

Project: Fire-Safe Testing

Certificate Number: HEL 0100435/1

Client: Metso Field Systems Oy,  
Helsinki, Finland

Office: Helsinki

Client's Order Number: 7110005

Date: 08 August 2001

Order Status: Complete

Inspection Dates

First: 17 January 2001

Final: 17 January 2001

This certificate is issued to Metso Field Systems Oy to certify that the undersigned Surveyor attended their works in Helsinki on the above date for the purpose of witnessing Fire Tests of one (1) metal seated full bore ball valve designed for bi-directional installation and manufactured by Metso Field Systems Oy.

Particulars of Valve

Type: XG02DWT AJ2SJHABA

Rating: ASME Class 300

Size: NPS 2"

Materials (as stated by the Manufacturer): See Appendix No. 2 of the Test Report.

Testing

The test valve was presented by the Manufacturer, without choice. The test was conducted in accordance with the standard API 607, Fourth Edition, May 1993. Throughout the test the valve performed satisfactorily and met all the requirements of the above standard. Visual examination after testing confirmed that the design was in accordance with the Manufacturer's drawing and parts list. Copy of the Test Report is attached.

Before commencing the tests the testing apparatus was examined and found to be in accordance with the above standard.

Additional Valve Qualification

In accordance with, and subject to the limitations of, the above standard, valves sized 1/2" to 8", as well as valves with pressure ratings ASME 400 and 600 are also qualified.

  
Matti Niskala for Hans Björkestam  
Surveyors to Lloyd's Register

**FIRE TEST FOR BALL VALVE,  
TYPE XG02DWTAJ2SJHABA**

1 (4)

**FIRE TEST FOR BALL VALVE,  
TYPE XG02DWT AJ2SJHABA**

2 (4)

**OBJECT:** Fire test of ball valve XG02DWT AJ2SJHABA in accordance with standard API 607, Fourth Edition, May 1993. (Fire Test for Soft-Seated Quarter-Turn Valves).

**SPECIMEN:** The test valve XG02DWT AJ2SJHABA is a metal seated full bore ball valve manufactured by METSO FIELD SYSTEMS OY Helsinki, Finland. The valve is designed for bi-directional installation. The size of the valve is NPS 2" and pressure class of the body is ASME 300. The manual actuator M07 was mounted on the test valve.

The assembly drawing, parts list, dimensional drawing of the valve and dimensional drawing of the manual actuator are enclosed in Appendices 1, 2, 3 and 4. Nameplate details and location of temperature measurement points are shown in Appendix 5.

**TESTS:** The valve had been tested before the fire test by the manufacturer according to normal factory procedure.

The valve was assembled between two end flanges equipped with a 25 mm water pipe.

The valve was filled with water for the fire test and the pressure of water against the closed ball was 2 bar during the test. The test was conducted at the Laboratory of METSO FIELD SYSTEMS OY Helsinki on January 17, 2001.

The test was conducted in direction A, the test pressure on the side of part no. 2 (Appendix 1).

The temperatures and test pressures during the test were recorded with a datalogger. The results are shown in Appendix 6. The temperature measurement points were located according to the test standard.

The flame temperature was raised to the required level in less than 2 minutes and after that the valve was heated with gas burners for 30 minutes and it was cooled with water-spray to 100°C. The cooling time was 5 minutes.

**FIRE TEST FOR BALL VALVE,  
TYPE XG02DWTAJ2SJHABA**

3 (4)

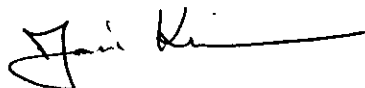
The through-seat leakages and external leakages of the test valve during the test are shown in Table 1 below.

**TABLE 1.**  
January 17, 2001.

| TEST PHASE                         | TIME<br>min. | LEAKAGE<br>ml/in/min |         |
|------------------------------------|--------------|----------------------|---------|
|                                    |              | measured             | allowed |
| Start                              | 0            | 0                    |         |
| Required flame temperature         | 0.5          | 0                    |         |
| Seat leakage during heating        | 30.5         | 1                    | 100     |
| External leakage heating + cooling | 40.5         | 0                    | 25      |
| Operation of valve                 | 41           |                      |         |
| Stabilization period               | 46           |                      |         |
| 5 min seat leakage                 | 51           | 0.5                  | 20      |
| 5 min external leakage             | 51           | 1                    | 25      |

In visual examinations after the test it was stated that the test valve was in full operating condition and complied with the supplied documents

**SUMMARY:** On the basis of the results it can be stated that the tested ball valve XG02DWTAJ2SJHABA met the requirements presented in standard API 607, Fourth Edition: 1993.



Jari Kirmanen  
Laboratory Engineer  
METSO FIELD SYSTEMS OY



Hans Björkestam  
Surveyor to Lloyd's  
Register

**FIRE TEST FOR BALL VALVE,  
TYPE XG02DWTAJ2SJHABA**

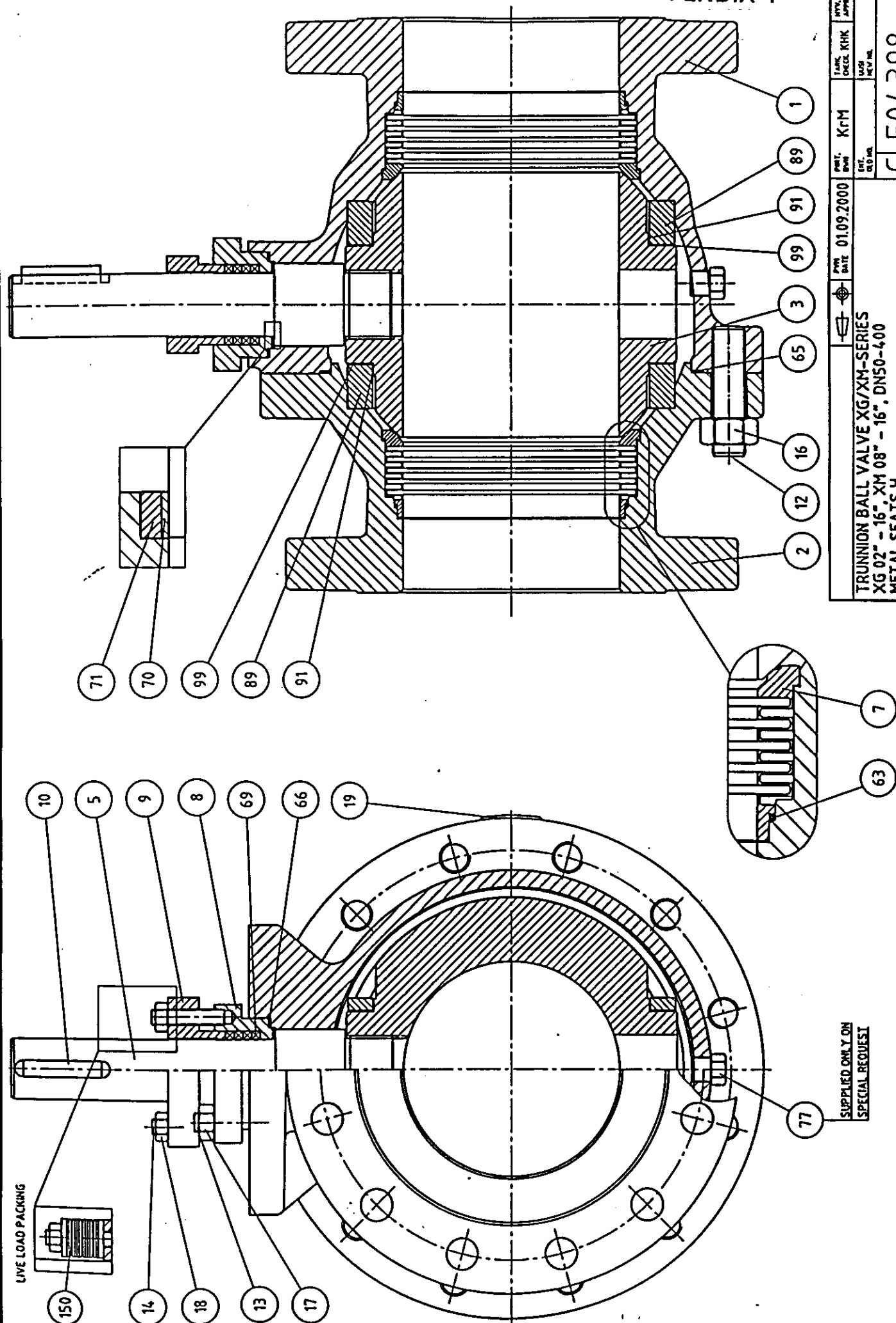
4 (4)

**APPENDICES:**

1. Assembly drawing C FO4398
2. Parts and material list H016762
3. Dimension drawing C FO4322
4. Manual actuators dimension drawing.
5. Nameplate details. Location of temperature measurement points.
6. Temperatures and pressure measurement results during the test .

(T1 and T2= Flame thernoc,  
T3= Bonnet, T4= Body, T5= unused.  
p1= Test pressure, p2= unused, p3= Center cavity.)

## APPENDIX 1



**SUPPLIED ONLY ON  
SPECIAL REQUEST**

|                                                                                                               |  |                                                                                     |                                                                                     |             |            |              |       |               |     |             |     |
|---------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------|------------|--------------|-------|---------------|-----|-------------|-----|
|                                                                                                               |  |  |  | PVN<br>DATE | 01.09.2000 | PRV.<br>BY   | KrM   | TARK.<br>DECK | KHK | WV.<br>APP. | TJP |
| TRUNNION BALL VALVE XG/XM-SERIES<br>XG 02" - 16", XM 08" - 16", DN50-400<br>METAL SEATS H<br>ASSEMBLY DRAWING |  |                                                                                     |                                                                                     |             |            |              |       |               |     |             |     |
|                                                                                                               |  |                                                                                     |                                                                                     |             |            | REV.         | 01.09 | REV. NO.      |     |             |     |
|                                                                                                               |  |                                                                                     |                                                                                     |             |            | C            |       | F04398        |     |             |     |
| Nesles Field Controls Oy                                                                                      |  |                                                                                     |                                                                                     |             |            | MICROFILM    |       |               |     |             |     |
| FINLAND                                                                                                       |  |                                                                                     |                                                                                     |             |            | P/ARTS ISSUE |       | -             |     |             |     |

Customer C-BOM  
XG02DWTJZSJHABA  
BALL VALVE

Page 1 (2)

Id-code: H016762 Rev: A

| Part | Id-code     | Description          | Material                   | Qty |
|------|-------------|----------------------|----------------------------|-----|
| 001  | H013792     | BODY                 | ASTM A216 gr. WCB          | 1   |
| 002  | H013866     | BODY CAP             | ASTM A216 gr. WCB          | 1   |
| 003  | H001877     | BALL                 | ASTM A351 gr. CF8M+HC      | 1   |
| 005  | H002034     | SHAFT                | ASTM A479 gr. XM-19        | 1   |
| 007  | H001991     | BELLOW SEAT          | EN 10088-1.4418+ALLOY 50Nb | 2   |
| 008  | H002154     | BONNET               | EN 10025-S355J2G3/A675-70  | 1   |
| 009  | 47300       | CASTING GLAND        | A351 gr. CF8M/1.4408       | 1   |
| 010  | 3096        | KEY                  | TYPE AISI 329              | 1   |
| 012  | 234883      | STUD                 | ASTM A193 gr. B7           | 6   |
| 013  | 3483        | STUD                 | ASTM A193 gr. B7           | 4   |
| 014  | 234929      | STUD                 | ASTM A193 gr. B7           | 2   |
| 016  | 3343        | HEXAGON NUT HEAVY    | ASTM A194 gr. 2H           | 6   |
| 017  | 3341        | HEXAGON NUT HEAVY    | ASTM A194 gr. 2H           | 4   |
| 018  | 3341        | HEXAGON NUT HEAVY    | ASTM A194 gr. 2H           | 2   |
| 019  | 234456L     | IDENTIFICATION PLATE | AISI 304                   | 1   |
| 000  | 234456A     | BLANK ID-PLATE       | AISI 304                   | 1   |
| 063  | 236963      | BACK SEAL            | GRAPHITE                   | 2   |
| 065  | 004-0543-36 | BODY GASKET          | GRAPHITE+AISI 316          | 1   |
| 066  | 236994      | SHEET RING           | GRAPHITE+AISI 316          | 1   |
| 069  | 234269      | PACKING RING         | GRAPHITE+PTFE              | 4   |
| 070  | 894986      | THRUST BEARING       | STELL 6B                   | 1   |
| 071  | H002074     | THRUST BEARING       | UNS S21800                 | 1   |

Customer C-BOM

XG02DWTAJ2SIHABA

BALL VALVE

Id-code: H016762

Rev:

A

Page 2 (2)

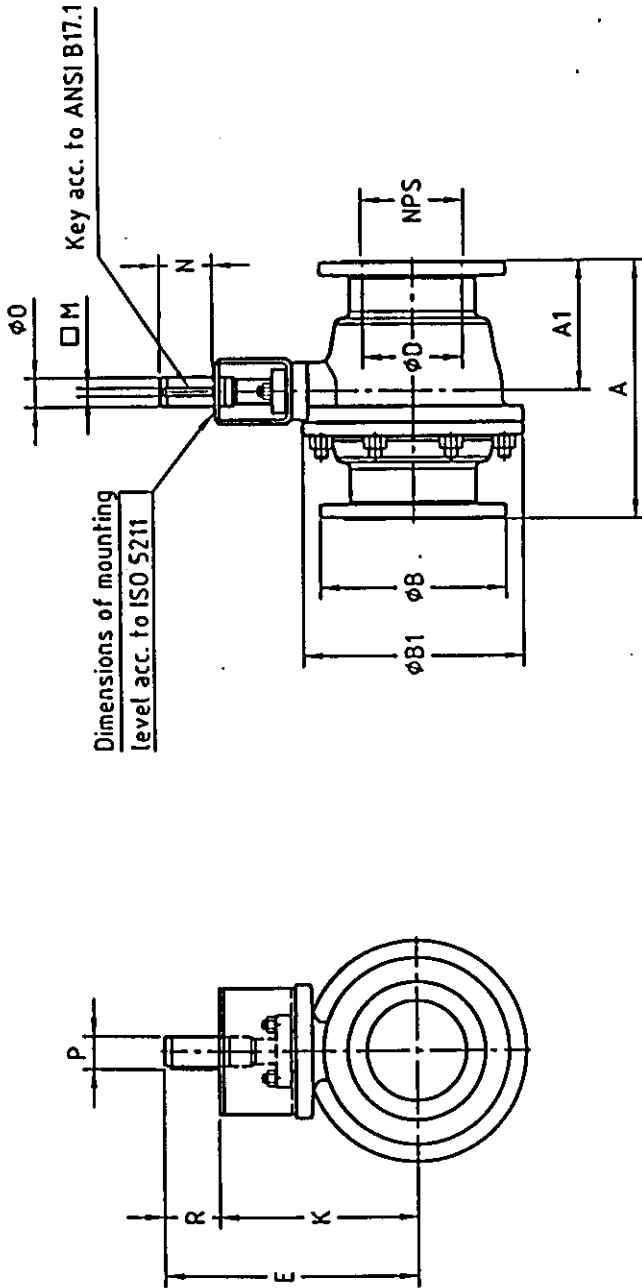
| Part | Id-code | Description      | Material             | Qty |
|------|---------|------------------|----------------------|-----|
| 077  | 3482    | HEXAGON PLUG     | DIN 1652-1.0050 K    | 0   |
| 089  | H014219 | TRUNNION PLATE   | ASTM A743 gr. CA15   | 2   |
| 091  | H002049 | THRUST BEARING   | ALLOY 6              | 2   |
| 099  | H000683 | TRUNNION BEARING | PTFE-AISI 316        | 2   |
| 150  | 979540  | DISC SPRING SET  | DIN 17222-1.1231+ENP | 2   |

Documents: F04398 TRUNNION BALL VALVE XG/XM-SERIES

Spare part sets:

For quotation purposes only

## APPENDIX 3



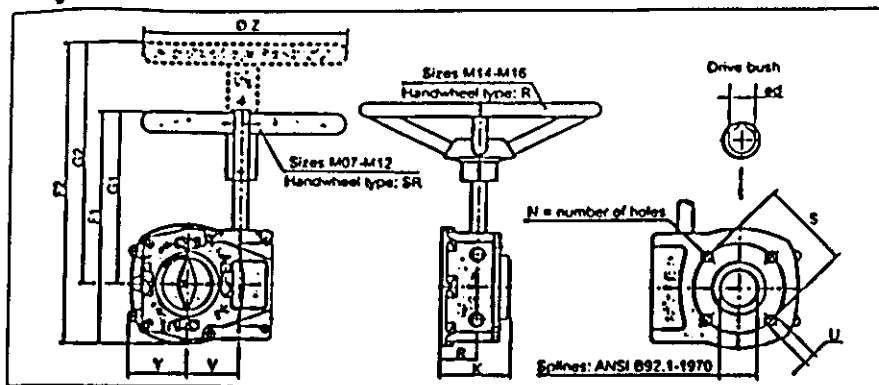
| TYPE | DN  | ISO FLANGE         | DIMENSIONS mm |       |       |     |       |     |     |        |     |    |        |     |      |  | Kg |
|------|-----|--------------------|---------------|-------|-------|-----|-------|-----|-----|--------|-----|----|--------|-----|------|--|----|
|      |     |                    | A             | A1    | ØB    | ØB1 | ØD    | E   | K   | DM     | N   | ØO | P      | R   |      |  |    |
| XG   | 50  | F07, F10           | 216           | 89    | 165.1 | 146 | 50.8  | 203 | 168 | 4.763  | 35  | 20 | 22.163 | 35  | 15   |  |    |
|      | 80  | F07, F10, F12, F14 | 282           | 142   | 209.6 | 200 | 76.2  | 225 | 190 | 4.763  | 35  | 20 | 22.163 | 35  | 32   |  |    |
|      | 100 | F10, F12, F14      | 305           | 152.5 | 254   | 254 | 101.6 | 296 | 250 | 6.35   | 46  | 25 | 27.75  | 46  | 58   |  |    |
|      | 150 | F12, F14, F16      | 403           | 201.5 | 317.5 | 353 | 152.4 | 373 | 305 | 9.525  | 68  | 40 | 44.225 | 68  | 125  |  |    |
|      | 200 | F14, F16, F25      | 502           | 251   | 381   | 462 | 203.2 | 453 | 385 | 9.525  | 68  | 40 | 44.225 | 68  | 225  |  |    |
|      | 250 | F14, F16, F25, F30 | 568           | 284   | 445   | 552 | 254   | 562 | 472 | 12.7   | 90  | 55 | 60.6   | 90  | 330  |  |    |
|      | 300 | F14, F16, F25, F30 | 648           | 324   | 521   | 626 | 304.8 | 605 | 515 | 12.7   | 90  | 55 | 60.6   | 90  | 610  |  |    |
|      | 350 | F16, F25, F30, F35 | 762           | 381   | 584   | 700 | 340   | 741 | 607 | 19.05  | 134 | 75 | 83.15  | 134 | 800  |  |    |
|      | 400 | F16, F25, F30, F35 | 838           | 419   | 648   | 800 | 390   | 779 | 633 | 22.225 | 146 | 85 | 94.625 | 146 | 1015 |  |    |
|      | 450 | F16, F25, F30, F35 | 914           | 476   | 719   | 880 | 430   | 854 | 700 | 25.4   | 165 | 95 | 101.6  | 165 | 1320 |  |    |

| TYPE | DN  | ISO FLANGE         | DIMENSIONS mm |     |     |     |       |     |     |        |     |    |        |     | Kg  |
|------|-----|--------------------|---------------|-----|-----|-----|-------|-----|-----|--------|-----|----|--------|-----|-----|
|      |     |                    | A             | A1  | ØB  | ØB1 | ØD    | F   | K   | PM     | N   | ØO | P      | R   |     |
| XM   | 200 | F14, F16, F25      | 457           | 279 | 343 | 476 | 203.2 | 453 | 385 | 9.525  | 68  | 40 | 44.225 | 68  | 190 |
|      | 250 | F14, F16, F25, F30 | 533           | 287 | 407 | 514 | 254   | 582 | 472 | 12.7   | 90  | 55 | 60.6   | 90  | 325 |
|      | 300 | F14, F16, F25, F30 | 610           | 305 | 483 | 592 | 304.8 | 605 | 515 | 12.7   | 90  | 55 | 60.6   | 90  | 480 |
|      | 350 | F16, F25, F30, F35 | 686           | 343 | 533 | 665 | 340   | 741 | 607 | 19.05  | 134 | 75 | 83.15  | 134 | 635 |
|      | 400 | F16, F25, F30, F35 | 762           | 381 | 597 | 750 | 390   | 779 | 633 | 22.275 | 146 | 85 | 94.625 | 146 | 840 |

Page 2 contains same information in imperial units. This is a page 1/2

FACE-TO-FACE DIMENSIONS ACC. TO ASME B16.10  
PRESSURE RATINGS: XG= ASME 300, XM=ASME150  
FLANGED, FULL BORE  
Valve is shown in closed position

|                                              |                                                                                     |                                                                                     |          |            |            |     |                  |                   |                |       |                   |
|----------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------|------------|------------|-----|------------------|-------------------|----------------|-------|-------------------|
|                                              |  |  | PMI DATE | 30.10.2000 | PNEL. SHAL | RLS | TANK. DECCO. RKM | HTV. SUPPL. T.JP. |                |       |                   |
|                                              |                                                                                     |                                                                                     |          |            |            |     |                  |                   | EXT. OLD. HSE. | WATER | HTV. SUPPL. T.JP. |
|                                              |                                                                                     |                                                                                     |          |            |            |     |                  |                   |                |       |                   |
| BALL VALVE XM/XG 2"-16"<br>DIMENSION DRAWING |                                                                                     |                                                                                     |          |            |            |     |                  |                   |                |       |                   |
| Neles Field Controls Oy                      |                                                                                     |                                                                                     |          |            |            |     |                  |                   |                |       |                   |



## HOW TO ORDER

M07F05SR5, where

M07 = type of manual operator  
 F05 = mounting flange for valve  
 SR5 = type of handwheel

## Dimensions in mm

| Unit size                            | M07       | M10       | M12       | M14         | M15       | M16       |
|--------------------------------------|-----------|-----------|-----------|-------------|-----------|-----------|
| Input torque, M1 (Nm)                | 22.7      | 45.5      | 88.5      | 111         | 166       | 170       |
| Max. output torque, M2 (Nm)          | 250       | 500       | 1000      | 1800        | 3400      | 4500      |
| Turns to close                       | 10        | 10        | 10.5      | 15          | 17        | 22        |
| Handwheel diameter, øZ / Type        | 125/SR5   | 200/SR8   | 250/SR10  | 457/R18     | 457/R18   | 610/R24   |
| G1, with standard input shaft        | 152       | 169       | 210       | 279         | 331       | 391       |
| F1, with standard input shaft        | 196       | 227       | 285       | 378         | 457       | 649       |
| G2, with extended input shaft        |           | 239       | 282       | 354         | 406       | 466       |
| F2, with extended input shaft        |           | 297       | 357       | 435         | 632       | 642       |
| V                                    | 38.5      | 52        | 66.7      | 89.5        | 123       | 154       |
| Y                                    | 45        | 68        | 75        | 86          | 114       | 117       |
| K                                    | 58        | 67        | 81        | 93.5        | 105.5     | 126.5     |
| R                                    | 26.5      | 35        | 42        | 60          | 60        | 60        |
| Max. stem height                     | 51        | 57        | 72        | 81          | 92        | 113       |
| ød, max. valve shaft diameter        | 25        | 25        | 30        | 45          | 65        | 70        |
| Splines: ANSI B92.1-1970             | 28T 20/40 | 28T 20/40 | 28T 16/32 | 40T 16/32   | 40T 12/24 | 44T 12/24 |
| Weight (kg)                          | 2.9       | 6         | 9.5       | 18          | 30.7      | 45.2      |
| Valve mounting flange, ISO 5211 type | F05 F07   | F10       | F12       | F12 F14 F16 | F14 F16   | F16 F25   |
| S                                    | 60        | 70        | 102       | 125         | 140       | 165       |
| N, number of holes                   | 4         | 4         | 4         | 4           | 4         | 4         |
| U, dia                               | M6 M8     | M10       | M12       | M12 M16 M20 | M16 M20   | M20 M16   |
| U, depth                             | 9         | 8.5       | 13        | 16          | 21.5      | 20        |

## Dimensions in inch

| Unit size                            | M07       | M10       | M12       | M14         | M15       | M16       |
|--------------------------------------|-----------|-----------|-----------|-------------|-----------|-----------|
| Input torque, M1 (ft lbs)            | 17        | 34        | 66        | 82          | 123       | 126       |
| Max. output torque, M2 (ft lbs)      | 185       | 370       | 741       | 1333        | 2519      | 3333      |
| Turns to close                       | 10        | 10        | 10.5      | 15          | 17        | 22        |
| Handwheel diameter, øZ / Type        | 6/SR5     | 8/SR8     | 10/SR10   | 18/R18      | 18/R18    | 24/R24    |
| G1, with standard input shaft        | 5.98      | 6.65      | 8.27      | 10.98       | 13.03     | 15.39     |
| F1, with standard input shaft        | 7.72      | 8.94      | 11.22     | 14.88       | 17.99     | 21.61     |
| G2, with extended input shaft        |           | 9.41      | 11.10     | 13.94       | 15.98     | 18.35     |
| F2, with extended input shaft        |           | 11.69     | 14.06     | 17.13       | 20.94     | 25.28     |
| V                                    | 1.52      | 2.05      | 2.63      | 3.52        | 4.84      | 6.06      |
| Y                                    | 1.77      | 2.28      | 2.95      | 3.39        | 4.49      | 4.61      |
| K                                    | 2.28      | 2.64      | 3.19      | 3.68        | 4.15      | 4.98      |
| R                                    | 1.04      | 1.38      | 1.65      | 1.97        | 1.97      | 1.97      |
| Max. stem height                     | 2.01      | 2.24      | 2.83      | 3.19        | 3.62      | 4.45      |
| ød, max. valve shaft diameter        | 1         | 1         | 1.2       | 1.8         | 2.2       | 2.8       |
| Splines: ANSI B92.1-1970             | 28T 20/40 | 28T 20/40 | 28T 16/32 | 40T 16/32   | 40T 12/24 | 44T 12/24 |
| Weight (lbs)                         | 6.4       | 11        | 20.9      | 39.6        | 67.5      | 99.4      |
| Valve mounting flange, ISO 5211 type | F05 F07   | F10       | F12       | F12 F14 F16 | F14 F16   | F16 F25   |
| S                                    | 1.97      | 2.76      | 4.02      | 4.92        | 5.51      | 6.50      |
| N, number of holes                   | 4         | 4         | 4         | 4           | 4         | 4         |
| U, dia                               | M6 M8     | M10       | M12       | M12 M16 M20 | M16 M20   | M20 M16   |
| U, depth                             | 0.35      | 0.33      | 0.51      | 0.63        | 0.85      | 0.79      |

Subject to change without prior notice.

## INTERNATIONAL MANUFACTURING AND SALES LOCATIONS

UNITED STATES: Shrewsbury, Massachusetts. MEXICO: Chihuahua. BRAZIL: São José dos Campos.

FINLAND: Helsinki. PEOPLE'S REPUBLIC OF CHINA: Shanghai.

Our products are available through Neles Automation sales offices in Australia, Austria, Belgium, Canada, Chile, Denmark, England, Germany, Indonesia, Italy, Japan, The Netherlands, Norway, Poland, Portugal, Russia, Saudi Arabia, Singapore, South Africa, South Korea, Spain, Sweden, Switzerland, Thailand, United Arab Emirates, Venezuela, as well as through a world-wide network of representatives.

**neles automation**  
 A member of Metso Corporation

P.O. Box 310, 00811 Helsinki, Finland Tel. int. +358 20 483 150 Fax int. +358 20 483 151

P.O. Box 8004, Shrewsbury, MA 01545, USA Tel. int. +1 508 852 3567 Fax int. +1 508 852 8762

501 Orchard Road, #05-09 Wheelock Place, 238880 Singapore Tel. int. +65 735 5200 Fax int. +65 735 2955

www.nelesautomation.com

TYPE : XG02DWT AJ2SJHABA

No.: HO 16762

BODY : \_ WCB \_

Tmax : \_ + 230° C \_

TRIM : \_ 316 \_

Tmin : \_ - 29° C \_

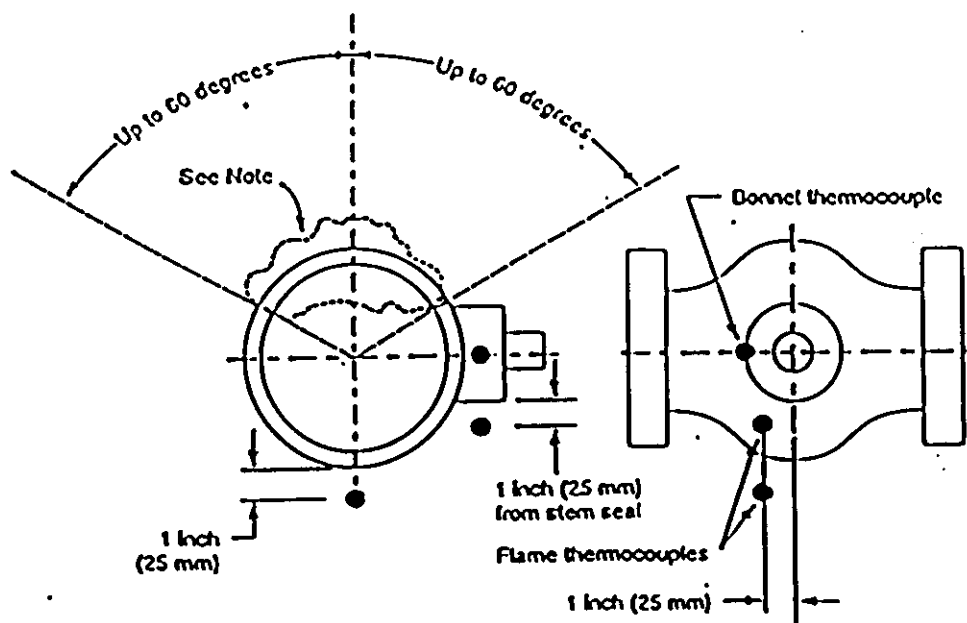
SHAFT : \_ XM-19 \_

RATING : \_ ASME 300 \_

SEAT : \_ STELL \_

dPs : \_ 51 BAR \_

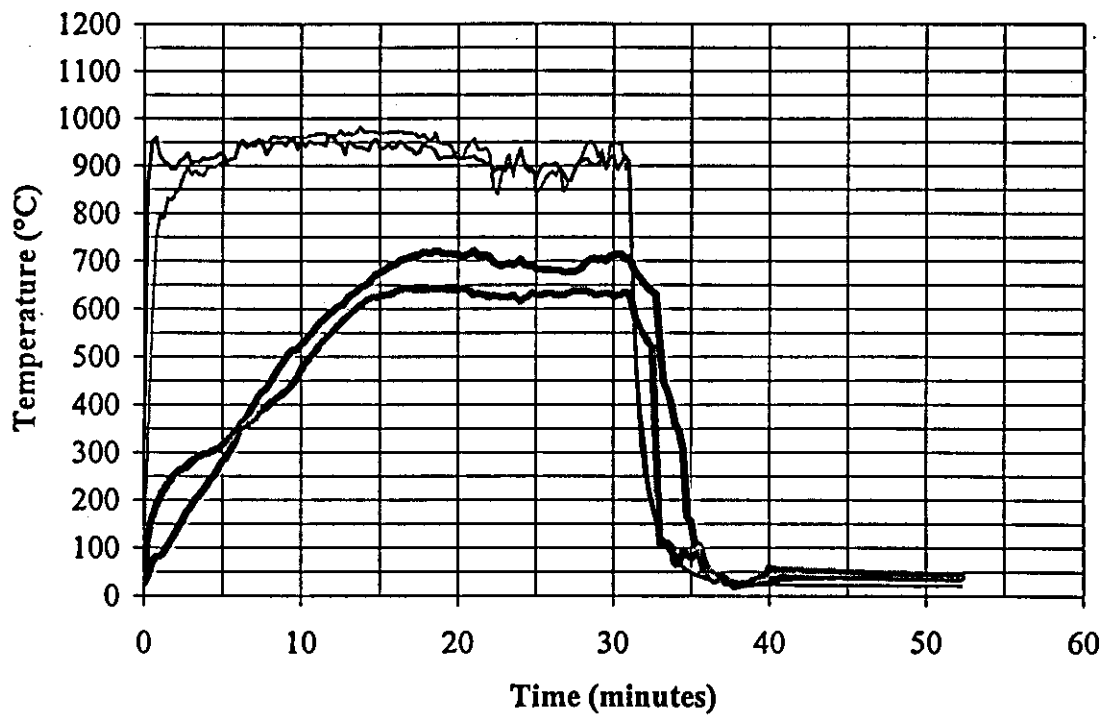
## NAMEPLATE DETAILS



Note: The body thermocouple shall be installed in this area. When installed externally, the body thermocouple shall be recessed into the valve body a distance of  $\frac{1}{2}$  the thickness of the wall.

Installation of Temperature Measurement Sensors for Valves Rated  
Lower Than Class 900

Time-Temperature-graph  
Valve type: XG02DWT AJ2SJHABA



Time-Pressure-graph

