 TORUS	· Owner H-101 INDIRECT-FIRED LINE HEATER DATASHEET	Document No.	MEC-DS-003		
		Revision / Date	A · September 29, 2026		
		Issue purpose	Issued for Review		
MECHANICAL · H-101 INDIRECT-FIRED LINE HEATER DATASHEET					
Rev.	Date	Revision description	Prepared	Reviewed	Approved
A	2026-09-29	Issued for Review			

GENERAL

The general data for H-101 are given in Table 1.

Table 1: General Data

Field	Value	Field	Value
Tag	H-101	Quantity	One
Service	Gas heating upstream of the control valves to prevent hydrates and liquid dropout	Type	Indirect-fired water-bath heater, natural draft
P&ID	 PRO-DWG-105	Plot location	Station grid (190, 140); coil nozzles on the west head, burner east
Thermal sizing	 PRO-CAL-004, Line Heater H-101	Codes	API Spec 12K; coil ASME B31.3; manifolds ASME VIII Div. 1 (2023)
Burner management	BMS-150, supplied with the heater	Overpressure protection	PSV-157, set 1,440 psig; manifolds per ASME Section XIII

SERVICE AND DESIGN CONDITIONS

The service and design conditions are given in Table 2. The coil nozzles are Class 900 because Class 600 Group 1.1 flanges are rated only 1,335 psig at 250 °F, below the 1,440 psig coil design pressure; Class 900 is rated 2,000 psig.

Table 2: Service and Design Conditions

Field	Value	Field	Value
Firebox rating (HHV)	6.0 MMBtu/h	Absorbed at rating	4.49 MMBtu/h at 75 % efficiency (typical)
Design absorbed duty	4.35 MMBtu/h (case C1 plus 10 %)	Gas flow	120 MMSCFD maximum, 10 MMSCFD minimum
Gas in / out, case C1	1,150 psig and 45 °F in, 67 °F out	Coil pressure drop	2.0 psi at C1, 2.8 psi at C5 (10 psi allowed)
Bath	50 wt % ethylene glycol and water, normal 180 °F, trip at 200 °F	Fuel at rating	5,400 scf/h; pilot 25 scf/h (typical)
Coil design	1,440 psig at -20 °F to 250 °F	Coil MDMT	-20 °F, impact tested
Bath shell	Atmospheric, vented	Corrosion allowance	Coil 1/16 in (bath side); shell 1/16 in

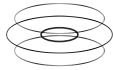
MATERIALS

The materials are listed in Table 3.

Table 3: Materials

Component	Material	Requirement
Coil and return bends	SA-106 B SMLS, NPS 6 Sch 80	Impact tested at -20 °F; bends 5D



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Component	Material	Requirement	
Inlet / outlet manifolds	SA-106 B SMLS NPS 12 Sch 80, SA-105N fittings	ASME VIII Div. 1, U-stamped	
Coil nozzle flanges	SA-105N, Class 900 RF weld neck	Impact tested at -20 °F	
Bath shell and heads	SA-36 or SA-516-70	3/8 in shell, 1/2 in heads	
Firetube	SA-516-70	3/8 in minimum	
Stack	Carbon steel, 24 in	Heat-resistant coating	

DIMENSIONS AND ELEVATIONS

Dimensions are given in Table 4. The heater is larger than the 30 ft x 8 ft envelope in  GEN-DB-001 because the 6.0 MMBtu/h rating needs about 600 ft² of firetube; the plot plan spacing shall be rechecked against the vendor's footprint (HOLD H-15).

Table 4: Dimensions and Elevations

Field	Value	Field	Value
Shell	96 in OD x 29 ft	Overall (indicative)	About 34 ft x 9.5 ft including skid, burner and coil head
Firetube	U-tube, 42 in fire leg, 36 in return leg, 27 ft legs	Firetube area	616 ft ²
Coil	NPS 6 Sch 80, 3 paths x 5 passes x 22 ft = 330 ft	Coil area (outside)	572 ft ²
Bath volume	780 ft ³ (5,900 gal) at 90 % fill	Stack	24 in, top at least 20 ft above grade
Grade at heater	EL 1150.65 ft	Coil nozzle centerline	EL 1153.62 ft

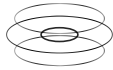
NOZZLES

The nozzle schedule is given in Table 5.  PRO-DWG-105 shows PSV-157 on line 1020 between HV-158A and the heater; N3 is an alternative on the outlet manifold, to be confirmed by process.

Table 5: Nozzle Schedule

Mark	Size	Rating / face	Service	Location	Connects to
N1	12 in	Cl 900 RF WN	Gas inlet manifold	West head (175, 141.5)	12"-G-1020-A6
N2	12 in	Cl 900 RF WN	Gas outlet manifold	West head (175, 138.5)	12"-G-1022-A6
N3	1 in	Cl 900 RF	PSV-157 (alternative location)	Outlet manifold	Orifice D, outlet 2"-V-1076-S1
N4	1-1/2 in	Cl 900 RF	TW-156	Outlet manifold	TT-156
N5	3 in	Cl 150 RF	Bath fill and expansion	Shell top	Vented standpipe
N6	2 in	Cl 150 RF	Bath drain	West end bottom	Valve and plug
N7	1 in	Coupling	TT-151 bath temperature	Side	Instrument
N8	2 in	Cl 150 RF	LSL-154 low bath level	Side	Instrument
N9	1 in	Coupling	TSHH-155 bath high-high	Side	Instrument
N10	1 in	NPT	Burner fuel (1140 / 1141)	East end	2"-F-1051-A1 riser



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INTERNALS AND ACCESSORIES

The burner management interface is given in Table 6. The BMS provides dry contacts for trip, running and first-out status to the RTU and accepts a hardwired ESD from the safety PLC. No natural-gas pneumatic devices are permitted; regulator vents are piped outside the burner enclosure.

Table 6: Burner Management Interface

Tag	Function	Scope
BMS-150	Flame safeguard, ignition, purge, low and high fire, trips; local panel Class I Div 2	Heater vendor
BE-153A / BE-153B	Two diverse flame detectors (flame rod and UV scanner, 1oo2)	Heater vendor
XV-150A / XV-150B	Main burner double block, fail closed	Heater vendor
XV-150C / PCV-150	Pilot shutoff and regulator	Heater vendor
TCV-152 / TIC-152	Firing rate from TT-156, remote setpoint from TT-135	Vendor valve, station controller
LSL-154 / TSHH-155	Low bath level and bath high-high trips	Heater vendor
HV-150A	Main burner manual isolation	Heater vendor
SDV-165	Heater fuel shutoff at FG-101, closes on ESD and BMS trip	Station
TT-156 high-high	Gas outlet 140 °F burner trip, recommended in  PRO-CAL-004	Station instrumentation

INSPECTION AND TESTING

Inspection and testing are given in Table 7.

Table 7: Inspection and Testing

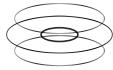
Field	Value
Coil and manifolds	Shop hydrotest 2,160 psig; vendor to confirm acceptance of the station test
Coil welds	100 % RT of butt welds, 100 % MT of attachment welds, 200 HB maximum
Bath shell	Water fill test, 24 h
Firetube	Dye penetrant examination of welds
Certification	U-stamp on manifolds; API 12K monogram or certificate of compliance
Nameplate	Tag, rating, coil MAWP 1,440 psig at 250 °F, MDMT -20 °F, test pressure, year, serial

PAINTING AND INSULATION

Painting and insulation are given in Table 8.

Table 8: Painting and Insulation

Field	Value
Shell and skid	Three-coat system per  SPC-SPC-010
Stack and firetube flange	Heat-resistant silicone aluminium, 1,000 °F
Insulation	3 in on the bath shell with aluminium jacket

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WEIGHTS

Weights for foundation design are given in Table 9.

Table 9: Weights

Condition	Weight (lb)	Basis
Empty / shipping	45,300	Calculated plates and coil; burner, skid and stack typical (HOLD H-15)
Operating, bath full, gas in coil	98,000	Bath 52,200 lb at SG 1.07
Test, bath full, coil full of water	101,300	Coil volume 60 ft ³

DESIGN CALCULATIONS SUMMARY

Table 10 summarizes the heater checks. The firetube area is based on the firebox (heat release) rating, which is how the average flux limit is applied in indirect heater practice. On the absorbed duty the area would be only 449 ft², which would understate the firetube.

Table 10: Design Calculations Summary

Check	Basis	Required	Selected / result
Coil wall, NPS 6	B31.3 304.1.2, S = 20,000 psi, Y = 0.4; + CA, / 0.875	0.336 in	Sch 80, 0.432 in
Coil wall, B31.8 check	841.1.1, F = 0.50, SMYS 35,000 psi; + CA, / 0.875	0.383 in	Sch 80, 0.432 in
Return bend intrados	B31.3 304.2.1, R/D = 5, l = 1.056	0.307 in after bending	Vendor to verify thinning
Manifold NPS 12	B31.3 304.1.2; + CA, / 0.875	0.581 in	Sch 80, 0.688 in
Coil hoop stress	1,440 psig, Sch 80	50 % SMYS	32 % SMYS
Firetube area	Firebox rating / 10,000 Btu/h-ft ²	600 ft ²	616 ft ² (9,700 Btu/h-ft ²)
Coil nozzle flanges	B16.5 Group 1.1 at 250 °F	1,440 psig	Class 900, 2,000 psig

NOTES AND HOLDS

1. Efficiency, stack temperature, firetube flux, dimensions and weights are typical, confirm with vendor data (HOLD H-15).
2. Heater emissions data are required for the air permit determination.
3. The fuel supply pressure at the burner sets the PCV-162 outlet pressure and the size of line 1051.

VENDOR DATA REQUIRED

General arrangement and nozzle orientation; thermal rating at cases C1, C5, C7 and the winter normal case; coil and manifold calculations; firetube flux; burner and BMS logic with cause and effect; fuel consumption and supply pressure; NO_x and CO emissions; weights, lifting and foundation loads; inspection and test plan.

