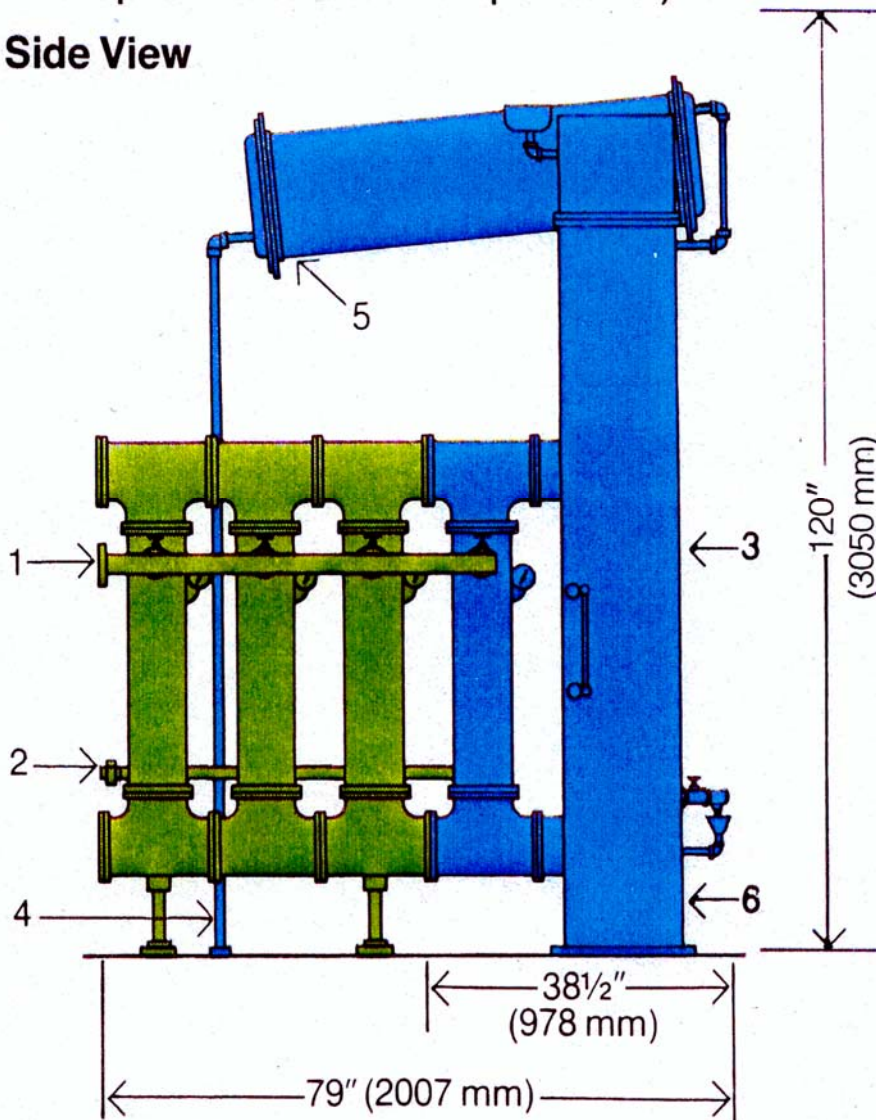


US ENGINEERED PRODUCTS TD SERIES STILLS

Maximum Dimensions

- Basic Still
- Full Expansion (low steam pressure requires additional evaporators.)

Side View



Each evaporator increases length by 13 1/4" (337 mm)

Typical TD 50 Series Thermodynamic Still

STILLS TO MEET TODAY'S SCIENTIFIC AND RESEARCH STRICT DEMANDS FOR PURE WATER.

- PHARMACEUTICAL
- LABORATORIES
- CHEMICAL
- COSMETICS
- ELECTRONICS
- SCHOOLS
- HOSPITALS

US ENGINEERED PRODUCTS THERMODYNAMIC STILLS FEATURE

- EXPANDABILITY
- HIGH PURITY
- AUTOMATIC OPERATION
- FAST START UP
- CHOICE OF MATERIAL
- MODULAR DESIGN
- TROUBLE FREE INSTALLATION AND MAINTENANCE
- CAPACITIES FROM 5-200 GPH
- DESIGNED TO A.S.M.E. CODES
- BUILT TO TODAY'S C.G.M.P

Distilled Water—The Universal standard for Pure Water.

For centuries, distilled water has been the accepted standard for pure water throughout the world. Its use has been recommended or specified for literally hundreds of important applications, from the preparation of water for injectables to critical rinsing steps in the manufacture of electronic components. Today, distillation continues to be the most accepted and most widely used method of providing pure water for science, medicine and industry.

The basic advantages that distillation offers are found in the inherent simplicity and reliability of the process. In distillation, impurities are separated from water through the fundamental processes of evaporation and condensation. Since water stills rely on these controlled changes of phase rather than on chemical or other complex techniques, the equipment is very understandable both in operation and in maintenance. And unlike other methods, distillation does not require replacement or regeneration of purification media.

Distillation also continues to be the only “single process” that consistently delivers pure water acceptable for biomedical applications. In contrast to ion exchange which removes only ionized impurities but not organics and bacteria, and reverse osmosis which is only effective in the 90% range, distillation offers generally acceptable removal of all water impurities, including pyrogen contamination.

USEP Distillation Systems—Standard in Distilled Water Production.

US Engineered Products Thermodynamic Distillation Systems are recognized the world over for their superior performance and trouble free operation. Utilizing many unique principles, Thermodynamic stills maximize the basic advantages of distillation in a design that affords both space-saving economy and unmatched flexibility for future expansion. Backed by a complete selection of options and accessories, Thermodynamic stills can be tailored to virtually any requirement.

Four Thermodynamic families are available in capacity ranges of 15-60 and 50-200 gallons per hour. Within these ranges, Thermodynamic stills are expandable in increments of 15 and 50 gallons per hour, respectively. Each series offers literally hundreds of product configurations to meet specific feedwater, end use, capital outlay and expansion criteria. Match your requirements to one of US Engineered Products standard Thermodynamic models or select components to design the Thermodynamic system that best satisfies your particular needs.

High Purity

Thermodynamics’ unique design enables it to routinely produce large volumes of pyrogen-free distillate with purity from 300,000 ohms-cm to over one megohm-cm at 25°C. Should the application require higher purity, Thermodynamic systems may be equipped with a High Purity Chamber to produce distilled water with specific resistance in excess of 1 megohm-cm. US Engineered Products Thermodynamic stills meet the most exacting standards of United States, British, Nordic and Japanese Pharmacopoeia.

Expandability

Easy and economical expansion is a primary feature of Thermodynamic stills. By simply adding system components, Thermodynamic stills may be modified after installation to obtain larger capacities within series limits, or to achieve even higher purity distillate, if required. Virtually any growth consideration can be accommodated in the initial Thermodynamic configuration without high cost of over-designing the still.

Choice of Feed-water Systems

Available in tap water feed, pretreated water feed and condensate return systems, Thermodynamic stills are adaptable to a variety of raw water conditions. At no obligation US Engineered Products provides a comprehensive feedwater analysis to determine the appropriate system for your installation. Whatever method you select, U.S Engineered Product provides and supports the entire system, including pretreatment equipment if required.

Fast Start-Up

Thermodynamic stills are designed to provide an exceptionally fast evaporation of feedwater. In seconds after steam is introduced to the evaporator, the still delivers pure water ready to use. This means much less time lost in start-up and can result in up to a 20% increase over conventional stills in daily distillate output.

Trouble-Free Installation And Maintenance

Thermodynamics’ modular design makes installation and expansion a simple matter of coupling matched components together. Easy disassembly facilitates routine maintenance reduces down time to a minimum. And since the basic Thermodynamic system contains no moving parts, low maintenance and high reliability is assured.

Complete Line of Components and Accessories

Thermodynamic stills are backed by a comprehensive selection of options and accessories ranging from automatic controls to components for still expansion and modification. US Engineered Products maintains a large inventory of Thermodynamic components insuring a quick response to any customer need.

Choice of materials

Standard material of construction is stainless steel for all surfaces that come in contact with distillate and pure vapor. Individual components and complete Thermodynamic systems are also available in stainless steel or titanium.

ASME Coded

US Engineered Products systems are designed to meet ASME codes and are so stamped where applicable.

Basic Still Operation

US Engineered Products Thermodynamic stills are steam heated distillation systems that use tap water, pretreated water or steam condensate (recovered from the evaporator) as the feedwater source. Three components are essential to their operation. The evaporator, where feedwater is vaporized, the unique CentriCyclone, in which impurities and water droplets are separated from the vapor and the condenser which cools the purified vapor. These components cause the liquid-to-vapor/vapor-to-liquid phase changes that are basic to the distillation process. While the capacity and configuration of these components varies to accommodate different user-requirements, the operating principles of all Thermodynamic models are essentially the same.

Evaporator

Thermodynamic evaporators are designed to effect an almost instantaneous evaporation of feedwater and to permit easy future expansion of still capacity. Inlet steam surrounds a tube bundle in which the feedwater is rapidly evaporated. Because of the extremely high velocity and turbulence of the vapor within the tube bundles, many scale forming impurities and entrapped solids are carried out of the evaporator to waste by means of a constant bleeding device and periodic draining of the still.

Thermodynamic evaporators are easily connected to the Centri-Cyclone and to each other by clamp-like couplings that can be quickly disconnected for access to the straight tube bundles. This external design permits the still to run at partial capacity without the full complement of evaporators in use. Cleaning is therefore possible with much less downtime and loss of output associated with descaling of conventional stills.

Designed to operate at 30-100 psig(2.1-7.0 kg/cm²) inlet steam pressure, up to four evaporators may be interconnected in series to expand output capacity, additional units can be added to achieve rated capacity in operation with low steam pressure. Steam and condensate manifolds are available for each evaporator configuration, but it is

advantageous to initially order manifolds that will accommodate the projected number of evaporators that will be used. Information on steam inlet requirements is contained in the Thermodynamic series descriptions on pages 5 to 8.

Centri-Cyclone Separator

The Centri-Cyclone centrifugal separator sets US Engineered Product Thermodynamic Distillation Systems apart from all conventional water stills. Unlike stills that rely on only baffle arrangements and gravity effects to purify vapor, the Centri-Cyclone also causes a continuous and uniform directional change of the vapor, resulting in a faster and more effective separation.

In operation, water vapor enters the Centri-Cyclone from the evaporator at a high velocity and is directed downward in tight spiral. The separating force achieved in the Centri-Cyclone is from 500 to 1,000 times greater than that at work in conventional stills. Even microscopic droplets of water are centrifuged out of the steam-water mixture and are collected at the base of the unit. The resulting pure, dry vapor then rises through an upper baffle which insures complete removal of entrapped matter including pyrogens.

At the base of the Centri-Cyclone, a constant-bleeder valve deconcentrates dissolved solids by continuously drawing boiling water from the still to a waste connection. Thus, the concentration of scale forming impurities is minimized.

In raw water fed systems, an external constant-level device and overflow control accepts the heated condenser cooling water to maintain a constant water level in the Centri-Cyclone and evaporator. Since the device is open to atmosphere, the bulk of gaseous impurities are eliminated from the heated raw water upon entry. The excess hot water is delivered to waste or the heat may be recovered if desired.

Condensers

Thermodynamic condenser use water to condense the purified vapor leaving the Centri-Cyclone. To conserve water,

condensers may be connected to closed systems, such as US Engineered Products Recirculating Cooling Water System. Special pressure condensers are available, when required, depending upon cooling loop back pressure.

Condensers attach to the Centri-Cyclone steam cover which can be rotated a full 360°. Thermodynamic condensers may therefore be oriented in a horizontal direction that best suits specific layout requirements.

Condenser cooling water requirements and back pressure limits are outlined in Thermodynamic series description, pages 5 to 8.

Optional Automatic Control

When used in conjunction with a pure water storage tank, any Thermodynamic still may be equipped with automatic control for completely unattended operation. With this, option the still starts and stops automatically to maintain proper storage tank levels and drains it itself every four hours to retard scale formation. When pretreated water is used as the feed water source, the timer may be adjusted to the appropriate drain cycle interval.

Thermodynamic automatic control is available for 115 volt, 60 Hz and for 230 volt, 50 Hz power.

US Engineered Products Feed Water Options.

Pretreated Feed Water Systems

In situations where the raw water source is extremely hard or otherwise of concern, Thermodynamic operation can be improved through pretreatment of feed water to lower the concentration of scale forming deposits. Chlorine, ammonia, etc.

Float Feeder/Preheater

The Float Feeder and Preheater accessories should be used in tandem on stills fed by treated water such as demineralized water. The Thermodynamic Float Feeder connects to the Centri-Cyclone and serves to regulate the flow of feed water to still. By adding only enough water to maintain a constant level in the Centri-Cyclone and evaporator, the Float Feeder effectively eliminates costly waste of pretreated water.

The Pretreated accessory, which connects between the Centri-Cyclone and condenser, is used to raise the temperature of the treated feed water. Without the Preheater option, approximately 10% of still capacity would be lost due to the introduction of relatively cold water to the evaporator.

The Float Feeder and Preheater accessories are included with all standard Thermodynamic models for pretreated feed water.

Condensate Return Systems

Available with or without an integral purifying arrangement, the condensate return method dramatically enhances Thermodynamic operation by virtually eliminating the need for periodic cleaning and draining of the still. It also enables the still to produce a higher purity distillate. In operation, boiler steam that condenses in the evaporation process is drawn from the evaporator, purified (the purifier arrangement is normally included), then fed back into the still as feed water.

Condensate Feedback Purifier

The Condensate Feedback Purifier is available with disposable or factory regenerable cartridges depending upon the size of the still. Included with the system are an organic removal cartridge, a deionization cartridge, as well as a Purity Lite Indicator which automatically signals when cartridges should be changed or regenerated. Also included are a condensate cooler and a special thermostatic valve which protects the purifying cartridges from excessively hot steam condensate.

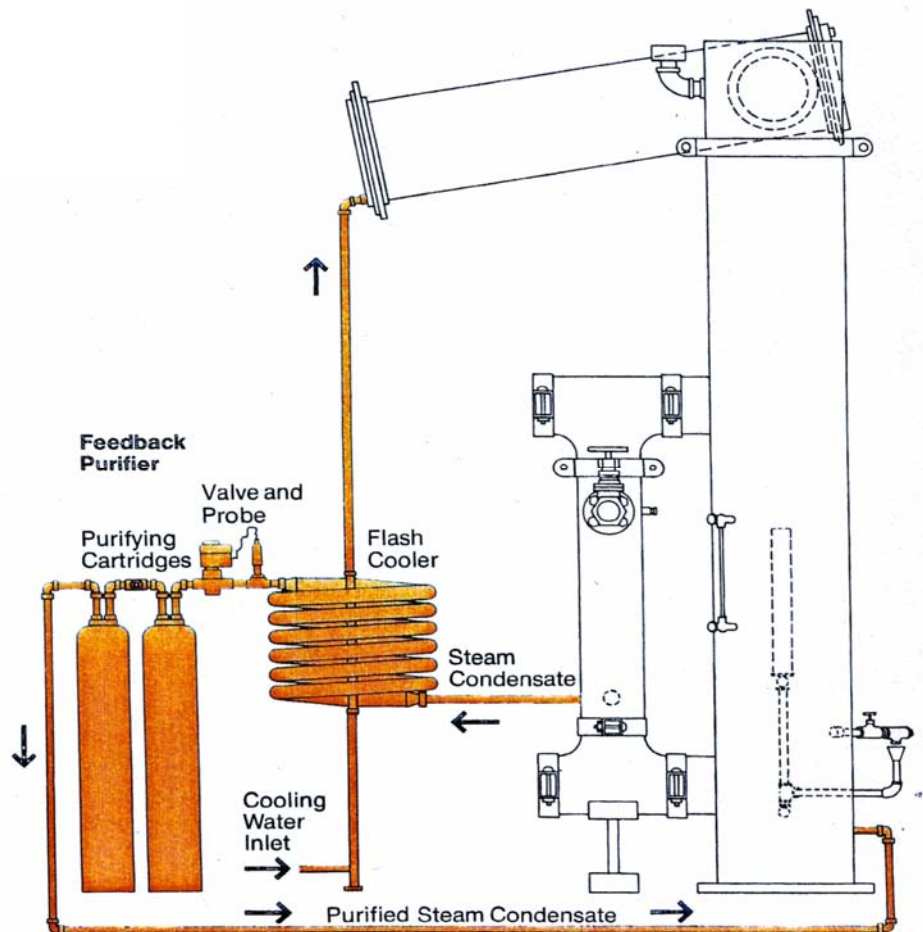
It is important to note, however, that the Condensate Feedback Purifier is not advised if boiler neutralizing amine content exceeds 3p.p.m, or if filming amines are present.

US Engineered Products offers a free steam condensate analysis service and it is recommended that a sample bottle of condensate and information on boiler treatment be sent to US Engineered Products before placing an order.

Condensate Feedback

A Condensate Return System without the purify arrangement is available for use where steam condensate is of unusually high purity and contains no amines or volatile impurities.

When both a Condensate Return System and Automatic Controls are ordered, a manual drain is supplied since periodic draining is not required and draining would only serve to waste the purified make-up water.



US Engineered Products Accessories

Pure-water Diverter

The Pure-water Diverter features an automatic temperature compensated directed-reading meter scaled from 0 to 18 megohms-cm with user-adjustable set points within this range. It offers built in above and below purity set-point lights and it can be connected to system controls or to an ancillary alarm device. An optional 30-day automatic recorder is also available with the meter to provide a permanent record of distillate purity and still performance. The Pure-water Diverter is available for 115 volt, 60Hz or 230 volt, 50 Hz power.

High Purity Chamber

When water of high resistivity is required, Thermodynamic stills may be equipped with a High Purity Chamber to rid the distilled of dissolved gaseous impurities. With this option, Thermodynamic purity capability exceeds 1 megohm-cm at 25 ° on most potable water supplies, as defined by the US Public Health Service.

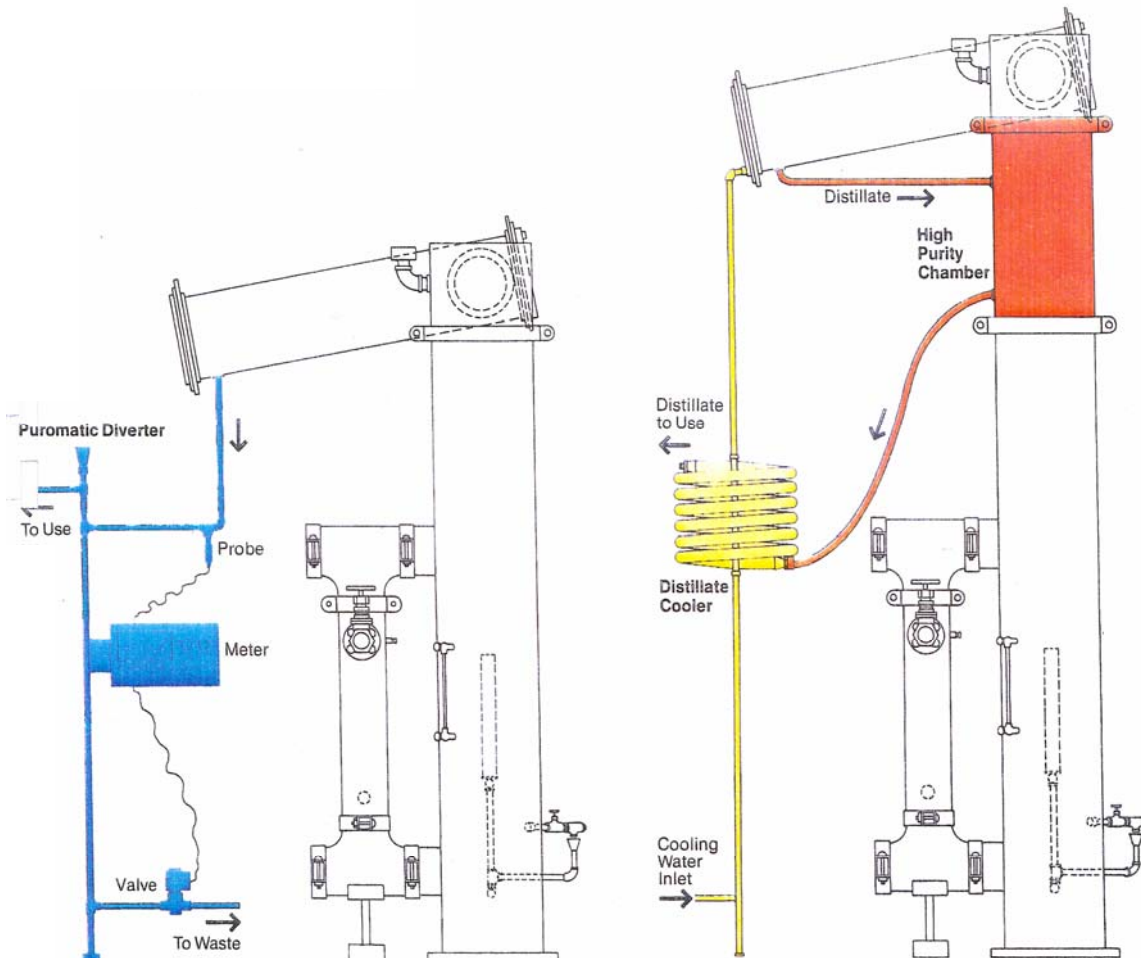
The High Purity Chamber connects between the Centri- Cyclone steam cover and main column. In operation, distillate from the condenser is piped into the High Purity Chamber where volatile impurities are eliminated

Since the temperature of the distillate flowing from the high Purity Chamber is typically in the range of 200-210° F (94-99°C), it is recommended that a Distillate Cooler be used in conjunction with the High Purity Chamber.

Distillate Cooler

In normal operation, the temperature of distillate as it leaves the still is approximately 150 °F to 180 °F (65 ° to 82 ° C). If storage tank heat tolerances or end use requirements necessitate cooling of the purified water, Thermodynamic Distillate Cooler can lower distillate temperature to within 20° F (11 °C) of the cooling water temperature.

Distillate Coolers are available in a range of sizes to match each Thermodynamic condenser capacity. Tap water may be used as the cooling medium or Distillate Coolers may be directly connected to the Thermodynamic Recirculating Cooling Water System or to an existing closed cooling system.



US Engineered Products TD-15 Series 15 to 60 gallons per hour.

Thermodynamic TD-15 Series is line of distillation systems satisfying pure water requirements of 400 to 1200 gallons per day. Ideal for medium-size installations where pure water demand is likely to increase, TD-15 is also a logical choice for fixed demand situations.

Four models are available in distillate capacities of 15, 30, 45 or 60 gph. The first three models can be field expanded to the maximum 60 gph by simply adding system components.

General Specifications

- Accepts one to four 15 gph evaporators (up to seven for low pressure operation).
- Accepts one or two condensers in any combination up to 60gph.
- Addition of High Purity Chamber increases height by 32" (813 mm).
- Addition of Preheater accessory increases height by 9" (229mm).
- Materials of construction : 316 stainless steel or titanium (optional) used where pure vapor or distillate is in contact with still.

Service Line Requirements

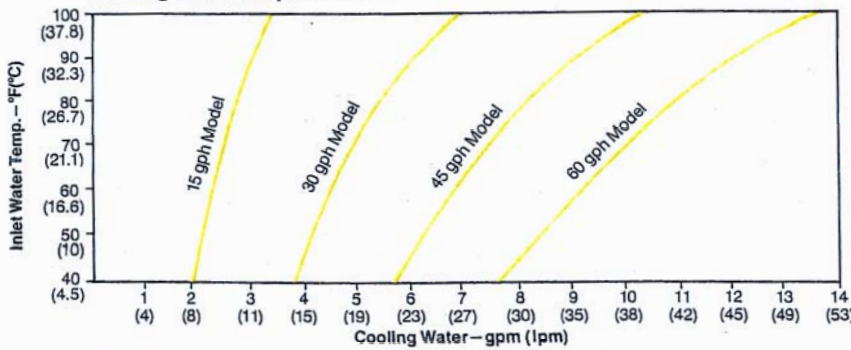
(As shown on side view)

1. Steam Inlet—3/4" NPT for 15 gph model 1 1/2" NPT for all other models (with manifolds). It is recommended that inlet piping be sized to accommodate both the maximum projected expansion of the still and the maximum available steam pressure to 100 psig.
2. Steam Return—3/8" NPT for 15 gph model; 3/4" NPT for all other models (with manifolds). Not required with Condensate Return Systems.
3. Feed water Inlet—1/4" NPT (Only for Pretreated Water System).
4. Cooling Water Inlet—1/2" NPT. Connections required for each condenser.
5. Distillate Outlet—1/2" NPT at each condenser.
6. Waste Connection—1 1/4" NPT. Connection to an atmospherically vented waste line.
7. Distillate Outlet Height—66" (1676 mm)

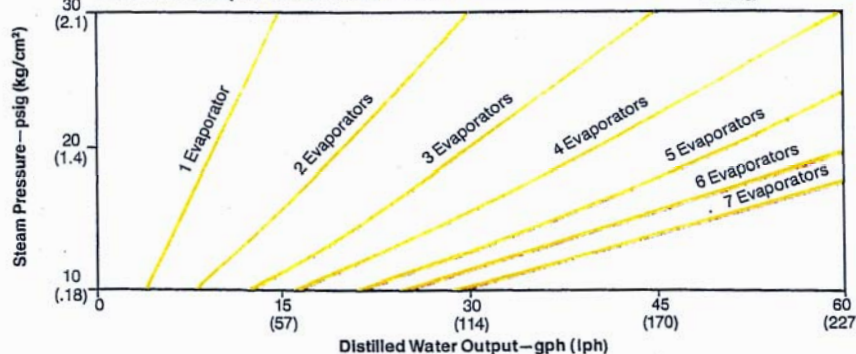
Inlet Steam Requirements

	Distillate Output			
	15 gph (57 lph)	30 gph (114 lph)	45 gph (170 lph)	60 gph (227 lph)
Inlet Steam lbs/hr (kg/hr)	138 (62)	276 (126)	414 (188)	552 (250)
Boiler Hp (KW)	4 (39)	8 (78)	12 (118)	16 (157)
Radiant Heat Loss BTU/hr (kcal/hr)	6,000 (1,512)	7,500 (1,890)	9,000 (2,268)	10,500 (2,646)

Cooling Water Requirements



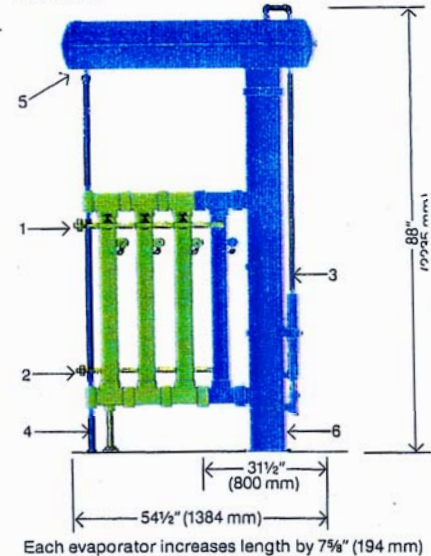
Distillate Output vs. Steam Pressure (derated to allow for normal scaling)



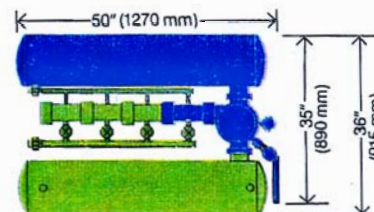
Maximum Dimensions

- Basic Still
- Full Expansion (low steam pressure requires additional evaporators.)

Side View



Top View



US Engineered Products TD-50 Series 50 to 200 gallons per hour. General Specifications

Available in four models—50, 100, 150 and 200 gallons per hour—Thermodynamic TD-50 Series is highly productive central distillation system for pure water requirements of 1000 to 4200 gallons per day. TD-50's exceptional expansion range makes it especially attractive to growing institutions with current distillate demands of 1000 to 2000 gallons per day. Like all Thermodynamic stills, TD-50 changes as your requirements change and grows as your volume demand increases.

- Accept one to four 50 gph evaporators (up to six for low pressure operation).
- Accepts one to two condensers in any combination up to 200 gph capacity.
- Addition of High Purity Chamber increases height by 42" (1067 mm).
- Addition of Preheater accessory increases width by 10 3/4" (273mm).
- Materials of construction: 316 stainless steel or titanium (optional) used where pure vapor or distillate is in contact with still.

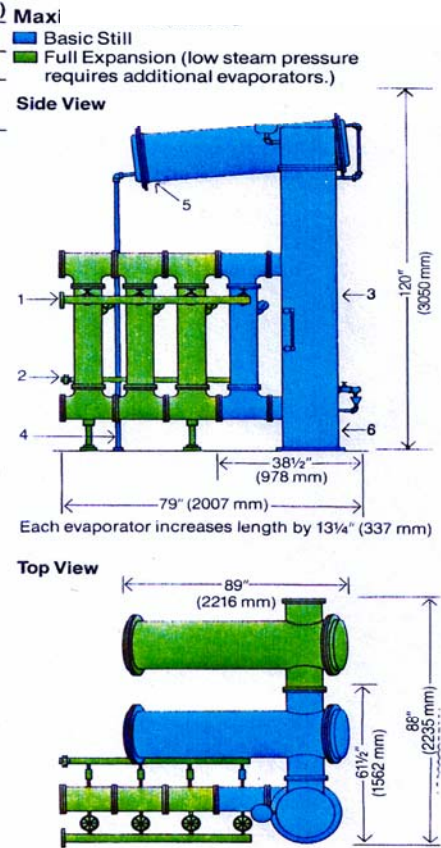
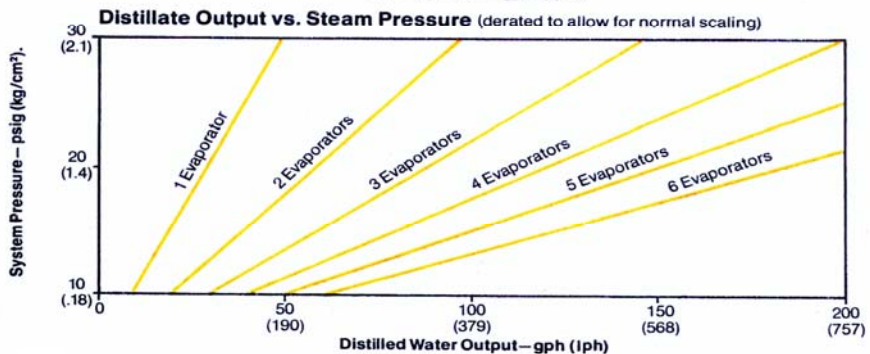
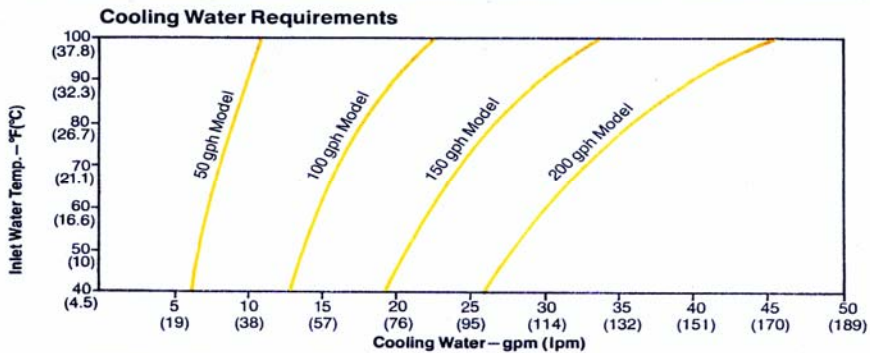
Service Line Requirements

(As shown on side view)

1. Steam Inlet—1 1/2" NPT for 50 gph model; 3" NPT for all other models (with manifolds). It is recommended that inlet piping be sized to accommodate both the maximum projected expansion of the still and the maximum available steam pressure to 100 psig.
2. Steam Return—3/4" NPT for 50 gph model. 1 1/2" NPT for all other models (with manifolds). Not required for Condensate Return Systems.
3. Feed water Inlet—3/4" NPT (only for Pretreated Water Systems).
4. Cooling Water Inlet—1" NPT (1 1/4" NPT for 200 gph condenser). Connections required for each condenser.
5. Distillate Outlet—1" NPT at each condenser (1 1/4" NPT for 150 and 200 gph condensers).
6. Waste Connection—2" NPT. Connect to an atmospherically vented waste connection.
7. Distillate Outlet Height—76" (1930mm)

Inlet Steam Requirements

	Distillate Output			
	50 gph (189 lph)	100 gph (379 lph)	150 gph (568 lph)	200 gph (757 lph)
Inlet Steam lbs/hr (kg/hr)	460 (209)	920 (418)	1380 (627)	1849 (836)
Boiler Hp (KW)	13 (131)	27 (262)	40 (392)	53 (523)
Radiant Heat Loss BTU/hr (kcal/hr)	16,000 (4,032)	18,000 (4,536)	20,000 (5,040)	22,000 (5,544)



TD-15

Ordering Information

The standard TD-15 models listed below have been specifically arranged to help you choose the distillation system that best satisfies your needs. Within each of the three available feed water systems, a full selection of automatic and manually controlled stills is offered for each output capacity in the series. Individual components for all standard TD-15 models are itemized in the tables. By using a standard model as a base, virtually any requirement can be met by interchanging basic still components or by adding accessories to the system.

To modify a standard model, simply indicate the part number(s) of the components to be interchanged. For example, an XN311 with oversize manifolds to accommodate expansion to four evaporators would be ordered as follows: "XN311 with modification T1204."

To add accessories, refer to the accessories section with particular attention to the accompanying notes.

Accessories are ordered by indicating the appropriate part number(s) after the system catalog number.

Unless otherwise specified, all TD-15 components in contract with distillate and pure vapor are fabricated in stainless steel. Individual components or complete systems are also available in stainless steel or titanium.

Expansion Contingencies

If future expansion of still capacity is anticipated, major savings can be realized by preparing the still for expansion with the original equipment order. Steam and condensate manifolds should be sized according to the maximum number of evaporators projected for the system. By ordering larger manifolds, new evaporators are added without the need for re-plumbing steam inlet and return service.

Condensers for 15 gph models should be similarly oversized to facilitate expansion.

By making this provision with the initial order, still expansion is more economical, both in terms of equipment cost and installation expense. All that would be required is an additional evaporator to achieve expansion. Recommended modifications for still expansion are indicated by shaded areas in the tables below.

Low Steam Pressure Operation

While TD-15 evaporators are designed to supply distillate at a rate of 15 gph at inlet steam pressure of 30-100 psig, rated still capacity can be achieved with low steam pressure by adding additional evaporators to the system. The Inlet Steam Pressure vs. Distillate Capacity graph illustrates the relationship between pressure and output. If the available inlet steam pressure is below *30 psig the number of evaporators ordered with the system should be modified accordingly.

*The 30 psig rating is nominal. Evaporator rating has been derated to allow for normal scaling.

Raw Water Systems		Catalog Number	Basic Still Components											Wt. (lbs.)	Cu Ft.			
			Centri-Cyclone	15 gph Evaporator	Manifolds (for 2 Evap.)	Manifolds (for 3 Evap.)	Manifolds (for 4 Evap.)	15 gph Condenser	30 gph Condenser	Auto Control/Auto Drain	Auto Control/Manual Drain	Extra Auto Steam Inlet Valve	Extra Auto Cooling Water Valve			Elbow Feeder	Auto Freshwater Valve	Preheater
15 gph (57 lph)	Manual	XM 200	1	1													625	90
	Automatic	XM 300	1	1				1		1							675	90
30 gph (114 lph)	Manual	XN 200	1	2	1											675	90	
	Automatic	XN 300	1	2	1				1	1				1		700	90	
45 gph (170 lph)	Manual	XO 200	1	3		1				2						875	90	
	Automatic	XO 300	1	3		1			2	1			2	1	900	90		
60 gph (227 lph)	Manual	XP 200	1	4		1			2							900	90	
	Automatic	XP 300	1	4		1			2	1			3	1	925	90		

Pretreated Water Systems		Manual	Automatic	XM 211	XM 311	XN 211	XN 311	XO 211	XO 311	XP 211	XP 311	Wt. (lbs.)	Cu Ft.
15 gph (57 lph)	Manual	1	1									725	90
	Automatic	1	1			1						750	90
30 gph (114 lph)	Manual	1	2	1								750	90
	Automatic	1	2	1			1	1				825	90
45 gph (170 lph)	Manual	1	3		1			2				975	90
	Automatic	1	3		1			2	1		1	1075	90
60 gph (227 lph)	Manual	1	4			1		2				1000	90
	Automatic	1	4			1		2	1		3	1075	90

Condensate Return Systems ³		Manual	Automatic	XM 230	XM 430	XN 230	XN 340	XO 230	XO 430	XP 230	XP 430	Wt. (lbs.)	Cu Ft.
15 gph (57 lph)	Manual	1	1									775	90
	Automatic	1	1			1						800	90
30 gph (114 lph)	Manual	1	2	1								800	90
	Automatic	1	2	1				1	1			875	90
45 gph (170 lph)	Manual	1	3		1			2				1000	90
	Automatic	1	3		1			2	1	2	1	1250	90
60 gph (227 lph)	Manual	1	4			1		2				1125	90
	Automatic	1	4			1		2	1	3	1	1350	90

Shaded areas indicate expansion considerations.

TD-15 Accessories

Puomatic Diverter	T1275
High Purity Chamber	T1270
15 gph Distillate Cooler	T1235 ⁴
30 gph Distillate Cooler	T1237
Air Heat Exchange Module	T1150 ⁵
Expansion Tank	T1175
15 gph High Flow Condenser	T1221 ⁶
30 gph High Flow Condenser	T1226
Manifolds for 5 Evap.	T1205 ⁷
Manifolds for 6 Evap.	T1206
Manifolds for 7 Evap.	T1207
Condensate Feedback	T1265 ³
Temperature Regulating Valve	T1280 ⁸
Extra Tube Bundle	21687

Notes:

- ¹ When adding evaporators or condensers to automatic stills, an Extra Auto Steam Inlet Valve must be ordered with each evaporator; an Extra Auto Cooling Water Valve must be ordered with each condenser.
- ² Uses disposable purifying cartridges. A second unit must be ordered to expand to 45 and 60 gph stills.
- ³ Condensate Return Systems without the purifiers are available if steam condensate analysis is favorable.
- ⁴ Distillate Cooler(s) should be sized to correspond with the condenser(s) used in the system.
- ⁵ Both units are required for Cooling Water System
- ⁶ Must be used with Recirculating Cooling Water System. If back pressure from cooling loop exceeds 15 psig, requires High Flow/High Pressure Condensers (consult factory).
- ⁷ For low pressure operation only.
- ⁸ Automatically regulates flow of cooling water to the condenser; should be ordered if cooling water fluctuates greatly in temperature.

TD-50
Ordering Information

The standard TD-50 models listed below have been specifically arranged to help you choose the distillation system that best satisfies your needs. Within each of the three available feed water systems, a full selection of automatic and manually controlled stills is offered for each output capacity in the series. Individual components for all standard TD-50 models are itemized in the tables. By using a standard model as a base, virtually any requirement can be met by interchanging basic still components or by adding accessories to the system.

To modify a standard model, simply indicate the part number(s) of the components to be interchanged. For example, an XR311 with oversized manifolds to accommodate expansion to four evaporated would be ordered as following: "XR311 with modification T1014."

To add accessories, refer to the accessories section with particular attention to the accompanying notes.

Accessories are ordered by indicating the appropriate part number(s) after the system catalog number. Unless otherwise specified, all TD-50 components in contact with distillate and pure vapor are fabricated in stainless steel, individual components or complete systems are also available in stainless steel or titanium. Contact US Engineered Products or your nearest US Engineered Products representative for complete details.

Expansion Contingencies

If future expansion of still capacity is anticipated, major savings can be realized by "preparing" TD-50 for expansion with the original equipment order. Steam and condensate manifolds, for example, should initially be sized according to the maximum number of evaporators projected for the system. By ordering larger manifolds, new evaporators are added without the need for re-plumbing steam inlet and return service. Condenser for 50 and 150 gph models should be similarly oversized to facilitate

expansion. By making this provision with the initial order, still expansion is more economical, all that would be required is an additional evaporator to achieve expansion. Recommended modifications for still expansion are indicated by shaded areas in the tables below.

Low Steam Pressure Operation

While TD-50 evaporators are designed to supply distillate at a rate of 50gph at an inlet steam pressure of 30-100 psig, rated still capacity can be achieved with low steam pressure by adding additional evaporators to the system. The Inlet Steam Pressure vs. Distillate Capacity graph illustrates the relationship between pressure and output. If the available inlet steam pressure is below 30psig*, the number of evaporators ordered with the system should be modified accordingly.

*The 30 psig rating is nominal. Evaporator rating has been derated to allow for normal scaling.

Raw Water Systems		Catalog Number	Basic Still Components												Wt. (lbs.)	Cu Ft.						
			Centri-Cyclone	50 gph Evaporator	Manifolds (for 2 Evap.)	Manifolds (for 3 Evap.)	Manifolds (for 4 Evap.)	50 gph Condenser	100 gph Condenser	150 gph Condenser	200 gph Condenser	Auto Controls	Auto Control / Auto Drain	Extra Auto Steam Inlet Valve	Floater	Auto Freshwater Valve	Preheater	Feedback Purifier	Feedback Purifier (150-200 gph)	T1080	T1086	T1067
50 gph (190 lph)	Manual	XQ 200	1	1																1600	190	
	Automatic	XQ 300	1	1																1775	190	
100 gph (379 lph)	Manual	XR 200	1	2	1			1												1775	190	
	Automatic	XR 300	1	2	1			1												1975	190	
150 gph (568 lph)	Manual	XS 200	1	3	1			1						1						2100	250	
	Automatic	XS 300	1	3	1			1		1			2							2450	250	
200 gph (757 lph)	Manual	XT 200	1	4				1		1										2400	250	
	Automatic	XT 300	1	4				1		1			3							2575	250	

Pretreated Water Systems		Catalog Number	Basic Still Components												Wt. (lbs.)	Cu Ft.						
			Centri-Cyclone	50 gph Evaporator	Manifolds (for 2 Evap.)	Manifolds (for 3 Evap.)	Manifolds (for 4 Evap.)	50 gph Condenser	100 gph Condenser	150 gph Condenser	200 gph Condenser	Auto Controls	Auto Control / Auto Drain	Extra Auto Steam Inlet Valve	Floater	Auto Freshwater Valve	Preheater	Feedback Purifier	Feedback Purifier (150-200 gph)	T1080	T1086	T1067
50 gph (190 lph)	Manual	XQ 211	1	1																1725	190	
	Automatic	XQ 311	1	1				1						1	1	1				1825	190	
100 gph (379 lph)	Manual	XR 211	1	2	1			1						1	1	1				2075	190	
	Automatic	XR 311	1	2	1			1					1	1	1	1				2325	190	
150 gph (568 lph)	Manual	XS 211	1	3	1			1						1	1	1				2300	250	
	Automatic	XS 311	1	3	1			1		1			2	1	1	1				2425	250	
200 gph (757 lph)	Manual	XT 211	1	4				1		1				1	1	1				2750	250	
	Automatic	XT 311	1	4				1		1			3	1	1	1				2875	250	

Condensate Return Systems ²		Catalog Number	Basic Still Components												Wt. (lbs.)	Cu Ft.						
			Centri-Cyclone	50 gph Evaporator	Manifolds (for 2 Evap.)	Manifolds (for 3 Evap.)	Manifolds (for 4 Evap.)	50 gph Condenser	100 gph Condenser	150 gph Condenser	200 gph Condenser	Auto Controls	Auto Control / Auto Drain	Extra Auto Steam Inlet Valve	Floater	Auto Freshwater Valve	Preheater	Feedback Purifier	Feedback Purifier (150-200 gph)	T1080	T1086	T1067
50 gph (190 lph)	Manual	XQ 230	1	1																2225	225	
	Automatic	XQ 430	1	1				1					1							2350	225	
100 gph (379 lph)	Manual	XR 230	1	2	1			1						1	1					2400	225	
	Automatic	XR 340	1	2	1			1					1	1						2700	225	
150 gph (568 lph)	Manual	XS 230	1	3	1			1						1	1					2925	285	
	Automatic	XS 430	1	3	1			1		1			2							3125	285	
200 gph (757 lph)	Manual	XT 230	1	4				1		1										3350	285	
	Automatic	XT 430	1	4				1		1			3							3650	285	

Shaded areas indicate expansion considerations.

TD-50 Accessories

Puromatic Diverter	T1075
High Purity Chamber	T1070
50 gph Distillate Cooler	T1035 ⁵
100 gph Distillate Cooler	T1036
150-200 gph Distillate Cooler	T1037
Air Heat Exchange Module	T1150 ⁶
Expansion Tank	T1175
50 gph Pressure Condenser	T1160 ⁷
100 gph Pressure Condenser	T1161
150 gph Pressure Condenser	T1162
200 gph Pressure Condenser	T1163
Manifolds for 5 Evap.	T1015 ⁸
Manifolds for 6 Evap.	T1016
Condensate Feedback	T1065 ⁹
Extra Auto Cooling Water Valve	01075 ¹
Temperature Regulating Valve (50-100 gph)	T1080 ⁹
(150-200 gph)	T1081
Extra Tube Bundle	02113

Notes:

- ¹When adding evaporators or condensers to automatic stills, an Extra Auto Steam Inlet Valve must be ordered with each evaporator; an Extra Auto Cooling Water Valve must be ordered with each condenser.
- ²Uses regenerable purifying cartridges.
- ³Condensate Return Systems without the purifiers are available if steam condensate analysis is favorable.
- ⁴For automatic stills with 200 gph condensers Auto Control/Auto Drain is Part No. T1049; Auto Control/Manual Drain is Part No. T1048.
- ⁵Distillate Cooler(s) should be sized to correspond with the condenser(s) used in the system.
- ⁶Both units are required for Cooling Water System. For 150 and 200 gph stills, a second Air-Heat Exchanger must be ordered.
- ⁷Pressure Condensers should be substituted for standard condensers if back pressure from a closed cooling system exceeds 15 psig (1.1 kg/cm²).
- ⁸For low pressure operation only.
- ⁹Automatically regulates flow of cooling water to the condenser; should be ordered if cooling water fluctuates greatly in temperature.