AERCO

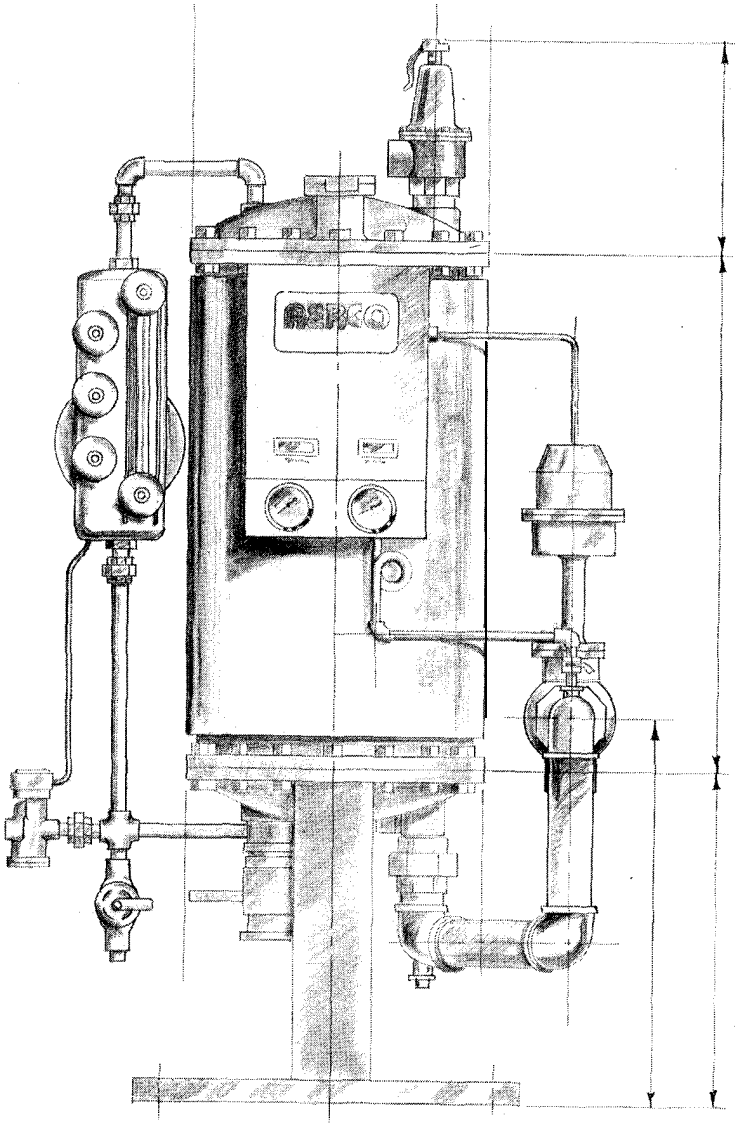
TECHNICAL BULLETIN SG-1000

STEAM-PLUS

Packaged Unfired

STEAM GENERATORS

Steam to Steam
&
High Temperature Water to Steam



Application & Sizing

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AERCO STEAM-PLUS STEAM GENERATORS

. . . . the most compact, fully packaged clean steam source available.

FEATURING. . .

● **The Highest Quality Construction and Materials Available**

AERCO Steam Generators are constructed to ASME Boiler and Pressure Vessel Code Section VIII, with a 50 PSIG rated shell and 250 PSIG rated coils.* All wetted parts are copper or bronze. These include copper or copper-nickel heat exchanger coils, cast bronze or copper lined heads, and solid copper shell lining. AERCO'S famous quality construction, coupled with our unique heat exchanger design, means long life and low maintenance.

*Higher ratings are available in special designs.

● **Proven Over 35 Years of Use**

AERCO has been producing helical coil heat exchangers since 1948 and their durability and self-descaling nature have never been duplicated ... a leader in heat exchange technology and quality manufacturing geared exclusively to serve the steam and hot water needs of commercial, industrial and institutional users.

● **With a Unique Helical Coil Heat Exchanger**

AERCO offers a compact vertical cross-flow heat exchanger with concentric coils which are free-floating, using no baffles or other supports. This configuration allows for maximum heat exchange efficiency and unusually long life. Periodic shock cleaning will not compromise heat exchanger integrity.

● **That Sheds Scale**

AERCO Steam Generators can be quickly and efficiently descaled without so much as picking up a wrench, The free-floating coil design readily permits thermal shocking. The scale which envelops the coils, in most cases, easily breaks away when the coils are thermal shocked because of the difference in coefficient of expansion between metals (tubes) and minerals (scale). Scale falls to the bottom of the generator where it is removed at blow-down.

● **In a Space-Efficient Package**

The average assembly will use only nine square feet of floor space. This is a fraction of what would be needed for a horizontal piece of equipment.

● **Easy to Install, Operate, and Maintain**

AERCO STEAM-PLUS Steam Generators are shipped completely assembled and ready for immediate hookup to existing steam, high temperature water and feedwater lines. The package includes the heat exchanger, pneumatic pressure controller, pneumatic control valve, over-pressure limit system, pressure gages, temperature gages (HTW), pressure relief valve, thermal insulation, water level controller, electric water feeder, sight glass, power and over-pressure indicator lights, all pre-wired and assembled.

● **All Non-Ferrous Internals Standard**

The AERCO STEAM-PLUS Steam Generator has standard construction that eliminates rust and corrosion while extending life on both closed and open system applications. (Alternate materials are available)

● **Safer to Use**

STEAM-PLUS Steam Generators use heat sources at temperatures up to 400°F instead of in the thousands of degrees as produced by direct fired boilers. Being unfired, safe STEAM-PLUS units can be placed in almost any facility. A low water level — or for that matter, NO water in the shell — poses no safety hazard! This eliminates the need for onsite personnel to monitor feedwater supply or automatic shut down controls.

AVAILABLE IN TWO VERSIONS . . .

Steam to Steam &
High Temperature Water to Steam

. . . For producing clean steam in hospitals, restaurants, hotels, university campuses, building and shopping complexes, medical and industrial laboratories, chemical and textile processing plants, etc.

AERCO manufactures two basic types of unfired steam generators: steam to steam and all-welded high temperature water (or other fluid) to steam. The high temperature fluid can be high temperature boiler water or high temperature process fluid. STEAM-PLUS Generators provide clean steam, free of boiler compounds and as pure as the analysis of the feedwater.

TYPICAL APPLICATIONS INCLUDE:

Humidification — This can be of special concern in hospitals where a 40% to 60% relative humidity level greatly reduces the dangers of airborne infectious viruses, bacteria, fungi, etc. Generated steam can be free from primary steam treatment chemicals. In museums, boiler compounds in direct injected steam straight from the boiler can leave hard-to-clean films on glass surfaces. The AERCO Steam Generator produces steam as pure as the feedwater supplied to it. None of the frequent cleaning or water treatment needed with electric humidifiers will be required. Usually 5 to 10 PSIG is generated for humidification.

Food Processing — When steam comes in direct contact with food, steam quality is of prime concern. Serving as a sterile steam source for food preparation by direct injection, or as a steam supplier for steam tables, kettles, scalding and blanching operations. AERCO Steam Generators are also a way to provide another level of cross-contamination protection from toxic boiler compounds.

Industrial Processes — A sterile steam source for cleaning parts or electronics, facility sterilization/cleaning, laboratory research, degreasing, pharmaceutical production.

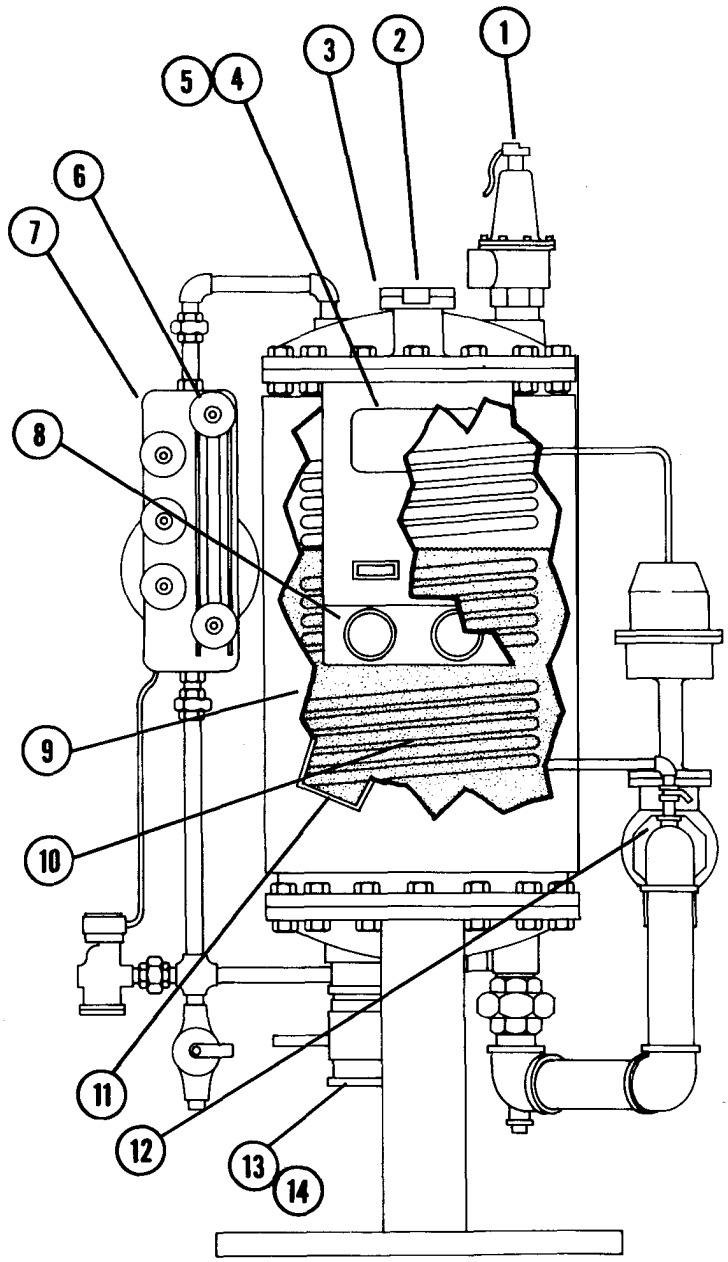
Custom Designs for Special Applications — All stainless steel construction, copper-nickel, and other materials are available in both standard and custom designs that can exceed the capacities listed on the tables. Contact your local AERCO Sales Representative for expert guidance.

General Description

The AERCO STEAM-PLUS Steam Generator is compact in design, requires a minimum of floor space and is highly efficient in producing low cost steam, Its operation is simple, Basically, the heating medium is passed through the coils in the generator transferring heat to the shell side water. Steam is formed above the make-up water level and is slightly superheated by the superheater coil above the water level. The steam passes through the outlet in the head.

STEAM-PLUS Steam Generators Are Packaged with the Following:

1. **Pressure relief valve**
2. **3” (NPT) steam outlet**
3. **Solid bronze or copper lined heads**
   —minimize corrosion for long life
4. **Pneumatic operating and pressure limit controls**
   —modulate heat source to the coils for precise pressure control • shuts down unit on over-pressure with auto-reset
5. **Fully wired control box**
   —with over-pressure and power indicator lights
6. **Sight glass assembly**
   —a clear indicator of water level status
7. **Feedwater level control and electric water feeder**
   —rugged construction which includes aux. contacts for a feedwater pump if required
8. **Pressure and temperature gages**
   —primary and secondary pressures on steam to steam • primary inlet and outlet temperatures with secondary steam pressure on HTW to steam equipment
9. **Copper lined steel shell**
   —for maximum corrosion resistance
10. **Modular free-floating copper coils**
    —self-descaling and shock cleanable for minimum maintenance • no baffles • ASME qualified • high or low pressure steam • no need for a pressure reducing valve
11. **Shell insulation**
    —resilient, tough, and color impregnated, it meets ASHRAE 90-75 and exceeds ASTM E-85 fire and smoke ratings
12. **Steam or HTW control valve**
    —custom designed to operate in concert with our heat exchangers with maximum sensitivity, control and life
13. **Drain valve**
    —2" ball valve for easy blow-down
14. **Condensate trap**



Guarantee

AERCO guarantees that any item of its manufacture shall not prove to be defective in materials and/or workmanship for a period of one year from the date of initial operation or eighteen months from the date of delivery, whichever first occurs, However, AERCO shall accept no responsibility if such item has been improperly installed, operated, or maintained or if any modification, adjustment, and/or repair has been made to such item without the specific authorization of AERCO.

In addition, for its steam generators, AERCO gives an unconditional 10-year guarantee against tube failure caused by thermal shock or mechanical failure, but not against any damage caused by corrosion.

Steam to Steam Selection Tables

On the following pages are steam to steam sizing tables for 5, 10, 15, 20, 25, 35, & 50 PSIG generated steam, Each table is suitable for from 40°F up to 180°F feedwater. Treated and untreated (with or without chemical or mechanical conditioning to inhibit scaling) feedwater capacities are presented in separate columns on each table,

To use the tables, simply find the required POUNDS/HOUR GENERATED in the appropriate column (TREATED or UNTREATED) and move across the row to the column equal to or below your STEAM SUPPLY PRESSURE. Read the steam generator/valve size where they intersect. To calculate the primary steam load, multiply the required pounds/hour generated by the factors indicated at the top of each page.

If steam pressures, feedwater temperatures, materials or other conditions departing from those stated in this catalog must be met, contact your local AERCO Sales Representative. We can quickly provide a computer generated sizing to suit your special requirements.

Example Problem:

A museum humidification system requires 600 lbs./hr. of 10 PSIG steam. There is no water treatment. 15, 30, and 80 PSIG heating steam sources are available. What size STEAM-PLUS Steam Generator should be specified and how much heating steam will it require?

Solution:

1. Select the appropriate steam table ...Use Table SS2 for 10 PSIG.
2. Select the capacity column ...Use “FOR UNTREATED WATER” and read down to the 600 LBS./HR. Row.
3. Read across to the 80 PSIG column (highest available)
4. The STEAM-PLUS unit required will be a MODEL SSIB+05/1.00/P, STYLE 210310.
5. The approximate steam required for 40°F feedwater will be 600 lbs./hr. X 1.31 = 786 lbs./hr. (see factor selection on each table page),

NOMENCLATURE KEY

MODEL **SSIB+**

Number of Coils		Number of Coils	
2	02	9	09
3	03	10	10
4	04	11	11
5	05	12	12
6	06	13	13
7	07	14	14
8	08	15	15

	Valve Size Inches (mm)
1.00	1" (25.4)
1.25	1.25" (31.75)

P	Valve Type
P	Pneumatic

STYLE **210310**

Note: To develop the approximate lbs/hr of primary steam required multiply the lbs/hr generated by:
- For 40°F feed water use: 1.31
- For 180°F feed water use: 1.15

Example: 500 lbs/hr generated using 40°F feed water requires 655 lbs/hr (500 × 1.31) of primary steam.

TABLE SS1

5 PSIG *(35 kPa)** GENERATED STEAM for 40°F *(4°C)* to 180°F *(82°C)* Feedwater

POUNDS/HOUR (kg/min) GENERATED		STEAM TO VALVE INLET PSIG							
FOR TREATED WATER	FOR UNTREATED WATER	40	50	60	70	80	90	100	110
100*(0.8)*	**67***(0.5)*	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00
150*(1.1)*	**100***(0.8)*	03/1.00	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00
200*(1.5)*	**134***(1.0)*	03/1.00	03/1.00	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00
250*(1.9)*	**168***(1.3)*	04/1.00	03/1.00	03/1.00	03/1.00	02/1.00	02/1.00	02/1.00	02/1.00
300*(2.3)*	**200***(1.5)*	04/1.00	03/1.00	03/1.00	03/1.00	03/1.00	02/1.00	02/1.00	02/1.00
400*(3.0)*	**268***(2.0)*	05/1.00	04/1.00	03/1.00	03/1.00	03/1.00	03/1.00	03/1.00	03/1.00
500*(3.8)*	**336***(2.5)*	06/1.00	04/1.00	04/1.00	04/1.00	03/1.00	03/1.00	03/1.00	03/1.00
600*(4.6)*	**400***(3.0)*	07/1.00	05/1.00	04/1.00	04/1.00	04/1.00	03/1.00	04/1.00	03/1.00
	500*(3.8)*	08/1.00	06/1.00	05/1.00	05/1.00	04/1.00	04/1.00	04/1.00	03/1.00
	600*(4.6)*	09/1.25	07/1.00	06/1.00	05/1.00	05/1.00	04/1.00	04/1.00	04/1.00
		(276)	***(345)***	***(413)***	***(482)***	***(551)***	***(620)***	***(689)***	***(758)***
		(Steam to Valve Inlet kPa)							

***Note:** Metric Values in ( ).

NOMENCLATURE KEY

MODEL **SSIB+** / [ ] / **P** / STYLE **210310**

Number of Coils		Number of Coils	
2	02	9	09
3	03	10	10
4	04	11	11
5	05	12	12
6	06	13	13
7	07	14	14
8	08	15	15

	Valve Size Inches (mm)
1.00	1"(25.4)
1.25	1.25"(31.75)

	Valve Type
P	Pneumatic

Note: To develop the approximate lbs/hr of primary steam required multiply the lbs/hr generated by:
- For 40°F feed water use: 1.31
- For 180°F feed water use: 1.15

Example: 500 lbs/hr generated using 40°F feed water requires 655 lbs/hr (500 X 1.31) of primary steam.

TABLE SS2

10 PSIG *(70 kPa)** GENERATED STEAM for 40°F *(4°C)* to 180°F *(82°C)* Feedwater

POUNDS/HOUR (kg/min) GENERATED		STEAM TO VALVE INLET PSIG							
FOR TREATED WATER	FOR UNTREATED WATER	40	50	60	70	80	90	100	110
100*(0.8)*	**67***(0.5)*	03/1.00	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00
150*(1.1)*	**100***(0.8)*	04/1.00	03/1.00	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00
200*(1.5)*	**134***(1.0)*	04/1.00	03/1.00	03/1.00	03/1.00	02/1.00	02/1.00	02/1.00	02/1.00
300*(2.3)*	**200***(1.5)*	06/1.00	04/1.00	03/1.00	03/1.00	03/1.00	03/1.00	03/1.00	02/1.00
400*(3.0)*	**268***(2.0)*	07/1.00	05/1.00	04/1.00	04/1.00	03/1.00	03/1.00	03/1.00	03/1.00
500*(3.8)*	**336***(2.5)*	09/1.00	06/1.00	05/1.00	04/1.00	04/1.00	03/1.00	03/1.00	03/1.00
600*(4.6)*	**400***(3.0)*	10/1.00	07/1.00	05/1.00	05/1.00	04/1.00	04/1.00	04/1.00	03/1.00
700*(5.3)*	**470***(3.6)*	12/1.25	08/1.25	06/1.25	05/1.00	05/1.00	04/1.00	04/1.00	04/1.00
	600*(4.6)*	13/1.25	09/1.00	07/1.00	06/1.00	05/1.00	05/1.00	04/1.00	04/1.00
	700*(5.3)*	15/1.25	10/1.25	08/1.25	07/1.00	06/1.00	05/1.00	05/1.00	05/1.00
		(276)	***(345)***	***(413)***	***(482)***	***(551)***	***(620)***	***(689)***	***(758)***
					(Steam to Valve Inlet kPa)				

***Note:** Metric Values in ( ).

TABLE SS3

15 PSIG *(103 kPa)** GENERATED STEAM for 40°F *(4°C)* to 180°F *(82°C)* Feedwater

POUNDS/HOUR (kg/min) GENERATED		STEAM TO VALVE INLET PSIG							
FOR TREATED WATER	FOR UNTREATED WATER	40	50	60	70	80	90	100	110
100*(0.8)*	**67***(0.5)*	04/1.00	03/1.00	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00
150*(1.1)*	**100***(0.8)*	06/1.00	03/1.00	03/1.00	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00
250*(1.9)*	**168***(1.3)*	09/1.00	05/1.00	04/1.00	03/1.00	03/1.00	03/1.00	03/1.00	02/1.00
350*(2.7)*	**235***(1.8)*	13/1.00	06/1.00	04/1.00	04/1.00	03/1.00	03/1.00	03/1.00	03/1.00
450*(3.4)*	**302***(2.3)*		07/1.00	05/1.00	04/1.00	04/1.00	04/1.00	03/1.00	03/1.00
550*(4.2)*	**369***(2.8)*		09/1.00	06/1.00	05/1.00	04/1.00	04/1.00	04/1.00	04/1.00
650*(4.9)*	**436***(3.3)*		10/1.25	07/1.00	06/1.00	05/1.00	05/1.00	04/1.00	04/1.00
750*(5.7)*	**503***(3.8)*		11/1.25	08/1.25	06/1.25	06/1.00	05/1.00	05/1.00	04/1.00
850*(6.4)*	**570***(4.3)*		13/1.25	09/1.25	07/1.25	06/1.25	05/1.25	05/1.00	05/1.00
	700*(5.3)*		15/1.25	10/1.25	08/1.25	07/1.25	06/1.25	06/1.00	05/1.00
	850*(6.4)*			12/1.25	10/1.25	08/1.25	07/1.25	07/1.00	06/1.00
		(276)	***(345)***	***(413)***	***(482)***	***(551)***	***(620)***	***(689)***	***(758)***
					(Steam to Valve Inlet kPa)				

***Note:** Metric Values in ( ).

NOMENCLATURE KEY

MODEL **SSIB+** / [ ] / [P] / STYLE **210310**

Number of Coils		Number of Coils	
2	02	9	09
3	03	10	10
4	04	11	11
5	05	12	12
6	06	13	13
7	07	14	14
8	08	15	15

	Valve Size Inches (mm)
1.00	1"(25.4)
1.25	1.25"(31.75)

	Valve Type
P	Pneumatic

Note: To develop the approximate lbs/hr of primary steam required multiply the lbs/hr generated by:
- For 40°F feed water use: 1.31
- For 180°F feed water use: 1.15

Example: 500 lbs/hr generated using 40°F feed water requires 655 lbs/hr (500 X 1.31) of primary steam.

TABLE SS4

20 PSIG *(140 kPa)** GENERATED STEAM for 40°F *(4°C)* to 180°F *(82°C)* Feedwater

POUNDS/HOUR (kg/min) GENERATED		STEAM TO VALVE INLET PSIG							
FOR TREATED WATER	FOR UNTREATED WATER	40	50	60	70	80	90	100	110
100*(0.8)*	**67***(0.5)*	12/1.00	04/1.00	03/1.00	02/1.00	02/1.00	02/1.00	02/1.00	02/1.00
200*(1.5)*	**134***(1.0)*		06/1.00	04/1.00	03/1.00	03/1.00	03/1.00	02/1.00	02/1.00
300*(2.3)*	**200***(1.5)*		08/1.00	05/1.00	04/1.00	03/1.00	03/1.00	03/1.00	03/1.00
400*(3.0)*	**268***(2.0)*		11/1.00	06/1.00	05/1.00	04/1.00	04/1.00	03/1.00	03/1.00
500*(3.8)*	**336***(2.5)*		13/1.00	08/1.00	06/1.00	05/1.00	04/1.00	04/1.00	04/1.00
600*(4.6)*	**400***(3.0)*		15/1.00	09/1.00	06/1.00	05/1.00	05/1.00	04/1.00	04/1.00
700*(5.3)*	**470***(3.6)*			10/1.25	07/1.00	06/1.00	05/1.00	05/1.00	05/1.00
850*(6.4)*	**570***(4.3)*			12/1.25	09/1.25	07/1.25	06/1.25	06/1.00	05/1.00
1000*(7.6)*	**670***(5.1)*			14/1.25	10/1.25	08/1.25	07/1.25	06/1.25	06/1.25
	850*(6.4)*				11/1.25	10/1.25	09/1.25	08/1.00	07/1.00
	1000*(7.6)*				13/1.25	11/1.25	10/1.25	09/1.25	08/1.25
		(276)	***(345)***	***(413)***	***(482)***	***(551)***	***(620)***	***(689)***	***(758)***
		(Steam to Valve Inlet kPa)							

***Note:** Metric Values in ( ).

TABLE SS5

25 PSIG *(172 kPa)** GENERATED STEAM for 40°F *(4°C)* to 180°F *(82°C)* Feedwater

POUNDS/HOUR GENERATED		STEAM TO VALVE INLET PSIG							
FOR TREATED WATER	FOR UNTREATED WATER	40	50	60	70	80	90	100	110
100*(0.8)*	**67***(0.5)*		06/1.00	03/1.00	03/1.00	02/1.00	02/1.00	02/1.00	02/1.00
200*(1.5)*	**134***(1.0)*		11/1.00	05/1.00	04/1.00	03/1.00	03/1.00	03/1.00	02/1.00
300*(2.3)*	**200***(1.5)*			07/1.00	05/1.00	04/1.00	03/1.00	03/1.00	03/1.00
400*(3.0)*	**268***(2.0)*			09/1.00	06/1.00	05/1.00	04/1.00	04/1.00	03/1.00
500*(3.8)*	**336***(2.5)*			11/1.00	07/1.00	06/1.00	05/1.00	04/1.00	04/1.00
650*(4.9)*	**436***(3.3)*			14/1.00	09/1.00	07/1.00	06/1.00	05/1.00	05/1.00
800*(6.1)*	**536***(4.1)*				10/1.25	08/1.25	07/1.00	06/1.00	05/1.00
950*(7.2)*	**636***(4.8)*				12/1.25	09/1.25	08/1.25	07/1.25	06/1.25
1100*(8.3)*	**736***(5.6)*				13/1.25	11/1.25	08/1.25	08/1.25	07/1.25
	900*(7.2)*					12/1.25	11/1.25	09/1.25	08/1.25
	1100*(8.3)*					14/1.25	13/1.25	11/1.25	10/1.25
		(276)	***(345)***	***(413)***	***(482)***	***(551)***	***(620)***	***(689)***	***(758)***
		(Steam to Valve Inlet kPa)							

***Note:** Metric Values in ( ).

NOMENCLATURE KEY

MODEL **SSIB+** / [ ] / [P] / STYLE **210310**

Number of Coils		Number of Coils	
2	02	9	09
3	03	10	10
4	04	11	11
5	05	12	12
6	06	13	13
7	07	14	14
8	08	15	15

	Valve Size Inches (mm)
1.00	1" (25.4)
1.25	1.25" (31.75)

	Valve Type
P	Pneumatic

Note: To develop the approximate lbs/hr of primary steam required multiply the lbs/hr generated by:
- For 40°F feed water use: 1.31
- For 180°F feed water use: 1.15

Example: 500 lbs/hr generated using 40°F feed water requires 655 lbs/hr (500 × 1.31) of primary steam.

TABLE SS6

35 PSIG *(241 kPa)** GENERATED STEAM for 40°F *(4°C)* to 180°F *(82°C)* Feedwater

POUNDS/HOUR GENERATED		STEAM TO VALVE INLET PSIG							
FOR TREATED WATER	FOR UNTREATED WATER	40	50	60	70	80	90	100	110
100*(0.8)*	**67***(0.5)*			09/1.00	04/1.00	03/1.00	03/1.00	02/1.00	02/1.00
200*(1.5)*	**134***(1.0)*				07/1.00	04/1.00	04/1.00	03/1.00	03/1.00
400*(3.0)*	**268***(2.0)*				12/1.00	07/1.00	06/1.00	05/1.00	04/1.00
600*(4.6)*	**400***(3.0)*					10/1.00	08/1.00	06/1.00	05/1.00
800*(6.1)*	**536***(4.1)*					13/1.25	10/1.00	08/1.00	07/1.00
1000*(7.6)*	**672***(5.1)*						12/1.25	09/1.25	08/1.25
1200*(9.1)*	**800***(6.1)*						14/1.25	11/1.25	09/1.25
1400*(10.6)*	**938***(7.1)*							13/1.25	10/1.25
	1200*(9.1)*							15/1.25	13/1.25
	1400*(10.6)*								14/1.25
		(276)	***(345)***	***(413)***	***(482)***	***(551)***	***(620)***	***(689)***	***(758)***
					(Steam to Valve Inlet kPa)				

***Note:** Metric Values in ( ).

TABLE SS7

50 PSIG *(345 kPa)** GENERATED STEAM for 40°F *(4°C)* to 180°F *(82°C)* Feedwater

POUNDS/HOUR GENERATED		STEAM TO VALVE INLET PSIG							
FOR TREATED WATER	FOR UNTREATED WATER	40	50	60	70	80	90	100	110
100*(0.8)*	**67***(0.5)*					08/1.00	04/1.00	03/1.00	03/1.00
300*(2.3)*	**200***(1.5)*						10/1.00	06/1.00	05/1.00
500*(3.8)*	**336***(2.5)*						15/1.00	10/1.00	08/1.00
700*(5.3)*	**469***(3.6)*							13/1.00	10/1.00
900*(6.8)*	**600***(4.6)*								12/1.00
1100*(8.3)*	**736***(5.6)*								15/1.25
		(276)	***(345)***	***(413)***	***(482)***	***(551)***	***(620)***	***(689)***	***(758)***
					(Steam to Valve Inlet kPa)				

***Note:** Metric Values in ( ).

High Temperature
Water to Steam Selection Tables

On the following pages are high temperature water to steam sizing tables for 5, 10, 15, 20, 25, 35, & 50 PSIG generated steam in two complete sets. One for 40°F feedwater (40WS tables) and another for 180°F feedwater (18OWS tables). Treated and untreated (with or without chemical or mechanical conditioning to inhibit scaling) feedwater capacities are presented in separate columns on each table. Primary flow rates are related to unit size and shown in the table below. Primary outlet temperatures are calculated using the formulas presented below each steam table.

To use the tables, first decide which group to use (40WS or 180WS). On the selected steam pressure table, find the desired POUNDS/HOUR to be generated in the appropriate column (TREATED or UNTREATED), Read across the row to the PRIMARY WATER TEMPERATURE column and find the size where they intersect, Find the primary flow in the table below. Calculate the primary outlet temperature by using the formula at the bottom of the selection table.

If steam pressures, feedwater temperatures, materials or other conditions departing from those stated in this catalog must be met, contact your local AERCO Sales Representative. We can quickly provide a computer generated sizing to suit your requirements.

Example problem:

A university food science building requires 800 lbs./hr. of 5 PSIG steam for steam kettles. The condensate is 100% returned. Water at the site is untreated. The primary heat source is 350°F water. What size STEAM-PLUS Steam Generator should be specified and how much primary water will be required?

Solution

1. Select the appropriate steam pressure table from the 180°F feedwater group Use Table 180WS 1 for 5 PSIG.
2. Select a capacity column Use “FOR TREATED WATER” and read down to the 950 lbs./hr. row. (Note: though the water is untreated, a closed loop system requires only minimal make-up water. Scale will be practically non-existent and therefore the treated condition can be assumed to minimize equipment size.)
3. Read across to the 350°F column.
4. The STEAM-PLUS unit required will be a MODEL WS3E+03/1.50/P, STYLE 210750.
5. Find the primary water flow rate from table below for a 3 coil unit . . . 50GPM.
6. Using the formula given on Table 180WS 1, calculate the primary water temperature drop.

$$\frac{\text{lbs./hr. X 1.784}}{\text{GPM}} = \triangle T \qquad \frac{800 \text{ X } 1.784}{50} = 28.5$$

The outlet temperature is 350 - 28.5 = 321.5°F

High Temperature Water Flow Rates
2 coils 34 GPM (2.15 l/s)*
3 coils 50 GPM (3.15 l/s)
4 coils 67 GPM (4.23 l/s)
5 coils 84 GPM (5.30 l/s)
6 coils 101 GPM (6.37 l/s)
7 coils 118 GPM (7.45 l/s)
8 coils 134 GPM (8.46 l/s)
9 coils 151 GPM (9.53 l/s)
10 coils 168 GPM (10.60 l/s)
11 coils 185 GPM (11.67 l/s)
12 coils 202 GPM (12.75 l/s)

SPECIAL NOTE:

The maximum allowable high temperature water flow rate through the tubes is 200 GPM. In the tables that follow, all selections of 13 coils or more are in excess of the maximum allowable flow rate. For applications requiring 13 coils or more, consult your sales representative or the factory for an alternate selection.

***Note:** Metric Values in ( ).

NOMENCLATURE KEY

MODEL **WS3E+** / / **P** STYLE **210750**

Number of Coils	
2	02
3	03
4	04
5	05
6	06
7	07
8	08
9	09
10	10
11	11

Number of Coils	
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20

	Valve Size Inches (mm)
1.00	1" (25.4)
1.25	1.25" (31.75)
1.50	1.50" (38.10)
2.00	2.00" (50.80)
2.50	2.50" (63.50)
3.00	3.00" (76.20)
4.00	4.00" (101.60)

	Valve Type
P	Pneumatic

TABLE 40WS 1 — 5 PSIG *(35 kPa)** GENERATED STEAM using 40°F *(4°C)* Feedwater

POUNDS/HOUR (kg/min) GENERATED		HIGH TEMPERATURE WATER TO VALVE				
FOR TREATED WATER	FOR UNTREATED WATER	300°F	325°F	350°F	375°F	400°F
200*(1.5)*	**150***(1.1)*	02/1.25	02/1.25	02/1.25	02/1.25	02/1.25
400*(3.0)*	**300***(2.3)*	03/1.50	03/1.50	02/1.25	02/1.25	02/1.25
600*(4.5)*	**450***(3.4)*	04/2.00	03/1.50	03/1.50	03/1.50	02/1.25
800*(6.1)*	**600***(4.5)*	05/2.00	04/2.00	03/1.50	03/1.50	03/1.50
1000*(7.6)*	**750***(5.7)*	06/2.00	04/2.00	04/2.00	03/1.50	03/1.50
1200*(9.1)*	**900***(6.8)*	07/2.50	05/2.00	04/2.00	04/2.00	03/1.50
1400*(10.6)*	**1050***(7.9)*	08/2.50	06/2.00	05/2.00	04/2.00	04/2.00
1550*(11.7)*	**1163***(8.8)*	09/2.50	06/2.00	05/2.00	04/2.00	05/2.00
	1350*(10.2)*	09/2.50	07/2.50	06/2.00	05/2.00	04/2.00
	1550*(11.3)*	10/2.50	08/2.50	06/2.00	05/2.00	05/2.00
		(149°C)	***(163°C)***	***(177°C)***	***(191°C)***	***(204°C)***
				HTW to Valve (C°)		

***Note:** Metric Values in ( ).

For 5 PSIG generated to calculate primary temperature drop through the coils in °F, use this Formula: $\frac{\#/HR \times 2.032}{GPM} = \Delta T$

For primary temperatures in °C use (°F-32) 5/9

TABLE 40WS 2 — 10 PSIG *(70 kPa)** GENERATED STEAM using 40°F *(4°C)* Feedwater

POUNDS/HOUR (kg/min) GENERATED		HIGH TEMPERATURE WATER TO VALVE				
FOR TREATED WATER	FOR UNTREATED WATER	300°F	325°F	350°F	375°F	400°F
200*(1.5)*	**150***(1.1)*	03/1.50	02/1.25	02/1.25	02/1.25	02/1.25
400*(3.0)*	**300***(2.3)*	04/2.00	03/1.50	03/1.50	02/1.25	02/1.25
650*(4.9)*	**488***(3.7)*	05/2.00	04/2.00	03/1.50	03/1.50	03/1.50
900*(6.8)*	**675***(5.1)*	07/2.50	05/2.00	04/2.00	03/1.50	03/1.50
1150*(8.7)*	**863***(6.5)*	08/2.50	06/2.00	05/2.00	04/2.00	04/2.00
1400*(10.6)*	**1050***(7.9)*	10/2.50	07/2.50	05/2.00	04/2.00	04/2.00
1650*(12.5)*	**1238***(9.4)*	11/3.00	08/2.50	06/2.00	05/2.00	05/2.00
1900*(14.4)*	**1425***(10.8)*	13/3.00	09/2.50	07/2.50	05/2.00	05/2.00
	1650*(12.5)*	14/3.00	10/2.50	07/2.50	06/2.00	06/2.00
	1900*(14.4)*	16/4.00	11/3.00	09/2.50	07/2.50	06/2.00
		(149°C)	***(163°C)***	***(177°C)***	***(191°C)***	***(204°C)***
				HTW to Valve (C°)		

***Note:** Metric Values in ( ).

For 10 PSIG generated to calculate primary temperature drop through the coils in °F, use this Formula: $\frac{\#/HR \times 2.039}{GPM} = \Delta T$

For primary temperatures in °C use (°F-32) 5/9

NOMENCLATURE KEY

MODEL **WS3E+** / / **P** STYLE **210750**

Number of Coils		Number of Coils	
2	02	12	12
3	03	13	13
4	04	14	14
5	05	15	15
6	06	16	16
7	07	17	17
8	08	18	18
9	09	19	19
10	10	20	20
11	11		

	Valve Size Inches (mm)
1.00	1"(25.4)
1.25	1.25"(31.75)
1.50	1.50"(38.10)
2.00	2.00"(50.80)
2.50	2.50"(63.50)
3.00	3.00"(76.20)
4.00	4.00"(101.60)

	Valve Type
P	Pneumatic

TABLE 40WS 3 15 PSIG *(103 kPa)** GENERATED STEAM using 40°F *(4°C)* Feedwater

POUNDS/HOUR (kg/min) GENERATED		HIGH TEMPERATURE WATER TO VALVE				
FOR TREATED WATER	FOR UNTREATED WATER	300°F	325°F	350°F	375°F	400°F
100*(0.8)*	**75***(0.6)*	02/1.25	02/1.25	02/1.25	02/1.25	02/1.25
300*(2.3)*	**225***(1.7)*	04/2.00	03/1.50	02/1.25	02/1.25	02/1.25
500*(3.8)*	**375***(2.8)*	05/2.00	04/2.00	03/1.50	03/1.50	02/1.50
700*(5.3)*	**525***(4.0)*	07/2.50	05/2.00	04/2.00	03/1.50	03/1.50
950*(7.2)*	**713***(5.4)*	09/2.50	06/2.00	04/2.00	04/2.00	03/1.50
1250*(9.5)*	**938***(7.1)*	12/3.00	07/2.50	05/2.00	04/2.00	04/2.00
1550*(11.7)*	**1163***(8.8)*	14/3.00	08/2.50	06/2.00	05/2.00	05/2.00
1900*(14.4)*	**1425***(10.8)*	17/4.00	10/2.50	07/2.50	06/2.00	05/2.00
2250*(17.0)*	**1688***(12.8)*	19/4.00	11/3.00	08/2.50	07/2.50	06/2.00
	1900*(14.4)*		13/3.00	09/2.50	07/2.50	06/2.00
	2250*(17.0)*		14/3.00	11/3.00	08/2.50	07/2.50
		(149°C)	***(163°C)***	***(177°C)***	***(191°C)***	***(204°C)***
				HTW to Valve (C°)		

***Note:** Metric Values in ( ).

For 15 PSIG generated to calculate primary temperature drop through the coils in °F, use this Formula: $\frac{\#/HR \times 2.046}{GPM} = \Delta T$

For primary temperatures in °C use (°F-32) 5/9

TABLE 40WS 4 20 PSIG *(140 kPa)** GENERATED STEAM using 40°F *(4°C)* Feedwater

POUNDS/HOUR (kg/min) GENERATED		HIGH TEMPERATURE WATER TO VALVE				
FOR TREATED WATER	FOR UNTREATED WATER	300°F	325°F	350°F	375°F	400°F
150*(1.1)*	**113***(0.9)*	03/1.50	02/1.25	02/1.25	02/1.25	02/1.25
350*(2.7)*	**263***(2.0)*	05/2.00	03/1.50	03/1.50	02/1.25	02/1.25
550*(4.2)*	**413***(3.1)*	07/2.50	04/2.00	03/1.50	03/1.50	03/1.50
800*(6.1)*	**600***(4.5)*	10/2.50	06/2.00	04/2.00	04/2.00	03/1.50
1050*(8.0)*	**788***(6.0)*	13/3.00	07/2.50	05/2.00	05/2.00	04/2.00
1350*(10.2)*	**1013***(7.7)*	16/4.00	09/2.50	06/2.00	05/2.00	05/2.00
1650*(12.5)*	**1238***(9.4)*	19/4.00	10/2.50	07/2.50	06/2.00	05/2.00
2000*(15.2)*	**1500***(11.4)*		12/3.00	09/2.50	07/2.50	06/2.00
2300*(17.4)*	**1725***(13.1)*		14/3.00	10/2.50	08/2.50	07/2.50
2600*(19.7)*	**1925***(14.8)*		15/4.00	11/3.00	09/2.50	07/2.50
	2300*(17.4)*		19/4.00	12/3.00	10/2.50	08/2.50
	2600*(19.7)*			14/3.00	10/2.50	08/2.50
		(149°C)	***(163°C)***	***(177°C)***	***(191°C)***	***(204°C)***
				HTW to Valve (C°)		

***Note:** Metric Values in ( ).

For 20 PSIG generated to calculate primary temperature drop through the coils in °F, use this Formula: $\frac{\#/HR \times 2.051}{GPM} = \Delta T$

For primary temperatures in °C use (°F-32) 5/9

NOMENCLATURE KEY

MODEL **WS3E+** / / **P** STYLE **210750**

Number of Coils		Number of Coils	
2	02	12	12
3	03	13	13
4	04	14	14
5	05	15	15
6	06	16	16
7	07	17	17
8	08	18	18
9	09	19	19
10	10	20	20
11	11		

	Valve Size Inches (mm)
1.00	1"(25.4)
1.25	1.25"(31.75)
1.50	1.50"(38.10)
2.00	2.00"(50.80)
2.50	2.50"(63.50)
3.00	3.00"(76.20)
4.00	4.00"(101.60)

	Valve Type
P	Pneumatic

TABLE 40WS 5 25 PSIG *(172 kPa)** GENERATED STEAM using 40°F *(4°C)* Feedwater

POUNDS/HOUR (kg/min) GENERATED		HIGH TEMPERATURE WATER TO VALVE				
FOR TREATED WATER	FOR UNTREATED WATER	300°F	325°F	350°F	375°F	400°F
150*(1.1)* **350***(2.7)* **600***(4.6)*	**113***(0.9)* **263***(2.0)* **450***(3.4)*	04/2.00 07/2.50 11/3.00	02/1.25 04/2.00 05/2.00	02/1.25 03/1.50 04/2.00	02/1.25 03/1.50 03/1.50	02/1.25 02/1.25 03/1.50
900*(6.8)* **1200***(9.1)* **1500***(11.4)*	**675***(5.1)* **900***(6.8)* **1125***(8.5)*	15/4.00 20/4.00	07/2.50 09/2.50 11/3.00	05/2.00 06/2.00 08/2.50	04/2.00 05/2.00 06/2.00	04/2.00 04/2.00 05/2.00
1800*(13.6)* **2100***(15.9)* **2400***(18.2)*	**1350***(10.2)* **1575***(11.9)* **1800***(13.6)*		13/3.00 15/4.00 17/4.00	09/2.50 10/2.50 11/3.00	07/2.50 08/2.50 08/2.50	06/2.00 06/2.00 07/2.50
2700*(20.5)* **3000***(22.7)*	**2025***(15.3)* **2250***(17.0)* **2400***(18.2)*		19/4.00	12/3.00 13/3.00 14/3.00	09/2.50 10/2.50 11/3.00	08/2.50 08/2.50 09/2.50
	2700*(20.5)* **3000***(22.7)*			16/4.00 17/4.00	12/3.00 13/3.00	09/2.50 10/2.50
		(149°C)	***(163°C)***	***(177°C)***	***(191°C)***	***(204°C)***
				HTW to Valve (C°)		

***Note:** Metric Values in ( ).

For 25 PSIG generated to calculate primary temperature drop through the coils in °F, use this Formula: $\frac{\#/HR \times 2.057}{GPM} = \Delta T$

For primary temperatures in °C use (°F-32) 5/9

TABLE 40WS 6 35 PSIG *(241 kPa)** GENERATED STEAM using 40°F *(4°C)* Feedwater

POUNDS/HOUR (kg/min) GENERATED		HIGH TEMPERATURE WATER TO VALVE				
FOR TREATED WATER	FOR UNTREATED WATER	300°F	325°F	350°F	375°F	400°F
100*(0.8)* **400***(3.0)* **700***(5.3)*	**75***(0.6)* **300***(1.7)* **525***(4.0)*	06/2.00 20/4.00	02/1.25 06/2.00 09/2.50	02/1.25 04/2.00 05/2.00	02/1.25 03/1.50 04/2.00	02/12.5 03/1.50 03/1.50
1000*(7.6)* **1300***(9.8)* **1700***(12.9)*	**750***(5.7)* **975***(7.4)* **1275***(9.7)*		12/3.00 15/3.00 18/4.00	07/2.50 09/2.50 11/2.50	05/2.00 06/2.00 07/2.50	04/2.00 05/2.00 06/2.00
2100*(15.9)* **2500***(18.9)* **2900***(22.0)*	**1575***(11.9)* **1875***(14.2)* **2175***(16.5)*			13/3.00 15/4.00 17/4.00	09/2.50 10/2.50 12/3.00	07/2.50 09/2.50 10/2.50
3300*(25.0)* **3700***(28.0)*	**2475***(18.8)* **2775***(21.0)* **3300***(25.0)*			19/4.00 20/4.00	13/3.00 14/3.00 17/4.00	11/3.00 12/3.00 13/3.00
	3700*(28.0)*				18/4.00	14/3.00
		(149°C)	***(163°C)***	***(177°C)***	***(191°C)***	***(204°C)***
				HTW to Valve (C°)		

***Note:** Metric Values in ( ).

For 35 PSIG generated to calculate primary temperature drop through the coils in °F, use this Formula: $\frac{\#/HR \times 2.064}{GPM} = \Delta T$

For primary temperatures in °C use (°F-32) 5/9

NOMENCLATURE KEY

MODEL **WS3E+** / / **P** STYLE **210750**

Number of Coils		Number of Coils	
2	02	12	12
3	03	13	13
4	04	14	14
5	05	15	15
6	06	16	16
7	07	17	17
8	08	18	18
9	09	19	19
10	10	20	20
11	11		

	Valve Size Inches (mm)
1.00	1" (25.4)
1.25	1.25" (31.75)
1.50	1.50" (38.10)
2.00	2.00" (50.80)
2.50	2.50" (63.50)
3.00	3.00" (76.20)
4.00	4.00" (101.60)

	Valve Type
P	Pneumatic

TABLE 40WS 7 50 PSIG *(345 kPa)** GENERATED STEAM using 40°F *(4°C)* Feedwater

POUNDS/HOUR (kg/min) GENERATED		HIGH TEMPERATURE WATER TO VALVE				
FOR TREATED WATER	FOR UNTREATED WATER	300°F	325°F	350°F	375°F	400°F
100*(0.8)*	**75***(0.6)*		04/2.00	02/1.25	02/1.25	02/1.25
500*(3.8)*	**375***(2.8)*		13/3.00	06/2.00	04/2.00	03/1.50
900*(6.8)*	**675***(5.1)*			09/2.50	06/2.00	04/2.00
1300*(9.8)*	**975***(7.4)*			12/3.00	07/2.50	06/2.00
1700*(12.9)*	**1275***(9.7)*			15/4.00	09/2.50	07/2.50
2100*(15.9)*	**1575***(11.9)*			18/4.00	11/3.00	08/2.50
2500*(18.9)*	**1875***(14.2)*				13/3.00	10/2.50
2900*(22.0)*	**2175***(16.5)*				15/4.00	11/3.00
3300*(25.0)*	**2475***(18.8)*				17/4.00	12/3.00
3700*(28.0)*	**2775***(21.0)*				19/4.00	13/3.00
4200*(31.8)*	**3150***(23.9)*					15/4.00
	3300*(25.0)*					15/4.00
	3700*(28.0)*					17/4.00
	4200*(31.8)*					19/4.00
		(149°C)	***(163°C)***	***(177°C)***	***(191°C)***	***(204°C)***
				HTW to Valve (C°)		

***Note:** Metric Values in ( ).

For 50 PSIG generated to calculate primary temperature drop through the coils in °F, use this Formula: $\frac{\#/HR \times 2.073}{GPM} = \Delta T$

For primary temperatures in °C use (°F-32) 5/9

NOMENCLATURE KEY

MODEL **WS3E+** / / **P** STYLE **210750**

Number of Coils		Number of Coils	
2	02	12	12
3	03	13	13
4	04	14	14
5	05	15	15
6	06	16	16
7	07	17	17
8	08	18	18
9	09	19	19
10	10	20	20
11	11		

	Valve Size Inches (mm)
1.00	1"(25.4)
1.25	1.25"(31.75)
1.50	1.50"(38.10)
2.00	2.00"(50.80)
2.50	2.50"(63.50)
3.00	3.00"(76.20)
4.00	4.00"(101.60)

	Valve Type
P	Pneumatic

TABLE 180WS 1 5 PSIG *(35 kPa)** GENERATED STEAM using 180°F *(82°C)* Feedwater

POUNDS/HOUR (kg/min) GENERATED		HIGH TEMPERATURE WATER TO VALVE				
FOR TREATED WATER	FOR UNTREATED WATER	300°F	325°F	350°F	375°F	400°F
150*(1.1)*	**113***(0.9)*	02/1.25	02/1.25	02/1.25	02/1.25	02/1.25
350*(2.7)*	**263***(2.0)*	03/1.50	02/1.25	02/1.25	02/1.25	02/1.25
550*(4.2)*	**413***(3.1)*	04/2.00	03/1.50	03/1.50	02/1.25	02/1.25
750*(5.7)*	**563***(4.3)*	05/2.00	04/2.00	03/1.50	03/1.50	03/1.50
950*(7.2)*	**713***(5.4)*	05/2.00	04/2.00	03/1.50	03/1.50	03/1.50
1150*(8.7)*	**863***(6.5)*	06/2.00	05/2.00	04/2.00	03/1.50	03/1.50
1350*(10.2)*	**1013***(7.7)*	07/2.50	05/2.00	04/2.00	04/2.00	03/1.50
1550*(11.7)*	**1163***(8.8)*	08/2.50	06/2.00	05/2.00	04/2.00	04/2.00
	1350*(10.2)*	09/2.50	06/2.00	05/2.00	04/2.00	04/2.00
	1550*(11.7)*	09/2.50	07/2.50	06/2.00	05/2.00	05/2.00
		(149°C)	***(163°C)***	***(177°C)***	***(191°C)***	***(204°C)***
				HTW to Valve (C°)		

***Note:** Metric Values in ( ).

For 5 PSIG generated to calculate primary temperature drop through the coils in °F, use this Formula: $\frac{\#/HR \times 1.784}{GPM} = \Delta T$

For primary temperatures in °C use (°F-32) 5/9

TABLE 180WS 2 10 PSIG *(70 kPa)** GENERATED STEAM using 180°F *(82°C)* Feedwater

POUNDS/HOUR (kg/min) GENERATED		HIGH TEMPERATURE WATER TO VALVE				
FOR TREATED WATER	FOR UNTREATED WATER	300°F	325°F	350°F	375°F	400°F
200*(1.5)*	**150***(1.1)*	03/1.50	02/1.25	02/1.25	02/1.25	02/1.25
400*(3.0)*	**300***(2.3)*	04/2.00	03/1.50	02/1.25	02/1.25	02/1.25
650*(4.9)*	**488***(3.7)*	05/2.00	04/2.00	03/1.50	03/1.50	03/1.50
900*(6.8)*	**675***(5.1)*	06/2.00	05/2.00	04/2.00	03/1.50	03/1.50
1150*(8.7)*	**863***(6.5)*	07/2.50	05/2.00	04/2.00	04/2.00	03/1.50
1400*(10.6)*	**1050***(7.9)*	09/2.50	06/2.00	05/2.00	04/2.00	04/2.00
1650*(12.5)*	**1238***(9.4)*	10/2.50	07/2.50	06/2.00	05/2.00	04/2.00
1900*(14.4)*	**1425***(10.8)*	11/3.00	08/2.50	06/2.00	05/2.00	05/2.00
	1650*(12.5)*	13/3.00	09/2.50	07/2.50	06/2.00	05/2.00
	1900*(14.4)*	14/3.00	09/2.50	07/2.50	06/2.00	05/2.00
		(149°C)	***(163°C)***	***(177°C)***	***(191°C)***	***(204°C)***
				HTW to Valve (C°)		

***Note:** Metric Values in ( ).

For 10 PSIG generated to calculate primary temperature drop through the coils in °F, use this Formula: $\frac{\#/HR \times 1.791}{GPM} = \Delta T$

NOMENCLATURE KEY

MODEL **WS3E+** / / **P** STYLE **210750**

Number of Coils	
2	02
3	03
4	04
5	05
6	06
7	07
8	08
9	09
10	10
11	11

Number of Coils	
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20

	Valve Size Inches (mm)
1.00	1"(25.4)
1.25	1.25"(31.75)
1.50	1.50"(38.10)
2.00	2.00"(50.80)
2.50	2.50"(63.50)
3.00	3.00"(76.20)
4.00	4.00"(101.60)

	Valve Type
P	Pneumatic

TABLE 180WS 3 15 PSIG *(103 kPa)** GENERATED STEAM using 180°F *(82°C)* Feedwater

POUNDS/HOUR (kg/min) GENERATED		HIGH TEMPERATURE WATER TO VALVE				
FOR TREATED WATER	FOR UNTREATED WATER	300°F	325°F	350°F	375°F	400°F
100*(0.8)*	**75***(0.6)*	02/1.25	02/1.25	02/1.25	02/1.25	02/1.25
300*(2.3)*	**225***(1.7)*	04/2.00	03/1.50	02/1.25	02/1.25	02/1.25
500*(3.8)*	**375***(2.8)*	05/2.00	04/2.00	03/1.50	03/1.50	02/1.25
700*(5.3)*	**525***(4.0)*	06/2.00	04/2.00	03/1.50	03/1.50	03/1.50
950*(7.2)*	**713***(5.4)*	08/2.50	05/2.00	04/2.00	04/2.00	03/1.50
1250*(9.5)*	**938***(7.1)*	10/2.50	06/2.50	05/2.00	04/2.00	04/2.00
1550*(11.7)*	**1163***(8.8)*	12/3.00	08/2.50	06/2.00	05/2.00	04/2.00
1900*(14.4)*	**1425***(10.8)*	15/4.00	09/2.50	07/2.50	06/2.00	05/2.00
2250*(17.0)*	**1688***(12.8)*	17/4.00	10/2.50	08/2.50	07/2.50	06/2.00
	1900*(14.4)*	19/4.00	11/3.00	08/2.50	07/2.50	07/2.50
	2250*(17.0)*		13/3.00	10/2.50	08/2.50	07/2.50
		(149°C)	***(163°C)***	***(177°C)***	***(191°C)***	***(204°C)***
				HTW to Valve (C°)		

***Note:** Metric Values in ( ).

For 15 PSIG generated to calculate primary temperature drop through the coils in °F, use this Formula: $\frac{\#/HR \times 1.798}{GPM} = \Delta T$

For primary temperatures in °C use (°F-32) 5/9

TABLE 180WS 4 20 PSIG *(140 kPa)** GENERATED STEAM using 180°F *(82°C)* Feedwater

POUNDS/HOUR (kg/min) GENERATED		HIGH TEMPERATURE WATER TO VALVE				
FOR TREATED WATER	FOR UNTREATED WATER	300°F	325°F	350°F	375°F	400°F
150*(1.1)*	**113***(0.9)*	03/1.50	02/1.25	02/1.25	02/1.25	02/1.25
350*(2.7)*	**263***(2.0)*	05/2.00	03/1.50	03/1.50	02/1.25	02/1.25
550*(4.2)*	**413***(3.1)*	07/2.50	04/2.00	03/1.50	03/1.50	03/1.50
800*(6.1)*	**600***(4.5)*	09/2.50	05/2.00	04/2.00	04/2.00	03/1.50
1050*(8.0)*	**788***(6.0)*	11/3.00	07/2.50	05/2.00	04/2.00	04/2.00
1350*(10.2)*	**1013***(7.7)*	14/3.00	08/2.50	06/2.00	05/2.00	04/2.00
1650*(12.5)*	**1238***(9.4)*	17/4.00	09/2.50	07/2.50	06/2.00	05/2.00
2000*(15.2)*	**1500***(11.4)*	20/4.00	11/3.00	08/2.50	07/2.50	06/2.00
2300*(17.4)*	**1725***(13.1)*		13/3.00	09/2.50	07/2.50	06/2.00
2650*(19.7)*	**1988***(14.8)*		14/3.00	10/2.50	08/2.50	07/2.50
	2300*(17.4)*		16/4.00	11/3.00	09/2.50	07/2.50
	2650*(19.7)*		17/4.00	12/3.00	09/2.50	08/2.50
		(149°C)	***(163°C)***	***(177°C)***	***(191°C)***	***(204°C)***
				HTW to Valve (°C)		

***Note:** Metric Values in ( ).

For 20 PSIG generated to calculate primary temperature drop through the coils in °F, use this Formula: $\frac{\#/HR \times 1.804}{GPM} = \Delta T$

For primary temperatures in °C use (°F-32) 5/9

NOMENCLATURE KEY

MODEL **WS3E+** / / **P** STYLE **210750**

Number of Coils		Number of Coils	
2	02	12	12
3	03	13	13
4	04	14	14
5	05	15	15
6	06	16	16
7	07	17	17
8	08	18	18
9	09	19	19
10	10	20	20
11	11		

	Valve Size Inches (mm)
1.00	1" (25.4)
1.25	1.25" (31.75)
1.50	1.50" (38.10)
2.00	2.00" (50.80)
2.50	2.50" (63.50)
3.00	3.00" (76.20)
4.00	4.00" (101.60)

	Valve Type
P	Pneumatic

TABLE 180WS 5 — 25 PSIG *(172 kPa)** GENERATED STEAM using 180°F *(82°C)* Feedwater

POUNDS/HOUR (kg/min) GENERATED		HIGH TEMPERATURE WATER TO VALVE				
FOR TREATED WATER	FOR UNTREATED WATER	300°F	325°F	350°F	375°F	400°F
150*(1.1)*	**113***(0.9)*	03/2.00	02/1.25	02/1.25	02/1.25	02/1.25
350*(2.7)*	**263***(2.0)*	06/2.00	03/2.00	03/1.50	02/1.25	02/1.25
600*(4.6)*	**450***(3.4)*	10/2.50	05/2.00	04/2.00	03/1.50	03/1.50
900*(6.8)*	**675***(5.1)*	14/3.00	07/2.50	05/2.00	04/2.00	03/1.50
1200*(9.1)*	**900***(6.8)*	18/4.00	08/2.50	06/2.00	05/2.00	04/2.00
1500*(11.4)*	**1125***(8.5)*		10/2.50	07/2.50	05/2.00	05/2.00
1800*(13.6)*	**1350***(10.2)*		12/3.00	08/2.50	06/2.00	05/2.00
2100*(15.9)*	**1575***(11.9)*		14/3.00	09/2.50	07/2.50	06/2.00
2400*(18.2)*	**1800***(13.6)*		15/4.00	10/2.50	08/2.50	06/2.00
2700*(20.5)*	**2025***(15.3)*		17/4.00	11/3.00	08/2.50	07/2.50
3000*(22.7)*	**2250***(17.0)*		18/4.00	12/3.00	09/2.50	07/2.50
	2400*(18.2)*		19/4.00	13/3.00	10/2.50	08/2.50
	2700*(20.5)*			14/3.00	11/3.00	09/2.50
	3000*(22.7)*			15/4.00	11/3.00	09/2.50
		(149°C)	***(163°C)***	***(177°C)***	***(191°C)***	***(204°C)***
				HTW to Valve (C°)		

***Note:** Metric Values in ( ).

For 25 PSIG generated to calculate primary temperature drop through the coils in °F, use this Formula: $\frac{\#/HR \times 1.809}{GPM} = \Delta T$

For primary temperatures in °C use (°F-32) 5/9

TABLE 180WS 6 — 35 PSIG *(241 kPa)** GENERATED STEAM using 180°F *(82°C)* Feedwater

POUNDS/HOUR (kg/min) GENERATED		HIGH TEMPERATURE WATER TO VALVE				
FOR TREATED WATER	FOR UNTREATED WATER	300°F	325°F	350°F	375°F	400°F
100*(0.8)*	**75***(0.6)*	05/2.00	02/1.25	02/1.25	02/1.25	02/1.25
400*(3.0)*	**300***(1.7)*	18/4.00	05/2.00	03/1.50	03/1.50	02/1.50
700*(5.3)*	**525***(4.0)*		08/2.50	05/2.00	04/2.00	03/1.50
1000*(7.6)*	**750***(5.7)*		10/2.50	06/2.00	05/2.00	04/2.00
1300*(9.8)*	**975***(7.4)*		13/3.00	08/2.50	06/2.00	05/2.00
1700*(12.9)*	**1275***(9.7)*		16/4.00	09/2.50	07/2.50	06/2.00
2100*(15.9)*	**1575***(11.9)*		20/4.00	11/3.00	08/2.50	07/2.50
2500*(18.9)*	**1875***(14.2)*			13/3.00	09/2.50	08/2.50
2900*(22.0)*	**2175***(16.5)*			15/4.00	10/3.00	09/2.50
3300*(25.0)*	**2475***(18.8)*			17/4.00	12/3.00	10/2.50
3700*(28.0)*	**2775***(21.0)*			*18/4.00*	*13/3.00*	*11/3.00*
	3300*(25.0)*				15/4.00	12/3.00
	3700*(28.0)*				16/4.00	12/3.00
		(149°C)	***(163°C)***	***(177°C)***	***(191°C)***	***(204°C)***
				HTW to Valve (C°)		

***Note:** Metric Values in ( ).

For 35 PSIG generated to calculate primary temperature drop through the coils in °F, use this Formula: $\frac{\#/HR \times 1.816}{GPM} = \Delta T$

For primary temperatures in °C use (°F-32) 5/9

NOMENCLATURE KEY

MODEL **WS3E+** / [ ] / [P] STYLE **210750**

Number of Coils	
2	02
3	03
4	04
5	05
6	06
7	07
8	08
9	09
10	10
11	11

Number of Coils	
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20

	Valve Size Inches (mm)
1.00	1"(25.4)
1.25	1.25"(31.75)
1.50	1.50"(38.10)
2.00	2.00"(50.80)
2.50	2.50"(63.50)
3.00	3.00"(76.20)
4.00	4.00"(101.60)

	Valve Type
P	Pneumatic

TABLE 180WS 7 50 PSIG *(345 kPa)** GENERATED STEAM using 180°F *(82°C)* Feedwater

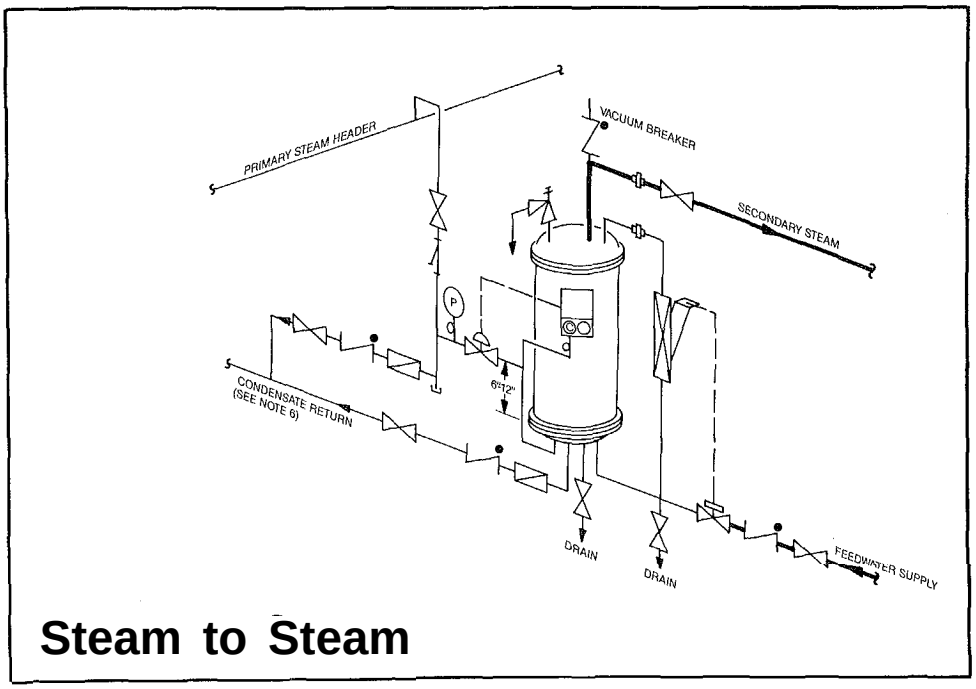
POUNDS/HOUR (kg/min) GENERATED		HIGH TEMPERATURE WATER TO VALVE				
FOR TREATED WATER	FOR UNTREATED WATER	300°F	325°F	350°F	375°F	400°F
100*(0.8)*	**75***(0.6)*		03/2.00	02/1.25	02/1.25	02/1.25
500*(3.8)*	**375***(2.8)*		12/3.00	05/2.00	04/2.00	03/1.50
900*(6.8)*	**675***(5.1)*		20/4.00	08/2.50	05/2.00	4/2.00
1300*(9.8)*	**975***(7.4)*			11/3.00	07/2.50	05/2.00
1700*(12.9)*	**1275***(9.7)*			14/3.00	08.2.50	06/2.00
2100*(15.9)*	**1575***(11.9)*			17/4.00	10/2.50	08/2.50
2500*(18.9)*	**1875***(14.2)*			19/4.00	12/3.00	09/2.50
2900*(22.0)*	**2175***(16.5)*				13/3.00	10/2.50
3300*(25.0)*	**2475***(18.8)*				15/4.00	11/3.00
3700*(28.0)*	**2775***(21.0)*				17/4.00	12/3.00
4200*(31.8)*	**3150***(23.9)*				19/4.00	14/3.00
4700*(35.6)*	**3525***(25.0)*					15/4.00
	3700*(28.0)*					15/4.00
	4200*(31.8)*					17/4.00
	4700*(35.6)*					19/4.00
		(149°C)	***(163°C)***	***(177°C)***	***(191°C)***	***(204°C)***
				HTW to Valve (C°)		

***Note:** Metric Values in ( ).

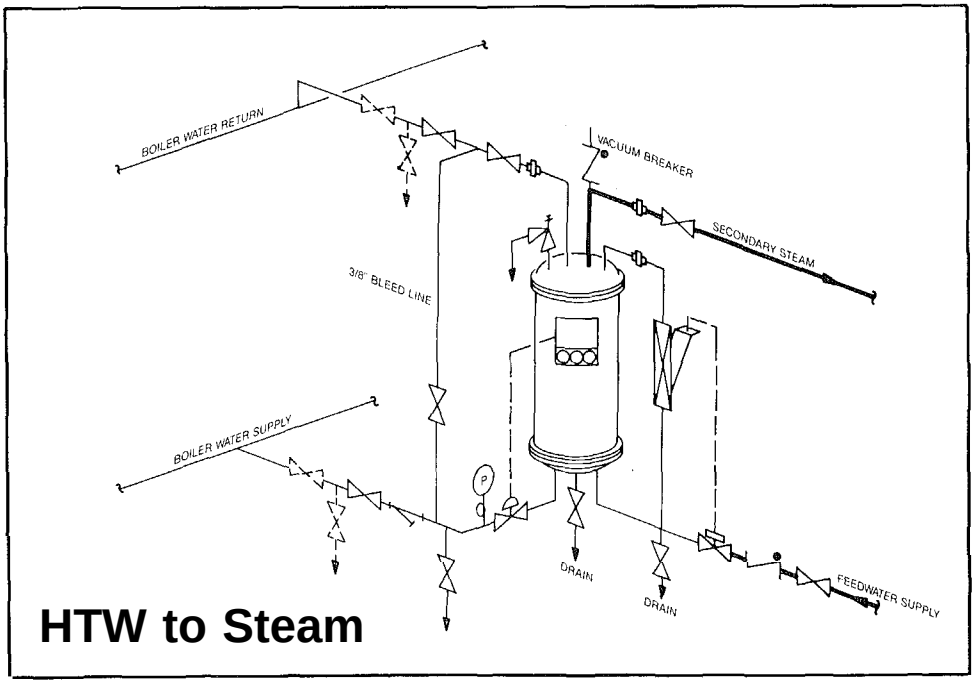
For 50 PSIG generated to calculate primary temperature drop through the coils in °F, use this Formula: $\frac{\#/HR \times 1.824}{GPM} = \Delta T$

For primary temperatures in °C use (°F-32) 5/9

Typical Systems



Steam to Steam



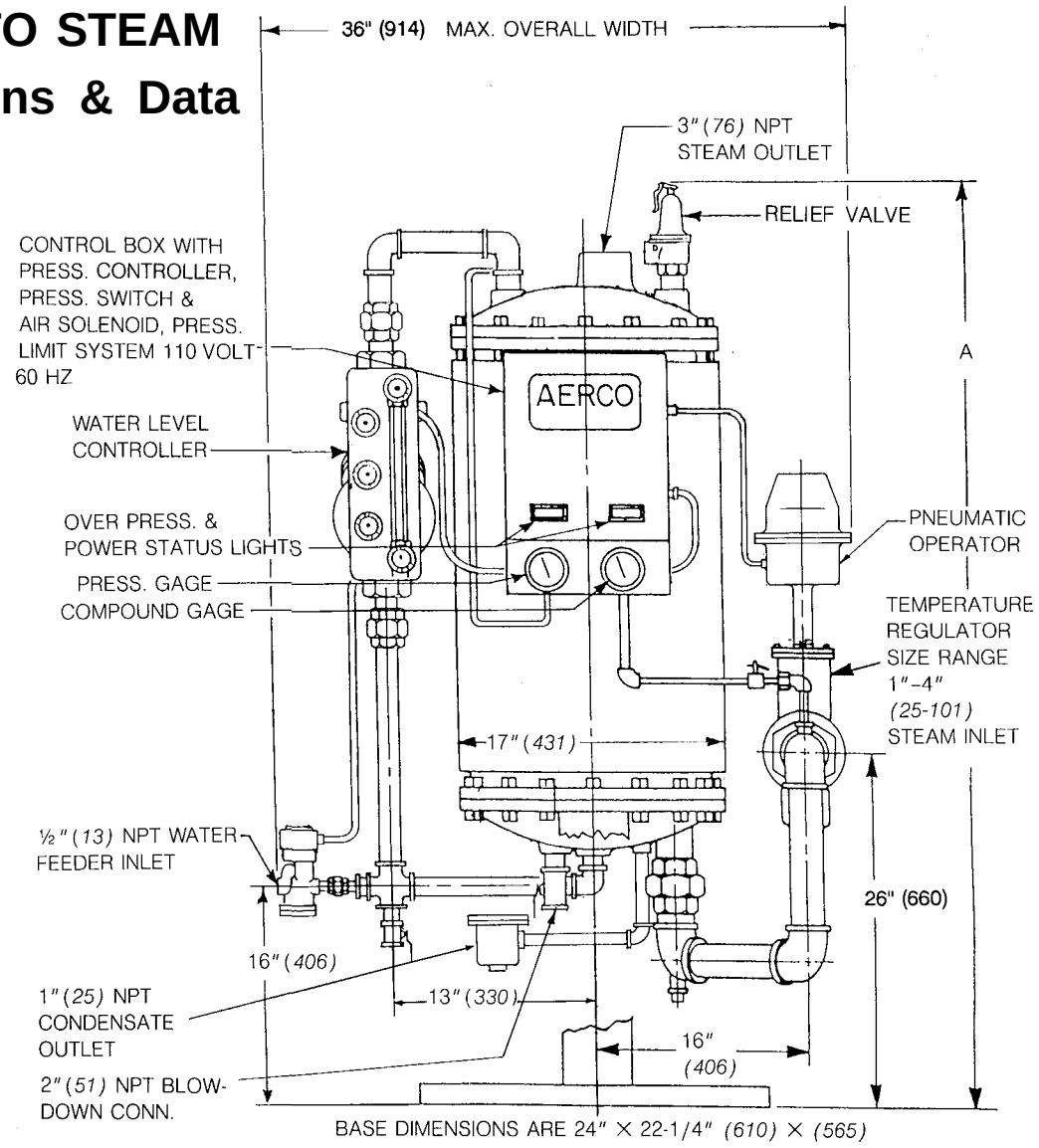
HTW to Steam

LEGEND

P	PRESSURE GAGE		STOP VALVE		STEAM TRAP
	PIPE UNION OR FLANGES		CHECK VALVE		STRAINER
C	COMPOUND PRESS. GAGE		CONTROL VALVE		RELIEF VALVE

STEAM TO STEAM
Dimensions & Data

U.S. ***(Metric)***
Inches ***(mm)***



DIMENSIONS - WEIGHTS		
Size No. of Coils	**Dimension A Inches** *(M)*	**Max. Weight Lbs.** *(Kg.)*
SS1B+02	55 (1.40)	660 (261)
SS1B+03	55 (1.40)	660 (268)
SS1B+04	60 (1.52)	720 (288)
SS1B+05	64 (1.63)	770 (308)
SS1B+06	69 (1.75)	830 (327)
SS1B+07	73 (1.85)	880 (345)
SS1B+08	78 (1.98)	930 (364)
SS1B+09	82 (2.08)	980 (383)
SS1B+10	87 (2.21)	1030 (407)
SS1B+11	91 (2.81)	1080 (431)
SS1B+12	96 (2.44)	1130 (438)
SS1B+13	100 (2.45)	1180 (445)
SS1B+14	105 (2.67)	1230 (490)
SS1B+15	109 (2.77)	1280 (535)

HEAT EXCHANGER DESIGN STANDARDS		
PART	**Max. Working Pressure PSIG** *(kPa)*	**Max. Temp.** *°F (°C)*
Shell	50 *(345)*	400 *(204)*
Tube	250 *(1723)*	400 *(204)*
ASME Code Certification Stamp		U

PART	**MATERIALS OF CONSTRUCTION**
Shell	Carbon Steel SA414 or SA285 G.R.C.
Shell Flanges	Steel ASME SA675 GRADE 55
Heads	Bronze SB62
Liner	Copper ASTM B152 Type ETP
Coils	Copper 0.049" Wall SB111

Dimensions are subject to change. Certified drawings are available on request.

Suggested Specification for an AERCO STEAM-PLUS Steam to Steam Generator

A. Furnish and install as shown on plans _____ AERCO STEAM-PLUS Steam Generator(s), Model _____ / _____ / _____ Style 210310, as manufactured by AERCO INTERNATIONAL, INC., Northvale, N.J.

Each steam generator shall be of vertical cross flow design with generated steam in the shell and primary steam in the coils.

B. Certification of the unit as to design and manufacture in accordance with ASME Pressure Vessel Code, Section VIII, shall be furnished for not less than 50 PSIG maximum allowable working pressure in the shell and not less than 250 PSIG maximum allowable working pressure in the coils.

C. Shell shall be carbon steel with copper lining. Heads shall be cast bronze.

D. Coils shall be helically wound copper tube (.049" wall). No water baffles or other supports shall be used within the shell. Coils shall provide descaling due to expansion and contraction and be shock cleanable. A ten-year guarantee shall be furnished against tube failure due to thermal shock or mechanical failure.

E. Each steam generator shall be furnished with the following accessories:

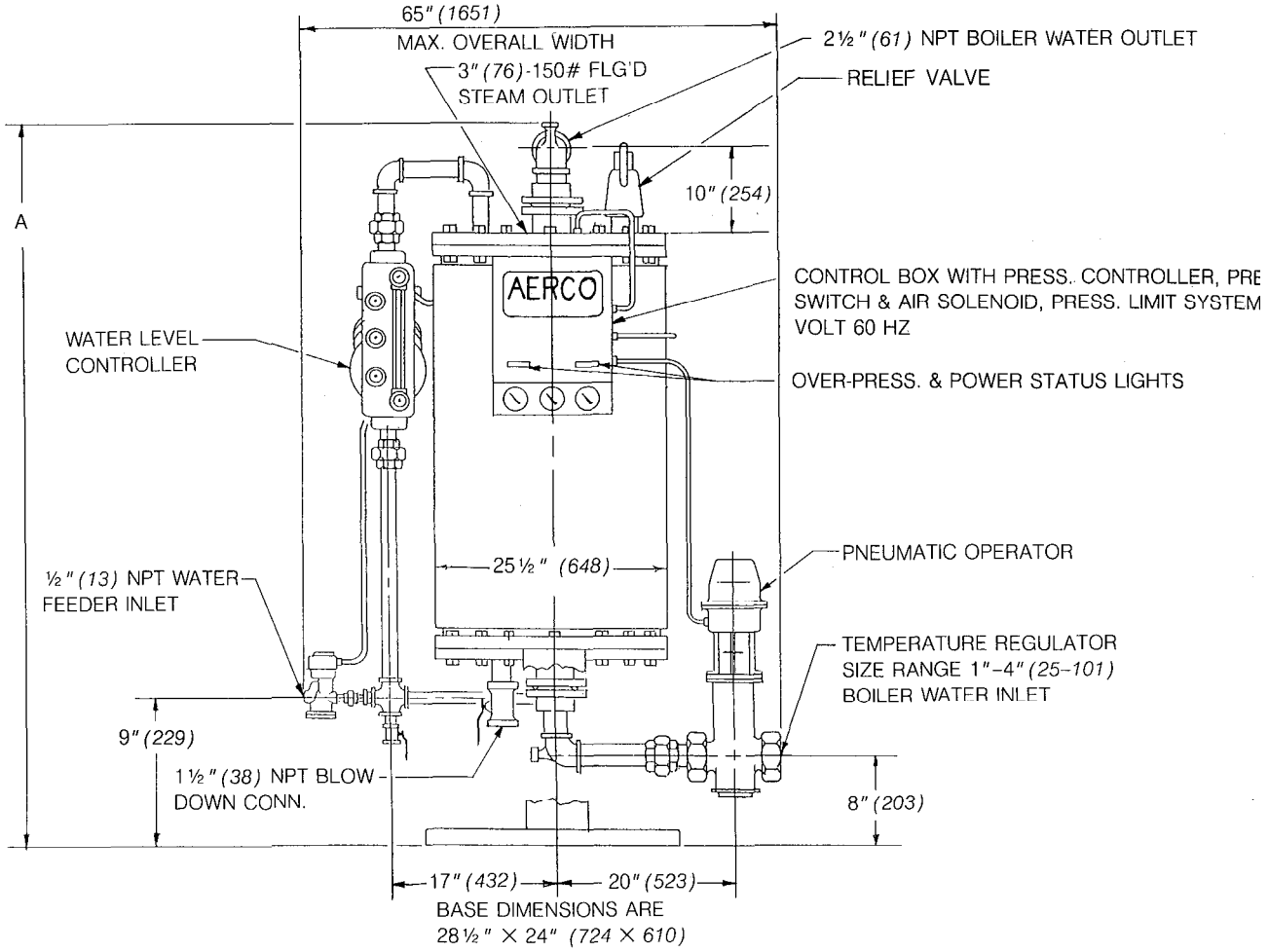
- Resilient insulation
- Pneumatic control valve with pressure controller
- Pressure relief valve
- Remote pressure gage
- Remote compound pressure gage
- Liquid level controller with feed water solenoid
- Over-pressure limit system with auto-reset
- Factory packaging
- Condensate trap
- Fully wired control box
- Over-pressure and power indicator lights

Performance

F. Each STEAM-PLUS Steam Generator shall be rated to produce: _____ pounds per hour of steam at _____ PSIG when supplied with _____ pounds per hour of _____ PSIG steam to the control valve, based on_____ °F feedwater.

HTW TO STEAM
Dimensions & Data

U.S. ***(Metric)***
Inches ***(mm)***



DIMENSIONS - WEIGHTS		
Size No. of Coils	**Dimension A Inches** *(M)*	**Max. Weight Lbs.** *(Kg)*
WS3E+02	61 *(1.55)*	645 *(293)*
WS3E+03	61 *(1.55)*	665 *(302)*
WS3E+04	65 *(1.65)*	710 *(322)*
WS3E+05	69 *(1.75)*	755 *(342)*
WS3E+06	74 *(1.88)*	800 *(363)*
WS3E+07	79 *(2.00)*	845 *(383)*
WS3E+08	83 *(2.11)*	885 *(401)*
WS3E+09	87 *(2.21)*	930 *(422)*
WS3E+10	92 *(2.34)*	970 *(440)*
WS3E+11	97 *(2.46)*	1015 *(460)*
WS3E+12	101 *(2.56)*	1055 *(479)*
WS3E+13	105 *(2.66)*	1100 *(499)*
WS3E+14	110 *(2.79)*	1140 *(517)*
WS3E+15	114 *(2.89)*	1180 *(535)*
WS3E+16	118 *(2.99)*	1225 *(556)*
WS3E+17	122 *(3.10)*	1265 *(574)*
WS3E+18	127 *(3.23)*	1310 *(594)*
WS3E+19	132 *(3.35)*	1350 *(612)*
WS3E+20	136 *(3.45)*	1395 *(633)*

HEAT EXCHANGER DESIGN STANDARDS		
PART	**Max. Working Pressure PSIG** *(kPa)*	**Max. Temp. °F** *(°C)*
Shell	50 *(345)*	400 *(204)*
Tube	350 *(2412)*	400 *(204)*
ASME Code Certification Stamp		U

PART	**MATERIALS OF CONSTRUCTION**
Shell,	Carbon Steel SA414 or SA285 G.R.C.
Shell Flanges	Steel ASME SA675 GRADE 55
Heads	Carbon Steel SA515 Grade 60
Liner	Copper ASTM B152 Type ETP
Coils	Copper-Nickel 0.049" Wall 90/10 SB111

Dimensions are subject to change. Certified drawings are available on request.

Suggested Specification for an AERCO STEAM-PLUS High Temperature Water to Steam Generator

A. Furnish and install as shown on plans _____ AERCO STEAM-PLUS Steam Generator(s), Model _____/_____/_____Style 210750, as manufactured by AERCO INTERNATIONAL, INC., Northvale, N.J.

Each steam generator shall be of all-welded, vertical cross flow design with steam in the shell and high temperature water in the coils.

B. Certification of the unit as to design and manufacture in accordance with ASME Pressure Vessel Code, Section VIII, shall be furnished for not less than 50 PSIG maximum allowable working pressure in the shell and not less than 350 PSIG maximum allowable working pressure in the coils.

C. Shell shall be carbon steel with copper lining. Heads shall be carbon steel plate with copper lining.

D. Coils shall be helically wound copper-nickel tube (.049" wall). No water baffles or other supports shall be used within the shell. Coils shall provide descaling due to expansion and contraction and be shock cleanable. A ten-year guarantee shall be furnished against tube failure due to thermal shock or mechanical failure.

E. Each steam generator shall be furnished with the following accessories:

- Resilient insulation
- Pneumatic control valve with pressure controller
- Pressure relief valve
- Remote pressure gage
- Remote primary inlet and outlet temperature gages
- Liquid level controller with feed water solenoid
- Over-pressure limit system with auto-reset
- Fully wired control box
- Factory packaging
- Over-pressure and power indicator lights

Performance

F. Each steam generator shall be rated to produce _____ pounds per hour of steam at _____ PSIG when supplied with _____ GPM of _____ °F high temperature water to the control valve, based on _____ °F feedwater.

QUALITY

For almost 40 years, AERCO has been building heat exchangers, water heaters, and heat reclamation systems exclusively for commercial, industrial, institutional, and marine applications requiring the highest quality construction, simplicity of design, low maintenance, and long life.

All AERCO products are constructed of quality materials and in accordance with ASME Boiler and Pressure Vessel Code, Section VIII, Div. I.

AERCO products also represent the very latest in state-of-the-art design and offer unique features that simply cannot be found in conventional shell-and-tube heaters and other competitive units.

SINGLE SOURCE RESPONSIBILITY

AERCO is pleased to offer its customers complete single source responsibility for all their steam and hot water needs, backed by a worldwide network of trained sales representatives and by factory service which extends from initial sizing and specification through final check-out and follow-up.

Technical information and application assistance are always available direct from AERCO when needed. And all standard parts are kept in stock for immediate delivery.

TOTAL SYSTEMS CAPABILITY

As a specialty manufacturer of heat exchangers, water heaters, and heat reclamation systems, AERCO offers a total systems capability and technical know-how that are unmatched in the field, an expertise which is available equally to all AERCO customers whether they require a standard AERCO product or a totally custom-engineered system.

So before you specify a water heating, steam generating, or heat reclamation system, consult with AERCO first.

We'll be happy to assist you in determining your hot water requirements, and to help you identify the system best suited to your needs consistent with the latest concepts and energy-conservation technology.

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