

DEKRA EXAM GmbH

Fachstelle für
Explosionsschutz -
Bergbau-Versuchsstrecke

Carl-Beyling-Haus
Dinnendahlstraße 9
44809 Bochum
Telefon +49.234.3696-180
Telefax +49.234.3696-150

exam-info@dekra.com
<http://www.dekra-exam.eu>

**Report
on tests
of the electrostatic characteristics
an earthing jumper with contact caps
of conductive EPDM**

Prepared for: Fr. Jacob Söhne GmbH & Co
Niedernfeldweg
32457 Porta Westfalica
Prepared by: Dr.-Ing. Carsten Blum
Tel. 0234/3696-173
Ref.: 10EXAM 10838 BVS-BI/Pri

Bochum, 20/01/2011

DEKRA EXAM GmbH

sd/-: Dr. Blum

Dr. Blum

sd/-: Prill

Prill

- 1. Subject** Earthing jumper with contact caps of conductive EPDM for pipelines
- 2. Customer** Fr. Jacob Söhne GmbH & Co, Porta Westfalica
- 3. Documents submitted** 1.) Test application of 14/01/2011
2.) Test samples if 01/10/.2010

4. Description

The purpose of providing earthing jumpers with contact caps of conductive EPDM (Figure 1 and Figure 2) is to service-fit equipotential bonding of pipelines of the Jacob pipe system after construction. The target is to ensure the earthing of the clamping ring irrespective of the seal or gasket in the clamping ring or the quality of the flared conical end.

Earthing jumpers with contact caps of conductive EDPM were tested for their conductivity in and compared with results obtained from pipe sections of different materials. Different pipe sections, which were provided by the firm Fr. Jacob Söhne GmbH & Co, Porta Westfalica, were examined.

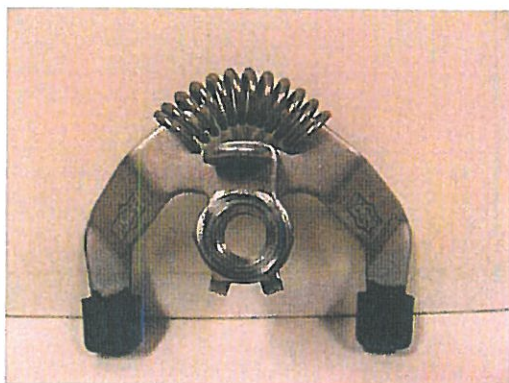


Figure 1: Earthing jumper with end caps



Figure 2: Earthing jumper fixed to pipe sections

5. Assessment

The resistance tests of the earthing jumpers were made at different pipe joints isolated electrically from each other by plastic tape at the flanges (see Figure 2). Pipe sections made of different materials were examined. The following resistance values were measured between the pipe sections:

| Pipe section material | Resistance |
|---|-------------------------|
| Powdered with conductive powder coating (type PI 1003 NRA 732) | $1.2 \cdot 10^5 \Omega$ |
| Galvanized | $1.2 \cdot 10^4 \Omega$ |
| Stainless steel | $4.2 \cdot 10^3 \Omega$ |

The tests were performed after at least 24 hours storage in standard environment conditions at 23 °C temperature and 50 % relative humidity according to DIN 50 014.

With all three materials tested, the earthing jumper with contact caps of conductive EPDM complies with the purpose for which it is intended and provides sufficient electric contact between the different pipe sections.

6. Conclusion

Given that the ground leakage resistance of the piping system is less than $10^6 \Omega$ at all points, no additional grounding systems are required between pipe sections when earthing jumpers with contact ends of conductive EDPM are used.

This statement applies to areas (zones) zones with a potentially explosive atmosphere where spark discharges should be expected to occur if non-earthed metal parts are present.

Following the rules „Avoiding dangers of ignition due to electrostatic charge („TRBS 2153“), April 2009, ch. 8.1 issued by Hauptverband der gewerblichen Berufsgenossenschaften, the umbrella organization of the employer's liability insurance associations), facilities for earthing and equipotential bonding should be constructed as follows:

„The earthing and the equipotential bonding shall be reliable and lasting and be able to withstand the expected stresses, especially due to corrosion.“

Earthing jumpers with contact caps of conductive EDPM comply with these requirements so that ignitable electrostatic discharges to mixtures of fuel/air are prevented. Consequently, there are no reservations as far as the use of earthing jumpers with end caps on pipelines in areas (zones) with potentially explosive atmosphere is concerned.

In addition to this, the following can be stated for earthing jumpers and the associated pipe sections, resp., with reference to Directive 94/9 EC:

The earthing jumpers and the associated pipe sections are not "equipment" as defined by directive 94/9 EC.

It can be stated, however, that based on national and international rules and regulations, the earthing jumpers in combination with the appropriate pipe sections in grounded state comply with the requirements of electrostatic discharge. This property can be referred to for the assessment of the risks associated with equipment subject to directive 94/9/EC („ATEX directive“) and in which the earthing jumpers are to be used in combination with the associated pipe sections.

Bochum, 20.01.2011

Prepared by

sd/-: Prill

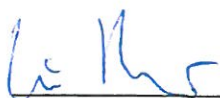
Prill

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


44809 Bochum, Germany, 31 January 2011

10EXAM 10838

DEKRA EXAM GmbH



Dr. Hesener



Dr. Blum