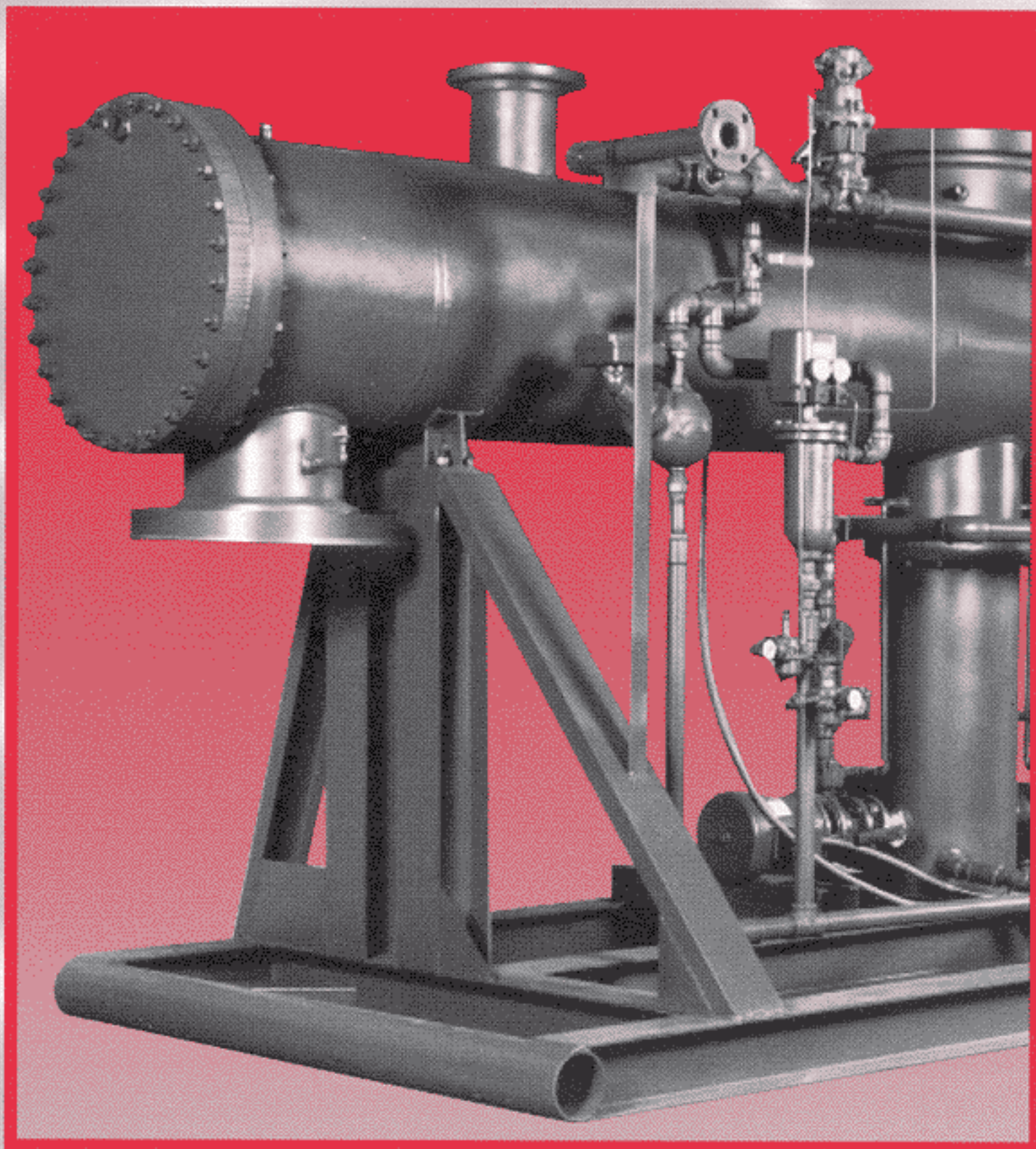


S1000[®] and S 1000 R[®] Surface Condensers

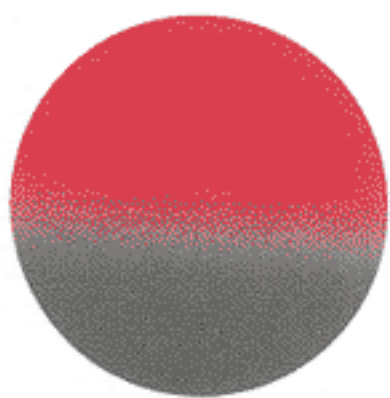


**Condensate
Recovery Package.
Proven performance
in the latest
design.**

ITT Standard



ITT Industries
Engineered for life



With ITT Standard surface condensers, you and the latest, efficient designs.

They're versatile.

Our S 1000 R and S 1000 surface condensers give better service in turbine-driven centrifugal compressor installations, or with air conditioning equipment, auxiliary generator sets, pumps, fans, blowers and standby units.

Standard parts—custom assembly.

We can build your custom design using standardized components. This gives design flexibility, and allows you to select shell diameters, tube lengths, tube sizes, pass arrangements and water box designs to let you meet your individual requirements—without special design and production costs.

They're built better.

In the last half-century, we've developed many innovations that later became industry standards. Innovations include bolting designed so you can remove water boxes without breaking tubesheet/shell flange seals, perforated plates under the steam inlet to protect the tube bank against impingement and erosion; and rugged support plates, spaced at not more than 60 tube-diameters.

The S 1000 R—new, economical to buy and operate.

The design of the new S 1000 R combines proven features with maximum condensing surface. It's economical. And the many configurations available from standard, pre-engineered components mean it's as flexible as you need it to be. So you save both time and money.

The S 1000—more features, proven design.

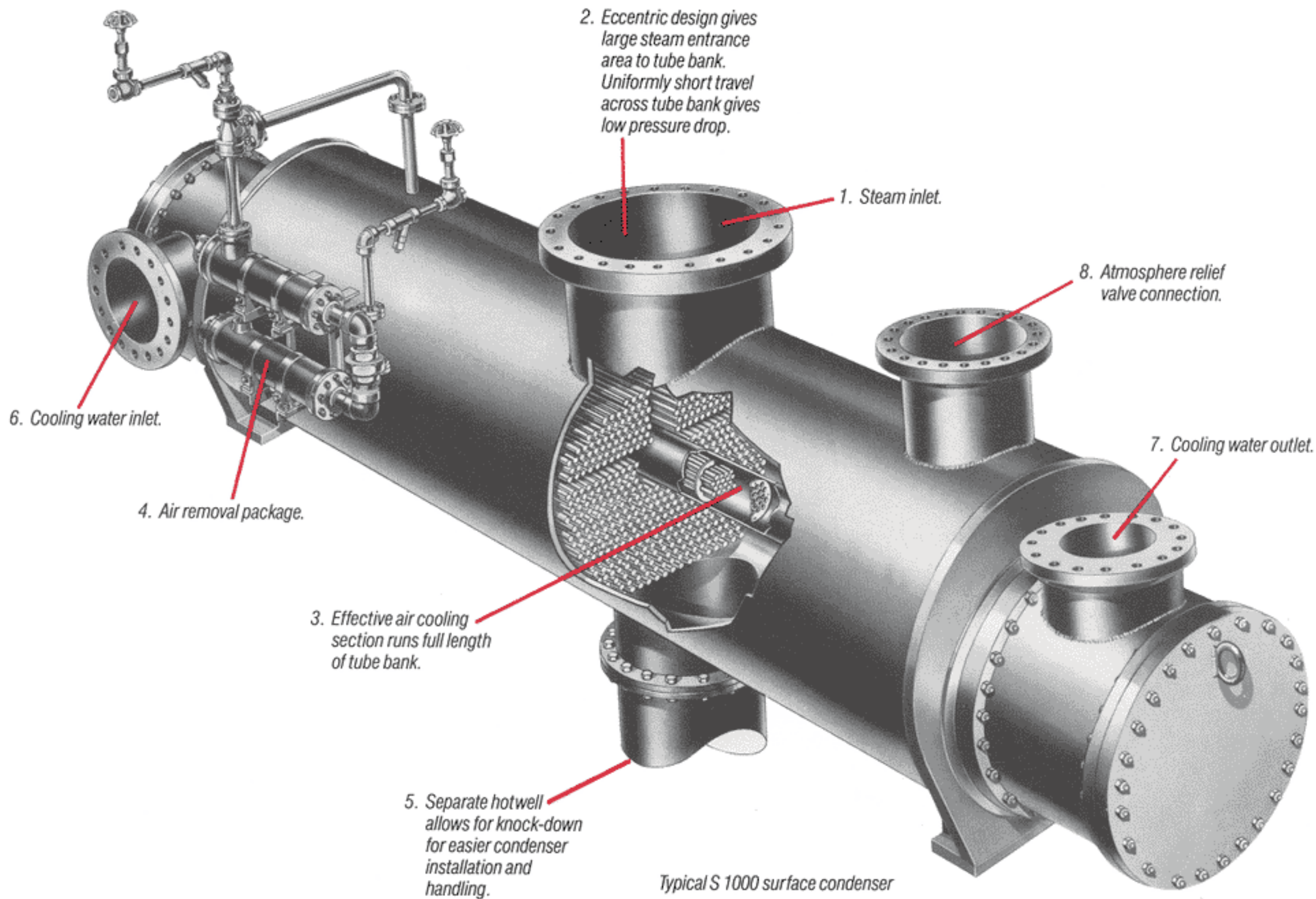
A unique eccentric tube bundle gives adequate steam distribution area. It effectively uses the entire condensing surface at maximum efficiency . . . in single and multipass arrangements.

An inner effective air cooling section uses the coldest water available to cool the air/water within a few degrees of the inlet water temperatures. This lowers vapor loading to the air removal package and allows for lower operating vacuums, particularly at partial steam loads.

Design means better performance—in both models.

Both models have proven bundle diameter versus tube length relationships . . . to give you short lengths of steam travel, low pressure drops and a lack of dead spots or voids. This results in both operating efficiency and long equipment life.

get proven performance...



Get the materials you need to do your job best.

SHELL SIDE	Shell and Hotwell—Steel • Support plates—Steel • Air cooler shroud and baffles—Steel • Bolting—Alloy steel.
TUBE SIDE	Tubesheets—* Steel, muntz metal, rolled naval brass, *copper nickel or *stainless steel • Water boxes—Steel • Tubes—Any suitable condenser tube compatible with tubesheet material • Gaskets—Compressed Fibre • Bolting—Alloy steel. *S 1000 R tubesheets

Data and dimensions.

S 1000[®] surface condensers.

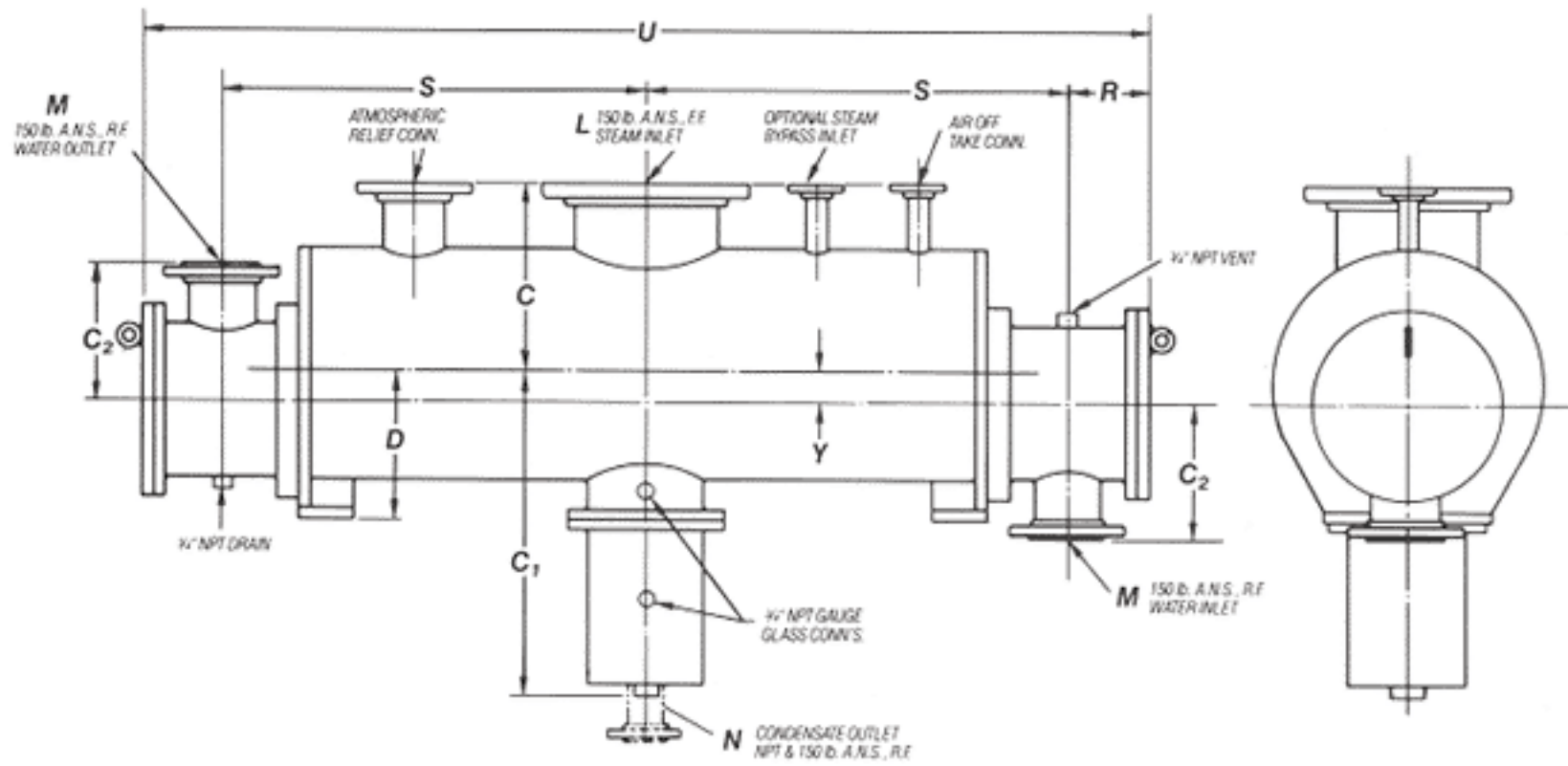
design pressures and temperatures

units designed to ASME, HEI or commercial standards

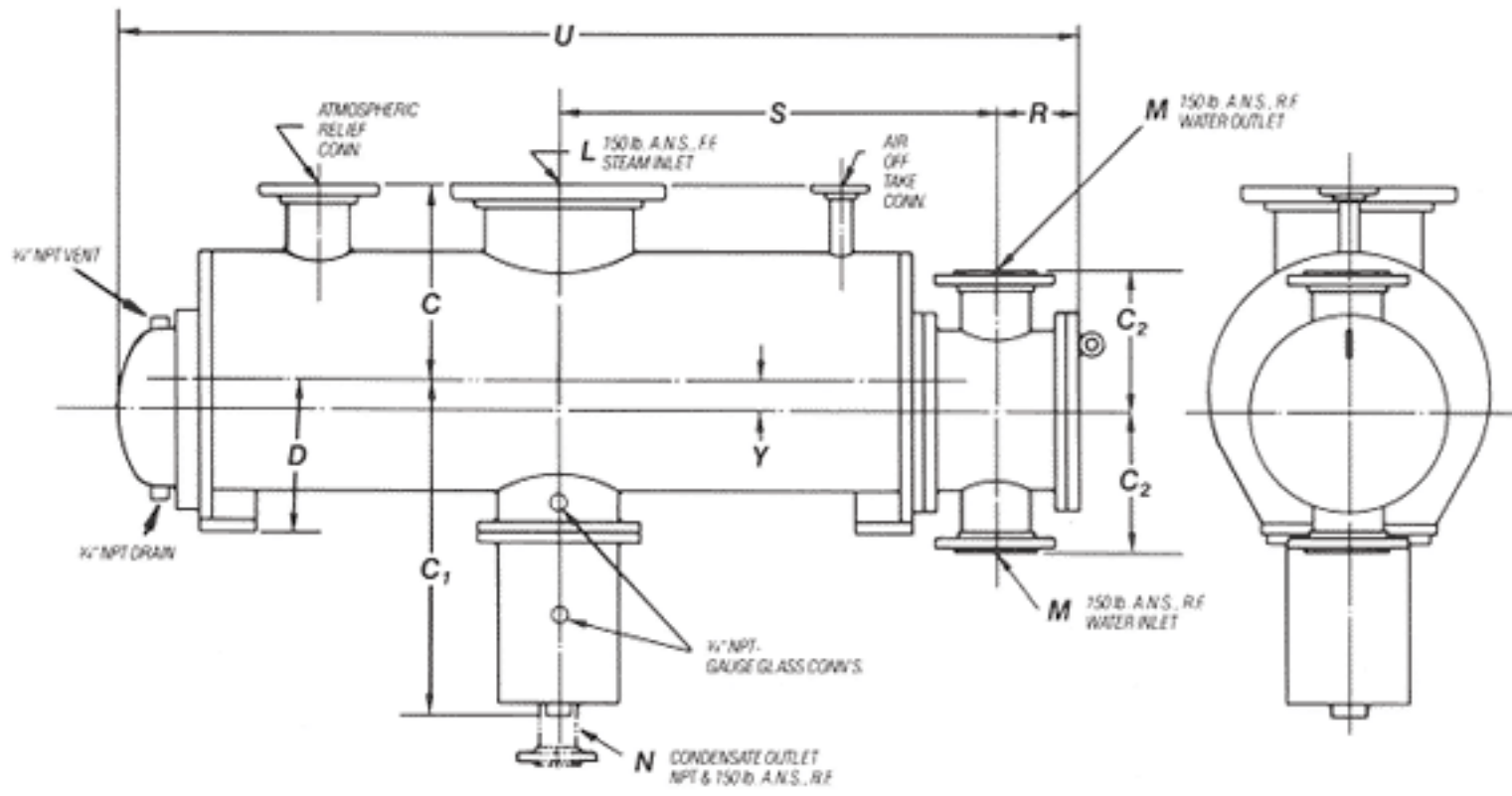
ASME Code	design pressure		test pressure		design temperature	
	PSI	kPa	PSI	kPa	°F	°C
shell side	full vacuum or 15	103	*flooded		300	149
tube side	75	517	115	793	150	65
	150	1034	225	1551		
	300	2068	450	3103		

*Test to 20 PSI if required by customer specifications

singlepass design



multipass design



- Notes:**
- 1. Dimensions S, R and U are based on 75 lb. tube side design. For other tube side pressures, these dimensions will vary slightly.
 - 2. Dimensions S and U are based on tube lengths (in inches) as shown in the table. For shorter tube lengths, subtract the difference.
 - 3. Catalog dimensions are subject to variation. Use only certified drawings for construction purposes.
 - 4. Contact your local ITT Standard representative for sizes and tube side nozzle orientations not covered here.
 - 5. When brass tubesheets are specified shell side design temperature is limited to 150°F.

dimensional data

(DIMENSIONS IN INCHES)

Unit Size & Tube Length	C	C ₁	C ₂	D	L	M		N	R		S		U		Y
						Single-Pass	Two-Pass		Single-Pass	Two-Pass	Single-Pass	Two-Pass	Single-Pass	Two-Pass	
15120	19.00	55.00	16.75	13.00	14	8	6	2NPT	8.50	7.50	68.12	67.12	153.25	141.25	1.94
17120	21.50	57.00	18.00	15.00	16	8	6	2NPT	8.75	7.75	68.25	67.25	154.00	141.75	2.94
19144	22.50	58.00	19.00	16.00	18	10	6	2NPT	9.88	7.88	81.62	79.38	183.00	166.25	2.88
21144	23.50	59.00	20.00	17.00	20	10	8	3NPT	10.12	9.12	81.62	80.38	183.50	168.62	3.00
23144	24.50	60.00	21.50	18.00	22	12	8	3NPT	11.75	9.25	82.00	80.50	187.50	169.00	2.88
25144	25.50	61.00	22.50	19.50	24	12	8	3NPT	11.88	9.75	83.00	80.88	189.75	170.88	3.00
27144	26.50	62.00	23.50	21.00	26	14	10	3NPT	12.62	11.00	83.62	82.00	192.50	173.62	3.00
29144	27.50	63.00	24.50	22.00	28	16	10	3NPT	13.62	11.00	84.62	82.00	196.50	174.38	3.00
31144	29.00	64.00	25.50	23.00	30	16	12	3NPT	13.88	12.25	84.75	83.12	197.25	176.75	3.00
33144	32.00	81.00	26.50	25.50	32	18	12	4FLG'D	14.88	12.25	85.75	83.12	201.25	177.50	4.50
35144	33.00	82.00	27.50	26.50	34	18	12	4FLG'D	15.00	12.38	85.75	83.12	201.50	178.25	4.50
37144	33.50	82.50	29.00	27.00	36	20	14	4FLG'D	16.12	13.12	86.38	83.38	205.00	179.00	4.00
39144	35.00	84.00	30.00	29.00	38	20	14	4FLG'D	16.50	13.50	86.50	83.50	206.00	180.00	4.50
42192	36.00	87.50	32.00	32.50	42	24	16	6FLG'D	18.75	14.75	112.50	108.50	262.50	231.00	6.00
45192	37.00	88.50	33.50	33.50	44	24	16	6FLG'D	18.75	14.75	112.50	108.50	262.50	232.00	5.50
48192	38.00	89.50	35.00	34.50	48	24	18	6FLG'D	18.88	15.88	112.75	109.75	263.25	234.50	5.00



S 1000[®] R surface condensers.

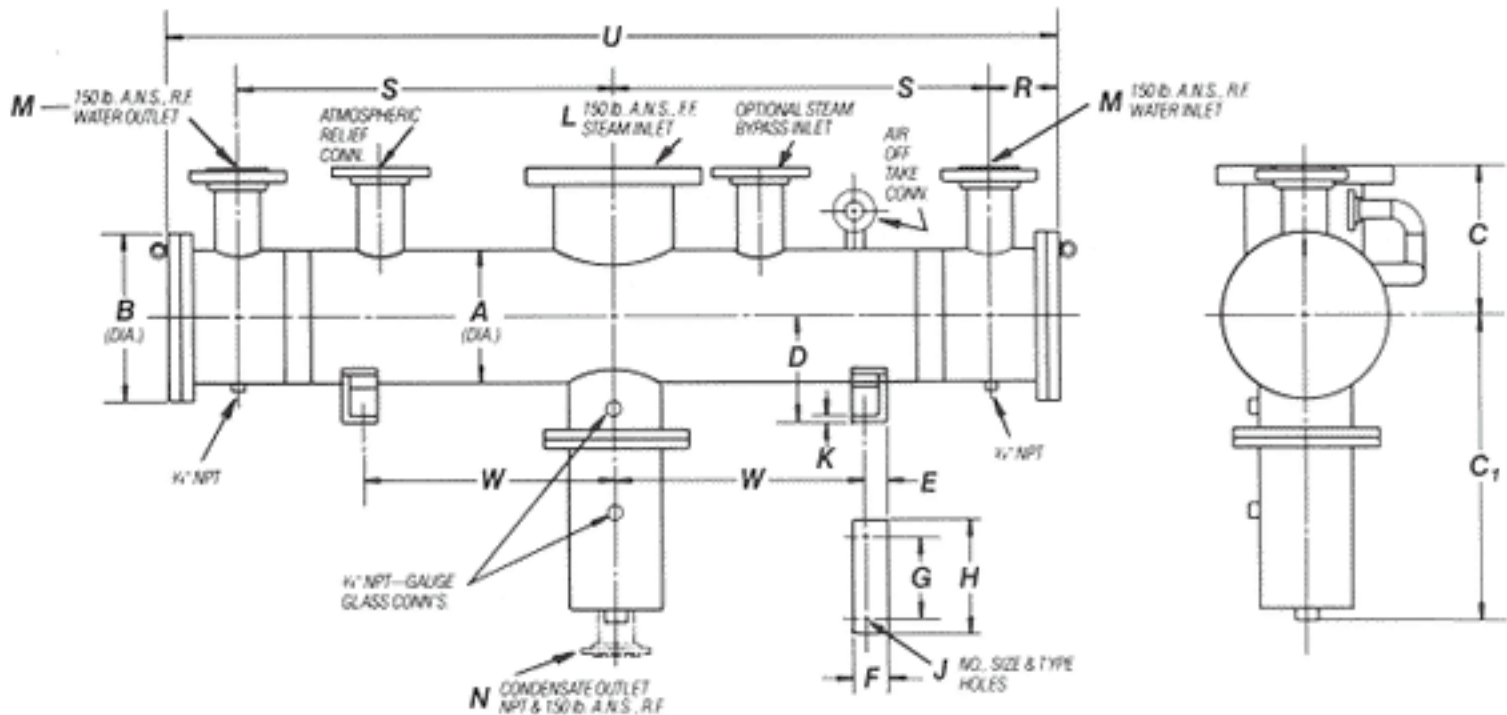
design pressures
and temperatures

units designed to ASME, HEI or
commercial standards

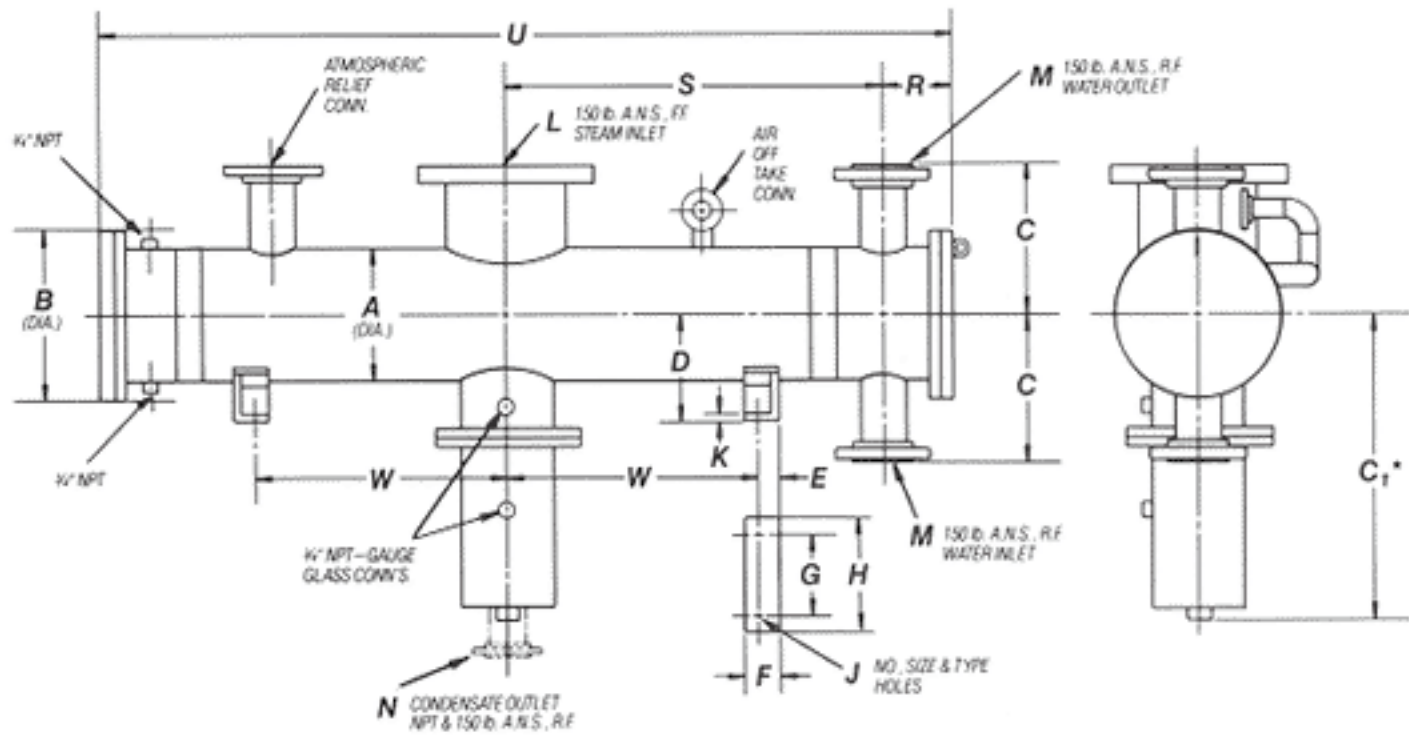
ASME Code	design pressure		test pressure		design temperature	
	PSI	kPa	PSI	kPa	°F	°C
shell side	full vacuum or 15	103	*flooded		300	149
tube side	75	517	115	793	150	65
	150	1034	225	1551	150	65
	300	2068	450	3103	150	65

*Test to 20 PSI if required by customer specifications

singlepass design



multipass design

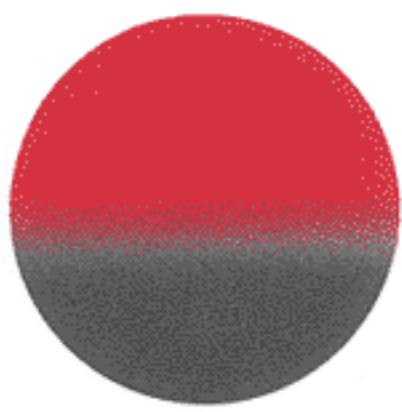


- Notes:**
1. Dimensions R, S and U are based on 75 lb. tube side design to ASME Code. For other tube side pressures, dimensions will vary.
 2. Dimensions S, U and X are based on tube lengths (in inches) as shown in the table. For shorter tube lengths, subtract the difference.
 3. Catalog dimensions are subject to variation. Use only certified drawings for construction purposes.
 4. Contact your local ITT Standard representative for sizes and tube side nozzle orientations not covered here. The S 1000 R design is available in models up to 69" in diameter; call us for full details.

dimensional data

(DIMENSIONS IN INCHES)

Unit Size & Tube Length	A	B	C	C ₁	D	E	F	G	H	J	K	L	M		N	R		S		U		W Max.
													Single-Pass	Two-Pass		Single-Pass	Two-Pass	Single-Pass	Two-Pass	Single-Pass	Two-Pass	
15120	16.00	19.50	16.75	53.00	11.50	2.00	3.25	8.50	10.75	2-.75 x 1.25 slotted	.38	14	8	6	2NPT	8.50	7.25	67.50	66.25	152.25	141.00	54.00
17120	18.00	21.62	18.00	54.00	12.00	2.00	3.25	9.50	11.75	2-.75 x 1.25 slotted	.38	16	8	6	2NPT	8.50	7.25	67.50	66.25	152.25	141.00	54.00
19144	20.00	23.62	19.00	55.00	13.00	2.75	4.00	10.50	12.75	2-.75 x 1.25 slotted	.50	18	10	6	2NPT	9.75	7.75	80.62	78.62	181.00	166.00	65.25
21144	21.75	25.75	20.00	56.00	13.69	2.75	4.00	13.50	15.50	2-.75 x 1.25 slotted	.50	20	10	8	3NPT	9.88	8.88	80.62	79.62	181.00	168.50	65.25
23144	24.00	27.75	21.50	57.00	15.00	2.75	4.00	13.50	15.50	2-.75 x 1.25 slotted	.50	22	12	8	3NPT	11.25	9.12	81.88	79.75	186.25	169.00	65.00
25144	25.75	29.38	22.50	58.00	16.00	1.00	5.00	14.00	16.00	4-.88 dia.	.544 avg.	24	12	8	3NPT	11.25	9.12	81.88	79.75	186.25	175.00	66.75
27144	27.75	31.62	23.50	59.00	17.00	1.00	5.00	15.00	17.00	4-.88 dia.	.544 avg.	26	14	10	3NPT	12.00	10.50	82.62	81.00	189.50	178.25	66.75
29144	29.75	33.50	24.50	60.00	18.00	1.00	5.00	16.00	18.00	4-.88 dia.	.544 avg.	28	16	10	3NPT	13.38	10.75	83.88	81.25	194.50	180.25	66.50
31144	31.75	35.62	25.50	61.00	19.00	1.00	5.00	17.00	19.00	4-.88 dia.	.544 avg.	30	16	12	3NPT	13.38	11.88	83.88	82.25	194.50	182.75	66.50
33144	33.75	38.00	26.50	76.50	22.00	1.25	6.00	19.50	22.00	4-1.00 dia.	.691 avg.	32	18	12	4FLG'D	14.62	12.00	85.00	82.38	199.50	183.75	66.25
35144	35.75	39.88	27.50	77.50	23.00	1.25	6.00	20.50	23.00	4-1.00 dia.	.691 avg.	34	18	12	4FLG'D	14.75	12.25	85.00	82.50	199.50	184.25	66.25
37144	37.75	42.00	29.00	78.50	24.00	1.25	6.00	21.50	24.00	4-1.00 dia.	.691 avg.	36	20	14	4FLG'D	16.12	13.12	86.25	83.25	204.75	186.75	66.25
39144	39.75	44.00	30.00	79.50	25.00	1.25	6.00	22.50	25.00	4-1.00 dia.	.691 avg.	38	20	14	4FLG'D	16.25	13.25	86.25	83.25	205.00	187.25	66.00
42192	42.75	46.88	32.00	81.50	26.00	1.25	6.00	23.50	26.00	4-1.00 dia.	.691 avg.	40	24	16	6FLG'D	18.50	14.50	112.50	108.50	262.00	238.50	90.00
45192	45.75	50.38	33.50	83.00	28.00	1.25	6.00	24.50	27.00	4-1.00 dia.	.691 avg.	44	24	16	6FLG'D	18.00	13.75	111.75	107.75	259.00	237.00	89.50
48192	48.75	53.38	35.00	84.50	29.00	1.25	6.00	26.50	29.00	4-1.00 dia.	.691 avg.	46	24	18	6FLG'D	18.50	18.50	112.00	112.00	261.00	261.00	89.50



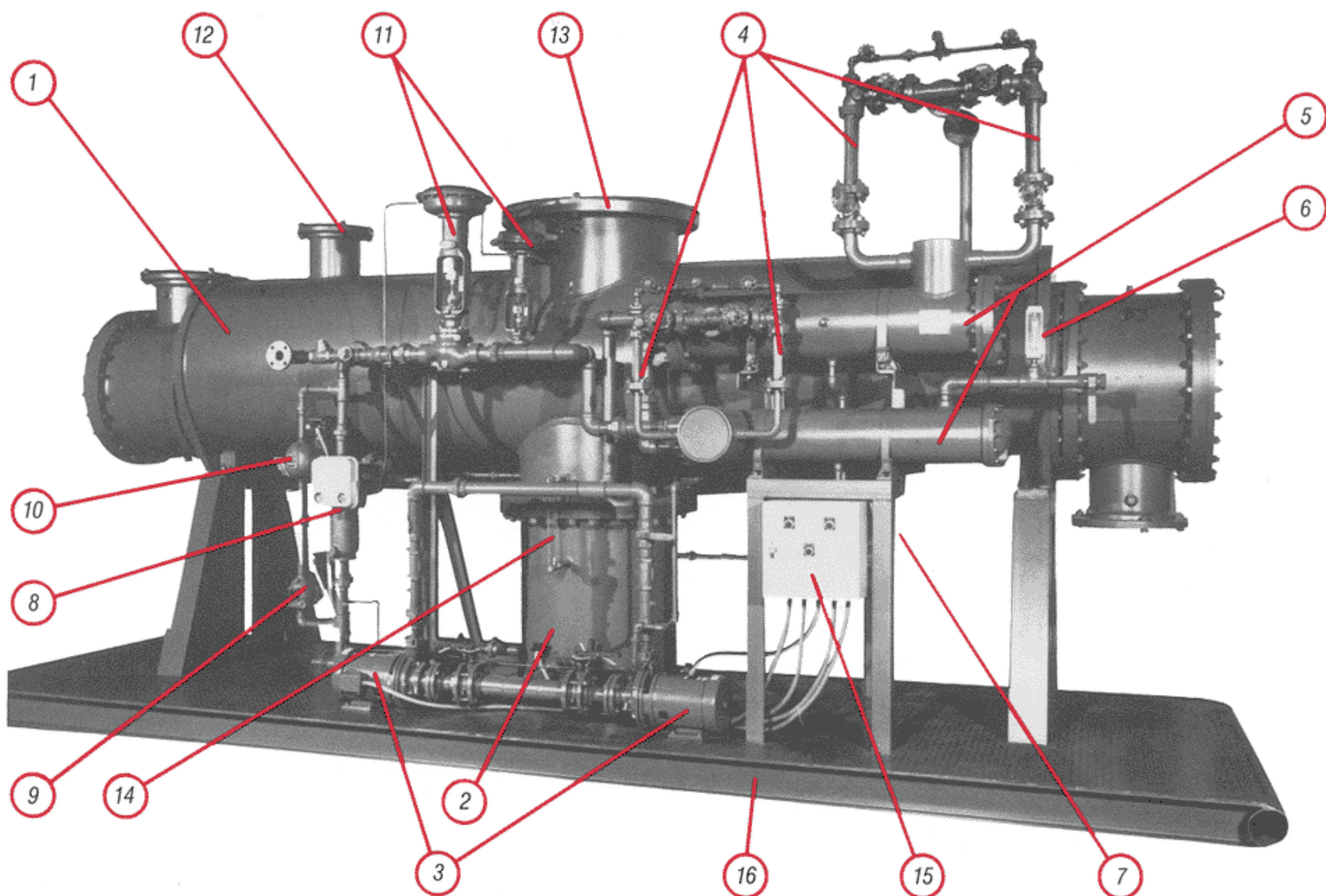
“ITT Standard Condensate Recovery Package”

The ITT Standard Condensate Recovery Package represents a simple solution to many of your problems. The skid-mounted surface condenser with associated accessories is the answer. Why overburden yourself? Let our experienced engineers and fabricators design and assemble a complete, ready to put on line, Condensate Recovery Package (CRP). Advantages of the complete CRP are:

- Ideal for mechanical contractors and turnkey type operations where prepackaged modular type construction is required.
- Saves on high field installation costs as our experienced fabricators can mount and pipe the accessories in half the time and half the cost.
- Reduces engineering cost as our engineers design

the system with time proven techniques for reliability.

- Great for cost estimators as everything is included in one price.
- With ITT Standard providing all the accessories there is no last minute scrambling for items that are either lost or forgotten.



SCOPE OF SUPPLY

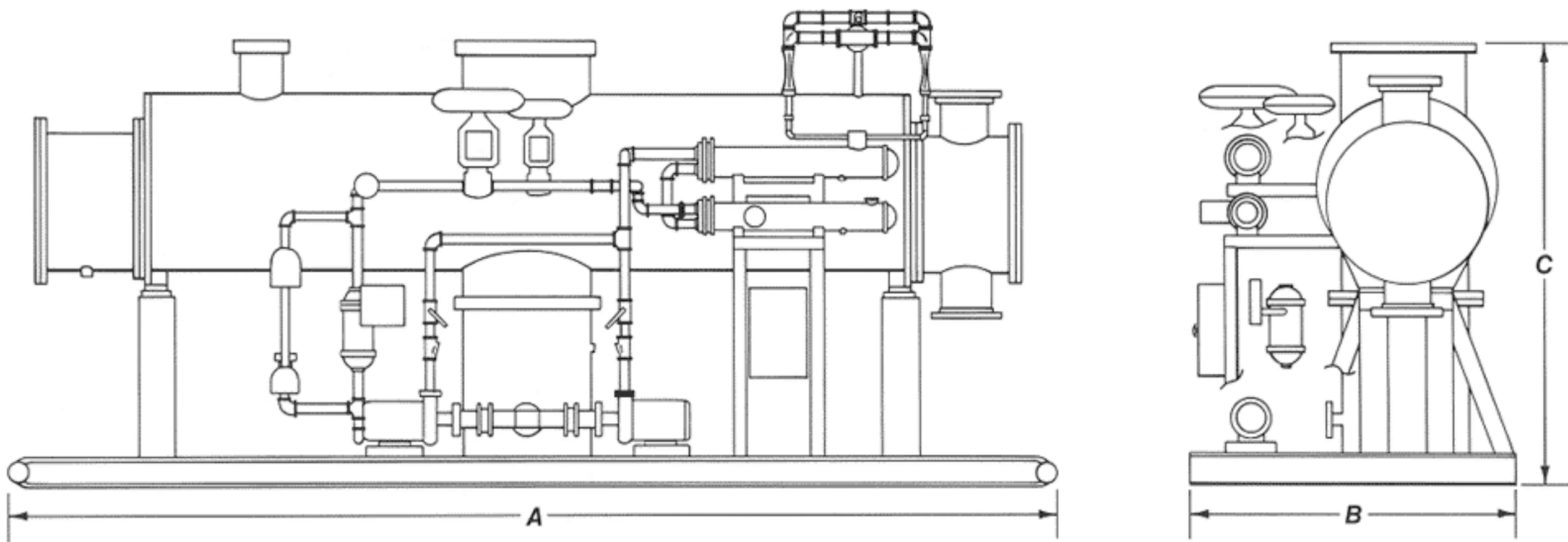
1. ITT Standard Surface Condenser—Rugged and dependable design based on sixty years of experience.
2. Hotwell—Normally integral to condenser shell with handhole for cleanout purposes.
3. ITT Domestic Pump Model HB35 Condensate Pumps—Standby and operating, exclusive pump requirement of 2' of NPSH reduces overall height of package making handling and transporting easier and less costly. Other makes available upon request.
4. Steam Jet Ejectors: Available in twin or single element arrangements.

5. ITT Standard Model EF Intercondenser and Aftercondenser.
6. Air Leakage Meter.
7. Condensate Drainers (not visible).
8. Pneumatic Operated Liquid Level Control.
9. Low Level Switch (optional): Pump cutoff or alarm.
10. High Level Switch (optional): High water alarm.
11. Pneumatic Operated Overboard and Recirculating Valves.
12. Atmospheric Relief Valve (not shown).
13. Steam Inlet Expansion Joint (not shown): Available in axial for down exhaust turbines or univer-

sally tied for up exhaust turbines.

14. Sight Gauge Glass for liquid level.
 15. NEMA 4 Electrical Panel: Standard on/off switch with running lights and motor starters—available in timed alternating pump service or standby pump start on operating pump failure.
 16. Oil Field Type Base for ease of handling with rigid diamond plate decking for safety.
- NOTE:** Not shown but included are all necessary valves, check valves, strainers, thermometers, pressure gauges and vacuum gauges.

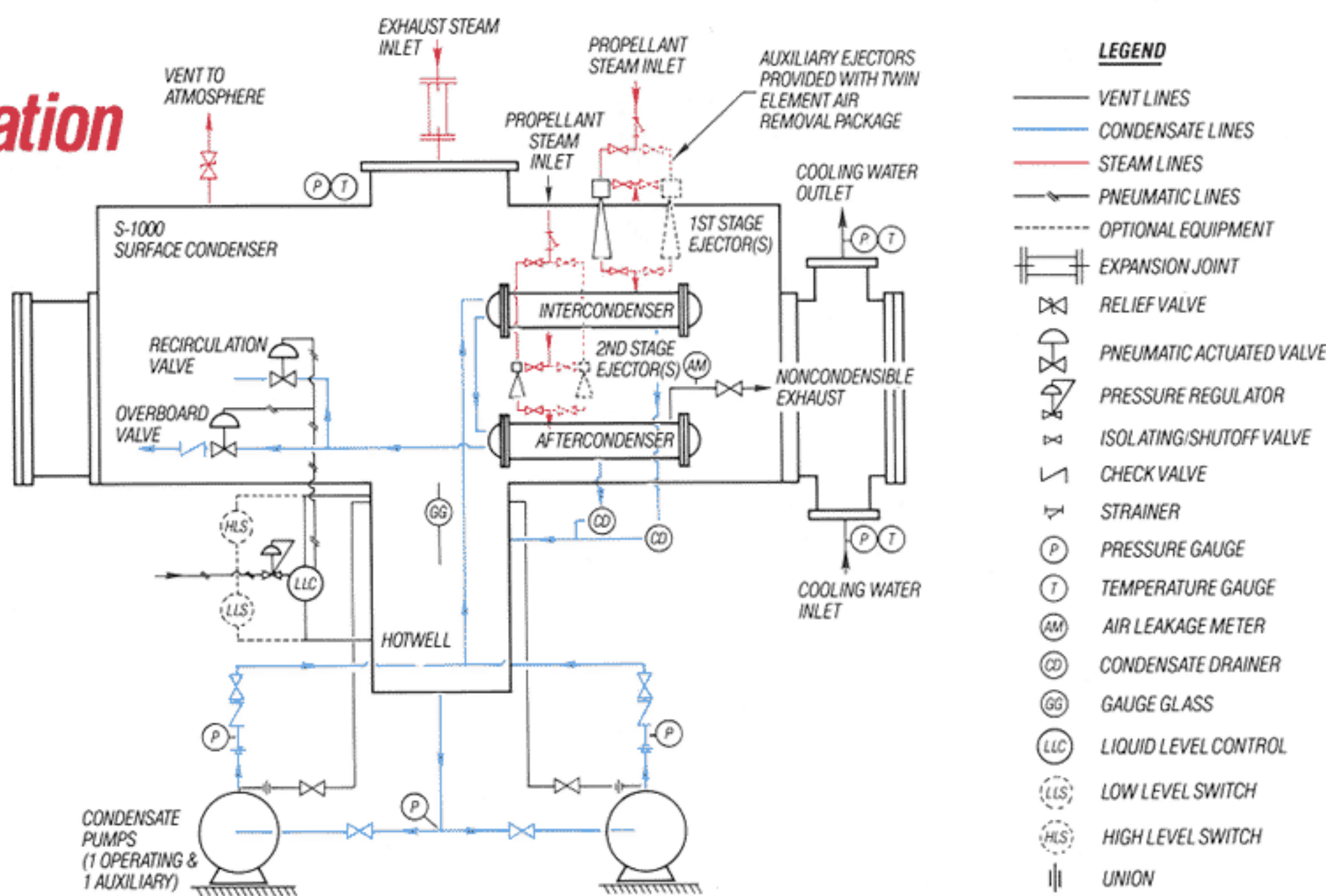
Dimensional Data



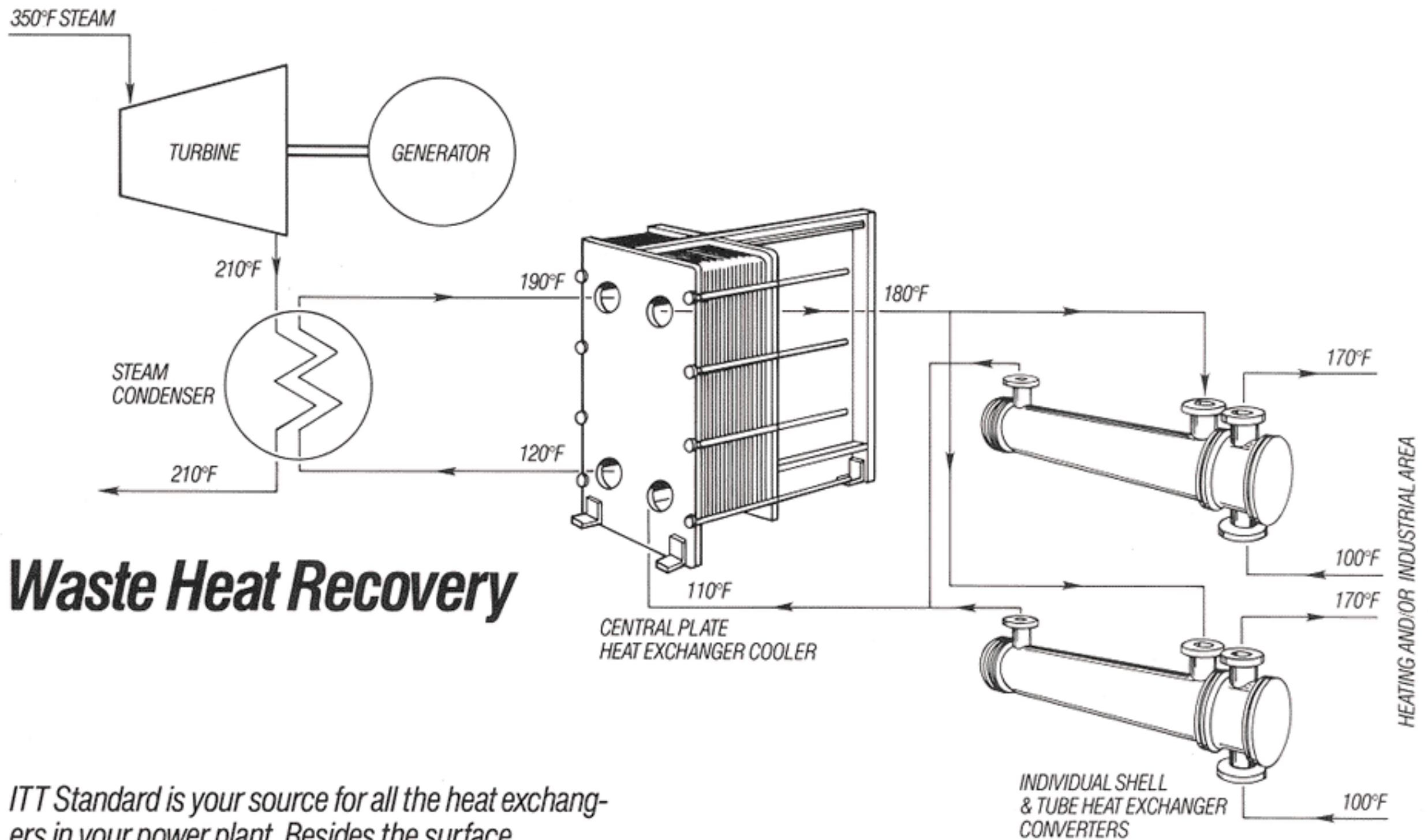
Unit Size & Tube Length	A		B	C
	Single-Pass	Two-Pass		
15120	160.25	148.25	72	73.50
17120	161.00	148.75	72	78.00
19144	190.00	173.25	72	80.00
21144	190.50	175.62	72	82.00
23144	194.50	176.00	72	84.00
25144	196.75	177.88	72	86.50
27144	199.50	180.62	72	89.00
29144	203.50	181.40	72	91.00
31144	204.25	183.75	72	93.50
33144	208.25	184.50	84	57.50
35144	208.50	185.25	84	101.00
37144	212.00	186.00	84	102.00
39144	213.00	187.00	84	105.50
42192	269.50	238.00	96	110.00
45192	269.50	239.00	96	112.00
48192	270.25	241.50	96	114.00

- NOTES:**
- 1. Dimension A is based on tube lengths (in inches) as shown in the table. For different tube lengths, add or subtract the difference.
 - 2. Dimensions based on an S 1000 type surface condenser. For an S 1000 R they will vary slightly.
 - 3. Catalog dimensions are subject to variation. Use only certified drawings for construction purposes.
 - 4. For maintenance purposes skid should have 5' clearance all the way around except for one end which should have one skid length free space for removal and replacement of condenser tubes.

Piping & Instrumentation Diagram



Why heat up the atmosphere? Let ITT Standard heat exchangers recover all those valuable BTU's.



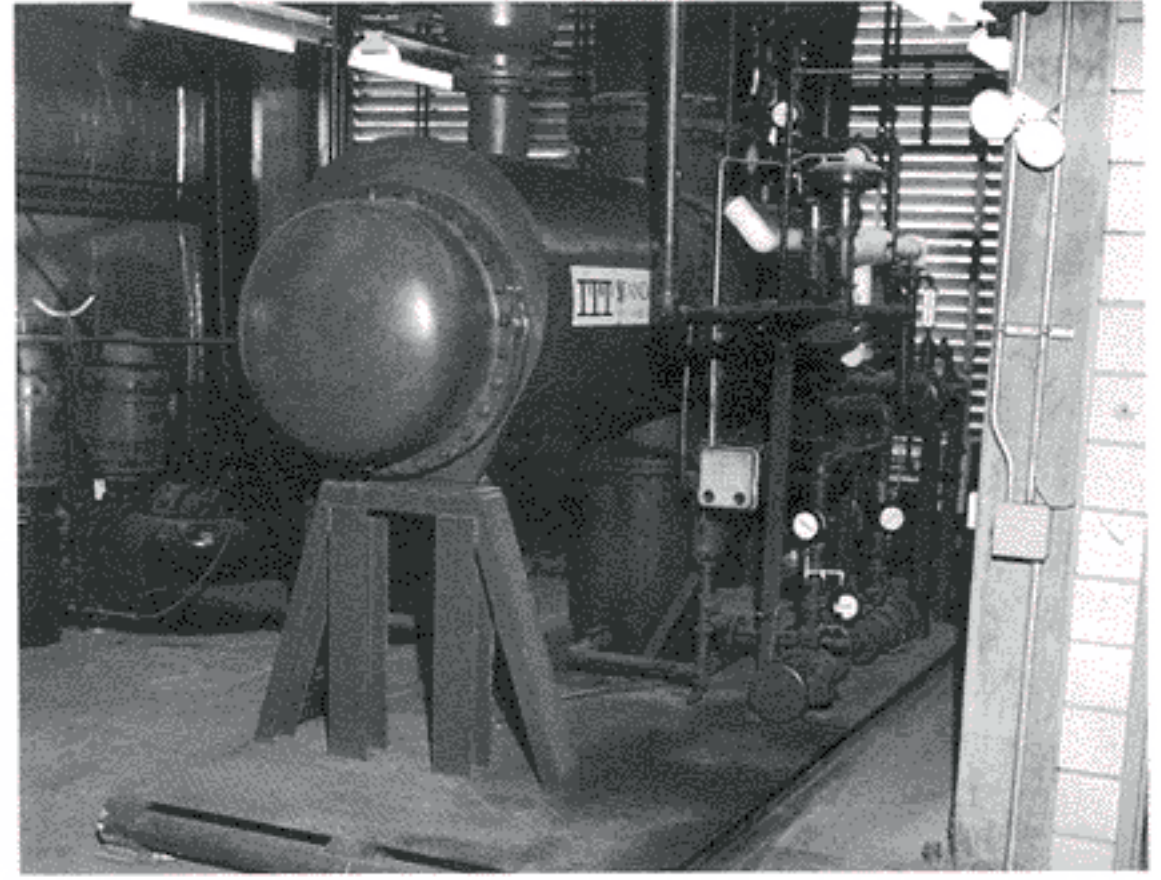
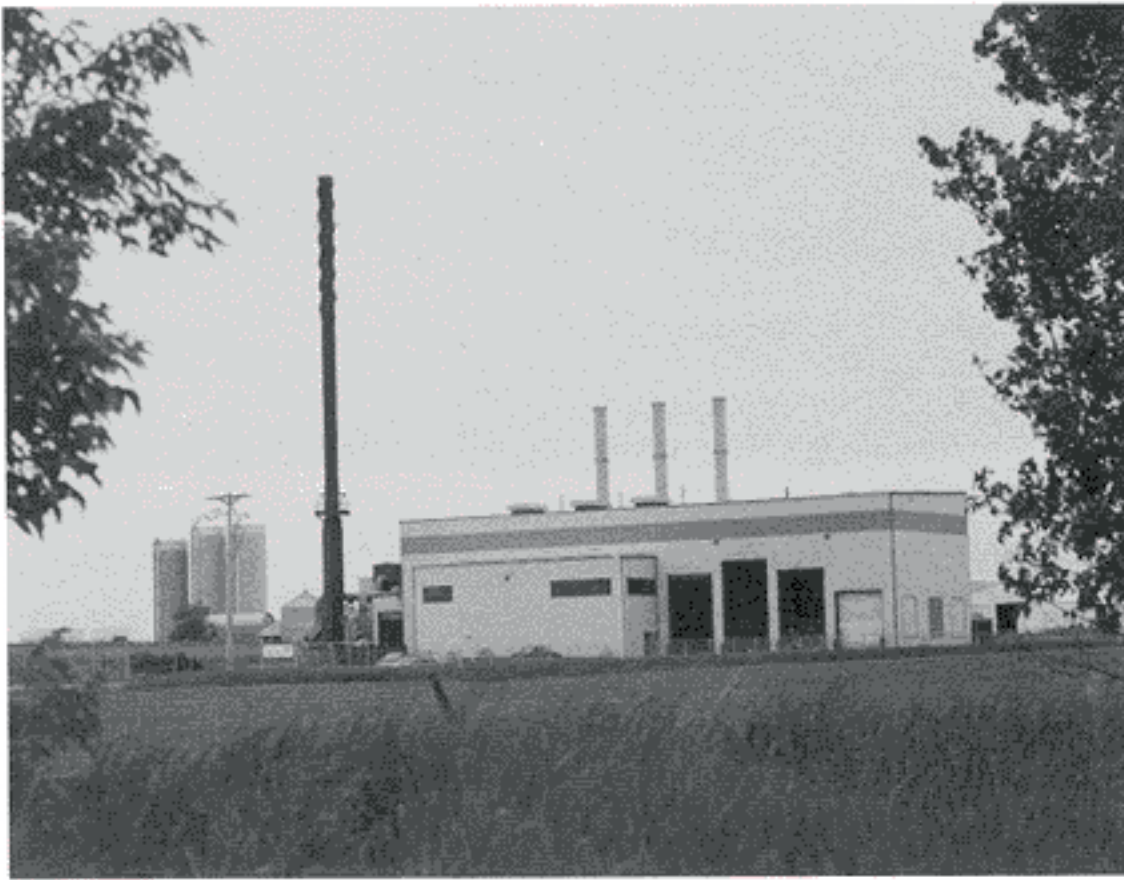
Waste Heat Recovery

ITT Standard is your source for all the heat exchangers in your power plant. Besides the surface condenser, we offer the high efficiency of our Plate-flow (Plate & Frame Exchangers) or the durability of our CPI (Shell & Tube Exchangers). We can provide you with all of the following:

1. Surface Condensers
2. Central Coolers
3. Vacuum and Feed Water Pump Coolers
4. Low Pressure Feed Water Heaters
5. Emergency Diesel Coolers
6. Lube Oil Coolers
7. Generator Coolers
8. Combustion Air Heaters
9. Transformer Oil Coolers

Let ITT Standard be your one stop for all of your heat exchanger needs.

ITT Standard Condensate Recovery Package Typical Installation

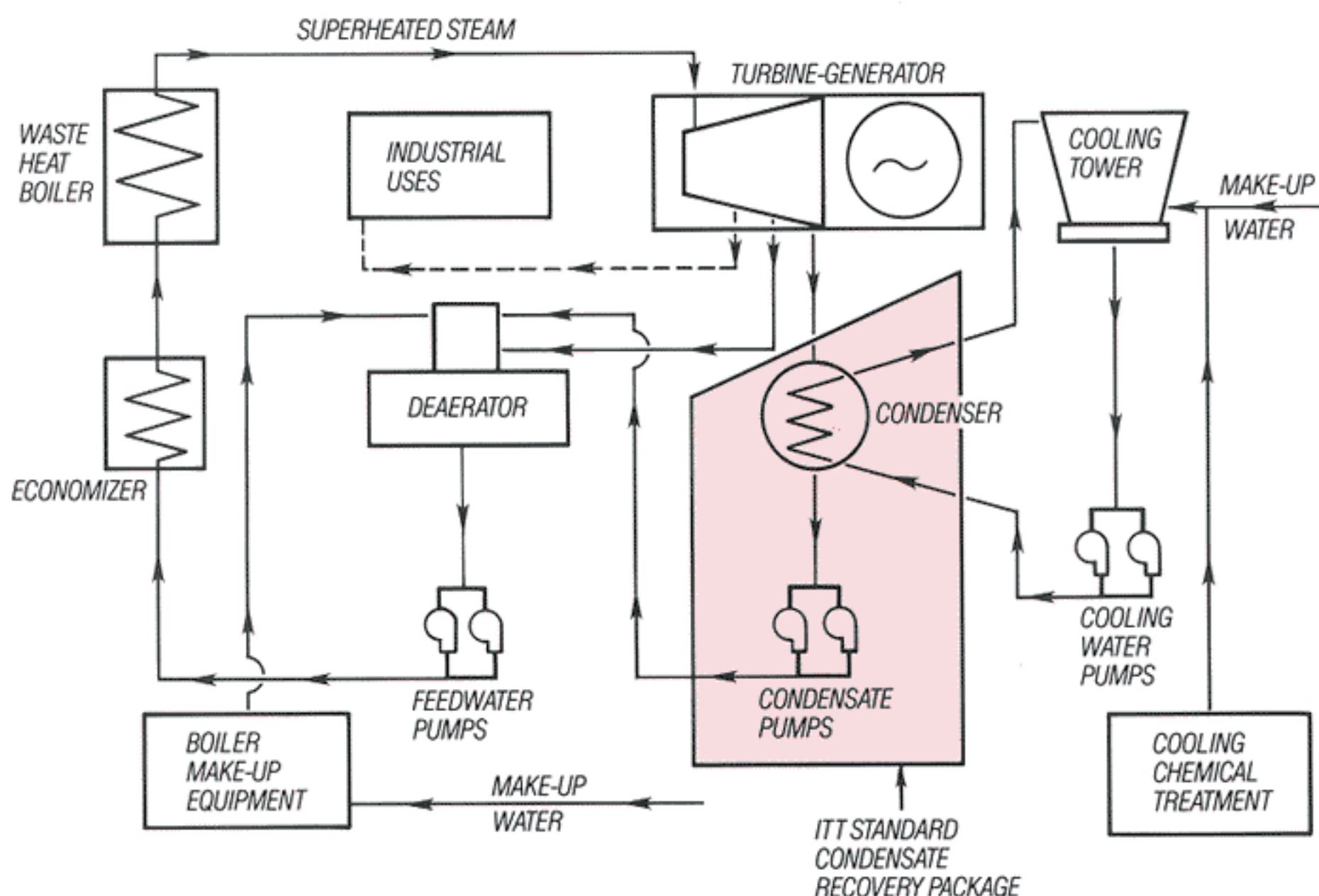


Helping to make this waste energy plant operate efficiently, is a compact, skid mounted condensate recovery package, designed and built by ITT Standard.

The ITT Standard Condensate Recovery Package is playing a big role in the waste to energy/cogeneration field. At this installation in New Richmond, Wisconsin, owned by American Resource Recovery Inc., 115 tons of garbage per day is converted into useful energy. Three waste heat boilers burn the garbage to

produce steam. The steam is then used for creating electricity and heating a nearby nursing home. The completed CRP allows you to be on line much quicker than ever before, thereby making money that much sooner.

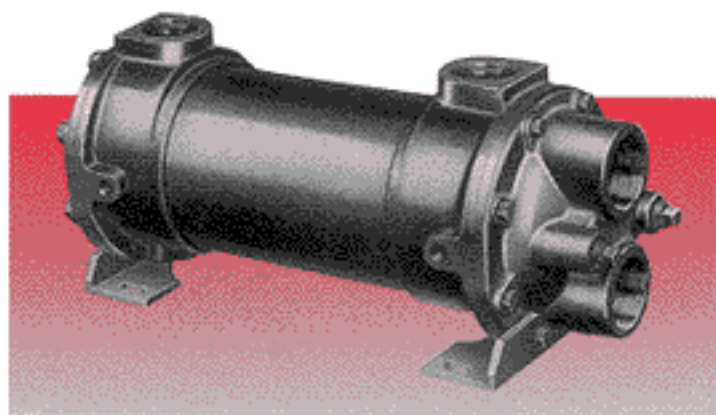
Steam path in a typical municipal solid waste plant



ITT STANDARD PRODUCTS.

DESIGNED
TO MEET
VIRTUALLY
EVERY HEAT
TRANSFER
APPLICATION
REQUIREMENT.

*Pre-engineered
shell-and-tube heat
exchangers for general
heating and cooling.*

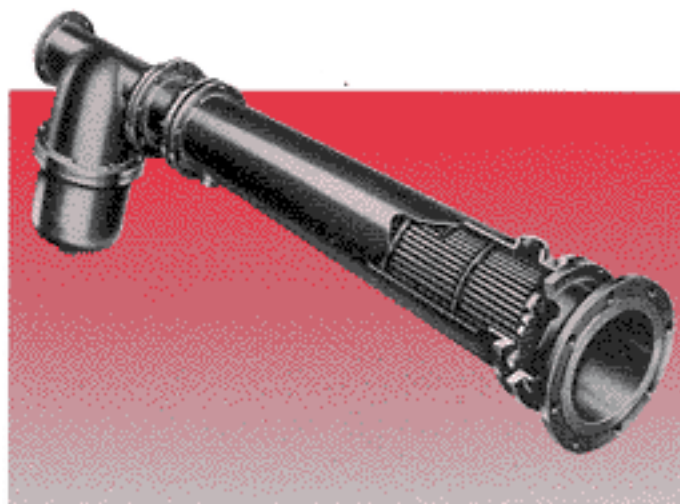


Efficiency.

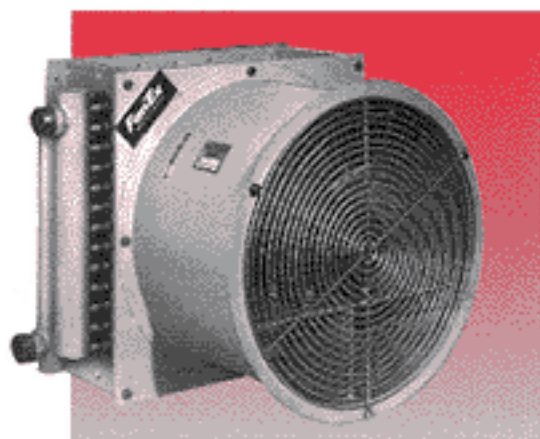
*Engineered/customized heat
exchangers for process and
other heating/cooling
applications.*



*Air and gas
aftercoolers.*

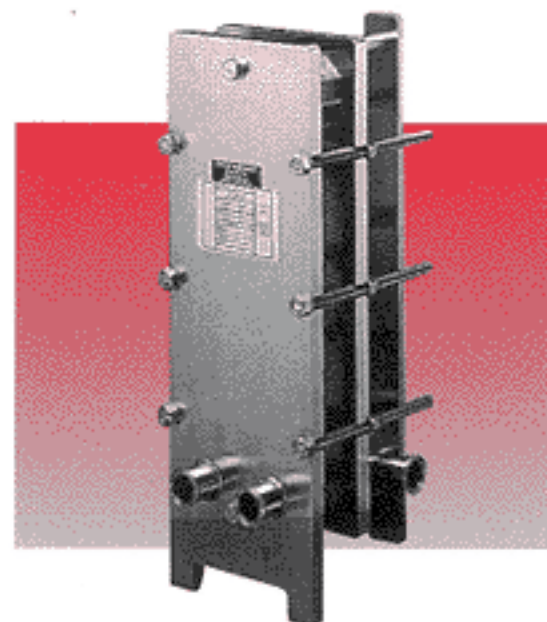


*FanEx® air/oil,
air/air, or air/water
heat exchangers.*

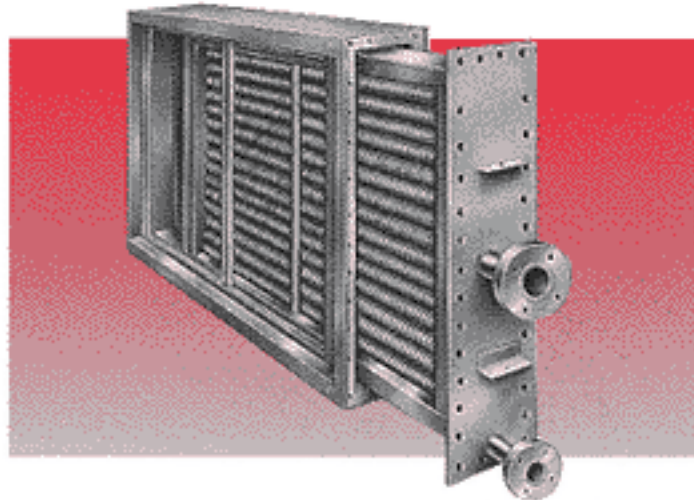


Expertise.

*Plateflow®
plate-and-frame
exchangers.*



*Heat
transfer
coils.*



ITT Industries
Engineered for life



ITT Standard

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Fax: 716/897-1777
www.ittstandard.com

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