

DEKRA EXAM GmbH

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Mining Test Facility

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**Test and assessment report
on the electrostatic properties
of textile Air Ducting & Diffusers
of type AS**

Applicant: Prihoda s.r.o
Za Radnici 476
53901 Hlinsko
Czech Republic

Responsible: Dr. Carsten Blum
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Reference no.: 11EXAM 11069 BVS-BI

Bochum, 15th December 2011

DEKRA EXAM GmbH

Signed: Hesener

Dr. Ute Hesener

Signed: Blum

Dr. Carsten Blum

- 1. Subject** Textile air ducting and diffusing system
Diameter: 1000 mm, length: 2000 mm
- 2. Name** Air Ducting & Diffusers AS
- 3. Manufacturer/ Applicant:** Prihoda s.r.o, Hlinsko, Czech Republic
- 4. Testing documents:** Application dated 03.11.2011
Test specimen

5. Background

Prihoda s.r.o, Hlinsko, Czech Republic, submitted specimen of their textile Air Ducting & Diffusers of type AS, for an assessment with regard to their electrostatic properties regarding a use in potentially explosive atmospheres. The hose system consists of a textile perforated fabric which can be extended in diameter by means of plastic zips and additional metallic press buttons. The textile air ducting and diffuser is equipped with textile ribbons which are fastened to the fabric and small metal rings (earthing points) which are worked into the fabric and serve the purpose of earthing the hosing system.

6. Assessment

In order to assess the electrostatic chargeability, the individual components of the capacitor were submitted to resistivity measurements and measurements of resistance to earth.

6.1 Resistivity measurements

The resistivity measurements were carried out after the specimen had been stored at normal climatic conditions, i.e. for a period of 24 hrs according to DIN 50 014 -23/50-2, and at a temperature of 22°C and relative humidity of 32% according to DIN IEC 60093.

The test was conducted applying a measuring voltage of 100 V.

A so-called ring electrode according to DIN EN 1149-2 was used to measure both the surface resistivity and the contact resistivity of the fabric.

The following surface resistivity R_o was measured at five different measuring points:

Measuring point	Resistivity R_o
1	$1.7 \cdot 10^8 \Omega$
2	$2.4 \cdot 10^8 \Omega$
3	$1.4 \cdot 10^8 \Omega$
4	$6.9 \cdot 10^7 \Omega$
5	$2.3 \cdot 10^8 \Omega$

This results in the following R_{OT} (geometric mean value of five measurements each):

$$R_o \approx 1.6 \cdot 10^8 \Omega.$$

The following surface resistivity R_D was measured at five different measuring points:

Measuring point	Resistivity R_D
1	$2.6 \cdot 10^9 \Omega$
2	$5.8 \cdot 10^8 \Omega$
3	$6.3 \cdot 10^8 \Omega$
4	$6,4 \cdot 10^8 \Omega$
5	$6.0 \cdot 10^8 \Omega$

This results in the following R_{DT} (geometric mean value of five measurements each):

$$R_D \approx 8.2 \cdot 10^8 \Omega.$$

All resistivity values measured lie below the limit value permitted of $1 \cdot 10^{11} \Omega$ (at 23°C, 30% rel. humidity). Thus the material used is to be assessed as electrostatically dischargeable.

Conductive adhesive aluminium tape was used as electrodes for measuring the resistivity of the ribbons; the electrodes had a length of 100mm, the distance between them was less than 10mm.

The values stated for the surface resistivity usually follow TRBS 2153 and refer to an arrangement of electrodes where the proportion of length and distance of the electrodes is 10:1. At the ribbons examined, a different proportion had to be chosen due to the geometrical layout of the specimen. Nevertheless, the quotient of length to distance of the electrodes is less than 10 for all measurements. This arrangement ensures that slightly higher values are achieved for the surface resistivity.

The surface resistivity measured at the ribbons was $R_o < 9.99 \cdot 10^{12} \Omega$. Thus this material exceeds the limit value of $1 \cdot 10^{11} \Omega$ (at 23°C, 30% rel. air humidity) and has to be assessed as insulating with regard to electrostatic charges.

However, due to the narrow width of less than 3cm no incendive brush discharges are expected to occur for gas/air mixtures in gas-Ex atmospheres of zones 1 and 2 for explosion groups IIA and IIB.

6.2 Test for resistance to earth

The resistance to earth was measured between the two ends of the fabric hose at the two earthing points provided. On the conditions that the metal press buttons at the zips are closed and that the air ducting and diffusers are integrated into the equipotential bonding of the system at their earthing points, it can be stated that the value measured corresponds with the resistance to earth (at a measuring voltage of 100 V):

$$R_E = 2.2 \cdot 10^9 \Omega.$$

Thus sufficient dischargeability of the air ducting and diffusers is provided.

7. Conclusion

With regard to its electrostatic properties, there are no objections against the use of the earthed fabric neither in gas-Ex atmospheres of zones 1 and 2 where gases of explosion groups IIA and IIB are present nor in dust-Ex atmospheres of zones 20, 21 and 22.

Bochum, 23rd December 2011

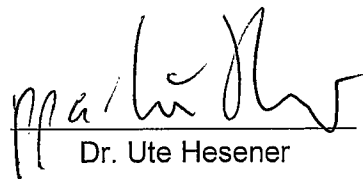

Responsible

Signed: Blum

Dr. Carsten Blum

In the case of arbitration only the German wording shall be valid and binding.

44809 Bochum, Germany, 12th January 2012
11EXAM 11069

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