

Summary of Test Results

Reference no. : BC-SUMMARY-2022-068

Customer : Gate Way Valve & Fitting Ltd.

Address : Flat A1, 4/F., Galaxy Factory Building, 25-27 Luk Hop Street, San Po Kong, Kowloon, H. K.

Sample description : Bronze Swing Check Valve

Nominal pressure (PN) : 16

Manufacturer : Kitz (Thailand) Ltd.

Brand name : Toyo

Body marking : RED-WHITE TOYO (Inch) 125S 200 WOG →

Model no. : 236A

Origin : Thailand

Sample submitted by : Gate Way Valve & Fitting Ltd.

Test standard : BS 5154 : 1991 / BS EN 1982 : 2008

Test period : 30 May to 07 October 2022

A) Sample List

DN (mm)	Inch	Specimen no.
15	1/2"	220525-2376-001
20	3/4"	220525-2376-002
25	1"	220525-2376-003
32	1-1/4"	220525-2376-004
40	1-1/2"	220525-2376-005
50	2"	220525-2376-006
65	2-1/2"	220525-2376-007
80	3"	220525-2376-008

B) Test Item**1) Dimensions Check (BS 5154 : 1991 Clause 8)**

DN (mm)	Inch	Test results	Castco LRN
15	1/2"	Passed	220525-2376
20	3/4"	Passed	
25	1"	Passed	
32	1-1/4"	Passed	
40	1-1/2"	Passed	
50	2"	Passed	
65	2-1/2"	Passed	
80	3"	Passed	

Remark(s) :

1. This page no. 1A of this summary supersedes page no. 1 of the previous summary of Reference no. : BC-SUMMARY-2022-068 issued on 25 June 2022.

Summary of Test Results

Reference no. : BC-SUMMARY-2022-068

B) Test Item (con't)**2) Pressure Test (BS 5154 : 1991 Clause 11)**

DN (mm)	Inch	Test results	Castco LRN
15	1/2"	Passed	220525-2376
20	3/4"	Passed	
25	1"	Passed	
32	1-1/4"	Passed	
40	1-1/2"	Passed	
50	2"	Passed	
65	2-1/2"	Passed	
80	3"	Passed	

3) Chemical Composition (Body) (BS EN 1982 : 2008 Table 23b Grade CC491K)

DN (mm)	Inch	Test results	Castco LRN
15	1/2"	Passed	220606-2518
25	1"	Passed	220606-2520
40	1-1/2"	Passed	220606-2522
50	2"	Passed	220606-2524
80	3"	Passed	220606-2526

4) Chemical Composition (Seat) (BS EN 1982 : 2008 Table 23b Grade CC491K)

DN (mm)	Inch	Test results	Castco LRN
15	1/2"	Passed	220606-2519
25	1"	Passed	220606-2521
40	1-1/2"	Passed	220606-2523
50	2"	Passed	220606-2525
80	3"	Passed	220606-2527

5) Chemical Composition (Cap) (BS EN 12164 : 2016 Table 6 Grade CW617N)

DN (mm)	Inch	Test results	Castco LRN
15	1/2"	Passed	221005-2290
25	1"	Passed	221005-2291
40	1-1/2"	Passed	221005-2292
50	2"	Passed	221005-2293
80	3"	Passed	221005-2294

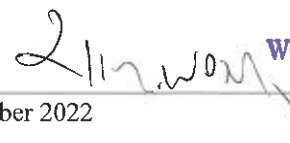
Remark(s) :

1. This page no. 2A of this summary supersedes page no. 2 of the previous summary of Reference no. : BC-SUMMARY-2022-068 issued on 25 June 2022.

Prepare by : _____
Date : 11 October 2022


FU HO MAN
Assistant Technical Manager

Review by : _____
Date : 11 October 2022


WONG KA MAN
Senior Manager

Test Report

Copper Alloy Check Valves - Dimensions

(In-house method VAL-COPPER-DIM-BS5154 in conjunction with the following specification(s) : BS 5154 : 1991 Clause 8 Tables 5, 7 and 8)

Date of issue : 25 June 2022

Page 1 of 7 page(s)

Castco LRN : 220525-2376

Details as supplied by customer

Customer : Gate Way Valve & Fitting Ltd.

Customer's ref. no. : - -

Address : Flat A1, 4/F., Galaxy Factory Building, 25-27 Luk Hop Street, San Po Kong, Kowloon, H. K.

Contract no. : - -

Job title : WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Sample description : Bronze Swing Check Valve

Nominal pressure (PN) : 16

Manufacturer : Kitz (Thailand) Ltd.

Brand name : Toyo

Body marking : RED-WHITE TOYO (Inch) 125S 200 WOG →

Model no. : 236A

Origin : Thailand

Sample submitted by : Gate Way Valve & Fitting Ltd.

Laboratory test results

Date of sample received : 25 May 2022

Date of test : 31 May 2022

A) Sample information

Specimen no.	220525-2376-001	220525-2376-002	220525-2376-003	220525-2376-004	220525-2376-005	220525-2376-006	220525-2376-007	220525-2376-008
DN (mm)	15	20	25	32	40	50	65	80
Inch	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"

B) Outside diameter of sealing face measurement

Ambient temperature (°C)		25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7	
Outside diameter of sealing face (mm)	End face 1	Measured minimum value	27.80	33.67	40.48	49.70	57.05	69.70	85.50	99.48
	End face 1	Measured minimum value	27.70	33.55	40.92	49.84	56.97	69.78	85.59	99.61
	BS 5154 : 1991 Table 5 requirement		min. 26	min. 32	min. 39	min. 49	min. 55	min. 68	min. 85	min. 98

Test Report

Copper Alloy Check Valves - Dimensions

(In-house method VAL-COPPER-DIM-BS5154 in conjunction with the following specification(s) : BS 5154 : 1991 Clause 8 Tables 5, 7 and 8)

Date of issue : 25 June 2022

Page 2 of 7 page(s)

Castco LRN : 220525-2376

Laboratory test results (con't)

C) Wall thickness measurement

Ambient temperature (°C)		25.7	25.7	25.7	25.7	25.7	25.7	25.7	25.7
Wall thickness of body (mm)	Measured minimum value	2.62	2.66	2.64	2.79	3.46	3.04	3.41	3.61
	BS 5154 : 1991 Table 8 requirement	min. 1.7	min. 1.8	min. 2.0	min. 2.2	min. 2.3	min. 2.5	min. 2.8	min. 3.1

Remark(s) :

1. Test results relate only to the specimen tested.
2. Test results of sample comply with the requirement of BS 5154 : 1991 Table 5 and 8 (this specification is not covered by the laboratory's HOKLAS accreditation).
3. The acceptance limit is the same as the tolerance limit (simple acceptance, see Figure A). Only test results out of the tolerance/acceptance limit will be concluded as out-of-tolerance.



Figure A - Graphical representation of a binary statement - Simple acceptance

4. Threaded end connection suit for BS EN 10266-2 (Previously BS 21) taper threads.

Checked by :

FU HO MAN
FU HO MAN
Assistant Technical Manager

Approved Signatory :

WONG KA MAN
WONG KA MAN
Senior Manager

**Test Report
Metallic Valves - Shell and Seat Tightness
(BS EN 12266-1 : 2012 Annex A3 and A4)**

Date of issue : 25 June 2022

Page 3 of 7 page(s)

Castco LRN : 220525-2376

Details as supplied by customer

Customer : Gate Way Valve & Fitting Ltd.

Customer's ref. no. : - -

Address : Flat A1, 4/F., Galaxy Factory Building, 25-27 Luk Hop Street, San Po Kong, Kowloon, H. K.

Contract no. : - -

Job title : WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Sample description : Bronze Swing Check Valve

Nominal pressure (PN) : 16

Manufacturer : Kitz (Thailand) Ltd.

Brand name : Toyo

Body marking : RED-WHITE TOYO (Inch) 125S 200 WOG →

Model no. : 236A

Origin : Thailand

Sample submitted by : Gate Way Valve & Fitting Ltd.

Laboratory test results

Date of sample received : 25 May 2022

Date of test : 30 May 2022

A) Shell Tightness

Specimen no.	220525-2376-001	220525-2376-002	220525-2376-003	220525-2376-004	220525-2376-005	220525-2376-006	220525-2376-007	220525-2376-008
DN (mm)	15	20	25	32	40	50	65	80
Inch	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"
Water temperature (°C)	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2
Apply pressure (bar)	24	24	24	24	24	24	24	24
Test duration (s)	60	60	60	60	60	60	60	60
Visually detectable leakage	No	No	No	No	No	No	No	No
Requirement	Visually detectable leakage is not permitted							

Test Report

Metallic Valves - Shell and Seat Tightness
(BS EN 12266-1 : 2012 Annex A3 and A4)

Date of issue : 25 June 2022

Page 4 of 7 page(s)

Castco LRN : 220525-2376

Laboratory test results (con't)

B) Seat Tightness

Specimen no.	220525-2376-001	220525-2376-002	220525-2376-003	220525-2376-004	220525-2376-005	220525-2376-006	220525-2376-007	220525-2376-008
DN (mm)	15	20	25	32	40	50	65	80
Inch	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"
Water temperature (°C)	23.2	23.2	23.2	23.2	23.2	23.2	23.2	23.2
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	60	60	60
Leakage rate (mm 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							

Remark(s) :

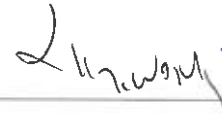
1. Test results relate only to the specimen tested.
2. Test results of sample comply with the requirement of BS 5154 : 1991 (this specification is not covered by the laboratory's HOKLAS accreditation).
3. For test with qualitative test results, effect of measurement uncertainty has not been taken into account.

Checked by :



FU HO MAN
Assistant Technical Manager

Approved Signatory :



WONG KA MAN
Senior Manager

Test Report

Copper Alloy Check Valves - Dimensions

(In-house method VAL-COPPER-DIM-BS5154 in conjunction with the following specification(s) : BS 5154 : 1991 Clause 8 Tables 5, 7 and 8)

Date of issue : 25 June 2022

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Castco LRN : 220525-2376

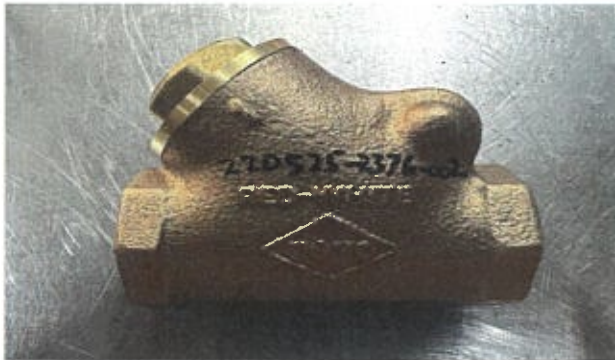
Appendix A



220525-2376-001 (1)



220525-2376-001 (2)



220525-2376-002 (1)



220525-2376-002 (2)



220525-2376-003 (1)



220525-2376-003 (2)

Test Report

Copper Alloy Check Valves - Dimensions

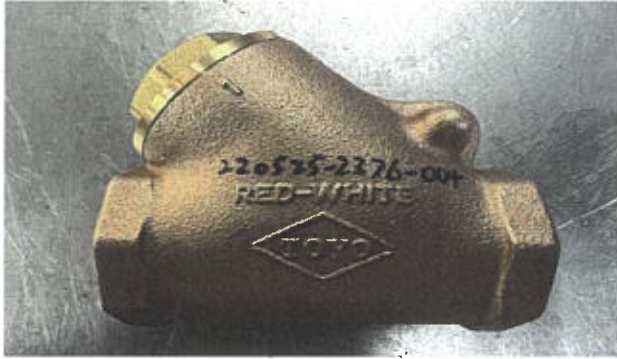
(In-house method VAL-COPPER-DIM-BS5154 in conjunction with the following specification(s) : BS 5154 : 1991 Clause 8 Tables 5, 7 and 8)

Date of issue : 25 June 2022

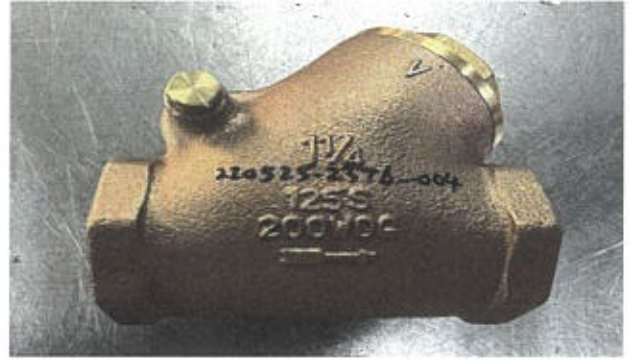
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Castco LRN : 220525-2376

Appendix B



220525-2376-004 (1)



220525-2376-004 (2)



220525-2376-005 (1)



220525-2376-005 (2)



220525-2376-006 (1)



220525-2376-006 (2)

Test Report

Copper Alloy Check Valves - Dimensions

(In-house method VAL-COPPER-DIM-BS5154 in conjunction with the following specification(s) : BS 5154 : 1991 Clause 8 Tables 5, 7 and 8)

Date of issue : 25 June 2022

Page 7 of 7 page(s)

Castco LRN : 220525-2376

Appendix C

220525-2376-007 (1)



220525-2376-007 (2)



220525-2376-008 (1)



220525-2376-008 (2)

End of Report

Form no. : BC_COPPER ALLOY CHECK VALVES_DIM_BS5154-1991_T_dd_14/03/2022

香港粉嶺安居街33號得利中心6樓 • 6/F, Techno Centre, 33, On Kui Street, Fanling, Hong Kong.

香港粉嶺安居街30號新寧中心1樓 • 1/F, Sun Ling Plaza, 30, On Kui Street, Fanling, Hong Kong.

香港粉嶺安全街29A號 • 29A, On Chuen Street, Fanling, Hong Kong.

Tel: 2597 8333 Fax: 2597 8399 E-mail: info@castco.com.hk Website: www.castco.com.hk

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2518-001

Page 1 of 2

Castco LRN: 220606-2518

Details as supplied by customer

Name of Customer : Gate Way Valve & Fitting Limited

Address : Flat A1, 4/F, Galaxy Fty Bldg, 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong

Job Title : WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No. : --

Customer's Ref. No. : --

Sample details as supplied by customer

Date Sampled : --

Sample Description : DN15 Bronze Swing Check Valve (Body)

Specification : BS EN 1982:2008, Table 23b, Grade CC491K

Specimen No. : 220525-2376-001

Sample Identification No.: -- / Model no.: 236A / Origin : Thailand

Manufacturer : Kitz (Thailand) Ltd. / Brand name : Toyo

Location of Works : --

Test Method(s):-

1) In-house ST-Multi-4 (Spark-OES for Gunmetal)

Remark(s):

I. Test results only relate to the specimen tested.

Checked by :

**Lau Hiú Yat**

Assistant Technical Manager

Approved Signatory :

**Cheng Chi Fai**

Senior Manager

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2518-001

Page 2 of 2

Castco LRN: 220606-2518

Laboratory test details

Date of Request Confirmed: 06-06-2022

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Chemical Analysis		Result
¹⁾ Aluminium	Al %	<0.003
¹⁾ Iron	Fe %	0.086
¹⁾ Nickel	Ni %	0.24
¹⁾ Phosphorus	P %	0.029
¹⁾ Lead	Pb %	4.91
¹⁾ Sulphur	S %	0.025
¹⁾ Antimony	Sb %	0.045
¹⁾ Silicon	Si %	<0.002
¹⁾ Tin	Sn %	4.78
¹⁾ Zinc	Zn %	5.84
¹⁾ Copper	Cu %	83.9

End of Report

Appendix A

Summary of Chemical Analysis of Copper and Copper Alloy

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2518-001

Page 1 of 1

Related Castco LRN: 220606-2518

Name of Customer: Gate Way Valve & Fitting Limited

Job Title: WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No.: --

Customer's Ref. No.: --

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Castco LRN:	220606-2518				
Specimen No. :	220525-2376-001				
Sample Description :	DN15 Bronze Swing Check Valve (Body)				
Sample Identification No.:	-- / Model no.: 236A / Origin : Thailand				
Manufacturer :	Kitz (Thailand) Ltd. / Brand name : Toyo				
Specification: BS EN 1982:2008, Table 23b, Grade CC491K				Test Results	Within / Exceed limit
Aluminium	Al	0.01 max.	%	<0.003	Within limit
Iron	Fe	0.3 max.	%	0.086	Within limit
Nickel	Ni	2.0 max.	%	0.24	Within limit
Phosphorus	P	0.10 max.	%	0.029	Within limit
Lead	Pb	4.0 to 6.0	%	4.91	Within limit
Sulfur	S	0.10 max.	%	0.025	Within limit
Antimony	Sb	0.25 max.	%	0.045	Within limit
Silicon	Si	0.01 max.	%	<0.002	Within limit
Tin	Sn	4.0 to 6.0	%	4.78	Within limit
Zinc	Zn	4.0 to 6.0	%	5.84	Within limit
Copper	Cu	83.0 to 87.0	%	83.9	Within limit

Remark(s):

I. Test results only relate to the specimen tested.

II. Test results of the specimen are in compliance with the chemical requirements of BS EN 1982:2008, Table 23b, Grade CC491K.

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2519-001

Page 1 of 2

Castco LRN: 220606-2519

Details as supplied by customer

Name of Customer : Gate Way Valve & Fitting Limited

Address : Flat A1, 4/F, Galaxy Fty Bldg, 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong

Job Title : WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No. : --

Customer's Ref. No. : --

Sample details as supplied by customer

Date Sampled : --

Sample Description : DN15 Bronze Swing Check Valve (Seat)

Specification : BS EN 1982:2008, Table 23b, Grade CC491K

Specimen No. : 220525-2376-001

Sample Identification No.: -- / Model no.: 236A / Origin : Thailand

Manufacturer : Kitz (Thailand) Ltd. / Brand name : Toyo

Location of Works : --

Test Method(s):-

- 1) In-house ST-Multi-4 (Spark-OES for Gunmetal)

Remark(s):

- I. Test results only relate to the specimen tested.

Checked by : _____

Lau Hiu Yat

Assistant Technical Manager

Approved Signatory : _____

Cheng Chi Fai

Senior Manager

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2519-001

Page 2 of 2

Castco LRN: 220606-2519

Laboratory test details

Date of Request Confirmed: 06-06-2022

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Chemical Analysis		Result
¹⁾ Aluminium	Al %	<0.003
¹⁾ Iron	Fe %	0.071
¹⁾ Nickel	Ni %	0.71
¹⁾ Phosphorus	P %	0.013
¹⁾ Lead	Pb %	4.92
¹⁾ Sulphur	S %	0.036
¹⁾ Antimony	Sb %	0.10
¹⁾ Silicon	Si %	<0.002
¹⁾ Tin	Sn %	4.78
¹⁾ Zinc	Zn %	5.28
¹⁾ Copper	Cu %	84.0

End of Report

Appendix A

Summary of Chemical Analysis of Copper and Copper Alloy

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2519-001

Page 1 of 1

Related Castco LRN: 220606-2519

Name of Customer: Gate Way Valve & Fitting Limited

Job Title: WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No.: --

Customer's Ref. No.: --

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Castco LRN:	220606-2519				
Specimen No. :	220525-2376-001				
Sample Description :	DN15 Bronze Swing Check Valve (Seat)				
Sample Identification No.:	-- / Model no.: 236A / Origin : Thailand				
Manufacturer :	Kitz (Thailand) Ltd. / Brand name : Toyo				
Specification: BS EN 1982:2008, Table 23b, Grade CC491K				Test Results	Within / Exceed limit
Aluminium	Al	0.01 max.	%	<0.003	Within limit
Iron	Fe	0.3 max.	%	0.071	Within limit
Nickel	Ni	2.0 max.	%	0.71	Within limit
Phosphorus	P	0.10 max.	%	0.013	Within limit
Lead	Pb	4.0 to 6.0	%	4.92	Within limit
Sulfur	S	0.10 max.	%	0.036	Within limit
Antimony	Sb	0.25 max.	%	0.10	Within limit
Silicon	Si	0.01 max.	%	<0.002	Within limit
Tin	Sn	4.0 to 6.0	%	4.78	Within limit
Zinc	Zn	4.0 to 6.0	%	5.28	Within limit
Copper	Cu	83.0 to 87.0	%	84.0	Within limit

Remark(s):

I. Test results only relate to the specimen tested.

II. Test results of the specimen are in compliance with the chemical requirements of BS EN 1982:2008, Table 23b, Grade CC491K.

Test Report**Chemical Analysis of Copper and Copper Alloy**Date of issue: 11-10-2022
Page 1 of 3Specimen No.: CHEM-221005-2290-001
Castco LRN: 221005-2290**Details as supplied by customer**

Name of Customer : Gate Way Valve & Fitting Limited

Address : Flat A1, 4/F, Galaxy Fty Bldg, 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong

Job Title : WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No. : --

Customer's Ref. No. : --

Sample details as supplied by customer

Date Sampled : --

Sample Description : DN15 Bronze Swing Check Valve (Cap)

Specification : BS EN 12164:2016, Table 6, Grade CW617N

Specimen No. : 220525-2376-001

Sample Identification No.: -- / Model no.: 236A / Origin : Thailand

Manufacturer : Kitz (Thailand) Ltd. / Brand name : Toyo

Location of Works : --

Test Method(s):-

- 1) In-house ST-Multi-4 (Spark-OES for Brass)
- 2) By Calculation

Remark(s):

I. Test results only relate to the specimen tested.

Checked by : _____


Lau Hiu Yat
Assistant Technical Manager

Approved Signatory : _____


Cheng Chi Fai
Senior Manager

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue: 11-10-2022

Specimen No.: CHEM-221005-2290-001

Page 2 of 3

Castco LRN: 221005-2290

Laboratory test details

Date of Request Confirmed: 05-10-2022

Date of Received by Lab.: 05-10-2022

Testing Period: 07-10-2022

Chemical Analysis		Result
1) Aluminium	Al %	<0.003
1) Iron	Fe %	0.096
1) Nickel	Ni %	0.048
1) Lead	Pb %	2.08
1) Tin	Sn %	0.13
1) Zinc	Zn %	38.7
1) Copper	Cu %	58.9

Test Report**Chemical Analysis of Copper and Copper Alloy**Date of issue: 11-10-2022
Page 3 of 3Specimen No.: CHEM-221005-2290-001
Castco LRN: 221005-2290**Laboratory test details**

Date of Request Confirmed: 05-10-2022

Date of Received by Lab.: 05-10-2022

Testing Period: 07-10-2022

Chemical Analysis	Result
2) Others Total %	<0.1

End of Report

Form No.: CHM Cu&Cu Alloy-3 T dd 03/02/2016

Appendix A

Summary of Chemical Analysis of Copper and Copper Alloy

Date of issue: 11-10-2022

Specimen No.: CHEM-221005-2290-001

Page 1 of 1

Related Castco LRN: 221005-2290

Name of Customer: Gate Way Valve & Fitting Limited
 Job Title: WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end
 Contract No.: --
 Customer's Ref. No.: --
 Date of Received by Lab.: 05-10-2022 Testing Period: 07-10-2022

Castco LRN:	221005-2290			
Specimen No.:	220525-2376-001			
Sample Description :	DN15 Bronze Swing Check Valve (Cap)			
Sample Identification No.:	-- / Model no.: 236A / Origin : Thailand			
Manufacturer :	Kitz (Thailand) Ltd. / Brand name : Toyo			
Location of Works :	--			
Specification: BS EN 12164:2016, Table 6, Grade CW617N	Test Results		Within / Exceed limit	
Aluminium Al 0.05 max. %	<0.003		Within limit	
Iron Fe 0.3 max. %	0.096		Within limit	
Nickel Ni 0.3 max. %	0.048		Within limit	
Lead Pb 1.6 to 2.5 %	2.08		Within limit	
Tin Sn 0.3 max. %	0.13		Within limit	
Zinc Zn Remainder %	38.7		Within limit	
Copper Cu 57.0 to 59.0 %	58.9		Within limit	
Others Total	0.2 max. %		<0.1 Within limit	

Remark(s):

- Test results only relate to the specimen tested.
- Test results of the specimen are in compliance with the chemical requirements of BS EN 12164:2016, Table 6, Grade CW617N.

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2520-001

Page 1 of 2

Castco LRN: 220606-2520

Details as supplied by customer

Name of Customer : Gate Way Valve & Fitting Limited

Address : Flat A1, 4/F, Galaxy Fty Bldg, 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong

Job Title : WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No. : --

Customer's Ref. No. : --

Sample details as supplied by customer

Date Sampled : --

Sample Description : DN25 Bronze Swing Check Valve (Body)

Specification : BS EN 1982:2008, Table 23b, Grade CC491K

Specimen No. : 220525-2376-003

Sample Identification No.: -- / Model no.: 236A / Origin : Thailand

Manufacturer : Kitz (Thailand) Ltd. / Brand name : Toyo

Location of Works : --

Test Method(s):-

1) In-house ST-Multi-4 (Spark-OES for Gunmetal)

Remark(s):

I. Test results only relate to the specimen tested.

Checked by :

**Lau Hiu Yat**

Assistant Technical Manager

Approved Signatory :

**Cheng Chi Fai**

Senior Manager



香港粉嶺安居街33號
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29A, On Chuen Street, Fanling, Hong Kong.
Website: www.castco.com.hk

Tel : 2597 8333
Fax: 2597 8399

Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2520-001

Page 2 of 2

Castco LRN: 220606-2520

Laboratory test details

Date of Request Confirmed: 06-06-2022

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Chemical Analysis		Result
1) Aluminium	Al %	<0.003
1) Iron	Fe %	0.036
1) Nickel	Ni %	0.17
1) Phosphorus	P %	0.016
1) Lead	Pb %	5.40
1) Sulphur	S %	0.033
1) Antimony	Sb %	0.086
1) Silicon	Si %	<0.002
1) Tin	Sn %	4.46
1) Zinc	Zn %	5.40
1) Copper	Cu %	84.3

End of Report

Form No.: CHM Cu&Cu Alloy-3 T dd 03/02/2016

Appendix A

Summary of Chemical Analysis of Copper and Copper Alloy

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2520-001

Page 1 of 1

Related Castco LRN: 220606-2520

Name of Customer: Gate Way Valve & Fitting Limited

Job Title: WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No.: --

Customer's Ref. No.: --

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Castco LRN:	220606-2520				
Specimen No. :	220525-2376-003				
Sample Description :	DN25 Bronze Swing Check Valve (Body)				
Sample Identification No.:	-- / Model no.: 236A / Origin : Thailand				
Manufacturer :	Kitz (Thailand) Ltd. / Brand name : Toyo				
Specification: BS EN 1982:2008, Table 23b, Grade CC491K				Test Results	Within / Exceed limit
Aluminium	Al	0.01 max.	%	<0.003	Within limit
Iron	Fe	0.3 max.	%	0.036	Within limit
Nickel	Ni	2.0 max.	%	0.17	Within limit
Phosphorus	P	0.10 max.	%	0.016	Within limit
Lead	Pb	4.0 to 6.0	%	5.40	Within limit
Sulfur	S	0.10 max.	%	0.033	Within limit
Antimony	Sb	0.25 max.	%	0.086	Within limit
Silicon	Si	0.01 max.	%	<0.002	Within limit
Tin	Sn	4.0 to 6.0	%	4.46	Within limit
Zinc	Zn	4.0 to 6.0	%	5.40	Within limit
Copper	Cu	83.0 to 87.0	%	84.3	Within limit

Remark(s):

I. Test results only relate to the specimen tested.

II. Test results of the specimen are in compliance with the chemical requirements of BS EN 1982:2008, Table 23b, Grade CC491K.

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2521-001

Page 1 of 2

Castco LRN: 220606-2521

Details as supplied by customer

Name of Customer : Gate Way Valve & Fitting Limited

Address : Flat A1, 4/F, Galaxy Pty Bldg, 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong

Job Title : WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No. : --

Customer's Ref. No. : --

Sample details as supplied by customer

Date Sampled : --

Sample Description : DN25 Bronze Swing Check Valve (Seat)

Specification : BS EN 1982:2008, Table 23b, Grade CC491K

Specimen No. : 220525-2376-003

Sample Identification No.: -- / Model no.: 236A / Origin : Thailand

Manufacturer : Kitz (Thailand) Ltd. / Brand name : Toyo

Location of Works : --

Test Method(s):-

1) In-house ST-Multi-4 (Spark-OES for Gunmetal)

Remark(s):

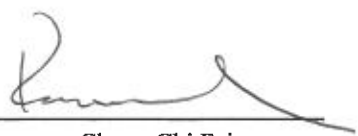
I. Test results only relate to the specimen tested.

Checked by :


Lau Hiu Yat

Assistant Technical Manager

Approved Signatory :


Cheng Chi Fai

Senior Manager

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2521-001

Page 2 of 2

Castco LRN: 220606-2521

Laboratory test details

Date of Request Confirmed: 06-06-2022

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Chemical Analysis		Result
¹⁾ Aluminium	Al %	<0.003
¹⁾ Iron	Fe %	0.031
¹⁾ Nickel	Ni %	0.16
¹⁾ Phosphorus	P %	0.017
¹⁾ Lead	Pb %	5.23
¹⁾ Sulphur	S %	0.035
¹⁾ Antimony	Sb %	0.086
¹⁾ Silicon	Si %	<0.002
¹⁾ Tin	Sn %	4.83
¹⁾ Zinc	Zn %	5.52
¹⁾ Copper	Cu %	84.0

End of Report

Appendix A

Summary of Chemical Analysis of Copper and Copper Alloy

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2521-001

Page 1 of 1

Related Castco LRN: 220606-2521

Name of Customer: Gate Way Valve & Fitting Limited

Job Title: WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No.: --

Customer's Ref. No.: --

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Castco LRN:	220606-2521				
Specimen No. :	220525-2376-003				
Sample Description :	DN25 Bronze Swing Check Valve (Seat)				
Sample Identification No.:	-- / Model no.: 236A / Origin : Thailand				
Manufacturer :	Kitz (Thailand) Ltd. / Brand name : Toyo				
Specification: BS EN 1982:2008, Table 23b, Grade CC491K				Test Results	Within / Exceed limit
Aluminium	Al	0.01 max.	%	<0.003	Within limit
Iron	Fe	0.3 max.	%	0.031	Within limit
Nickel	Ni	2.0 max.	%	0.16	Within limit
Phosphorus	P	0.10 max.	%	0.017	Within limit
Lead	Pb	4.0 to 6.0	%	5.23	Within limit
Sulfur	S	0.10 max.	%	0.035	Within limit
Antimony	Sb	0.25 max.	%	0.086	Within limit
Silicon	Si	0.01 max.	%	<0.002	Within limit
Tin	Sn	4.0 to 6.0	%	4.83	Within limit
Zinc	Zn	4.0 to 6.0	%	5.52	Within limit
Copper	Cu	83.0 to 87.0	%	84.0	Within limit

Remark(s):

I. Test results only relate to the specimen tested.

II. Test results of the specimen are in compliance with the chemical requirements of BS EN 1982:2008, Table 23b, Grade CC491K.

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue: 11-10-2022

Specimen No.: CHEM-221005-2291-001

Page 1 of 3

Castco LRN: 221005-2291

Details as supplied by customer

Name of Customer : Gate Way Valve & Fitting Limited
Address : Flat A1, 4/F, Galaxy Fty Bldg, 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong
Job Title : WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end
Contract No. : --
Customer's Ref. No. : --

Sample details as supplied by customer

Date Sampled : --
Sample Description : DN25 Bronze Swing Check Valve (Cap)
Specification : BS EN 12164:2016, Table 6, Grade CW617N
Specimen No. : 220525-2376-003
Sample Identification No.: -- / Model no.: 236A / Origin : Thailand
Manufacturer : Kitz (Thailand) Ltd. / Brand name : Toyo
Location of Works : --

Test Method(s):-

- 1) In-house ST-Multi-4 (Spark-OES for Brass)
- 2) By Calculation

Remark(s):

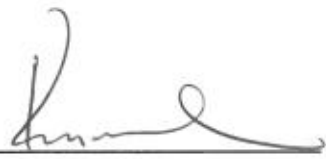
I. Test results only relate to the specimen tested.

Checked by :


Lau Hiu Yat

Assistant Technical Manager

Approved Signatory :


Cheng Chi Fai

Senior Manager

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue: 11-10-2022

Specimen No.: CHEM-221005-2291-001

Page 2 of 3

Castco LRN: 221005-2291

Laboratory test details

Date of Request Confirmed: 05-10-2022

Date of Received by Lab.: 05-10-2022

Testing Period: 07-10-2022

Chemical Analysis		Result
¹⁾ Aluminium	Al %	<0.003
¹⁾ Iron	Fe %	0.095
¹⁾ Nickel	Ni %	0.048
¹⁾ Lead	Pb %	2.11
¹⁾ Tin	Sn %	0.13
¹⁾ Zinc	Zn %	38.9
¹⁾ Copper	Cu %	58.6

Form No.: CHM Cu&Cu Alloy-3 T dd 03/02/2016

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue: 11-10-2022

Specimen No.: CHEM-221005-2291-001

Page 3 of 3

Castco LRN: 221005-2291

Laboratory test details

Date of Request Confirmed: 05-10-2022

Date of Received by Lab.: 05-10-2022

Testing Period: 07-10-2022

Chemical Analysis	Result
2) Others Total %	0.1

End of Report

Form No.: CHM Cu&Cu Alloy-3 T dd 03/02/2016

Appendix A

Summary of Chemical Analysis of Copper and Copper Alloy

Date of issue: 11-10-2022

Specimen No.: CHEM-221005-2291-001

Page 1 of 1

Related Castco LRN: 221005-2291

Name of Customer: Gate Way Valve & Fitting Limited
 Job Title: WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end
 Contract No.: --
 Customer's Ref. No.: --
 Date of Received by Lab.: 05-10-2022 Testing Period: 07-10-2022

Castco LRN:	221005-2291			
Specimen No.:	220525-2376-003			
Sample Description :	DN25 Bronze Swing Check Valve (Cap)			
Sample Identification No.:	-- / Model no.: 236A / Origin : Thailand			
Manufacturer :	Kitz (Thailand) Ltd. / Brand name : Toyo			
Location of Works :	--			
Specification: BS EN 12164:2016, Table 6, Grade CW617N	Test Results		Within / Exceed limit	
Aluminium Al 0.05 max. %	<0.003		Within limit	
Iron Fe 0.3 max. %	0.095		Within limit	
Nickel Ni 0.3 max. %	0.048		Within limit	
Lead Pb 1.6 to 2.5 %	2.11		Within limit	
Tin Sn 0.3 max. %	0.13		Within limit	
Zinc Zn Remainder %	38.9		Within limit	
Copper Cu 57.0 to 59.0 %	58.6		Within limit	
Others Total 0.2 max. %	0.1		Within limit	

Remark(s):

- Test results only relate to the specimen tested.
- Test results of the specimen are in compliance with the chemical requirements of BS EN 12164:2016, Table 6, Grade CW617N.



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Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2522-001

Page 1 of 2

Castco LRN: 220606-2522

Details as supplied by customer

Name of Customer : Gate Way Valve & Fitting Limited
Address : Flat A1, 4/F, Galaxy Fty Bldg, 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong
Job Title : WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end
Contract No. : --
Customer's Ref. No. : --

Sample details as supplied by customer

Date Sampled : --
Sample Description : DN40 Bronze Swing Check Valve (Body)
Specification : BS EN 1982:2008, Table 23b, Grade CC491K
Specimen No. : 220525-2376-005
Sample Identification No.: -- / Model no.: 236A / Origin : Thailand
Manufacturer : Kitz (Thailand) Ltd. / Brand name : Toyo
Location of Works : --


Test Method(s):-

1) In-house ST-Multi-4 (Spark-OES for Gunmetal)

Remark(s):

I. Test results only relate to the specimen tested.

Checked by : 
Lau Hiu Yat
Assistant Technical Manager

Approved Signatory : 
Cheng Chi Fai
Senior Manager

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2522-001

Page 2 of 2

Castco LRN: 220606-2522

Laboratory test details

Date of Request Confirmed: 06-06-2022

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Chemical Analysis		Result
¹⁾ Aluminium	Al %	<0.003
¹⁾ Iron	Fe %	0.040
¹⁾ Nickel	Ni %	0.16
¹⁾ Phosphorus	P %	0.017
¹⁾ Lead	Pb %	5.12
¹⁾ Sulphur	S %	0.036
¹⁾ Antimony	Sb %	0.069
¹⁾ Silicon	Si %	<0.002
¹⁾ Tin	Sn %	4.56
¹⁾ Zinc	Zn %	5.72
¹⁾ Copper	Cu %	84.2

End of Report

Appendix A

Summary of Chemical Analysis of Copper and Copper Alloy

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2522-001

Page 1 of 1

Related Castco LRN: 220606-2522

Name of Customer: Gate Way Valve & Fitting Limited

Job Title: WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No.: --

Customer's Ref. No.: --

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Castco LRN:	220606-2522				
Specimen No. :	220525-2376-005				
Sample Description :	DN40 Bronze Swing Check Valve (Body)				
Sample Identification No.:	-- / Model no.: 236A / Origin : Thailand				
Manufacturer :	Kitz (Thailand) Ltd. / Brand name : Toyo				
Specification: BS EN 1982:2008, Table 23b, Grade CC491K				Test Results	Within / Exceed limit
Aluminium	Al	0.01 max.	%	<0.003	Within limit
Iron	Fe	0.3 max.	%	0.040	Within limit
Nickel	Ni	2.0 max.	%	0.16	Within limit
Phosphorus	P	0.10 max.	%	0.017	Within limit
Lead	Pb	4.0 to 6.0	%	5.12	Within limit
Sulfur	S	0.10 max.	%	0.036	Within limit
Antimony	Sb	0.25 max.	%	0.069	Within limit
Silicon	Si	0.01 max.	%	<0.002	Within limit
Tin	Sn	4.0 to 6.0	%	4.56	Within limit
Zinc	Zn	4.0 to 6.0	%	5.72	Within limit
Copper	Cu	83.0 to 87.0	%	84.2	Within limit

Remark(s):

I. Test results only relate to the specimen tested.

II. Test results of the specimen are in compliance with the chemical requirements of BS EN 1982:2008, Table 23b, Grade CC491K.

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2523-001

Page 1 of 2

Castco LRN: 220606-2523

Details as supplied by customer

Name of Customer : Gate Way Valve & Fitting Limited

Address : Flat A1, 4/F, Galaxy Fty Bldg, 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong

Job Title : WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No. : --

Customer's Ref. No. : --

Sample details as supplied by customer

Date Sampled : --

Sample Description : DN40 Bronze Swing Check Valve (Seat)

Specification : BS EN 1982:2008, Table 23b, Grade CC491K

Specimen No. : 220525-2376-005

Sample Identification No.: -- / Model no.: 236A / Origin : Thailand

Manufacturer : Kitz (Thailand) Ltd. / Brand name : Toyo

Location of Works : --

Test Method(s):-

1) In-house ST-Multi-4 (Spark-OES for Gunmetal)

Remark(s):

I. Test results only relate to the specimen tested.

Checked by : _____

Lau Hiu Yat

Assistant Technical Manager

Approved Signatory : _____

Cheng Chi Fai

Senior Manager

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2523-001

Page 2 of 2

Castco LRN: 220606-2523

Laboratory test details

Date of Request Confirmed: 06-06-2022

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Chemical Analysis		Result
¹⁾ Aluminium	Al %	<0.003
¹⁾ Iron	Fe %	0.030
¹⁾ Nickel	Ni %	0.18
¹⁾ Phosphorus	P %	0.011
¹⁾ Lead	Pb %	5.13
¹⁾ Sulphur	S %	0.038
¹⁾ Antimony	Sb %	0.089
¹⁾ Silicon	Si %	<0.002
¹⁾ Tin	Sn %	4.93
¹⁾ Zinc	Zn %	5.33
¹⁾ Copper	Cu %	84.2

End of Report

Appendix A

Summary of Chemical Analysis of Copper and Copper Alloy

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2523-001

Page 1 of 1

Related Castco LRN: 220606-2523

Name of Customer: Gate Way Valve & Fitting Limited

Job Title: WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No.: --

Customer's Ref. No.: --

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Castco LRN:	220606-2523				
Specimen No. :	220525-2376-005				
Sample Description :	DN40 Bronze Swing Check Valve (Seat)				
Sample Identification No.:	-- / Model no.: 236A / Origin : Thailand				
Manufacturer :	Kitz (Thailand) Ltd. / Brand name : Toyo				
Specification: BS EN 1982:2008, Table 23b, Grade CC491K				Test Results	Within / Exceed limit
Aluminium	Al	0.01 max.	%	<0.003	Within limit
Iron	Fe	0.3 max.	%	0.030	Within limit
Nickel	Ni	2.0 max.	%	0.18	Within limit
Phosphorus	P	0.10 max.	%	0.011	Within limit
Lead	Pb	4.0 to 6.0	%	5.13	Within limit
Sulfur	S	0.10 max.	%	0.038	Within limit
Antimony	Sb	0.25 max.	%	0.089	Within limit
Silicon	Si	0.01 max.	%	<0.002	Within limit
Tin	Sn	4.0 to 6.0	%	4.93	Within limit
Zinc	Zn	4.0 to 6.0	%	5.33	Within limit
Copper	Cu	83.0 to 87.0	%	84.2	Within limit

Remark(s):

I. Test results only relate to the specimen tested.

II. Test results of the specimen are in compliance with the chemical requirements of BS EN 1982:2008, Table 23b, Grade CC491K.

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue: 11-10-2022

Specimen No.: CHEM-221005-2292-001

Page 1 of 3

Castco LRN: 221005-2292

Details as supplied by customer

Name of Customer : Gate Way Valve & Fitting Limited

Address : Flat A1, 4/F, Galaxy Fty Bldg, 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong

Job Title : WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No. : --

Customer's Ref. No. : --

Sample details as supplied by customer

Date Sampled : --

Sample Description : DN40 Bronze Swing Check Valve (Cap)

Specification : BS EN 12164:2016, Table 6, Grade CW617N

Specimen No. : 220525-2376-005

Sample Identification No.: -- / Model no.: 236A / Origin : Thailand

Manufacturer : Kitz (Thailand) Ltd. / Brand name : Toyo

Location of Works : --

Test Method(s):-

- 1) In-house ST-Multi-4 (Spark-OES for Brass)
- 2) By Calculation

Remark(s):

I. Test results only relate to the specimen tested.

Checked by : _____


Lau Hiu Yat
Assistant Technical Manager

Approved Signatory : _____


Cheng Chi Fai
Senior Manager

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue: 11-10-2022

Specimen No.: CHEM-221005-2292-001

Page 2 of 3

Castco LRN: 221005-2292

Laboratory test details

Date of Request Confirmed: 05-10-2022

Date of Received by Lab.: 05-10-2022

Testing Period: 07-10-2022

Chemical Analysis		Result
¹⁾ Aluminium	Al %	<0.003
¹⁾ Iron	Fe %	0.094
¹⁾ Nickel	Ni %	0.047
¹⁾ Lead	Pb %	2.11
¹⁾ Tin	Sn %	0.13
¹⁾ Zinc	Zn %	39.5
¹⁾ Copper	Cu %	58.1

Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 11-10-2022

Specimen No.: CHEM-221005-2292-001

Page 3 of 3

Castco LRN: 221005-2292

Laboratory test details

Date of Request Confirmed: 05-10-2022

Date of Received by Lab.: 05-10-2022

Testing Period: 07-10-2022

Chemical Analysis	Result
²⁾ Others Total %	<0.1

End of Report

Form No.: CHM Cu&Cu Alloy-3 T dd 03/02/2016

Appendix A

Summary of Chemical Analysis of Copper and Copper Alloy

Date of issue: 11-10-2022

Specimen No.: CHEM-221005-2292-001

Page 1 of 1

Related Castco LRN: 221005-2292

Name of Customer: Gate Way Valve & Fitting Limited
 Job Title: WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end
 Contract No.: --
 Customer's Ref. No.: --
 Date of Received by Lab.: 05-10-2022 Testing Period: 07-10-2022

Castco LRN:	221005-2292	
Specimen No.:	220525-2376-005	
Sample Description :	DN40 Bronze Swing Check Valve (Cap)	
Sample Identification No.:	-- / Model no.: 236A / Origin : Thailand	
Manufacturer :	Kitz (Thailand) Ltd. / Brand name : Toyo	
Location of Works :	--	
Specification: BS EN 12164:2016, Table 6, Grade CW617N	Test Results	Within / Exceed limit
Aluminium Al 0.05 max. %	<0.003	Within limit
Iron Fe 0.3 max. %	0.094	Within limit
Nickel Ni 0.3 max. %	0.047	Within limit
Lead Pb 1.6 to 2.5 %	2.11	Within limit
Tin Sn 0.3 max. %	0.13	Within limit
Zinc Zn Remainder %	39.5	Within limit
Copper Cu 57.0 to 59.0 %	58.1	Within limit
Others Total 0.2 max. %	<0.1	Within limit

Remark(s):

- Test results only relate to the specimen tested.
- Test results of the specimen are in compliance with the chemical requirements of BS EN 12164:2016, Table 6, Grade CW617N.

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2524-001

Page 1 of 2

Castco LRN: 220606-2524

Details as supplied by customer

Name of Customer : Gate Way Valve & Fitting Limited

Address : Flat A1, 4/F, Galaxy Fty Bldg, 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong

Job Title : WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No. : --

Customer's Ref. No. : --

Sample details as supplied by customer

Date Sampled : --

Sample Description : DN50 Bronze Swing Check Valve (Body)

Specification : BS EN 1982:2008, Table 23b, Grade CC491K

Specimen No. : 220525-2376-006

Sample Identification No.: -- / Model no.: 236A / Origin : Thailand

Manufacturer : Kitz (Thailand) Ltd. / Brand name : Toyo

Location of Works : --

Test Method(s):-

1) In-house ST-Multi-4 (Spark-OES for Gunmetal)

Remark(s):


I. Test results only relate to the specimen tested.

Checked by :


Lau Hiu Yat

Assistant Technical Manager

Approved Signatory :


Cheng Chi Fai

Senior Manager

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2524-001

Page 2 of 2

Castco LRN: 220606-2524

Laboratory test details

Date of Request Confirmed: 06-06-2022

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Chemical Analysis		Result
¹⁾ Aluminium	Al %	<0.003
¹⁾ Iron	Fe %	0.050
¹⁾ Nickel	Ni %	0.15
¹⁾ Phosphorus	P %	0.014
¹⁾ Lead	Pb %	5.16
¹⁾ Sulphur	S %	0.034
¹⁾ Antimony	Sb %	0.087
¹⁾ Silicon	Si %	<0.002
¹⁾ Tin	Sn %	4.96
¹⁾ Zinc	Zn %	5.41
¹⁾ Copper	Cu %	84.1

End of Report

Appendix A

Summary of Chemical Analysis of Copper and Copper Alloy

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2524-001

Page 1 of 1

Related Castco LRN: 220606-2524

Name of Customer: Gate Way Valve & Fitting Limited

Job Title: WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No.: --

Customer's Ref. No.: --

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Castco LRN:	220606-2524				
Specimen No. :	220525-2376-006				
Sample Description :	DN50 Bronze Swing Check Valve (Body)				
Sample Identification No.:	-- / Model no.: 236A / Origin : Thailand				
Manufacturer :	Kitz (Thailand) Ltd. / Brand name : Toyo				
Specification: BS EN 1982:2008, Table 23b, Grade CC491K				Test Results	Within / Exceed limit
Aluminium	Al	0.01 max.	%	<0.003	Within limit
Iron	Fe	0.3 max.	%	0.050	Within limit
Nickel	Ni	2.0 max.	%	0.15	Within limit
Phosphorus	P	0.10 max.	%	0.014	Within limit
Lead	Pb	4.0 to 6.0	%	5.16	Within limit
Sulfur	S	0.10 max.	%	0.034	Within limit
Antimony	Sb	0.25 max.	%	0.087	Within limit
Silicon	Si	0.01 max.	%	<0.002	Within limit
Tin	Sn	4.0 to 6.0	%	4.96	Within limit
Zinc	Zn	4.0 to 6.0	%	5.41	Within limit
Copper	Cu	83.0 to 87.0	%	84.1	Within limit

Remark(s):

I. Test results only relate to the specimen tested.

II. Test results of the specimen are in compliance with the chemical requirements of BS EN 1982:2008, Table 23b, Grade CC491K.

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2525-001

Page 1 of 2

Castco LRN: 220606-2525

Details as supplied by customer

Name of Customer : Gate Way Valve & Fitting Limited

Address : Flat A1, 4/F, Galaxy Fty Bldg, 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong

Job Title : WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No. : --

Customer's Ref. No. : --

Sample details as supplied by customer

Date Sampled : --

Sample Description : DN50 Bronze Swing Check Valve (Seat)

Specification : BS EN 1982:2008, Table 23b, Grade CC491K

Specimen No. : 220525-2376-006

Sample Identification No.: -- / Model no.: 236A / Origin : Thailand

Manufacturer : Kitz (Thailand) Ltd. / Brand name : Toyo

Location of Works : --

Test Method(s):-

1) In-house ST-Multi-4 (Spark-OES for Gunmetal)

Remark(s):

I. Test results only relate to the specimen tested.

Checked by :


Lau Hiu Yat
Assistant Technical Manager

Approved Signatory :


Cheng Chi Fai
Senior Manager

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2525-001

Page 2 of 2

Castco LRN: 220606-2525

Laboratory test details

Date of Request Confirmed: 06-06-2022

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Chemical Analysis		Result
¹⁾ Aluminium	Al %	<0.003
¹⁾ Iron	Fe %	0.022
¹⁾ Nickel	Ni %	0.17
¹⁾ Phosphorus	P %	0.015
¹⁾ Lead	Pb %	4.56
¹⁾ Sulphur	S %	0.034
¹⁾ Antimony	Sb %	0.091
¹⁾ Silicon	Si %	<0.002
¹⁾ Tin	Sn %	4.80
¹⁾ Zinc	Zn %	5.36
¹⁾ Copper	Cu %	84.6

End of Report

Appendix A

Summary of Chemical Analysis of Copper and Copper Alloy

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2525-001

Page 1 of 1

Related Castco LRN: 220606-2525

Name of Customer: Gate Way Valve & Fitting Limited

Job Title: WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No.: --

Customer's Ref. No.: --

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Castco LRN:	220606-2525				
Specimen No. :	220525-2376-006				
Sample Description :	DN50 Bronze Swing Check Valve (Seat)				
Sample Identification No.:	-- / Model no.: 236A / Origin : Thailand				
Manufacturer :	Kitz (Thailand) Ltd. / Brand name : Toyo				
Specification: BS EN 1982:2008, Table 23b, Grade CC491K				Test Results	Within / Exceed limit
Aluminium	Al	0.01 max.	%	<0.003	Within limit
Iron	Fe	0.3 max.	%	0.022	Within limit
Nickel	Ni	2.0 max.	%	0.17	Within limit
Phosphorus	P	0.10 max.	%	0.015	Within limit
Lead	Pb	4.0 to 6.0	%	4.56	Within limit
Sulfur	S	0.10 max.	%	0.034	Within limit
Antimony	Sb	0.25 max.	%	0.091	Within limit
Silicon	Si	0.01 max.	%	<0.002	Within limit
Tin	Sn	4.0 to 6.0	%	4.80	Within limit
Zinc	Zn	4.0 to 6.0	%	5.36	Within limit
Copper	Cu	83.0 to 87.0	%	84.6	Within limit

Remark(s):

I. Test results only relate to the specimen tested.

II. Test results of the specimen are in compliance with the chemical requirements of BS EN 1982:2008, Table 23b, Grade CC491K.

Test Report**Chemical Analysis of Copper and Copper Alloy**Date of issue: 11-10-2022
Page 1 of 3Specimen No.: CHEM-221005-2293-001
Castco LRN: 221005-2293**Details as supplied by customer**

Name of Customer : Gate Way Valve & Fitting Limited

Address : Flat A1, 4/F, Galaxy Fty Bldg, 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong

Job Title : WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No. : --

Customer's Ref. No. : --

Sample details as supplied by customer

Date Sampled : --

Sample Description : DN50 Bronze Swing Check Valve (Cap)

Specification : BS EN 12164:2016, Table 6, Grade CW617N

Specimen No. : 220525-2376-006

Sample Identification No.: -- / Model no.: 236A / Origin : Thailand

Manufacturer : Kitz (Thailand) Ltd. / Brand name : Toyo

Location of Works : --

Test Method(s):-

- 1) In-house ST-Multi-4 (Spark-OES for Brass)
- 2) By Calculation

Remark(s):

I. Test results only relate to the specimen tested.

Checked by : Lau Hiu Yat
Assistant Technical ManagerApproved Signatory : Cheng Chi Fai
Senior Manager

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue: 11-10-2022

Specimen No.: CHEM-221005-2293-001

Page 2 of 3

Castco LRN: 221005-2293

Laboratory test details

Date of Request Confirmed: 05-10-2022

Date of Received by Lab.: 05-10-2022

Testing Period: 07-10-2022

Chemical Analysis		Result
1) Aluminium	Al %	<0.003
1) Iron	Fe %	0.092
1) Nickel	Ni %	0.048
1) Lead	Pb %	2.13
1) Tin	Sn %	0.13
1) Zinc	Zn %	39.1
1) Copper	Cu %	58.5

Form No.: CHM Cu&Cu Alloy-3 T dd 03/02/2016

Test Report**Chemical Analysis of Copper and Copper Alloy**Date of issue: 11-10-2022
Page 3 of 3Specimen No.: CHEM-221005-2293-001
Castco LRN: 221005-2293**Laboratory test details**

Date of Request Confirmed: 05-10-2022

Date of Received by Lab.: 05-10-2022

Testing Period: 07-10-2022

Chemical Analysis	Result
²⁾ Others Total %	<0.1

End of Report

Form No.: CHM Cu&Cu Alloy-3 T dd 03/02/2016

Appendix A

Summary of Chemical Analysis of Copper and Copper Alloy

Date of issue: 11-10-2022

Specimen No.: CHEM-221005-2293-001

Page 1 of 1

Related Castco LRN: 221005-2293

Name of Customer: Gate Way Valve & Fitting Limited
 Job Title: WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end
 Contract No.: --
 Customer's Ref. No.: --
 Date of Received by Lab.: 05-10-2022 Testing Period: 07-10-2022

Castco LRN:	221005-2293				
Specimen No.:	220525-2376-006				
Sample Description :	DN50 Bronze Swing Check Valve (Cap)				
Sample Identification No.:	-- / Model no.: 236A / Origin : Thailand				
Manufacturer :	Kitz (Thailand) Ltd. / Brand name : Toyo				
Location of Works :	--				
Specification: BS EN 12164:2016, Table 6, Grade CW617N				Test Results	Within / Exceed limit
Aluminium	Al	0.05 max.	%	<0.003	Within limit
Iron	Fe	0.3 max.	%	0.092	Within limit
Nickel	Ni	0.3 max.	%	0.048	Within limit
Lead	Pb	1.6 to 2.5	%	2.13	Within limit
Tin	Sn	0.3 max.	%	0.13	Within limit
Zinc	Zn	Remainder	%	39.1	Within limit
Copper	Cu	57.0 to 59.0	%	58.5	Within limit
Others Total		0.2 max.	%	<0.1	Within limit

Remark(s):

- Test results only relate to the specimen tested.
- Test results of the specimen are in compliance with the chemical requirements of BS EN 12164:2016, Table 6, Grade CW617N.

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2526-001

Page 1 of 2

Castco LRN: 220606-2526

Details as supplied by customer

Name of Customer : Gate Way Valve & Fitting Limited

Address : Flat A1, 4/F, Galaxy Fty Bldg, 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong

Job Title : WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No. : --

Customer's Ref. No. : --

Sample details as supplied by customer

Date Sampled : --

Sample Description : DN80 Bronze Swing Check Valve (Body)

Specification : BS EN 1982:2008, Table 23b, Grade CC491K

Specimen No. : 220525-2376-008

Sample Identification No.: -- / Model no.: 236A / Origin : Thailand

Manufacturer : Kitz (Thailand) Ltd. / Brand name : Toyo

Location of Works : --


Test Method(s):-

1) In-house ST-Multi-4 (Spark-OES for Gunmetal)

Remark(s):

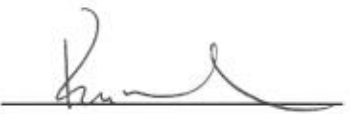
I. Test results only relate to the specimen tested.

Checked by :


Lau Hiu Yat

Assistant Technical Manager

Approved Signatory :


Cheng Chi Fai

Senior Manager

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2526-001

Page 2 of 2

Castco LRN: 220606-2526

Laboratory test details

Date of Request Confirmed: 06-06-2022

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Chemical Analysis		Result
¹⁾ Aluminium	Al %	<0.003
¹⁾ Iron	Fe %	0.034
¹⁾ Nickel	Ni %	0.23
¹⁾ Phosphorus	P %	0.014
¹⁾ Lead	Pb %	4.85
¹⁾ Sulphur	S %	0.045
¹⁾ Antimony	Sb %	0.10
¹⁾ Silicon	Si %	<0.002
¹⁾ Tin	Sn %	4.77
¹⁾ Zinc	Zn %	5.16
¹⁾ Copper	Cu %	84.6

End of Report

Appendix A

Summary of Chemical Analysis of Copper and Copper Alloy

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2526-001

Page 1 of 1

Related Castco LRN: 220606-2526

Name of Customer: Gate Way Valve & Fitting Limited

Job Title: WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No.: --

Customer's Ref. No.: --

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Castco LRN:	220606-2526				
Specimen No. :	220525-2376-008				
Sample Description :	DN80 Bronze Swing Check Valve (Body)				
Sample Identification No.:	-- / Model no.: 236A / Origin : Thailand				
Manufacturer :	Kitz (Thailand) Ltd. / Brand name : Toyo				
Specification: BS EN 1982:2008, Table 23b, Grade CC491K				Test Results	Within / Exceed limit
Aluminium	Al	0.01 max.	%	<0.003	Within limit
Iron	Fe	0.3 max.	%	0.034	Within limit
Nickel	Ni	2.0 max.	%	0.23	Within limit
Phosphorus	P	0.10 max.	%	0.014	Within limit
Lead	Pb	4.0 to 6.0	%	4.85	Within limit
Sulfur	S	0.10 max.	%	0.045	Within limit
Antimony	Sb	0.25 max.	%	0.10	Within limit
Silicon	Si	0.01 max.	%	<0.002	Within limit
Tin	Sn	4.0 to 6.0	%	4.77	Within limit
Zinc	Zn	4.0 to 6.0	%	5.16	Within limit
Copper	Cu	83.0 to 87.0	%	84.6	Within limit

Remark(s):

I. Test results only relate to the specimen tested.

II. Test results of the specimen are in compliance with the chemical requirements of BS EN 1982:2008, Table 23b, Grade CC491K.

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2527-001

Page 1 of 2

Castco LRN: 220606-2527

Details as supplied by customer

Name of Customer : Gate Way Valve & Fitting Limited

Address : Flat A1, 4/F, Galaxy Fty Bldg, 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong

Job Title : WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No. : --

Customer's Ref. No. : --

Sample details as supplied by customer

Date Sampled : --

Sample Description : DN80 Bronze Swing Check Valve (Seat)

Specification : BS EN 1982:2008, Table 23b, Grade CC491K

Specimen No. : 220525-2376-008

Sample Identification No.: -- / Model no.: 236A / Origin : Thailand

Manufacturer : Kitz (Thailand) Ltd. / Brand name : Toyo

Location of Works : --

Test Method(s):-

1) In-house ST-Multi-4 (Spark-OES for Gunmetal)

Remark(s):

I. Test results only relate to the specimen tested.

Checked by :

**Lau Hiu Yat**
Assistant Technical Manager

Approved Signatory :

**Cheng Chi Fai**
Senior Manager

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2527-001

Page 2 of 2

Castco LRN: 220606-2527

Laboratory test details

Date of Request Confirmed: 06-06-2022

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Chemical Analysis		Result
¹⁾ Aluminium	Al %	<0.003
¹⁾ Iron	Fe %	0.038
¹⁾ Nickel	Ni %	0.18
¹⁾ Phosphorus	P %	0.014
¹⁾ Lead	Pb %	5.07
¹⁾ Sulphur	S %	0.047
¹⁾ Antimony	Sb %	0.12
¹⁾ Silicon	Si %	<0.002
¹⁾ Tin	Sn %	4.79
¹⁾ Zinc	Zn %	5.11
¹⁾ Copper	Cu %	84.5

End of Report

Appendix A

Summary of Chemical Analysis of Copper and Copper Alloy

Date of issue : 22-06-2022

Specimen No.: CHEM-220606-2527-001

Page 1 of 1

Related Castco LRN: 220606-2527

Name of Customer: Gate Way Valve & Fitting Limited

Job Title: WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No.: --

Customer's Ref. No.: --

Date of Received by Lab.: 06-06-2022

Testing Period: 16-06-2022

Castco LRN:	220606-2527				
Specimen No. :	220525-2376-008				
Sample Description :	DN80 Bronze Swing Check Valve (Seat)				
Sample Identification No.:	-- / Model no.: 236A / Origin : Thailand				
Manufacturer :	Kitz (Thailand) Ltd. / Brand name : Toyo				
Specification: BS EN 1982:2008, Table 23b, Grade CC491K				Test Results	Within / Exceed limit
Aluminium	Al	0.01 max.	%	<0.003	Within limit
Iron	Fe	0.3 max.	%	0.038	Within limit
Nickel	Ni	2.0 max.	%	0.18	Within limit
Phosphorus	P	0.10 max.	%	0.014	Within limit
Lead	Pb	4.0 to 6.0	%	5.07	Within limit
Sulfur	S	0.10 max.	%	0.047	Within limit
Antimony	Sb	0.25 max.	%	0.12	Within limit
Silicon	Si	0.01 max.	%	<0.002	Within limit
Tin	Sn	4.0 to 6.0	%	4.79	Within limit
Zinc	Zn	4.0 to 6.0	%	5.11	Within limit
Copper	Cu	83.0 to 87.0	%	84.5	Within limit

Remark(s):

I. Test results only relate to the specimen tested.

II. Test results of the specimen are in compliance with the chemical requirements of BS EN 1982:2008, Table 23b, Grade CC491K.

Test Report**Chemical Analysis of Copper and Copper Alloy**Date of issue: 11-10-2022
Page 1 of 3Specimen No.: CHEM-221005-2294-001
Castco LRN: 221005-2294**Details as supplied by customer**

Name of Customer : Gate Way Valve & Fitting Limited

Address : Flat A1, 4/F, Galaxy Fty Bldg, 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong

Job Title : WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end

Contract No. : --

Customer's Ref. No. : --

Sample details as supplied by customer

Date Sampled : --

Sample Description : DN80 Bronze Swing Check Valve (Cap)

Specification : BS EN 12164:2016, Table 6, Grade CW617N

Specimen No. : 220525-2376-008

Sample Identification No.: -- / Model no.: 236A / Origin : Thailand

Manufacturer : Kitz (Thailand) Ltd. / Brand name : Toyo

Location of Works : --

Test Method(s):-

- 1) In-house ST-Multi-4 (Spark-OES for Brass)
- 2) By Calculation

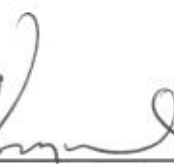
Remark(s):

I. Test results only relate to the specimen tested.

Checked by :


Lau Hiu Yat
Assistant Technical Manager

Approved Signatory :


Cheng Chi Fai
Senior Manager

Test Report**Chemical Analysis of Copper and Copper Alloy**

Date of issue: 11-10-2022

Specimen No.: CHEM-221005-2294-001

Page 2 of 3

Castco LRN: 221005-2294

Laboratory test details

Date of Request Confirmed: 05-10-2022

Date of Received by Lab.: 05-10-2022

Testing Period: 07-10-2022

Chemical Analysis		Result
¹⁾ Aluminium	Al %	<0.003
¹⁾ Iron	Fe %	0.094
¹⁾ Nickel	Ni %	0.048
¹⁾ Lead	Pb %	2.12
¹⁾ Tin	Sn %	0.13
¹⁾ Zinc	Zn %	39.0
¹⁾ Copper	Cu %	58.6

Form No.: CHM Cu&Cu Alloy-3 T dd 03/02/2016

Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 11-10-2022

Specimen No.: CHEM-221005-2294-001

Page 3 of 3

Castco LRN: 221005-2294

Laboratory test details

Date of Request Confirmed: 05-10-2022

Date of Received by Lab.: 05-10-2022

Testing Period: 07-10-2022

Chemical Analysis	Result
²⁾ Others Total %	<0.1

End of Report

Form No.: CHM Cu&Cu Alloy-3 T dd 03/02/2016

Appendix A

Summary of Chemical Analysis of Copper and Copper Alloy

Date of issue: 11-10-2022

Specimen No.: CHEM-221005-2294-001

Page 1 of 1

Related Castco LRN: 221005-2294

Name of Customer: Gate Way Valve & Fitting Limited
 Job Title: WSD GA renew of Toyo Fig. 236A, bronze swing check valve to PN16, screw end
 Contract No.: --
 Customer's Ref. No.: --
 Date of Received by Lab.: 05-10-2022 Testing Period: 07-10-2022

Castco LRN:	221005-2294			
Specimen No.:	220525-2376-008			
Sample Description :	DN80 Bronze Swing Check Valve (Cap)			
Sample Identification No.:	-- / Model no.: 236A / Origin : Thailand			
Manufacturer :	Kitz (Thailand) Ltd. / Brand name : Toyo			
Location of Works :	--			
Specification: BS EN 12164:2016, Table 6, Grade CW617N	Test Results		Within / Exceed limit	
Aluminium Al 0.05 max. %	<0.003		Within limit	
Iron Fe 0.3 max. %	0.094		Within limit	
Nickel Ni 0.3 max. %	0.048		Within limit	
Lead Pb 1.6 to 2.5 %	2.12		Within limit	
Tin Sn 0.3 max. %	0.13		Within limit	
Zinc Zn Remainder %	39.0		Within limit	
Copper Cu 57.0 to 59.0 %	58.6		Within limit	
Others Total 0.2 max. %	<0.1		Within limit	

Remark(s):

- Test results only relate to the specimen tested.
- Test results of the specimen are in compliance with the chemical requirements of BS EN 12164:2016, Table 6, Grade CW617N.