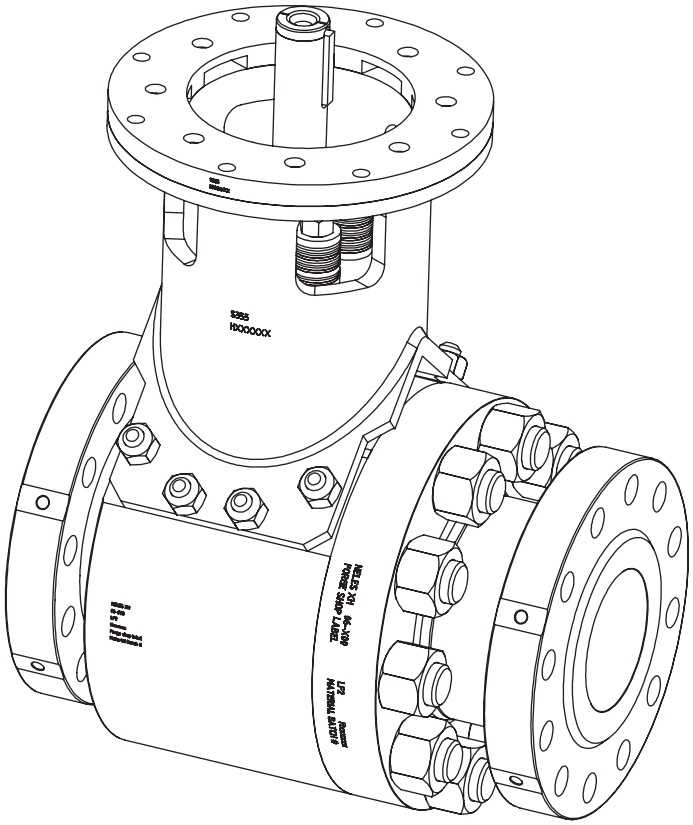
neles

# NELES®
# TRUNNION MOUNTED BALL VALVE, FULL BORE

## Series XH

Installation, Maintenance and
Operating Instructions



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1 XH 70 en • 4/2020

# 6 INSTALLING THE ACTUATOR

## 6.1 General

**CAUTION:**
**Beware of ball cutting movement!**

Different Metso actuators can be mounted using suitable brackets and couplings. The valve can be actuated by an M-handwheel operator or B1-series actuators.

## 6.2 Installing the M-handwheel operator

- ❑ The mark at the end of the shaft indicates the direction of the ball flow bore. Turn the valve to the closed position.
- ❑ Lubricate the grooves of the actuator and the couplings. Place the coupling on the shaft and lock it. Place the bracket on the valve and turn the lubricated screws a few times.
- ❑ Turn the actuator to the closed position and push it carefully onto the valve shaft on which the coupling has been mounted. Please note the marks on the handwheel and the coupling.
- ❑ Lubricate the actuator screws. Tighten all screws.
- ❑ Adjust the ball open and closed positions with the hexagon screws located at the side of the housing (see Figure 16). The stop-screw for the open position is nearest to the handwheel on the side of the housing and the screw for the closed position is at the opposite end. The turning directions for the handwheel are marked on the wheel.
- ❑ Check the handwheel by turning the valve to the extreme positions. The yellow arrow should indicate the direction of the ball flow bore.

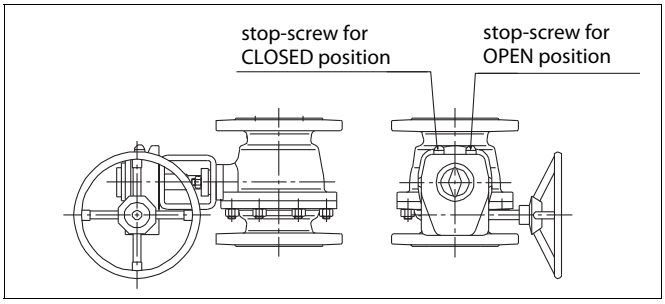



*Fig. 14 Open and closed positions of the M actuator*

## 6.3 Installing the B1C-series actuator

- ❑ Turn the valve to the closed position and drive actuator piston to the extreme outward position.
- ❑ File off any burrs and clean the shaft bore.
- ❑ The line at the end of the shaft indicates the direction of the ball flow bore.
- ❑ Lubricate the actuator shaft bore. Fasten the bracket loosely to the valve.
- ❑ Slip the actuator carefully onto the valve shaft. Avoid forcing it since this may damage the ball and seats. We recommend mounting the actuator so that the cylinder is pointing upwards.
- ❑ Position the actuator parallel or vertical to the pipeline as accurately as possible. Lubricate the actuator mounting screws and then fasten all screws.
- ❑ Adjust the ball open and closed positions by means of the actuator stop screws located at both ends (see Fig. 17). An accurate open position can be seen in the body flow bore. Check that the yellow arrow on the actuator indicates the ball flow opening position. **Keep fingers out of the flow bore!**

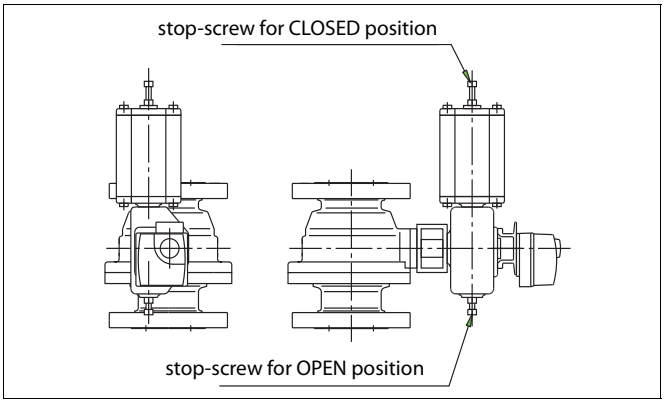



*Fig. 15 Open and closed positions of the B1C/B1J actuator*

There is no need for stop screw adjustment if the actuator is re-installed in the same valve. Drive actuator piston to the housing end (open position). Turn the actuator by hand until the valve is in the open position. Fasten the actuator in this position as explained above.

- ❑ Check the stop screw thread tightness. An O-ring is used for sealing.
- ❑ Check that the actuator is functioning correctly. Drive the actuator piston to both cylinder ends and check the ball position and its movement with respect to the actuator (close: clockwise; open: counterclockwise). The valve should be closed when the piston is in the extreme outward position.
- ❑ If necessary, change the position of the actuator pointing cover to correctly indicate the valve open/closed position.

## 6.4 Installing the B1J-series actuator

Spring-return actuators are used in applications where valve opening or closing movement is needed in case the air supply is interrupted. The B1J type is used for spring-to-close operation; the spring pushes the piston towards the cylinder end, the extreme outward position. In turn, the B1JA type is used for spring-to-open operation; the spring pushes the piston towards the housing. Spring-return actuators are installed in a manner similar to B1C-series actuators, taking into account the following.

### 6.4.1 B1J type

- ❑ Install the actuator so that the piston is in the extreme outward position. The cylinder must not be pressurized and air supply connections must be open. The valve must be in the closed position.

### 6.4.2 B1JA type

- ❑ Install the actuator so that the piston is in the cylinder end position at housing side. The cylinder must not be pressurized and air supply connections must be open. The valve must be in the open position.

The rest of the installation procedure is the same as in Section 6.3.

## 6.5 Installing other makes of actuators

**NOTE:**
Metso accepts no responsibility for compatibility of actuators not installed by Metso.

Other actuators can be installed only if they have an ISO 5211 actuator connection.

## 7 TROUBLE SHOOTING TABLE

The following Table 3 lists malfunctions that might occur after prolonged use.

*Table 3. Trouble shooting*

| Symptom | Possible fault | Recommended action |
|---|---|---|
| Leakage through a closed valve | Wrong stop screw adjustment of the actuator | Adjust the stop screw for closed position |
| | Faulty zero setting of the positioner | Adjust the positioner |
| | Damaged seat | Replace seat |
| | Damaged closing member | Replace the closing member |
| | Closing member in a wrong position relative to the actuator | Select the correct keyway in the actuator |
| Leakage through body joint | Damaged gasket | Replace the gasket |
| | Loose body joint | Tighten the nuts or screws |
| Irregular valve movements | Actuator or positioner malfunction | Check the operation of the actuator and positioner |
| | Process medium accumulated on the sealing surface | Clean the sealing surfaces |
| | Closing member or seat damaged | Replace the closing member or seat |
| | Crystallizing medium has entered the bearing spaces | Flush the bearing spaces |
| Gland packing leaking | Gland packing worn or damaged | Replace the gland packing |
| | Loose packing | Tighten the packing nuts |

## 8 TOOLS

In addition to standard tools, the following special tools might facilitate some phases of the work.

- ❑ For removal of the actuator:
  - extractor (ID-code table in actuator's IMO).

This tool can be ordered from the manufacturer. Always give the valve type designation when ordering.

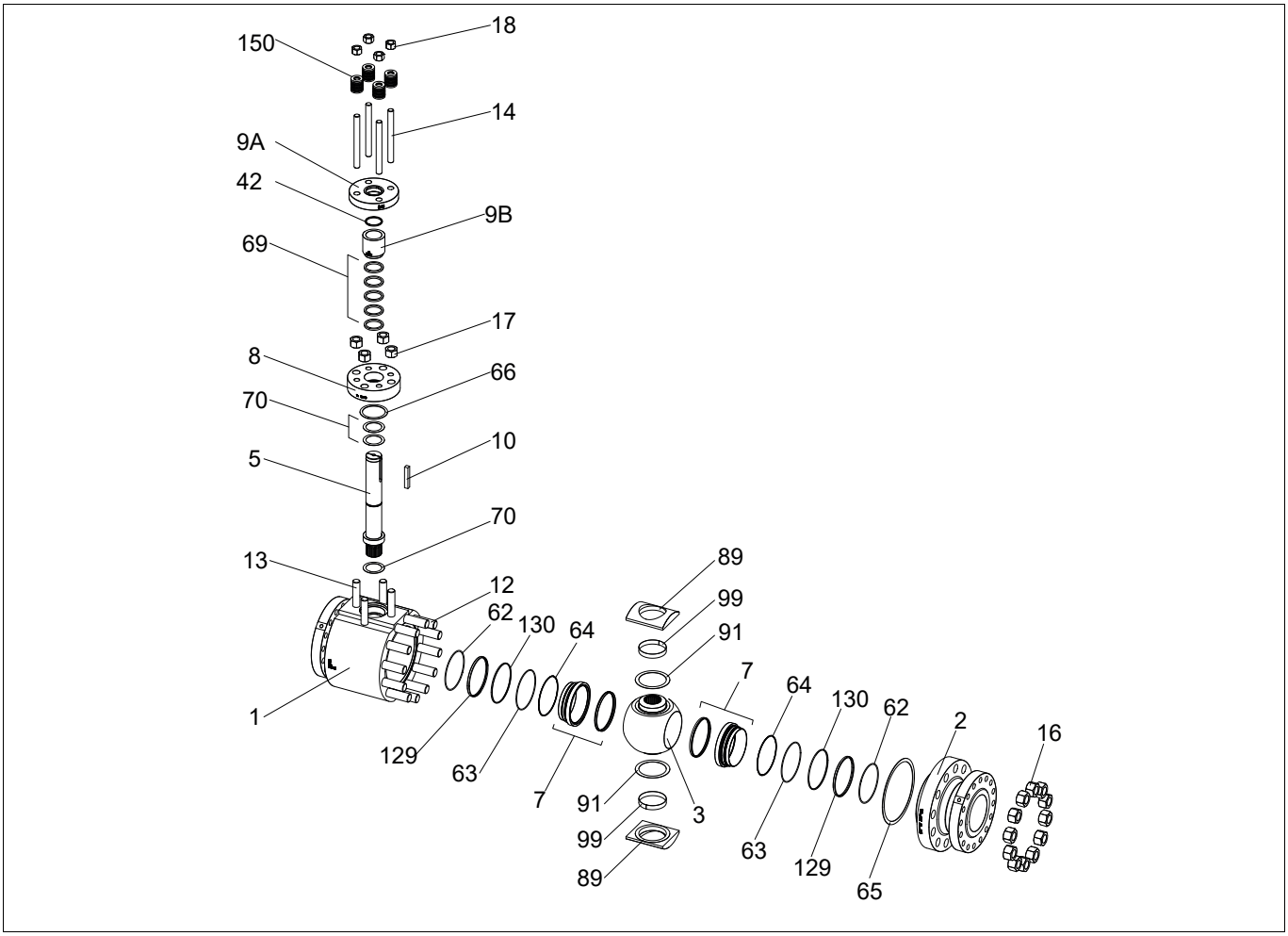
## 9 ORDERING SPARE PARTS

When ordering spare parts, always include the following information:

- ❑ type code, sales order number, serial number
- ❑ number of the parts list, part number, name of the part and quantity required

This information can be found from the identification plate or documents.

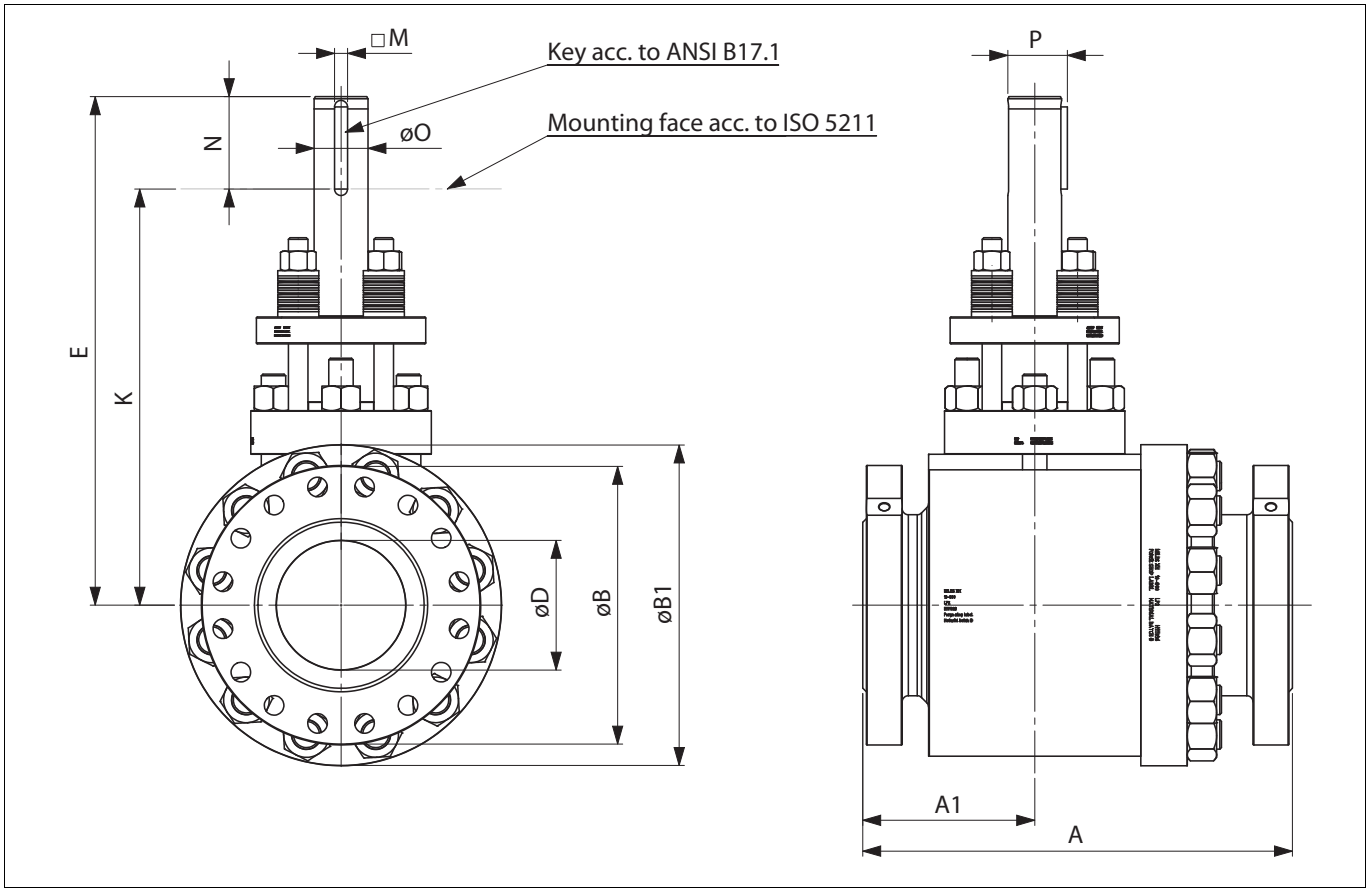
## 10 EXPLODED VIEW AND PARTS LIST




| Item | Qty | Description | Spare part category |
|---|---|---|---|
| 1 | 1 | Body | |
| 2 | 1 | Bodycap | |
| 3 | 1 | Ball | 3 |
| 5 | 1 | Shaft | 3 |
| 7 | 1 or 2 | Ball seat | 2 |
| 8 | 1 | Bonnet | |
| 9A | 1 | Gland | |
| 9B | 1 | Sleeve | |
| 10 | 1 | Key | 3 |
| 12 | | Stud | |
| 13 | | Stud | |
| 14 | | Stud | |
| 16 | | Hexagon nut | |
| 17 | | Hexagon nut | |
| 18 | | Hexagon nut | |
| 42 | 1 | Retainer ring | |
| 62 | 1 or 2 | Seat spring | 2 |
| 63 | 1 or 2 | O-ring (B,R) | 1 |
| | 1 or 2 | Back seal (F) | 1 |
| 64 | 1 or 2 | Back-up ring (B,R) | 1 |
| 65 | 1 | Body gasket | 1 |
| 66 | 1 | Bonnet gasket | 1 |
| 69 | | Packing ring | 1 |
| 70 | 3 | Thrust bearing | 3 |
| 89 | 2 | Trunnion plate | |
| 91 | 2 | Thrust bearing | 3 |
| 99 | 2 | Trunnion bearing | 3 |
| 129 | 1 or 2 | Ring (B,R) | 2 |
| 130 | 1 or 2 | Backseal (B,R) | 1 |
| 150 | | Disc spring set | |

Spare part (Spare Part Set): Recommended soft parts, always needed for the repair. Delivered as a set.
Spare part category 2: Parts for replacing of the seat. Available also as a set.
Spare part category 3: Parts for replacing of the closing element.
Spares for the full overhaul: All parts from the categories 1, 2 and 3.

## 11 DIMENSIONS AND WEIGHTS




| | NPS | DN | A | A1 | ØB | ØB1 | ØD | E | K | M | N | O | P | Weight [kg] | Weight [kg] (with bracket & adapter) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| "XHG Class 900 Raised Face" | 02 | 50 | 368 | 144 | 215 | 225 | 49 | 353 | 308 | 6.35 | 46 | 25 | 27,8 | 130 | 140 |
| | 03 | 80 | 381 | 145 | 240 | 285 | 74 | 434 | 383 | 6,35 | 51 | 30 | 32,9 | 140 | 160 |
| | 04 | 100 | 457 | 173 | 290 | 348 | 100 | 541 | 462 | 12,70 | 80 | 45 | 50,4 | 230 | 250 |
| | 06 | 150 | 610 | 237 | 380 | 433 | 150 | 629 | 539 | 12,70 | 90 | 55 | 60,6 | 470 | 540 |
| | 08 | 200 | 737 | 303 | 470 | 508 | 201 | 847 | 701 | 22,23 | 146 | 85 | 94,6 | 850 | 980 |
| | 10 | 250 | 838 | 325 | 545 | 630 | 252 | 1045 | 866 | 25,40 | 180 | 105 | 116,1 | 1430 | 1640 |
| | 12 | 300 | 965 | 389 | 610 | 728 | 303 | 1110 | 905 | 31,75 | 205 | 120 | 133,8 | 2150 | 2480 |
| | 14 | 350 | 1029 | 416 | 640 | 804 | 322 | 1279 | 1054 | 31,75 | 225 | 135 | 149,0 | 2890 | 3340 |
| | 16 | 400 | 1130 | 443 | 705 | 922 | 373 | 1401 | 1153 | 38,10 | 250 | 150 | 166,6 | 3950 | 4460 |
| | 18 | 450 | 1219 | 504 | 785 | 1010 | 423 | 1474 | 1195 | 38,10 | 280 | 165 | 181,8 | 5020 | 5610 |
| | 20 | 500 | 1321 | 549 | 855 | 1114 | 471 | 1508 | 1194 | 44,45 | 315 | 180 | 199,5 | 6530 | 7390 |
| | 24 | 600 | 1549 | 643 | 1040 | 1300 | 570 | 1720 | 1350 | 50,80 | 370 | 220 | 242,4 | 11000 | 12000 |
| "XHG Class 900 Ring Type Joint" | 02 | 50 | 371 | 145 | 215 | 225 | 49 | 353 | 308 | 6.35 | 46 | 25 | 27.8 | 130 | 140 |
| | 03 | 80 | 384 | 146 | 240 | 285 | 74 | 434 | 383 | 6,35 | 51 | 30 | 32,9 | 140 | 160 |
| | 04 | 100 | 460 | 175 | 290 | 348 | 100 | 541 | 462 | 12,70 | 80 | 45 | 50,4 | 230 | 250 |
| | 06 | 150 | 613 | 239 | 380 | 433 | 150 | 629 | 539 | 12,70 | 90 | 55 | 60,6 | 470 | 540 |
| | 08 | 200 | 740 | 304 | 470 | 508 | 201 | 847 | 701 | 22,23 | 146 | 85 | 94,6 | 850 | 980 |
| | 10 | 250 | 841 | 327 | 545 | 630 | 252 | 1045 | 866 | 25,40 | 180 | 105 | 116,1 | 1430 | 1640 |
| | 12 | 300 | 968 | 390 | 610 | 728 | 303 | 1110 | 905 | 31,75 | 205 | 120 | 133,8 | 2150 | 2480 |
| | 14 | 350 | 1039 | 420 | 640 | 804 | 322 | 1279 | 1054 | 31,75 | 225 | 135 | 149,0 | 2890 | 3340 |
| | 16 | 400 | 1140 | 448 | 705 | 922 | 373 | 1401 | 1153 | 38,10 | 250 | 150 | 166,6 | 3950 | 4460 |
| | 18 | 450 | 1232 | 510 | 785 | 1010 | 423 | 1474 | 1195 | 38,10 | 280 | 165 | 181,8 | 5020 | 5610 |
| | 20 | 500 | 1334 | 556 | 855 | 1114 | 471 | 1508 | 1194 | 44,45 | 315 | 180 | 199,5 | 6530 | 7390 |
| | 24 | 600 | 1568 | 652 | 1040 | 1300 | 570 | 1720 | 1350 | 50,80 | 370 | 220 | 242,4 | 11000 | 12000 |

# 12 TYPE CODE

## *Neles Trunnion Mounted, Ball Valve, Full Bore, Series XH*

| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **XH** | **06** | **G** | **W** | **TA** | **AB** | **RX** | **R** | **N** | **B** | **F** | **A** |

| **1.** | **VALVE SERIES & STYLE & FACE-TO-FACE** |
|---|---|
| **XH** | Full bore, trunnions, f-to-f ASME B 16.10, Table 4, long pattern, ASME 900 |

| **2.** | **SIZE / NPS** |
|---|---|
| **02** | 2" |
| **03** | 3" |
| **04** | 4" |
| **06** | 6" |
| **08** | 8" |
| **10** | 10" |
| **12** | 12" |
| **14** | 14" |
| **16** | 16" |

| **3.** | **PRESSURE CLASS** |
|---|---|
| **G** | ASME Class 900 |

| **4.** | **END CONNECTION STYLE** |
|---|---|
| **W** | Raised face, ASME B 16.5, (Ra 3.2-6.3), standard |
| **Z** | Ring joint, ASME B16.5 |

| **5.** | **CONSTRUCTION & APPLICATION** |
|---|---|
| **TA** | Standard construction. Double seated. Live loaded packing. |
| **TZ** | BAM tested non-metallic materials, for oxygen service.<br>Double seated. Metal bearings.<br>Live loaded graphite packing.<br>Temperature range -50...+200C. Max pressure based on body rating.<br>Oxygen cleaning acc. to Metso internal procedure T-2115 included.<br>Constructions are not covered in ISO 15848-1 certification |

| **6.** | **BODY MATERIAL** |
|---|---|
| **AB** | ASTM A350 LF2 (CS) |
| **S6** | ASTM A351 gr. CF8M (SS) |

| **7.** | **BALL / COATING & STEM MATERIAL** |
|---|---|
| **RX** | 316SS / Chrome carbide & XM-19 or 17-4PH |
| **SL** | 316SS /NiBo & XM-19 or 17-4PH |

| **8.** | **SEAT TYPE** |
|---|---|
| **B** | Metal, solid proof |
| **F** | Metal, bellows |
| **R** | Metal, firesafe service |

| **9.** | **SEAT MATERIAL** |
|---|---|
| **N** | Type 316 stainless steel |

| **10.** | **BEARING & SEAL MATERIAL** | | | |
|---|---|---|---|---|
| | **Trunnion bearing** | **Packings** | **Body gaskets** | **O-rings** |
| **B** | PTFE / SS net | Graphite | Graphite | Viton GF |
| **D** | Cobalt based alloy | Graphite | Graphite | Viton GF |

| **11.** | **BOLTING MATERIAL** | |
|---|---|---|
| | **Studs** | **Nuts** |
| **D*** | B8M | 8M |
| **F**** | L7M | 2HM |

| **12.** | **MODEL CODE** |
|---|---|
| **A** | XH design version A |

*) Bolting material for stainless steel body
**) Bolting material for carbon and low alloy steel body

Note: Ball material coding specifies only the type of material not grade (cast, wrought, bar, forged), which can change based on ball size or type. E.g. "316SS" type may be A351 gr CF8M, A479 gr 316, A182 gr F316 or equivalent.
Recommended type codings for oxygen service:
XH _ GW TZ S6 RR FR DD A
XH_ GW TZ N1 NR FE DD A
XH _ GW TZ VE LR FD DD A
Constructions are not covered in ISO 15848-1 certification.