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Enquiries: D.P Visser
Tel: (012) 653-2959
Fax: 086 605 8568
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Butyl Technology (Pty) Ltd
16 Payne Street Park Rynie
Durban
4182

Electric Tape Assessment (Self-amalgamating Polyisobutylene based rubber tape with inorganic filler)

SUBJECT

The assessment of the Butyl Electric Tape in accordance with Standard Specifications:

ASTM D1000-10 EN : 2010: "Standard Test Methods for Pressure-Sensitive Adhesive-Coated Tapes Used For Electrical and Electronic Applications"

Note: Assessments and interpretations were conducted according to historically accepted approaches in South Africa. The assessments and interpretations are not necessarily accepted in an international approach.

DESCRIPTION

The material is black adhesive-coated insulation and void-filling tape. The tape is designed to be used in low & medium-voltage applications as well as sealing/waterproofing electrical installations such as joints and terminations.

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Datasheet

Documents are kept in the project file or on the MASC document management system.

SELECTION OF SPECIMEN

Samples were supplied by Butyl Technologies for testing purposes.

METHODS AND RESULTS

The equipment was examined and tested for compliance with the relevant requirements of ASTM D1000.

ASSESSMENTS

Breaking Strength and Elongation (Clause 37)

Breaking Strength:

Test Conditions:

Conditioning Temperature	23 ± 3°C
Conditioning Relative Humidity	50 ± 10% RH
Duration	24hrs

After the conditioning period, the material was inserted into the test apparatus with standard dimensions:

Thickness:	1.02 mm
Width:	14.86 mm

The force measured when breakage occurred was calculated to be 105N. The tensile strength was calculated as below:

$$\begin{aligned}\sigma &= F / A \\ &= 37.278\text{N} / (1.02\text{mm} \times 14.86\text{mm} / 10^6) \\ &= 22459425 \\ &= 2.459 \text{ MPa}\end{aligned}$$

Elongation:

Test Conditions:

Conditioning Temperature	23 ± 3°C
Conditioning Relative Humidity	50 ± 10% RH
Duration	24hrs

After the conditioning period, the material was inserted into the test apparatus with standard dimensions:

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The original length before any force was applied was measured to be 57.13mm. The Elongated length was then measured after breakage to be 640mm.

From this:

$$\begin{aligned} L\% &= L1/L2 \times 100 \\ &= 752 / 16.3 \times 100 \\ &= 4613.5\% \end{aligned}$$

Insulation Resistance at High Humidity (Clauses 91 – 96)

Test Conditions:

Conditioning Temperature	23 ± 3°C
Conditioning Relative Humidity	96 ± 2% RH
Duration	18hrs
Brass Steel Bars	6mm thick with 25mm spacing between the two steel bars
Test Voltage	510 Vdc @ 10mA

The steel bars were placed on the material inside the conditioning chamber. The test was conducted by connecting a withstand voltage tester between the two conductive bars while still in the test chamber.

Result:

No current was recorded to flow through the compound between the conductive bars. Therefore, insulation resistance > 1 x 10⁶Ω.

Dielectric Strength Assessment (Clauses 83 – 90)

Test Conditions:

Distilled water Immersion	24hrs @ 23 ± 1°C
Conditioning Relative Humidity	96 hrs @ 96% RH, 23 ± 1°C

Result:

After the conditioning period, the test sample with a thickness of 1mm was positioned between the two electrodes. An AC voltage of 15kV was applied before the breakdown occurred. Therefore:

$$\text{Dielectric Strength} = 22 \text{ kV/mm}$$

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Dielectric Constant

Test Conditions:

Reference Temperature 23 ±3 °C
 Reference Humidity 50 ± 5 %RH

The sample is placed between two metallic plates and the capacitance is measured and recorded. Following this, another test was run without the sample to measure the air between the two plates.

Result:

The capacitance between the two metallic plates with the sample was measured to be:

$$C = 5.12 \text{ pF}$$

The capacitance between the two metallic plates without the sample was measured to be:

$$C = 3.96 \text{ pF}$$

Therefore,

$$\begin{aligned} K &= E / E_0 \\ &= 5.12 / 3.96 \\ &= 1.293 \end{aligned}$$

The dielectric constant of the material is = 1.293

Technical Data

From the various test above the below technical data are applicable:

Properties	Values
Width	40 mm
Thickness	1.5 mm
Elongation	4613.5%
Tensile Strength	2.459 MPa
Insulation Resistance	> 1 x 10 ⁶ Ω
Dielectric Strength	22 kV/mm
Dielectric Constant	1.293

I. CONCLUSIONS...

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CONCLUSIONS

The Butyl Electric tape **COMPLIED** with the ASTM D1000 test requirements as described above.

Conditions of manufacturing/certification:

- None

VALIDITY OF THIS REPORT

Any modification to the unit, or exceeding its ratings, or using it in another atmosphere as described above, will invalidate the applicability of this report to the equipment.

This report only covers the type approval of the equipment.

According to the relevant requirements of the MHS Act and the OHS Act, production units of explosion protected equipment are required to comply with third party quality assurance (an approved mark scheme or batch testing by an accredited test laboratory.)



S. Jordaan
TECHNICAL OFFICER



C. Welthagen
TECHNICAL SPECIALIST

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