RAND WATER

FLOAT CONTROL VALVES

1 OBJECTIVE
This specification provides the minimum requirements for float control valves to be used by Rand Water and should be used when purchasing new valves.

2 SCOPE
This Specification is for the manufacture, supply, testing and delivery to Rand Water’s Central Depot or construction site of valves for installation by Rand Water.

3 DRAWING REFERENCES
A11791 Standard Flange Dimensions

4 GENERAL

4.1 WORKMANSHIP AND MATERIALS
4.1.1 The workmanship shall be of the highest quality throughout and any inferior work will be a cause for rejection.
4.1.3 All materials shall be of that quality and possess those properties best suited to the purpose for which they are used. All materials and performances shall comply with the requirements of the most recent edition of the appropriate Standard Specification and test pieces forming part of the actual castin

4.2 MATERIALS
4.2.1 The material of valve bodies, bonnet and covers shall be in accordance with the following table:

<table>
<thead>
<tr>
<th>Test pressure</th>
<th>Material</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500 kPa</td>
<td>Cast Iron</td>
<td>BS 1452 Gr 220 (min)</td>
</tr>
<tr>
<td>3500 kPa</td>
<td>Spheroidal Graphite Cast Iron</td>
<td>BS 2789 Gr 420/12 (min)</td>
</tr>
<tr>
<td>5000 kPa</td>
<td>Cast Steel</td>
<td>BS 3100 Gr A2 (min)</td>
</tr>
<tr>
<td>7000 kPa</td>
<td>Cast Steel</td>
<td>BS 3100 Gr A2 (min)</td>
</tr>
<tr>
<td>8500 kPa</td>
<td>Cast Steel</td>
<td>BS 3100 Gr A2 (min)</td>
</tr>
</tbody>
</table>
4.2.2 The design of all valves shall be such that safe stresses are not exceeded when the valves are subjected to the test pressures specified.

5. SPECIFICATION

Seal Pressure Rating 35 bar
Body test pressure 70 bar
Sealing metal to metal seal
Inlet bend Ductile iron BS EN 1583 GJS 400 15
Inlet section Ductile iron BS EN 1583 GJS 400 15
Discharge section Ductile iron BS EN 1563GJS 400 15
Plunger Stainless steel BS 1504 304C15/Stellite
Nosepiece Stainless steel BS 970-316S31
Pilot valve Stainless steel BS 970 type 316/Stellite
Pilot valve rod Aluminium bronze BS EN 12164 CW307G
Seat Stainless steel BS 970-316S31
O Rings EPDM
Bolting HTS grade 8.8
Inlet flange To suit the existing installation
Corrosion protection Epoxy coating, 300 um min. DFT, Blue,
Internal lever Galvanised carbon steel BS 4360 grade 43A
Float tube Stainless steel BS 970-316L
Guide rod Stainless steel BS 970-316S16
Cheese shaped float Stainless steel BS 970-316L

The design of all valves shall be such that safe stresses are not exceeded when the valves are subjected to the test pressures specified.

5.1 ITEMS NOT MENTIONED

5.1.1 This Specification does not necessarily mention every detail which has to be supplied and the type of design of any detail not specifically mentioned is left to the discretion of the Tenderer provided the complete equipment supplied complies with the Specification.
5.2 DEPARTURE FROM SPECIFICATION

5.2.1 Certain features and items which are considered essential are detailed in this Specification. Any departure by the Tenderer from these requirements shall be specially excluded or amended in writing by noting them in the contract at the time of tendering, otherwise the Engineer may require such features and items to be provided by the Contractor without any increase in the contract price.

5.3 DRAWINGS AND INFORMATION

5.3.1 General Arrangement Drawings and Specification shall be supplied with the tender.

5.3.2 Drawings for approval may be paper prints but, after approval, these drawings shall be supplied with the approved “CAD” drawings tabled and stored in a format that can be loaded, edited and printed from CAD.

5.3.3 Before completion of the contract, the Contractor shall also supply any drawings that the Engineer may require additional to those listed.

5.3.4 All drawings shall bear Rand Water’s contract number and reference number and the title shall state the type, size and test pressure of the valve.

5.3.5 Two sets of clearly marked 650 MB CDROM disk containing all drawings shall be supplied. Drawings shall be supplied with the approved “CAD” drawings tabled and stored in a format that can be loaded, edited and printed from ACAD release 14 or later.

5.3.6 Sufficient information shall be given on the drawings to enable replacement parts to be made locally, if necessary.

5.4 OPERATING, MAINTENANCE AND INSTALLATION MANUALS

5.4.1 The Contractor shall provide fully illustrated operating, maintenance and installation manuals for the valves and actuators written in English for approval to Rand Water. One copy of the approved manuals and two sets of clearly marked 650 MB CDROM disks containing operating, maintenance and installation manuals shall be supplied to the Engineer with delivery of the valve.

5.4.2 Each document shall take the form of a fully indexed Workshop Manual containing, but not limited to the following data:

- General Arrangement drawing for each valve.
- Detailed operating instructions.
- Proposed preventative maintenance schedules and procedures covering all wearing components.
- Lubrication schedule together with recommended lubricant for each application and quantity used.
- Detailed dismantling and reassembly instructions and procedures.
- Full details of proprietary components used, i.e. descriptive literature bearing reference numbers, circlip and seal details, etc.
- Spare parts lists with full re-order information.
- Schedule of maintenance tools provided / required and the method of use.
- Electrical schematic diagrams, instrumentation loop diagrams and cable schedules (if applicable).
- Detailed installation requirements and procedures.
- Detailed commissioning procedure.

5.4.3 All data included in the manuals shall be produced on standard A4 size sheets. The materials used shall be resistant to oil and dirt.

5.5 INSPECTION AND TESTING AT WORKS

5.5.1 The whole of the work is to be inspected by the Engineer's Representative at the manufacturers' subcontractors' and/or other outside supplier's works during manufacture. Full information regarding the progress and the necessary facilities to enable the various components to be properly tested and/or inspected shall be given to the Engineer's Representative.

5.5.2 Each component shall be inspected, approved and stamped by the Engineer's Representative with his private mark before assembly commences. All castings shall be true and shall be thoroughly cleaned by shot or sand blasting before machining. Valve body surfaces shall be thoroughly cleaned of excess adhesive or other material used for securing sealing faces, guides and shoes.

5.5.3 All approved castings shall, before coating, be stamped by the Engineer's Representative on the edge of the flange with his private mark. A flat machined surface 15 mm by 25 mm in area shall be provided for this purpose.

5.5.4 After assembly and prior to hydrostatic testing the valves under each Item shall be numbered consecutively. This number shall be hard stamped on the valve flange and used as a reference during inspection and testing.
5.5.6 Rand Water reserves the right to reject any Item which has not been presented for such test and/or inspection.

5.5.7 Certificates of all tests on materials and components are to be forwarded to the Engineer immediately on completion of the tests.

5.6 HYDROSTATIC TESTING

5.6.1 Each pressure containing component and each assembled valve shall be subjected to the hydrostatic tests at the manufacturer’s works, in the presence of and to the satisfaction of the Engineer’s Representative. Each pressure containing component and assembled valve shall withstand the relevant hydrostatic test pressure specified without showing any sweating or defect of any kind. For the hydrostatic test blank flanges shall be bolted to each flange of the valve; through-bolts shall not be used. The pressure shall be applied steadily by approved means and maintained without variation for the duration to be specified for proof and inspection. Should water ooze or sweat from any part or any defect of any nature be discovered the casting shall be indelibly marked and rejected.

5.6.3 Each fully assembled valve shall be subjected to a second hydrostatic pressure test at the specified test pressure, at the manufacturer’s works, in the presence of and to the satisfaction of the Engineer’s Representative.

5.7 FLANGES

5.7.1 Each valve body flange shall be fully machined on the face and spot-faced at each bolt hole on the back. All other drilled holes on cast surfaces shall be spot faced. Sufficient clearance shall be provided between the valve body flanges to enable flange bolts to be tightened (refer S A E wrench clearances). Bolt holes shall be drilled with the center of the bolt circle coincident with the center of the bore of the valve. Each flange shall be of the thickness shown, subject to the tolerance allowed and drilled in accordance with the table under Clause 5.14.

5.7.2 Each valve shall be supplied with two plain faced loose flanges in accordance with the details provided in Clause 5.15.4.

5.7.3 All flanges for valves having a test pressure of 5 000 kPa, 7 000 kPa and 8 500 kPa shall be of the raised face type in accordance with Drawing A11791.

5.15.4 The loose flanges shall be made of materials as listed in Drawing A11791, machined all over and each flange shall be indelibly marked with the reference number of the
5.15.5 The Tenderer shall state the analysis of the material proposed for loose flanges and in the event of cast steel flanges being accepted an analysis of the material used shall be submitted for each flange cast.

5.15.6 All bolts, nuts, washers, etc. necessary for jointing the loose flanges to the valve and those for any other joint in the valve shall be supplied. The loose flanges shall be attached to the respective valve with the complete set of bolts and washers under light tension. Gaskets for the joint between the loose flanges and the valve flanges shall not be supplied.

5.16 FLANGE DRILLING TABLE

5.16.1 All sizes in mm.

5.16.2 Each flange shall be drilled in accordance with the appropriate table indicated on Drawing A11791 for the specified test pressure of the particular valve.

5.16.3 NOTE: Bolt holes shall be drilled off center lines.

5.16.4 Valves of 600 mm diameter and larger having a test pressure of 5 000 kPa, 7 000 kPa and 8 500 kPa shall have their flanges grooved for “O” rings as indicated on Drawing A11791.

5.17 BOLTS

5.17.1 All bolts and nuts shall be threaded in accordance with BS 4190: 1967 or equivalent.

5.17.2 The length of the bolts shall be such that when the bolt is in position and fully tightened the bolt shall project beyond the nut; this projection shall be not more than two threads.

5.17.3 Two mild steel washers shall be provided with each bolt and nut.

5.17.4 Each stud bolt shall be screwed into the parent flange to a depth equal to the full thickness of such flange or a depth equivalent to 1.5 times the nominal bolt size.

5.17.5 All nuts and bolts will be gauged by the Engineer’s Representative and nuts or bolts not complying with will be rejected.
5.18 LIFTING BOLTS
5.18.1 Each valve shall have at least two eye bolts of the requisite strength designed with a factor of safety of at least four securely attached so that the valve can be lowered into the pipeline in its correct position for installation. The depth of the tapped holes in the valve castings shall be at least 1.5 times the diameter of the eye bolt shank.
5.18.2 Additional eye bolts shall be supplied and located on the valves in positions that allow the valves of 450 mm and larger to be lifted safely either in the vertical or horizontal position.
5.18.3 In close proximity of all the lifting bolts the words “LIFT HERE” to be stenciled on the valve body in red paint. The minimum letter size on valves smaller than 450 mm diameter to be 25 mm and on valves larger than 450 mm diameter to be 45 mm.

5.19 IDENTIFICATION PLATE AND NUMBER
5.19.1 A substantial brass or gun metal plate shall be securely attached near the top of each valve, on which the following information shall be recorded:

RAND WATER CONTRACT ..............
NAME OF MANUFACTURER
YEAR OF MANUFACTURE
SIZE OF VALVE .................. mm
BODY TEST PRESSURE ............... kPa
MASS ...........kg (including flanges, nuts, bolts and washers)
REFERENCE No
MAKER’S SERIAL No

5.19.2 In addition, each valve shall have the maker’s serial number cast or stamped on all component parts of the valve and embossed figures showing the size and test pressure shall be cast on the body of the valve.

5.20 PAINTING
5.20.1 Before assembly each valve shall be shot blasted or sandblasted to remove founding material, scale or rust to provide a degree of cleanliness equivalent to SA 2 1/2 of Swedish Standard SIS 05.5900/1967 and then given sufficient coats of Carboline 891 or approved equivalent to ensure a minimum dry film thickness of 250
micrometers to all internal body surfaces and non-machined parts. After each valve has passed the hydrostatic tests specified in Clause 5.10.1 all external surfaces shall be cleaned as above and coated with Carboline 134 or an approved equivalent to ensure a dry film thickness of 200 micrometers. The final colour to be medium sea grey code G24 as per SABS 1091. Gears, spindles, machined surfaces, including machined flanges, etc shall be adequately protected against corrosion.

5.20.2 In the case where a machining surface is to be painted, or where the cutting oil from the machining process has come into contact with a surface to be painted, that surface shall be cleaned with a suitable solvent-free de-greaser and then given a coat of etching zinc primer before the first coat of Carboline or approved equivalent is applied.

5.20.3 Details of the methods of protection to be provided shall be submitted for approval.

5.20.4 Fusion bonded epoxy coatings shall be acceptable but full details are to be provided for approval.

5.21 MARKING, SHIPPING

5.21.1 Each valve and fitting, etc shall have the mass and the reference number specified in the delivery schedule and the words “Rand Water” and the reference number painted in white on the outside. All cases or packages shall have the mass and contents and the words “RAND WATER” and the reference number painted clearly thereon.

5.21.2 Each valve shall be adequately protected against damage in transit.

5.21.3 Machined parts of valves shall be protected by means of plastic or similar protective coatings and other fragile components shall be packed in a separate crate.

5.21.4 Each Type 2 air valve shall be bolted to its isolating valve with a complete set of bolts, nuts, washers and rubber insertion gasket of three mm thickness and shall be delivered as an assembly, including drain and pressure gauge valves of the full bore type.

5.21.5 The actuator for the valve shall be packed in a packing crate separately from the valve and shall be delivered with the valve. The package shall be clearly marked with the relevant valve reference number and serial number (see Clauses 5.9.5 and 5.19) and the fact that the package contains electrical equipment requires that it should be stored in a dry place.