Indirect Line Heater Design Data Form

1.1 Quote Information

Customer Information			
Name		Company	
Business Title			
Email		Phone Number:	
Equipment Information			
Quantity:		Ship to Location (City, State, Zip)	
Proposal Due Date		Freight Terms	☐ EXW ☐ FCA ☐ FOB ☐ CIF ☐ Other _____
Potential Order Date:		Preferred Ship Date:	

Rank (1-4) Importance of the Following:							
Price:		Spec Compliance:		Delivery:		Quality/Reliability:	

Additional Comments

1.2 Process Conditions

Process Data	Parameter	Line Heater Typical Values
Inlet Pressure (PSIG)		1000-5000
Inlet Temp (°F)		40-120
Design Pressure (PSIG)		720-1440
Gas Inlet Flowrate (MMSCFD)		5-20
Gas Inlet SG		0.57-0.8
Gas Outlet Temp (°F)		70-120
Gas Outlet Pressure (PSIG)		1000
Water Inlet Flowrate (BBL/Day)		0-2000
Water Inlet SG		1.1
Oil Inlet Flowrate (BBL/Day)		0-2000
Oil Inlet SG / API		0.8
Liquid Inlet Flowrate (BBL/Day)		0-2000

Liquid Inlet SG		.6-1.0
Site Elevation (Ft)		
Inlet Fluid Composition		
Shop Capable Size	<120"OD, <30'E/E Duty: 3MMBTU/HR Coil: <5000#	**Required** **Requested**

1.3 Design Scope

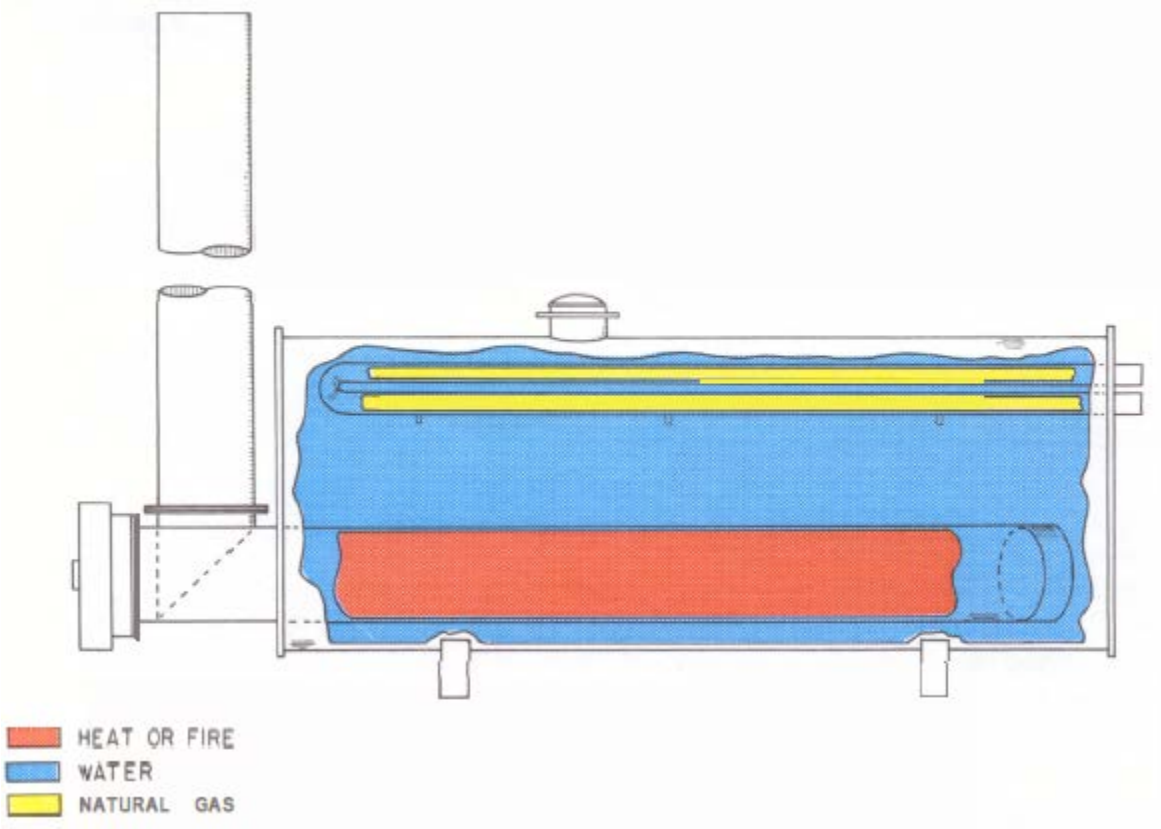
Style	☐ Bare Vessel ☐ Vessel with Accessories ☐ Vessel with Skid ☐ Packaged
Coil	☐ Transmission ☐ Split
Coil Rating	☐ 1440 psig ☐ 3000 psig ☐ 5000 psig ☐ 10000 psig ☐ Other
Process Fluid	☐ Gas ☐ Glycol ☐ Oil
Bath	☐ Glycol/Water Mix ☐ Water
Heating Source	☐ Hot Oil ☐ Fired ☐ Electric Immersion
Externals	☐ Ladder/Platform
Expansion Tank:	☐ Yes ☐ No
Paint	☐ Cimarron Standard SP-3/DTM 1 Coat, Color: Desert Tan ☐ Cimarron Standard SP-6/2 Coat, Color: Desert Tan ☐ Custom

Major Equipment (if Packaged)	**Accessories (Ship Loose of Bare Vessel option)**	
	Item:	**OEM/Type Preference:**
Fuel Train: ☐ Scrubber Auto-Drain ☐ Instrument Air Connections BMS Installed: ☐ ARC Premier ☐ Profire HBB 2100	Gauges (Level, PI, TI) ☐ Sight ☐ Transmitters	
	Choke: ☐ Manual ☐ Pneumatically Actuated ☐ Electrically Actuated	
	Stack Accessories: ☐ Bird Cone ☐ Equalized Stack Head	

Skid (if Skidded or Packaged Option accepted)
☐ On-skid deck grating Containment: ☐ Containment Pan (Cookie Sheet) with Drain ☐ In-skid containment (sloped drip pans)

Additional Requests

1.4 Application Guidance



Process Description:
Fuel gas is burned within the horizontal “U” -shaped firebox immersed in the lower portion of the water bath. Heat released by the burning fuel gas is quickly transmitted through the firebox wall to the water bath, maintaining it at desired temperature.

The fluid to be heated (wellstream, natural gas, oil, water, etc.) is conducted through the flow coil of the heater which is immersed in the upper portion of the water bath. Heat is transmitted from the hot water bath through the tube-wall to the fluid inside the flow coil.

The heater temperature controller maintains the water bath typically between 150°F and 190°F such that fluid in coil stays above hydrate formation temperatures. Greater than 190°F temperatures causes water losses.

Sizing is based on fluid composition such that fluid is heated adequately enough to stay above hydrate formation temperatures. The firetube size is a function of heat duty required to maintain fluid temperatures above required outlet temperatures.

Typically designed in accordance with API 12K specification.

Applications:

- Heating natural gas prior to regulation to prevent formation of frost rings around the buried line downstream of the regulation station.
- Heating high pressure natural gas prior to pressure reduction to prevent the formation of natural gas-water hyudrates in the line downstream of the choke or regulator.

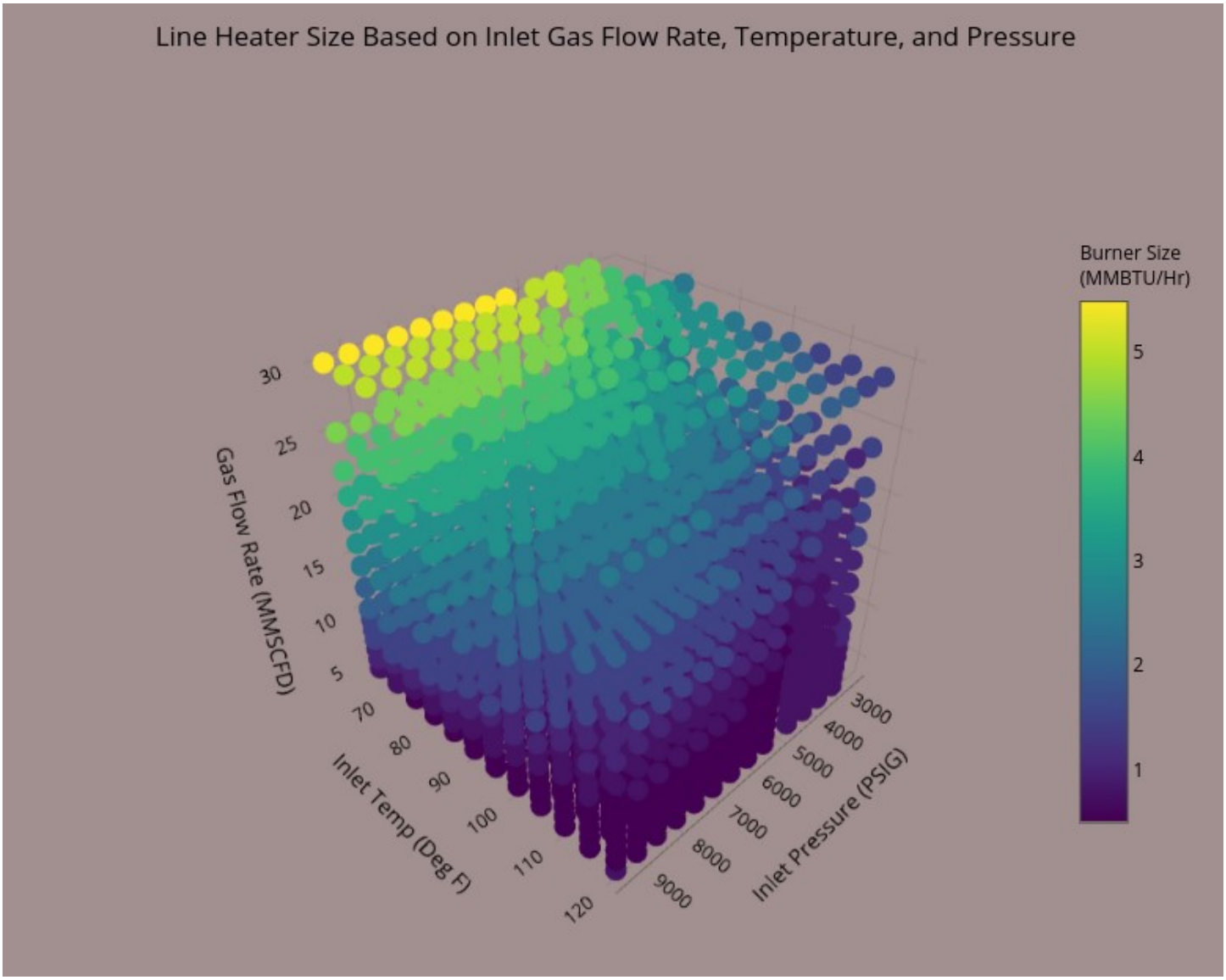
- Heating a natural gas-condensate wellstream prior to separation, with or without an associated pressure reduction, so as to control the separation temperature, prevent the formation of hydrates, and assure good gas-liquid separation.
- Heating of crude oil to maintain temperature above paraffin pour-point and to reduce its viscosity for easier handling in further lease processing.
- Heating glycol for use in heat tracing applications.
- Heating a natural gas wellstream to maintain it above its hydrate-forming temperature from the well to the processing point even though reduction of wellstream pressure is minimal.

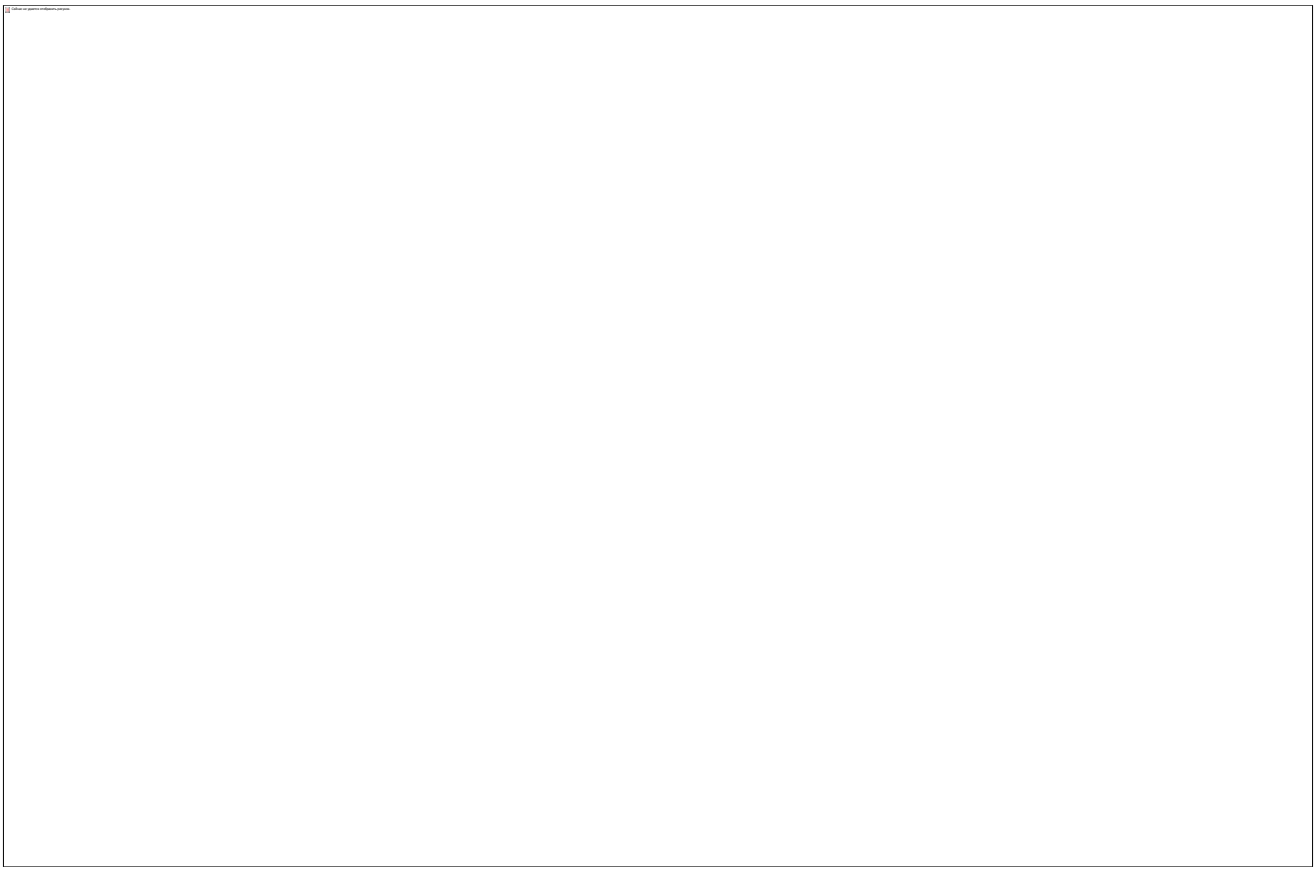
Smith Industries Handbook

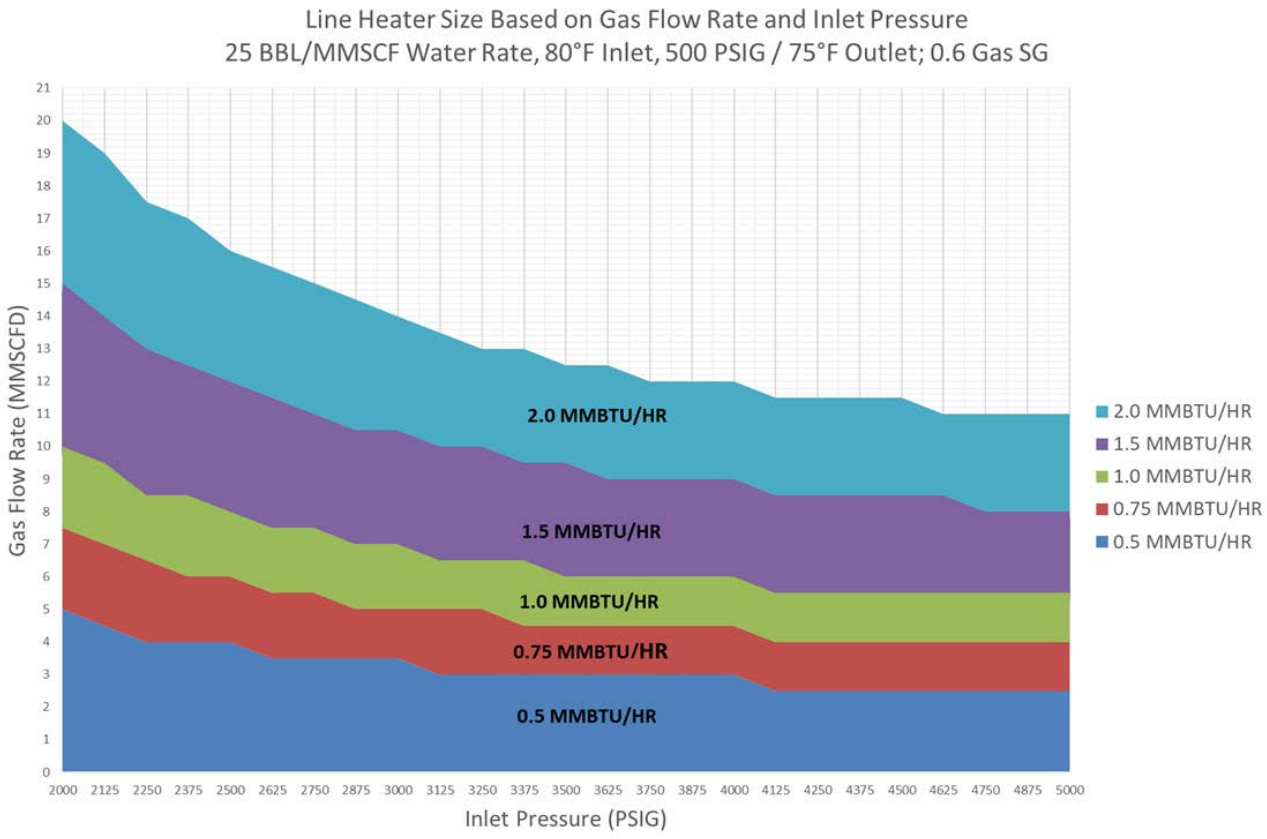
Heater	Bath Temp [°F]	Outside Coil Bundle [BTU/hr-sqft-°F]	Firetube Flux [BTU/hr-sqft-°F]	Stack Temp [°F]	Firetube Eff. NTE [%]
Water Bath	180-195	160	10000-13000	750-900	76-82
50% EG/50% Water	195-205	115	8000-10000	850-900	76-80
TEG Reboiler	350-400		6000-8000	700-10000	75-80
Treater	100-140	60	3000-5000	600-800	60

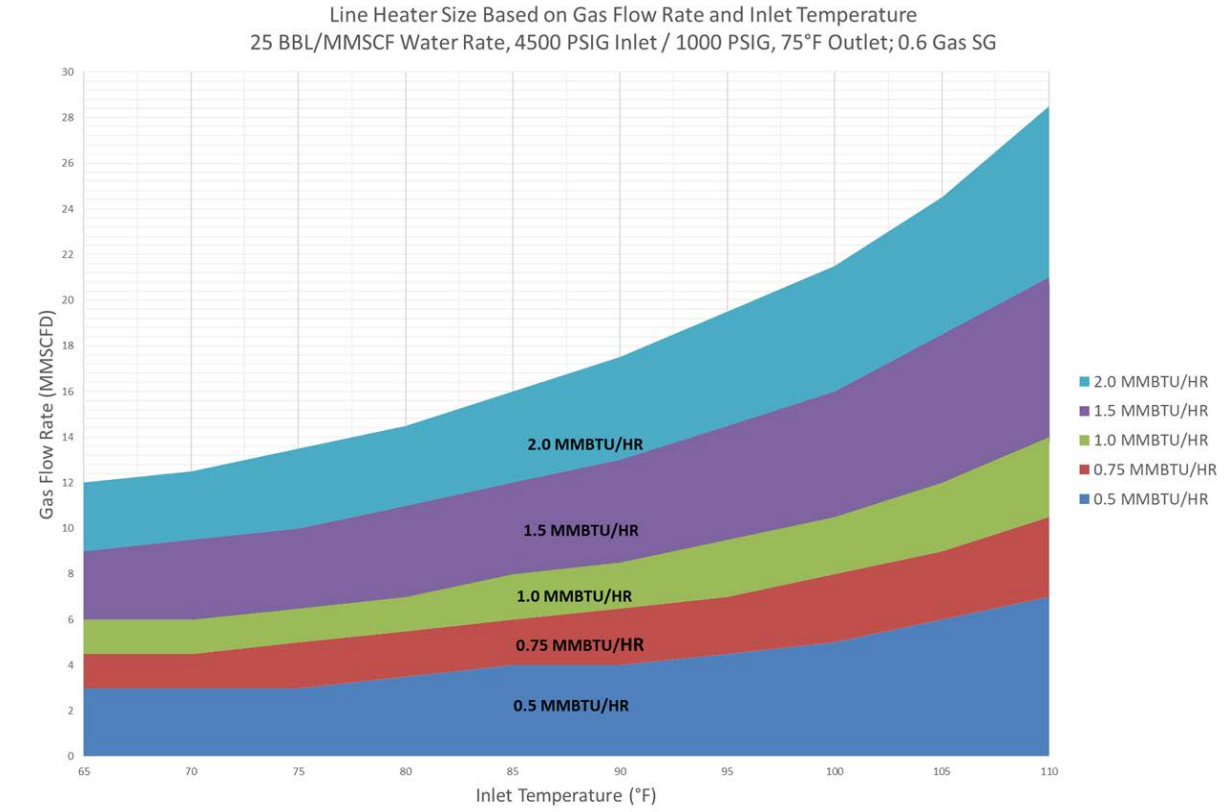
Oilfield Processing, Manning and Thompson, ©1995

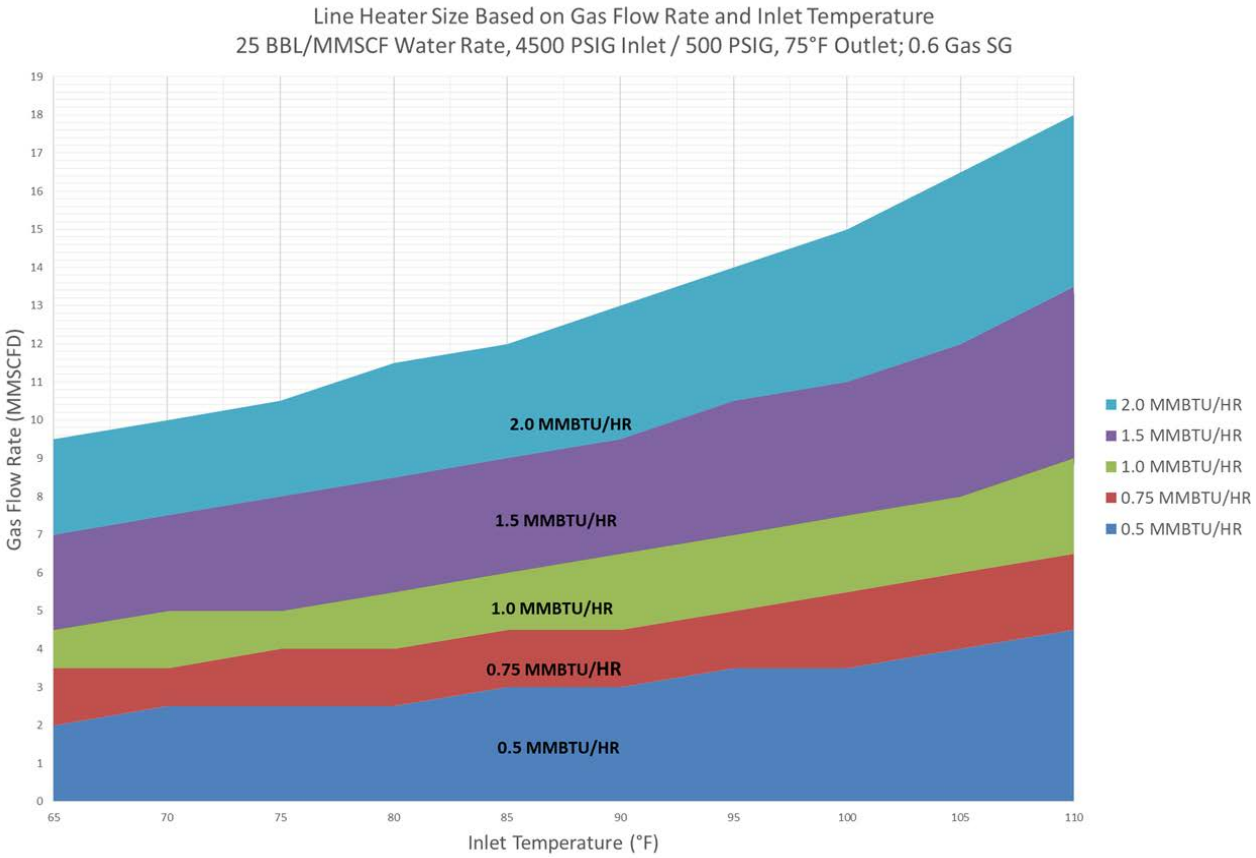
1.5 Sizing Information






Line Heater Size Based on Gas Flow Rate and Inlet Pressure
25 BBL/MMSCF Water Rate, 80°F Inlet, 500 PSIG / 75°F Outlet; 0.6 Gas SG
Gas Flow Rate (MMSCFD)
Inlet Pressure (PSIG)
2.0 MMBTU/HR
1.5 MMBTU/HR
1.0 MMBTU/HR
0.75 MMBTU/HR
0.5 MMBTU/HR


Line Heater Size Based on Gas Flow Rate and Inlet Temperature
25 BBL/MMSCF Water Rate, 4500 PSIG Inlet / 1000 PSIG, 75°F Outlet; 0.6 Gas SG
Gas Flow Rate (MMSCFD)
Inlet Temperature (°F)
2.0 MMBTU/HR
1.5 MMBTU/HR
1.0 MMBTU/HR
0.75 MMBTU/HR
0.5 MMBTU/HR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1.5 MMBTU/HR
1.0 MMBTU/HR
0.75 MMBTU/HR
0.5 MMBTU/HR