

# TEST REPORT

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**Setesco Services Pte Ltd**  
18 Teban Gardens Crescent  
Singapore 608925  
Tel : (65) 6566 7777  
Fax: (65) 6566 7718  
www.setesco.com  
Business Reg. No. 196900269D

**Date: 01/06/2020**

**Your Ref: -**

**Our Ref: MM 8500104620/T**

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- Subject** : Testing of 'AECO Rubber Expansion Joint' for use in contact with water intended for human consumption. The sample submitted by Asiatic Engineering Pte Ltd on 24/03/2020 and testing commenced on 06/04/2020.
- Tested For** : **Asiatic Engineering Pte Ltd**  
148-160 Owen Road  
Singapore 218945  
**Attention: Mr. David Yap / Ms. Sue Foo**
- Test Method** : **SS 375 : 2015 - 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
  - 8) Part 3 : High temperature tests
- Sample Description** : Rubber sample said to be used for "AECO" Rubber Expansion Joint, (photo attached). The sample was tested as per surface area basis per litre.

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LA-1993-0051-C LA-1998-0144-D  
LA-1993-0067-G LA-2000-0181-F  
LA-1994-0068-A LA-2012-0519-E  
LA-1987-0001-B LA-1987-0001-B-1

**Results :**

**1) Odour and Flavour of Water**

Temperature of Extraction: 40°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 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 SS 375:2015 Part 1, Clause 4 for the odour and flavour of water test.*

**2) Appearance of Water**

Temperature of Extraction: 40°C  
One sample was tested.

| Test                 | Sample                  | Requirements of<br>SS375: Part 1: Specification<br>(Maximum Admissible Level) |
|----------------------|-------------------------|---|
|                      | 1 <sup>st</sup> Extract |   |
| Colour (Hazen Units) | <2.5                    | 5   |
| Turbidity (FNU)      | <0.01                   | 0.5   |

*The results obtained show that the sample **complies** with the requirements of SS375:2015 Part 1, Clause 5 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<br>SS375: Part 1: Specification<br>(MDOD, mg/L) |
|--------------------|-------------|---|
| Positive Reference | 7.9         | 7.5 ± 2.5   |
| Negative Reference | 0.1         | 0.0 ± 0.6   |
| Test Sample        | 1.09        | ≤1.69   |

**MDOC (Mean Dissolved Oxygen Concentration)**

| Determination | MDOC (mg/L) | Requirements of<br>SS375: Part 1: Specification<br>(MDOC, mg/L) |
|---------------|-------------|---|
| Control       | 9.7         | 8.5 ± 2.5   |

*The results obtained show that the sample **complies** with the requirements of SS375:2015 Part 1, Clause 6 for the growth of aquatic micro-organisms test.*



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

Temperature of Extraction: 40°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 SS375:2015 Part 1, Clause 7 for the cytotoxicity test.*

 5) **The extraction of metals**

Temperature of Extraction: 40°C

Two samples were tested.

Analysis was performed using ICP/AAS and ICPMS.

| Determination   | Results of Metal Content in Final Extract (µg/L) |          | Max Allowable Concentration (µg/L) |
|-----------------|--|----------|------------------------------------|
|                 | 1 <sup>st</sup> Extract                          |          |                                    |
|                 | Sample 1   | Sample 2 |                                    |
| Aluminium as Al | <20  | <20      | 200                                |
| Antimony as Sb  | <0.5   | <0.5     | 5                                  |
| Arsenic as As   | <1   | <1       | 10                                 |
| Boron as B      | <200   | <200     | 2400                               |
| 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   | <0.1   | <0.1     | 1                                  |
| Nickel as Ni    | <2   | <2       | 20                                 |
| Selenium as Se  | <1   | <1       | 10                                 |
| Silver as Ag    | <10  | <10      | 100                                |

*The results obtained show that the sample **complies** with the requirements of SS375:2015 Part 1, Clause 8 (Table 1) for the extraction of metals test.*

**Conclusion:-**

Based on the results obtained, the sample is **suitable** for use in contact with water intended for human consumption in accordance with SS375:2015.



**DR. WU JI'EN**  
**MANAGER**  
**BIOLOGICAL & CHEMICAL TECHNOLOGY DIVISION**

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