

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Safety Valve for Boiler and Pressure Vessel

with type designation(s)
526

Issued to

LESER GmbH & Co. KG
HOHENWESTEDT, Germany

is found to comply with

Det Norske Veritas' Rules for Classification of Ships Pt.4, Ch.6 "Piping Systems"
Det Norske Veritas' Standards for Certification 2.9 No. 5-794.40

Application :

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

The safety relief valves may be used for steam, liquids, gases, and LPG services. Only type 526 - 1 1/2" is approved for LNG service with temperature below -55°C.

K. Orifice D: Steam 3,9 and Gas 2,6 / Orifice E-T: Steam 2,6 and Gas 1,5 (based on test factor: results in accordance with ASME section VIII)

This Certificate is valid until **2018-12-31**.

Issued at **Høvik** on **2015-11-19**

for **DNV GL**

DNV GL local station: **Hamburg**

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.

Product description

- Flanged Safety Relief Valves, spring loaded, full nozzle type
- Design (conventional and balanced bellow)

Type 526 (closed and open bonnet)	
Lifting devices	Bolted Cap H1 / Screwed cap H2 Packed lever H4 / Plain lever H3 Lifting device H6
Opening characteristics	Normal (steam/gases/liquids)
Connection inlet/outlet	flanged
Standard pressure rating	Inlet: PN1 up to PN400, (CL150 up to CL2500)

- Material specifications and temperature range

Part/Type	5262	5263	5267	5264
Body	Steel castings for pressure purposes: GP240GH(1.0619) or WCB	Steel castings for pressure purposes 1.0619 - LCB	Steel castings for pressure purposes G17CrMo5-5 (1.7357) or WC6	Steel castings for pressure purposes: GX5CrNiMo19-11-2 (1.4408) or CF8M Castings, Austenitic-Ferritic (Duplex) Stainless Steel: ASME SA-995 Gr. 4A / CD3MN (Duplex)/1.4462 ASME SA-995 Gr. 6A / CD3MWCuN (Super Duplex) Hastelloy C-22 (CX2MW) Hastelloy C-276 (CW12MW)
Disc	Stainless Steel: X39CrMo17-1(1.4122) Or MT440			Stainless Steel: X2CrNiMo17-12-2 (1.4404 - 316L)*
	Stainless steels: ASME SA-182 F51 (Duplex) /1.4462 ASME SA-479 S31803 (Duplex) /1.4462 ASME SA-182 F55 (Super Duplex) /1.4501 ASME SA-479 S32760 (Super Duplex) /1.4501		-	Stainless steels: ASME SA-182 F51 (Duplex) /1.4462 ASME SA-479 S31803 (Duplex) /1.4462 ASME SA-182 F55 (Super Duplex) /1.4501 ASME SA-479 S32760 (Super Duplex) /1.4501 2.4856/NO6625 Grade 1 Inconel 625

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Job Id: **262.1-002761-5**
Certificate No: **TAP0000059**

Nozzle	Stainless Steel: X2CrNiMo17-12-2 (1.4404 - 316L) or Steel castings for pressure purposes: GX5CrNiMo19-11-2 (1.4408) or CF8M		
	Stainless steels: ASME SA-182 F51 (Duplex) /1.4462 ASME SA-479 S31803 (Duplex) /1.4462 ASME SA-182 F55 (Super Duplex) /1.4501 ASME SA-479 S32760 (Super Duplex) /1.4501	-	Stainless steels: ASME SA-182 F51 (Duplex) /1.4462 ASME SA-479 S31803 (Duplex) /1.4462 ASME SA-182 F55 (Super Duplex) /1.4501 ASME SA-479 S32760 (Super Duplex) /1.4501 2.4856/NO6625 Grade 1 Inconel 625

*Stelited

- Valve sizes

d ₀ (mm)	14,0 to 161,5
DN	DN25 to 200
ANSI	1" - 8"
Orifice letter	D - T

- Temperature range based on used material:

Material	Min. Temp	Max. Temp
GP 240GH / 1.0619 / WCB	-85°C	450°C
1.0619 - LCB	-46°C	538°C
GX5CrNiMo19-11-2 / 1.4408 / CF8M	-270°C	400°C
ASME SA-995 Gr. 4A / CD3MN (Duplex) / 1.4462	-60°C	250°C
ASME SA-995 Gr. 6A / CD3MWCuN (Super Duplex)	-80°C	316°C
G17CrMo5-5 / 1.7357 / WC6	-85°C	550°C
X2CrNiMo17-12-2 / 1.4404 / 316L	-273°C	550°C
ASME SA-182 F51 (Duplex) / 1.4462	-60°C	250°C
ASME SA-479 S31803 (Duplex) / 1.4462	-60°C	250°C
ASME SA-182 F55 (Super Duplex) / 1.4501	-40°C	250°C
ASME SA-479 S32760 (Super Duplex) / 1.4501	-40°C	250°C
X39CrMo17-1 / 1.4122 / MT440	-85°C	550°C
Hastelloy C-22 (CX2MW) ASME IIB, SA-494	-198°C	260°C
Hastelloy C-276 (CW12MW) ASME IIB, SA-494	-198°C	538°C
2.4856/NO6625 Grade 1 Inconel 625 ASME IIB, SA-446	-198°C	649°C

- Pressure rating will be reduced on higher temperature or lower temperature according to ASME B16.34.
- Sufficient valve capacity is to be calculated for each application acc. to DNV ship rules Pt.4 Ch.6.

Limitation

Materials to show minimum impact value 27J at test temperature. For design temperatures below 0°C valves of steel castings are to be charpy tested at 5°C below the design temperature or -20°C whichever is lower.

Type Approval documentation

Tests carried out

Cryogenic test

Production testing and Certification

- All valves shall be tested as below:
 1. Hydrostatic test of the valve body at a pressure equal to 1.5 times the design pressure for all valves.
 2. Test of set pressure at ambient temperature.
 3. Leak test after reset at 90% of each set pressure at room temperature.
- Above tests shall be done in presence of DNV GL surveyor for valves intended for LNG/LPG systems or for valves where $DN \geq 40$.
- Documents, signboards etc. which are to accompany each product/delivery:
 - Instruction and maintenance manuals
 - Surveyors report
 - DNV product certificate is required for all valves having $DN \geq 40$.
- Materials of the valve body intended for LNG/LPG systems are to be delivered with material certificates in accordance with DNV Ship Rules Part 5, Chapter 5 Section 2 Table E1. For other systems, material certificates are to be in accordance with DNV Ship rules Pt.4 Ch.6 Sec.2 Table A2.
- All of materials with NV or Work certificate have to be supplied from an approved manufacturer of DNV GL for the type and grade of steel being supplied and for the relevant steelmaking and processing route.

Marking of product

For traceability to this Type Approval the products are to be marked with:

- Manufacturer's name or trade mark
- Design or type designation
- Size
- Set pressure and capacity.

Periodical assessment

For retention of the Type Approval, a DNV GL surveyor shall perform periodical assessment every second year and before the expiry date of this certificate. The scope of the periodical assessment survey, is to verify that the conditions stipulated for the Type Approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the certificate retention survey are:

- review of Type Approval documentation
- review of possible changes in design, materials and performance
- ensure traceability between manufacturer's product type marking and Type Approval Certificate.

END OF CERTIFICATE