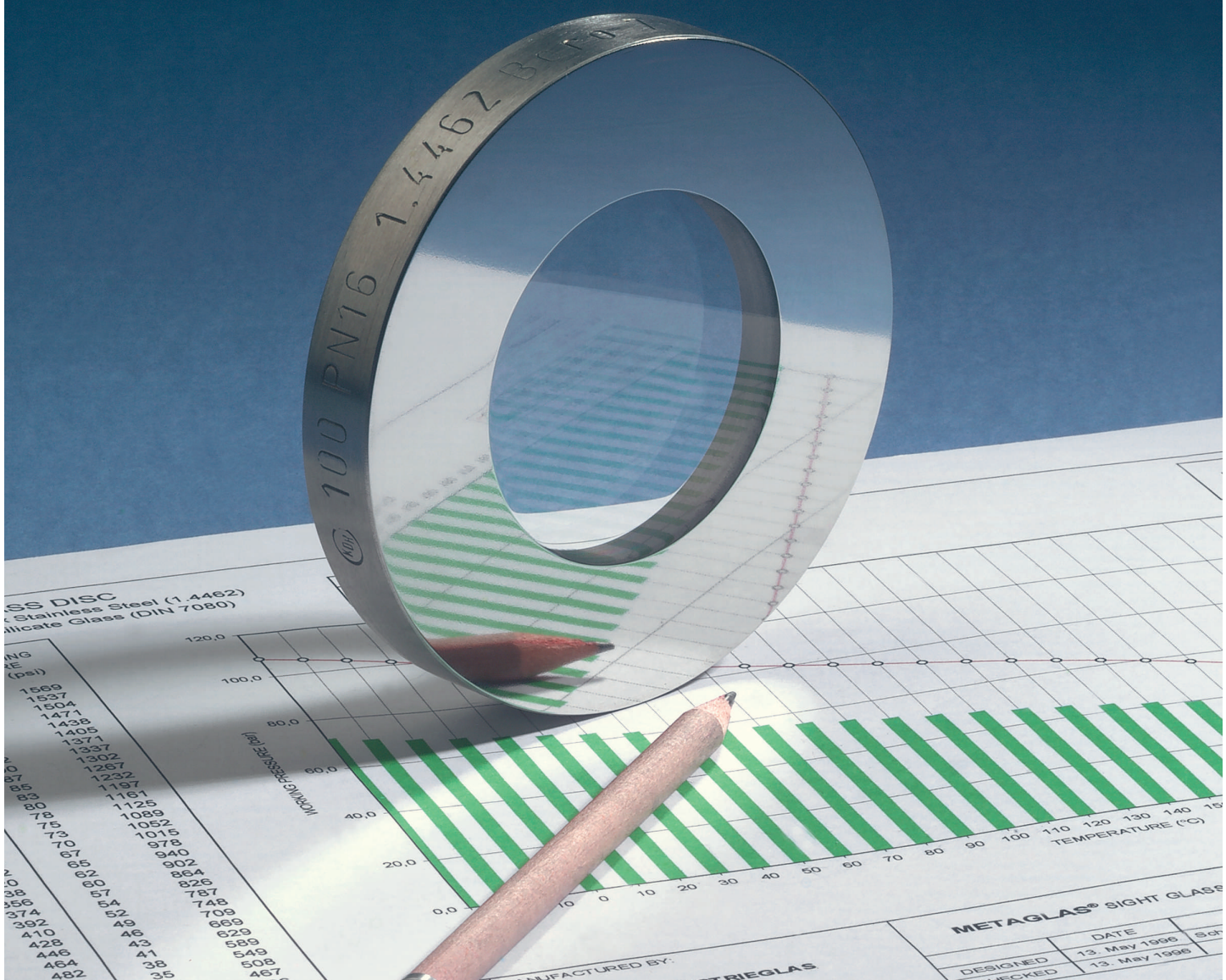


# Metal Fused Sight Glasses



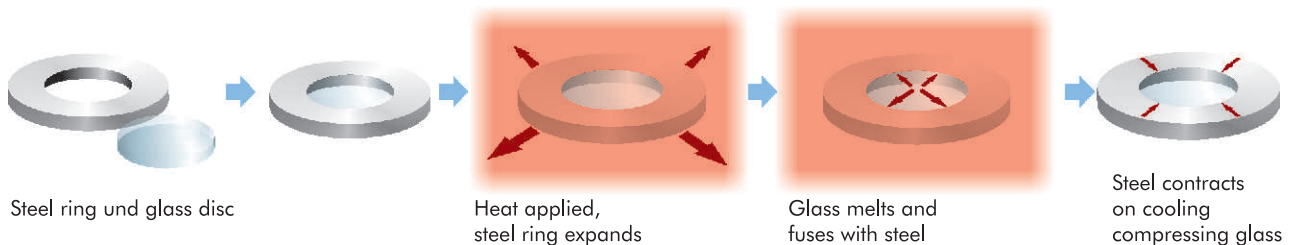
## METAGLAS® Improved Safety, Constructive Solutions and Simplified Fitting with Metal Fused Sight Glasses

**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 sightglass for sight window or visual flow indicator application.



- Special Features**
- Reliability against total failure – due to the mechanically prestressed glass
  - Unurpassed 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 97/23/EG 02/98
  - 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
  - ASME BPE-2002

- 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

	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
<b>BENDING</b>		
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




TÜV Rheinland Group

### ZERTIFIKAT

**Qualitätssicherungs-System**  
nach Richtlinie 97/23/EG  
Zertifikat-Nr.: 01 202 811/Q-00 0015

Name und Anschrift des Herstellers: **Herberts Industrieglas GmbH & Co. KG**  
Gewerbeschulstraße 72  
D - 42289 Wuppertal

Hiermit wird bescheinigt, daß der Hersteller ein QS-System gemäß der Richtlinie 97/23/EG eingeführt hat und anwendet. Der Hersteller ist berechtigt, die von ihm im Rahmen des Geltungsbereichs dieses QS-Systems beschriebenen und hergestellten Druckgeräte mit dem abgebildeten Zeichen zu kennzeichnen:

**CE 0035**

Geprüft nach Richtlinie 97/23/EG: QS-System (Modul H1)  
Die QS-Module E1, E, D1, D und H der Richtlinie sind durch Modul H1 abgedeckt

Auditbericht-Nr.: 811/Q-00 0015

Geltungsbereich: Entwicklung, Herstellung und Vertrieb von metallverschmolzenen Schaugläsern in Anlehnung an die DIN 7079 und von Sonderanfertigungen

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

Gültig bis: September 2009

Köln, 30. Oktober 2006



TÜV CERT-Zertifizierungsstelle für Druckgeräte

*Dr. Ing. W. Wicherl*

Beraterin Deke, Kennnummer 9035



TÜV Rheinland Industrie Service GmbH  
Am Grauen Stein  
51105 Köln  
Tel: ++49 221 89-0  
Fax: ++49 221 89-1354  
e-mail: tsv@tuev.com

Mitzglied der  
UNIVERSITÄT DUISBURG ESSEN COOPERATION CONTROL



## CERTIFICATE

The TÜV CERT Certification Body  
of TÜV Rheinland Industrie Service GmbH

certifies in accordance with  
TÜV CERT procedures that

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

has established and applies a quality management system for

design, manufacture and sale of glass to metal fused sight glasses  
similar to DIN 7079 and special designed sight glasses.

An audit was performed, Report No. 002170.  
Proof has been furnished that the requirements according to

**DIN EN ISO 9001:2000**

are fulfilled.  
The certificate is valid until 2009-10-31.  
Certificate Registration No. 01 100 002170



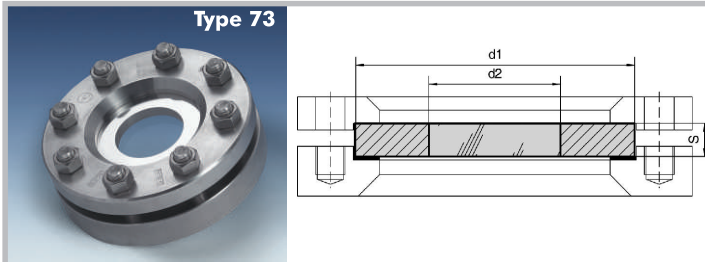


*K. Dierker*

TÜV CERT Certification Body of  
TÜV Rheinland Industrie Service  
GmbH

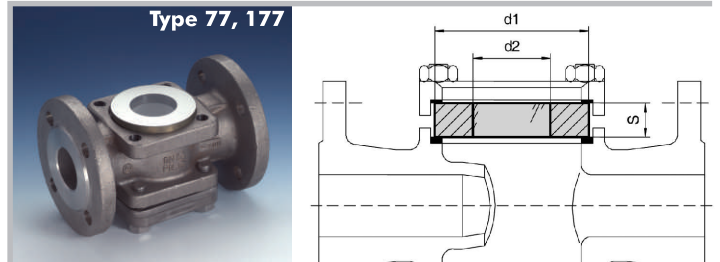
Wuppertal, 2006-11-02  
First certification 2000

www.tuv.com



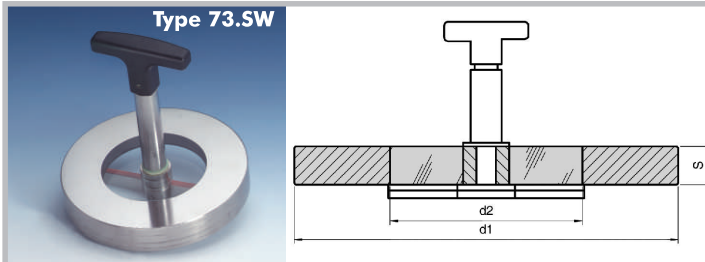
### Metaglas Sightglass Discs

- For circular sightports to DIN 28120 or similar
- For screwed sightglasses similar to DIN 11851
- Pressure rating PN10 – PN64, higher pressure on request
- Sizes DN25 – DN200



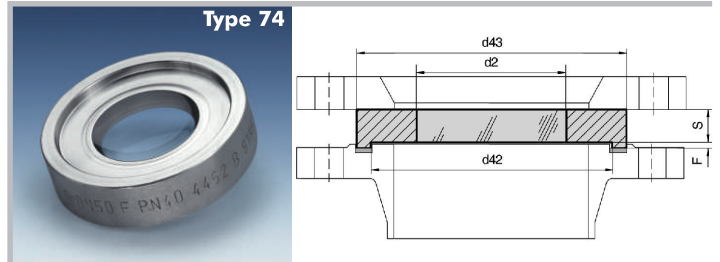
### Metaglas Sightglass Discs

- For sight flow indicators
- Pressure rating PN10 – PN64, 150psi – 600psi
- DIN or ANSI sizes



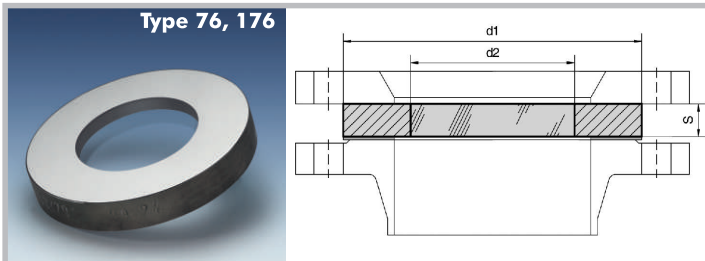
### Metaglas Sightglass Discs with Wiper

- Centrally operated wipers are mounted through the sightglass disc on either DIN 28120, DIN 11851 or similar sightglasses
- Pressure rating PN10



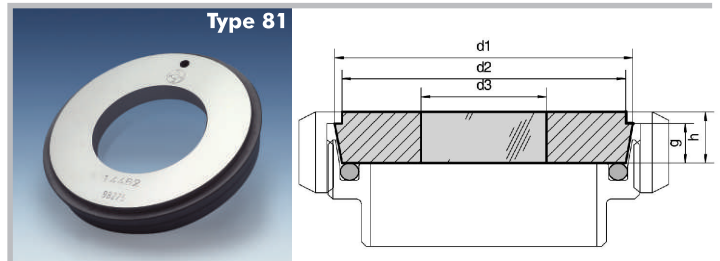
### Sightglass Discs with Tongue and Groove Joint

- For nozzles to DIN 28115 or 28025
- For weld neck flanges DIN 2632 or 2636
- For flanges with tongue / groove based on DIN 2512



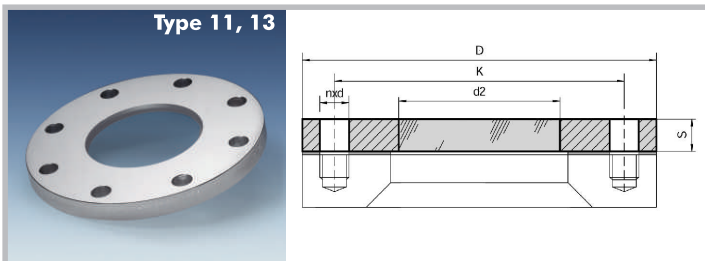
### Metaglas Sightglass Discs

- For circular 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
- Connection DIN or ANSI



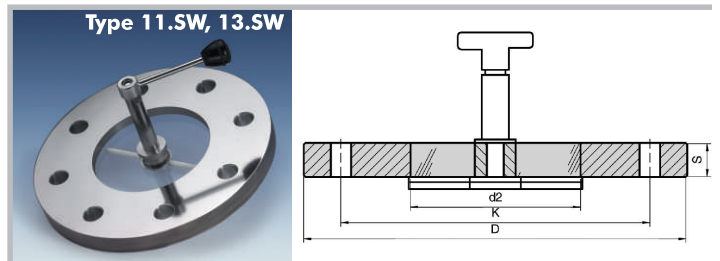
### Metaglas Sightglass

- For screwed sightglass fittings DIN 11851
- For use in food processing, cosmetic and pharmaceutical applications, etc.



### Bolt-on Sightglass

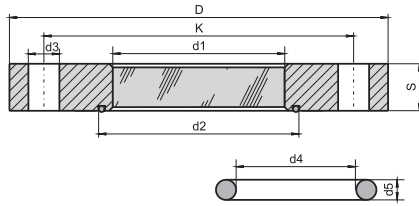
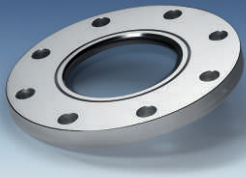
- For flat face mating flange, DIN or ANSI
- Smooth easy clean surface
- Pressure rating: PN10 – PN100, 150lbs – 600lbs
- Size: DN40 – DN200, 1,5" – 8"



### Bolt-on Sightglass with Wiper

- For flat face mating flange, DIN or ANSI
- Centrally operated wipers are mounted through the sightglass
- Pressure rating PN10
- Size: DN40 – DN200, 1,5" – 8"

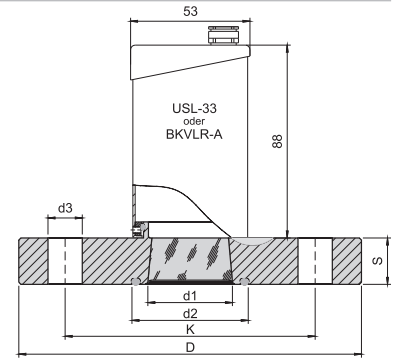
**Type 19.BIO**



**Bolt-on Sightglass**

- For aseptic and sanitary applications
- Base flange to DIN 28117 or similar
- Size: DN 40 – 200, ANSI 1" to 8"

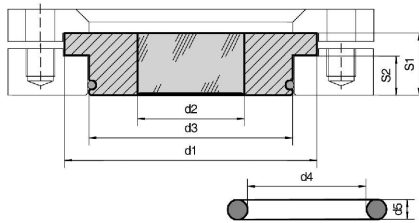
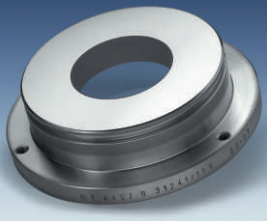
**Type 19.BIO USL33**



**Bolt-on Sightglass with Luminaire**

- For aseptic and sanitary applications
- DIN or ANSI Connections
- For Ex or non-Ex Luminaire

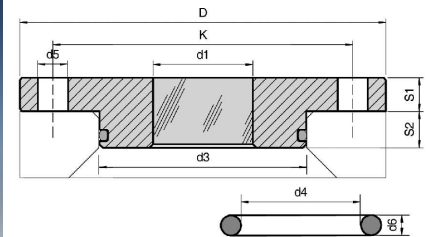
**Type 901**



**Metaglas Sightglass**

- For sanitary applications
- Base flange to DIN 28117 or similar
- Dead zone free, flush wall seal design
- Sizes DN40 – DN200

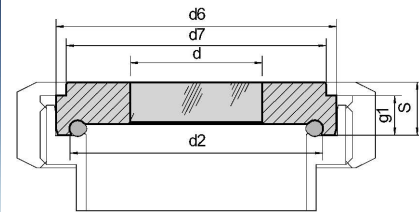
**Type 903**



**Metaglas Sightglass**

- For sanitary applications
- Base flange to DIN 28117 or similar
- Dead zone free, flush wall seal design
- Sizes DN40 - DN200

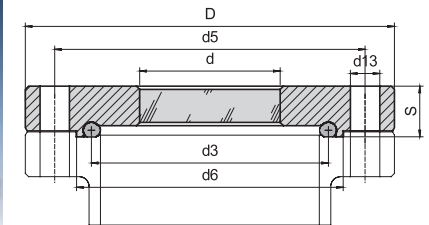
**Type 83**



**Metaglas Sightglass Disc**

- For aseptic screwed pipe connection DIN 11864-1
- Sizes DN20 – 100, Series A,B,C
- Option: for Luminaire Ex or non-Ex

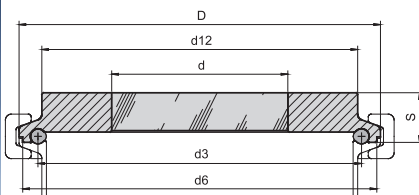
**Type 84**



**Metaglas Sightglass**

- For aseptic flanged pipe connection DIN 11864-2
- Male or Female
- DN40 – 150
- Series A,B,C
- According to recommendations of ASME BPE-2002

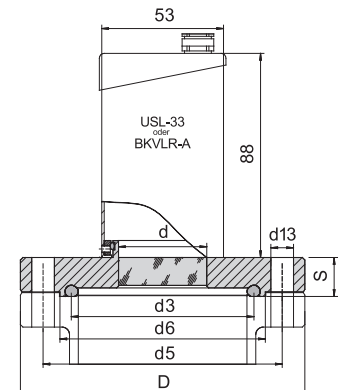
**Type 85**



**Metaglas Sightglass**

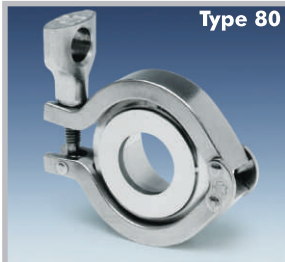
- For aseptic clamp pipe connection DIN 11864-3
- Male or Female
- DN20 – 100
- Series A,B,C
- According to recommendations of ASME BPE-2002

**Type 84.USL33**

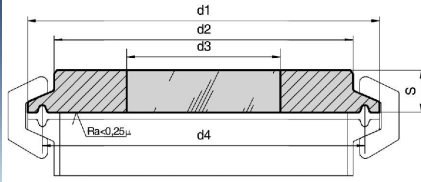


**Metaglas Sightglass**

- For aseptic flanged pipe connection DIN 11864-2
- Male or Female
- DN40 – 150
- Series A,B,C
- For luminaire EX or non-EX



**Type 80**

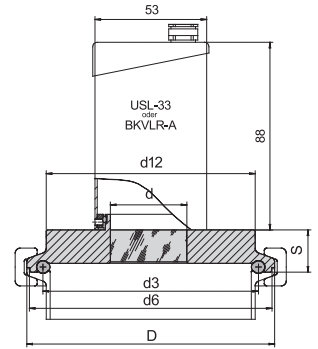


### Metaclamp

- For clamp fittings to **DIN 32676 / ISO 2852**
- DN10 – 300, ½" – 12"
- Glass: Borosilicate
- According to ASME BPE-2002



**Type 85.USL33**

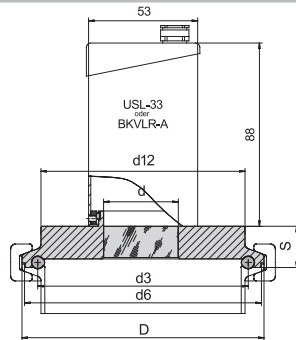


### Metaglas Sightglass

- For aseptic clamp pipe connection **DIN 11864-3**
- For luminaires non-Ex or Ex
- DN40 – 150
- Series A,B,C
- Male or Female

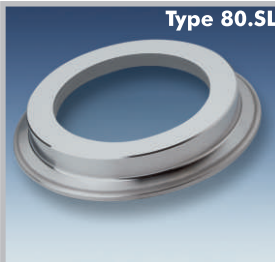


**Type 80.USL33**

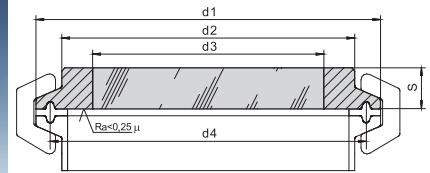


### Metaclamp

- For Sanitary Clamp Fitting for non-Ex Luminaire
- acc. **DIN 32676 / ISO 2852**
- DN10 – 100, ½" – 4"
- for non-Ex luminaires type USL01, Mikrolux, BKVLR-A, USL33, USL35 or similar

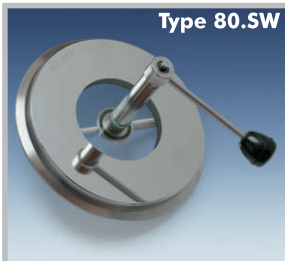


**Type 80.SL**

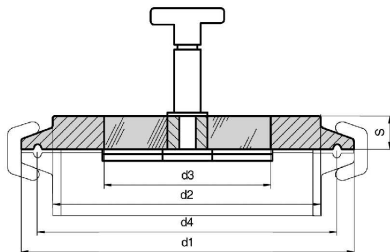


### Large View Metaglas

- For Sanitary Clamp Fitting
- For clamp fittings to **DIN 32 676 / ISO 2852**
- Glass: Sodalime
- Max. operating temperature 177°C
- Extremely compact construction
- Large view diameter



**Type 80.SW**

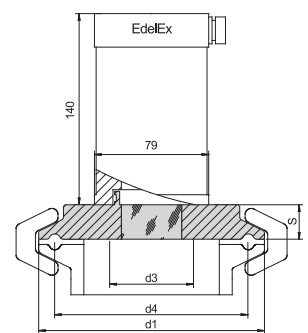


### Metaclamp Sightglass with Wiper

- For clamp fittings to **DIN 32 676 / ISO 2852**
- With central wiper assembly
- Glass Borosilicate or Sodalime

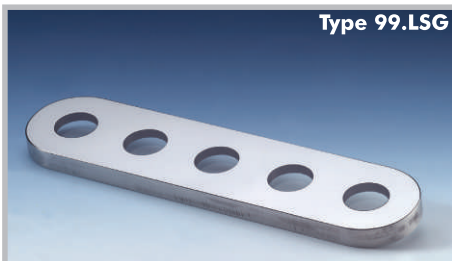


**Type 80.EEk**

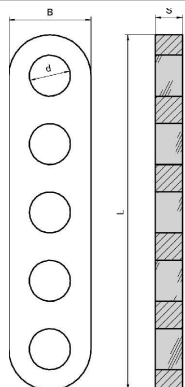


### Metaclamp Sightglass

- For "Ex"-Luminaires
- For sanitary clamp fittings **DIN 32676 / ISO 2852**
- DN25 – 100, 1" – 4"
- For Ex-luminaires type EdelEx, ESL25, USL05 or similar



**Type 99.LSG**

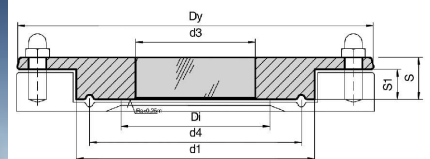


### Metaglas Elongated Sightglass

- To replace conventional glass in rectangular and D-ended sightglass assemblies
- Alternative dimensions available to customer specification



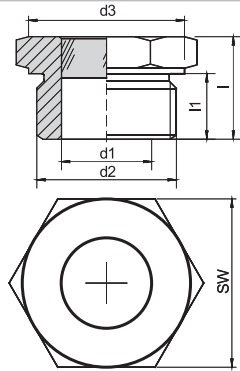
**Type 99.NA**



### Metaglas

- For **NA-Connect Fitting**
- For flush-mounted **NA-Connect system**
- DN10 – 100, ½" – 4"
- Extremely compact construction
- Combination of luminaire and Metaglas available

**Type 61**

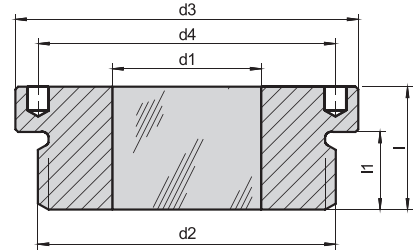
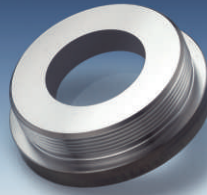


**Threaded Sightglass – Hexagon Head**

- For female connection with M, G, NPT thread

- Glass Brosilicate or Sodlime
- Pressure rating 50 bar, 100 bar or higher

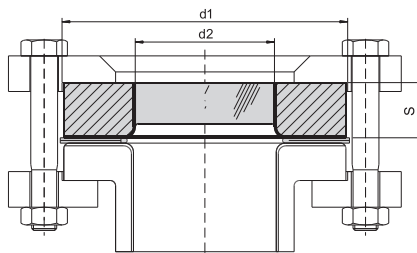
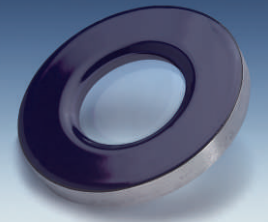
**Type 64**



**Threaded Sightglass – Round Head**  
- For female connection with M, G, NPT thread

- Glass Brosilicate or Sodlime
- Pressure rating 50 bar, 100 bar or higher

**Type 275**

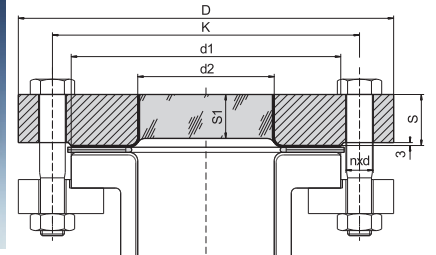


**Glas Lined Metaglas Sightglass**

- For glass-lined vessels

- Inert surface so cannot adversely affect product purity
- No catalyst effect and no infection
- Shatterproof with reliability against total failure

**Type 211**

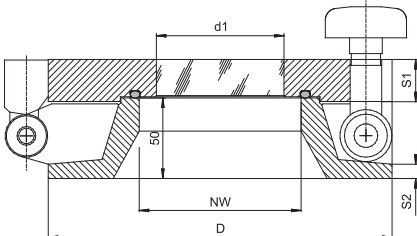


**Glass Lined Bolt-on Sightglass**

- For glass-lined vessels

- Connections DIN or ANSI
- Sizes: DN50 – 200, 2" – 8"
- Pressure rating PN10 – PN16, ANSI 150lbs – 300lbs

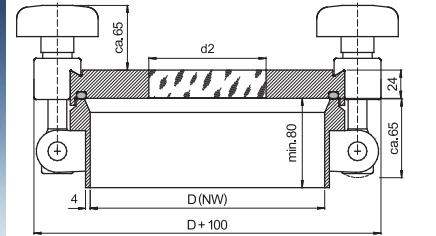
**Type 98.ZIM**



**Meta-Flange-Sightglass**

- With hinge and knob
- Easy to clean caused of flush internal shape
- Metal parts in different materials

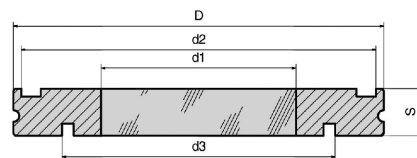
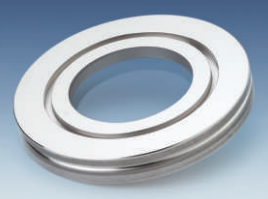
**Type 99.ZIM**



**Glasspane Cover with Metaglas**

- With hinge and handle
- Easy to clean caused of flush internal shape
- Seal built in the cover, it is out of the working area when the cover is open

**Type 79.ISO-K, 19.CF**

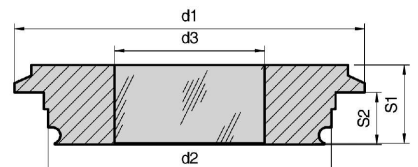


**Metaglas**

- For Vacuum

- ISO-K sightglasses
- ConFlat flanges
- KF Sightglasses
- For high vacuum

**Type 99.TUC, 99.NBC, 99.APV, 99.SÜD**



**Metaglas**

For different In-Line-Systems:

- Varivent (Tuchenhagen)
- Neumo-Bio-Controls
- APV-Rosista In-Line
- Südmo In-Line



**Type 73**

Sight port DIN 28120 with Metaglas



**Type 11**

Bolt-on sight glass



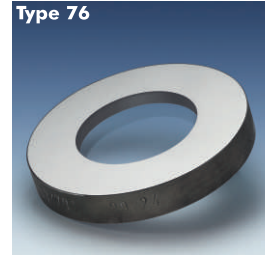
**Type 77**

Sight flow indicator with Metaglas



**Type 74**

Sight glass disc with tongue and groove joint



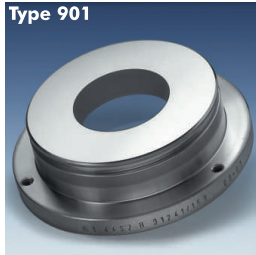
**Type 76**

Metaglas sight glass disc



**Type 903**

Sight glass for sanitary applications



**Type 901**

Sight glass for sanitary applications



**Type 19.BIO**

Bolt-on sight glass for sanitary applications



**Type 99.TUC**

Sight glass for Varivent-in-line fittings



**Type 80**

Metacamp - sanitary clamp fitting



**Type 80.USL01**

Metacamp with USL01 luminaire



**Type 80.SW**

Metacamp with wiper



**Type 80.ESL25**

Metacamp with ESL25-Ex luminaire



**Type 99.ZIM**

Pressure cover with integral Metaglas sight glass



**Type 80.NA**

Metacamp for flush mounted NA-Connect



**Type 83.USL33**

Metaglas for aseptic screwed pipe connection DIN 11864



**Type 11.SW**

Bolt-on sight glass with wiper



**Type 73.SW**

Metaglas disc with wiper



**Type 61**

Threaded sight glass - hexagon head



**Type 64**

Threaded sight glass - round head



**Type 19.BIO.USL33**

Bolt-on sight glass for sanitary applications with luminaire



**Type 99.NA.USL33**

Metaglas with luminaire for NA-Connect fitting



**Type 80.USL33**

Metacamp with USL33 luminaire



**Type 275**

Glass lined Metaglas sight glass



**Type 83**

Metaglas for aseptic screwed pipe connection



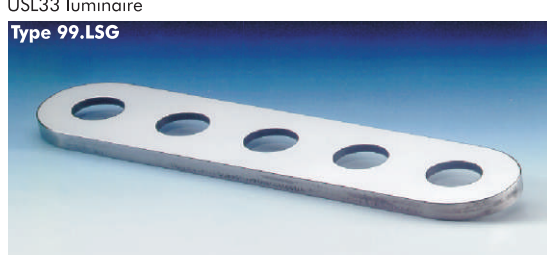
**Type 99.NA**

Metaglas for NA-Connect fitting



**Type 84**

Metaglas for aseptic flanged pipe connection



**Type 99.LSG**

Metaglas elongated sight glass



**Type 99.TUC.USL33**

Metaglas with luminaire for Varivent-in-line fitting