

Report No.: 48252328a 001

Page 1 of 8

Client: **Mars Valve Co., Ltd.**
No. 83, Sec. 1, Chongde 8th Rd., Beitun Dist., Taichung City 406032, Taiwan,
R.O.C.

Test item(s): 4 material(s) of metal, 5 material(s) of plastic

Identification/Model No(s): BALL VALVE

Sample obtaining method: Sending by customer

Condition at delivery: Test item complete and undamaged.

Sample receiving date: 2024-09-16

Testing period: 2024-09-16 – 2024-11-26

Place of testing: TÜV Rheinland Hong Kong Ltd.

Test specification:

Testing according to customer's specification for the following parameters:

GRAS

FDA 21 CFR 177.1550

Test result:

Refer to result page

Pass

For and on behalf of
TÜV Rheinland Taiwan Ltd.


2024-12-05
Date
Arthur Cheng/Project Manager
Name/Position



*Sample information is provided by customer. Test result is drawn according to the kind and extent of tests performed.
This test report relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be
duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.
"Decision Rule" document announced in our website (<https://www.tuv.com/landingpage/en/qm-gcn/>) describes the statement of conformity
and its rule of enforcement for test results are applicable throughout this test report.*

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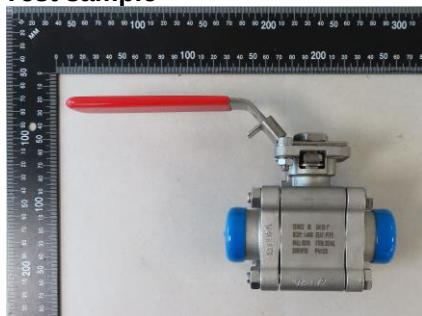
Page 2 of 8

Material List:

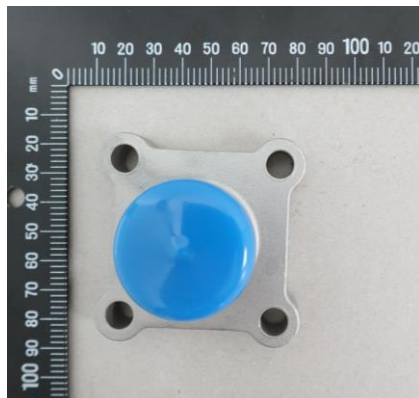
Item: BALL VALVE

Material No.	Material	Color	Location
1	Metal	Metallic	TCL240916-02; CF8M/1.4408
2	Metal	Metallic	TCL240916-02; CF3M/1.4409
3	Metal	Metallic	TCL240916-02; SS316
4	Metal	Metallic	TCL240916-02; SS316L
5	Plastic	White	TCL240916-02; PTFE
6	Plastic	White	TCL240916-02; RTFE
7	Plastic	White	TCL240916-02; 25%Glass Fiber+PTFE
8	Plastic	Black	TCL240916-02; CTFE
9	Plastic	White	TCL240916-02; TFM1600

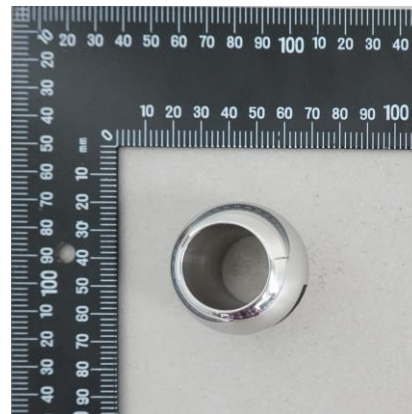
* Test parts were selected by the client.

Test sample**Material Photo**

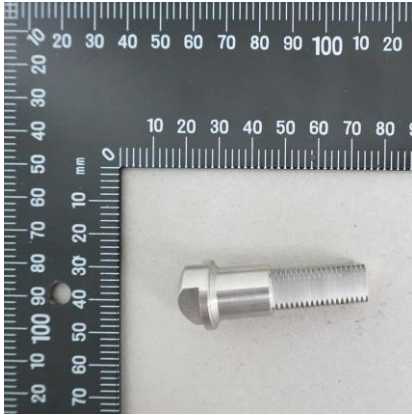
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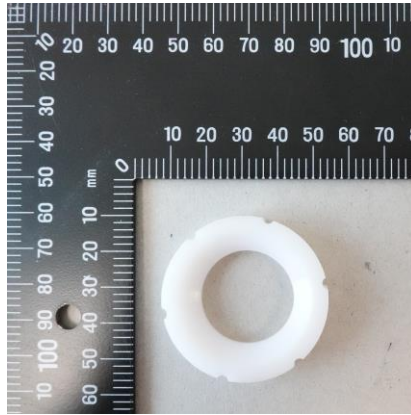
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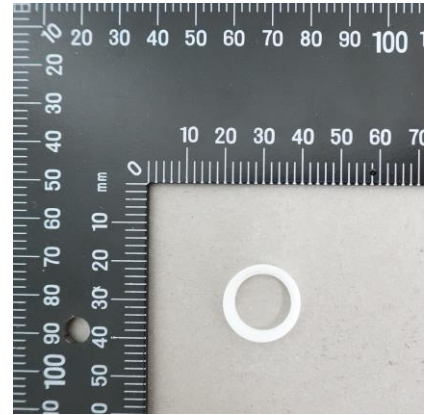
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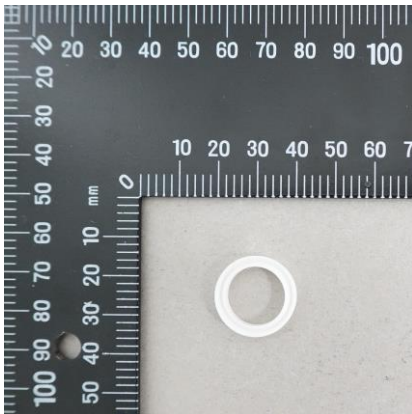
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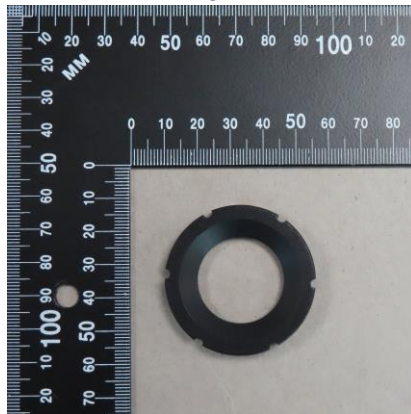
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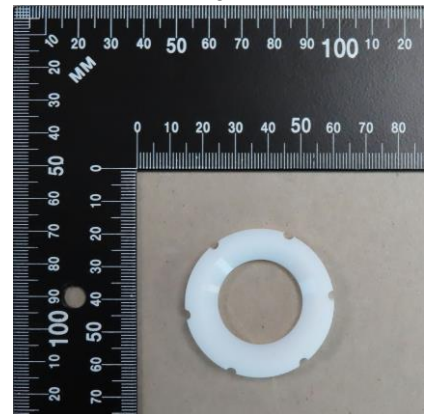
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9

1. GRAS Evaluation for Stainless Steel Materials

Test method: Carbon, Sulphur and Phosphorus: Analysis by Metal-OES Metal Analyser with reference to ASTM E 1086-08

Other elements: Acid Digestion, Determination of Elements by ICP-OES with reference to ISO 11885:2007

Limit: The material shall meet the specification of claimed stainless steel type. Stainless Steel is considered as a Generally Recognized As Safe (GRAS) material under FDA.

Material No.			Mat.1	Mat.2	Mat.3	Mat.4
Claimed Stainless Steel Type:			CF8M/1.4408	CF3M/1.4409	SS316	SS316L
Parameter	Unit	RL	Result	Result	Result	Result
Silicon (Si)	%	0.1	0.7	0.6	0.4	0.2
Molybdenum (Mo)	%	0.1	2.6	2.7	2.3	2.2
Manganese (Mn)	%	0.1	1.2	1.3	1.0	2.1
Phosphorous (P)	%	0.005	0.030	0.032	0.026	0.025
Chromium (Cr)	%	0.1	17.2	17.4	17.5	16.8
Nickel (Ni)	%	0.1	11.0	12.3	9.5	10.7
Carbon (C)	%	0.01	0.04	0.03	0.07	0.02
Sulfur (S)	%	0.01	<RL	< RL	< RL	0.022
Tantalum (Ta)	%	0.1	<RL	< RL	< RL	< RL
Niobium (Nb)	%	0.1	<RL	< RL	< RL	< RL
Zirconium (Zr)	%	0.1	<RL	< RL	< RL	< RL
Titanium (Ti)	%	0.1	<RL	< RL	< RL	< RL
Aluminium (Al)	%	0.1	<RL	< RL	< RL	< RL
Copper (Cu)	%	0.1	0.1	0.1	0.3	0.8

Abbreviations:

% = Percentage

< = Less than

RL = Reporting Limit

2. Fluoride extractives from Perfluorocarbon resins

Test method: With reference to FDA 21 CFR 177.1550(e)

Limit: FDA 21 CFR 177.1550(e)

The following simulating solvents and test conditions were stipulated:

Food simulant	Test duration / Temperature
Distilled water	2 hour(s) / boiling under reflux
Ethanol 50 %	2 hour(s) / boiling under reflux
n -Heptane	2 hour(s) / boiling under reflux
Ethyl acetate	2 hour(s) / boiling under reflux

Material No.	Mat.5		
Fluoride extractives in simulant	Unit	Result	Limit
Distilled water	mg/in ²	<0.01	0.03
Ethanol 50 %	mg/in ²	<0.01	0.03
n -Heptane	mg/in ²	<0.01	0.03
Ethyl acetate	mg/in ²	<0.01	0.03

Material No.	Mat.6		
Fluoride extractives in simulant	Unit	Result	Limit
Distilled water	mg/in ²	<0.01	0.03
Ethanol 50 %	mg/in ²	<0.01	0.03
n -Heptane	mg/in ²	<0.01	0.03
Ethyl acetate	mg/in ²	<0.01	0.03

Material No.	Mat.7		
Fluoride extractives in simulant	Unit	Result	Limit
Distilled water	mg/in ²	<0.01	0.03
Ethanol 50 %	mg/in ²	<0.01	0.03
n -Heptane	mg/in ²	<0.01	0.03
Ethyl acetate	mg/in ²	<0.01	0.03

Material No.	Mat.8		
Fluoride extractives in simulant	Unit	Result	Limit
Distilled water	mg/in ²	<0.01	0.03
Ethanol 50 %	mg/in ²	<0.01	0.03
n -Heptane	mg/in ²	<0.01	0.03
Ethyl acetate	mg/in ²	<0.01	0.03

Material No.	Mat.9		
Fluoride extractives in simulant	Unit	Result	Limit
Distilled water	mg/in ²	<0.01	0.03
Ethanol 50 %	mg/in ²	<0.01	0.03
n -Heptane	mg/in ²	<0.01	0.03
Ethyl acetate	mg/in ²	<0.01	0.03

Abbreviations: % = Percentage
 < = Less than

The examined item does meet the requirement

3. Extractive Substances for Perfluorocarbon resins

Test method: With reference to FDA 21 CFR 177.1550(e)

Limit: FDA 21 CFR 177.1550(e)

The following simulating solvents and test conditions were stipulated:

Food simulant	Test duration / Temperature
Distilled water	2 hour(s) / boiling under reflux
Ethanol 50 %	2 hour(s) / boiling under reflux
n -Heptane	2 hour(s) / boiling under reflux
Ethyl acetate	2 hour(s) / boiling under reflux

Material No.	Mat.5		
Fluoride extractives in simulant	Unit	Result	Limit
Distilled water	mg/in ²	0.05	0.2
Ethanol 50 %	mg/in ²	0.02	0.2
n -Heptane	mg/in ²	<0.01	0.2
Ethyl acetate	mg/in ²	0.05	0.2

Material No.	Mat.6		
Fluoride extractives in simulant	Unit	Result	Limit
Distilled water	mg/in ²	0.09	0.2
Ethanol 50 %	mg/in ²	0.01	0.2
n -Heptane	mg/in ²	<0.01	0.2
Ethyl acetate	mg/in ²	0.01	0.2

Material No.	Mat.7		
Fluoride extractives in simulant	Unit	Result	Limit
Distilled water	mg/in ²	0.16	0.2
Ethanol 50 %	mg/in ²	0.17	0.2
n -Heptane	mg/in ²	0.01	0.2
Ethyl acetate	mg/in ²	0.01	0.2

Material No.	Mat.8		
Fluoride extractives in simulant	Unit	Result	Limit
Distilled water	mg/in ²	0.03	0.2
Ethanol 50 %	mg/in ²	0.02	0.2
n -Heptane	mg/in ²	0.02	0.2
Ethyl acetate	mg/in ²	0.02	0.2

Material No.	Mat.9		
Fluoride extractives in simulant	Unit	Result	Limit
Distilled water	mg/in ²	0.02	0.2
Ethanol 50 %	mg/in ²	0.02	0.2
n -Heptane	mg/in ²	<0.01	0.2
Ethyl acetate	mg/in ²	<0.01	0.2

Abbreviations: % = Percentage
 < = Less than

The examined item does meet the requirement

--- End of Test-Report ---