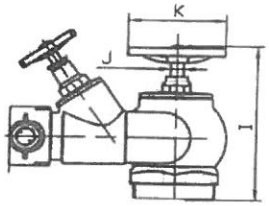
FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Client Ref. : --
Report No. : 205153PC200277

REPORT ON TESTING OF HYDRANT VALVE

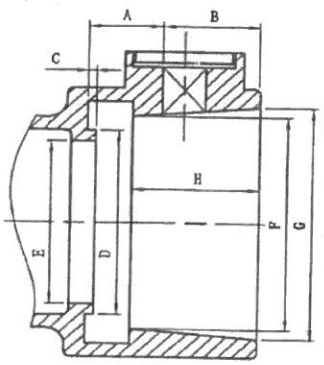
Information Supplied by Client

Client	:	Wah Hung Fire Prevention Equipment Co., Limited
Address	:	G/F, No.129, Tai Nan Street, Prince Edward, Kowloon, Hong Kong
Sample Description	:	100mm Copper alloy individual control twin outlet valve, 4" BSP male inlet and 2 1/2" twin female instant outlets.
Brand	:	WAH HUNG
Country of Origin	:	China
Model	:	WH004
Body Marking	:	W 106 100
Manufacturer	:	Wah Nan Fire Fighting Equipment Co., Ltd.



Laboratory Information

Lab. Sample I.D.	:	PC200277/1
Date Received	:	21 September 2020, 06 October 2020 & 28 November 2020
Date Test Started	:	21 September 2020
Date Test Completed	:	02 December 2020
Test Method	:	BS 5041: Part 1 : 1987 : BS336 : 2010 , BS EN 1982 : 2008 & BS EN 12164 : 2016



BS336 Figure 5

Test Results

1. DIMENSIONS

(Clause 9 Figure 5a of 336 : 2010)

		Sample (mm)	BS Requirement (mm)	Remark
Nominal size (mm)		100	-	--
Diameter of handwheel (K) (mm)		135	-	
Height of valve (I)	fully open (mm)	268	-	
	fully closed (mm)	236	-	
Minimum wall thickness (mm)		5.3	min.3.5 (BS5154 PN16)	Pass
Stem diameter		19.05	min.19 (BS5041)	

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	Results	BS Requirement	Remark
A (mm)	22.10	22±0.25	Pass
B (mm)	29.10	29±0.25	
C (mm)	3.0	3±0.25	
D (mm)	60.1	60±0.25	
E (mm)	53.0	53max.	
F (mm)	71.1	71.1±0.1	
G (mm)	74.9	74.8±0.1	
H (mm)	37.01	37±0.25	

2. Water Flow Rate and Outlet Pressure Test

(BS5041 part 1 clause 22)

	Flow Rate (l/S)	Inlet pressure (bar)	Outlet pressure (bar)	Remark
Sample	8.5	4.7	4.1	Pass
BS Requirement	8.5	4.7	≥4	--

3. Hydraulic pressure test

(BS5041 part 1 clause 19)

	Body Test			Seat Test		
	Test Pressure (bar)	Duration (min)	Remark	Test Pressure (bar)	Duration (min)	Remark
Sample	22.5	2	Pass	16.5	2	Pass
BS Requirement for low pressure valve	22.5	2	-	16.5	2	-

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4. Chemical Composition (Body)
(BS 5041 : Part 1 : 1987 clause 8)

Testing items	Results	Specification according to BS EN 1982 : 2008 Grade CC491K castings
1. Copper (Cu) content, %	85.4	83.0 - 87.0 [1)]
2. Nickel (Ni) content, %	0.36	2.0 max.
3. Phosphorus (P) content, %	<0.03	0.10 max.
4. Lead (Pb) content, %	4.9	4.0 - 6.0
5. Tin (Sn) content, %	5.2	4.0 - 6.0
6. Zinc (Zn) content, %	4.3	4.0 - 6.0
7. Aluminium (Al) content, %	<0.01	0.01 max.
8. Iron (Fe) content, %	0.1	0.3 max.
9. Sulfur (S) content, %	<0.04	0.10 max.
10. Antimony (Sb) content, %	0.03	0.25 max.
11. Silicon (Si) content, %	<0.01	0.01 max.

Remark : [1)] Include 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 CC491K castings
The chemical composition results are obtained from our test report no. 205153EN202857

5. Chemical Composition (Main disc)

Testing items	Results	Specification according to BS EN 1982 : 2008 Grade CC491K castings
1. Copper (Cu) content, %	85.8	83.0 - 87.0 [1)]
2. Nickel (Ni) content, %	0.23	2.0 max.
3. Phosphorus (P) content, %	<0.03	0.10 max.
4. Lead (Pb) content, %	4.8	4.0 - 6.0
5. Tin (Sn) content, %	5.0	4.0 - 6.0
6. Zinc (Zn) content, %	4.3	4.0 - 6.0
7. Aluminium (Al) content, %	<0.01	0.01 max.
8. Iron (Fe) content, %	0.04	0.3 max.
9. Sulfur (S) content, %	<0.04	0.10 max.
10. Antimony (Sb) content, %	0.04	0.25 max.
11. Silicon (Si) content, %	<0.01	0.01 max.

Remark : [1)] Include 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 CC491K castings
The chemical composition results are obtained from our test report no. 205153EN202857

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6. Chemical Composition (Twin outlet disc)

Testing items	Results	Specification according to BS EN 1982 : 2008 Grade CC491K castings
1. Copper (Cu) content, %	86.4	83.0 - 87.0 [1)]
2. Nickel (Ni) content, %	0.28	2.0 max.
3. Phosphorus (P) content, %	<0.03	0.10 max.
4. Lead (Pb) content, %	4.1	4.0 - 6.0
5. Tin (Sn) content, %	5.0	4.0 - 6.0
6. Zinc (Zn) content, %	4.4	4.0 - 6.0
7. Aluminium (Al) content, %	<0.01	0.01 max.
8. Iron (Fe) content, %	<0.04	0.3 max.
9. Sulfur (S) content, %	<0.04	0.10 max.
10. Antimony (Sb) content, %	0.06	0.25 max.
11. Silicon (Si) content, %	0.01	0.01 max.

Remark : [1)] Include 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 CC491K castings

The chemical composition results are obtained from our test report no. 205153EN202857

7. Chemical Composition (Main bonnet)

Testing items	Results	Specification according to BS EN 12164 : 2016 Grade CW617N
1. Aluminum (Al) content, %	<0.01	0.05 max.
2. Copper (Cu) content, %	58.4	57.0 – 59.0
3. Nickel (Ni) content, %	<0.08	0.3 max.
4. Lead (Pb) content, %	1.9	1.6 – 2.5
5. Tin (Sn) content, %	0.11	0.3 max.
6. Zinc (Zn) content, %	39.3	Remainder
7. Iron (Fe) content, %	0.16	0.3 max.
Hence, others content, %	<0.2	0.2 max.

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 12164 : 2016 Grade CW617N.

The chemical composition results are obtained from our test report no. 205153EN203033.

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8. Chemical Composition (Twin outlet bonnet)

Testing items	Results	Specification according to BS EN 12164 : 2016 Grade CW617N
1. Aluminum (Al) content, %	<0.01	0.05 max.
2. Copper (Cu) content, %	57.8	57.0 – 59.0
3. Nickel (Ni) content, %	<0.08	0.3 max.
4. Lead (Pb) content, %	1.9	1.6 – 2.5
5. Tin (Sn) content, %	0.11	0.3 max.
6. Zinc (Zn) content, %	39.9	Remainder
7. Iron (Fe) content, %	0.16	0.3 max.
Hence, others content, %	<0.2	0.2 max.

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 12164 : 2016 Grade CW617N.
The chemical composition results are obtained from our test report no. 205153EN203033.

9. Chemical Composition (Main stem)

Testing items	Results	Specification according to BS EN 12164 : 2016 Grade CW614N
1. Aluminium (Al) content, %	0.02	0.05 max.
2. Copper (Cu) content, %	58.7	57.0 – 59.0
3. Nickel (Ni) content, %	<0.08	0.3 max.
4. Lead (Pb) content, %	2.6	2.5 – 3.5
5. Tin (Sn) content, %	0.18	0.3 max.
6. Zinc (Zn) content, %	38.2	Remainder
7. Iron (Fe) content, %	0.16	0.3 max.
Hence, others content, %	<0.2	0.2 max.

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 12164 : 2016 Grade CW614N.
The chemical composition results are obtained from our test report no. 205153EN203033.

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10. Chemical Composition (Twin outlet stem)

Testing items	Results	Specification according to BS EN 12164 : 2016 Grade CW614N
1. Aluminium (Al) content, %	0.02	0.05 max.
2. Copper (Cu) content, %	57.5	57.0 – 59.0
3. Nickel (Ni) content, %	<0.08	0.3 max.
4. Lead (Pb) content, %	2.7	2.5 – 3.5
5. Tin (Sn) content, %	0.18	0.3 max.
6. Zinc (Zn) content, %	39.3	Remainder
7. Iron (Fe) content, %	0.16	0.3 max.
Hence, others content, %	<0.2	0.2 max.

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 12164 : 2016 Grade CW614N.
The chemical composition results are obtained from our test report no. 205153EN203033.

11. Summary of Results

Dimension	--	Pass
Water Flow Rate and Outlet Pressure Test	--	Pass
Hydraulic pressure test	--	Pass
Chemical Composition (Body)	--	Pass
Chemical Composition (Main disc)	--	Pass
Chemical Composition (Twin outlet disc)	--	Pass
Chemical Composition (Main bonnet)	--	Pass
Chemical Composition (Twin outlet bonnet)	--	Pass
Chemical Composition (Main stem)	--	Pass
Chemical Composition (Twin outlet stem)	--	Pass

Remarks : The test results relate only to the samples tested.

Checked by : _____ Date : - 8 DEC 2020 Certified by : _____ Date : - 8 DEC 2020

Ng Shu Shing Chris
Assistant Manager (Plumbing Components)

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Test Sample

Body Marking

Body Marking

End of Report