

Vapour Heat Exchanger

Vapour Heat Exchanger

VHE

Description

The GESTRA VHE is a vapour heat exchanger with connections to utilise flash steam from discharge and exhaust vent pipework to pre-heat make-up or process water thereby recovering valuable heat energy that would otherwise be lost to atmosphere.

The GESTRA VHE will improve steam system efficiency and is environmentally friendly, reducing CO₂ + carbon emissions and removing visible discharges from the atmosphere whilst saving valuable energy. It is easy to install and provides an optimised heat transfer solution when compared to other heat exchanger designs used in similar applications.

As standard the construction is completely stainless steel and the tube side is all in AISI 316. There are no gaskets (with the exception of the piping connection) and no painted components.

The heat-exchanging surface is of straight corrugated tubes designed for low viscosity fluids and for turbulent flow working conditions. The tube sheets are of an integral type and are supplied ready for installation.

Standards

Designed and manufactured in accordance with EN 13445 code and fully complies with the requirements of the Pressure Equipment Directive (PED).

VHE 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

This product is available with a manufacturers Typical Test Report.

Note: All certification/inspection requirements must be stated at the time of order placement.

EN	ASME	GB National standard
CE mark with Pressure Equipment Directive (PED)	ASME VIII design with U stamp certification	Chinese GB national standard

Available models

Heat exchanger shell diameter	Steam mass flow		Heat load		Water flow	
	kg/h	(lb/h)	kW	(MBtu/h)	kg/h	(Gal/m)
VHE 1½" - 1F	30	(66)	19	(0.06)	804	(3.5)
VHE 2" - 1F	50	(110)	31	(0.1)	1 350	(6)
VHE 3" - 1F	100	(220)	62	(0.2)	2 690	(11.8)
VHE 4" - 1F	200	(440)	125	(0.42)	5 370	(23.5)
VHE 6" - 1F	300	(660)	187	(0.6)	8 060	(35.5)
VHE 8" - 1F	500	(1 102)	312	(1.06)	13 400	(59)
VHE 10" - 1F	750	(1 653)	469	(1.6)	20 100	(88.5)

* Performance sized with water from 50 °C to 70 °C (122 °F to 158 °F).

** Sized with maximum inlet steam velocity 15 m/s (49 ft/s).

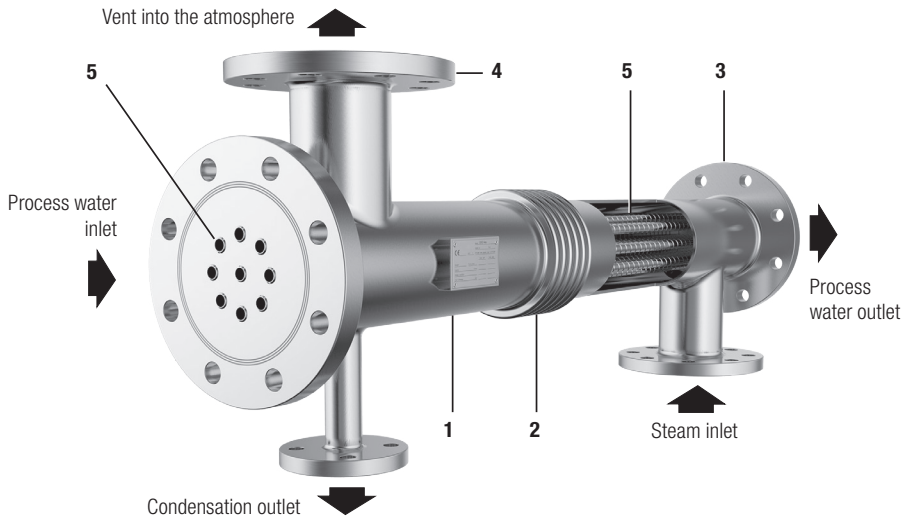
Pressure/temperature limits

TMA	Maximum allowable temperature	Shell side	6 bar g (87 psi g)	300 °C (572 °F)
		Tube side	12 bar g (174 psi g)	200 °C (392 °F)
PMA	Maximum allowable pressure	Shell side	-10 °C to +200 °C (14 °F to 392 °F)	12 bar g (174 psi g)
		Tube side		

The cold hydraulic tests are performed at 21 bar g with design limit to 12 bar g (304.5 psi g with design limit to 174 psi g) and at 10.5 bar g with design limit to 6 bar g (152.2 psi g with design limit to 87 psi g).

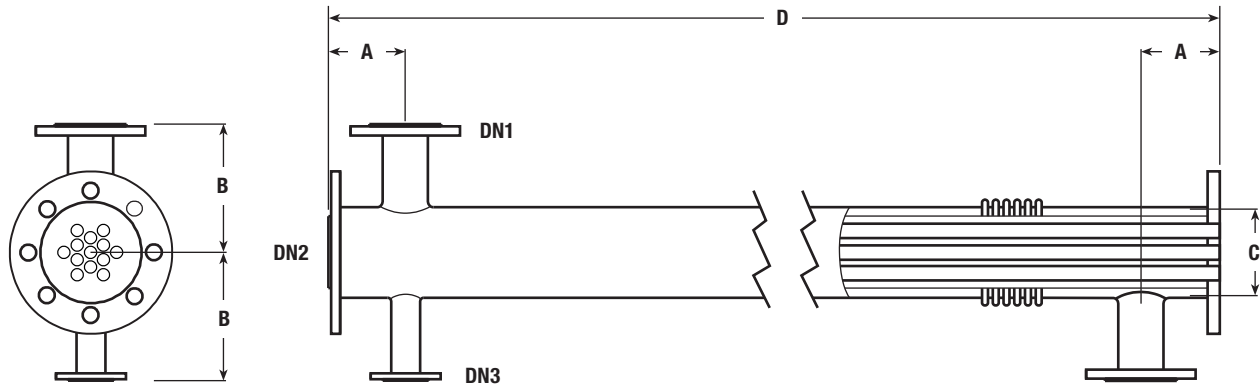
This pressure meets with the requirements of Section 7.4, attachment 1, of the Pressure Equipment Directive (PED).

Materials



No.	Part	Material	ASTM designation
1	Shell	Stainless steel	A312 TP304
2	Expansion joint	Stainless steel	A240 TP321
3	Tubesheet	Stainless steel	A182 F316
4	Shell side connections	Stainless steel	A182 F304
5	Tubes (corrugated)	Stainless steel	A249 TP316

Dimensions/weights (approximate) in mm and kg (inches and lbs)



Model	DN1	DN2	DN3	A	B	C	D	Weight
VHE 1½" - 1F	32 (1¼")	40 (1½")	15 (½")	94 (3¾")	140 (5½")	48.3 (2")	1000 (39¼")	13.2 (29)
VHE 2" - 1F	40 (1½")	50 (2")	15 (½")	90 (3½")	140 (5½")	60.3 (2¼")	1000 (39¼")	16.5 (36)
VHE 3" - 1F	65 (2½")	80 (3")	15 (½")	110 (4¼")	160 (6¼")	88.9 (3½")	1000 (39¼")	23.0 (50)
VHE 4" - 1F	80 (3")	100 (4")	25 (1")	125 (5")	180 (7")	114.3 (4½")	1000 (39¼")	36.4 (80)
VHE 6" - 1F	100 (4")	150 (6")	25 (1")	140 (5½")	220 (8½")	168.3 (6½")	1000 (39¼")	68.2 (138)
VHE 8"- 1F	125 (5")	200 (8")	32 (1¼")	160 (6¼")	250 (9¾")	219.1 (8½")	1000 (39¼")	106.0 (233)
VHE 10" - 1F	150 (6")	250 (10")	40 (1½")	180 (7")	280 (11")	273.0 (10¾")	1000 (39¼")	145.0 (319)

Table notes:

- Dimension tolerance:
A = ± 3 mm,
B = ± 3 mm,
D = ± 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 assuming a 'not dangerous fluid', Group 2 according to the classification as per the Pressure Equipment Directive (PED).

Safety information, installation and maintenance

For full details see the Installation and Maintenance Instructions supplied with the product.

Installation note:

The installation depends on the application and on the service required; however the unit must always be installed horizontally.

It is always necessary that one end of the heat exchanger is allowed to move axially, in order to permit the normal expansion of the exchangers tubes during operation.

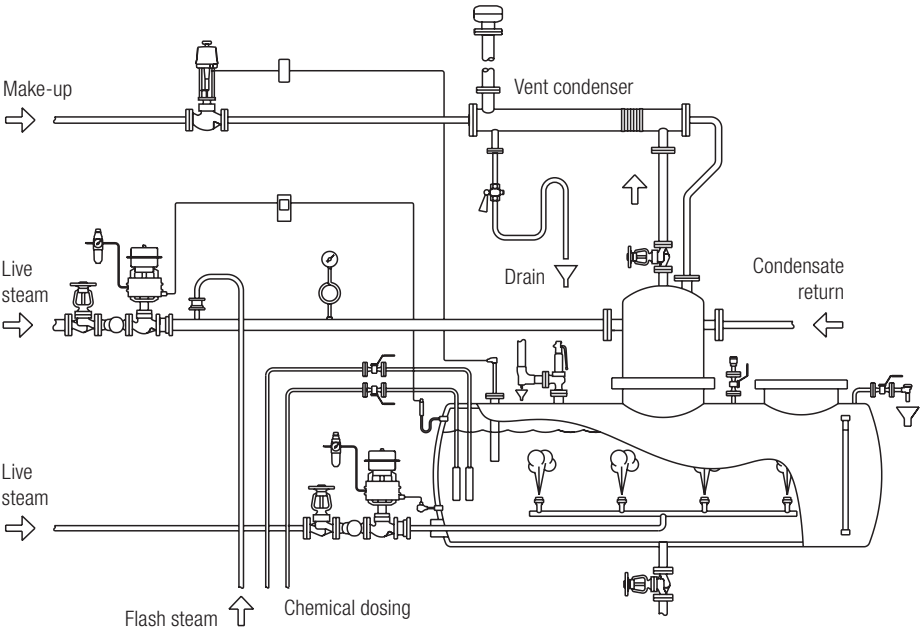
We recommend that an air vent be fitted to the unit to continuously vent during start-up and operation.

Insulation is recommended, and it is absolutely necessary, if the shell temperature is much higher than the ambient one - If insulation is required it is suggested that it be fitted on site to eradicate its damage whilst in transit.

Disposal

This product is recyclable. No ecological hazard is anticipated with the disposal of this product providing due care is taken.

Typical installation



Sizing and selection

GESTRA has developed integrated thermal modelling, sizing and selection software, to select and fully optimise an VHE heat exchanger to precisely match your application needs.

Trained technicians are available at your local GESTRA company to ensure the correct heat exchanger is always selected.

Because of GESTRA's expertise and wide product range we can provide a complete heat transfer solution, advising on the most suitable control system and ancillary equipment for your heat exchanger.

Our technicians can also advise on the suitability and sizing of heat exchangers for most gases, vapours and superheated liquids other than water.

VHE product nomenclature:

Please note that other units are available on request to suit the specifics of a particular process application.

Heat exchanger type	VHE	VHE
Shell diameter	1½", 2", 3", 4", 6", 8", 10" = Range in inches	3"
Tube and tubesheet material	SX = Stainless steel AISI 316	SX
Tube length	1 m (39") = Range in meter	1
Connection type	F* = UNI 2278/2229 PN16 flanges	FE
	FA* = ANSI B16.5 Class 150 Flanges	
	FE = EN1092-1 PN16 flanges	
Mechanical code	Empty = VSR	E
	E = EN13445	
	A* = ASME VIII Div.1	
Shell design pressure	V = 12 bar g (174 psi g)	V
Tube to tube sheet coupling	Empty = Expanding	CI
	Empty = CE marking not supplied	
PED category	CI = Category I	
	CII = Category II	

Product selection example	VHE	3"	SX	1	FE	E	V	CI
---------------------------	-----	----	----	---	----	---	---	----

* Note: Available as special order (ETO).

GESTRA AG

Münchener Straße 77, 28215 Bremen, Germany
Telefon +49 421 3503-0, Telefax +49 421 3503-393
E-mail info@de.gestra.com, Web www.gestra.com

