

TEST REPORT

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Date: 24/01/2017

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Subject : Testing of 'Reflex C/DC/DE/HW Series' rubber material for use in contact with water intended for human consumption submitted by Reflex Winkelmann Asia Pacific Pte Ltd on 11/10/2016.

Tested For : **Reflex Winkelmann Asia Pacific Pte Ltd**
25 International Business Park
#04-68A
Singapore 609916
Attention: Daniel Testar

Test Method : **SS 375 : 2001 - Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water.**

- 1) Part 1 : Specification
- 2) Part 2:1 : Samples for testing
- 3) Part 2:2:1 : Odour and flavour of water
- 4) Part 2:3 : Appearance of water
- 5) Part 2:4 : Growth of aquatic micro-organisms
- 6) Part 2:5 : The extraction of substances that may be of concern to public health
- 7) Part 2:6 : The extraction of metals

Sample Description : Ten pieces of rubber material – 'Reflex C/DC/DE/HW Series' - measuring 120 mm x 50 mm x 2 mm were submitted by Reflex Winkelmann Asia Pacific Pte Ltd. The sample was tested as per surface area basis per litre.



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Results :

1) Odour and Flavour of Water

Temperature of Extraction: 23°C.

One sample was tested.

No discernible odour was detected in the first chlorine-free and chlorinated extracts.

No flavour was detected in the first dilution of both the first chlorine-free and chlorinated extracts.

The first extract shall be defined as the final extract.

*The results obtained show that the sample **complies** with the requirements of SS375:2001:Part 2:2:1 for the odour and flavour of water test.*

2) Appearance of Water

Temperature of Extraction: 23°C

One sample was tested.

Test	Sample	Requirements of SS375: Part 1: Specification (Maximum Admissible Level)
	1 st Extract	
Colour (Hazen Units)	<2.5	5
Turbidity (FNU)	0.3	0.5

*The results obtained show that the sample **complies** with the requirements of SS375:2001:Part 2:3 for the appearance of water test*

3) Growth of Aquatic Microorganisms

Test Temperature: 30°C

One sample was tested.

MDOD (Mean Dissolved Oxygen Difference)

Determination	MDOD (mg/L)	Requirements of SS375: Part 1: Specification (MDOD, mg/L)
Positive Reference	5.6	7.5 ± 2.5
Negative Reference	0.2	0.0 ± 0.6
Test Sample	1.60	≤1.69

MDOC (Mean Dissolved Oxygen Concentration)

Determination	MDOC (mg/L)	Requirements of SS375: Part 1: Specification (MDOC, mg/L)
Control	7.3	8.5 ± 2.5

*The results obtained show that the sample **complies** with the requirements of SS375:2001:Part 2:4 for the growth of aquatic micro-organisms test.*



4) **The extraction of substances that may be of concern to public health**

Temperature of Extraction: 23°C

One sample was tested.

Presence of confluent cell layer was observed in the test extract in contact with Vero cells.

This observation indicates a non-cytotoxic response of the test extract to the cells.

*The results obtained show that the sample **complies** with the requirements of SS375:2001:Part 2:5 for the cytotoxicity test.*

5) **The extraction of metals**

Temperature of Extraction: 23°C

Two samples were tested.

Analysis was performed on the first extract by using ICP/AAS and ICPMS.

Determination	Results of Metal Content in Final Extract (µg/L)		Max Allowable Concentration (µg/L)
	Sample 1	Sample 2	
Aluminium as Al	<20	<20	200
Antimony as Sb	<0.5	<0.5	5
Arsenic as As	<1	<1	10
Barium as Ba	<100	<100	700
Cadmium as Cd	<0.5	<0.5	3
Chromium as Cr	<5	<5	50
Iron as Fe	<20	<20	200
Lead as Pb	<1	<1	10
Manganese as Mn	<5	<5	50
Mercury as Hg	<0.5	<0.5	1
Nickel as Ni	<2	<2	20
Selenium as Se	<1	<1	10
Silver as Ag	<1	<1	10

*The results obtained show that the sample **complies** with the requirements of SS375:2001:Part 2:6 (Table 1) for the extraction of metals test.*

Conclusion: Based on the results obtained, the sample is deemed suitable for use in contact with water intended for human consumption in accordance with SS375:2001 Standard.



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