DNV·GL

Certificate No:
TAP0000044

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Seamless Gas Bottle

with type designation(s)
RT535, RT545, RT571

Issued to
Roth Mions S.A.S.
MIONS, France

is found to comply with
Det Norske Veritas' Rules for Classification of Ships Pt.4 Ch.7, Pressure Vessels, 2012
Offshore Standard DNV-OS-D101, Marine and Machinery Systems and Equipment

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Type	Loading pressure:	Operating media:	Test pressure:	Filling ratio
RT535	See Certificate	Mineral oil / N2	See Certificate	
RT545	See Certificate	Mineral oil / N2	See Certificate	
RT571	See Certificate	Mineral oil / N2	See Certificate	

This Certificate is valid until **2017-06-30**.

Issued at **Høvik** on **2015-10-12**

for **DNV GL**

DNV GL local station: **Marseille**

Approval Engineer: **Tom Berg-Nielsen**

Marianne Spæren Marveng
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

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Job Id: **262.1-014359-3**
Certificate No: **TAP0000044**

Product description

Seamless gas bottle as bladder accumulator body designed according to EN14359:2006.
It is approved as DNV GL class I pressure vessel.

Tube outside diameter (mm)	Minimum shell thickness (mm)	Maximum design pressure / Test pressure at 80^0 C (bar)		
		RT535	**RT545**	**RT571**
226.2	11.3	420/601	508/726	N.A
223.6	10.2	378/541	457/654	N.A
221	9.3	343/491	416/595	N.A
219.1	8.35	305/437	370/530	N.A
168.3	8.33	N.A	N.A	401/574

Corrosion allowance : 1mm

Material: 34Cr Mo4 with following guarantied values:

RT535 RT571	$R_m \geq 825$ N/mm^2 $R_e 20^0C \geq 730$ N/mm^2 $R_e 80^0C \geq 660$ N/mm^2 Elongation ≥ 14 %
RT545	$R_m \geq 985$ N/mm^2 $R_e 20^0C \geq 870$ N/mm^2 $R_e 80^0C \geq 800$ N/mm^2 Elongation ≥ 14 %

Design temperature range RT535 & 545: -60^0 C to +80^0 C / RT571: -50^0 C to +80^0 C

Maximum load cycles (0 bar to Maximum design pressure) RT535 & 545: 14701 cycles / RT571: 2572 cycles

Application/Limitation

The materials used shall be heat-treated steels. The materials shall fulfill requirements stated on EN14359 clause 4.1

Manufacturing, workmanship and testing of cylinders shall be done according to design code EN14359

Each cylinder manufactured to this type approval is to be certified by DNV and delivered with DNV product certificate when it is required by DNV Rules or purchaser

Type Approval documentation

Drawing Number RT535 Rev.01
Drawing Number RT545 Rev.00
Drawing Number RT571 Rev.00
Calculation note NTEN005 rev. 02
Calculation note NTEN010 rev. 00
Mechanical test reports issued by Bureau Veritas 2013 0065-1-TC; 2013 0068-1-TC; 2013 0066-1-TC
Impact test report for the material at minimum design temperature
Heat treatment procedure

Marking of product

Each seamless bladder accumulator is to be permanently and legibly marked with following information:

- Date of manufacture, (month/year)
- Manufacturer's serial number
- Manufacturer's name/symbol
- Total shell volume in liters
- Allowable temperature range in degrees Celsius
- Maximum allowable pressure
- Test pressure

The location and process of stamping of the accumulators shall not be detrimental to its strength.

Periodical assessment

For retention of the Type Approval, a DNV GL Surveyor shall perform a survey - every second year and before the expiry date of this certificate - to verify that the conditions for the type approval are complied with.

END OF CERTIFICATE