VALVESTAR® 7
Training lectures – Walk through
These **Training Lectures for VALVESTAR® 7** must be used by all teachers of VALVESTAR 7 to ensure the most efficient training and the highest quality of training.

**VALVESTAR® 7, the sizing tool of LESER, is more than only a calculation tool:**

- VALVESTAR® is a calculation tool for Safety Valves according all world wide known and used rules and standards
- VALVESTAR® is a sizing tool for LESER Safety Valves with an option configuration tool
- VALVESTAR® is a product register of LESER Safety Valves with all the product specific data in “VALVE INFO”
- VALVESTAR® is a medium database with several specific liquid- and gaseous medium data
• VALVESTAR® is a visual database with all drawings of LESER Safety Valves and spotlights of possible options
• VALVESTAR® is a documentation tool with three different types of documents and many different available formats.
• VALVESTAR® is easy to handle with the Wizard which leads you through the sizing
Introduction. Pop-up view of VALVESTAR 7.1.2 and higher.
Sizing. Sizing according to ASME, (steam/gases).

Service condition: Air, Set pressure = 10bar g, required massflow = 11500kg/h
Valve construction: Type 441, semi nozzle, Carbon Steel body (1.0619/WCB), closed bonnet, lifting device cap H4

1. Step: How to start

or: see next page
1. Step: How to start
2. Step: Sizing standard and additional calculation

At this step you need to select a type of sizing and a medium. Please specify sizing or calculation for a valve. Then specify a medium and additional calculation.

<table>
<thead>
<tr>
<th>Tag No.</th>
<th>Medium</th>
<th>Sizing standard</th>
<th>Selected units</th>
<th>CDIP Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gas</td>
<td>ASME VIII</td>
<td>ASME VIII</td>
<td></td>
</tr>
</tbody>
</table>

Additional calculations:

- Reaction force
- Noise
- Fire Case
- Pressure drop inlet line
- Built up back pressure outlet pipe

<table>
<thead>
<tr>
<th>AD2000/A2</th>
<th>API 520</th>
<th>ISO / CD 4126-9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sizing according to ASME, (steam/gases).
Sizing. Sizing according to ASME, (steam/gases).

3. Step: Medium database and medium selection

Image of the medium selection screen with Air as the selected medium.
4. Step: Service condition

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum allowable working pressure (MAWP)</td>
<td>- psi-g</td>
</tr>
<tr>
<td>Set pressure</td>
<td>p psi-g</td>
</tr>
<tr>
<td>Superimposed back pressure</td>
<td>paf 0 psi-g</td>
</tr>
<tr>
<td>Built-up back pressure</td>
<td>pas - psi</td>
</tr>
<tr>
<td>On pressure</td>
<td>dp 10.0%</td>
</tr>
<tr>
<td>Temperature</td>
<td>t °C</td>
</tr>
<tr>
<td>Required massflow</td>
<td>q_m, lb</td>
</tr>
<tr>
<td>Volume flow to be discharged (working condition)</td>
<td>q_m, lb</td>
</tr>
<tr>
<td>Volume flow to be discharged (std condition) [T=50°F, P=45 psig]</td>
<td>q_m, lb</td>
</tr>
<tr>
<td>Options</td>
<td>ASME</td>
</tr>
<tr>
<td>Case for blow off</td>
<td></td>
</tr>
<tr>
<td>Rupture disc correction factor</td>
<td></td>
</tr>
</tbody>
</table>

The diagram shows a service condition wizard with fields for inputting various parameters such as pressure, temperature, and mass flow. The wizard is used to select the appropriate valve for the given service condition.
5. Step: Service condition

![Service Condition Window]

- **Maximum allowable working pressure (MAWP)**
- **Net pressure**
- **Superimposed back pressure**
- **Built up back pressure**
- **Overpressure**
- **Temperature**
- **Required mass flow**
- **Volume flow to be discharged (working condition)**
- **Volume flow to be discharged (std condition)**

**Options**
- Volume flow standard
- Check for disc off

**Installations**
- Rupture disc correction factor

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**Notes:**
- The screenshot shows a window for setting service conditions, including pressure, temperature, and other parameters.
- The window includes fields for entering specific values and options for standardization and verification.
- The context is for sizing according to ASME for steam/gases.
6. Step: Valve Finder

Valve Finder

Please specify the required valve parameters. Leave the fields blank to list all the available valve types.

<table>
<thead>
<tr>
<th>Product group</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonnet</td>
<td></td>
</tr>
<tr>
<td>Nozzle design</td>
<td></td>
</tr>
</tbody>
</table>
7. Step: Processing of all possible safety valves
8. Step: Connections

**Table:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Possible inlet connections</th>
<th>Possible outlet connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>1303</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1504</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1305</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection standard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>acc. to DIN EN 1992</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flange facing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIN 1692-1 flange B1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIN 2526...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flange guide...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selected outlet connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1303</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1504</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1305</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connection standard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>acc. to DIN EN 1992</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN 50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flange facing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIN 1692-1 flange B1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIN 2526...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Diagram:**

[Image of a connection diagram with flanges and piping connections]
Sizing. Sizing according to ASME, (steam/gases)


Flange Guide

<table>
<thead>
<tr>
<th>Service condition</th>
<th>Additional service condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set pressure</td>
<td>10 bar-g</td>
</tr>
<tr>
<td>Temperature</td>
<td>20 °C</td>
</tr>
</tbody>
</table>

Flanges

<table>
<thead>
<tr>
<th>connection standard</th>
<th>acc. to DIN EN 1092</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>

Legend

✓ permissible pressure rating

× non permissible pressure rating

Check  Close

VALESTAR® 7 – Training lectures – Walk through | LESER GmbH & Co. KG | 01.06.2018 | Rev. 00 | 14/117
9. Step: Options
### 10. Step: Materialist

![Image of a material list](image)

<table>
<thead>
<tr>
<th>Pos No</th>
<th>Description</th>
<th>Q</th>
<th>Material (SD)</th>
<th>Material (US)</th>
<th>Certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>12040</td>
<td>Body</td>
<td>1</td>
<td>SA 234 WCB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12050</td>
<td>Seat</td>
<td>1</td>
<td>316L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12070</td>
<td>Disc</td>
<td>1</td>
<td>Martened Stainless</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12080</td>
<td>Guide</td>
<td>1</td>
<td>1.4544</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12090</td>
<td>Bonnet</td>
<td>1</td>
<td>Double 64, 60-40-10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12100</td>
<td>Spindles</td>
<td>1</td>
<td>420</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12140</td>
<td>Splitting</td>
<td>2</td>
<td>SA 417 400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12160</td>
<td>Spring plate</td>
<td>1</td>
<td>1.0718/1.0750</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>12170</td>
<td>Spring plate</td>
<td>1</td>
<td>1.0718/1.0750</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>12180</td>
<td>Adjusting screw</td>
<td>1</td>
<td>SA 417 400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12190</td>
<td>Lock nut</td>
<td>1</td>
<td>1.0718</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>12200</td>
<td>Cap M12</td>
<td>1</td>
<td>1.0718</td>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>12240</td>
<td>Spring</td>
<td>1</td>
<td>Carbon steel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12250</td>
<td>Bolt</td>
<td>4</td>
<td>1.1121</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 11. Step: Valve Dimensions

#### Valve dimensions
Dimensions for the valve.

<table>
<thead>
<tr>
<th>Capacity exceed [%]</th>
<th>Certified massflow [kg/h]</th>
<th>Article No.</th>
<th>DN inlet x DN outlet</th>
<th>d0</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.29</td>
<td>11,876,566</td>
<td>4412.4542</td>
<td>50x80</td>
<td>46</td>
<td>Type 4412 DN 50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1400</th>
<th>Discharge area</th>
<th>Ao</th>
<th>2,576</th>
<th>in²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1401</td>
<td>Discharge diameter</td>
<td>do</td>
<td>1,811</td>
<td>inch</td>
</tr>
<tr>
<td>1402</td>
<td>Centre to Face dimensions</td>
<td>a</td>
<td>5,906</td>
<td>inch</td>
</tr>
<tr>
<td>1403</td>
<td>Centre to Face dimensions</td>
<td>b</td>
<td>4,724</td>
<td>inch</td>
</tr>
<tr>
<td>1405</td>
<td>Height</td>
<td>H</td>
<td>22,402</td>
<td>inch</td>
</tr>
<tr>
<td>1406</td>
<td>Weight</td>
<td>M</td>
<td>48,502</td>
<td>lb</td>
</tr>
</tbody>
</table>
12. Step: Finish Sizing
Sizing. Sizing according to ASME, (steam/gases)

13. Step: Valve Calculation
14 Step: ERRORs and Warnings

New Sizing Completed!

Errors and warnings while creating new sizing:

- Built-up back pressure has too high value. Maximum allowed pressure is \( p_{AE} = 0,15 \times (p - p_{AF}) = 1,5 \) [bar].
- Bellow is needed.
- Ask LESER if this valve works properly.

Errors and warnings are shown at the end of a sizing or during sizing, indicated by the **flashing yellow label**. Click on the symbol for a listing of the errors and warnings.
Sizing. Sizing according to ASME, (steam/gases)

Service condition: Heavy Oil, Set pressure = 500 bar g, Temperature 20°C, required massflow = 100000 kg/h, viscosity = 0.038 Pa s.

Valve construction: Type 526, Full nozzle, Carbon Steel body (1.0619/WCB), closed bonnet, lifting device cap H2, stainless steel bellows design.

1. Step: Sizing Standard and additional calculation
2. Step: Medium database and medium selection

- Choose Heavy fuel oil from the medium selection list.
- Enter the density as 0.307 g/cm³.
- Select the type of mix as Volume.
- Choose the viscosity as 2.588 Pa·s.
3. Step: Service condition

The image shows a screenshot of a software interface with fields for setting service conditions. The fields include:

- Maximum allowable working pressure (MAWP)
- Set pressure
- Superimposed back pressure
- inlet back pressure
- Overpressure
- Temperature
- Required massflow
- Volume flow to be discharged (working condition)

Values are entered in various units, such as bar, psi, °C, %, and more. Options and installations are also listed.
4. Step: Valve Finder

Please specify the required valve parameters. Leave the fields blank to list all the available valve types.

- **Product group**: API Series
- **Bonnet**: High Performance, API Series, Compact Performance
- **Nozzle design**: Clean Service, Critical Service, Modulate Action, SGR - Safety Valves for special or regional Application
5. Step: Processing of all possible safety valves

<table>
<thead>
<tr>
<th>Capacity exceed [%]</th>
<th>Certified massflow [kg/h]</th>
<th>Article No.</th>
<th>DN inlet x DN outlet</th>
<th>d0</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-17,16</td>
<td>82,840.045</td>
<td>ES62.0452</td>
<td>1 1/25</td>
<td>22,5</td>
<td>Type 5262 Office G #450</td>
</tr>
<tr>
<td>-17,16</td>
<td>82,840.645</td>
<td>ES62.0502</td>
<td>255</td>
<td>22,5</td>
<td>Type 5262 Office G #500</td>
</tr>
<tr>
<td>-17,16</td>
<td>82,840.645</td>
<td>ES62.0512</td>
<td>255</td>
<td>22,5</td>
<td>Type 5262 Office G #500</td>
</tr>
<tr>
<td>32,52</td>
<td>132.521.93</td>
<td>ES62.1422</td>
<td>1 1/25</td>
<td>28,3</td>
<td>Type 5262 Office H #500</td>
</tr>
<tr>
<td>32,52</td>
<td>132.521.93</td>
<td>ES62.1442</td>
<td>2 2/3</td>
<td>28,3</td>
<td>Type 5262 Office H #500</td>
</tr>
<tr>
<td>32,52</td>
<td>132.521.93</td>
<td>ES62.1462</td>
<td>2 2/3</td>
<td>28,3</td>
<td>Type 5262 Office H #500</td>
</tr>
<tr>
<td>32,52</td>
<td>132.521.93</td>
<td>ES62.1482</td>
<td>2 2/3</td>
<td>28,3</td>
<td>Type 5262 Office H #500</td>
</tr>
</tbody>
</table>

Total capacity exceed 32,52 [%], certified massflow 132.521.93 [kg/h]
6. Step: Connection

### Valve connections

Specify the inlet and outlet parameters.

<table>
<thead>
<tr>
<th>Capacity exceeded [%]</th>
<th>Certified maxflow [m³/h]</th>
<th>Article No.</th>
<th>DN inlet x DN outlet</th>
<th>d8</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>150</td>
<td>122414</td>
<td>1 1/2 x 1 1/2</td>
<td>25.3</td>
<td>Type 9262 Orifice M #600</td>
</tr>
</tbody>
</table>

**Possible inlet connections**

- **Type**: Connection standard
- **Connection**: sec. to ASME B16.5

<table>
<thead>
<tr>
<th>Type</th>
<th>Flanged connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>L002</td>
<td></td>
</tr>
</tbody>
</table>

**Possible outlet connections**

- **Type**: Connection standard
- **Connection**: sec. to ASME B16.5

<table>
<thead>
<tr>
<th>Type</th>
<th>Flanged connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>L003</td>
<td></td>
</tr>
</tbody>
</table>

**Selected inlet connection**

- **Type**: Connection standard
- **Connection**: sec. to ASME B16.5

**Selected outlet connection**

- **Type**: Connection standard
- **Connection**: sec. to ASME B16.5

**Flange guide**

- RF

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**Create new sizing wizard - Valve connections**

**LESER**

The-Safety-Valve.com
7. Step: Sizing finished

New Sizing Completed!

New Sizing Creation Successfully Completed!
Sizing of the inlet line. Attention: Inlet line with different cross sections

- According to AD 2000 A2 and ISO 4126-9 the provided formulas for the inlet pressure drop calculation consider only one cross section within the inlet line.
- The inlet pressure drop calculation within VALVESTAR is based on the formulas described in the according standards.
- In reality, the isometry of the inlet line shows sometimes different cross section.
- VALVESTAR uses the inner diameter $d_E$ which is related to the maximum developed pipe length $L_E$ for the calculation of the inlet pressure drop.
- If there are differing diameters ($d_{DN}$) to $d_E$ within the inlet line the resulting zeta values of those sections and components have to be transferred by the following formula:

$$\zeta_{d_E} = \left(\frac{d_E}{d_{DN}}\right)^4 \cdot \zeta_{d_{DN}}$$
Sizing of the inlet line. Attention: Inlet line with different cross sections

- The transferred zeta values can be inserted as shown in the next slides
- Without the transformation of zeta values, VALVESTAR can not be used correctly for cases with different cross sections
1. Step: Additional calculation

When starting a new sizing:

![Create new sizing wizard - Sizing Type and Medium Selection](image)

**Sizing Type and Medium Selection**

At this step you need to select a type of sizing and a medium. Please specify sizing or calculation for a valve. Then specify a medium and:

<table>
<thead>
<tr>
<th>Tag No.</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>Gas</td>
<td></td>
</tr>
<tr>
<td>Sizing standard</td>
<td>ASME VIII</td>
<td></td>
</tr>
<tr>
<td>Selected units</td>
<td>ASME VIII</td>
<td></td>
</tr>
<tr>
<td>ODTP Calculation</td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>

**Additional calculations**

<table>
<thead>
<tr>
<th></th>
<th>AD 2000 A2</th>
<th>API 520</th>
<th>ISO/CD 4126-9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reaction force</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire Case</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure drop inlet line</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Built up back pressure outlet pipe</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. Step: Additional calculation
You can also start inlet pressure drop calculation in menu
Sizing of inlet pressure drop. (according AD 2000-Markblatt A2).

2. Step: Dimension of inlet pipe and pipe components
3. Step: Dimension of inlet pipe and pipe components
1. Step: Dimension of inlet pipe and pipe components

When starting a new sizing:
### 1. Step: Dimension of outlet pipe and pipe components

You can also start built-up backpressure calculation in menu

| Projects | 1501 | Inlet pipe | Add outlet pipe | Outlet pipe | Add outlet pipe | Changes history | Add new sizing | Add new valve | Add new sizing | Add new valve | Add new sizing | Add new valve | Add new sizing | Add new valve | Add new sizing | Add new valve | Add new sizing | Add new valve | Add new sizing | Add new valve |
|----------|------|-------------|-----------------|-------------|----------------|----------------|----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Inlet pipe | Outlet pipe | Add outlet pipe | Outlet pipe | Add outlet pipe | Changes history | Add new sizing | Add new valve | Add new sizing | Add new valve | Add new sizing | Add new valve | Add new sizing | Add new valve | Add new sizing | Add new valve | Add new valve | Add new valve | Add new valve | Add new valve |

... or start in project three
2. Step: Dimension of outlet pipe and pipe components
3. Step: Calculation and warning
3. Step: Calculation and warning

Service condition: water, temperature = 20°C, Set pressure = 10bar g, effect of fire on the wetted surface of vessel, wetted surface = 10m², no drainage, bare vessel, heat of evaporation 1998.5 kJ/kg

Valve construction: Type 526, full nozzle, Carbon Steel body (1.0619/WCB), closed bonnet, lifting device cap H2

API RP 521
Fire case according to API RP 521.


API RP 521
Fire case according to API RP 521.

API RP 521
Fire case according to API RP 521.

Two Phase Flow. LESER mixed formula.


**Service condition:**
hot water, temperature = 150°C, Set pressure = 10bar g, required massflow = 10000kg/h

**Valve construction:**
Type 441, semi nozzle, Carbon Steel body (1.0619/WCB), closed bonnet, lifting device cap H2, evaporation while depressuring from 10bar g to environmental pressure in case of blow off.

---

Valve construction:

**Tag No.**

<table>
<thead>
<tr>
<th>Medium</th>
<th>Two-phase flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sizing standard</td>
<td>LESER catalogue 20/50</td>
</tr>
<tr>
<td>Selected units</td>
<td>LESER catalogue 20/50</td>
</tr>
<tr>
<td>COTP Calculation</td>
<td>✔</td>
</tr>
</tbody>
</table>
### Two Phase Flow. LESER mixed formula.

#### 1. Introduction

#### 2. Sizing

#### 3. Fire

#### 4. Two Phase

#### 5. Add. Sizing

#### 6. Reporting and Settings

#### 7. Translation

#### 8. Data Change

#### 9. Copy and Paste

#### 10. Internet

#### 11. Spares

---

**Service Condition**

At this step you need to set values for Input Pressure, Temperature, Massflow or Volumeflow.

<table>
<thead>
<tr>
<th>Set pressure</th>
<th>p [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superimposed back pressure</td>
<td>p_{ef} [bar]</td>
</tr>
<tr>
<td>Overpressure</td>
<td>dp [bar]</td>
</tr>
<tr>
<td>Temperature</td>
<td>T [°C]</td>
</tr>
<tr>
<td>Required massflow</td>
<td>\dot{m}_{sol} [kg/h]</td>
</tr>
<tr>
<td>Saturated state</td>
<td>\n</td>
</tr>
</tbody>
</table>

**Options**

- Case for blow off

---

**Valve Finder**

Please specify the required valve parameters. Leave the fields blank to list all the available valve types.

- **Product group**: High Performance
- **Bonnet**
- **Nozzle design**
Two Phase Flow. LESER mixed formula.

All the next steps until finish are not shown.
Result: Documentation on screen
Service condition: Butane, Set pressure = 10bar g, required massflow = 10000kg/h
Valve construction: Type 441, semi nozzle, Carbon Steel body (1.0619/WCB), closed bonnet, lifting device cap H2
Two Phase Flow. VdTÜV Merkblatt 100.

1. Introduction
2. Sizing
3. Fire
4. Two Phase
5. Add. Sizing
6. Reporting and Settings
7. Translation
8. Data Change
9. Copy and Paste
10. Internet
11. Spares

Medium selection

Use this page to select a medium.

- Butane (n) [C4H10]

<table>
<thead>
<tr>
<th>Name</th>
<th>Formula</th>
<th>Molecular mass</th>
<th>k</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butane (n)</td>
<td>C4H10</td>
<td>58.1</td>
<td>1.09</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Total percentage 100.00%
Two Phase Flow. VdTÜV Merkblatt 100.


Service Condition
At this step you need to set values for Input Pressure, Temperature, Massflow or Volumeflow.

<table>
<thead>
<tr>
<th>Set pressure</th>
<th>p</th>
<th>bar-g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overpressure</td>
<td>q_p</td>
<td>10.00</td>
</tr>
<tr>
<td>Required massflow</td>
<td>q_{mass}</td>
<td>1000</td>
</tr>
</tbody>
</table>

Options
Case for blow off

Remarks According to J. C. LESER [1] it is proved that the function \( Y = Y \) for pressures between 4 bar and 150 bar in double logarithmic coordinate system is following nearly a straight line also for chemical different mediums, like propane, propane, butane, butane and water. Other mediums shall be estimated according to [1], because there might be other courses for \( Y \).

Valve Finder

Please specify the required valve parameters. Leave the fields blank to list all the available valve types.

<table>
<thead>
<tr>
<th>Product group</th>
<th>High Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonnet</td>
<td></td>
</tr>
<tr>
<td>Nozzle design</td>
<td>High Performance</td>
</tr>
<tr>
<td></td>
<td>API Series</td>
</tr>
<tr>
<td></td>
<td>Compact Performance</td>
</tr>
<tr>
<td></td>
<td>Clean Service</td>
</tr>
<tr>
<td></td>
<td>Critical Service</td>
</tr>
<tr>
<td></td>
<td>Modulate Action</td>
</tr>
<tr>
<td></td>
<td>S6R - Safety Valves for special or regional Application</td>
</tr>
</tbody>
</table>
Two Phase Flow. VdTÜV Merkblatt 100.

## Result: Documentation on screen

![Image of software interface](image_url)

### Table: Two Phase Flow

<table>
<thead>
<tr>
<th>Designation</th>
<th>Value (l/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor mass</td>
<td>N</td>
</tr>
<tr>
<td>Ratio of specific heats</td>
<td>k</td>
</tr>
<tr>
<td>Compressibility factor</td>
<td>2</td>
</tr>
</tbody>
</table>

### Service condition

<table>
<thead>
<tr>
<th>p</th>
<th>10 bar-g</th>
</tr>
</thead>
<tbody>
<tr>
<td>dp</td>
<td>10.00 %</td>
</tr>
<tr>
<td>pu</td>
<td>1.003 bar</td>
</tr>
<tr>
<td>qm,ab</td>
<td>10.000 kg/h</td>
</tr>
</tbody>
</table>

### Results

- Certified mass flow: 13.065 kg/h
- Certified volumetric flow (operating condition): 1.2, 2, 3
- Certified volumetric flow (standard condition): 1.2, 3
- Maximum mass flow: 15.005 kg/h
- Maximum volumetric flow (operating condition): 1.2, 3
- Maximum volumetric flow (standard condition): 1.2, 3
**Two Phase Flow. Omega method according API 520 Appendix D.**

1. Introduction  
2. Sizing  
3. Fire  
4. Two Phase  
5. Add. Sizing  
6. Reporting and Settings  
7. Translation  
8. Data Change  
9. Copy and Paste  
10. Internet  
11. Spares

---

**Service condition:**  Propene; Set pressure = 10bar g,  
required massflow = 10000kg/h

**Valve construction:**  Type 441, semi nozzle, Carbon Steel body (1.0619/WCB),  
closed bonnet, lifting device cap H2
1. Step: Reaction force and noise level

**Tag No.**

**Medium**
- Gas

**Sizing standard**
- ASME VIII

**Selected units**
- ASME VIII

**CDTP Calculation**
- 

### Additional calculations

<table>
<thead>
<tr>
<th></th>
<th>AD2000/A2</th>
<th>API 520</th>
<th>ISO / CD 4126-9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reaction Force</td>
<td>✔️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td>✔️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire Case</td>
<td></td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>Pressure drop inlet line</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Built up pressure outlet pipe</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LESER**

The-Safety-Valve.com
Additional Sizings, Noise Level, Reaction Forces.

1. Step: Reaction force and noise level

![Diagram of VALVESTAR® 7 software interface showing the setup for reaction force and noise level.](image)

**General**

- Tag No: 1008
- Case for blow off: 1009
- Reaction force noise level
- Air

**Service condition**

- Maximum allowable working pressure (MAWP): 1100
- Set pressure: 1101
- Superimposed back pressure: 1102

**Attributes**

- MAWP
- p
- psig
- bar

---

LESER The-Safety-Valve.com
1. Step: Create a report

![Image of software interface showing report creation]

1. Step: Create a report

1. Introduction
2. Sizing
3. Fire
4. Two Phase
5. Add. Sizing
6. Reporting and Settings
7. Translation
8. Data Change
9. Copy and Paste
10. Internet
11. Spares
1. Step: Create a report

- **Language**: English (United Kingdom)
- **Units system**: ASME VIII
- **Template**: Standard
- **Minimize size of files to be exported**: Preview
- **Sections**:
  - Project: Additional fields
  - Zoning - Medium
  - Zoning - Firecase
  - Zoning - Service condition
  - Initial stimuli acc. to API 520
  - Jet pipe
  - Jet components
  - Outlet pipe
  - Outlet components
  - Banana - Calculation
Reporting.
Reporting.


### Reporting.

<table>
<thead>
<tr>
<th>NO</th>
<th>Tag NO</th>
<th>Article NO 1</th>
<th>Article NO 2</th>
<th>Order code</th>
<th>Serial number</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>4412.4542</td>
<td>4412.4542-10</td>
<td>BAU-947H51</td>
<td>2000000</td>
<td>Samstag</td>
</tr>
</tbody>
</table>
1. Step: Create a report
2. Step: Create a one page report
2. Step: Create a one page report

![One page report options]

- Order No
- Serial No
- Customer Name
- Customer No
- LESER Order Code: 4412.45x2-10 bar-ge+147155-0.1
- Remark

Settings:
- Language: English (United Kingdom)
- Units system: ASME VIII
- Reset units to selected system: No
- Template: Vertical
- Output to: Preview
- Minimize size of files to be exported: No

OK Cancel
2. Step: Create a one page report
3. Step: Create a project report
3. Step: Create a project report

[Image of Excel sheet with data]
What is new for dimensions S1, S2, c?

These data have been added to the database for all slip on flange based safety valve and all full nozzle safety valve to get the correct bolt length or thread length.
How I find it in the documentation

In the report full-version the additional dimensions are listed if these are available
Reporting.

How I find it in the documentation

In the one-page report the additional dimensions are listed if these are available.
What is the Product datasheet?

The product datasheet is an overview of a single safety valve and its main features like drawing, dimensions and weight, possible options, approval, ...
What is the Product datasheet?

For product datasheet two different drawings as main drawing could be selected: coloured drawing as standard and sectional drawing if needed.
What is the Product datasheet?
With coloured drawing as standard
What is the Product datasheet?

With sectional drawing
What is different to a report or one-page report?
The product datasheet is also available without sizing, with the feature “Valve finder”
What is different to a report or one-page report?

All possible options are listed and shown
What is the report one-page-vertical?

This report is an advanced one-page report with additional data which are necessary for completeness.
What is the report onepage-vertical?

This report is available as xls-file to change data for future redesign. The source of template is preset.
What is the report one-page-vertical?

Define a file
What is the report one-page-vertical?
The page has to be adjusted to an A4-format
What is the report one-page-vertical?
The page has to be adjusted to an A4-format
What is the report one-page-vertical?

The EXCEL-file can be added with additional data from user. Main data are picked from sizing data.
What is the feature “name plate”?

Three current nameplates are printed in the “report full-version”
How can I add data to the initial “name plate”?

It is possible to add serial numbers and date of delivery later.
How can I add data to the initial “name plate”?

<table>
<thead>
<tr>
<th>NP</th>
<th>Tag NP</th>
<th>Article NP</th>
<th>Order code</th>
<th>Serial number</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1111</td>
<td>4112-4832</td>
<td>4112-4832-15</td>
<td>12248373</td>
<td>1/8/2008</td>
</tr>
<tr>
<td>2</td>
<td>2222</td>
<td>4112-4832</td>
<td>4112-4832-15</td>
<td>12248379</td>
<td>1/8/2008</td>
</tr>
<tr>
<td>3</td>
<td>3333</td>
<td>4112-2492</td>
<td>4112-2492-15</td>
<td>12248380</td>
<td>1/8/2008</td>
</tr>
</tbody>
</table>
After adding, what is new on “name plate”?

The nameplate is valid for additional serial numbers, 12345678.

**Settings. Profiles.**
Settings. Profiles.

Settings. Profiles.

1. Introduction
2. Sizing
3. Fire
4. Two Phase
5. Add. Sizing
6. Reporting and Settings
7. Translation
8. Data Change
9. Copy and Paste
10. Internet
11. Spares

![Profile settings window](image)

- General
- User information
- Configuration
- Unit settings
- Value settings
- Volume flow standards
- Preferences for report

Company: LESER GmbH & Co. KG

Street
City
Zip
State
Country
E-mail
Phone
Phone mobile
Fax

Company logo

Company logo 2

LESER
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Settings. Profiles.


![Profile Setting Image](image1)

![Profile Setting Image](image2)
Settings. Profiles.

## Settings. Profiles.

### 1. Introduction

### 2. Sizing

### 3. Fire

### 4. Two Phase

### 5. Add. Sizing

### 6. Reporting and Settings

### 7. Translation

### 8. Data Change

### 9. Copy and Paste

### 10. Internet

### 11. Spares

### Profile Configuration

<table>
<thead>
<tr>
<th>Environmental pressure</th>
<th>1,013 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decimal separator</td>
<td></td>
</tr>
<tr>
<td>Group separator</td>
<td></td>
</tr>
<tr>
<td>Application mode</td>
<td>Super user</td>
</tr>
<tr>
<td>Isentropic exponent source</td>
<td>DIN EN ISO 4126-1</td>
</tr>
<tr>
<td>Default sizing standard</td>
<td>DIN EN ISO 4126-1</td>
</tr>
<tr>
<td>Default volume flow standard</td>
<td>DIN ISO 2533</td>
</tr>
<tr>
<td>Projects storage</td>
<td>N:\PM\MA\Cal</td>
</tr>
<tr>
<td>Default paper size</td>
<td>A4</td>
</tr>
<tr>
<td>Automatic updates</td>
<td>Daily</td>
</tr>
</tbody>
</table>
Settings. Profiles.

Settings. Profiles.


![Settings and Profiles window](image)

**Type**

**Body material**

**Lifting device**

**Description**

DIN relief valve spring loaded up to PN 63 for steam, gases and liquids.
**Settings. Profiles.**


---

<table>
<thead>
<tr>
<th>Denomination</th>
<th>Abbreviation</th>
<th>Temperature</th>
<th>Unit</th>
<th>Pressure</th>
<th>Unit</th>
<th>Volume flow unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard conditions acc. to DIN ISO 2533</td>
<td>DIN ISO 2533</td>
<td>15 °C</td>
<td>Unit</td>
<td>101.325 Pa</td>
<td>m³/h</td>
<td></td>
</tr>
<tr>
<td>Physical standard conditions</td>
<td>Physical</td>
<td>0 °C</td>
<td>Unit</td>
<td>1,013 bar</td>
<td>m³/h</td>
<td></td>
</tr>
<tr>
<td>Technical standard conditions</td>
<td>Technical</td>
<td>20 °C</td>
<td>Unit</td>
<td>1 atm</td>
<td>m³/h</td>
<td></td>
</tr>
<tr>
<td>Chemical standard conditions</td>
<td>Chemical</td>
<td>25 °C</td>
<td>Unit</td>
<td>1,013 bar</td>
<td>m³/h</td>
<td></td>
</tr>
<tr>
<td>Standard conditions acc. to DIN 1343</td>
<td>DIN 1343</td>
<td>0 °C</td>
<td>Unit</td>
<td>101.325 Pa</td>
<td>cm³/h</td>
<td></td>
</tr>
<tr>
<td>Standard conditions acc. to ASME Code...</td>
<td>ASME</td>
<td>60 °F</td>
<td>Unit</td>
<td>14,7 psi</td>
<td>SCFM</td>
<td></td>
</tr>
<tr>
<td>User defined 1</td>
<td>U1</td>
<td>15 °C</td>
<td>Unit</td>
<td>101.325 Pa</td>
<td>m³/h</td>
<td></td>
</tr>
<tr>
<td>User defined 2</td>
<td>U2</td>
<td>15 °C</td>
<td>Unit</td>
<td>101.325 Pa</td>
<td>m³/h</td>
<td></td>
</tr>
<tr>
<td>User defined 3</td>
<td>U3</td>
<td>15 °C</td>
<td>Unit</td>
<td>101.325 Pa</td>
<td>m³/h</td>
<td></td>
</tr>
</tbody>
</table>
Settings. Profiles.

Translation.

Translation.

How to change data.

How to change data.

Not possible to change
How to change data.

How to change data.


How to manually input a reseller article no.

First: Do a standard sizing
How to change data.


How to manually input a reseller article no.
Second: Add a reseller article no.
Copy and Paste.


---

### VALVESTAR® 7.1.3 - (PSV 001 (AISI V80 Coro))

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medium</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Designation</strong></td>
<td>Butane (C4)</td>
</tr>
<tr>
<td><strong>Formula</strong></td>
<td>C₄H₁₀</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>N</td>
</tr>
<tr>
<td><strong>State of specific heats</strong></td>
<td>h</td>
</tr>
<tr>
<td><strong>Compressibility factor</strong></td>
<td>Z</td>
</tr>
</tbody>
</table>

### Service conditions

- **Max. allowable working pressure (MAWP)**: 15 kg/cm²
- **Safety pressure**: 15 kg/cm²
- **Superimposed back pressure**: 0 kg/cm²
- **Built-up back pressure**: 0 kg/cm²
- **Back pressure**: 0 kg/cm²
- **Overpressure**: 0 kg/cm²
- **Environmental pressure**: 0 kg/cm²
- **Temperature**: 450 °F
- **Required max. flow rate**: 36,800 l/h
- **Volume flow to be discharged (working condition)**: 48,864 l/min
- **Volume flow to be discharged (std condition)**: 1,085,13 SCFM

---

Copy and Paste.
Copy and Paste.
What are the features for better handling?

Sort function in menu “View”
What are the features for better handling?

Printing in one pdf-file for all sizings of one project can be done with documentation “report full-version”
How to change data.

Where is the pdf-filed automatically?

Filed in the project storage
Update via Internet.

Update via Internet.


What is the new feature spare parts?

Two different listings of spare parts are available. Listing while single sizing in the “report full-version” and a spire list of complete project spare parts.
What is a spir list and how I generate a spir list?

A spir list is a summerize of spare parts which are generated of a complete project. If equal parts are used in different sized valves this will affect the maximum quantity of parts which are shown in the spir list.
What is a spir list and how I generate a spir list?
Thank you for your attention.