



VEP and VES Turflow Heat Exchangers

Description

The Turflow heat exchanger range is a shell & tube design consisting of straight corrugated tubes within a shell. The tubes are secured at either end of the shell by fixed tube sheets. The corrugated tube design promotes increased turbulent flow conditions to provide the Turflow's high heat transfer efficiency. The shell incorporates a bellows type expansion joint that ensures thermal stress does not damage the heat exchanger. The shell is also fitted with drain and vent connections. The heat exchanger is a gasket free design constructed wholly from stainless steel. Normally the heated fluid will flow through the tubes and the heating medium will be in the shell; both countercurrent and concurrent flow paths can be accommodated, inclusive of horizontal or vertical installation.



Standards

Turflow type heat exchangers fully comply with the requirements of the EU Pressure Equipment Directive/UK Pressure Equipment (Safety) Regulations and carry the **CE** mark when so required. All units are supplied with a Declaration of Conformity.

Turflow type heat exchangers fully comply with the requirements of the ASME Boiler and Pressure Vessel Code and carry the "U" ASME Stamp when so required.

Certification

A manufacturer's Hydraulic Test Report and Material Certification documentation is available on request.
Note: All certification/inspection requirements must be stated at the time of order placement.

EN	ASME	GB National standard
CE mark with PED EU Pressure Equipment Directive/UK Pressure Equipment (Safety) Regulations EC1935/2004 compliant tube side	ASME VIII design with U stamp certification	Chinese GB national standard

Pressure/temperature limits

	DIN	ASME
PMA Shell/Tube side	-10 °C to 200 °C 12 bar g (176 psi g)	12 bar g (176 psi g)
	200 °C to 300 °C 6 bar g (87 psi g)	6 bar g (87 psi g)
This option is to be specified at the time of order placement.		
TMA Shell/Tube side	12 bar g -10 °C to 200 °C (14 °F to 392 °F)	-10 °C to 200 °C (14 °F to 392 °F)
	6 bar g 200 °C to 300 °C (392 °F to 572 °F)	200 °C to 300 °C (392 °F to 572 °F)
This option is to be specified at the time of order placement.		
Cold hydraulic test pressure	21 bar g with design limit to 12 bar g (304.5 psi g with design limit to 174 psi g)	17.1 bar g with design limit to 12 bar g (241 psi g) with design limit to 174 psi g)
	10.5 bar g with design limit to 6 bar g (152.2 psi g with design limit to 87 psi g)	8.55 bar g with design limit to 12 bar g (124 psi g with design limit to 174 psi g)

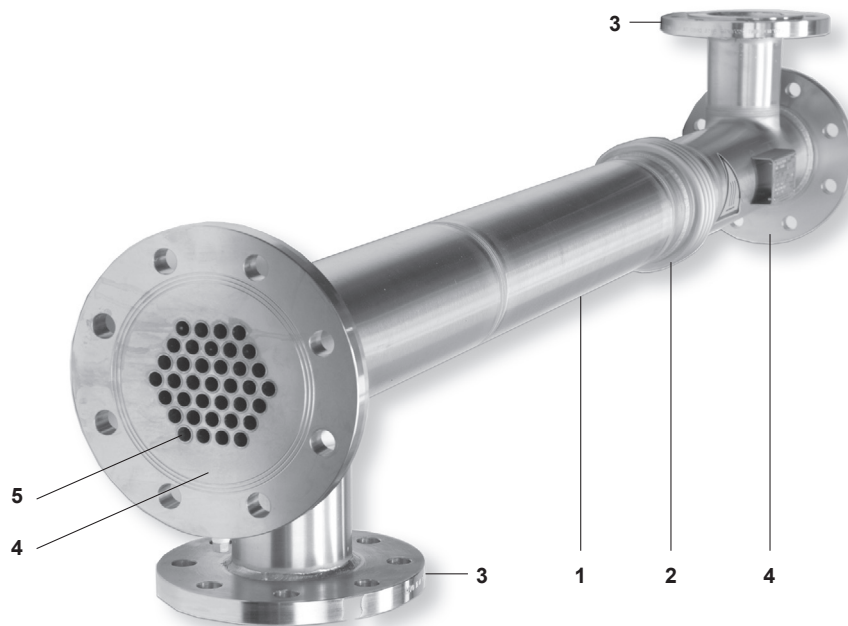
Turflow type heat exchangers

The **VEP** design is fitted with small diameter tubes.

The **VES** design is fitted with large diameter tubes.

Please contact Spirax Sarco for advice regarding selection – The most suitable unit will be selected by Spirax Sarco and will be specific for the given application.

Materials



No.	Part	Material		Surface finish	
1	Shell	Stainless steel	ASTM A312 – TP304	Pickling	
2	Expansion joint	Stainless steel	ASTM A240 – TP321	Pickling	
3	Shell side flanges	Stainless steel	ASTM A182 F304	Pickling	
4	Tube sheets/tube side flanges (Different options available according to the specific model)	SX	Stainless steel 316	ASTM A182 F316	Pickling
		SS	Stainless steel 304	ASTM A182 F304	
5	Corrugated tubes (Different options available according to the specific model)	SX	Stainless steel 316	ASTM A249-TP316L	Pickling *
		SS	Stainless steel 304	ASTM A249-TP304	

* **Note** "FB" version will undergo tube side passivation internal tube in addition to specified treatments.

Sizes and end connections

Type	Shell length (metres)	Shell Ø	Connections
VEP	0.6, 1, 1.5 and 2 *	1½", 2", 3" 4", 5", 6", 8" and 10"	Flanged EN 1092 PN16 or ASME B16.5 Class 150
VES	1, 2 and 3	2", 3" 4", 5", 6", 8" and 10"	Flanged EN 1092 PN16 or ASME B16.5 Class 150

* **Note** 0.6 and 1.5 shell lengths are not available for shell diameters 5" to 10".

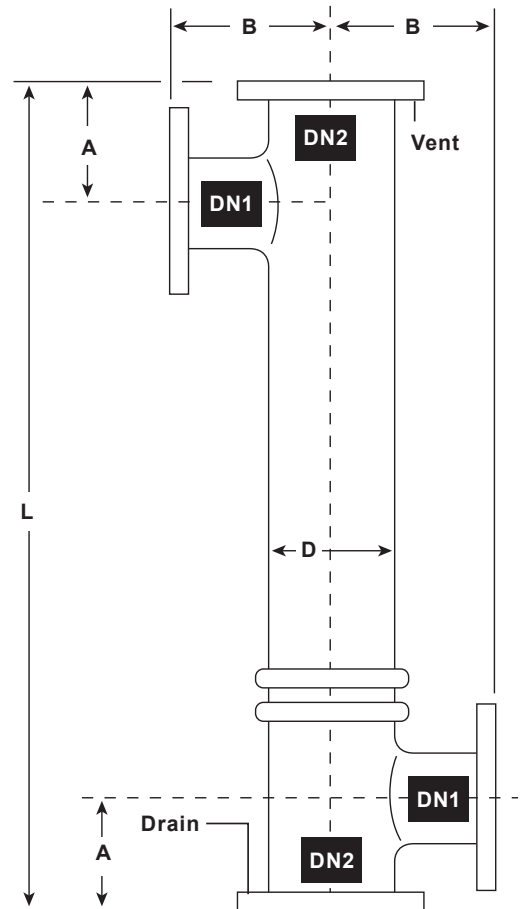
Dimension for shell size 1½" and 2" (approximate) in mm (inches)

Weight in Kg (Lbs) and Volume in Ltr (gal)

							VEP				VES			
Shell	Flange		Dimensions				Weight	Volume		PED Cat.	Weight	Volume		PED Cat.
Ø	DN1	DN2	A	B	D	L		Tube	Shell			Tube	Shell	
1½"	DN32 (1¼")	DN40 (1½")	94 (3½")	140 (5½")	48.3 (2")	600 (23½")	11.2 (24.5)	0.21 (0.05)	0.84 (0.22)	SEP	-	-	-	-
						1000 (39½")	12.4 (27.3)	0.35 (0.09)	1.28 (0.33)	SEP	-	-	-	-
						1500 (59")	14 (30.8)	0.53 (0.14)	1.85 (0.48)	SEP	-	-	-	-
						2000 (78¾")	15.5 (34)	0.71 (0.18)	2.42 (0.64)	SEP	-	-	-	-
2"	DN40 (1½")	DN50 (2")	90 (3½")	140 (5½")	60.3 (2¼")	600 (23½")	13.9 (30.6)	0.46 (1.12)	1.18 (0.31)	SEP	-	-	-	-
						1000 (39½")	15.8 (34.8)	0.76 (0.20)	1.81 (0.47)	SEP	15 (33)	0.85 (0.22)	1.86 (0.49)	SEP
						1500 (59")	18.2 (40)	1.15 (0.30)	2.59 (0.68)	SEP	-	-	-	-
						2000 (78¾")	20.5 (45)	1.53 (0.40)	3.88 (1.02)	SEP	19 (42)	1.69 (0.44)	3.42 (0.90)	SEP
						3000 (118")	-	-	-	-	22.9 (50)	2.54 (0.67)	4.98 (1.31)	I

Table notes:

- Dimension tolerance:
A = ± 3 mm,
B = ± 3 mm,
L = ± 6 mm,
Flange rotation = ± 1°,
Connection alignment = ± 3 mm.
- Flange sizes according to EN 1092-1 rating PN16, optional equivalent diameter according to ASME B16.5 rating 150 lb.
- PED categorisation Group 2 according to the classification as per the EU Pressure Equipment Directive/UK Pressure Equipment (Safety) Regulations.



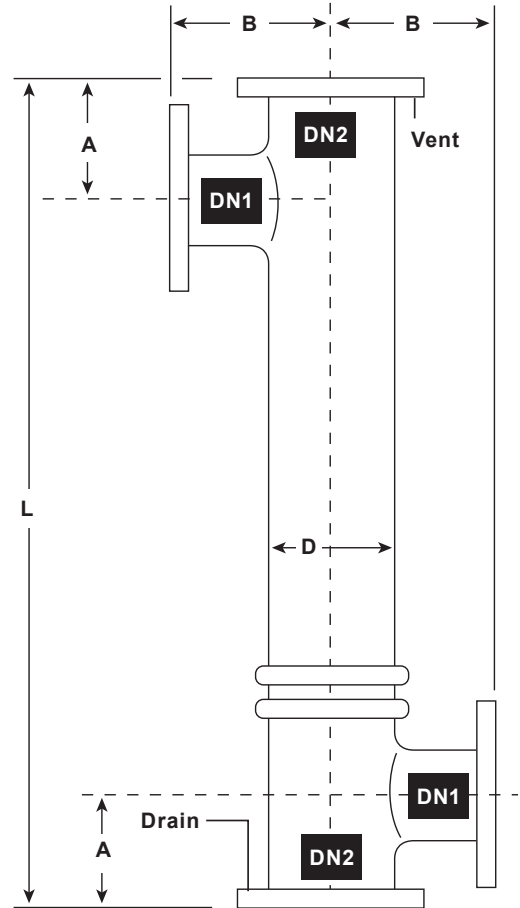
Dimension for shell size 3" and 4" (approximate) in mm (inches)

Weight in Kg (Lbs) and Volume in Ltr (gal)

							VEP				VES			
Shell	Flange		Dimensions				Weight	Volume		PED Cat.	Weight	Volume		PED Cat.
Ø	DN1	DN2	A	B	D	L		Tube	Shell			Tube	Shell	
3"	DN65 (2½")	DN80 (3")	110 (4¼")	160 (6¼")	88.9 (3½")	600 (23½")	19.7 (43)	1.07 (0.5)	2.63 (0.7)	SEP	-	-	-	-
						1000 (39½")	22.5 (49)	1.79 (0.4)	3.95 (1)	SEP	23.9 (53)	2.0 (0.52)	4.3 (1.1)	I
						1500 (59")	25.9 (57)	2.67 (0.7)	5.63 (1.5)	I	-	-	-	-
						2000 (78¾")	29.3 (65)	3.57 (0.9)	7.24 (1.9)	I	32.1 (70)	3.9 (1)	7.7 (2)	I
						3000 (118")	-	-	-	-	40.3 (88)	5.9 (1.55)	11.1 (2.93)	I
4"	DN80 (3")	DN100 (4")	125 (5")	180 (7")	114.3 (4½")	600 (23½")	28.3 (62)	1.88 (0.5)	4.15 (1.1)	SEP	-	-	-	-
						1000 (39½")	35.3 (78)	3.14 (0.8)	6.25 (1.6)	I	32.3 (70)	3.7 (0.98)	6.4 (1.7)	I
						1500 (59")	44.1 (97)	4.71 (1.2)	8.88 (2.4)	I	-	-	-	-
						2000 (78¾")	52.8 (116)	6.28 (1.6)	10.5 (2.7)	I	46.9 (103)	7.4 (1.9)	11.4 (3)	I
						3000 (118")	-	-	-	-	61.5 (135)	11.1 (2.93)	16.4 (4.3)	I

Table notes:

- Dimension tolerance:
A = ± 3 mm,
B = ± 3 mm,
L = ± 6 mm,
Flange rotation = ± 1°,
Connection alignment = ± 3 mm.
- Flange sizes according to EN 1092-1 rating PN16, optional equivalent diameter according to ASME B16.5 rating 150 lb.
- PED categorisation Group 2 according to the classification as per the EU Pressure Equipment Directive/UK Pressure Equipment (Safety) Regulations.



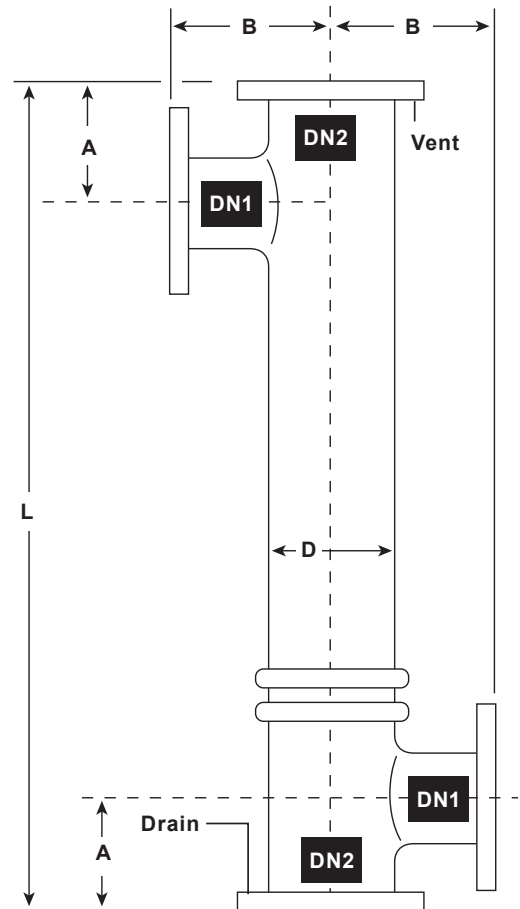
Dimension for shell size 5" and 6" (approximate) in mm (inches)

Weight in Kg (Lbs) and Volume in Ltr (gal)

							VEP				VES			
Shell	Flange		Dimensions				Weight	Volume		PED Cat.	Weight	Volume		PED Cat.
	Ø	DN1	DN2	A	B	D		L	Tube			Shell	Tube	
5"	DN80 (3")	DN125 (5")	125 (5")	200 (8")	141.3 (5½")	1000 (39½")	49 (108)	5.18 (1.3)	8.5 (2.2)	I	43.7 (96)	5.9 (1.5)	9.0 (2.3)	I
						2000 (78¾")	77.6 (171)	10.36 (2.7)	16.07 (4.2)	I	67 (147)	11.7 (3)	16.6 (4.3)	I
						3000 (118")	-	-	-	-	90.3 (198)	17.6 (4.6)	24.2 (6.4)	II
6"	DN100 (4")	DN150 (6")	140 (5½")	220 (8½")	168.3 (6½")	1000 (39½")	67.7 (149)	7.73 (2)	11.88 (3)	I	58.7 (127)	8.1 (2)	13.4 (3.5)	I
						2000 (78¾")	106.9 (236)	15.45 (4)	22.06 (5.8)	II	88.6 (194)	16.1 (4)	24.5 (6.5)	II
						3000 (118")	-	-	-	-	118.5 (260)	24.1 (6.3)	35.6 (9.4)	II

Table notes:

- Dimension tolerance:
A = ± 3 mm,
B = ± 3 mm,
L = ± 6 mm,
Flange rotation = ± 1°,
Connection alignment = ± 3 mm.
- Flange sizes according to EN 1092-1 rating PN16, optional equivalent diameter according to ASME B16.5 rating 150 lb.
- PED categorisation Group 2 according to the classification as per the EU Pressure Equipment Directive/UK Pressure Equipment (Safety) Regulations.



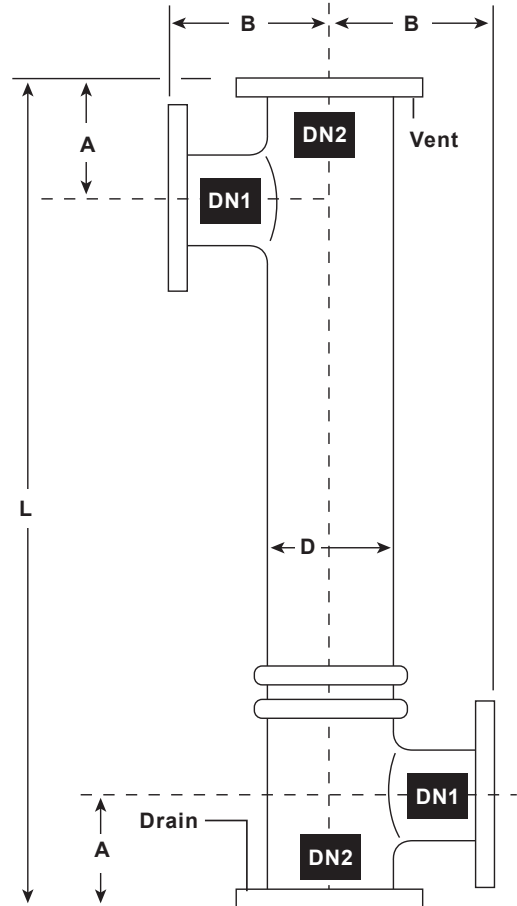
Dimension for shell size 8 and 10" (approximate) in mm (inches)

Weight in Kg (Lbs) and Volume in Ltr (gal)

							VEP				VES			
Shell	Flange		Dimensions				Weight	Volume		PED Cat.	Weight	Volume		PED Cat.
	Ø	DN1	DN2	A	B	D		L	Tube			Shell	Tube	
8"	DN125 (5")	DN200 (8")	160 (6¼")	250 (10")	219.1 (8½")	1000 (39½")	103.3 (227)	12.7 (3.3)	18.74 (5)	II	86 (189)	13.3 (3.4)	23.2 (6)	II
						2000 (78¾")	168.9 (372)	25.6 (6.6)	35.5 (9.3)	II	132 (291)	26.5 (7)	42.8 (11.3)	II
						3000 (118")	-	-	-	-	178.4 (392)	39.7 (10.5)	62.5 (16.5)	II
10"	DN150 (6")	DN250 (10")	180 (7")	280 (11")	273.0 (10¾")	1000 (39½")	171 (377)	20.2 (5.2)	29.1 (7.6)	II	142.2 (313)	19.3 (5.1)	35.6 (9.4)	II
						2000 (78¾")	270.5 (595)	40.5 (10.5)	55 (14.5)	II	209.5 (461)	38.5 (10)	67.5 (17.8)	II
						3000 (118")	-	-	-	-	276.7 (608)	57.7 (15.2)	99.3 (26.2)	III

Table notes:

- Dimension tolerance:
A = ± 3 mm,
B = ± 3 mm,
L = ± 6 mm,
Flange rotation = ± 1°,
Connection alignment = ± 3 mm.
- Flange sizes according to EN 1092-1 rating PN16, optional equivalent diameter according to ASME B16.5 rating 150 lb.
- PED categorisation Group 2 according to the classification as per the EU Pressure Equipment Directive/UK Pressure Equipment (Safety) Regulations.



Product nomenclature

Turflow type	VEP = Small diameter tubes	VES
	VES = Large diameter tubes	
Shell diameter	1½", 2", 3", 4", 5", 6", 8" and 10" = VEP range in inches	2"
	2", 3", 4", 5", 6", 8" and 10" = VES range in inches	
Tube and tube sheet material	SS = Stainless steel AISI 304	SX
	SX = Stainless steel AISI 316L	
Tube length	0.6 , 1, 1.5, 2 = VEP range in metres	3
	1, 2, 3 = VES range in metres	
Connections type	F = UNI 2278/2229 PN16 flanges (*) (**)	FE
	FE = EN1092-1 PN16 flanges (**)	
	FA = ASME B16.5 Class 150 flanges (^)	
Mechanical code	Empty = VSR (*) (**)	E
	E = EN13445 (**)	
	A = ASME VIII Div.1 (*) (^)	
Shell design pressure	V = 12 bar	V
	Empty = Other (*)	
Tube to tube sheet coupling	Empty = Expanding (^)	S
	S = Welding	
Certifications	Empty = None	
	FB = EC 1935 certificate (tube side) (**)	
PED category (not relevant for ASME version)	Empty = CE marking not supplied	CI
	CI = Category I	
	CII = Category II	
	CIII = Category III	

(*) = Option not standard for EN version – available on request

(**) = Option not standard for ASME version – available on request

(^)= Not available for "FB" version

Product selection example	VES	2"	SX	3	FE	E	V	S		CI
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How to order

Contact your local Spirax Sarco office with your application details - We will provide the correct product selection, and quotation for the Turflow exchanger that will provide optimum performance for your application.