

Multiple-Effect Distillation Units

MULTISTILL: MS 1250, MS 1500

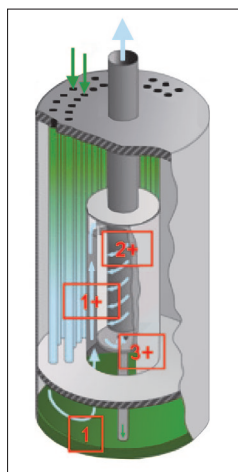


- MULTISTILL Units for 200 up to 13,200 l/h
- Energy efficient and unique BWT AQUA AG 3+ separation system
- WFI production fulfills all the latest EU criteria and US Pharmacopoeias
- High Efficiency internal Pre-heating of feed water
- Efficient droplet and impurities separation system with >200 G centrifugal action
- Optional: full access from plant supervisor system via Ethernet communication
- Compliant with cGMP, optional compliant with GAMP and 21 CFR Part 11 requirements
- Uniform, complete documentation for all systems (FAT, SAT, IQ and OQ)

The BWT AQUA AG MS distillation units are designed to produce pharmaceutical grade Water for Injection (WFI) for the preparation of parenteral solutions, dilute samples in test laboratories, final flush in washers and similar applications. Water is produced by the evaporation, purification and condensation of feed water. MS units use the unique BWT AQUA AG internal preheating and separation systems for longer life and better performance.

The BWT AQUA AG MS distillation units consist of a series of heat exchangers (columns) and a condenser mounted vertically in a frame. Preheating, evaporation and separation take place within the column, minimizing external piping. The external piping transfers plant steam, feed water, cooling water, condensate, pure steam and WFI to and from the

columns and the condenser. Automatic valves in the system are generally pneumatically operated and are controlled by the PLC-based control system. This is designed to operate automatically according to a validated program, but may also be operated manually. The MS series consistently produce WFI that meets and is typically better than Pharmacopoeia requirements. The BWT AQUA AG MS units are fully automatic in operation. The PLC control system can be delivered with documentation according to GAMP guidelines and is 21CFR Part 11 capable via Ethernet communication to client's control system. All alarms and set point parameters are entered / altered via a hierarchical password protected menu system. Data from the process may be collected from the PLC via a variety of industry standard network solutions.



BWT AQUA AG 3+ Separation System

The pre-heated "falling film" evaporation responds rapidly to load changes, and the 3+ separation system provides excellent impurity separation at all flow conditions. These features make the MS unit ideal for all WFI applications.

1 At the exit of the evaporation tubes the clean steam turns 180°. Non-evaporated feed water and large droplets are separated and fall to the bottom of the column. This effluent (typically 5–10%) is continuously discharged to drain as "blowdown", carrying away impurities from the separation system.

1+ The clean steam continues at low velocity upwards through the central tube within the column. Lower weight droplets continue to separate under gravity.

2+ The clean steam enters a tangential port to the cyclone chamber and accelerates at high velocity within the chamber. This centrifugal action further removes water droplets with impurities that drain to the base of the cyclone chamber.

3+ Finally, the steam turns again 180° and exits as pure steam from the top of the column.

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FOR YOU AND PLANET BLUE.



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Type:			MS 1250				MS 1500			
Number of columns x			4	5	6	7	4	5	6	7
Capacity at heating steam pressure of:										
	WFI Capacity	l/h	2750				3300			
	Feed water	l/h	3030				3630			
8 bar (g)	Plant Steam	kg/h	950	760	635	545	1140	915	760	655
	Cooling water	l/h	1790	825	185	0	2145	990	220	0
	WFI Capacity	l/h	2550				3060			
	Feed water	l/h	2810				3370			
7 bar (g)	Plant Steam	kg/h	870	695	580	500	1045	835	695	595
	Cooling water	l/h	1660	765	170	0	1985	915	200	0
	WFI Capacity	l/h	2250				2700			
	Feed water	l/h	2480				2970			
6 bar (g)	Plant Steam	kg/h	755	605	505	435	905	725	605	520
	Cooling water	l/h	1465	675	150	0	1755	810	180	0
	WFI Capacity	l/h	1940				2325			
	Feed water	l/h	2140				2560			
5 bar (g)	Plant Steam	kg/h	645	515	430	370	770	615	515	440
	Cooling water	l/h	1260	585	130	0	1510	695	155	0
	WFI Capacity	l/h	1560				1875			
	Feed water	l/h	1720				2070			
4 bar (g)	Plant Steam	kg/h	510	410	340	290	610	490	410	350
	Cooling water	l/h	1010	465	100	0	1220	560	125	0
	WFI Capacity	l/h	1250				1500			
	Feed water	l/h	1380				1650			
3 bar (g)	Plant Steam	kg/h	400	320	270	230	480	385	320	275
	Cooling water	l/h	815	375	85	0	975	450	100	0

Power consumption:										
Distillation heat emission *1)	kW	19.6	23.6	27.5	31.4	19.6	23.6	27.5	31.4	
Electrical power approx. *2)	kW	3.2				3.2				
Voltage	VAC	400				400				
Frequency	Hz	50				50				

*1) Heat emission is worst case, based on experience.

*2) The electrical power depends on the pump capacity and on the feed water pressure.

Note: All capacity data is with a tolerance of +3-5%. Data is based on standard configured unit.

Feed water temperature of 20°C. Cooling water = 15°C.

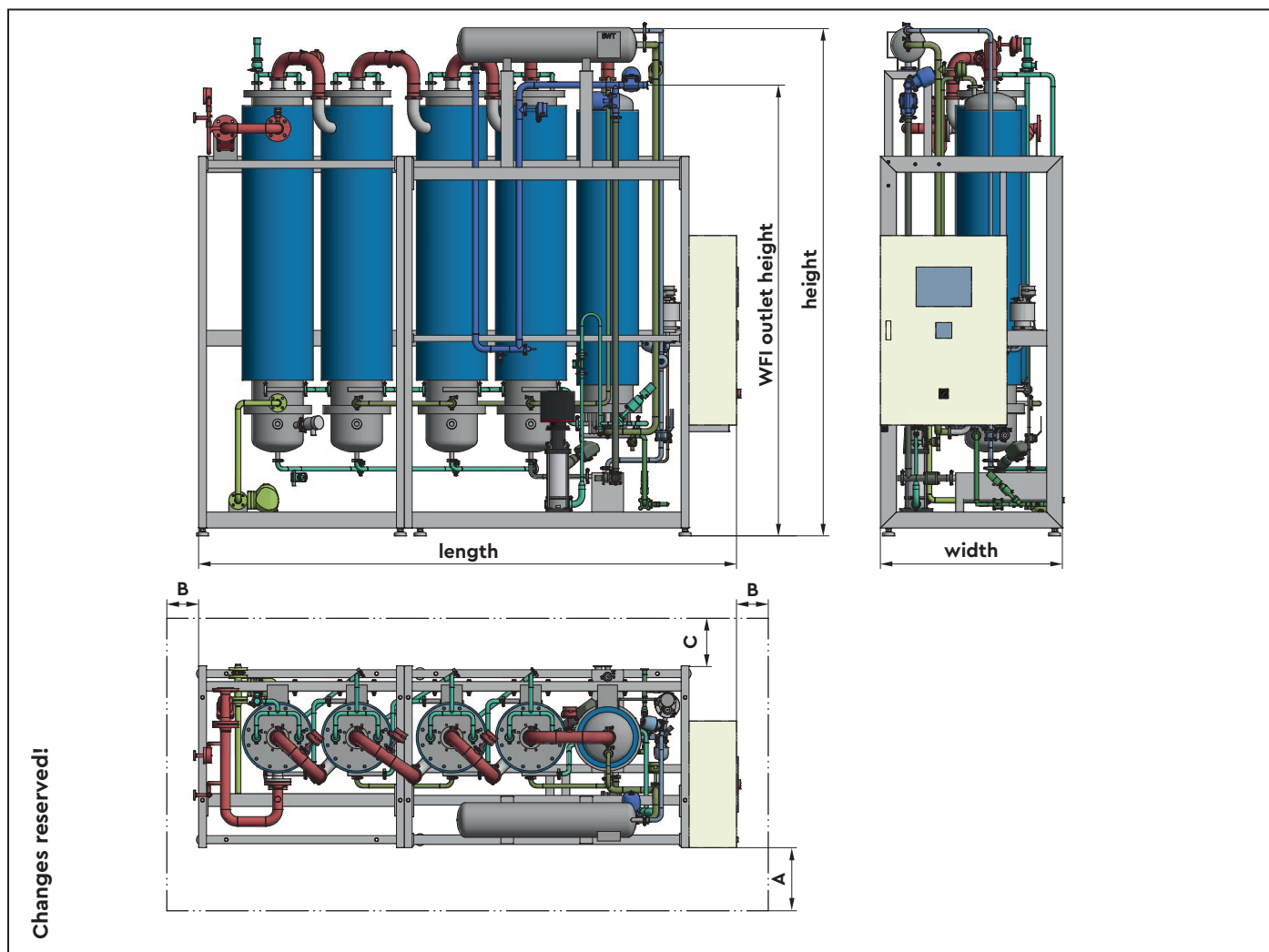
Dedicated data can be calculated based on customer's available utilities and requirements, including physical size.

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Type:		MS 1250				MS 1500			
Number of columns x		4	5	6	7	4	5	6	7
Dimensions: *3)									
Width	mm	1400				1400			
Height	mm	3800				3800			
Length	mm	4350	5050	5700	6450	4350	5050	5700	6450
Empty Weight	kg	3490	4010	4520	5160	3540	4070	4600	5260
WFI Outlet Height	mm	3300				3300			
Additional required free spaces for maintenance and installation:									
Width in front (A)	mm					1000			
Length left and right side (B)	mm					1000			
Width in behind (C)	mm					700			
Topside	mm					300			

*3) Length, width and height dimensions are based on basic unit configuration.
Dimensions and weights may vary depending on options selected.



Changes reserved!

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