OIL INDIA LIMITED
(A Government of India Enterprise)
P.O. Duliajan-786602, Assam, India
E-mail: ranjanbarman@oilindia.in

Ref: EOI/Indirect Heater/2018

INVITATION FOR EXPRESSION OF INTEREST

Oil India Limited (OIL) invites **Expression of Interest (EOI**) for '**Supply of Indirect Water Bath Heater Package 55 Nos.'** from Indigenous firms**.** Interested Parties having relevant experience and expertise are invited to submit their EOI, complete with all documents within **09.07.2018(13:00 HRS)** through courier/post super-scribing **"Expression of Interest for Supply of Indirect Water Bath Heater Package"** at the address mentioned below. All corrigenda, addenda, amendments, time extension etc. in regard to the above EOI will be hosted on OIL website only. Prospective parties are requested to regularly visit the website to keep themselves updated.

DGM-Materials (IP)
OIL INDIA LIMITED
Duliajan, Dist.-Dibrugarh
Assam-786602

Ref: EOI/Indirect Heater/2018

Expression of Interest for supply of Indirect Water Bath Heater Package

Requirement:

Oil India Limited requires 55 Nos. of Indirect Water Bath Heater Package. Interested parties are requested to send their proposal with detail information/confirmation/credentials as sought under.

1.0 Technical

1.1. Qualification:

a) The party should be an OEM and they should confirm the same.
b) The party should confirm that the Indirect Heater will be made as per API 12K standard and they will engage welders who are qualified under ASME boiler and pressure Vessels Code Section –IX regulation.

1.2 Experience:

1.2.1 The party should have experiences of successful execution of order(s) of Indirect Heater or any of the crude oil process equipment as detailed below, to Oil & Gas Industries and/or to E&P Company.

(a) Indirect Heater of working pressure of 105.46 kg/cm2 or above.
(b) Steam jacket of working pressure of 105.46 kg/cm2 or above.
(c) Crude Oil Emulsion Treater of working pressure 2.0 kg/cm2 or above.
(d) Gas Oil Separator of minimum 200 KLPD capacities & working pressure 1.0 kg/cm2 or above.

1.2.2 The party shall submit the following documents in support of successful execution of past supply order(s) /contract(s), as applicable under clause 1.2.1 .

(a) Copy(ies) of Purchase Order(s) / Contract document(s), and
(b) Any of the following documents that confirms the successful execution of the order(s)/contracts-

- ❖ - Performance/Commissioning Report from the clients,
- ❖ - Delivery challan / invoice etc.
- ❖ - any other documentary evidence that can substantiate the successful execution of each of the above Purchase Order/ contract.

Note : The party should submit all their past experience credentials, as applicable under clause no. 1.2.1

1.3 Delivery Period

Party should mention maximum delivery period required by them for supply of 55 nos. of Indirect Water Bath Heater Package.

2.0 FINANCIAL

2.1 Party should mention their Annual Financial Turnover during preceding 03 (three) financial /accounting years i.e. 2015-16, 2016-17,& 2017-18

2.2. Net worth of the firm for the proceeding Financial/Accounting year (2017-18)

No price should be indicated in the proposal.

Interested Parties having relevant experience and expertise as above are invited to submit their EOI complete with all documents within 09.07.2018(13:00 HRS) through courier/post super-scribing "Expression of interest for Supply of "**Indirect Water Bath Heater Package** " at the following address:

DGM-Materials (IP)
OIL INDIA LIMITED
Duliajan, Dist.-Dibrugarh
Assam-786602

OIL reserves the right to (a) accept or reject any/all EOIs submitted by parties; (b) cancel the process at any time without any liability and assigning any reason thereof.

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Detailed specifications are as under:

FABRICATION, PACKAGING, SUPPLY OF INDIRECT WATER BATH HEATER PACKAGE FOR PROCESSING CRUDE OIL: - QTY = 55 NOS

Double Coiled Bath Type Field Indirect Heater of heating capacity 0.88 x 10^6 watts (3.0 MM BTU/HR.) for heating 10,000 BBLS (1800 KLS) per day of crude oil associated with sweet natural gas at 105.46 kg/cm2 pressure, generally as per OIL drawings - OIL /2670/A, OIL/5303, OIL/2672./A, OIL/ 2051/C , OIL/PDNO/P&D/001/01 .

1.0 SERVICE CONDITION

1.1 Fluid to be handled : Crude oil mixed with sweet natural gas & formation water
1.2 Flow Rate : 10,000 BBLS (1800 KLS) per day
1.3 Heating capacity : 0.88 x 10^6 watts (3.0 MM BTU/HR.)
1.4 Coil operating pressure : 105.46 kg/cm2 (1500 psig)
1.5 Bath medium : Water
1.6 Shell Operating Pressure : Water Fill-up
1.7 Water bath temp : 90 Deg. C

2.0 DRAWINGS : The indirect Heater shall be manufactured as per following OIL drawings

2.1 OIL /2670/A : Bath type IH General Arrangement
2.2 OIL/5303 : Details of Shell Sub Assembly
2.3 OIL/2672./A : Details of Fire Tube and Chimney
2.4 OIL/ 2051/C : Detail of Indirect Heater Coil.
2.5 OIL/PDNO/P&D/001/01: Flame Arrester
2.6 OIL/PDNO/P&D/024/A(1): Indirect Heater Pilot Burner
2.7 OIL/PDNO/P&D/024/A(2) : P &ID diagram, Burner control

3.0 APPLICABLE STANDARDS FOR MATERIAL OF CONSTRUCTION & FABRICATION

3.1 Fire Tube :Seamless Carbon Steel Pipe as per ASTM A106 Gr. B Standard
3.2 Coil Pipe :Seamless Carbon Steel Pipe as per ASTM A106 Gr. B/ API 5L Gr. B,
3.3 Coil Fittings : As per ASTM A 234 Gr. WPB or WPC
3.4 Shell Body :As per IS2062 Gr. B Standard
3.5 Coil Flange :As per ASTM 105
3.6 Fastners :As per IS 1364 / ASTM A 307 Standard (For non pressure parts)
3.7 Studs & Nuts :As per ASTM A193 Gr. B7 & ASTM A194 Gr. 2H Standard
3.8 Fuel Gas piping system : As per ASME B31.3 Standard
3.9 Welding :As per ASME Section IX.
3.10 Design, fabrication & Shop testing : As per API Spec 12K
3.11 Shell nameplate : As Per API 12K

4.0 SHELL

Shell will conform to all the requirements and dimensions of OIL Drawing no: OIL/5303 and must have adequate nozzles for inlet, outlet of coils, fire tube and mounting, various equipment & instruments for burner, drain valves etc.

The Indirect Heater shell will have suitable lifting lugs attached for lifting and placing the same at site.

The Indirect Heater shell will have Two (2) nos. of 3/4" studs with nuts (1 each at one of the legs and the vessel) to be welded for electrical earthing.

Reference Drawing no: OIL/5303(Details of Shell Sub Assembly)

5.0 Coils (Seamless):

5.1 No. of Coil : 2 (two) sets
5.2 No. of Pass: 8 (Eight) passes for each coil.
5.3: Coil size: 4"(101.6mm) NB x 0.237" (6.02mm) wall thickness (Schedule 40) for straight pipes and 0.337" (8.55mm) wall thickness (Schedule 80) for return bends.
5.4 Coil Material : Seamless pipe as per API-5L Gr. B, / ASTM A106 Gr. B .
5.5 Coil Operating Pressure: Max: 105.46 kg/cm2 (1500 psig)
5.6 Coil Hydraulic Test Pressure: 1.5 times the maximum working pressure
5.7 Radiography of weld joints of Coil bundle: 100 %

Reference: General Drawing: OIL/ 2051/C : Detail of Indirect Heater Coil.

6.0 Coil End Connection:

6.1 Coil End : Flanged, 101.6 mm NB x 900 class RTJ, conforming to ANSI B16.5.
6.2 Companion Flange : The Indirect Heater shall be complete with bevel ended companion flanges conforming to ANSI B16.5, ring joint gasket and required Nos. of high tensile studs-nuts as per ASTM A193 Gr. B-7,ASTM A194 Gr. 2H respectively.

Reference Drawing no: OIL/2051/C

7.0 Fire Tube & Chimney:

Fire tube & Chimney shall conform all the requirements and dimensions of OIL Drawing no: OIL/2672/A & designed natural draft.
(a) There will be only 01 no of fire tube, 01 no of chimney and 01 no of flame arrestor box for burners. Flame arrester Box will have to accommodate 2(two) nos of main burner & 1(one no of Pilot Burner

8.0 Fuel Scrubber:

8.1 Scrubber with high efficiency wire mesh type mist extractor of adequate size to cater Fuel & Servo Gas Flow requirement shall be used for supplying liquid free fuel to the burner and servo gas to the pneumatic instruments.

8.2 The scrubber shall be equipped with
i) Pressure gauge with isolating valve.
ii) Drain connection with isolation valve.
iii) Sight glass/level gauges with gauge cocks
iv) Safety Relief valve- 1 Nos. (set range 5 to 33 kg/cm2)
8.3 Operating pressure of fuel scrubber: 30 kg/sq cm
8.4 Hydraulic Test Pressure of fuel scrubber: 1.5 times the maximum working pressure i.e. 45 kg/cm2 (640 psig)

9.0 Flame Arrested Burner & Accessories:
Standard flame arrestor, Aluminium box type suitable for offered Bath Type Indirect Heater of following specification:
a) Make: FLAMECO OR WENKO OR ACL

Reference Drawing no: OIL/PDNO/P&D/001/01 attached with the tender.

b)Fire tube : "U" type, OD, ID & other dimensions of fire tube as detailed below

i) Furnace capacity: 3,000,000 BTU/Hr. (Net)

ii)Temperature of bath: 26 Deg.C to 90 Deg.C

iii)Natural gas Calorific value: 1000 BTU

iv)Burner Gas Pressure: 0.7-1.05 Kg/sq. cm (10-15 Psi)

(c) Within the single flame arrestor box, there will be 02 nos of mixture assemblies, 02 nos of burner nozzles, 02 nos of burner orifices & 02 nos of burner pipe nipples. Kindly refer to item no 3 in drawing no OIL/PDNO/P&D/001/01 attached with the tender, for layout arrangement of 02 nos of burner assemblies within the single flame arrestor box for burners to be provided with the indirect heater.

Reference Drawing no: OIL/2672./A (Details of Fire Tube and Chimney)

d) Main Burner Assembly : Each flame arrestor should be complete with main burner assembly as below:

i) 101.6 mm (4")) , The burner mixture shall be of Make Eclipse model NS 160 (016 as per new catalogue number) or equivalent, low pressure compound type atmospheric injector - 02 Nos.

ii) 101.6 mm (4") Eclipes sticktite Model ST 216 - 84 or Equivalent burner nozzle: 02 Nos.

iii) 6.75 mm (17/64") Size burner orifice: 02 Nos.

iv) 101.6 mm (4") Burner Pipe nipple 36" Long: 02 Nos.

v) Couplings of different sizes as shown in drg. No. OIL/PDNO/P&D/001/01.

vi) Lifting Lug: 04 nos.

vii) Sight Glass: 01 No.

viii) Flame arrestor mounting frame shall be such as to match the bolting pattern of the fire tube of the offered heater and Drawing. No. OIL/PDNO/P&D/001/01

Reference Drawing no: . OIL/PDNO/P&D/001/01 (Details of flame Arrestor for Indirect Heater)

e) Pilot Burner Assembly: Each flame arrestor should be complete with pilot burner assembly as detailed in 10.3.2 (Pilot Burner Assembly)

Reference Drawing no: . OIL/PDNO/P&D/024/01 (Details of pilot burner for Indirect Heater)

10.0 INSTRUMENTATION & CONTROL SYSTEM:

The following instrumentation & control system components shall be provided along with the Indirect Heater. However, the party has to include, but not limited to all the items as per the instruments specified below, such that the offered system is functionally and operationally complete in all respect.

The quantity mentioned in bracket is specified for each indirect bath water heater.

10.1 Instruments to be mounted on Shell

a) Temperature Gauge with Thermowell: Required for bath temperature (Qty. 01 No.)

i) Temperature Range: 0 to 150 Deg C

ii) Thermo well Connection: 1 Inch NPT

Iii) Insertion Length : 300 mm (12 Inch)

iv) Type: Bimetallic/ Mercury Filled

v) Sensing Element Connection: 1/2" NPT

vi) Material of Construction: All Stainless Steel

vii) Accuracy: ± 0.5 Deg C

viii) Make: Wika/ Odin / Waree / Ashcroft/ Icon /Forbes Marshall

b) Level Gauge: The Level gauge shall be of the following specification: (Qty: 1 No.)
i) Type: Reflex Type
ii) Connection Size: ½"
iii) Isolation Valves: Required (Needle Valve)
iv) Max.Working Pressure: 2 Kg/Sq.cm.
v) Test Pressure: 10 Kg/Sq.cm
vi) Max.Working Temperature: 100 Deg C.
vii) Make: Pratolina/Levcon/Daniel/Chemtrol/Norriseal

c) Water Filling Float Valve, 25 mm (1") NB: (Qty: 1 No.)
Inlet nozzle at water inlet line on top of the bath heater must be provided with a float operated industrial valve to avoid water over flow. The float shall be made of SS.

d) Liquid Level Switch: (Qty: 1 No.)
Water bath should be equipped with low water level shut down device with the following specification:
i) Type: Pneumatic
ii) Action: ON/OFF
iii) Output: 15-20 psig
iv) Supply: 20 psig
v) Type: Float less pneumatic switch with differential pilot (0-500 mm WC).
Make: Kimray / Fisher / Norriseal

e) Additonal Therowells : (Qty: 3 Nos.)

Three (03) nos additional thermo wells of 1" NPT of 300 mm length shall be fixed on the shell for provision of insertion other instruments.

10.2 Instruments to be provided for mounting on Coil Inlet & Outlet:

a) Temperature Gauge with Thermowell: (Qty.: 4 Nos.)

i) Temperature Range : 0 to 100 Deg C
ii) Thermowell connection: ½" NPT
iii) Insertion Length: 3 Inch
iv) Type: Bimetallic/ Mercury Filled
v) Sensing Element Connection: 1/2"NPT
vi) Material of construction: All Stainless Steel
vii) Accuracy : ± 0.5 Deg C
Make : Wika / Odin / Waree / Ashcroft/ Icon/ Forbes Marshall

b) Pressure Gauges: Inlet pressure gauges in each of the preheat coils: (Qty.: 4 Nos.)
i) Dial Size: 150 mm (6") Minimum
ii) Range: 0 to 210 Kg/Sq. cm
iii) Pressure Element: SS Bourdon tube
iv) Material of construction: All SS
v) Accuracy: ± 1% of reading
vi) End Connection: 1/2" NPT
vii) Isolation Valves: Required (Needle Valve) as per gauge rating±
Make: Wika / Odin / Waree / Ashcroft/ Icon/Noshok/Mdanial/ Forbes Marshall

10.3 PNEUMATIC BURNER CONTROL SYSTEM:

10.3.1 Control Philosophy:
The Indirect Heaters shall be equipped with the pneumatic control system to carry out the following functions:

a) A Portable Hand-held High Energy battery operated remote Igniter shall be used to ignite the pilot burner remotely. All the systems for the remote igniter shall be in Flame-proof enclosure.
b) The main burner Manual Shut-off valve shall be opened only after establishment of the pilot burner flame, to prevent backfire.
c) Main flame shall be shut down in case of
• Pilot flame failure, through pneumatic No Flame Shut off Switch and No Flame Shut off Valve
• Low liquid level, through pneumatic Liquid Level Switch (LS) and Temperature Control Valve (TCV)
• High water temperature, through Temperature Switch (TS), Temperature Indicating Controller (TIC) and Temperature Control Valve (TCV).
d) Pilot Flame sensing shall be through thermocouple / Mercury filled sensor and signal shall be sent to pneumatic No Flame Shut Off Switch mounted on Pilot Burner gas supply line. In case of pilot flame failure, No Flame Shut Off Switch will stop gasl supply to pilot burner and will also send signal to close No Flame Shut Off Valve mounted on Main burner gas supply line, so that unnecessary raw gas shall not enter into the firetube.
e) Temperature Control of the water bath shall be through Temperature Indicating Controller (TIC) and Temperature Control valve (TCV)

10.3.2 Specification for Pilot Burner and Burner Control System

[A] Pilot Burner Assembly: (Qty: 1 set)
a) Mixer
i) Function: To maintain air-fuel ratio to the pilot burner
ii) Outlet Connection: 1/2 inch LP Female Threaded
Make & Model : INVALCO Model 100 mixer 45008576 or equivalent
b) Orifice
i) Function: To maintain air-fuel ratio for the pilot burner.
ii) Feature : Suitable for Gas Mixer as above
iii) Size : Suitable for Gas Mixer as above
iv) Material of construction: Brass or SS
v) Inlet Connection : ¼ Inch LP Female Threaded
Make & Model : INVALC, Orifice #72,45002892 or equivalent
c) Pilot Burner Pipe
i) Function: To carry air-fuel mixture from Mixer to Pilot Burner Nozzle .
ii) Size : 1/2" LP Threaded line pipe of suitable length .
d) Pilot Burner Nozzle with Thermowell
i) Function: To provide pilot flame in the Natural Gas fired indirect heater vessel
ii) Material of construction: SS 310 or equivalent, suitable for high temperature applications
iii) Inlet Connection : ½ Inch LP Female Threaded
iv) Thermowell : Thermowell shall be welded on side of the nozzle for placing thermocouple/mercury bulb sensor for no flame shut off system
Make & Model : INVALCO, RHSB Pilot burner, 48729563 or equivalent

[B] Ignition Electrode Assembly : (Qty: 1 set)
e) Ignition Electrode
i) Function: To provide ignition for pilot flame in conjunction with portable Igniter
ii) Features : The ignition electrode is to be mounted on the body of the pilot burner & fixed gap is to be kept between the electrode tip and the pilot burner nozzle for proper ignition
Make & Model : INVALCO 49001179 or equivalent
f) Insulator
i) Function : To provide isolation between the ignition electrode and the body of the pilot burner
i) Insulation: It should have necessary CERAMIC insulation.
Make & Model INVALCO 46001175 or equivalent
g) Insulator holder:
i) Function : To hold the Insulator & Ignition Rod.

ii) Feature : To be mounted on Holding Strap. Provision is to be kept for clamping & length adjustment of the electrode.
iii) Make & Model : INVALCO 46002045 or equivalent.
h) Holding Strap
i) Function : To hold the insulation holder
ii) Feature : To be mounted on ½ inch pilot burner pipe
Make & Model : INVALCO 46001176 or equivalent
i) High Voltage Connector and Pushing Connector (RAJAH FERRULE)
i) Function : To provide connection between the high voltage ignition cable and ignition electrode
ii) Feature : To be mounted on the ignition electrode
Make & Model INVALCO ; Rajesh Ferrule SSN, 79113088 or equivalent
j) High Voltage Connector Assembly (Female) with Pushing Connector (RAJAH FERRULE)
i) Function : To provide connection between ignition cable and portable remote igniter
ii) Feature : To be mounted on side of the Flame Arrestor body
Make & Model : INVALCO 49011511 or equivalent
k) High Voltage Ignition Cable
i) Function : To provide connection between portable remote igniter and ignition electrode
ii) Features : High voltage handling & heat resistant
iii) Conductor: Fireproof, multistrand copper conductor
iv) Insulation Voltage: 11 KV (min)
v) Insulation: PTFE insulated with mica tapping & fibre glass top
vi) Heat resistant: upto 400 Deg C
vii) Length of cable : 5 meters
Make & Model : INVALCO, BELDEN 734805,32307010 or equivalent

[C] Portable Remote Igniter: (Qty: 1 No.)
a) Function : To ignite pilot flame of natural gas fired burners
b) Features: Portable hand-held, High energy, Flameproof and Battery operated
b) Battery: 12V DC, Rechargeable type
c) Enclosure: The Igniter should be housed in a flameproof box IP 65 (minimum)
d) Connector: High Voltage Connector (Male) to be mounted on the body of the igniter, matching with High Voltage Connector (Female) mounted on the Flame Arrestor Body, to provide connection between the Portable Remote Igniter and the Ignition Electrode
e) Earthing Clamp & Cable : Suitable Earthling Clamp & cable to connect Portable Remote Igniter with Flame Arrestor Body
f) Make & Model : ACL/ Combustex /GIE s.r.l/FMC INVALVO 81001654 or equivalent

[D] No Flame Shut Off Switch: (Qty: 1 No.)
i) Function: To provide positive Shut-off of gas supply to both Pilot Burner and Main Burner in the event of Pilot Flame out in gas fired Indirect heater.
ii) Feature : To be mounted on Pilot Burner gas supply line, no external power source required for operation, ensures that main burner remains closed during pilot ignition, latchable reset for pilot ignition.
iii) Pilot Flame Sensing element: Thermocouple/ Mercury Bulb
iv) Temperature limit of flame sensing element : 815 Deg C (1500 Deg F)
v) Length of Thermocouple Cable/ Mercury bulb Capillary Tube: 5 meters minimum
vi) Inlet Pressure: 10 to 20 psig.
vii) Output signal pressure : 3 to 15 psig
viii) Make: FMC Invalco CM7/ ACL/ Combustex /GIE s.r.l/Kimray

The items [A], [B], [C] & [D] mentioned above shall be preferably from the same vendor .

[E] No Flame Fuel Shut-off Valve: (Qty: 1 No.)
i) Function : To shut off gas supply to main burner in case of pilot flame failure
ii) Type : ON/OFF
iii) Actuator Type : Pneumatic Diaphragm Operated

iv) Actuator Spring : Adjustable
v) Diaphragm Material : Nylon reinforced Buna N/ Neoprene rubber
vi) Stem Material : 303 SS
vii) Packing Material : Standard O Rig, Buna N
viii) Plug Type : Soft plug for tight shut off
ix) Case Material : Cast Aluminium
x) Body Material : Ductile iron A 395
xi) Body Cover / Lower Diaphragm Case : Ductile iron A 395
xii) Gas Flow Rate: 40-130 SCM/Hr
xiii) Input Operating Signal Pressure: 3 to 15 psig
xiv) Inlet Pressure: 1 to 4 Kg/Sq.cm
xv) Design Pressure: 10 Kg/Sq.cm
xvi) Test Pressure: 15 Kg/Sq.cm
xvii) End Connection : 1" NPT(F)/ Flanged
Make : Invalco/ Fisher/ Samson/ Forbes Marshall/Combustex/Kimray/MIL/Brightech/Emerson/Murphy/Norreseal.

[F] Indicating Type Tempearture Controller: (Qty: 1 No.)
i) Type: Pneumatic Indicating PID Controller
ii) Range : 0 to 150 Deg C
iii) Sensor : Mercury Filled
iv) Sensor Connection : 1/2" NPT
v) Thermowell : Required
vi) Thermowell Connection : 1" NPT
vi) Insertion Length : 300 mm (12")
vii) Input pressure: 10 to 30 psig
viii) Output Signal pressure: 3 to 15 psig
Make & Model: Fisher /Samson/ ABB/ OMC s.r.l- Italy/Norreseal

[G] Temperature Control Valve: (Qty: 1 No.)
i) End Connection : 1" NPT / Flanged
ii) Type : Proportional
iii) Actuator : Pneumatic Diaphragm Operated
iv) Gas Flow Rate: 40-130 SCM/Hr
v) Operating signal : 3 to 15 psig.
vi) Inlet Pressure: 1 to 4 Kg/Sq.cm
vii) Design Pressure: 10 Kg/Sq.cm
viii) Test Pressure: 15 Kg/Sq.cm
Make : Invalco/ Fisher /Samson/Forbes Marshall/Combustex / Kimray/MIL/Brightech/Emerson/Norreseal / OMC s.r.l- Italy

[H] Main Supply Gas Regulator: (Qty: 1 No.)
i) Type: Spring Loaded
ii) Input pressure : 30 Kg/Sq.cm
iii) Output pressure: 0 to 4 Kg/Sq. cm adjustable
iv) Connection : 1" LP Female
v) Gas Flow Rate: 40 to 130 SCM/Hr.
Make : Invalco / Samson/ Fisher/ Kimray/Norgen/Norreseal/ OMC s.r.l- Italy

[I] Controller Supply Gas Regulator: (Qty: 1 No.)
i) Type: Spring loaded
ii) Input Pressure : 0 to 4 Kg/cm2
iii) Output Pressure: 0 to 20 psig adjustable
iv) Connection : 1/4" LP Female
Make : Invalco /Samson/ Fisher/ Kimray/Norgen/Norreseal / OMC s.r.l- Italy

[J] Pilot Supply Gas Regulator no 1: (Qty: 1 No.)
i) Type: Spring loaded
ii) Input Pressure : 0 to 4 Kg/cm2
iii) Output Pressure: 0 to 20 psig adjustable
iv) Connection : 1/4" LP Female
Make : Invalco /Samson/ Fisher/ Kimray/Norgen/Norreseal/ OMC s.r.l- Italy

[K] Pilot Supply Gas Regulator no 2: (Qty: 1 No.)
i) Type: Spring loaded
ii) Input Supply : 0 to 20 psig
iii) Output : 0 to 5 psig adjustable
iv) Connection : 1/4" LP Female
Make : Invalco /Samson/ Fisher/ Kimray/Norgen/Norreseal/ OMC s.r.l- Italy

[L] Pressure gauge in main supply gas line before and after Regulator: (Qty: 2 Nos.)
i) Range : 0 to 40 Kg/Sq.cm (before Regulator), 0 to 7 Kg/Sq.cm (after Regulator)
ii) Dial Size : 4" Fluid filled type
iii) Connection Size: 1/4"
iv) Material of Construction: All Stainless Steel
Make : Wika/ Odin / Waree / Ashcroft/Noshok/ Mdanial/ Forbes Marshall

[M] Pressure gauge in controller gas supply line after the regualtor: (Qty:1 No.)
i) Range : 0 to 20 PSI
ii Dial Size : 50 mm (2")
iii) Connection Size: 1/4"
iv) Material of Construction: All Stainless Steel
Make : Wika/ Odin / Waree/ Ashcroft/Noshok/ Mdanial / Forbes Marshall

[N] Pressure gauge in pilot burner gas supply line after the regulator no 1: (Qty:1 No.)
i) Range : 0 to 20 PSI
ii Dial Size : 50 mm (2")
iii) Connection Size: 1/4"
iv) Material of Construction: All Stainless Steel
Make : Wika/ Odin / Waree/ Ashcroft/Noshok/ Mdanial / Forbes Marshall

[O] Strainer:
i) Sp. Gravity of Natural Gas: 0.6
ii) Flow rate of gas: 130 SCM/Hr.
iii) Mesh: 80 Mesh SS 304
iv) End Connection: 1" NPT
v) Working Pressure: 15 Kg/Sq.cm
vi) Test Pressure: 25 Kg/Sq.cm
Make: Zoloto/Leader/Sant or equivalent

[P] Mechanical Shut off Valves :

Manual Shut off valve of Globe valve type with LP Female Threaded End connection shall be provided as below

i) Main Supply Gas Manual Shut off Valve, 1" x 30 Ksc WP - 01 no
ii) Main Burner Manual Shut off Valve , 1" x 10 Ksc WP - 01 no
iii) Pilot Burner Manual Shut Off Valve, 1/4" x 10 Ksc WP - 01 no
Make: Swagelok/Parker/Hylok/Samson.

[Q] Isolation & Bypass Valve for Temperature Control Valve & No Flame Shut off Valve :

Isolation & Bypass Valve of Globe valve type with LP Female Threaded End connection shall be provided as below

i) Isolation Valve for Temperature Control Valve, 1" x 10 Ksc WP – 02 nos
ii) By Pass Valve for Temperature Control Valve,1" x 10 Ksc WP– 01 no
iii) Isolation Valve for No Flame Shut off Valve ,1" x 10 Ksc WP– 02 nos
iv) By Pass Valve for No Flame Shut off Valve, 1" x 10 Ksc WP- 01no
Make : Swagelok/Parker/Hylok/Samson

[R] Tubes & Fittings:

Tubes and Fittings shall be supplied of sufficient quantity to commission all the indirect heaters.
Make : Swagelok, Parker, Hylok.

[S] Unions: Unions of suitable size & pressure rating shall be provided on both sides' valves of all controllers, control valves, shut off valves and Pilot Guard, for ease of replacement/maintenance without disturbing other components of the system.

10.4 General notes for Instrument & Control System:

a) All the pneumatic instruments shall be suitable for operating in natural gas as servo supply.
b)Oil will provide necessary natural gas supply as servo upto battery limit ,however the required Servo Gas Pressure Regulators for all pneumatic instruments of make: Fisher Model 67 CFR / Norgren / Maxitrol /Norriseal / OMC s.r.l.- Italy shall be provided by the party.
c) The Temperature Control Valve and the Fuel Shut-off Valve shall have isolation and bypass Valves .
b) Operation and Maintenance manuals of all the instruments shall be provided along with the supply of materials.
d) Step by step operating procedure of remote ignition and no flame shutdown system shall be separately inscribed in a non-erasable placard in the area where its operation would be carried out.
e) Earthing Provision:
Two (2) nos. of 3/4" studs with nuts (1 each at one of the legs and the vessel) to be welded for electrical earthing.

Special notes:

i) The party shall confirm that the goods, materials to be supplied shall be new, of recent make, of the best quality & workmanship. The party shall confirm that the materials shall be guaranteed for a period of 18 months from the date of despatch or 12 months from the date of receipt/assembling at Fields, whichever is earlier, against defects arising from faulty materials, workmanship or design. Defective goods / materials or parts notified by OIL to the Seller shall be replaced immediately by the Seller on FOR destination basis including payment of all taxes and duties at Seller's expense. This guarantee shall survive and hold good not-withstanding inspection, payment for and acceptance of the goods.

ii) Suppliers are to note that the drawing supplied by OIL is purely to guide the suppliers to make the final working drawings by them. The drawings should, in no case be treated as final fabrication drawings. Manufacturer's working drawing should be sent to OIL for approval along with Quality Assurance Plan (QAP) prior to the commencement of manufacture/fabrication of the heaters. The Party shall confirm the same in their technical Bid

iii) The heaters should be shop constructed and tested as per API Std. 12K (latest revision).

iv) All the welding shall be done as per ASME section IX. Suppliers shall confirm that all coils and shell welding will be done by welders who are qualified under ASME boiler and pressure vessel code section- IX regulations.

v) Stress relieving of the pressure coils and fire tubes shall be required. Stress relieving operations are to be conducted in automatic temperature controlled furnace. The Party shall confirm the same in their technical Bid.

vi) Pressure coils and fire tubes should be hydraulically tested to the pressure specified in the drawings & technical specification. The Party shall confirm the same in their technical Bid.

vii) The coils should be tested 100% radiographically. The Party shall confirm the same in their technical Bid.

viii) X- Ray plate & report, radiographic test report should be produced to OIL's inspectors while inspecting and subsequently to be provided with supply of the materials.

ix) The following documents shall be forwarded with the technical bid:
a) Typical Process and Instrumentation (P&ID) diagrams
b) Typical General Arrangement Diagram (GAD) of the unit.
c) Sectional drawing showing the internals of the indirect heater.
d) Sectional drawing showing the internals of the Fuel Scrubber.
e) Drawings showing details of Remote Ignition System of Pilot Burner and Flame Failure shutdown system.
f) Circuit Diagram of Remote Ignition System with details of electronic components and battery.
h) Instrument data sheets along with name of manufacturer.
i) Make and technical specification of all the bought-out items along with technical literature, GAD etc.

x) Test Certificates: Manufacturer to provide following certificates along with the supply as per standard of manufacture & QAP. The Party shall confirm the same with the technical bid
a) Raw materials: Chemical & mechanical test certificate as per standard specified in technical specification.
b) Hydraulic test certificate, radiographic test certificate, certificate of Quality & Standard of welding.
c) Certificate of visual inspection & measurement of dimensions.
d) Process and Instrumentation diagrams.

xi) Third Party Inspection: The materials shall be offered for third party inspection for the following scope-

a) Inspection of raw materials.
b) Inspection of radiography of welded joints.
c) Inspection of Hydraulic testing of Process/Pressure coils.
d) Inspection of Hydraulic testing of Fire Tube.
e) inspection of Water fill test of the shell.
f) Inspection of bought-out items.
g) Inspection of certificates in respect of raw materials, bought-out items, radiography etc.
h) Inspection of Hydraulic testing of Fuel Scrubber.

xii) The Third Party Inspector must be OIL's authorized / recognized inspecting agencies i.e. M/s Lloyds or M/s Bureau Veritas or RITES or M/s IRS or M/s DNV or Tuboscope Vetco.

xiii) Pre-dispatch Inspection by OIL

OIL's representative shall inspect the materials prior to dispatch at vendor's works at OIL's cost. OIL's representative shall review TPI reports, witness hydraulic testing of coils and remote ignition system with Hand-held High Energy Igniter. Three weeks prior notice to be given to OIL for pre–dispatch inspection.

xiv) Painting and Insulation:

a) External surface shall be cleaned, by sand blasting to Sa2 -1/2 grade followed by 2 coats of heat resistant primer followed by high temperature aluminium paint.

b) Inner surface will be cleaned by wire brushing and will be provided with 2 coats of heat resistant primer. Each coat will have min DFT of 35 micron.

c) The heater body shall be thermally insulated by rock wool (Density 120) and aluminum sheet (20 gauges) covered with tight sealing, to prevent heat loss and external insertion of water and foreign elements.

xv) Marking: OIL's logo, Purchase order No. and manufacturers name shall be die stamped/weld written in the shell of the heater.

xvi) Joint Inspection on arrival of Materials:

I. Commissioning of the equipments will be carried out by OIL at fields. However after Receipt of Equipments, the supplier will send their representative/ Service Engineer for the assembling of the components, mountings & Instrumentation items on each unit before deployment for field operation. On receipt of the equipments by OIL, the supplier will be intimated to depute their representative/Service engineer. The supplier shall depute their representative/ service Engineer within 20 days after receipt of official intimation. The Party shall confirm the same in their technical Bid.

II. The representative/Service Engineer shall have to provide practical demonstration to operating personnel of OIL regarding safe operating procedure & maintenance of equipments & Instrumentation items.

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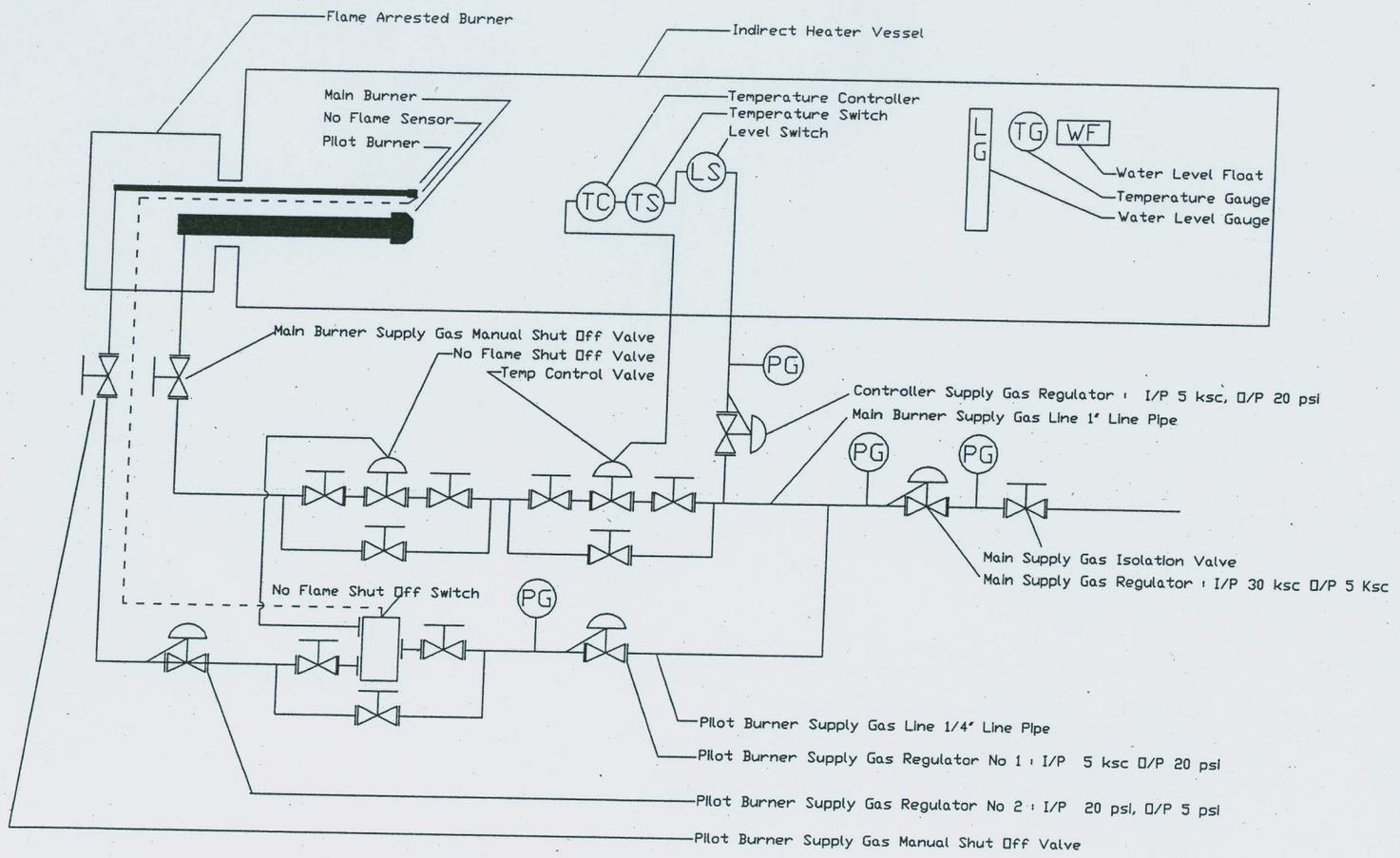

NOTES : 1) NOT TO SCALE 2) REFER SPECIFICATION FOR ITEM DESCRIPTION	**OIL INDIA LIMITED** PROD (OIL) DEPTT. DULIAJAN 786602	**INDIRECT HEATER : P&ID DIAGRAM**	DR NO	OIL/PDNO/P&D/025/A-Pg 2 of 2

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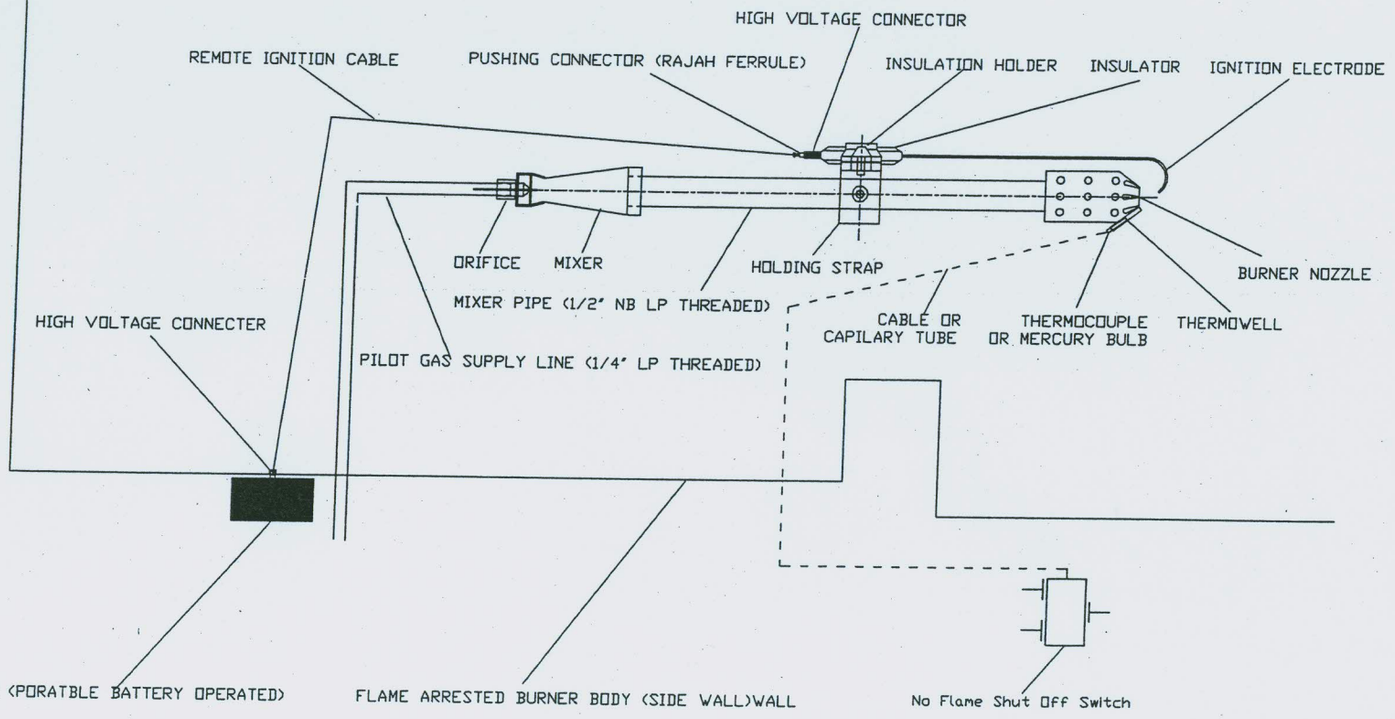
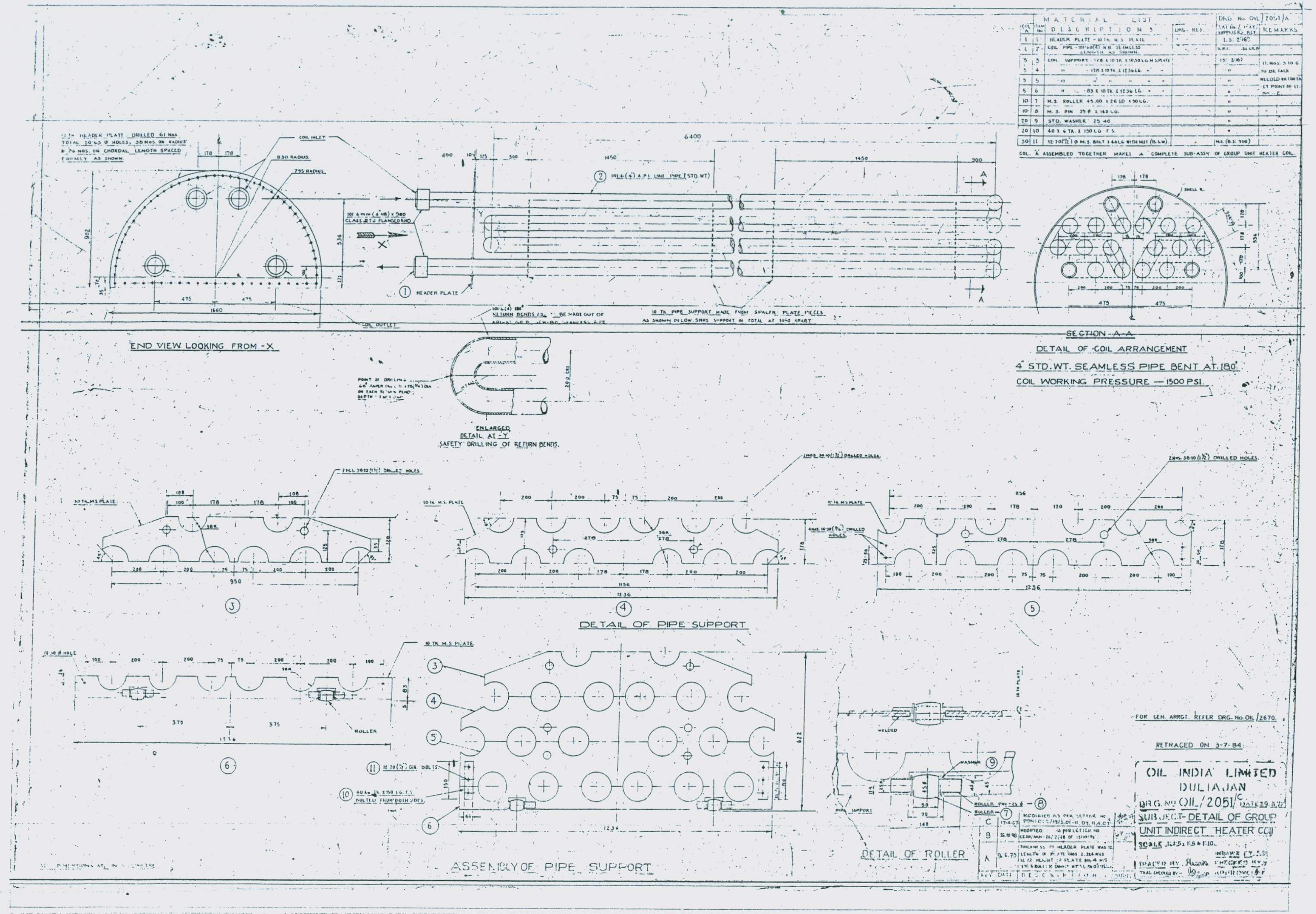
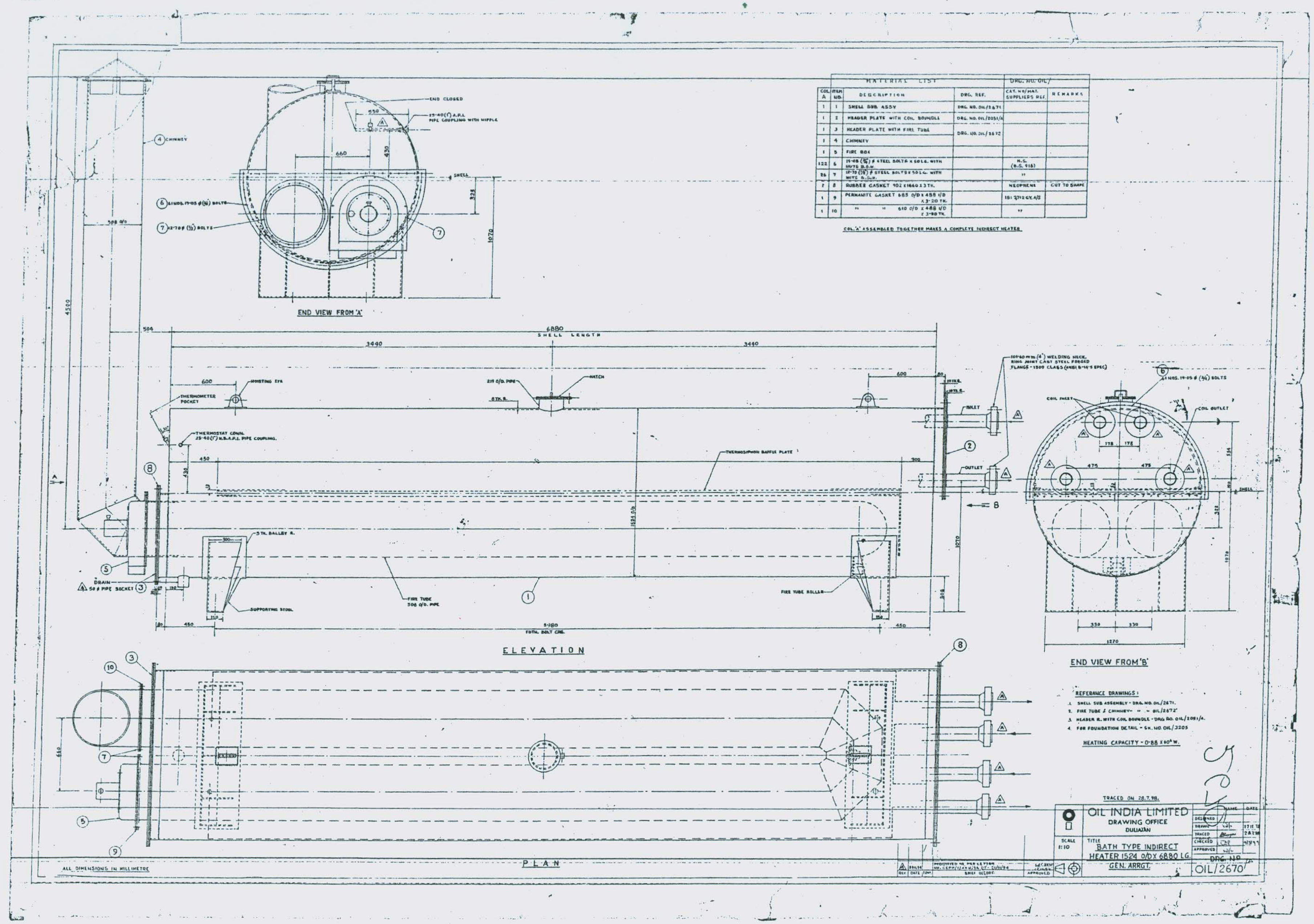


NOTES : 1) NOT TO SCALE 2) REFER SPCIFICATION FOR ITEM DESCRIPTION	**OIL INDIA LIMITED** PROD (OIL) DEPTT. DULIAJAN 786602	**INDIRECT HEATER : PILOT BURNER WITH REMOTE IGNITION**	DR NO	OIL/PDNO/P&D/025/A-Pg 1 of 2

(24)

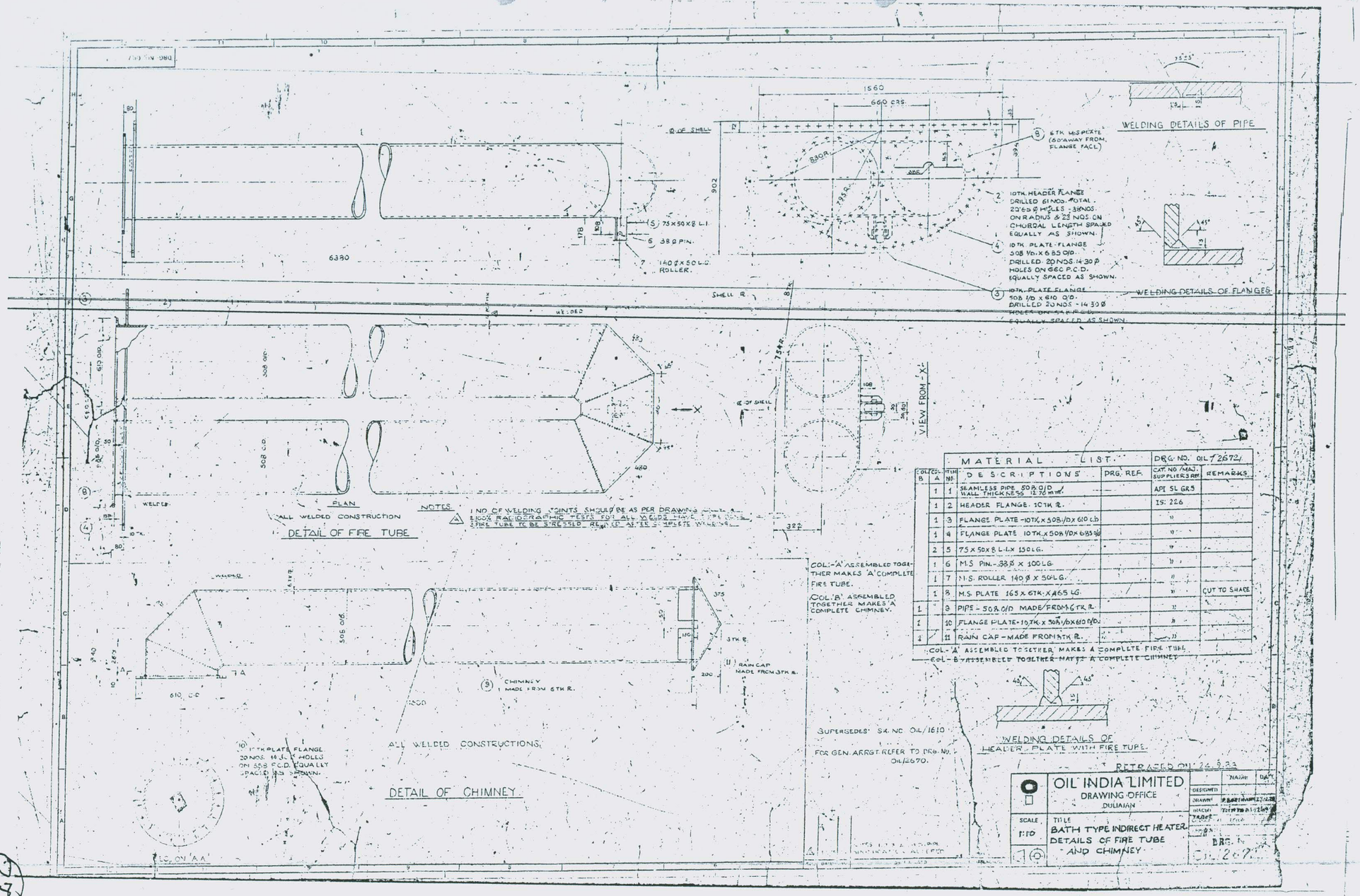

END VIEW LOOKING FROM -X
SECTION A-A
DETAIL OF COIL ARRANGEMENT
4" STD. WT. SEAMLESS PIPE BENT AT 180°
COIL WORKING PRESSURE — 1500 PSI.
ENLARGED
DETAIL AT -Y
SAFETY DRILLING OF RETURN BENDS.
HEADER PLATE
COIL INLET
COIL OUTLET
6400
DETAIL OF PIPE SUPPORT
ASSEMBLY OF PIPE SUPPORT
DETAIL OF ROLLER
ROLLER
WASHER
WELDED
FOR GEN. ARRGT. REFER DRG. No. OIL/2670
RETRACED ON 3-7-84
OIL INDIA LIMITED
DULIAJAN
DRG. No. OIL/2051/C
SUBJECT- DETAIL OF GROUP
UNIT INDIRECT HEATER COIL
MATERIAL LIST
DESCRIPTIONS
REMARKS
HEADER PLATE
M.S. ROLLER
M.S. PIN
STD. WASHER
COIL 'A' ASSEMBLED TOGETHER MAKES A COMPLETE SUB-ASSY OF GROUP UNIT HEATER COIL.



MATERIAL LIST — DRG. NO. OIL/

COL. A	ITEM NO.	DESCRIPTION	DRG. REF.	CAT. NO/MAT. SUPPLIERS REF.	REMARKS
1	1	SHELL SUB ASSY	DRG. NO. OIL/2671		
1	2	HEADER PLATE WITH COIL BOUNDLE	DRG. NO. OIL/2051/A		
1	3	HEADER PLATE WITH FIRE TUBE	DRG. NO. OIL/2672		
1	4	CHIMNEY			
1	5	FIRE BOX			
122	6	19-05 (3/4) ϕ STEEL BOLTS x 50 LG. WITH NUTS B.S.W.		M.S. (B.S. 916)	
26	7	12-70 (1/2) ϕ STEEL BOLTS x 50 LG. WITH NUTS B.S.W.		"	
2	8	RUBBER GASKET 902 x 1660 x 3 TK.		NEOPRENE	CUT TO SHAPE
1	9	PERMANITE GASKET 685 O/D x 488 I/D x 3·20 TK.		IS: 2712 GY. A/S	
1	10	" " 610 O/D x 488 I/D x 3·20 TK.		"	

COL. 'A' ASSEMBLED TOGETHER MAKES A COMPLETE INDIRECT HEATER



MATERIAL LIST

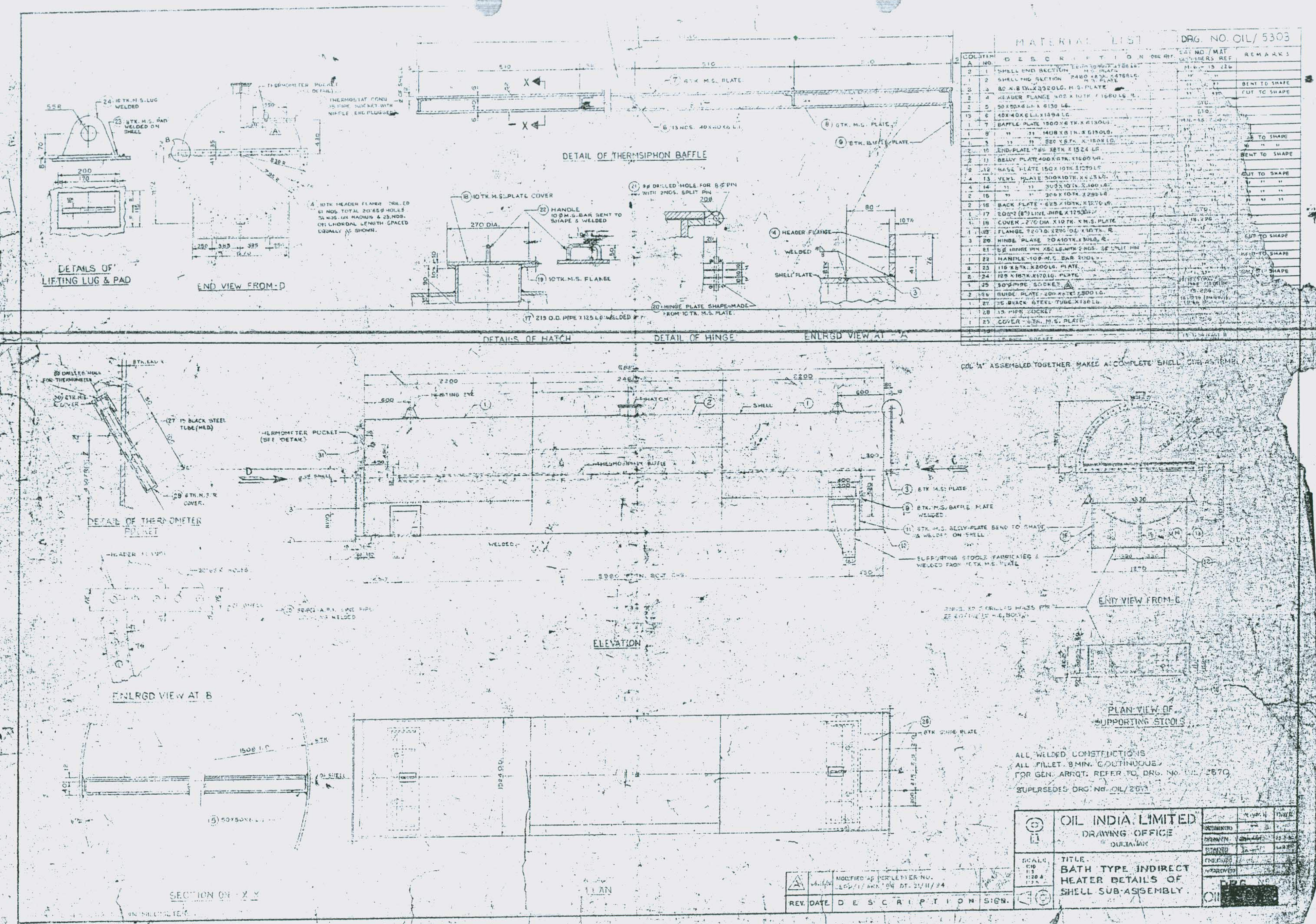
DRG NO. OIL 72672/

COL B	COL A	ITEM NO	DESCRIPTIONS	PRG. REF.	CAT. NO / MAT. SUPPLIERS REF.	REMARKS
	1	1	SEAMLESS PIPE 508 O/D WALL THICKNESS 12.70 MM.		API 5L GR.B	
	1	2	HEADER FLANGE. 10TK R.		IS: 226	
	1	3	FLANGE PLATE-10TK x 508 I/D x 610 O/D		"	
	1	4	FLANGE PLATE 10TK x 508 I/D x 685 O/D		"	
	2	5	75 x 50 x 8 L-I-X 150 LG.		"	
	1	6	M.S PIN - 38 Ø x 100 LG.		"	
	1	7	M.S. ROLLER 140 Ø x 50 LG.		"	
	1	8	M.S. PLATE 165 x 6TK x 165 LG.		"	CUT TO SHAPE
1		9	PIPE - 508 O/D MADE FROM 6TK R.		"	
1		10	FLANGE PLATE-10TK x 508 I/D x 610 O/D		"	
1		11	RAIN CAP - MADE FROM 3TK R.		"	

COL-'A' ASSEMBLED TOGETHER MAKES A COMPLETE FIRE TUBE.
COL-B ASSEMBLED TOGETHER MAKES A COMPLETE CHIMNEY

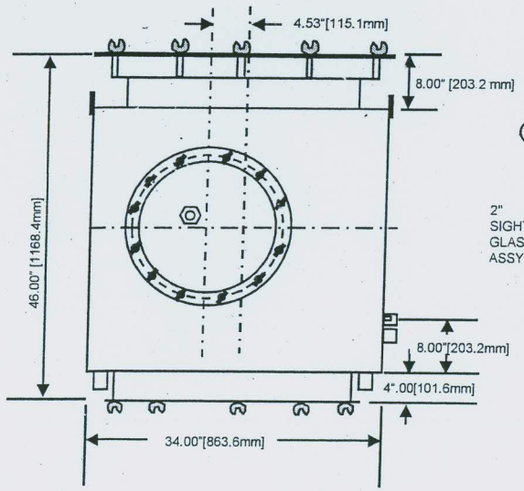
	NAME	DATE
DESIGNED		
DRAWN		
TRACED		
CHKD.		

DRG. NO. OIL 2672

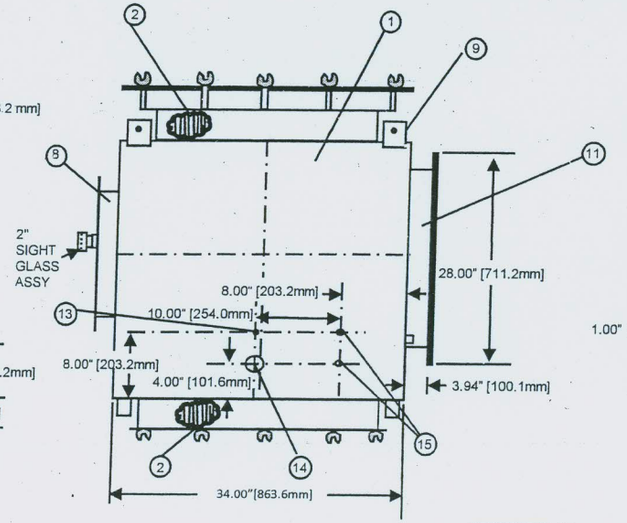

MATERIAL LIST
DRG. NO. OIL/5303
DETAILS OF LIFTING LUG & PAD
END VIEW FROM-D
DETAIL OF THERMSIPHON BAFFLE
DETAILS OF HATCH
DETAIL OF HINGE
ENLRGD VIEW AT
DETAIL OF THERMOMETER POCKET
ELEVATION
ENLRGD VIEW AT B
END VIEW FROM-C
PLAN VIEW OF SUPPORTING STOOLS
SECTION ON - X-Y
PLAN
COL "A" ASSEMBLED TOGETHER MAKES A COMPLETE SHELL SUB-ASSEMBLY
ALL WELDED CONSTRUCTIONS
ALL FILLET 8MIN. CONTINUOUS
FOR GEN. ARRGT. REFER TO DRG. No. OIL/2570
SUPERSEDES DRG. No. OIL/2013
OIL INDIA LIMITED
DRAWING OFFICE
DULIAJAN
TITLE.
BATH TYPE INDIRECT HEATER DETAILS OF SHELL SUB-ASSEMBLY
REV. DATE DESCRIPTION SIGN.
DRG. No. OIL [redacted]

ITEM NO. 1:
Details of Flame Arrestor for 3.0 MMBTU/Hr.
Indirect Heater.
Drg. No. OIL/PDNO/P&D/001/01

ENGINEERING DATA				
ITEM	QTY.	DESCRIPTION	SIZE	MATERIAL
1	1	HOUSING	0.16" THICK	ALUM.3003-H14
2	2	FLAME CELL	23" O.D. x 4" THICK	ALUM.3003-H14
3	2	MIXER	4" ECLIPSE NS-160 ASSEMBLY 300128	CAST IRON
4	2	NOZZLE (NOT SHOWN)	4" ECLIPSE STICKTITE ST-216-84	CAST IRON
5	1	PILOT (NOT SHOWN)	1/4" NPT	CARBON STEEL W/ S.S. SHIELD
6	2	BURNER PIPE NIPPLE (NOT SHOWN)	4" NPT X 36" LONG	CARBON STEEL
7	1	PILOTPIPE NIPPLE (NOT SHOWN)	1/2" NPT X 37" LONG	CARBON STEEL
8	1	MANWAY	18" I.D.	ALUM.3003-H14
9	4	LIFTING LUG	4" X 4" X 0.16" THICK	ALUMINUM
10	4	COUPLING	1-1/2" NPT	ALUMINUM
11	1	NECK, EXTENDED W/ OUTSIDE FLANGE	20" ID. X 28" O.D.X 0.25" THICK	ALUM.3003-H14
12	1	RAIN HOOD	0.16" THICK	ALUM.3003-H14
13	2	COUPLING	1/4" NPT	ALUMINUM
14	1	COUPLING	2" NPT	ALUMINUM
15	2	COUPLING W/BUSHING	1" NPT & 1" X 1/4" NPT	ALUMINUM

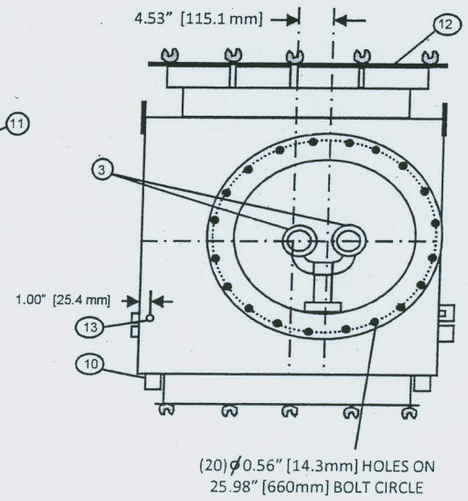


FRONT VIEW



SIDE VIEW

NOT TO SCALE



BACK VIEW