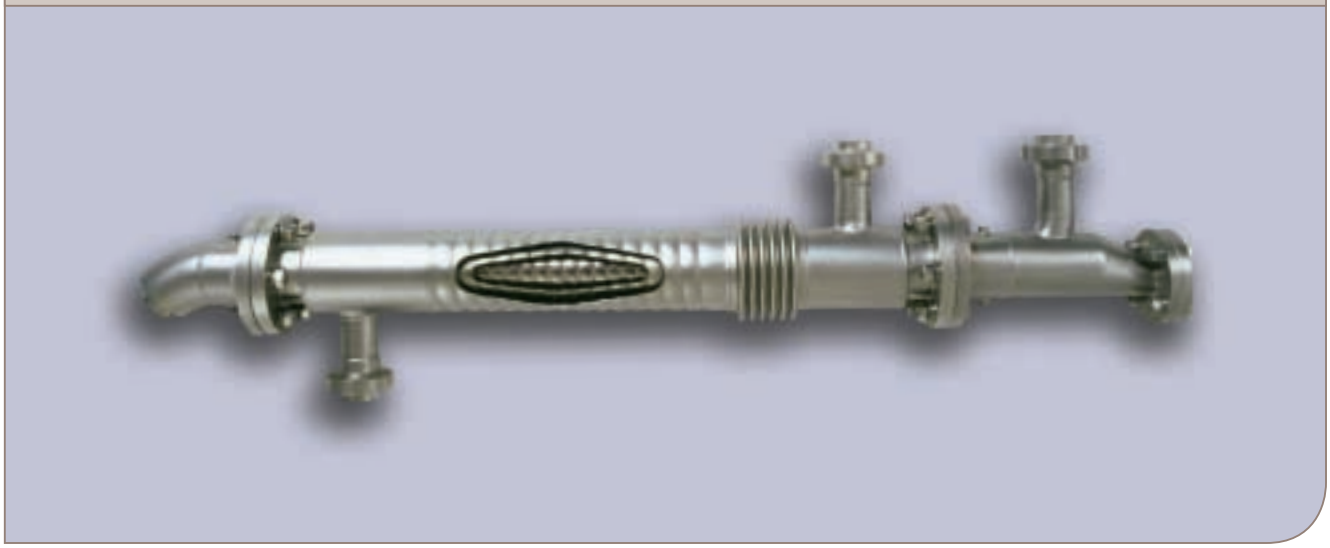
ViscoLine™ Annular Unit

The tubular heat exchanger series from Alfa Laval



ViscoLine Annular with open sectional view

Applications

The ViscoLine™ Annular unit is a tube-in-tube-in-tube heat exchanger that is ideal for the heating, cooling and pasteurization of products with high viscosity, and products that contain particulates. The unit is highly suitable for aseptic applications with steam purge and leak detectors.

These units are most commonly used in conjunction with low-acid products with average/high viscosity, such as tomato concentrate, banana paste, sourdough, chocolate sauce, mayonnaise, malt extract and tomato-based sauces in general.

Standard design

The ViscoLine Annular unit consists of three or four concentric tubes. In the case of four tubes (with low service velocity), the innermost tube is empty. The product medium flows in between two service channels, and is heated or cooled from the inside and outside at the same time. The unit features easy, full inspection of the product side.

The product medium inside the tube runs in a flow that is counter-current in relation to the service medium. If required, the product tube can feature a hard corrugated surface.

ViscoLine Annular modules are normally connected in series and grouped on a common frame.

The only spare parts needed are the O-rings in the header.

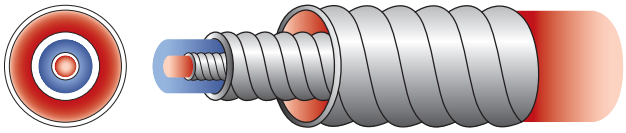
The ViscoLine Annular unit is provided with double 180° elbow joints that enable continuous heat treatment.

There is a maximum gap on the product side of 18 mm and a minimum gap of 5 mm.

Standard materials

Product side (tubes)	Stainless steel AISI 316L or SMO254
Service side (shell)	Stainless steel AISI 304 or AISI 316
Frame	Stainless steel AISI 304 (units can be angled for self-draining on request)

Other materials are available on request.



Graphic representation of the flow pattern in the ViscoLine Annular Unit.

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Technical data

Mechanical design pressure

The ViscoLine Annular unit was designed for a pressure of 25 bar (363 PSI) on the product side (tubes) and 10 bar (145 PSI) on the service side (shell), depending on the connection. The unit can, however, accommodate higher pressure ratings, depending on component thickness and connection type.

The ViscoLine Annular Unit complies with the European Pressure Equipment Directive (PED), and is entitled to bear the CE mark, though depending on the design of the connections.

It is designed for a temperature of 140°C (284°F). All units are provided with an expansion joint to absorb any thermal expansion stresses that arise.

Connections

Product side (tubes)[1)]	ISO clamps, aseptic ISO clamps, sterile flanges, Tri-Clamps and ANSI flanges
Service side (shell)[1)]	DIN 2576 flanges,ISO clamps and ANSI flanges

Other connections are available on request.

[1)] In compliance with DIN 11851

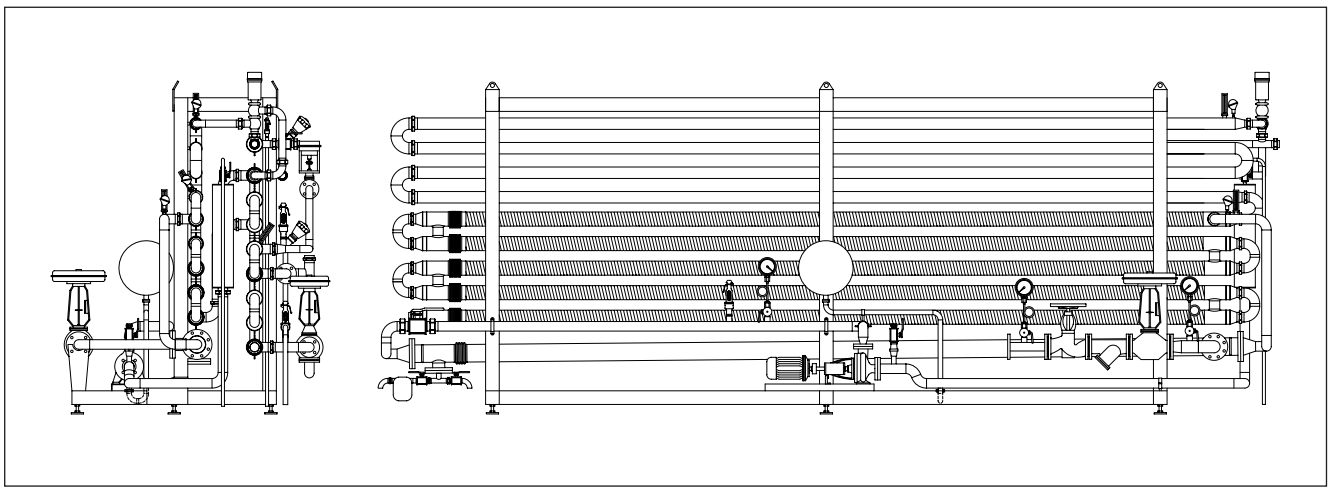
Options

A number of additional features are available for use with the ViscoLine Annular Unit:

- Protection sheets
- Thermal insulation



The ViscoLine tubular heat exchanger connected in series and grouped on a common frame



Alfa Laval offers complete installations

Designation

VLA1x76/104/129/154-6.0-316L/304-H or S

VLA:	ViscoLine Annular
1:	number of product tubes
76:	1st tube diameter (for higher flow speeds of inner heating/cooling media)
104:	2nd tube diameter
129:	3rd tube diameter
154:	4th and outer diameter of service shell
6.0:	module length (m)
316L:	material product side (tube)
304:	material service side (shell)
H:	tubes are hard corrugated
S:	tubes without corrugation (smooth)

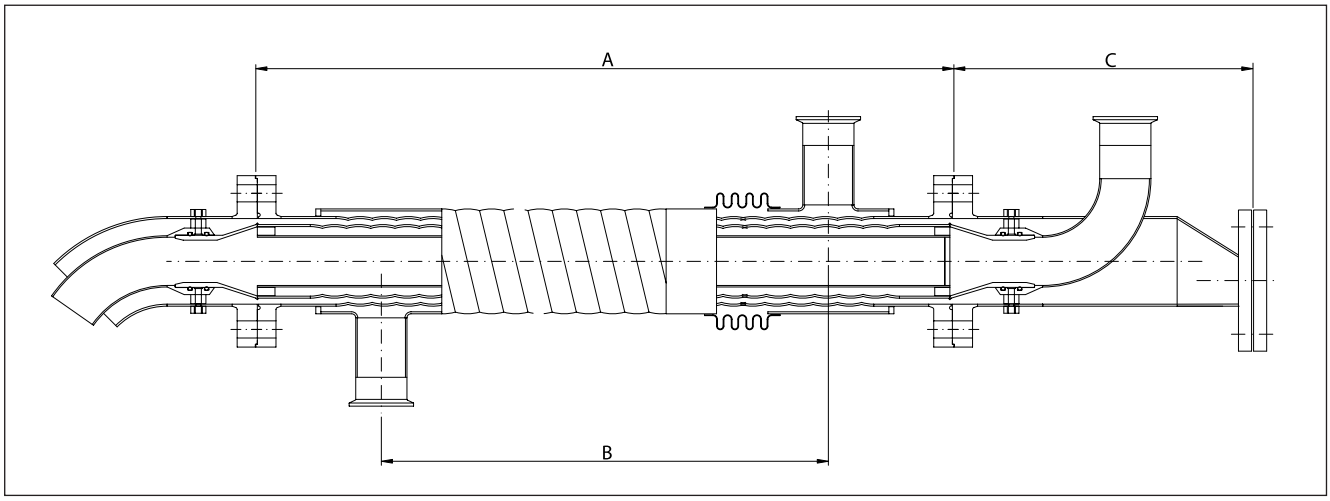
VLA1x51/76/104-6.0-316L/304-H or S

VLA:	ViscoLine Annular
1:	number of product tubes
51:	1st tube diameter
76:	2nd tube diameter
104:	3rd tube diameter
6.0:	module length (m)
316L:	material product side (tube)
304:	material service side (shell)
H:	tubes are hard corrugated
S:	tubes without corrugation (smooth)

Type	Tube Ø		Shell Ø		Module length		Volume tube		Heat transfer area	
	mm	(inches)	mm	(inches)	m	(inches)	litres	(US gallons)	m^2	(ft^2)
VLA1x38/51/76-3,0	51	(2.01)	76	(2.99)	3.0	(118)	9.4	(2.48)	0.84	(9.05)
VLA1x25/51/76-6,0	51	(2.01)	76	(2.99)	6.0	(236)	18.9	(4.99)	1.68	(18.1)
VLA1x63/76/104-3,0	76	(2.99)	104	(4.09)	3.0	(118)	19.1	(5.04)	1.32	(14.2)
VLA1x63/76/104-6,0	76	(2.99)	104	(4.09)	6.0	(236)	38.2	(10.09)	2.63	(28.4)
VLA1x51/76/104-3,0	76	(2.99)	104	(4.09)	3.0	(118)	15.7	(4.15)	1.11	(12.9)
VLA1x51/76/104-6,0	76	(2.99)	104	(4.09)	6.0	(236)	31.5	(8.32)	2.39	(25.9)
VLA1x38/76/104-3,0	76	(2.99)	104	(4.09)	3.0	(118)	18.2	(4.81)	1.08	(11.6)
VLA1x38/76/104-6,0	76	(2.99)	104	(4.09)	6.0	(236)	26.5	(7.0)	2.16	(23.3)
VLA1x63/89/104/129-3,0	104	(4.09)	129	(5.08)	3.0	(118)	19.8	(5.23)	1.82	(19.6)
VLA1x63/89/104/129-6,0	104	(4.09)	129	(5.08)	6.0	(236)	39.6	(10.45)	3.64	(39.3)
VLA1x51/76/104/129-3,0	104	(4.09)	129	(5.08)	3.0	(118)	18.4	(4.86)	1.7	(18.3)
VLA1x51/76/104/129-6,0	104	(4.09)	129	(5.08)	6.0	(236)	36.9	(9.74)	3.4	(36.7)
VLA1x38/63/104/129-3,0	104	(4.09)	129	(5.08)	3.0	(118)	17.1	(4.51)	1.58	(17.0)
VLA1x38/63/104/129-6,0	104	(4.09)	129	(5.08)	6.0	(236)	34.2	(9.03)	3.16	(34.1)
VLA1x89/114/129/154-3,0	129	(5.08)	154	(6.06)	3.0	(118)	23.8	(6.28)	2.29	(24.8)
VLA1x89/114/129/154-6,0	129	(5.08)	154	(6.06)	6.0	(236)	47.7	(12.59)	4.59	(49.5)
VLA1x76/104/129/154-3,0	129	(5.08)	154	(6.06)	3.0	(118)	23.7	(6.26)	2.2	(23.7)
VLA1x76/104/129/154-6,0	129	(5.08)	154	(6.06)	6.0	(236)	47.4	(12.51)	4.39	(47.4)
VLA1x63/89/129/154-3,0	129	(5.08)	154	(6.06)	3.0	(118)	21.3	(5.62)	2.05	(22.2)
VLA1x63/89/129/154-6,0	129	(5.08)	154	(6.06)	6.0	(236)	42.6	(11.25)	4.11	(44.4)

Measurements in mm (inches)

	A		B		C	
Type	mm	(inches)	mm	(inches)	mm	(inches)
VLA1x38/51/76-3,0	2925	(115,2)	2629	(103,5)	285	(11.2)
VLA1x25/51/76-6,0	5925	(233,3)	5629	(221,6)	285	(11.2)
VLA1x63/76/104-3,0	2925	(115,2)	2629	(103,5)	285	(11.2)
VLA1x63/76/104-6,0	5925	(233,3)	5629	(221,6)	285	(11.2)
VLA1x51/76/104-3,0	2925	(115,2)	2629	(103,5)	285	(11.2)
VLA1x51/76/104-6,0	5925	(233,3)	5629	(221,6)	285	(11.2)
VLA1x38/76/104-3,0	2925	(115,2)	2629	(103,5)	285	(11.2)
VLA1x38/76/104-6,0	5925	(233,3)	5629	(221,6)	285	(11.2)
VLA1x63/89/104/129-3,0	2925	(115,2)	2629	(103,5)	285	(11.2)
VLA1x63/89/104/129-6,0	5925	(233,3)	5629	(221,6)	285	(11.2)
VLA1x51/76/104/129-3,0	2925	(115,2)	2629	(103,5)	285	(11.2)
VLA1x51/76/104/129-6,0	5925	(233,3)	5629	(221,6)	285	(11.2)
VLA1x38/63/104/129-3,0	2925	(115,2)	2629	(103,5)	285	(11.2)
VLA1x38/63/104/129-6,0	5925	(233,3)	5629	(221,6)	285	(11.2)
VLA1x89/114/129/154-3,0	2925	(115,2)	2629	(103,5)	357	(14.1)
VLA1x89/114/129/154-6,0	5925	(233,3)	5629	(221,6)	357	(14.1)
VLA1x76/104/129/154-3,0	2925	(115,2)	2629	(103,5)	357	(14.1)
VLA1x76/104/129/154-6,0	5925	(233,3)	5629	(221,6)	357	(14.1)
VLA1x63/89/129/154-3,0	2925	(115,2)	2629	(103,5)	357	(14.1)
VLA1x63/89/129/154-6,0	5925	(233,3)	5629	(221,6)	357	(14.1)



Alfa Laval reserves the right to change specifications without prior notification.