

Summary of Test Results

Reference no. : BC-SUMMARY-2018-69

Customer : AVK Valves Company Hong Kong Ltd.
 Address : Unit C & D, 10/F., Centre 600, 82 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
 Sample description : Ductile Iron Swing Check Valve
 Nominal pressure (PN) : 16
 Manufacturer : AVK Valves (Anhui) Co., Ltd.
 Brand name : AVK
 Body marking : AVK ← (DN) PN16 GJS 500-7
 Model no. : Series 41
 Origin : China
 Sample submitted by : AVK Valves Company Hong Kong Ltd.
 Test standard : BS EN 1092-2 : 1997 / WIS 4-52-01 / BS EN 12334 : 2001 / BS EN 16767 : 2016 / BS EN 12266-1 : 2012 / BS EN 1563 : 2011
 Test period : 15 to 24 May 2018

A) Sample List

| DN (mm) | Specimen no. |
|---------|--------------------|
| 50 | BC0180509-002-MISL |
| 65 | BC0180509-003-MISL |
| 80 | BC0180509-004-MISL |
| 100 | BC0180509-005-MISL |
| 150 | BC0180509-006-MISL |
| 200 | BC0180509-007-MISL |
| 250 | BC0180509-008-MISL |
| 300 | BC0180509-009-MISL |

B) Test Item

1) Dimensions Check (BS EN 1092-2 : 1997 Clause 5 Table 9)

| DN (mm) | Test results | Castco LRN |
|---------|--------------|--------------------|
| 50 | Passed | BC0180509-001-MISL |
| 65 | Passed | |
| 80 | Passed | |
| 100 | Passed | |
| 150 | Passed | |
| 200 | Passed | |
| 250 | Passed | |
| 300 | Passed | |

2) Coating Thickness Test (WIS 4-52-01 Appendix B)

| DN (mm) | Test results | Castco LRN |
|---------|--------------|--------------------|
| 50 | Passed | BC0180509-001-MISL |
| 65 | Passed | |
| 80 | Passed | |
| 100 | Passed | |
| 150 | Passed | |
| 200 | Passed | |
| 250 | Passed | |
| 300 | Passed | |

Summary of Test Results

Reference no. : BC-SUMMARY-2018-69

B) Test Item (con't)3) Hydrostatic Strength Test (BS EN 12334 : 2001 Clause 4.2 / BS EN 16767 : 2016 Clause 5 / BS EN 12266-1 : 2012 Clause 4 Annex A)

| DN (mm) | Test results | Castco LRN |
|---------|--------------|--------------------|
| 50 | Passed | BC0180509-001-MISL |
| 65 | Passed | |
| 80 | Passed | |
| 100 | Passed | |
| 150 | Passed | |
| 200 | Passed | |
| 250 | Passed | |
| 300 | Passed | |

4) Tensile Properties - Body (BS EN 1563 : 2011 Clause 7.2.1.1 Table 1 and Clause 9.1 Grade EN-GJS-500-7)

| DN (mm) | Test results | Castco LRN |
|---------|--------------|--------------------|
| 50 | Passed | BC0180509-001-MISL |
| 80 | Passed | |
| 150 | Passed | |
| 250 | Passed | |
| 300 | Passed | |

Prepare by : _____
Date : 29 May 2018

FU HO MAN
Assistant Technical Manager
Review by : _____
Date : 29 May 2018

WONG KA MAN
Senior Manager

Test Report
Dimensions Check of Check Valves
(BS EN 1092-2 : 1997 Clause 5 Table 9)

Date of issue : 29 May 2018

Page 1 of 9 page(s)

Castco LRN : BC0180509-001-MISL

Details as supplied by customer

Customer : AVK Valves Company Hong Kong Ltd.

Customer's ref. no. : - -

Address : Unit C & D, 10/F., Centre 600, 82 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong

Contract no. : - -

Job title : - -

Sample description : Ductile Iron Swing Check Valve

Nominal pressure (PN) : 16

Manufacturer : AVK Valves (Anhui) Co., Ltd.

Brand name : AVK

Body marking : AVK ← (DN) PN16 GJS 500-7

Model no. : Series 41

Origin : China

Sample submitted by : AVK Valves Company Hong Kong Ltd.

Laboratory test results

Date of sample received : 09 May 2018

Date of test : 15 May 2018

| Specimen no. | BC0180509-002-MISL | BC0180509-003-MISL | BC0180509-004-MISL | BC0180509-005-MISL | BC0180509-006-MISL | BC0180509-007-MISL | BC0180509-008-MISL | BC0180509-009-MISL | |
|---|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| DN (mm) | 50 | 65 | 80 | 100 | 150 | 200 | 250 | 300 | |
| Outside diameter of flange (mm) | Measured mean value | 165 | 187 | 201 | 220 | 285 | 340 | 406 | 460 |
| | Requirement | 165 | 185 | 200 | 220 | 285 | 340 | 405 | 460 |
| Diameter of bolt circle (mm) | Measured mean value | 125 | 146 | 161 | 180 | 240 | 295 | 355 | 410 |
| | Requirement | 125 | 145 | 160 | 180 | 240 | 295 | 355 | 410 |
| Diameter of bolt hole & Bolts number (mm & no.) | Measured mean value | 19.41 - 4 | 19.60 - 4 | 19.12 - 8 | 19.09 - 8 | 23.52 - 8 | 23.19 - 12 | 28.45 - 12 | 28.45 - 12 |
| | Requirement | 19 (+1.5 / 0) - 4 | 19 (+1.5 / 0) - 4 | 19 (+1.5 / 0) - 8 | 19 (+1.5 / 0) - 8 | 23 (+1.5 / 0) - 8 | 23 (+1.5 / 0) - 12 | 28 (+1.5 / 0) - 12 | 28 (+1.5 / 0) - 12 |
| Flange thickness (mm) | Measured mean value | 17.64 | 17.11 | 18.65 | 18.51 | 18.65 | 18.99 | 20.75 | 23.80 |
| | Requirement | 19 (+4 / -3) | 19 (+4 / -3) | 19 (+4 / -3) | 19 (+4 / -3) | 19 (+4 / -3) | 20 (+4 / -3) | 22 (+4 / -3) | 24.5 (+4 / -3) |
| Test results | Passed | Passed | Passed | Passed | Passed | Passed | Passed | Passed | |

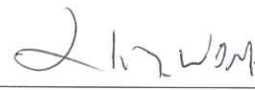
Remark(s) :

1. Test results relate only to the specimen tested.
2. Test results of sample comply with the requirement of BS EN 1092-2 : 1997 Table 9.

Checked by : _____


FU HO MAN
Assistant Technical Manager

Certified by : _____


WONG KA MAN
Senior Manager

Test Report
Coating Thickness Test of Check Valves
(WIS 4-52-01 Appendix B)

Date of issue : 29 May 2018

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Castco LRN : BC0180509-001-MISL

Details as supplied by customer

Customer : AVK Valves Company Hong Kong Ltd.

Customer's ref. no. : - -

Address : Unit C & D, 10/F., Centre 600, 82 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong

Contract no. : - -

Job title : - -

Sample description : Ductile Iron Swing Check Valve

Nominal pressure (PN) : 16

Manufacturer : AVK Valves (Anhui) Co., Ltd.

Brand name : AVK

Body marking : AVK ← (DN) PN16 GJS 500-7

Model no. : Series 41

Origin : China

Sample submitted by : AVK Valves Company Hong Kong Ltd.

Laboratory test results

Date of sample received : 09 May 2018

Date of test : 15 May 2018

| Specimen no. | BC0180509-002-MISL | BC0180509-003-MISL | BC0180509-004-MISL | BC0180509-005-MISL | BC0180509-006-MISL | BC0180509-007-MISL | BC0180509-008-MISL | BC0180509-009-MISL | |
|--|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-----|
| DN (mm) | 50 | 65 | 80 | 100 | 150 | 200 | 250 | 300 | |
| Measured value of coating thickness (µm) | 1 | 503 | 790 | 639 | 501 | 483 | 720 | 547 | 421 |
| | 2 | 751 | 605 | 647 | 521 | 589 | 625 | 852 | 418 |
| | 3 | 679 | 718 | 390 | 554 | 620 | 615 | 785 | 450 |
| | 4 | 732 | 524 | 413 | 465 | 473 | 687 | 769 | 591 |
| | 5 | 598 | 533 | 449 | 541 | 765 | 676 | 770 | 464 |
| | 6 | 458 | 803 | 560 | 776 | 502 | 638 | 591 | 822 |
| | 7 | 473 | 778 | 482 | 441 | 883 | 731 | 616 | 419 |
| | 8 | 485 | 798 | 429 | 442 | 905 | 659 | 835 | 425 |
| | 9 | 480 | 823 | 479 | 712 | 637 | 715 | 975 | 848 |
| | 10 | 458 | 481 | 449 | 657 | 530 | 568 | 914 | 792 |
| | 11 | 446 | 594 | 661 | 687 | 509 | 615 | 609 | 786 |
| | 12 | 628 | 806 | 646 | 660 | 685 | 837 | 859 | 949 |
| | 13 | 405 | 792 | 599 | 401 | 582 | 750 | 750 | 807 |
| | 14 | 689 | 803 | 544 | 427 | 502 | 748 | 886 | 765 |
| | 15 | 552 | 773 | 622 | 438 | 606 | 659 | 510 | 457 |
| Mean | 555.8 | 708.1 | 533.9 | 548.2 | 618.1 | 682.9 | 751.2 | 627.6 | |

Remark(s) :

1. Test results relate only to the specimen tested.

Checked by :

 **FU HO MAN**
Assistant Technical Manager

Certified by :

 **WONG KA MAN**
Senior Manager

Test Report

Hydrostatic Strength Test of Check Valves

(BS EN 12334 : 2001 Clause 4.2 / BS EN 16767 : 2016 Clause 5 / BS EN 12266-1 : 2012 Clause 4 Annex A)

Date of issue : 29 May 2018

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Castco LRN : BC0180509-001-MISL

Details as supplied by customer

Customer : AVK Valves Company Hong Kong Ltd.

Customer's ref. no. : - -

Address : Unit C & D, 10/F., Centre 600, 82 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong

Contract no. : - -

Job title : - -

Sample description : Ductile Iron Swing Check Valve

Nominal pressure (PN) : 16

Manufacturer : AVK Valves (Anhui) Co., Ltd.

Brand name : AVK

Body marking : AVK ← (DN) PN16 GJS 500-7

Model no. : Series 41

Origin : China

Sample submitted by : AVK Valves Company Hong Kong Ltd.

Laboratory test results

Date of sample received : 09 May 2018

Date of test : 15 May 2018

A) Shell Tightness (BS EN 12266-1 : 2012 Annex A.3)

| Specimen no. | BC0180509-002-MISL | BC0180509-003-MISL | BC0180509-004-MISL | BC0180509-005-MISL | BC0180509-006-MISL | BC0180509-007-MISL | BC0180509-008-MISL | BC0180509-009-MISL |
|-----------------------------|--|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| DN (mm) | 50 | 65 | 80 | 100 | 150 | 200 | 250 | 300 |
| Apply pressure (bar) | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| Test duration (s) | 60 | 60 | 60 | 60 | 60 | 120 | 120 | 120 |
| Visually detectable leakage | No | No | No | No | No | No | No | No |
| Requirement | Visually detectable leakage is not permitted | | | | | | | |
| Test results | Passed | Passed | Passed | Passed | Passed | Passed | Passed | Passed |

Test Report

Hydrostatic Strength Test of Check Valves

(BS EN 12334 : 2001 Clause 4.2 / BS EN 16767 : 2016 Clause 5 / BS EN 12266-1 : 2012 Clause 4 Annex A)

Date of issue : 29 May 2018

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Castco LRN : BC0180509-001-MISL

Laboratory test results (con't)

B) Seat Tightness (BS EN 12266-1 : 2012 Annex A.4)

| Specimen no. | BC0180509-002-MISL | BC0180509-003-MISL | BC0180509-004-MISL | BC0180509-005-MISL | BC0180509-006-MISL | BC0180509-007-MISL | BC0180509-008-MISL | BC0180509-009-MISL |
|----------------------------------|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| DN (mm) | 50 | 65 | 80 | 100 | 150 | 200 | 250 | 300 |
| Side | A | A | A | A | A | A | A | A |
| Apply pressure (bar) | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 | 17.6 |
| Test duration (s) | 60 | 60 | 60 | 60 | 60 | 120 | 120 | 120 |
| Leakage rate (m ³ /s) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Requirement | The leakage rate shall not exceed specified in BS EN 12266-1 : 2012 Annex A.4.3 Table A.5 | | | | | | | |
| Test results | Passed | Passed | Passed | Passed | Passed | Passed | Passed | Passed |

Remark(s) :


1. Test results relate only to the specimen tested.
2. Test results of sample comply with the requirement of BS EN 12266-1 : 2012 Clause 4 Annex A.

Checked by : _____



FU HO MAN
Assistant Technical Manager

Certified by : _____



WONG KA MAN
Senior Manager

Test Report

Tensile Properties of Spheroidal Graphite Cast Iron
(BS EN 1563 : 2011 Clause 7.2.1.1 Table 1 and Clause 9.1)

Date of issue : 29 May 2018

Page 5 of 9 page(s)

Castco LRN : BC0180509-001-MISL

Details as supplied by customer

Customer : AVK Valves Company Hong Kong Ltd.

Customer's ref. no. : - -

Address : Unit C & D, 10/F., Centre 600, 82 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong

Contract no. : - -

Job title : - -

Sample description : Ductile Iron Swing Check Valve

Nominal pressure (PN) : 16

Manufacturer : AVK Valves (Anhui) Co., Ltd.

Brand name : AVK

Body marking : AVK ← (DN) PN16 GJS 500-7

Model no. : Series 41

Origin : China

Sample submitted by : AVK Valves Company Hong Kong Ltd.

Laboratory test results

Date of sample received : 09 May 2018

Date of test : 24 May 2018

| Specimen no. | BC0180509-002-MISL | BC0180509-004-MISL | BC0180509-006-MISL | BC0180509-008-MISL | BC0180509-009-MISL | |
|----------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|------|
| DN (mm) | 50 | 80 | 150 | 250 | 300 | |
| Steel grade | EN-GJS-500-7 | | | | | |
| Total specimen length (mm) | 184 | 186 | 185 | 183 | 183 | |
| Area (mm ²) | 155.7 | 155.3 | 155.9 | 156.8 | 156.1 | |
| 0.2% proof (MPa) | Strength | 396 | 366 | 367 | 362 | 380 |
| | Requirement | min. 320 | | | | |
| Tensile (MPa) | Strength | 565 | 561 | 567 | 553 | 575 |
| | Requirement | min. 500 | | | | |
| Elongation (%) | Measured value | 12.1 | 14.7 | 10.9 | 14.3 | 10.7 |
| | Requirement | min. 7 | | | | |
| Test results | Passed | Passed | Passed | Passed | Passed | |

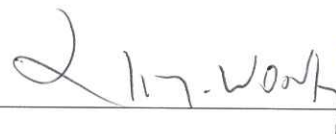
Remark(s) :

1. Test results relate only to the specimen tested.
2. Test results of sample comply with the requirement of BS EN 1563 : 2011 Table 1.

Checked by : _____


FU HO MAN
Assistant Technical Manager

Certified by : _____


WONG KA MAN
Senior Manager

Test Report
Dimensions Check of Check Valves
(BS EN 1092-2 : 1997 Clause 5 Table 9)

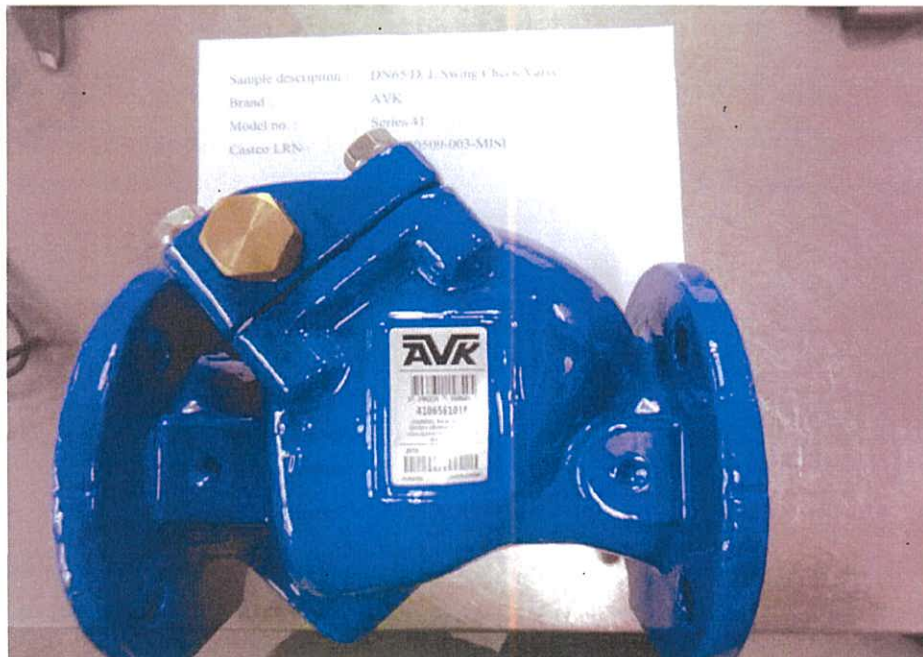
Date of issue : 29 May 2018
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Castco LRN : BC0180509-001-MISL

Appendix A



BC0180509-002-MISL



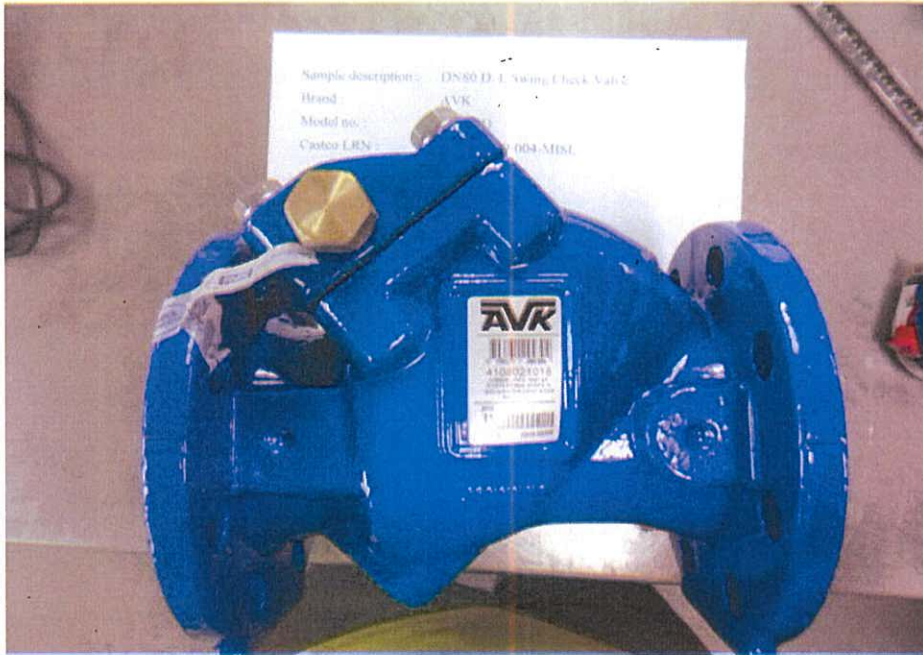
BC0180509-003-MISL

Test Report
Dimensions Check of Check Valves
(BS EN 1092-2 : 1997 Clause 5 Table 9)

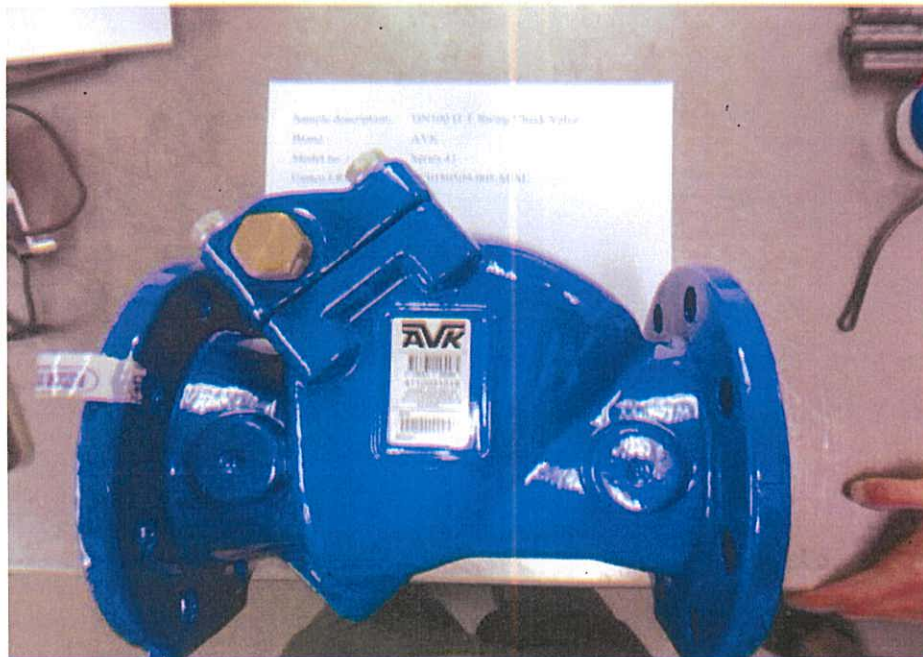
Date of issue : 29 May 2018
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Castco LRN : BC0180509-001-MISL

Appendix B



BC0180509-004-MISL



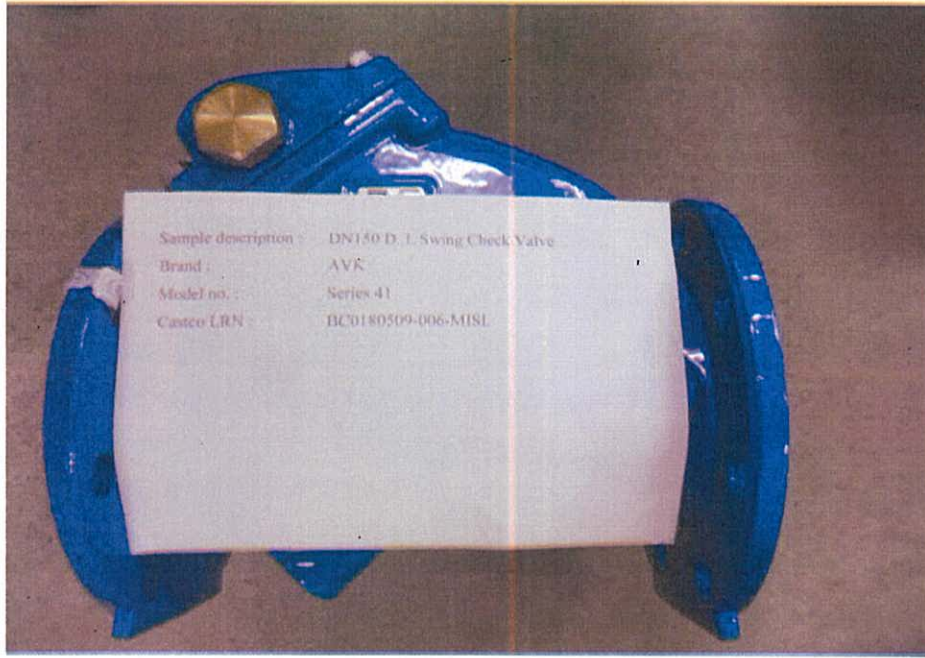
BC0180509-005-MISL

Test Report
Dimensions Check of Check Valves
(BS EN 1092-2 : 1997 Clause 5 Table 9)

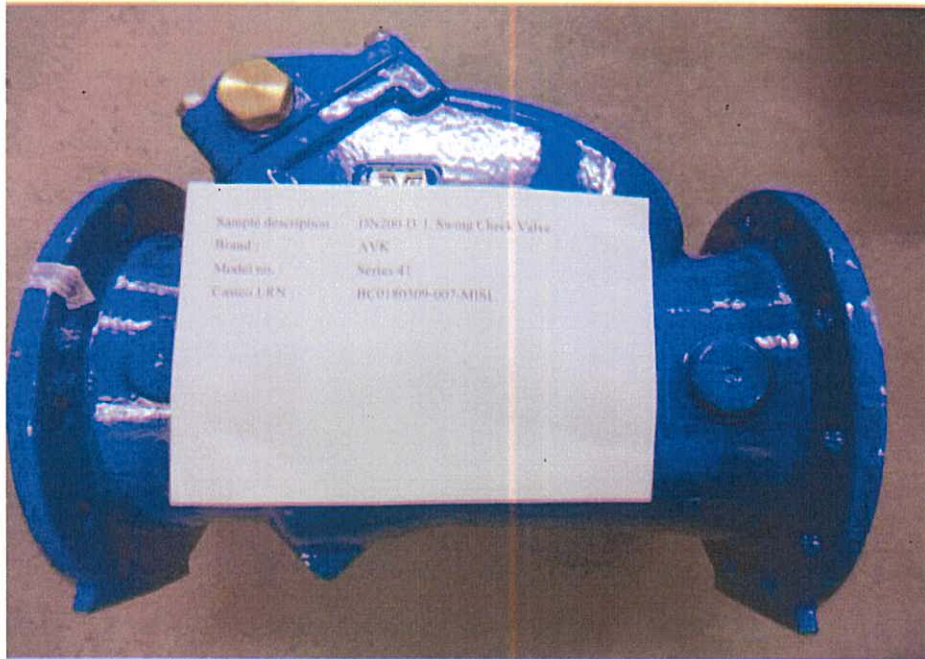
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Castco LRN : BC0180509-001-MISL

Appendix C



BC0180509-006-MISL



BC0180509-007-MISL

Test Report
Dimensions Check of Check Valves
(BS EN 1092-2 : 1997 Clause 5 Table 9)

Date of issue : 29 May 2018
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Castco LRN : BC0180509-001-MISL

Appendix D



BC0180509-008-MISL



BC0180509-009-MISL

End of Report