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CASTCO TESTING CENTRE LTD.

Summary of Test Results

Reference no. : DP-SUMMARY-2016-28

Customer : Gate Way Valves & Fitting Ltd.
Address : Flat A1, 4/F., Galaxy Factory Building, 25-27 Luk Hop Street, San Po Kong, Kowloon, H. K.
Sample description : Copper Alloy Gate Valve with Soldering Ends
Manufacturer : Kitz (Thailand) Ltd.
Brand : Toyo
Origin : Thailand
Sample submitted by : Gate Way Valves & Fitting Ltd.
Test standard : BS 5154 : 1991 / BS EN 12266-1 : 2012
Test period : 08 January to 10 May 2016

A) Sample List

Model no.	DN	Specimen no.
Fig. No. 207	15	DP0160419-172
	22	DP0151231-189
	28	DP0151231-190
	35	DP0151231-191
	42	DP0151231-192
	54	DP0151231-193

B) Test Item

1) Dimensions Check (BS 5154 : 1991 Clause 8 Table 7 & 8)

DN	Test results	Castco LRN
15	Passed	DP0160419-172 DIM
22	Passed	DP0151231-189 DIM
28	Passed	DP0151231-190 DIM
35	Passed	DP0151231-191 DIM
42	Passed	DP0151231-192 DIM
54	Passed	DP0151231-193 DIM

2) Hydrostatic Strength Test (BS EN 12288 : 2010 Clause 4.3.3 / BS EN 12266-1 : 2012 Clause 4 Annex A)

DN	Test results	Castco LRN
15	Passed	DP0160419-172 HYD
22	Passed	DP0151231-189 HYD
28	Passed	DP0151231-190 HYD
35	Passed	DP0151231-191 HYD
42	Passed	DP0151231-192 HYD
54	Passed	DP0151231-193 HYD

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Summary of Test Results

Reference no. : DP-SUMMARY-2016-28

B) Test Item (con't)

3) Chemical Composition - Body (BS EN 1982 : 2008 Table 23b Grade CC491K / Table 7 Grade CC754S)

DN	Parts of valve	Test results	Castco LRN
15	Body	Passed	MS0160421-1
	Bonnet	Passed	MS0160421-2
	Seat Ring	Test results comply with the specification of BS EN 1982 : 2008, Table 7, Grade CC754S except phosphorus. Phosphorus content was found to be exceeding the maximum limit, however, phosphorus was commonly used to strengthen the copper alloy.	MS0160421-3
	Stem	Test results comply with the specification of BS EN 1982 : 2008, Table 7, Grade CC754S except phosphorus. Phosphorus content was found to be exceeding the maximum limit, however, phosphorus was commonly used to strengthen the copper alloy.	MS0160421-4
35	Body	Passed	MS0160421-5
	Bonnet	Passed	MS0160421-6
	Seat Ring	Passed	MS0160421-7
	Stem	Test results comply with the specification of BS EN 1982 : 2008, Table 7, Grade CC754S except phosphorus. Phosphorus content was found to be exceeding the maximum limit, however, phosphorus was commonly used to strengthen the copper alloy.	MS0160421-8
54	Body	Passed	MS0160421-9
	Bonnet	Passed	MS0160421-10
	Seat Ring	Passed	MS0160421-11
	Stem	Test results comply with the specification of BS EN 1982 : 2008, Table 7, Grade CC754S except phosphorus. Phosphorus content was found to be exceeding the maximum limit, however, phosphorus was commonly used to strengthen the copper alloy.	MS0160421-12

Prepare by : FU HO MAN
Assistant Technical Officer
Date : 08 June 2016

Review by : WONG KA MAN
Laboratory Manager
Date : 08 June 2016

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佳力高試驗中心有限公司
CASTCO TESTING CENTRE LTD.

Test Report
Dimensions Check of Gate Valves
(BS 5154 : 1991 Clause 8 Table 7 & 8)

Date of issue : 29 January 2016

Castco LRN : DP0151231-189 to 193 DIM

Details as suppiled 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 : - -
Sample description : Copper Alloy Gate Valves with Soldering Ends
Manufacturer : Kitz (Thailand) Ltd.
Brand name : Toyo
Nominal pressure (PN) : 16
Body marking : RED WHITE TOYO 125S
Model no. : Fig. No. 207
Origin : Thailand
Sample submitted by : Gate Way Valve & Fitting Ltd.

Laboratory test results

Date of sample received : 31 December 2015
Date of test : 08 January 2016

Specimen no.		DP0151231-189	DP0151231-190	DP0151231-191	DP0151231-192	DP0151231-193
DN		22	28	35	42	54
Stem diameter (mm)	Measured Mean Value	7.91	9.53	9.87	10.76	12.41
	Requirement	min. 7.5	min. 8.5	min. 9.5	min. 10.5	min. 12
Wall thickness (mm)	Measured Mean Value	2.72	3.16	3.37	3.31	4.04
	Requirement	min. 1.8	min. 2	min. 2.2	min. 2.3	min. 2.5
Face to face (mm)	Measured Mean Value	62	72	78	87	102
Outside diameter of sealing face (mm)	Measured Mean Value	27.73	34.75	41.68	48.57	62.63

Remark(s) :
1. Test results relate only to the specimen tested.
2. Test results of sample comply with the requirement of BS 5154 : 1991 Clause 8 Table 7 & 8.
3. No requirements in dimensions for face to face, outside diameter of sealing face are stated in the BS 5154 : 1991 and therefore the measured dimension are used for reference.

Checked by : FU HO MAN, Assistant Technical Officer
Certified by : WONG KA MAN, Laboratory Manager

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Test Report
Hydrostatic Strength Test of Gate Valves
(BS EN 12288 : 2010 Clause 4.3.3 / BS EN 12266-1 : 2012 Clause 4 Annex A)

Date of issue : 29 January 2016
 Castco LRN : DP0151231-189 to 193 HYD

Details as suppiled 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 : - -
Sample description : Copper Alloy Gate Valves with Soldering Ends
Manufacturer : Kitz (Thailand) Ltd.
Brand name : Toyo
Nominal pressure (PN) : 16
Body marking : RED WHITE TOYO 125S
Model no. : Fig. No. 207
Origin : Thailand
Sample submitted by : Gate Way Valve & Fitting Ltd.

Laboratory test results

Date of sample received : 31 December 2015 Date of test : 12 January 2016

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

Specimen no.	DN	Apply pressure (bar)	Test duration (s)	Visually detectable leakage	Test results	Requirement
DP0151231-189	22	24	60	No	Passed	Visually detectable leakage is not permitted
DP0151231-190	28	24	60	No	Passed	
DP0151231-191	35	24	60	No	Passed	
DP0151231-192	42	24	60	No	Passed	
DP0151231-193	54	24	60	No	Passed	

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

Specimen no.	DN	Side	Apply pressure (bar)	Test duration (s)	Visually detectable leakage	Leakage rates (m^3/s)	Test results	Requirement
DP0151231-189	22	A	17.6	60	No	0	Passed	The leakage rate shall not exceed specified in BS EN 12266-1 : 2012 Annex A.4.3 Table A.5
		B	17.6	60	No	0	Passed	
DP0151231-190	28	A	17.6	60	No	0	Passed	
		B	17.6	60	No	0	Passed	
DP0151231-191	35	A	17.6	60	No	0	Passed	
		B	17.6	60	No	0	Passed	
DP0151231-192	42	A	17.6	60	No	0	Passed	
		B	17.6	60	No	0	Passed	
DP0151231-193	54	A	17.6	60	No	0	Passed	
		B	17.6	60	No	0	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 Officer

Certified by : WONG KA MAN Laboratory Manager

End of Report

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Test Report
Dimensions Check of Gate Valves
(BS 5154 : 1991 Clause 8 Table 7 & 8)

Date of issue : 29 January 2016

Appendix A

DP0151231-189(1)

DP0151231-189(2)

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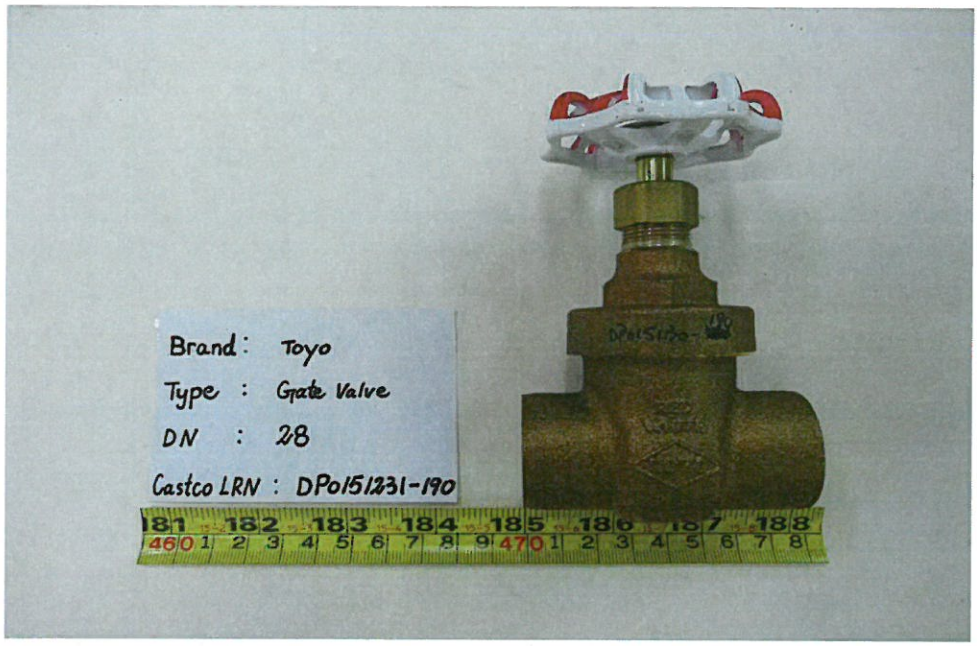
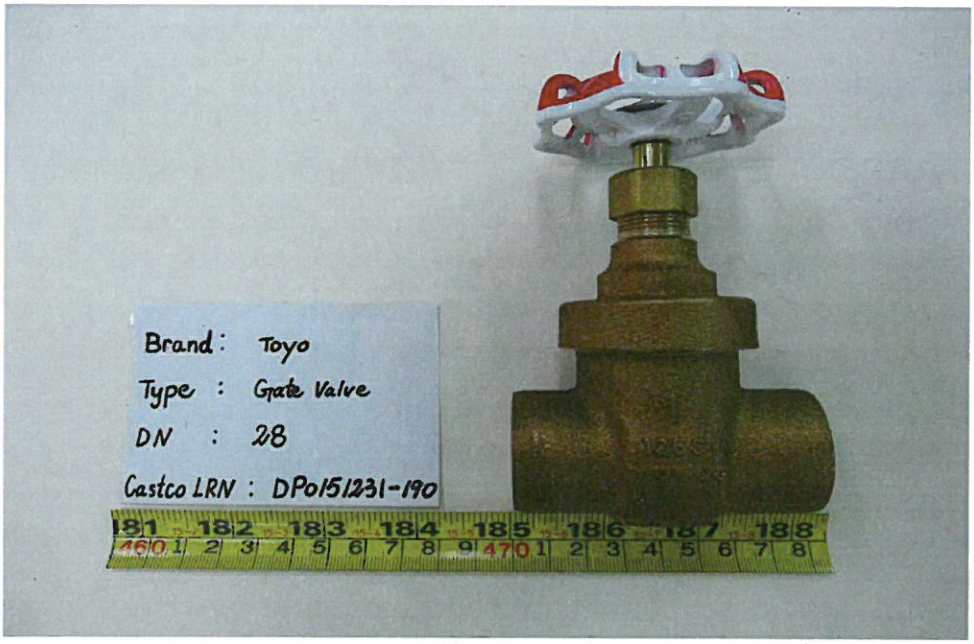
Test Report
Dimensions Check of Gate Valves
(BS 5154 : 1991 Clause 8 Table 7 & 8)

Date of issue : 29 January 2016

Appendix B



DP0151231-190(1)



DP0151231-190(2)

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Test Report
Dimensions Check of Gate Valves
(BS 5154 : 1991 Clause 8 Table 7 & 8)

Date of issue : 29 January 2016

Appendix C

DP0151231-191(1)

DP0151231-191(2)

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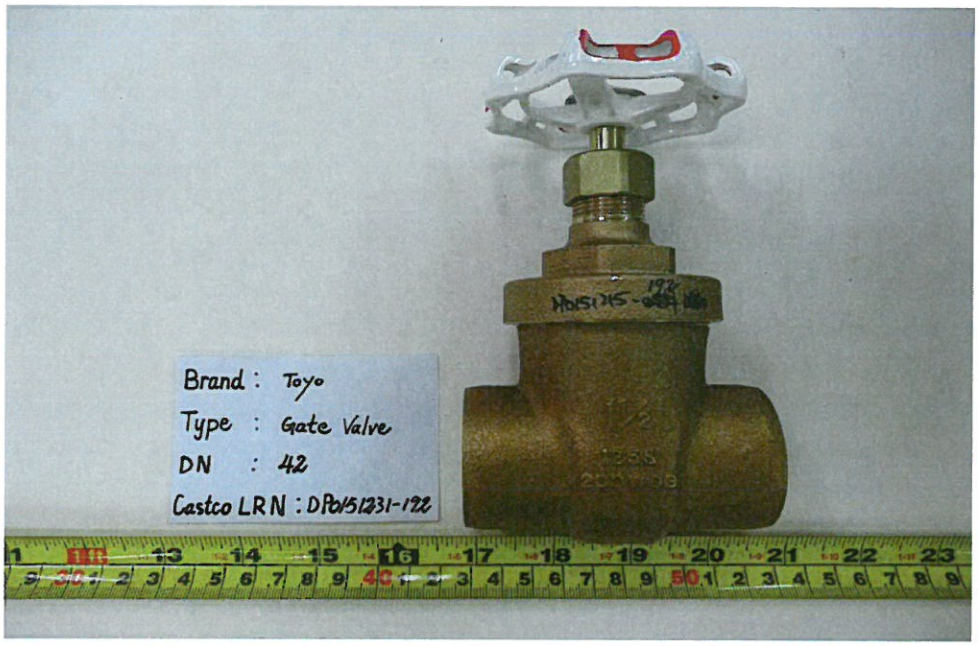
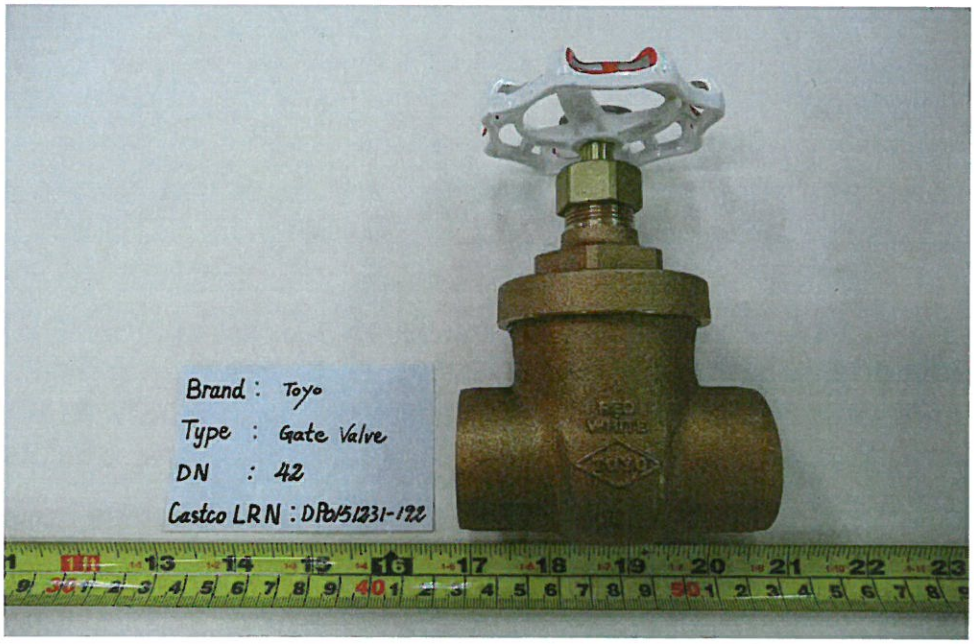
Test Report
Dimensions Check of Gate Valves
(BS 5154 : 1991 Clause 8 Table 7 & 8)

Date of issue : 29 January 2016

Appendix D



DP0151231-192(1)



DP0151231-192(2)

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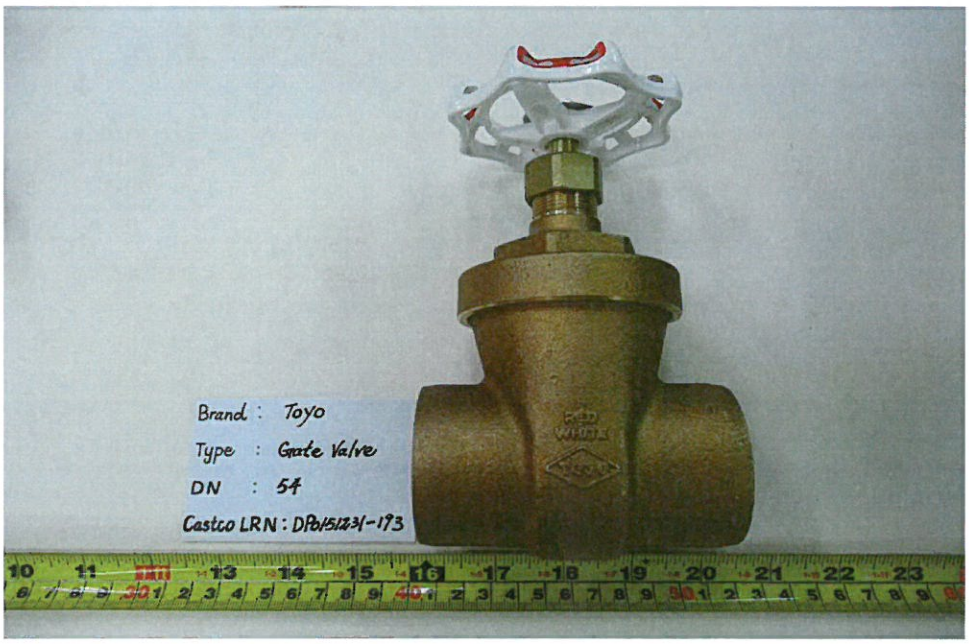
Test Report
Dimensions Check of Gate Valves
(BS 5154 : 1991 Clause 8 Table 7 & 8)

Date of issue : 29 January 2016

Appendix E

DP0151231-193(1)



DP0151231-193(2)

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佳力高試驗中心有限公司
CASTCO TESTING CENTRE LTD.

Test Report
Dimensions Check of Gate Valves
(BS 5154 : 1991 Clause 8 Table 7 & 8)

Date of issue : 22 April 2016
 Castco LRN : DP0160419-172 DIM

Details as suppiled 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 : - -
Sample description : Copper Alloy Gate Valves with Soldering Ends
Manufacturer : Kitz (Thailand) Ltd.
Brand name : Toyo
Nominal pressure (PN) : 16
Body marking : RED WHITE TOYO 125S
Model no. : Fig. No. 207
Origin : Thailand
Sample submitted by : Gate Way Valve & Fitting Ltd.

Laboratory test results

Date of sample received : 19 April 2016 Date of test : 20 April 2016

Specimen no.		DP0160419-172
DN		15
Stem diameter (mm)	Measured Mean Value	7.97
	Requirement	min. 6.5
Wall thickness (mm)	Measured Mean Value	2.83
	Requirement	min. 1.7
Face to face (mm)	Measured Mean Value	45.98
Outside diameter of sealing face (mm)	Measured Mean Value	20.94

Remark(s) :
1. Test results relate only to the specimen tested.
2. Test results of sample comply with the requirement of BS 5154 : 1991 Clause 8 Table 7 & 8.
3. No requirements in dimensions for face to face, outside diameter of sealing face are stated in the BS 5154 : 1991 and therefore the measured dimension are used for reference.

Checked by : FU HO MAN Assistant Technical Officer Certified by :

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Test Report
Hydrostatic Strength Test of Gate Valves
(BS EN 12288 : 2010 Clause 4.3.3 / BS EN 12266-1 : 2012 Clause 4 Annex A)

Date of issue : 22 April 2016
 Castco LRN : DP0160419-172 DIM

Details as suppiled 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 : - -
Sample description : Copper Alloy Gate Valves with Soldering Ends
Manufacturer : Kitz (Thailand) Ltd.
Brand name : Toyo
Nominal pressure (PN) : 16
Body marking : RED WHITE TOYO 125S
Model no. : Fig. No. 207
Origin : Thailand
Sample submitted by : Gate Way Valve & Fitting Ltd.

Laboratory test results

Date of sample received : 19 April 2016 Date of test : 20 April 2016

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

Specimen no.	DN	Apply pressure (bar)	Test duration (s)	Visually detectable leakage	Test results	Requirement
DP0160419-172	15	24	60	No	Passed	Visually detectable leakage is not permitted

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

Specimen no.	DN	Side	Apply pressure (bar)	Test duration (s)	Visually detectable leakage	Leakage rates (m^3/s)	Test results	Requirement
DP0160419-172	15	A	17.6	60	No	0	Passed	The leakage rate shall not exceed specified in BS EN 12266-1 : 2012 Annex A.4.3 Table A.5
		B	17.6	60	No	0	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 Officer Certified by : WONG KA MAN Laboratory Manager

End of Report

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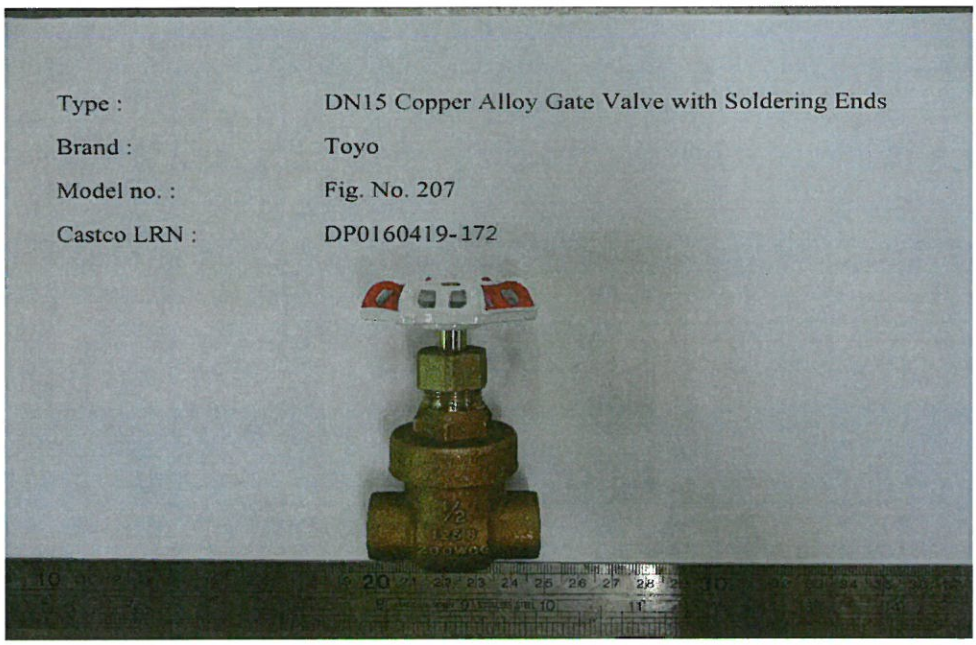
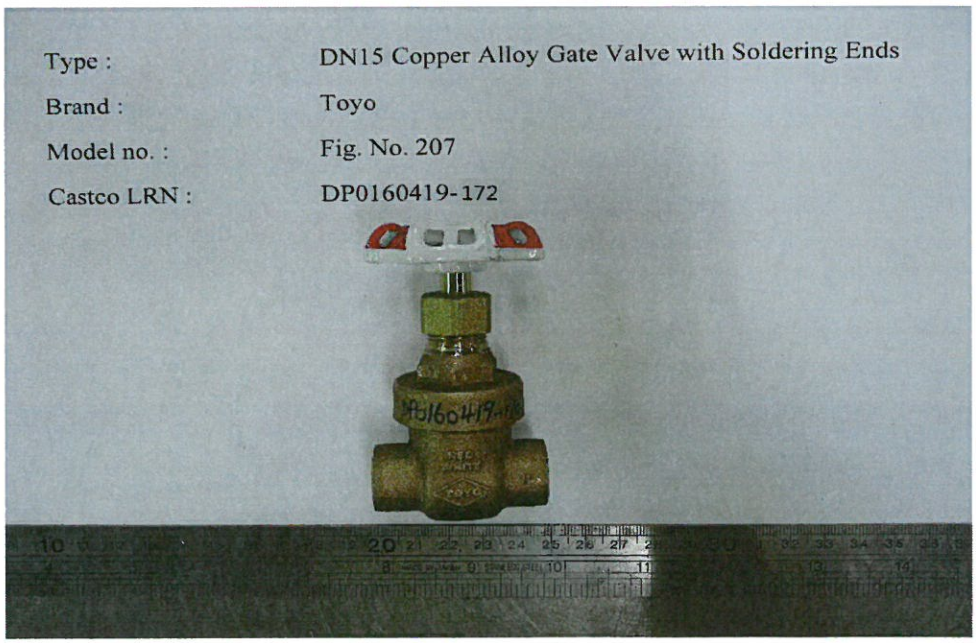
Test Report
Dimensions Check of Gate Valves
(BS 5154 : 1991 Clause 8 Table 7 & 8)

Date of issue : 22 April 2016

Appendix A



DP0160419-172(1)



DP0160419-172(2)

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CASTCO TESTING CENTRE LTD.

Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-1

Details as supplied by customer

Name of Customer :	Gate Way Valve & Fitting Ltd.
Address :	Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong
Job Title :	"Toyo" Gate Valve - Fig. No.207
Contract No. :	--
Customer's Ref. No. :	--

Sample details as supplied by customer

Date of Sample Received :	21-04-2016
Date Sampled :	--
Test Period :	10-05-2016
Sample Description :	DN15 Copper Alloy Gate Valve with Soldering Ends (Body)
Specification :	BS EN 1982:2008 Grade CC491K
Specimen No.:	DP0160419-170
Manufacturer :	Kitz (Thailand) Ltd.
Model No.:	Fig. No. 207 / Brand Name : Toyo / Origin: Thailand
Body Marking :	RED WHITE TOYO 125S

Test Method(s):-

1) In House Method: ST-Multi-4 (Spark-OES)

Remarks:

I. Test results only relate to the specimen tested.

Checked by : _____
Cheng Chi Fai
Senior Manager

Certified by: _____
LEE Stephen Shu Hang
Ph.D.
Technical Director

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CASTCO TESTING CENTRE LTD.

Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-1

Chemical Analysis		Result	Specification BS EN 1982:2008, Table 23b, Grade CC491K castings
1) Aluminium	Al %	<0.003	0.01 max.
1) Iron	Fe %	0.046	0.3 max.
1) Nickel	Ni %	0.17	2.0 max.
1) Phosphorus	P %	0.025	0.10 max.
1) Lead	Pb %	5.44	4.0 min. 6.0 max.
1) Sulphur	S %	0.023	0.10 max.
1) Antimony	Sb %	0.059	0.25 max.
1) Silicon	Si %	<0.002	0.01 max.
1) Tin	Sn %	4.97	4.0 min. 6.0 max.
1) Zinc	Zn %	5.33	4.0 min. 6.0 max.
1) Copper	Cu %	83.9	83.0 min. 87.0 max.

Executive Summary

Test results of the specimen are compliance / ~~not compliance~~ with the chemical requirement of BS EN 1982:2008, Table 23b, Grade CC491K.

End of Report

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CASTCO TESTING CENTRE LTD.

Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-2

Details as supplied by customer

Name of Customer :	Gate Way Valve & Fitting Ltd.
Address :	Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong
Job Title :	"Toyo" Gate Valve - Fig. No.207
Contract No. :	--
Customer's Ref. No. :	--

Sample details as supplied by customer

Date of Sample Received :	21-04-2016
Date Sampled :	--
Test Period :	10-05-2016
Sample Description :	DN15 Copper Alloy Gate Valve with Soldering Ends (Bonnet)
Specification :	BS EN 1982:2008 Grade CC491K
Specimen No.:	DP0160419-170
Manufacturer :	Kitz (Thailand) Ltd.
Model No.:	Fig. No. 207 / Brand Name : Toyo / Origin: Thailand
Body Marking :	RED WHITE TOYO 125S

Test Method(s):-

1) In House Method: ST-Multi-4 (Spark-OES)

Remarks:

I. Test results only relate to the specimen tested.

Checked by : _____
Cheng Chi Fai
Senior Manager

Certified by: _____
LEE Stephen Shu Hang
Ph.D.
Technical Director

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E-mail: castco@netvigator.com Website: www.castco.com.hk

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佳力高試驗中心有限公司
CASTCO TESTING CENTRE LTD.

Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-2

Chemical Analysis		Result	Specification BS EN 1982:2008, Table 23b, Grade CC491K castings
1) Aluminium	Al %	<0.003	0.01 max.
1) Iron	Fe %	0.042	0.3 max.
1) Nickel	Ni %	0.17	2.0 max.
1) Phosphorus	P %	0.022	0.10 max.
1) Lead	Pb %	5.23	4.0 min. 6.0 max.
1) Sulphur	S %	0.023	0.10 max.
1) Antimony	Sb %	0.055	0.25 max.
1) Silicon	Si %	<0.002	0.01 max.
1) Tin	Sn %	4.94	4.0 min. 6.0 max.
1) Zinc	Zn %	5.22	4.0 min. 6.0 max.
1) Copper	Cu %	84.2	83.0 min. 87.0 max.

Executive Summary

Test results of the specimen are compliance / ~~not compliance~~ with the chemical requirement of BS EN 1982:2008, Table 23b, Grade CC491K.

End of Report

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

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CASTCO
佳力高試驗中心有限公司
CASTCO TESTING CENTRE LTD.

Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 06-06-2016

Castco LRN: MS0160421-3

Details as supplied by customer

Name of Customer :	Gate Way Valve & Fitting Ltd.
Address :	Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong
Job Title :	"Toyo" Gate Valve - Fig. No.207
Contract No. :	--
Customer's Ref. No. :	--

Sample details as supplied by customer

Date of Sample Received :	21-04-2016
Date Sampled :	--
Test Period :	11-05-2016 to 01-06-2016
Sample Description :	DN15 Copper Alloy Gate Valve with Soldering Ends (Seat Ring)
Specification :	BS EN 1982:2008 Grade CC754S
Specimen No.:	DP0160419-170
Manufacturer :	Kitz (Thailand) Ltd.
Model No.:	Fig. No. 207 / Brand Name : Toyo / Origin: Thailand
Body Marking :	RED WHITE TOYO 125S

Test Method(s):-

1) In House Method: ST-Multi-4 (Spark-OES)
2) In House Method: ICP-OES

Remarks:

I. Test results only relate to the specimen tested.

Checked by : _____
Cheng Chi Fai
Senior Manager

Certified by: _____
LEE Stephen Shu Hang
Ph.D.
Technical Director

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Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 06-06-2016

Castco LRN: MS0160421-3

Chemical Analysis		Result	Specification refer to BS EN 1982:2008 Grade CC754S
1) Aluminium	Al %	<0.003	0.8 (max.)
1) Iron	Fe %	0.069	0.7 (max.)
1) Manganese	Mn %	<0.010	0.5 (max.)
1) Nickel	Ni %	0.063	1.0 (max.)
1) Phosphorus	P %	0.11	0.02 (max.)
1) Lead	Pb %	1.95	0.5 (min.) 2.5 (max.)
1) Silicon	Si %	<0.002	0.05 (max.)
1) Zinc	Zn %	36.2	Remainder
1) Copper	Cu %	60.4	58.0 (min.) 63.0 (max.)
2) Tin	Sn %	0.98	1.0 (max.)

Executive Summary

Test results comply with the specification of BS EN 1982:2008, Table 7, Grade CC754S except phosphorus. Phosphorus content was found to be exceeding the maximum limit, however, phosphorus was commonly used to strengthen the copper alloy.

End of Report

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CASTCO TESTING CENTRE LTD.

Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-4

Details as supplied by customer

Name of Customer :	Gate Way Valve & Fitting Ltd.
Address :	Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong
Job Title :	"Toyo" Gate Valve - Fig. No.207
Contract No. :	--
Customer's Ref. No. :	--

Sample details as supplied by customer

Date of Sample Received :	21-04-2016
Date Sampled :	--
Test Period :	11-05-2016
Sample Description :	DN15 Copper Alloy Gate Valve with Soldering Ends (Stem)
Specification :	BS EN 1982:2008 Grade CC754S
Specimen No.:	DP0160419-170
Manufacturer :	Kitz (Thailand) Ltd.
Model No.:	Fig. No. 207 / Brand Name : Toyo / Origin: Thailand
Body Marking :	RED WHITE TOYO 125S

Test Method(s):-

1) In House Method: ST-Multi-4 (Spark-OES)

Remarks:

I. Test results only relate to the specimen tested.

Checked by : Cheng Chi Fai
Senior Manager

Certified by: LEE Stephen Shu Hang
Ph.D.
Technical Director

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Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-4

Chemical Analysis		Result	Specification refer to BS EN 1982:2008 Grade CC754S
1) Aluminium	Al %	<0.003	0.8 (max.)
1) Iron	Fe %	0.032	0.7 (max.)
1) Manganese	Mn %	<0.010	0.5 (max.)
1) Nickel	Ni %	0.063	1.0 (max.)
1) Phosphorus	P %	0.13	0.02 (max.)
1) Lead	Pb %	2.42	0.5 (min.) 2.5 (max.)
1) Silicon	Si %	<0.002	0.05 (max.)
1) Tin	Sn %	0.32	1.0 (max.)
1) Zinc	Zn %	35.3	Remainder
1) Copper	Cu %	61.7	58.0 (min.) 63.0 (max.)

Executive Summary

Test results comply with the specification of BS EN 1982:2008, Table 7, Grade CC754S except phosphorus. Phosphorus content was found to be exceeding the maximum limit, however, phosphorus was commonly used to strengthen the copper alloy.

End of Report

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CASTCO TESTING CENTRE LTD.

Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-5

Details as supplied by customer

Name of Customer :	Gate Way Valve & Fitting Ltd.
Address :	Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong
Job Title :	"Toyo" Gate Valve - Fig. No.207
Contract No. :	--
Customer's Ref. No. :	--

Sample details as supplied by customer

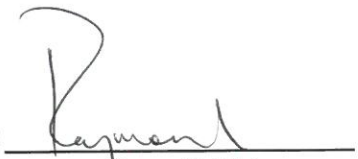
Date of Sample Received :	21-04-2016
Date Sampled :	--
Test Period :	10-05-2016
Sample Description :	DN35 Copper Alloy Gate Valve with Soldering Ends (Body)
Specification :	BS EN 1982:2008 Grade CC491K
Specimen No.:	DP0151231-191
Manufacturer :	Kitz (Thailand) Ltd.
Model No.:	Fig. No. 207 / Brand Name : Toyo / Origin: Thailand
Body Marking :	RED WHITE TOYO 125S

Test Method(s):-

1) In House Method: ST-Multi-4 (Spark-OES)

Remarks:

I. Test results only relate to the specimen tested.

Checked by : 

Cheng Chi Fai
Senior Manager

Certified by:

LEE Stephen Shu Hang
Ph.D
Technical Director

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Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-5

Chemical Analysis		Result	Specification BS EN 1982:2008, Table 23b, Grade CC491K castings
1) Aluminium	Al %	<0.003	0.01 max.
1) Iron	Fe %	0.043	0.3 max.
1) Nickel	Ni %	0.17	2.0 max.
1) Phosphorus	P %	0.019	0.10 max.
1) Lead	Pb %	4.65	4.0 min. 6.0 max.
1) Sulphur	S %	0.018	0.10 max.
1) Antimony	Sb %	0.042	0.25 max.
1) Silicon	Si %	<0.002	0.01 max.
1) Tin	Sn %	4.08	4.0 min. 6.0 max.
1) Zinc	Zn %	5.43	4.0 min. 6.0 max.
1) Copper	Cu %	85.5	83.0 min. 87.0 max.

Executive Summary

Test results of the specimen are compliance / ~~not compliance~~ with the chemical requirement of BS EN 1982:2008, Table 23b, Grade CC491K.

End of Report

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Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-6

Details as supplied by customer

Name of Customer :	Gate Way Valve & Fitting Ltd.
Address :	Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong
Job Title :	"Toyo" Gate Valve - Fig. No.207
Contract No. :	--
Customer's Ref. No. :	--

Sample details as supplied by customer

Date of Sample Received :	21-04-2016
Date Sampled :	--
Test Period :	10-05-2016
Sample Description :	DN35 Copper Alloy Gate Valve with Soldering Ends (Bonnet)
Specification :	BS EN 1982:2008 Grade CC491K
Specimen No.:	DP0151231-191
Manufacturer :	Kitz (Thailand) Ltd.
Model No.:	Fig. No. 207 / Brand Name : Toyo / Origin: Thailand
Body Marking :	RED WHITE TOYO 125S

Test Method(s):-

1) In House Method: ST-Multi-4 (Spark-OES)

Remarks:

I. Test results only relate to the specimen tested.

Checked by : _____
Cheng Chi Fai
Senior Manager

Certified by: _____
LEE Stephen Shu Hang
Ph.D.
Technical Director

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Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-6

Chemical Analysis		Result	Specification BS EN 1982:2008, Table 23b, Grade CC491K castings
[1] Aluminium	Al %	<0.003	0.01 max.
[1] Iron	Fe %	0.044	0.3 max.
[1] Nickel	Ni %	0.17	2.0 max.
[1] Phosphorus	P %	0.022	0.10 max.
[1] Lead	Pb %	5.42	4.0 min. 6.0 max.
[1] Sulphur	S %	0.023	0.10 max.
[1] Antimony	Sb %	0.056	0.25 max.
[1] Silicon	Si %	<0.002	0.01 max.
[1] Tin	Sn %	4.76	4.0 min. 6.0 max.
[1] Zinc	Zn %	5.36	4.0 min. 6.0 max.
[1] Copper	Cu %	84.1	83.0 min. 87.0 max.

Executive Summary

Test results of the specimen are compliance / ~~not compliance~~ with the chemical requirement of BS EN 1982:2008, Table 23b, Grade CC491K.

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Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

 Castco LRN: MS0160421-7

Details as supplied by customer

Name of Customer :	Gate Way Valve & Fitting Ltd.
Address :	Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong
Job Title :	"Toyo" Gate Valve - Fig. No.207
Contract No. :	--
Customer's Ref. No. :	--

Sample details as supplied by customer

Date of Sample Received :	21-04-2016
Date Sampled :	--
Test Period :	10-05-2016
Sample Description :	DN35 Copper Alloy Gate Valve with Soldering Ends (Seat Ring)
Specification :	BS EN 1982:2008 Grade CC491K
Specimen No.:	DP0151231-191
Manufacturer :	Kitz (Thailand) Ltd.
Model No.:	Fig. No. 207 / Brand Name : Toyo / Origin: Thailand
Body Marking :	RED WHITE TOYO 125S

Test Method(s):-

1) In House Method: ST-Multi-4 (Spark-OES)

Remarks:

I. Test results only relate to the specimen tested.

Checked by : _____
Cheng Chi Fai
Senior Manager

Certified by: _____
LEE Stephen Shu Hang
Ph.D.
Technical Director

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Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-7

Chemical Analysis		Result	Specification BS EN 1982:2008, Table 23b, Grade CC491K castings
[1] Aluminium	Al %	<0.003	0.01 max.
[1] Iron	Fe %	0.032	0.3 max.
[1] Nickel	Ni %	0.17	2.0 max.
[1] Phosphorus	P %	0.024	0.10 max.
[1] Lead	Pb %	5.32	4.0 min. 6.0 max.
[1] Sulphur	S %	0.024	0.10 max.
[1] Antimony	Sb %	0.036	0.25 max.
[1] Silicon	Si %	<0.002	0.01 max.
[1] Tin	Sn %	4.77	4.0 min. 6.0 max.
[1] Zinc	Zn %	5.47	4.0 min. 6.0 max.
[1] Copper	Cu %	84.1	83.0 min. 87.0 max.

Executive Summary

Test results of the specimen are compliance / ~~not compliance~~ with the chemical requirement of BS EN 1982:2008, Table 23b, Grade CC491K.

End of Report

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

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CASTCO TESTING CENTRE LTD.

Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-8

Details as supplied by customer

Name of Customer :	Gate Way Valve & Fitting Ltd.
Address :	Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong
Job Title :	"Toyo" Gate Valve - Fig. No.207
Contract No. :	--
Customer's Ref. No. :	--

Sample details as supplied by customer

Date of Sample Received :	21-04-2016
Date Sampled :	--
Test Period :	11-05-2016
Sample Description :	DN35 Copper Alloy Gate Valve with Soldering Ends (Stem)
Specification :	BS EN 1982:2008 Grade CC754S
Specimen No.:	DP0151231-191
Manufacturer :	Kitz (Thailand) Ltd.
Model No.:	Fig. No. 207 / Brand Name : Toyo / Origin: Thailand
Body Marking :	RED WHITE TOYO 125S

Test Method(s):-

1) In House Method: ST-Multi-4 (Spark-OES)

Remarks:

I. Test results only relate to the specimen tested.

Checked by : _____
Cheng Chi Fai
Senior Manager

Certified by: _____
LEE Stephen Shu Hang
Ph.D.
Technical Director

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CASTCO TESTING CENTRE LTD.

Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-8

Chemical Analysis		Result	Specification refer to BS EN 1982:2008 Grade CC754S
1) Aluminium	Al %	<0.003	0.8 (max.)
1) Iron	Fe %	0.078	0.7 (max.)
1) Manganese	Mn %	<0.010	0.5 (max.)
1) Nickel	Ni %	0.058	1.0 (max.)
1) Phosphorus	P %	0.12	0.02 (max.)
1) Lead	Pb %	2.42	0.5 (min.) 2.5 (max.)
1) Silicon	Si %	<0.002	0.05 (max.)
1) Tin	Sn %	0.27	1.0 (max.)
1) Zinc	Zn %	35.3	Remainder
1) Copper	Cu %	61.8	58.0 (min.) 63.0 (max.)

Executive Summary

Test results comply with the specification of BS EN 1982:2008, Table 7, Grade CC754S except phosphorus. Phosphorus content was found to be exceeding the maximum limit, however, phosphorus was commonly used to strengthen the copper alloy.

End of Report

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CASTCO TESTING CENTRE LTD.

Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-9

Details as supplied by customer

Name of Customer :	Gate Way Valve & Fitting Ltd.
Address :	Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong
Job Title :	"Toyo" Gate Valve - Fig. No.207
Contract No. :	--
Customer's Ref. No. :	--

Sample details as supplied by customer

Date of Sample Received :	21-04-2016
Date Sampled :	--
Test Period :	10-05-2016
Sample Description :	DN54 Copper Alloy Gate Valve with Soldering Ends (Body)
Specification :	BS EN 1982:2008 Grade CC491K
Specimen No.:	DP0151231-193
Manufacturer :	Kitz (Thailand) Ltd.
Model No.:	Fig. No. 207 / Brand Name : Toyo / Origin: Thailand
Body Marking :	RED WHITE TOYO 125S

Test Method(s):-

1) In House Method: ST-Multi-4 (Spark-OES)

Remarks:

I. Test results only relate to the specimen tested.

Checked by : _____
Cheng Chi Fai
Senior Manager

Certified by: _____
LEE Stephen Shu Hang
Ph.D.
Technical Director

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Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-9

Chemical Analysis		Result	Specification BS EN 1982:2008, Table 23b, Grade CC491K castings
1) Aluminium	Al %	<0.003	0.01 max.
1) Iron	Fe %	0.036	0.3 max.
1) Nickel	Ni %	0.20	2.0 max.
1) Phosphorus	P %	0.018	0.10 max.
1) Lead	Pb %	5.29	4.0 min. 6.0 max.
1) Sulphur	S %	0.025	0.10 max.
1) Antimony	Sb %	0.036	0.25 max.
1) Silicon	Si %	<0.002	0.01 max.
1) Tin	Sn %	4.70	4.0 min. 6.0 max.
1) Zinc	Zn %	5.42	4.0 min. 6.0 max.
1) Copper	Cu %	84.2	83.0 min. 87.0 max.

Executive Summary

Test results of the specimen are compliance / ~~not compliance~~ with the chemical requirement of BS EN 1982:2008, Table 23b, Grade CC491K.

End of Report

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CASTCO TESTING CENTRE LTD.

Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-10

Details as supplied by customer

Name of Customer :	Gate Way Valve & Fitting Ltd.
Address :	Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong
Job Title :	"Toyo" Gate Valve - Fig. No.207
Contract No. :	--
Customer's Ref. No. :	--

Sample details as supplied by customer

Date of Sample Received :	21-04-2016
Date Sampled :	--
Test Period :	10-05-2016
Sample Description :	DN54 Copper Alloy Gate Valve with Soldering Ends (Bonnet)
Specification :	BS EN 1982:2008 Grade CC491K
Specimen No.:	DP0151231-193
Manufacturer :	Kitz (Thailand) Ltd.
Model No.:	Fig. No. 207 / Brand Name : Toyo / Origin: Thailand
Body Marking :	RED WHITE TOYO 125S

Test Method(s):-

1) In House Method: ST-Multi-4 (Spark-OES)

Remarks:

I. Test results only relate to the specimen tested.

Checked by : _____
Cheng Chi Fai
Senior Manager

Certified by: _____
LEE Stephen Shu Hang
Ph.D.
Technical Director

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Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-10

Chemical Analysis		Result	Specification BS EN 1982:2008, Table 23b, Grade CC491K castings
[1] Aluminium	Al %	<0.003	0.01 max.
[1] Iron	Fe %	0.036	0.3 max.
[1] Nickel	Ni %	0.20	2.0 max.
[1] Phosphorus	P %	0.019	0.10 max.
[1] Lead	Pb %	5.47	4.0 min. 6.0 max.
[1] Sulphur	S %	0.025	0.10 max.
[1] Antimony	Sb %	0.040	0.25 max.
[1] Silicon	Si %	<0.002	0.01 max.
[1] Tin	Sn %	4.93	4.0 min. 6.0 max.
[1] Zinc	Zn %	5.28	4.0 min. 6.0 max.
[1] Copper	Cu %	83.9	83.0 min. 87.0 max.

Executive Summary

Test results of the specimen are compliance / ~~not compliance~~ with the chemical requirement of BS EN 1982:2008, Table 23b, Grade CC491K.

End of Report

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CASTCO TESTING CENTRE LTD.

Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-11

Details as supplied by customer

Name of Customer :	Gate Way Valve & Fitting Ltd.
Address :	Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong
Job Title :	"Toyo" Gate Valve - Fig. No.207
Contract No. :	--
Customer's Ref. No. :	--

Sample details as supplied by customer

Date of Sample Received :	21-04-2016
Date Sampled :	--
Test Period :	10-05-2016
Sample Description :	DN54 Copper Alloy Gate Valve with Soldering Ends (Seat Ring)
Specification :	BS EN 1982:2008 Grade CC491K
Specimen No.:	DP0151231-191
Manufacturer :	Kitz (Thailand) Ltd.
Model No.:	Fig. No. 207 / Brand Name : Toyo / Origin: Thailand
Body Marking :	RED WHITE TOYO 125S

Test Method(s):-

1) In House Method: ST-Multi-4 (Spark-OES)

Remarks:

I. Test results only relate to the specimen tested.

Checked by : _____
Cheng Chi Fai
Senior Manager

Certified by: _____
LEE Stephen Shu Hang
Ph.D.
Technical Director

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CASTCO
佳力高試驗中心有限公司
CASTCO TESTING CENTRE LTD.

Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-11

Chemical Analysis		Result	Specification BS EN 1982:2008, Table 23b, Grade CC491K castings
1) Aluminium	Al %	<0.003	0.01 max.
1) Iron	Fe %	0.034	0.3 max.
1) Nickel	Ni %	0.17	2.0 max.
1) Phosphorus	P %	0.024	0.10 max.
1) Lead	Pb %	5.57	4.0 min. 6.0 max.
1) Sulphur	S %	0.025	0.10 max.
1) Antimony	Sb %	0.041	0.25 max.
1) Silicon	Si %	<0.002	0.01 max.
1) Tin	Sn %	4.82	4.0 min. 6.0 max.
1) Zinc	Zn %	5.57	4.0 min. 6.0 max.
1) Copper	Cu %	83.7	83.0 min. 87.0 max.

Executive Summary

Test results of the specimen are compliance / ~~not compliance~~ with the chemical requirement of BS EN 1982:2008, Table 23b, Grade CC491K.

End of Report

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

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Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-12

Details as supplied by customer

Name of Customer :	Gate Way Valve & Fitting Ltd.
Address :	Flat A1, 4/F., Galaxy Factory Bldg., 25-27 Luk Hop Street, San Po Kong, Kowloon, Hong Kong
Job Title :	"Toyo" Gate Valve - Fig. No.207
Contract No. :	--
Customer's Ref. No. :	--

Sample details as supplied by customer

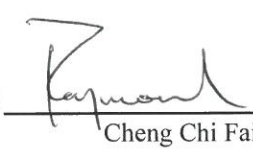
Date of Sample Received :	21-04-2016
Date Sampled :	--
Test Period :	11-05-2016
Sample Description :	DN54 Copper Alloy Gate Valve with Soldering Ends (Stem)
Specification :	BS EN 1982:2008 Grade CC754S
Specimen No.:	DP0151231-193
Manufacturer :	Kitz (Thailand) Ltd.
Model No.:	Fig. No. 207 / Brand Name : Toyo / Origin: Thailand
Body Marking :	RED WHITE TOYO 125S

Test Method(s):-

1) In House Method: ST-Multi-4 (Spark-OES)

Remarks:

I. Test results only relate to the specimen tested.

Checked by : 

Cheng Chi Fai
Senior Manager

Certified by:

LEE Stephen Shu Hang
Ph.D.
Technical Director

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Test Report

Chemical Analysis of Copper and Copper Alloy

Date of issue: 13-05-2016

Castco LRN: MS0160421-12

Chemical Analysis		Result	Specification refer to BS EN 1982:2008 Grade CC754S
[1] Aluminium	Al %	<0.003	0.8 (max.)
[1] Iron	Fe %	0.079	0.7 (max.)
[1] Manganese	Mn %	<0.010	0.5 (max.)
[1] Nickel	Ni %	0.067	1.0 (max.)
[1] Phosphorus	P %	0.12	0.02 (max.)
[1] Lead	Pb %	2.43	0.5 (min.) 2.5 (max.)
[1] Silicon	Si %	<0.002	0.05 (max.)
[1] Tin	Sn %	0.27	1.0 (max.)
[1] Zinc	Zn %	35.5	Remainder
[1] Copper	Cu %	61.5	58.0 (min.) 63.0 (max.)

Executive Summary

Test results comply with the specification of BS EN 1982:2008, Table 7, Grade CC754S except phosphorus. Phosphorus content was found to be exceeding the maximum limit, however, phosphorus was commonly used to strengthen the copper alloy.

End of Report

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