FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Client Ref. : --
Report No. : 200862PC200068(5)A

REPORT ON TESTING OF COPPER ALLOY (BRASS) SWING CHECK VALVE WITH SCREWED ENDS

Information Supplied by Client

Client	:	Wah Hung Fire Prevention Equipment Co., Limited
Client Address	:	G/F, No.129, Tai Nan Street, Prince Edward, Kowloon, Hong Kong
Sample Description	:	80mm(3") Copper Alloy (Brass) Swing Check Valve With Screwed Ends
Model	:	WH027
Brand	:	WAH HUNG
Body Marking	:	3 PN16
Country of Origin	:	China
Manufacturer	:	Wah Nan Fire Fighting Equipment Co., Ltd.

Laboratory Information

Lab. Sample I.D.	:	PC200068/6
Date Received	:	07 Apirl 2020
Date Test Started	:	20 April 2020
Date Test Completed	:	21 May 2020
Test Method	:	BS 5154 : 1991, BS EN 1982 : 2008 and BS EN 10088-1 : 2014

Test Results

1. Dimensions

BS 5154 : 1991 clause 8 and Manufacturer Requirement

Lab. Sample I.D.	Nominal Size (DN)	BS Reqirement	L (mm)	H (mm)	Manufacturer Reqirement (mm)		Result
					L	H	
PC200068/6	80 mm (3")	80 mm (3")	140	95	140	95	PASS

The Female thread comply with BS21 : 1985

2. Shell and Seat Tightness to Internal Pressure

BS 5154 : 1991, Clause 11

Lab Sample I.D.	Shell Test				
	Nominal Pressure PN (bar)	Test Pressure (bar)	Duration (sec)	Observation	Result
PC200068/6	16	24	15	No leakage	Pass
BS 5154 : 1991 Clause 11 Table 11 Requirement	16	16 X 1.5 = 24	15	No leakage during the test period	

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BS 5154 : 1991, Clause 11

Lab Sample I.D.	Seat Test				
	Nominal Pressure PN (bar)	Test Pressure (bar)	Duration (sec.)	Observation	Result
PC200068/6	16	17.6	15	No leakage	Pass
BS 5154 : 1991 Clause 11 Table 11 Requirement	16	16 X 1.1 = 17.6	15	No leakage during the test period	

3. Chemical Composition (Body)

BS 5154 : 1991 clause 10

Testing items	Results	Specification according to BS EN 1982 : 2008 Grade CC754S castings
1. Aluminium (Al) content, %	0.28	0.8 max.
2. Copper (Cu) content, % [1)]	60.5	58.0 – 63.0
3. Nickel (Ni) content, %	0.38	1.0 max.
4. Lead (Pb) content, %	2.5	0.5 – 2.5
5. Tin (Sn) content, %	0.62	1.0 max.
6. Zinc (Zn) content, %	35.5	Remainder
7. Iron (Fe) content, %	0.45	0.7 max.
8. Manganese (Mn) content, %	0.03	0.5 max.
9. Phosphorus (P) content, %	<0.02	0.02 max.
10. Silicon (Si) content, %	0.05	0.05 max.

Remark: [1)] Including nickel

Note: Based on the test results of the submitted sample, it is found that the sample complies with the chemical composition specification of BS EN 1982 : 2008 Grade CC754S castings. The chemical composition results are obtained from our test report no. 200862EN201096.

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4. Chemical Composition (Disc)

BS 5154 : 1991 clause 10

Testing items	Results	Specification according to BS EN 1982 : 2008 Grade CC754S castings
1. Aluminium (Al) content, %	0.5	0.8 max.
2. Copper (Cu) content, % [1)]	59.8	58.0 – 63.0
3. Nickel (Ni) content, %	0.39	1.0 max.
4. Lead (Pb) content, %	2.5	0.5 – 2.5
5. Tin (Sn) content, %	0.58	1.0 max.
6. Zinc (Zn) content, %	36.1	Remainder
7. Iron (Fe) content, %	0.47	0.7 max.
8. Manganese (Mn) content, %	0.03	0.5 max.
9. Phosphorus (P) content, %	<0.02	0.02 max.
10. Silicon (Si) content, %	0.04	0.05 max.

Remark: [1)] Including nickel

Note: Based on the test results of the submitted sample, it is found that the sample complies with the chemical composition specification of BS EN 1982 : 2008 Grade CC754S castings. The chemical composition results are obtained from our test report no. 200862EN201096.

5. Chemical Composition (Hinge Pin)

BS 5154 : 1991 clause 10

Testing items	Results	Specification according to BS EN 10088-1:2014 Grade X5CrNi18-10 (1.4301)
1. Carbon (C) content, %	0.04	0.07 max
2. Silicon (Si) content, %	0.39	1.00 max.
3. Manganese (Mn) content, %	1.10	2.00 max.
4. Phosphorus (P) content, %	0.016	0.045 max.
5. Sulfur (S) content, %	<0.011	0.015 max.
6. Chromium (Cr) content, %	17.6	17.5 – 19.5
7. Nickel (Ni) content, %	8.1	8.0 – 10.5

Note: Based on the test results of the submitted sample, it is found that the sample complies with the chemical composition specification of BS EN 10088-1:2014 Grade X5CrNi18-10 (1.4301). The chemical composition results are obtained from our test report no. 200862EN201096(1).

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6. Chemical Composition (Bonnet)

BS 5154 : 1991 clause 10

Testing items	Results	Specification according to BS EN 1982 : 2008 Grade CC754S castings
1. Aluminium (Al) content, %	0.43	0.8 max.
2. Copper (Cu) content, % [1)]	59.5	58.0 – 63.0
3. Nickel (Ni) content, %	0.37	1.0 max.
4. Lead (Pb) content, %	2.4	0.5 – 2.5
5. Tin (Sn) content, %	0.6	1.0 max.
6. Zinc (Zn) content, %	36.5	Remainder
7. Iron (Fe) content, %	0.46	0.7 max.
8. Manganese (Mn) content, %	0.03	0.5 max.
9. Phosphorus (P) content, %	<0.02	0.02 max.
10. Silicon (Si) content, %	0.04	0.05 max.

Remark: [1)] Including nickel

Note: Based on the test results of the submitted sample, it is found that the sample complies with the chemical composition specification of BS EN 1982 : 2008 Grade CC754S castings. The chemical composition results are obtained from our test report no.200862EN201676

7. Summary of Results (apply only to sample tested)

Dimensions	-- Pass
Shell and Seat Tightness to Internal Pressure	-- Pass
Chemical Composition (Body)	-- Pass
Chemical Composition (Disc)	-- Pass
Chemical Composition (Hinge Pin)	-- Pass
Chemical Composition (Bonnet)	-- Pass

Remarks : 1.) The test results relate only to the samples tested.
2.) No coating was visible on the visual internal water contact surface of the sample.
3.) The test sample is shown in the photograph on page 5 of this report.
4.) This report is to supersede our previous test report no.200862PC200068(5).

Checked by : _____ Date : 28 JUL 2020

Certified by : _____ Date : 28 JUL 2020

Ng Shu Shing Chris
Assistant Manager (Plumping Components)

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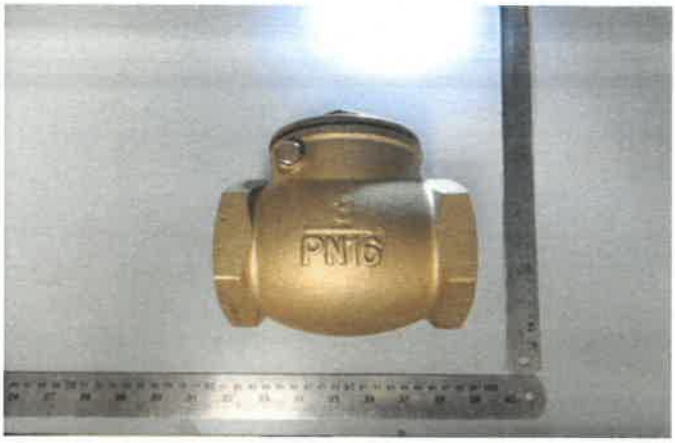
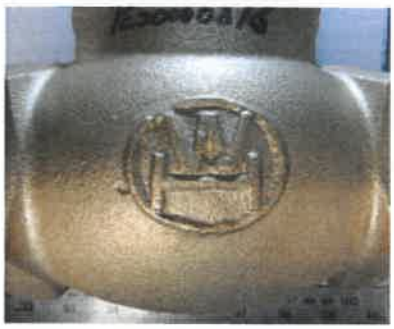


Test Sample

Body Marking



Body Marking

End of Report

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