| | | | |
|---|---|---|---|
| *Project:* | Fire-Safe Testing | *Certificate Number:* | HEL 0001080/1 |
| *Client:* | Metso Field Systems Oy, Helsinki, Finland | *Office:* | Helsinki |
| *Client's Order Number:* | 7100032 | *Date:* | 14 February 2001 |
| | | *Order Status:* | Complete |
| *Inspection Dates* | | | |
| *First:* | 22 November 2000 | *Final:* | 27 November 2000 |

*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: XT04CWTAJ2SJHABA
Rating: ANSI Class 150
Size: NPS 4"
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 3" to 6" as well as valves with pressure rating ASME 300 are also qualified.

Lloyd's Register
SURVEYOR TO LLOYD'S REGISTER OF SHIPPING
Helsinki

Päivi Björkestam
Surveyor to Lloyd's Register of Shipping

# FIRE TEST FOR BALL VALVE, TYPE XT04CWTAJ2SJHABA

**OBJECT:** Fire test of ball valve XT04CWTAJ2SJHABA in accordance with standard API 607, Fourth Edition, May 1993. (Fire Test for Soft-Seated Quarter-Turn Valves).

**SPECIMEN:** The test valve XT04CWTAJ2SJHABA 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 4" and pressure class of the body is ASME 150. The manual actuator M10 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 November 22, and 27, 2000.

The temperatures and test pressures during the test were recorded with a datalogger. The results are shown in Appendices 6 and 7. 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 for direction B 6 minutes and for direction A 5 minutes. In direction B the test pressure is on the side of part no. 1 (Appendix 1).

The through-seat leakages and external leakages of the test valve during the test are shown in Tables 1 and 2 below.

**TABLE 1.**
Direction B, November 22, 2000

| TEST PHASE | TIME min. | LEAKAGE ml/in/min | |
|---|---|---|---|
| | | measured | allowed |
| Start | 0 | 0 | |
| Required flame temperature | 0.5 | 0 | |
| Seat leakage during heating | 30.5 | 0 | 100 |
| External leakage heating + cooling | 40.5 | 0 | 25 |
| Operation of valve | 42 | | |
| Stabilization period | 47 | | |
| 5 min seat leakage | 52 | 0 | 20 |
| 5 min external leakage | 52 | 0 | 25 |

**TABLE 2.**
Direction A, November 27, 2000

| TEST PHASE | TIME min. | LEAKAGE ml/in/min | |
|---|---|---|---|
| | | measured | allowed |
| Start | 0 | 0 | |
| Required flame temperature | 1 | 0 | |
| Seat leakage during heating | 31 | 6 | 100 |
| External leakage heating + cooling | 41 | 0 | 25 |
| Operation of valve | 42 | | |
| Stabilization period | 47 | | |
| 5 min seat leakage | 52 | 1 | 20 |
| 5 min external leakage | 52 | 0 | 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 XT04CWTAJ2SJHABA met the requirements presented in standard API 607, Fourth Edition: 1993.

Jari Kirmanen
Laboratory Engineer
METSO FIELD SYSTEMS OY

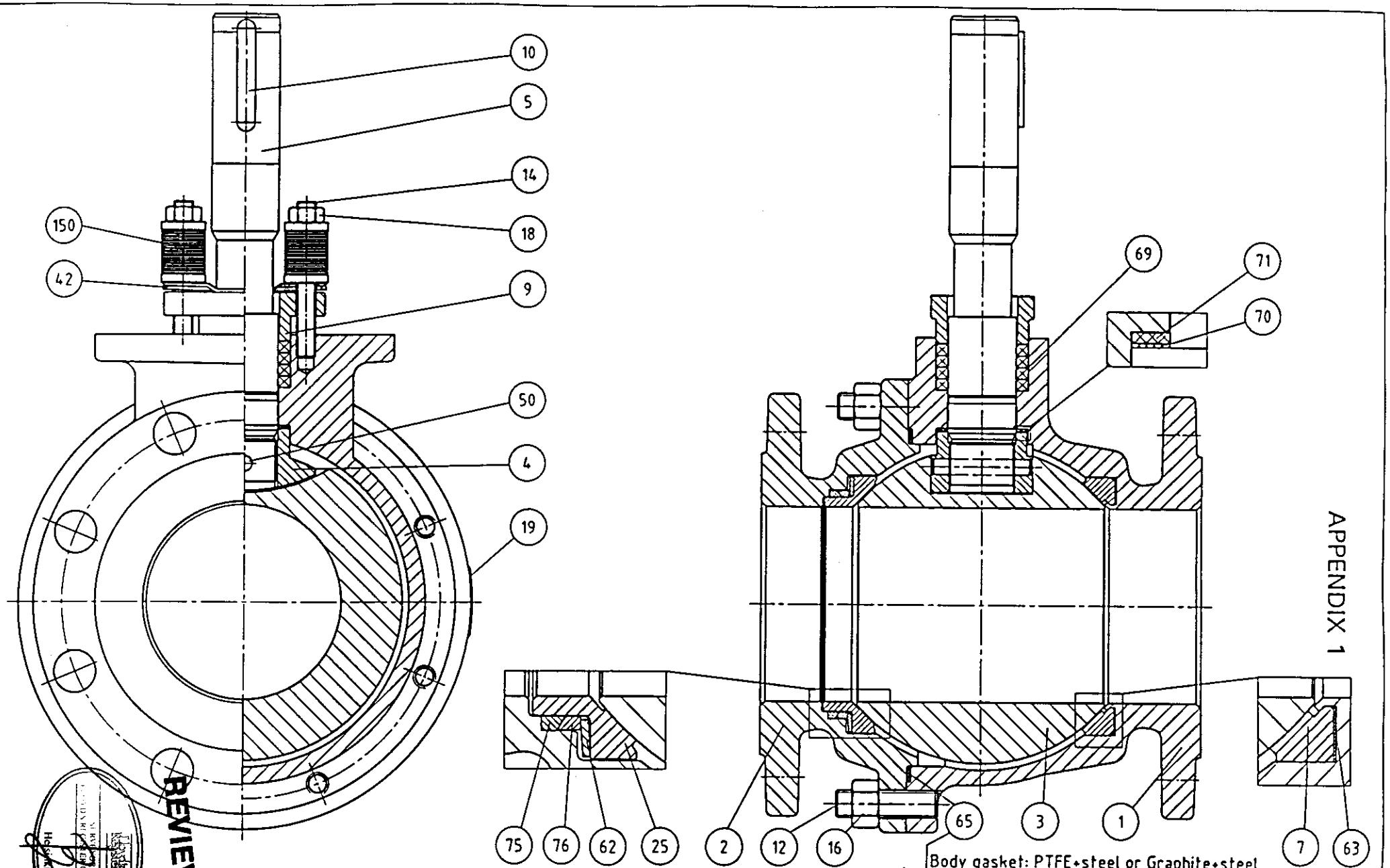
Päivi Björkestam
Surveyor to Lloyd's Register

SURVEYOR TO LLOYD'S REGISTER OF SHIPPING
Helsinki

APPENDICES:

1. Assembly drawing C FO3315
2. Parts and material list H016760
3. Dimension drawing CF04219
4. Manual actuators dimension drawing.
5. Nameplate details. Location of temperature measurement points.
6. Temperatures and pressure measurement results during the test of the direction B.
7. Temperatures and pressure measurement results during the test of the direction A.

   (T1 and T2= Flame thernoc,
   T3= Bonnet, T4= Body, T5= unused.
   P1= Center cavity, p2= unused, p3= test pressure.)


10
5
14
18
150
42
9
50
4
19
69
71
70
75
76
62
25
2
12
16
65
3
1
7
63
Body gasket: PTFE+steel or Graphite+steel
APPENDIX 1
REVIEWED
BALL VALVE XA/XT-SERIES 02"-08", DN50-200
STANDARD CONSTRUCTION
SEAT H FULL BORE
ASSEMBLY DRAWING
Neles Field Controls Oy
DWN DATE 03.04.00
DWN. RLS
CHECK MI
APPR. TJP
C F03315

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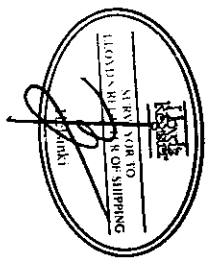
Customer C-BOM
XT04CWTAJ2SJHABA Id-code: H016760 Rev: 0
BALL VALVE



| Part | Id-code | Description | Material | Qty |
|---|---|---|---|---|
| 001 | H013556 | BODY | ASTM A216 gr. WCB | 1 |
| 002 | H013611 | BODY CAP | ASTM A216 gr. WCB | 1 |
| 003 | 881640 | BALL | ASTM A351 gr. CF8M+HCr | 1 |
| 000 | 943120 | BALL | A351 gr. CF8M/1.4408 | 1 |
| 004 | 1182840 | SPLINE DRIVER | A351 gr. CF8M/1.4581 | 1 |
| 005 | 1172860 | SHAFT | ASTM A479 gr. XM-19 | 1 |
| 007 | H013632 | BALL SEAT | AISI 316+ALLOY 50Nb | 1 |
| 009 | 46270 | CASTING GLAND | A351 gr. CF8M/1.4408 | 1 |
| 010 | 3099 | KEY | AISI 329 | 1 |
| 012 | 234938 | STUD | ASTM A193 gr. B7 | 6 |
| 014 | H016753 | STUD | ASTM A193 gr. B7 | 2 |
| 016 | 3344 | HEXAGON NUT HEAVY | ASTM A194 gr. 2H | 6 |
| 018 | 3342 | HEXAGON NUT HEAVY | ASTM A194 gr. 2H | 2 |
| 019 | 234456L | IDENTIFICATION PLATE | AISI 304 | 1 |
| 000 | 234456A | BLANK ID-PLATE | AISI 304 | 1 |
| 025 | H013681 | BALL SEAT | AISI 316+ALLOY 50Nb | 1 |
| 042 | 932760 | RETAINER PLATE | 316L/1.4435 | 2 |
| 050 | H013707 | LOCKING PIN | ASTM A479 gr. XM-19 | 1 |
| 062 | H013714 | SEAT SPRING | UNS N08825 | 2 |
| 063 | 90551 | SHEET RING | GRAPHITE | 1 |
| 065 | 004-0630-36 | BODY GASKET | GRAPHITE+AISI 316 | 1 |
| 069 | 233396 | PACKING RING | GRAPHITE+PTFE | 4 |



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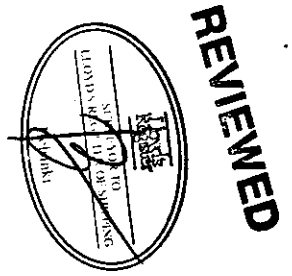
Customer C-BOM
XT04CWTAJ2SJHABA Id-code: H016760 Rev: 0
BALL VALVE

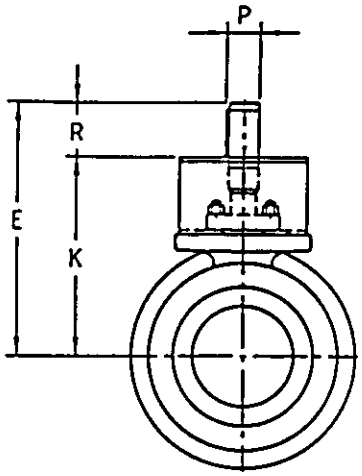


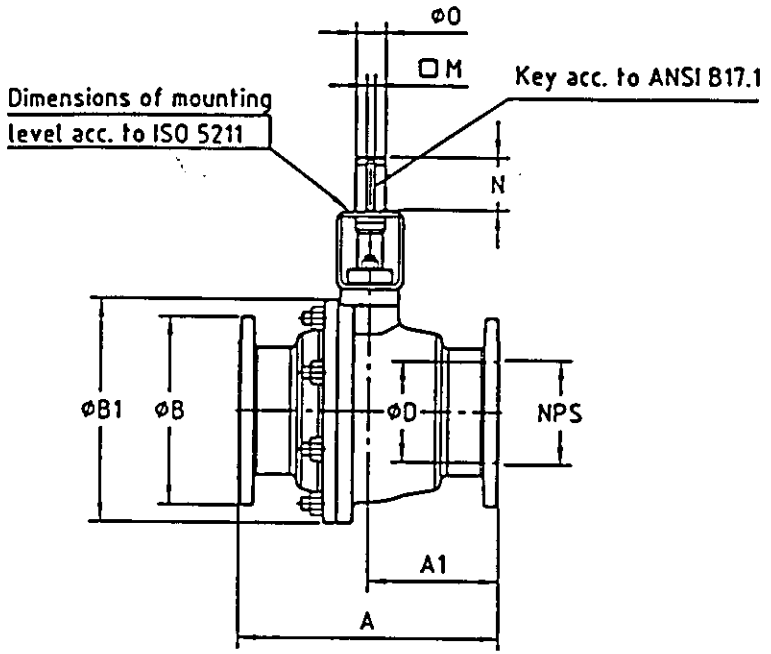
| Part | Id-code | Description | Material | Qty |
|---|---|---|---|---|
| 070 | 004-0701-49/H | THRUST BEARING | PTFE+C+GF (MTFE) | 3 |
| 075 | 939382 | BACK SEAL | GRAPHITE | 1 |
| 076 | 939320 | SUPPORT RING | AISI 316 | 1 |
| 150 | 979560 | DISC SPRING SET | EN 10083-1.8159+ENP | 2 |

Documents: F03315 BALL VALVE XA/XT-SERIES 02"-08", DN50-200

Spare part sets:





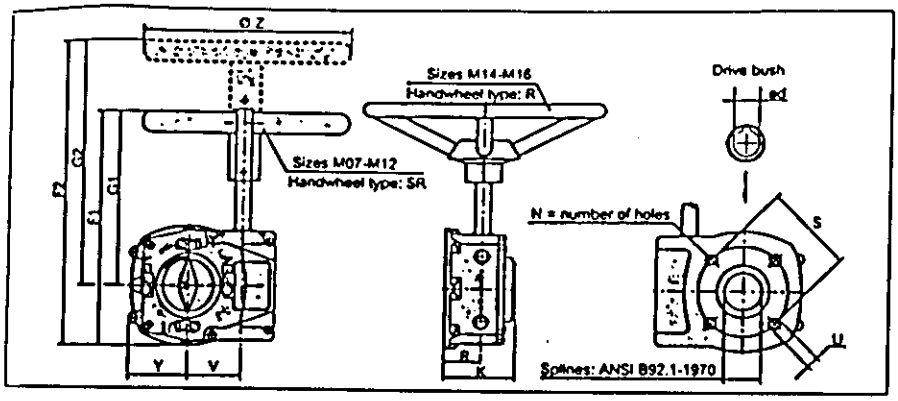

| TYPE | SIZE | ISO FLANGE | DIMENSIONS mm (in) | | | | | | | | | | | | KG (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | A | A1 | ØB | ØB1 | ØO | E | K | □M | N | ØO | P | R | |
| XT__C | 2 | F07, F10 | 178 (7.01) | 79 (3.11) | 152.4 (6) | 146 (5.75) | 50.8 (2) | 215 (8.46) | 168 (6.1) | 6.35 (0.25) | 46 (1.81) | 25 (0.98) | 27.8 (1.09) | 47 (1.85) | 11 (25) |
| | 3 | F07, F10, F12, F14 | 203 (7.99) | 101.5 (4) | 190.5 (7.5) | 190 (7.48) | 76.2 (3) | 237 (9.33) | 190 (7.48) | 6.35 (0.25) | 46 (1.81) | 25 (0.98) | 27.8 (1.09) | 47 (1.85) | 25 (56) |
| | 4 | F10, F12, F14 | 229 (9.02) | 110.5 (4.35) | 228.6 (9) | 241 (9.49) | 101.6 (4) | 309 (12.17) | 250 (9.84) | 9.52 (0.37) | 58 (2.28) | 35 (1.38) | 39.1 (1.54) | 59 (2.32) | 39 (86) |
| | 6 | F14, F16 | 394 (15.51) | 197 (7.76) | 279.5 (11) | 342 (13.46) | 152.4 (6) | 386 (15.2) | 305 (12) | 12.70 (0.5) | 80 (3.15) | 45 (1.77) | 50.4 (1.98) | 81 (3.19) | 93 (205) |
| | 8 | F14, F16, F25 | 457 (17.99) | 228.5 (9) | 342.9 (13.5) | 430 (16.93) | 203.2 (8) | 476 (18.74) | 385 (15.16) | 12.70 (0.5) | 90 (3.54) | 55 (2.16) | 60.6 (2.39) | 91 (3.58) | 190 (419) |
| | | | | | | | | | | | | | | | |
| XA__D | 2 | F07, F10 | 216 (8.5) | 89 (3.5) | 165.1 (6.5) | 146 (5.75) | 50.8 (2) | 215 (8.46) | 168 (6.1) | 6.35 (0.25) | 46 (1.81) | 25 (0.98) | 27.8 (1.09) | 47 (1.85) | 15 (33) |
| | 3 | F07, F10, F12, F14 | 282 (11.1) | 141 (5.55) | 209.6 (8.25) | 200 (7.87) | 76.2 (3) | 237 (9.33) | 190 (7.48) | 6.35 (0.25) | 46 (1.81) | 25 (0.98) | 27.8 (1.09) | 47 (1.85) | 35 (75) |
| | 4 | F10, F12, 14 | 305 (12.01 | 152.5 (6) | 254 (10) | 254 (10) | 101.6 (4) | 309 (12.17) | 250 (9.84) | 9.52 (0.37) | 58 (2.28) | 35 (1.38) | 39.1 (1.54) | 59 (2.32) | 59 (130) |
| | 6 | F14, F16 | 403 (15.87) | 201.5 (7.93) | 317.5 (12.5) | 353 (13.9) | 152.4 (6) | 386 (15.2) | 305 (12) | 12.70 (0.5) | 80 (3.15) | 45 (1.77) | 50.4 (1.98) | 81 (3.19) | 129 (284) |
| | 8 | F14, F16, F25 | 502 (19.75) | 249 (9.81) | 381 (15) | 462 (18.19) | 203.2 (8) | 476 (18.74) | 385 (15.16) | 12.70 (0.5) | 90 (3.54) | 55 (2.16) | 60.6 (2.39) | 91 (3.58) | 255 (562) |

APPENDIX 3

FACE-TO-FACE DIMENSIONS ACC. TO ASME B16.10
PRESSURE RATINGS C=ASME 150, D=ASME 300
FLANGED, FULL BORE
Valve is shown in closed position

REVIEWED

| | | | | |
|---|---|---|---|---|
| | PVM DATE 30.05.2000 | PART. DWG RLS | TAPE. CHECK. HE | HYV. APPR. TJP |
| BALL VALVE XT/XA 2"-8"<br>DIMENSION DRAWING | | ENT. BLD NR. | MATR. REV. NO | |
| | | C | F04219 | |
| 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 diamete, eZ / 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 | | 549 | |
| 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 | | 58 | 75 | 86 | | | 114 | | 117 | |
| K | 58 | | 67 | 81 | 93.5 | | | 105.5 | | 126.5 | |
| R | 26.5 | | 35 | 42 | 50 | | | 60 | | 60 | |
| Max. stem height | 51 | | 57 | 72 | 81 | | | 92 | | 113 | |
| ed, 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 | 125 | 140 | 165 | 140 | 165 | 165 | 254 |
| N, number of holes | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 8 |
| U, dia | M6 | M8 | M10 | M12 | M12 | M16 | M20 | M16 | M20 | M20 | M16 |
| U, depth | 9 | 8.5 | 13 | 16 | 21.5 | 21.5 | 21.5 | 23 | 25 | 25 | 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, eZ / Type | 5/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 | |
| ed, 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 | 4.92 | 5.51 | 6.50 | 5.51 | 6.50 | 6.50 | 10.00 |
| N, number of holes | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 8 |
| 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 | 0.85 | 0.85 | 0.91 | 0.98 | 0.98 | 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.

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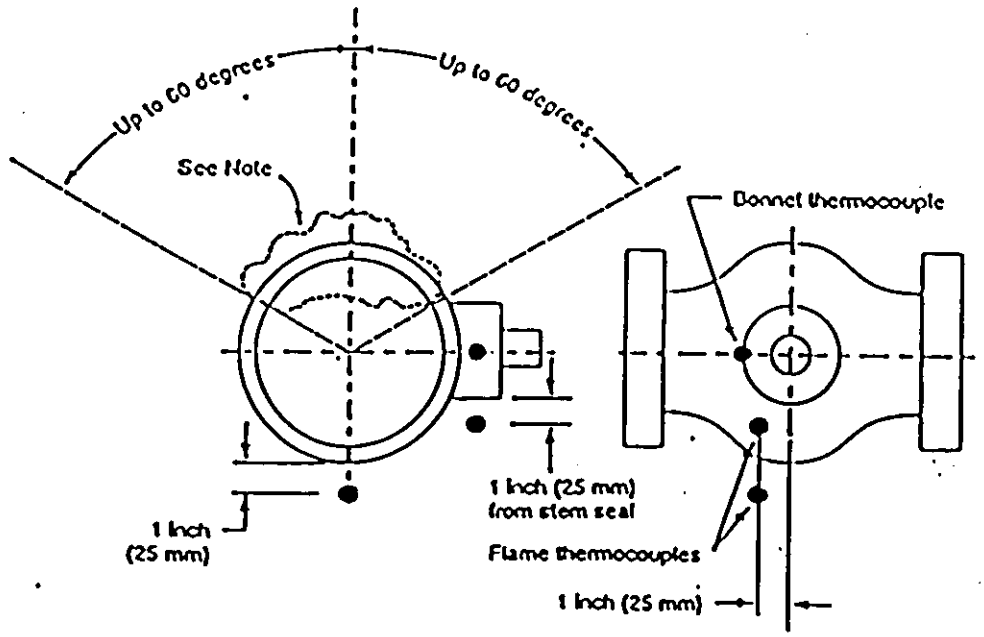
APPENDIX 5

TYPE : XT04CWTAJ2SJHABA

No.: HO 16760

| | |
|---|---|
| BODY : _ 1.4408/CF8M _ | Tmax : _ +425° C_ |
| TRIM : _ 316 _ | Tmin : _ - 29° C_ |
| SHAFT : _ XM-19 _ | RATING : _ ASME 150 _ |
| SEAT : _ STELL _ | dPs : _ 19,6 BAR_ |

NAMEPLATE DETAILS



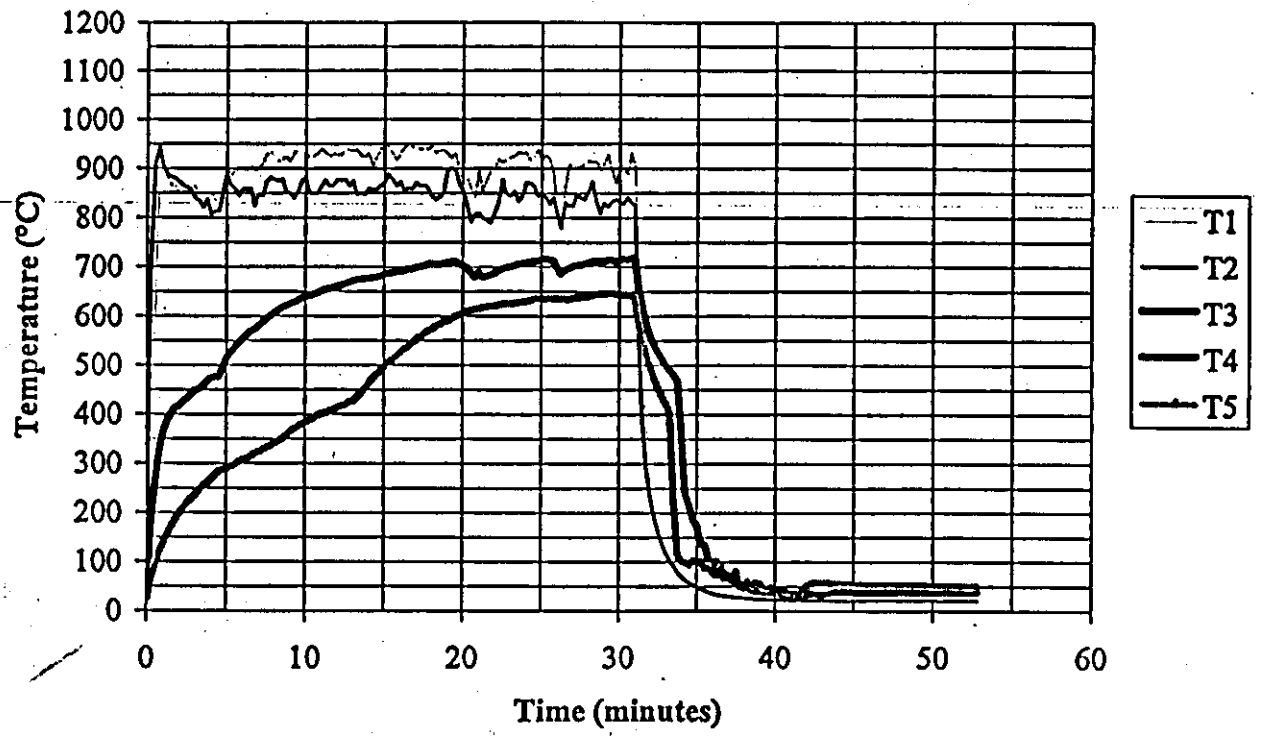

Note: The body thermocouple shall be installed in this area. When installed externally, the body thermocouple shall be recessed into the valve body a distance of ¼ the thickness of the wall.

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

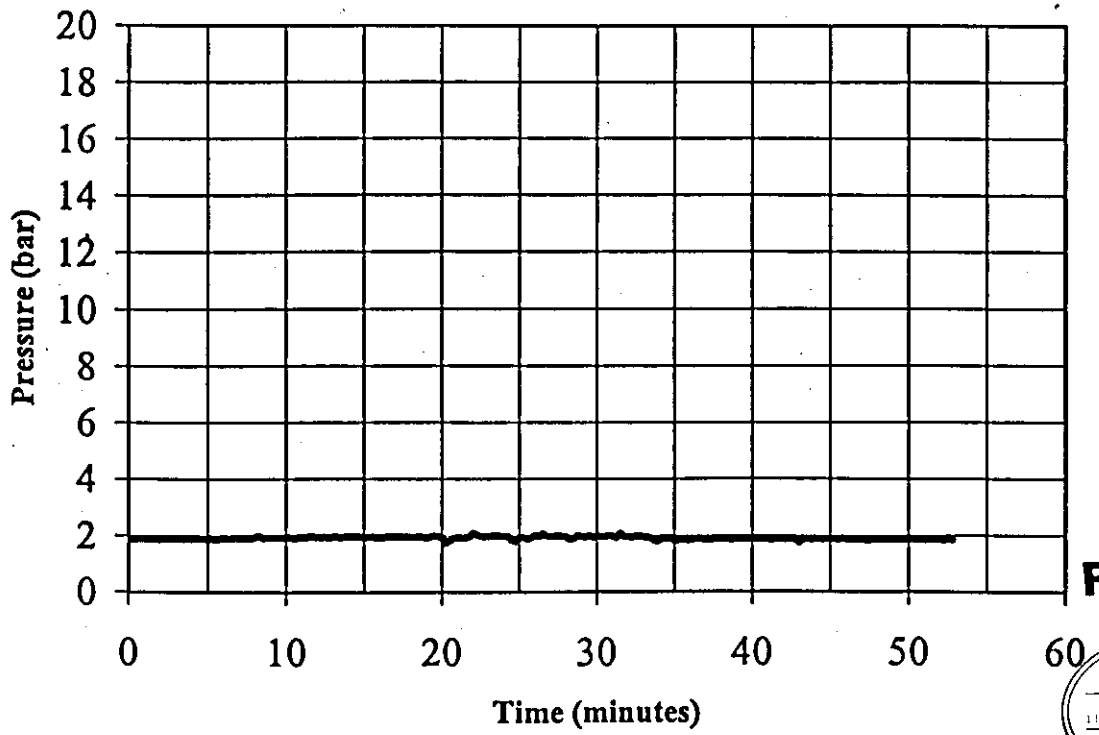
REVIEWED

Lloyd's Register
SURVEYOR TO LLOYD'S REGISTER OF SHIPPING
Helsinki

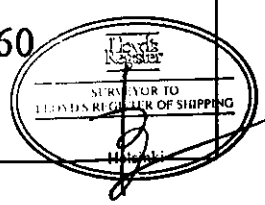
Time-Temperature-graph
Valve type:XT04CWTAJ2SJHABA



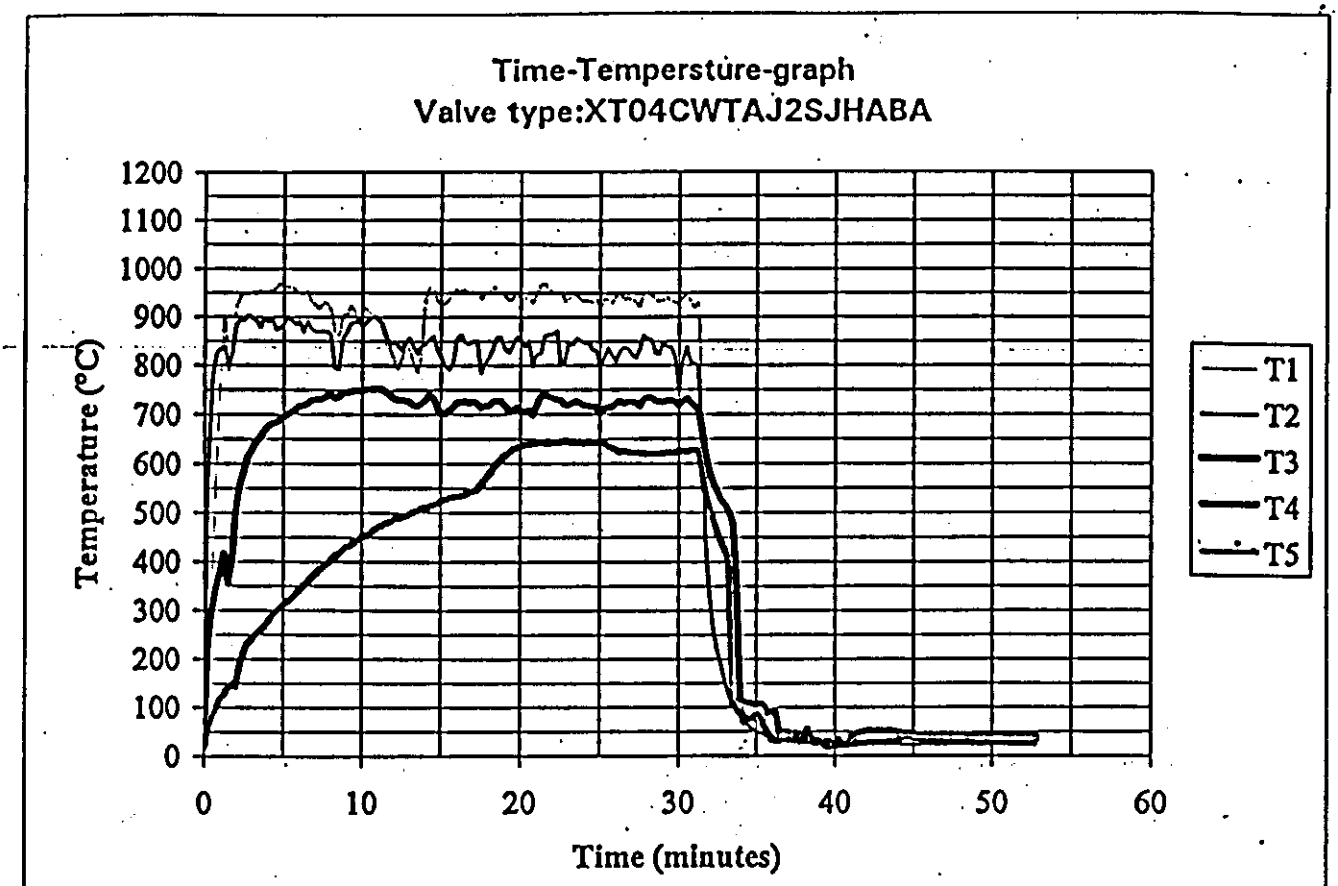

Time-Pressure-graph

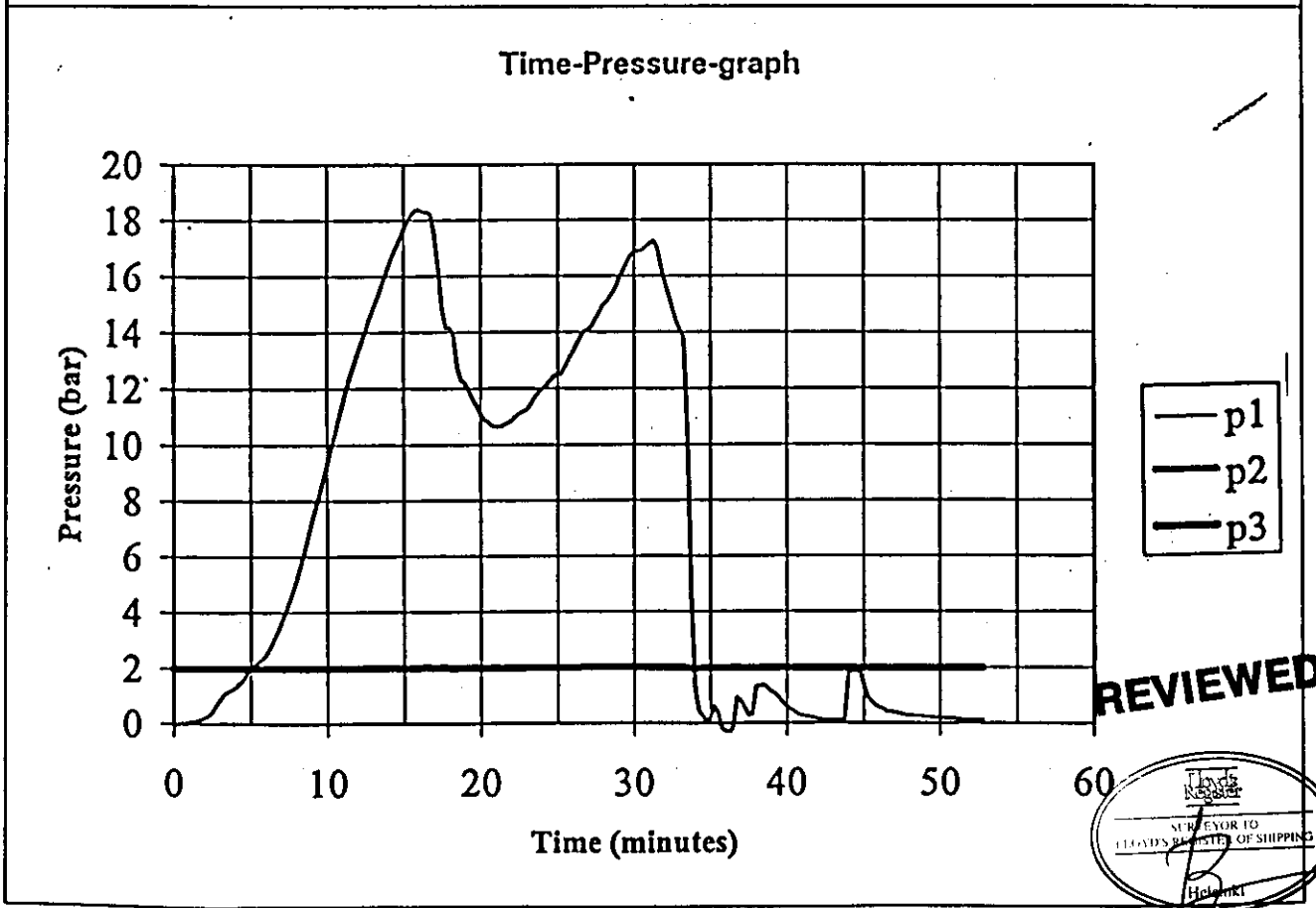



REVIEWED




November 22. 2000




REVIEWED



November 27, 2000