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## Translation

### Certificate

on the testing of pipe segments with angular flange connections  
connected by quick-release rings for  
pressure shock resistance

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Reference: 100/410a/08 BVS-Fu

Bochum, 10/08/2009

**DEKRA EXAM GmbH**

Signed: Michael Faber  
(Michael Faber)

Signed: Dr. Oliver Fuß  
(Dr. Oliver Fuß)

The pipeline segments DN 300 of 2 mm wall thickness with angular flange connections and mounted gaskets of Sikaflex-221, product of Sika Deutschland GmbH, Bad Urach, and clamping rings manufactured by Fr. Jacob Söhne GmbH & Co., Porta Westfalica according to the following drawings.

- ENG-015381, of 07/05/2009 & 11/05/2009, end cover with angular flange D=300
- 21WFL343, of 12/05/2009, pipe bend R=2D with angular flange
- 21WFL010, of 12/05/2009, pipe with angular flange
- ENG-014949, of 14/05/2009, pipe D=300, 5 mm long, one end angular flange, other end beaded
- 21WFL382, of 20/4/2009, clamping ring for angular flange construction 2009

were flange-mounted to a 1 m<sup>3</sup> vessel as shown for the test setup in drawing No. ENG-014026 of 2/12/2008 and exposed to methane explosions. The explosive mixture of methane and air was obtained by flush filling. The mixture was fired by a squib (E = 100 J) at the centre of the vessel.

Under the predefined test conditions, the pipeline segments with angular flange connections and clamping rings – clamping rings tightened to 25 Nm - were exposed to a maximum explosion gauge pressure of 11.3 bar.

As a result of the explosion tests according to DIN EN 14460, the pipeline segments with angular flange connection in combination with clamping rings can be certified to be pressure shock resistant to **10.2 bar**. This also applies to identical smaller sizes of the same wall thickness of 2 mm and the same tightening torque.

Bochum, 10/08/2009

Responsible  
Dr. Fuß