



## NARVIK-YARWAY

Narvik-Yarway covers requirements for level gauges and electronic water level systems with a wide range of models, sizes and materials to satisfy all the specifications of the power and process industry.

### Features

- High pressure level gauge for use on boiler drums and vessels with continuous vision up to 3000 psi (210 bar) and a service temperature of max. 698°F (370°C)
- Transparency (dual color) type suitable for in- and outdoor application
- Illuminator: direct view type IP44/65 and EExd IIB T5 available
- Pressure class and connections:
  - ASME B16.34 class 150 to 1500
  - DIN 2401 class PN 25 to 250
  - Flanged to ANSI 1/2" to 1"
  - Flanged to EN DN 15 to 25
  - Socket weld connections to ANSI B16.11
  - Butt weld connections to ANSI B16.25 or DIN 2559
- Materials:
  - ASTM A479 TP304 or 1.4301



### Technical data


Number of ports: 5 up to 21  
 Visibility: 12 1/2" to 48 3/8"  
 (314 to 1228 mm)

Construction in accordance with  
 ASME and AD2000  
 CE Marking if required

### Main applications

Boiler drums, blow-down tanks, deaerators,  
 feed water heaters



			
0434	CE	97/23/EG	Cat:II Group:2
Narvik-Yarway Heerie (NL.)			
Type:	Model:		
Volume:	DN:		
Ps:	bar	Tmax:	°C
Pt:	bar	TAG:	
Mat:	Class:		
Ident:	Year:		

Nameplate with CE Marking supplied if applicable

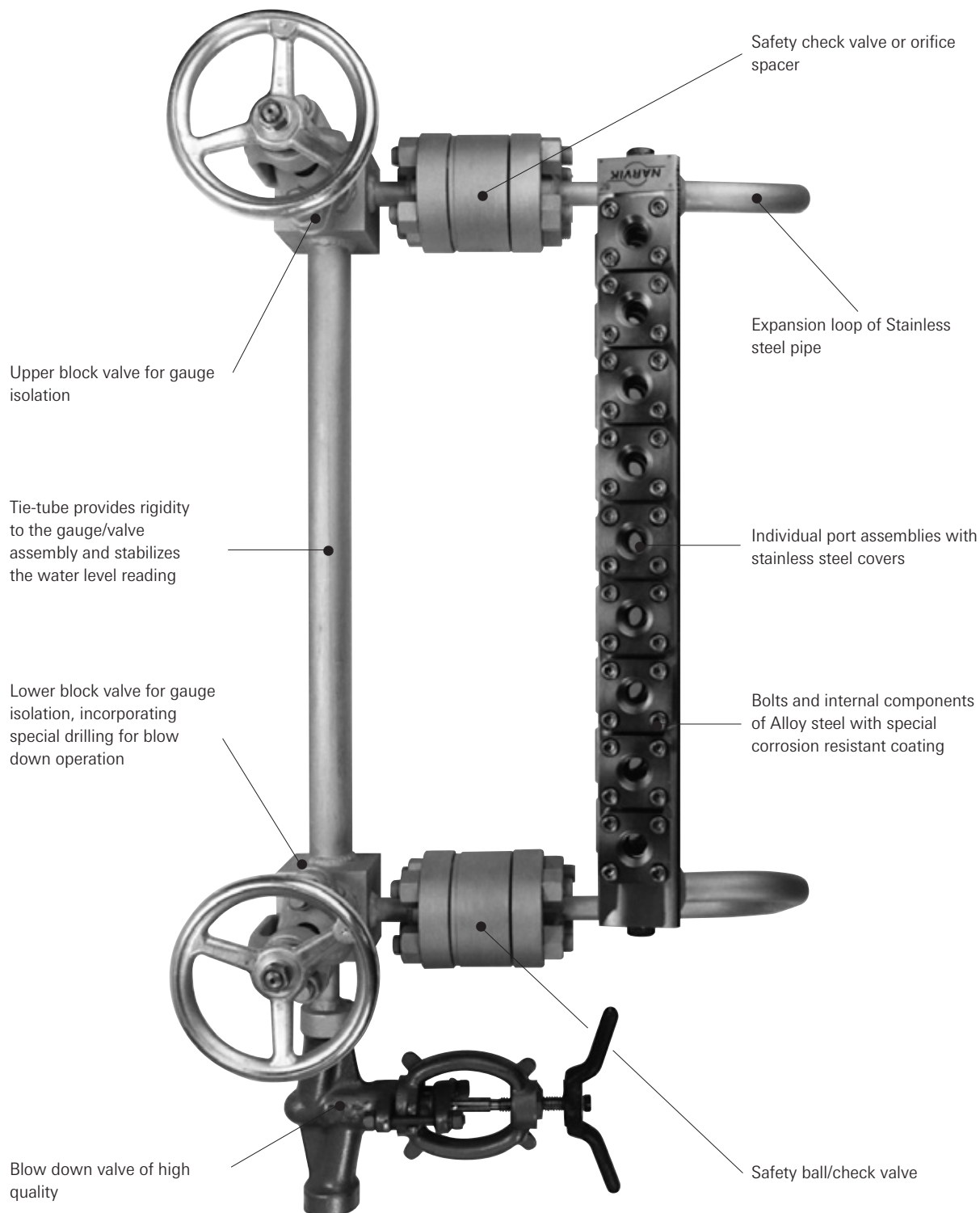


Figure 1

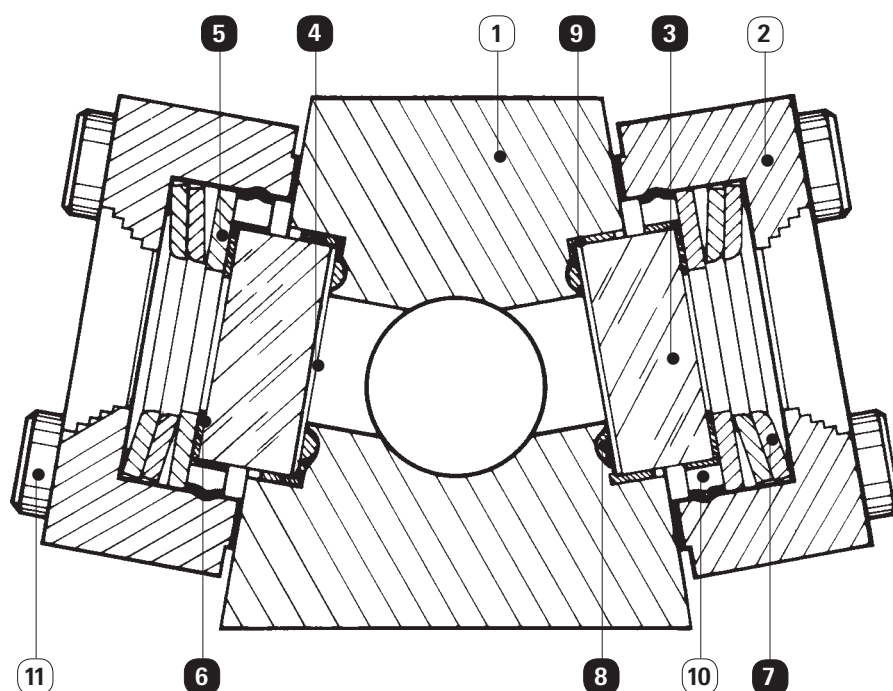
## High pressure level gauges: 850 - 3000 psi (60 - 210 bar)

The Narvik-Yarway high pressure (dual color) gauge assembly (see figure 1) consists of a Stainless steel insert (1) which is provided with connecting pipes and flanges. The pipes also serve as expansion compensators, to absorb forces onto the gauge connections, due to thermal expansion. In the majority of applications, the insert is combined with a tie-tube and Narvik-Yarway own design block valves. The tie-tube provides rigidity to the system, as well as recirculation for the condensate and hence stabilizes the water level reading. The total assembly is flanged or welded to the boiler drum connections.

Each insert has a number of port holes, arranged on both sides of the insert, as shown in figure 2. Each port assembly comprises a glass kit (3), washer (5), spring cones (7), and these components are retained in the cover (2) by a retaining ring (10). Sealing of the glass is by means of an oval sealing gasket (8), located in a grooved seat in the insert, and is loaded continuously and evenly by the spring cones. The cover is bolted to the insert by four bolts (11) and has metal-to-metal location with the insert face. The loading on the glass is therefore totally independent of the torque exerted on the bolts and uneven or excessive loading of the glass is prevented.

The glass is protected from the boiler water by a high quality Indian ruby mica (4), which meets the quality requirements of ASTM D351 60T/V 4.

In order to protect the spring cones, washer and cover bolts against corrosion, these components are treated using a special process. In this process, lead and zinc are diffused into the metal surface and the components are finished with a sprayed Molykote layer. This Molykote layer reduces friction and prevents crevice corrosion. The treatment technique meets MIL std 171 C finish 5.3.2.4 and considerably improves the service life of these vital components.



● Recommended spares

**Figure 2**

**Table 1: Materials**

Item	Name	Material
1	Gauge insert	A479 TP 304 / 1.4301
2	Cover	A479 TP 304 / 1.4301
3	Glass	Aluminium silicate Duquar
4	Mica	Indian ruby clear and slightly stained
5	DuCo ring	AISI 420 / 1.4021
6	Cushioning ring	Asbestos free
7	Spring cone	PH 15 - 7 Mo / 1.4532
8	Sealing gasket	Monel / silver clad
9	Clip ring	AISI 302 / 1.4319
10	Retaining ring	Armco 17. 7
11	Bolt	A193 Gr. B7

## Plano type gauges

Gauges of this type have one expansion loop, usually at the top of the gauge and are available in the various configurations as shown. Other gauge/valve arrangements are available upon request.

- (A) Orifice spacer or automatic shut-off valve (see figure 5 and 6)
- (B) Ball check valve (see figure 7)

\* Model number.

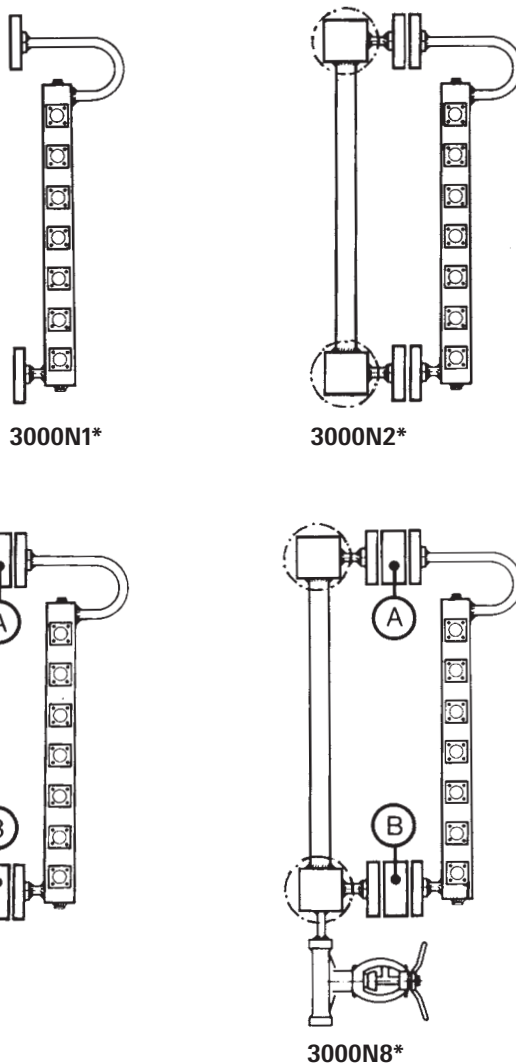


Figure 3

## Field of application

The Narvik-Yarway high pressure level gauges are used predominantly on steam boilers with operating pressures in excess of 60 bar. HP gauges may be installed in- and outdoor environment, as gauge glasses and other components are well protected from such weather conditions as rain, snow, etc.

## Principle of application

- When light passes through a liquid, it is refracted through an angle of approximately 10°. The HP gauge uses this principle, in conjunction with an illuminator, to obtain contrasting green and red reading of the water/steam level in the boiler.
- The viewing length (gauge visibility, see figure 8 / table 2) is divided into a number of individual port assemblies, thus eliminating long, continuous glass strips, which are susceptible to cracking.

These two principles combined, enables clear reading of the HP gauge, and provides reliable operation over an extended service life.

## Wiring type gauges

Gauges of this type have two expansion loops. The gauge insert is offset in relation to the valve assembly. This configuration is mostly often used to adapt the HP gauge for use on existing installations, as it provides a wide range of mounting options.

- (A) Orifice spacer or automatic shutoff valve (see figure 5 and 6)
- (B) Ball check valve (see figure 7)

\* Model number.

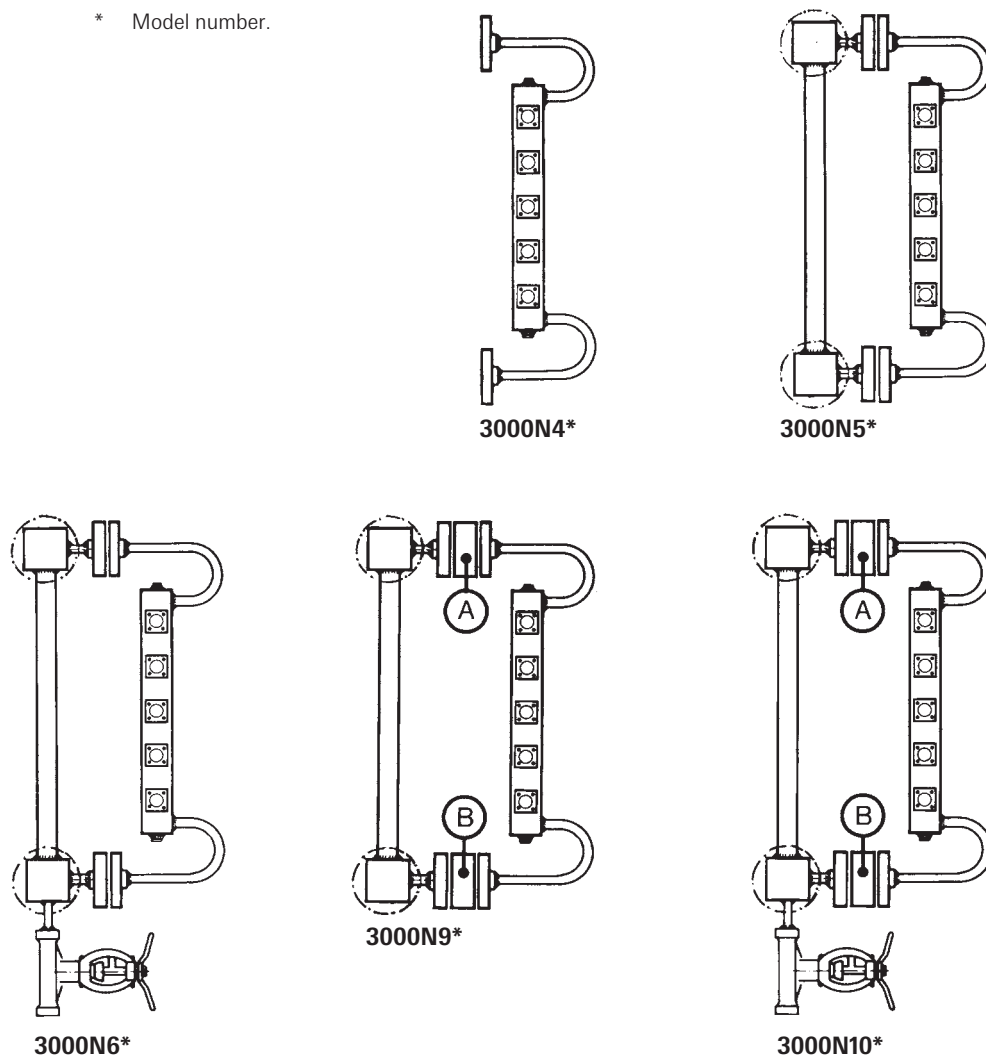


Figure 4

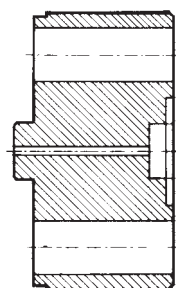


Figure 5:  
Orifice spacer

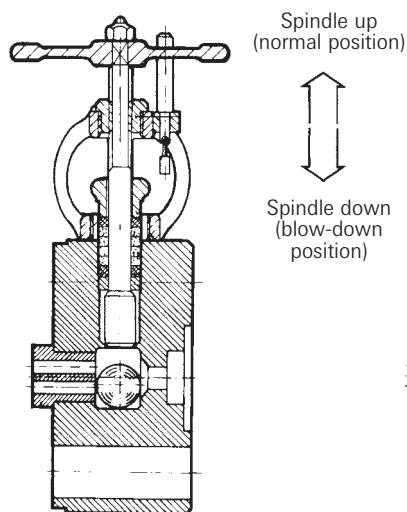


Figure 6:  
Automatic shut-off valve

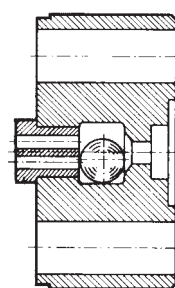


Figure 7:  
Ball/check valve

# High Pressure Level Gauges, Model: 17

## Options

### Valves

Narvik-Yarway supplies block valves (see figure 9) as standard, for gauge isolation and a drain valve for blow down (see figure 10), other valve arrangements are available upon request. In the steam leg, an automatic shut-off valve (see figure 6) can also be provided, and this would replace the orifice spacer (see figure 5). In the water leg, a ball/check valve (see figure 7) can be provided.

### Piping

The steam leg of the level gauge is left uninsulated to facilitate condensing of the steam, which results in a circulation flow between boiler drum and gauge. To prevent build-up of rust or magnetic particles on the gauge glass, the steam leg should be of Stainless steel (SA 312 TP 321). It is Narvik-Yarways policy to use only Stainless steel bends of 3/4" size (depending on code requirements).

According to standard piping practice, it can be seen that schedule 160 piping will meet all requirements. Tie-bar material used as a standard: SA 106 Gr. C (1 1/2" XXS).

### Hand wheels

Hand wheels are manufactured from aluminium as a standard. Cast steel chain wheels are optional and available to either ANSI or EN specifications. If required spokeless hand wheels, closed type hand wheels are available.


## Special options

- A steam heating tube may be fitted within the gauge body. This device compensates for the reading error found in applications involving elevated working pressures.
- Water columns can be manufactured to meet ASME or other specifications upon request.

## Boiler codes

DuCo level gauges provide the indication of boiler water level as required by the ASME-I Boiler Code PG60.1, if equipped with dual color illuminator. The code states: "to provide obvious visual discrimination between water and vapor in the individual sections". DuCo gauges can also be manufactured to meet other, international, boiler codes. In many countries, remote reading of boiler drum level is available with an 'Electronic Safety System for Boilers', is accepted by local authorities.

Please consult Narvik or their local representative for advice concerning local rules.

For applications in hazardous areas, Narvik has an illuminator explosion proof to  II 2 GD EEx d[ia] IIB T6 to T5 IP65.

## Visibility

### Definition

The 'visibility' of a gauge is defined as the distance between the top of the upper and the bottom of the lower visible glass (see table 2 / figure 8).

Table 2

Number of ports	5	7	7	9	12	13 up to 21
Visibility [inch]	12.5	15.5	18	21	28.125	30 7/8 up to 48 3/8
Visibility [mm]	314	403	460	530	720	783 up to 1228
'A' [mm]	73	63.5	73	63.5	63.5	63.5
						Upon request

### Note

Dimensions may be subject to change without prior notification.  
Narvik will provide a certified dimensional drawing upon request.

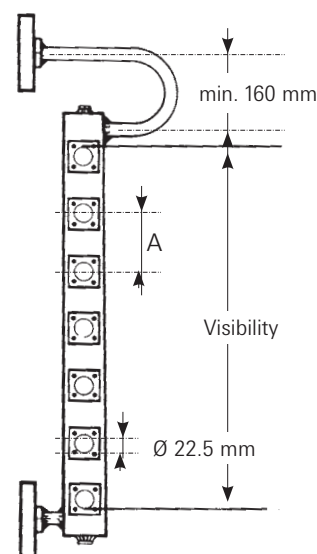


Figure 8

## Block valve (see figure 9)

Narvik-Yarway supplies boiler block valves of their own design. Upper and lower valve are identical.

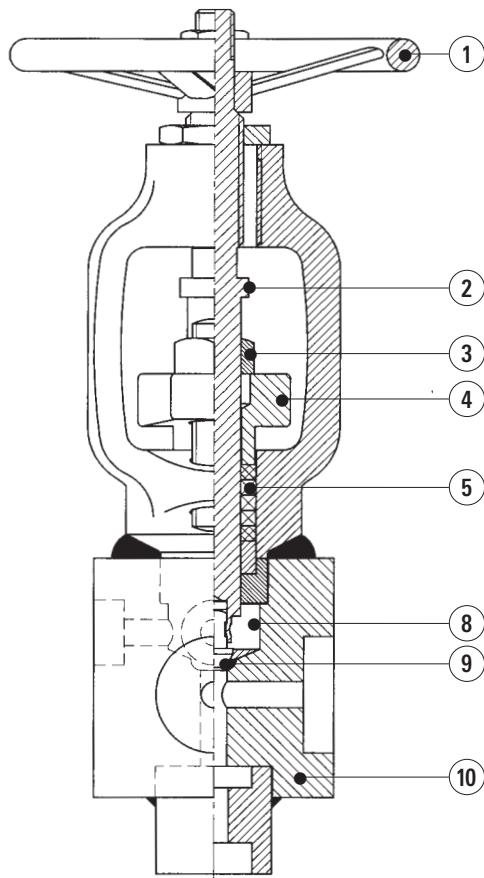


Figure 9

## Drain valve (see figure 10)

Forged steel globe valve 3/4" class 1500, design for ASME boiler and pressure vessel code, section 1 applications.

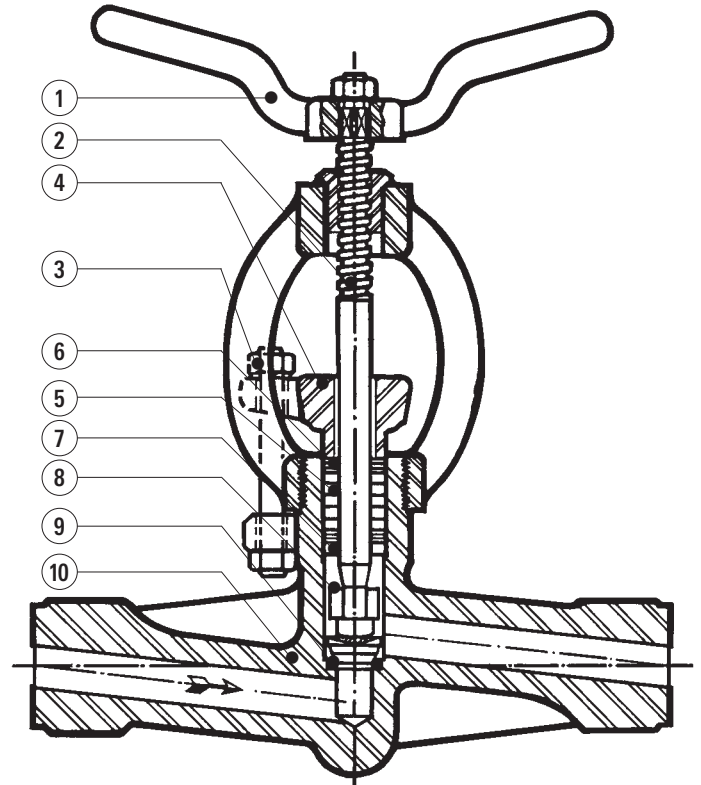


Figure 10

Table 3 - Standard materials

Shut-off valve				Drain valve			
Item	Name	Material	Equivalent	Item	Name	Material	Equivalent
1	Handwheel	Aluminium		1	Handwheel	A278 Gr. 40	
2	Stem	A479 TP410		2	Stem	13Cr1Mo	
3	Stud/nut	A193 B7/2H		3	Stud/nut	A193 B7/2H	
4	Packing gland	SA105		4	Packing gland	A181 Gr. 60	
5	Packing	Graphite		5	Packing	Graphite	
6				6	Packing ring	Merkel 5604	
7				7	Ring	A182 F316	
8	Disc	Stellite 6		8	Disc	Stellite	
9	Seat	Stellite 6		9	Seat	Stellite	
10	Body	A516 Gr. 70		10	Body	A105 N	

Connections: flanged, butt weld, socket weld or threaded to various standards, upon request



Principle of operation

- When light passes through a liquid, it is refracted through an angle of approximately 10° (see figure 11). The high pressure gauge uses this principle, in conjunction with an illuminator, to obtain contrasting green and red, reading of the water/steam level in the boiler.
- The viewing length is divided into a number of individual port assemblies, thus eliminating long, continuous glass strips, which are susceptible to cracking.
- These two principles, combined, enable clear reading of the high pressure gauge, and provides reliable operation over an extended service life.

Red indication

When there is no water present in the port, the light from the LED's passes through the plano convex lens. This focused light beam then travels through the gauge insert and is displayed on the frosted glass in the readout section in the front view hood. The image is large and of high definition and may be viewed through a wide angle. When there is no water in the port, the red light beam has an uninterrupted path through the port and will be displayed as red on the readout.

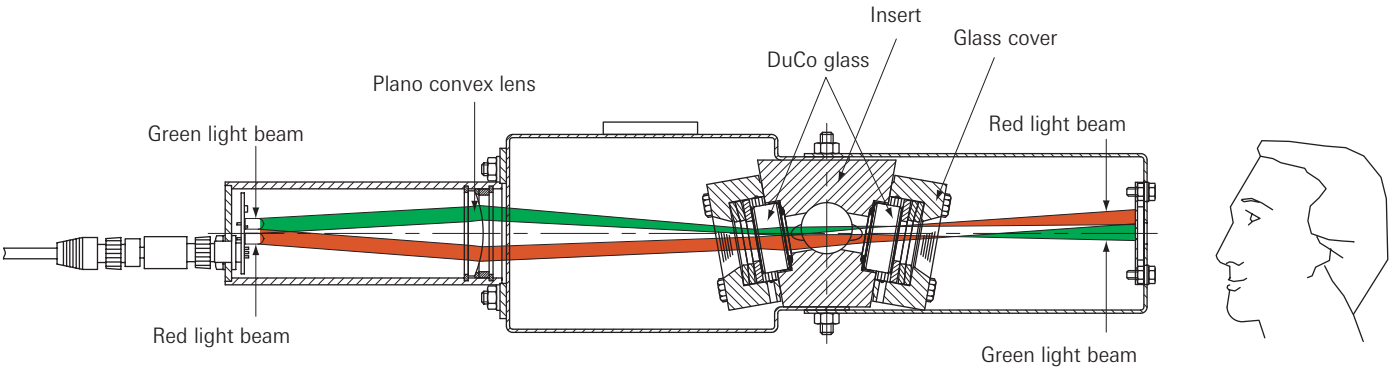
Green indication

When there is water present in the port, the red/green light beam is refracted. The red light is offset outside the port whilst the green light has an uninterrupted path through the port and will be displayed as green on the readout.

Electrical detail

The Narvik-Yarway DuCoLeD illuminator is provided with led technology for use with supply voltage of 12 Vdc. Power consumption is 60 mA per led unit. Power supply suitable for 110-230 Vac, 15 W.

Figure 11: Water in the port: Green signal on readout window



Partslist

Pos.	Name	Material
1	Read-out housing	Stainless steel
2	Led unit housing	Stainless steel
3	Led unit	Stainless steel
4	T-connector and cable	
5	Frosted glass	Borosilicate
6	Glass holder	Stainless steel

