GS – GAS FIRED STEAM SUPERHEATERS

SMALL UNIT ON FORKLIFT

Construction

ACME GS Series Steam Superheaters are auxiliary equipment to steam boilers. They are built to meet the specific design and performance requirements of each application.

Pressure sections are built to ASME code. National Board or CRN registrations are available.

The coil design is available for operating pressures of up to 800 PSIG and temperatures up to 1200˚F. Steam flow is only limited by practical size considerations.

The ACME Horizontal or Vertical Superheaters have inlet and outlet flanged connections oriented to suit local conditions for simplified field installation. A pressure safety valve is standard.

The casing of the Superheater could be in Carbon Steel or Stainless Steel as required. It is further insulated with H.T Ceramic Fiber which in turn is protected by an aluminum cover.

The ACME Superheater is delivered to site on a skid prewired and prepiped requiring only steam, gas, main power and stack connections. Two Service and Operating Manuals are provided with each unit.

Special features such as weatherproof construction and stainless steel insulated casings for corrosive ambient conditions can be provided if required.

Burners

Burners are AGA or CGA listed with UL, CSA, FM, IR or other gas train standards as requested or applicable. They are complete with an original OEM burner control panel.

The burner control panel is supplemented by the ACME Temperature and Control Panel of NEMA 12, 4 or 4X construction, incorporating the main power switch, digital electronic indicating temperature controller with high limit protection, audible and visual alarm circuits with manual reset, high temperature stack detector and interlock connection confirming steam flow.

While ACME Electric Steam Superheaters using SCR power controllers can track demand variations between 0 and 100%, the gas fired Superheater's performance is limited by the gas burner's capabilities.

On large gas burners it is possible to modulate from 25% to 100% of output. Small size burners are provided with HI-LO-OFF capacity control.

When the burner is switched OFF because of low load, the accumulated heat in the coil and casing provides a flywheel effect reducing any temperature variation.

Burners for different gas mixtures are available. Also burners for light oil #2 – diesel.

PRODUCT CODE – STEAM SUPERHEATER – GS SERIES

Product code	Operating Pressure PSIG	Coil Metal	lbs of Steam / hr	Final Temp. ˚F
GS	A B C PSI	01 – Carbon Steel 02 – Stainless Steel 03 – Others	F G H J K	L M N O

EXAMPLE: 125 PSI STEAM, 3000 lbs.hr, 600˚F final temperature. = MODEL NO.: GS-125-01-3000-600

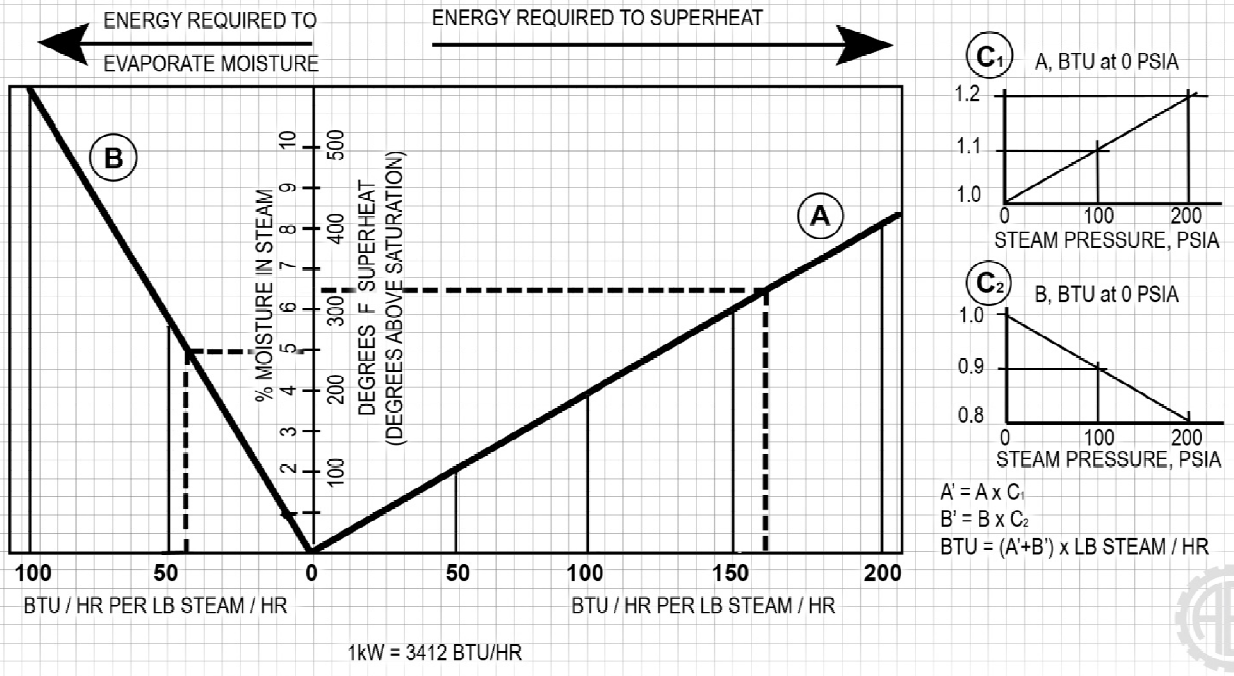
SUPERHEATER SIZING INFORMATION

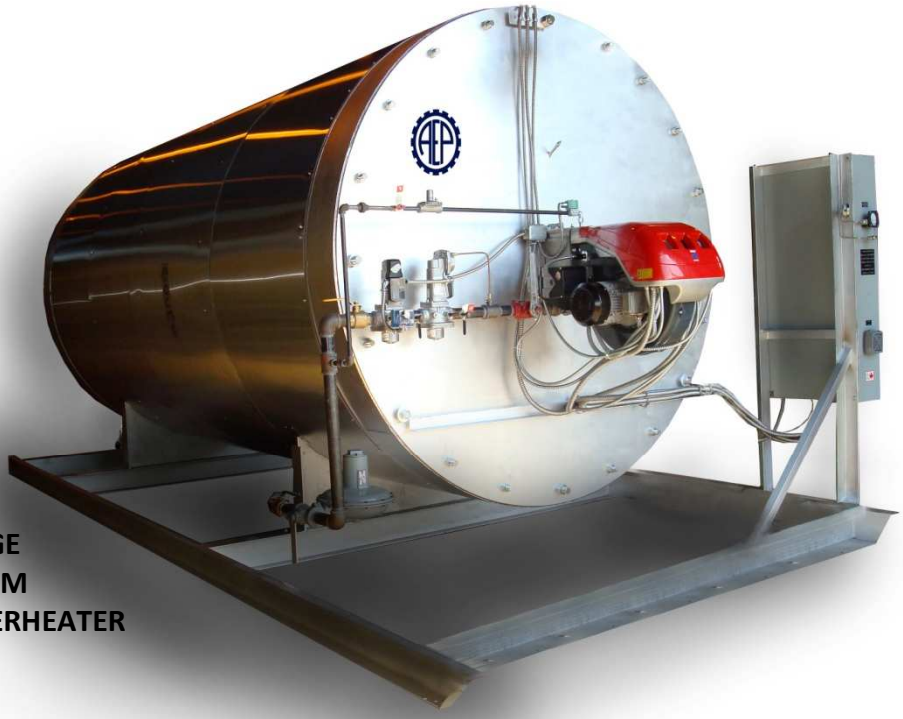
EXAMPLE: How many BTU's are required to superheat 1000 lbs / hr of steam from 100 PSIA saturated, 5% moisture to 650˚F at the Superheater outlet?

USE FIGURE-1 TO DETERMINE THE REQUIRED BTU/HR

1. Find the temperature of saturated steam (see steam tables) @ 100 PSIA saturated = 328˚F
2. Degrees superheat = 650 – 328 = 322˚F
3. On vertical scale at 5% moisture, proceed horizontally left to line B and read down to B = 46 BTU/lb. steam/hr
4. On vertical scale at 322˚F superheat, proceed right to line A and read down to A = 159 BTU / lb. steam/hr
5. Determine correction factors C_1 and C_2 for 100 PSIA. C_1 = 1.09; C_2 = 0.91
6. Determine A' = A x C_1 = 159 x 1.09 = 173 BTU /lb.steam/hr
7. Determine B' = B x C_2 = 46 x 0.91 = 42 BTU /lb.steam/hr
8. BTU = (173 + 42) x 1000 = 215 MBH
9. Add an allowance for efficiency and heat loss (say .75) 215/0.75 = 287 MBH burner NET input to Superheater for 1000 lb/hr.

FIGURE1: APPROXIMATE ENERGY REQUIRED TO SUPERHEAT STEAM





LARGE STEAM SUPERHEATER

ENLARGED VIEW OF CONTROL PANEL

TYPICAL SPECIFICATIONS: GS-SERIES

General

Supply and install where shown on drawings, GS series package type GAS Fired Steam Superheaters as manufactured by ACME Engineering Products. Units shall be skid mounted factory assembled, pre-wired, including automatic controls and factory tests.

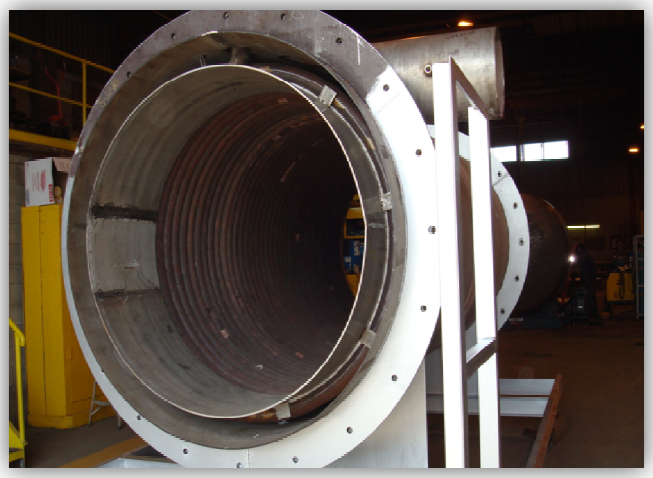
The ACME Superheater shall heat _____ lbs steam/hr (kg / hr) entering at _____ PSIG (Barg) saturated with ____ % steam quality at ____ ˚F (˚C) and have adequate heating capacity including a 10% allowance for losses and safety considerations. Capacity shall be modulated from minimum of burner to maximum. In and Out connections shall be _____ in. flanged. Provide a Safety Relief Valve to suit.

Pressure Vessel

Pressure Vessel design shall be minimum 50 PSI and 100 ˚F above operating conditions in order to allow for suitable settings of protection devices. Design to ASME Boiler and Pressure Vessel Code Section VIII Div.1 and provide “U” stamp, National Board or CRN Registration. Inlet and Outlet connections shall be class 300# flanges or higher as applicable. ___ in (mm) of high temperature insulation shall cover the vessel casing and in turn be covered by aluminum sheet (or stainless steel sheet if atmosphere is corrosive).

Gas Burner

The gas burner suitable for selected gas and main pressure of 10 PSI (0.7 Bar) max., shall have a minimum BTU/hr (kW) output for the required performance. Gas burner shall be complete with associated firing and protection controls and have its own control panel. Gas train as supplied with the burner shall meet the requirements of _____ (UL,FM,IR,CSA) for the BTU/hr (kW) capacity and shall be prepiped and prewired as part of the packaged unit.



INTERNAL VIEW

Power and Control Panel

NEMA (12 or 4 or 4X) Enclosure shall include the following:

- Disconnect Switch, door interlocked for _____V _____Ph _____Hz.
- Fused output to burner panel.
- Control Transformer fused primary.
- On-Off breaker for 120V control circuit.
- Dual Digital Display Electronic Controller, ¼" DIN size for ease of operation.
- Controller to modulate burner capacity according to demand from minimum burner output to maximum.
- Thermocouple in outlet to detect leaving steam temperature. A minimum flow is required.
- Two levels of high steam temperature protection, one with automatic reset and the second one with manual reset in separate protection circuits for maximum security.
- High Stack temperature controller with manual reset.
- Audible and visual alarm circuit with associated display lights, silencing button and horn.
- Emergency Stop Button.
- SPDT dry contacts for remote alarm supervision.
- External interlock confirming minimum steam flow

Optional:

- Remote Set Point (SV) using 4-20mA input.
- Retransmission of Process Output Value (PV) – 4-20mA output.
- Remote Emergency Stop.
- Remote Start-Stop.

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