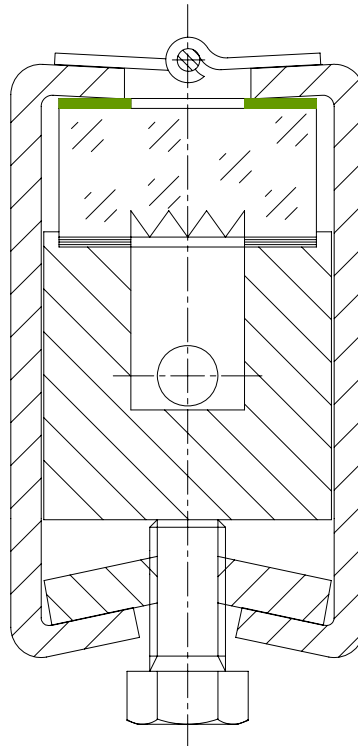


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**Installation / Operation / Maintenance Manual**  
**KLINGER Reflex Level Gauge**  
**Type R 25**

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**TYPE R 25**

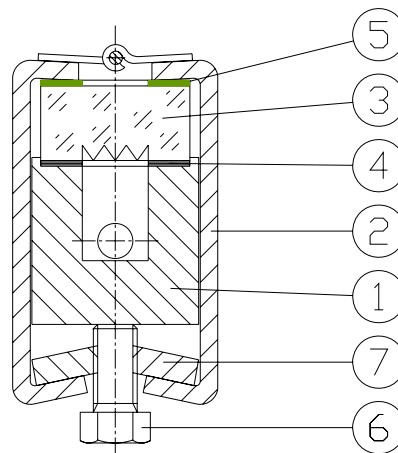
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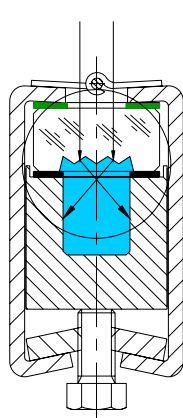
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## OPERATING PRINCIPLE

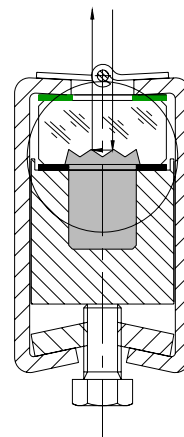
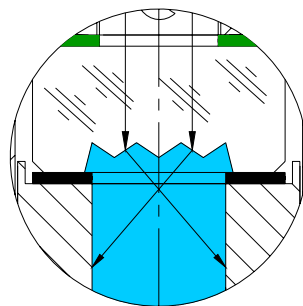
Klinger reflex level gauges are used to indicate the level of liquids in boilers and vessels. Reflex glass (3), is installed between of the centre piece (1) and the cover plate (2). In conjunction with the sealing gasket (4) and cushion joint (5) it seals the liquid and vapour contained within the reflex level gauge and prevents release of media to atmosphere. The enclosed sealing gasket and cushion joint ensure perfect sealing. The liquid level can be viewed through a slot in the cover plate.



The side of the reflex glass exposed to the medium has prismatic right angled grooves. Rays of light penetrating from the outside are absorbed into the liquid filled area but are completely reflected in the vapour area within the reflex level gauge, due to their different refraction indices. Therefore the liquid filled area retains the colour of the medium, whereas the vapour filled area appears silvery. For steam applications, the liquid filled space appears black and the vapour filled space appears silvery.



Water Filled Area of Gauge



Vapour Filled Area of Gauge

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## SAFETY INSTRUCTIONS

To ensure the safe operation of your Reflex level gauge the following must be complied with at all times.

Before installation, check to ensure that the operating conditions i.e. pressure and temperature, do not exceed the maximum operating pressure and temperature limits of the model of reflex level gauge being installed. The rating of the level gauge will be stated on the type plate and must not be exceeded.

Level gauges must be installed in accordance with the Installation, Operation and Maintenance Manual.

The installation, operation and maintenance should only be carried out by qualified personnel.

Ensure that all connecting pieces are tightened on assembly and after carrying out maintenance.

When opening and closing drain cocks, media will be discharged from the level gauge chamber. Care should be taken to ensure that personnel working in the area will not come into contact with the media, as it may be under pressure and at elevated temperatures.

Do not release any nuts/bolts on pressure tightening parts, unless following instructions as defined in the Installation, Operation and Maintenance Manual.

**Before conducting any maintenance activities on either the level gauge or the isolation valves/cocks, ensure that the level gauge has been isolated, the internal pressure has been completely removed and that the temperature of the gauge permits safe manual handling.**

When taking a reading or checking the operation of a Reflex level gauge, or any other type of glass gauge, it is mandatory that the operator does not approach the level gauge unless they are wearing suitable eye protection.

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## STORAGE INSTRUCTIONS

### FOR KLINGER REFLEX LEVEL GAUGES AND SPARE PARTS.

Gauges and their respective spare parts must be stored in clean, dry, storage facilities. Fully assembled gauges should be stored in the packaging as supplied. Spare parts for the gauges should be handled with care and stored in their original packing.

The ambient temperature in the storeroom must be between -20° C. and + 50° C. Sudden changes in temperature should be avoided (the danger of condensation / water).

It is recommended to take protective measures if the parts are stored under dusty conditions.

To avoid mistakes in spare part identification, all parts should be marked according to the delivery documentation and stored in the appropriate place.

Instructions for handling and use are enclosed with each shipment. Store these instructions along with the parts lists and other documentation for future reference.

Spare part lists will help identify Klinger spare parts for maintenance purposes.

Any damage due to inappropriate storage will release Klinger from any obligation derived under warranty, guarantee and/or product liability.

## INSTALLATION

Standard Klinger Reflex level gauges of type R 25 are typically supplied with either an isolation valve or a gauge cock set to isolate the level gauge from the pressure vessel or storage tank.

**RAV valves** are an offset metal seated isolation valve with an integral safety ball which is available in the following configurations

**Connection to the Vessel** ( Standard configuration listed others available on request )

Flanged      DN 15, 20, 25, PN 40  
                  1/2", 3/4", 1", ANSI 150-300-600  
                  1 1/2" ANSI 150  
                  DN 15, 20 PN 64-100-160

Threaded     1/2" – 3/4" NPT Male

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## INSTALLATION

### Connections to the level gauge

½" NPT union nipple ( Rotatable ) or ½" NPT nipple ( Non rotatable )

**AB18 'DG' and AB18 'D' Gauge Mount sets** are also supplied as standard with safety balls in top and bottom mount. Gauge cock sets are supplied as standard with a ½" drain cock.

**Connection to the Vessel** ( Standard configuration listed others available on request )

Flanged    DN 15, 20, 25, PN 40  
              1/2", 3/4", 1", ANSI 150-300-600  
              1 1/2" ANSI 150  
              DN 15, 20 PN 64-100-160

Threaded    1/2" – 3/4" NPT Male

### Connections to the level gauge

#### **AB18 'DG'**

½" NPT nipple, non rotatable.

#### **AB18 'D'**

16 mm End tube with gland ring and union nut rotatable.

Refer to the appropriate Installation, Operation and Maintenance Manual for the type and configuration of isolation valve/cock to be installed with the level gauge.

When installing the level gauge, special attention must be paid to the alignment of the connecting flanges, as this is extremely important to ensure the reliability and safe operation of the installed level gauge. The **maximum** dimensional tolerance between centres and transversal alignment must not exceed 1.5 mm. Flanges must also be in the same plane with a maximum misalignment of 1.5 mm. **(This data should be checked prior to installation.)**

Use only suitable lifting and handling devices.

Do not stress critical points when lifting e.g. valve hand wheel.

Only competent workers should execute handling and lifting operations.

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## COMMISSIONING

### **Minimisation of thermal shock to gauge glass.**

Thermal shock considerably affects the life and performance of the glasses.

Where a complete Plant is being commissioned, the gauge cocks/isolating valves are left in the open position to minimise thermal shock.

Where the gauge has been isolated for maintenance while the rest of the plant is operating under temperature and pressure, the following procedure is recommended to bring the gauge back into service.

- 1.1 With the top and bottom cocks/valves shut, open-the drain cock and then crack the top cock/valve to allow a small flow of vapour to pass through the gauge chamber, until working temperature is attained.
- 1.2 Close the drain cock.
- 1.3 Open the top gauge cock/valve fully and allow the gauge to fill with liquid.
- 1.4 Open the bottom gauge cock/valve fully.
- 1.5 During the commissioning period, the covers and the joints could settle and it is essential therefore to follow up all clamping nuts to maintain the required torque values. For correct bolt torque sequence refer to the tightening procedure.

Additionally the joints and glands should be tightened on the gauge cocks/valves (see appropriate maintenance sheet for correct procedure).

### **Bolt Torque at Ambient Temperatures**

<b>Klinger Level Gauge</b>	<b>Bolt Torque</b>
R 25	30 Nm

## TIGHTENING PROCEDURE

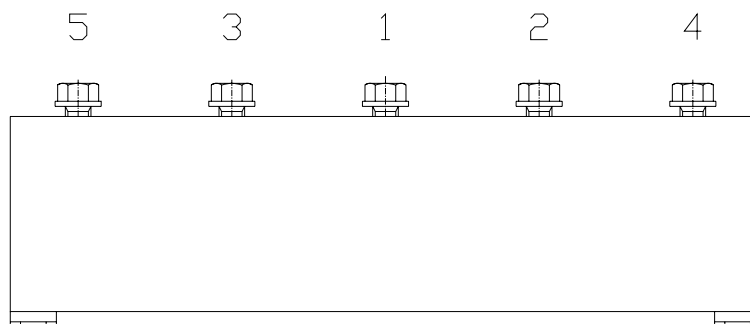
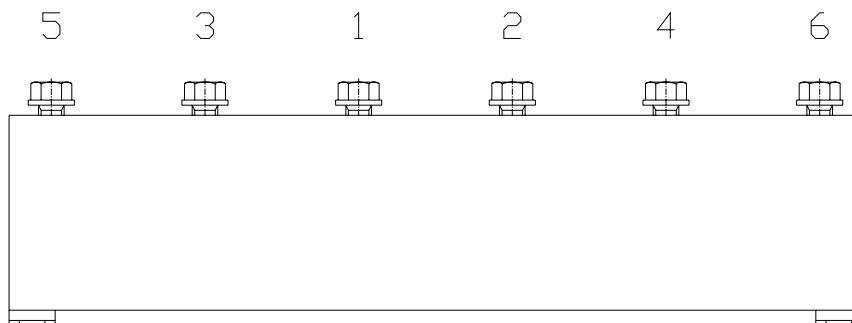
Select the appropriate tightening sequence to be followed based on the actual level gauge glass size.

Some level gauges are supplied with an even number of spaces between the tightening bolts and others are supplied with an odd number of spaces between the tightening bolts. The number of bolts used is governed by the glass length of the level gauge.

When replacing glass in a reflex level gauge it is critical that bolts are tightened with a torque wrench in the correct sequence shown, the torque being increased incrementally until the final torque value has been obtained.

Note :- You must ensure that the final torque value is applied evenly to all bolts, this may require a number of tightening cycles at the final torque value as the gaskets settle.

R25                      20Nm  $\longrightarrow$  30Nm





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## MAINTENANCE INSTRUCTIONS

Any leaks which appear during service should be stopped immediately by following up at the appropriate point.

- Gauge – see commissioning procedure.
- Cocks or Valves – see appropriate maintenance sheet.

### Changing Glasses

#### 1. Dismantling

- 1.1 Isolate the gauge from the source of pressure.
- 1.2 Relieve the gauge of internal pressure.
- 1.3 Isolate and remove ancillary equipment (see appropriate maintenance sheet).
- 1.4 Loosen the tightening bolts in the correct sequence, as shown in the release procedure.
- 1.5 Remove tightening plate from the gauge (supporting covers and internals).
- 1.6 Remove the cover plate, glasses and joints from the centre piece.
- 1.7 Clean joint faces of the centre piece and cover plate, making sure that they are free of any remnants of the joints. Take care not to damage the joint face of the centre piece.
- 1.8 Inspect joint faces of the centre piece. Check and ensure that surface is clean and straight with no signs of damage to the sealing face.

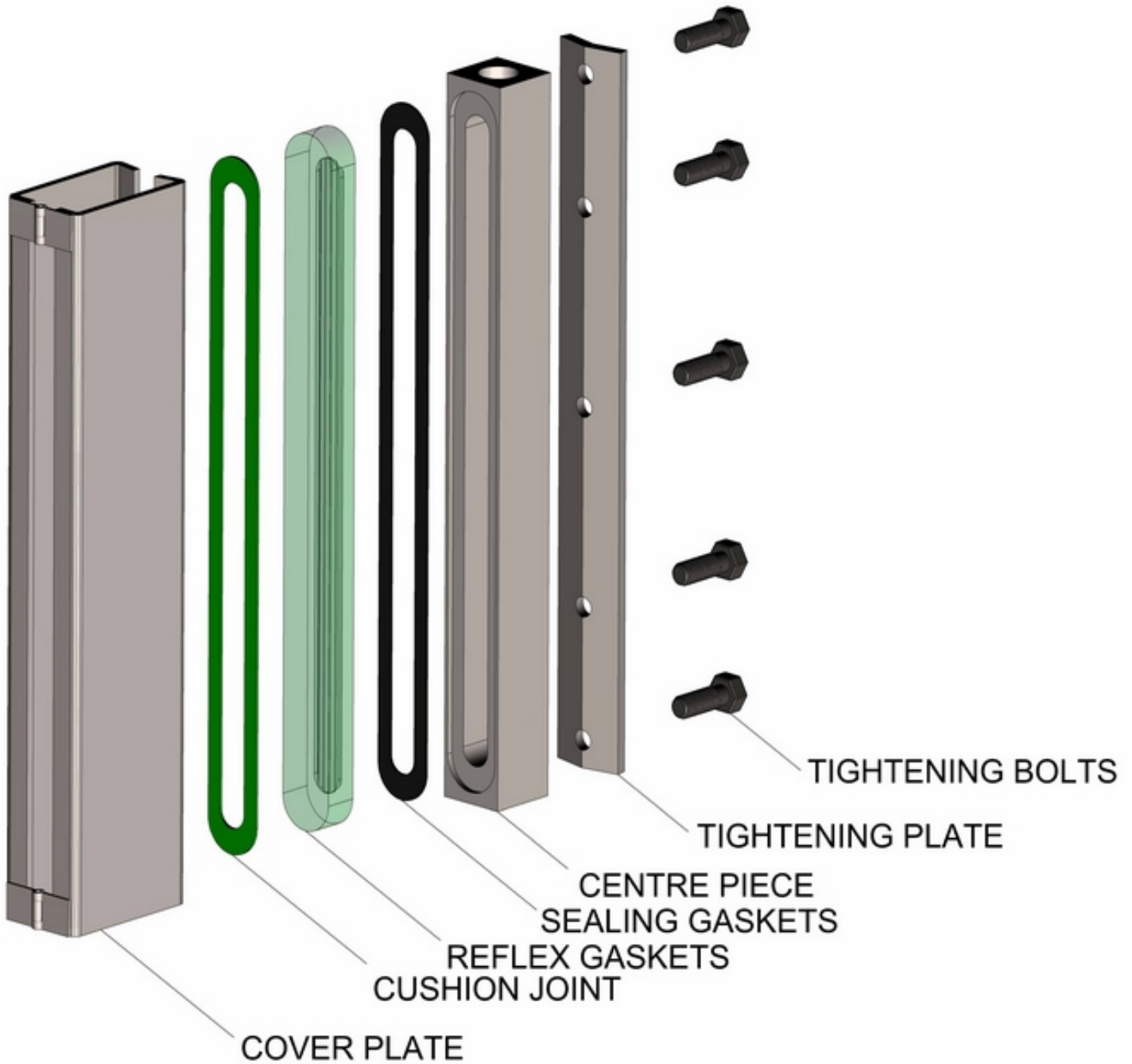
#### 2. Assembly

- 2.1 Fit a new Reflex glass with new joints, (never re-use joints which have already been in service!)
- 2.2 Reassemble all the components in the correct sequence.
  - 2.2.1 Sealing joint between centre piece and reflex glass.
  - 2.2.2 Reflex glass must be installed with grooves towards the centre piece
  - 2.2.3 Cushion joint between cover plate and reflex glass.
- 2.3 Tighten the tightening bolts to the prescribed torque following the tightening procedure. Lubricate threads of the tightening bolts with Molykote thread grease 1000.
- 2.4 Never grip the level gauge body in a vice during the assembly process, assembly on a flat clean surface.

#### 3. Refurbishing.

- 3.1 No refurbishing should be necessary other than the replacement of glasses and joints.

## Exploded View - R 25 Level Gauge

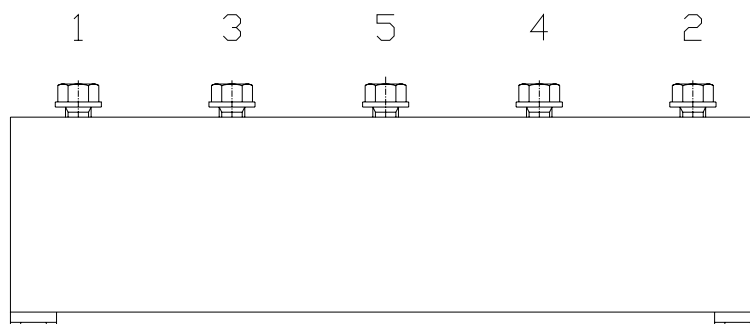
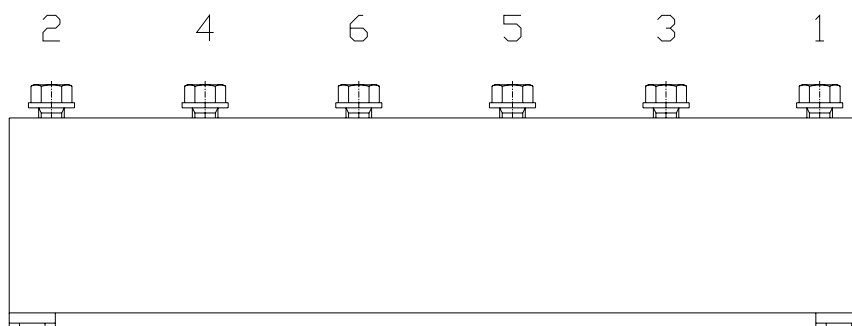


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## RELEASE PROCEDURE

Select the appropriate release sequence to be followed, based on the actual level gauge glass size.

Some level gauges are supplied with an even number of spaces between the tightening bolts and others are supplied with an odd number of spaces between the tightening bolts. The number of bolts used is governed by the glass length and the pressure rating of the level gauge.



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## **SPARE PARTS / IMPORTANT INFORMATION**

Use only original Klinger replacements parts.

Cleanliness is most essential when assembling, and all directions listed under changing glasses must be observed.

Draughts or adverse weather conditions may cause thermal shock, resulting in glass breakage. If there are windows, lift doors, etc in the vicinity it is advisable that the gauge should be screened off. If the level gauge is installed outdoors the glass should be sheltered from rain, hail and cold

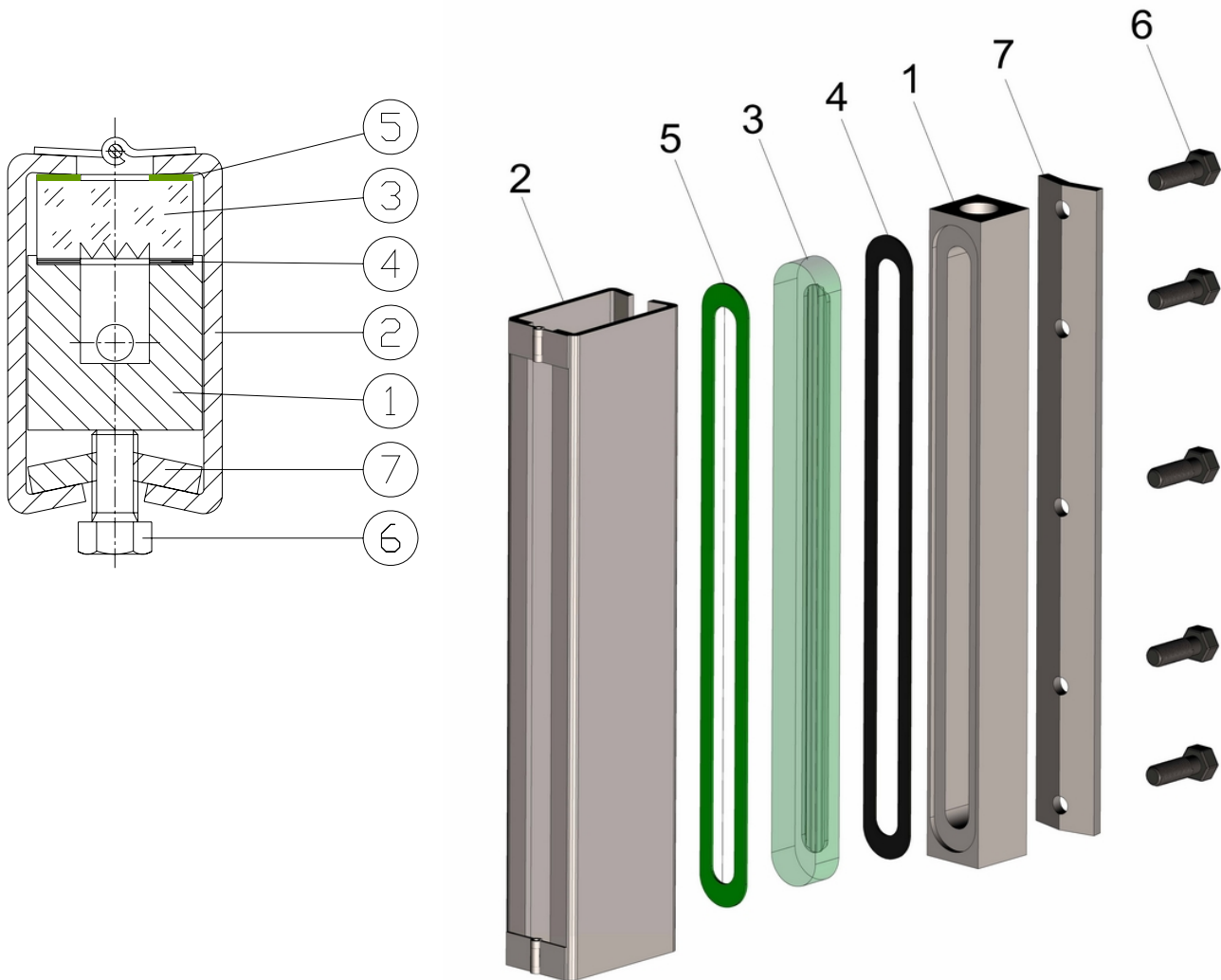
Glass corrosion – if the glasses have become opaque or liquid level definition deteriorates, the glasses should be examined, cleaned and if worn, replaced at once.

Protective shields can only be fitted to transparent level gauges – they must never be fitted to reflex level gauges.

It is recommended that one complete set of glasses and joints be kept for spares and a new set ordered as soon as these are used.

When ordering please quote the type and size of the gauge e.g. R 25 - VII as stated on the gauge type plate.

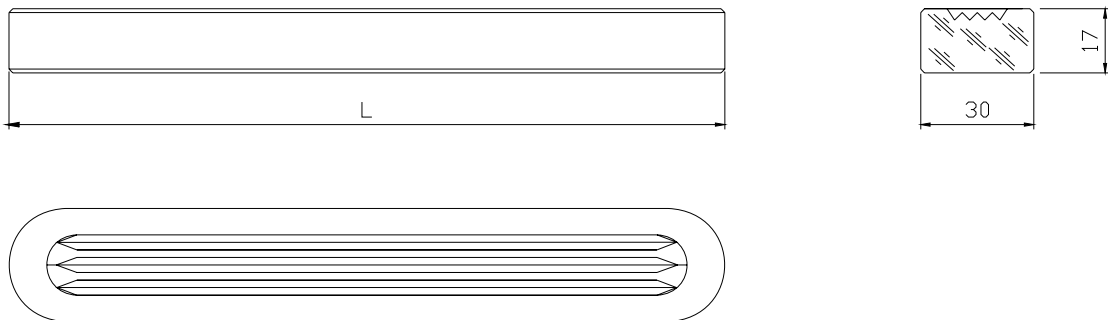
## R 25 COMPONENTS AND MATERIALS



Components	Materials		Spare parts
	FS/H	M/H	
1 Centre piece	ASTM A105N	AISI 316	
2 Cover plate	Fe 430	Fe 430	
3 Reflex glass	Borosilicate		*
4 Sealing gasket	Klinger Graphite SLS		*
5 Cushion joint	KLINGERSIL <sup>®</sup> C-4430		*
6 Hexagon head set screw	8.8	8.8	
7 Tightening plate	Fe 430	Fe 430	

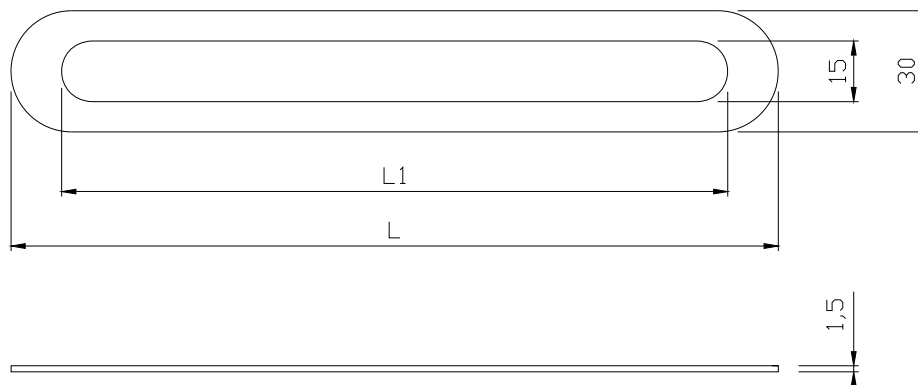
## SPARE PARTS DETAILS GLASSES, GASKETS AND JOINTS FOR R 25

### Reflex Glass, type A



Size	II	III	IV	V	VI	VII	VIII	IX
L	140	165	190	220	250	280	320	340

### Sealing gasket and cushion joint, type A



Size	II	III	IV	V	VI	VII	VIII	IX
L	140	165	190	220	250	280	320	340
L1	115	140	165	195	225	255	295	315