

Report

on Testing a Thread Sealing Material for Reactivity with Oxygen

Reference Number II-2396/2009 E

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Order Date October 19, 2009

Receipt of Order October 21, 2009

Test Samples Thread Sealant LOXEAL 85-86 for use in valves and fittings or other components for gaseous oxygen service at temperatures up to 60 °C.
BAM-Order-No. II.1/49 855

Receipt of Samples October 20, 2009

Test Date January 27, 2010

Test Location BAM Working Group "Safe Handling of Oxygen", building no. 41, room no. 120

Test Procedure According to DIN EN 1797: 2002-02
„Cryogenic Vessels - Gas/Material Compatibility“
ISO 21010: 2004-04
„Cryogenic Vessels - Gas/Material Compatibility“
Annex of pamphlet M 034-1 (BGI 617-1)
„Liste der nichtmetallischen Materialien die von der Bundesanstalt für Materialforschung und -prüfung (BAM) zum Einsatz in Anlageteilen für Sauerstoff als geeignet befunden worden sind.“,
to pamphlet M 034 „Sauerstoff“ (BGI 617)
Berufsgenossenschaft der chemischen Industrie
Edition: October 2008;
according chapter 3.17 „Gleitmittel und Dichtwerkstoffe“
to rule BGR 500 „Betreiben von Arbeitsmitteln“ part 2,
chapter 2.32 „Betreiben von Sauerstoffanlagen“,
Edition: September 2008.

All pressures of this report are excess pressures.
This test report consists of page 1 to 4 and annex 1.

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

TEST REPORT



1 Documents and Test Samples

The following documents and samples were submitted to BAM:

- 1 Test Application
- 1 Safety Data Sheet
- 1 Material Data Sheet
- 50 ml Thread Sealant LOXEAL 85-86
Colour: green

2 Test Methods and Results

A determination of the autogenous ignition temperature (AIT) and an investigation of the aging resistance in high pressure were not necessary as thread sealant LOXEAL 85-86 is not for use at temperatures greater than 60 °C.

The thread sealant LOXEAL 85-86 has been tested in liquid and in cured condition.

2.1 Ignition Sensitivity to Gaseous Oxygen Impacts

The test method is described in annex 1.

2.1.1 Liquid Thread Sealant

Results:

Sample Temperature t_a [°C]	Oxygen Pressure p_a [bar]	Oxygen Pressure p_e [bar]	Reaction on Impact
60	1	30	ignition on 1. impact
60	1	25	ignition on 2. impact
60	1	20	no reaction*)
60	1	20	no reaction*)

*) within a series of five consecutive impacts

In two separate tests, each consisting of a series of five consecutive impacts, no reactions of the thread sealant LOXEAL 85-86 with oxygen could be observed at an oxygen pressure p_e of 20 bar.

2.1.2 Cured Thread Sealant

Results:

Sample Temperature t_a [°C]	Oxygen Pressure p_a [bar]	Oxygen Pressure p_e [bar]	Reaction on Impact
60	1	30	ignition on 1. impact
60	1	25	ignition on 5. impact
60	1	20	no reaction*)
60	1	20	no reaction*)

*) within a series of five consecutive impacts

In two separate tests each consisting of a series of five consecutive impacts, no reactions of the thread sealant LOXEAL 85-86 with oxygen could be observed at an oxygen pressure p_e of 20 bar.

3 Evaluation

According to ISO 21010: 2004-04 „Cryogenic Vessels - Gas/Material Compatibility" the criterion for a positive reaction of a sample to gaseous oxygen impacts is a temperature rise of at least 20 °C.

On basis of the above-mentioned criterion and the test results, there are no objections with regard to technical safety, to use the thread sealant LOXEAL 85-86 in piping, valves and fittings, or other components for gaseous oxygen service at following operating conditions:

Maximum Temperature	Maximum oxygen pressure
60 °C	20 bar

This evaluation does not cover the use of the material for liquid oxygen service. For this application, a particular test for reactivity with liquid oxygen needs to be carried out.

4 Comments

The test results refer exclusively to the tested material.

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.

**BAM Federal Institute for Materials Research and Testing
12200 Berlin, February 4, 2010**

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


Dr. Chr. Binder
Head of Working Group

**Working Group
"Safe Handling of Oxygen"**


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Engineer in Charge

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