

Testing the Combustion Behaviour of Flat Gaskets for Flanges in Oxygen Piping

Keywords

Technical safety of components, safety engineering, flange connection, oxygen, high pressure, flat gasket

Applications

Test to evaluate flat gaskets for use in flanged connections in piping for gaseous oxygen.

Test method and Equipment

The gasket to be tested is fixed between two steel pipes equipped with welded standard flanges (PN 160 mm/DN 65 mm). An incorrect assembly of the gasket is simulated, where the gasket projects into the pipe. This free part of the gasket can be ignited by particles contained in the oxygen flow.

The pipes and flanges may be heated up to a maximum temperature of 300 °C and the oxygen can be pressurized up to a maximum of 160 bar. The gasket under test is electrically ignited.

Test Samples

The test samples are usually disks of 140 mm in diameter and of a maximum thickness of 3 mm.

Test Parameters / Test Criteria

The gasket is considered unsuitable for use, if the fire is transmitted to the steel of the flange or the flange connection becomes untight.

If only those parts of the gasket burn, that project into the pipe and the fire is not transmitted to the flanges, and if the gasket does not burn between the flanges and the flange remained gas-tight, there are no objections with regard to technical safety to use the gasket under the conditions tested.

A positive result has to be confirmed in four additional tests.

Result Uncertainty / Reliability

The measurement uncertainty for the test pressure is ± 1 bar, for the test temperature ± 1 °C.

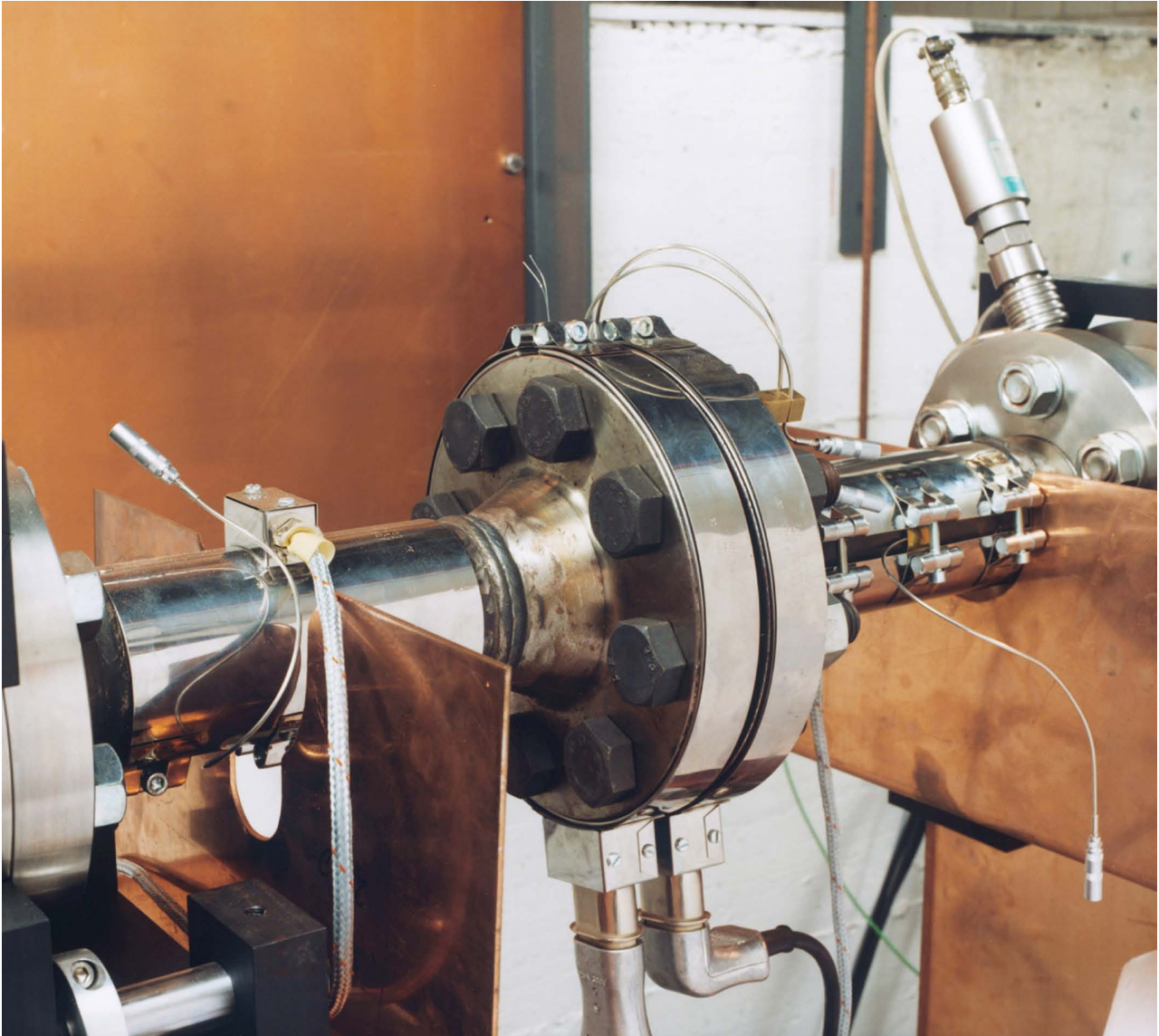
Qualification und Quality Assurance

This test facility is nationally and internationally the only one of its kind. So far, over 200 different gasket materials have been tested.

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Further Information

The test facility is described in the booklet „Liste der nichtmetallischen Materialien, die von der BAM Bundesanstalt für Materialforschung und -prüfung zum Einsatz in Anlagenteilen für Sauerstoff als geeignet befunden worden sind“ published by BAM in connection with the safety rule B 7 „Sauerstoff“ (Oxygen) of the „Berufsgenossenschaft der chemischen Industrie“ (Employers liability insurance association of the chemical industry).



Technical data:

Max. test pressure	160 bar
Max. test temperature	300 °C
Standard flanges with DN	25 mm, 40 mm and 65 mm