In all shapes, sizes and standards

Alfa Laval Installation Material

Alfa Laval is your complete source for specialized fittings and tubing required in food, dairy, beverage, personal care, biotechnology and pharmaceutical process applications. Smooth, crevice-free interiors and secure, self-aligning joints are characteristic for Alfa Laval Fittings. Each offers superior corrosion-resistance and unmatched service life. Alfa Laval fittings are designed and manufactured to ensure dimensional accuracy and structural integrity, making them easy to install. Tubing is manufactured to Alfa Laval's stringent specifications, making it a perfect match for the weld fittings. Choose from a wide range of tube sizes, surface finishes and connect options. All products are labelled with a bar code, product information and manufacturing date. This provides the optimum identification and ensures that the product arrives to the job site in a clean orbital weld condition.

The Alfa Laval tubes and fittings are divided into two product ranges, Sanitary and UltraPure, The Sanitary range is suitable for most standard duties and the UltraPure range is suitable for duties with extra high demands on hygiene and cleanability.

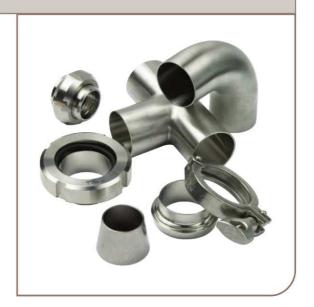
Sanitary range tubes and fittings

The Sanitary product range offers a wide range of tubes and fittings with an internal surface finish from Ra<0.8 μm to Ra< 1.6 μm . The Sanitary range has tubes and fittings according to DIN 11850, ISO 2037, BS 4825 and ASME dimension standards.

UltraPure range tubes and fittings

The UltraPure product range offers a wide range of tubes and fittings with an internal surface finish from Ra<0.4 μm to Ra< 0.8 μm , either electro polished or mechanically polished. The UltraPure range has tubes and fittings according to ISO 2037 and ASME BPE dimension standards. The UltraPure range is manufactured in compliance with the ASME BPE and ISO 2037 standards. All tubes and fittings are internally cleaned and individually capped and bagged. All product wetted stainless steel products in the UltraPure range are delivered with MTR (Mill Test Report) or with 3.1. certificate in accordance to EN 10204.

The UltraPure range is manufactured under extra strict and through quality control methods. Wall thickness integrity is maintained through the use of fabrication grade minimum wall tubing for all cold-formed tubular products. After cold forming, our tube product is resized to ensure that the ovality falls within the prescribed tolerances. End facing is provided with a machined square-cut method. This allows for the most accurate and consistent orbital weld result. All fittings are put through 100% visual inspection and ovality and squareness tolerances are inspected with calibrated equipment. Surface finish is inspected with a calibrated profilometer to ensure the Roughness average (Ra) maximum is not exceeded.



Surface specification for Alfa Laval Sanitary range Sanitary tubes

	Surface texture (Ra µm)			0			Dimension ranges			
Alfa Laval designation	Internal Surface	Welded area	External	Standard designa- tion	According to	Treatment	DIN 11850	ISO 2037	BS 4825	Tri-Clover® Sanitary ASME
ВС	< 0.8	< 1.6	pickled	ВС	DIN 11850	Annealed	X	X	×	
BD	< 0.8	< 1.6	< 1.0	BD	DIN 11850	Annealed	X	×	×	
CC	< 0.8	< 1.6	pickled	CC	DIN 11850	Not annealed	X			
CD	< 0.8	< 1.6	< 1.0	CD	DIN 11850	Not annealed	X			
Tri-Clover® Sanitary	< 0.8	< 0.8	< 0.8	No. 4 1)	ЗА	Annealed				X

¹⁾ According to 3A 33-01 section D1

Sanitary Fittings

	Surface	e designation		Dime	nsion ranges	
Product	Internal	External	DIN	ISO	BS	Tri-Clover® Sanitary ASME
	Mat	Mat	X			
Unions	Semi bright	Semi bright	X	X	X	
Unions	Mirror	Mirror				
	ЗА	3A				X
	Mat	Mat	X			
	Raw	Raw			X	
	Raw	Semi bright	X			
Develo	Raw	Polished	X	X		
Bends	Semi bright	Semi bright		X		
	Polished	Polished			X	
	Mirror	Mirror				
	3A	3A				X
	Mat	Mat	X			
	Raw	Raw			X	
Tees	Polished	Polished	X	X	X	
	Mirror	Mirror				
	3A	3A				X
	Mat	Mat	X			
	Raw	Semi bright	X			
Reducers	Raw	Polished		X	X	
	Semi bright	Semi bright		X		
	3A	3A				X

Explanation of surface designation for fittings

Alfa Laval designation	Surface te	xture (Ra µ m)	Mathad	
Alia Lavai designation	Internal	Bended area	Method	
Mat	< 1.6	Not spec.	Shot Blasted	
Raw	< 0.8 1)	Not spec.	As fabricated or tumbled	
Semi bright	< 0.8	Not spec.	As fabricated or tumbled	
Polished	< 0.8	Not spec.	Mechanically polished	
Mirror	< 0.8	Not spec.	Mechanically polished and buffed for a shiny surface	
3A	< 0.8	< 0.8	Mechanically polished or as fabricated	

¹⁾ Not guaranteed in welds.

Surface specification for Alfa Laval Tri-Clover® UltraPure range UltraPure tubes and fittings

S		ice texture (Ra	Standard	Standard designation			Tri-Clover®	Tri-Clover®	
Alfa Laval	Internal	Welded /	External	Turbular	Machined	According to	Treatment	UltraPure	UltraPure ISO
designation Internal	Bended area	LXterrial	Turbulai Macrine				ASME-BPE	2037	
PL	< 0.5	< 0.5	< 0.8	SF1	SF1	ASME BPE	Annealed	X	
PM	< 0.4 EP3)	< 0.4 EP3)	< 0.8	SF4	SF4	ASME BPE	Annealed	X	
H3o/H3	< 0.8	< 0.8	< 1.61.6	Н3о	НЗ	DIN 11866	Annealed		X
H4o/H4	< 0.4	< 0.4	< 0.8	H4o	H4	DIN 11866	Annealed		X
HE4o/HE4	< 0.4 EP3)	< 0.4 EP3)	< 0.8	HE4o	HE4	DIN 11866	Annealed		X

³⁾ Electro polished

Conversion table - Surface finish

Correlation between Grit and Ra values

Ra (µ m)	Ra (µ inch)	US Grit	UK Grit
3	125		120
2	85		180
1.65	70	80	
1.5	50		240
0.75	30		320
0.62	25	180	
0.45	18	240	
0.40	15		500
0.25	10	320	

Material specification for Alfa Laval Sanitary range

Wetted steel parts

	Dimension ranges							
Material	DIN 11850	ISO 2037	BS 4825	Tri-Clover® Sanitary ASME				
1.4301* (304)	X	X						
1.4307* (304L)	X	X	X					
1.4401* (316)			1)					
1.4404* (316L)	X	×	X					
304**				X				
316L**				X				

¹⁾ Reducers and Reducing tees are only available in 1.4401 (316)

Seal ring material for clamp fittings

	Dimension ranges							
Material	DIN 11850	ISO 2037	BS 4825	Tri-Clover® Sanitary ASME				
NBR	X	X	X					
Nitrile (Buna-N)				X				
White Nitrile (White Buna-N)				X				
EPDM	×	X	×	×				
FPM	×	×	X					
Viton®				×				
PTFE	X	X	X	X				
Silicone (Q)	X	×		×				

^{*} SF-Surface Finish. SF4: Ra < 0.375 EP

^{*} According to DIN EN 10088-1

 $^{^{\}star\star}$ According to ASTM A 269 and A 270.

Material specification for Alfa Laval Tri-Clover® UltraPure range Wetted steel parts

	Dimension ranges			
Material	Tri-Clover® UltraPure	Tri-Clover® UltraPure		
	ASME-BPE	Tri-Clover® UtraPure ISO 203		
1.4404* (316L)		X		
316L**	X			

^{*} According to DIN EN 10088-1

Gasket material in fittings

	Dimension ranges					
Material	Tri-Clover® UltraPure	Tri-Clover® UltraPure				
	ASME-BPE	Tri-Clover® UtraPure ISO 2037				
Nitrile (Buna-N)	X					
White Nitrile (White Buna-N)	X					
EPDM	X1)	X				
FPM		X				
Viton®	X ¹⁾					
White Viton®	X					
PTFE	X	X				
Silicone (Q)	X1)					

¹⁾ EPDM, Viton and Silicone available with USP Class 6 certificate - please request by order.

Chemical composition table

Material Grade		C	Si	Mn	Chemical composition in % by mass					
Material Number	Standard				Р	S	N	Cr	Ni	Мо
1.4404	DIN-EN 10088-1	≤ 0.030	≤ 1.000	≤ 2.00	0.045	≤ 0.015	≤ 0.11	16.50 - 18.50	10.00 - 13.00	2.00 - 2.50
316L	ASTM A 269	≤ 0.035	≤ 0.750	≤ 2.00	0.040	≤ 0.030		16.00 - 18.00	10.00 - 15.00	2.00 - 3.00
316L*	ASTM BPE / ASTM A 270 S-2	≤ 0.035	≤ 0.075	≤ 2.00	0.040	0.005 - 0.017		16.00 - 18.00	10.00 - 10.00	2.00 - 3.00

^{*}According to ASTM A 269 and A 270 S2. All Tri-Clover® UltraPure ASME BPEweld ends are also according to ASME BPE sulphur content 0.005-0.017%

^{**} According to ASTM A 269 and A 270 S2. All Tri-Clover® UltraPure ASME BPEweld ends are also according to ASME BPE sulphur content 0.005-0.017%

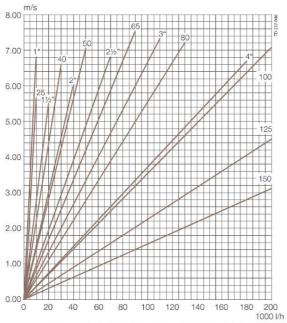
Pressure ratings (bar) of Tri-Clamp® Connections

			Service R	atings* (bar)			
Size Tube OD	1/2 & 3/4 inch	1 & 11/2 inch	2 inch	$2^{1}/_{2}$ inch	3 inch	4 inch	6 inch
13MHLA			(Screw tighter	ed to maximum)			
at 20℃	()	10.3	10.3	10.3	10.3	10.3	ST.T.S
at at 120℃		8.6	8.6	8.6	8.6	5.2	(55)
13MHHM		(Win	g nut tightened	to 2.8 Nm of torq	ue)		
at at 20℃		34.5	31.0	27.6	24.1	20.7	10.3
at at 120℃		20.7	20.7	13.8	13.4	10.3	5.2
13MHHS		(Win	g nut tightened	to 2.8 Nm of torq	ue)		
at at 20℃	151.7	41.4	37.9	31.0	24.1	20.7	-
at at 120℃	82.7	20.7	19.0	15.5	12.1	10.3	
13MHP		(Bo	Its tightened to	2.71 Nm of torqu	e)		
at at 20℃		103	68.9	68.9	68.9	55.1	20.7
at at 120℃		82.7	55.2	55.2	55.2	41.4	13.8
A13MO		(1-3" nuts tig	ghtened to 2.3	Nm., 4"-6" 3.4 Nm.	of torque)		
at at 20℃		34.5	24.1	20.7	13.8	10.3	5.2
at at 120℃		17.2	13.8	10.3	10.3	10.3	3.4
A13MHM		(Win	g nut tightened	to 2.8 Nm of torq	ue)		
at at 20℃		34.5	31	27.6	24.1	20.7	10.3
at at 120 °C	(##)	20.7	17.2	13.8	12.1	10.3	5.2

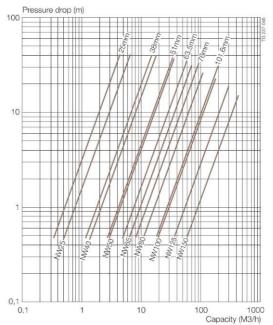
^{*} Service ratings are based on hydrostatic tests using standard-molded Buna-N material gaskets, with proper installation of ferrules, assembly of joints and absence of shock pressure. Contact Alfa Laval for service of other type and material gaskets, and for ratings at higher temperatures.

All ratings shown are dependent upon related components within the systems and proper installation. For temperatures above at 120 °C, we recommend using only 13MHP clamps.

Pressure drop and flow velocity curves



Flow velocity in ISO 2037 and DIN 11850 tubes



Pressure drop in 100 m ISO 2037 and DIN 11850 tubes