

Keep an Eye on Your Product

Alfa Laval LKS 105 Tank Sight Glass

5.7

Application

Sight glass, type LKS 105, is designed for pressureless storage tanks and should be installed above liquid level. The sight glass is welded into tanks or containers to facilitate inspection of product, level, processing, cleaning ect.

Standard design

The sight glass consists of a welding flange with inside thread, two seal rings as well as a glass plate and lock washer. The sight glass is completely tight-fitting.



TECHNICAL DATA

Max. product pressure: 100 kPa (1 bar).
Max. temperature: 90 °C.

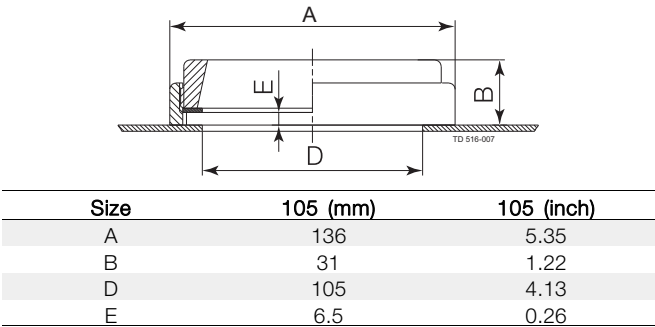
Options

- a. MiniVision light fitting with push botton for LKS (20 or 50 Watt).
- b. MiniVision light fitting without push botton for LKS (50 Watt).
- c. Collar flange fixation for MiniVision light fitting without push botton for LKS size 105.

PHYSICAL DATA

Materials
Washers: Stainless steel AISI 304.
Glass: Borasilikat
Seal rings: Para rubber, Klingerite.
Finish: Semi-bright.

Measurements
Size: ø 105 mm.
Weight: 1 kg.



Keep an Eye on Your Product

Alfa Laval Union Sight Glass based on DIN 11851

Concept

These screwed sight glasses are used for the visual control of processes inside vessels, storage tanks, mixers, reactors etc. They are used in dairies, breweries and other food industries as well as pharmaceutical and cosmetics industries.

Standard Design

The sight glass consists of a welding flange (see drawing pos. 1), a grooved collar nut (2), a glass disc (3) and two gaskets (4+5). The product wetted side of the gasket (5) is made of EPDM. The welding part (1) and glass disc (3) are delivered with a material certificate EN10204.3.1.B/2.2 as standard.



5.7

TECHNICAL DATA

Temperature

Temperature range: -10°C to +140°C (EPDM).

Pressure

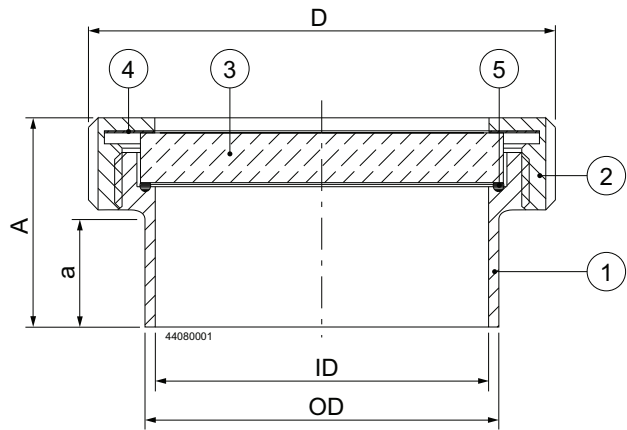
Max. product pressure: Max. 6 bar (600 kPa).
Min. product pressure: 1 mbar absolute (1 Torr).

PHYSICAL DATA

Materials

Welding flange: AISI 316L, material
certificate 3.1B/ADW2 to DIN 50049.
Grooved collar nut: AISI 304
Glass disc: Borosilicate to DIN 7080 (max.
280°C),
material certificate 2.2.
Gasket cover side: PTFE
Gasket product wetted side: . . EPDM.

Dimensions (mm)



Size DIN DN	ID	a	A	OD	D
65	65	22	49	72	112
100	100	32	65	106	148
125	125	20	60	132	178

Options

- A. Product wetted side of gasket in FPM, PTFE or Silicone.
- B. miniVISION light fitting.

Ordering

- DN size.
- Material type of product wetted gasket side.
- miniVISION light fitting, if needed.

Keep an Eye on Your Product

Alfa Laval LKGG-1 and LKGL-1 In-Line Sight Glass

Concept

In-line sight glass type LKGG-1 and LKGL-1 is used in pipelines to allow visual observation of product flow.

Standard Design

LKGG-1 consists of a perforated stainless steel shield tube fitted with a welding union at each end. A special glass tube is fixed in the shield tube so that it is unaffected by possible stresses in the pipelines. LKGL-1 has a stainless steel light fitting unit welded onto the shield tube so that the product flow can be illuminated.



TECHNICAL DATA

Temperature

Recommended max. working temperature: 110°C.
Max. thermal shock: 100°C.
Bulb: 24 V / 24 W.
Bulb socket: B 15.

Pressure

Max. test pressure (20°C): 500 kPa (5 bar).

Sizes

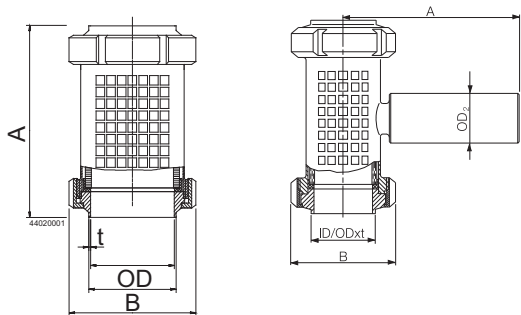
25 mm (1"), 38 mm (1½"), 51 mm (2"), 63.5 mm (2 ½") and 76 mm (3").

PHYSICAL DATA

Materials

Seals: EPDM rubber.
Steel grade: Stainless steel AISI 304 or
acidresistant steel AISI 316.
Glass disc: Borosilicate.

Dimensions (mm)



Size	25mm	38mm	51mm	63.5mm	76.1mm	101.6mm
A	175	181	188	194	200	-
B	64	77	91	106	122	148
OD	26.2	38.9	51.6	64.3	76.6	102
ID	22.5	35.5	48.5	60.5	72	97.6
t	1.85	1.7	1.55	1.9	2.3	2.2
Weight (kg)	1.0	1.5	2.0	2.5	3.6	-

Note!

- LKGL-1: +0.5 kg
- Size 101.6mm only for LKGG-1

Options

Material grades

A. Seals of Nitrile (NBR).

Ordering

Please state the following when ordering:

- Materials, AISI 304 or 316.
- Type: LKGG-1 or LKGL-1.
- Size.

Keep an Eye on Your Product

Alfa Laval Sight Glass according to DIN 28120

Concept

The bolted sight glass is used for visual control of processes inside vessels which typically are under high pressure and have temperatures. The sight glass is used in chemical, pharmaceutical and cosmetical industries as well as in dairies, breweries and other food industries.

Standard Design

The sight glass consists of a base flange, a cover flange, gaskets, a glass disc, nuts and studs. The sight glass is to be welded into or onto vessel walls and it corresponds in its construction and assembly to the dimensions and constructional guidelines of the DIN specification 28120. The respect of the DIN prescriptions for the flange thicknesses guarantees a distortion free location of the sight glass disc in case of correct welding. The pressure resistance of the glass disc is, of course, dependent on the care with which the bolts and nuts are tightened (always working on diametrically opposed pairs). For lubricated bolts, Ra = 0.1mm, the recommended tightening torque values (in Nm) are indicated in the table on page 2. The glass discs are made of borosilicate glass to DIN 7080 which means that the maximum operating temperature is 280°C. All steel parts available with material certificate EN10204. 3.1B/AD-W2.



5.7

TECHNICAL DATA

Temperature

Temperature range: -10°C to +140°C
(EPDM), (higher temperatures up to 280°C with gaskets of Klingersil).

Pressure

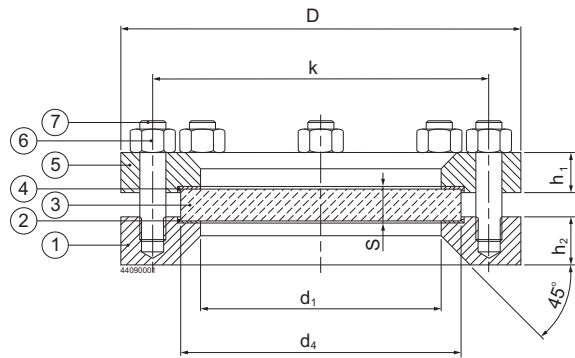
Max. product pressure: Max. 10 bar (1000 kPa).
Min. product pressure: Full vacuum.

PHYSICAL DATA

Materials

Base flange: AISI 316L, material certificate 3.1B/AD-W2.
Cover flange: AISI 321, material certificate 3.1B/AD-W2.
Gaskets: Klingersil C4400 (cover side)/EPDM (product side).
Glass disc: Borosilicate to DIN 7080, material certificate 2.2 (max. 280°C).
Bolts or studs: To DIN 938/934 in A2-70.

Dimensions (mm)



Size DIN	Pressure Rating	Viewing Diameter	Sight glass disc			Base flange and cover flange				Bolts or studs and nuts		
DN	(bar)	d1	d4	s	D	k	h1	h2	Number	Size	Tightening torque (Nm)	
100	10	125	150	20	220	180	22	30	8	M16	26	
125	10	150	175	20	250	210	25	30	8	M16	32	
150	10	175	200	25	285	240	30	36	8	M20	47	

Installation

The numbers in the following installation instructions refer to the drawing above.

After having correctly welded the base flange (1) onto or into the vessel wall, the gasket (2), the sight glass disc (3), the gasket (4) and the cover flange (5) are mounted one after the other and then the nuts (6) are tightened, always working on diametrically opposite pairs. The above indicated tightening torque values have to be strictly respected. Additional information may be taken from the DIN specification 28120.

Options

- Product wetted side of gasket in Klingsil C4400.
- miniVISION light fitting.

Ordering

When ordering, please state the following:

- DN size.
- Material type of product wetted gasket side.
- miniVISION light fitting, if needed.

Keep an Eye on Your Product

Alfa Laval miniVISION Light Fitting

Concept

The miniVISION light fittings are to be fitted on the Sight Glass acc. to DIN 28120 and Union Sight Glass based on DIN 11851 as well as on the LKS Sight Glass and can be used in any food processing and pharmaceutical industry.

Standard Design

The miniVISION is delivered in two versions: Type 53 and type 70. Type 53 provides sight and light in one assembly using the sight glass and the miniVISION type 53 light fitting together as shown in fig. 1 and 3 to 6. The other version is the type 70 to be used for light only as shown in fig. 8 to 10. The miniVISION can be ordered both separately or in packages together with either LKS or Sight Glass acc. to DIN 28120 or Union Sight Glass based on DIN 11851. Housing and cover are of stainless steel. The miniVISION light fitting is independent of internal vessel pressure, vacuum and temperature. The glass disc is resistant to high temperatures and the gaskets are resistant to corrosion and alteration.



TECHNICAL DATA

- Cable gland: .Pg 9.
- Supply voltage: .AC or DC.
- Terminal voltage: .24 V.

- Power:
- Type 53: .20 or 50 Watt.
- Type 70: .50 Watt.

- Max. current: .4.2 A.
- Bulb: .Halogen.
- Lamp sockets: .2-pin
 - Socket G4 (20W)
 - Socket GY 6.35 (50W)

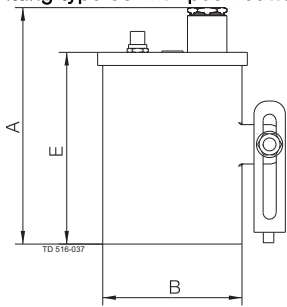
- Protection class: .IP 65.

PHYSICAL DATA

- Materials**
- Housing and cover: .AISI 304.
- Installation**
- The luminaire is normally mounted by means of its fixation elements, suitably slotted to take a fixing bolt M4. This bolt fits a drilled and tapped hole in the cover flange of Sight Glass acc. to DIN 28120 as well as in the grooved collar nut of a screwed sight glass (LKS or Union Sight Glass based on DIN 11851).
- The very small dimensions of miniVISION type 53 enable sight and light in one assembly, still providing a high lighting power. It is possible to change the bulbs without having to demount the bolted-on luminaire.
- Note!** In case of repeated use of miniVISION type 53 within a short period, the temperature raise of the housing has to be observed.

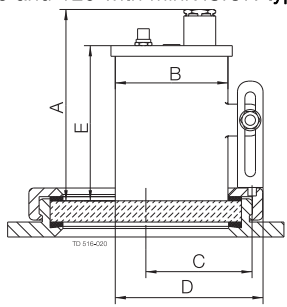
5.7

miniVISION Light Fitting type 53 with push button.



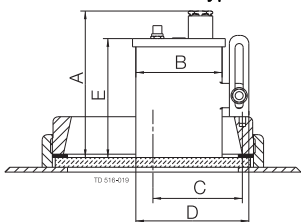
A	B	E
90	53	73

Sight glass LKS 78 and 120 with miniVISION type 53.



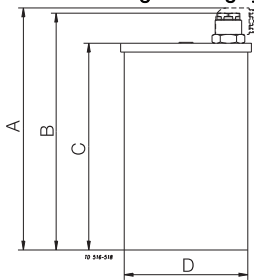
LKS size	A	B	C	D	E	Weight (kg)
78	90	53	48	72	73	0.30
120	90	53	69	72	73	0.30

Sight glass LKS 105 with miniVISION type 53.



A	B	C	D	E
90	53	59	72	73

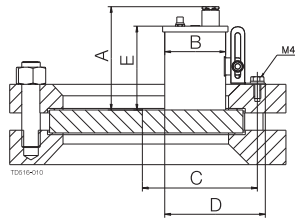
miniVISION Light Fitting type 70.



A	B	C	D
141	134	117	70

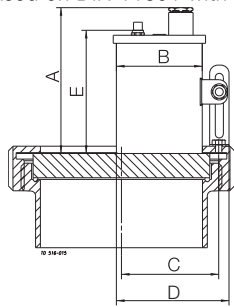
Sight glass LKS 78 with miniVISION type 70.

Sight Glass acc. to DIN 28120 with miniVISION type 53.



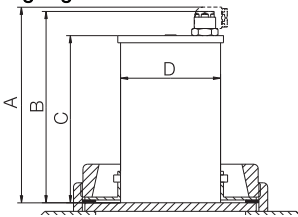
DN	A	B	C	D	E	Weight (kg)
100	90	53	87	90	73	0.30
125	90	53	100	90	73	0.30
150	90	53	112	90	73	0.30

Union Sight Glass based on DIN 11851 with miniVISION type 53.



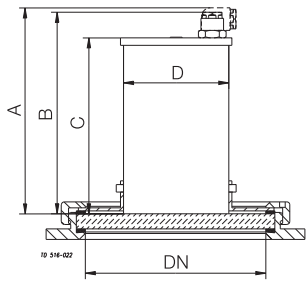
DN	A	B	C	D	E	Weight (kg)
65	90	53	39	72	73	0.30
100	90	53	57	72	73	0.30
125	90	53	69	72	73	0.30

Sight glass LKS 105 with miniVISION type 70.

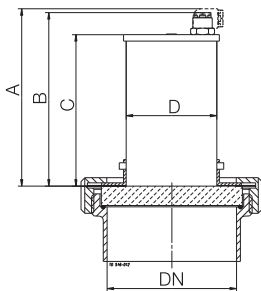


A	B	C	D
141	134	117	70

Union Sight Glass based on DIN 11851 with miniVISION type 70.



DN	A	B	C	D
78	141	134	117	70



DN	A	B	C	D
65	141	134	117	70

Note! For size DN 65 (only).

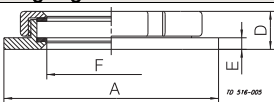
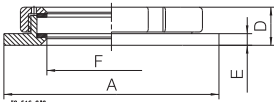
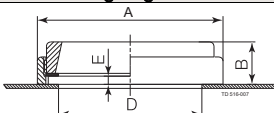
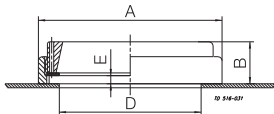
Ordering

When ordering, please state the following:

- Type and size of sight glass on which the luminaire has to be mounted.
- Power.
- Sight Glass type to be delivered with the light fitting, if needed.

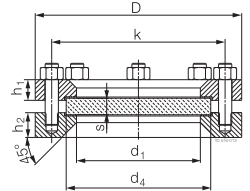
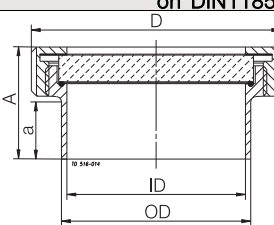
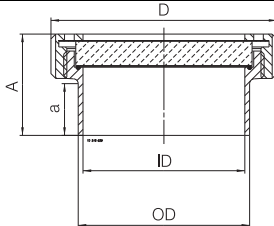
LKS and Sight Glasses acc. to DIN 28120 and based on DIN11851
Product code: 5532

5.7

Item No.	PPL EUR	Size	Dimension (mm)					
1.4404 (316L)			A	B	D	E	F	Sight glass LKS 78 and 120
9611710101	254	78	130		23	7	78	
9611710102	364	120	180		28	7.5	120	
LKS 78 and 120 for miniVision light fitting								
9611710103	254	78	130		23	7	78	
9611710104	364	120	180		28	7.5	120	
1.4301 (304)			A	B	D	E	F	Sight glass LKS 105
3201025271	168	105	136	31	105	6.5		
LKS 105 for miniVision light fitting								
3201025272	168	105	136	31	105	6.5		

LKS and Sight Glasses acc. to DIN 28120 and based on DIN11851
 Product code: 5532

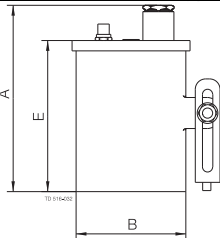
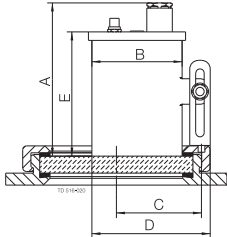
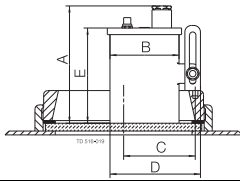
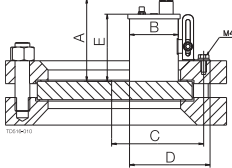
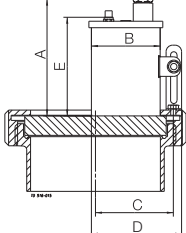
Finish: Semi bright
 Material: 1.4404 (316L)

Item No.	PPL EUR	Size	Dimension (mm)							
		DIN/DN	s	d ₁	d ₄	D	k	h ₁	h ₂	Sight glass acc. to DIN 28120
9611995021	651	50	15	80	100	165	125	16	30	
9611995022	862	80	15	100	125	200	160	20	30	
9611993292	1073	100	20	125	150	220	180	22	30	
9611993662	1115	125	20	150	175	250	210	25	30	
9611993663	1947	150	25	175	200	285	240	30	36	
9611995023	2441	200	30	225	250	340	295	35	36	
		DIN/DN	ID	a	A	OD	D			Union sight glass based on DIN11851
9611995024	207	50	50	18	46	55	92			
9611993664	252	65	66	22	49	72	112			
9611995025	321	80	80	23	54	87	127			
9611993667	453	100	100	32	65	106	148			
9611993669	693	125	125	20	60	132	178			
9611995026	1055	150	150	15	62	157	210			
Union sight glass based on DIN11851 for miniVision										
9611995027	234	50	50	18	46	55	92			
9611993665	274	65	66	22	49	72	112			
9611995028	347	80	80	23	54	87	127			
9611993668	470	100	100	32	65	106	148			
9611993670	720	125	125	20	60	132	178			
9611995029	1081	150	150	15	62	157	210			
Flange for LKS 78 and 105										
9611993676	236	78								
9611993677	47	105								

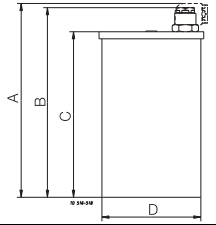
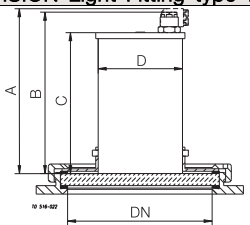
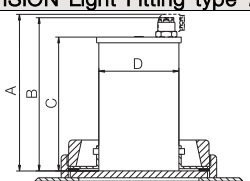
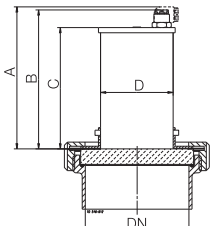
LKS and Sight Glasses acc. to DIN 28120 and based on
DIN11851 with miniVISION Light Fitting type 53
Product code: 5532

Material: 1.4301 (304)

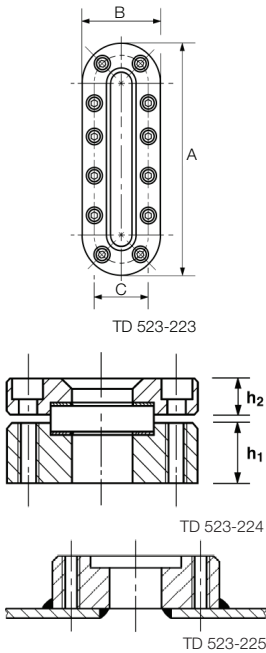
5.7

Item No.	PPL EUR	Type				Dimension (mm)					
						A	B	C	D	E	miniVISION Light Fitting type 53
9611993671	301	For DIN 28120	With push botton	50 W	24V	90	53			73	
9611993672	301	For LKS and DIN11851	With push botton	20 W	24V	90	53			73	
9611993673	301	For LKS and DIN11851	With push botton	50 W	24V	90	53			73	
Sight glass LKS 78 and 120 with miniVISION Light Fitting type 53											
9612630403	664	LKS 78	With push botton	20 W		90	53	48	72	73	
9612630404	651	LKS 78	With push botton	50 W		90	53	48	72	73	
9612630405	856	LKS 120	With push botton	20 W		90	53	69	72	73	
9612630406	856	LKS 120	With push botton	50 W		90	53	69	72	73	
Sight glass LKS 105 with miniVISION Light Fitting type 53											
9612630407	651	LKS 105	With push botton	20 W		90	53	59	72	73	
9612630408	651	LKS 105	With push botton	50 W		90	53	59	72	73	
Sight glass acc. to DIN 28120 with miniVISION Light Fitting type 53											
9612630409	1278	DN100	With push botton	50 W		90	53	87	90	73	
9612630410	1344	DN125	With push botton	50 W		90	53	100	90	73	
9612630411	1808	DN150	With push botton	50 W		90	53	112	90	73	
Union sight glass based on DIN11851 with miniVISION Light Fitting type 53											
9612630412	530	DN65	With push botton	20 W		90	53	39	90	73	
9612630413	530	DN65	With push botton	50 W		90	53	39	90	73	
9612630414	681	DN100	With push botton	20 W		90	53	57	90	73	
9612630415	681	DN100	With push botton	50 W		90	53	57	90	73	
9612630416	952	DN125	With push botton	20 W		90	53	69	90	73	
9612630417	971	DN125	With push botton	50 W		90	53	69	90	73	

LKS and Sight Glasses based on DIN11851 and miniVISION Light Fitting type 70
 Product code: 5532

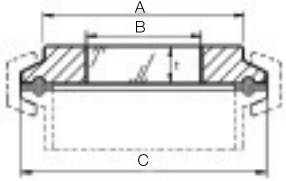
Item No.	PPL EUR	Type			DIN DN	Dimension (mm)				
						A	B	C	D	
9611993674	381	For LKS and Union Sight Glass based on DIN11851	50 W	24V		141	134	117	70	miniVISION type 70 
Sight glass LKS 78 with miniVISION Light Fitting type 70										
9612630401	861	LKS 78 without push botton	50 W		78	141	134	117	70	
Sight glass LKS 105 with miniVISION Light Fitting type 70										
9612630402	699	LKS 105 without push botton	50 W		105	141	134	117	70	
Union sight glass based on DIN11851 with miniVISION Light Fitting type 70										
9612630418	633	Size DN65 only			65	141	134	117	70	

5.7

Item No.	PPL EUR	Description	Pres- sure	Max. Temper- ature	Free view		A	B	C	h1	h2	
					Length	Width						
Tapping drilled through, type DB base flange												
9611995030	1905	Short version	2.5	100°C	200	50	266	116	94	25	15	
9611995031	1977	Short version	2.5	243°C	200	50	266	116	94	25	15	
9611995032	1844	Short version	6	100°C	195	30	261	96	74	25	15	
9611995033	1893	Short version	6	243°C	195	30	261	96	74	25	15	
9611995034	4581	Long version	2.5	100°C	725	50	791	116	94	25	15	
9611995035	4774	Long version	2.5	243°C	725	50	791	116	94	25	15	
9611995036	3785	Long version	6	100°C	580	30	646	96	74	25	15	
9611995037	3858	Long version	6	243°C	580	30	646	96	74	25	15	

Other lengths are available on request.

Material : 1.4462
Connection: Tri-clamp DIN 32676
Temperature range: -30 °C to + 280 °C
Pressure: -1 to 10 bar

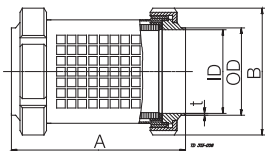
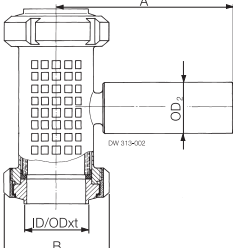
Item No.	PPL EUR	Description	Size	A	B	C	t	
Metal fused sightglass								
9611995046	422	DN50/2"	DN50/ 2"	52	30	64	10	
9611995047	524	DN65/3"	DN65/ 3"	76	40	91	10	
9611995048	591	DN80/3.5"	DN80/ 3.5"	90	50	106	10	

Other Metal fused sightglass available on request, such as Metal fused sight glass with wiper.

Product code: 5083

Inch Tube
Seals: EPDM

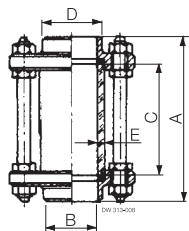
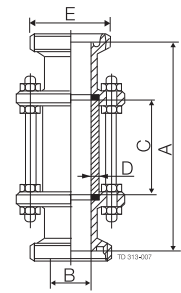
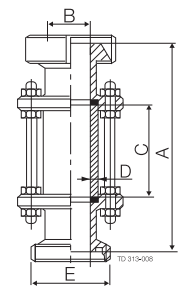
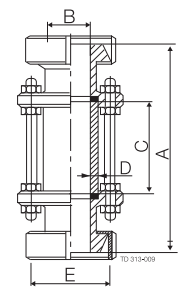
5.7

Item No.	PPL EUR	Item No.	PPL EUR	Size	Dimension (mm)				
1.4301 (304)		1.4404 (316L)			OD/ID x t	A	B	OD ₂	LKGG-1
9612141401	412	9612141406	476	25	26.2/22.5 x 1.85	200	64		
9612141402	455	9612141407	461	38	38.9/35.5 x 1.7	200	77		
9612141403	545	9612141408	564	51	51.6/48.5 x 1.55	200	91		
9612141404	669	9612141409	705	63.5	64.3/60.5 x 1.9	200	106		
9612141405	1190	9612141410	1307	76.1	76.6/72 x 2.3	200	122		
9612141411	1767	9612141412	1893	101.6	102/97.6 x 2.2	203	148		
With bulb, LKGL-1									
9612141601	1074	9612141606	1126	25	26.2/22.5 x 1.85	175	64	17	
9612141602	1180	9612141607	1234	38	38.9/35.5 x 1.7	181	77	22	
9612141603	1286	9612141608	1344	51	51.6/48.5 x 1.55	188	91	29	
9612141604	1383	9612141609	1482	63.5	64.3/60.5 x 1.9	194	106	29	
9612141605	1458	9612141610	2022	76.1	76.6/72 x 2.3	200	122	29	

Product code: 5083

 DIN Tube
 Material: 1.4301 (304)
 Seals: NBR

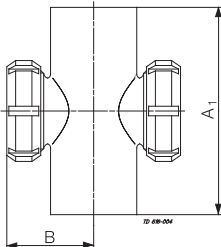
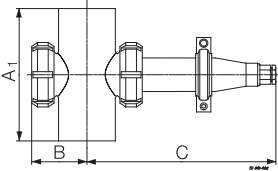
5.7

Item No.	PPL EUR	Size	Dimension (mm)					
		DIN	A	B	C	D	E	Welding
9611292351	205	10	88	10	60	15	2.5	
9611292361	223	15	88	16	60	21	2.5	
9611292371	248	20	88	20	60	25	3	
9611292381	194	25	98	26	70	31	3	
9611292391	212	32	104	32	70	37	3	
9611292401	239	40	112	38	70	43	5	
9611292411	277	50	112	50	70	55	5	
9611292421	346	65	127	66	85	72	5	
9611292431	461	80	135	81	85	87	5	
9611292441	588	100	169	100	115	105	5	
9611292451	1356	125	202	125	160	132	7	
9611292461	2503	150	216	150	170	157	9	
Male/male								
9611292481	177	10	122	10	60	2.5	28 x 1/8"	
9611292491	191	15	122	16	60	2.5	34 x 1/8"	
9611292501	249	20	124	20	60	3	44 x 1/6"	
9611292511	199	25	142	26	70	3	52 x 1/6"	
9611292521	227	32	154	32	70	3	58 x 1/6"	
9611292531	252	40	164	38	70	5	65 x 1/6"	
9611292541	286	50	168	50	70	5	78 x 1/6"	
9611292551	371	65	191	66	85	5	95 x 1/6"	
9611292561	496	80	209	81	85	5	110 x 1/4"	
9611292581	650	100	257	100	115	5	130 x 1/4"	
9611292591	1206	125	270	125	160	7	160 x 1/4"	
9611292601	2073	150	290	150	170	9	160 x 1/4"	
Male/nut-liner								
9611292611	191	10	122	10	60	2.5	28 x 1/8"	
9611292621	204	15	122	16	60	2.5	34 x 1/8"	
9611292631	225	20	124	20	60	3	44 x 1/6"	
9611292641	212	25	142	26	70	3	52 x 1/6"	
9611292651	240	32	154	32	70	3	58 x 1/6"	
9611292661	270	40	164	38	70	5	65 x 1/6"	
9611292671	307	50	168	50	70	5	78 x 1/6"	
9611292681	401	65	191	66	85	5	95 x 1/6"	
9611292691	528	80	209	81	85	5	110 x 1/4"	
9611292711	632	100	257	100	115	5	130 x 1/4"	
9611292721	1286	125	270	125	160	7	160 x 1/4"	
9611292731	2256	150	290	150	170	9	160 x 1/4"	
Nut-liner/Nut-liner								
9611292741	192	10	122	10	60	2.5	28 x 1/8"	
9611292751	236	15	122	16	60	2.5	34 x 1/8"	
9611292761	231	20	124	20	60	3	44 x 1/6"	
9611292771	201	25	142	26	70	3	52 x 1/6"	
9611292781	225	32	154	32	70	3	58 x 1/6"	
9611292791	282	40	164	38	70	5	65 x 1/6"	
9611292801	294	50	168	50	70	5	78 x 1/6"	
9611292811	379	65	191	66	85	5	95 x 1/6"	
9611292821	563	80	209	81	85	5	110 x 1/4"	
9611292841	691	100	257	100	115	5	130 x 1/4"	
9611292851	1370	125	270	125	160	7	160 x 1/4"	
9611292861	2451	150	290	150	170	9	160 x 1/4"	

Product code: 5083

Seals: EPDM
 Connections: Welding ends
 Material: 1.4404 (316L)

5.7

Item No.	PPL	Size	Dimension (mm)			
	EUR		A ₁	B	C	
9611940001	1682	38	102	50		
9611940002	1823	51	152	66		
9611940003	1948	63.5	152	64		
9611940004	2579	76.1	204	73		
9611940005	3838	101.6	204	91		
with bulb						
9611940011	3248	38	102	50	179	
9611940012	3561	51	152	66	194	
9611940013	3635	63.5	152	64	191	
9611940014	4211	76.1	204	73	199	
9611940015	4396	101.6	204	91	244	
For further information - please see PD-sheet.						
NOTE! Additional length (mm) A 2 measure for male parts - please see below.						
Seals						
	0	Replacement to seals of Nitrile (NBR).				
	54	Replacement to seals of Fluorinated rubber (FPM).				

Item No.	PPL EUR	Size	SMS	DS	ISO-clamp	IDF for ISO tube	IDF for SWG tube	BS	DIN for INCH tube
In-line sight glasses with male parts on request. Additional prices for sight glasses with male Parts.									
	394	38							
	539	51							
	573	63.5							
	626	76.1							
	716	101.6							
Overall length (mm) A₂ measure with male parts									
	0	38	142	142	128	145	145	146	146
	0	51	192	192	177	195	195	196	196
	0	63.5	200	200	177	195	195	196	202
	0	76.1	252	252	229	247	247	248	264
	0	101.6	274	252	236	247	264	258	264

Size	1½"	2"	2½"	3"	4"		
SMS	142	192	200	252	274		
DS	142	192	200	252	252		
ISO clamp	128	177	177	229	236		
IDF for ISO tube	145	195	195	247	247		
IDF for SWG tube	145	145	195	247	264		
BS	146	196	196	248	258		
DIN	146	196	202	264	264		