

TEST REPORT

Information Provided by Customer

Customer : [REDACTED]
Address : [REDACTED]
Subject : Testing of Ductile Iron Copper Alloy Seated Gate Valve with Cap Top operated, PN16 & DN450 (Brand Name [REDACTED], Model no, [REDACTED])

Lab. Information

Report No. : [REDACTED]
Issue Date : [REDACTED]
No. : [REDACTED]
Lab. No. : [REDACTED]
Page No. : 1 of 6

Results of testing conducted on the ductile iron copper alloy seated gate valve with cap top operated, PN16 & DN450 are as follows:

1.0) Period of tests : [REDACTED]

2.0) Applicant document : Dimensional measurement ✓
- Face to face dimension and tolerances to clause 4.2.1 of BS 5163-1:2004 and manufacturer's drawing
- Maximum height dimension to clause 4.2.3 of BS 5163-1:2004 and manufacturer's drawing
- Flange (PN16) dimensions and tolerances to figure 6, table 5, 9 & 13 of BS EN 1092-2:1997 and manufacturer's drawing

Hydrostatic Pressure test ✓
- Leak-tightness of shell to internal pressure test to clause 5.1.1 & 5.2.1.1 of BS EN 1074-2:2000 & Annex A of BS EN 1074-1:2000
- Seat tightness at high differential pressure with MOT to clause 5.1.1, 5.2.2.1, 5.2.3, Annex B & C of BS EN 1074-2:2000

Strength test ✓
- Resistance of valve to operating load (mST) to clause 5.1.4, Annex A & B of BS EN 1074-2:2000

Coating test (Fusion bonded epoxy) ✓
- Thickness measurement to clause 4.4 of BS 5163-1:2004 and manufacturer's drawing

Tensile strength test ✓
- Spheroidal graphite cast iron (ductile iron) body material to grade EN-GJS-500/7 of BS EN 1563:2011

Chemical composition analysis ✓
- Stainless steel stem material to grade 1.4057 of BS EN 10088-3:2014
- Copper alloy stem nut material to grade CC491K of BS EN 1982:2008
- Copper alloy seat ring material to grade CC491K of BS EN 1982:2008

3.0) Sample details :

Manufacturer : [REDACTED]
Brand : [REDACTED]
Model no, [REDACTED]
Country of Origin : [REDACTED]

| Sample descriptions | Nominal size (mm) | Marking |
|---|-------------------|------------|
| [REDACTED] brand, ductile iron gate valve, stainless steel stem, copper alloy seated, cap top operated, PN16, externally & internally coated with fusion bonded epoxy in blue color | DN450 | [REDACTED] |

4.0) Scope of testing :

- 4.1) Dimensional measurement
- 4.2) Leak-tightness of shell to internal pressure test
- 4.3) Seat tightness at high differential pressure with MOT
- 4.4) Resistance of valve to operating load (mST)
- 4.5) Seat tightness at high differential pressure with MOT after resistance of valve to operating load (mST)
- 4.6) Coating thickness measurement (Fusion bonded epoxy)
- 4.7) Tensile strength test (Spheroidal graphite cast iron body material)
- 4.8) Chemical composition analysis (Stainless steel stem material)
- 4.9) Chemical composition analysis (Copper alloy stem nut material)
- 4.10) Chemical composition analysis (Copper alloy seat ring material)

5.0) Test results

5.1) Dimensional measurement (all dimensions are in mm)

| Nominal size | | Face to face dimension (L) | Maximum height dimension (H) | Remark |
|--------------|--------------|----------------------------|------------------------------|------------|
| DN450 | Requirements | 432 ^{+3/-3} | 1390 | Acceptable |
| | Results | 433 | 1073 | |

Flange (PN16) dimensional measurement to BS EN 1092-2:1997

| Nominal size | | D | K | d | b | f | n | L | Remark |
|--------------|--------------|-----|-----|---------------------|---------------------|------------------------|----|----|------------|
| DN450 | Requirements | 640 | 585 | 548 ^{-4.5} | 30 ^{+4/-3} | 4 ^{1 mm min.} | 20 | 31 | Acceptable |
| | Results | 638 | 585 | 548 | 33 | 3.5 | 20 | 31 | |

5.2) Leak-tightness of shell to internal pressure test

| Nominal size | Test pressure (MPa) | Test duration (minute) | Test results | Remark |
|--------------|---------------------|------------------------|--|------------|
| DN450 | 2.5 | 10 | No signs of leakage, sweating or any other kind of failure was found during the test | Acceptable |

5.3) Seat tightness at high differential pressure with MOT

| Nominal size | Test pressure (MPa) | Test duration (minute) | Applied MOT (Nm) | Test results | Remark |
|--------------|---------------------|------------------------|------------------|--|------------|
| DN450 | 1.76 | 10 | 510 | No visually detectable leakage exceeded the requirements of rate B of BS EN 12266-1:2012 | Acceptable |

5.4) Resistance of valves to operating load (mST)

| Nominal size | Applied mST (Nm) | Applied bending moment (Nm) | Test duration (minute) | Test results | Remark |
|--------------|------------------|-----------------------------|------------------------|---|------------|
| DN450 | 2550 | 1500 | 10 | Without any damage likely to impair their functional capabilities beyond the limits specified | Acceptable |

5.5) Seat tightness at high differential pressure with MOT after resistance of valve to operating load (mST)

| Nominal size | Test pressure (MPa) | Test duration (minute) | Applied MOT (Nm) | Test results | Remark |
|--------------|---------------------|------------------------|------------------|--|------------|
| DN450 | 1.76 | 10 | 510 | No leakage exceeded the requirements of rate B of BS EN 12266-1:2003 | Acceptable |

5.6) Coating thickness measurement (Fusion bonded epoxy)

| Nominal size | Requirements & test results (μm) | | | | Remark |
|--------------|---|---------|---------------------|---------|------------|
| | Internal | | External | | |
| | Minimum Requirement | Results | Minimum Requirement | Results | |
| DN450 | 250 | 582-761 | 250 | 388-847 | Acceptable |

5.7) Tensile strength test (Spheroidal graphite cast iron material)

| Nominal size | Requirements | | | Remark |
|--------------|-----------------------------------|--------------------------------|----------------------|------------|
| | 0.2% proof strength (320MPa min.) | Tensile strength (500MPa min.) | Elongation (7% min.) | |
| | Results | | | |
| DN450 | 355 | 508 | 15 | Acceptable |

5.8) Chemical composition analysis (Stainless steel stem)

| Nominal size | Test results, % (elements) | | | | | | | Remark |
|--|----------------------------|------------|--------------|--------------|------------|-------------|-----------|--------|
| DN450 | Carbon C | Silicon Si | Manganese Mn | Phosphorus P | Sulphur S | Chromium Cr | Nickel Ni | |
| <i>Requirements -</i> | 0.19 | 0.41 | 0.47 | 0.034 | <0.004 | 16.9 | 2.21 | Pass |
| <i>Grade 1.4057 of BS EN 10088-3:2014, Table 5</i> | 0.12-0.22 | 1.00 max. | 1.50 max. | 0.040 max. | 0.030 max. | 15.0-17.0 | 1.50-2.50 | |

Our report no. [REDACTED]

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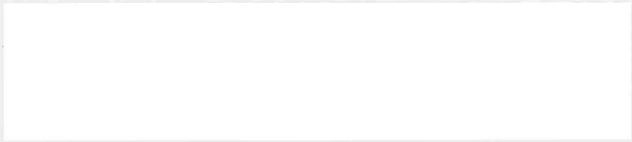
5.9) Chemical composition analysis

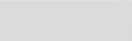
5.9.1) For copper alloy stem nut material

| Nominal size | Test results, % (elements) | | | | | | | | | | | Remark |
|---|-------------------------------|--------------|-----------------|------------|-----------|------------|-----------------|------------|--------------|----------------|---------------|--------|
| | Copper Cu | Nickel Ni | Phosphorus P | Lead Pb | Tin Sn | Zinc Zn | Aluminium Al | Iron Fe | Sulphur S | Antimony Sb | Silicon Si | |
| DN450 | 83.7 | 1.4 | 0.03 | 5.7 | 4.2 | 4.8 | <0.01 | <0.1 | <0.02 | <0.02 | <0.01 | Pass |
| Requirements - | | | | | | | | | | | | |
| Grade CC491K of BS EN 1982:2008 Table 23b | 83.0-87.0 | 2.0 max. | 0.10 max. | 4.0-6.0 | 4.0-6.0 | 4.0-6.0 | 0.01 max. | 0.3 max. | 0.10 max. | 0.25 max. | 0.01 max. | |

5.9.2) For copper alloy seat ring material

| Nominal size | Test results, % (elements) | | | | | | | | | | | Remark |
|---|-------------------------------|--------------|-----------------|------------|-----------|------------|-----------------|------------|--------------|----------------|---------------|--------|
| | Copper Cu | Nickel Ni | Phosphorus P | Lead Pb | Tin Sn | Zinc Zn | Aluminium Al | Iron Fe | Sulphur S | Antimony Sb | Silicon Si | |
| DN450 | 83.3 | 1.4 | 0.03 | 6.0 | 4.3 | 4.8 | <0.01 | <0.1 | <0.02 | <0.02 | <0.01 | Pass |
| Requirements - | | | | | | | | | | | | |
| Grade CC491K of BS EN 1982:2008 Table 23b | 83.0-87.0 | 2.0 max. | 0.10 max. | 4.0-6.0 | 4.0-6.0 | 4.0-6.0 | 0.01 max. | 0.3 max. | 0.10 max. | 0.25 max. | 0.01 max. | |



Our report no. 


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6.0) Summary of results (applied only to the samples tested)

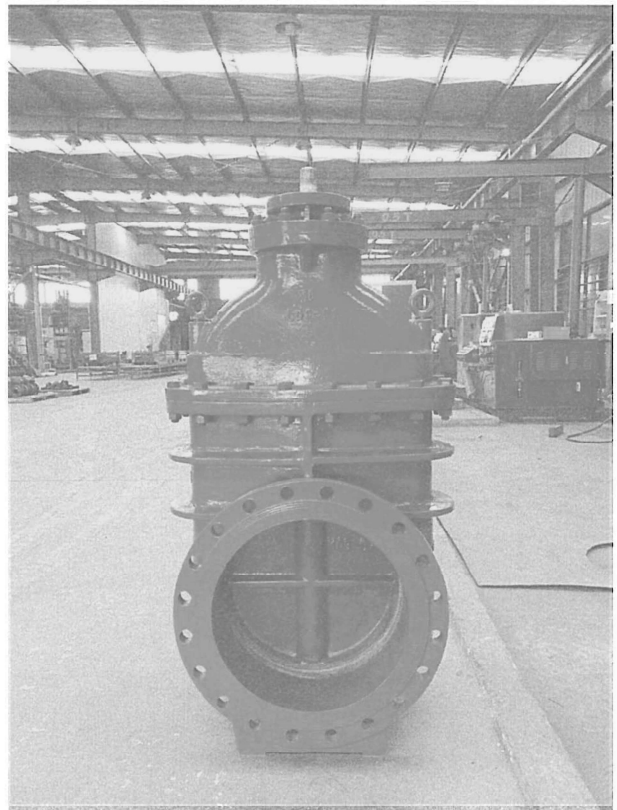
| | | |
|-------------------------------|---|--------------|
| Dimensional measurement | : | Satisfactory |
| Hydrostatic pressure test | : | Satisfactory |
| Strength test | : | Satisfactory |
| Coating thickness measurement | : | Satisfactory |
| Tensile strength test | : | Satisfactory |
| Chemical composition analysis | : | Satisfactory |

7.0) Tested & reported by : 

Approved Signatory



Our report no. [REDACTED]



Approval Number: [REDACTED]
Test Report: [REDACTED]



Water Regulations Advisory Scheme Ltd.
Unit 13,
Willow Road,
Pen y Fan Industrial Estate,
Crumlin,
Gwent,
NP11 4EG

[REDACTED]
[REDACTED]
[REDACTED]

WATER REGULATIONS ADVISORY SCHEME LTD. (WRAS)
MATERIAL APPROVAL

The material referred to in this letter is suitable for contact with wholesome water for domestic purposes having met the requirements of BS6920-1:2000 and/or 2014 'Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water'.

The reference relates solely to its effect on the quality of the water with which it may come into contact and does not signify the approval of its mechanical or physical properties for any use.

COATINGS, PAINTS & LININGS - FACTORY APPLIED PIPE & FITTINGS COATINGS.

5030

'R2 Red & R2 Blue'. Factory applied epoxy powder coatings. Apply as per manufacturer's instructions for use revision no: 1 dated July 5th 2016. Cure for 10 minutes@200°C. For use with water up to 80°C. This material is only approved for the curing conditions that appear on the approval. If the cure conditions are varied from those specified on the approval then the material is not covered by the scope of the approval.

APPROVAL NUMBER: [REDACTED]
APPROVAL HOLDER: [REDACTED]

The Scheme reserves the right to review approval.
Approval [REDACTED] is valid between June 2016 and June 2021

An entry, as above, will accordingly be included in the Water Fittings Directory on-line under the section headed, "Materials which have passed full tests of effect on water quality".

The Directory may be found at: www.wras.co.uk/directory

Yours faithfully

[REDACTED]

Approvals & Enquiries Manager
Water Regulations Advisory Scheme

WRAS MATERIAL APPROVAL - MATERIALS WHICH HAVE PASSED FULL TESTS OF EFFECT ON WATER QUALITY

The material referred to in this letter is suitable for contact with water for domestic purposes. **Approval of this material does not signify the approval of its mechanical or physical properties for any use.**

Manufacturers or applicants may only quote in their sales literature terms which are used in this letter, namely that; 'the material as listed, having passed the tests of effect on water quality, is suitable for use in contact with wholesome water'

This may be abbreviated to 'Water Regulations Advisory Scheme - Approved Material' or 'WRAS Approved Material'.

The scope of an Approval does not extend to rebranded materials unless otherwise agreed by the Scheme.

Use of the WRAS Approved Material Logo

Approval holders may use the WRAS Approved Material logo and make reference to any approval issued by WRAS Ltd. in respect of a particular material or range of materials provided the approval is, and remains valid.

Approval holders are entitled to use the logo on the packing, promotional literature and point of sale advertising Approved Materials.

Modifications to existing Approvals

It is a condition of WRAS Material Approval that NO changes or modifications to the Approved Material, be made without the Approval Holder first notifying WRAS Ltd. Full details of the proposed changes must be provided to the Scheme. Failure to comply with this condition will immediately invalidate a previously granted Approval.

Re-Approval

WRAS will write to you 1 year before the approval expires asking whether you would like to renew it. Please complete the relevant section of the MA3 application form which will be included with the letter and return to WRAS (via e-mail or post).

Please note it is the responsibility of the Approval Holder to ensure the Approval remains valid. WRAS Ltd. accepts no liability for the delay in granting approval where this is caused by circumstances outside of the Scheme's control.

Approval Number: [REDACTED]
Test Report: [REDACTED]



Water Regulations Advisory Scheme Ltd.
Unit 13,
Willow Road,
Pen y Fan Industrial Estate,
Crumlin,
Gwent,
NP11 4EG

[REDACTED]
[REDACTED]
[REDACTED]

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MATERIAL APPROVAL

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RUBBERS - ETHYLENE PROPYLENE DIENE MONOMER (EPDM) - MATERIAL ONLY. 5365

[REDACTED]. Black coloured, transfer moulded EPDM rubber materials. Shore hardness between 50 & 88 Shore A. Tested in-radius size 1.0mm. For use with water up to 60°C.

APPROVAL NUMBER: [REDACTED]
APPROVAL HOLDER: [REDACTED]

The Scheme reserves the right to review approval.
Approval [REDACTED] is valid between December 2016 and December 2021

An entry, as above, will accordingly be included in the Water Fittings Directory on-line under the section headed, "Materials which have passed full tests of effect on water quality".

The Directory may be found at: www.wras.co.uk/directory

Yours faithfully

[REDACTED]

Approvals & Enquiries Manager
Water Regulations Advisory Scheme

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