DNV·GL

TECHNOLOGY CERTIFICATE

Certificate no.:	Initial date:	Valid until:
2015-3296	26. January 2016	26. January 2020

This is to certify that the

General Design Methodology for Thermoplastic Composite Pipes

as detailed in /1/ is qualified in accordance with DNV-RP-A203 Technology Qualification /2/ and specifically for design of products according to DNVGL RP-F119 Thermoplastic Composite Pipes /3/ (TCP) provided that the conditions below and specified in /4/ are met.

This is a certificate for the design methods and tools. *This is not a product certificate.* Products can be subjected to design verification according to DNVGL RP-F119/3/ and manufacturing survey.

Technology owner:	**Airborne Oil & Gas**
Name of technology:	Generic Design Methodology and Tools for Thermoplastic Composite Pipes based on finite element analysis and micromechanics.
Description:	Analysis of the TCP pipe body and end fitting by finite element calculations based on material tests on the coupon level and confirmation tests on pipe samples.
Designated use:	The design methodology will be used for design calculations of TCPs. It describes how the calculations are based on material test data and validated against pipe sample tests.
Conditions:	This certificate is only valid together with the Qualification Report /4/ that specifies the intended use and limitations and conditions that apply. For application to a specific product, material inputs must be confirmed for the actual production and the modelling results verified by comparing them to full-scale test results as described in /3/.
Involvement:	DNV GL has been involved in the qualification process in accordance with /5/, has evaluated the design procedures and commented on reports as detailed in /4/.
Verification and certification:	Specific design calculations shall be verified against the procedures and limitations described in /1,3,4/. Additional calculations beyond the general approach shall be verified according to /3/.
Reference documents:	/1/ Generic design qualification - design analysis methodology, Airborne Oil and Gas Report AOG1305020R004, Rev. 03, 11 Dec. 2015 /2/ DNV-RP-A203, Qualification of New Technology, July 2013. /3/ DNVGL-RP-F119, Thermoplastic Composite Pipes, December 2015 /4/ DNVGL Technical Report No. 2015-3296 Rev.0 "Evaluation of the General Design Methodology for TCP", 26 January 2016 /5/ DNVGL-SE-0160, Technology Qualification Management and Verification, December 2015

DNV GL shall not be held liable for undiscovered failure modes or causes or for missing qualification activities.

26. January 2016
for DNV GL AS

Gustav Heiberg
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