



# Piston valves

## KVN DN 15 – 200 KX-GT

**CE** 0408  
Conformity with Pressure  
Equipment Directive 97/23/EC

Edition 2010

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# KLINGER piston valves

Application examples



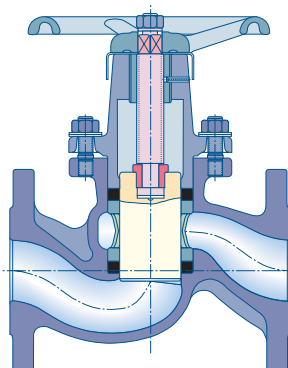
# KLINGER piston valves

## Advantages and summary of types

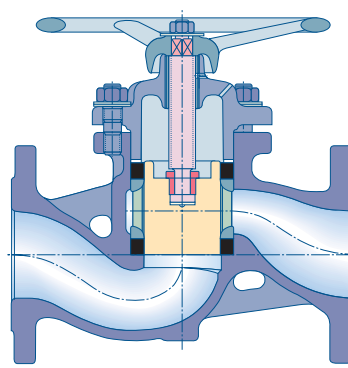
### KVN Advantages

- **Reliably tight – across the ports and to the atmosphere**
- **Environmentally safe and energy efficient**
- **Asbestos-free**
- **No erosion on the sealing surfaces**
- **Insensitive to impurities due to maintenance-free sealing system**
- **Unbeatable in a comparison of profitability**
- **Maintenance-free**
- **Easy to install**
- **Valve rings are replaceable in the line**
- **Excellent control characteristics**
- **Fire-safe tested according to API 6FA**
- **Inspected according to EPA-emission-test**
- **Conforms to TA-Luft**
- **VdTÜV license 1065 type approval**
- **Suitable for oxygen (BAM)**

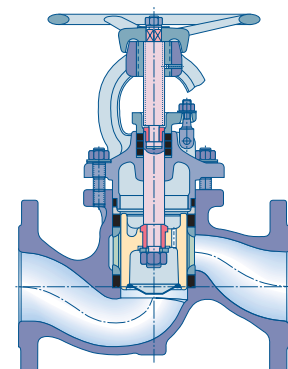
KVN 15–50 m.c. III, VI, VIII, Xc



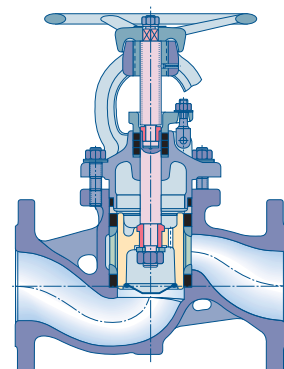
KVN 65–150 m.c. III



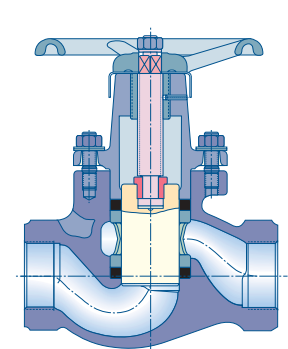
KVN 65–200 m.c. III/VIII



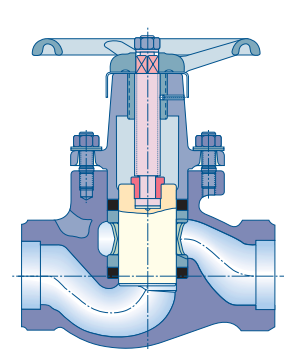
KVN 65–200 m.c. VI, VIII



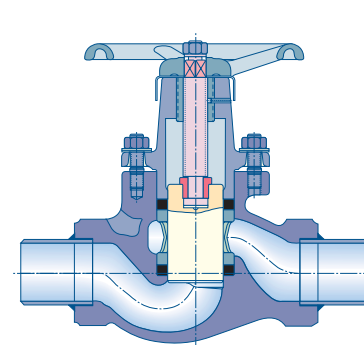
KVMN 1/2"–2" m.c. III, VIII



KVSN 1/2"–2" m.c. VIII



KVSN 15–50 m.c. VIII







# KLINGER piston valves

Optimization through experience



## **Piston valves KVN**

### **Excellent ideas are lasting**

In the year 1922 Richard KLINGER the founder of this company had an idea, the principle of which is still valid today. He designed the first piston valve. He replaced the sealing system of a conventional globe valve with a cylindrical piston and two elastic replaceable jointing rings.

### **Environmentally safe and energy efficient**

Constant research and further development yield a quality, which comes through brilliantly in extreme applications and is marked by the slightest of leak rates. KLINGER piston valves are the best solution in hot water-, steam-, heat transfer medium- and dry gas application.

### **Tested and certified**

KLINGER KVN piston valves have been tested by independent research institutes under the toughest conditions.

They passed the Fire-safe test according to API 6FA as well as the Helium-leakage test with best results. These results impressively prove the exceptional efficiency of KLINGER piston valves.

Today, piston valves are manufactured based on the state of the art technique and according to the highest quality requirements of ISO 9001: 2008.

### **Efficiency and reliability**

The sealing element is formed by two elastic valve rings enveloping a stainless steel piston. The upper valve ring seals to the outside, the lower ring seals across the port. Due to the large piston skirt the sealing effect is optimal. As the valve closes the piston removes impurities which the medium might contain from the inside of the lower valve ring. In this way the valve reliably seals off even contaminated media. In principle, damage to the sealing surface is precluded and tightness is guaranteed as a result.

### **Excellent control characteristics**

The standard version of the KLINGER piston valve is already very well suited for controlling the flow. Because the piston is guided by the upper and the lower valve ring vibration and instability in the pipe does not occur. KLINGER piston valves have proved to be excellent as by-pass control valves.

Through simple replacement of the piston and the lantern bush the KVN can be retrofitted to act as a special precision control valve.

### **In-line valve ring replacement**

A newly installed piston valve does not require any maintenance for a long time after. However, the spindle should be regularly lubricated. If nevertheless a valve ring wears out it can be replaced without problems while remaining in the line and, if assembly instructions are followed, it can be changed by in-house personnel.

After replacement the valve is like new.

# KX-GT: Competitiveless in sealing

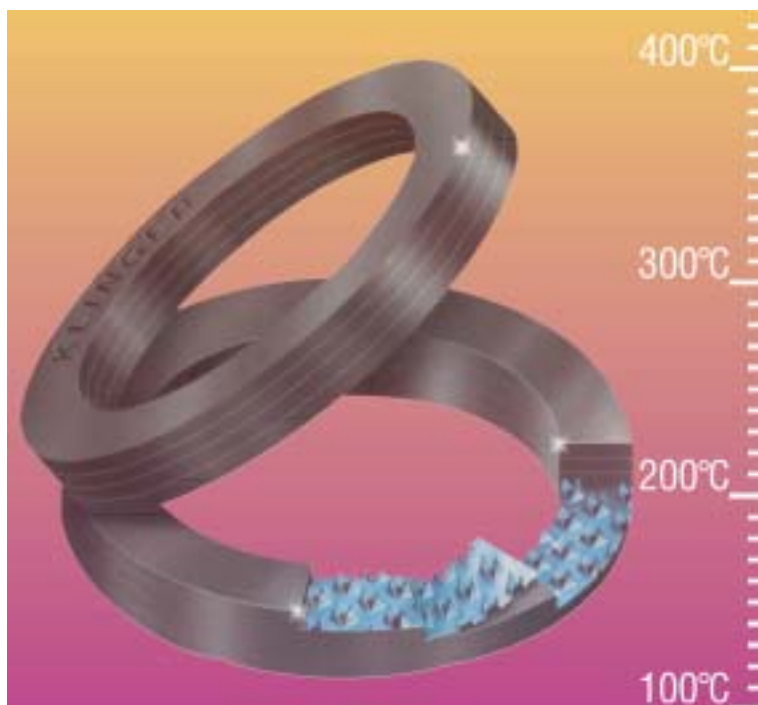
Environmentally safe and energy efficient

## **The core of the piston valve: The valve rings KX-GT**

The high quality valve ring KX-GT is made of graphite laminate with tang metal sheet inserts made of stainless steel. The valve is absolutely asbestos- and maintenance-free. The variable thermal expansions which occur under alternating thermal loads are completely compensated by KX-GT-valve rings, which were presealed in a built-in condition.

## **Long term sealing even at highest demands**

Media in the temperature range between  $-40^{\circ}\text{C}$  and  $+400^{\circ}\text{C}$  and at pressures of up to 63 bar, can be reliably controlled. KX-GT valve rings are excellent for the use in temperature shock operation as well as steam condensate alternating-operation. (Flash-application).



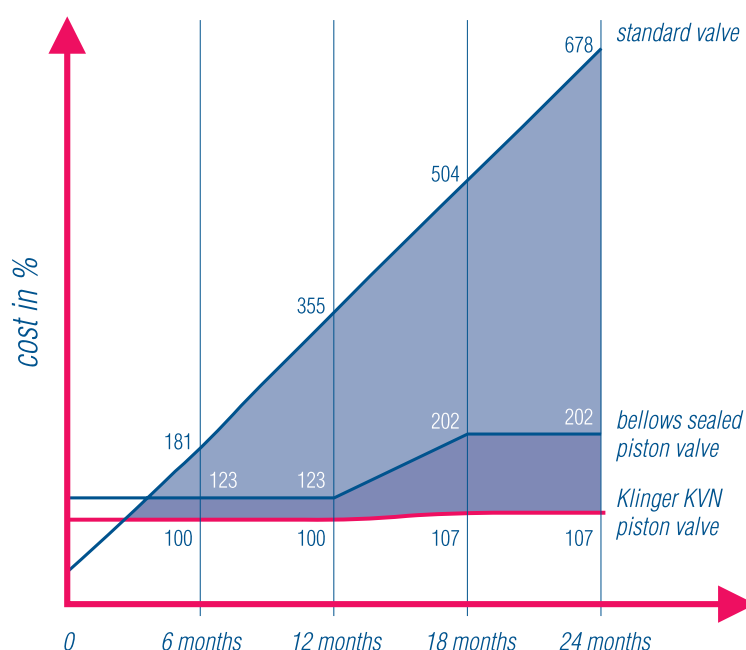
## **Pressure relieved piston**

In order to ensure convenient actuation at high differential pressures, the pistons of the KVN range are made of cast steel, whereof the sizes DN 65 to 200

are pressure relieved. The spindle is sealed with a gland and an additional valve ring provides the sealing between the body and the bonnet.

## **Cost justification**

Piston valve – seat valve – bellows seal valve



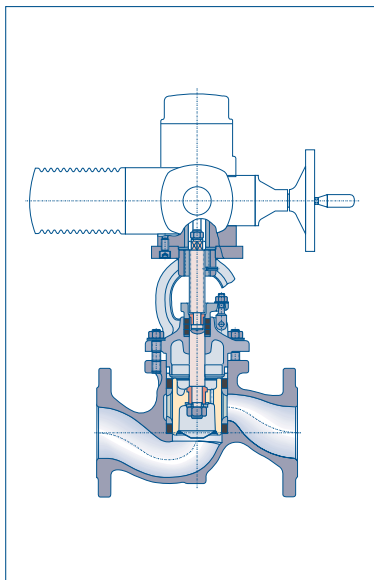


# Actuators for KVN

## Electro mechanical and pneumatic actuators

### Electro mechanical actuator

*Various designs at request*



### Pneumatic actuator

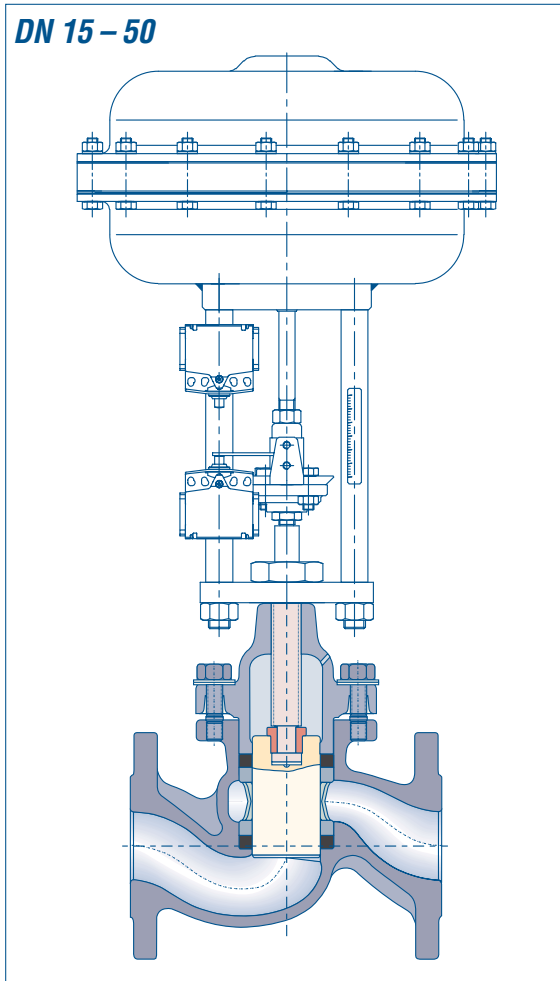
*The pneumatic actuator is single or double acting and offers an ON/OFF-function. It is often preferred in comparison to the electro mechanical actuator for many reasons.*

*The actuator closes the valve with spring force (security!) and opens it by air pressure. Safe control media are compressed air and nitrogen at a maximum of 6 bar. Compressed air supply: R 1/4, measurement, weight and valve lift at request.*

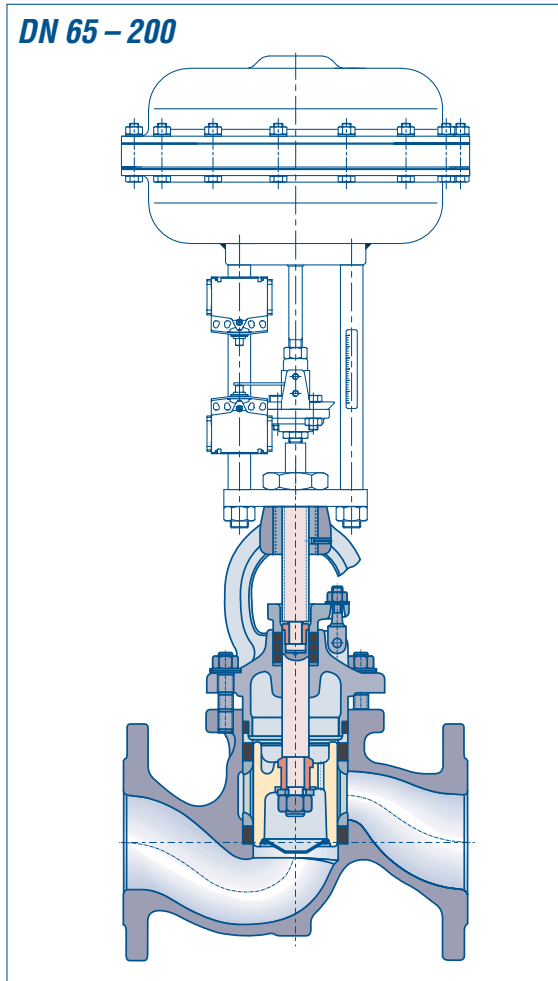
*Pneumatic actuators can be applied at ambient temperatures from  $-30^{\circ}\text{C}$  up to  $90^{\circ}\text{C}$ . The standard version includes a pneumatic diaphragm actuator, an end switch, a stroke scale and a mechanical valve lifting stop. Special design with emergency-hand switch is also available.*



### DN 15 – 50



### DN 65 – 200



# KLINGER piston valves

## Technical data

| Type                                           | DN      | PN | material             | connection | overall length | page |
|------------------------------------------------|---------|----|----------------------|------------|----------------|------|
| <b>KLINGER flanged-valves</b>                  |         |    |                      |            |                |      |
| KVN                                            | 15–50   | 16 | cast iron            | EN 1092-2  | EN 558-1 GR1   | 8    |
| KVN                                            | 65–150  | 16 | cast iron            | EN 1092-2  | EN 558-1 GR1   | 9    |
| KVN                                            | 65–200  | 16 | cast iron            | EN 1092-2  | EN 558-1 GR1   | 10   |
| KVN                                            | 65–200  | 16 | spheroidal cast iron | EN 1092-2  | EN 558-1 GR1   | 11   |
| KVN                                            | 15–50   | 40 | spheroidal cast iron | EN 1092-2  | EN 558-1 GR1   | 8    |
| KVN                                            | 15–50   | 40 | cast steel           | EN 1092-1  | EN 558-1 GR1   | 8    |
| KVN                                            | 15–50   | 40 | stainless steel      | EN 1092-1  | EN 558-1 GR1   | 8    |
| KVN                                            | 65–200  | 40 | cast steel           | EN 1092-1  | EN 558-1 GR1   | 11   |
| <b>KLINGER valves with female screwed ends</b> |         |    |                      |            |                |      |
| KVMN                                           | 1/2"–2" | 16 | cast iron            | ISO 228-1  | DIN 3202-M9    | 12   |
| KVMN                                           | 1/2"–2" | 63 | cast steel           | ISO 228-1  | DIN 3202-M9    | 12   |
| <b>KLINGER valves with weld ends</b>           |         |    |                      |            |                |      |
| KVSN                                           | 1/2"–2" | 63 | cast steel           | EN 12 760  | DIN 3202-M9    | 13   |
| KVSN                                           | 15–50   | 63 | cast steel           | EN 12 627  |                | 14   |
| Pressure/temperature-diagrams                  |         |    |                      |            |                | 15   |
| Connection dimensions                          |         |    |                      |            |                | 16   |
| Material code                                  |         |    |                      |            |                | 16   |
| Technical data                                 |         |    |                      |            |                | 17   |
| <b>Special design</b>                          |         |    |                      |            |                |      |
| Piston valve with heating jacket               |         |    |                      |            |                |      |
| KVN                                            | 15–200  |    |                      |            |                | 18   |
| Piston valve for Fire-safe application         |         |    |                      |            |                |      |
| KVN                                            | 15–200  |    |                      |            |                | 18   |
| Piston valve for TA-Luft and EPA application   |         |    |                      |            |                |      |
| KVN                                            | 15–200  |    |                      |            |                | 20   |
| Certifications                                 |         |    |                      |            |                | 20   |





# Piston valves KVN

Flange acc. to EN 1092-2 PN 16, flange acc. to EN 1092-1 PN 40  
Material: cast iron, spheroidal cast iron, cast steel, stainless steel  
valve ring KX-GT

## KVN 15–50

**PN 40**

DN 15–50

material code VI, VIII, Xc

**PN 16**

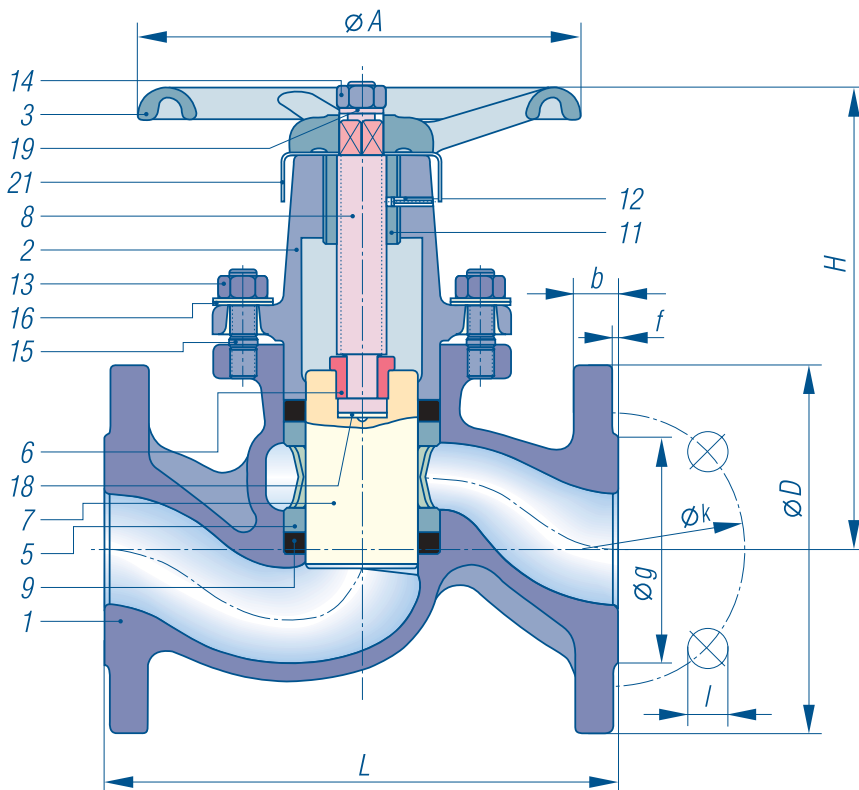
DN 15–50

material code III

**overall length**

**acc. to EN 558-1**

**Basic Series 1**



Pressure and temperatur  
limits see page 15

Material code and flange  
dimension see page 16

### Suggested order specification

#### Shut off valve PN 40, PN 16

designed as straight-through piston valve, sealed off by 2 flexible valve rings – body made of cast iron, spheroidal cast iron, cast steel or stainless steel. Handwheel made of cast iron, piston made of special Niro-steel, overall length to EN 558-1 GR1, flanges drilled to EN 1092-1 resp. EN1092-2. Make: KLINGER

Type: KVN VI KX for DN 15–50

### Ordering example:

**KVN 15-VIII KX, PN 40**

| Part name               | Material code |              |              |            |
|-------------------------|---------------|--------------|--------------|------------|
|                         | III           | VI           | VIII         | Xc         |
| 1 Body                  | EN-GJL-250    | EN-JS 1049   | 1.0619       | 1.4581     |
| 2 Bonnet                | EN-GJL-250    | 1.0619       | 1.0619       | 1.4581     |
| 3 Handwheel             | EN-GJL-200    | EN-GJL-200   | EN-GJL-200   | EN-GJL-200 |
| 5 Lantern bush          | Sint C10      | Sint C10     | Sint C10     | 1.4408     |
| 6 Split nut             | 1.0715 gal    | 1.0715 gal   | 1.0715 gal   | 1.4571     |
| 7 Piston                | 1.4104        | 1.4104       | 1.4104       | 1.4404     |
| 8 Spindle               | 1.4021        | 1.4021       | 1.4021       | 1.4404     |
| 9 Upper valve ring      | KX-GT         | KX-GT        | KX-GT        | KX-GT      |
| 11 Threaded bush 1)     | –             | Sint C11     | Sint C11     | 1.4401     |
| 12 Tension pin 1)       | –             | spring steel | spring steel | 1.4305     |
| 13 Bonnet nut           | 1.1181        | 1.1181       | 1.1181       | A4         |
| 14 Handwheel nut        | 1.1181        | 1.1181       | 1.1181       | A4         |
| 15 Stud bolt KVN15–25   | 1.1181        | 1.1181       | 1.1181       | A4         |
| 15 Stud bolt KVN32–50   | 1.7709        | 1.7709       | 1.7709       | A4         |
| 16 Belleville washer    | 50CrV4        | 50CrV4       | 50CrV4       | 1.4310     |
| 18 Disc                 | 1.4401        | 1.4401       | 1.4401       | 1.4401     |
| 19 Serrated lock washer | spring steel  | spring steel | spring steel | A2         |
| 21 Type plate           | Al            | Al           | Al           | Al         |

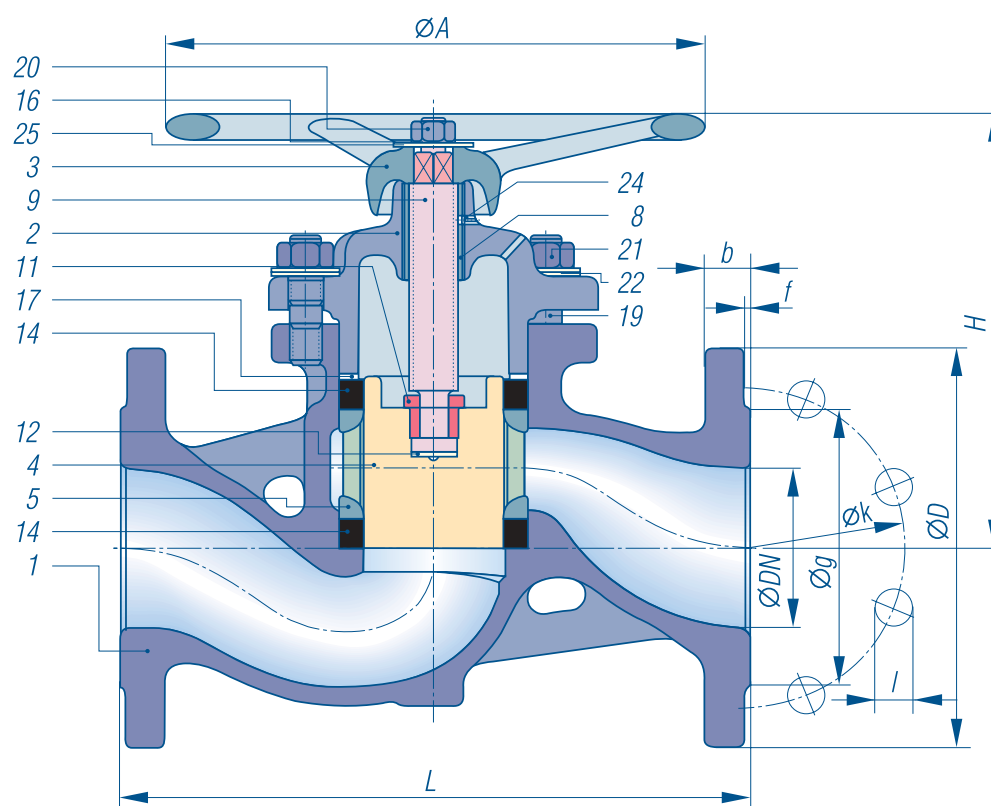
1) only DN 40 and DN 50

| Overall length in mm |     |     |     |     | approx. weight (kg)             |                       |
|----------------------|-----|-----|-----|-----|---------------------------------|-----------------------|
| DN                   | L   | H   | Hub | A   | m.c. III/PN 16<br>m.c. VI/PN 40 | PN 40<br>m.c. VIII/Xc |
| 15                   | 130 | 105 | 23  | 100 | 2,50                            | 2,70                  |
| 20                   | 150 | 120 | 28  | 120 | 4,15                            | 4,60                  |
| 25                   | 160 | 139 | 33  | 140 | 5,40                            | 5,90                  |
| 32                   | 180 | 156 | 37  | 160 | 8,50                            | 9,10                  |
| 40                   | 200 | 186 | 44  | 180 | 10,90                           | 11,40                 |
| 50                   | 230 | 211 | 51  | 200 | 14,20                           | 16,30                 |



# Piston valves KVN

Flange acc. to EN 1092-2 PN 16  
Material: cast iron; valve ring KX-GT



**KVN 65 – 150**

**PN 16**

material code III

**overall length  
acc. to EN 558-1  
Basic Series 1**

Pressure and temperatur  
limits see page 15

Material code and flange  
dimension see page 16

| Part name               | Material code III |
|-------------------------|-------------------|
| 1 Body                  | EN-GJL-250        |
| 2 Bonnet                | EN-GJL-250        |
| 3 Handwheel             | EN-GJL-200        |
| 4 Piston                | 1.4104            |
| 5 Lantern bush          | EN-GJL-200        |
| 8 Threaded bush         | Sint C11          |
| 9 Spindle               | 1.4021            |
| 11 Split nut            | 1.4401            |
| 12 Disc                 | 1.4401            |
| 14 Upper valve ring     | KX-GT             |
| 16 Serrated lock washer | spring steel      |
| 17 Washer               | St37 / mat nickel |
| 20 Handwheel nut        | 5                 |
| 21 Bonnet nut           | 5                 |
| 22 Belleville washer    | 50CrV4            |
| 24 Tension pin          | spring steel      |
| 25 Type plate           | Al                |

## Suggested order specification Shut off valves PN 16

Designed as a straight-through piston valve, sealed off by 2 flexible valve rings – body and handwheel made of grey cast iron, piston made of special Niro-steel, overall length to EN 558-1 GR1, flanges drilled to EN 1092-2.

Make: KLINGER

Type: KVN III KX for DN 65 – 150

## Ordering example: KVN 65-III KX, PN 16

| Overall length in mm |     |       |     |     | approx. weight (kg) |
|----------------------|-----|-------|-----|-----|---------------------|
| DN                   | L   | H     | Hub | A   | PN 16               |
| 65                   | 290 | 194,5 | 50  | 265 | 20,30               |
| 80                   | 310 | 219   | 58  | 265 | 27,60               |
| 100                  | 350 | 260   | 78  | 300 | 38,30               |
| 125                  | 400 | 303   | 86  | 400 | 55,00               |
| 150                  | 480 | 331   | 98  | 400 | 85,00               |



# Piston valves KVN

Flange acc. to EN 1092-2 PN, 16  
Material: cast iron; valve ring KX-GT

## KVN 65 – 200

PN 16

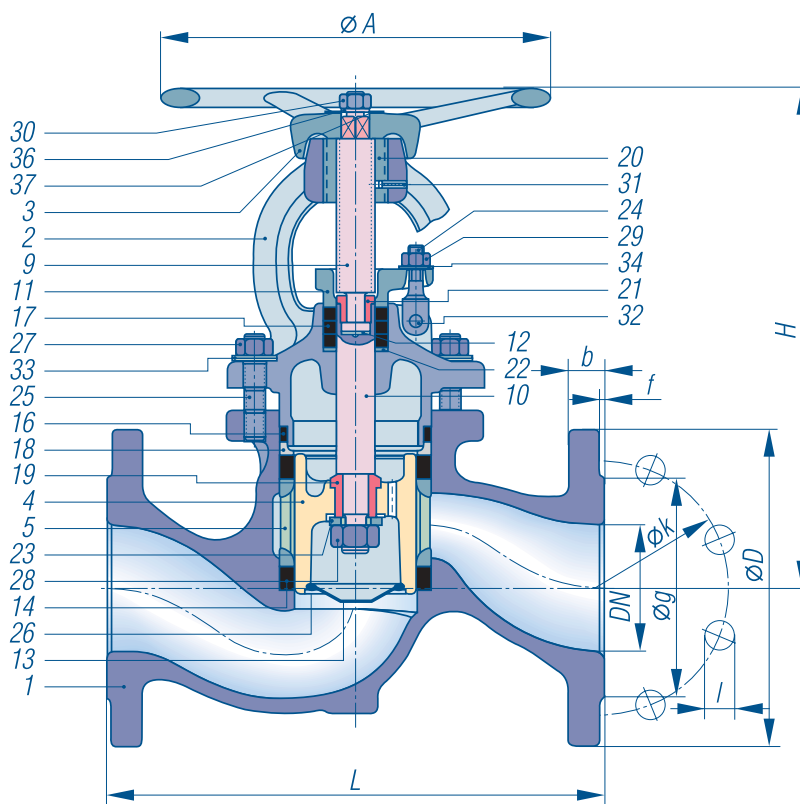
material code III/VIII

overall length

acc. to EN 558-1

Basic Series 1

pressure balanced



Pressure and temperatur  
limits see page 15

Material code and flange  
dimension see page 16

### Suggested order specification Shut-off valve PN 16

Designed as straight-through piston valve, backseat relieved, sealed off by 3 flexible valve rings, stuffing box self retightening by means of belleville washer. Body and handwheel made of cast iron, piston made of special niro-steel. Overall length acc. to EN 558-1 GR1, flange drilled acc. to EN 1092-2 Make: KLINGER

Type: KVN III/VIII KX for DN 65–200

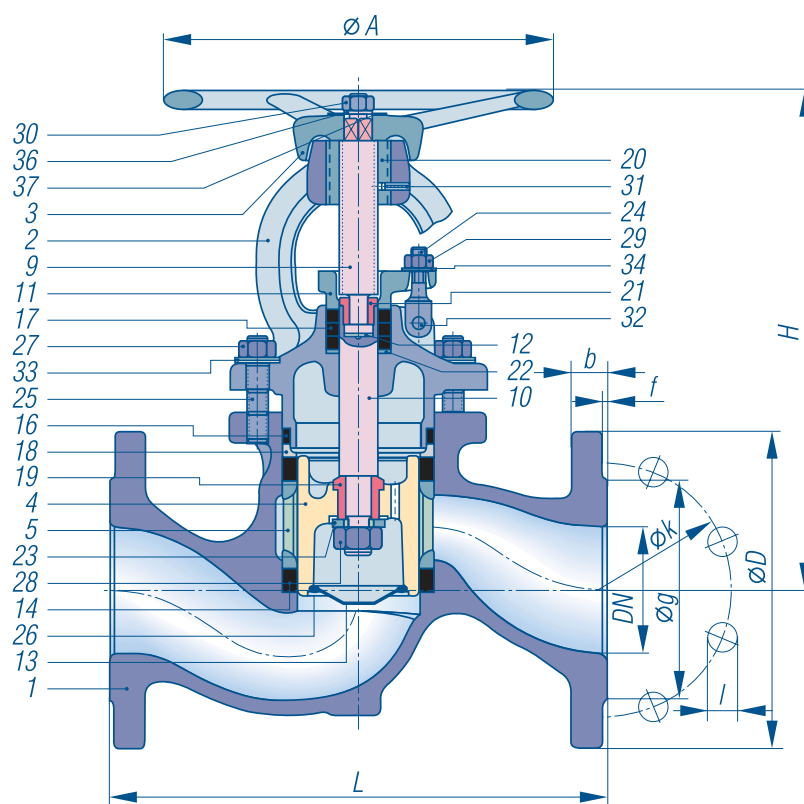
### Ordering example: KVN 65-III/VIII KX, PN 16

| PN 16                |     |     |     |     |                           |
|----------------------|-----|-----|-----|-----|---------------------------|
| Overall length in mm |     |     |     |     | approx.<br>weight<br>(kg) |
| DN                   | L   | H   | Hub | A   |                           |
| 65                   | 290 | 306 | 50  | 265 | 24,0                      |
| 80                   | 310 | 327 | 58  | 265 | 30,5                      |
| 100                  | 350 | 375 | 78  | 300 | 46,5                      |
| 125                  | 400 | 447 | 86  | 400 | 69,0                      |
| 150                  | 480 | 477 | 98  | 400 | 85,0                      |
| 200                  | 600 | 561 | 118 | 400 | 157,5                     |

| Part name               | Material code  |
|-------------------------|----------------|
| 1 Body                  | EN-GJL-250     |
| 2 Bonnet                | 1.0619         |
| 3 Handwheel             | EN-GJL-200     |
| 4 Piston                | 1.4086         |
| 5 Lantern bush          | EN-GJL-200     |
| 9 Spindle               | 1.4021         |
| 10 Piston shaft         | 1.4104         |
| 11 Gland retainer       | EN-JS 1030     |
| 12 Disc                 | 1.4401         |
| 13 Piston nose cone     | 1.4401         |
| 14 Upper valve ring     | KX-GT          |
| 16 OT-valve ring        | Graphit-L      |
| 17 Stuffingbox ring     | KX-GT          |
| 18 Thrust piece         | 1.0553         |
| 19 Back seat            | 1.4104         |
| 20 Threaded bush        | Sint C11 spec. |
| 21 Split nut            | 1.4401         |
| 22 Washer               | St 37 gal      |
| 23 Disc                 | 1.4401         |
| 24 Swing bolt           | 5.6            |
| 25 Stud bolt            | 1.7709         |
| 26 Securing ring        | 1.4310K        |
| 27 Bonnet nut           | 1.1181         |
| 28 Bonnet nut notched   | 5 black        |
| 29 Bonnet nut           | 1.1181         |
| 30 Bonnet nut           | 1.1181         |
| 31 Tension pin          | spring steel   |
| 32 Notched parallel pin | 6.8            |
| 33 Belleville washer    | 50CrV4         |
| 34 Belleville washer    | 50 CrV4        |
| 36 Serrated lock washer | spring steel   |
| 37 Type plate           | Al             |

# Piston valves KVN

Flange acc. to EN 1092-2, PN 16, spheroidal cast iron  
flange acc. to EN 1092-1 PN 40, cast steel; valve ring KX-GT



## KVN 65 – 200

### PN 40

DN 65–200

material code VIII

### PN 16

DN 65–200

material code VI/VIII

**overall length**

**acc. to EN 558-1**

**Basic Series 1**

**pressure balanced**

Pressure and temperatur  
limits see page 15

Material code and flange  
dimension see page 16

## Suggested order specification

### Shut-off valves PN 40, PN 16

Designed as straight-through piston valves, beackseat-relieved, sealed off by 3 flexible valve rings – stuffing box self retightening by means of belleville washer, body made of spheroidal cast iron or cast steel. Handwheel made of cast iron, piston made of special Niro-steel, overall length to EN 558-1 GR1, flanges drilled to EN1092-1 resp.

EN1092-2

Make: KLINGER

Type: KVN VIII KX for DN 65–200

## Ordering example:

**KVN 65-VIII KX, PN 40**

| Part name           | Material code    |                  |
|---------------------|------------------|------------------|
|                     | VI / PN 16       | VIII             |
| 1 Body              | EN-JS 1025       | 1.0619           |
| 2 Bonnet            | 1.0619           | 1.0619           |
| 3 Handwheel         | EN-GJL-200       | EN-GJL-200       |
| 4 Piston            | 1.4086           | 1.4086           |
| 5 Lantern bush      | EN-GJL-200       | EN-GJL-200       |
| 9 Spindle           | 1.4021           | 1.4021           |
| 10 Piston shaft     | 1.4104           | 1.4104           |
| 11 Gland retainer   | EN-JS 1030       | EN-JS 1030       |
| 12 Disc             | 1.4401           | 1.4401           |
| 13 Piston nose cone | 1.4401           | 1.4401           |
| 14 Upper valve ring | KX-GT            | KX-GT            |
| 16 OT-valve ring    | Graphit-L        | Graphit-L        |
| 17 Stuffingbox ring | KX-GT            | KX-GT            |
| 18 Thrust piece     | 1.0553           | 1.0553           |
| 19 Back seat        | 1.4104           | 1.4104           |
| 20 Threaded bush    | Sint C11 special | Sint C11 special |
| 21 Split nut        | 1.4401           | 1.4401           |
| 22 Washer           | St12.03          | St12.03          |

| Part name               | Material code |              |
|-------------------------|---------------|--------------|
|                         | VI / PN 16    | VIII         |
| 23 Disc                 | A4            | A4           |
| 24 Swing bolt           | 5.6           | 5.6          |
| 25 Stud bolt            | 1.7709        | 1.7709       |
| 26 Securing ring        | 1.4310K       | 1.4310K      |
| 27 Bonnet nut           | 1.1181        | 1.1181       |
| 28 Hexagon nut notched  | 5 black       | 5 black      |
| 29 Bonnet nut           | 1.1181        | 1.1181       |
| 30 Bonnet nut           | 1.1181        | 1.1181       |
| 31 Tension pin          | spring steel  | spring steel |
| 32 Notched parallel pin | 6.8           | 6.8          |
| 33 Belleville washer    | 50CrV4        | 50CrV4       |
| 34 Belleville washer    | 50 CrV4       | 50 CrV4      |
| 36 Serrated lock washer | spring steel  | spring steel |
| 37 Type plate           | Al            | Al           |

| PN 40                |     |     |     |     |                     |
|----------------------|-----|-----|-----|-----|---------------------|
| Overall length in mm |     |     |     |     | approx. weight (kg) |
| DN                   | L   | H   | Hub | A   |                     |
| 65                   | 290 | 306 | 49  | 250 | 25,0                |
| 80                   | 310 | 327 | 59  | 250 | 31,8                |
| 100                  | 350 | 375 | 63  | 280 | 47,8                |
| 125                  | 400 | 447 | 83  | 320 | 75,8                |
| 150                  | 480 | 477 | 93  | 360 | 107,5               |
| 200                  | 600 | 561 | 118 | 400 | 180,0               |

| PN 16                |     |     |     |     |                     |
|----------------------|-----|-----|-----|-----|---------------------|
| Overall length in mm |     |     |     |     | approx. weight (kg) |
| DN                   | L   | H   | Hub | A   |                     |
| 65                   | 290 | 306 | 50  | 265 | 20,3                |
| 80                   | 310 | 327 | 58  | 265 | 27,6                |
| 100                  | 350 | 375 | 78  | 300 | 38,3                |
| 125                  | 400 | 447 | 86  | 400 | 55,0                |
| 150                  | 480 | 477 | 98  | 400 | 85,0                |
| 200                  | 600 | 561 | 118 | 400 | 180,0               |



# Piston valves KVMN

Female screwed ends with pipe thread acc. to ISO 228-1  
Materials: cast iron, cast steel; valve ring KX-GT

## KVMN 1/2"–2"

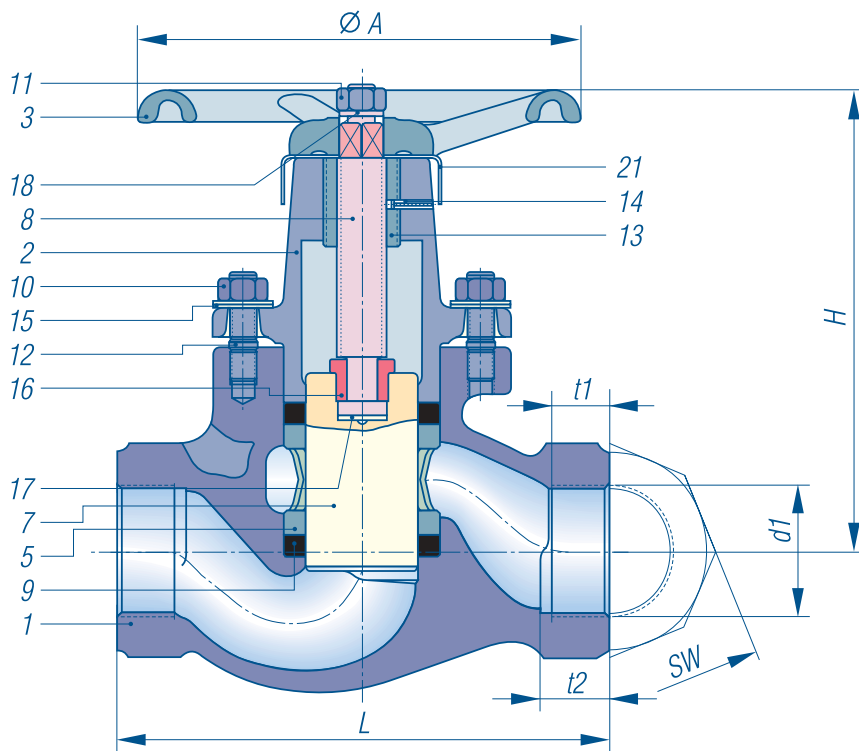
**PN 63**

DN 1/2"–2"  
material code VIII,

**PN 16**

DN 1/2"–2"  
material code III

**Overall length to  
DIN 3202-M9**



Pressure and temperatur  
limits see page 15

Material code and flange  
dimension see page 16

| Part name                      | Material code |              |
|--------------------------------|---------------|--------------|
|                                | III           | VIII         |
| 1 Body                         | EN-GJL-250    | 1.0619       |
| 2 Bonnet                       | EN-GJL-250    | 1.0619       |
| 3 Handwheel                    | EN-GJL-200    | EN-GJL-200   |
| 5 Lantern bush                 | Sint C10      | Sint C10     |
| 7 Piston                       | 1.4104        | 1.4104       |
| 8 Spindle                      | 1.4021        | 1.4021       |
| 9 Upper valve ring             | KX-GT         | KX-GT        |
| 10 Bonnet nut                  | 1.1181        | 1.1181       |
| 11 Handwheel nut               | 1.1181        | 1.1181       |
| 12 Stud bolt 1/2" – 1"         | 1.1181        | 1.1181       |
| Stud bolt 1 1/4" – 2"          | 1.7709        | 1.7709       |
| 13 Threaded bush <sup>1)</sup> | –             | Sint C11     |
| 14 Tension pin <sup>1)</sup>   | –             | spring steel |
| 15 Belleville washer           | 50CrV4        | 50CrV4       |
| 16 Split nut                   | 1.0715        | 1.0715       |
| 17 Disc                        | 1.4401        | 1.4401       |
| 18 Serrated lock washer        | spring steel  | spring steel |
| 21 Type plate                  | Al            | Al           |

1) only 1 1/2" and 2"

### Suggested order specification

#### Shut-off valve PN 63, PN 16

Designed as straight through piston valve, sealed-off by 2 flexible valve rings – body made of cast iron or cast steel. Handwheel made of cast iron, piston made of special Niro-steel. Overall length to DIN 3202-M9, bushes with pipe threads to ISO 228-1.

Make: KLINGER

Type: KVMN VIII KX for DN 1/2"–2"

### Ordering example:

**KVMN 1/2"-III KX, PN 16**

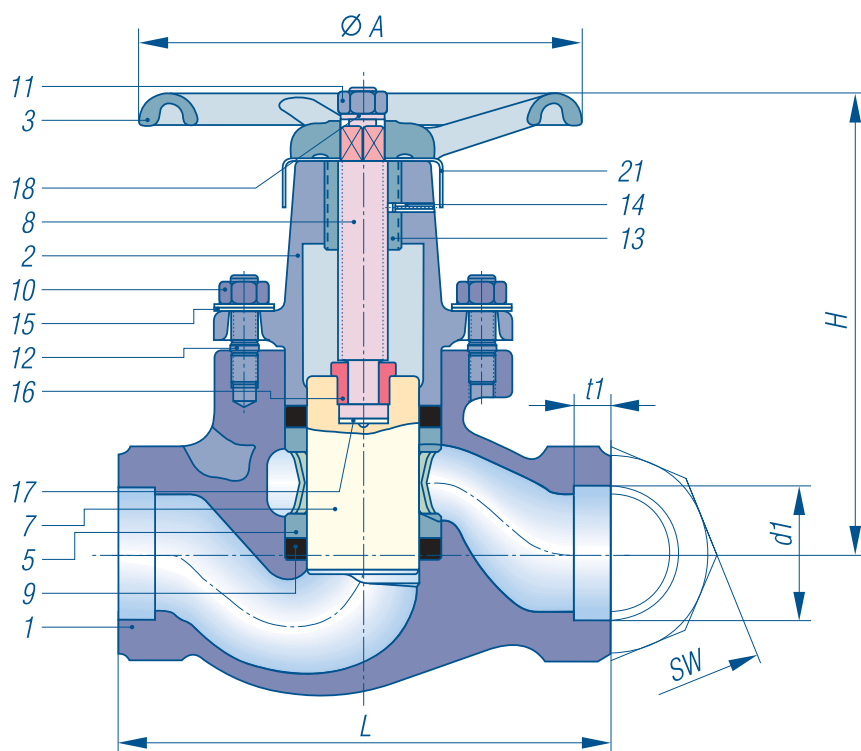
| Overall length in mm |     |     |     |     | approx. weight (kg) |       |
|----------------------|-----|-----|-----|-----|---------------------|-------|
| DN                   | L   | H   | Hub | A   | PN 16               | PN 63 |
| 1/2"                 | 100 | 105 | 23  | 100 | 1,40                | 1,50  |
| 3/4"                 | 120 | 120 | 28  | 120 | 2,35                | 2,45  |
| 1"                   | 135 | 138 | 33  | 140 | 3,50                | 3,60  |
| 1 1/4"               | 160 | 156 | 37  | 160 | 5,70                | 5,90  |
| 1 1/2"               | 185 | 186 | 44  | 180 | 8,10                | 8,50  |
| 2"                   | 220 | 211 | 51  | 200 | 11,00               | 11,50 |

| PN 16, PN 63 |                         |      |      |    |
|--------------|-------------------------|------|------|----|
| DN           | DIN Threaded connection |      |      |    |
|              | d1                      | t1   | t2   | SW |
| 1/2"         | R½                      | 15,5 | 19,5 | 36 |
| 3/4"         | R¾                      | 16,0 | 20,0 | 41 |
| 1"           | R1"                     | 17,0 | 22,0 | 50 |
| 1 1/4"       | R1 ¼                    | 19,0 | 25,0 | 65 |
| 1 1/2"       | R1 ½                    | 19,0 | 24,0 | 75 |
| 2"           | R2"                     | 26,0 | 31,0 | 90 |



# Piston valves KVSN

Socket weld ends acc. to EN 12760  
Material: cast steel; valve ring KX-GT



## KVSN 1/2"–2"

PN 63

DN 1/2"–2"

material code VIII

Overall length acc. to  
DIN 3202-M9

Pressure and temperatur  
limits see page 15

Material code and flange  
dimension see page 16

| DN     | Connection dimensions in mm |    |    |
|--------|-----------------------------|----|----|
|        | d1                          | t1 | SW |
| 1/2"   | 21,80                       | 10 | 36 |
| 3/4"   | 27,10                       | 13 | 41 |
| 1"     | 33,80                       | 13 | 50 |
| 1 1/4" | 42,60                       | 13 | 65 |
| 1 1/2" | 48,70                       | 13 | 75 |
| 2"     | 61,20                       | 16 | 90 |

| Part name                      | Material code VIII |
|--------------------------------|--------------------|
| 1 Body                         | 1.0619             |
| 2 Bonnet                       | 1.0619             |
| 3 Handwheel                    | EN-GJL-200         |
| 5 Lantern bush                 | Sint C10           |
| 7 Piston                       | 1.4104             |
| 8 Spindle                      | 1.4021             |
| 9 Upper valve ring             | KX-GT              |
| 10 Bonnet nut                  | 1.1181             |
| 11 Handwheel nut               | 1.1181             |
| 12 Stud bolt 1/2" – 1"         | 1.1181             |
| Stud bolt 1 1/4" – 2"          | 1.7709             |
| 13 Threaded bush <sup>1)</sup> | Sint C11           |
| 14 Tension pin <sup>1)</sup>   | spring steel       |
| 15 Belleville washer           | 50CrV4             |
| 16 Split nut                   | 1.0715             |
| 17 Disc                        | 1.4401             |
| 18 Serrated lock washer        | spring steel       |
| 21 Type plate                  | Al                 |

1) only 1 1/2" and 2"

### Suggested order specification Shut-off valve PN 63

Designed as straight-through piston valve, sealed-off by 2 flexible valve rings, body made of cast steel and handwheel made of cast iron, piston made of special Niro-steel, overall length to DIN 3202-M9.

Socket weld ends to EN 12760

Make: KLINGER

Type: KVSN VIII KX for DN 1/2"–2"

### Ordering example:

KVSN 1/2"-VIII KX, PN 63

## KVSN 1/2" – 2"

| Overall length in mm |     |     |     |     | weight |
|----------------------|-----|-----|-----|-----|--------|
| DN                   | L   | H   | Hub | A   | (kg)   |
| 1/2"                 | 100 | 105 | 23  | 100 | 1,50   |
| 3/4"                 | 120 | 120 | 28  | 120 | 2,45   |
| 1"                   | 135 | 138 | 33  | 140 | 3,60   |
| 1 1/4"               | 160 | 156 | 37  | 160 | 5,90   |
| 1 1/2"               | 185 | 186 | 44  | 180 | 8,50   |
| 2"                   | 220 | 211 | 51  | 200 | 11,50  |



# Piston valves KVSN

butt weld ends acc. to EN 12627  
Material: cast steel; valve ring KX-GT

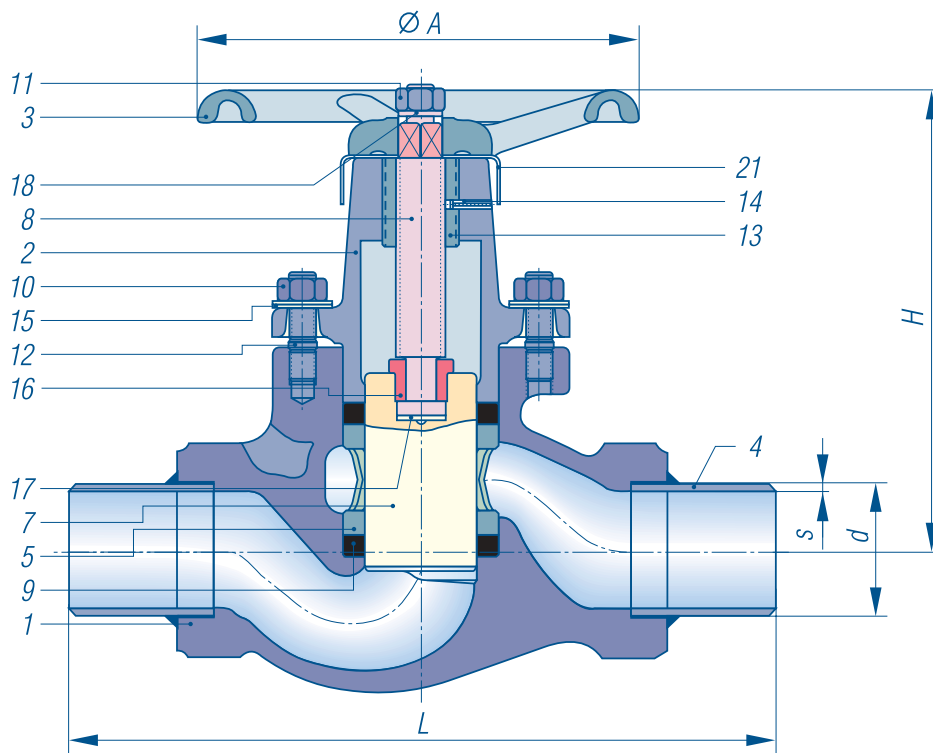
## KVSN 15 – 50

PN 63

DN 15–50

material code VIII

Overall length acc.  
to Klinger-standard



Pressure and temperatur  
limits see page 15

Material code and flange  
dimension see page 16

| Connection dimensions in mm |      |      |
|-----------------------------|------|------|
| DN                          | d    | s    |
| 15                          | 21,3 | 3,25 |
| 20                          | 26,9 | 3,25 |
| 25                          | 33,7 | 4,00 |
| 32                          | 42,4 | 4,00 |
| 40                          | 48,3 | 4,00 |
| 50                          | 60,3 | 4,50 |

| Part name                      | Material code VIII |
|--------------------------------|--------------------|
| 1 Body                         | 1.0619             |
| 2 Bonnet                       | 1.0619             |
| 3 Handwheel                    | EN-GJL-200         |
| 4 Pipe thread                  | 1.0345             |
| 5 Lantern bush                 | Sint C10           |
| 7 Piston                       | 1.4104             |
| 8 Spindle                      | 1.4021             |
| 9 Upper valve ring             | KX-GT              |
| 10 Bonnet nut                  | 1.1181             |
| 11 Handwheel nut               | 1.1181             |
| 12 Stud bolt 15–25             | 1.1181             |
| Stud bolt 32–50                | 1.7709             |
| 13 Threaded bush <sup>1)</sup> | Sint C11           |
| 14 Tension pin <sup>1)</sup>   | spring steel       |
| 15 Belleville washer           | 50CrV4             |
| 16 Split nut                   | 1.0715             |
| 17 Disc                        | 1.4401             |
| 18 Serrated lock washer        | spring steel       |
| 21 Type plate                  | Al                 |

<sup>1)</sup> only DN 40 and DN 50

### Suggested order specification Shut-off valves PN 63

Designed as a straight-through piston valve, sealed off by 2 flexible valve rings, body made of cast steel, handwheel made of cast iron, piston made of special Niro-steel, butt weld ends acc. to EN 12627

Make: KLINGER

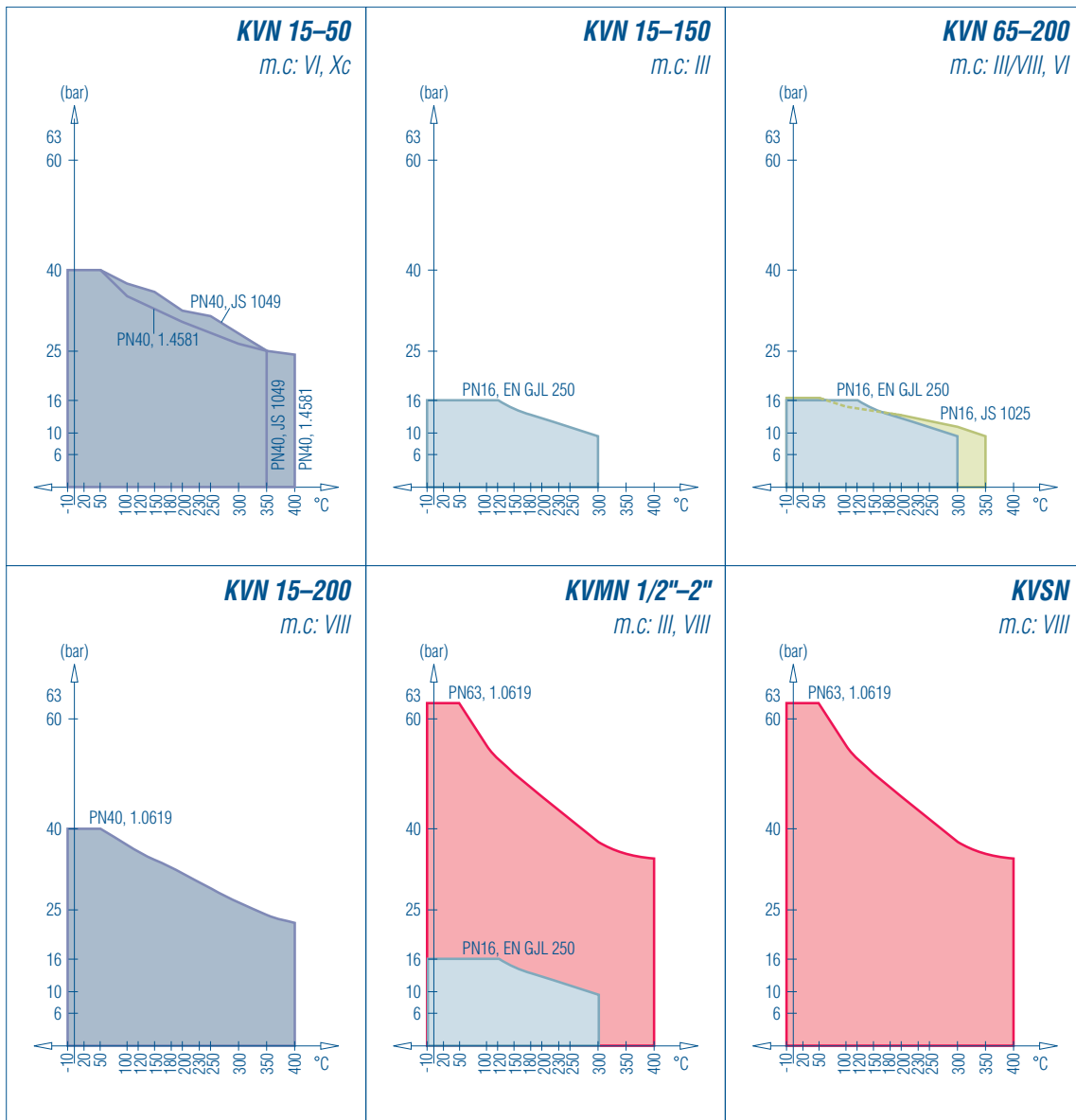
Type: KVSN VIII KX for DN 15–50

Ordering example:  
KVSN 15-VIII KX, PN 63

| Overall length in mm |     |     |     |     | approx. weight (kg) |
|----------------------|-----|-----|-----|-----|---------------------|
| DN                   | L   | H   | Hub | A   |                     |
| 15                   | 145 | 105 | 23  | 100 | 1,70                |
| 20                   | 170 | 120 | 28  | 120 | 2,55                |
| 25                   | 200 | 138 | 33  | 140 | 3,80                |
| 32                   | 230 | 156 | 37  | 160 | 6,20                |
| 40                   | 270 | 186 | 44  | 180 | 8,90                |
| 50                   | 320 | 211 | 51  | 200 | 12,20               |

# Pressure-/temperature diagrams

Economical consideration  
Application limitations



## Pressure-/temperature diagrams

This pressure-/temperature diagram helps you to choose the most economical of the KLINGER piston valves KVN.



# Technical data

## Connection dimensions in mm

| PN 16 cast iron, spheroidal cast iron |     |    |     |   |                 |    |     |
|---------------------------------------|-----|----|-----|---|-----------------|----|-----|
| DN                                    | D   | b  | g   | f | number of holes | l  | k   |
| 15                                    | 95  | 16 | 46  | 2 | 4               | 14 | 65  |
| 20                                    | 105 | 18 | 56  | 2 | 4               | 14 | 75  |
| 25                                    | 115 | 18 | 65  | 3 | 4               | 14 | 85  |
| 32                                    | 140 | 18 | 76  | 3 | 4               | 19 | 100 |
| 40                                    | 150 | 18 | 84  | 3 | 4               | 19 | 110 |
| 50                                    | 165 | 18 | 99  | 3 | 4               | 19 | 125 |
| 65                                    | 185 | 20 | 118 | 3 | 4               | 19 | 145 |
| 80                                    | 200 | 22 | 132 | 3 | 8               | 19 | 160 |
| 100                                   | 220 | 24 | 156 | 3 | 8               | 19 | 180 |
| 125                                   | 250 | 26 | 184 | 3 | 8               | 19 | 210 |
| 150                                   | 285 | 26 | 211 | 3 | 8               | 23 | 240 |
| 200                                   | 340 | 30 | 266 | 3 | 12              | 23 | 295 |

| PN 40 spheroidal cast iron |     |    |    |   |                 |    |     |
|----------------------------|-----|----|----|---|-----------------|----|-----|
| DN                         | D   | b  | g  | f | number of holes | l  | k   |
| 15                         | 95  | 16 | 46 | 2 | 4               | 14 | 65  |
| 20                         | 105 | 18 | 56 | 2 | 4               | 14 | 75  |
| 25                         | 115 | 18 | 65 | 3 | 4               | 14 | 85  |
| 32                         | 140 | 18 | 76 | 3 | 4               | 19 | 100 |
| 40                         | 150 | 19 | 84 | 3 | 4               | 19 | 110 |
| 50                         | 165 | 19 | 99 | 3 | 4               | 19 | 125 |

| PN 40 cast steel, stainless steel |     |    |     |   |                 |    |     |
|-----------------------------------|-----|----|-----|---|-----------------|----|-----|
| DN                                | D   | b  | g   | f | number of holes | l  | k   |
| 10                                | 90  | 16 | 40  | 2 | 4               | 14 | 60  |
| 15                                | 95  | 16 | 45  | 2 | 4               | 14 | 65  |
| 20                                | 105 | 18 | 58  | 2 | 4               | 14 | 75  |
| 25                                | 115 | 18 | 68  | 2 | 4               | 14 | 85  |
| 32                                | 140 | 18 | 78  | 2 | 4               | 18 | 100 |
| 40                                | 150 | 18 | 88  | 2 | 4               | 18 | 110 |
| 50                                | 165 | 20 | 102 | 2 | 4               | 18 | 125 |

| PN 40 cast steel |     |    |     |   |                 |    |     |
|------------------|-----|----|-----|---|-----------------|----|-----|
| DN               | D   | b  | g   | f | number of holes | l  | k   |
| 65               | 185 | 22 | 122 | 2 | 8               | 18 | 145 |
| 80               | 200 | 24 | 138 | 2 | 8               | 18 | 160 |
| 100              | 235 | 24 | 162 | 2 | 8               | 22 | 190 |
| 125              | 270 | 26 | 188 | 2 | 8               | 26 | 220 |
| 150              | 300 | 28 | 218 | 2 | 8               | 26 | 250 |
| 200              | 375 | 34 | 285 | 2 | 12              | 30 | 320 |

## Material code (m.c.)

| m.c. | Body                 | Bonnet               | internal parts             | colour of body                                          |
|------|----------------------|----------------------|----------------------------|---------------------------------------------------------|
| III  | cast iron            | cast iron            | without copper alloy parts | black phosphated (DN 15–50), grey vanished (DN 65–200)  |
| VI   | spheroidal cast iron | spheroidal cast iron | without copper alloy parts | black phosphated (DN 15–50), green vanished (DN 65–200) |
| VIII | cast steel           | cast steel           | without copper alloy parts | black phosphated (DN 15–50), blue vanished (DN 65–200)  |
| Xc   | stainless steel      | stainless steel      | stainless steel            | polished, pickled (DN 15–50),                           |

Primary criterion for the material code number is the basic material of the body and bonnet.

## Flow coefficient and zeta-values

| Type KVN |     |    |      |      |    |    |    |     |     |     |     |     |
|----------|-----|----|------|------|----|----|----|-----|-----|-----|-----|-----|
| DN       | 15  | 20 | 25   | 32   | 40 | 50 | 65 | 80  | 100 | 125 | 150 | 200 |
| $k_v$    | 4,5 | 8  | 12,5 | 20,5 | 32 | 50 | 69 | 104 | 163 | 233 | 335 | 582 |
| $\zeta$  | 4   | 4  | 4    | 4    | 4  | 4  | 6  | 6   | 6   | 7,2 | 7,2 | 7,2 |

$k_v$  = Flow coefficient ( $m^3/h$ )

$\zeta$  = Zeta-value

The values shown in the table have an accuracy of  $\pm 10\%$  and apply to water at a temperature of  $20^\circ C$  and a density of approx.  $1000 \text{ kg/m}^3$ .

Graphs and exact flow calculations for all KLINGER valves are available at request

# Technical data

## Application limitations with KX-GT

| Service category | Permissible working pressure (bar) at pressure rating |    |    |    |     | Lowest permissible working temperature in °C KVN KX |                      |                      |     |
|------------------|-------------------------------------------------------|----|----|----|-----|-----------------------------------------------------|----------------------|----------------------|-----|
|                  | 63                                                    | 40 | 25 | 16 | 10  | III                                                 | VI                   | VIII                 | Xc  |
| I                | 63                                                    |    |    |    |     |                                                     |                      |                      |     |
|                  |                                                       | 40 |    |    |     |                                                     |                      |                      |     |
|                  |                                                       |    | 25 |    |     |                                                     | -10                  | -10                  | -10 |
|                  |                                                       |    |    | 16 |     |                                                     |                      |                      |     |
|                  |                                                       |    |    |    | 10  | -10                                                 |                      |                      |     |
| II               | 48                                                    |    |    |    |     |                                                     |                      |                      |     |
|                  |                                                       | 30 |    |    |     |                                                     |                      |                      |     |
|                  |                                                       |    | 19 |    |     |                                                     | -60 <sup>2)</sup>    | -60 <sup>1) 2)</sup> | -60 |
|                  |                                                       |    |    | 12 |     |                                                     |                      |                      |     |
|                  |                                                       |    |    |    | 10  | -10                                                 |                      |                      |     |
| III              | 16                                                    |    |    |    |     |                                                     |                      |                      |     |
|                  |                                                       | 10 |    |    |     |                                                     |                      |                      |     |
|                  |                                                       |    | 6  |    |     |                                                     | -60 <sup>1) 2)</sup> | -60 <sup>1) 2)</sup> | -85 |
|                  |                                                       |    |    | 4  |     |                                                     |                      |                      |     |
|                  |                                                       |    |    |    | 2,5 | -10                                                 |                      |                      |     |

1) with A4 screws

2) with lantern made of stainless steel

## Belleville washers, stud bolts

| DN  | Body – Bonnet     |       |            |       | Bonnet – Gland retainer |       |            |       |
|-----|-------------------|-------|------------|-------|-------------------------|-------|------------|-------|
|     | belleville washer |       | stud bolts |       | belleville washer       |       | stud bolts |       |
|     | Dimension         | piece | Dimension  | piece | Dimension               | piece | Dimension  | piece |
| 15  | 20× 10,2× 1       | 4     | M 10× 30   | 2     |                         |       |            |       |
| 20  | 20× 10,2× 1       | 6     | M 10× 30   | 3     |                         |       |            |       |
| 25  | 20× 10,2× 1       | 8     | M 10× 30   | 4     |                         |       |            |       |
| 32  | 28× 12,2× 1,5     | 8     | M 12× 35   | 4     |                         |       |            |       |
| 40  | 28× 12,2× 1,5     | 8     | M 12× 35   | 4     |                         |       |            |       |
| 50  | 28× 12,2× 1,5     | 8     | M 12× 35   | 4     |                         |       |            |       |
| 65  | 31,5× 16,3× 1,25  | 8     | M 16× 55   | 4     | 20× 10,2× 1             | 4     | M 10× 50   | 2     |
| 80  | 31,5× 16,3× 1,25  | 12    | M 16× 55   | 6     | 20× 10,2× 1             | 4     | M 10× 50   | 2     |
| 100 | 31,5× 16,3× 1,25  | 16    | M 16× 60   | 8     | 20× 10,2× 1             | 4     | M 10× 50   | 2     |
| 125 | 40× 20,4× 2,25    | 12    | M 20× 70   | 6     | 20× 10,2× 1             | 4     | M 10× 50   | 2     |
| 150 | 40× 20,4× 2,25    | 16    | M 20× 70   | 8     | 20× 10,2× 1             | 4     | M 10× 50   | 2     |
| 200 | 50× 25,4× 2,5     | 16    | M 24× 75   | 8     | 20× 10,2× 1             | 4     | M 10× 50   | 2     |

## Dimensions of valve rings and stuffing box rings

| DN 15–50 m.c. III, VI, VIII, Xc |               |                  |                 |      |
|---------------------------------|---------------|------------------|-----------------|------|
| Type                            | item          | outside diameter | inside diameter | H    |
| KVN KX 15                       | 2 valve rings | 23,5             | 15              | 8.0  |
| KVN KX 20                       | 2 valve rings | 30               | 20              | 9.3  |
| KVN KX 25                       | 2 valve rings | 38               | 25              | 10.6 |
| KVN KX 32                       | 2 valve rings | 45               | 30              | 14.6 |
| KVN KX 40                       | 2 valve rings | 58               | 40              | 14.6 |
| KVN KX 50                       | 2 valve rings | 70               | 50              | 16.0 |

| DN 65–150 m.c. III |               |                  |                 |      |
|--------------------|---------------|------------------|-----------------|------|
| Type               | item          | outside diameter | inside diameter | H    |
| KVN KX 65          | 2 valve rings | 82               | 60              | 13.3 |
| KVN KX 80          | 2 valve rings | 94               | 70              | 14.6 |
| KVN KX 100         | 2 valve rings | 112              | 90              | 14.6 |
| KVN KX 125         | 2 valve rings | 135              | 110             | 16.0 |
| KVN KX 150         | 2 valve rings | 155              | 130             | 17.3 |

| DN 65–200 m.c. III/VIII, VI/VIII, VIII |                      |                  |                 |      |
|----------------------------------------|----------------------|------------------|-----------------|------|
| Type                                   | item                 | outside diameter | inside diameter | H    |
| KVN KX 65                              | 2 valve rings        | 82               | 60              | 13.3 |
|                                        | 1 bonnet valve ring  | 82               | 69              | 10.0 |
|                                        | 3 stuffing box rings | 36               | 24              | 8.0  |
| KVN KX 80                              | 2 valve rings        | 94               | 70              | 14.6 |
|                                        | 1 bonnet valve ring  | 94               | 80              | 10.0 |
|                                        | 3 stuffing box rings | 36               | 24              | 8.0  |
| KVN KX 100                             | 2 valve rings        | 112              | 90              | 14.6 |
|                                        | 1 bonnet valve ring  | 112              | 100             | 11.0 |
|                                        | 3 stuffing box rings | 46               | 30              | 10.0 |
| KVN KX 125                             | 2 valve rings        | 135              | 110             | 16.0 |
|                                        | 1 bonnet valve ring  | 135              | 121             | 13.0 |
|                                        | 3 stuffing box rings | 46               | 30              | 10.0 |
| KVN KX 150                             | 2 valve rings        | 155              | 130             | 17.3 |
|                                        | 1 bonnet valve ring  | 155              | 141             | 13.0 |
|                                        | 3 stuffing box rings | 46               | 30              | 10.0 |
| KVN KX 200                             | 2 valve rings        | 200              | 170             | 18.6 |
|                                        | 1 bonnet valve ring  | 200              | 184             | 15.0 |
|                                        | 3 stuffing box rings | 46               | 30              | 10.0 |





# Special designs

## KVN with heating jacket KVN Fire-safe

### **KVN with heating jacket**

All KLINGER piston valves KVN can be provided with heating jacket.

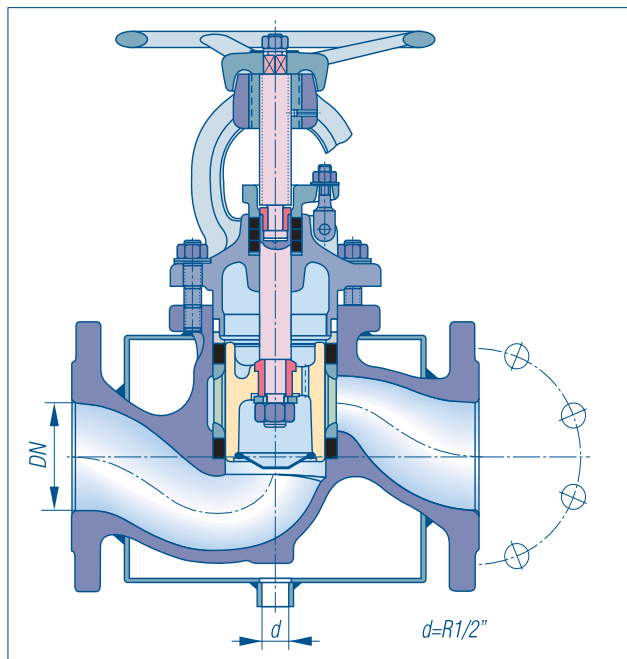
Overall- / connection dimensions and application range, see the appropriate product pages.

KLINGER piston valves with heating jacket are designed for the use with viscous media or media which solidify when cold.

The jacket is made of stainless steel 1.4541 and may be used with all heating fluids for which steel piping is suitable. Two heating connections and a drain connection are provided on the heating jacket. The max. heating fluid pressure is 6 bar. Since considerable condensation may be expected in the heating jacket when steamheating is used, it is advisable to connect a steam trap to the drain connection of the jacket.

Max. pressure of heating medium 6 bar.

**Pressure rating of the heating jacket: max. 6 bar**



### **KVN Fire-safe tested acc. to API 6FA**

The Fire-safe test was conducted by TÜV in Austria, acc. to API Standard 6FA and ISO 10497.

The Fire-safe-type KVN requires a special type of sealing elements across the port which the KVN is supplied with and can also be retrofitted without problems. This is the advantage of the KLINGER-modular systems.



### **KVN for tank vehicles**

KVN piston valves can be used at tankers transporting dangerous goods.

The valves are type approved acc. to GGVSE (ADR/RID TRT 002, TRT 006 and TRT 042 (technical guidelines tanks).

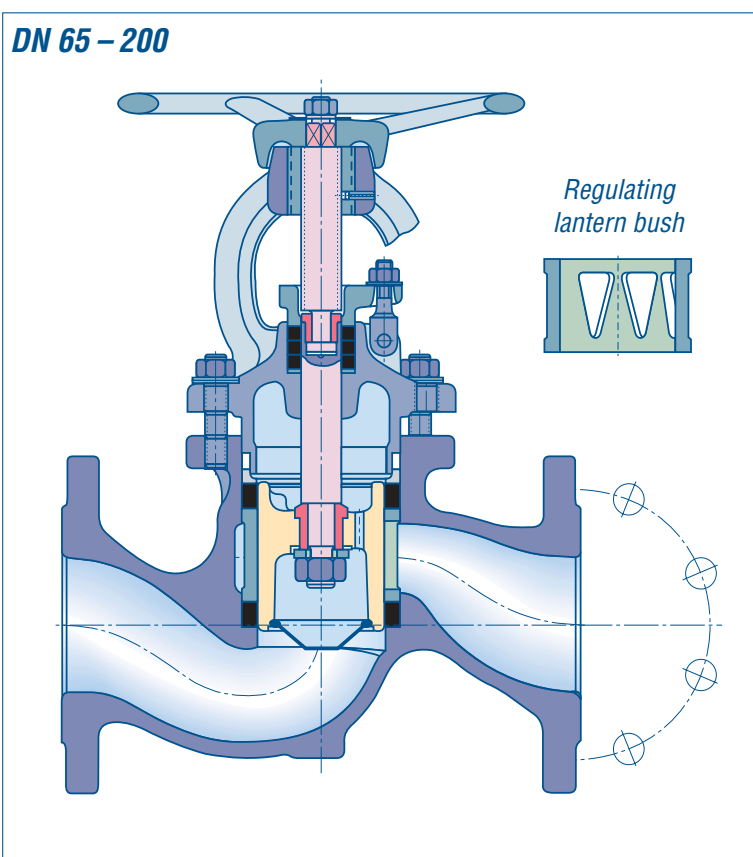
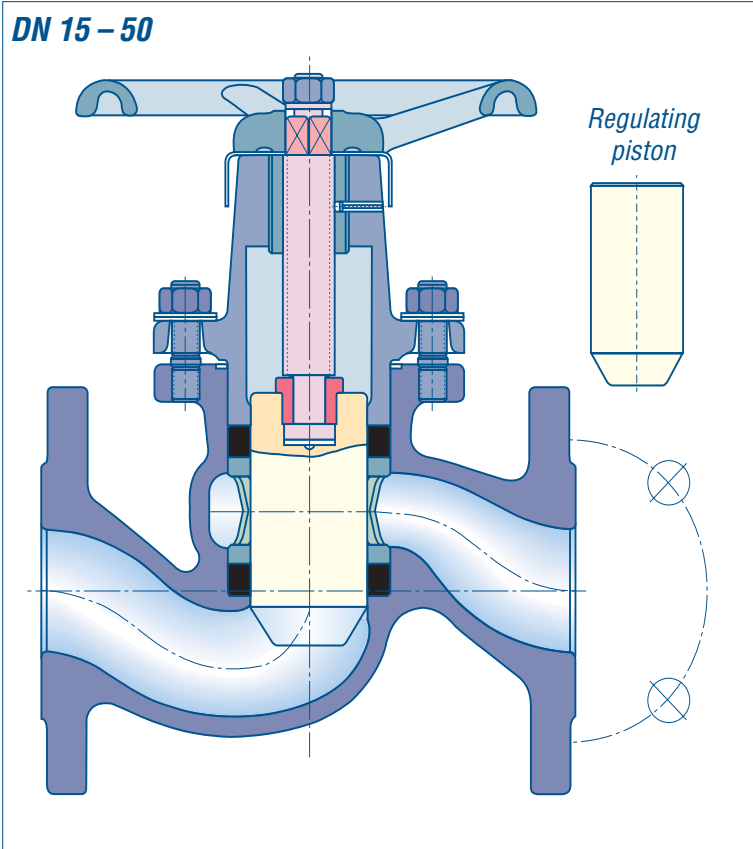
A special locking device for the handwheel is available. Special paintings as show on the picture on request!



# Regulation piston valves

## Regulation piston valves

Klinger piston valves are excellent suited for controlling applications. From size DN 15 up to 50 the regulation of flow is done with a regulating piston. A regulating lantern bush is used for regulation of piston valves with nominal diameter bigger than DN 65. Klinger regulation piston valves are designed for a linear regulation characteristics. The data sheet could be send on request.





# Special designs

## KVN KX1 for TA-Luft and EPA applications



### **KVN KX-1 fulfills the requirements of TA-Luft, EPA, VDI 2440 and the EN 15848 standard**

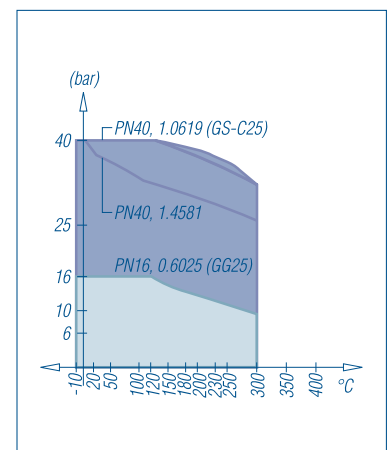
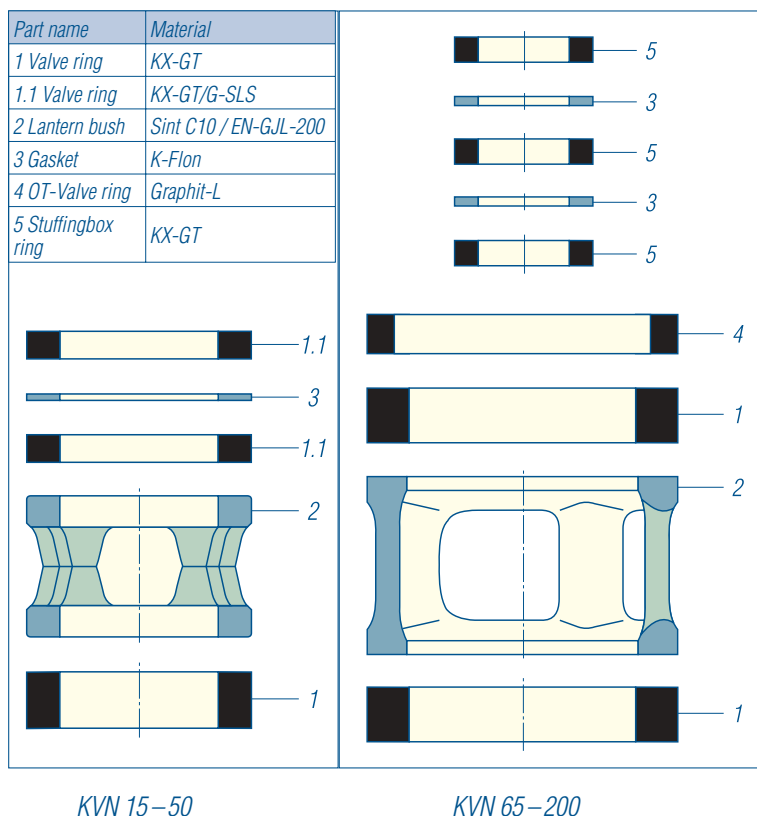
The standard KX-GT valve ring of this special design is equipped with additional Klingerflon gaskets. These additional rings are joined to the upper valve ring resp. the stuffing box. This system guarantees lowest leakage rates (2 ppm!) and meets both the TA-Luft and EPA-requirements, but also the newest requirements of VDI 2440 and EN 15848 (fugitiv emissions) better than conventional sealings.

All other parts of the valves are as in the standard design and the according specifications.

Media in the temperature range from  $-10^{\circ}\text{C}$  to  $+300^{\circ}\text{C}$  and pressures up to 63 bar can be reliably sealed with the KLINGER piston valve KVN with KX-1 sealing system.

All KLINGER piston valves already in service can easily be equipped with the KX-1 system without disassembly.

TA-Luft = Technische Anleitung Luft (technical guidelines air) Germany  
EPA = Environmental Protection Agency USA



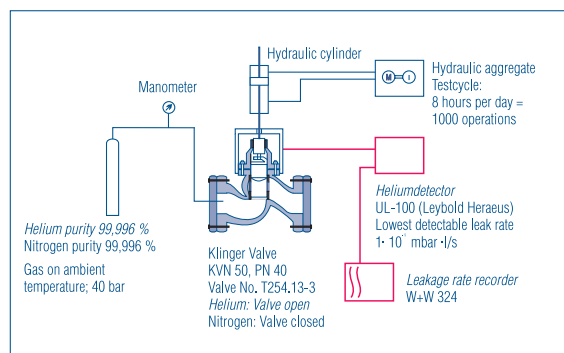
# KVN certification

## Manufacturer- and type approvals

| No. | Tests and approvals                                                       | Testing institute                  | Certificate resp. registration Nr. |
|-----|---------------------------------------------------------------------------|------------------------------------|------------------------------------|
| 1   | Quality system ISO 9001                                                   | TÜV CERT Austria                   | 20 100 0918                        |
| 2   | Manufacturer approval acc. to AD-Merkblatt HPO and TRB 801 No. 45         | TÜV Bayern                         | 21878                              |
| 3   | Welding approval acc. to DIN EN 729-2                                     | TÜV Süddeutschland                 | 21878                              |
| 4   | Welding approval acc. to OENORM EN 729-2                                  | TÜV Austria                        | PZ/00/S/091/HVK                    |
| 5   | Manufacturer approval for welding acc. to OENORM M 7812 Part name 1       | TÜV Austria                        | V 1225/Sei/85                      |
| 6   | Approval acc. to Pressure Equipment Directive 97/23/EG/DGVO 426/99        | TÜV Austria                        | Q02/00                             |
| 7   | Type approval for KVN 10-50 acc. to VdTÜV 1065                            | TÜV Bayern                         | TÜV.AR.086-96                      |
| 8   | Type approval for KVN 10-50 for tankers (RID/ADR+TRT)                     | TÜV Bayern                         | TÜ.AGG.252-95                      |
| 9   | Fire-safe-test KVN 2" Class 300 acc. to API 6F                            | Southwest Research Institute / USA | Test No. 6-298                     |
| 10  | Fire-safe-test KVN 50 PN 40 acc. to API 6F                                | TÜV Austria                        | V 371/MK/WR                        |
| 11  | Fire-safe-test KVN 100 PN 40 acc. to API 6F                               | TÜV Austria                        | V 1798/SEI/HA                      |
| 12  | Release for oxygen service for KVN 10-200                                 | BAM Berlin                         | Tgb.Nr. 6494/96 IV                 |
| 13  | TA-Luft-tests with KVN 50 PN 40 with KX-1/rings                           | TÜV Hessen                         | W 8000/2                           |
| 14  | TA-Luft-tests for KVN 100 PN 40 with KX-1/rings                           | TÜV Austria                        | WP 1430/GÖ/FUK                     |
| 15  | TA-Luft-tests for KVN 50 PN 40 with TFM 1600/rings                        | TÜV Austria                        | WP 919/MK/BE                       |
| 16  | EN ISO 15848-1 (VDI 2440) tests for KVN 25 PN 40 with KX1-SLS rings       | TÜV Austria                        | WP2337/MK/BE-E                     |
| 17  | Type approval for KVN DN 80 VIII for tank vehicles (RID TRT 022, TRT 006) | TÜV Berlin                         |                                    |



## Leakage rates



KVN KX1 50.000 cycle test



# Table of chemical resistance

All given **recommendations** are intended to help in selecting suitable materials and valve types. No guarantee can be given since performance and service life of the products depend on a series of factors on which the manufacturer has no influence. Special regulations must be observed. **Please contact us in case of doubt.** Solid media listed in the table are to be understood as aqueous solutions or suspensions.

EN-GJL250 cast iron to EN 1561

EN-JS 1025 spheroidal cast iron to EN 1563

1.0619 mild cast steel acc. to EN 10213

1.4581 stabilised chrome-nickel-molybdenum steel acc. to EN 10213

Sealing ring materials:

KX GT special sealing based on graphite

TFM-1600 special sealing PTFE-based

Explanation of symbols

for metallic materials:

0 = practically resistant, loss in weight less than 2,4 g/m<sup>2</sup>/day

1 = fairly resistant, loss in weight 2,4–24 g/m<sup>2</sup>/day

2 = low resistance, loss in weight 24–72 g/m<sup>2</sup>/day

3 = non-resistant, loss in weight more than 72 g/m<sup>2</sup>/day

– = not tested or not customary

for sealing materials:

• = suitable

– = not suitable

Abbreviations:

Bp. = boiling point

satd. sol. = saturated solution

hyd.sol. = hydrous solution

conc. = concentrated

| Fluid                               | Chemical formula                                                  | Concentration and temperature |     | Materials for seals |          | Metallic materials       |        |        | Material code     |
|-------------------------------------|-------------------------------------------------------------------|-------------------------------|-----|---------------------|----------|--------------------------|--------|--------|-------------------|
|                                     |                                                                   | %                             | °C  | KX-GT               | TFM-1600 | EN-JS 1049<br>EN-GJL 250 | 1.0619 | 1.4581 |                   |
| Aceton                              | CH <sub>3</sub> COCH <sub>3</sub>                                 |                               | 20  | •                   | •        | 0                        | 0      | 0      | all               |
| Acetylen                            | C <sub>2</sub> H <sub>2</sub>                                     |                               |     | •                   | •        | 0                        | 0      | 0      | III, VIII, X, Xc  |
| Air, dry                            |                                                                   |                               |     | •                   | •        | 0                        | 0      | 0      | all               |
| Alum                                | KAl(SO <sub>4</sub> ) <sub>2</sub>                                | 10                            | 20  | •                   | •        | –                        | –      | 0      | X, Xc             |
| Alum                                | KAl(SO <sub>4</sub> ) <sub>2</sub>                                | 10                            | 100 | •                   | •        | –                        | –      | 0      | X, Xc             |
| Aluminium acetate                   | (CH <sub>3</sub> COO) <sub>3</sub> Al                             |                               |     | •                   | •        | 3                        | 3      | 0      | X, Xc             |
| Aluminium chlorate                  | Al(ClO <sub>3</sub> ) <sub>3</sub>                                |                               |     | •                   | •        | –                        | –      | 0      | X, Xc             |
| Aluminium ethylate                  | Al(OC <sub>2</sub> H <sub>5</sub> ) <sub>2</sub>                  |                               |     | •                   | •        | 0                        | 0      | 0      | all               |
| Aluminium fluoride                  | AlF <sub>3</sub>                                                  |                               |     | •                   | •        | 0                        | 0      | 3      | III, VIII         |
| Aluminium oxyde                     | Al <sub>2</sub> O <sub>3</sub>                                    |                               |     | •                   | •        | 0                        | 0      | 0      | all               |
| Ammonium hydroxyde                  | NH <sub>4</sub> OH                                                | 10                            | 20  | •                   | •        | 0                        | 0      | 0      | III, VIII, X, Xc  |
| Ammonium hydroxyde                  | NH <sub>4</sub> OH                                                | 10                            | 100 | •                   | •        | 0                        | 0      | 0      | III, VIII, X, Xc  |
| Ammonium bicarbonate                | (NH <sub>4</sub> )HCO <sub>3</sub>                                |                               |     | •                   | •        | 0                        | 0      | 0      | III, VIII, X, Xc  |
| Ammonium carbonate                  | (NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub>                   |                               | Kp  | •                   | •        | 2                        | 2      | 0      | X, Xc             |
| Ammonium chloride                   | NH <sub>4</sub> Cl                                                | 5                             | 20  | •                   | •        | 1                        | 1      | 0      | all               |
| Ammonium chloride                   | NH <sub>4</sub> Cl                                                | 10                            | 20  | •                   | •        | 1                        | 1      | 0      | all               |
| Ammonium chloride                   | NH <sub>4</sub> Cl                                                | 10                            | 100 | •                   | •        | 3                        | 3      | 0      | X, Xc             |
| Ammonium chloride                   | NH <sub>4</sub> Cl                                                | 50                            | 20  | •                   | •        | 1                        | 1      | 0      | all <sup>1)</sup> |
| Ammonium diphosphate                | (NH <sub>4</sub> ) <sub>2</sub> HPO <sub>4</sub>                  |                               |     | •                   | •        | 1                        | 1      | 0      | III, VIII, X, Xc  |
| Ammonium nitrate                    | NH <sub>4</sub> NO <sub>3</sub>                                   |                               | 20  | •                   | •        | 2                        | 2      | 0      | X, Xc             |
| Ammonium sulphate                   | (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>                   |                               | 20  | •                   | •        | 3                        | 3      | 0      | X, Xc             |
| Aniline                             | C <sub>6</sub> H <sub>5</sub> NH <sub>2</sub>                     |                               |     | •                   | •        | 0                        | 0      | 0      | all               |
| Arsenic acid                        | H <sub>3</sub> AsO <sub>4</sub>                                   |                               |     | •                   | •        | 2                        | 2      | 0      | X, Xc             |
| Asphalt (tar)                       |                                                                   |                               |     | •                   | •        | –                        | –      | 0      | X, Xc             |
| Beer                                |                                                                   |                               |     | •                   | •        | 3                        | 3      | 0      | X, Xc             |
| Benzine                             |                                                                   |                               |     | •                   | •        | 0                        | 0      | 0      | all               |
| Benzene                             | C <sub>6</sub> H <sub>6</sub>                                     |                               |     | •                   | •        | 0                        | 0      | 0      | all               |
| Bleaching liquor (chloride of lime) |                                                                   |                               |     | •                   | •        | –                        | –      | 1      | X, Xc             |
| Borax                               | Na <sub>2</sub> B <sub>4</sub> O <sub>7</sub> 10 H <sub>2</sub> O |                               |     | •                   | •        | –                        | –      | 0      | X, Xc             |



| Fluid                               | Chemical formula                                             | Concentration and temperature |     | Materials for seals |          | Metallic materials      |        |        | Material code     |
|-------------------------------------|--------------------------------------------------------------|-------------------------------|-----|---------------------|----------|-------------------------|--------|--------|-------------------|
|                                     |                                                              | %                             | °C  | KY-GT               | TFM-1600 | EN-LS 1049<br>EN-GL 250 | 1.0619 | 1.4581 |                   |
| Boric acid                          | H <sub>3</sub> BO <sub>3</sub>                               | 4                             | 20  | •                   | •        | 2                       | 2      | 0      | X, Xc             |
| Boric acid                          | H <sub>3</sub> BO <sub>3</sub>                               | 4                             | 100 | •                   | •        | 2                       | 2      | 0      | X, Xc             |
| Boric acid                          | H <sub>3</sub> BO <sub>3</sub>                               | 100                           | 100 | •                   | •        | 2                       | 2      | 0      | X, Xc             |
| Butane                              | C <sub>4</sub> H <sub>10</sub>                               |                               |     | •                   | •        | 0                       | 0      | 0      | all               |
| Buttermilk                          |                                                              |                               | 20  | •                   | •        | —                       | —      | 0      | X, Xc             |
| Butyl acetate                       | CH <sub>3</sub> COOC <sub>4</sub> H <sub>9</sub>             |                               |     | •                   | •        | 0                       | 0      | 0      | all               |
| Butyl alcohol                       | C <sub>4</sub> H <sub>9</sub> OH                             |                               |     | •                   | •        | 0                       | 0      | 0      | all               |
| Calcium bisulphite                  | Ca(HS O <sub>3</sub> ) <sub>2</sub>                          |                               | 20  | —                   | •        | 2                       | 3      | 0      | X, Xc             |
| Calcium bisulphite                  | Ca(HS O <sub>3</sub> ) <sub>2</sub>                          |                               | 200 | •                   | •        | 2                       | 3      | 0      | X, Xc             |
| Calcium chloride                    | CaCl <sub>2</sub>                                            |                               | 20  | •                   | •        | 1                       | 1      | 0      | X, Xc             |
| Calcium chloride                    | CaCl <sub>2</sub>                                            |                               | 100 | •                   | •        | 2                       | 2      | 1      | X, Xc             |
| Calcium hydroxide (milk of lime)    | Ca(OH) <sub>2</sub>                                          |                               |     | •                   | •        | 0                       | 0      | 0      | all               |
| Calcium hypochlorite                | Ca(ClO) <sub>2</sub>                                         |                               |     | —                   | •        | 2                       | 2      | 1      | X, Xc             |
| Calcium sulphate                    | CaSO <sub>4</sub>                                            |                               |     | •                   | •        | 0                       | 0      | 0      | all               |
| Carbon dioxide, dry                 | CO <sub>2</sub>                                              | to                            | 150 | •                   | •        | 0                       | 0      | 0      | all               |
| Carbon dioxide, dry                 | CO <sub>2</sub>                                              |                               | 400 | •                   | •        | 0                       | 0      | 0      | VII, X, Xc        |
| Carbon disulphide                   | CS <sub>2</sub>                                              |                               | 20  | •                   | •        | 0                       | 0      | 0      | III, VIII, X, Xc  |
| Carbon tetrachloride                | CCl <sub>4</sub>                                             |                               |     | •                   | •        | 1                       | 1      | 0      | all               |
| Chlor sulphonic acid                | HOSO <sub>2</sub> Cl                                         |                               | Kp  | •                   | •        | 1                       | 1      | 3      | all               |
| Chloroform                          | CHCl <sub>3</sub>                                            |                               |     | •                   | •        | 0                       | 0      | 0      | all               |
| Chloroform                          | CHCl <sub>3</sub>                                            |                               | 20  | •                   | •        | 0                       | 0      | 0      | all               |
| Chromic acid                        | H <sub>2</sub> CroO <sub>4</sub>                             | 10                            | 20  | •                   | •        | 1                       | 0      | 0      | III, VIII, X, Xc  |
| Chromic acid                        | H <sub>2</sub> CroO <sub>4</sub>                             | 10                            | Kp  | •                   | •        | —                       | —      | 0      | X, Xc             |
| Chromic acid                        | H <sub>2</sub> CroO <sub>4</sub>                             | 50                            | 20  | •                   | •        | 0                       | 0      | 0      | III, VIII, X, Xc  |
| Citric acid                         | (CH <sub>2</sub> COOH) <sub>2</sub> C<br>(OH)COOH            |                               | 20  | •                   | •        | 3                       | 3      | 0      | X, Xc             |
| Citric acid                         | CH <sub>2</sub> COOH) <sub>2</sub> C<br>(OH)COOH             |                               | Kp  | •                   | •        | 3                       | 3      | 0      | X, Xc             |
| Clophen T 64                        |                                                              |                               |     | •                   | •        | 0                       | 0      | 0      | all               |
| Copper acetate wat. sol.            | (CH <sub>3</sub> COO) <sub>2</sub> Cu                        |                               | 20  | •                   | •        | 0                       | 0      | 0      | all               |
| Copper acetate wat. sol.            | (CH <sub>3</sub> COO) <sub>2</sub> Cu                        |                               | Kp  | •                   | •        | 2                       | 2      | 0      | X, Xc             |
| Copper sulphate                     | CuSO <sub>4</sub>                                            |                               | 20  | •                   | •        | 3                       | 2      | 0      | X, Xc             |
| Copper sulphate                     | CuSO <sub>4</sub>                                            |                               | Kp  | •                   | •        | 3                       | 2      | 0      | X, Xc             |
| Diazotation bath, (weakly acid)     |                                                              |                               | 20  | •                   | •        | 2                       | 2      | 1      | X, Xc             |
| Diazotation bath, (weakly acid)     |                                                              |                               | 80  | •                   | •        | 2                       | 2      | 1      | X, Xc             |
| Diesel oil                          |                                                              |                               | 20  | •                   | •        | 0                       | 0      | 0      | all               |
| Diphyl                              |                                                              |                               |     | •                   | •        | 0                       | 0      | 0      | all <sup>3)</sup> |
| Dowtherm A                          |                                                              |                               |     | •                   | •        | 0                       | 0      | 0      | all <sup>3)</sup> |
| Dye liquor, alkaline or neutral     |                                                              |                               | 20  | •                   | •        | —                       | —      | 0      | X, Xc             |
| Dye liquor, alkaline or neutral     |                                                              |                               | Kp  | •                   | •        | —                       | —      | 0      | X, Xc             |
| Dye liquor, organic acid            |                                                              |                               | 20  | •                   | •        | —                       | —      | 0      | X, Xc             |
| Dye liquor, organic acid            |                                                              |                               | Kp  | •                   | •        | —                       | —      | 0      | X, Xc             |
| Dye liquor, strongly sulphuric acid | H <sub>2</sub> SO <sub>4</sub> above<br>0,3%                 |                               | 20  | •                   | •        | —                       | —      | 0      | X, Xc             |
| Dye liquor, strongly sulphuric acid | H <sub>2</sub> SO <sub>4</sub> above<br>0,3%                 |                               | Kp  | •                   | •        | —                       | —      | 1      | X, Xc             |
| Dye liquor, weakly sulphuric acid   | H <sub>2</sub> SO <sub>4</sub> under<br>0,3%                 |                               | Kp  | •                   | •        | —                       | —      | 0      | X, Xc             |
| Ethane                              | C <sub>2</sub> H <sub>6</sub>                                |                               |     | •                   | •        | 0                       | 0      | 0      | all               |
| Ethanol                             | C <sub>2</sub> H <sub>5</sub> OH                             |                               |     | •                   | •        | 0                       | 0      | 0      | all               |
| Ethyl acetate                       | CH <sub>3</sub> COOC <sub>2</sub> H <sub>5</sub>             |                               | Kp  | •                   | •        | 0                       | 0      | 0      | all               |
| Ethyl ether                         | C <sub>2</sub> H <sub>5</sub> OC <sub>2</sub> H <sub>5</sub> |                               |     | —                   | •        | 1                       | 1      | 0      | all               |



| Fluid                           | Chemical formula  | Concentration and temperature |     | Materials for seals |          | Metallic materials       |                 |        | Material code       |
|---------------------------------|-------------------|-------------------------------|-----|---------------------|----------|--------------------------|-----------------|--------|---------------------|
|                                 |                   | %                             | °C  | KX-GT               | TFM-1600 | EN-1S 1049<br>EN-GIL 250 | 1.0619          | 1.4581 |                     |
| Ethylen chloride (Dichlorethan) | $(CH_2Cl)_2$      | 20                            |     | •                   | •        | 0                        | 0               | 0      | all                 |
| Ethylene                        | $C_2H_4$          |                               |     | —                   | •        | 0                        | 0               | 0      | all <sup>1)</sup>   |
| Fatty acids from $C_6$          |                   |                               |     | •                   | •        | 1                        | 1               | 0      | all                 |
| Formaldehyde                    | HCHO              | 40                            | 20  | •                   | •        | 3                        | 3               | 0      | X, Xc               |
| Formaldehyde                    | HCHO              | 40                            | Kp  | •                   | •        | 3                        | 3               | 0      | X, Xc               |
| Formic acid                     | HCOOH             | 10                            | 20  | •                   | •        | 3                        | 3               | 0      | X, Xc               |
| Formic acid                     | HCOOH             | 10                            | 100 | •                   | •        | 3                        | 3               | 1      | X, Xc               |
| Formic acid                     | HCOOH             | 100                           | 20  | •                   | •        | 3                        | 3               | 0      | X, Xc               |
| Formic acid                     | HCOOH             | 100                           | 100 | •                   | •        | 3                        | 3               | 1      | X, Xc               |
| Freon                           |                   |                               |     | •                   | •        | 0                        | 0               | 0      | all                 |
| Glacial acetic acid             | $CH_3COOH$        |                               | 20  | •                   | •        | 2                        | 2               | 0      | X, Xc               |
| Glacial acetic acid             | $CH_3COOH$        | 10                            | 20  | •                   | •        | 2                        | 2               | 0      | X, Xc               |
| Glacial acetic acid             | $CH_3COOH$        | 10                            | Kp  | •                   | •        | 2                        | 2               | 0      | X, Xc               |
| Glacial acetic acid             | $CH_3COOH$        | 50                            | 20  | •                   | •        | 3                        | 2               | 0      | X, Xc               |
| Glacial acetic acid             | $CH_3COOH$        | 50                            | Kp  | •                   | •        | 3                        | 2               | 1      | X, Xc               |
| Glacial acetic acid             | $CH_3COOH$        | 80                            | 20  | •                   | •        | 3                        | 2               | 1      | X, Xc               |
| Glacial acetic acid             | $CH_3COOH$        | 80                            | Kp  | •                   | •        | 3                        | 2               | 1      | X, Xc               |
| Glycerine                       | $(CH_2OH)_2CHOH$  |                               | 20  | •                   | •        | 2                        | 2               | 0      | X, Xc               |
| Glycerine                       | $(CH_2OH)_2CHOH$  |                               | 100 | •                   | •        | 2                        | 2               | 0      | X, Xc               |
| Grape vinegar                   |                   |                               | 20  | •                   | •        | —                        | —               | 0      | X, Xc               |
| Heat transfer oils              |                   |                               |     | •                   | •        | 0                        | 0               | 0      | all <sup>3)</sup>   |
| Hydrochloric acid               | HCl               | 0,2                           | 20  | •                   | •        | 3                        | 3               | 0      | X, Xc               |
| Hydrochloric acid               | HCl               | 0,2                           | 50  | •                   | •        | 3                        | 3               | 1      | X, Xc               |
| Hydrochloric acid               | HCl               | 1                             | 20  | •                   | •        | 3                        | 3               | 1      | X, Xc               |
| Hydrochloric acid, dry          | HCl               |                               | 20  | •                   | •        | 1                        | 1               | 1      | all                 |
| Hydrochloric acid, dry          | HCl               |                               | 100 | •                   | •        | 1                        | 1               | 2      | all                 |
| Hydrogen                        | $H_2$             |                               |     | •                   | •        | 0                        | 0               | 0      | all <sup>4)</sup>   |
| Hydrogen peroxide               | $H_2O_2$          |                               | 20  | •                   | •        | 3                        | 3               | 0      | X, Xc               |
| Hydrogen peroxide               | $H_2O_2$          |                               | 50  | —                   | •        | 3                        | 3               | 0      | X, Xc               |
| Hydrogen sulphide, gas, dry     | $H_2S$            |                               | 20  | •                   | •        | —                        | —               | 0      | X, Xc               |
| Hydrogen sulphide, gas, wet     | $H_2S$            |                               | 20  | •                   | •        | —                        | —               | 0      | X, Xc <sup>1)</sup> |
| Hydroxylamine sulphate          | $(NH_2OH)H_2SO_4$ | 10                            | 20  | •                   | •        | —                        | —               | 0      | X, Xc               |
| Hydroxylamine sulphate          | $(NH_2OH)H_2SO_4$ | 10                            | Kp  | •                   | •        | —                        | —               | 0      | X, Xc               |
| Illuminating gas                |                   |                               |     | •                   | •        | 0                        | 0               | 0      | all                 |
| Kreosote                        |                   |                               | 20  | —                   | •        | —                        | —               | 0      | X, Xc               |
| Kreosote                        |                   |                               | Kp  | —                   | •        | —                        | —               | 0      | X, Xc               |
| Lead acetate (lead sugar)       | $Pb(CH_3COO)_2$   | 100                           | Kp  | •                   | •        | 3                        | 3               | 2      | X, Xc               |
| Lead arsenate                   | $Pb(AsO_4)_2$     |                               |     | •                   | •        | —                        | —               | 0      | X, Xc               |
| Linseed oil                     |                   |                               | 20  | •                   | •        | —                        | —               | 0      | X, Xc               |
| Linseed oil                     |                   |                               | 100 | •                   | •        | —                        | —               | 0      | X, Xc               |
| M. E. K (Butanone)              | $CH_3COC_2H_5$    |                               | Kp  | •                   | •        | 1                        | 1               | 0      | all                 |
| Manganous chloride              | $MnCl_2$          |                               | 20  | •                   | •        | 2                        | 2               | 0      | X, Xc               |
| Manganous chloride              | $MnCl_2$          |                               | Kp  | •                   | •        | 2                        | 2               | 0      | X, Xc               |
| Magnesium sulphate              | $MgSO_4$          |                               | 20  | •                   | •        | 1                        | 1               | 0      | all                 |
| Magnesium sulphate              | $MgSO_4$          |                               | Kp  | •                   | •        | 1                        | 1               | 0      | all                 |
| Mercury                         | Hg                |                               | 20  | •                   | •        | 1                        | 1               | 0      | III, VIII, X, Xc    |
| Mercury (II) chloride           | $HgCl_2$          |                               | 20  | •                   | •        | 3                        | 3               | 0      | X, Xc               |
| Mercury (II) nitrate            | $Hg(NO_3)_2$      |                               | 20  | •                   | •        | 3                        | 3               | 0      | X, Xc               |
| Methyl alcohol                  | $CH_3OH$          |                               | 20  | •                   | •        | 0 <sup>2)</sup>          | 0 <sup>2)</sup> | 0      | all                 |
| Methyl alcohol                  | $CH_3OH$          |                               | Kp  | •                   | •        | 0 <sup>2)</sup>          | 0 <sup>2)</sup> | 0      | all                 |
| Methylene chloride              | $CH_2Cl_2$        |                               | 20  | •                   | •        | 1                        | 1               | 0      | Xc                  |
| Methylene chloride              | $CH_2Cl_2$        |                               | Kp  | •                   | •        | 1                        | 1               | 0      | Xc                  |
| Milk                            |                   |                               |     | •                   | •        | 2                        | 2               | 0      | X, Xc               |

| Fluid                                                          | Chemical formula                                       | Concentration and temperature |    | Materials for seals |          | Metallic materials       |        |        | Material code    |
|----------------------------------------------------------------|--------------------------------------------------------|-------------------------------|----|---------------------|----------|--------------------------|--------|--------|------------------|
|                                                                |                                                        | %                             | °C | KY-GT               | TFM-1600 | EN-ISO 1049<br>EN-GL 250 | 1.0619 | 1.4581 |                  |
| Milk of lime                                                   | $\text{Ca}(\text{OH})_2$                               |                               | 20 | •                   | •        | 0                        | 0      | 0      | all              |
| Milk of lime                                                   | $\text{Ca}(\text{OH})_2$                               |                               | Kp | •                   | •        | 0                        | 0      | 0      | all              |
| Sodium acetate                                                 | $\text{CH}_3\text{COONa}$                              | 20                            | 20 | •                   | •        | 1                        | 1      | 0      | all              |
| Natural gas                                                    |                                                        |                               |    | •                   | •        | 1                        | 0      | 0      | all              |
| Nitric acid                                                    | $\text{HNO}_3$                                         | 10                            | 20 | •                   | •        | 3                        | 3      | 0      | X, Xc            |
| Nitric acid                                                    | $\text{HNO}_3$                                         | 10                            | Kp | •                   | •        | 3                        | 3      | 0      | X, Xc            |
| Nitric acid                                                    | $\text{HNO}_3$                                         | 40                            | 20 | •                   | •        | 3                        | 3      | 0      | X, Xc            |
| Nitric acid                                                    | $\text{HNO}_3$                                         | 40                            | Kp | •                   | •        | 3                        | 3      | 0      | X, Xc            |
| Nitric acid                                                    | $\text{HNO}_3$                                         | konz.                         | 20 | —                   | •        | 3                        | 3      | 0      | X, Xc            |
| Nitric acid                                                    | $\text{HNO}_3$                                         | konz.                         | Kp | —                   | •        | 3                        | 2      | 1      | X, Xc            |
| Nitrogen                                                       | $\text{N}_2$                                           |                               |    | •                   | •        | 0                        | 0      | 0      | all              |
| Oils (lubricating oils, mineral)                               |                                                        |                               | 20 | •                   | •        | 0                        | 0      | 0      | all              |
| Oils (vegetable)                                               |                                                        |                               | 20 | •                   | •        | 0                        | 0      | 0      | all              |
| Oleic acid                                                     | $\text{C}_{17}\text{H}_{33}\text{COOH}$                |                               |    | —                   | •        | 0                        | 0      | 0      | all              |
| Oxalic acid                                                    | $\text{COOHCOOH}$                                      |                               |    | —                   | •        | 2                        | 2      | 0      | X, Xc            |
| Oxygen                                                         | $\text{O}_2$                                           |                               | 20 | •                   | •        | 0                        | 0      | 0      | all              |
| Pentyl acetate                                                 | $\text{CH}_3\text{COOC}_5\text{H}_{11}$                |                               |    | •                   | •        | 0                        | 0      | 0      | all              |
| Petroleum ether                                                |                                                        |                               | 20 | •                   | •        | 0                        | 0      | 0      | all              |
| Phenol                                                         | $\text{C}_6\text{H}_5\text{OH}$                        |                               |    | •                   | •        | 2                        | 2      | 0      | X, Xc            |
| Phosphoric acid                                                | $\text{H}_3\text{PO}_4$                                | 10                            | 20 | •                   | •        | 2                        | 2      | 0      | X, Xc            |
| Phosphoric acid                                                | $\text{H}_3\text{PO}_4$                                | 10                            | Kp | •                   | •        | 3                        | 3      | 0      | X, Xc            |
| Phosphoric acid                                                | $\text{H}_3\text{PO}_4$                                | 50                            | 20 | •                   | •        | 2                        | 2      | 0      | X, Xc            |
| Phosphoric acid                                                | $\text{H}_3\text{PO}_4$                                | 50                            | Kp | •                   | •        | 3                        | 3      | 1      | X, Xc            |
| Phosphoric acid                                                | $\text{H}_3\text{PO}_4$                                | 80                            | 20 | •                   | •        | 3                        | 3      | 0      | X, Xc            |
| Phosphoric acid                                                | $\text{H}_3\text{PO}_4$                                | 80                            | Kp | •                   | •        | 3                        | 3      | 2      | X, Xc            |
| Potassium acetate                                              | $\text{CH}_3\text{COOK}$                               |                               | Kp | •                   | •        | 0                        | 0      | 0      | all              |
| Potassium carbonate                                            | $\text{K}_2\text{CO}_3$                                | 50                            | 20 | •                   | •        | 1                        | 0      | 0      | all              |
| Potassium carbonate (potash)                                   | $\text{K}_2\text{CO}_3$                                |                               | Kp | •                   | •        | 1                        | 0      | 0      | all              |
| Potassium chlorate                                             | $\text{KClO}_3$                                        |                               | Kp | —                   | •        | 2                        | 2      | 0      | X, Xc            |
| (at 100°, sat.sol)                                             |                                                        |                               |    |                     |          |                          |        |        |                  |
| Potassium chromium sulphate                                    | $\text{KCr}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$ |                               | 20 | •                   | •        | —                        | —      | 0      | X, Xc            |
| Potassium chromium sulphate (chromic alum)                     | $\text{KCr}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$ | 25                            | Kp | •                   | •        | —                        | —      | 3      |                  |
| Potassium cyanide solution                                     | $\text{KCN}$                                           | 5                             | 20 | • 4)                | •        | 1                        | 1      | 1      | III, VIII, X, Xc |
| Potassium dichromate                                           | $\text{K}_2\text{Cr}_2\text{O}_7$                      |                               | 20 | •                   | •        | 0                        | 0      | 0      | all              |
| Potassium dichromate                                           | $\text{K}_2\text{Cr}_2\text{O}_7$                      |                               | Kp | —                   | •        | 2                        | 2      | 0      | X, Xc            |
| Potassium hydrochlorite                                        | $\text{KOCI}$                                          |                               | 20 | •                   | •        | 2                        | 2      | 1      | X, Xc            |
| Potassium hydrochlorite up to 20 g akt. $\text{Cl}_2/\text{l}$ | $\text{KOCI}$                                          |                               | 40 | •                   | •        | 2                        | 2      | 1      | X, Xc            |
| Potassium hydrogenartrate                                      | $\text{COOH}(\text{CHOH})_2$                           |                               | 20 | •                   | •        | —                        | —      | 0      | X, Xc            |
|                                                                | $\text{COOK}$                                          |                               |    |                     |          |                          |        |        |                  |
| Potassium hydrogenartrate (at 100°, sat.sol)                   | $\text{COOH}(\text{CHOH})_2$                           |                               | Kp | •                   | •        | —                        | —      | 1      | X, Xc            |
|                                                                | $\text{COOK}$                                          |                               |    |                     |          |                          |        |        |                  |
| Potassium hydroxyde                                            | $\text{KOH}$                                           | 25                            | 20 | •                   | •        | 0                        | 0      | 0      | all              |
| Potassium hydroxyde                                            | $\text{KOH}$                                           | 25                            | Kp | •                   | •        | —                        | —      | 0      | X, Xc            |
| Potassium hydroxyde                                            | $\text{KOH}$                                           | 50                            | 20 | •                   | •        | 0                        | 0      | 0      | all              |
| Potassium hydroxyde                                            | $\text{KOH}$                                           |                               | Kp | •                   | •        | 3                        | 3      | 0      | X, Xc            |
| Potassium iodide                                               | $\text{KI}$                                            | 50                            | Kp | •                   | •        | 2                        | 2      | 0      | Xc               |
| Potassium iodide                                               | $\text{KI}$                                            |                               |    | •                   | •        | 1                        | 1      | 0      | III, VIII, X, Xc |
| Potassium nitrate                                              | $\text{KNO}_3$                                         |                               | 20 | —                   | •        | 0                        | 0      | 0      | all              |
| Potassium nitrate                                              | $\text{KNO}_3$                                         |                               | Kp | —                   | •        | 2                        | 2      | 0      | X, Xc            |
| Potassium permanganate                                         | $\text{KMnO}_4$                                        |                               | 20 | •                   | •        | 0                        | 0      | 0      | all              |
| Potassium permanganate                                         | $\text{KMnO}_4$                                        |                               | Kp | —                   | •        | 3                        | 3      | 0      | X, Xc            |
| Propane                                                        | $\text{C}_3\text{H}_8$                                 |                               | 20 | •                   | •        | 0                        | 0      | 0      | all              |



| Fluid                                             | Chemical formula     | Concentration and temperature |     | Materials for seals |          | Metallic materials    |        |        | Material code   |
|---------------------------------------------------|----------------------|-------------------------------|-----|---------------------|----------|-----------------------|--------|--------|-----------------|
|                                                   |                      | %                             | °C  | KX-GT               | TFM-1600 | EN-1049<br>EN-GJL 250 | 1.0619 | 1.4581 |                 |
| Salicylic acid                                    | $C_6H_4OHCOOH$       |                               | 20  | •                   | •        | 2                     | 2      | 0      | X, Xc           |
| Salpeter                                          |                      |                               |     | •                   | •        | 0                     | 0      | 0      | all             |
| Sea water                                         |                      |                               | 20  | •                   | •        | 3                     | 3      | 0      | X, Xc           |
| Sea water                                         |                      |                               | Kp  | •                   | •        | 3                     | 3      | 0      | X, Xc           |
| Silicone oil                                      |                      |                               |     | •                   | •        | 0                     | 0      | 0      | all             |
| Soap                                              |                      |                               |     | •                   | •        | 0                     | 0      | 0      | all             |
| Sodium carbonate                                  | $Na_2CO_3$           |                               | 20  | •                   | •        | 0                     | 0      | 0      | all             |
| Sodium carbonate                                  | $Na_2CO_3$           |                               | Kp  | •                   | •        | 1                     | 1      | 0      | all             |
| Sodium hydroxide                                  | $NaOH$               |                               |     | •                   | •        | 0                     | 0      | 0      | all             |
| Sodium hydroxide                                  | $NaOH$               | 20                            | Kp  | •                   | •        | —                     | —      | 0      | X, Xc           |
| Sodium hydroxide                                  | $NaOH$               | 35                            | 20  | •                   | •        | 0                     | 0      | 0      | all             |
| Sodium hydroxide                                  | $NaOH$               | 35                            | Kp  | •                   | •        | 3                     | 3      | 0      | X, Xc           |
| Sodium sulphate                                   | $Na_2SO_4$           |                               |     | •                   | •        | 0                     | 0      | 0      | all             |
| Sole                                              | $NaCl$               |                               | 20  | •                   | •        | 3                     | 3      | 1      | X, Xc           |
| Spinbath (up to 10% $H_2SO_4$ )                   |                      |                               | 80  | •                   | •        | 3                     | 3      | 0      | X, Xc           |
| Starch solution                                   |                      |                               |     | •                   | •        | 2                     | 2      | 0      | X, Xc           |
| Steam (water vapour)                              |                      |                               |     | •                   | • 4)     | 0                     | 0      | 0      | all             |
| Stearic acid                                      | $C_{17}H_{35}COOH$   |                               |     | •                   | •        | 2                     | 2      | 0      | X, Xc           |
| Sugar                                             |                      |                               | 20  | •                   | •        | 1                     | 1      | 0      | all             |
| Sugar                                             |                      |                               | 80  | •                   | •        | 1                     | 1      | 0      | all             |
| Sulphite lye (fresh cooking liquor, spend liquor) | $Ca(HSO_3)_2$        |                               | 20  | •                   | •        | —                     | —      | 0      | X, Xc           |
| Sulphite lye (fresh cooking liquor, spend liquor) | $Ca(HSO_3)_2$        |                               | 80  | •                   | •        | —                     | —      | 0      | X, Xc           |
| Sulphuric acid                                    | $H_2SO_4$            | 1                             | 20  | •                   | •        | 3                     | 3      | 0      | X, Xc           |
| Sulphuric acid                                    | $H_2SO_4$            | 10                            | 20  | •                   | •        | 3                     | 3      | 0      | X, Xc           |
| Sulphuric acid                                    | $H_2SO_4$            | 90                            | 20  | •                   | •        | 1                     | 1      | 0      | 1)              |
| Sulphuric acid                                    | $H_2SO_4$            | konz.                         | 20  | •                   | •        | 0                     | 0      | 0      | all*)           |
| Sulphur dioxide                                   | $SO_2$               |                               |     | •                   | •        | 3                     | 3      | 0      | X, Xc           |
| Sulphurous acid (cold) sat.sol.                   | $H_2SO_3$            |                               |     | •                   | •        | 3                     | 3      | 0      | X, Xc           |
| Tannic acid                                       | $C_{76}H_{52}O_{46}$ | 10                            | 20  | •                   | •        | 2                     | 2      | 0      | X, Xc           |
| Tannic acid                                       | $C_{76}H_{52}O_{46}$ | 10                            | Kp  | •                   | •        | 3                     | 3      | 0      | X, Xc           |
| Tannic acid                                       | $C_{76}H_{52}O_{46}$ | 50                            | 20  | •                   | •        | 2                     | 2      | 0      | X, Xc           |
| Tar (neutral)                                     |                      |                               | 180 | •                   | •        | 1                     | 1      | 0      | III, VII, X, Xc |
| Tartaric acid                                     | $(CHOHCOOH)_2$       |                               | 20  | •                   | •        | 2                     | 2      | 0      | X, Xc           |
| Toluol                                            | $C_6H_5CH_3$         |                               | 20  | •                   | •        | 0                     | 0      | 0      | all             |
| Trichlorethylene                                  | $C_2HCl_3$           |                               |     | •                   | •        | 1                     | 1      | 0      | all             |
| Turpentine oil                                    |                      |                               | 20  | •                   | •        | 0                     | 0      | 0      | all             |
| Urea                                              | $(NH_2)_2CO$         |                               | 20  | •                   | •        | 1                     | 1      | 0      | all             |
| Water (fresh- a. drinking water)                  | $H_2O$               |                               |     | •                   | •        | 0                     | 0      | 0      | all             |
| Water glass (K- and Na-silicate)                  | $K_2SiO_3Na_2HCl_3$  |                               |     | •                   | •        | 0                     | 0      | 0      | all             |
| Xylene                                            | $C_6H_4(CH_3)_2$     |                               | 20  | •                   | •        | 0                     | 0      | 0      | all             |

1) Piston and piston shaft in 1.4404 (please specify when ordering).

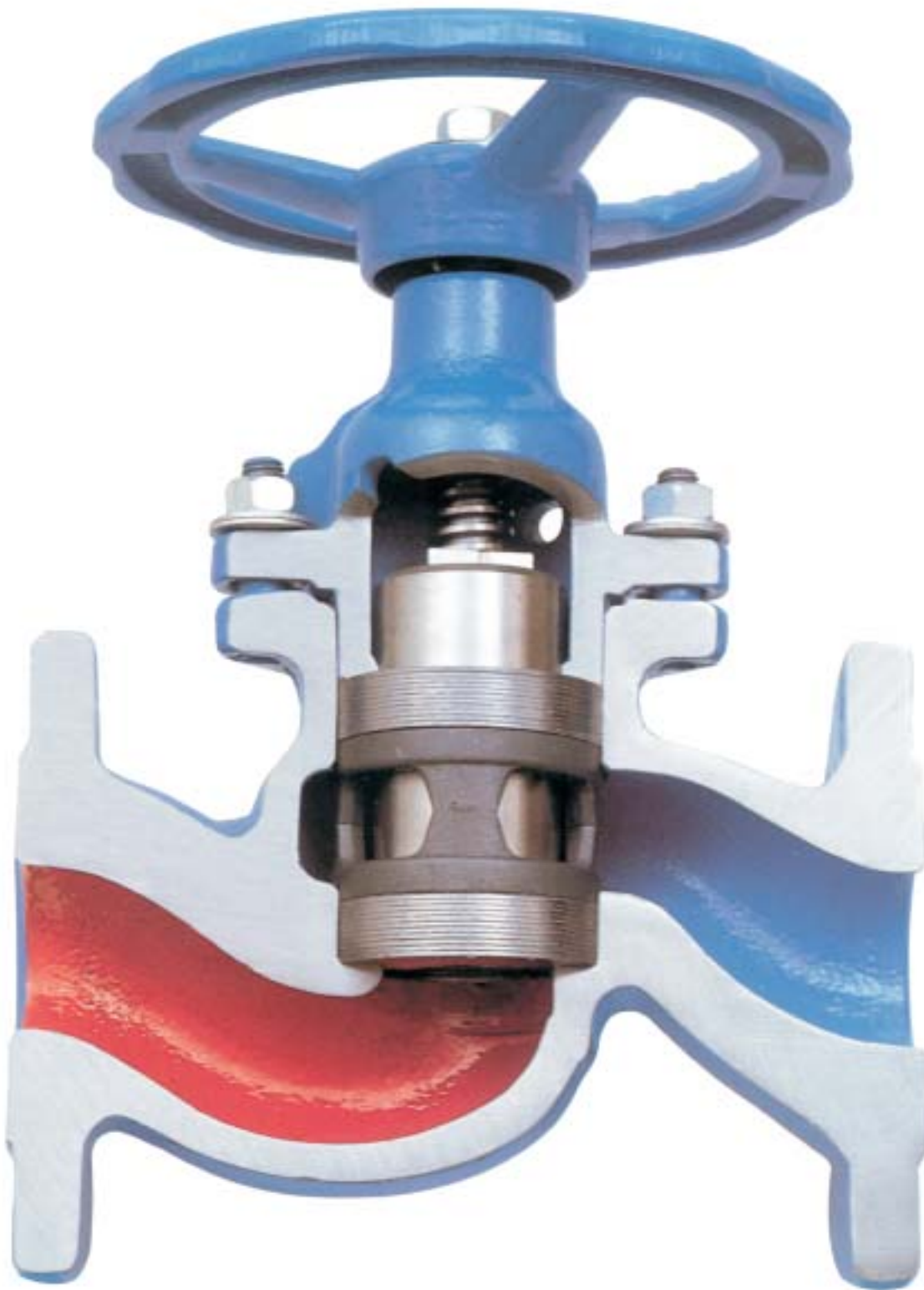
2) Discoloration may occur.

3) With heat-transfer media please inquire in our Gumpoldskirchen factory regarding choice of valve rings. Please state the type of medium and the temperature range. Cast iron is chemically resistant to

heat transfer media but, in view of the ability of these media to penetrate the pores, it is not recommended  
4) 150 °C

# KLINGER KVN piston valves

Security for years







# KLINGER product range

## ***Product range***

### ***Ballostar® KHA***

*3-piece ball valve made of grey cast iron, steel and stainless steel*

### ***Ballostar® KHI***

*2-piece ball valve with trunnion mounted ball, made of cast steel, steel and stainless steel*

### ***Ballostar® KHE***

*2-piece ball valve with floating ball, made of steel and stainless steel*

### ***Monolith KHO***

*One-piece fully welded ball valve made of steel*

### ***KLINGER Monoball®***

*One-piece ball valve made of steel and stainless cast steel*

### ***KLINGER Ball-o-top***

*Brass ball valves*

### ***Piston valves KVN***

*made of grey cast iron, spheroidal cast iron, steel and stainless cast steel*

### ***KLINGERMATIC®***

*Actuator for piston valves and ball valves*

### ***Reflex and transparent glasses***

### ***Circular sight-glasses***

### ***AB cocks***

*Packing-sleeve cocks and pressure-gauge cocks in brass, steel and stainless steel*

**K**ey role

**L**ink

**I**nnovation

**N**avigation

**G**rowth

**E**fficiency

**R**outine

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