

Metal Fused Sight Glasses

Technical Information



METAGLAS® Disc Type and Flange Type**Side**

4/5	Type 73 / 73.SW	Sight glasses / for wiper
6/7	Type 77 / 177	Sight glass Discs for sight flow indicators DIN/ ANSI
8/9	Type 76 / 176	Sight glasses for welding neck flanges DIN / ANSI
10/11	Type 13 / 13.B3	Bolt-on sight glasses ANSI
12 - 15	Type 11 / 11.B3	Bolt-on sight glasses DIN
16/17	Type 11.SW / 13.SW	Bolt-on sight glasses for wiper
18/19	Type 81 / 82	Sight glasses for screwed fittings DIN 11851
20	Type 74	Sight glasses with tongue and groove joint
21	Type 99.ING	Sight glasses for Ingold sockets

METAGLAS® for Aseptic and Sanitary Applications

22/23	Type 19.BIO / 19.BIO.USL33	Bolt-on sight glasses for sanitary applications
24/25	Type 901 / 903	Sight glasses for sanitary applications
26 - 35	Type 83 / 83.USL33 / 84 / 84.BF / 84.USL33 / 84.BF.USL33 / 85 / 85.BF / 85.USL33 / 85.BF.USL33	Sight glasses for aseptic connection DIN 11864
54/55	Type 99.TUC / 99.TUC.USL33	Sight glasses for Neumo-BioControl
56	Type 99.NBC	Sight glasses for Varivent-In-Line-Systeme
57	Type 19.CF	Metaglas sight glasses for vacuum

METACLAMP® Sight Glasses

36/37	Type 80 / 80.SL	Metaclamp, sanitary sight glasses
38/39	Type 80.SW / 80.SL.W	Metaclamp, sight glass Discs for Wiper
40 - 44	Type 80.LAN / 80.USL01 / 80.USL33 / 80.USL35 / 80.USL03	Metaclamp for non Ex Luminaire
45/46/47	Type 80.USL05 / 80.EEk / 80.ESL25	Metaclamp for Ex Luminaire
48 - 52	Type 80.NA / 99.NA / 99.NA.USL33 / 80.MVLR / 89	Metaglas for NA-Connect fitting
53	Type 80.ETW	Metaclamp, sanitary Metaclamp & Luminaire SGL

METAGLAS®

58/59	Type 79.ISO-K / 99.KF	Metaglas sight glasses for vacuum
60/61	Type 99.ZIM / Typ 98.ZIM	Pressure cover with integral Metaglas sight glass cover
66/67	Type 211+213 / 275	Glass lined Metaglas sight glasses
68	Type 99.LSG	Metaglas elongated sight glasses

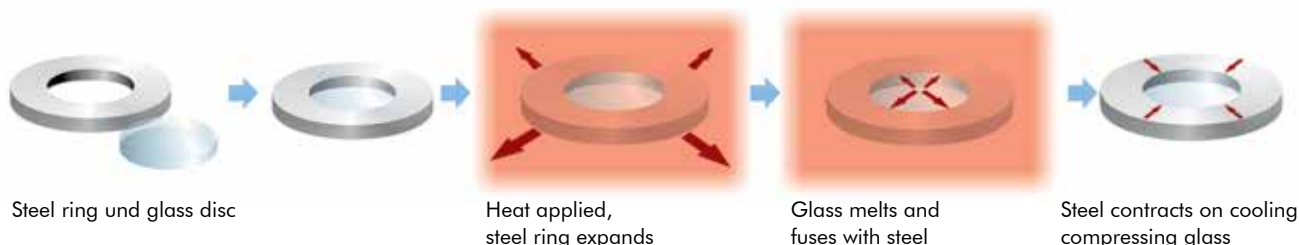
METAGLAS® Threaded Sight Glasses

62	Type 64	Metaglas threaded sight glasses - round head
63	Type 61	Metaglas threaded sight glasses - hexagon head
64/65	Type 61.NTP / 62.NTP	Metaglas threaded sight glasses - NPT-thread

Date: April 2017

METAGLAS[®] Improved Safety, Constructive Solutions and Simplified Fitting with Metal Fused Sight Glasses

- Introduction**
- Conventional sight glasses are sensitive to stress, bending and impact and when subject to mechanical overload they may catastrophically fail without warning. This can cause a relatively minor expense and inconvenience if it happens during installation but a major cost and safety implication if it occurs when plant is fully operational.
 - **METAGLAS[®]** eliminates this mode of sight glass failure, helping to improve safety and avoid the expense and inconvenience of unscheduled plant shut downs. These advantages are due to the unique "glass fused to metal" fabrication of **METAGLAS[®]** which gives it unmatched strength and integrity.
 - **METAGLAS[®]** is made by melting circular glass inside a metal frame. This results in the fusion of glass and metal. Upon cooling, the glass solidifies and the difference in the linear coefficient of thermal expansion between glass and metal then produces forces that create a uniform compressive stress throughout the glass.
 - This high degree of mechanically induced compressive stress makes **METAGLAS[®]** the strongest and most secure sight glass for sight window or visual flow indicator application.



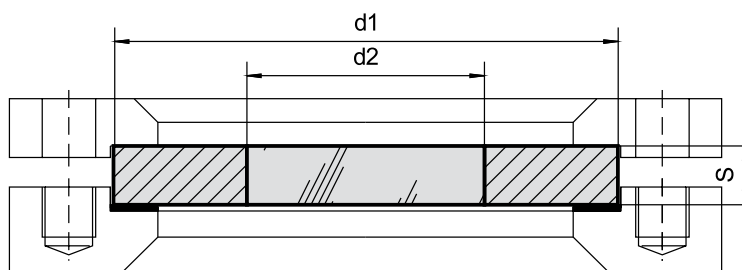
- Special Features**
- Reliability against total failure – due to the mechanically prestressed glass
 - Unsurpassed resistance to pressure, impact and temperature
 - Simple, stress free installation – resistant to bending, overtightening and impact
 - Reusable – Metaglas can be cleaned and reused in the same or other applications, conventional sight glasses cannot
- Applications**
- **METAGLAS[®]** can replace conventional glass in many applications including circular flange assemblies for welding into vessels, weld neck & nozzle flanges and sight flow indicators.
 - In addition, Metaglas cover flanges can be mounted onto flat face base flanges, these are available for all international flange connections including ANSI & BS. Existing installations can therefore be easily retrofitted to improve safety and extend plant life. The unique properties of **METAGLAS[®]** also make it ideal for use with sanitary mounting systems.
 - **METACLAMP[®]**s are available as sight glass caps for sanitary clamp and In-line systems and sight glasses and Luminaire adaptors for sterile flush mount designs such as the NA-Connect system and Triclamp fittings.
 - **METAGLAS[®]** has been subjected to the most rigorous tests by specific testing facilities in the chemical industry and has subsequently been integrated into their works standards.
- Specifications**
- Pressure Equipment Directive 2014/68/EU
 - module H/H1 (DIN/EN/ISO9001)
 - Materials to VdTÜV specifications & DIN/EN standards
 - Sight glass fused to metal to DIN 7079
 - AD Standards W0/TRD 100
 - 3-A Standard for food processing
- Tech Data**
- Materials: Duplex stainless steel 1.4462
 - Carbon steel 1.0570, Hastelloy and others
 - Operating Temp.: -30°C to +280°C (300°C)
 - Operating Pressure: 64 bar (TÜV)
 - max. 1000 bar, depending on material and design

METAGLAS® versus Toughened Glass

The structure of toughened glass is such that any surface damage or stress caused by uneven forces can lead to catastrophic failure. The structure of Metaglas is such that surface damage is limited to local areas and does not affect the overall strength of the glass. Local pitting or cracking may obscure the view but the glass remains leak tight and secure. Likewise, uneven stresses do not cause Metaglas to fail.

	Tempered Glass	METAGLAS®
Surface Damage	Damage to the tempered surface can cause unexpected catastrophic failure.	Scratches or any other surface damage do not affect the safety or life of METAGLAS®.
Re-use	Residual stress is created during bolting. Re-bolting causes excessive residual stress which can lead to failure. Glass cannot be re-used.	Repeated re-bolting does not affect Metaglas strength and integrity.
Impact	Impact (mechanical shock) causes catastrophic failure causing the glass to shatter into a multitude of small fragments.	METAGLAS® has an extremely high resistance to impact. Very high impact may cause local pitting of the glass but does not affect its function or its integrity.
Bending Moment	Tempered glass is very sensitive to uneven torquing of sight port bolts. The glass surfaces must be entirely flat and smooth (within 0.07 mm) to avoid uneven torquing.	Extremely high tolerance to uneven torquing. Uneven surfaces do not therefore result in glass damage.
Installation	Uneven or over torquing results in the glass cracking.	METAGLAS® cannot be overtorqued since torquing is metal on metal. Reaching the limits of uneven torquing cracks will appear but the METAGLAS® will remain leak tight.
Corrosion	Corrosion, particularly through the glass toughened surface, results in significant weakening which can lead to catastrophic failure.	METAGLAS® will remain leak tight to a high level of corrosion.
Cleaning	Glass must be replaced unless it can be cleaned place (CIP).	METAGLAS® can last indefinitely regardless of how many times you remove, clean and replace it.

METAGLAS® Sight Glass Discs



Applications

As a replacement for conventional glass discs in the following assemblies:

- Circular sight ports to DIN 28120 or similar
- Circular sight ports to DIN 28121
- Screwed sight glasses similar to DIN 11851
- Sight flow indicators

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2

Ring materials Operating temperature

1.0570	-10°C to +300°C
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4605	-60°C to +300°C
2.4610	-60°C to +300°C
2.4819	-60°C to +300°C

Approvals and technical data

- Manufactured and tested in conformance with:
- Pressure Equipment Directive 2014/68/EU, Module H/H1 (DIN/EN/ISO 9001)
- AD Standards W0/TRD 100
- TÜV and Factory Mutual Approval*
- Sight glass fused to metal conforming to DIN 7079
- Borosilicate glass to DIN 7080 / DIN 7079

Advantages

- Reliability against total failure – the possibility of sudden unexpected rupture is totally excluded
- High resistance to bending and over-tightening offers simple and fast installation with no risk of breakage
- Extreme resistance to impact, pressure and temperature
- Reusable in the same or other applications – conventional glass is not
- Wide acceptance in the European & American chemical industries

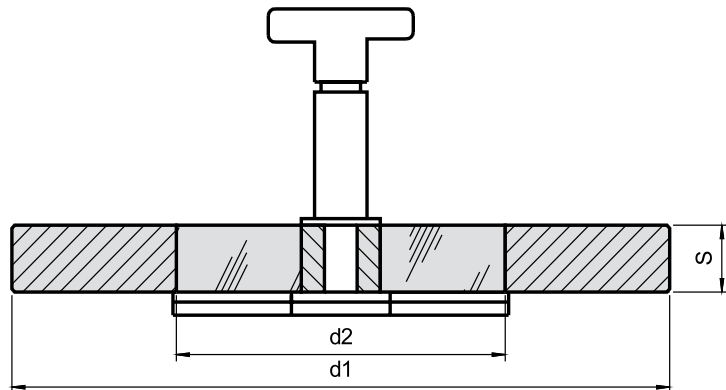
Operating conditions

- Temperature: -60°C to +300°C
- Pressure: Up to 64 bar (TÜV)
- Higher pressures possible

DN to DIN 28120	Diameter		Pressure rating				
	d1	d2	10 bar	16 bar	25 bar	40 bar	64 bar
			S	S	S	S	S
	45	25	10	10	10	10	15
	60	35	10	10	12	15	18
25	63	35	10	10	12	15	20
40	80	45	10	12	15	20	22
50	100	55	12	15	20	25	28
80	125	65	15	20	25	25	30
100	150	70	20	25	30	30	32
125	175	80	20	25	30	30	35
150	200	100	25	30	30	35	40
200	250	120	30	30	35	40	–

*Approved dimensions and materials see www.metaglas.de

METAGLAS® Sight Glass Discs for Wiper



Applications

- Wipers may be used to prevent the crystallisation of media onto the glass and to remove dust and dirt.
- Centrally operated wipers are mounted through the sight glass disc on either DIN 28120 (DN 50 - 200), DIN 11851 (DN 65 - 125) or similar sight glasses

Advantages

- Security against total failure
- Simple installation
- Can be combined with sight glass luminaires
- Long operating time

Ring materials	Operating temperature
1.0570	-10°C to +150°C
1.4462	-30°C to +150°C
2.4602	-60°C to +150°C
2.4605	-60°C to +150°C
2.4610	-60°C to +150°C

Approvals and technical data

- Manufactured and tested in conformance with:
- Pressure Equipment Directive 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- PN10 to PN16, higher pressure ranges possible
- Max. operating temperature 150°C
- Ring materials 1.4462, 2.6402, 2.4605, 2.4610 amongst others
- Gland material 1.3912 (Alloy 36)
- Glass quality: Borosilicate to DIN 7080 / DIN 7079

Material certificates

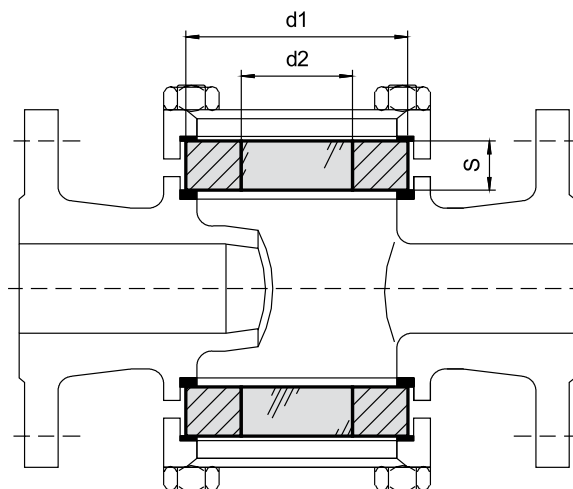
- Certificate of Conformity to EN 10204-3.1 or 3.2

Technical data – wiper

- Wiper blades silicon rubber, PTFE, and others
- All product contact parts are of stainless steel
- O-Rings – VITON

DN	Diameter		Pressure rating 10 bar	Pressure rating 16 bar
to DIN 28120	d1	d2	S	S
40	80	45	12	12
50	100	55	15	15
80	125	65	15	20
100	150	70	20	25
125	175	80	20	25
150	200	100	25	30
200	250	120	30	30

METAGLAS® Sight Glass Discs for Sight Flow Indicators (DIN)



Applications

- As a replacement for conventional sight glasses in through flow sight glass fittings

Operating conditions

- Temperature: -60°C to +300°C
- Pressure: Up to 64 bar (TÜV)
Higher pressures possible

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2

Ring materials	Operating temperature
1.0570	-10°C to +300°C
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4605	-60°C to +300°C
2.4610	-60°C to +300°C

Approvals and technical data

Manufactured and tested in conformance with:

- Pressure Equipment Directive 2014/68/EU, Module H/H1 (DIN/EN/ISO 9001)
- AD 2000 Standards W0/TRD 100
- TÜV and Factory Mutual Approval*
- Sight glass fused to metal conforming to DIN 7079
- Borosilicate glass to DIN 7080 / DIN 7079

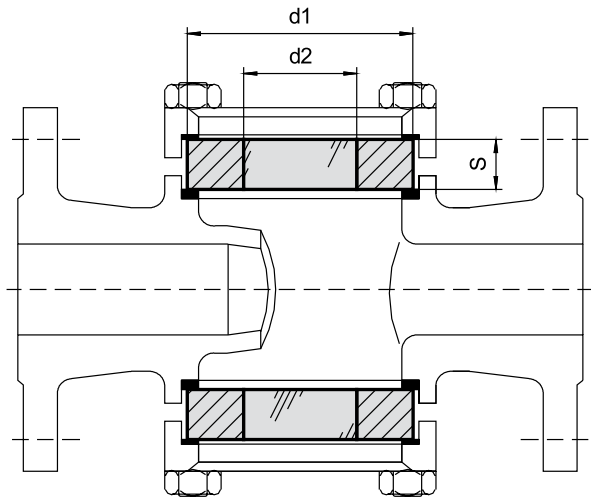
Advantages

- Reliability against catastrophic failure – the possibility of sudden unexpected rupture is totally excluded
- High resistance to bending and over-tightening offers simple and fast installation with no risk of breakage
- Extreme resistance to impact, pressure and temperature
- Reusable in the same or other applications – conventional glass is not available
- Wide acceptance in the European & American chemical industries

Nominal size	Diameter		Maximum pressure				
	d1	d2	10 bar	16 bar	25 bar	40 bar	64 bar
			S	S	S	S	S
15	45	25	10	10	10	10	15
(15)	50	25	10	10	10	10	15
20	45	25	10	10	10	10	15
25	63	35	10	10	12	15	20
(32)	80	45	10	12	15	20	22
40	80	45	10	12	15	20	22
50	100	55	12	15	20	25	28
65	100	55	12	15	20	25	28
80	125	65	15	20	25	25	30
100	150	70	20	25	30	30	32
125	175	80	20	25	30	30	35
150	200	100	25	30	30	35	40

*Approved dimensions and materials see www.metaglas.de

METAGLAS® Sight Glass Discs for Sight Flow Indicators (ANSI)



Applications

- As replacement for conventional glasses in sight flow indicators

Operating conditions

- Temperature: -60°C to +300°C
- Pressure: Up to 64 bar (TÜV)
- Higher pressures possible

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2

Ring materials	Operating temperature
1.0570	-10°C to +300°C
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4605	-60°C to +300°C
2.4610	-60°C to +300°C

Approvals and technical data

Manufactured and tested in conformance with:

- Pressure Equipment Directive 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD Standards W0/TRD 100
- TÜV and Factory Mutual Approval*
- Sight glass fused to metal conforming to DIN 7079
- Borosilicate glass to DIN 7080 / DIN 7079

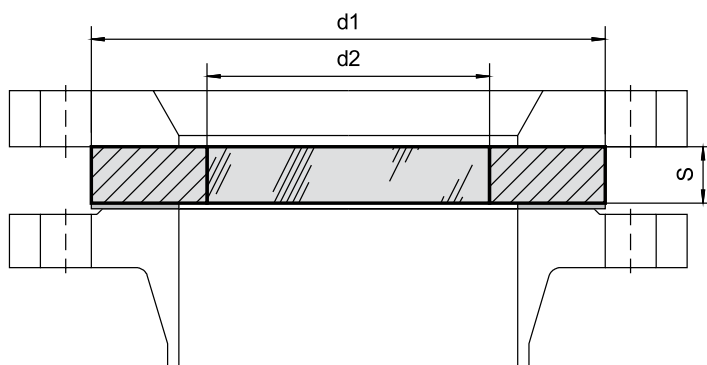
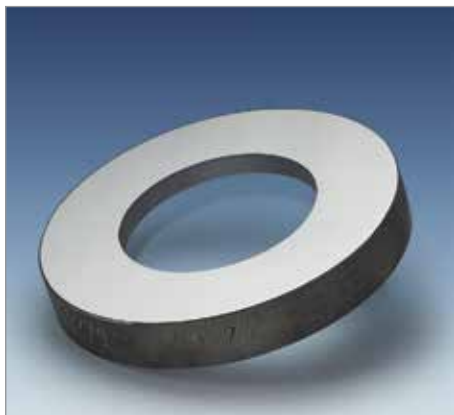
Advantages

- Reliability against total failure – the possibility of sudden unexpected rupture is totally excluded
- High resistance to bending and over-tightening offers simple and fast installation with no risk of breakage
- Extreme resistance to impact, pressure and temperature
- Reusable in the same or other applications – conventional glass is not available
- Wide acceptance in the European & American chemical industries

Nominal size	Maximum pressure								
	150 psi			300 psi			600 psi		
	d1	d2	S	d1	d2	S	d1	d2	S
1/2"	45	25	10	45	25	10	45	25	12
3/4"	45	25	10	45	25	10	45	25	12
1"	50	25	10	50	25	10	50	25	12
1 1/2"	66	35	12	66	35	12	66	35	15
2"	76	40	12	76	40	12	76	40	17
3"	125	65	20	125	65	20	125	65	27
4"	145	70	20	145	70	20	145	70	30
6"	218	100	25	218	100	30	218	100	40

*Approved dimensions and materials see www.metaglas.de

METAGLAS[®] Sight Glass Discs for Welding Neck Flanges – Connection to DIN



Applications

As a replacement for conventional glasses in the following assemblies:

- Circular sight ports to DIN 28121
- Plus any other assemblies where the glass is of the same dimensions, e.g. weld neck flanges with flat or raised face

Operating conditions

- Temperature: -60°C to +300°C
- Pressure: Up to 40 bar (TÜV)
- Higher pressures possible

Ring materials Operating temperature

1.0570	-10°C to +300°C
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4605	-60°C to +300°C
2.4610	-60°C to +300°C

Approvals and technical data

- Manufactured and tested in conformance with:
- Pressure Equipment Directive 2014/68/EU, Module H/H1 (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- TÜV and Factory Mutual Approval*
- Sight glass fused to metal conforming to DIN 7079
- Borosilicate glass to DIN 7080 / DIN 7079

Advantages

- Reliability against total failure – the possibility of sudden unexpected rupture is totally excluded
- High resistance to bending and over-tightening offers simple and fast installation with no risk of breakage
- Extreme resistance to impact, pressure and temperature
- Reusable in the same or other applications – conventional glass is not available
- Wide acceptance in the European & American chemical industries

Material certificates

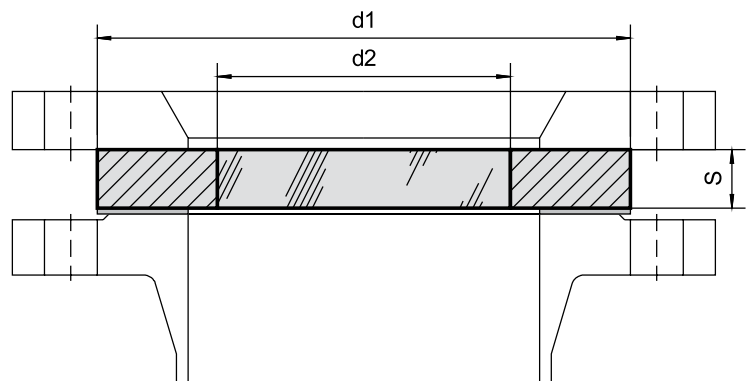
- Certificate of Conformity to EN 10204-3.1 or 3.2

maximum pressure

Nominal size	16 bar			40 bar		
	d1	d2	S	d1	d2	S
25	70	30	10	70*	30	15
32	82	40	12	82	40	15
40	92	45	15	92	45	20
50	107	50	15	107	50	20
65	127	70	15	127	70	25
80	142	75	20	142	75	25
100	162	80	20	162*	80	25
125	192	100	20	192*	100	30
150	218	100	25	218*	100	35
200	273	120	30	273*	120	40

*Approved dimensions and materials see www.metaglas.de

METAGLAS® Sight Glass Discs for Welding Neck Flanges – Connection to ANSI B16.5



Applications

As replacement for conventional glasses in the following assemblies:

- Circular sight ports similar to DIN 28121
- Plus any other assemblies where the glass is of the same dimensions, welding neck flanges with flat or raised face

Operating conditions

- Temperature: -60°C to +300°C
- Pressure: Up to 40 bar (TÜV)
Higher pressures possible

Ring materials	Operating temperature
1.0570	-10°C to +300°C
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Approvals and technical data

Manufactured and tested in conformance with:

- Pressure Equipment Directive 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- TÜV and Factory Mutual Approval*
- CRN
- Sight glass fused to metal conforming to DIN 7079
- Borosilicate glass to DIN 7080 / DIN 7079

Advantages

- Reliability against total failure – the possibility of sudden unexpected rupture is totally excluded
- High resistance to bending and over-tightening offers simple and fast installation with no risk of breakage
- Extreme resistance to impact, pressure and temperature
- Reusable in the same or other applications – conventional glass is not available
- Wide acceptance in the European & American chemical industries

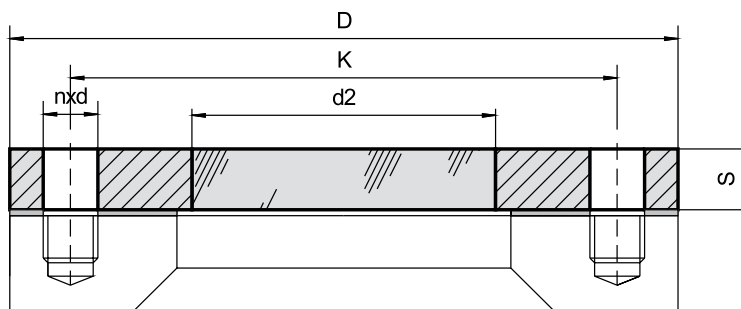
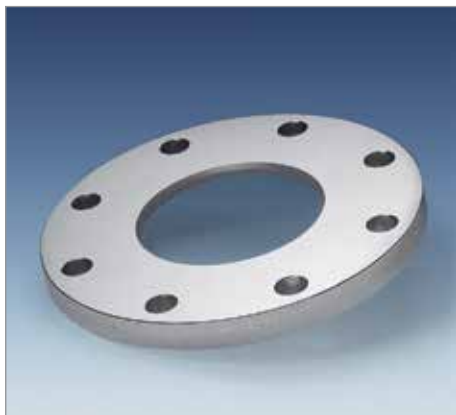
Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2 for extra costs

Nominal size	maximum pressure								
	150 psi			300 psi			600 psi		
	D1	D2	S	D1	D2	S	D1	D2	S
1"	63	30	10	70	30	15	70	30	20
1½"	82	40	12	92	40	18	92	40	25
2"	100	55	15	107	50	20	107	50	25
3"	134	70	15	145	70	25	145	70	33
4"	171	80	20	177	80	28	190	80	40
5"	192	100	20	–	–	–	–	–	–
6"	218	100	25	244	120	35	263	100	45
8"	273	120	30	305	125	40	315	100	50
10"	336	150	30	358	130	45	–	–	–

*Approved dimensions and materials see www.metaglas.de

METAGLAS® Bolt-on Sight Glass to ANSI B16.5



Applications

- Flat face ANSI mating flange

Advantages

- Reliability against total failure. The possibility of unexpected rupture is excluded
- Long working time
- Smooth easy clean surface
- Maximum viewing
- Minimum design height

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Operating conditions

- Pressure: PN20 to PN50, higher pressures possible
- Temperature: see table

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2 for extra costs

Important

- Requires parallel flat face mounting flange and full gasket

Ring materials	Operating temperature
1.0570	-10°C to +300°C
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4605	-60°C to +300°C
2.4610	-60°C to +300°C

PN20 – 150 lb/sq.in.

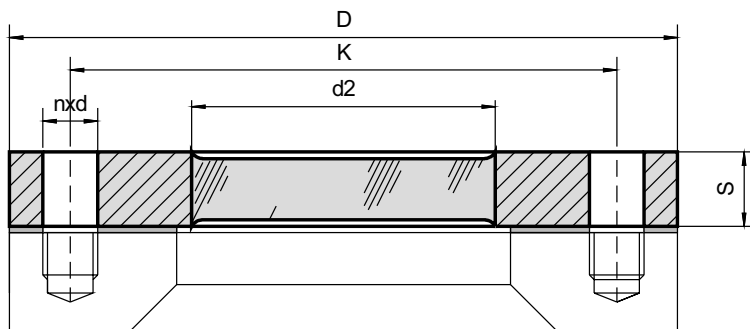
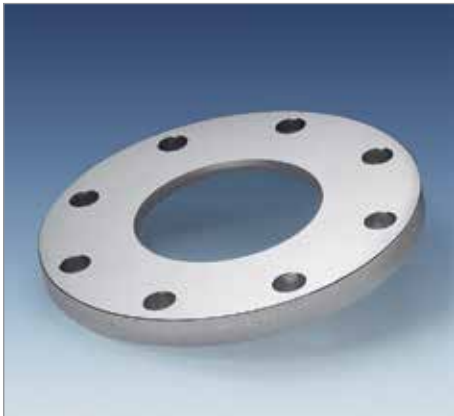
Flange				Glass	Mounting holes		Gasket
DN	D	K	S	d2	n	d	
1½"	127,0	98,6	20	40	4	15,7	127,0 x 70 x 2
2"	152,4	120,7	20	50	4	19,1	152,4 x 89 x 2
2½"	177,8	139,7	20	60	4	19,1	177,8 x 100 x 2
3"	190,5	152,4	20	75	4	19,1	190,5 x 114 x 2
4"	228,6	190,5	20	100	8	19,1	228,6 x 152 x 2
6"	279,4	241,3	25	135	8	22,4	279,4 x 203 x 2
8"	342,9	298,5	30	160	8	22,4	342,9 x 254 x 2

PN50 – 300 lb/sq.in.

Flange				Glass	Mounting holes		Gasket
DN	D	K	S	d2	n	d	
1½"	155,4	114,3	28	40	4	22,3	155,4 x 73 x 2
2"	165,1	127,0	30	50	8	19,0	165,1 x 89 x 2
2½"	190,5	149,3	30	60	8	22,3	190,5 x 108 x 2
3"	209,5	168,1	32	70	8	22,3	209,5 x 127 x 2
4"	254,0	200,1	36	100	8	22,3	254,0 x 146 x 2

METAGLAS® Bol-on Sight Glass to ANSI B16.5

(glass - concave both faces)



Applications

- Flat face ANSI mating flange

Advantages

- Reliability against total failure. The possibility of unexpected rupture is excluded
- Long working time
- Smooth easy clean surface
- Maximum viewing
- Minimum design height

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2 for extra costs

Operating conditions

- Pressure: PN20 to PN50, higher pressures possible
- Temperature: see table

Important

- Requires parallel flat face mounting flange and full gasket

Ring materials	Operating temperature
1.0570	-10°C to +300°C
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4605	-60°C to +300°C
2.4610	-60°C to +300°C

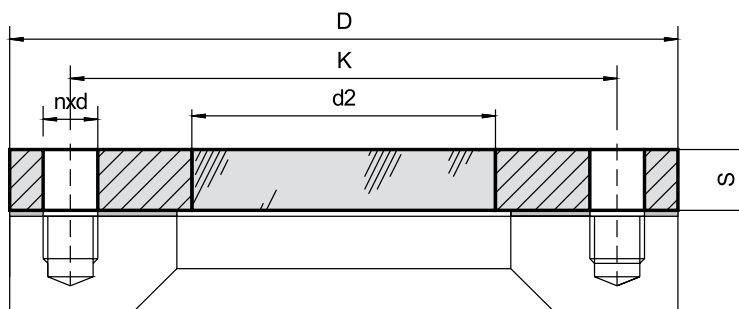
PN20 – 150 lb/sq.in.

Flange				Glass	Mounting holes		Gasket
DN	D	K	S	d2	n	d	
1½"	127,0	98,6	23	40	4	15,7	127,0 x 70 x 2
2"	152,4	120,7	23	50	4	19,1	152,4 x 89 x 2
2½"	177,8	139,7	23	60	4	19,1	177,8 x 100 x 2
3"	190,5	152,4	23	75	4	19,1	190,5 x 114 x 2
4"	228,6	190,5	23	100	8	19,1	228,6 x 152 x 2
6"	279,4	241,3	28	135	8	22,4	279,4 x 203 x 2
8"	342,9	298,5	30	160	8	22,4	342,9 x 254 x 2

PN50 – 300 lb/sq.in.

Flange				Glass	Mounting holes		Gasket
DN	D	K	S	d2	n	d	
1½"	155,4	114,3	30	40	4	22,3	155,4 x 73 x 2
2"	165,1	127,0	32	50	8	19,0	165,1 x 89 x 2
2½"	190,5	149,3	32	60	8	22,3	190,5 x 108 x 2
3"	209,5	168,1	35	70	8	22,3	209,5 x 127 x 2
4"	254,0	200,1	38	100	8	22,3	254,0 x 146 x 2
6"	317,5	269,7	40	125	12	22,3	317,5 x 222 x 2

METAGLAS[®] Sight Glass Flange – Connection to DIN 2501



Applications

- Flat face mating flange

Advantages

- Reliability against total failure. The possibility of unexpected rupture is excluded
- Long working time
- Smooth easy clean surface
- Maximum viewing
- Minimum design height

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H/H1 (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2

Approvals

- TÜV-Approval in accordance with the governing standards (for pressure vessels) (PN6 to PN40); with Carbon Steel (DIN 1.0570) or Duplex Stainless Steel (DIN 1.4462)

Important

- Requires parallel flat face mounting flange and full gasket

Ring materials	Operating temperature
1.0570	-10°C to +300°C
1.4462	-30°C to +280°C
2.4602	-80°C to +300°C
2.4605	-80°C to +300°C
2.4610	-80°C to +300°C

PN6	Flange				Glass	Mounting holes			Gasket
	NW	D	K	S		n	Thread	d	
	40	130	100	14	40	4	M12	14	130 x 70 x 2
	50	140	110	14	50	4	M12	14	140 x 85 x 2
	65	160	130	14	70	4	M12	14	160 x 100 x 2
	80	190	150	16	80	4	M16	18	190 x 110 x 2
	100	210	170	16	100	4	M16	18	210 x 130 x 2
	125	240	200	20	120	8	M16	18	240 x 160 x 2
	150	265	225	20	140	8	M16	18	265 x 185 x 2
	200	320	280	20	160	8	M16	18	320 x 240 x 2

PN10 Flange				Glass	Mounting holes			Gasket
NW	D	K	S	d2	n	Thread	d	
40	150	110	16	40	4	M16	18	150 x 70 x 2
50	165	125	18	50	4	M16	18	165 x 85 x 2
65	185	145	18	70	4	M16	18	185 x 105 x 2
80	200	160	20	80	8	M16	18	200 x 120 x 2
100	220	180	20	100	8	M16	18	220 x 140 x 2
125	250	210	22	120	8	M16	18	250 x 170 x 2
150	285	240	22	135	8	M20	22	285 x 195 x 2
200	340	295	28	160	8	M20	22	340 x 250 x 2

PN16 Flange				Glass	Mounting holes			Gasket
NW	D	K	S	d2	n	Thread	d	
40	150	110	16	40	4	M16	18	150 x 70 x 2
50	165	125	18	50	4	M16	18	165 x 85 x 2
65	185	145	18	70	4	M16	18	185 x 105 x 2
80	200	160	20	80	8	M16	18	200 x 120 x 2
100	220	180	20	100	8	M16	18	220 x 140 x 2
125	250	210	25	120	8	M16	18	250 x 170 x 2
150	285	240	25	135	8	M20	22	285 x 195 x 2
200	340	295	30	160	12	M20	22	340 x 250 x 2

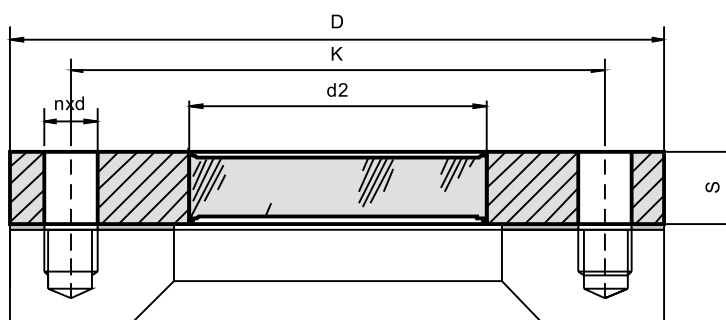
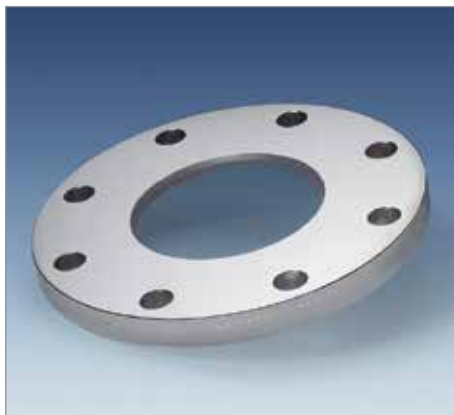
PN25 Flange				Glass	Mounting holes			Gasket
NW	D	K	S	d2	n	Thread	d	
40	150	110	20	40	4	M16	18	150 x 70 x 2
50	165	125	20	50	4	M16	18	165 x 85 x 2
65	185	145	22	70	8	M16	18	185 x 105 x 2
80	200	160	24	80	8	M16	18	200 x 120 x 2
100	235	190	26	100	8	M20	22	235 x 145 x 2
125	270	220	26	120	8	M24	26	270 x 170 x 2
150	300	250	30	125	8	M24	26	300 x 200 x 2

PN40 Flange				Glass	Mounting holes			Gasket
NW	D	K	S	d2	n	Thread	d	
65	185	145	22	70	8	M16	18	185 x 105 x 2
80	200	160	25	70	8	M16	18	200 x 120 x 2
100	235	190	30	80	8	M20	22	235 x 145 x 2
125	270	220	40	100	8	M24	26	270 x 170 x 2
150	300	250	35	125	8	M24	26	300 x 200 x 2

PN64 Flange				Glass	Mounting holes			Gasket
NW	D	K	S	d2	n	Thread	d	
65	205	160	32	65	8	M20	22	205 x 115 x 2
80	215	170	35	80	8	M20	22	215 x 125 x 2
100	250	200	40	80	8	M24	26	250 x 150 x 2
125	295	240	40	100	8	M27	30	295 x 185 x 2

PN100 Flange				Glass	Mounting holes			Gasket
NW	D	K	S	d2	n	Thread	d	
65	220	170	32	60	8	M24	26	220 x 120 x 2
80	230	180	40	70	8	M24	26	230 x 130 x 2
100	265	210	40	80	8	M27	30	265 x 150 x 2
125	315	250	45	90	8	M30	33	315 x 185 x 2

METAGLAS® Sight Glass Flange – Connection to DIN 2501 (glass - concave both faces)



Applications

- Flat face mating flange

Advantages

- Reliability against total failure. The possibility of unexpected rupture is excluded
- Long working time
- Smooth easy clean surface
- Maximum viewing
- Minimum design height

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H/H1 (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2

Approvals

- TÜV-Approval in accordance with the governing standards (for pressure vessels) (PN6 to PN40); with Carbon Steel (DIN 1.0570) or Duplex Stainless Steel (DIN 1.4462)

Important

- Requires parallel flat face mounting flange and full gasket

Ring materials	Operating temperature
1.0570	-10°C to +300°C
1.4462	-30°C to +280°C
2.4602	-80°C to +300°C
2.4605	-80°C to +300°C
2.4610	-80°C to +300°C

PN6	Flange				Glass	Mounting holes			Gasket
	NW	D	K	S		n	Thread	d	
	40	130	100	17	40	4	M12	14	130 x 70 x 2
	50	140	110	17	50	4	M12	14	140 x 85 x 2
	65	160	130	17	70	4	M12	14	160 x 100 x 2
	80	190	150	19	80	4	M16	18	190 x 110 x 2
	100	210	170	19	100	4	M16	18	210 x 130 x 2
	125	240	200	21	120	8	M16	18	240 x 160 x 2
	150	265	225	23	135	8	M16	18	265 x 185 x 2
	200	320	280	23	160	8	M16	18	320 x 240 x 2

PN10 Flange				Glass	Mounting holes			Gasket
NW	D	K	S	d2	n	Thread	d	
40	150	110	19	40	4	M16	18	150 x 70 x 2
50	165	125	21	50	4	M16	18	165 x 85 x 2
65	185	145	21	70	4	M16	18	185 x 105 x 2
80	200	160	23	80	8	M16	18	200 x 120 x 2
100	220	180	23	100	8	M16	18	220 x 140 x 2
125	250	210	25	120	8	M16	18	250 x 170 x 2
150	285	240	25	135	8	M20	22	285 x 195 x 2
200	340	295	28	160	8	M20	22	340 x 250 x 2

PN16 Flange				Glass	Mounting holes			Gasket
NW	D	K	S	d2	n	Thread	d	
40	150	110	19	40	4	M16	18	150 x 70 x 2
50	165	125	21	50	4	M16	18	165 x 85 x 2
65	185	145	21	70	4	M16	18	185 x 105 x 2
80	200	160	23	80	8	M16	18	200 x 120 x 2
100	220	180	23	100	8	M16	18	220 x 140 x 2
125	250	210	25	120	8	M16	18	250 x 170 x 2
150	285	240	28	135	8	M20	22	285 x 195 x 2
200	340	295	33	160	12	M20	22	340 x 250 x 2

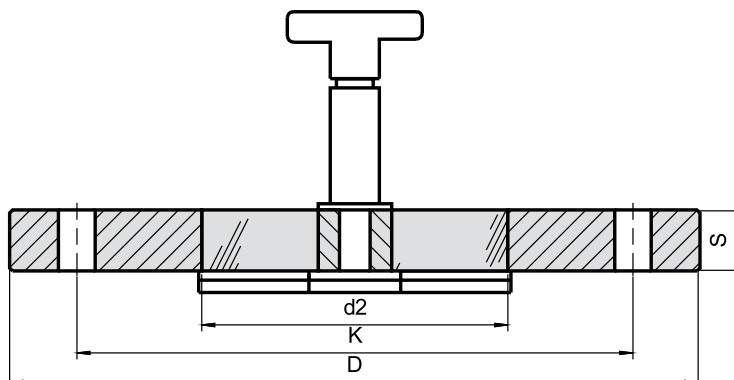
PN25 Flange				Glass	Mounting holes			Gasket
NW	D	K	S	d2	n	Thread	d	
40	150	110	21	40	4	M16	18	150 x 70 x 2
50	165	125	23	50	4	M16	18	165 x 85 x 2
65	185	145	25	70	8	M16	18	185 x 105 x 2
80	200	160	27	80	8	M16	18	200 x 120 x 2
100	235	190	27	100	8	M20	22	235 x 145 x 2
125	270	220	29	120	8	M24	26	270 x 170 x 2
150	300	250	33	125	8	M24	26	300 x 200 x 2

PN40 Flange				Glass	Mounting holes			Gasket
NW	D	K	S	d2	n	Thread	d	
65	185	145	25	70	8	M16	18	185 x 105 x 2
80	200	160	27	70	8	M16	18	200 x 120 x 2
100	235	190	28	80	8	M20	22	235 x 145 x 2
125	270	220	35	100	8	M24	26	270 x 170 x 2
150	300	250	38	125	8	M24	26	300 x 200 x 2

PN64 Flange				Glass	Mounting holes			Gasket
NW	D	K	S	d2	n	Thread	d	
65	205	160	35	65	8	M20	22	205 x 115 x 2
80	215	170	38	80	8	M20	22	215 x 125 x 2
100	250	200	40	80	8	M24	26	250 x 150 x 2
125	295	240	43	100	8	M27	30	295 x 185 x 2

PN100 Flange				Glass	Mounting holes			Gasket
NW	D	K	S	d2	n	Thread	d	
65	220	170	38	60	8	M24	26	220 x 120 x 2
80	230	180	40	70	8	M24	26	230 x 130 x 2
100	265	210	45	80	8	M27	30	265 x 155 x 2
125	315	250	50	90	8	M30	33	315 x 185 x 2

METAGLAS® Sight Glass Flange – Connection to DIN 2501 – for Wiper



Applications

- Flat face mating flange

Advantages

- **Reliability against total failure.** The possibility of unexpected rupture is excluded
- Long working time
- Smooth easy clean surface
- Maximum viewing
- Minimum design height
- Possible to combine with Luminaire

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- PN10 to PN16, higher pressures on request
- Glass: Borosilicate to DIN 7080 / DIN 7079
- Fused Bush: 1.3912 (Alloy 36)

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2

Accessories

Wiper

- Contact metal parts stainless steel V4A
- Wiper blade: Silicone rubber or PTFE
- O-Ring: Viton, EPDM

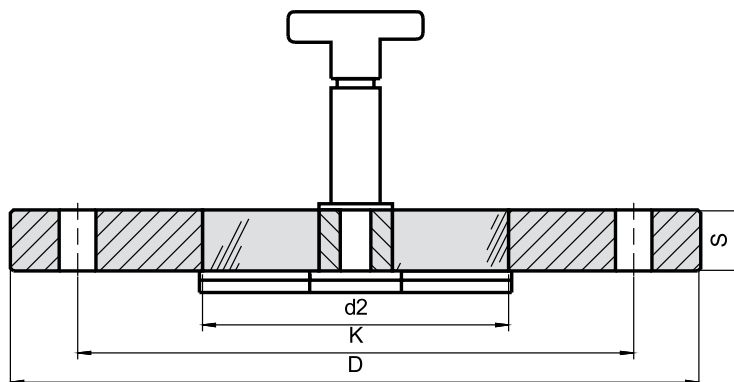
Important

- **Requires parallel flat face mounting flange and full gasket**

Ring materials	Operating temperature
1.0570	-10°C to +150°C
1.4462	-30°C to +150°C
2.4602	-80°C to +150°C
2.4605	-80°C to +150°C
2.4610	-80°C to +150°C

Flange					Glass	Mounting holes				Gasket
NW	PN	D	K	S	d2	n	Thread	d		
40	10	150	110	16	50	4	M16	18		150 x 70 x 2
50	10	165	125	18	60	4	M16	18		165 x 85 x 2
65	10	185	145	18	70	4	M16	18		185 x 105 x 2
80	10	200	160	20	80	8	M16	18		200 x 120 x 2
100	10	220	180	20	100	8	M16	18		220 x 140 x 2
125	10	250	210	22	125	8	M16	18		250 x 170 x 2
150	10	285	240	25	140	8	M20	22		285 x 195 x 2
200	10	340	295	30	160	8	M20	22		340 x 250 x 2

METAGLAS® Bolt on Sight Glass to ANSI B16.5 – for Wiper



Applications

- Flat face ANSI mating flange

Advantages

- **Reliability against total failure.** The possibility of unexpected rupture is excluded
- Long working time
- Smooth easy clean surface
- Maximum viewing
- Minimum design height
- Possible to combine with Luminaire

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H/H1 (DIN/EN/ISO 9001)
- AD Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- PN10 to PN16, higher pressures possible
- Glass: Borosilicate to DIN 7080 / DIN 7079
- Fused Bush: 1.3912 (Alloy 36)

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2

Accessories

Wiper

- Contact metal parts stainless steel V4A
- Wiper blade: Silicone rubber or PTFE
- O-Ring: Viton, EPDM

Important

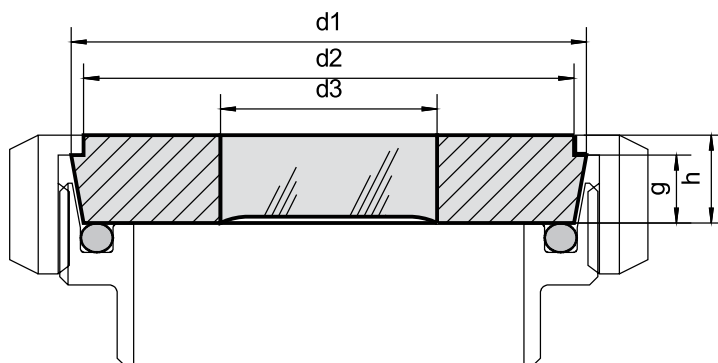
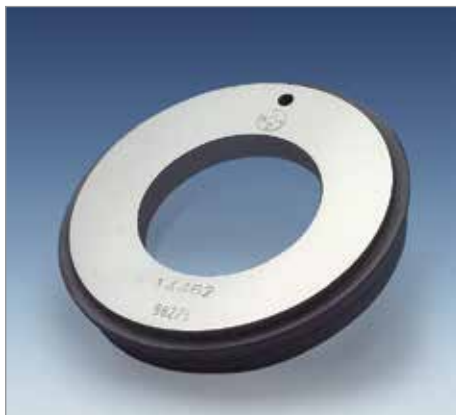
- Requires parallel flat face mounting flange and full gasket

Ring materials	Operating temperature
1.0570	-10°C to +150°C
1.4462	-30°C to +150°C
2.4602	-60°C to +150°C
2.4605	-60°C to +150°C
2.4610	-60°C to +150°C

PN20 – 150 lb/sq.in.

Flange				Glass	Mounting holes		Gasket
DN	D	K	S	d2	n	d	
1½"	127,0	98,6	18	40	4	15,7	127,0 x 70 x 2
2"	152,4	120,7	20	50	4	19,1	152,4 x 89 x 2
2½"	177,8	139,7	20	60	4	19,1	177,8 x 100 x 2
3"	190	152,4	20	75	4	19,1	190,5 x 114 x 2
4"	228,6	190,5	20	100	8	19,1	228,6 x 152 x 2
6"	279,4	241,3	25	140	8	22,4	279,4 x 203 x 2
8"	342,9	298,5	25	160	8	22,4	342,9 x 254 x 2

METAGLAS[®] Sight Glass Discs for Screwed Fittings to DIN 11851



Applications

- Screwed sight glass fitting to DIN 11851
- for use in food processing, cosmetic and pharmaceutical applications where a product or process has to be observed or controlled inside stirred vessels, tanks, dryers, columns, centrifuges, mixers, evaporators, etc.

Advantages

- Perfect sealing to atmospheric side
- Easy, economical installation
- Long operating time
- Security against total failure

Approvals and technical data

Manufactured and tested in conformance with:

- Pressure Equipment Directive 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Borosilicate glass to DIN 7080 / DIN 7079

Operating conditions

- Temperature: -60°C to +300°C
- Pressure: up to 40 bar (higher pressures on request)

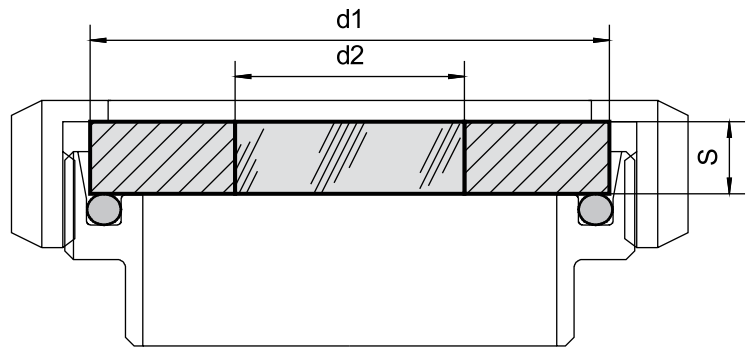
Material certificates

- Certificate of Conformity EN 10204 – 3.1 or 3.2

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4605	-60°C to +300°C
2.4610	-60°C to +300°C
2.4819	-80°C to +300°C

NW	d1	d2	d3	h	g	Pressure rating [bar]
32	50	41	23	13	10	40
40	56	48	25	13	10	40
50	68,5	61	35	14	11	40
65	86	79	45	15	12	25
80	100	93	50	16	12	16
100	121	114	60	20	15	16
125	150	137	70	23	17	16
150	176	163	80	24	18	16

METAGLAS® for Screwed Sight Glass Fittings similar to DIN 11851



Applications

- Screwed sight glass fitting similar to DIN 11851
- for use in food processing, cosmetic and pharmaceutical applications where a product or process has to be observed or controlled inside stirred vessels, tanks, dryers, columns, centrifuges, mixers, evaporators, etc.

Advantages

- Reliability against total failure – the possibility of sudden unexpected rupture is totally excluded
- Simple assembly
- Long working time

Approvals and technical data

Manufactured and tested in conformance with:

- Pressure Equipment Directive 2014/68/EU, Module H/H1 (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- TÜV and Factory Mutual Approval
- Sight glass fused to metal conforming to DIN 7079
- Borosilicate glass to DIN 7080 / DIN 7079

Operating conditions

- Temperature: -60°C to +300°C
- Pressure: up to 40 bar (TÜV)
(higher pressures on request)

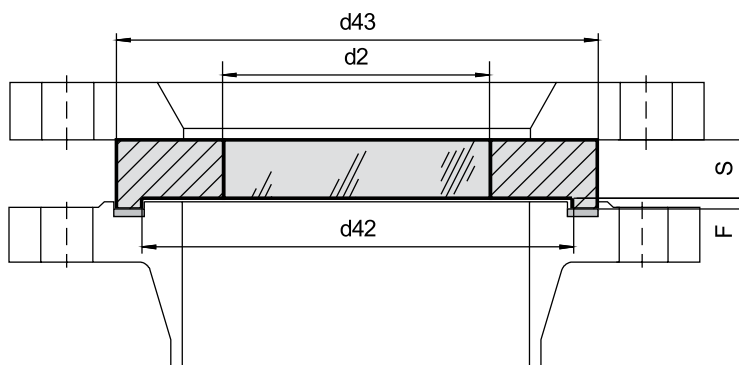
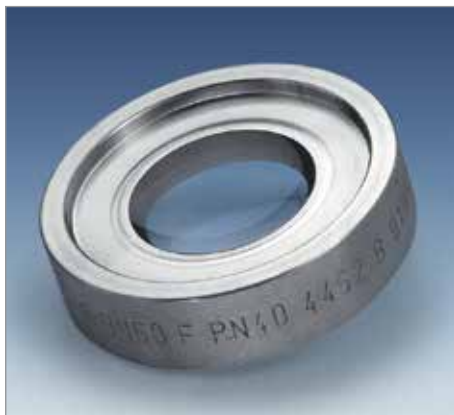
Material certificates

- Certificate of Conformity EN 10204 – 3.1 or 3.2

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4605	-60°C to +300°C
2.4610	-60°C to +300°C

NW	d1	d2	S	Pressure rating [bar]
32	45	25	10	40
40	50	25	10	40
50	63	35	10	16
65	80	45	10	10
80	93	50	10	10
100	113	60	15	16
125	142	75	20	16
150	166	80	20	16

METAGLAS® Sight Glass Discs with Tongue and Groove Joint



Applications

- Nozzles to DIN 28115 or 28025
- Weld neck flange DIN 2632 to 2636
- Flanges with tongue / groove based on DIN 2512

Advantages

- Security against total failure
- Simple, instruction free installation
- Long operating time

Approvals and technical data

Manufactured and tested in conformance with:

- Pressure Equipment Directive 2014/68/EU, Module H/H1 (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- TÜV Approval
- Sight glass fused to metal conforming to DIN 7079
- Borosilicate glass to DIN 7080 / DIN 7079

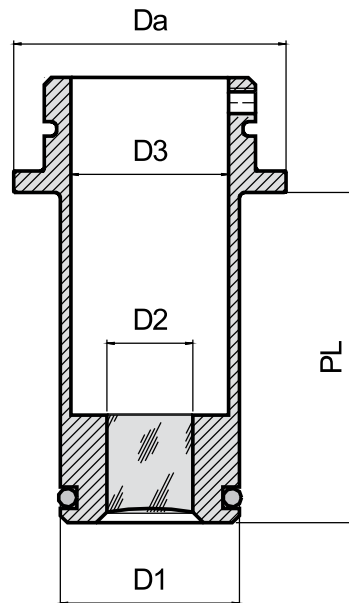
Material certificates

- Certificate of Conformity EN 10204 – 3.1 or 3.2

Ring materials	Operating temperature
1.0570	-10°C to +300°C
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4605	-60°C to +300°C
2.4610	-60°C to +300°C

Nominal size	maximum pressure						
	16 bar		40 bar		Spring		
	d2	S	d2	S	d42	d43	F
40	35	10	35	15	61	75	4
50	45	13	45	17	73	87	4
65	60	13	60	20	95	109	4
80	63	15	63	20	106	120	4
100	70	20	70	25	129	149	4,5
125	80	20	80	30	155	175	4,5
150	100	25	100	30	183	203	4,5
200	125	30	–	–	239	259	4,5

METAGLAS® Sight Glass for Ingold socket and luminaire Mikrolux



Applications

- Ingold socket

Advantages

- Extremely compact design

Material certificates

- Certificate of conformity EN 10204-3.1

Materials

- 1.4462, 2.4602
- Glass: borosilicate glass
DIN 7080 / DIN 7079

Surfaces

- Product touching surfaces $R_a < 0,4 \mu\text{m}$
- Electro polished on demand

Accessories

Stainless steel luminaire type 1803 „Mikrolux“ (for DN25)

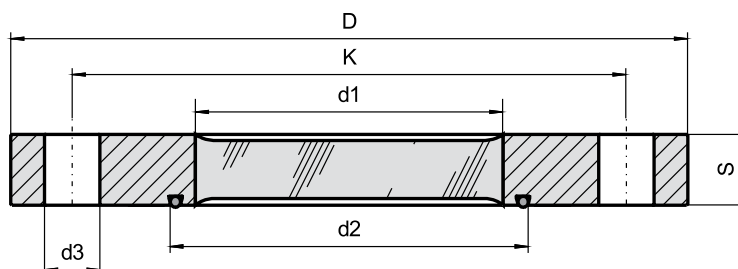
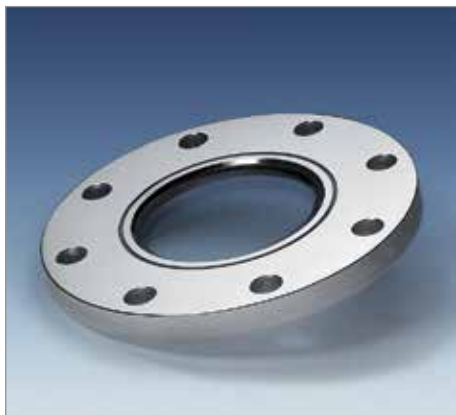
- voltage: 6-24 VDC
- LED-technology
- power: 2W-140 lm for continuous operation
- power: 4W-340 lm for currently operation
- 3- or 4-pole plug connection
- with or without built-in push button

Stainless steel luminaire type MVLR (for DN40)

- voltage: 22-26V AD/CD
- power: 2W
- LED-technology
- approved for continuous operation

size	D1	PL	D2	D3	Da
DN25 PL30	25	30	12	22	38
DN25 PL46	25	46	12	22	38
DN40 PL30	40	30	24	34	50
DN40 PL48	40	48	24	34	50

METAGLAS[®] Bolt-on Sight Glass for Sterile Applications



Applications

- Aseptic and sanitary applications
- Base flange to DIN 28117 or similar
- Weld neck with flat face

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2

Operating conditions

- Pressure: -1 to 16 bar
- Temperature: see table

O-Ring

- AS 568 A / B.S. 1806

Ring materials Operating temperature

1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4605	-60°C to +300°C
2.4610	-60°C to +300°C
2.4610	-60°C to +300°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Advantages

- Reliability against total failure. The possibility of unexpected rupture is excluded
- Effortless cleaning for sterile applications
- Flush glass/metal border on outer side for easy cleaning
- Maximum viewing area

Approvals

- TÜV-Approval in accordance with the governing standards (for pressure vessels) (With Duplex Stainless Steel (DIN 1.4462))

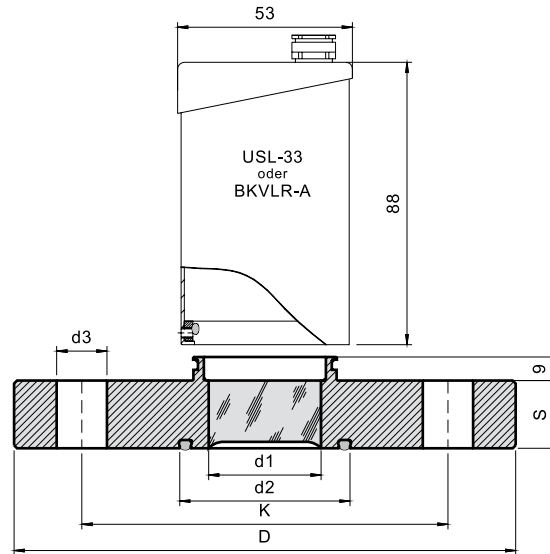
Important

- **Only for use with parallel flat face flange without seal recess. Maximum torque 20 Nm.**
- **We therefore recommend the use of Belleville spring washers, 2 pcs. for each connection hole.**

NW	PN	D	K	S	d1	d2	d3	Connection holes	O-Ring	Spring washers
50	16	165	125	21	50	66	18	4	58,74 x 3,53	31,5/16,3 x 1,25
65	16	185	145	23	70	86	18	4	78,97 x 3,53	31,5/16,3 x 1,25
80	16	200	160	23	80	96	18	8	88,50 x 3,53	31,5/16,3 x 1,25
100	16	220	180	23	90	116	18	8	107,5 x 3,53	31,5/16,3 x 1,25
125	16	250	210	25	110	141	18	8	132,9 x 3,53	31,5/16,3 x 1,25
150	16	285	240	28	130	165	22	8	158,34 x 3,53	40/20,4 x 1,5
200	10	340	295	30	160	208	22	8	202,8 x 3,53	40/20,4 x 1,5

METAGLAS® Bolt on Sight Glass for Sterile Applications

Using Sight Glass Luminaires Series USL-33 or BKVLR-A



Applications

- Aseptic and sanitary applications
- Mating to weld neck flat face flange and
- weld in base flange DIN 28117 or similar

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2

Advantages

- Security against total failure
- Compact design
- Easy cleaning – verifiable gap
- Suitable for CIP and SIP cleaning

Approvals

- TÜV component approval for use as pressure vessel part to pressure vessel codes (matl. of const 1.4462)

Operating conditions

- Pressure: -1 to 16 bar
- Temperature: see table

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4605	-60°C to +300°C
2.4610	-60°C to +300°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Sight glass luminaire

model EdelEx

- Electric supply AC/DC 12V, 24V, 220V, 240V
- Rating 5W, 10W, 20W
- Ignition protection to EN 50018/50019/VDE/0170/0171, EEx d
- Explosion group IIC (all explosion classes)

USL-33 (non Ex)

- Electric supply AC or DC 24V
- Rating 20W (without p b switch i.e. continuous operation), 50W (with p b switch)
- Filament operational lamp life over 2500 hrs
- Body stainless steel 1.4301 or similar
- Max permissible ambient temp. at luminaire gland 90 °C
- Dust and water spray protection IP65 to EN 60 529/DIN VDE 0470 part 1

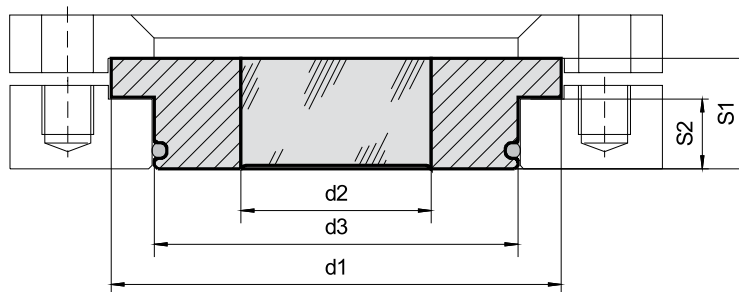
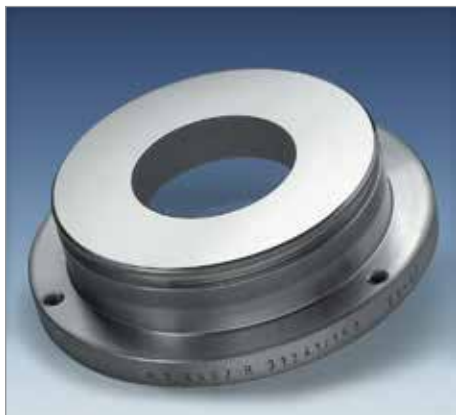
Important

- Only for use with parallel flat face flange without seal recess. Maximum torque 20 Nm.

We therefore recommend the use of Belleville spring washers, 2 pcs. for each connection hole

NW	PN	D	K	S	d1	d2	d3	Connection holes	O-Ring	Spring washers
50	16	165	125	21	37	66	18	4	58,74 x 3,53	31,5/16,3 x 1,25
65	16	185	145	23	37	86	18	4	78,97 x 3,53	31,5/16,3 x 1,25

METAGLAS[®] Sight Glass Discs for Sterile Applications



Applications

- Weld in base flanges similar to DIN 28117

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2

Operating conditions

- Pressure: -1 to 16 bar
- Temperature: see table

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4605	-60°C to +300°C
2.4610	-60°C to +300°C

Technical data

- Manufactured and tested to:
- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Advantages

- Security against total failure
- Gap can be checked
- Dead zone free, flush wall seal design
- Suitable for CIP and SIP cleaning

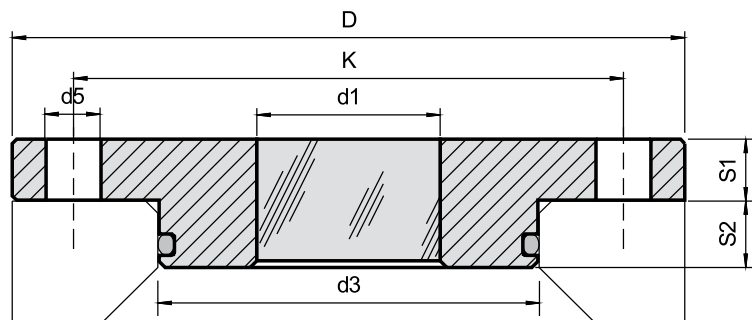
O-Ring

- AS 568 A / B.S. 1806
- Dimensions: see table

Nominal size

	d1	d2	d3	S1	S2	O-Ring
40	80	30	64,5	34	24	58,74 x 3,53
50	100	35	79,5	34	24	72,62 x 3,53
80	125	50	99,5	34	24	91,67 x 3,53
100	150	60	124,5	34	24	113,7 x 5,34
125	175	70	149,5	34	24	139,07 x 5,34
150	200	80	174,5	40	30	164,46 x 5,34
200	250	100	224,5	40	30	208,91 x 5,34

METAGLAS® Sight Glass Discs for Sterile Applications



Applications

- Weld in base flanges similar to DIN 28117

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2

Operating conditions

- Pressure: -1 to 16 bar
- Temperature: see table

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4605	-60°C to +300°C
2.4610	-60°C to +300°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Advantages

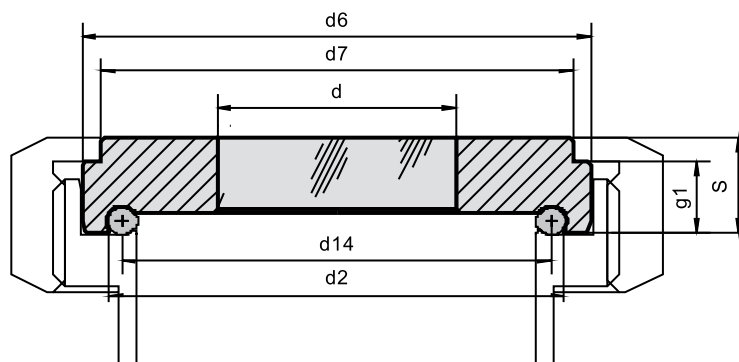
- Security against total failure
- Gap can be checked
- Dead zone free, flush wall seal design
- Suitable for CIP and SIP cleaning

O-Ring

- AS 568 A / B.S. 1806
- Dimensions: see table

Nominal size	D	d1	d3	d5	K	Connection holes	S1	S2	O-Ring
40	150	30	64,5	18	110	4	16	24	58,74 x 3,53
50	165	35	79,5	18	125	4	18	22	72,62 x 3,53
80	200	50	99,5	18	160	8	20	20	91,67 x 3,53
100	220	60	124,5	18	180	8	20	20	113,7 x 5,34
125	250	70	149,5	18	210	8	22	18	139,07 x 5,34
150	285	80	174,5	22	240	8	22	18	164,46 x 5,34
200	340	100	224,5	22	295	8	24	18	208,91 x 5,34

METAGLAS[®] Sight Glass Discs for Aseptic Screwed Pipe Connection DIN 11864-1



Applications

- Aseptic screwed pipe connection
DIN 11864-1

Material certificates

- Certificate of Conformity
EN 10204 – 3.1 or 3.2 for extra costs

Operating conditions

- Pressure: 25 bar
- Temperature: see table

Ring materials Operating temperature

1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4605	-60°C to +300°C
2.4610	-60°C to +300°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Advantages

- Security against total failure
- Easy cleaning – gap can be checked
- Flush glass/metal joint to atmospheric side
- Suitable for CIP and SIP cleaning
- Maximum visual aperture

Nominal size DN

Series A DIN 11850	Series B ISO 1127	Series C ISO 2037 BS 4825		d6	d	d14	d7	d2	g1	S	O-Ring
20	–	–	25	35,9	17	24,9	30	27,97	7	11	22 x 3,5
25	–	–	25	42,9	20	30,9	35	33,97	9	12	28 x 3,5
–	33,7	–	25	48,9	23	36,35	41	40,36	10	13	32 x 5
32	–	–	25	48,9	23	38,65	41	42,66	10	13	34 x 5
–	–	1 1/2"	25	54,9	30	41,45	48	45,46	10	14	37 x 5
40	–	–	25	54,9	28	44,65	48	48,66	10	14	40 x 5
–	42,4	–	25	54,9	28	45,05	48	49,06	10	14	40,5 x 5
–	48,3	–	25	66,9	34	50,95	61	54,96	11	14	46,5 x 5
–	–	2"	25	66,9	34	54,45	61	58,46	11	14	50 x 5
50	–	–	25	66,9	34	56,65	61	60,66	11	14	52 x 5
–	60,3	–	16	84,9	40	62,95	79	66,96	12	15	58,5 x 5
–	–	2 1/2"	16	84,9	40	66,85	79	70,86	12	15	62 x 5
65	–	–	16	84,9	40	72,65	79	76,66	12	18	68 x 5
–	76,1	–	16	98,9	47	78,35	93	82,36	14	18	73,5 x 5
–	–	3"	16	98,9	47	79,55	93	83,56	14	18	75 x 5
80	–	–	16	98,9	47	87,65	93	91,66	14	18	83 x 5
–	88,9	–	16	118,9	55	90,95	114	94,96	15	21	86,5 x 5
–	–	4"	16	118,9	55	104,05	114	108,06	15	21	100 x 5
100	–	–	16	118,9	55	106,65	114	110,66	15	21	102 x 5

METAGLAS® Sight Glass Discs for Aseptic Screwed Pipe Connection DIN 11864-1 for Mounting Luminaires USL33, BKVLR-A



Applications

- Aseptic screwed pipe connection
DIN 11864-1

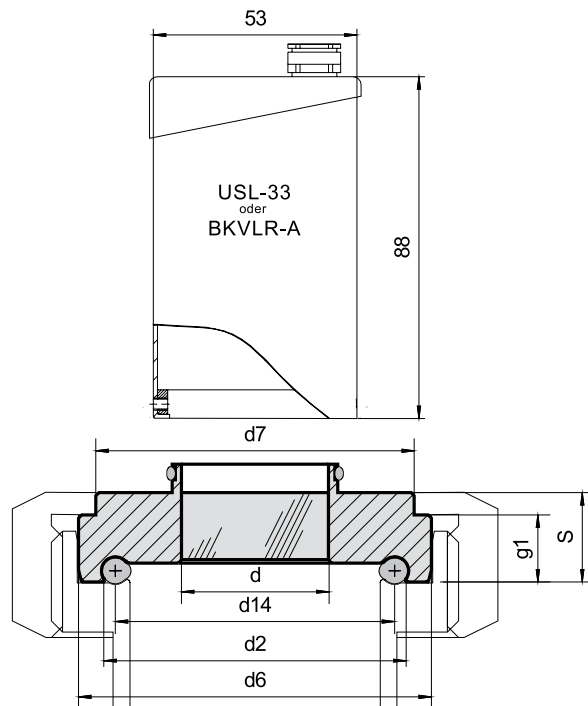
Material certificates

- Certificate of Conformity
EN 10204 – 3.1 or 3.2 for extra costs

Accessories

Light Type USL33 or BKVLR-A

- Supply Voltage: 24V AC or DC
- Output: 20W (without built in push button)
50W (with built in push button)
- Housing: Stainless steel DIN 1.4301 or similar
- Dust and water-jet proof to IP65 & EN60 529 /DIN VDE 0470 part 1



Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Advantages

- Security against total failure
- Sterile
- Long operating time
- Easy, instruction free installation
- Suitable for CIP and SIP cleaning

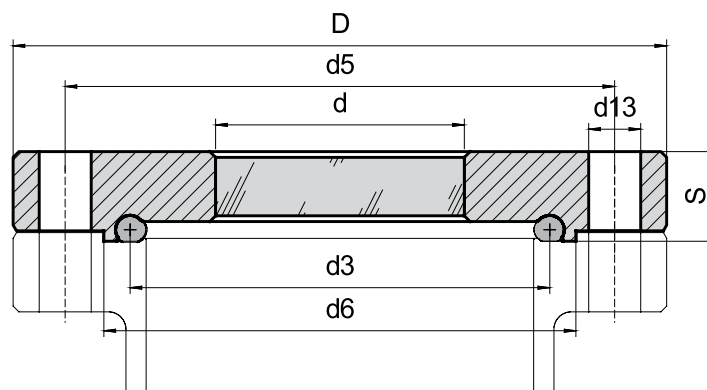
Ring materials Operating temperature

1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4605	-60°C to +300°C
2.4610	-60°C to +300°C

Nominal size DN

Nominal size DN			Nominal Pressure	d6	d	d14	d7	d2	g1	S	O-Ring
Series A DIN 11850	Series B ISO 1127	Series C ISO 2037 BS 4825									
–	–	1½"	25	54,9	28	41,45	48	45,46	10	14	37 x 5
40	–	–	25	54,9	28	44,65	55	44,56	10	14	40 x 5
–	42,4	–	25	54,9	28	45,05	55	49,06	10	14	40,5 x 5
–	48,3	–	25	66,9	34	50,95	61	54,96	11	15	46,5 x 5
–	–	2"	25	66,9	34	54,45	61	58,46	11	15	50 x 5
50	–	–	25	66,9	34	56,65	61	60,66	11	15	52 x 5
–	60,3	–	16	84,9	34	62,95	79	66,96	12	15	58,5 x 5
–	–	2½"	16	84,9	34	66,85	79	70,86	12	15	62 x 5
65	–	–	16	84,9	34	72,65	79	76,66	12	15	68 x 5
80	–	–	16	98,9	35	87,65	93	91,66	14	18	83 x 5

METAGLAS[®] Sight Glass for Aseptic Flanged Pipe Connection DIN 11864-2



Applications

- Sterile duty fitting to DIN 11864 part 2 form A
- Version with raised lip for installation on recessed face sterile duty flange form A

Material certificates

- Certificate of conformity EN 10204-3.1 or 3.2

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

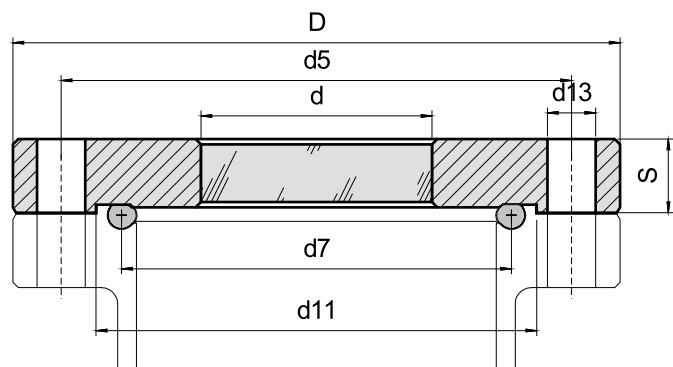
Advantages

- Security against total failure
- Sight glass and sealing profile correspond to recommendations of EHEDG (European Hygienic Equipment Design Group) and to ASME BPE (Bioprocessing Equipment)
- Long operating time
- Flush seal against atmospheric side
- Suitable for CIP and SIP cleaning
- Complies with GMP for clean condition, cleaning, sterilization

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Nominal size DN			max. operating pressure	D	d	d3	d5	d6	d13	S	O-Ring
Series A DIN 11850	Series B ISO 1127	Series C ISO 2037 BS 4825									
40	—	—	16	82	35	44,65	65	53,6	4 x Ø9	14	40 x 5
—	42,4	—	16	82	28	45,05	65	54,0	4 x Ø9	14	40,5 x 5
—	48,3	—	16	88	37	50,95	71	59,9	4 x Ø9	15	46,5 x 5
—	—	2"	16	92	40	54,45	75	63,4	4 x Ø9	16	50 x 5
50	—	—	16	94	40	56,65	77	65,6	4 x Ø9	17	52 x 5
—	60,3	—	16	103	40	62,86	85	71,9	4 x Ø9	17	58,5 x 5
—	—	2½"	16	107	45	66,85	89	75,8	8 x Ø9	18	62 x 5
65	—	—	16	113	45	72,65	95	81,6	8 x Ø9	18	68 x 5
—	76,1	—	16	125	50	78,35	104	88,1	8 x Ø11	20	73,5 x 5
—	—	3"	16	125	50	79,55	104	89,5	8 x Ø11	20	75 x 5
80	—	—	16	133	55	87,65	112	97,6	8 x Ø11	20	83 x 5
—	88,9	—	16	137	60	90,86	116	100,9	8 x Ø11	20	86,5 x 5
—	—	4"	10	157	65	104,05	135	114,2	8 x Ø11	22	100 x 5
100	—	—	10	159	65	106,65	137	116,6	8 x Ø11	22	102 x 5
—	114,3	—	10	168	70	115,61	146	125,6	8 x Ø11	22	111 x 5
125	—	—	10	183	75	131,65	161	141,6	8 x Ø11	25	127 x 5
150	—	—	10	213	90	156,56	188	167,6	8 x Ø14	25	152 x 5

METAGLAS® Sight Glass for aseptic flanged pipe connection DIN 11864-2 (flange with notch)



Applications

- Sterile fitting to DIN 11864-2 form A
- Aseptic flange with notch for installation on aseptic flange with groove

Material certificates

- Certificate of conformity EN 10204-3.1 or 3.2

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN(ISO 9001))
- AD 2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN7080 / DIN7079

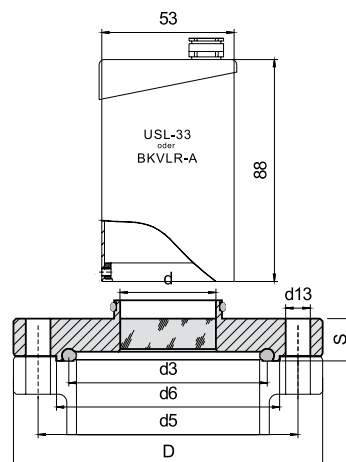
Advantages

- Sight glass and sealing profile correspond to EHEDG (European Hygienic Equipment Design Group) and ASME-BPE (Bioprocessing Equipment)
- Security against total fail
- Long operating time
- Suitable for CIP and SIP cleaning
- complies with GMP for clean condition, cleaning, sterilization

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Nominal size DN			max operating pressure	D	d	d7	d5	d11	d13	S	O-Ring
Series A DIN 11850	Series B ISO 1127	Series C ISO 2037 BS 4825									
40	—	—	16	82	35	44,56	65	53,7	4 x Ø9	14	40 x 5
—	42,4	—	16	82	35	44,96	65	54,1	4 x Ø9	14	40,5 x 5
—	48,3	—	16	88	35	50,86	71	60,0	4 x Ø9	14	46,5 x 5
—	—	2"	16	92	35	54,36	75	63,5	4 x Ø9	14	50 x 5
50	—	—	16	94	40	56,56	77	65,7	4 x Ø9	16,3	52 x 5
—	60,3	—	16	103	40	62,86	85	72,0	4 x Ø9	16	58,5 x 5
—	—	2½"	16	107	45	66,76	89	75,9	8 x Ø9	18	62 x 5
65	—	—	16	113	45	72,56	95	81,7	8 x Ø9	16	68 x 5
—	76,1	—	16	125	50	78,26	104	88,4	8 x Ø11	20	73,5 x 5
—	—	3"	16	125	50	79,46	104	89,6	8 x Ø11	20	75 x 5
80	—	—	16	133	55	87,56	112	97,7	8 x Ø11	20,26	83 x 5
—	88,9	—	16	137	60	90,86	116	101,0	8 x Ø11	20	86,5 x 5
—	—	4"	10	157	70	103,96	135	114,4	8 x Ø11	22,5	100 x 5
100	—	—	10	159	65	106,56	137	116,7	8 x Ø11	24	102 x 5
—	114,3	—	10	168	70	115,81	146	125,9	8 x Ø11	24	111 x 5
125	—	—	10	183	75	131,56	161	141,7	8 x Ø11	22	127 x 5
150	—	—	10	213	90	156,56	188	167,7	8 x Ø14	26	152 x 5

METAGLAS[®] Sight Glass for Aseptic Flanged Pipe Connection DIN 11864-2 for Luminaires USL33 or BKVLR-A



Advantages

- Security against total failure
- Sight glass and sealing profile correspond to recommendations of EHEDG (European Hygienic Equipment Design Group) and to ASME BPE (Bioprocessing Equipment)
- Long operating time
- Flush seal against atmospheric side
- Suitable for CIP and SIP cleaning
- Complies with GMP for clean condition, cleaning, sterilization

Applications

- Sterile duty fitting to DIN 11864 part 2 form A
- Version with raised lip for installation on recessed face sterile duty flange form A

Technical data

- Directive for Pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD 2000 Standards W0/TRD 100
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Material certificates

- Certificate of conformity EN 10204-3.1 or 3.2

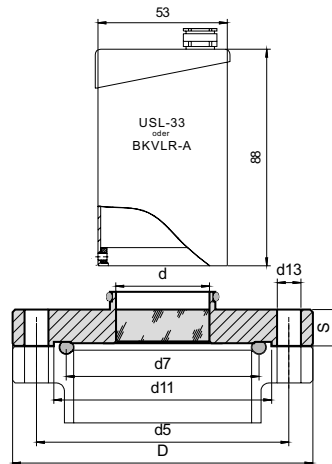
Sight glass light USL-33 or BKVLR A (non Ex)

- Supply voltage: 24 V AC or DC
- output: 20W (without built in push button)
50W (with built in push button)
- housing: stainless steel 1.4301 or similar
- operating time: more than 2500 hours

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Nominal size DN			max operating pressure	D	d	d3	d5	d6	d13	S	O-Ring
Series A DIN 11850	Series B ISO 1127	Series C ISO 2037 BS 4825									
25	—	—	16	70	25	30,90	53	38,3	4 x Ø9	14	28 x 3,5
—	33,7	—	16	74	25	36,35	57	45,3	4 x Ø9	14	32 x 5
32	—	—	16	76	25	38,65	59	47,6	4 x Ø9	14	34 x 5
—	—	1 1/2"	16	79	30	41,45	62	50,4	4 x Ø9	14	37 x 5
40	—	—	16	82	30	44,65	65	53,6	4 x Ø9	14	40 x 5
—	42,3	—	16	82	30	45,05	65	53,6	4 x Ø9	14	40,5 x 5
—	48,3	—	16	88	35	50,86	71	59,9	4 x Ø9	14	46,5 x 5
—	—	2"	16	92	35	54,36	75	63,4	4 x Ø9	16	50 x 5
50	—	—	16	94	35	56,56	77	65,6	4 x Ø9	16	52 x 5
—	60,3	—	16	103	35	62,86	85	71,9	4 x Ø9	16	58,5 x 5
—	—	2 1/2"	16	107	35	66,76	89	75,8	8 x Ø9	18	62 x 5
65	—	—	16	113	35	72,56	95	81,6	8 x Ø9	18	68 x 5
—	76,1	—	16	125	35	78,06	104	88,1	8 x Ø11	20	73,5 x 5
—	—	3"	16	125	35	79,46	104	89,5	8 x Ø11	20	75 x 5
80	—	—	16	133	35	87,56	112	97,6	8 x Ø11	20	83 x 5
—	88,9	—	16	137	35	90,86	116	100,9	8 x Ø11	20	86,5 x 5

METAGLAS® Sight Glass for aseptic flanged pipe connection DIN 11864-2
For sight glass luminaire type USL33 or BKVLR-A
 (flange with notch)



Advantages

- Sight glass and sealing profile correspond to EHEDG (European Hygienic Equipment Design Group) and ASME BPE (Bioprocessing Equipment)
- Security against total fail
- Long operating time
- Suitable for CIP and SIP cleaning
- Complies with GMP for clean condition, cleaning, sterilization

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Applications

- Sterile fitting to DIN 11864 part 2 form A
- Aseptic groove flange model for installation on aseptic round flange form A

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD 2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN7080 / DIN7079

Material certificates

- Certificate of conformity EN 10204-3.1 or 3.2

Sight glass light USL-33 or BKVLR A (non Ex)

- Supply voltage: 24 V AC or DC
- output: 20W (without built in push button)
50W (with built in push button)
- housing: stainless steel 1.4301 or similar
- operating time: more than 2500 hours

Nominal size DN			max operating pressure	D	d	d7	d5	d11	d13	S	O-Ring
Series A DIN 11850	Series B ISO 1127	Series C ISO 2037 BS 4825									
25	—	—	16	70	25	30,76	53	38,4	4 x Ø9	14	28 x 3,5
—	33,7	—	16	74	25	36,26	57	45,4	4 x Ø9	14	32 x 5
32	—	—	16	76	25	38,56	59	47,7	4 x Ø9	14	34 x 5
—	—	1½"	16	79	30	41,36	62	50,5	4 x Ø9	14	37 x 5
—	42,4	—	16	82	30	44,56	65	53,7	4 x Ø9	14	40,5 x 5
—	48,3	—	16	88	35	50,86	71	60,0	4 x Ø9	14	46,5 x 5
—	—	2"	16	92	35	54,36	75	63,5	4 x Ø9	14	50 x 5
50	—	—	16	94	35	56,56	77	65,7	4 x Ø9	16,3	52 x 5
—	60,3	—	16	103	35	62,86	85	72,0	4 x Ø9	16	58,5 x 5
—	—	2½"	16	107	35	66,76	89	75,9	8 x Ø9	18	62 x 5
65	—	—	16	113	35	72,56	95	81,7	8 x Ø9	16	68 x 5
—	76,1	—	16	125	35	78,26	104	88,4	8 x Ø11	20	73,5 x 5
—	—	3"	16	125	35	79,46	104	89,6	8 x Ø11	20	75 x 5
80	—	—	16	133	35	87,56	112	97,7	8 x Ø11	20	83 x 5

METAGLAS® Sight Glass for Aseptic Clamp Pipe Connection DIN 11864-3



Applications

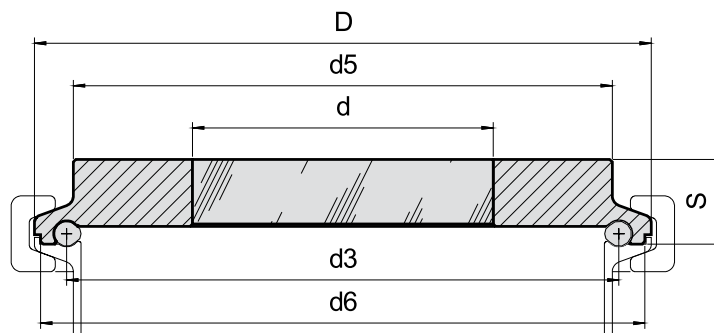
- Sterile duty fitting to DIN 11864 part 3 form A
- Version with raised lip for installation on recessed face sterile duty flange form A

Material certificates

- Certificate of Conformity EN 10204 – 3.1 or 3.2

Ring materials Operating temperature

1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C



Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN7080 / DIN7079

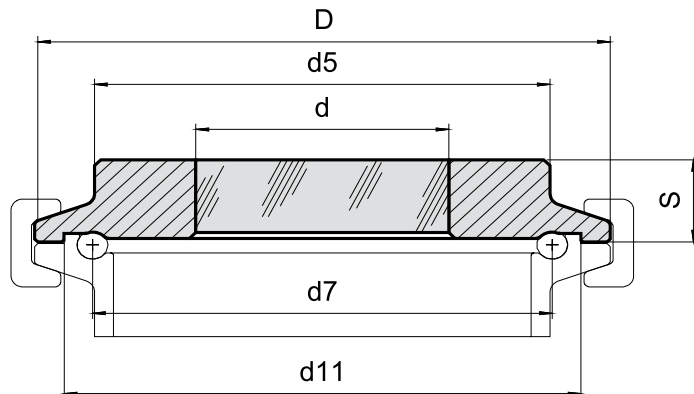
Advantages

- Security against total failure
- Sight glass and sealing profile correspond to recommendations of EHEDG (European Hygienic Equipment Design Group) and to ASME BPE (Bioprocessing Equipment)
- Flush seal against atmospheric side
- Suitable for CIP and SIP cleaning
- Complies with GMP for clean condition, cleaning, sterilization

Nominal size DN max operating pressure

Series A DIN 11850	Series B ISO 1127	Series C ISO 2037 BS 4825		D	d	d3	d6	d5	S	O-Ring
20	–	–	16	50,5	20	24,90	32,3	42	12	22 x 3,5
–	–	1"	16	50,5	22	26,90	34,3	42	12	24 x 3,5
–	26,9	–	16	50,5	22	28,60	36,0	42	12	26 x 3,5
25	–	–	16	50,5	24	30,90	38,3	42	12	28 x 3,5
32	–	–	16	50,5	24	38,65	47,6	42	14	34 x 5
–	–	1½"	16	64	30	41,45	50,4	54	14	37 x 5
40	–	–	16	64	30	44,65	53,6	54	14	40 x 5
–	42,4	–	16	64	30	45,05	54,0	54	14	40,5 x 5
–	48,3	–	16	64	30	50,95	59,9	54	14	46,5 x 5
–	–	2"	16	77,5	35	54,55	63,4	62	15	50 x 5
50	–	–	16	77,5	35	56,65	65,6	62	15	52 x 5
–	60,3	–	10	91	40	62,95	71,9	78	16	58,5 x 5
–	–	2½"	10	91	40	66,85	75,8	78	16	62 x 5
65	–	–	10	91	40	72,65	81,6	78	16	68 x 5
–	76,1	–	10	106	50	78,35	88,3	93	16	73,5 x 5
–	–	3"	10	106	50	79,55	89,5	93	16	75 x 5
80	–	–	10	106	50	87,65	97,6	93	16	83 x 5
–	88,9	–	10	119	50	90,95	100,9	104	18	86,5 x 5
–	–	4"	10	130	60	104,05	114,2	115	20	100 x 5
100	–	–	10	130	60	106,65	116,6	115	20	102 x 5
–	114,3	–	10	144	65	115,90	125,8	124	22	111 x 5
125	–	–	10	155	65	131,65	141,6	130	22	127 x 5
150	–	–	10	183	80	156,65	167,6	155	25	152 x 5

METAGLAS® Sight Glass for aseptic clamp pipe connection DIN 11864-3 (clamp sight glass with notch)



Applications

- Sterile duty fitting to DIN 11864 part 3 form A
- Aseptic groove clamp for installation on aseptic round clamp form A

Material certificates

- Certificate of Conformity EN 10204 – 3.1 or 3.2

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Technical data

Manufactured and tested to:

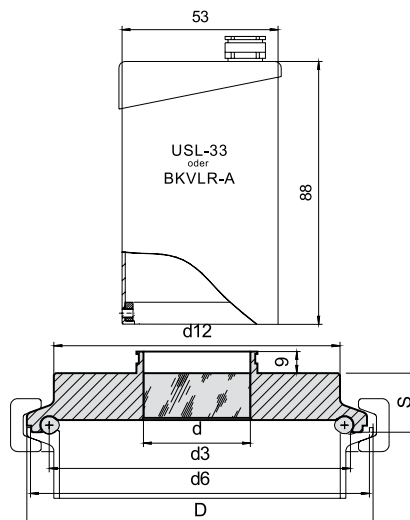
- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Advantages

- Security against total failure
- Sight glass and sealing profile correspond to recommendations of EHEDG (European Hygienic Equipment Design Group) and to ASME BPE (Bioprocessing Equipment)
- Flush seal against atmospheric side
- Suitable for CIP and SIP cleaning
- Complies with GMP for clean condition, cleaning, sterilization

Nominal size DN			max operating pressure	D	d	d11	d7	d5	S	O-Ring
Series A DIN 11850	Series B ISO 1127	Series C ISO 2037 BS 4825								
20	–	–	16	50,5	20	32,4	24,76	42	12	22 x 3,5
–	–	1"	16	50,5	22	34,4	26,76	42	12	24 x 3,5
–	26,9	–	16	50,5	22	36,1	28,46	42	12	26 x 3,5
25	–	–	16	50,5	24	38,4	30,76	42	12	28 x 3,5
32	–	–	16	50,5	24	47,7	38,56	42	12	34 x 5
–	–	1½"	16	64	30	50,5	41,36	54	12	37 x 5
40	–	–	16	64	30	53,7	44,56	54	12	40 x 5
–	42,4	–	16	64	30	54,1	44,96	54	12	40,5 x 5
–	48,3	–	16	64	30	60,0	50,86	54	12	46,5 x 5
–	–	2"	16	77,5	35	63,5	54,36	62	14	50 x 5
50	–	–	16	77,5	35	65,7	56,56	62	14	52 x 5
–	60,3	–	10	91	40	72,0	62,86	78	14	58,5 x 5
–	–	2½"	10	91	40	75,9	66,76	78	14	62 x 5
65	–	–	10	91	40	81,7	72,56	78	14	68 x 5
–	76,1	–	10	106	50	88,4	78,26	93	14	73,5 x 5
–	–	3"	10	106	50	89,6	79,46	93	16	75 x 5
80	–	–	10	106	50	97,7	87,56	93	14	83 x 5
–	88,9	–	10	119	55	101,0	90,86	104	18	86,5 x 5
–	–	4"	10	130	60	114,4	103,96	115	18	100 x 5
100	–	–	10	130	60	116,7	106,56	115	18	102 x 5
–	114,3	–	10	144,4	65	125,9	115,6	124	21	111 x 5

METAGLAS[®] Sight Glass for aseptic clamp pipe connection DIN 11864-3
For luminaire type USL-33 or BKVLR-A (clamp sight glass with notch)



Advantages

- Security against total failure
- Sight glass and sealing profile correspond to recommendations of EHEDG (European Hygienic Equipment Design Group) and to ASME BPE (Bioprocessing Equipment)
- Flush seal against atmospheric side
- Suitable for CIP and SIP cleaning
- Complies with GMP for clean condition, cleaning, sterilization

Applications

- Sterile duty fitting to DIN 11864 part 3 form A
- Version with raised lip for installation on recessed face sterile duty flange form A

Technical data

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Material certificates

- Certificate of conformity EN 10204-3.1 or 3.2

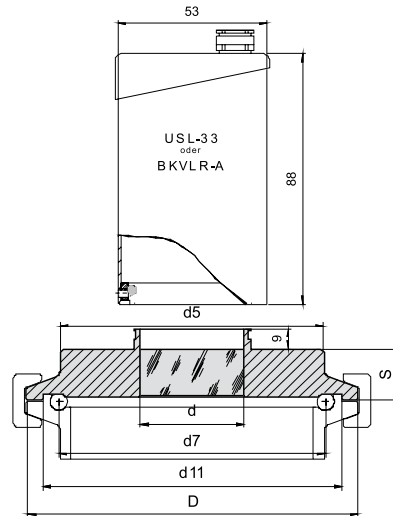
Sight glass light USL-33 or BKVLR A (non Ex)

- Supply voltage: 24 V AC or DC
- output: 20W (without built in push button)
50W (with built in push button)
- housing: stainless steel 1.4301 or similar
- operating time: more than 2500 hours

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Nominal size DN			max operating pressure	D	d	d3	d6	d12	S	O-Ring
Series A DIN 11850	Series B ISO 1127	Series C ISO 2037 BS 4825								
25	–	–	16	50,5	24	30,90	38,3	42	17	28 x 3,5
32	–	–	16	50,5	24	38,65	47,6	42	14	34 x 5
–	–	1½"	16	64	30	41,45	50,4	54	14	37 x 5
40	–	–	16	64	30	44,65	53,6	54	17	40 x 5
–	42,4	–	16	64	30	45,05	54,0	54	14	40,5 x 5
–	48,3	–	16	64	30	50,95	59,9	54	14	46,5 x 5
–	–	2"	16	77,5	35	54,55	63,4	62	15	50 x 5
50	–	–	16	77,5	35	56,65	65,6	62	15	52 x 5
–	60,3	–	10	91	35	62,95	71,9	78	16	58,5 x 5
–	–	2½"	10	91	35	66,85	75,8	78	16	62 x 5
65	–	–	10	91	37	72,65	81,6	78	16	68 x 5
–	76,1	–	10	106	35	78,35	88,1	90,5	18	73,5 x 5
–	–	3"	10	106	35	79,55	89,5	90,5	18	75 x 5
80	–	–	10	106	35	87,65	97,6	90	18	83 x 5

METAGLAS® Sight Glass for aseptic clamp pipe connection DIN 11864-3 For luminaire type USL-33 or BKVLR-A



Advantages

- Security against total failure
- Sight glass and sealing profile correspond to EHEDG (European Hygienic Equipment Design Group) and ASME BPE (Bioprocessing Equipment)
- Flush seal against atmospheric side
- Suitable for CIP and SIP cleaning
- Complies with GMP for clean condition, sterilization

Applications

- Sterile duty fitting to DIN 11864 part 3 form A
- Aseptic groove clamp for installation on aseptic round clamp form A

Technical data

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Ring materials Operating temperature

1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Material certificates

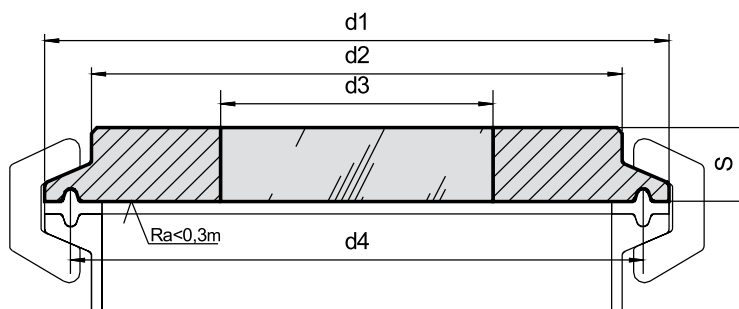
- Certificate of conformity EN 10204-3.1 or 3.2

Sight glass light USL-33 or BKVLR A (non Ex)

- Supply voltage: 24 V AC or DC
- output: 20W (without built in push button)
50W (with built in push button)
- housing: stainless steel 1.4301 or similar
- operating time: more than 2500 hours

Nominal size DN			max operating pressure	D	d	d11	d7	d5	S	O-Ring
Series A DIN 11850	Series B ISO 1127	Series C ISO 2037 BS 4825								
25	–	–	16	50,5	24	38,4	30,76	42	12	28 x 3,5
32	–	–	16	50,5	24	47,7	38,56	42	12	34 x 5
–	–	1½"	16	64	30	50,5	41,36	54	12	37 x 5
40	–	–	16	64	30	53,7	44,56	54	12	40 x 5
–	42,4	–	16	64	30	54,1	44,96	54	12	40,5 x 5
–	48,3	–	16	64	30	60,0	50,86	54	12	46,5 x 5
–	–	2"	16	77,5	35	63,5	54,36	62	14	50 x 5
50	–	–	16	77,5	35	65,7	56,56	62	14	52 x 5
–	60,3	–	10	91	35	72,0	62,86	78	14	58,5 x 5
–	–	2½"	10	91	35	75,9	66,76	78	14	62 x 5
65	–	–	10	91	35	81,7	72,56	78	14	68 x 5
–	76,1	–	10	106	35	88,4	78,26	93	14	73,5 x 5
–	–	3"	10	106	35	89,6	79,46	93	16	75 x 5
80	–	–	10	106	35	97,7	87,56	93	16	83 x 5

METACLAMP[®] Sight Glass for Sanitary Clamp Fitting



Applications

- For clamp fittings to
DIN 32 676 / ISO 2852

Material certificates

- Certificate of Conformity to
EN 10204-3.1 or 3.2

Operating conditions

- Pressure: -1 to 16 bar
- Temperature: see table

Ring materials Operating temperature

1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Approvals and technical data

Manufactured and tested in conformance with:

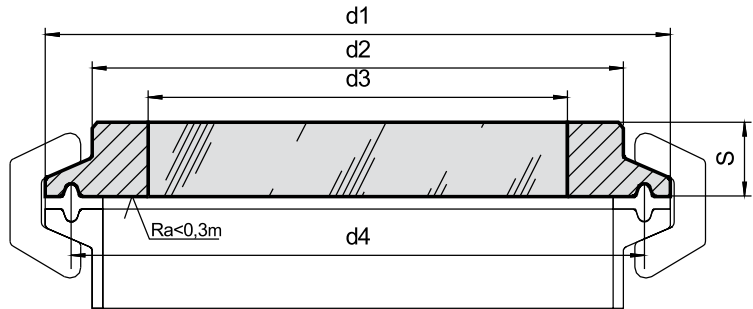
- Pressure Equipment Directive 2014/68/EU,
Module H (DIN/EN/ISO 9001)
- AD 2000 Standards W0/TRD 100
- A3 Standard for food processing
- Sight glass fused to metal conforming to DIN 7079
- Borosilicate glass to DIN 7080 / DIN 7079

Advantages

- Extremely compact construction
- Suitable for food processing & other sterile applications
(A3-Standard)
- Reliability against total failure – the possibility of sudden
unexpected rupture is totally excluded
- Fast & simple installation & maintenance
- Extreme resistance to impact and temperature
- Wide acceptance in the European & American food,
beverage, pharmaceutical and chemical industries

Nominal size			d1	d2	d3	d4	S	Max operating pressure [bar]
DIN	ISO	ASME BPE						
–	8/10	½", ¾"	25	18	10	18,0	10	25
10/15/20	–	–	34	23	14	27,5	8	25
25/32/40	15/20/25	1", 1½"	50,5	41	25	43,5	10	16
50	32/40	2"	64	52	30	56,5	10	16
–	50	2½"	77,5	63,5	35	70,5	10	16
65	65	3"	91	76	40	83,5	10	10
80	80	3½"	106	90	50	97,0	10	10
100	–	4"	119	101	55	110,0	12	10
–	100	4½"	130	114	60	122,0	16	10
–	–	5"	144,5	127	65	134,5	16	10
125	–	5½"	155	138	70	146,0	16	6
–	–	6"	167	152	75	156,5	16	6
150	150	–	183	160	80	174,3	16	6
–	–	8"	217,5	198	100	207,4	18	6
200	200	–	233,5	210	100	225,1	18	6
–	–	10"	268	245	130	257,8	20	6
250	–	–	287,5	266	140	278,4	22	6
–	–	12"	319,3	300	150	309,1	22	6
300	300	–	338,3	316	150	328,4	22	6

METACLAMP® Sight Glass for Sanitary clamp fitting with sodalime glass



Applications

- For clamp fittings to DIN 32 676 / ISO 2852
- For sodalime glass approved applications

Material certificates

- Certificate of conformity EN 10204-3.1

Ring materials	Operating temperature
1.4462	-30°C to +150°C
2.4602	-60°C to +150°C

Technical data

Manufactured and tested conformance with:

- Pressure equipment directive 2014/68/EU, Module H (DIN/EN ISO 9001)
- AD 2000 standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Glass: B270 sodalime glass DIN 8901 / DIN 7079 (limited usable for pressure vessels)

Advantages

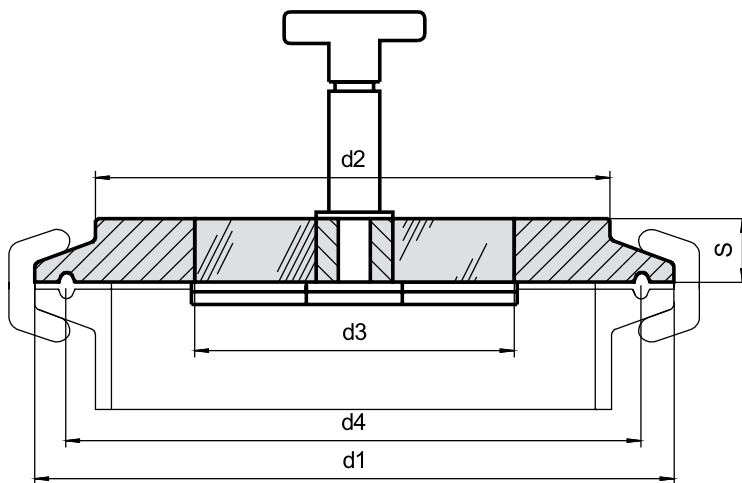
- Aseptic design
- Security against total fail
- Fast & simple installation & maintenance
- Long operating time
- Big glass diameter

Operating conditions

- Pressure: -1 to 16 bar
- Temperature: see table

Nominal size			d1	d2	d3	d4	S	Max operating pressure [bar]
DIN	ISO	ASME BPE						
25/32/40	15/20/25	1", 1½"	50,5	41	30	43,5	10	16
50	32/40	2"	64	52	37	56,5	12	16
–	50	2½"	77,5	63,5	45	70,5	14	16
65	65	3"	91	76	55	83,5	14	10
80	80	3½"	106	90	60	97,0	15	10
100	–	4"	119	102,5	75	110,0	18	10
–	–	6"	167	152	105	156,5	22	6
–	–	8"	217,5	198	135	207,4	24	6
–	–	10"	268	245	160	257,8	25	6
–	–	12"	319,3	300	200	309,1	30	6

METACLAMP[®] with Wiper for Triclamp Fitting Borosilicate Glass



Applications

- For clamp fittings to
DIN 32 676 / ISO 2852

Advantages

- Extremely compact construction
- Reliability against total failure – the possibility of sudden unexpected rupture is totally excluded
- Fast & simple installation & maintenance
- Long working time

Operating conditions

- Pressure: -1 to 10 bar
- Temperature: up to 150°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Materials

- Ring: Duplex stainless steel 1.4462, Hastelloy C-22
- Glass: Borosilicate to DIN 7080
- Fused Bush: Alloy 36 (DIN 1.3912)

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2 for extra costs

Accessories

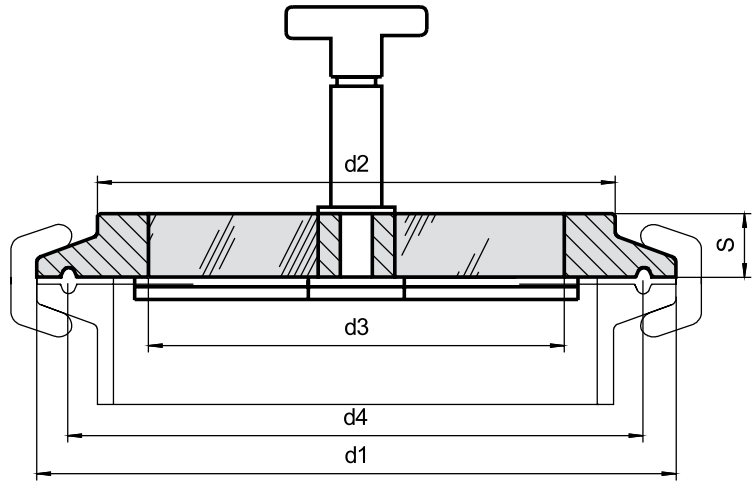
Wiper

- Wiper blade: PTFE or Silicone-rubber
- Contact metal parts stainless steel: V4A

Nominal size			d1	d2	d3	d4	S	Max operating pressure [bar]
DIN	ISO	ASME BPE						
65	65	3"	91	76	40	83,5	10	10
80	80	3½"	106	90	50	97,0	12	10
100	–	4"	119	101	55	110,0	12	10
–	–	6"	167	152	80	156,5	16	6
150	150	–	183	160	80	174,3	16	6
–	–	8"	217,5	198	100	207,4	18	6
200	200	–	233,5	210	110	225,1	20	6
–	–	10"	268	245	130	257,8	20	6
250	–	–	287,5	266	140	278,4	22	6
–	–	12"	319,3	300	140	309,1	22	6
300	300	–	338,3	316	140	328,4	22	6

METACLAMP® with Wiper for Triclamp Fitting

Sodalime Glass



Applications

- For clamp fittings to
DIN 32 676 / ISO 2852

Advantages

- Compact construction
- Security against total fail
- Fast & simple installation & maintenance
- Long operating time
- Big glass diameter

Operating conditions

- Pressure: -1 to 10 bar
- Temperature: up to 150°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU,
- Module H (DIN/EN(ISO 9001)
- AD 2000 Standards W0/TRD 100
- sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: B270 (sodalime glass)

Materials

- Ring: Duplex stainless steel 1.4462, Hastelloy C-22
- Fused bush: Alloy 36 (DIN 1.3912)

Material certificates

- Certificate of Conformity to EN 10204-3.1

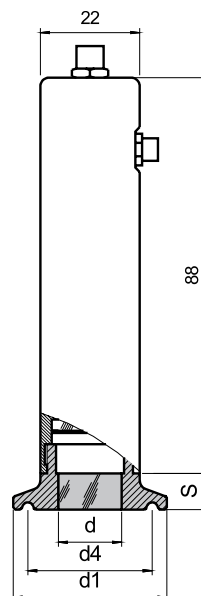
Accessories

Wiper

- Wiper blade: PTFE or silicon-rubber
- Contact metal stainless steel: V4A

Nominal size			d1	d2	d3	d4	S	Max operating pressure [bar]
DIN	ISO	ASME BPE						
65	65	3"	91	76	55	83,5	14	10
80	80	3½"	106	90	60	97,0	15	10
100	–	4"	119	102,5	75	110,0	18	10
–	–	6"	167	152	105	156,5	22	6

METACLAMP[®] with Luminaire Mikrolux



Applications

- Compact sanitary combination of miniatur stainless steel Luminaire Mikrolux light with proven Metaclamp sanitary mounting system. Providing up to 20 watts of intense glare free illumination through a Metaglas safety glass lens

Material certificates

- Certificate of conformity to EN 10204-3.1 or 3.2 for extra costs

Sanitary Metaclamp Materials

- Duplex Stainless Steel (1.4462)
- Hastelloy C-22 (2.4602)
- Hastelloy C-4 (2.4610)

Operating conditions

- Pressure: -1 to 16 bar
- Temperature: see table
- Temperature: (With light) up to 90°C

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilikate to DIN 7080 / DIN 7079

Advantages

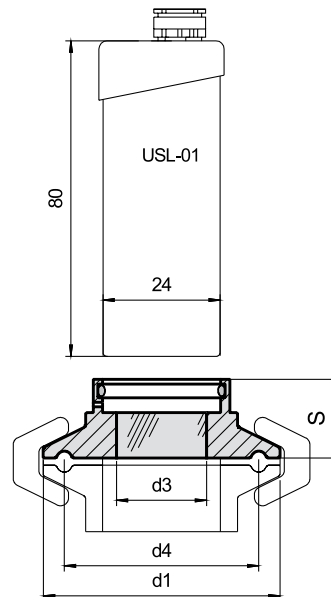
- Very compact construction
- Maintenance-friendly plug connection
- Ideal for the illumination of small tanks in non explosion hazard areas
- Aseptic design

Light Type 1803 „Mikrolux“

- Supply voltage: 24V AC or DC
12V light with 5 W or 10 W
24V light with 20 W
- Housing: stainless steel DIN 1.4301 or similar
- Operating time: more than 2500 operating hours
- Dust and water-jet proof IP65 & EN 60 529/DIN VDE 0470 part 1

Nominal size			d1	d	d4	S	Pressure rating [bar]
DIN	ISO	ASME BPE					
–	8/10	1/2" / 3/4"	25	13	20,5	10	16
10/15/20	–	–	34	14	27,5	8	16
25/32/40	15/20/25	1 1/2" / 1"	50,5	14	43,5	10	16

METACLAMP® & Mini USL01 Luminaire



Applications

- Compact sanitary combination of miniature stainless steel Lumiglas USL-01 light with the proven Metaclamp sanitary mounting system. Providing up to 20 watts of intense glare free illumination through a Metaglas safety glass lens.

Sanitary Metaclamp Materials

- Duplex Stainless Steel (1.4462)
- Hastelloy C-22 (2.4602)
- Hastelloy C-4 (2.4610)

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2 for extra costs

Operating conditions

- Pressure: -1 to 16 bar
- Temperature: see table
- Temperature: (With light) up to 90°C

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Advantages

- Miniature space saving design
- Suitable for food processing (A3-Standard)
- Dust and water jet resistant (IP65) even during external washdown
- Fast & simple installation with no risk of breakage
- Very high resistance to impact
- Sight glass resistant to catastrophic failure

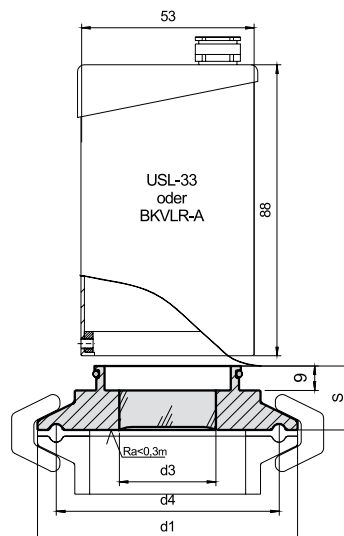
Light Mini-Lumiglas Stainless Steel

- Supply Voltage: 24V AC or DC
- Output: 5W (without built in push button)
20W (with built in push button)
- Housing: stainless steel DIN 1.4301 or similar
- Power cable: 3 m
- Bulb life: Over 2500 hours
- Dust and water-jet proof IP65 & EN60 529/DIN VDE 0470 part 1

Nominal size			d1	d3	d4	S	Pressure rating [bar]
DIN	ISO	Inch					
–	8/10	1/2", 3/4"	25	10	18,0	28	16
10/15/20	–	–	34	14	27,5	28	16
25/32/40	15/20/25	1", 1 1/2"	50,5	22	43,5	22	16
50*	32/40*	2" *	64	23	56,5	22	16

* sight glass fitting type USL33 recommended

METACLAMP® Sanitary Metacamp & Luminaire USL33 or BKVLR-A



Applications

- Extremely compact unit combining the popular Lumiglas USL-33 light with the proven Metacamp sanitary mounting system. This compact combination can be mounted directly to any vessel or pipeline and provides up to 50W of intense glare free illumination through a Metaglas safety glass lens. Lights are available with an optional push button momentary on/off switch.

Material certificates

- Certificate of Conformity to EN 10204-3.1 3.2 for extra costs

Sanitary Metacamp Materials

- Duplex Stainless Steel (1.4462)
- Hastelloy C-22 (2.4602)
- Hastelloy C-4 (2.4610)

Operating conditions

- Pressure: -1 to 16 bar
- Temperature: see table
- Temperature: (With light) up to 55°C

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Advantages

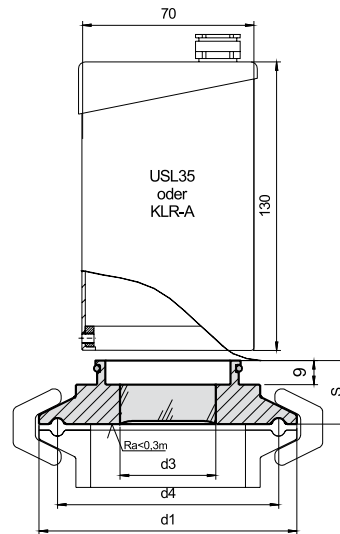
- Extremely compact
- Minimal crevices for sanitary applications
- Suitable for food processing (A3-Standard)
- Dust and water jet resistant (IP65) even during external washdown
- Fast & simple installation with no risk of breakage
- Very high resistance to impact
- Sight glass resistant to catastrophic failure

Light Type USL33 or BKVLR-A (none Ex)

- Supply Voltage: 24V AC or DC
- Output: 20W (without built in push button)
50W (with built in push button)
- Housing: Stainless steel DIN 1.4301 or similar
- Power cable: 3 m
- Bulb life: Over 2500 hours
- Dust and water-jet proof IP65 & EN60 529/DIN VDE 0470 part 1

Nominal size			d1	d3	d4	S	Max operating pressure [bar]
DIN	ISO	ASME BPE					
25/32/40	15/20/25	1", 1½"	50,5	25	43,5	20	16
50	32/40	2"	64	30	56,5	24	16
–	50	2½"	77,5	34	70,5	21	10
65	65	3"	91	35	83,5	21	10
80	80	3½"	106	35	97,0	22	10
100	–	4"	119	35	110,0	22	10

METACLAMP® Sanitary Metacamp and Light Fitting USL35 or KLR-A



Applications

- Powerful stainless steel Lumiglas USL-35 light with the proven Metacamp sanitary mounting system. This compact combination can be mounted directly to any vessel or pipeline and provides up to 100 watts of intense glare free illumination through a Metaglas safety glass lens. Lights are available with an optional push button momentary on/off switch

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2 for extra costs

Sanitary Metacamp Materials

- Duplex Stainless Steel (1.4462)
- Hastelloy C-22 (2.4602)
- Hastelloy C-4 (2.4610)

Operating conditions

- Pressure: -1 to 10 bar
- Temperature: see table
- Temperature: (With light) up to 90°C

Ring materials Operating temperature

1.4462	-30°C to +280°C
2.4602	-60°C to +300°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Advantages

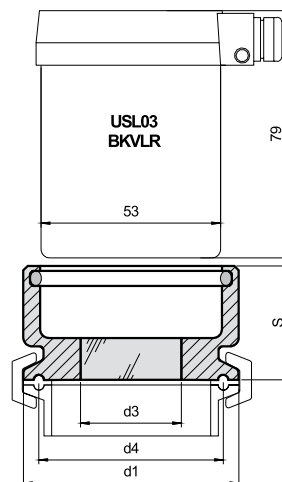
- Powerful illumination
- Minimal crevices for sanitary applications
- Suitable for food processing (A3-Standard)
- Dust and water jet resistant (IP65) even during external washdown
- Fast & simple installation with no risk of breakage
- Wide range of voltages available
- Very high resistance to impact
- Sight glass resistant to catastrophic failure

Light Type USL-35 (none Ex)

- Supply Voltage: 24V, 120V or 230V, AC or DC
- Output: 20W (without built in push button)
100W (with built in push button)
- Housing: Stainless steel DIN 1.4301 or similar
- Power cable: 3 m
- Bulb life: Over 2500 hours
- Dust and water-jet proof: IP65 & EN60 529/DIN VDE 0470 part 1

Nominal size			d1	d3	d4	S	Max operating pressure [bar]
DIN	ISO	ASME BPE					
25/32/40	15/20/25	1", 1½"	50,5	28	43,5	21	16
50	32/40	2"	64	32	56,5	25	16
–	50	2½"	77,5	35	70,5	21	16
65	65	3"	91	45	83,5	22	10
80	80	3½"	106	50	97,0	22	10
100	–	4"	119	51	110,0	23	10
125	125	5½"	155	51	146,0	25	10
–	–	6"	167	52	156,5	27	10

METACLAMP® Sanitary Metaclamp & Luminaire USL03 or BKVLR



Applications

- Extremely compact unit combining the popular Lumiglas USL-03 light with the proven Metaclamp sanitary mounting system. This compact combination can be mounted directly to any vessel or pipeline and provides up to 50W of intense glare free illumination through a Metaglas safety glass lens. Lights are available with an optional push button momentary on/off switch.

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2 for extra costs

Sanitary Metaclamp Materials

- Duplex Stainless Steel (1.4462)
- Hastelloy C-22 (2.4602)
- Hastelloy C-4 (2.4610)

Operating conditions

- Pressure: -1 to 16 bar
- Temperature: see table
- Temperature: (With light) up to 80°C

Ring materials Operating temperature

1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Advantages

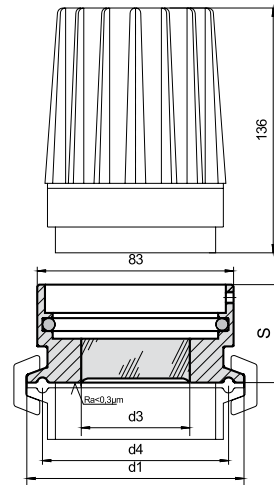
- Extremely compact
- High light output
- Suitable for food processing (A3-Standard)
- Dust and water jet resistant (IP65) even during external washdown
- Fast & simple installation with no risk of breakage
- Very high resistance to impact
- Sight glass resistant to catastrophic failure

Light USL-03 or BKVLR (none Ex)

- Supply Voltage: 24V AC or DC
- Output: 20W (without built in push button)
50W (with built in push button)
- Housing: Stainless steel DIN 1.4301 or similar
- Power cable: 3 m
- Bulb life: Over 2500 hours
- Dust and water-jet proof IP65 & EN60 529/DIN VDE 0470 part 1

Nominal size			d1	d3	d4	S	Max operating pressure [bar]
DIN	ISO	ASME BPE					
25/32/40	15/20/25	1", 1½"	50,5	28	43,5	34	16
50	32/40	2"	64	34	56,5	34	16
–	50	2½"	77,5	38	70,5	34	16
65	65	3"	91	50	83,5	34	10
80	80	3½"	106	50	97,0	34	10
100	–	4"	119	55	110,0	34	10

METACLAMP® for Sanitary Applications & Explosion proof Luminaire USL05



Applications

- Compact unit combining the popular Lumiglas USL-05 Ex explosion proof light with the proven Metaclamp sanitary mounting system. This unit safely illuminates pressurised tanks, pipelines, mixers and any other closed vessels and provides up to 20W of intense glare free illumination through a Metaglas safety glass lens.

Advantages

- Compact design
- Fast & simple installation with no risk of breakage
- Suitable for food processing (A3-Standard)
- Sight glass resistant to catastrophic failure
- Explosion proof for all explosion classes
- Dust and water jet resistant (IP65) even during external washdown

Operating conditions

- Pressure: -1 to 16 bar
- Temperature: see table
- Temperature: (With light) up to 60°C

Ring materials Operating temperature

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2 for extra costs

Sanitary Metaclamp Materials

- Duplex Stainless Steel (1.4462)
- Hastelloy C-22 (2.4602)
- Hastelloy C-4 (2.4610)

Light / Protection Class

Eex d, flame proof enclosure acc. DIN EN 50 018/VDE 0171

- Explosion Group: IIc (all explosion classes)
- Temperature Class: up to T6 (depending on wattage)

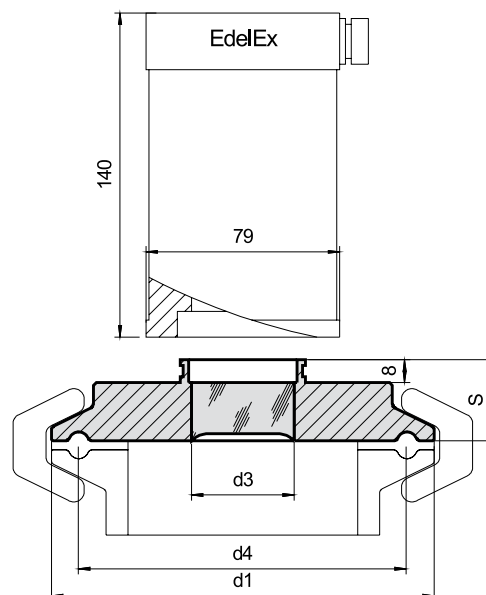
Operating Voltage

- Without built in transformer:
 - supply 12V: halogen lamp 5W or 20W
 - supply 24V: halogen lamp 20W
- With built in transformer:
 - supply 115V: halogen lamp 5W
 - supply 230V: halogen lamp 5W
- Housing: Corrosion resistant die cast alu., GL-AL Si 10 Mg
- Bulb life: Over 2500 hours
- Dust and water-jet proof IP65 & EN60 529/DIN VDE 0470 part 1

Nominal size			d1	d3	d4	S	Max operating pressure [bar]
DIN	ISO	ASME BPE					
25/32/40	15/20/25	1", 1½"	50,5	28	43,5	38	16
50	32/40	2"	64	34	56,5	38	16
–	50	2½"	77,5	38	70,5	38	16
65	65	3"	91	50	83,5	38	10
80	80	3½"	106	50	97,0	36	10
100	–	4"	119	55	110,0	37	10

METACLAMP® Sight Glasses

for use with clamp connections and light fitting EdelEx



Applications

- Clamp style nozzles

Advantages

- Compact construction
- Aseptic design
- Security against totally fail
- Powerful illumination
- Use in Ex hazardous process areas
- Long operating time

Operating conditions

- Pressure: -1 to 16 bar
- Temperature: see table

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Technical data

- Manufactured and tested to:
- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 standards W0/TRD 100
- Sight glass fused to metal conforming to DIN7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN7080 / DIN7079

Material certificates

- Certificate of conformity EN 10204 – 3.1 or 3.2 for extra costs

Approvals

- A3-standard for foodstuffs

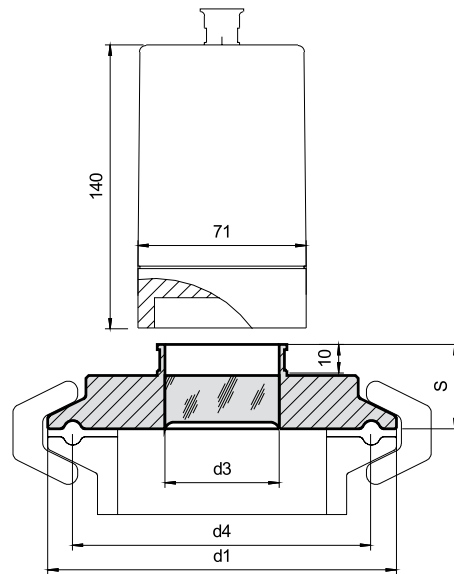
Sight Glass luminaire Type EdelEx

ATEX stainless steel luminaire

- EEx d II C T4, Ex II 2G+D
- Electrical supply: AC or DC
- Supply voltage: 2, 24, 120 or 230 Volts
- Power: 5, 10 or 20W depending on type
- IIC (all explosion groups)
- Ignition protection: EEx d DIN EN 50 014 / 50 018

Nominal size			d1	d3	d4	S	Max operating pressure [bar]
DIN	ISO	ASME BPE					
25/32/40	15/20/25	1", 1½"	50,5	28	43,5	20	16
50	32/40	2"	64	32	57,0	20	16
–	50	2½"	77,5	35	70,5	20	16
65	65	3"	91	36	83,5	20	10
80	80	3½"	106	36	97,0	20	10
100	–	4"	119	36	110,0	20	10

METACLAMP® Sight Glasses for Use with Clamp Connections and Sight Glass Luminaires ESL25



Applications

- Clamp style nozzles
- For ESL25-Sterile, ESL55, ASL55 light fitting

Advantages

- Compact construction
- Aseptic design
- Powerful illumination
- Security against total failure
- Long operating time
- Use in Ex hazardous process areas

Operating conditions

- Pressure: -1 to 16 bar
- Temperature: see table

Ring materials Operating temperature

1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Material certificates

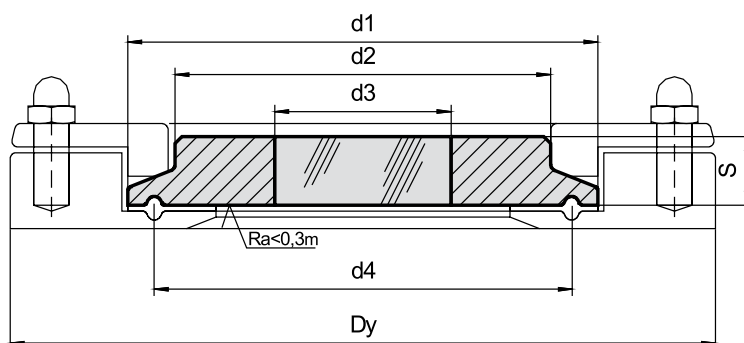
- Certificate of Conformity EN 10204 – 3.1 or 3.2 for extra costs

Sight glass luminaire Type ESL 25 Ex

- ATEX stainless steel luminaire
- Ex II 2G EEx d II C T4 / T5 / T6
- Electric supply AC or DC
- Supply voltage 12, 24, 120 or 230V
- Rating 5, 10 or 20W depending on luminaire model
- Ambient temperatures up to 60°C
- IIC (all explosion groups)
- Ignition protection EEx d "pressure tight encapsulation" DIN EN 50 018
- EC type test certification DMT 98 ATEX E 039 X
- Dust and waterjet tight IP65 to EN60529/DIN VDE 0470 part 1
- (for more information see data sheet 07.25)

Nominal size			d1	d3	d4	S	Max operating pressure [bar]
DIN	ISO	ASME BPE					
25/32/40	15/20/25	1", 1½"	50,5	28	43,5	24	16
50	32/40	2"	64	35	56,5	25	16
–	50	2½"	77,5	35	70,5	26	16
65	65	3"	91	40	83,5	22	10
80	80	3½"	106	42	97,0	22	10
100	–	4"	119	42	110,0	25	10

METACLAMP® for Flush Mounted NA-Connect™ Fitting



Overview

- Type 80.NA Metaclamp is designed to fit the flush-mounted NA-Connect system to offer clear process visibility and unmatched safety with easy cleaning and sterilization.
- The NA-Connect sight glass eliminates the dead leg created by a standard sanitary ferrule connection avoiding air pockets and trapped undissolved material.

Advantages

- Suitable for aseptic pharmaceutical and food applications (3-A Standard)
- Easy validation of connection for sterilization and cleaning
- Extremely compact construction
- Simple installation and maintenance
- Glass resistant to catastrophic failure
- Long working time

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2

Approvals

- ASM BPE

Operating conditions

- Temperature: (With light) up to 90°C
- Pressure: Up to 7 bar

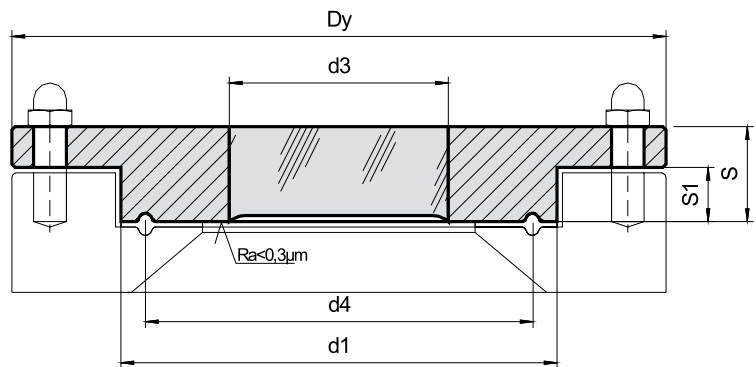
For connector NA-Connect dimensions and technical data please request data sheet NAC00-S

Ring materials Operating temperature

1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Nominal size			PN	d1	d2	d3	d4	S	Dy
DIN	ISO	ASME BPE							
–	8/10	1/2" / 3/4"	25	25,0	18	10	20,4	10	55
10/15/20	–	–	25	34,0	18	10	27,5	8	70
25/32/40	15/20/25	1 1/2" / 1"	16	50,5	38	25	43,5	10	85
50	32/40	2"	16	64,0	52	30	56,5	10	100
–	50	2 1/2"	16	77,5	63,5	35	70,5	10	112
65	65	3"	10	91,0	76	40	83,5	10	131
80	80	3 1/2"	10	106,0	90	50	97,0	10	140
100	–	4"	10	119,0	101	55	110	12	170
–	100	4 1/2"	10	130,0	114	60	122	16	170

METAGLAS® for NA-Connect™ -Fitting



Overview

- Type 99.NA Metaglas is designed to fit the flush-mounted NA-Connect system to offer clear process visibility and unmatched safety with easy cleaning and sterilization.
- The NA-Connect sight glass eliminates the dead leg created by a standard sanitary ferrule connection avoiding air pockets and trapped undissolved material.

Advantages

- Suitable for aseptic pharmaceutical and food applications (3-A Standard)
- Easy validation of connection for sterilization and cleaning
- Extremely compact construction
- Simple installation and maintenance
- Glass resistant to catastrophic failure
- Long working time

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2

Operating conditions

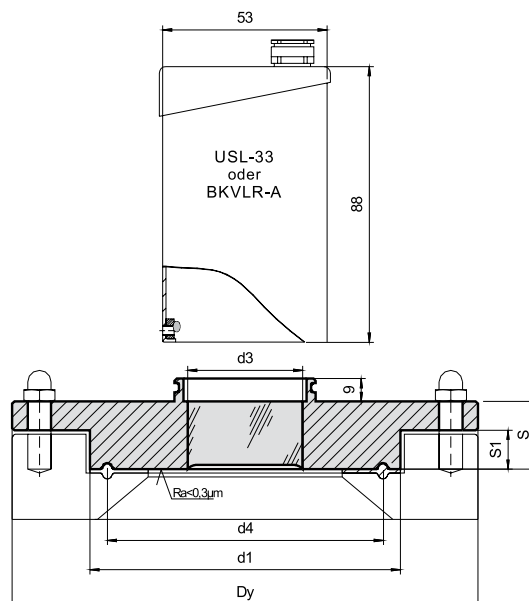
- Temperature: (With light) up to 90°C
- Pressure: Up to 7 bar

For connector NA-Connect dimensions and technical data please request data sheet NAC00-S

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Nominal size			PN	d1	d3	d4	S1	S	Dy
DIN	ISO	ASME BPE							
–	8/10	1/2" / 3/4"	7	25,0	13	20,2	7	11	55
10/15/20	–	–	7	34,0	18	27,5	7	12	70
25/32/40	15/20/25	1 1/2" / 1"	7	50,5	30	43,5	7	13	85
50	32/40	2"	7	64,0	35	56,5	8	14	100
	50	2 1/2"	7	77,5	40	70,5	8	17	112
65	65	3"	7	91,0	45	83,5	8	18	131
80	80	3 1/2"	7	106,0	60	97,0	8	18	140
100	–	4"	7	119,0	65	110,0	8	18	170
–	100	4 1/2"	7	130,0	70	122,0	8	20	170

METAGLAS® & USL33 Luminaire for NA-Connect™ Fitting



Applications

- Sanitary combination of the stainless steel Lumiglas USL33 light and METAGLAS® to fit the flush mount NA-Connect system. Providing up to 50 watts of intense glare free illumination through a METAGLAS® safety glass lens.

Advantages

- Compact
- Suitable for food processing (3-A Standard)
- Dust and water jet resistant (IP65) even during external washdown
- Simple & fast installation with no risk of breakage
- Sight glass resistant to catastrophic failure
- Luminaires available with an optional push button momentary on/off switch

Operating conditions

- Temperature: (With light) up to 90°C
- Pressure: Up to 7 bar

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2

Light Type USL33 or BKVLR-A (none Ex)

- Supply Voltage: 24V AC or DC
- Output: 20W (without built in push button)
50W (with built in push button)
- Housing: Stainless steel DIN 1.4301 or similar
- Power cable: 3 m
- Bulb life: Over 2.500 hours
- Dust and water-jet proof: IP65 & EN60 529/DIN VDE 0470 part 1

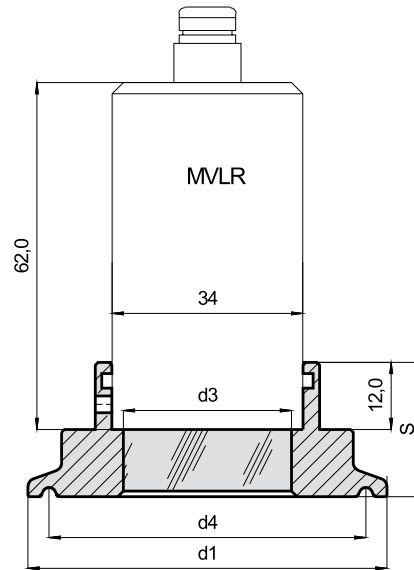
NA-Connect™

- For connector NA-Connect dimensions and technical data please request data sheet NAC00-S

Nominal size DIN			PN	d1	d3	d4	S1	S	Dy
25/32/40	15/20/25	1½" / 1"	7	50,5	30	43,5	7	13	85
50	32/40	2"	7	64,0	35	56,5	8	14	100
	50	2½"	7	77,5	40	70,5	8	17	112
65	65	3"	7	91,0	45	83,5	8	18	131
80	80	3½"	7	106,0	60	97,0	8	18	140
100	–	4"	7	119,0	65	110,0	7,5	19	170

*Recommended Metaglas & Luminaire USL35

METACLAMP® for MVLR Light Fitting



Applications

- Compact sanitary combination of miniature stainless steel MVLR light fitting with the proven Metaclamp sanitary mounting system.

Advantages

- Miniature space saving design
- The robust and highly reliable light fittings are particularly suitable for use in pharmaceutical and sterile applications on metal fused sight glasses.
- Dust and water jet resistant (IP65) even during external washdown
- Fast & simple installation with no risk of breakage
- Very high resistance to impact
- Sight glass resistant to catastrophic failure

Ring materials Operating temperature

1.4462	-30°C to +280°C
2.4602	-60°C to +300°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2 for extra costs

Light Type MVLR-LED

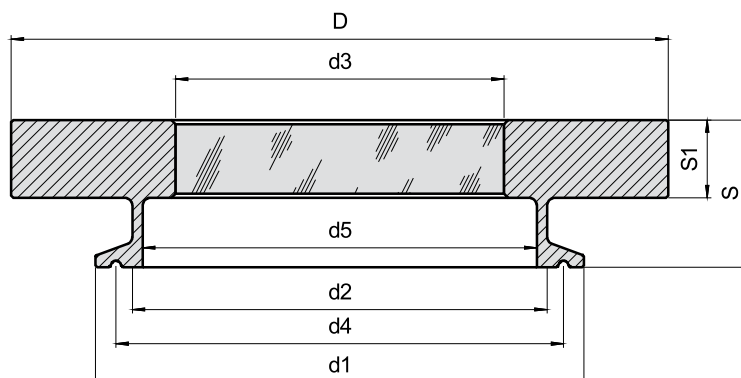
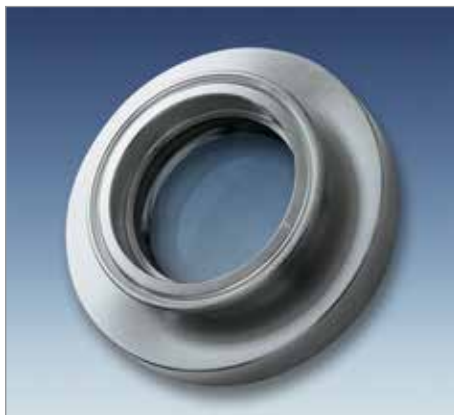
- The built-in LED module offers a cold light output. The life span is approximately 35.000 operating hours.
- Terminal voltage: 22 - 26 V AC or DC
- Nominal rating: 2 W LED
- Housing: Stainless steel, polished
- Dust and water-jet proof IP65 & EN60 529/DIN VDE 0470 part 1

Operating conditions

- Temperature: see table
- Pressure: -1 to 16°C

Nominal size			d1	d3	d4	S	Max operating pressure [bar]
DIN	ISO	ASME BPE					
–	8/10	1/2", 3/4"	25	10	20,5	26	16
10/15/20	–	–	34	14	27,5	26	16
25/32/40	15/20/25	1", 1 1/2"	50,5	25	43,5	22	16
50	32/40	2"	64	30	56,5	22	16
–	50	2 1/2"	77,5	30	70,5	24	16
65	65	3"	91	30	83,5	24	10
80	80	3 1/2"	106	30	97,0	24	10
100	–	4"	119	30	110,0	24	10

METAGLAS[®] Sight Glass for Sanitary Clamp Fitting



Applications

- For clamp fittings to
DIN32 676 / ISO 2852

Advantages

- Extremely compact construction
- Suitable for food processing & other sterile applications
- Reliability against total failure – the possibility of sudden unexpected rupture is totally excluded
- Fast & simple installation & maintenance
- Extreme resistance to impact and temperature
- Wide acceptance in the European & American food, beverage, pharmaceutical and chemical industries
- Large view

Approvals and technical data

Manufactured and tested in conformance with:

- Pressure Equipment Directive 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD 2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Borosilicate glass to DIN 7080 / DIN 7079

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2

Operating conditions

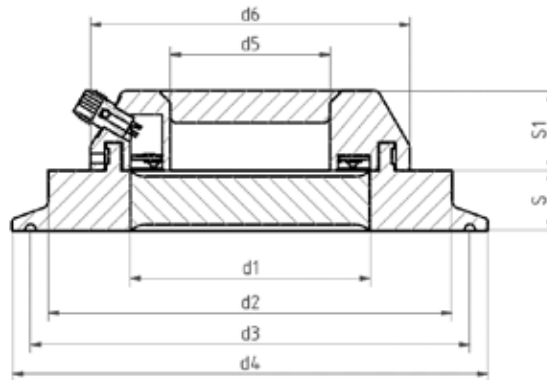
- Pressure: -1 to 16 bar
- Temperature: see table

Ring materials Operating temperature

1.4462	-30°C to +280°C
2.4610	-60°C to +300°C

Nominal size		d1	d2	d3	d4	d5	S	S1	D	Max operating pressure [bar]
DN	Inch									
25/32/40	1", 1½"	50,5	38	33	43,5	34,8	22	10	65	16
50	2"	64	51	45	56,5	47,5	24	12	85	16
65	3"	91	76	65	83,5	72	34	19	125	16
100	4"	119	101	83	110,0	97,4	36	19	160	16
–	5"	144,5	127	95	134,5	123	36	18	180	10
–	6"	167	153	110	156,5	146,8	36	19	210	10
–	8"	217,5	202	140	207,4	198	40	20	280	10

Metaclamp® sanitary Metaclamp & Luminaire SGL



For

- Clamp fitting to
DIN 326767 / ISO 2582 / BS4825

Advantages

- Space-saving application for viewing and illumination
- Sanitary design
- Safety against total failure
- Easy installation
- Long operating time

Material certificates

- Certificate of Conformity to
EN 10204-3.1 or 3.2

Technical datas for luminaire

- Evenly, glare, contrasty illumination of agitators, tanks, vessels, pipes in nonhazardous areas
- Very compact, easy to clean design
- Body: 1.4404, polished
- Light color: white (WS)
- Voltage: 24VDC (+/-10%)
- Light flux: 266 lm
- Current, continuously: 100mA
- Ambient temperature: 0°C to 50°C
- Protection class: IP68
- UL-compliant

Technical datas of sight glass

- Pressure equipment directive 2014/68/EU, AD 2000, DIN 7079
- Materials according to VdTÜV and the intended DIN/EN standards
- Glass: Borosilicate glass according to DIN 7080 / DIN 7079

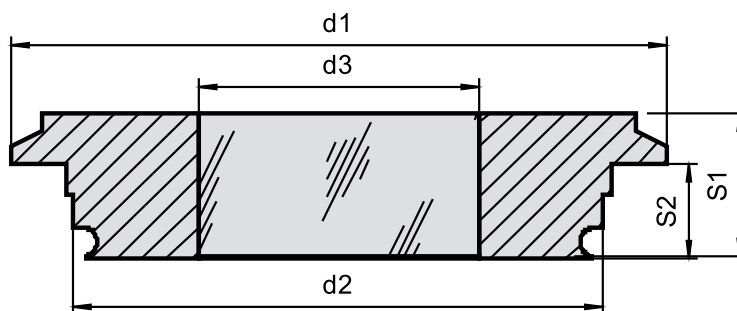
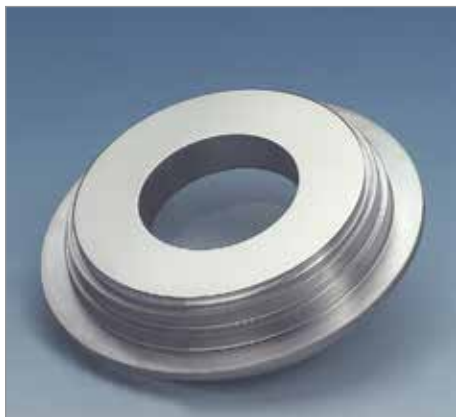
Ring materials Operating temperature

1.4462	-30°C to +280°C
2.4602	-60°C to +280°C
2.4605	-60°C to +280°C
2.4610	-60°C to +280°C

Luminaire	d5	d6	S1	Power
SGL80	40	40	40	40
SGL95	55	55	55	55
SGL110	70	70	70	70

Nominal Size			d4	d2	d1	d3	S	max operating Pressure	Luminaire
DIN	ISO	ASME BPE							
100	–	4"	119	101	55	110,0	12	10	SGL80
–	100	4½"	130	114	60	122,0	16	10	SGL80
–	–	5"	144,5	127	65	134,5	16	10	SGL80
125	–	5½"	155	138	70	146,0	16	6	SGL80 or SGL95
–	–	6"	167	152	75	156,5	16	6	SGL80 or SGL95
150	150	–	183	160	80	174,3	16	6	SGL95 or SGL110
–	–	8"	217,5	198	100	207,4	18	6	SGL110
200	200	–	233,5	210	100	225,0	18	6	SGL110

METAGLAS[®] Sight Glass with Luminaire for VARIVENT[®]-In-Line Fittings



Applications

- VARIVENT[®] In-Line flanges
- VARIVENT[®] In-Line housings

Advantages

- Housing free of dead zones, no domes or pools
- Pre-determined distortion of O-Ring by metal contact faces
- Suitable for CIP and SIP treatment
- Security against total failure
- Long operating life
- Crevice free seal

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Material certificates

- Certificate of Conformity EN 10204-3.1 (or 3.2 for extra costs)

Operating conditions

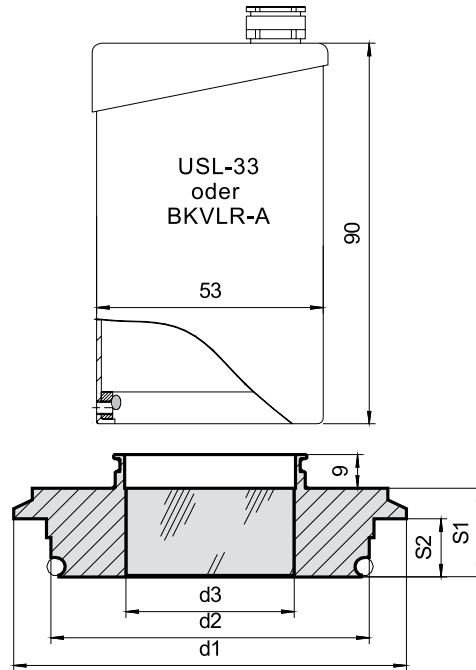
- Pressure: 25 bar
- Temperature: see table

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4605	-60°C to +300°C
2.4610	-60°C to +300°C

Process connections

		d1	d2	d3	S1	S2	O-Ring
F	VARIVENT DN 25, 1" OD and 25 ISO	66	49,90	25	19	12,2	42 x 3,0
N	VARIVENT 32 ISO 6" IPS	84	67,95	35	17	12,3	60 x 3,0
G	VARIVENT DN100 and DN 125	142	122,90	65	21	21	113 x 4,0

METAGLAS® Sight Glass with Luminaire for VARIVENT®-In-Line Fittings



Applications

- VARIVENT® In-Line flanges
- VARIVENT® In-Line housings

Advantages

- Housing free of dead zones, no domes or pools
- Pre-determined distortion of O-Ring by metal contact faces
- Suitable for CIP and SIP treatment
- Security against total failure
- Long operating time
- Crevice free seal

Material certificates

- Certificate of Conformity
EN 10204 – 3.1 or 3.2 for extra costs

Operating conditions

- Pressure: 25 bar
- Temperature: see table

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4605	-60°C to +300°C
2.4610	-60°C to +300°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

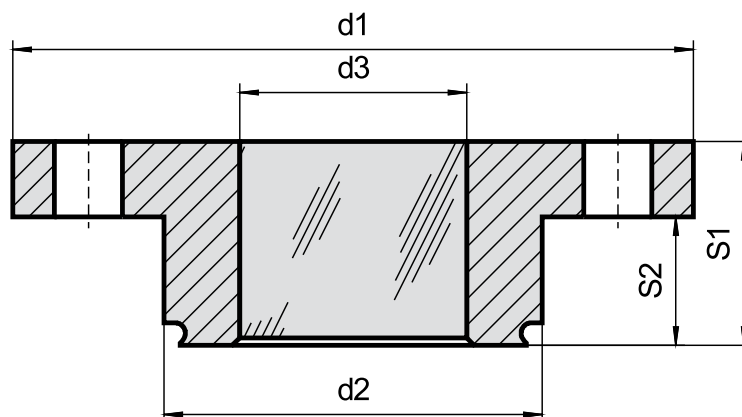
Light Type USL-33 (none Ex)

- Supply Voltage: 24V AC or DC
- Output: 5W (without built in push button)
20W (with built in push button)
- Housing: Stainless steel DIN 1.4301 or similar
- Power cable: 3m
- Bulb life: Over 2500 hours
- Dust and water-jet proof IP65 & EN60 529/DIN VDE 0470 part 1

Process connections

		d1	d2	d3	S1	S2	O-Ring
N	VARIVENT 32 ISO 6" IPS	84	67,95	35	17	12,3	60 x 3,0

METAGLAS[®] Sight Glasses for Neumo Bio Control



Applications

- Neumo BioControl

Advantages

- Defined distortion of O-ring by metal contact faces
- Suitable for CIP and SIP treatment
- Security against total failure
- Long operating time
- Housing free of dead zones, no domes or pools
- Crevice free seal

Technical data

- Manufactured and tested to:
- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Material certificates

- Certificate of Conformity EN 10204 – 3.1 or 3.2 for extra costs

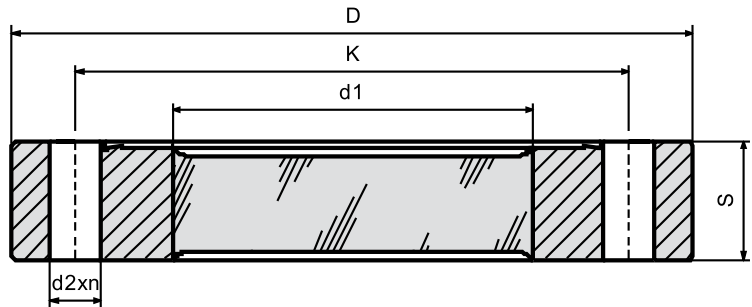
Operating conditions

- Pressure: 16 bar
- Temperature: see table

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C

Nominal size	Nominal pressure	d1	d2	d3	S1	S2	O-Ring
25	16	64	30,35	18	20	11	23,5 x 3,0
50	16	90	49,85	30	27	17	42,0 x 3,0
65	16	120	67,85	38	27	17	60,0 x 3,0
80	16	140	87,40	45	37	25	78,0 x 3,0

METAGLAS® ConFlat Sight Glasses



Applications

- ConFlat connections ISO 3699
- Ultra high vacuum

Advantages

- Compact construction
- Suitable for high vacuum and pressure
- Security against total failure
- Easy, instruction free installation
- Long working time

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Material certificates

- Certificate of Conformity EN 10204 – 3.1 or 3.2 for extra costs

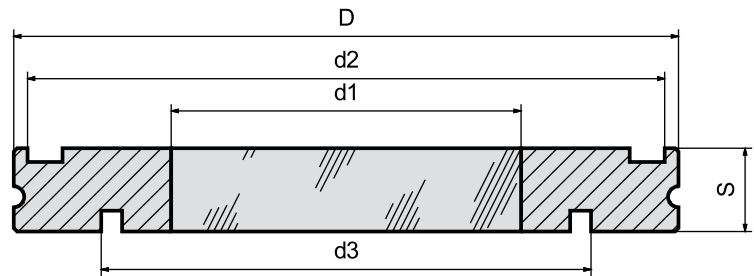
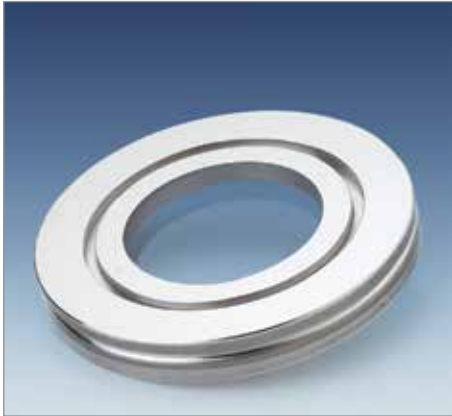
Operating conditions

- Temperature: see table

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

DN	D	d1	K	S	d2	n
16 CF	34	16,5	27,0	15	4,3	6
40 CF	70	35	58,7	20	7	6
63 CF	113	60	92,2	25	8,4	8
100 CF	152	70	130,3	33	8,4	16
160 CF	202	90	181,0	35	8,4	20
200 CF	253	120	231,8	35	8,4	24

METAGLAS[®] ISO-K Sight Glasses



Applications

- ISO-K – connections
- Ultra high vacuum

Advantages

- Extremely compact construction
- Easy, instruction free installation
- Security against total failure
- Long working time
- Suitable for high vacuum and pressure

Operating conditions

- Temperature: see table

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

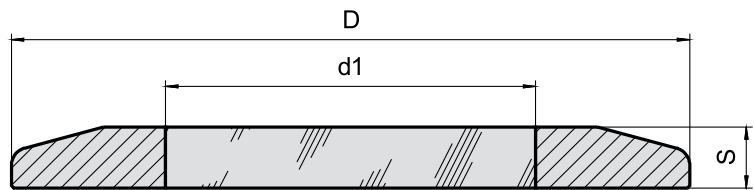
Material certificates

- Certificate of Conformity EN 10204 – 3.1 or 3.2 for extra costs

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

NW	D	d1	d2	d3	S
63	95	50	92	70	12
80	110	60	105	83	12
100	130	65	125	102	12
125	155	75	150	127	12
160	180	90	175	153	12
200	240	120	235	213	12
250	290	140	285	261	12

METAGLAS® KF Sight Glasses



Applications

- KF (also known as QF, NW) – quick flanged vacuum sight glasses
- For applications where quick-clamped installation and removal is desired.

Advantages

- Exhibits no outgassing or contamination of most systems
- Extremely compact construction
- Easy, instruction free installation
- Security against total failure
- Long working time
- Suitable for high vacuum and pressure

Operating conditions

- Temperature: see table

Ring materials	Operating temperature
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C
2.4610	-60°C to +300°C

Technical data

Manufactured and tested to:

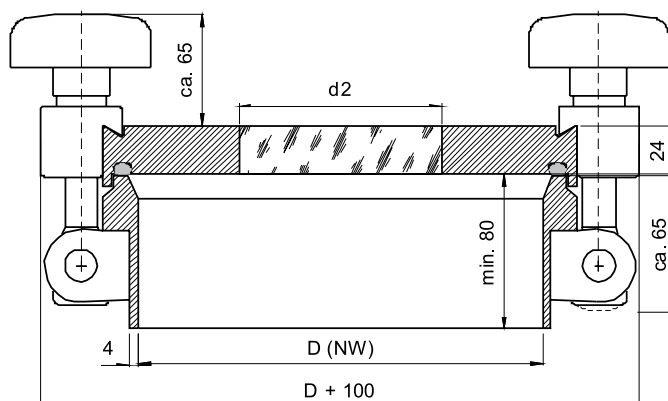
- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Material certificates

- Certificate of Conformity EN 10204 – 3.1

Nominal Size	D	d1	S
16	30	12	5
20	40	20	5
25	40	20	5
32	55	30	7
40	55	30	7
50	75	40	7
63	87	45	9

Pressure Cover with Integral METAGLAS® Sight Glass Cover



Standard Construction & Materials

- Main body product contact: Stainless Steel 316Ti (1.4571) (316L optional)
- Metaglas top Duplex Stainless Steel (1.4462) and Borosilicate Glass similar to DIN 7080
- Fittings – Stainless Steel 304
- Silicone Gasket (blue)
- With hinge & handles
- Shot-blasted surface finish

Options

- Special materials Hastelloy (C-22, C-4, C-276), 1.4435 BN2, 1.4539, 1.4529, Duplex 1.4462
- Alternative gasket materials (EPDM, Viton, FEP-Silicone etc.)
- Surface finish: pickled, shot-blasted, ground up to Ra 0.2 µm
- Spring assisted hinge
- Alternative neck lengths & wall thicknesses
- Swivel/slide opening
- Optional handle types including stainless steel

Advantages

- Safety Sight glass with extremely high resistance to damage by impact and vibration
- Approved by TÜV & ASME for use up to 12 bar (depending on nominal size)
- Complete reliability against total failure of sight glass
- Long working time
- Exceptional polished finish up to Ra<0.2µm

Material certificates

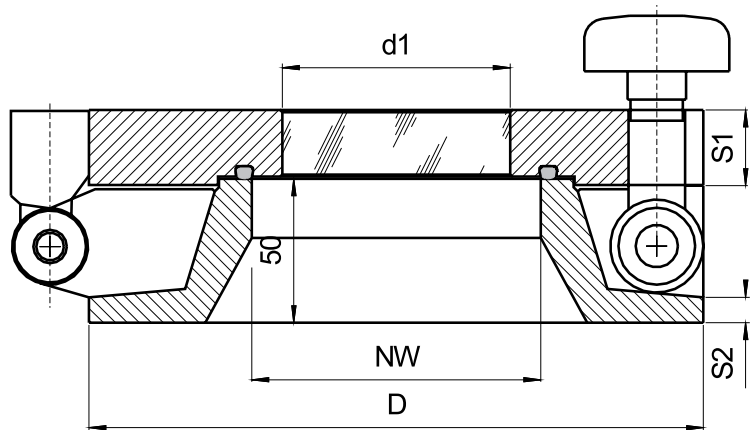
- Certificate of Conformity to EN 10204-3.1 or 3.2 for extra costs

Technical data

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

NW	d2	Maximum Pressure (bar)	Maximum Temperature (°C)	No. of Screws M16	Overall Height (A)	Weight (kg)
100	60	4	280	4	240	13
100	60	12	280	4	240	14
150	75	4	280	4	240	15
150	75	10	280	4	240	15
200	100	4	280	4	245	18
200	100	10	280	4	245	19
250	125	4	280	4	250	25
250	125	8	280	4	250	26
300	150	4	280	4	250	27
300	150	6	280	6	250	30

METAGLAS® folding Sight Glass



Approvals

- TÜV-component inspection,
- with individual check according to DGR 2014/68/EU
- with ASME certification (optional)

Operation areas

- Chemical-, pharmaceutical-, food industry

Circular fastener

for scrutinizing according to TÜV, ASME; depending on size up to 10 / -1 bar

Standard application

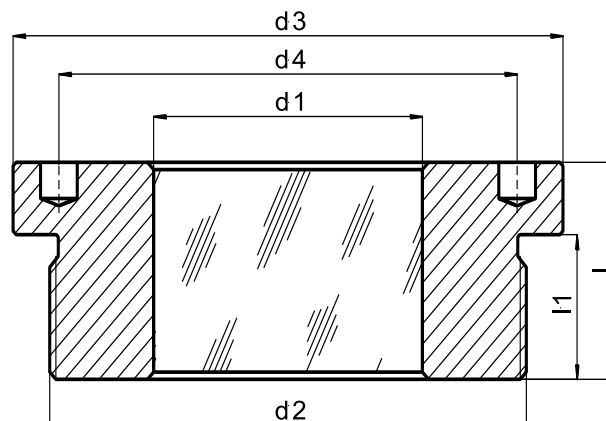
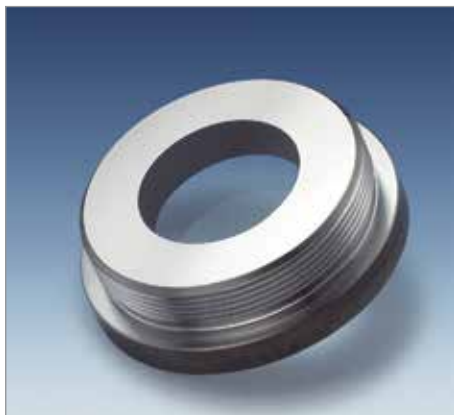
- Materials wetted parts: 1.4571, optional 1.4404
- Sight glass 1.4462 / Borosilicate
- Plastic star handle with stainless steel screw socket
- Silicon seal
- With hinge and button
- Flange height 50 mm, thickness 10 mm, outside conical
- Surface non-ground, glass blasted

Options

- Different collar materials: 1.4435 BN2, 1.4539, 1.4529, 1.4462, Hastelloy (C-22, C-4, C-276 ...)
- Sight glass: Hastelloy / Borosilicate
- Different sealings
- Different surface qualities (glass blasted, pickled or ground to $Ra < 0,2 \mu m$)
- Optional sizes available
- Fastener slew able sideways
- Different fastening nuts: stainless steel star handles, locking handle
- Self snapping safety adjustment
- Spring-opening aid
- Wiper and luminaires
- Fitting in special materials

NW	Maximum Pressure (bar)	Max operating temperature	No. of Screws M16	S1	S2	D	D1	Weight (kg)
100	10	280°C	4	30	10	215	80	15
125	10	280°C	4	30	10	240	100	16
150	10	280°C	4	30	10	265	110	17
175	10	280°C	4	30	10	290	120	18
225	10	280°C	8	30	10	340	140	19

METAGLAS® Threaded Sight Glass – Round Head



Applications

- Female connection with Metric or Whitworth thread

Advantages

- Very compact
- High pressure resistance
- Simple assembly
- Long working time

Operating conditions

- Pressure: 100 bar
- Temperature: see table

Ring materials

max. operating temperature

Borosilicate	+280°C
Sodalime	+150°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2 for extra costs

Materials

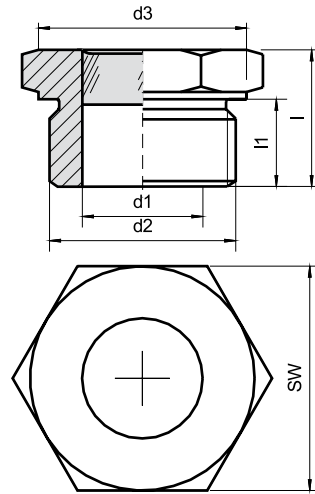
- Ring material: Carbon Steel (1.0570), Stainless Steel (1.4462)
- Glass: Borosilicate to DIN 7080 / DIN 7079 or Sodalime

Dimensions to DIN 3852

- Type F (Sealing with O-Ring)

d1 (Glass Diameter)		d2 (Thread)		d3	d4	l	l1
Sodalime	Borosilicate	M-Thread	G-Thread				
10	6	M 18 x 1,5		25	21	18	11
10	8		G ³ / ₈ "	25	20	16,5	11
12	9	M 20 x 1,5		26	21	18	11
12	8		G ¹ / ₂ "	26	21	18	11
16	12	M 26 x 1,5		32	27	18	11
16	12	M 27 x 2	G ³ / ₄ "	32	27	21	14
20	18	M 33 x 2		40	34	24	16
20	15		G1"	40	34	24	16
23	20	M 42 x 2		50	40	30	20
23	23		G1 ¹ / ₄ "	50	44	23	15
26	25	M 48 x 2		55	48	24	14
26	25		G1 ¹ / ₂ "	55	48	24	14,5
34	30	M 60 x 2		68	58	25	15,5
34	35		G2"	68	58	25	15,5
44	44	M 78 x 2		88	75	30	20
44	44		G2 ¹ / ₂ "	88	70	26	16

METAGLAS® Threaded Sight Glass – Hexagon Head



Applications

- Female connection with metric or Whitworth thread

Advantages

- Very compact
- High pressure resistance
- Simple assembly
- Long working time

Operating conditions

- Pressure: 50 bar
- Temperature: see table

Ring materials Operating temperature

1.4462	-30°C to +280°C
2.4602	-60°C to +300°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD 2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2 for extra costs

Materials

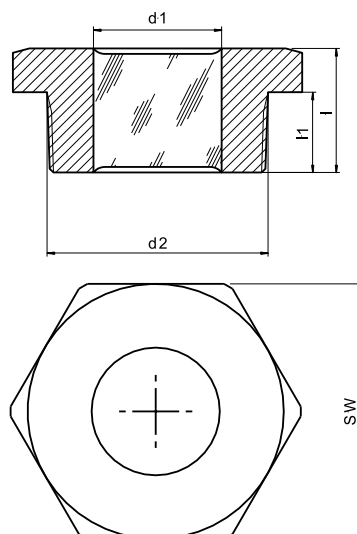
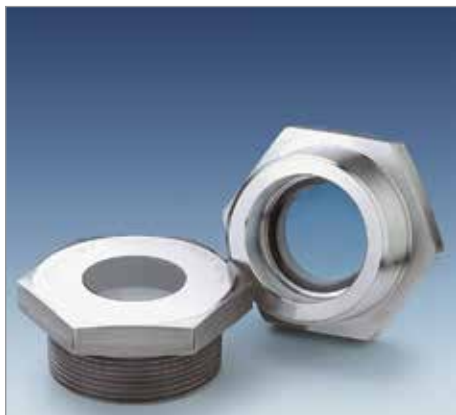
- Ring material: Carbon Steel (1.0570), Stainless Steel (1.4462) or Hastelloy C22
- Glass: Borosilicate to DIN7080 / DIN7079

Dimensions to DIN 3852

- Type F (Sealing with O-Ring)

d2 (Thread)		SW	d1	d3	l	l1
M-Thread	R-Thread					
M18 x 1,5		24	12,5	24	18	12
	G ³ / ₈ "	24	12	24	18	12
M20 x 1,5		27	13	27	18	12
	G ¹ / ₂ "	27	13	27	19	12
M26 x 1,5		32	16	32	23	15
M27 x 2	G ³ / ₄ "	32	16	32	25	14
M33 x 2		41	22	41	25	16
	G1"	41	22	41	25	16
M42 x 2		50	26	50	27	18
	G1 ¹ / ₄ "	50	25	50	27	18
M48 x 2		55	28	55	33	22
	G1 ¹ / ₂ "	55	28	55	33	22
M60 x 2		70	35	70	37	19
	G2"	70	35	70	37	19
M78 x 2		90	50	88	37	22,5
	G2 ¹ / ₂ "	90	50	88	37	22,5

METAGLAS[®] Threaded Sight Glass – NPT-Thread



Applications

- Female connection with NPT or NPTF thread

Advantages

- Very compact
- High pressure resistance
- Simple assembly
- Long working time

Ring materials Operating temperature

1.0570	-10°C to +300°C
1.4462	-30°C to +280°C
2.4602	-60°C to +300°C

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD 2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards

Material certificates

- Certificate of Conformity to EN 10204-3.1 or 3.2 for extra costs

Operating conditions

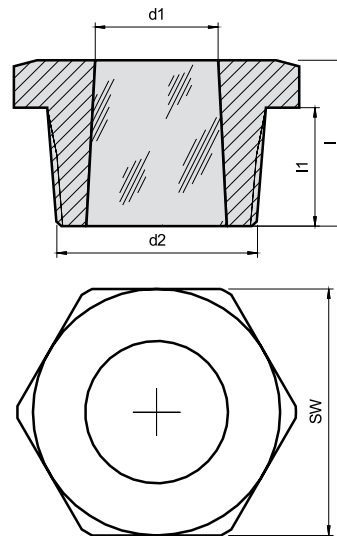
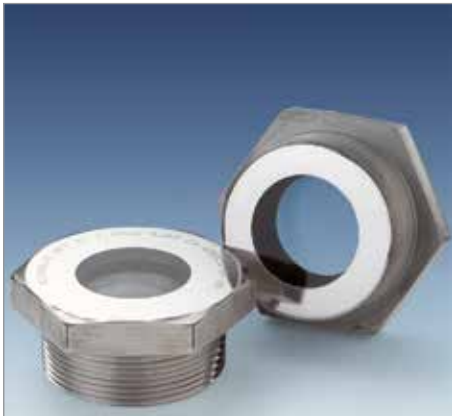
- Pressure: 100 bar
- Temperature: see table

Materials

- Ring material: Carbon Steel (1.0570), Stainless Steel (1.4462) Hastelloy
- Glass: Borosilicate to DIN 7080 / DIN 7079

d2 (Thread)	SW	d1	d4	l	l1
1/4" NPT	21	8	9	15	10
3/8" NPT	24	10	12	15	10
1/2" NPT	27	14	16	25	15
3/4" NPT	36	18	20	26	16
1" NPT	41	22	23	28	18
1 1/4" NPT	50	25	30	30	20
1 1/2" NPT	55	30	36	32	22
2" NPT	70	37	44	35	25
3" NPT	100	55	60	38	28

METAGLAS® Threaded Sight Glass – NPT-Thread



Applications

- Female connection with NPT or NPTF thread

Advantages

- Very compact
- High pressure resistance
- Simple assembly
- Long working time

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD 2000 Standards W0/TRD 100
- Sight glass fused to metal similar to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards

Materials

- Ring material: Carbon Steel 1.0570, Stainless Steel 1.4523
- Glass: Sodalime glass to DIN 8902

Material certificates

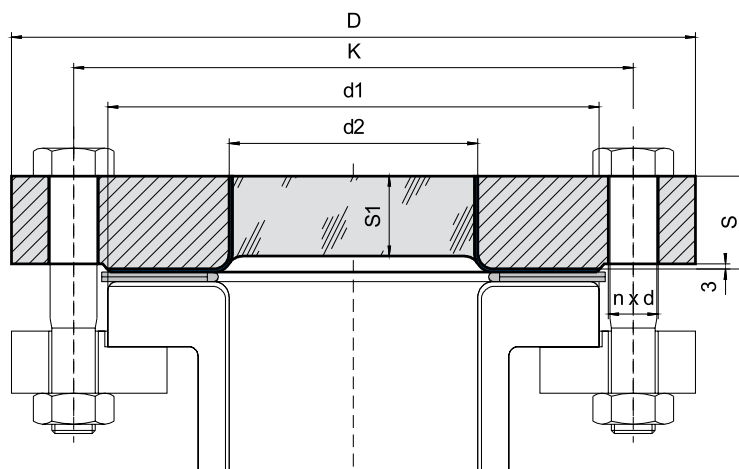
- Certificate of Conformity to EN 10204-3.1

Operating conditions

- Pressure: 100 bar
- Temperature: -30°C to +150°C

d2 (Thread)	SW	d1	l	l1
1/4" NPT	21	8	17	11
3/8" NPT	24	10	20	13
1/2" NPT	31	12	25	15
3/4" NPT	36	15	26	16
1" NPT	41	19	32	18
1 1/4" NPT	50	22	35	23
1 1/2" NPT	55	25	32	20
2" NPT	70	35	33	22

METAGLAS® Glass Lined Sight Glass Flange Connection to DIN 2501 or ANSI B16.5



Applications

- Glass lined vessels
- Connection DIN 2501 or ANSI B16.5
- Sight flow indicators to DIN 3236, 3237

Advantages

- Glass lined Metaglas sight glasses combine the security of failsafe fused glass with the excellent characteristics of a glass surface.

Advantages of glass lining:

- Highly resistant to corrosive processes
- Inert surface so cannot adversely affect product purity
- No catalyst effect and no infection
- not adhesive: polymerization processes
- the product will only get into contact with polished glass

Technical data

- Manufactured and tested to:
- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards

Safety

- Leak-free, high pressure resistant
- High safety factor, no total failure, tightness will retain if cracks will occur

Materials

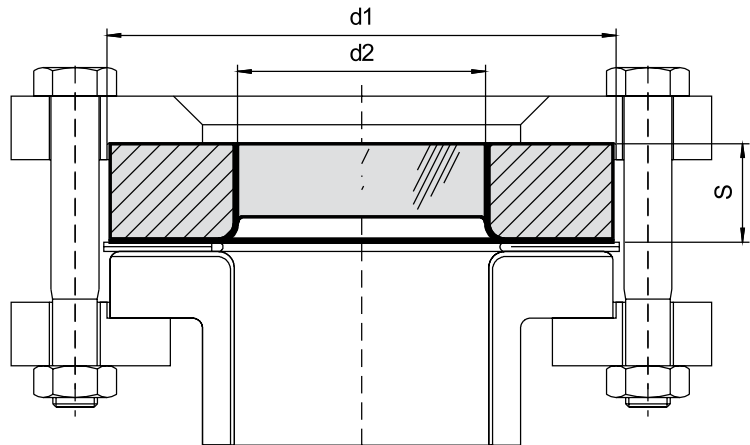
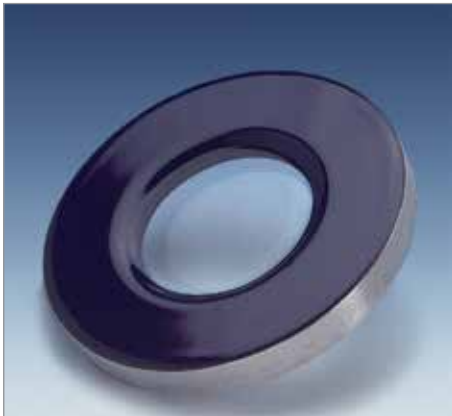
- Material: 1.0425 (P265 GH),
- Glass: B270
- Enamel: DD 3009 blue or white, E800

Operating temperature

- -60°C / +250°C

Nominal size		D	K	d1	d2	Maximum Pressure -1/10 bar			Maximum Pressure -1/16 bar		
DN	ANSI					S1	S	nxd	S1	S	nxd
50	–	165	125	102	50	15	20	4 x 18	18	23	4 x 18
–	2"-150"	152,4	120,6	102	50	15	20	4 x 19	–	–	–
–	2"-300"	165	127	102	50	–	–	–	18	23	8 x 19
–	3"-150"	190,5	152,4	127	75	18	23	4 x 19	–	–	–
–	3"-300"	209,5	168,3	127	80	–	–	–	23	28	8 x 22,2
80	–	200	160	137	80	20	25	8 x 18	25	30	8 x 18
100	–	220	180	158	95	25	30	8 x 18	28	33	8 x 18
–	4"-150"	228,6	190,5	158	95	25	30	8 x 19	–	–	–
–	4"-300"	254	200	158	95	–	–	–	30	35	8 x 22,2
150	6"-150"	285	240	214	130	30	35	8 x 22	35	40	8 x 22
–	6"-300"	317,5	269,9	214	130	–	–	–	40	45	12 x 22,2
200	–	340	295	269	150	35	40	8 x 22	40	45	12 x 22
–	8"-150"	342,9	298,4	269	150	35	40	8 x 22,2	–	–	–
–	8"-300"	381	330,2	269	150	–	–	–	40	45	12 x 25,4

METAGLAS® Glass Lined Metaglas Sight Glass



Applications

- Glass lined vessels
- Sight glass fittings to DIN 28121
- Through flow sight glasses to DIN 3236, DIN 3237

Advantages

- Glass lined Metaglas sight glasses combine the security of failsafe fused glass with the excellent characteristics of a glass surface.

Advantages of glass lining:

- The product will only come into contact with polished glass
- Highly resistant to corrosive processes
- Inert surface so cannot adversely affect product purity
- No catalyst effect and no infection
- Resists build up of sticky products which gives:
Better heat transfer & higher productivity

Technical data

Manufactured and tested to:

- Directive for pressure equipment 2014/68/EU, Modul H/H1 (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal similar to DIN 7079
- Materials to VdTÜV-specifications and the DIN/EN designated standard

Safety

- Leaktight with very high pressure resistance
- High safety factor
- Shatterproof with reliability against total failure. The possibility of unexpected rupture is excluded
- High resistance to bending and overtightening offers simple, fast installation with no risk of breakage
- Remains leak tight even when glass is damaged

Ring material

- P 265 GH (1.0425) EN 10028-2
- Sight Glass: B270
- Enamel DD 3009 blue or white

Approvals

- TÜV-Approval in accordance with governing standards (for pressure vessels)

Operating temperature:

- -60°C to 250°C

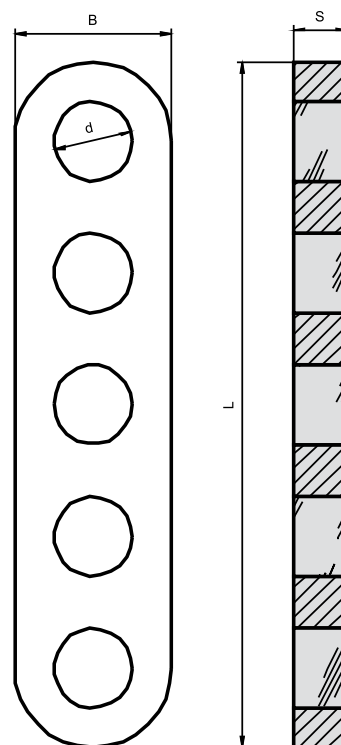
Nominal size

Maximum Pressure -1/10 bar

Maximum Pressure -1/16 bar

DN	ANSI	d1	d2	S	d1	d2	S
50	–	102	50	20	102	50	20
–	–	127	75	23	127	75	28
80	3"	137	80	25	137	80	30
100	–	158	95	30	158	95	33
150	–	214	130	35	214	130	40
200	–	269	150	40	269	150	45

METAGLAS[®] Fused metal elongated Sight Glass



Applications

- To replace conventional glass in rectangular and D-Ended sight glass assemblies

Advantages

- No catastrophic failure
- Extremely long life & reliability
- High resistance to impact & pressure
- Simple & safe installation
- Constructive solution

Operating conditions

- Pressure: -1 to 40 bar, higher pressures possible
- Temperature: -60°C to 300°C, depending on material

Ring materials

- Duplex stainless steel (1.4462)
- Hastelloy C-22 (2.4602)
- Hastelloy C-4 (2.4610)

Technical data

- Manufactured and tested to:
- Directive for pressure equipment 2014/68/EU, Module H (DIN/EN/ISO 9001)
- AD2000 Standards W0/TRD 100
- Sight glass fused to metal conforming to DIN 7079
- Materials to VdTÜV specifications and the DIN/EN designated standards
- Glass: Borosilicate to DIN 7080 / DIN 7079

Materials

- 1.4462, 2.4602 u.a.

Material certificate

- Certificate of Conformity to EN 10204-3.1 or 3.2 for extra costs

Dimensions

- See table for standard dimensions
- Alternative dimensions available to customer specification

Size	L	B	S	Glass	
				d	number
1	115	34	17,5	16	4
2	140	34	17,5	16	4
3	165	34	17,5	16	5
4	190	34	17,5	16	6
5	220	34	17,5	16	7
6	250	34	17,5	16	8
7	280	34	17,5	16	9
8	320	34	17,5	16	10
9	340	34	17,5	16	11

METAGLAS® versus Toughened Glass

The structure of toughened glass is such that any surface damage or stress caused by uneven forces can lead to catastrophic failure.

The structure of Metaglas is such that surface damage is limited to local areas and does not affect the overall strength of the glass. Local pitting or cracking may obscure the view but the glass remains leak tight and secure. Likewise, uneven stresses do not cause Metaglas to fail.

	Toughened Glass	METAGLAS®
Surface Damage	Damage to the toughened surface can cause unexpected catastrophic failure	Scratches or any other surface damage do not affect safety or life of Metaglas
Residual Stress	Residual stress is created when bolting up. Re-bolting causes excessive residual stress which can lead to failure	Repeated re-bolting does not affect Metaglas strength and integrity.
Pressure	Lower resistance to pressure and catastrophic failure on overpressurisation	Higher pressure ratings for similar disc thickness
Impact	Impact (mechanical shock) causes catastrophic failure and the glass shatters into a multitude of small fragments	Metaglas has an extremely high resistance to impact. Very high impact may cause local pitting of the glass but this neither affects the function or its leak tightness
BENDING		
Sensitivity	Toughened Glass is very sensitive to uneven torquing of sight port bolts The glass surfaces must be entirely flat and smooth (within 0.07 mm) to avoid uneven torquing.	Extremely high tolerance to uneven torquing. Uneven surfaces do not therefore result in glass damage
Made of Failure	Uneven or over torquing results in the glass cracking right through	Metaglas cannot be overtorqued as you are torquing metal on metal. On reaching the limits of uneven torquing cracks will appear but the Metaglas will remain leak tight
Erosion	Erosion, particularly right through the glass toughened surface, results in significant weakening which can lead to catastrophic failure	Metaglas will remain leak tight to a high level of erosion
Cleaning	Glass must be replaced unless it can be cleaned in-situ	Metaglas lasts indefinitely regardless of how many times you remove, clean and replace it

Operating and Maintenance Instructions for METAGLAS® Fused Metal/Glass Sight Glasses.

Product Description

METAGLAS® Fused metal-glass sight glass discs comprise a glass viewing disc fused into a metal ring. During manufacture of the fused sight glasses, the steel ring and the glass disc are brought up to a temperature where the glass melts and fuses with the steel ring. After this there follows a controlled cooling phase. The glass solidifies and is compressed by the steel ring. The cooled sight glass unit is then ground and polished.

The mechanical prestressing causes metal-glass fused sight glass to take on the properties of a very tough material and offers superior safety against the conventional thermally treated/toughened sight glass. This is why fused metal/glass sight glasses units should always be used in preference to toughened Borosilicate or Sodaslime glass discs in cases of hazardous process conditions.

Application

Fused Metal/Glass sight glasses are used wherever there is the need to have visual control of a process operation being carried out in a sealed container; e.g. pressure vessels, pipelines, electric switching stations, refrigeration technology, etc.

They are suitable for mounting in standard fittings (e.g. to DIN 28120 or DIN28121), mounting onto flange pads or weld flanges (with or without raised face), for screwing directly into threaded entries and for mounting within Triclamp and NA-Connect style assemblies etc.

Factors which could lead to damage or destruction of the sight glass are as follows

Temperature

- The minimum operating temperature is determined by the material of the metal ring. If this lower temperature limit is exceeded the metal may become brittle and its tensile strength may be affected resulting in break up of the sight glass unit
- The maximum operating temperature is determined by the mechanical pre-stressing of the glass and/or the material of the metal ring. Even if the temperature is exceeded by a small amount, the result will be failure of the sight glass.

Pressure

- The maximum operating pressure is determined by the configuration (dimensions) and the combination of materials of construction of the sight glass. If the pressure is exceeded concentric or net shaped cracks will appear in the surface of the glass on the low pressure side. Further increase will result in enlargement of the cracks, slivers of glass will come away and finally the glass will fail.

Temperature Shock

- Avoid rapid heating up or cooling down of the sight glass. With fused metal/glass sight glasses the steel ring is in tension and the glass insert in compression. The stresses in the two materials are not homogeneous. In the glass disc, the stress is concentrated around the peripheral glass/metal joint. If the sight glass is subjected to temperature shock, concentric cracks may appear in this area or even fine slivers of glass may come away. These cracks will not disturb the pressure- tightness/sealing properties of the glass, nor will they create a direct safety risk as long as they are no deeper than 10% of the original glass thickness. The sight glass should however be checked properly and if necessary exchanged. The same applies to chemical corrosion.

Chemical Corrosion

The chemical resistance of the unit is determined by the two constituent materials, glass and metal.

Glass

Generally glass has a high resistance to water, salt solutions, acids, and organic substances and is thus superior to most metals and synthetic resins. It is only significantly attacked at raised temperatures by fluorine, strong alkaline and concentrated phosphoric acid solutions. Chemical erosion, however, can take place in the presence of condensate and salt solutions. Corrosion will increase at higher pH values, increased concentration and higher temperatures. The greatest deterioration of the glass will result from alternating exposure to acid and alkali. There is no mutual reaction between glass and non aqueous organic solutions.

Reciprocal reaction with glass surfaces can cause turbidity, spots, thin films with interference colouring and grainy or smooth deposits. These effects may remain restricted to the surface but in the extreme can lead to failure or dissolution of the glass.

Metal

The user should check that the material of the ring has the corrosion resistance to the substances to which it will be exposed.

Mechanical Loading

Fused metal/glass sight glass units are generally more resistant to distorting loads when incorrectly fitted than conventional sight glass discs. However incorrect installation can affect the function of the unit and even lead to its failure. Sight glasses should only be installed by personnel who have been thoroughly versed in:

- careful handling of sight glasses
- cleaning of housings, discs, gaskets, and inserts prior to installation i.e. removal of all foreign bodies (e.g. swarf)
- even tightening of securing bolts

During installation there should be no additional stresses imposed nor should the units be exposed to mechanical impact loads.

Fused metal/glass sightglasses must be included in all planned maintenance procedures and periodically checked both visually and with ultrasonic-wall thickness testing equipment. In the event of a glass being damaged, adequate visual checks should be made until the relevant vessel can conveniently be shut down. This will make for a practical glass exchange routine to suit the process operation.

Stress Calculations for Metal Fused Sight Glass Discs

Fused metal sight glass discs are used in many sectors of the chemical and pharmaceutical industries. They provide an alternative to the thermally stressed sight glass discs made to DIN 7080.

Thermally stressed discs fail suddenly once a crack appears, whereas the fused metal glasses, when damaged, suffer surface cracks but not total failure.

As opposed to thermally stressed sight glass discs, the fused metal glasses are subject to compression stresses resulting from the difference in thermal expansion coefficients of the metal and glass. The difference in operational properties between the thermal and mechanical stressing sight glass discs can be explained by the residual stress which results from the manufacturing process; in the case of the thermally stressed sight glass discs, the heated blank is quenched by air applied to the outer surface which shrinks and simultaneously shocks the still hot and soft core area. During further cooling the surface area is subject to compression stress and the core sector under tensile stress. The resulting equilibrium is illustrated in figure 1 (left hand section, curve b).

In the production of metal fused sight glasses, the steel ring and glass are heated up to the necessary melting temperature where the glass flows onto the steel ring. During the cooling of the composite mass, when a point is reached below the so called inversion temperature the glass comes under compression stress due to the different yet suited expansion coefficients of steel and glass; the level of this stress is proportional to the impeded heat expansion. At the same time the steel ring comes under tensile stress. The mechanically stressed sight glass disc comes under a homogeneous compression stress which applies homogeneously across the whole cross section (shown in diagram 1, right hand section curve b where the horizontal lines signify the stressed area). Due to the effect of bending loads on the beginning of a crack in the case of the thermally stressed disc the crack comes under tensile stress whilst in the case of the mechanically stressed disc the crack will be under compressive stress (load stress curve in each case represented by a; load and residual stress resultant curves in each case represented by c, yellow stress area*). That means that in the case of the thermally stressed disc the limiting value K_{Ic} for sudden "overcritical" crack formation is exceeded, in other words, the disc will shatter.

In the case of the mechanically stressed disc, the crack formation resulting from the localised exceeding of the breaking strength factor K_{Ic} will enter an area limited by the compression stress, with the result that the breaking mechanics – load factor K_I becomes smaller again than the breaking strength factor K_{Ic} – and the crack development is halted. Every effort to extend the crack requires renewed energy supply in form of pressure increase. A sudden bursting of the disc is thus unlikely so long as the compression stress condition is maintained.

In the production of fused metal sight glasses, steel ring and glass are heated together to the temperature where the glass liquefies and begins to flow onto the steel ring. This is followed by a relatively quick cooling of the parts which ensures the retention

by the ring material of its mechanical strength. The glass is compressed as it solidifies by the steel ring. The cooled sight glass discs are then ground and polished on both faces to produce a clean glass.

After the cooling process the geometry of the structural parts is demonstrated in figure 2.

The metal surround, because of its greater thermal expansion coefficient, compresses the glass disc not just radially; it is responsible for setting up forces at right angles to the glass surface around the joint area. The result is that around this border area the glass is subjected to compression stress and the metal to tensile stress.

The stress condition can be recognised in shape distortion of the visible surface. The change in thickness around the joint area causes a slight convex form which even grinding of the surface will not entirely remove. The "new surface" created by the manufacturing process inevitably follows the effective forces acting upon it.

FEM – investigations (4) into fused metal sight glass discs show that the compressive stress is not unconnected with the radius and spacing coordinates at right angles to the glass surface.

Figure 3 shows the typical course of radial stress in the glass surface, indicated as compression stress by the minus sign.

From the centre of the glass a relatively large area of constant stress can be recognised. Close to the glass edge i.e. one or two millimetres from the separation area bordering the steel, the stress is shown to be at a distinct minimum. Further toward the steel rim, the compression stress rises at a steep gradient again, and indeed over the value at the centre of the glass.

Certificate

Quality-Assurance System

acc. to Directive 97/23/EC

Certificate no.: 01 202 811/Q-00 0015

Name and address of the manufacturer:

Herberts Industrieglas GmbH & Co. KG
Gewerbeschulstraße 72
D - 42289 Wuppertal

Herewith we certify that the above -mentioned manufacturer operates a quality system according to the European Directive 97/23/EC. The manufacturer has the permission to affix the following CE marking to pressure equipment described and manufactured in accordance to the scope covered by this Quality-Assurance System:

CE 0035

Tested acc. to Directive 97/23/EC:

QS-System (Module H1)
(The QS-Modules E1, E, D1, D and H are covered by Module H1)

Audit report no.:

811/Q-00 0015

Area of validity:

Design, manufacture and sale of glass to metal fused sight glasses similar to DIN 7079 and of special designed sight glasses, see annex to certificate

Manufacturing plant:

Herberts Industrieglas GmbH & Co. KG
Gewerbeschulstraße 72
D - 42289 Wuppertal

Valid until:

October 31, 2018

Cologne, December 07, 2015

Dipl.-Ing. Svenja Kreß



TÜV Rheinland-Certification Body for Pressure Equipment
TÜV Rheinland Industrie Service GmbH
Notified Body, ID-No. 0035
Am Grauen Stein, D-51105 Köln

E-014-Rev7

www.tuv.com

 **TÜVRheinland®**
Precisely Right.

Certificate

Standard **ISO 9001:2008**

Certificate Registr. No. 01 100 002170

Certificate Holder: **Herberts Industrieglas GmbH & Co. KG**
Gewerbeschulstraße 72
D - 42289 Wuppertal

Scope: Design, manufacture and sale
of glass to metal fused sight glasses
and special designed sight glasses

Proof has been furnished by means of an audit
that the requirements of ISO 9001:2008 are met.

Validity: The certificate is valid from 2015-11-09 until 2018-09-14.
First certification 2000

2015-11-10


TÜV Rheinland Cert GmbH
Am Grauen Stein · 51105 Köln

www.tuv.com



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