTRUCTIONS

SCOPE

The fire and explosion hazards in Oil and Gas Production have made it necessary to use appropriate preventative type safety devices. One of these devices is a Firebox Flame Arrestor, which is commonly used on equipment designed to heat fluids in operations such as indirect fires heaters, emulsion heated treaters, glycol dehydrators reboilers, line heaters and storage tanks.

The flame arrestor is a device that, without stopping the air communication, prevents propagation of flame from the firebox of a fired vessel into the surrounding atmosphere, which may contain an ignitable mixture of air and flammable gases.

Oil and Gas production facilities, with equipment representing substantial investment, are usually concentrated in a relatively small area and, therefore, offer increased potential for damages to equipment and personnel. Preventative safety devices, such as firebox flame arrestors, are essential in protecting central installations and individual remote facilities.

IMPORTANT - Proper sizing, installation, start-up, operation and maintenance are essential for a firebox flame arrestor to provide its maximum designed protection.

PROPER SIZING

To achieve the most efficient operation of a flame arrested burner, certain factors must be addressed. The amount of heat transferred to the process is directly related to the surface area of the firetube. By determining the surface area and multiplying that by the flux or absorption rate of the process, you come up with the proper BTU/hr rating for the heater. It must be remembered that this will be all the heat transferred, no matter how much excess is put into the firetube. **(A firetube rated at 500,000 BTU/hr will transfer only 500,000 BTU/hr even if 2,000,000 BTU/hr is being burned.)**

Any amount of excess heat will be wasted as well as having the potential to create hot spots on the firetube that could lead to firetube collapse.

Proper sizing is achieved by calculating the amount of fuel required to be burned to create the desired BTU output. Once this required amount is determined, the orifice is drilled to the proper size to allow that amount of fuel to enter the Eclipse Air/Gas mixer. The variables in this equation are fuel pressure and the BTU value of the fuel. ZIRCO sizes their burners using 9 psig (using ACL burner internals) & 14 psig (using Eclipse burner internals) as the standard fuel pressure. Any change in this pressure setting will affect the output of the burner. **(If a burner is required to operate at a supply pressure other than the specified pressure, ZIRCO must be notified so that the orifice can be sized accordingly.)** The BTU value of the fuel is required if it varies from the standard natural gas. When propane is used as the fuel, there is a considerable difference in the size of the orifice.

By sizing the orifice for the desired BTU rating for the specific firetube, we have made setting the burner much easier. With the gas pre-set, all the operator has to adjust is the air component. This is easily done with the air shutter on the back of the Air/Gas mixer. The flame should be blue in color with orange tips for maximum efficiency.



START-UP

FIREBOX BURNER OPERATION SHOULD BE EXECUTED BY TRAINED AND QUALIFIED PERSONNEL ONLY.

For those with automatic ignition systems, the operation instructions should be adhered to. In all cases the operator must follow the burner lighting procedures as prescribed by his or her

OPERATION

1. Operators of firebox flame arrestors must observe safe practices in potentially hazardous conditions to ensure that the benefits of a properly designed flame arrestor are realized.
2. Refrain from introducing any possible ignition source not designed for this environment in close proximity of this equipment such as motor vehicles, cigarettes, firearms or electrical devices.
3. Inspect surrounding area for gas odor, mist or audible leaks and check for any unusual performance of the equipment (use of a combustible gas indicator would be recommended).
4. Listen for a smooth combustion operation. There should not be any puffing, uncommon noises or smoking at the stack.
5. Inspect for any warping of the flanges or housing.
6. Check to see that all fasteners are in place and securely fastened. The unit must be airtight.

MAINTENANCE

1. The firebox flame arrestor as with any safety device is of value only as long as it remains in good operating condition. To ensure the proper operation of the firebox flame arrestor, regular maintenance must be performed.
2. A flame arrestor element is designed to form air paths of a controlled size configuration and length. All apertures of the flame arrestor element should be inspected for blockages or build-up residue or heat damage. If any is found, the element should be cleaned and tested prior to returning the unit to service.
3. An inspection of all seals and seams should be made. The seal between the firebox flame arrestor and the firebox must be airtight. Additionally, any seam on the firetube must be free of cracks or holes that might allow a flame to escape.
4. When removing the firebox flame arrestor from the firetube flange, a new gasket should be installed and flanges cleaned to ensure an airtight seal.
5. Inspection ports and access openings must be airtight when the unit is in service. Access closures must be securely fastened and sight glasses must be free of chips or cracks.
6. Remove any debris in the surrounding area, grass, leaves, trash etc., to keep the flame cell element clean and prevent other possible ignition sources. Remove any obstructions that prevent access to the unit.



FLAME ARRESTED BURNER INTERNAL PIPING SUPPORT AND BURNER LOCATION RECOMMENDATIONS

1. Location of the end of the burner nozzle should always protrude inside the shell wall. Distance varies depending on the air/gas mixer and firetube size. To ensure flame impingement is in the bath for maximum heat transfer, nozzle should be two to four inches inside shell wall.
2. Pipe nipple length should be a minimum of twelve inches in length for two inch and smaller air/gas mixers. Larger mixers should use a pipe nipple at least eight times the O.D. of the pipe size.
3. All burner piping should be supported in the firetube as close to the burner nozzle as possible. Star, spider, or saddle supports are common, manufactured from carbon steel bar or rod. They ensure the proper centering of the burner nozzle and eliminate possible movement due to vibration or fatigue.
4. Pilot position is normally +1/4" from the end of the burner nozzle. The pilot nozzle and burner nozzle need to stay in close proximity and may touch to ensure a smooth ignition. Location of the pilot nozzle secured by the burner support or attached with a hose clamp. The pilot should be tested for proper location by manually simulating the burner operation before using unattended.