

# DeltaV-Seal 316L

## Test Summary



<b>Product Description</b>	<b>DeltaV-Seal™</b> , one-piece, 316L full metal gasket, an alternative to spiral wound and Kamm profile gaskets and suitable for ASME B16.5 and EN 1092-1 flanges.
<b>Tested in accordance with</b>	Tests in accordance with to Shell MESC SPE 85/300 (dated Feb. 2019), carried out at AMTEC in Germany in March 2020. Other third-party tests listed separately below.
<b>3rd Party Testing at AMTEC Germany with specification Shell MESC SPE 85/300</b> <b>Date: March 2020.</b> Final testing carried out by AMTEC Germany using the AMTEC TEMESfl.a11 Multifunctional test rig. <b>Test item: DeltaV-Seal 4" #300</b>	

	Result	
<b>Shell Leakage Test at Ambient Temperature (MESC SPE 85/300 3.3.2)</b> Test: 6 steps 400 MPa – 811.7 MPa, 51 bar.	Class AH $2.1 \cdot 10^{-12} \text{ Pa}\cdot\text{m}^3/(\text{s}\cdot\text{mm}_{\text{dia}})$	PASS
<b>Shell Leakage Test at 400°C (MESC SPE 85/300 3.3.2)</b> Test: 4 steps, 600 MPa – 811.7 MPa, 34.7 bar, 24 hours. Leak rate at 700/800/811.7 MPa after 24 hours: Not measurable Therefore leak rate was set by AMTEC to $4.3 \cdot 10^{-8} \text{ Pa}\cdot\text{m}^3/(\text{s}\cdot\text{mm}_{\text{dia}})$ .	$4.3 \cdot 10^{-8} \text{ Pa}\cdot\text{m}^3/(\text{s}\cdot\text{mm}_{\text{dia}})$	PASS
<b>Compression Test at Ambient Temperature (MESC SPE 85/300 3.3.4: EN-13555)</b>	$Q_{\text{smax}} = 800 \text{ MPa}$ : No collapse, no damage	PASS
<b>Compression Test at 400°C (MESC SPE 85/300 3.3.4: EN-13555)</b>	$Q_{\text{smax}} = 800 \text{ MPa}$ : No collapse, no damage	PASS
<b>Creep Relaxation Test Ambient Temperature (MESC SPE 85/300 – 3.3.4: EN-13555)</b> Test: Initial gasket stress 799.4 MPa, 25°C, remaining 788.5 MPa (relaxation $P_{\text{QR}} = 0.99$ )	$P_{\text{QR}} 0.99$	PASS
<b>Creep Relaxation Test at 400°C (MESC SPE 85/300 – 3.3.4: EN-13555)</b> Test: Initial gasket stress 799.4 MPa, 400°C, remaining 727.0 MPa (relaxation $P_{\text{QR}} = 0.91$ )	$P_{\text{QR}} 0.91$	PASS
<b>Leakage test (MESC SPE 85/300 – 3.3.4: EN-13555)</b> Media: Helium, 40 bar. Test: Cyclic loading 200 MPa, 300 MPa, 200 MPa, 400 MPa, 500 MPa, 600 MPa, 800 MPa Result: Minimum gasket stress in assembly for tightness class $L_{0.000001} Q_{\text{min}} = 295 \text{ MPa}$ Lowest leakness level reached: $L_{0.0000000001}$ in both tests	$< 1.1 \cdot 10^{-10} \text{ mg}/(\text{s}\cdot\text{m})$	PASS
<b>Shell Cycle Test at 400°C (HOTT) (MESC SPE 85/300 3.3.5)</b> Test: 811.7 MPa - 400°C, 34.7 bar Helium. Requirement: < 1 bar	< 0.2 bar pressure loss	PASS
<b>Hot Blowout Test 400°C (HOBT-1) (MESC SPE 85/300 – 3.3.6)</b> Test: 338 MPa ambient, 400°C – 272 MPa, 52 bar Helium added, 148 MPa. No pressure drop detected during 2 x 15 min. dwell time. Requirement: No blowout at 1.5 x rated pressure	No pressure drop detected	PASS
<b>Gasket Adhesion Test: Flange Inspection Following Ambient Temperature Fugitive Emission Test (MESC SPE 85/300 – 3.3.8)</b>	No adhesion	PASS

Other 3 <sup>rd</sup> Party Tests	Result	
<p><b>Cryogenic Test, Wroclaw University of Science and Technology, 22.12.2020, Department of Mechanics, Machines, Devices and Energy Processes K50</b>                      Test of DeltaV-Seal DN40 PN40, pressure range 10 – 100 bar, - 196°C                      Media: Helium                      Result: Maintains tightness higher than 10<sup>-8</sup> mg/s, pressure range 10 – 100 bar</p>	<p>&lt; 10<sup>-8</sup> mg/s</p>	<p><b>PASS</b></p>
<p><b>Fire Test, (API 6FB), AMTEC Germany, 28.10.2016</b>                      40 bar, &gt; 650°C, 30 min. Requirement: Max leakage 1.00 ml / (inch ·min)</p>	<p>0.01 ml / (inch ·min)                      Fire Safe acc. to API 6FB</p>	<p><b>PASS</b></p>
<p><b>TA Luft Helium Leakage Test (VDI-2440), AMTEC Germany 28.10.2016</b>                      400°C in 48 hours, 12 hours ambient, 1 bar helium.                      Requirement: Max leakage rate of 1.0·10<sup>-4</sup> mbar·l / (s·m)</p>	<p>1.01·10<sup>-8</sup> mbar·l / (s·m)</p>	<p><b>PASS</b></p>
<p><b>DNV GL Type Approval Test</b>                      Test items: DeltaV-Seal ASME 1", 6", 12", pressure class 300#                      Test 1: 10 mill. vibrations, 23.5 Hz, 5 days, simultaneously with:                      Test 2: 0.5 mill. pressure pulses, 1 Hz, sequence: 0 – 78 – 51 – 0 bar, 5 days                      Type Approval Certificate: TAP000003B rev. 2 renewed at 16.10.2019,                      valid for NPS 1/2" – 24" / DN15 – DN600</p>	<p>Type Approved</p>	<p><b>PASS</b></p>