ACL® CT-SVFI

Clamp Type Sterile Visual Flow Indicator

The **CT-SVFI** (Patent Pending) is a novel sight glass that has been designed with hygienic processing in mind. The glass/o-ring/flange end is sealed utilising a sanitary clamp. As there is a mechanical stop, the gasket cannot be over compressed. The use of a clamp connection reduces the need for tools to assemble or disassemble the sight glass. Additional seals provide a secondary barrier to prevent the ingress of contaminants to the seal location.

Advantages

- Design is aseptic due to the addition of external o-ring
- Labyrinth design with capillary fluid barriers to halt external media migrating to process side
- Gasket compression is controlled with metal to metal contact
- Assembly / disassembly is very simple
- No large screw threads to clean – less COP time
- Force is applied in one direction to the gasket

Applications

- Pharmaceutical processing
- Food / dairy
- Chemical processing
- Can be welded in place and easily disassembled

Compliance

- EC 1935/2004, FDA CFR 21 177.2600 & USP VI <87> <88> Certified gaskets
- Surface finish according to ASME-BPE
- Controlled gasket extrusion to ASME-BPE CAT2
- Fully complies with the requirements of the European Pressure Equipment Directive 2014/68/EU and carries the 'CE' mark when so required
- Borosilicate glass 3.3 – pressure rating calculated according to CRN (FOS 10:1)

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ACL® CT-SVFI
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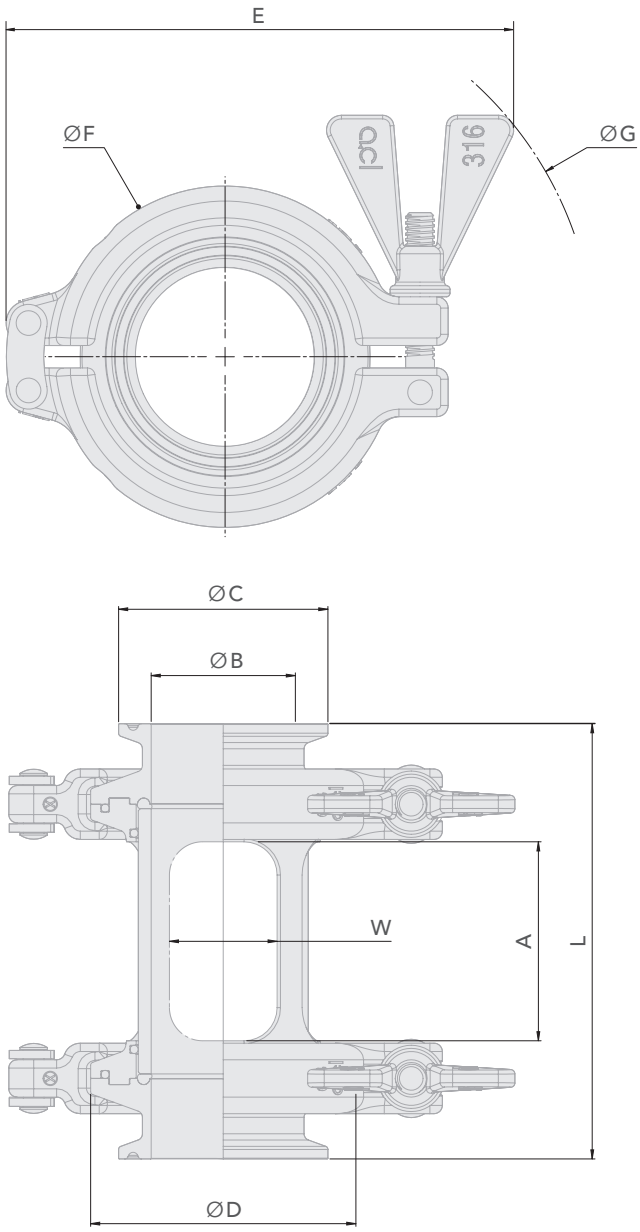
Dimensions



Clamp Type Sterile Visual Flow Indicators

Nominal size (inches)	DIMENSIONS (mm)										Working pressure (BAR)	Mass (kg)
	Window A x W	ID ØB	Mating flange ØC	Integral flange ØD	Length L	Width E	Minor OD ØF	Major OD ØG	Number of windows	Integral clamp size		
½	24 x 8	9.40	25.0	34.0	76.0	85.0	46.3	136.0	4	DN10/15/20	20.0	0.58
¾	29 x 13	15.75	25.0	50.5	87.0	102.0	62.2	154.0	4	1" - 1.5"	17.5	0.90
1	34 x 16	22.10	50.5	50.5	90.0	102.0	62.2	154.0	4	1" - 1.5"	8.5	1.01
1½	48 x 26	34.80	50.5	64.0	105.0	123.0	77.7	186.0	4	2"	8.0	1.19
2	55 x 36	47.50	64.0	77.5	120.0	140.0	91.2	200.0	4	2.5"	7.0	1.53
2½	72 x 33	60.20	77.5	91.0	151.0	150.0	104.7	212.0	6	3"	6.5	1.90
3	108 x 36	72.90	91.0	106.0	175.0	165.0	119.7	226.0	6	3.5"	6.5	2.51
4	135 x 48	97.38	119.0	130.0	200.0	191.0	143.7	256.0	6	4.5"	4.0	3.47

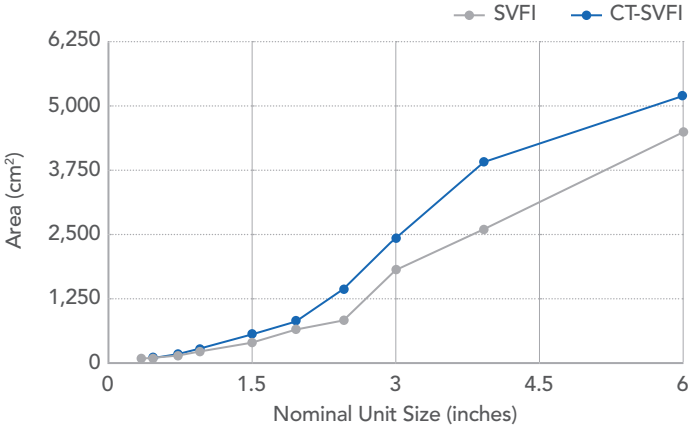
ACL® CT-SVFI

Clamp Type Sterile Visual Flow Indicator

Bill of Materials

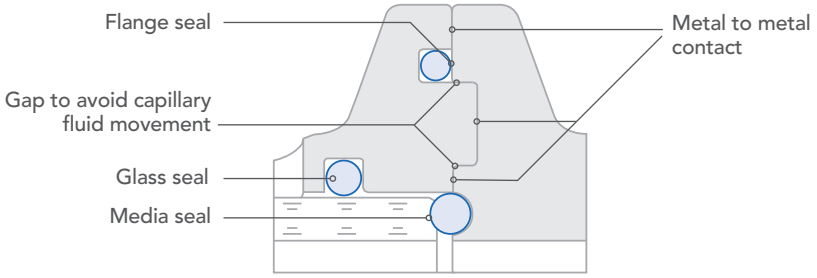
Item	Quantity	Description	Material	Available options
1	1	Glass	Borosilicate 3.3	-
2	2	Flange ends	AISI 316L	C22 / AL6XN
3	1	Body	AISI 316L	C22 / AL6XN
4	2	Sealing o-rings	EPDM	FEP / VITON / PC-SIL
5	2	Cushion o-rings	EPDM	FEP / VITON / PC-SIL
6	2	Clamp o-rings	EPDM	FEP / VITON / PC-SIL
7	2	ACL clamps	CF8M / CF8	-

Viewing Window Area – SVFI v CT-SVFI

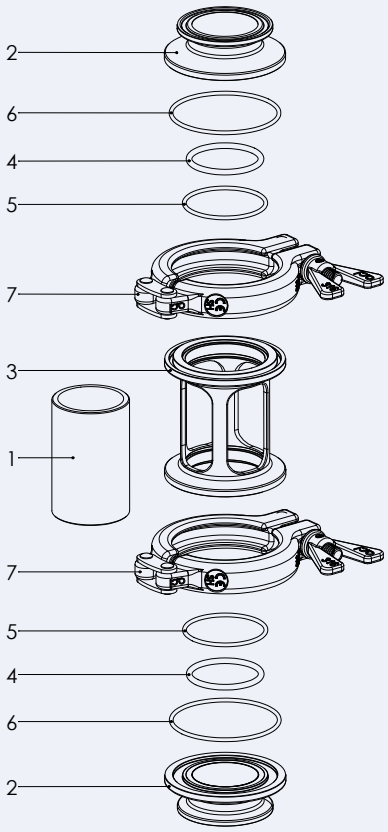


The CT-SVFI has been designed to ensure the largest viewing area possible whilst maintaining the mechanical integrity of the component.

Seal Layout



Exploded Assembly



1 Glass
2 Flange ends
3 Body
4 Sealing o-rings
5 Cushion o-rings
6 Clamp o-rings
7 ACL clamps

Quality Assurance

The ACL Quality Management System is certified according to EN ISO 9001:2015. We ensure that our suppliers also maintain a certified Quality Management System.

Materials used in the fabrication of the CT-SVFI are European sourced and conform to AD2000 W2 and PED, ensuring the highest level of reliability and safety.

Further Information

For detailed selection criteria, technical information, installation guidelines or to contact ACL, please visit our website:

www.advanced-couplings.com

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Spare Parts

½″

BOM No.	Code	Name	Qty
1	SG.SV.050.G	½″ SVFI - Glass Element - 40mm long	1
2	SG.SC.050.F	½" Clamp Type SVFI Flange Ends - 316L	2
3	SG.SC.050.B	½" SVFI Clamp Type Body - 316L	1
4	SG.SV.050.OS	½" SVFI - EPDM Small O-Ring	2
5	SG.SV.050.OL	½" SVFI - EPDM Large O-Ring	2
6	SG.SC.050.OC	½ SVFI - EPDM Clamp O-Ring	2
7	CL.SH.D010	DIN 10/15/20 SH Clamp 316	2

¾″

BOM No.	Code	Name	Qty
1	SG.SV.075.G	¾″ SVFI - Glass Element - 47mm Long	1
2	SG.SC.075.F	¾" Clamp Type SVFI Flange Ends - 316L	2
3	SG.SC.075.B	¾" SVFI Clamp Type Body - 316L	1
4	SG.SV.075.OS	¾" SVFI - EPDM Small O-Ring	2
5	SG.SV.075.OL	¾" SVFI - EPDM Large O-Ring	2
6	SG.SV.150.OL	1½" SVFI - EPDM Large O-Ring	2
7	CL.SH.0100	1" - 1½" SH Clamp 316	2

1″

BOM No.	Code	Name	Qty
1	SG.SV.100.G	1″ SVFI - Glass Element - 50mm Long	1
2	SG.SC.100.F	1" SVFI Clamp Type Flange Ends - 316L	2
3	SG.SC.100.B	1" SVFI Clamp Type Body - 316L	1
4	SG.SV.100.OS	1" SVFI - EPDM Small O-Ring	2
5	SG.SV.100.OL	1" SVFI - EPDM Large O-Ring	2
6	SG.SV.150.OL	1½" SVFI - EPDM Large O-Ring	2
7	CL.SH.0100	1″ - 1½″ SH Clamp 316	2

1 ½″

BOM No.	Code	Name	Qty
1	SG.SV.150.G	1½″ SVFI - Glass Element - 64mm Long	1
2	SG.SC.150.F	1½" SVFI Clamp Type Flange Ends - 316L	2
3	SG.SC.150.B	1½" SVFI Clamp Type Body - 316L	1
4	SG.SV.150.0S	1½" SVFI - EPDM Small O-Ring	2
5	SG.SV.150.OL	1½" SVFI - EPDM Large O-Ring	2
6	SG.SC.150.OC	1½" SVFI - EPDM Clamp O-Ring	2
7	CL.SH.0200	2" SH Clamp 316	2

2″

BOM No.	Code	Name	Qty
1	SG.SV.200.G	2″ SVFI - Glass Element - 70mm Long	1
2	SG.SC.200.F	2" SVFI Clamp Type Flange Ends - 316L	2
3	SG.SC.200.B	2" SVFI Clamp Type Body - 316L	1
4	SG.SV.200.OSN	2" SVFI - EPDM Small O-Ring	2
5	SG.SV.200.OL	2" SVFI - EPDM Large O-Ring	2
6	SG.SC.200.OC	2" SVFI - EPDM Clamp O-Ring	2
7	CL.SH.0250	2½" SH Clamp 316	2

2½″

BOM No.	Code	Name	Qty
1	SG.SV.250.G	2½″ SVFI - Glass Element - 86mm Long	1
2	SG.SC.250.F	2½" SVFI Clamp Type Flange Ends - 316L	2
3	SG.SC.250.B	2½" SVFI Clamp Type Body - 316L	1
4	SG.SV.250.OS	2½" SVFI - EPDM Small O-Ring	2
5	SG.SV.250.OL	2½" SVFI - EPDM Large O-Ring	2
6	SG.SC.250.OC	2½" SVFI - EPDM Clamp O-Ring	2
7	CL.SH.0300	3" SH Clamp 316	2

3″

BOM No.	Code	Name	Qty
1	SG.SV.300.G	3″ FVFI - Glass Element - 122.5mm Long	1
2	SG.SC.300.F	3" SVFI Clamp Type Flange Ends - 316L	2
3	SG.SC.300.V	3" SVFI Clamp TYpe Body - 316L	1
4	SG.SC.300.OS	3" SVFI - EPDM Seal O-Ring	2
5	SG.SV.300.OL	3" SVFI - EPDM Large O-Ring	2
6	SG.SC.300.OC	3" SVFI - EPDM Clamp O-Ring	2
7	CL.SH.0350	3½" SH Clamp 316	2

4″

BOM No.	Code	Name	Qty
1	SG.SV.400.G	4″ SVFI - Glass Element - 147.5mm Long	1
2	SG.SC.400.F	4" SVFI Clamp Type Flange Ends - 316L	2
3	SG.SC.400.B	4" SVFI Clamp Type Body - 316L	1
4	SG.SV.400.OS	4" SVFI - EPDM Small O-Ring	2
5	SG.SV.400.OL	4" SVFI - EPDM Large O-Ring	2
6	SG.SC.400.OC	4" SVFI - EPDM Clamp O-Ring	2
7	CL.SH.0450	4½" SH Clamp 316	2

6″

BOM No.	Code	Name	Qty
1	SG.FV.600.G	6″ FVFI - Glass Element	1
2	SG.SC.600.F	6" SVFI Clamp Type Flange Ends - 316L	2
3	SG.SC.600.B	6" SVFI Clamp Type Body - 316L	1
4	SG.SV.600.OS	6" SVFI - EPDM Small O-Ring	2
5	SG.SV.600.OL	6" SVFI - EPDM Large O-Ring	2
6	SG.SC.600.OC	6" SVFI - EPDM Clamp O-Ring	2
7	CL.SH.0658	6 5/8" SH Clamp 316 (Single Bolt)	2

ACL® Curved SVFI

Curved Sterile Visual Flow Indicator

The **Curved SVFI** has been developed to overcome issues inherent in the processing industry. As it can be difficult to view the middle of a bend without equipment such as boroscopes, it is not easy to ensure the cleanliness of a system. Surface finish cannot be guaranteed at the middle of a bend as it is inaccessible to measuring equipment and not all bends are 'piggable', due to their manufacturing method.

All of these points can be overcome by using an ACL Curved SVFI.

Advantages

- Super fine finish >0.01Ra across the entire media contact face
- Transparent (due to borosilicate glass)
- The Curved SVFI is piggable
- Pressure ratings to general pharmaceutical system ratings
- Higher rouging corrosion resistance than stainless steel

Applications

- Pharmaceutical processing
- Food / dairy
- Chemical processing

Compliance

- EC 1935/2004, FDA CFR 21 177.2600 & USP VI <87> <88> Certified gaskets
- Surface finish according to ASME-BPE
- Controlled gasket extrusion to ASME-BPE CAT2
- Fully complies with the requirements of the European Pressure Equipment Directive 2014/68/EU and carries the 'CE' mark when so required
- Borosilicate glass 3.3 – pressure rating calculated according to CRN (FOS 10:1)

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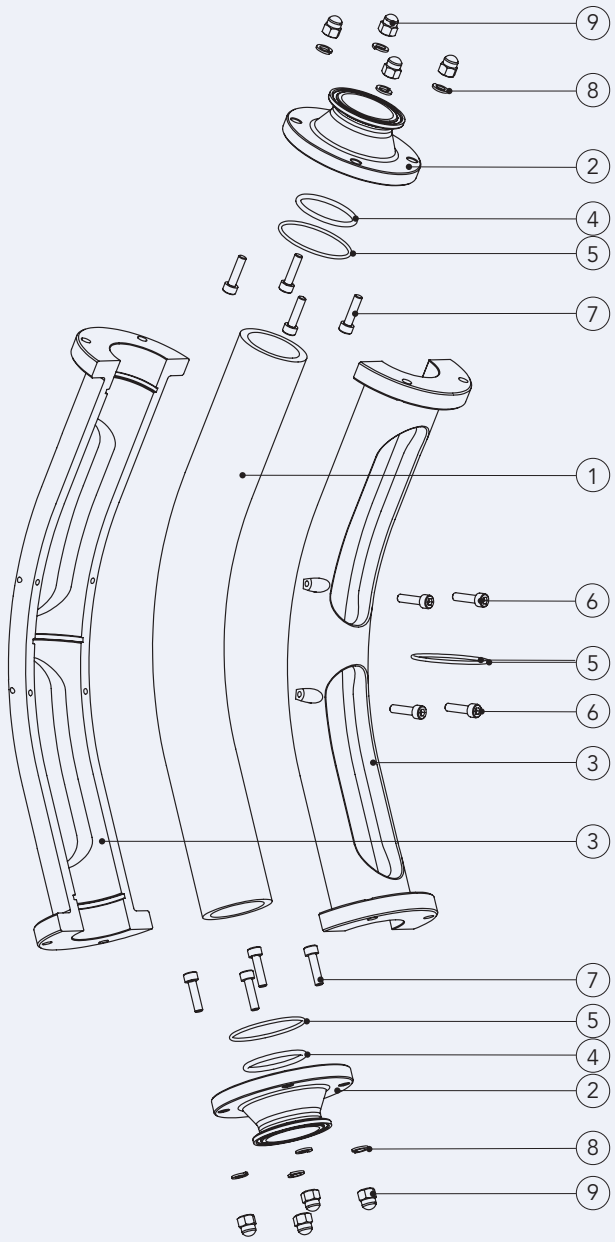
ACL® Curved SVFI

Curved Sterile Visual Flow Indicator

Exploded Assembly



Bill of Materials

Item	Quantity	Description	Material	S/FInish - Grade	Available options
1	1	DURAN® Glass bend	Borosilicate 3.3	Flame polished	-
2	2	C-SVFI Flange end	AISI 316L	SF4 - 0.38Ra EP	C22 / AL6XN
3	1	Body	AISI 316L	0.8Ra	C22 / AL6XN
4	2	Sealing o-rings	EPDM	FDA / USP VI	FEP / VITON / PC-SIL
5	3	Cushion o-rings	EPDM	FDA / USP VI	FEP / VITON / PC-SIL
6	4	M5 SKT Cap screw	AISI 304	A2-70	-
7	8	M6 SKT Cap screw	AISI 304	A2-70	-
8	8	M6 Spring washer	AISI 304	A2	-
9	8	M6 Domed nut	AISI 316L	0.8Ra	-

ACL® Curved SVFI
Curved Sterile Visual Flow Indicator

Glass Bends by SCHOTT

ACL has used glass bends produced from DURAN® tubing by SCHOTT in its range of visual flow indicators in order to create a new product for the pharmaceutical / food and dairy industry that can be integrated seamlessly within a hygienic processing system.

"SCHOTT offers high precision glass bends made from optimum quality DURAN® in a wide range of diameters with various bend angles ... Resistance-free flow is ensured by accurately matching the inner diameter of the glass bends to existing conveying systems. The transparency of the glass ensures simple monitoring of the material flowing through. With its food grade properties glass is perfectly suited for the food industry. High quality borosilicate glass is distinguished by its durability and its favorable price/ benefit ratio."

Source: https://www.schott.com/d/tubing/e3abe0b4-f9c8-40b8-b4b7-80ffb4d2df01/1.6/

Specification of DURAN® Tubing Glass Bends by SCHOTT

Technical Data	Specification
Glass type	Borosilicate Glass 3.3
Outside diameter	1.5" up to 4.3"
Lengths	20" up to 51"
Bending angle	45° and 90° *
Centre line radius	3.5" up to 24"

Physical Data	Specification
Coefficient of mean linear thermal expansion $\propto$ (20°C; 300°C) DIN ISO 7991	3.3 10^{-6} K^{-1}
Transformation temperature T_g DIN ISO 7884-8	525°C
Density ρ at 25°C	2.23g-cm^{-3}
Modulus of elasticity E (Young's Modulus)	63-10^3 N-mm^{-2}
Thermal conductivity λ_w at 90°C	1.2 W-m^{-1}-K^{-1}
Log of electric volume resistivity (Ω-cm) at: 250°C 300°C	8.0 6.5

Chemical Resistance	Specification
Hydrolytic resistance ISO 719	Class HGB 1
Acid resistance DIN 12116	Class S 1
Alkali resistance ISO 695	Class A 2

* Other angles are available on request

The manufacturer's full specification information for this product can be found at: *www.schott.com/d/tubing/e3abe0b4-f9c8-40b8-b4b7-80ffb4d2df01/1.6/schott-duran-glass-bends-fact-sheet-english-29112017.pdf*

Quality Assurance

The ACL Quality Management System is certified according to EN ISO 9001:2015. We ensure that our suppliers also maintain a certified Quality Management System.

All materials used in the construction of the ACL Curved SVFI conform to ASME Standards. Glass pressure ratings are according to the manufacturer guidelines.

Further Information

For detailed selection criteria, technical information, installation guidelines or to contact ACL, please visit our website:

www.advanced-couplings.com

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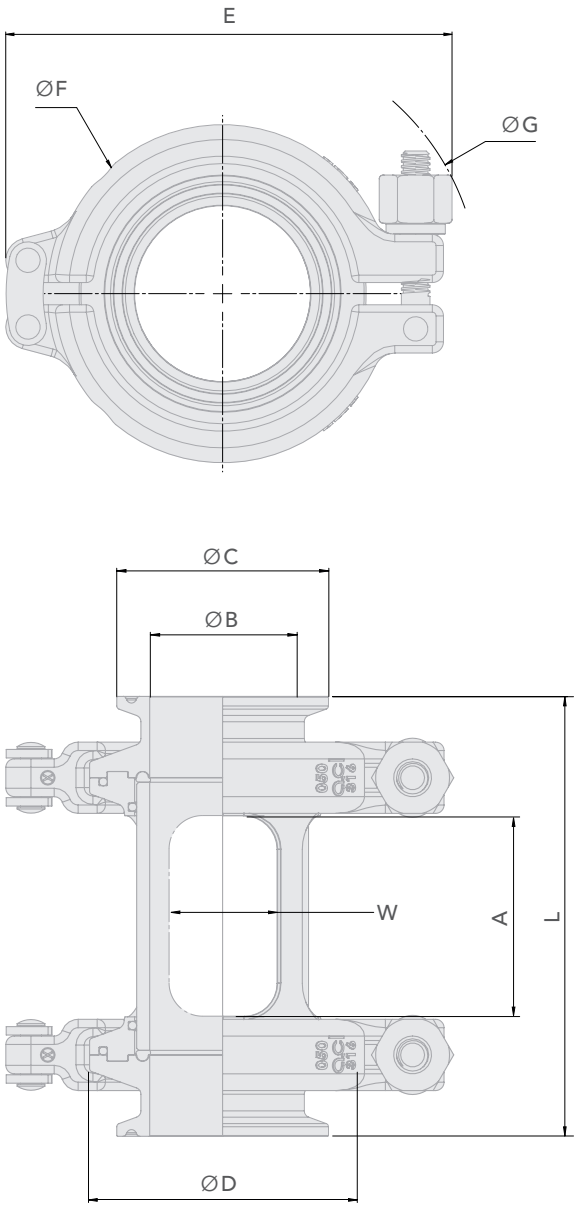
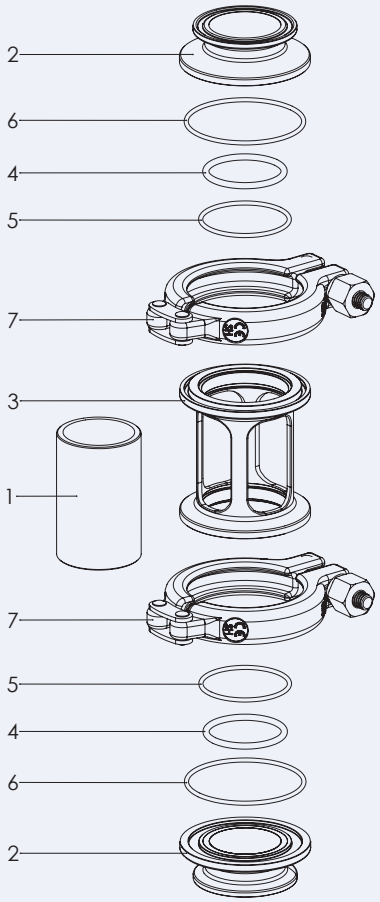
ACL® CT-SVFI

Clamp Type Sterile Visual Flow Indicator

Dimensions



Exploded Assembly



1 Glass
2 Flange ends
3 Body
4 Sealing o-rings
5 Cushion o-rings
6 Clamp o-rings
7 ACL clamps

Clamp Type Sterile Visual Flow Indicators

Nominal size (inches)	DIMENSIONS (mm)										Working pressure (BAR)	Mass (kg)
	Window A x W	ID ØB	Mating flange ØC	Integral flange ØD	Length L	Width E	Minor OD ØF	Major OD ØG	Number of windows	Integral clamp size		
½	24 x 8	9.40	25.0	34.0	76.0	85.0	46.3	106.0	4	DN10/15/20	20.0	0.58
¾	29 x 13	15.75	25.0	50.5	87.0	102.0	62.2	114.0	4	1" - 1.5"	17.5	0.90
1	34 x 16	22.10	50.5	50.5	90.0	102.0	62.2	114.0	4	1" - 1.5"	8.5	1.01
1½	48 x 26	34.80	50.5	64.0	105.0	123.0	77.7	127.0	4	2"	8.0	1.19
2	55 x 36	47.50	64.0	77.5	120.0	140.0	91.2	139.0	4	2.5"	7.0	1.53
2½	72 x 33	60.20	77.5	91.0	151.0	150.0	104.7	157.0	6	3"	6.5	1.90
3	108 x 36	72.90	91.0	106.0	175.0	165.0	119.7	171.0	6	3.5"	6.5	2.51
4	135 x 48	97.38	119.0	130.0	200.0	191.0	143.7	194.0	6	4.5"	4.0	3.47

ACL® CT-Bubble Trap

Clamp Type Bubble Trap

The **CT-Bubble Trap** (Patent Pending) has been developed to incorporate the best features of the ACL Bubble Trap and the CT-SVFI (patent pending). The glass/o-ring/flange end is sealed utilising a sanitary clamp.
As there is a mechanical stop, the gasket cannot be over-compressed. The use of a clamp connection reduces the need for tools to assemble or disassemble the bubble trap. Additional seals provide a secondary barrier to prevent the ingress of contaminants to the seal location.

Advantages

- Design is aseptic due to the addition of external o-ring
- Labyrinth design with capillary fluid barriers to halt external media migrating to process side
- Gasket compression is controlled with metal to metal contact
- Assembly / disassembly is very quick and simple
- Minimal screw threads to clean – less COP time
- Force is applied in one direction to the gasket

Applications

- Pharmaceutical processing (chromatography columns)
- Food / dairy
- Chemical processing (seal pot)

Approvals / Compliance

- EC 1935/2004, FDA CFR 21 177.2600 & USP VI <87> <88> Certified gaskets
- Surface finish according to ASME-BPE
- Controlled gasket extrusion to ASME-BPE CAT2
- This product fully complies with the requirements of the European Pressure Equipment Directive 2014/68/EU and carries the 'CE' mark when so required
- Borosilicate glass 3.3 – pressure rating calculated according to CRN (FOS 10:1)

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ACL® CT-Bubble Trap
Clamp Type Bubble Trap

Sizing Guide

The most important feature of any bubble trap installation is the selection of the correct size trap. There are two over-riding factors that ultimately dictate which size bubble trap you require:

- **Flow Rate (Q)** - Flow rate of the media entering the bubble trap, measured in litres per minute (LPM).
- **Operating Pressure** - Pressure inside the system when entering the bubble trap.

When these two factors are known a bubble trap can easily be selected from the table below.

Note: ACL stocks a variety of 'CT' sizes from ½" to 8" with variable pressure ratings and fill volumes.

Ratings / Configurations

It should be noted that each separate diameter size of bubble trap overlaps the previous size, this is particularly useful as the small diameter longer length bubble trap will always have a higher pressure rating than its larger sized diameter alternative. The data in the table below is derived from the underlying principal that the media should remain inside the bubble trap for a minimum of 15 seconds (residence time) and is generated from the basic formula:

$$Rt = \frac{Rfv}{Q} \times 60$$

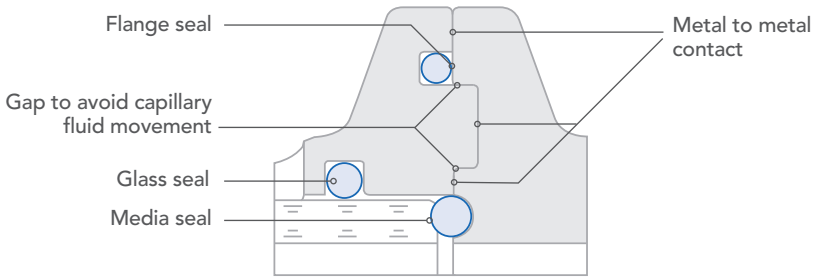
where:

Rt = Residence Time (greater than 15 seconds)
Rfv = Recommended Fill Volume (Litres)
Q = Flow Rate (Litres per minute - LPM)

Note: If your exact flow rate is not shown in the table below, the bubble trap sized for the nearest flow rate larger/quicker than yours must be selected. This will guarantee the residence time will exceed the 15 second minimum.

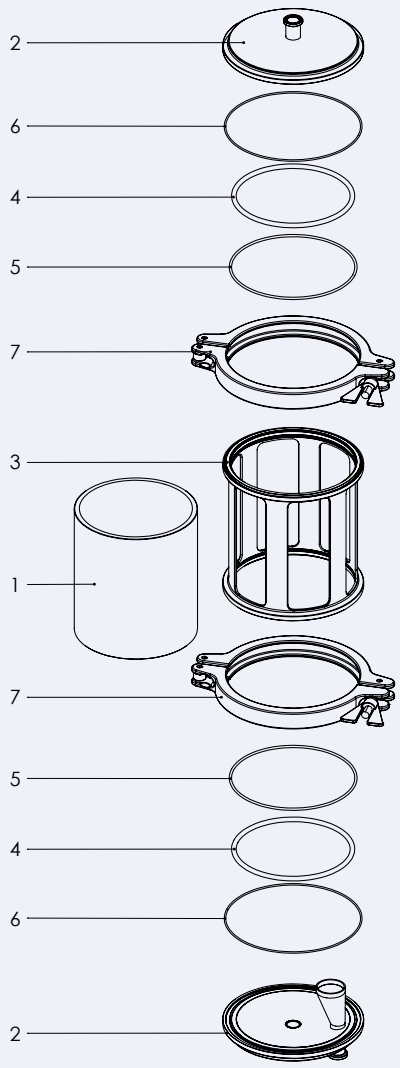
Bubble Trap Ø (inches)	Rec. Fill Volume (litres)	Flow Rate (LPM)	Operating Pressure		Base Inlet/Outlet Tri-clamp Ferrule Sizes					Lid Controls (2 Ports) Tri-clamp Ferrule Sizes					Lid Controls (3 Ports) Tri-clamp Ferrule Sizes				
			Borosilicate 3.3 Bar (PSI)	Acrylic Bar (PSI)	½"	¾"	1"	1½"	2"	½"	¾"	1"	1½"	2"	½"	¾"	1"	1½"	2"
3"	0.5	2	7.0 (101)	7.5 (109)	•	•				•	•				•	•			
	0.7	3			•	•				•	•				•	•			
	1	4			•	•				•	•				•	•			
4"	1	4	6.0 (87)	7.0 (102)	•	•	•			•	•	•	•		•	•	•		
	2	8			•	•	•			•	•	•	•		•	•	•		
	3	12			•	•	•			•	•	•	•		•	•	•		
6"	2	8	5.5 (80)	6.0 (87)		•	•	•		•	•	•	•	•	•	•	•	•	
	3	12				•	•	•		•	•	•	•	•	•	•	•	•	
	4	16				•	•	•		•	•	•	•	•	•	•	•	•	
	6	24				•	•	•		•	•	•	•	•	•	•	•	•	
	8	32				•	•	•		•	•	•	•	•	•	•	•	•	
8"	6	24	5.0 (73)	5.0 (73)			•	•	•	•	•	•	•	•	•	•	•	•	
	8	32					•	•	•	•	•	•	•	•	•	•	•	•	
	10	40					•	•	•	•	•	•	•	•	•	•	•	•	
	12	48					•	•	•	•	•	•	•	•	•	•	•	•	
10"	12	48	3.5 (51)	4.0 (58)			•	•	•	•	•	•	•	•	•	•	•	•	•
	16	64					•	•	•	•	•	•	•	•	•	•	•	•	•
	20	80					•	•	•	•	•	•	•	•	•	•	•	•	•

Seal Layout



ACL® CT-Bubble Trap
Clamp Type Bubble Trap

Exploded Assembly



Bill of Materials

Item	Qty	Description	Material	S/FInish - Grade	Available options
1	1	Glass	Borosilicate 3.3	Flame polished	Quartz / Acrylic
2	1	Bubble trap ends	AISI 316L	SF4 - 0.38Ra EP	C22 / AL6XN
3	1	Body	AISI 316L	0.8Ra	C22 / AL6XN
4	2	Sealing o-rings	EPDM	FDA / USP VI	FEP / VITON / PC-SIL
5	2	Cushion o-rings	EPDM	FDA / USP VI	FEP / VITON / PC-SIL
6	2	Clamp o-rings	EPDM	FDA / USP VI	FEP / VITON / PC-SIL
7	2	ACL clamps	CF8M / CF8	0.8Ra	-

Quality Assurance

The ACL Quality Management System is certified according to EN ISO 9001:2015. We ensure that our suppliers also maintain a certified Quality Management System. Materials used in the fabrication of the CT-Bubble Trap are European sourced and conform to AD2000 W2 and PED. This ensures the highest level of reliability and safety.

Further Information

For detailed selection criteria, technical information, installation guidelines or to contact ACL, please visit our website:

www.advanced-couplings.com

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