

# TYPE APPROVAL CERTIFICATE

**This is to certify:****That the Safety Valve for Boiler and Pressure Vessel**with type designation(s)  
**459, 462**

Issued to

**Leser GmbH & Co. KG**  
**Hamburg, Germany**

is found to comply with

**DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems****DNV GL rules for classification – Ships Pt.4 Ch.7 Pressure equipment****DNV GL rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers****DNV GL class programme DNVGL-CP-0186 – Type approval – Valves****Application :****Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.****K. factor: Refer to certificate.**Issued at **Hamburg** on **2017-07-10**This Certificate is valid until **2022-07-09**.for **DNV GL**DNV GL local station: **Hamburg**Approval Engineer: **Hagen Markus**

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**Olaf Drews**  
**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

Spring loaded safety relief valve, angle type with flange or threaded connections for steam, gases and liquids. Opening characteristic Full Lift or Standard. Optional with conventional or balanced stainless steel bellow

| Valve types and details                   |                                                       | Type     |
|-------------------------------------------|-------------------------------------------------------|----------|
| Lifting devices                           |                                                       |          |
| H2                                        | Gastight cap                                          | 459, 462 |
| H3                                        | Open bonnet lifting device                            | 459, 462 |
| H4                                        | Gastight with lifting device                          | 459, 462 |
| Opening characteristics                   | Full lift (steam, gases)                              | 459, 462 |
|                                           | Standard (liquids)                                    | 459, 462 |
| Connection type inlet / outlet            | Flanges or threaded <sup>2</sup>                      | 459, 462 |
| Body                                      | Angle type                                            |          |
| Pressure ratings                          |                                                       |          |
| Inlet flange <sup>1</sup> / Outlet flange | Refer to table "Sizes and pressure ratings" on page 3 | 459, 462 |
| Set pressure range                        | Refer to LESER product catalogue                      |          |

### Notes

<sup>1</sup> Refer to LESER product catalogue, Doc.No. 0777.5680.

Pressure rating may be reduced on higher temperature or lower temperature according to ASME B16.34.

<sup>2</sup> Relief valves with pipe thread connections that seal on the thread are limited in the application

Threaded pipe connections are in general not approved for toxic or flammable media or services where fatigue, severe erosion or crevice corrosion is expected to occur. Valves with parallel pipe thread connection are not approved for pipe class I and II but for pipe class III up to DN50. Tapered pipe thread connections are approved up to DN 25 for pipe class I and up to DN50 for pipe class II and III.

## Material and temperature range

| Type                              | 4623<br>4593                        | 4592<br>4622                        | 4594<br>4624                      | 4594 HDD<br>4624 HDD |
|-----------------------------------|-------------------------------------|-------------------------------------|-----------------------------------|----------------------|
| Inlet Body                        | X14CrMoS17<br>(1.4104)<br>AISI430F  | X2CrNiMo17-12-2<br>(1.4404)<br>316L | X2CrNiMo17-12-2 (1.4404)<br>316L  |                      |
|                                   | X2CrNiMo17-12-2<br>(1.4404)<br>316L |                                     |                                   |                      |
| Outlet Body                       | GP240GH (1.0619)<br>WCB             |                                     | GX5CrNiMo19-11-2 (1.4408)<br>CF8M |                      |
| Disc                              | X39 CrMo 17-1 (1.4122)<br>MT440     |                                     | X2CrNiMo17-12-2 (1.4404)<br>316L  |                      |
| Temperature range <sup>5, 6</sup> |                                     |                                     |                                   |                      |
| Metallic seat                     | -10°C up to +300<br>°C              | -85°C up to<br>+450°C               | -165°C up to +400°C               |                      |

### Notes

<sup>1</sup> Stellite

<sup>2</sup> Valves of steel castings intended for the use at design temperatures below 0°C are to be Charpy-V tested at 5°C below design temperature or -20°C whichever is lower.  
Refer to Pt.2, Ch.2, Sec.8 – 6 – Table 14.

<sup>3</sup> Nodular cast iron is not approved for application in pipe class I piping systems.

<sup>4</sup> The use of grey cast and nodular cast iron for media having a temperature below 0°C shall be considered in each particular case.

<sup>5</sup> For application below - 55°C refer to "Application / Limitation" on page 3

<sup>6</sup> In case of soft sealed valve disc the temperature range is limited acc. to the O-ring material as specified in LESER specification LDeS 3027.01.

## Requirements depending on pipe classes and application

The requirements on the safety relief valve design, material grades and certificates of pressurised parts

as well as the scope and requirements of production testing depends on the application and pipe class. For the range of application specified on page 1 of this certificate the following DNVGL Rules are to be observed:

- DNV GL Pt. 2, Ch. 1, Sec. 2 (Approval of material manufacturers)  
Ch.2, Sec. 8 – 5 Castings for boilers, pressure vessels and piping systems  
Sec. 8 – 6 Ferritic steel castings for low temperature service  
Sec. 8 – 7 Stainless steel castings
- DNV GL Pt. 4, Ch. 6, Sec. 1 – Table 1 (pipe classes)  
Sec. 1 – Table 4 (certification requirements)  
Sec. 2 – Table 3 (material certificates acc. to pipe classes)

In addition, for steam and pressure vessels application

- DNV GL Pt.4, Ch. 7, Sec.1 - General Requirements  
Sec.2 - Materials  
Sec.3 - Thermal-oil installations  
Sec.5 – 2 Safety Valves (steam boilers)  
Sec.7 – Manufacture, workmanship and testing

In addition, for cryogenic application

- DNV GL Pt. 5, Ch. 7, Sec. 1, Table 7 - Certification of components  
Ch. 7, Sec. 6 – Materials of Construction, Quality Control and Marking  
DNV GL Pt. 6, Ch. 2, Sec. 5, Table 4 - Certification of material quality and testing

## Application/Limitation

The safety relief valves of type 459, 462 are type approved for application in steam, gas, liquid and LPG services.

## Sizes and pressure ratings

| Type                         |        | 459/462                |                        |             | 459 HDD/462 HDD    |                            |                            |
|------------------------------|--------|------------------------|------------------------|-------------|--------------------|----------------------------|----------------------------|
| d <sub>0</sub> [mm]          |        | 9                      | 13                     | 17,5        | 6                  | 9                          | 13                         |
| Inlet size                   |        | threaded: ½" – 1"      |                        |             | threaded: ½" - 1   |                            |                            |
|                              |        | flanged: DN 15 – DN 40 |                        |             | / NPS ½" – NPS 1½" |                            |                            |
| Outlet size                  |        | threaded: 1" - 2"      |                        |             | threaded: 1" - 1½" |                            |                            |
|                              |        | flanged: DN 25 – DN40  |                        |             | / NPS 1" – NPS 1½" |                            |                            |
| PN                           | Inlet  | 500                    | 250                    | 160         | 850                | 500                        | 250                        |
|                              | Outlet | 160                    | 160                    | 40          | 160                | 160                        | 160                        |
| Pressure rating (DIN / ANSI) |        | PN500                  | PN250                  | PN160       | PN850              | PN500                      | PN250                      |
| Set pressure range [bar]     |        | 1.50 to 420 (type 459) | 0.10 to 250 (type 459) | 0.20 to 140 | 200 to 850         | 1.50 to 420 (type 459 HDD) | 0.10 to 250 (type 459 HDD) |
|                              |        | 0.50 to 420 (type 462) | 0.20 to 250 (type 462) | n.a.        | n.a.               | 0.50 to 420 (type 462 HDD) | 0.20 to 250 (type 462 HDD) |

### Cryogenic application

The valve type 4594 is in addition type approved for cryogenic application with service temperatures below – 55°C up to – 165°C for the following sizes:

| d <sub>0</sub> [mm] | Inlet flange     | Outlet flange |
|---------------------|------------------|---------------|
| 9                   | ½", ¾", 1"       | 1", 1¼", 1½"  |
| 13                  | ½", ¾", 1"       | 1", 1¼", 1½"  |
| 17.5                | ¾", 1", 1¼", 1½" | 1", 1¼", 1½"  |

### Coefficient of discharge K<sub>D</sub><sup>1</sup>

Based on test results in accordance with ASME, Section VIII Div.1

| Type     | d <sub>0</sub> [mm] | K <sub>D</sub> |       |         |
|----------|---------------------|----------------|-------|---------|
|          |                     | Steam          | Gases | Liquids |
| 459, 462 | 6, 9, 13, 17.5      | 0.811          |       | 0.566   |

### Note

<sup>1</sup> Valves with diameter d<sub>0</sub> < 38 mm for the Standard type and < 20 mm for the Full lift type valve are not to be used on boilers.

### Sizing of pressure relief valves

In addition to the sizing tables specified in LESER product catalogue, Doc. No. 0777.5680, applicable DNV GL Rules are to be observed.

For steam boiler and pressure vessel application refer to DNV GL Pt.4, Ch.7, Sec.5.

### Type Approval documentation

Job Id: **262.1-008264-4**  
Certificate No: **TAP0000105**

## Tests carried out

Visual inspection, Pressure test on valve bodies, Tightness test at 90% of set pressure at room temperature and cryogenic conditions, Set pressure test at room temperature and cryogenic condition.

## Production testing

Each relief valve is subject to production testing according to applicable DNVGL Rules as follows:

- Machinery piping systems Pt.4, Ch 6, Section 9 - 3 Valves
- Liquefied gas tanker piping systems and tanks Pt.5, Ch. 7 - Sec. 5 – 13.1 Valves
- Steam boilers, steam generators and pressure vessels Pt.4, Ch.7 – Section 7 – 4.6 Hydraulic test

Appropriate DNV GL product certificate to be issued, if required by the Rules.  
Reference is made to Recognition Certificate MSARC0000ATE.

## Marking of product

For traceability to this type approval certificate each valve is to be provided with a name plate with at least the following data:

|                                        | Example          |
|----------------------------------------|------------------|
| Manufacturer's name or trade mark      | LESER            |
| Type designation                       | 459 – H2, H3, H4 |
| Nominal pressure rating Inlet          | PN160            |
| Size inlet / outlet                    | DN15             |
| Dimeter $d_0$ [mm]                     | 9                |
| Set pressure                           | 125 bar          |
| Coefficient of discharge $K_D$ - Media | 0.811 - S/G      |

### **Periodical assessment**

For retention of the type approval certificate periodical assessments shall be carried out at production places by DNVGL surveyor.  
The objective of the periodical assessment is to verify that the design and production conditions for the type approval have not been altered.

Main scope of the assessment:

- verification of the production and quality control system
- review of quality control documentation of recent deliveries
- review of drawings in production to verify any design changes which may have an impact on data specified in the type approval certificate, performance and range of application
- verification of the product marking

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.