

5B.175-E TES Issue 1 - 2020

# PDA Pressurized Thermophysical Deaerator



## Description

PDA Pressurised Thermophysical Deaerator series consists of pre-assembled units designed to heat the boiler feed water to a temperature above 100°C. Units operates by removing all dissolved gases and minimizing the use of chemicals. Different sizes are available, according to the quantity of feed water needed by the steam generators. Higher capacities are available on request. The unit is delivered tested and ready for installation and commissioning.

#### Versions available

Model	Tank volume	Useful capacity
PDA.03	3,000 liters	2,100 liters
PDA.05	5,000 liters	3,500 liters
PDA.08	8,000 liters	5,600 liters
PDA.10	10,000 liters	7,000 liters
PDA.12	12,000 liters	8,400 liters
PDA.15	15,000 liters	10,500 liters

#### First for Steam Solutions

## **Construction and features**

- Complete, functional and safe system.
- · Design studied to contain the overall dimensions and facilitate the operation of the equipment.
- Modulating control of pressure, temperature and level.
- Assembled package system complete with wired control panel on the unit's side.
- · Process variables controlled by PLC logic.
- Configurable options to meet specific customer needs.
- Solution designed, built and tested by Spirax Sarco Italy.
- · Unit classified as a whole and accompanied by a plate bearing the CE marking and the EC declaration of conformity.
- · Widespread Spirax Sarco qualified assistance service.

## **Design conditions**

	Design Pressure (PS)	0.5 bar g
Tank and deaerator head	Design Temperature (TS)	160°C
	Safety Valve calibration	0.5 bar g
	Design Pressure (PS)	12 bar g
Steam Loop	Design Temperature (TS)	191.7°C
	Design Pressure (PS)	10 bar g
Make-up water circuit	Design Temperature (TS)	99°C

### Operating conditions of the plant related to the performance of the different units

Model	Plant steam generation	Condensate return 80°C	Demineralized make-up water 15°C	Steam	System autonomy
PDA.03	5,000 kg/h	3,000 kg/h	1,600 kg/h	400 kg/h	min. 20 minutes
PDA.05	10,000 kg/h	6,000 kg/h	3,200 kg/h	800 kg/h	min. 20 minutes
PDA.08	15,000 kg/h	9,000 kg/h	4,800 kg/h	1,200 kg/h	min. 20 minutes
PDA.10	20,000 kg/h	12,000 kg/h	6,300 kg/h	1,700 kg/h	min. 20 minutes
PDA.12	25,000 kg/h	15,000 kg/h	7,900 kg/h	2,100 kg/h	min. 20 minutes
PDA.15	30,000 kg/h	18,000 kg/h	9,500 kg/h	2,500 kg/h	min. 20 minutes

#### Materials

Designation		Material		
	Body	Carbon steel		
Tank	Steam diffuser tube	Stainless steel		
Tank	Chemical additives input	Stainless steel		
	Saddles	Coated Carbon steel		
Deaerator head	Body	AISI 304 Stainless steel		
	Internal plates	AISI 316 Stainless steel		
Steam line – Design Temperature (TS)		Carbon Steel		
Make-up water line		Stainless steel		
Carpentry of the contro	ol panel	Sheet metal painted according to our standard RAL 7035		
Unit Chassis		Mild steel Fe 360 painted according to our std RAL 5010		

## **Technical Data**

Air supply Compressed air pressure minimum 5 bar - max 13 bar to the valve re				
Power supply	Voltage 230V single phase -50 / 60Hz			
Power supply	Installed power 0.4 kW			

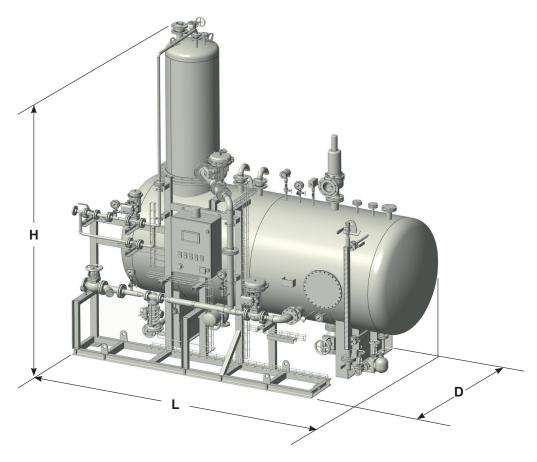
Model - Size	L Lenght	D Depth	H Height	Empty weight	Operating weight
PDA.03 - 3.000 I	3,400 mm	1,890 mm	3,531 mm	1,350 kg	3,450 kg
PDA.05 - 5.000 I	3,869 mm	1,965 mm	3,931 mm	1,770 kg	5,270 kg
PDA.08 - 8.000 I	4,515 mm	2,180 mm	4,316 mm	2,600 kg	8,200 kg
PDA.10 - 10.000 I	4,892 mm	2,290 mm	4,439 mm	3,200 kg	10,200 kg
PDA.12 - 12.000 I	5,419 mm	2,435 mm	4,966 mm	3,500 kg	11,900 kg
PDA.15 - 15.000 I	5,469 mm	2,610 mm	5,233 mm	3,900 kg	14,400 kg

### Dimensions / weights (approximate) in mm and kg

### Note:

1. In order to allow easy access to the unit, it is recommended to leave a respect distance, free of obstacles, of at least 800mm on the front and on the two side sides.

2. The above dimensions and weights refer to the basic version without options.



## Flanged connections according to UNI-EN 1092-1 PN16 / 40

	PDA.03	PDA.05	PDA.08	PDA.10	PDA.12	PDA.15
Degassed water to boilers	DN80	DN80	DN80	DN100	DN100	DN100
Primary steam line	DN50	DN50	DN65	DN80	DN80	DN80
Injection steam to head	DN80	DN100	DN150	DN150	DN200	DN200
Injection steam to tank	DN80	DN80	DN100	DN125	DN150	DN150
Condensate return	DN40	DN80	DN80	DN80	DN100	DN100
Make-up water	DN25	DN25	DN25	DN40	DN40	DN40
Manual blowdown	DN50	DN50	DN50	DN80	DN80	DN80
Automatic blowdown	DN50	DN50	DN50	DN80	DN80	DN80
Mechanical overflow (for leaks)	DN25	DN25	DN25	DN25	DN25	DN25
Vent for non-condensable gasses	DN15	DN15	DN40	DN40	DN50	DN50
Safety Valve drain	DN80	DN80	2xDN80	2xDN80	2xDN100	2xDN100
Chemical additives inputs	2xDN20	2xDN20	2xDN20	2xDN20	2xDN20	2xDN20

#### **Nomenclature and Selection Guide**

The product designation depends on the characteristics of the main elements and the options, as exemplified in the following table:

Design   A   ASME   E     Volume / Useful capacity   03   3,000 liters / 2,100 liters   03   3,000 liters / 3,000 liters   03     Volume / Useful capacity   08   8,000 liters / 15,000 liters   03   03   000 liters / 15,000 liters   03   03     Design conditions   12   12,000 liters / 15,000 liters   0		E	EN			
03   3.000 liters / 2.100 liters   03   3.000 liters / 3.600 liters   03     Volume / Useful capacity   05   5.000 liters / 3.600 liters   03   03     10   10.000 liters / 7.000 liters   12   12.000 liters / 7.000 liters   03   03     Design conditions   0   0.5 bar g / 10°C   0   0   0   0     Tank material   CS   Carbon steel   CS   0   0   0     Tank material   CS   Carbon steel   CS   CS   0   0     Tank material   CS   Carbon steel   CS   CS   CS   0     Controller   P0   PLC EATCO XV 102 series + 7' touch screen display   P0   PLC   PC     Controller   P0   PLC EATCO XV 102 series + 7' touch screen display   P0   PC   CA   Pofinet   C3   P0   PC   CA   Profinet   CA   Pofinet   C3   P0   CA   Profinet   CA   Pofinet   CA   Pofinet   CA   Pofinet   CA	Design			- E		
Volume / Useful capacity   05   5,000 liters / 3,600 liters   03     06   8,000 liters / 5,600 liters   03     12   12,000 liters / 1,000 liters / 1,000 liters   03     Design conditions   0   0,5 bar g/,100° liters   0     0   0,5 bar g/,110° C   0   0     Cardnon steel   CS   Cardnon steel   CS     SS   AISI 304 stainless steel   PN   Pheumatic (fail safe)   PN     Controller   P0   PLC EATON XV 102 series + 7° touch screen display   P0     Controller   P1   PLC Siemens S7 1200 series + 7° touch screen display   P0     Communication interface   C2   BACnet MS / TP   C0     C3   Profibus DP   C4   Profibus DP   C4     C4   Profibus DP   C4   Profibus DP   0   Cargentry in AISI 304 stainless steel   0     Cargentry in AISI 304 stainless steel with double door, digree of protection IP65   2   Cargentry in AISI 304 stainless steel with double door, digree of protection IP65   0     Statistical Control panel   I   Rock wood with aliminu						
Jolume / Useful capacity   08   8.000 liters / 5.600 liters   03     10   10,000 liters / 5.600 liters   03     12   12,000 liters / 4.000 liters   0     16   15,000 liters / 4.000 liters   0     13   3bar g / 160°C   0     14   3bar g / 160°C   0     15   15,000 liters / 7.000 liters   0     15   15,000 liters / 7.000 liters   0     16   15,000 liters / 7.000 liters   0     16   15,000 liters / 7.000 liters   0     16   15,000 liters / 7.000 liters   0     15   16,000 liters / 7.000 liters   0     16   16,000 liters / 7.000 liters   0     16   16,000 liters / 7.000 liters   0     16   16,000 liters / 7.000 liters   0     17   100 liters / 7.000 liters   0     16   160 liters / 7.000 liters / 7.000 liters   10     17   PLC EATON X/ 102 series + 7* touch screen display   P0     10   Carpentry in AISI 304 stainless steel   10				-		
Johume / Useful capacity   10   10,000 liters / 7,000 liters   03     12   12,000 liters / 7,000 liters   10,000 liters / 7,000 liters   10   0 <t< td=""><td></td><td></td><td></td><td>-</td></t<>				-		
12   12,000 liters / 8,400 liters     15   15,000 liters / 10,500 liters     0   0.5 har g / 110° C   0     Carbon steel   CS   Carbon steel   CS     SS   ALSI 304 stainless steel   CS   CS     Ype of valve actuators   PN   Pneumatic (fail safe)   PN     Polic EATON XV 102 series + 7" touch screen display   P0   PLC EATON XV 102 series + 7" touch screen display   P0     Controller   P1   PLC EATON XV 102 series + 7" touch screen display   P0   P1     C0   Modbus TCP / IP   C1   Modbus TCP / IP   C0   C0     C3   Profibus DP   C1   Modbus TCP / IP   C0   C0   C0     C3   Profibus DP   C4   Profibus DP   C4   Profibus DP   C4   Profibus DP   0   C3   Carpentry in AISI 304 stainless steel   0   0   C3   Carpentry in AISI 304 stainless steel   0   0   C3   Carpentry in AISI 304 stainless steel   0   0   C3   Carpentry in AISI 304 stainless steel steet coating   0   2 <td>/olume / Useful capacity</td> <td></td> <td></td> <td>- 03</td>	/olume / Useful capacity			- 03		
15   15,000 liters / 10,500 liters   0   0.5 bar g / 10°C   0     Design conditions   0   0.5 bar g / 10°C   0   0     fank material   CS   Carbon steel   CS   Cs   0     fype of valve actuators   PN   Pneumatic (valia stee)   PN   Pneumatic (valia stee)   PN     Schtroller   PO   PLC EATON XV 102 series + 7" touch screen display   P0   PC     Controller   P1   PLC Siemens S7 1200 series + 7" touch screen display   P0   PC     Communication interface   C2   BACnet MS / TP   C0   C0   C0     C3   Profibus DP   C1   Modbus RTU   C0   C0   C0     C4   Profibus DP   C4   Profibus DP   C4   Profibus CP   C1   PSP protection degree   0   C3   Carpentry in AlSI 304 stainless steel   0   0   C3   Carpentry in AlSI 304 stainless steel   0   0   C4   Profibus CP   2   Carpentry in AlSI 304 stainless steel   0   0   C3   Carpentry in AlSI 304 stainles				-		
Design conditions   0   0.5 bar g / 10°C   0     1   3 bar g / 16°C   0     fank material   CS   Carbon steel   CS     Type of valve actuators   PN   Pneumatic (fail safe)   PN     PLC EATON XV 102 series + 7" touch screen display   PO   PC   PN     Controller   P1   PLC EATON XV 102 series + 7" touch screen display   PO     Controller   P1   PLC EATON XV 102 series + 7" touch screen display   PO     Communication interface   C2   BACnet MS/ TP   CO   Modbus TCP / IP   CO     C1   Modbus TCP   PO   CO   Capentry in painted metal sheet according our standard RAL7035   Metal sheet capentry painted RAL7035 with double door, IPS   O   Capentry in AISI 304 stainless steel   0   C     Electrical control panel   1   Rock wool with AISI 304 stainless steel sheet coating   2   Capentry in AISI 304 stainless steel sheet coating   2     Stead   0   Excluded   C   PN   PN   PN     Insulation   1   Rock wool with AISI 304 stainless steel sheet coating		-		-		
Design conditions   1   3 bar g / 160°C   0     Fank material   CS   Carbon steel   CS   Carbon steel   CS     Yppe of valve actuators   PN   Pneumatic (fail safe)   PN   PN     Controller   PO   PLC EATON XV 102 series + 7" touch screen display   P0     P1   PLC SATON XV 102 series + 7" touch screen display   P0     C0   Modbus TCP / IP   CC     C1   Modbus TCP / IP   CC     C3   Profinet   CC     C4   Profinet   CC     C4   Profinet   CC     C5   Carpentry in painted metal sheet according our standard RAL7035   Metal sheet carpentry painted RAL7035 with double door, iPFS protection degree     C4   Profinet   C   Carpentry in AISI 304 stainless steel   0     Stainless   Stainless steel   C   0   2     Carpentry in AISI 304 stainless steel with double door, degree of protection iPFS   2   2     Stainless   Stainless steel   C   2     Staind Vitainded   Condensate separator complete wit		-				
CS   Carbon steel   CS   Carbon steel   CS     Sign AISI 304 stainless steel   SS   AISI 304 stainless steel   PN   Pneumatic (fail safe)   PN     Schuroller   PN   Pneumatic (fail safe)   PN   PN   Pneumatic (fail safe)   PN     Controller   P0   PLC EATON XV 102 series + 7" touch screen display   P0   PC   <	Design conditions			- 0		
Single Air material   Single Air Air and Air and Air		-				
PN   Pneumatic (fail safe)   PN     EL   Electric (fail safe)   PN     Controller   P0   PLC EATON XV 102 series + 7" touch screen display   P0     P1   PLC Stemens S7 1200 series + 7" touch screen display   P0     Communication interface   C0   Modbus TCP / IP   C1   Modbus TCP / IP   C0   C0 <t< td=""><td>Fank material</td><td>_</td><td></td><td>- CS</td></t<>	Fank material	_		- CS		
Sype of valve actuators   EL   Electric (tall safe)   PN     Controller   P0   PLC EATON XV 102 series + 7" touch screen display   P0     Controller   P1   PLC Siemens S7 1200 series + 7" touch screen display   P0     Communication interface   C0   Modbus TCP / IP   C0   Modbus TCP / IP   C0     Communication interface   C2   BACnet MS / TP   C0						
EL   Electric (tall safe)     Sontroller   P0   PLC ExtON XV 102 series + 7" touch screen display   P0     Communication interface   C0   Modbus TCP / IP   C1   Modbus RTU   C0     Communication interface   C2   BACnet MS / TP   C0   C0 <t< td=""><td>Type of valve actuators</td><td></td><td></td><td>- PN</td></t<>	Type of valve actuators			- PN		
P1   PLC Siemens S7 1200 series + 7" touch screen display   P0     C0   Modbus TCP / IP   C1   Modbus TCP / IP   C2   BACnet MS / TP   C0				-		
P1   PLC Silements S7 1200 series + 7" touch screen display     Communication interface   C0   Modbus TCP / IP   C0     C3   Profibus DP   C1   Modbus RTU   C0     C3   Profibus DP   C4   Profibus DP   C0   C0     C4   Profibus DP   C4   Profibus DP   C0   C0   C0   C0   C0   C0   C1   Metal sheet carpentry painted RAL7035 with double door, degree of protection lP65   0   C0   C0   C1   Carpentry in AISI 304 stainless steel   0   2   C0   C0   C2   Carpentry in AISI 304 stainless steel with double door, degree of protection lP65   2   Carpentry in AISI 304 stainless steel with double door, degree of protection lP65   2   C0   C0   C0	Controller			- P0		
Communication interface   C1   Modbus RTU   C0     C3   Profibus DP   C1   C0     C3   Profibus DP   C1   C0     C4   Profinet   C1   Modbus RTU   C0     C3   Profibus DP   C4   Profinet   C1   C0     Carpentry in painted metal sheet according our standard RAL7035   Metal sheet carpentry painted RAL7035 with double door, IP65 protection degree   0   Carpentry in AISI 304 stainless steel   0     2   Carpentry in AISI 304 stainless steel with double door, degree of protection IP65   0   2   Carpentry in AISI 304 stainless steel with double door, degree of protection IP65   2     ansulation   1   Rock wool with AISI 304 stainless steel sheet coating   2     Options				-		
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C3   Profibus DP     C4   Profinet     C4   Profinet     0   Carpentry in painted metal sheet according our standard RAL7035     1   IP65 protection degree     2   Carpentry in AISI 304 stainless steel     3   Carpentry in AISI 304 stainless steel with double door, degree of protection IP65     0   Excluded     1   Rock wool with aluminum sheet coating     2   Rock wool with AISI 304 stainless steel sheet coating     2   Rock wool with AISI 304 stainless steel sheet coating     0   Excluded     0   Excluded     0   Excluded     0   Excluded     0   Excluded     0   Excluded (Max Pressure Design 0.5 bar g)     1   PED Certification (For 3 bar g Design Conditions)     2   3.1 Certification				-		
C4   Profinet     0   Carpentry in painted metal sheet according our standard RAL7035   1   Metal sheet carpentry painted RAL7035 with double door, IP65 protection degree   0   0     2   Carpentry in AISI 304 stainless steel   0   0     3   Carpentry in AISI 304 stainless steel   0   0     ansulation   1   Rock wool with aluminum sheet coating   2   2     Carpentry in AISI 304 stainless steel sheet coating   2   2   Rock wool with aluminum sheet coating   2   2     Deteckluded   1   Rock wool with AISI 304 stainless steel sheet coating   2   2     Deteckluded   1   Rock wool with AISI 304 stainless steel sheet coating   2   PN     PN   PN pneumatic valve   PN   PN   PN   PN     Condensate separator   0   Excluded   0   0   0     Cartification   1   PED Certification (For 3 bar g) Design Conditions)   1   1     Cartifications   1   PED Certifications   1   1     Cartification for seismic zone   0	Communication interface		BACnet MS / TP	C0		
0   Carpentry in painted metal sheet according our standard RAL7035   0     1   IP65 protection degree   0   0     2   Carpentry in AISI 304 stainless steel   0   0     3   Carpentry in AISI 304 stainless steel   0   0     3   Carpentry in AISI 304 stainless steel   0   2     ansulation   1   Rock wool with aluminum sheet coating   2   2     2   Rock wool with AISI 304 stainless steel sheet coating   2   2   2     Options   2   Rock wool with AISI 304 stainless steel sheet coating   2   2     Options   0   Excluded   PN   PN   PN   PN     PN   PN pneumatic valve   PN   PN   PN   PN   PN     Condensate separator   0   Excluded   0		C3	Profibus DP	_		
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Electrical control panel   IP65 protection degree   0   0     2   Carpentry in AISI 304 stainless steel   0   0     3   Carpentry in AISI 304 stainless steel with double door, degree of protection P65   2   2     0   Excluded   2   2   Rock wool with aluminum sheet coating   2   2     2   Rock wool with AISI 304 stainless steel sheet coating   2   PN   PN   PN   PN   PN   2   2   2   PN   2   2   2   2		0	Carpentry in painted metal sheet according our standard RAL7035			
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2 Rock wool with AISI 304 stainless steel sheet coating   Options   Lock valve on primary steam line 0 Excluded   PN PN pneumatic valve PN   EL EL electric valve 0   Condensate separator on primary steam line 0 Excluded 0   1 Condensate separator complete with Blowdown Unit 0 0   0 Excluded (Max Pressure Design 0.5 bar g) 1 0   1 PED Certifications 1 1   2 3.1 Certifications 1 1   2 3.1 Certifications 1 1   3 Welding Certifications 1 1   4 Certification for seismic zone 1 1   Fest 0 Excluded 1 1   3 PDI (Pre-Delivery Acceptance Test) attended by the Customer 0 0   Smart diagnostics N not present 11 1   11 System Diagnostics 0 0 0		0	Excluded	-		
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O   Excluded   PN   PN pneumatic valve   PN     EL   EL electric valve   0   Excluded   0   0     Condensate separator   0   Excluded   0		2	Rock wool with AISI 304 stainless steel sheet coating	-		
Lock valve on primary steam linePN PN ELPN pneumatic valve ELPN FLPN PN pneumatic valvePN 	Options					
PN   PN pneumatic valve   PN   PN pneumatic valve   PN   PR   PN   PR   PN   PR   PN   PR   PN   PR   PN   PN   PR   PN   PN   PR   PN   PR   PN   PR   PN   PR   PN   PN   PN   PR   PN   PR   PN   PN   PR   PN   PR   PN		0	Excluded			
EL   EL electric valve   0   Excluded   0   0     Condensate separator on primary steam line   0   Excluded   0		-	PN pneumatic valve	-   PN		
Condensate separator on primary steam line0Excluded01Condensate separator complete with Blowdown Unit00Excluded (Max Pressure Design 0.5 bar g)1PED Certification (For 3 bar g Design Conditions)123.1 Certifications23.1 Certifications13Welding Certifications4Certification for seismic zone14Certification for seismic zone1FAT (Factory Acceptance Test) attended by the Customer02PMI by customer specification3PDI (Pre-Delivery Inspection)04SAT performed by our engineers011Smart diagnosticsNnot present11CustomizingOOur Standard (basic version)0	on primary steam line		•	-		
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3 Welding Certifications   4 Certification for seismic zone   0 Excluded   1 FAT (Factory Acceptance Test) attended by the Customer   2 PMI by customer specification   3 PDI (Pre-Delivery Inspection)   4 SAT performed by our engineers   Smart diagnostics N   0 Our Standard (basic version)	Cortification			- 1		
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0 Excluded   1 FAT (Factory Acceptance Test) attended by the Customer   2 PMI by customer specification 0   3 PDI (Pre-Delivery Inspection) 0   4 SAT performed by our engineers 11   Smart diagnostics N not present 11   11 System Diagnostics 11 0   Customizing O Our Standard (basic version) 0				-		
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3 PDI (Pre-Delivery Inspection)   4 SAT performed by our engineers   Smart diagnostics N not present   11 System Diagnostics I1   Customizing O Our Standard (basic version) O	<b>-</b> 4	-		0		
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N   not present   I1   I1     System Diagnostics   0   Our Standard (basic version)   0				-		
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I1   System Diagnostics     Outromizing   O   Our Standard (basic version)   O	Smart diagnostics			I1		
S Customer-tailored package	Customizing		Our Standard (basic version)			
		S	Customer-tailored package			
	Selection example					