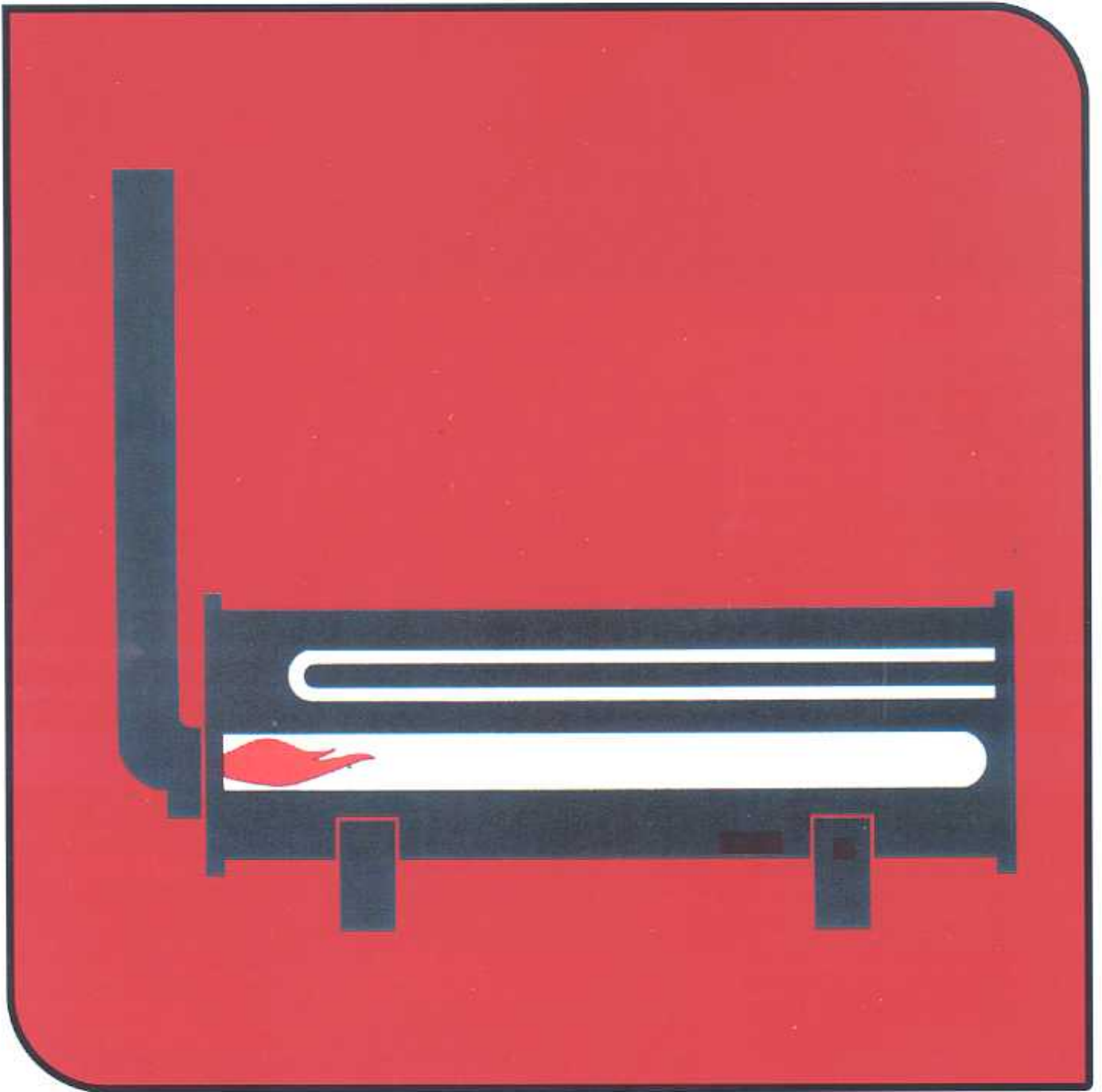


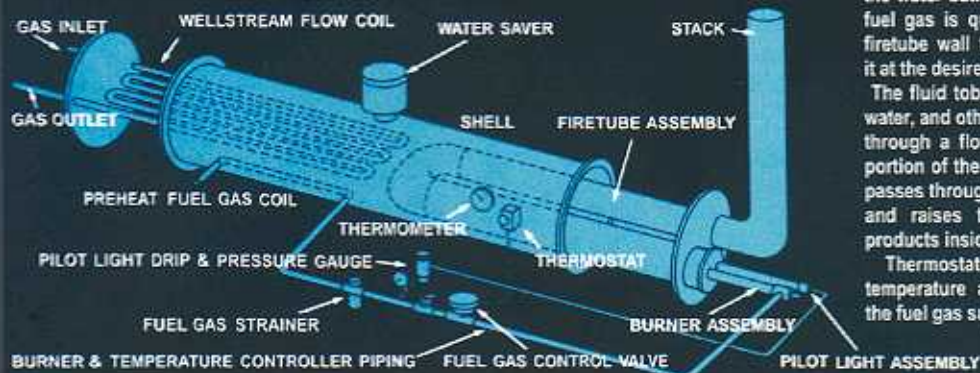
Indirect Heaters



Dependable, efficient, indirect heating
with proved-in-use BS&B Indirect Heaters



BS&B Indirect Heaters



How It Works

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

The fluid to be heated - wellstream, oil, gas, water, and other fluid products - is conducted through a flow coil immersed in the upper portion of the water bath. Heat from the bath passes through the tube walls of the flow coil and raises the temperature of the fluid products inside.

Thermostatic controls maintain water bath temperature at desired level by regulating the fuel gas supply to the burner.

BS&B Indirect Heaters are internally heated vessels employing BS&B Full Octave Tuned Firing system in which an EVN-FLUX firetube achieves 70 percent thermal efficiency. Both the firetube and the fluid carrying coil are immersed in a liquid bath (usually water) and heat is transferred from the firetube, through the bath and to the coil for safe, even, controlled product heating.

Coils can operate under pressures to 10,000 psi and higher. Heater shell usually operates at atmospheric pressure.

There is no baffling in standard units to restrict heat flow. Result is fast warmup and quick response of firetube heat output to meet coil demand.

Eleven standard shell sizes-18 through 60-inch diameter-housing 145 standard coil arrangements and 12 standard firetubes 75,000 BTU/hour through 4,000,000 BTU/hour-are available in current designs.

Typical applications are heating wellhead gas prior to entry to a transmission pipeline; installation on a pipeline at regular intervals to keep line above the hydrate forming temperature; heating wellstream prior to pressure reduction to prevent either the formation of hydrate or frost rings around buried pipe; heating crude oil, propane or LPG vaporizer service, fractionation and stabilization reboilers.

BS&B Indirect Heaters, proved in use since 1937 and continuously refined, assure dependable, efficient service.

BS&B Indirect Heater Specifications

Model No.	Nominal Rated Heating Cap. To water BTU/Hour	Firetube Heating Surface Area - Sq. Ft.	Fuel* Consumption SCF/Hr.	** Nominal water Capacity Gallons	Nominal Shell Size - OD x Length	Stack Size	Approx. Shipping Weight w/Coil
75 IH	75,000(a)	6.3	107	33	20" x 2'10"	6" x 6'8"	450 lbs.
90 IH	90,000	11.4	129	55	18" x 5'0"	4" x 10'	650 lbs.
150 IH	150,000	12	214	97	24" x 5'0"	6" x 6'8"	850 lbs.
250 IH	250,000	29	357	189	24" x 10'0"	6" x 6'8"	1,600 lbs.
500 IH	500,000	44	714	145	24" x 10'0"	8" x 9'0"	1,750 lbs.
750 IH	750,000	69	1071	298	30" x 12'5"	8" x 12'	2,800 lbs.
1000 IH	1,000,000	93	1428	481	36" x 14'5"	10" x 12'	4,750 lbs.
1500 IH	1,500,000	134	2142	1094	48" x 16'5"	12" x 7'6"	7,700 lbs.
2000 IH	2,000,000	175	2857	1327	48" x 21'5"	12" x 13'	10,300 lbs.
2500 IH	2,500,000	207	3571	1587	48" x 24'0"	12" x 18'	11,000 lbs.
3000 IH	3,000,000	277	4285	1956	54" x 27'0"	16" x 13'4"	15,700 lbs.
4000 IH	4,000,000(b)	367	5714	1974	60" x 22'6" (2)	12" x 13'	17,100 lbs.

*Fuel consumption based on rated capacity (full load) using 1000 BTU/SCF natural gas.
 **Water capacity is nominal, actual capacity determined by size and number of tubes in coil bundle.
 (a) 75 IH Heater has single straight thru firetube, all others have single U-tube type firetubes.
 (b) 4000 IH Heater has twin U-tube type firetube.

Features

- Specifically designed to safely heat gases or liquids over a wide range of pressures and temperatures without need for high pressure shell or a special design for each application.
- Firetube thermal efficiency of 70 percent is highest of any indirect heater offered for oil and gas field application. Higher thermal efficiency means lower operating costs through fuel gas saving.
- Combustible or heat sensitive fluids are heated in a flow coil by the heat transfer medium, completely isolated from the firetube.
- Firetube is always immersed in a clean, non-fouling heat transfer medium. Fresh water with corrosion or freeze inhibitor as required is the most common bath medium, but high boiling heat transfer oils, proprietary organic and inorganic heat transfer media can be used to obtain higher temperatures (above 200° F).
- Uniform heating of the transfer bath keeps flow coil tube wall temperature low, reduces scaling inside the flow coil; no hot spots to cause coil failure.
- Wide range of interchangeable flow coils available for each heater size. Allows easy selection of proper coil arrangement to satisfy heat transfer surface area and pressure drop requirements.
- Flow coils supported independent of firetube, easily changed out of heater to satisfy changing field conditions or applications.
- Wide range of standard firetube ratings available from 75,000 BTU per hour to 4,000,000 BTU per hour. Heaters also available in sizes from 4,000,000 BTU per hour to 20,000,000 BTU per hour for special applications.
- No baffles or obstructions between the firetube and the flow coil to restrict rapid movement of thermal convection currents in the water bath.
- Entire flow coil positioned above the firetube in hottest portion of water bath.

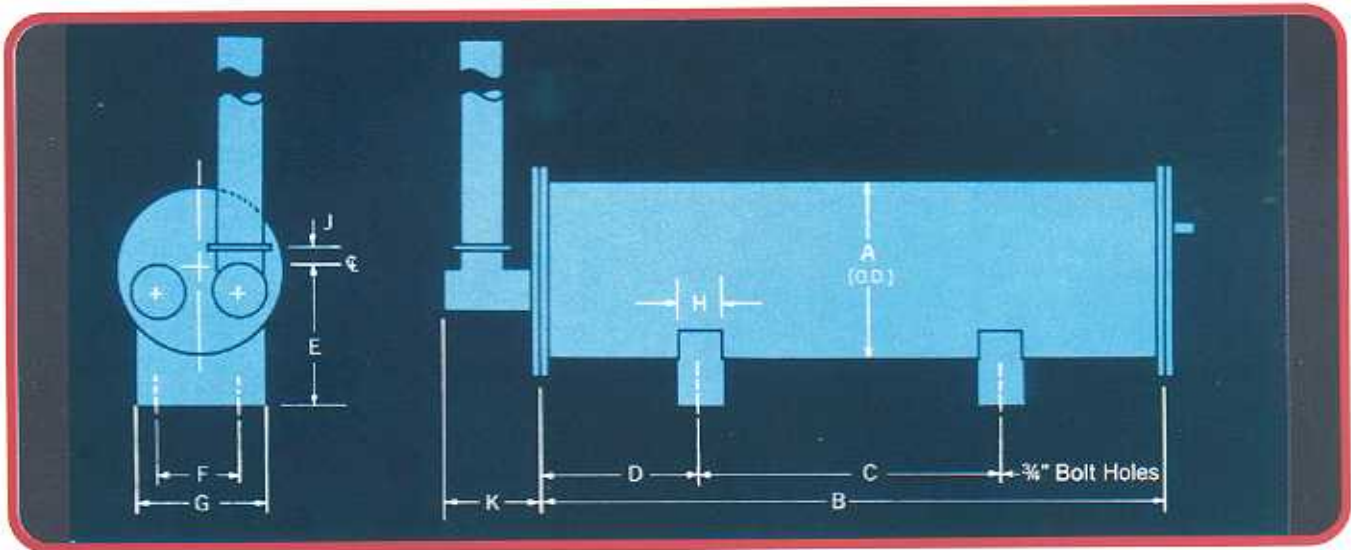


Table of Dimensions

Model No.	A	B	C	D	E	F	G	H	J	K
75 IH*	20"	2'10 1/4"	2'0 3/4"	3 1/2"	1'1 3/16"	9 5/8"	1'4 1/8"	3"	6 9/16"	11"
90 IH	18"	5'0"	3'0"	1'0"	1'2"	9 1/2"	1'4"	3"	2 5/8"	8 1/2"
150 IH	24"	5'0"	3'0"	1'0"	1'6"	1'2"	1'8"	4"	3 7/8"	11 9/16"
250 IH	24"	10'0"	6'0"	2'0"	1'6"	1'2"	1'8"	4"	3 7/8"	11 9/16"
500 IH	24"	10'0"	6'0"	2'0"	1'6"	1'2"	1'8"	4"	6 9/16"	13 1/4"
750 IH	30"	12'5"	7'5"	2'6"	1'9"	1'8"	2'2"	4"	10 5/16"	14"
1000 IH	36"	14'5"	8'9"	2'10"	2'3"	2'2"	2'8"	6"	11 3/8"	15 1/2"
1500 IH	48"	16'5"	9'10"	3'3 1/2"	2'9"	3'0"	3'6"	8"	1'5"	17 1/2"
2000 IH	48"	21'5"	12'6"	4'5 1/2"	2'9"	3'0"	3'6"	8"	1'5"	17 1/2"
2500 IH	48"	24'0"	14'0"	5'0"	2'9"	3'0"	3'6"	8"	1'5"	17 1/2"
3000 IH	54"	27'0"	18'0"	4'6"	3'0"	3'6"	4'0"	8"	1'4 1/4"	21"
4000 IH	60"	22'6"	13'8"	4'5"	3'3"	3'10"	4'4"	8"	1'8"	17 1/2"

(a) 75 IH heater has single straight thru firetube; all others have single U-tube type firetube. Firetube and coil non-removable on 75 IH
 (b) 4000 IH Heater has twin U-tube type firetube.

- Water saver accessory, standard, minimizes water vapor loss from the heater shell and assures safe water level.
- Burner and pilot assemblies designed to match firetube capacity and provide safe, dependable, efficient operation even under varying loads or adverse weather conditions.
- Temperature controls and other controls, parts and accessories carefully selected for dependable, trouble-free operation.
- Fuel gas preheat coils incorporated to assure dry fuel gas and prevent fuel line freeze-up when large pressure reductions are required of the fuel gas regulator.
- Wide selection of accessories available as extra-price items for various field applications include: adjustable chokes, pilot operated chokes, fuel gas safety shutoff valve, fuel gas scrubber, pressure regulators, firetube flame arrestors, heated fluid temperature controllers, stack arrestors, flame failure shutdowns, and reignition systems.

Removable Wellstream Flow Coils

BS&B API Safety Drilled flow coils are furnished in pipe sizes from one inch to eight inches and design pressures from 1,375 pounds (8" STD.) to 10,000 pounds (2 1/2" XXXH).

Maximum Coil Design Pressures Per Pipe Codes **

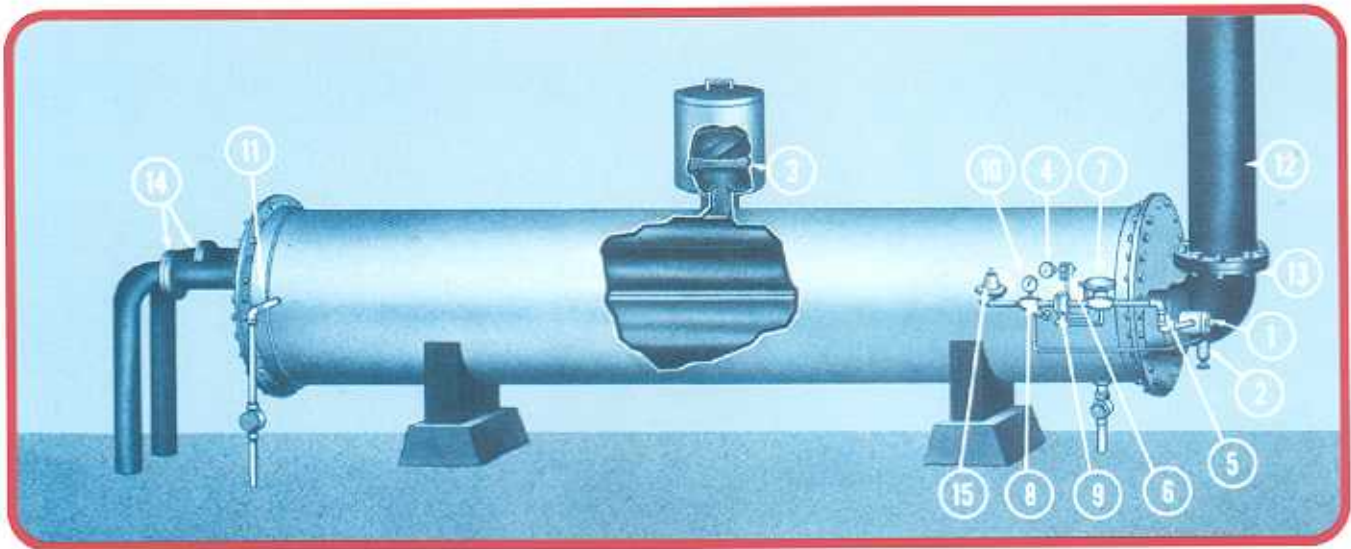
CODES	Nominal Pipe Size, Weight and Design Pressures								
	1" STD	1" 30H	2" STD	2" 30H	2" 30X	2 1/2" XXXH	3" STD	3" 30H	3" 30X
API-12K	37144	5000*	3383*	3172*	6747*	10000*	2208*	3158*	5300*
ASA-B31-RC	2540	4764	2270	3220	9425		2160	3000	5000
ASME Sec. 8	7850	3949	1793	2575	5529		1693	2393	5113
TEST PRESS (PSI)	5571	7503	3574	5058	10120	15000	3402	4725	9450

CODES	Nominal Pipe Size, Weight and Design Pressures								
	4" STD	4" 30H	4" 30X	6" STD	6" 30H	6" 30X	8" STD	8" 30H	8" 30X
API-12K	10268	3713*	5029*	13036	2336*	4792*	1271*	2100*	3729*
ASA-B31-RC	1061	2613	5242	1477	3232	4964	1301	2627	3543
ASME Sec. 8	1431	3674	4382	1742	1799	3767	1901	1508	2884
TEST PRESS (PSI)	2561	4124	8254	2325	3594	7483	2055	3195	5082

*10,000# W.P. coils are fabricated of special 2 1/2" O.D. seamless tubing.

**No corrosion allowance and no thread reduction.

@API-12K code, other test pressures are 1 1/4 times coil design pressure.



Standard Accessories

The following standard accessories are included in heater price. Numbers are keyed to photograph of heater above:

- (1) Burner assembly
- (2) Pilot light assembly and drip pot
- (3) Water saver (extra price on 75 and 90 1H)
- (4) Dial face thermometer
- (5) Set of burner and temperature controller piping
- (6) Temperature controller (thermostat) for water bath temperature
- (7) Fuel gas control valve (except 75 and 90 1H)
- (8) Fuel gas strainer (except 75 and 90 1H)
- (9) Fuel gas shutoff cock
- (10) Fuel gas pressure gauge
- (11) Fuel gas preheat coil (1"-3000#)
- (12) Stack assembly
- (13) Removable firetube assembly (except 75 1H models)
- (14) Wellstream flow coil assembly,* API safety drilled and removable (except 75 1H)

*Single pass with threaded connections are standard for 2" and smaller; 2½" and larger are beveled for welding.

Optional Accessories

- (15) Fuel gas regulator
- Firetube flame arrestor
- Stack arrestor
- Choke assembly, adj. or pilot operated
- Skid assembly
- Insulation
- Aluminum jacketing
- Gauge glass assembly for water saver
- Pilot light safety shutdown assembly
- Low bath level shutdown control
- Rain cap for stack
- High bath temperature controller
- Split coils and outside piping
- Different coil arrangement and sizes
- Flanged and union coil connections
- Fuel gas scrubber
- Horizontal water expansion chambers
- Product outlet temperature controller
- Fuel gas relief valve
- Low pressure burner for low noise level
- Flame failure combustion safeguard with manual pilot reignition
- Automatic pilot light reignitor
- Special firing controls, required for FIA or FM approval

Inquiries

Please furnish the following information on the operating conditions with your inquiry:

- 1. Flow rate in SCFD.
- 2. Specific gravity of gas.
- 3. Minimum inlet temperature, degrees Fahrenheit.
- 4. Maximum temperature at heater outlet, or after pressure regulator, degrees Fahrenheit.
- 5. Maximum inlet operating pressure, psig.
- 6. Allowable -pressure drop through unit.
- 7. Type of fuel to be used.
- 8. Type of firing controls approval.
- 9. Code or non-code coil and maximum design pressure.
- 10. Downstream pressure if regulator is used.
- 11. Type or physical properties of heat transfer bath medium.

Black, Sivalls & Bryson reserves the right to make changes at any time, without notice, in materials of construction, equipment and specifications.

