

### Calculation header

Identifier  
Tag No.

**Steam Header Safetyvalve**  
**810LBA01AA101**

### Operating data

Phase

Medium

Set pressure

Relieving pressure

Back pressure

Built-up back pressure

Operating temperature

Mass flow rate

Volume flow rate (operating conditions)

**Single phase**

**Water**

pSet		<b>16,46</b>	bar(a)
p0		<b>18,005</b>	bar(a)
pb		<b>1,2133</b>	bar(a)
pae		<b>1,3842</b>	bar
t1		<b>317,0</b>	°C
qm		<b>70.000,0</b>	kg/h
qv		<b>10.161,0</b>	m³/h

### Properties at operating point

State

Operating density (t1, p1)

Isentropic exponent (t1, p1)

**Vaporous**

ρ1		<b>6,889</b>	kg/m³
κ		<b>1,2936</b>	-

### Physical constants

Critical pressure

Critical temperature

Vapour temperature (1013 mbar)

pc		<b>220,64</b>	bar(a)
tc		<b>373,95</b>	°C
ts		<b>99,974</b>	°C

### Safety relief valve

Calculation standard

Valve manufacturer

Series

Material

Valve selection

Valve from database

Rated coefficient of discharge (gas/vapour)

Narrowest flow cross-section

Narrowest flow diameter

Size and pressure class

Inlet

**DN 150**

Outlet

**DN 250**

**ISO 4126-1:2004**

**LESER**

**441/442 DN 20-200**

**0.7043 GGG-40.3**

**A0: 12272, DN 150 x DN 250, Typ:...**

Kdr,G		<b>0,7</b>	-
A0		<b>12.272,0</b>	mm²
d0		<b>125,0</b>	mm

**Metric**

<b>150,0</b>	mm
<b>250,0</b>	mm

### Results

Required discharge coefficient for A0

Required flow cross-section for Kdr

Rated mass flow

Kdr,min		<b>0,676</b>	-
A0,min		<b>11.843,0</b>	mm²
qm,t		<b>72.534,0</b>	kg/h

### Feeding pipe

Inlet pipeline

Size class

Pressure class

Pipe roughness

Length of pipeline

Pressure loss of pipeline

Permissible flow resistance coefficient

DN,F		<b>DN 200</b>	
PN,F		<b>PN 40</b>	
k,F		<b>0,03</b>	mm
l,F		<b>0,3</b>	m
Δp,F		<b>5,604</b>	E -3 bar
ζmax,F		<b>1,5716</b>	-



Permissible pipe length	$l_{max,F}$	<b>24,807</b>	m
Permissible pressure loss	$\Delta p_{max,F}$	<b>0,4634</b>	bar

### Discharge pipe

<input checked="" type="checkbox"/> Discharge pipe			
Max. permissible pressure loss	$\Delta p_P$	<b>15,0</b>	%
Built-up back pressure	$p_{ae}$	<b>1,3842</b>	bar
Permissible pressure loss	$\Delta p_{max,O}$	<b>2,317</b>	bar

### Pipe sections

	Section 1	Section 2	Section 3	
<input checked="" type="radio"/> DN	<b>DN 250</b>	<b>DN 300</b>	<b>DN 400</b>	
PN	<b>PN 16</b>	<b>PN 16</b>	<b>PN 16</b>	
k	<b>0,03</b>	<b>0,03</b>	<b>0,03</b>	m...
$\zeta_i$		<b>0,64</b>		-
l	<b>0,2</b>	<b>4,0</b>	<b>15,0</b>	m
$\Delta p$	<b>0,023631</b>	<b>1,0091</b>	<b>0,35149</b>	bar
Ma2	<b>0,76009</b>	<b>0,91787</b>	<b>0,78973</b>	-

### Comments:

#### Series

*Full Lift Safety Valve up to PN 40 spring loaded*

#### Zeta value of all installations - $\zeta_{i,2}$

*2 90° bend, Smooth  $r = 3d$  (0,24)  
1 Low-resistant branch pieces, Branch - Flow - Mixing (0,4)*

### Legend

- Calculated value
- Modified calculated value
- Lookup value