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Class I

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# **RAYCHEM INSTALITE CBMS QUALITY ASSURANCE SPECIFICATION**

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**RW-3042**

## **Raychem INSTALITE Cable Bundle Management Sleeves (CBMS)**

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## 1. SCOPE

This Quality Assurance Specification establishes the quality standard for an abrasion resistant fabric sleeve made from PBT.

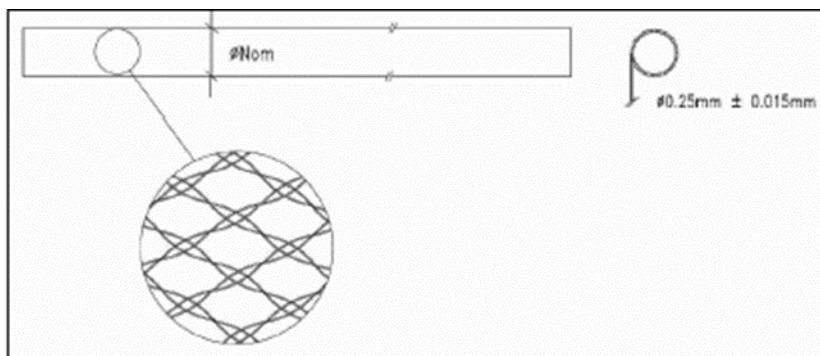
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## 2. REQUIREMENTS

### 2.1. Composition, Appearance and Colour

CBMS product shall be fabricated from PBT (polybutylene terephthalate) monofilaments woven into a highly flexible, highly expandable sleeving.



The sleeving will be free from flaws, defects, seams or broken monofilaments which could affect the performance. The product will be olive green in colour unless otherwise specified.

### 2.2. Dimensions

Table 1 Construction Details (mm)

| Size      | Nominal Diameter As Supplied (mm) | Max. expansion diameter (mm) | Max. flattened width (mm) |
|-----------|-----------------------------------|------------------------------|---------------------------|
| CBMS-10-P | 10                                | 32                           | 50                        |
| CBMS-20-P | 20                                | 42                           | 66                        |
| CBMS-40-P | 40                                | 58                           | 91                        |

### 2.3. Test Requirements

The adhesive shall meet all the requirements in Table 2.

*Some product attributes are defined by the characteristics of the base polymer used to produce CBMS product. These attribute values and associated test methods are listed in the Appendix.*

### 3. TEST METHODS

#### 3.1. Preparation of test sample

Test samples will be cut from a length of sleeving from CBMS20-P. Test sample length shall be a minimum of 15" (381 mm).

#### 3.2. Tensile strength and elongation

Carefully separate 5 strands from the sleeving.

The strand shall be placed in a tensometer with an initial jaw separation of 10" (254 mm).

The strands shall be hand in place using 1200 grit paper to prevent the sample slipping in the jaws.

The jaw separation speed shall be 50 mm/min.

The peak load and the extension at break shall be recorded.

The extension shall be expressed as a percentage of the original length.

#### 3.3. Heat Shock

One sleeving sample shall be suspended in an oven at  $200 \pm 5^{\circ}\text{C}$  for  $4\text{h} \pm 15\text{m}$

Upon removal from the oven the sample will be allowed to cool.

The sample will be subjected to a mandrel bend test around a 10 mm diameter and visually inspected for dripping cracking and flowing.

The sample shall then be tested as per clause 3.2 for tensile strength and elongation.

#### 3.4. Heat Aging

The sample shall be suspended in an oven at  $160 \pm 3^{\circ}\text{C}$  for  $168\text{h} \pm 2\text{h}$

The sample will be subjected to a mandrel bend test around a 10 mm diameter and visually inspected for dripping cracking or flowing.

The sample shall then be tested as per clause 3.2 for tensile strength and elongation.

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### 3.5. Low Temperature Flexibility

Three test samples will be placed in a freezer and  $-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$  for  $4\text{h} \pm 15\text{m}$  together with a 10 mm mandrel.

After four hours the samples will be bend around the mandrel for three full turns at a rate of one turn per second.

### 3.6. Fluid Resistance

One sleeving sample shall be immersed in each of the following fluids for a period of  $24\text{h} \pm 30\text{m}$  at  $23 \pm 2^{\circ}\text{C}$ .

- MEK
- Jet-A1
- H-515
- IRM-902
- Skydrol-500B

Upon removal from the fluid, the sample shall be lightly wiped using absorbent paper and suspended for  $45 \pm 15\text{m}$ .

The samples may be re-wiped after the 45-minute drying time.

After the drying period, the sample shall be tested according to section 3.2 for tensile strength & elongation.

## 4. RELATED STANDARDS

| Title     | Description  |
|-----------|--|
| ISO 3146C | Determination of melting behaviour (melting temperature or melting range) of semi-crystalline polymers by capillary tube and polarizing-microscope methods |
| ISO 1183  | Methods for determining the density of non-cellular plastics   |
| ISO 62    | Plastics - Determination of water absorption   |
| ISO 4589  | Plastics - Determination of burning behaviour by oxygen index - Part 2: Ambient-temperature test   |
| UL 94     | Standard for Safety of Flammability of Plastic Materials for Parts in Devices and Appliances testing   |

Subsequent amendments to, or revisions of, any of the above publications apply to this standard. It is therefore the responsibility of the persons using this standard to check for the latest issue / version of the above specifications.

## 5. SAMPLING

Testing frequency shall be Production Routine.

Production Routine tests shall be carried out on samples taken at random from each batch of finished sleeving. A batch of sleeving is defined as that quantity of sleeving manufactured at any one time. Every sleeving batch shall be tested for visual examination, nominal diameter as supplied and expanded diameter.

Qualification tests shall be carried out at a frequency of every 3 years and shall consist of all tests listed in table II of this document.

## 6. PACKAGING

Packaging shall be in accordance with good commercial practice. Each package shall bear an identification label showing material quantity, description, size, and batch number.

Table 2 - Test Requirements

| Test                                      | Test Method   | Requirement   |
|---|---|---|
| <b>Internal Diameter as supplied (mm)</b> | Measure relaxed flattened braid width   | As per Table 1  |
| <b>Expanded Diameter (mm)</b>             | Measure max. possible width of flattened braid                                  | As per Table 1  |
| <b>Thermal Properties</b>                 |   |   |
| <b>Heat aging</b>                         | 168 hours at 160°C  | No dripping, cracking or flowing<br>200MPa min tensile strength<br>20% min elongation |
| <b>Heat shock</b>                         | 4 hours at 200°C  | No dripping, cracking or flowing<br>200MPa min tensile strength<br>20% min elongation |
| <b>Low Temperature Flexibility</b>        | 4 hours at -40°C  | No Cracking   |
| <b>Fluid Resistance</b>                   |   |   |
| <b>Fluid resistance</b>                   | 24 hours immersion at 23C<br>MEK<br>Jet A1<br>H-515<br>IRM-902<br>Skydrol 500-B | 200MPa min tensile strength<br>20% min elongation                                     |

## APPENDIX

The product attributes below are defined by the performance of the polymer material used to produce CBMS. These values have not been tested as part of the CBMS qualification and are given just for information purposes.

| Test                                | Test Method | Requirement                    |
|-------------------------------------|-------------|--------------------------------|
| Density                             | ISO1183     | 1.47 kg/m <sup>3</sup> nominal |
| Water Absorption                    | ISO 62      |                                |
| 23°C 50% Relative Humidity (RH)     |             | 0.15 max                       |
| 23°C in water for 24 hours          |             | 0.39 max                       |
| <b>Flammability</b>                 |             |                                |
| Flammability Test                   | UL94        | V0                             |
| Oxygen Index at Ambient Temperature | ISO 4589    | 30 %                           |



## 7. REVISION HISTORY

| Author   | Date        | Rev | Comments      |
|----------|-------------|-----|---------------|
|          | OCT 2016    | 1   |               |
|          | MAR 2017    | 2   | RTS-1294862.1 |
| Pedro Vu | 12 JUL 2019 | 3   | RTS-1456528.1 |

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