

## Report

on Testing a Sealing Material for Reactivity with Oxygen

**Reference Number** II-2236/2004 II  
**Copy** 1. Copy of 2 Copies

### 1 Application

**Applicant** DONIT TESNIT, d. d.  
Cesta komandanta Staneta 38  
1215 MEDVODE,  
SLOVENIJA

**Date of Application** June 15, 2004

**Reference** -

**Date of Entry** June 21, 2004

**Subject of Application** Gasket BA-F for use in flanged connections in gaseous oxygen piping at temperatures greater than 60 °C;  
BAM Order No. II.1/47 462

**Entry of Test Sample** June 21, 2004

**Test Date** July 13, 2004 to August 5, 2004

**Test Location** BAM-Laboratory II.13; building no. 41, room no. 073

**Applied Regulations/  
Test Procedures** Regulation BGV B 7 „Oxygen“ of the „Berufsgenossenschaft der chemischen Industrie“. Test methods according to the annex of the pamphlet „Liste der nichtmetallischen Materialien die von der Bundesanstalt für Materialforschung und -prüfung (BAM) zum Einsatz in Anlageteilen für Sauerstoff als geeignet befunden worden sind.“(Edition: 31. August 2003) of BGV B 7.

**TESTREPORT**

This test report consists of page 1 to 3 and annex 1 to 3.

This test report may only be published in full and without any additions. A revocable permission in writing has to be obtained from BAM for any amended reproduction of this certificate or the publication of any excerpts. The test results refer exclusively to the tested materials.

In case a German version of the test report is available, exclusively the German version is binding.



## **2 Documents and Test Samples**

The following documents and samples were submitted to BAM:

- 1 Application for testing,
- 1 Technical data sheet on BA-F and
- 15 disks of BA-F (thickness: ca. 2 mm; diameter: 140 mm), color: one side anthracitic marbled and one side anthracitic, with imprint „TESNIT, BA-F“

## **3 Test Methods and Results**

### **3.1 Autogenous Ignition Temperature (AIT)**

The test method is described in annex 1.

Results:

In five tests with an oxygen pressure of  $p_a = 90$  bar, an AIT of 165 °C was determined with a standard deviation of  $\pm 6$  °C. The oxygen pressure  $p_e$  at ignition is approximately 133 bar.

### **3.2 Artificial Aging**

The test method is described in annex 2.

Results:

After aging of BA-F at 100 bar oxygen pressure and 105 °C, the material was very brittle. The sample gained 4,5 % in mass.

The AIT of the aged sample at 136 bar oxygen pressure was 172 °C with a standard deviation of  $\pm 4$  °C. The test shows that the AIT is unchanged regarding the AIT of the unaged sample within the precision of measurement.

### **3.3 Flange Test**

The test method is described in annex 3.

Results:

The samples were tested at 100 bar oxygen pressure and 80 °C. Only those parts of the gasket burn that projected into the pipe; the fire is neither transmitted to the steel nor does the gasket burn between the flanges. The flange remained gas-tight. Thereupon, the test was repeated four times at 100 bar and 80 °C. The same result was obtained as before.

#### **4 Evaluation**

The tests have shown that the autogenous ignition temperature of the material is  $(165 \pm 6)^\circ\text{C}$  at an oxygen pressures of 133 bar.

At a temperature of  $105^\circ\text{C}$  and an oxygen pressure of 100 bar, the material proved not to be sufficient aging resistant. As a result of the aging test, the material was very brittle. Therefore, the gasket BA-F is suitable only for use in flanges that are not dynamically stressed. Furthermore, the unfavourable aging behaviour may have an impact on the gasket's usability.

On basis of the test results, regarding technical safety, the flat gasket BA-F may be used in flange connections made of copper, copper alloys or steel at oxygen pressures up to 100 bar and temperatures up to  $80^\circ\text{C}$ . This applies to flat faced flanges, male and female flanges, and flanges with tongue and groove.

This report does not cover the use of the gasket for liquid oxygen service. A particular test for reactivity with liquid oxygen needs to be carried out to evaluate the compatibility of the gasket with liquid oxygen.

#### **5 Comments**

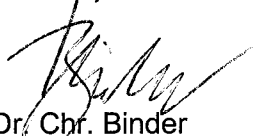
This report expires at once, if the composition of the tested material is changed. This report expires on August 31, 2014, at the latest. A prolongation beyond this date is possible, if the manufacturer confirms in writing that the material has not changed since this evaluation.

Products that have been tested by us, and which are on the market, shall be marked according to our evaluation in the BAM test report. A label on a product saying that a BAM test has been performed and (or) citing our reference number, only, is not tolerable. The use of the product and its safe operating conditions must also be given.


It shall be clear that the product may only be used for gaseous oxygen service. The maximum safe oxygen pressure of the product and its maximum use temperature as well as other restrictions in use shall be given.

**Federal Institute for Materials Research and Testing (BAM)  
12200 Berlin, August 31, 2004**

**Division II.1  
"Gases, Gas Plants"**

  
Dr. Chr. Binder  
Head of Laboratory

**Laboratory II.13  
"Equipment for Gases, Oxygen"**

  
Dipl.-Ing. K. Arlt  
Engineer in Charge

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1. Copy: DONIT TESNIT, d. d.
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