VALVESTAR® 7

Training lectures – Walk through

Introduction.

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

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Introduction.

- 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

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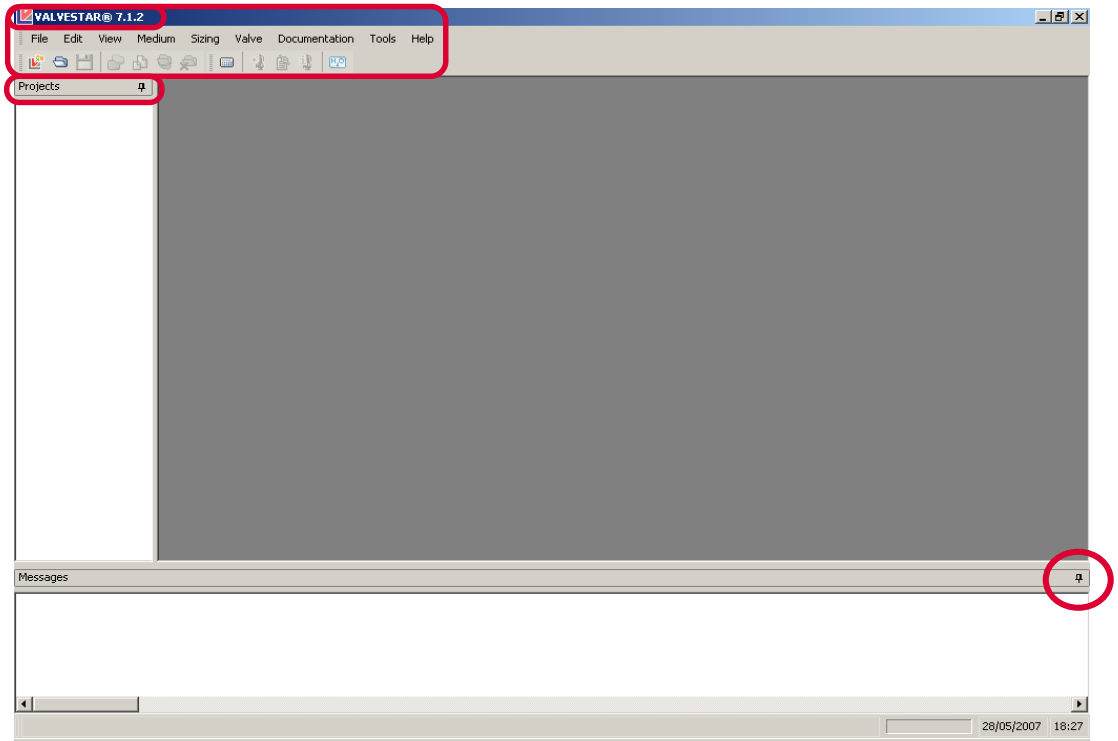
Introduction. Pop-up view of VALVESTAR 7.1.2 and higher.



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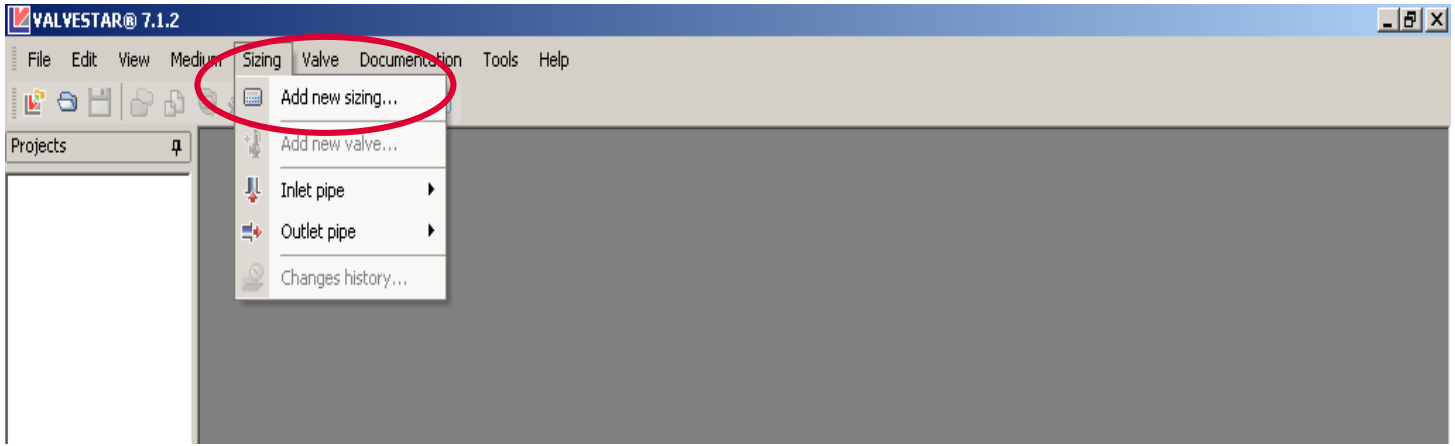
Sizing. Sizing according to ASME, (steam/gases).

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

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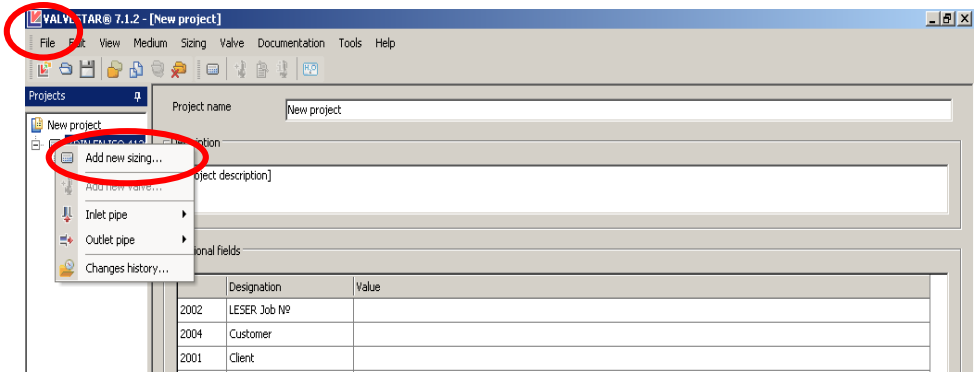
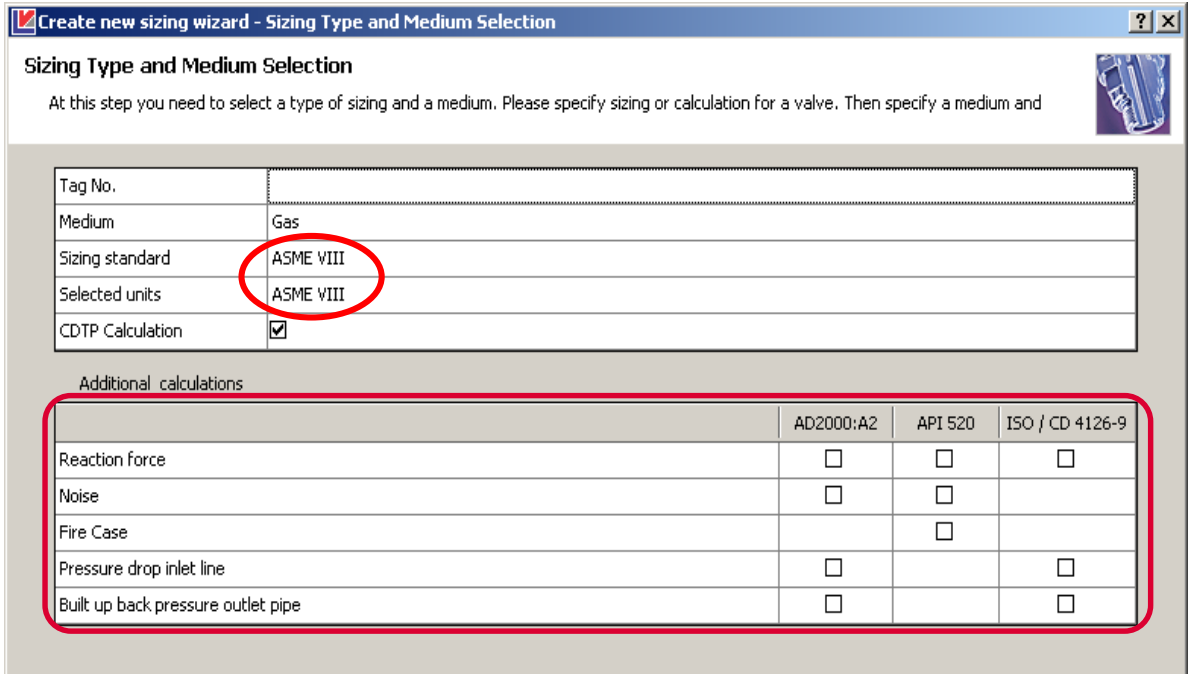
1. Step: How to start



2. Step: Sizing standard and additional calculation



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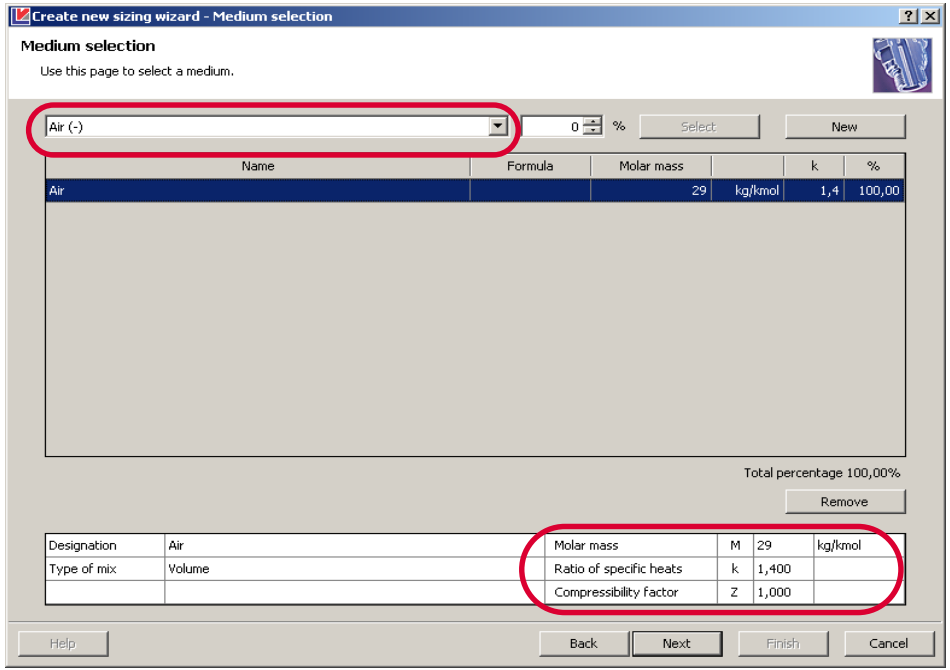
3. Step: Medium database and medium selection



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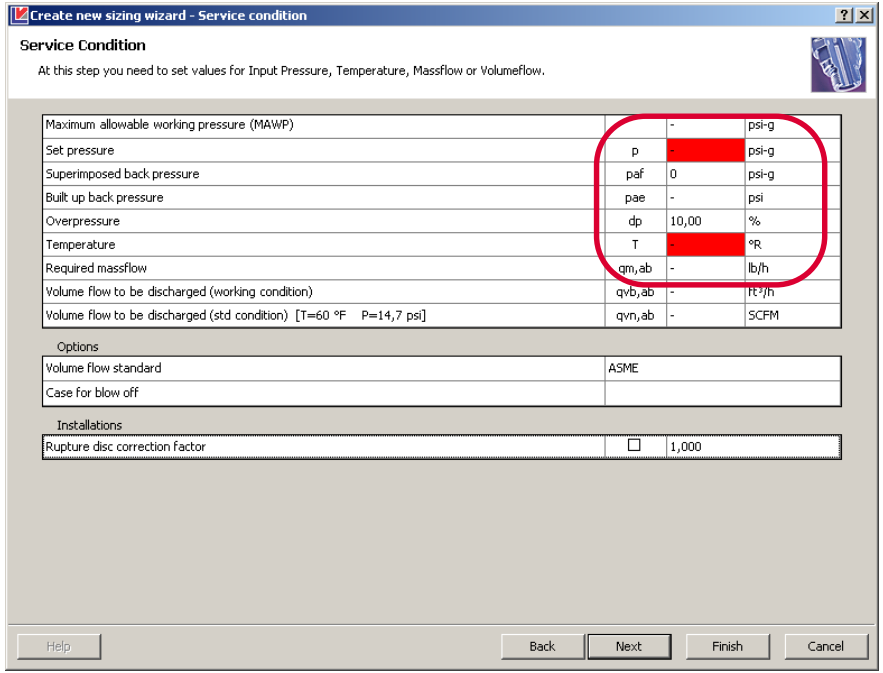
4. Step: Service condition



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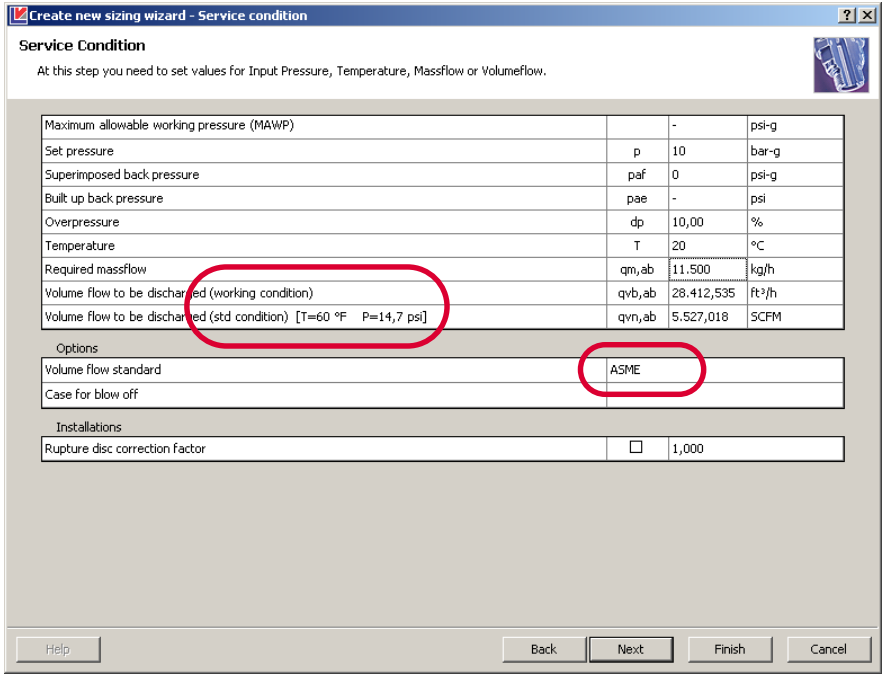
5. Step: Service condition



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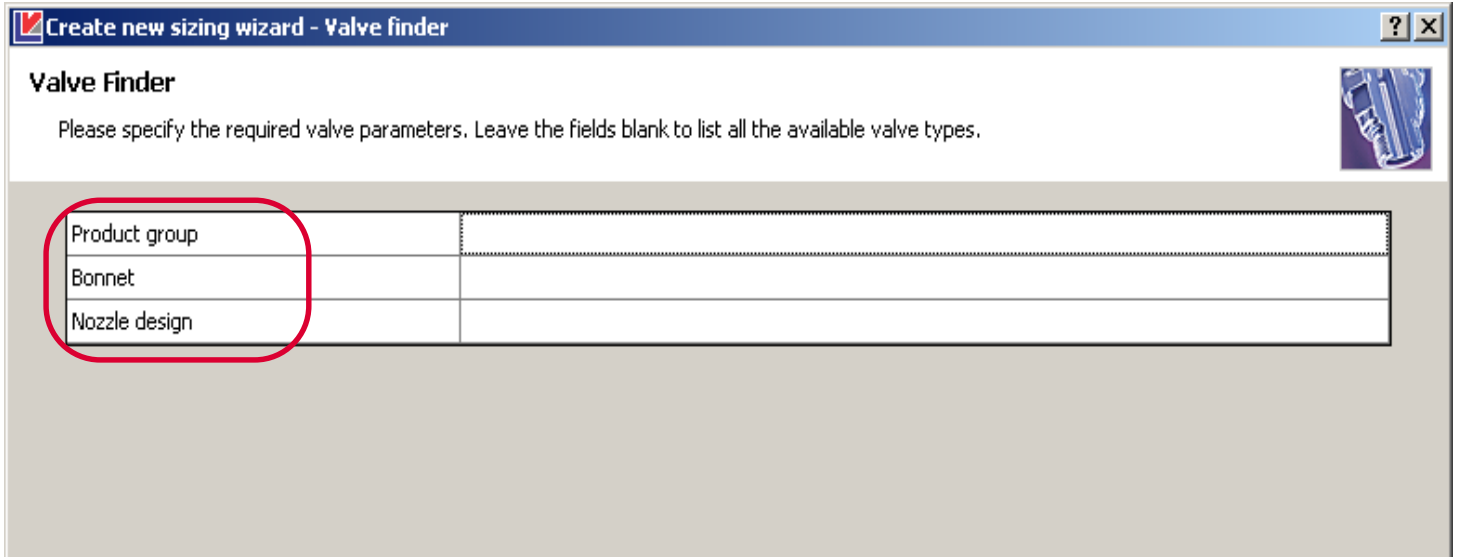
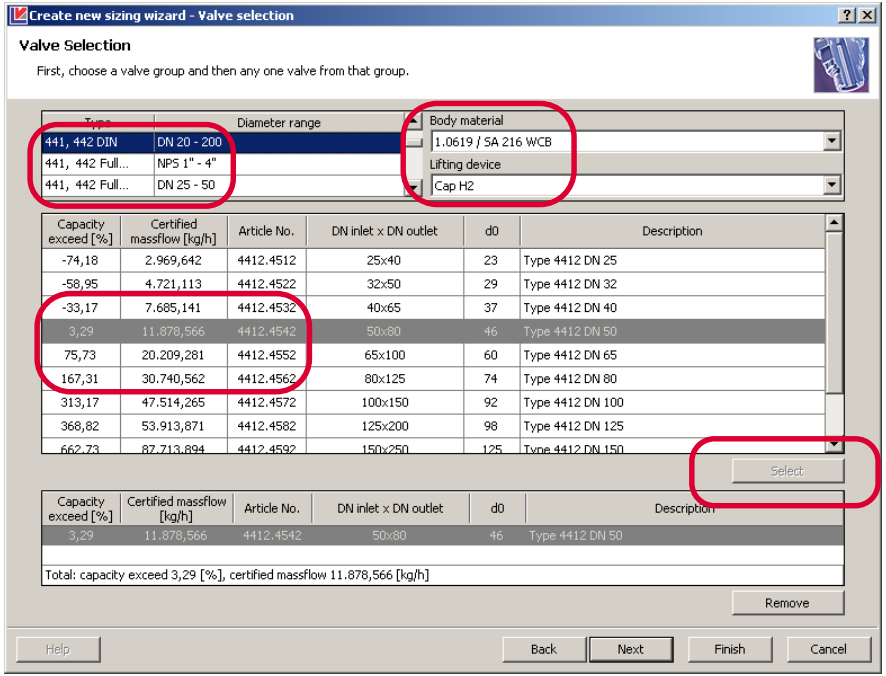
6. Step: Valve Finder



7. Step: Processing of all possible safety valves



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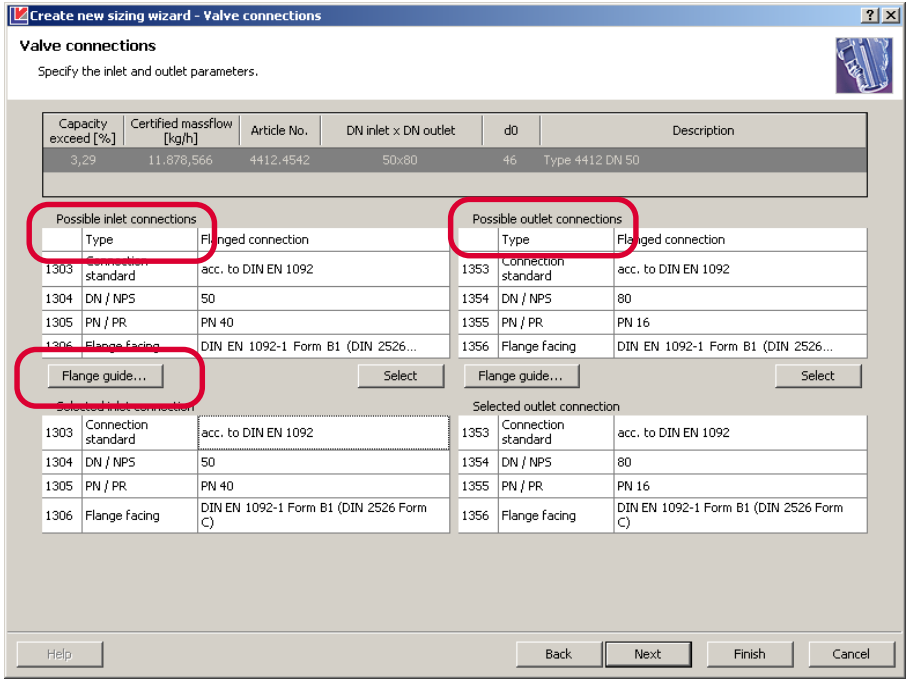
8. Step: Connections



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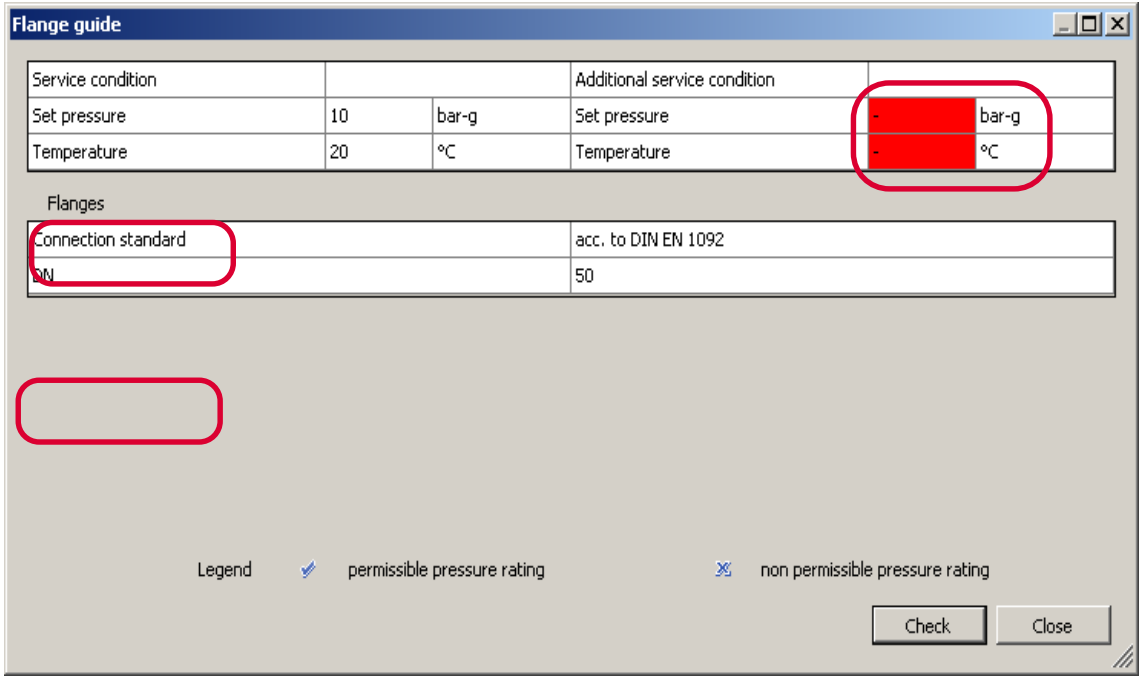
Flange Guide



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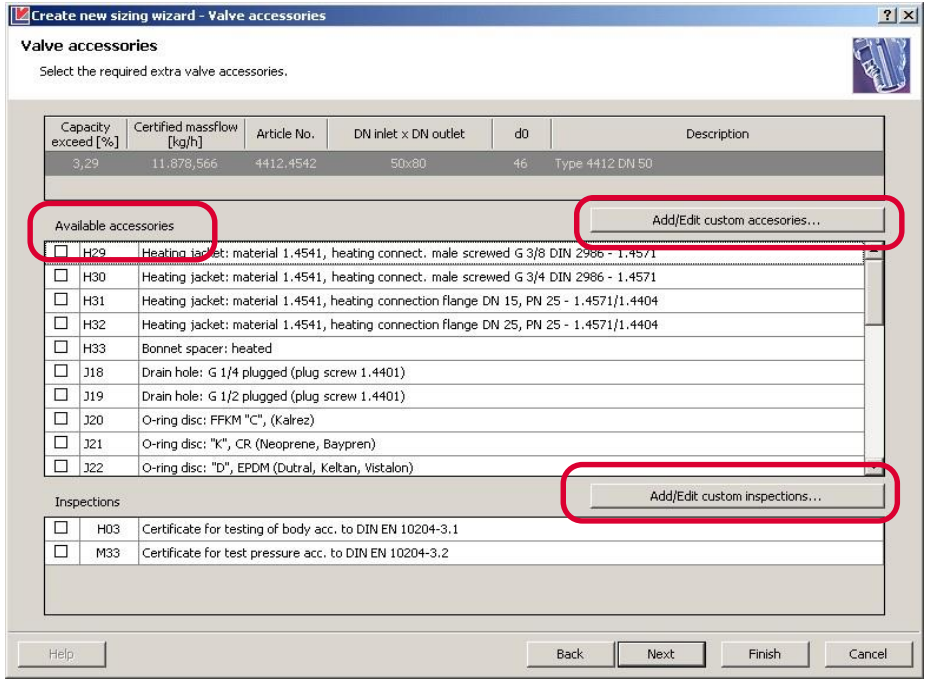
9. Step: Options



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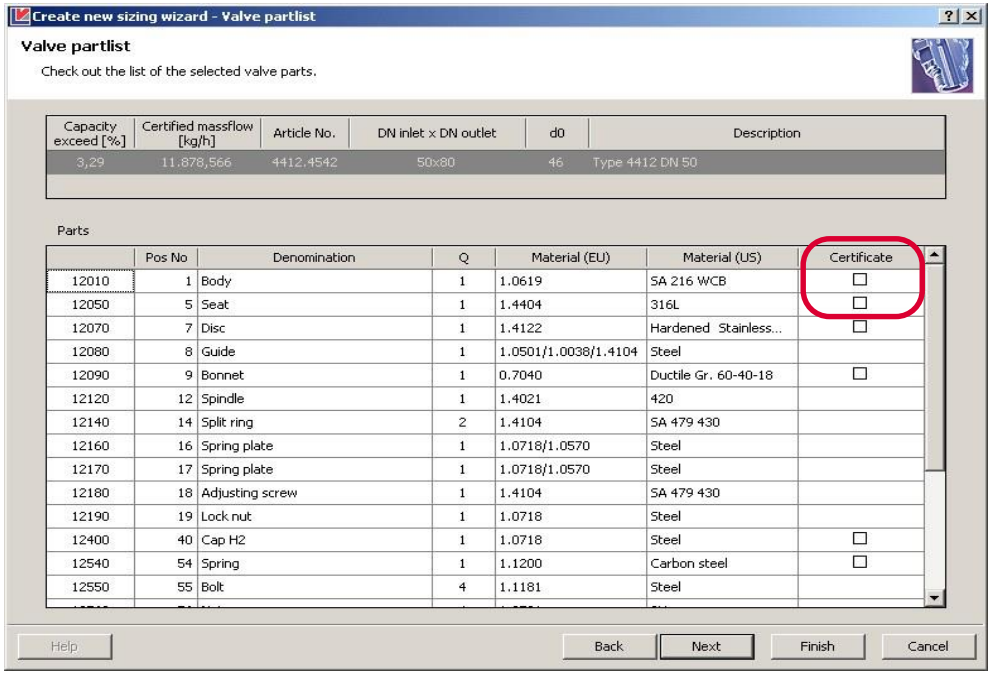
10. Step: Materialist



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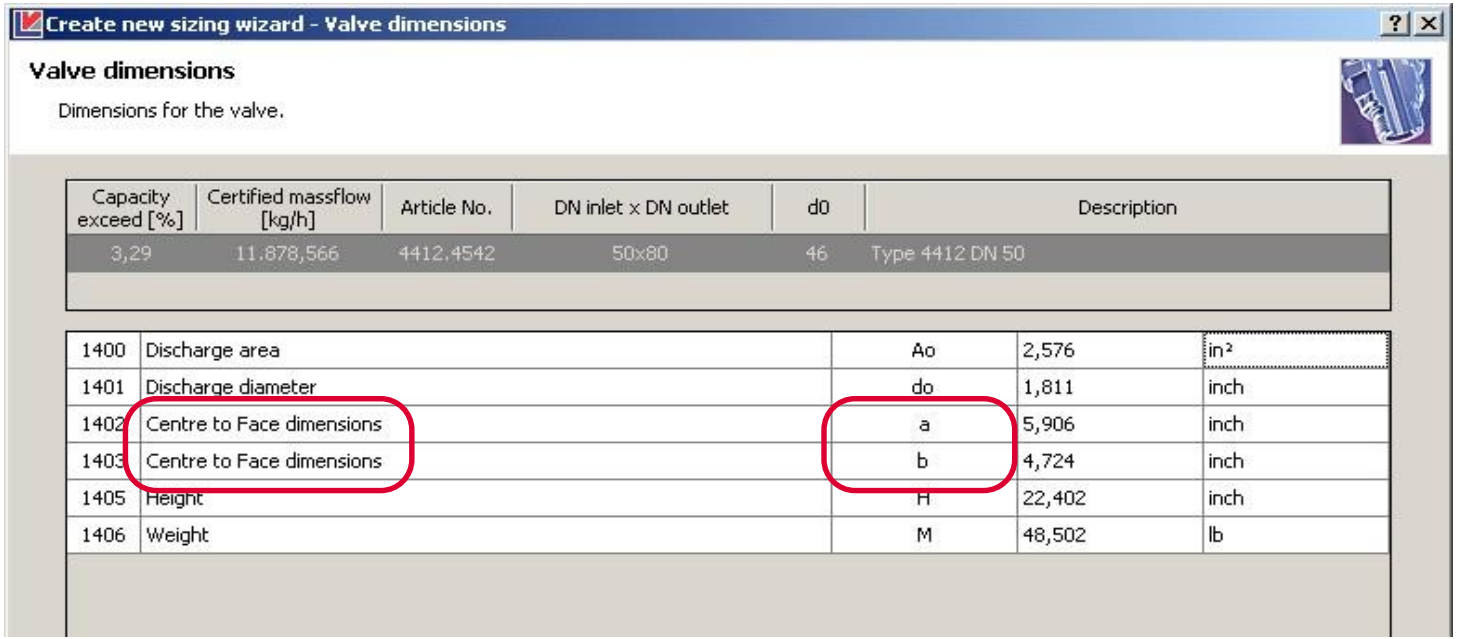
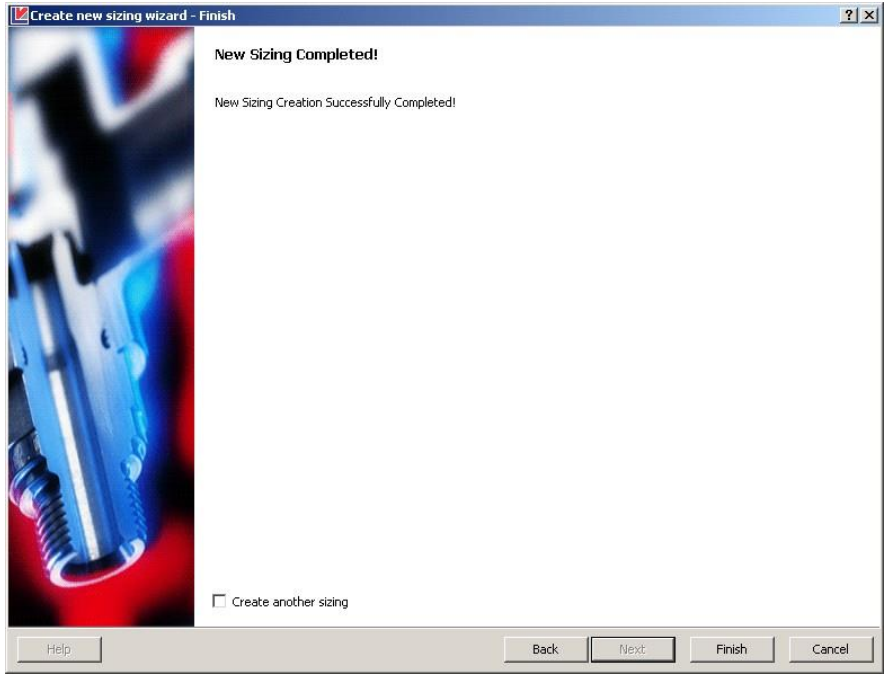
11. Step: Valve Dimensions



Capacity exceed [%]	Certified massflow [kg/h]	Article No.	DN inlet x DN outlet	d0	Description
3,29	11.878,566	4412.4542	50x80	46	Type 4412 DN 50

1400	Discharge area	Ao	2,576	in²
1401	Discharge diameter	do	1,811	inch
1402	Centre to Face dimensions	a	5,906	inch
1403	Centre to Face dimensions	b	4,724	inch
1405	Height	H	22,402	inch
1406	Weight	M	48,502	lb

12. Step: Finish Sizing



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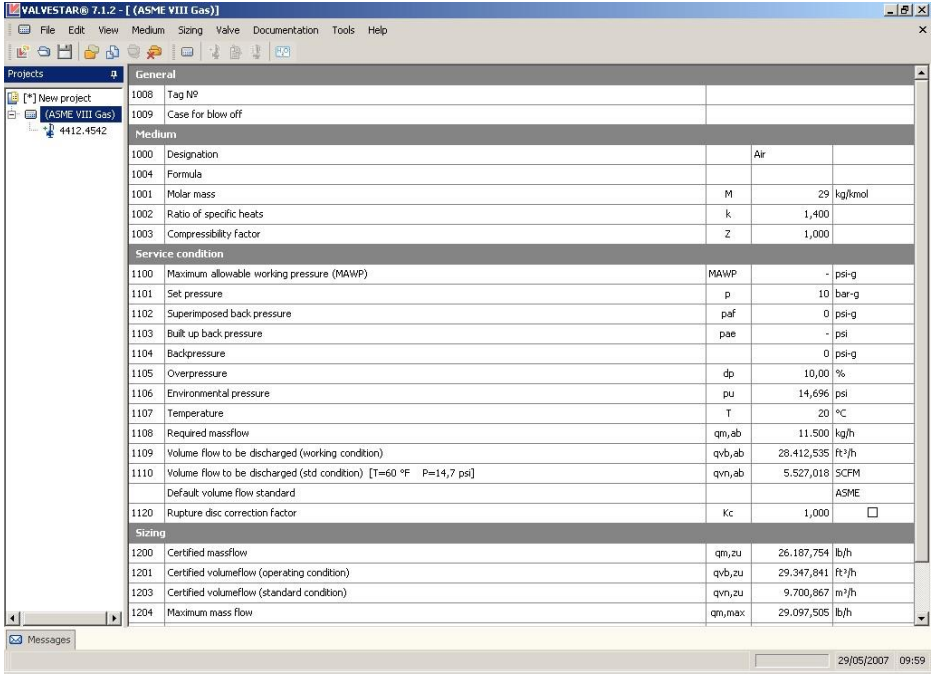
13. Step: Valve Calculation



General				
1008	Tag Nº			
1009	Case for blow off			
Medium				
1000	Designation		Air	
1004	Formula			
1001	Molar mass	M	29	kg/kmol
1002	Ratio of specific heats	k	1,400	
1003	Compressibility factor	Z	1,000	
Service condition				
1100	Maximum allowable working pressure (MAWP)	MAWP	-	psi-g
1101	Set pressure	p	10	bar-g
1102	Superimposed back pressure	paf	0	psi-g
1103	Built up back pressure	pae	-	psi
1104	Backpressure		0	psi-g
1105	Overpressure	dp	10,00	%
1106	Environmental pressure	pu	14,696	psi
1107	Temperature	T	20	°C
1108	Required massflow	qm,ab	11.500	kg/h
1109	Volume flow to be discharged (working condition)	qvb,ab	28.412,535	ft³/h
1110	Volume flow to be discharged (std condition) [T=60 °F P=14,7 psi]	qvn,ab	5.527,018	SCFM
	Default volume flow standard			ASME
1120	Rupture disc correction factor	Kc	1,000	☐
Sizing				
1200	Certified massflow	qm,zu	26.187,754	lb/h
1201	Certified volumeflow (operating condition)	qvb,zu	29.347,841	ft³/h
1203	Certified volumeflow (standard condition)	qvn,zu	9.700,867	m³/h
1204	Maximum mass flow	qm,max	29.097,505	lb/h

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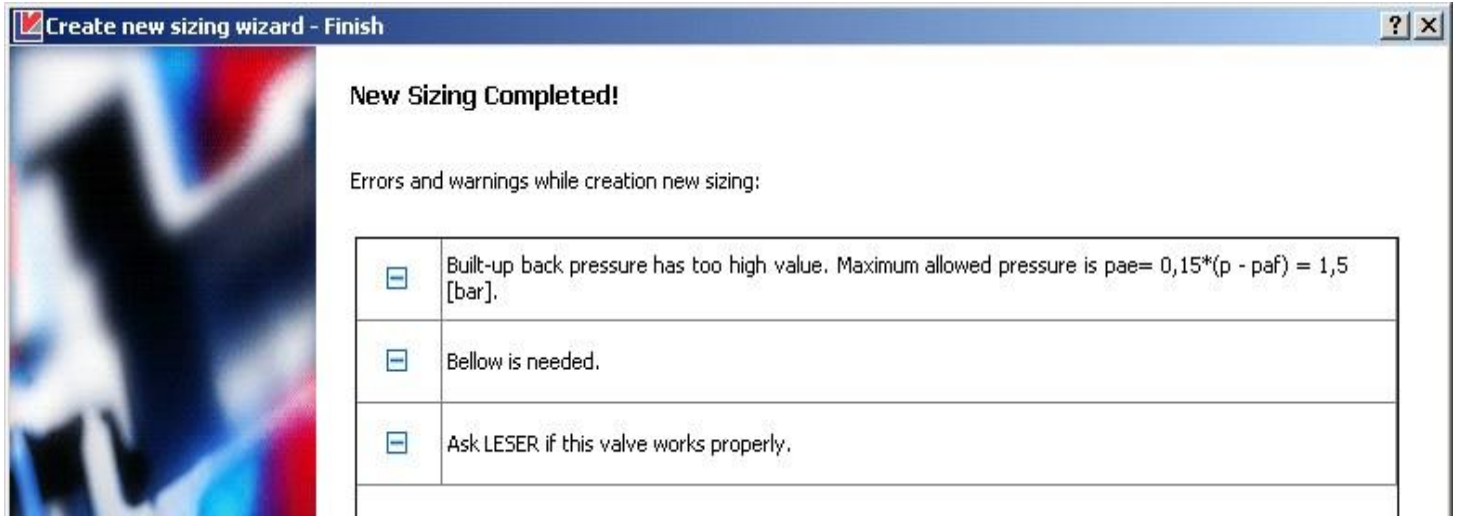
14 Step: ERRORs and Warnings



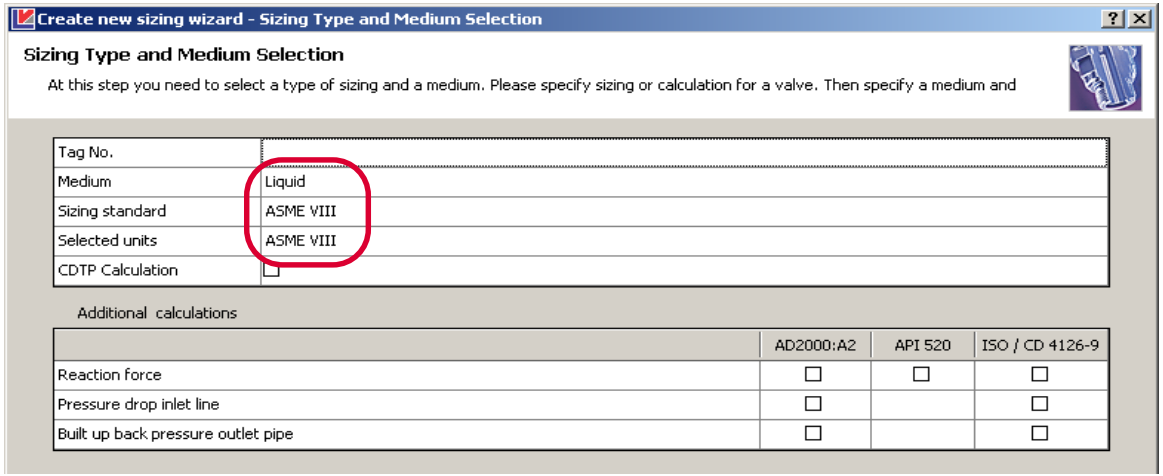
Errors and warnings are shown at the end of a sizing or:

during sizing, indicated by the **flashing yellow label**.
Click on the symbol for a listing of the errors and warnings.

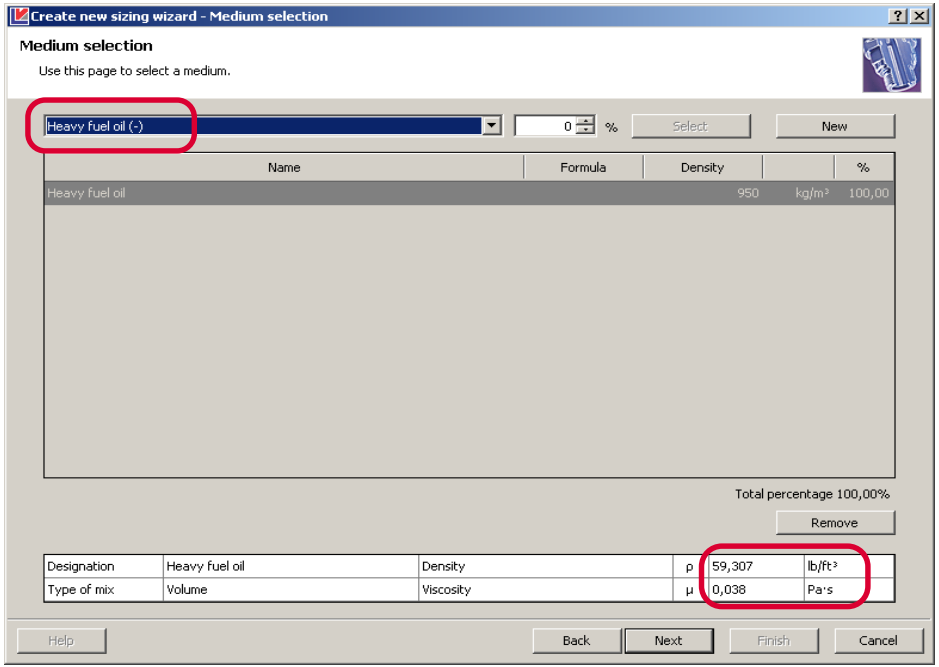
Service condition: Heavy Oil, Set pressure = 500 bar g, Temperature 20°C, required massflow = 100000kg/h, viscosity = 0,038 Pa s.

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

1. Step: Sizing Standard and additional calculation



2. Step: Medium database and medium selection



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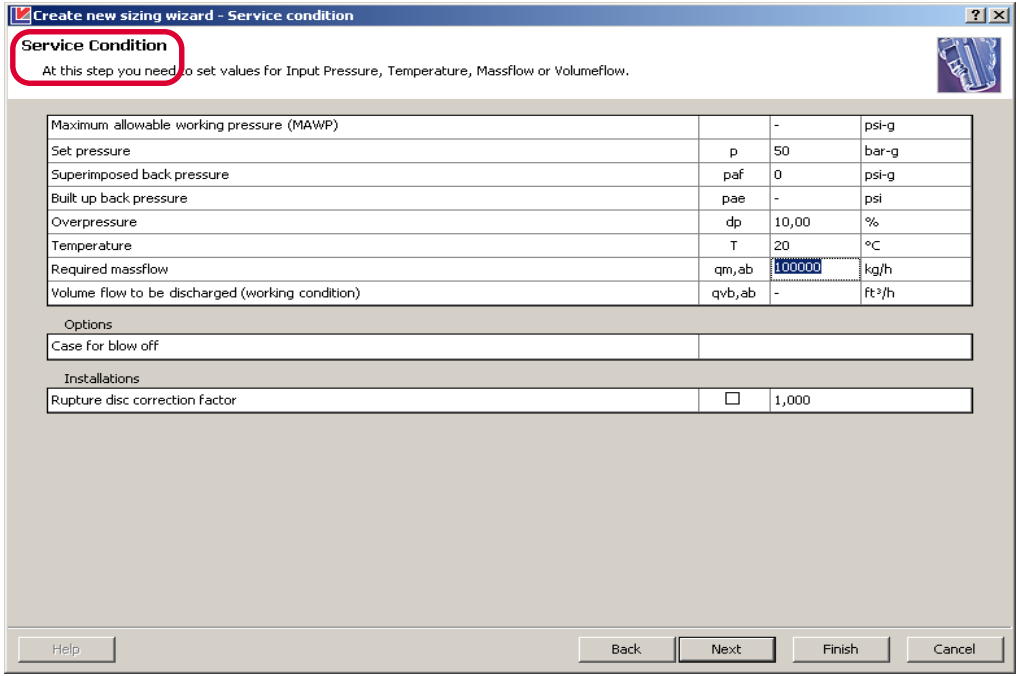
3. Step: Service condition



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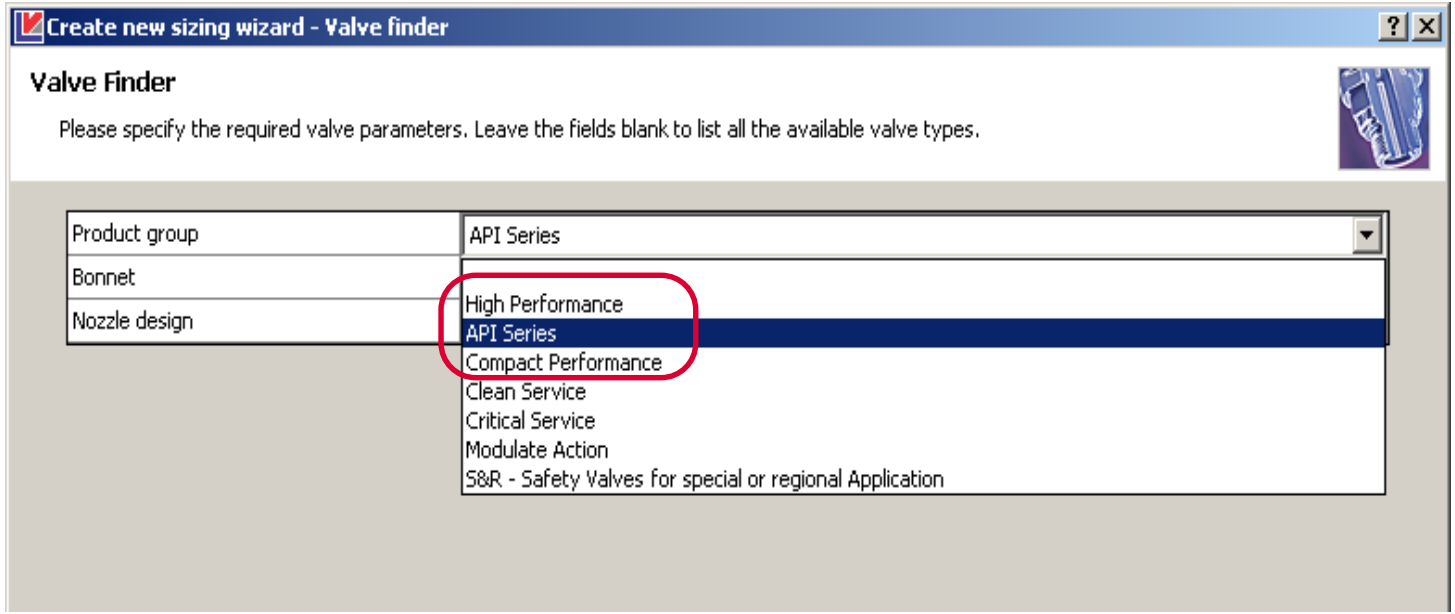
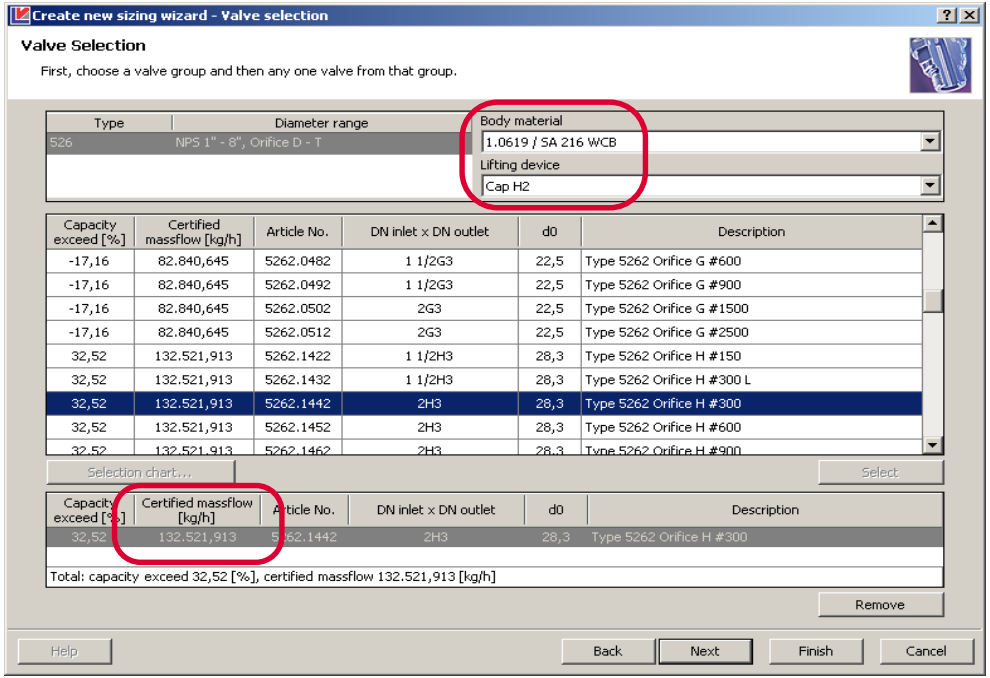
4. Step: Valve Finder



5. Step: Processing of all possible safety valves



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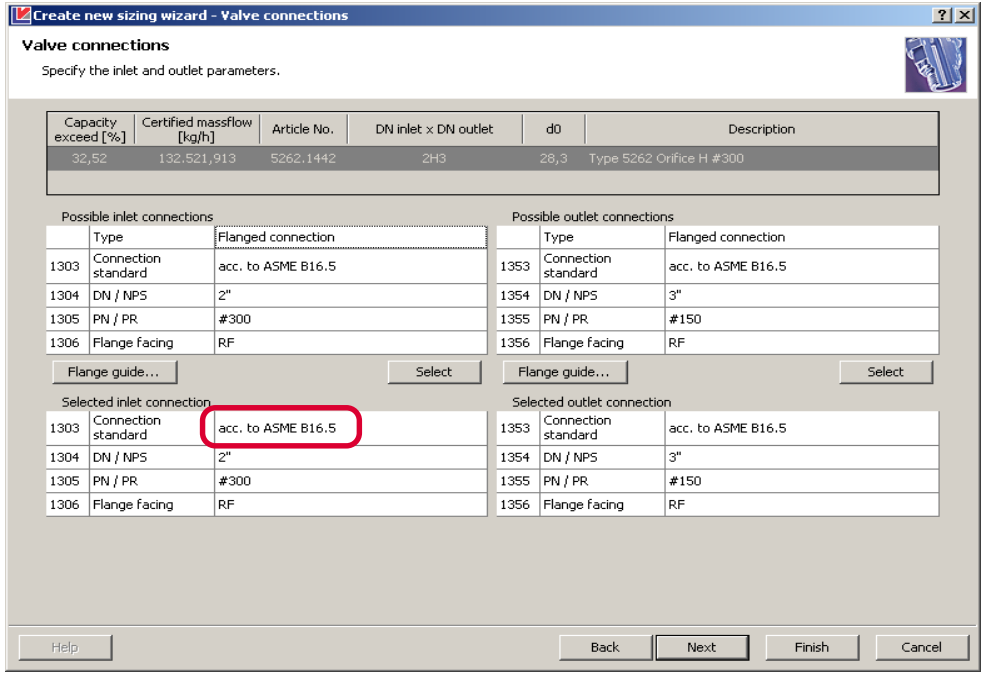
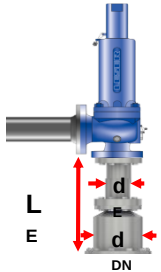
6. Step: Connection



7. Step: Sizing finished

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:
- $\zeta_{d_E} = (\frac{d_E}{d_{DN}})^4 * \zeta_{d_{DN}}$



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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

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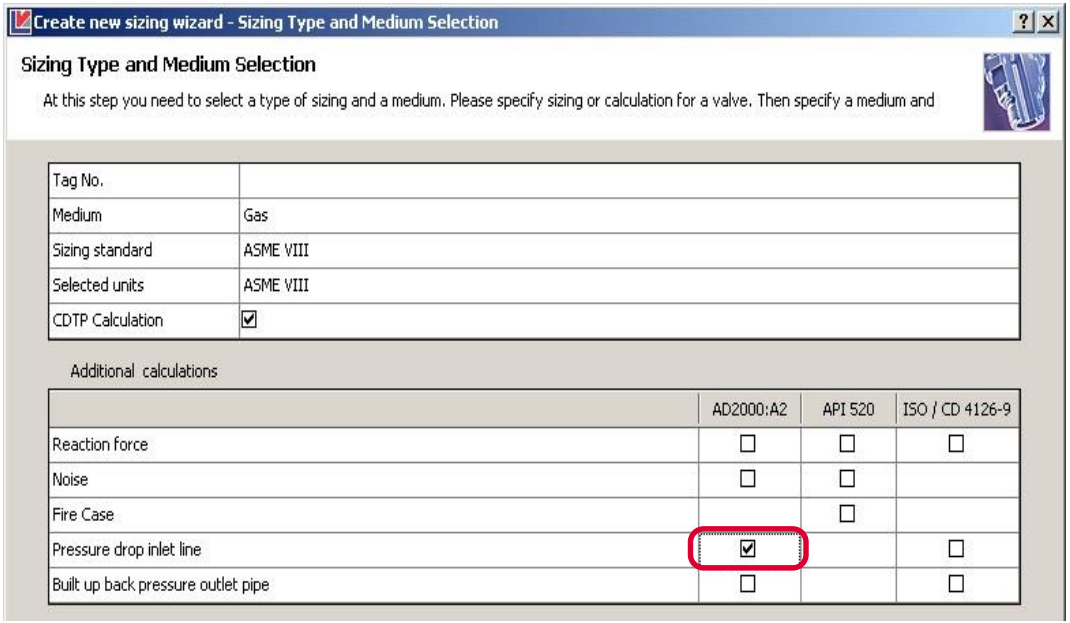
Sizing of inlet pressure drop. (according AD 2000-Markblatt A2).

1. Step: Additional calculation

When starting a new sizing:



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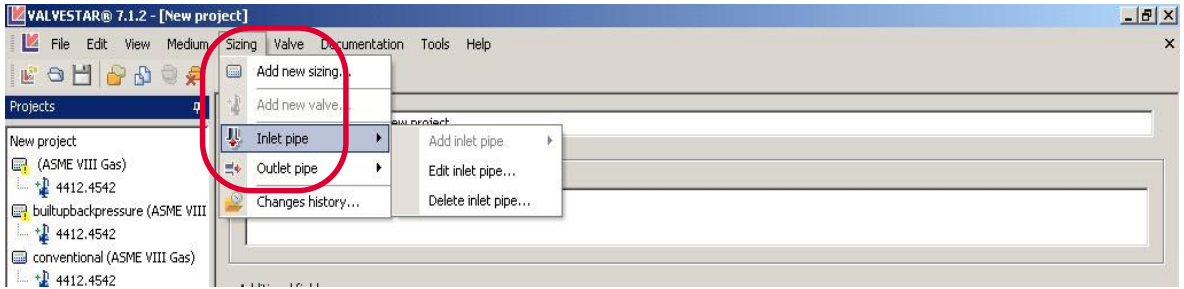
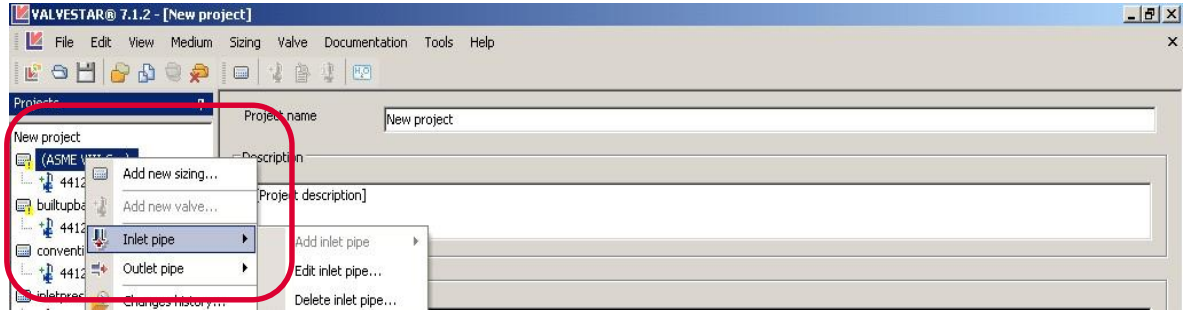
Sizing of inlet pressure drop. (according AD 2000-Markblatt A2).

1. Step: Additional calculation

You can also start inlet pressure drop calculation in menu





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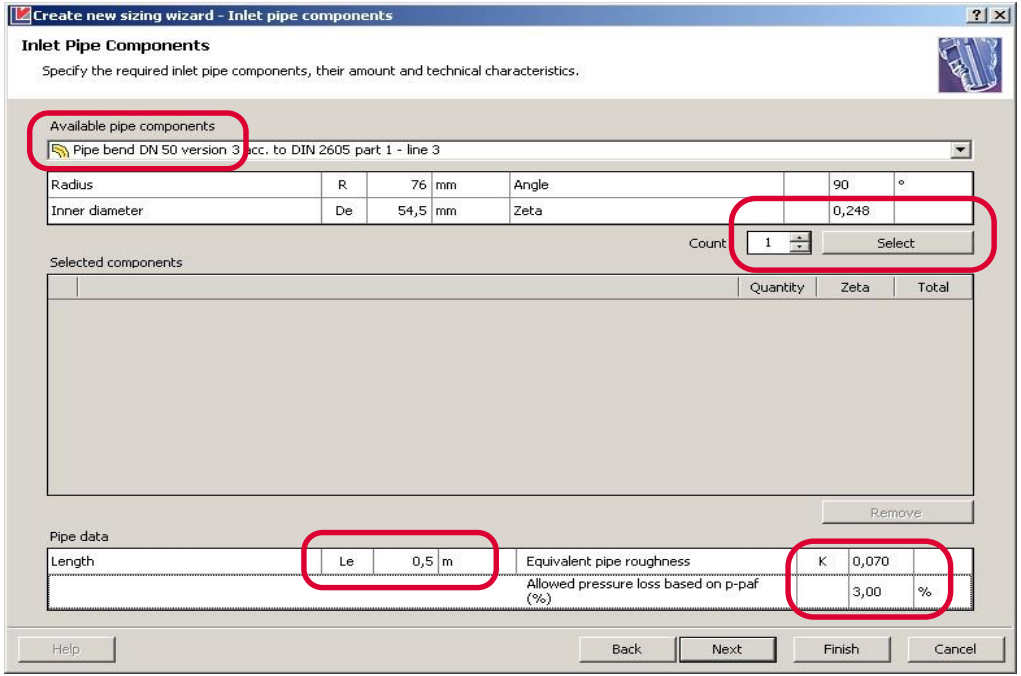
Sizing of inlet pressure drop. (according AD 2000-Markblatt A2).

2. Step: Dimension of inlet pipe and pipe components



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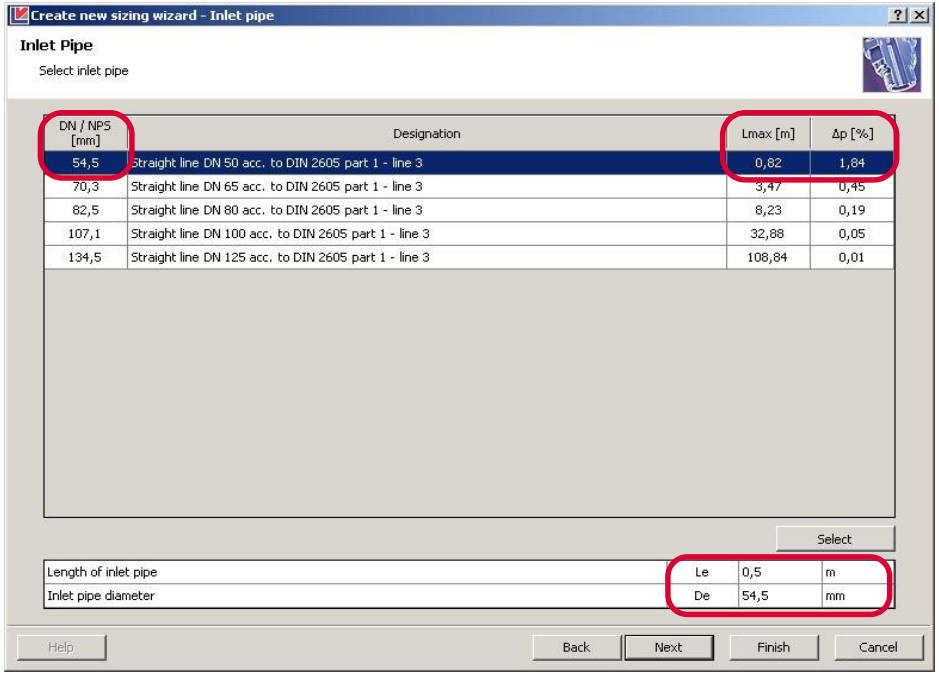
Sizing of inlet pressure drop. (according AD 2000-Markblatt A2).

3. Step: Dimension of inlet pipe and pipe components



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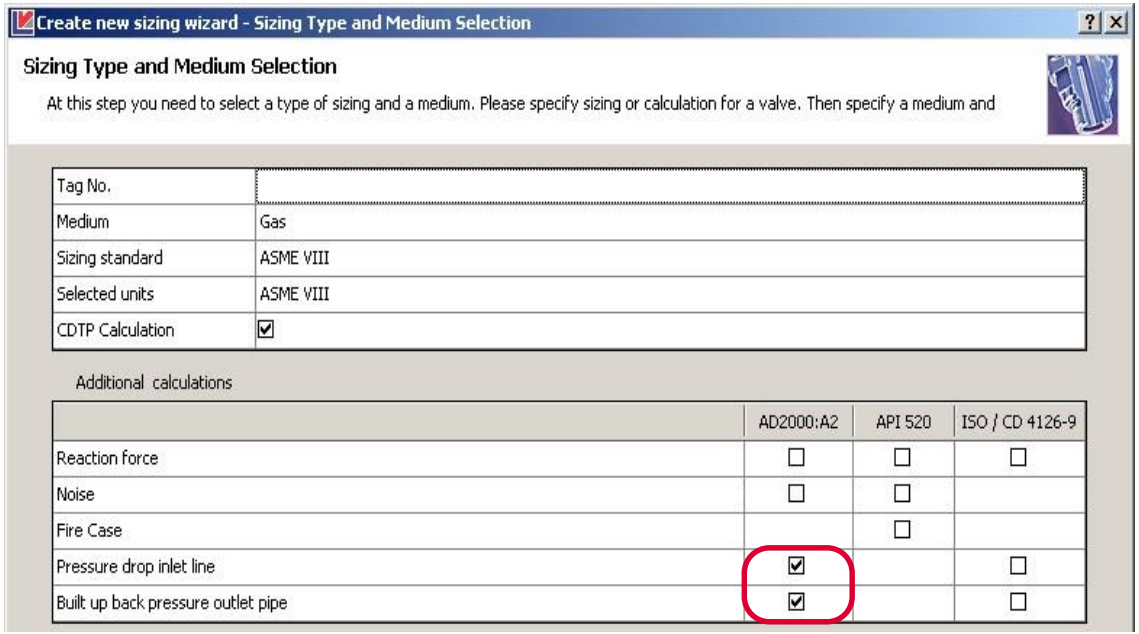
Sizing of built-up backpressure.

1. Step: Dimension of inlet pipe and pipe components

When starting a new sizing:



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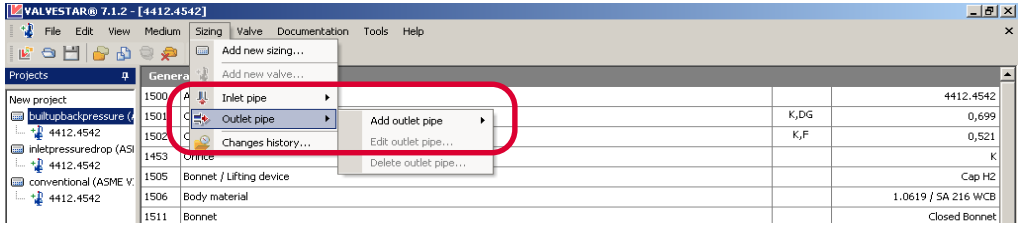
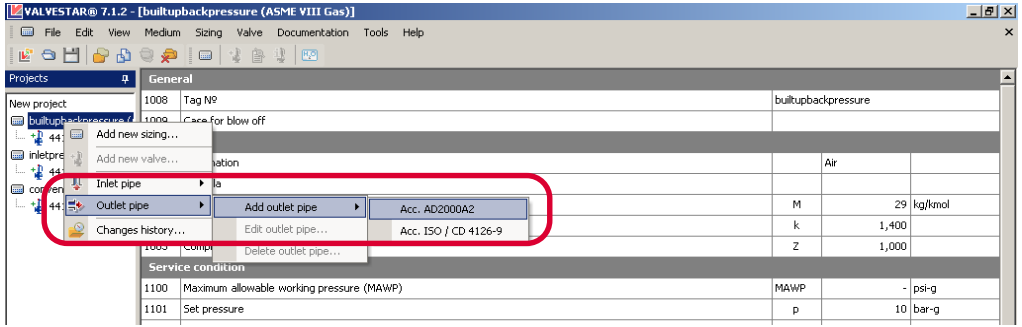
Sizing of built-up backpressure.

1. Step: Dimension of outlet pipe and pipe components

You can also start built-up backpressure calculation in menu



… or start in project three



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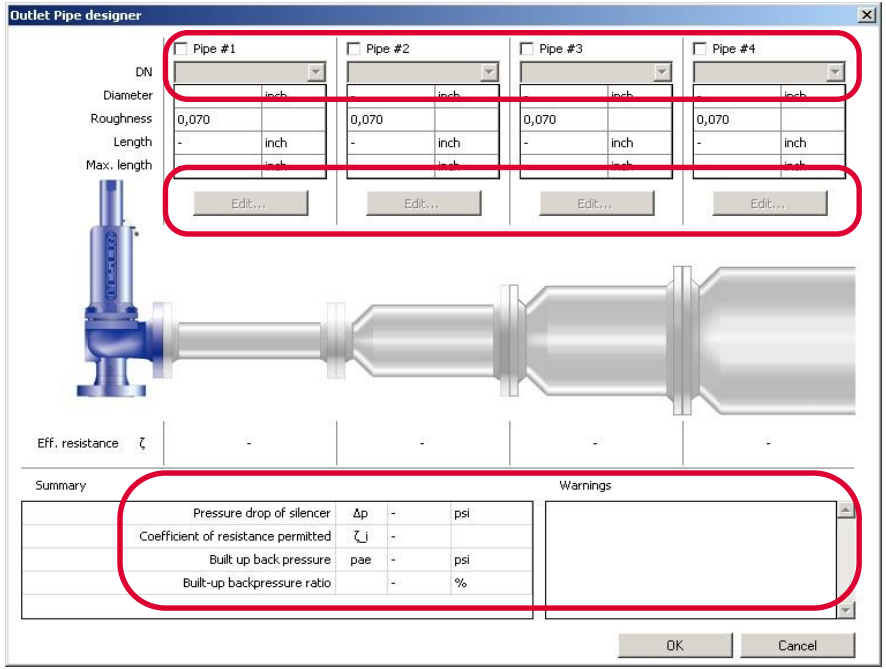
2. Step: Dimension of outlet pipe and pipe components



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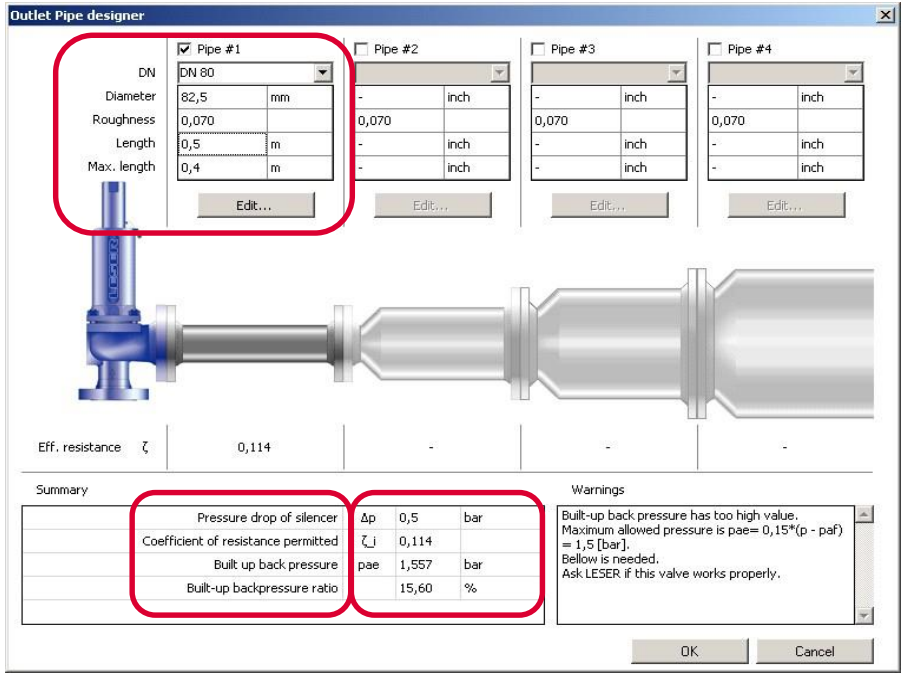
Sizing of built-up backpressure.

3. Step: Calculation and warning



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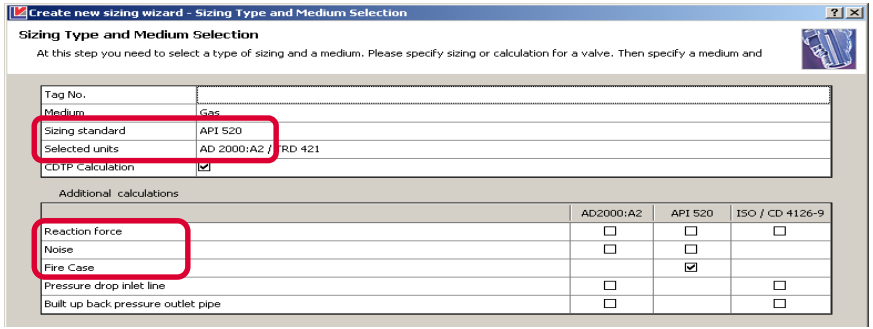
Fire case according to API RP 521.

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



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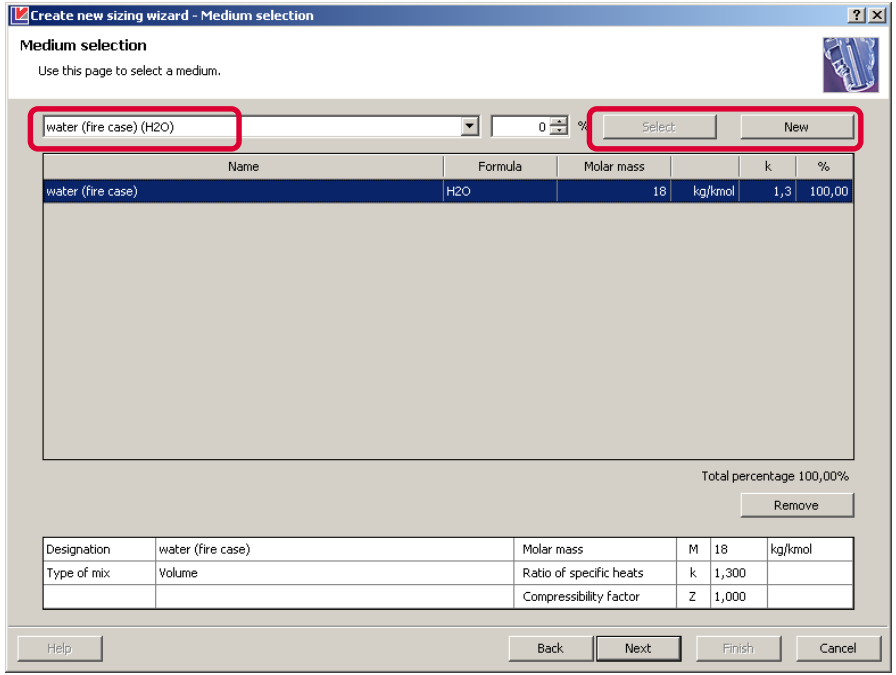
Fire case according to API RP 521.

API RP 521



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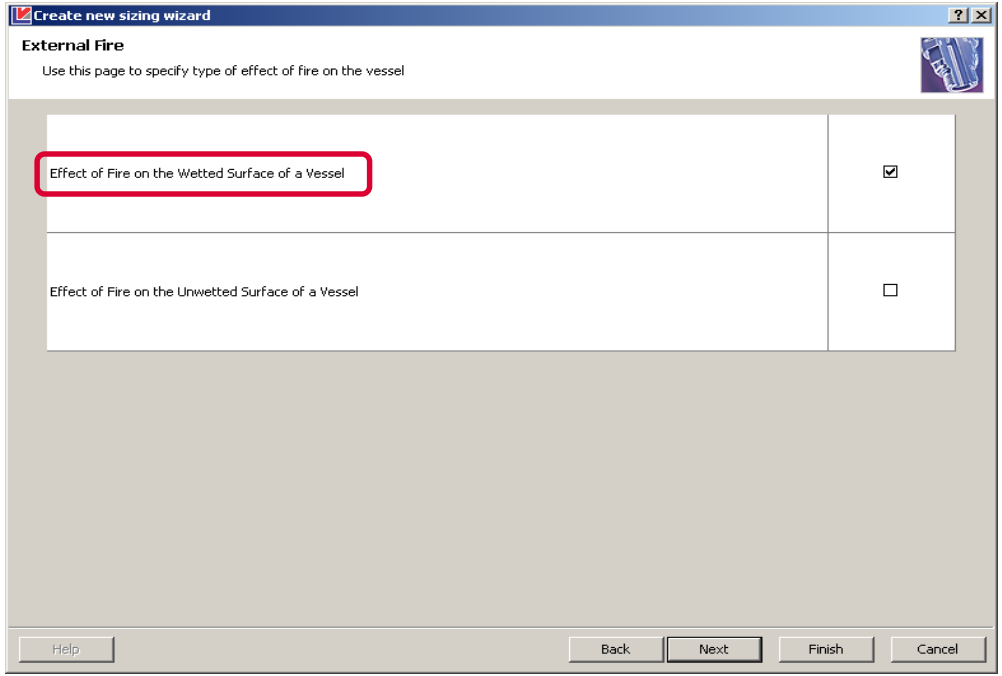
Fire case according to API RP 521.

API RP 521



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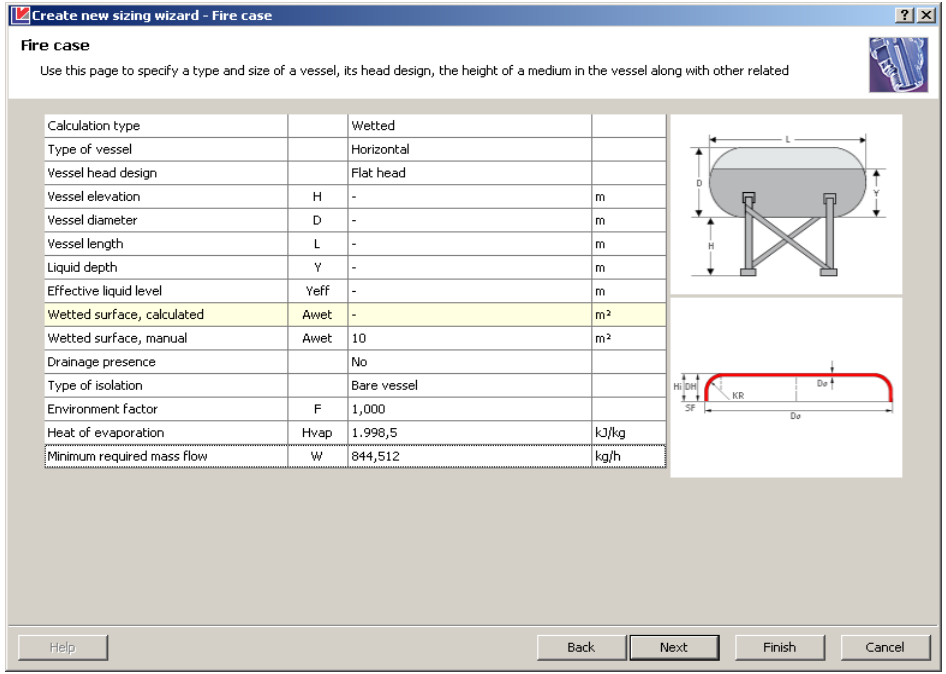
Fire case according to API RP 521.

API RP 521



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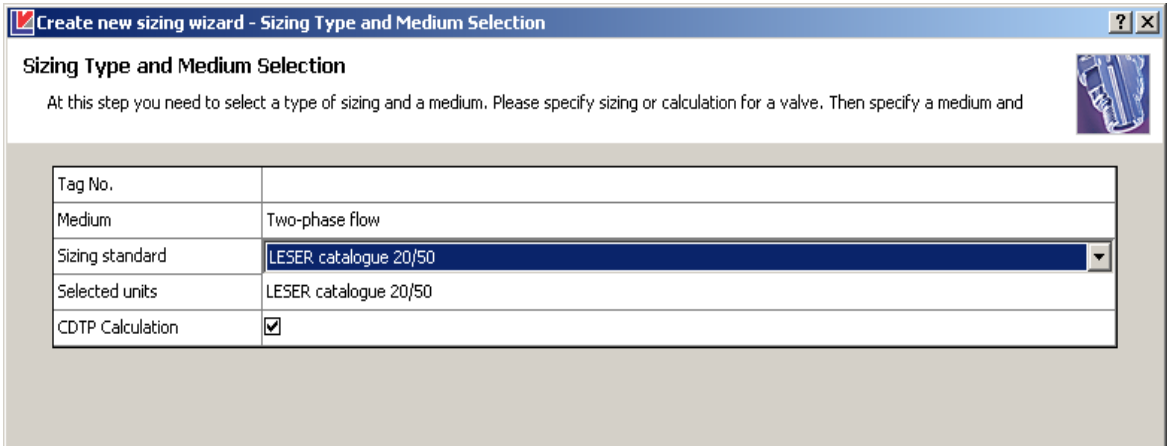
Two Phase Flow. LESER mixed formula**.**

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.



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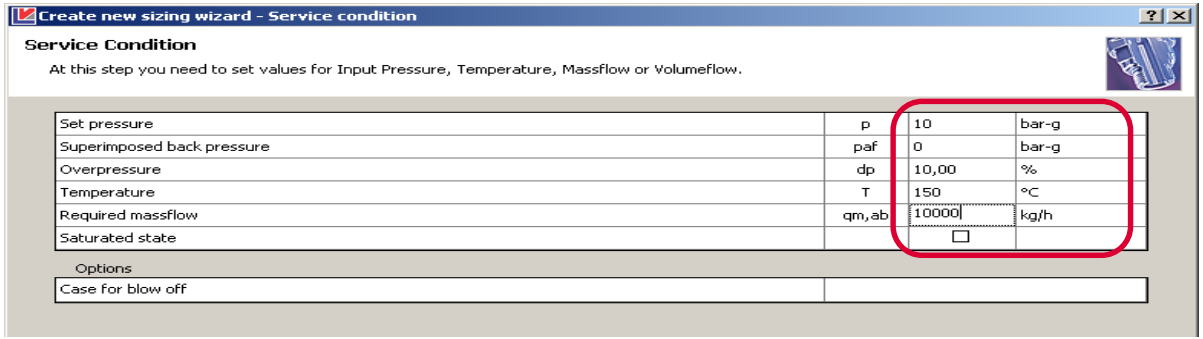
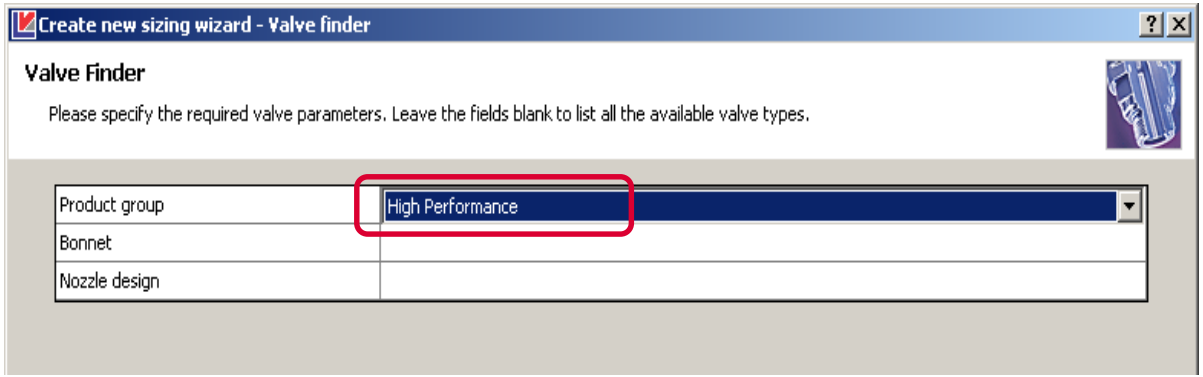
Two Phase Flow. LESER mixed formula**.**





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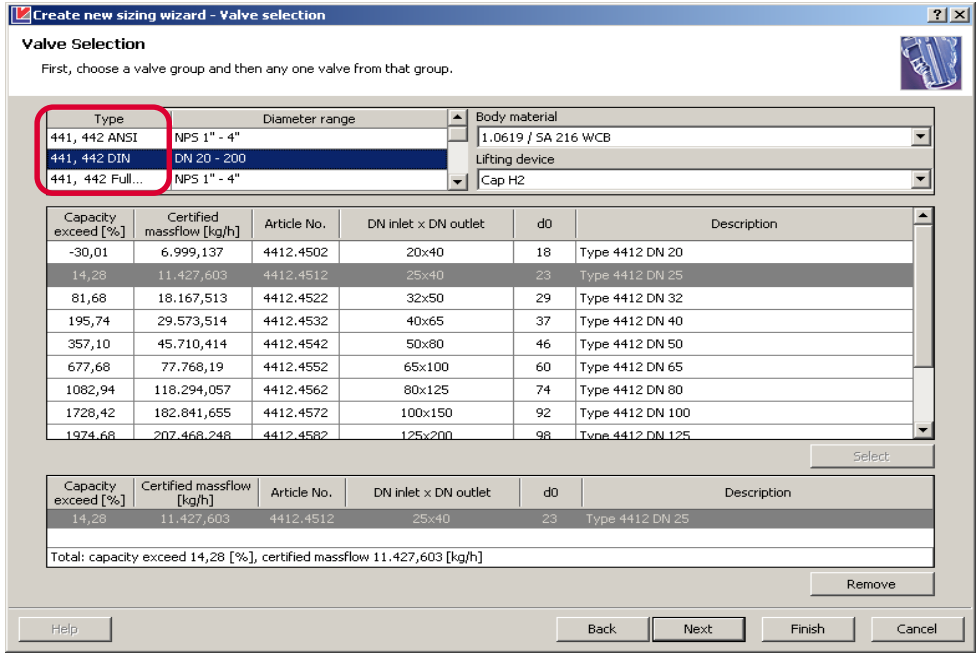
Two Phase Flow. LESER mixed formula**.**



All the next steps until finish are not shown.

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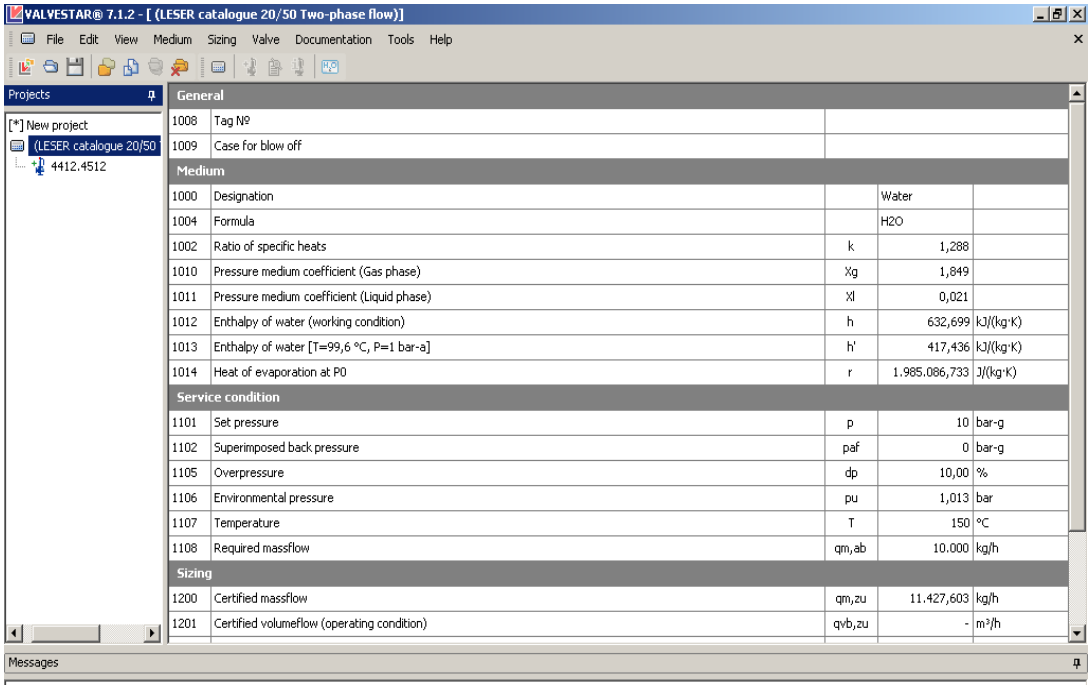
Result: Documentation on screen

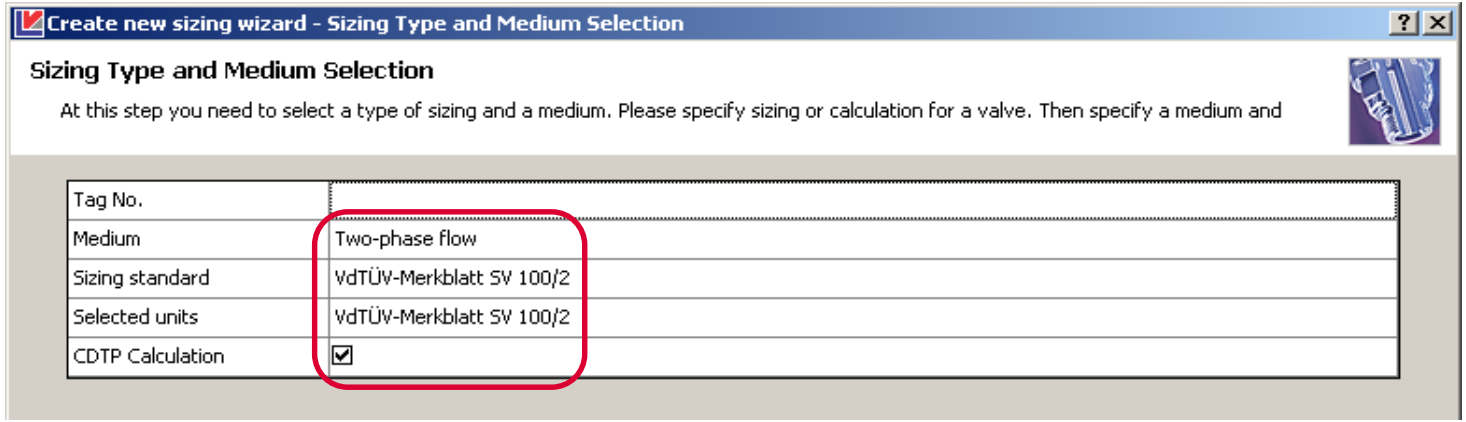


General				
1008	Tag №			
1009	Case for blow off			
Medium				
1000	Designation		Water	
1004	Formula		H2O	
1002	Ratio of specific heats	k	1,288	
1010	Pressure medium coefficient (Gas phase)	Xg	1,849	
1011	Pressure medium coefficient (Liquid phase)	Xl	0,021	
1012	Enthalpy of water (working condition)	h	632,699	kJ/(kg·K)
1013	Enthalpy of water [T=99,6 °C, P=1 bar-a]	h'	417,436	kJ/(kg·K)
1014	Heat of evaporation at P0	r	1.985.086,733	J/(kg·K)
Service condition				
1101	Set pressure	p	10	bar-g
1102	Superimposed back pressure	paf	0	bar-g
1105	Overpressure	dp	10,00	%
1106	Environmental pressure	pu	1,013	bar
1107	Temperature	T	150	°C
1108	Required massflow	qm,ab	10.000	kg/h
Sizing				
1200	Certified massflow	qm,zu	11.427,603	kg/h
1201	Certified volumeflow (operating condition)	qvb,zu	-	m³/h

Two Phase Flow. VdTÜV Merkblatt 100.

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



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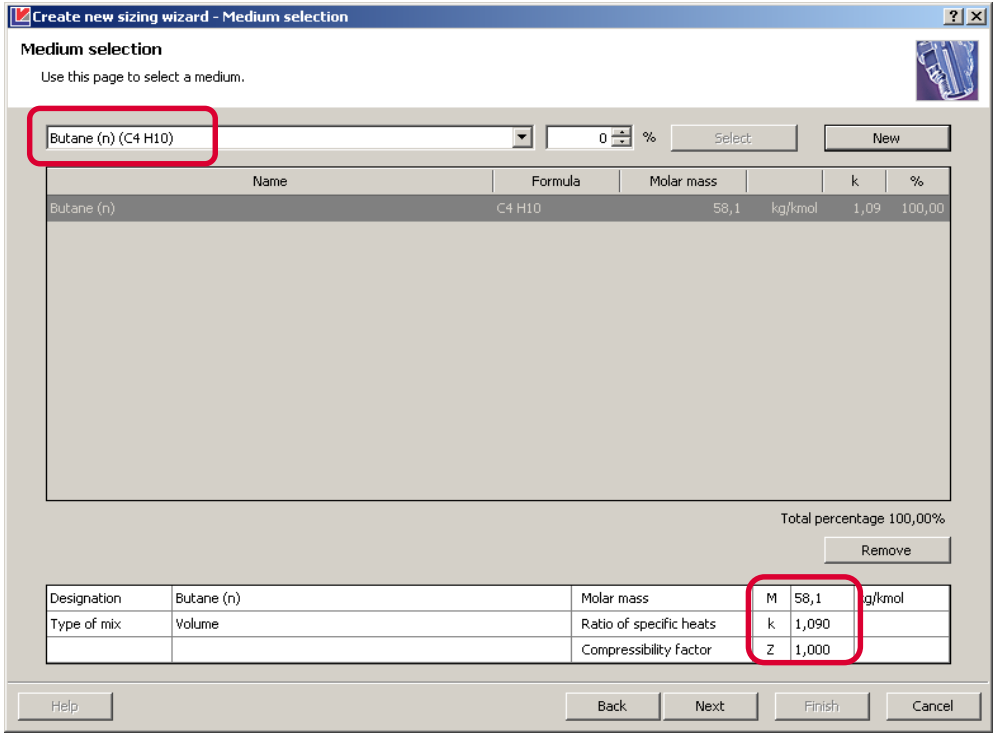
Two Phase Flow. VdTÜV Merkblatt 100.



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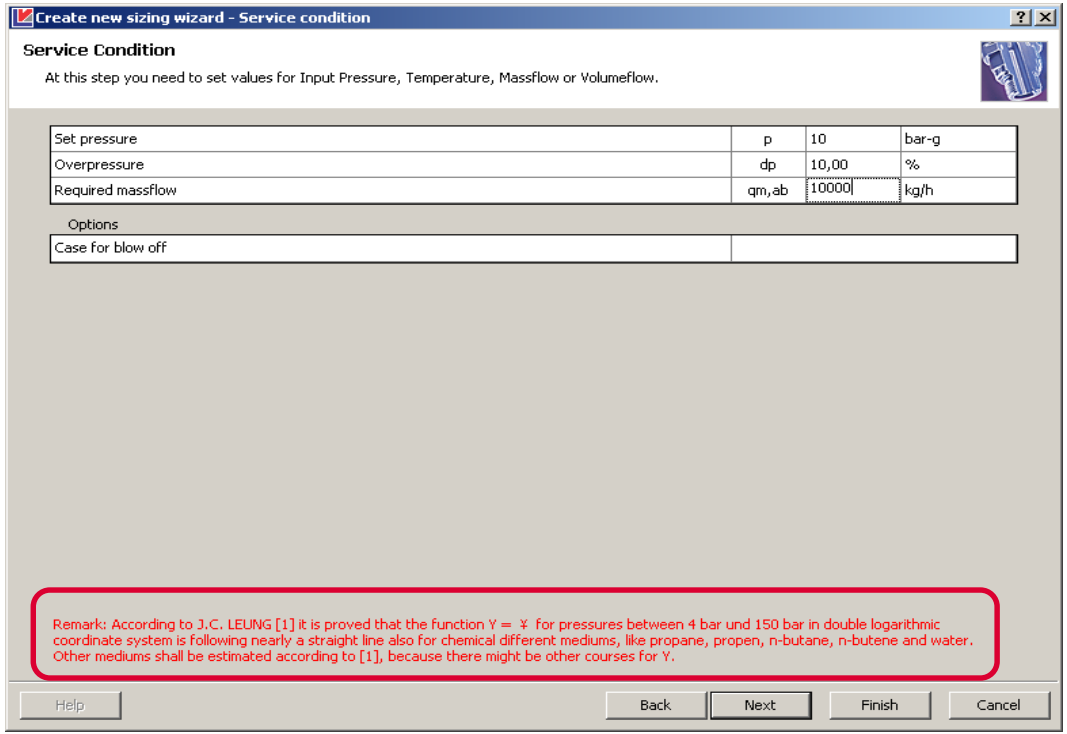
Two Phase Flow. VdTÜV Merkblatt 100.



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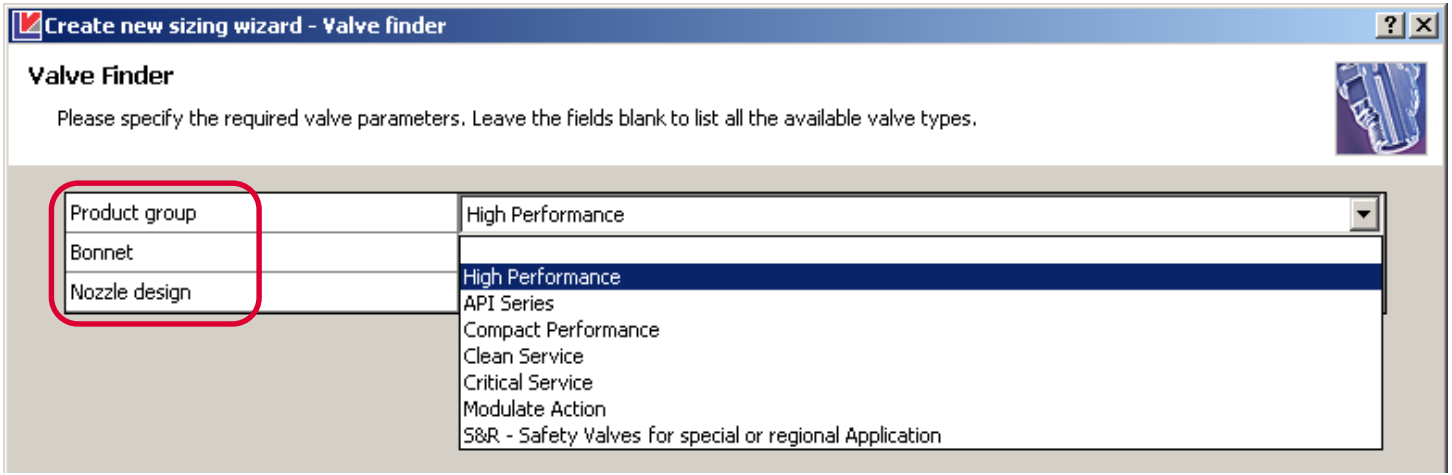
Two Phase Flow. VdTÜV Merkblatt 100.



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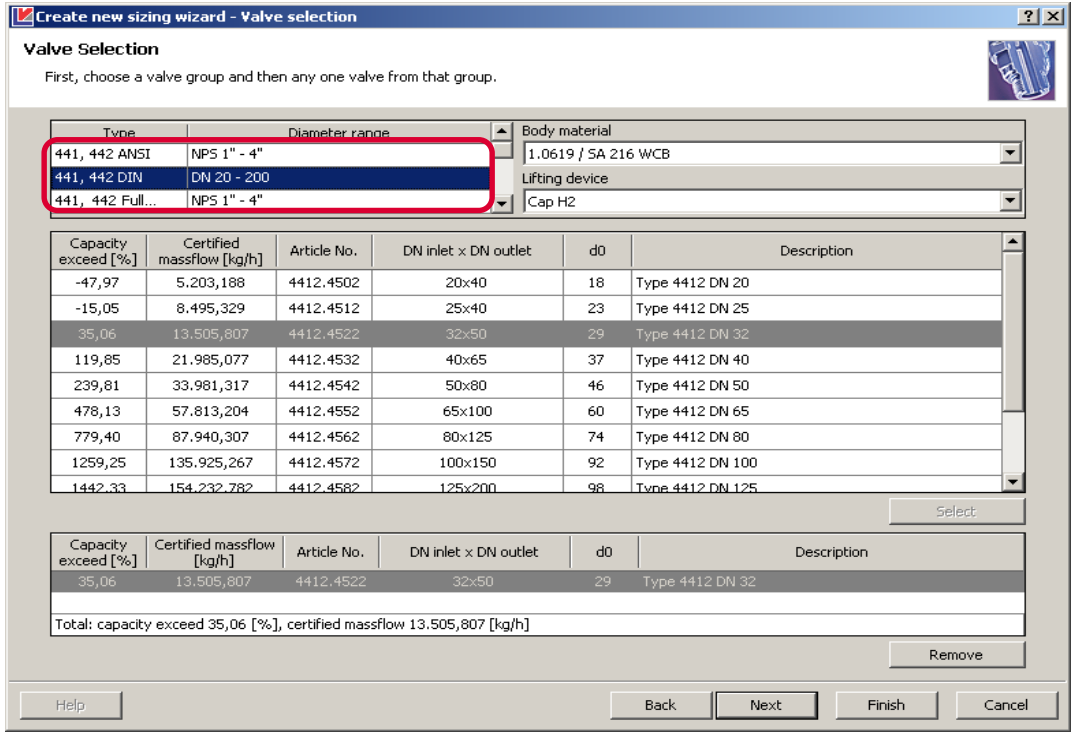
Two Phase Flow. VdTÜV Merkblatt 100.



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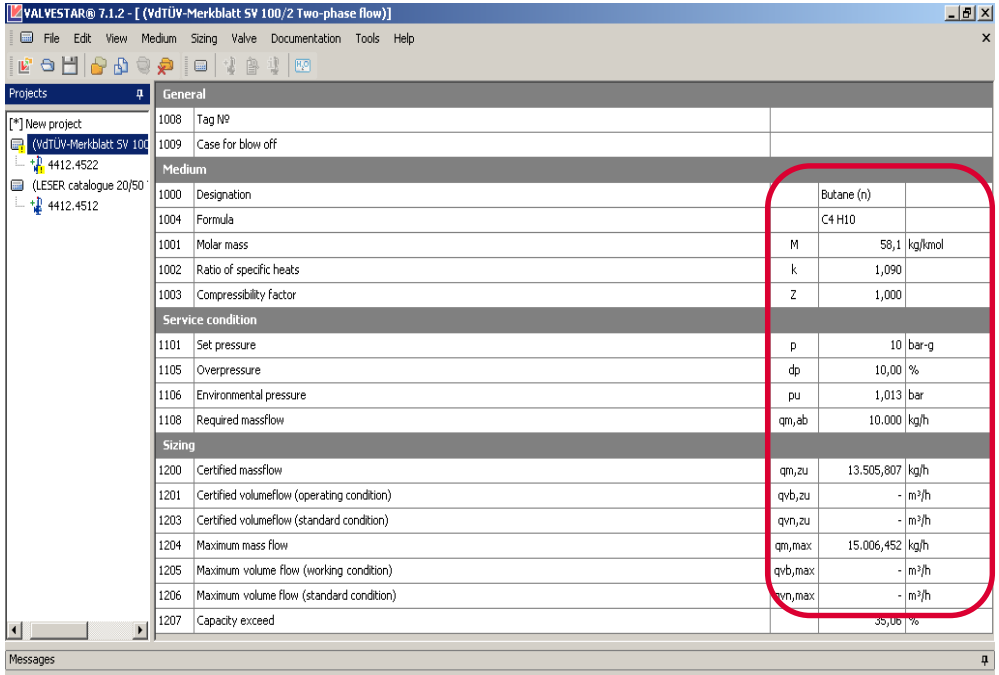
Result: Documentation on screen



General				
1008	Tag №			
1009	Case for blow off			
Medium				
1000	Designation		Butane (n)	
1004	Formula		C4 H10	
1001	Molar mass	M	58,1	kg/kmol
1002	Ratio of specific heats	k	1,090	
1003	Compressibility factor	Z	1,000	
Service condition				
1101	Set pressure	p	10	bar-g
1105	Overpressure	dp	10,00	%
1106	Environmental pressure	pu	1,013	bar
1108	Required massflow	qm,ab	10.000	kg/h
Sizing				
1200	Certified massflow	qm,zu	13.505,807	kg/h
1201	Certified volumeflow (operating condition)	qvb,zu	-	m³/h
1203	Certified volumeflow (standard condition)	qvn,zu	-	m³/h
1204	Maximum mass flow	qm,max	15.006,452	kg/h
1205	Maximum volume flow (working condition)	qvb,max	-	m³/h
1206	Maximum volume flow (standard condition)	qvn,max	-	m³/h
1207	Capacity exceed		35,06	%

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Two Phase Flow. Omega method according API 520 Appendix D.

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

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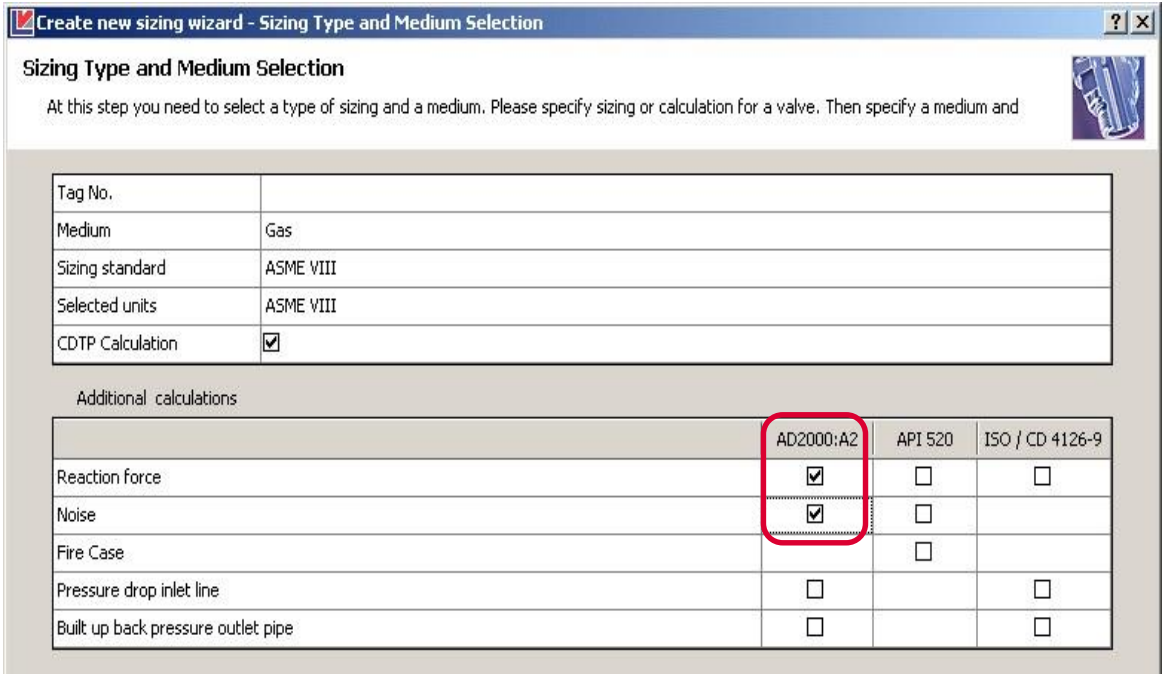
Additional Sizings, Noise Level, Reaction Forces.

1. Step: Reaction force and noise level



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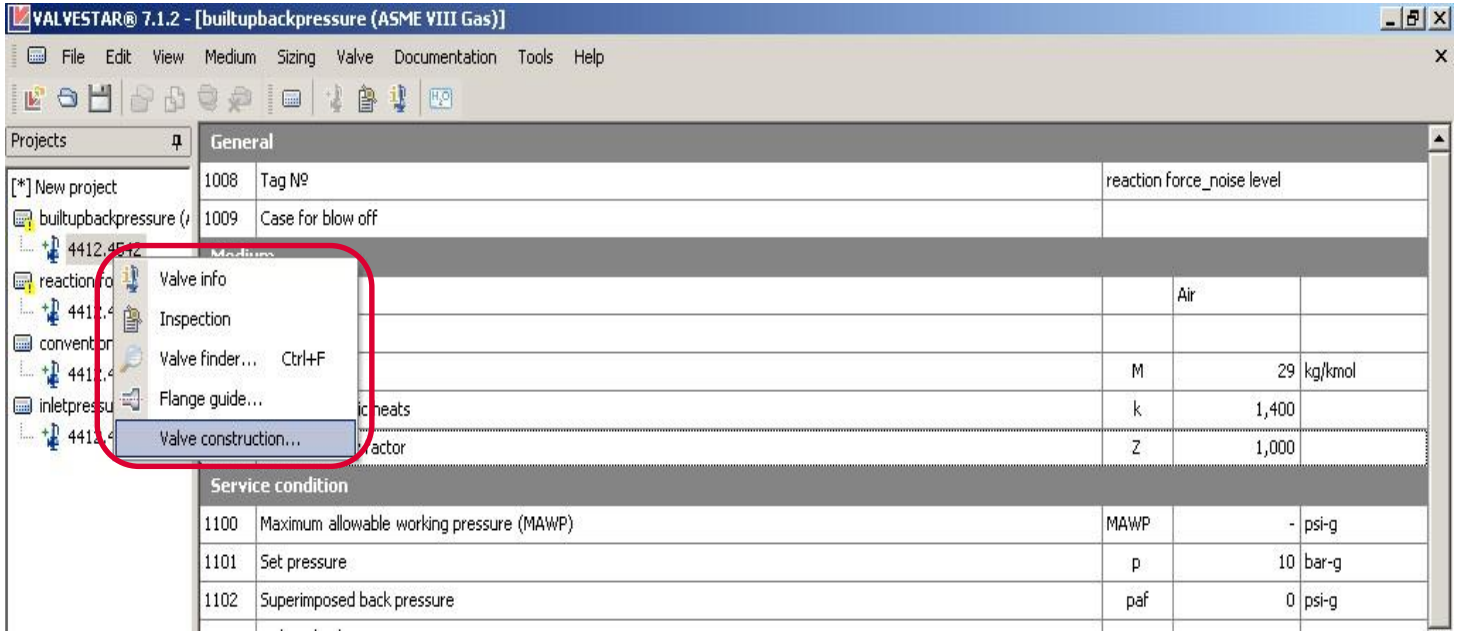
Additional Sizings, Noise Level, Reaction Forces.

1. Step: Reaction force and noise level



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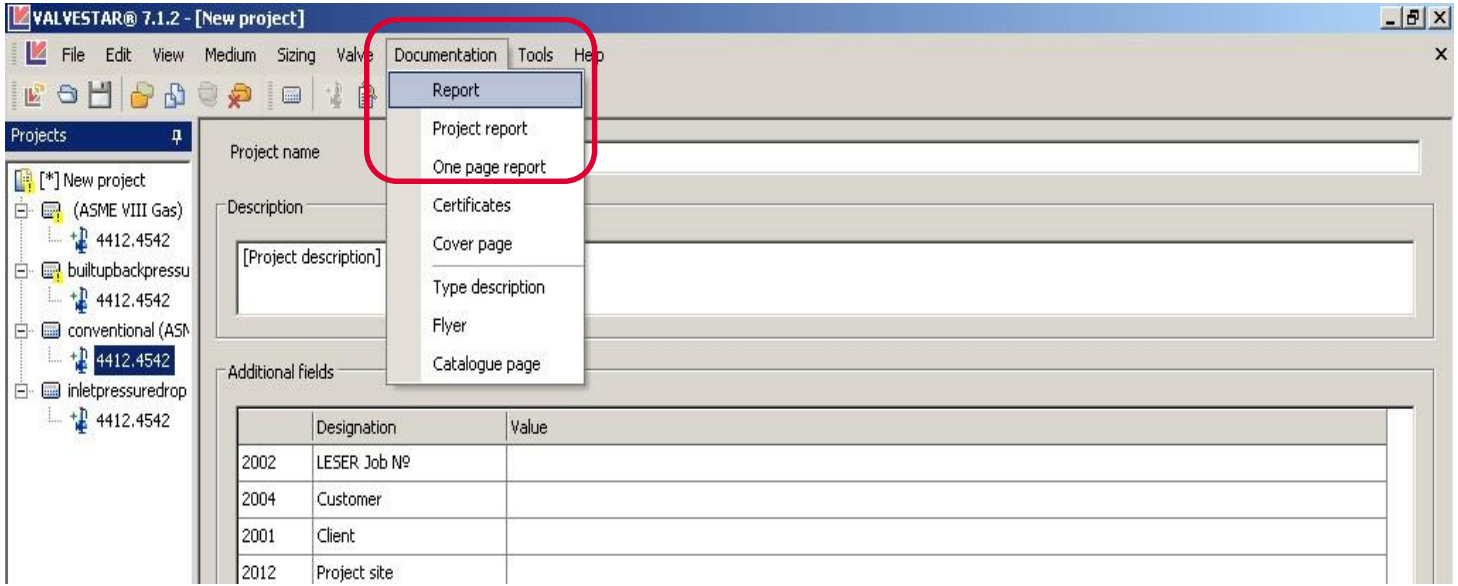
1. Step: Create a report



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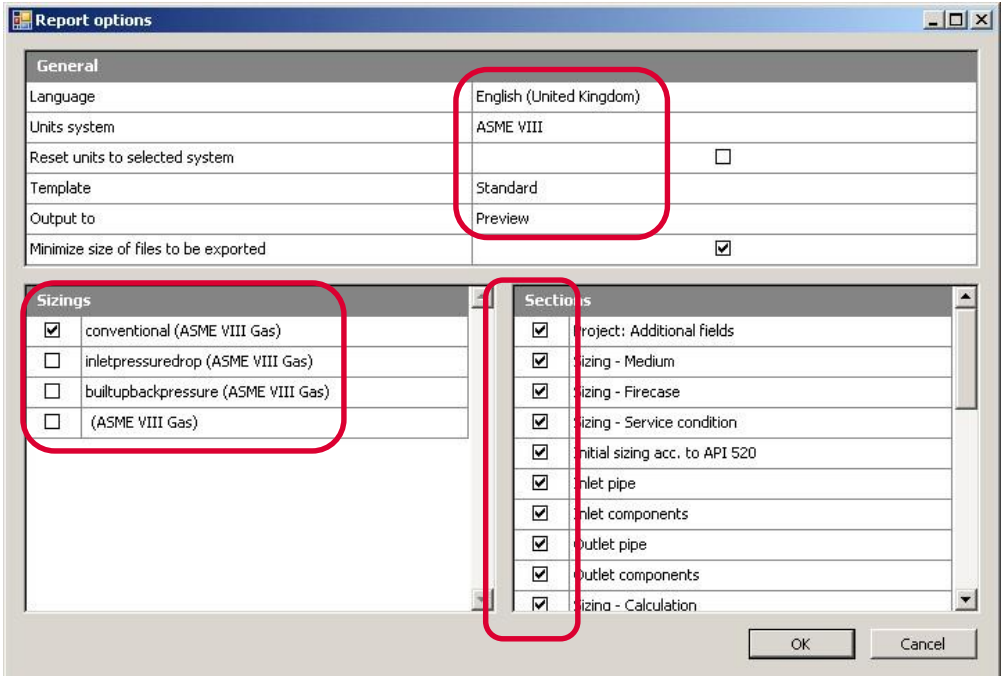
1. Step: Create a report



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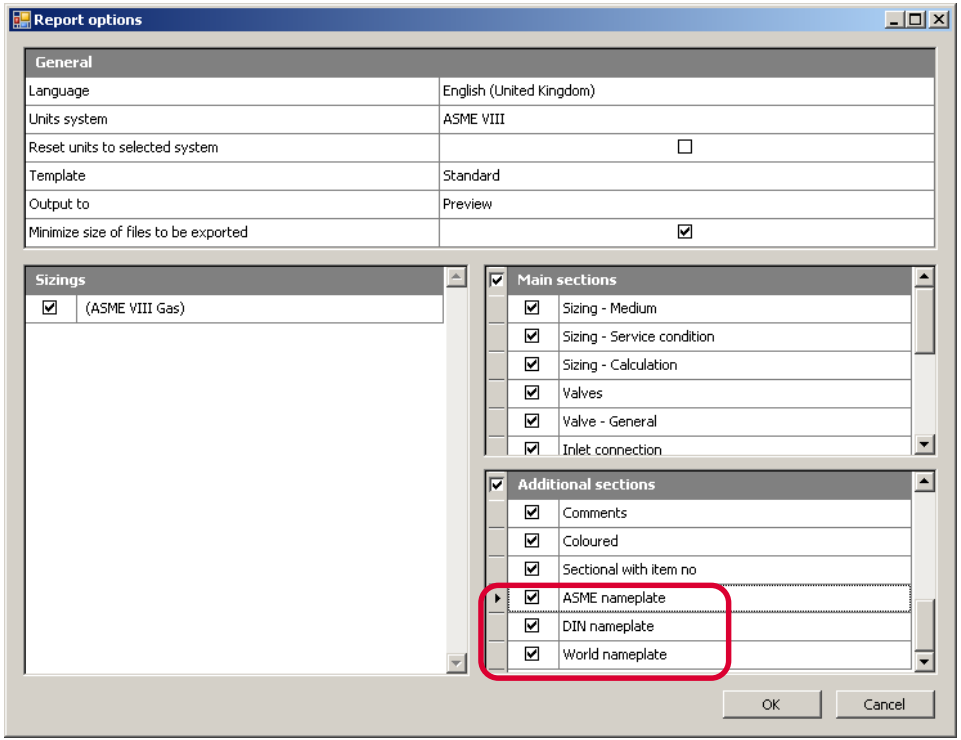
Reporting.



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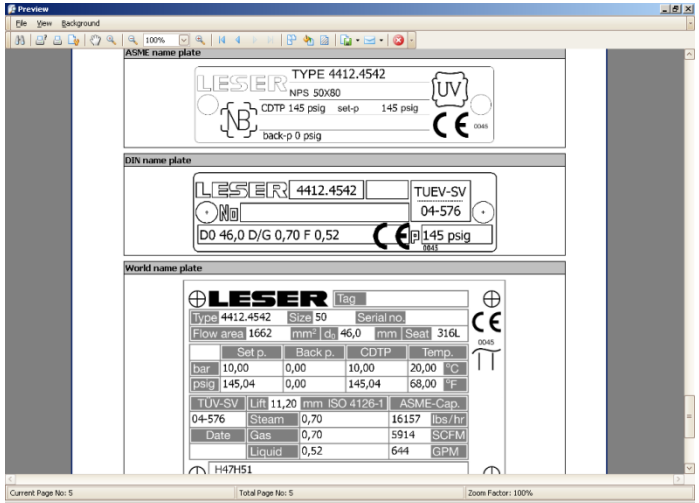
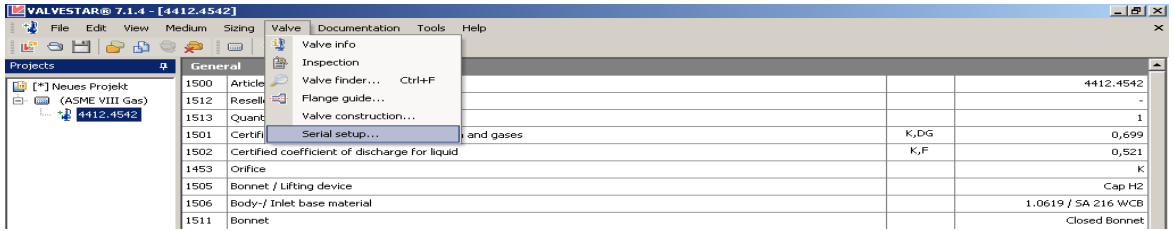
Reporting.





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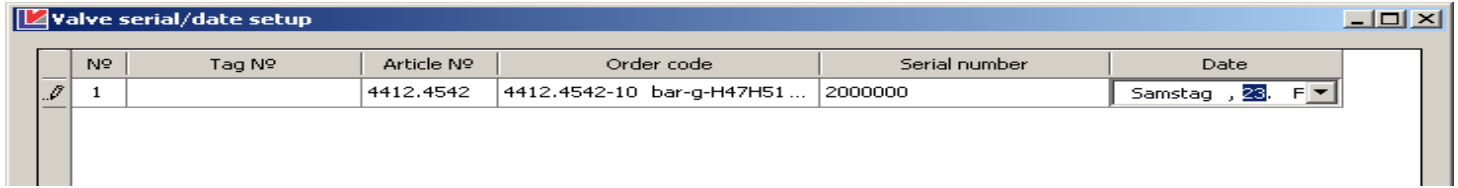
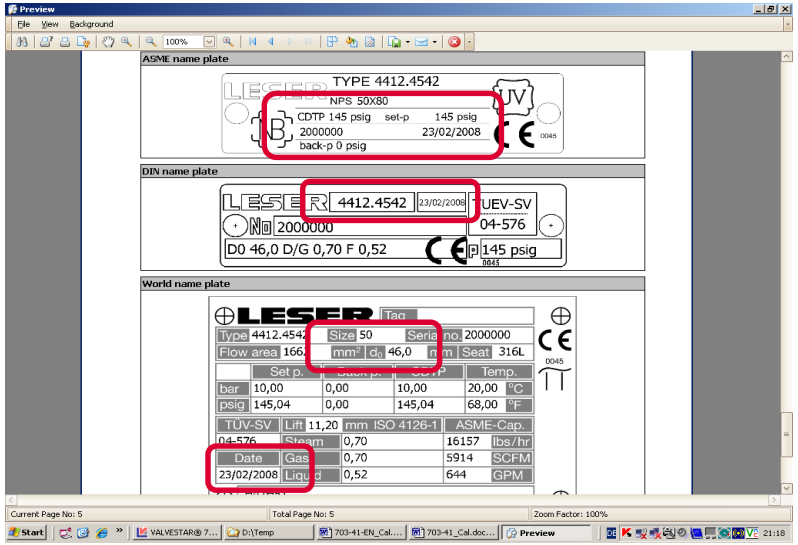
Reporting.





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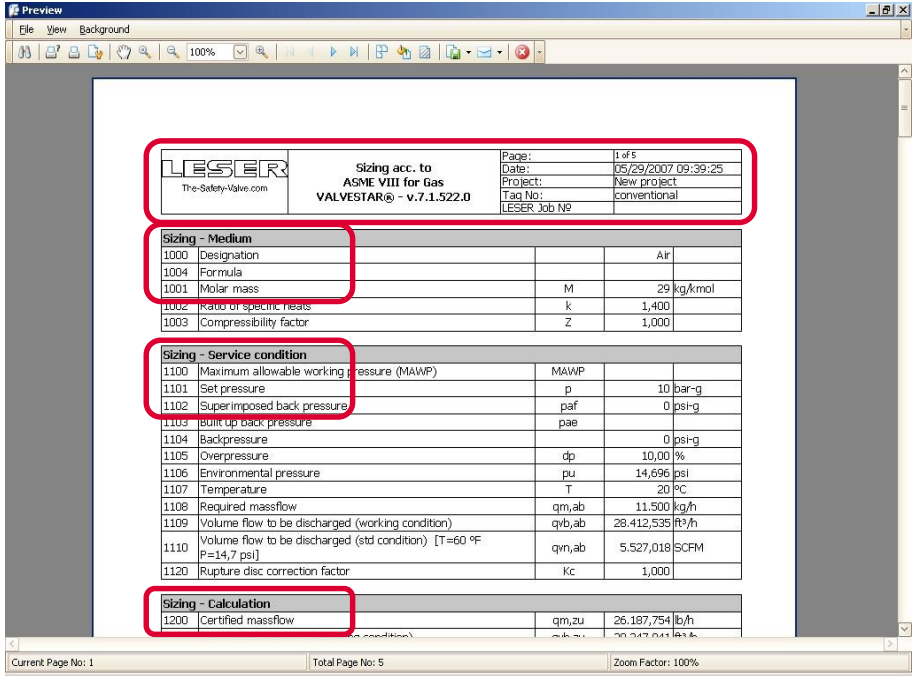
Reporting.

1. Step: Create a report



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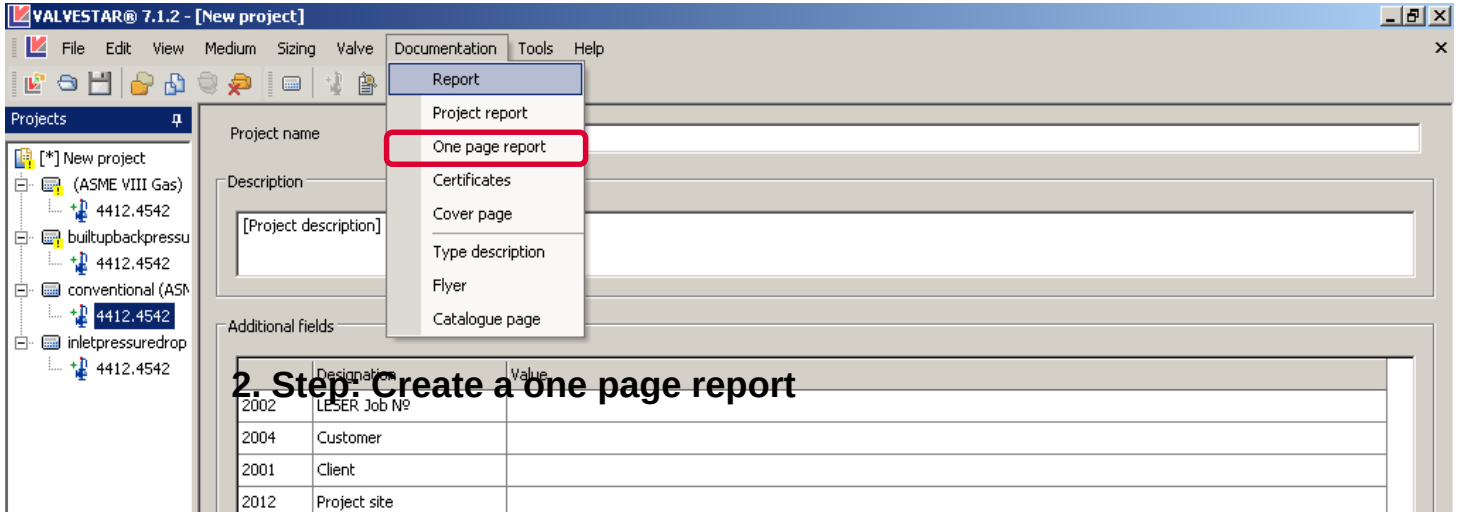
2. Step: Create a one page report



2. Step: Create a one page report

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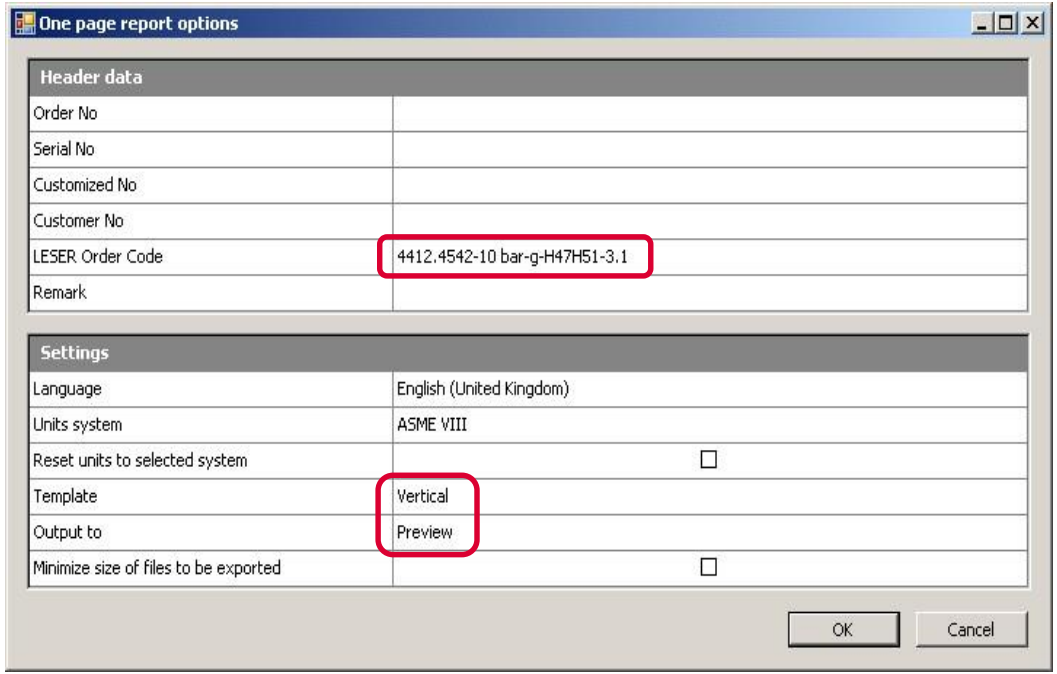
2. Step: Create a one page report



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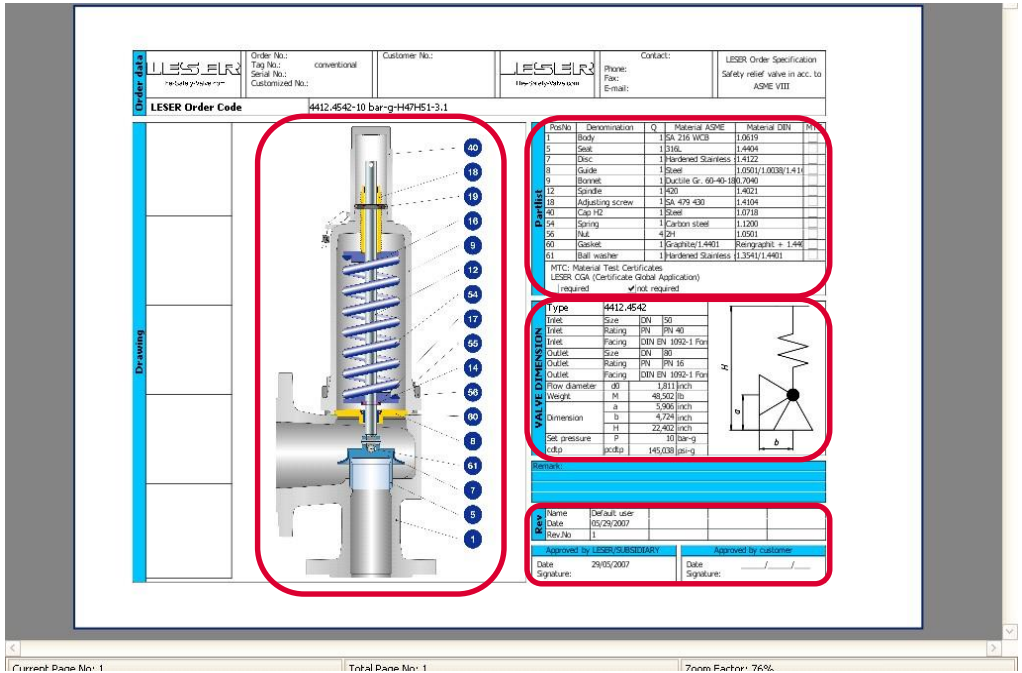
2. Step: Create a one page report



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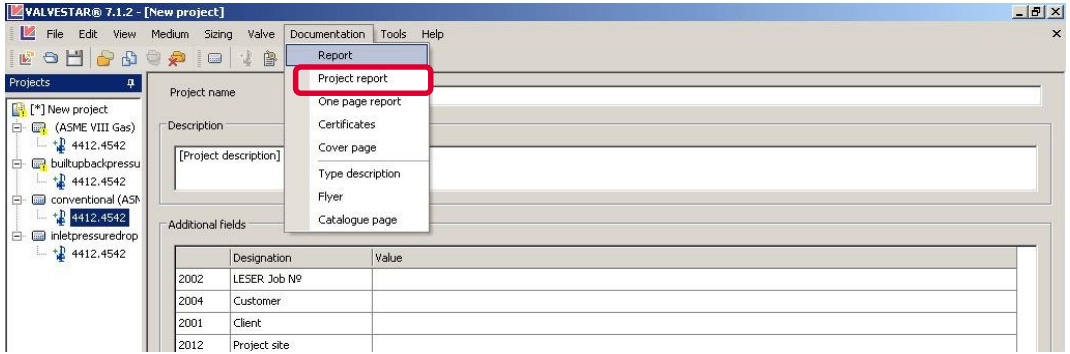
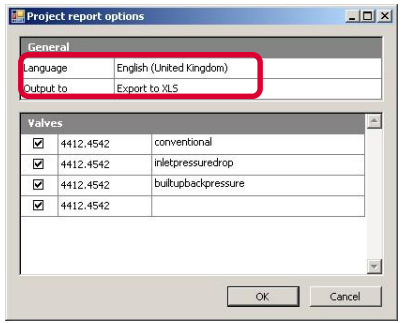
3. Step: Create a project report





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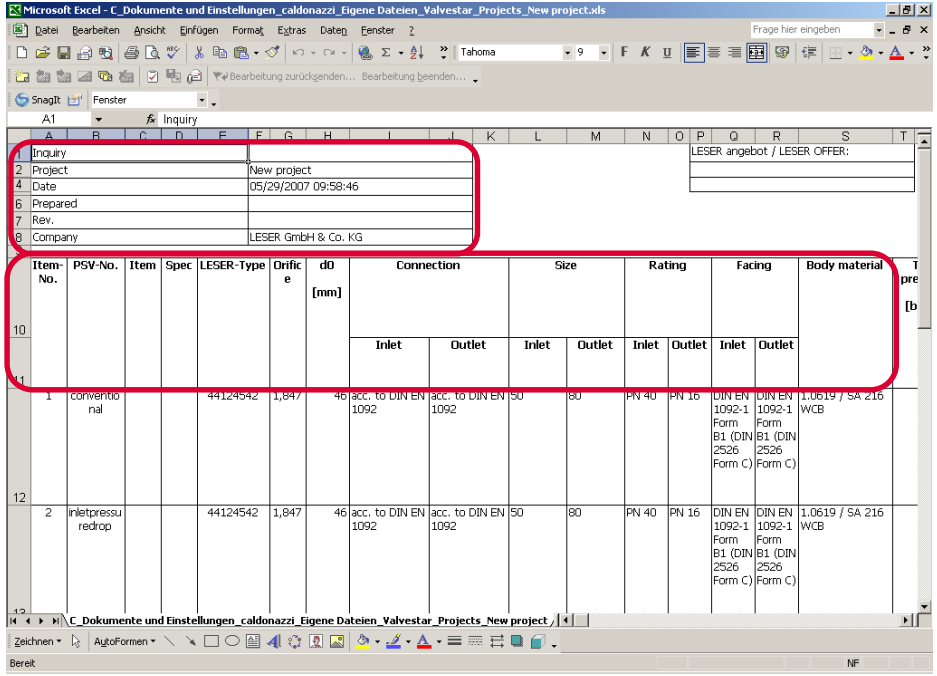
3. Step: Create a project report



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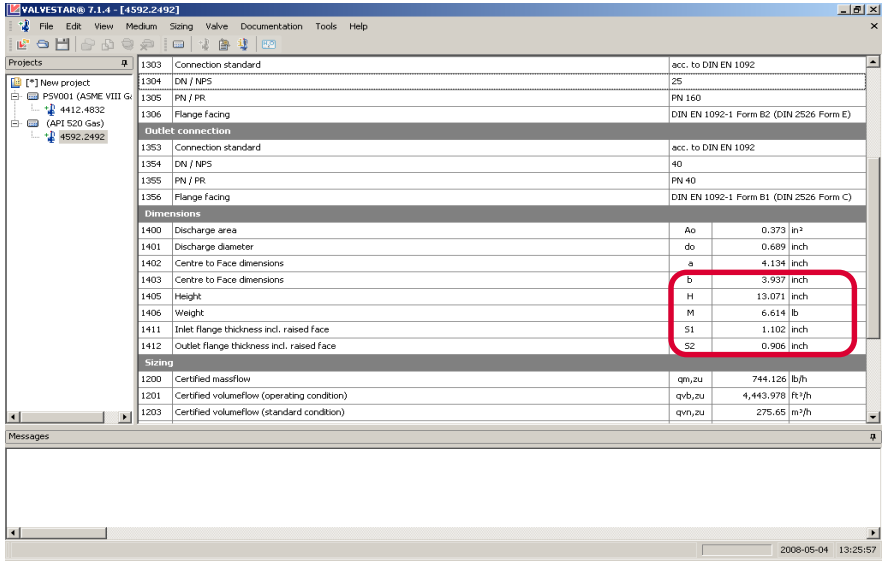
What is new for dimensions S1, S2, c?

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.



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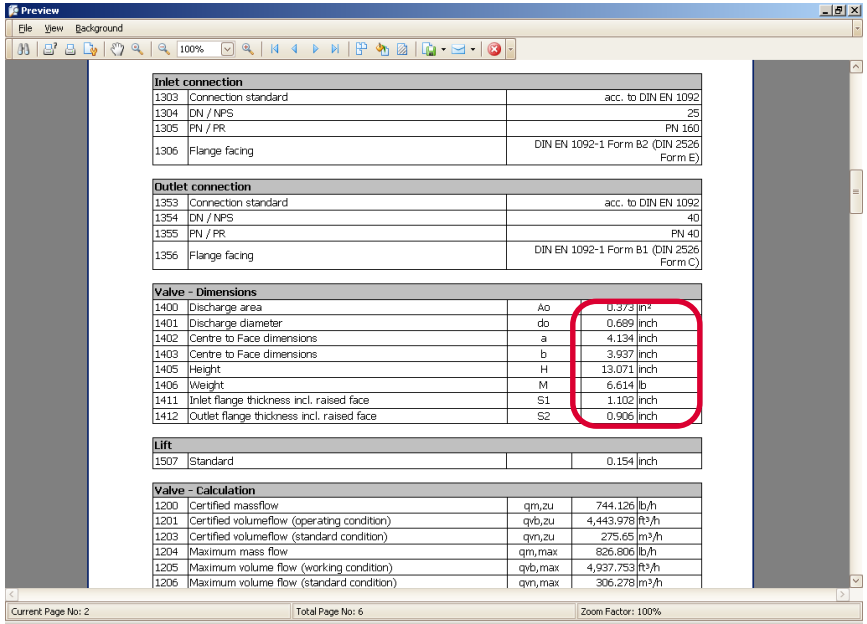
How I find it in the documentation

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



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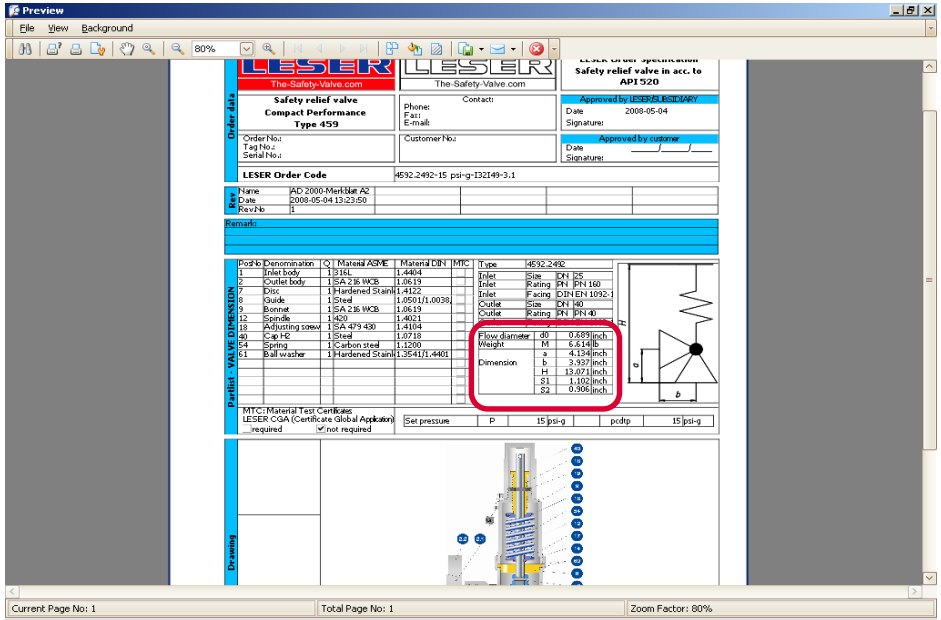
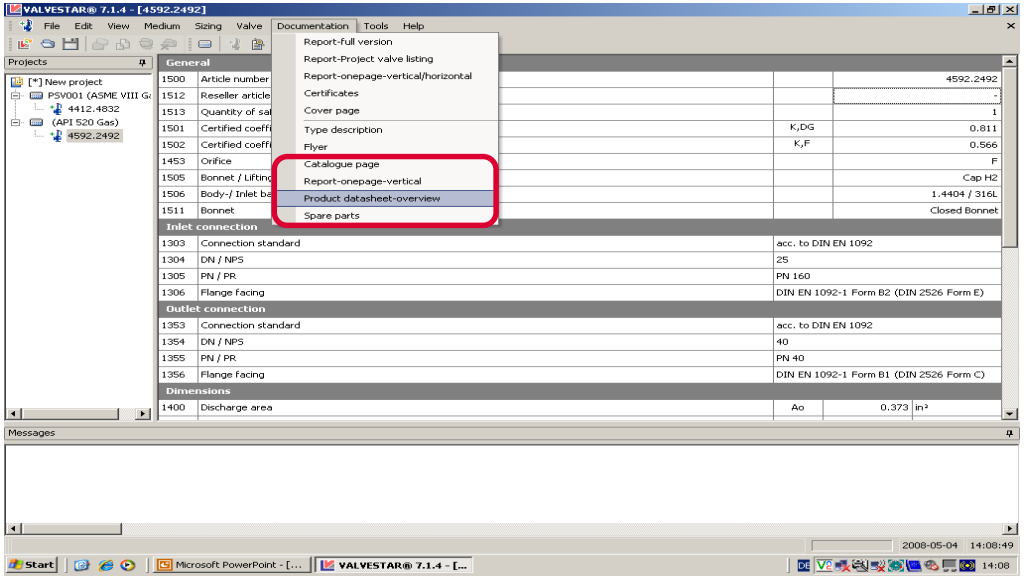
How I find it in the documentation

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, ...



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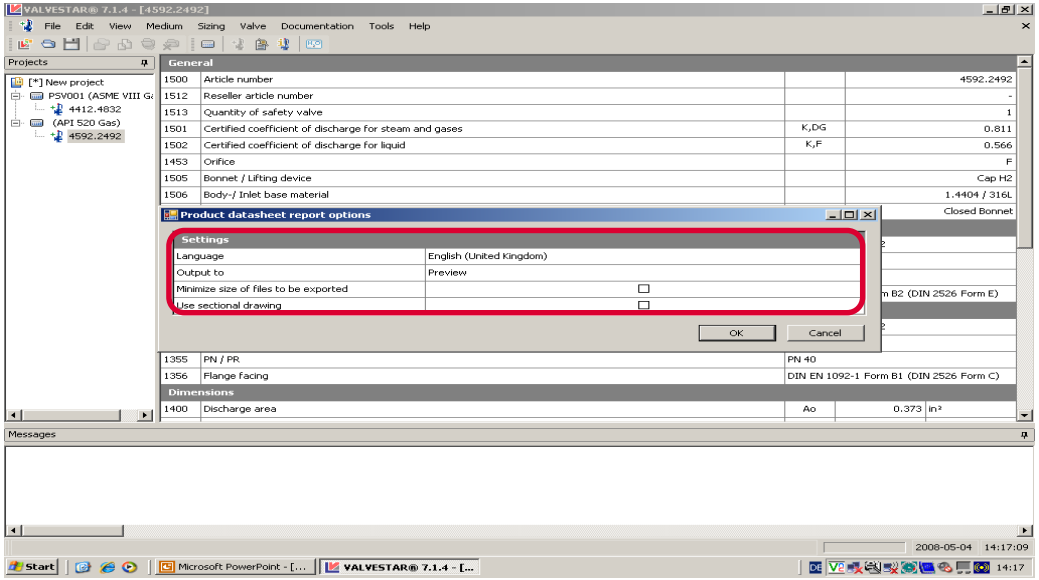
What is the Product datasheet ?

For product datasheet two different drawings as main drawing could be selected: coloured drawing as standard and sectional drawing if needed.



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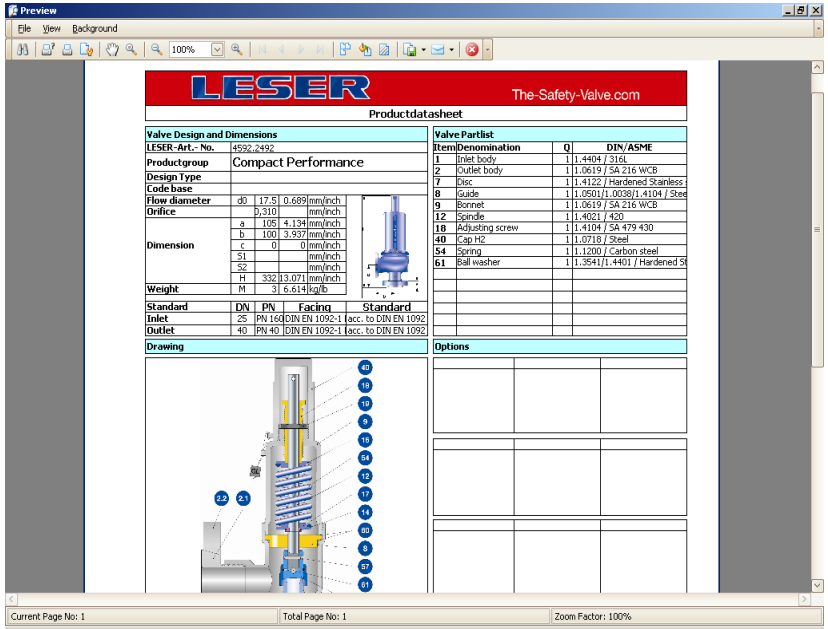
What is the Product datasheet ?

With coloured drawing as standard



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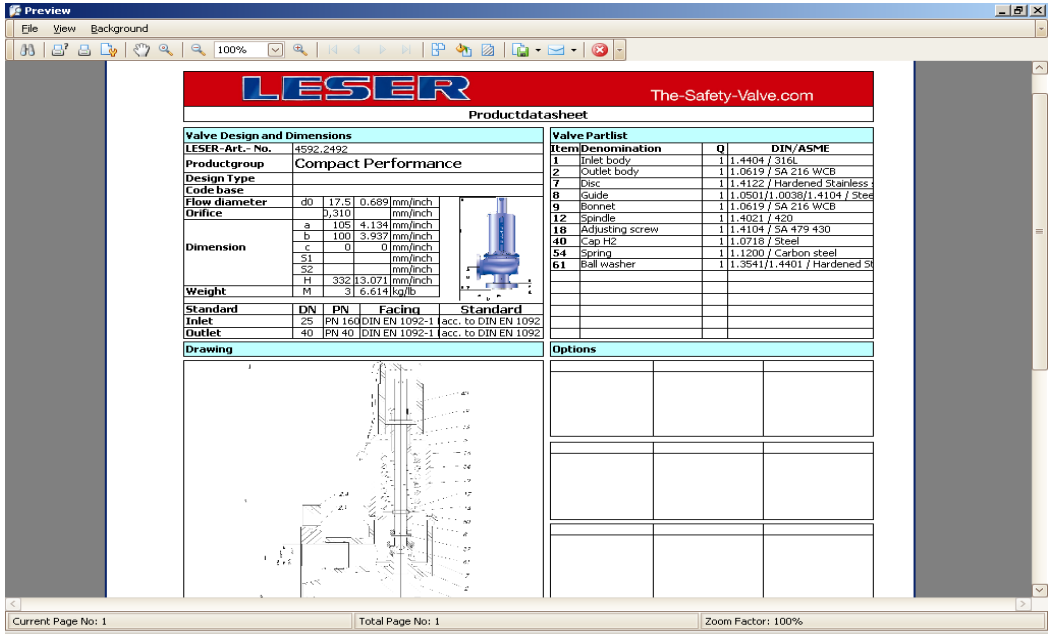
What is the Product datasheet ?

With sectional drawing



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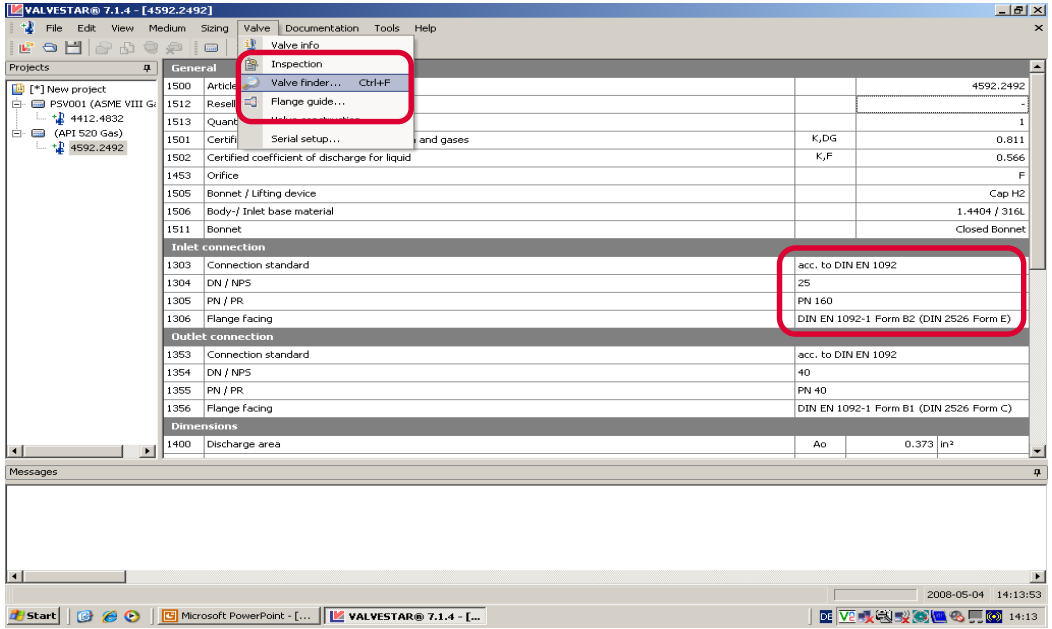
What is different to a report or one-page report?

The product datasheet is also available without sizing, with the feature “Valve finder”



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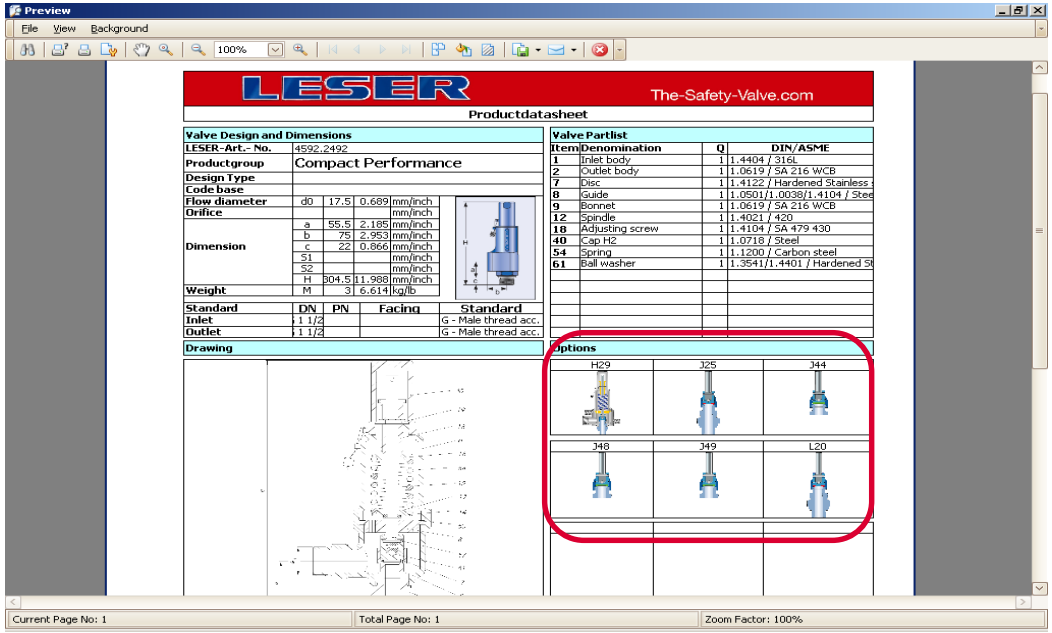
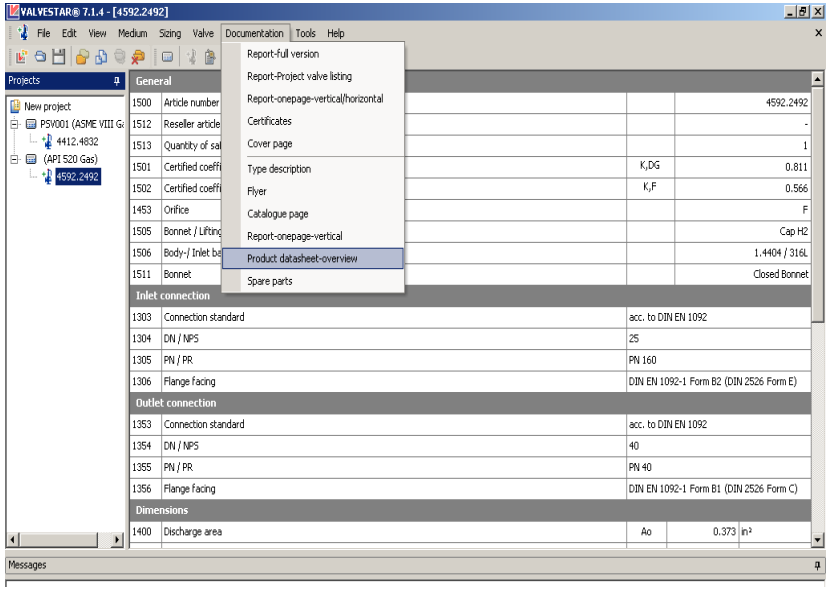
What is different to a report or one-page report?

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



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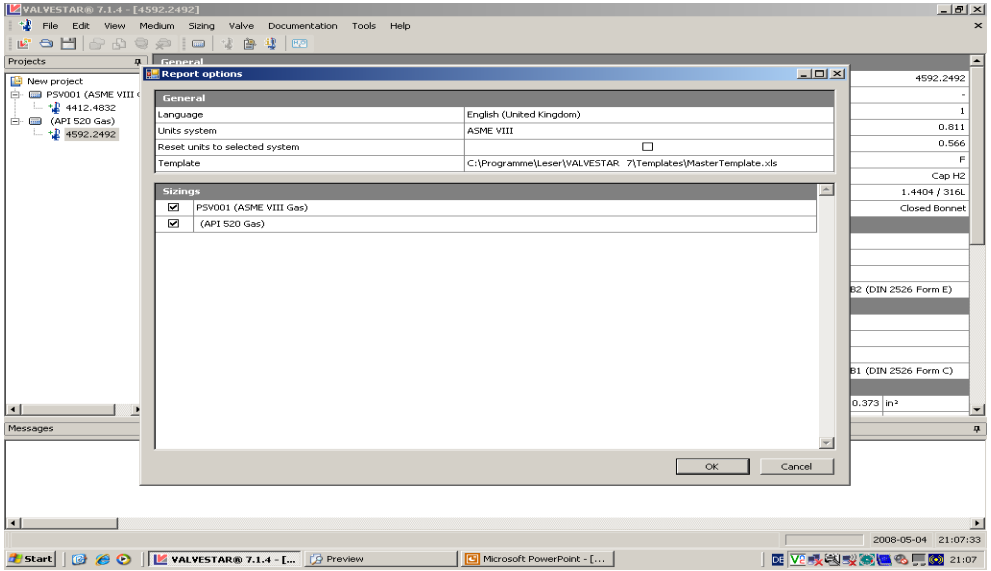
What is the report onepage-vertical ?

This report is available as xls-file to change data for future redesign. The source of template is preset.



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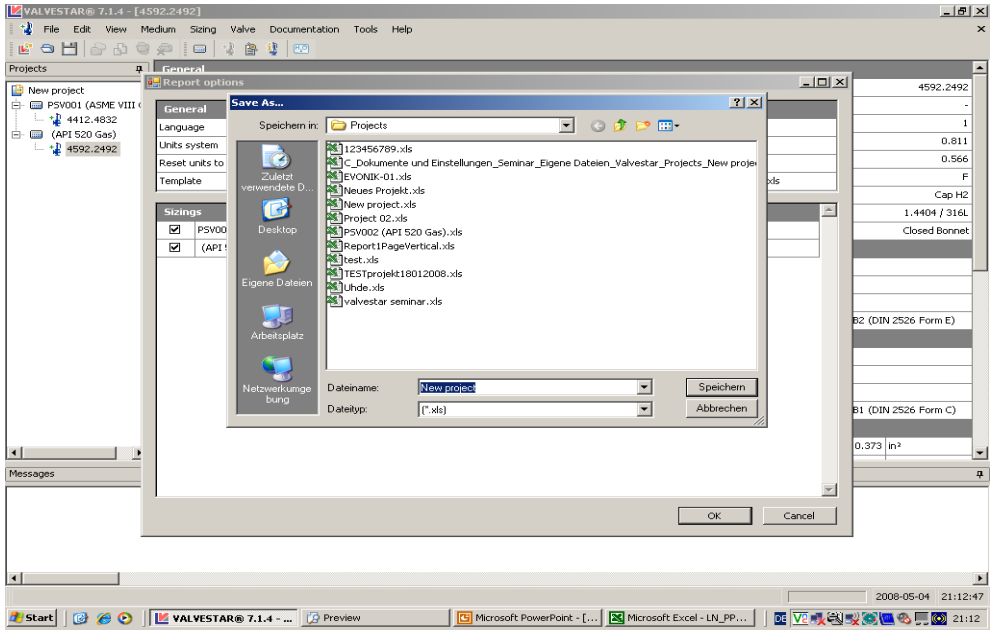
What is the report one-page-vertical ?

Define a file



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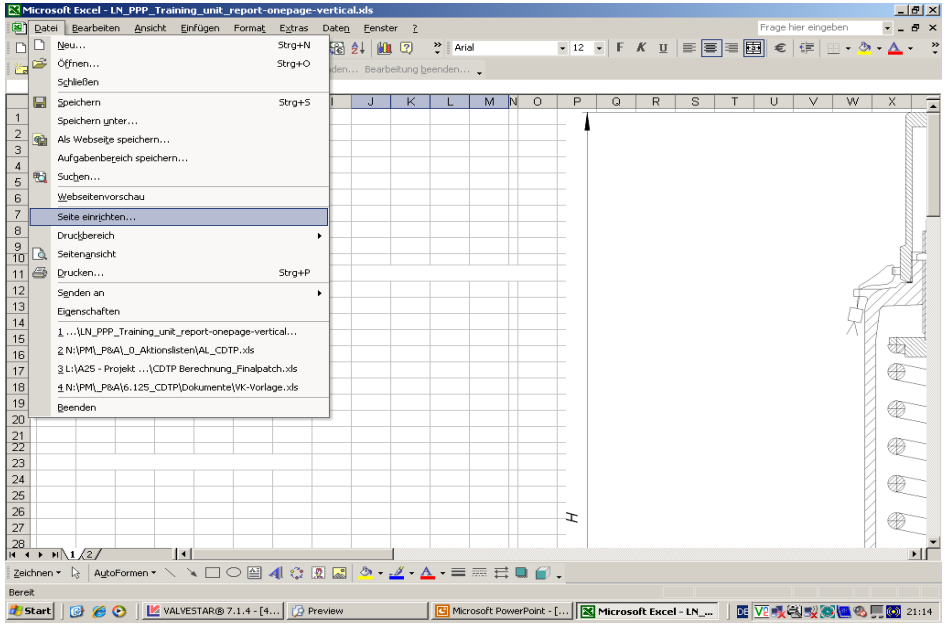
What is the report one-page-vertical ?

The page has to be adjusted to an A4-format



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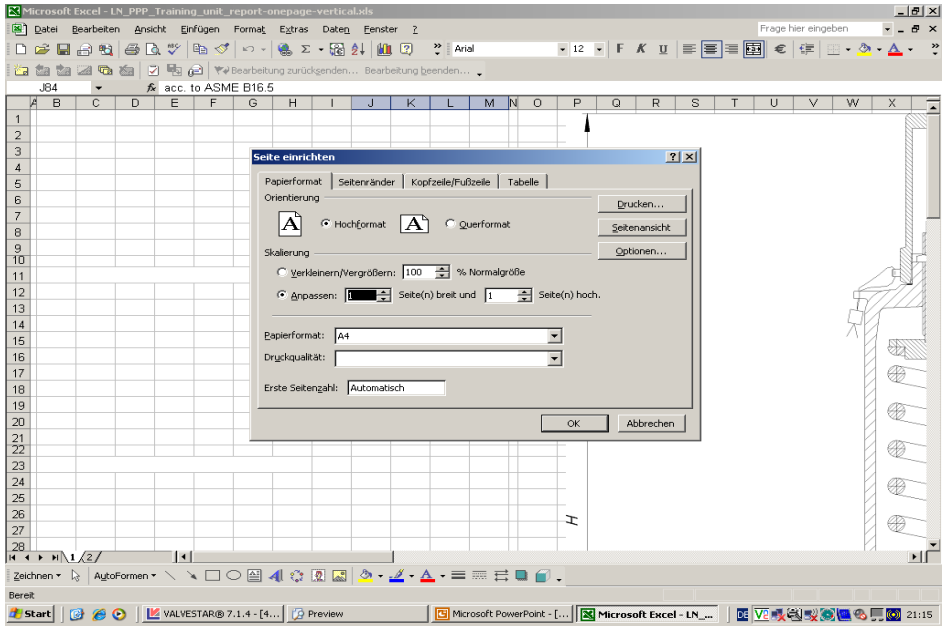
What is the report one-page-vertical ?

The page has to be adjusted to an A4-format



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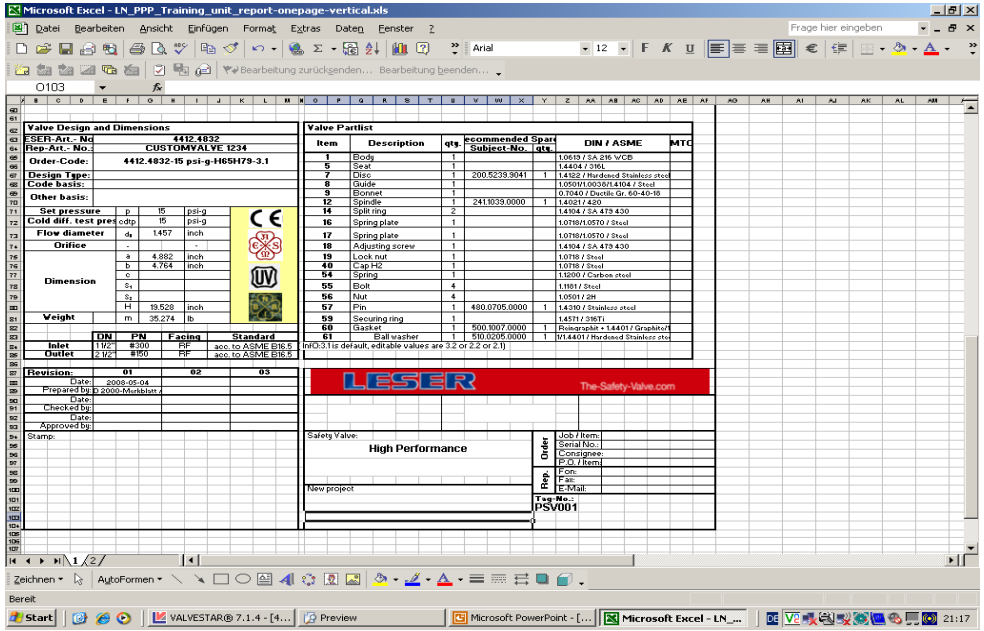
Reporting.

What is the report one-page-vertical ?

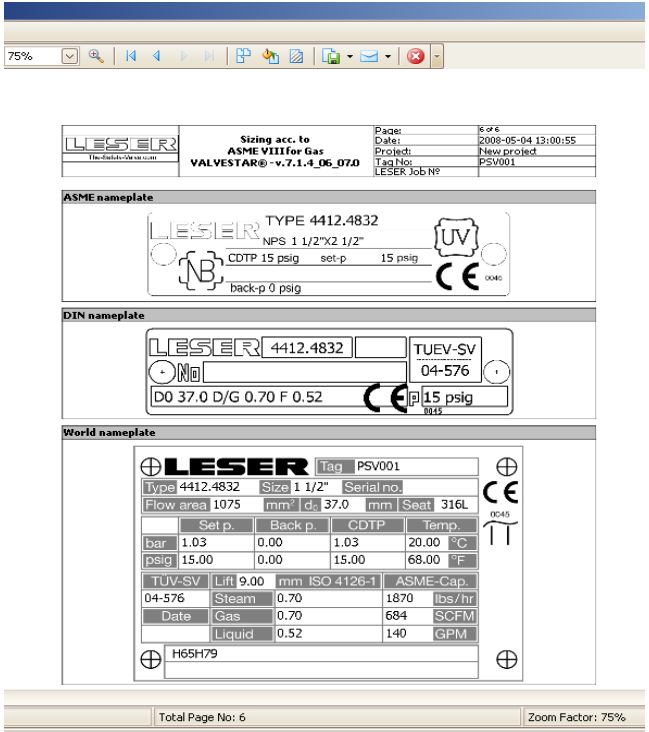
The EXCEL-file can be added with additional data from user. Main data are picked from sizing data



Reporting.

What is the feature “name plate”?

Three current nameplates
are printed in the
“report full-version”



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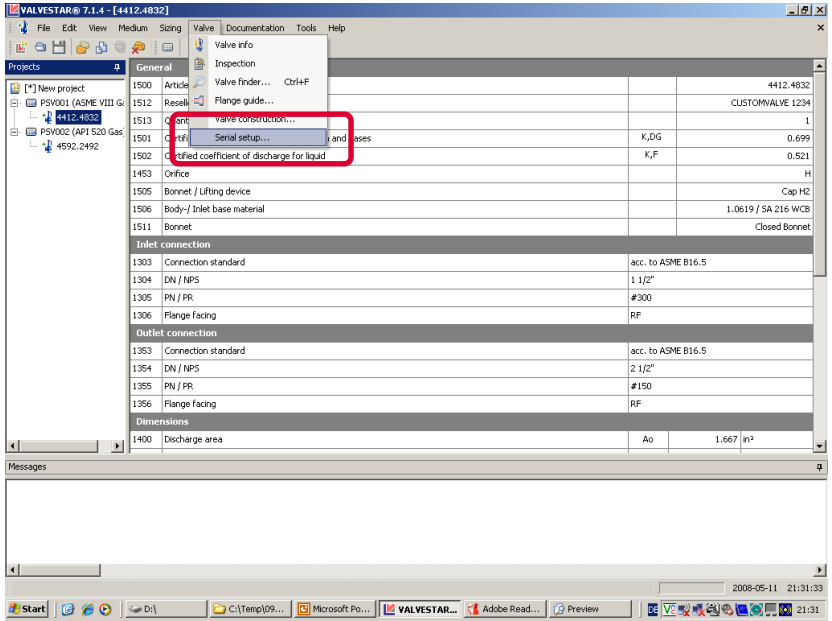
How can I add data to the initial “name plate”?

It is possible to add serial numbers and date of delivery later



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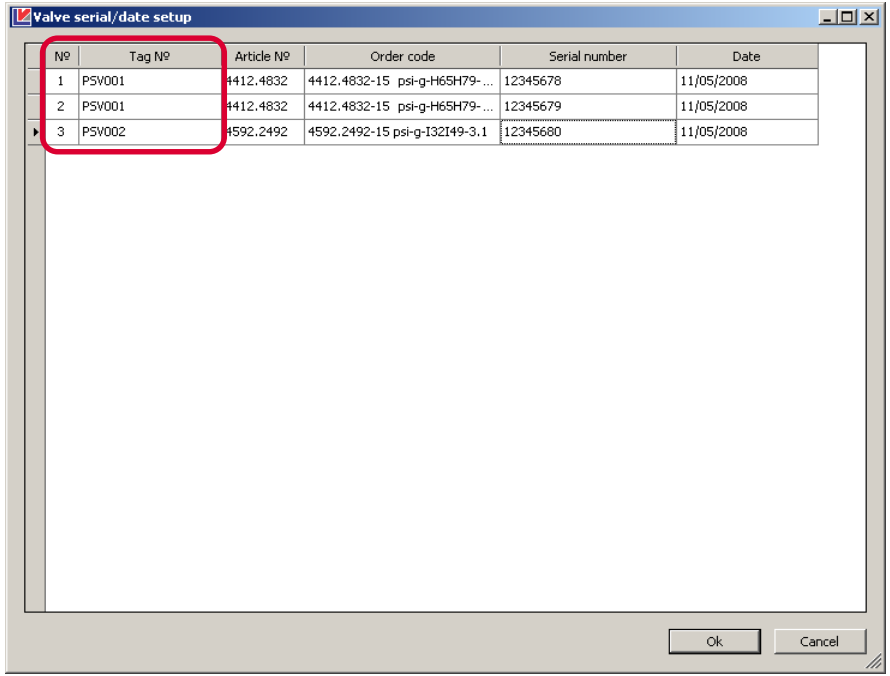
How can I add data to the initial “name plate”?



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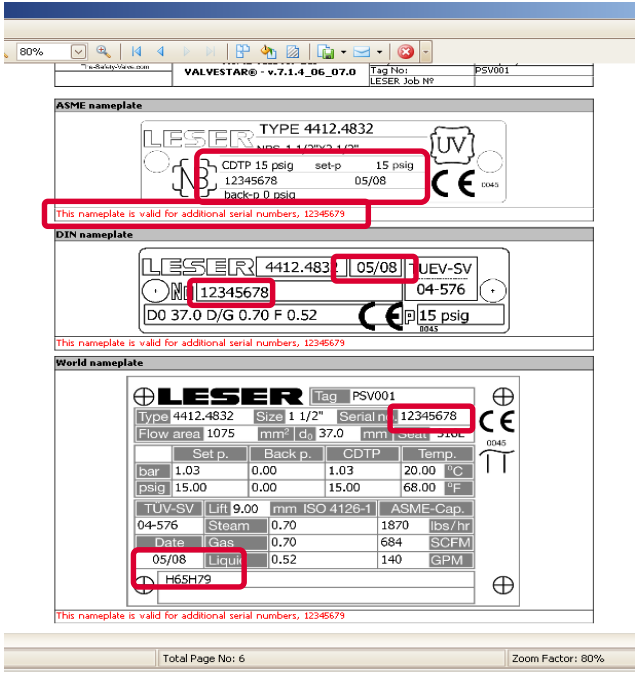
After adding, what is new on “name plate”?



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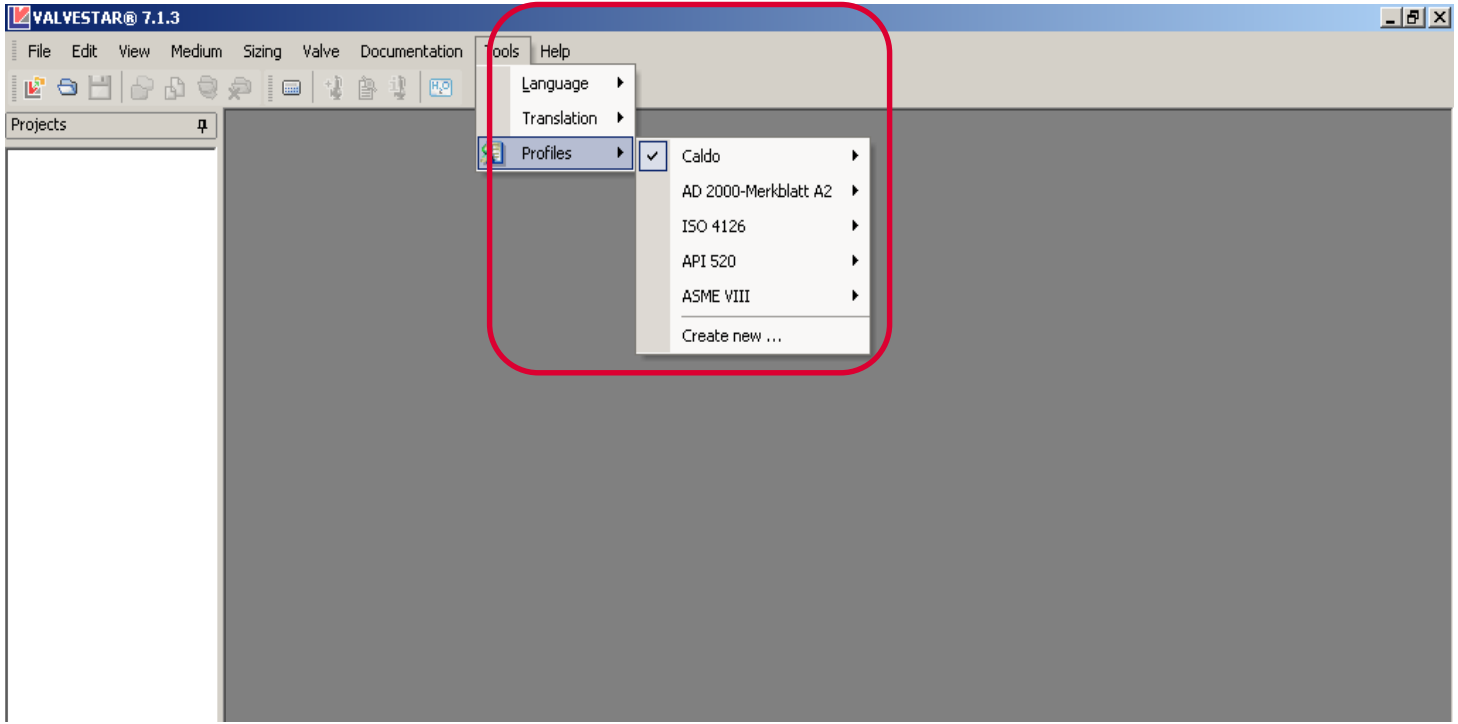
Settings. Profiles.



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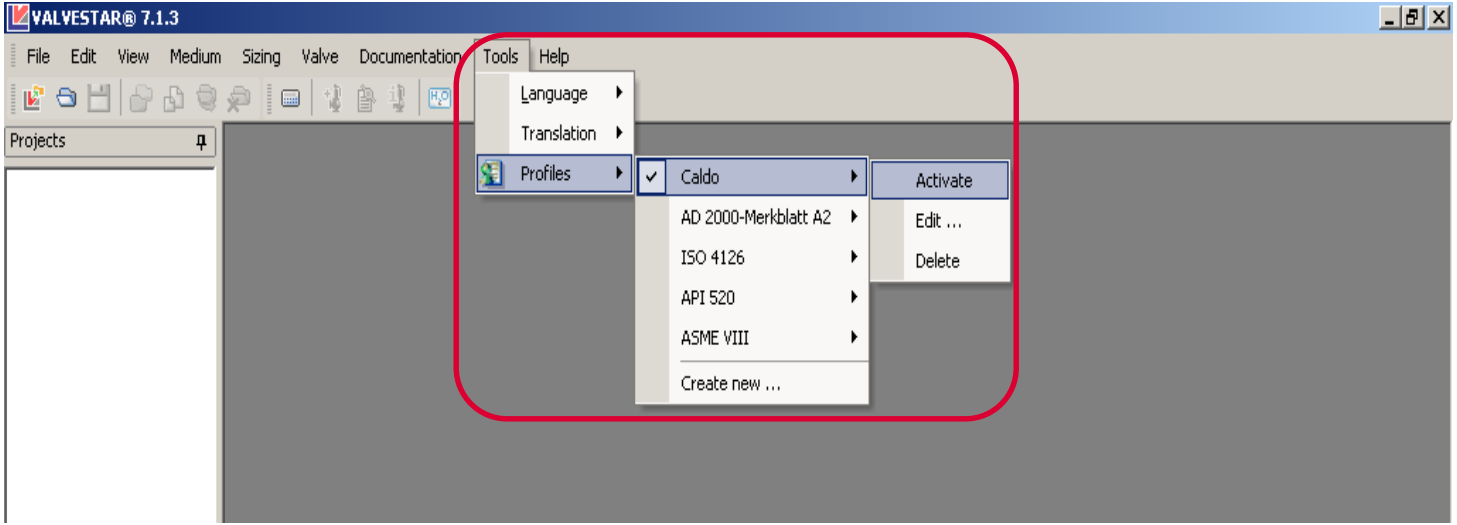
Settings. Profiles.



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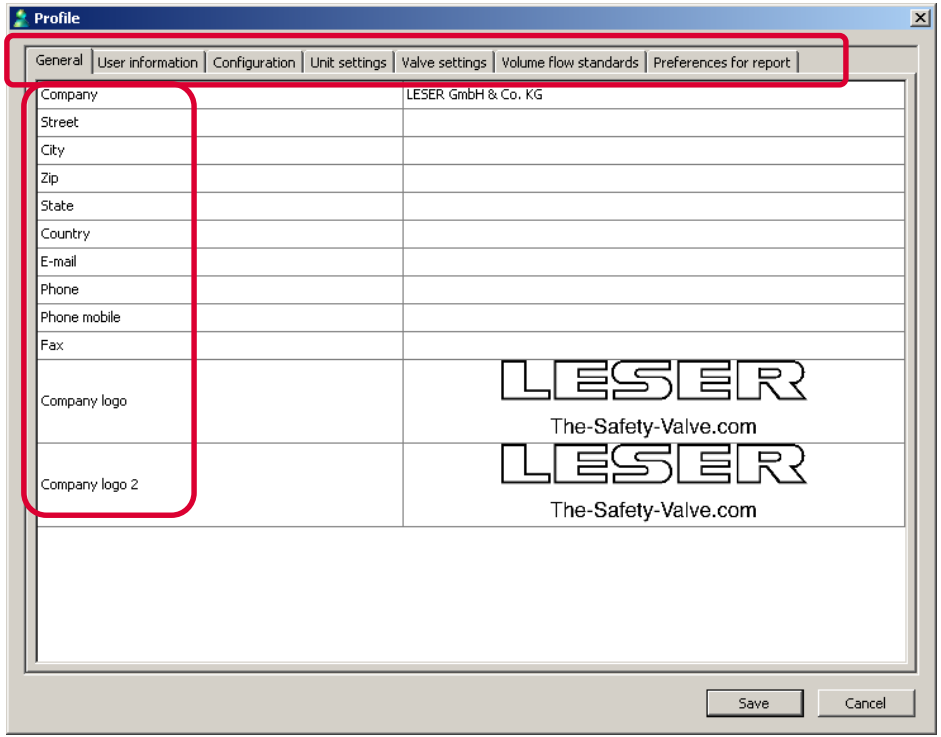
Settings. Profiles.



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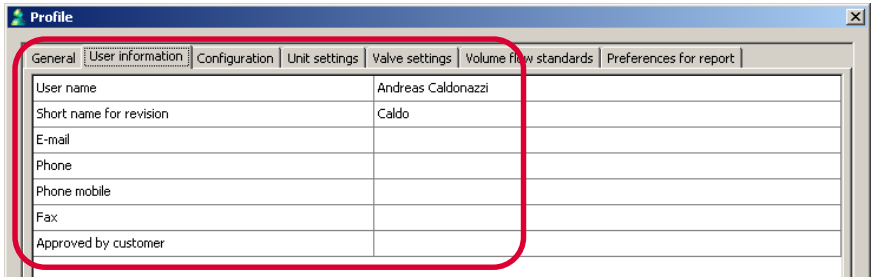
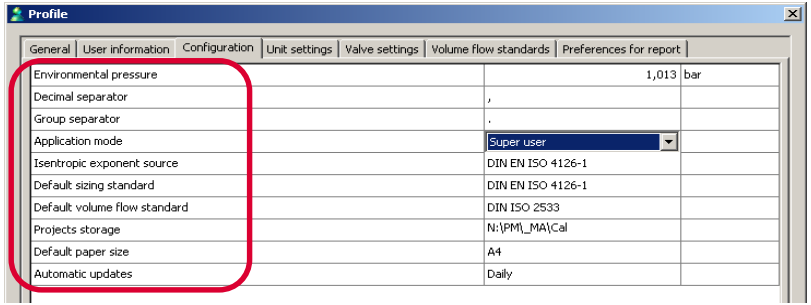
Settings. Profiles.



Name	Default user	Andreas Caldonazzi				
Date	08/15/2007 07:25:16	08/17/2007 11:47:28				
Rev.No	1	2				



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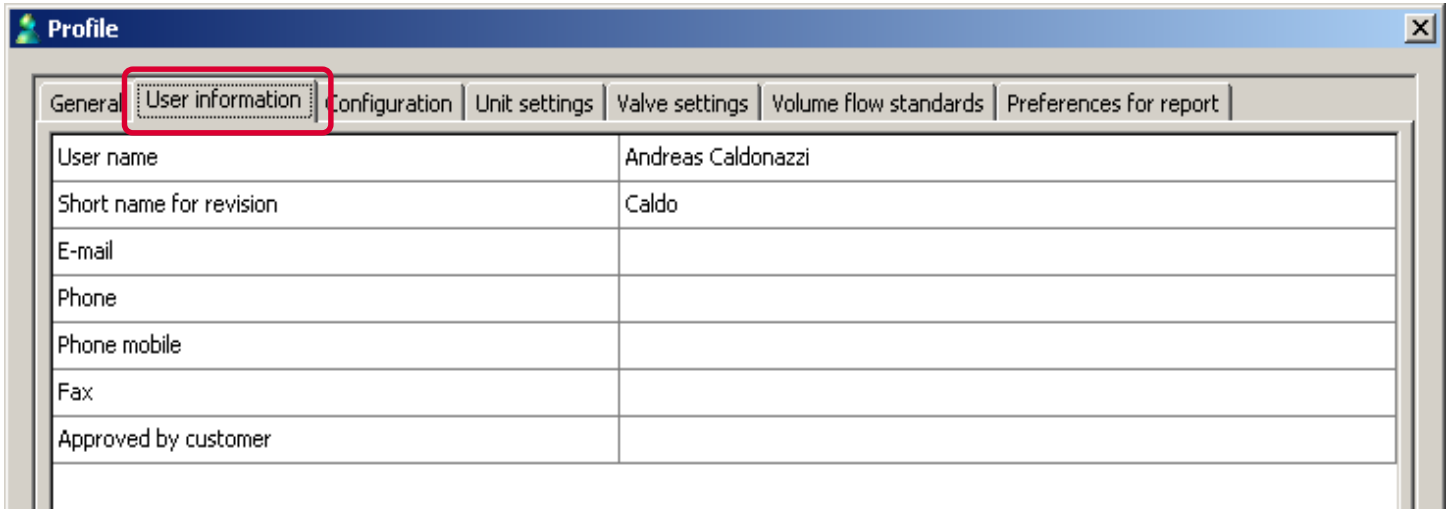
Settings. Profiles.



Name	Default user	Andreas Caldonazzi			
Date	08/15/2007 07:25:16	08/17/2007 11:47:28			
Rev.No	1	2			

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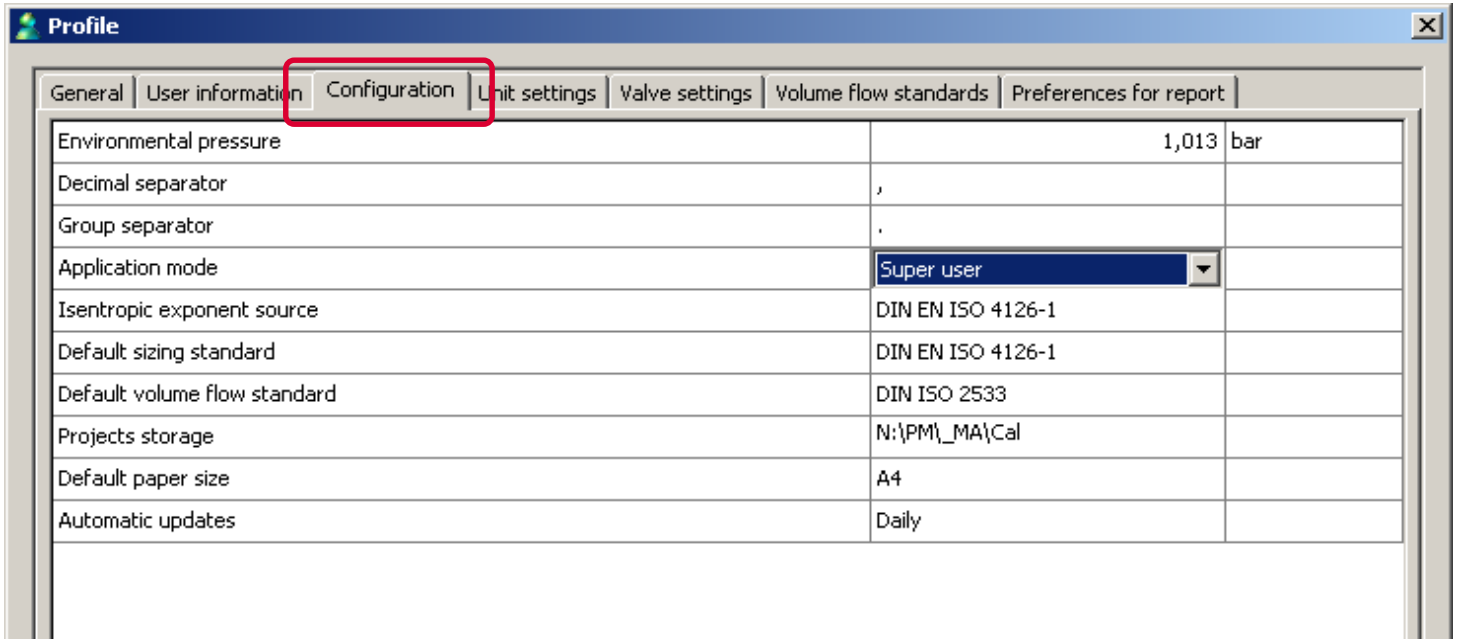
Settings. Profiles.



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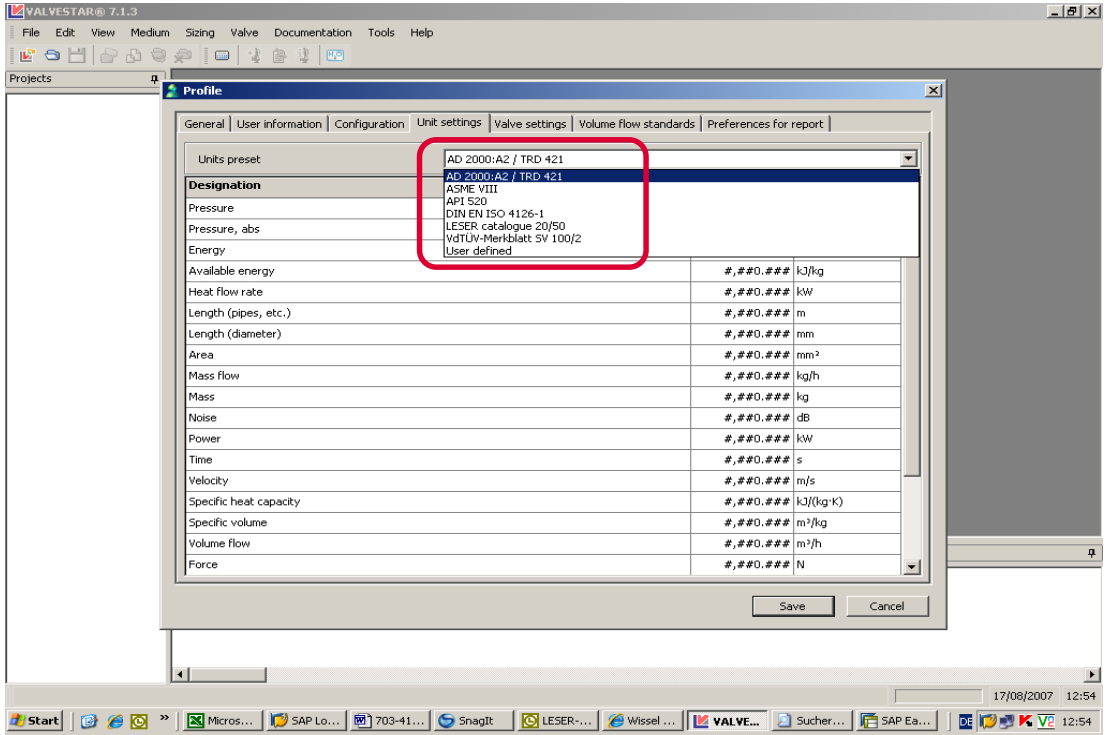
Settings. Profiles.



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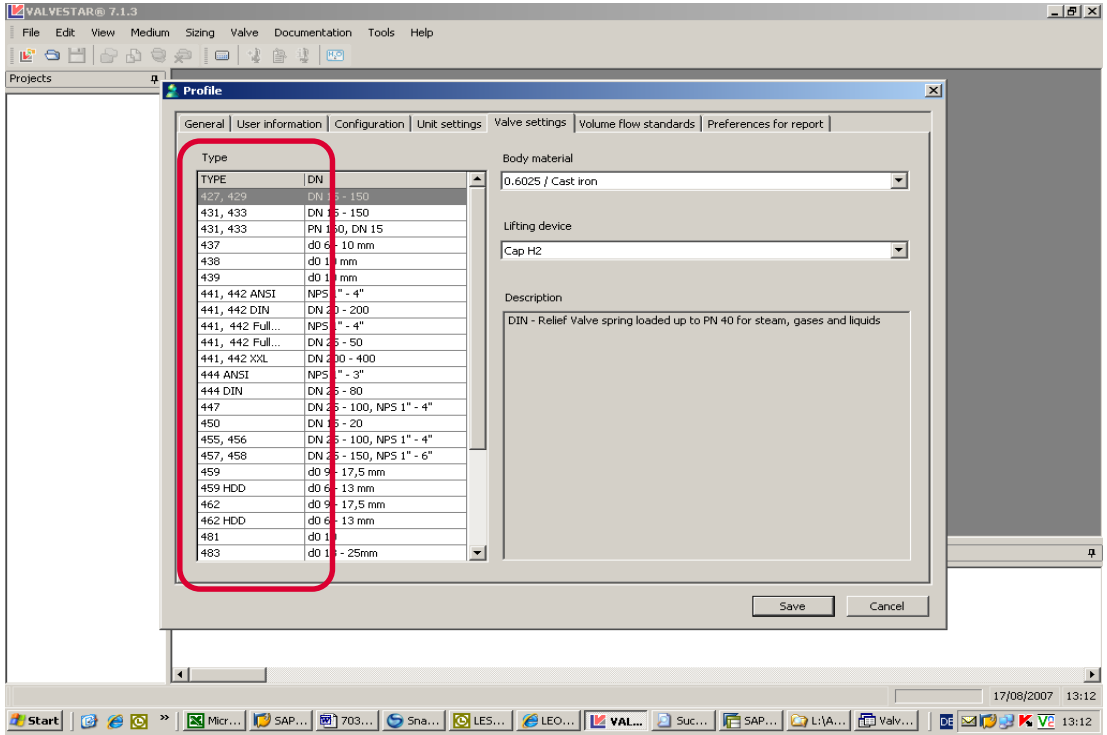
Settings. Profiles.



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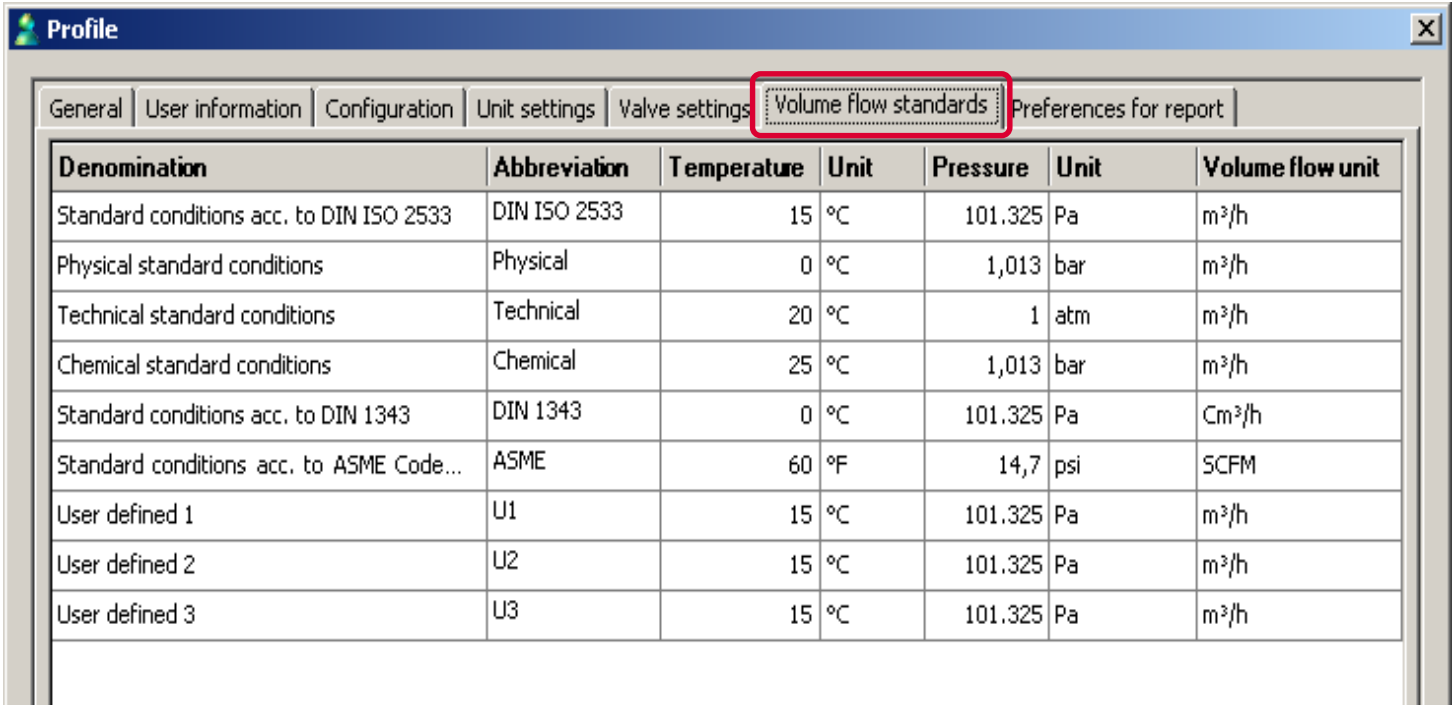
Settings. Profiles.



Denomination	Abbreviation	Temperature	Unit	Pressure	Unit	Volume flow unit
Standard conditions acc. to DIN ISO 2533	DIN ISO 2533	15	°C	101.325	Pa	m³/h
Physical standard conditions	Physical	0	°C	1,013	bar	m³/h
Technical standard conditions	Technical	20	°C	1	atm	m³/h
Chemical standard conditions	Chemical	25	°C	1,013	bar	m³/h
Standard conditions acc. to DIN 1343	DIN 1343	0	°C	101.325	Pa	Cm³/h
Standard conditions acc. to ASME Code...	ASME	60	°F	14,7	psi	SCFM
User defined 1	U1	15	°C	101.325	Pa	m³/h
User defined 2	U2	15	°C	101.325	Pa	m³/h
User defined 3	U3	15	°C	101.325	Pa	m³/h

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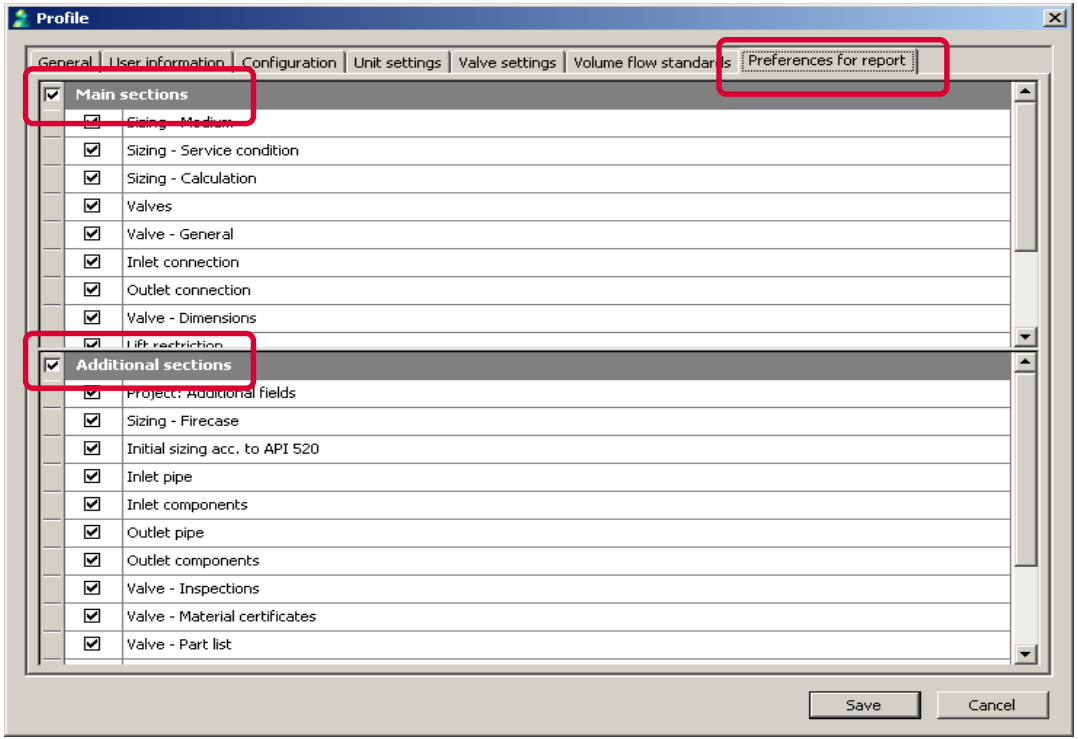
Settings. Profiles.



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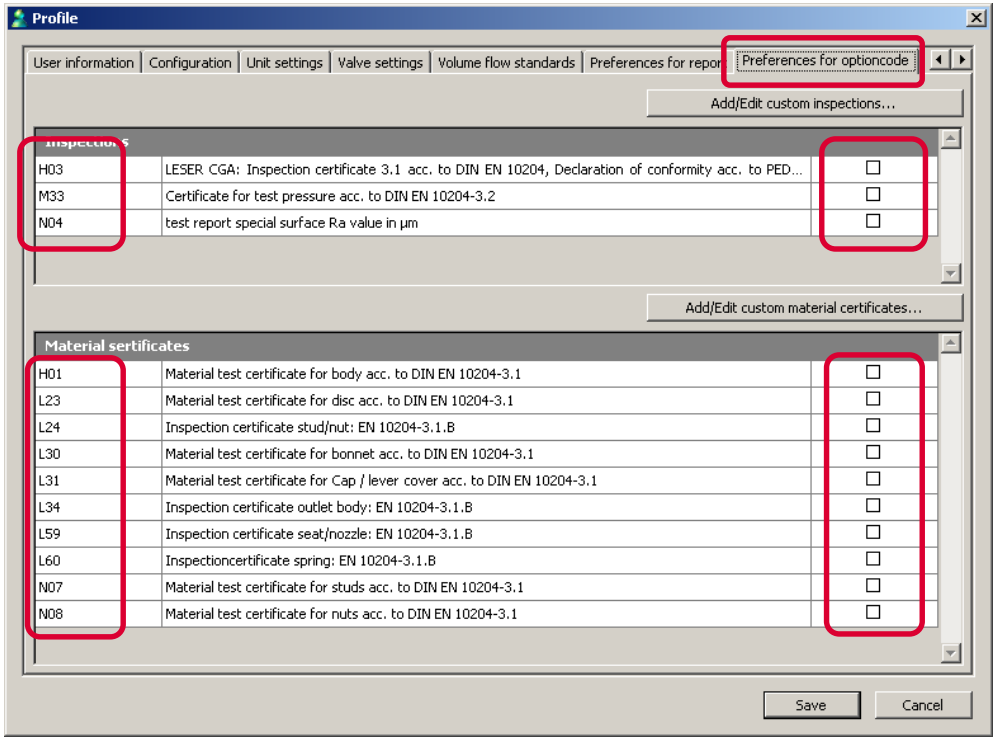
Settings. Profiles.



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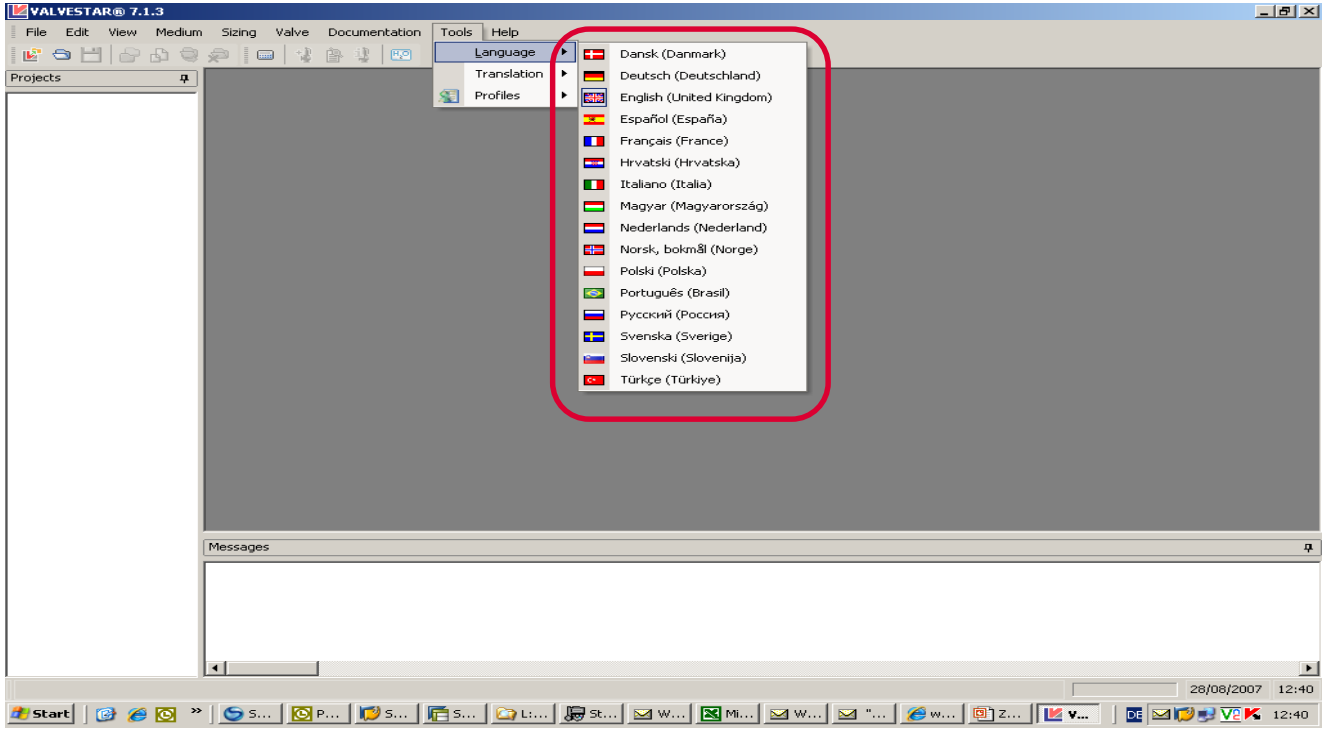
Language.



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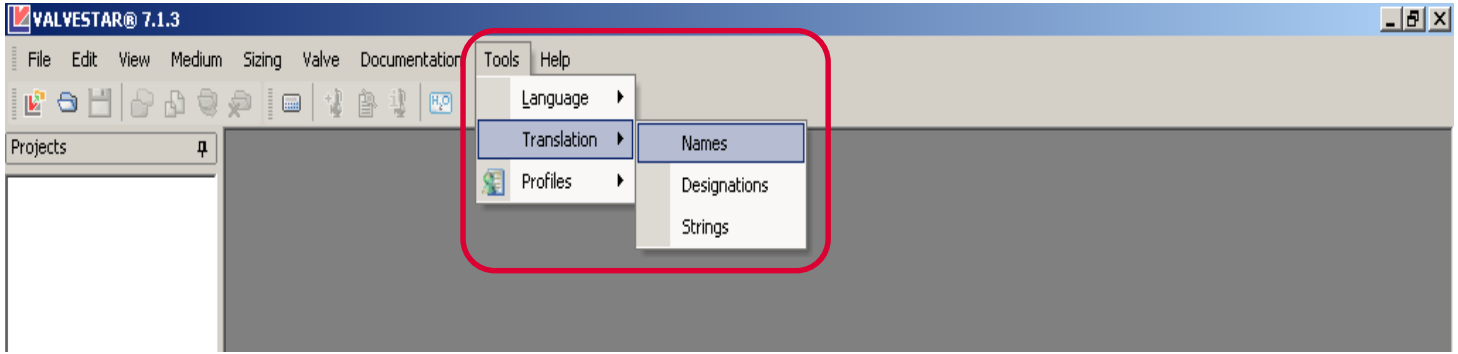
Translation.



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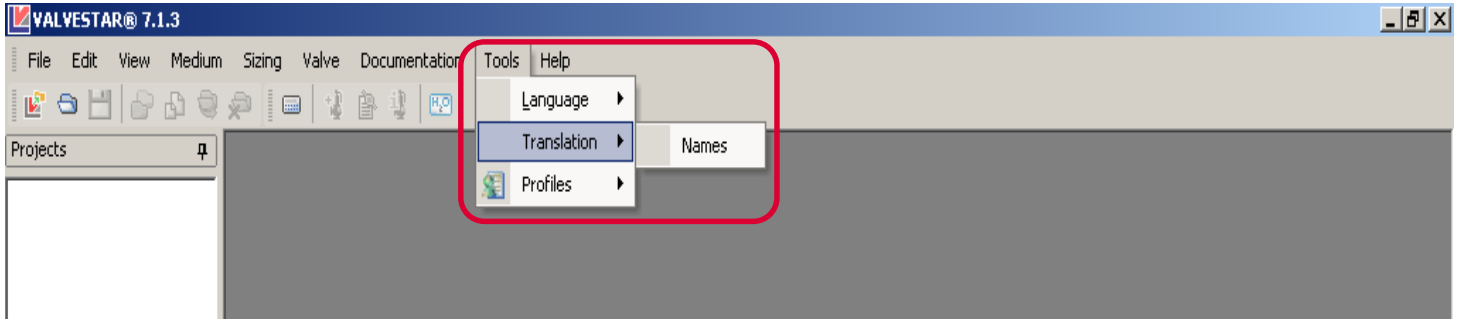
Translation.



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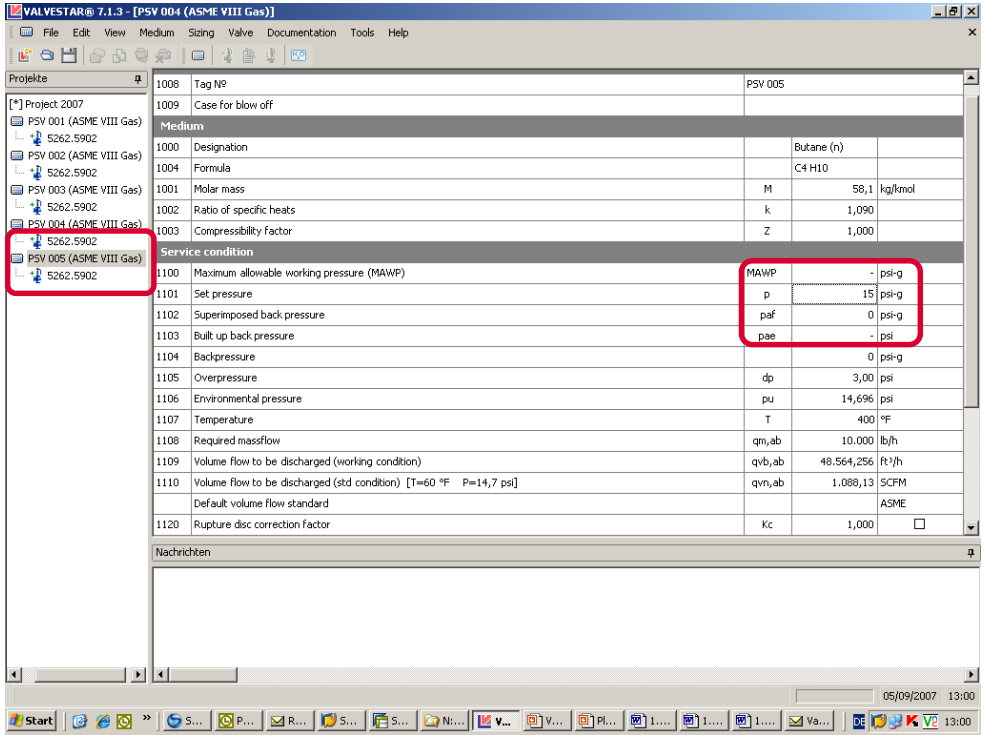
How to change data.



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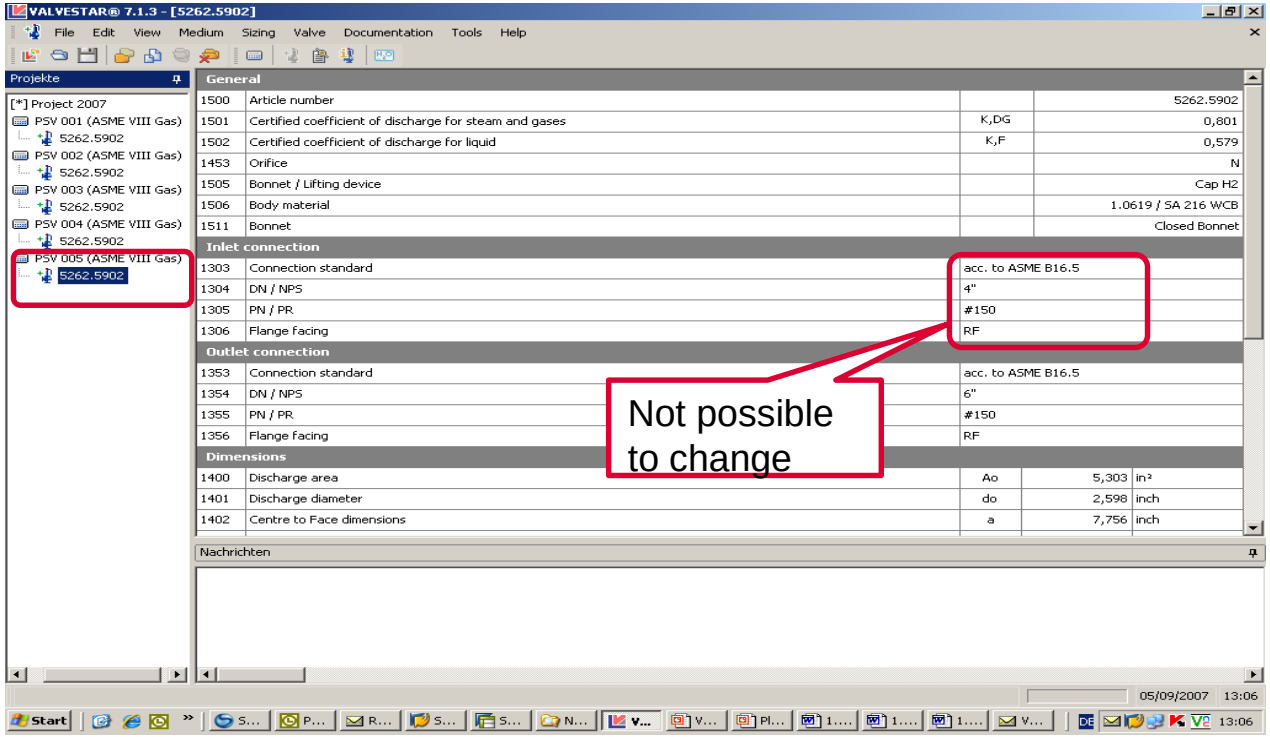
How to change data.



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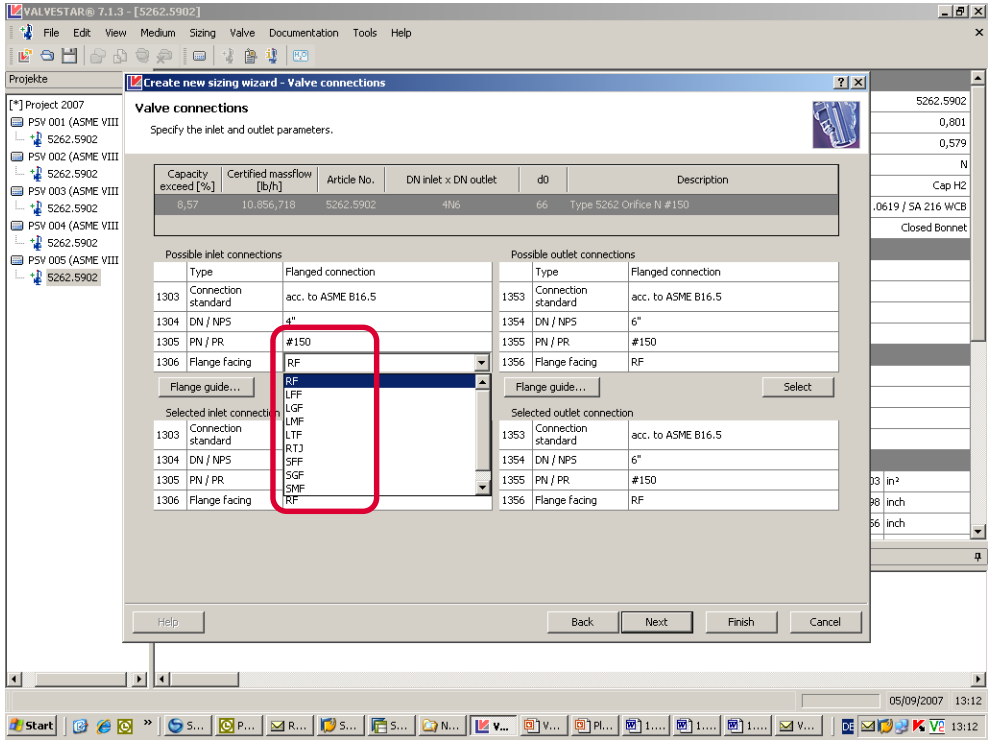
How to change data.



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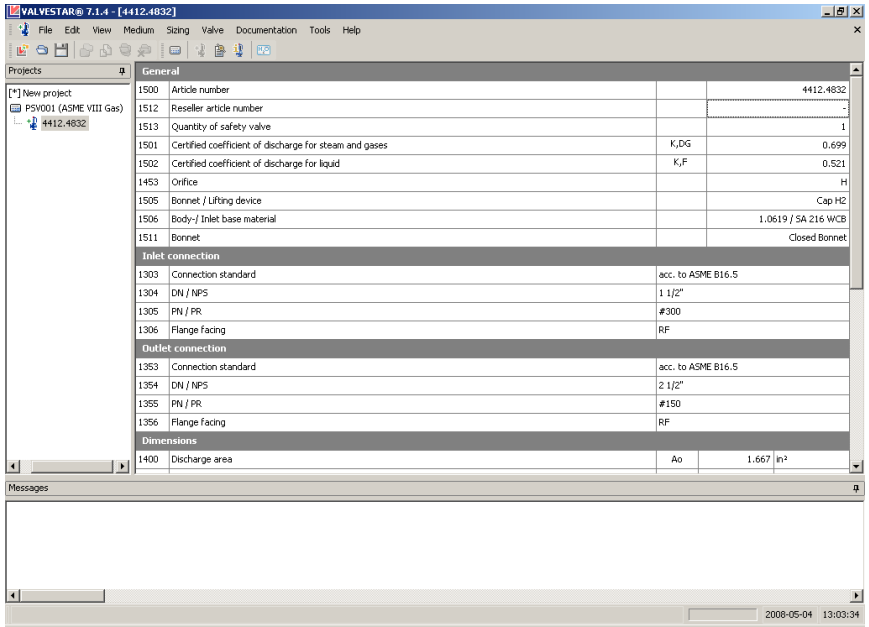
How to change data.

How to manually input a reseller article no.

First: Do a standard sizing



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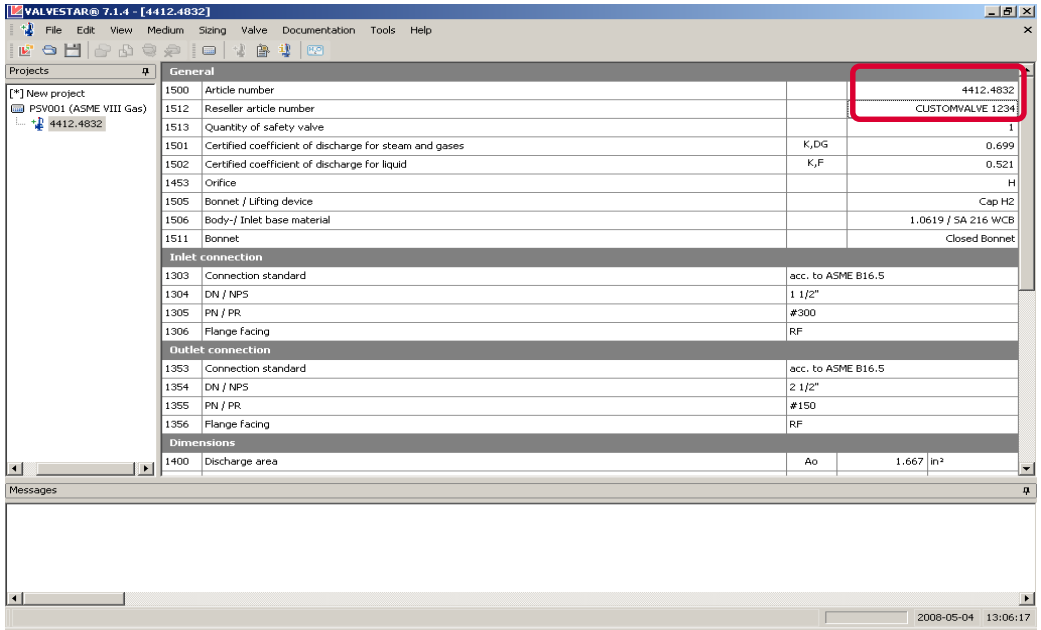
How to change data.

How to manually input a reseller article no.

Second: Add a reseller article no.



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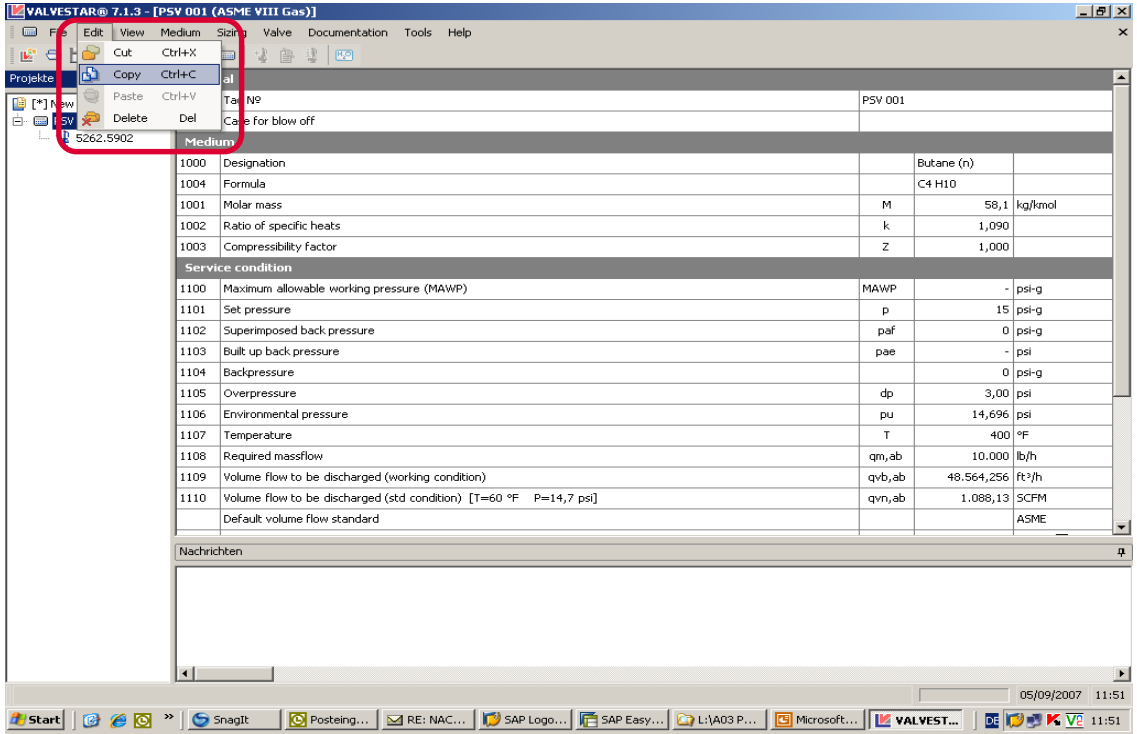
Copy and Paste.



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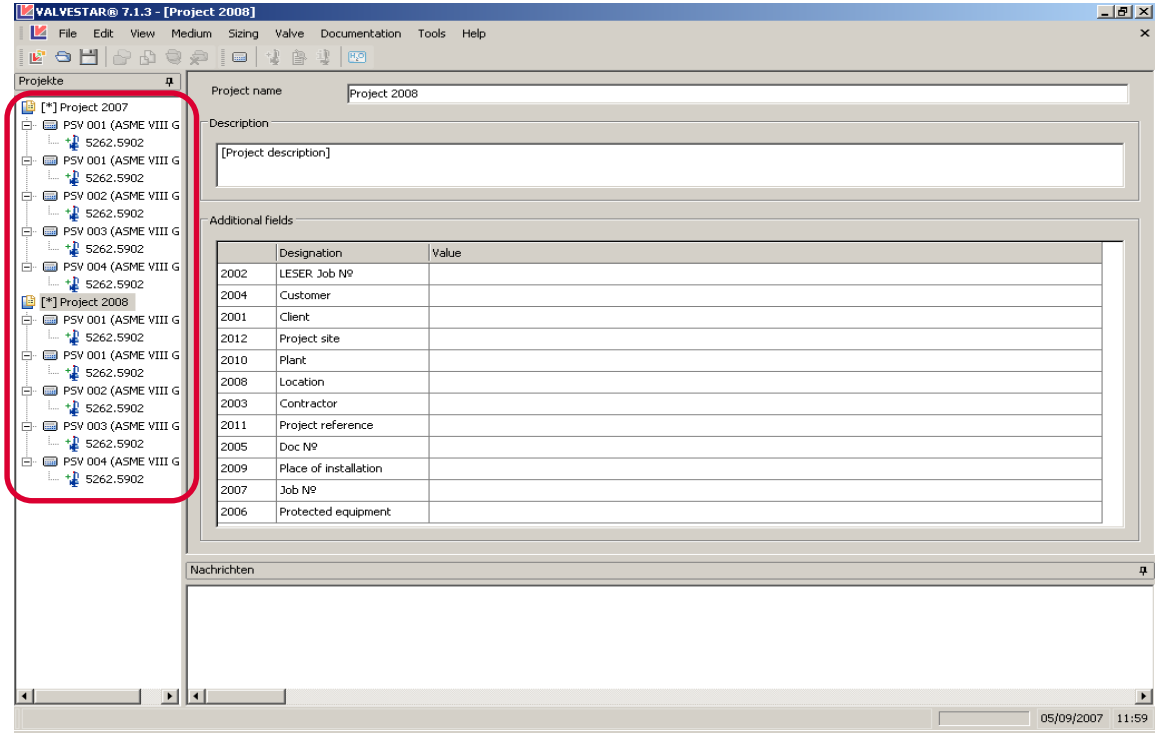
Copy and Paste.



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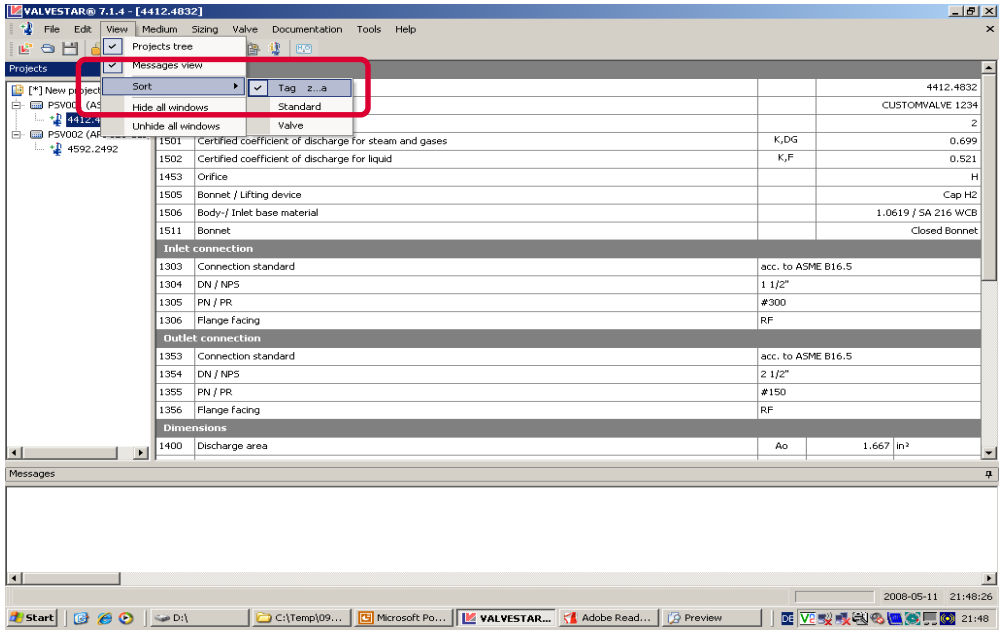
How to change data.

What are the features for better handling?

Sort function in menue “View”



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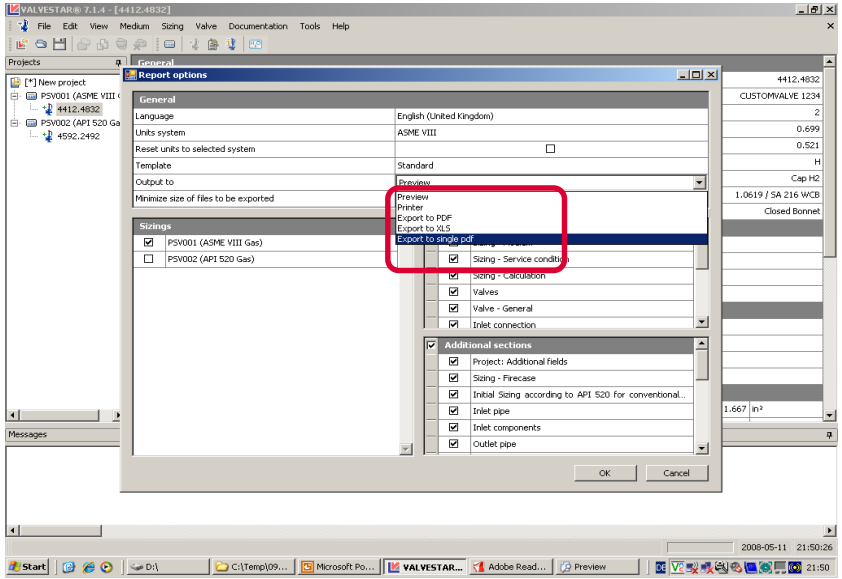
How to change data.

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”



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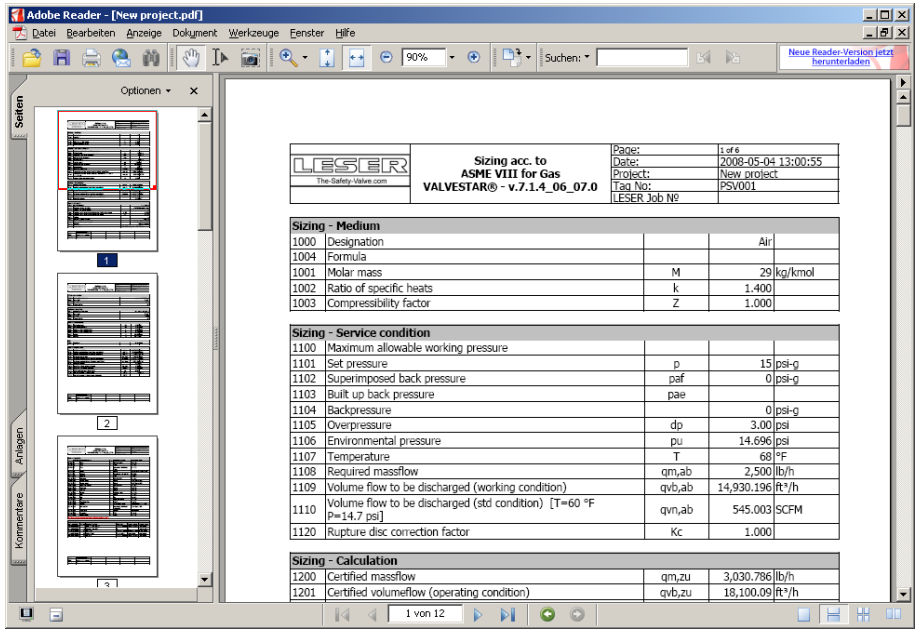
How to change data.

Where is the pdf-filed automatically?

Filed in the project storage”



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	Sizing acc. to ASME VIII for Gas VALVESTAR® - v.7.1.4_06_07.0	Page:	1 of 6
		Date:	2008-05-04 13:00:55
		Project:	New project
		Tag No:	PSV001
		LESER Job №	

Sizing - Medium				
1000	Designation		Air	
1004	Formula			
1001	Molar mass	M	29	kg/kmol
1002	Ratio of specific heats	k	1.400	
1003	Compressibility factor	Z	1.000	

Sizing - Service condition				
1100	Maximum allowable working pressure			
1101	Set pressure	p	15	psi-g
1102	Superimposed back pressure	paf	0	psi-g
1103	Built up back pressure	pae		
1104	Backpressure		0	psi-g
1105	Overpressure	dp	3.00	psi
1106	Environmental pressure	pu	14.696	psi
1107	Temperature	T	68	°F
1108	Required massflow	qm,ab	2,500	lb/h
1109	Volume flow to be discharged (working condition)	qvb,ab	14,930.196	ft³/h
1110	Volume flow to be discharged (std condition) [T=60 °F P=14.7 psi]	qvn,ab	545.003	SCFM
1120	Rupture disc correction factor	Kc	1.000	

Sizing - Calculation				
1200	Certified massflow	qm,zu	3,030.786	lb/h
1201	Certified volumeflow (operating condition)	qvb,zu	18,100.09	ft³/h

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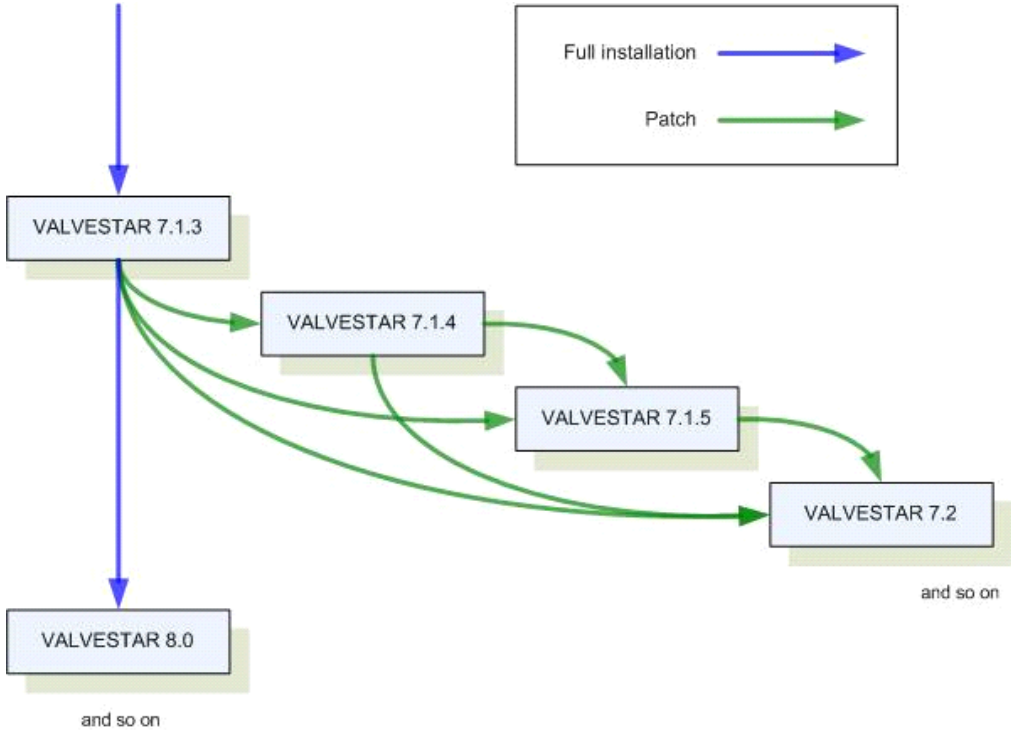
Update via Internet.



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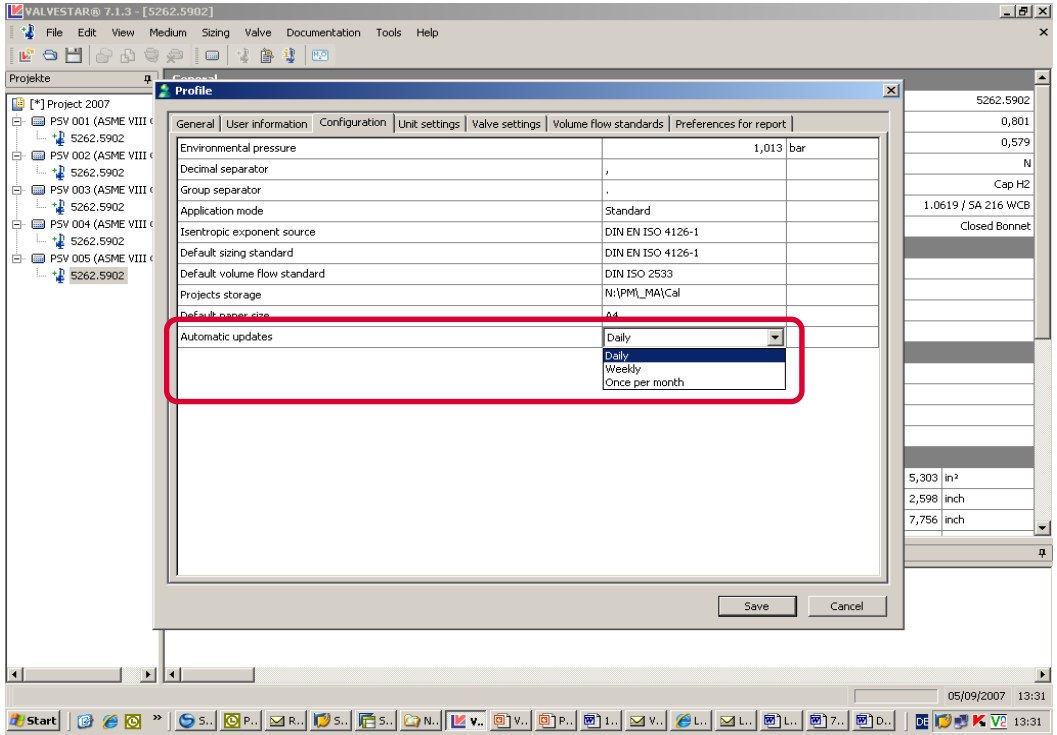
Update via Internet.



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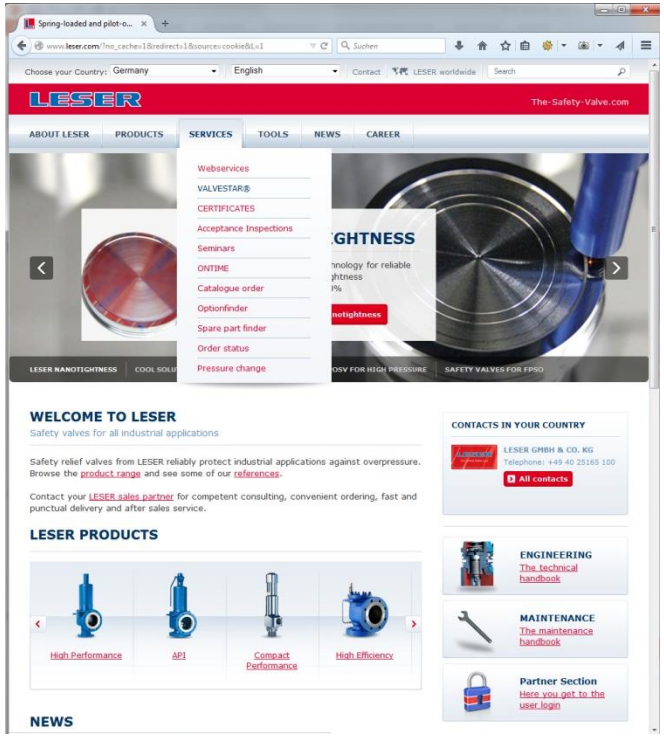
Update via Internet. Homepage – www.leser.com.



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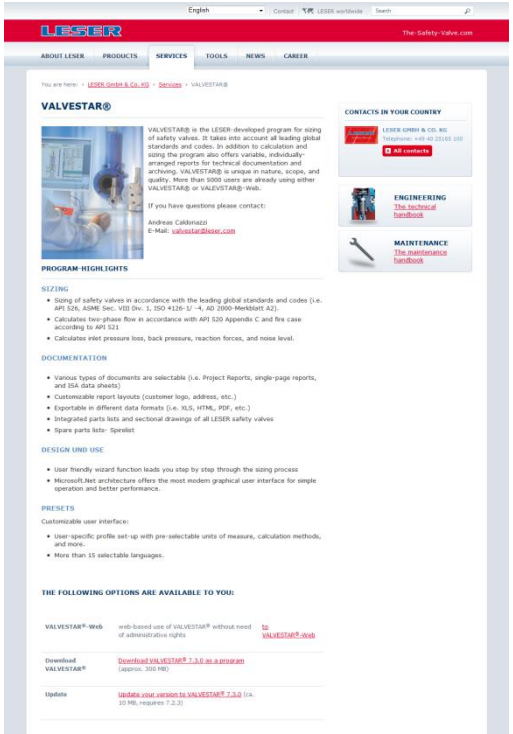
Update via Internet. www.leser.com/en/services/valvestar.



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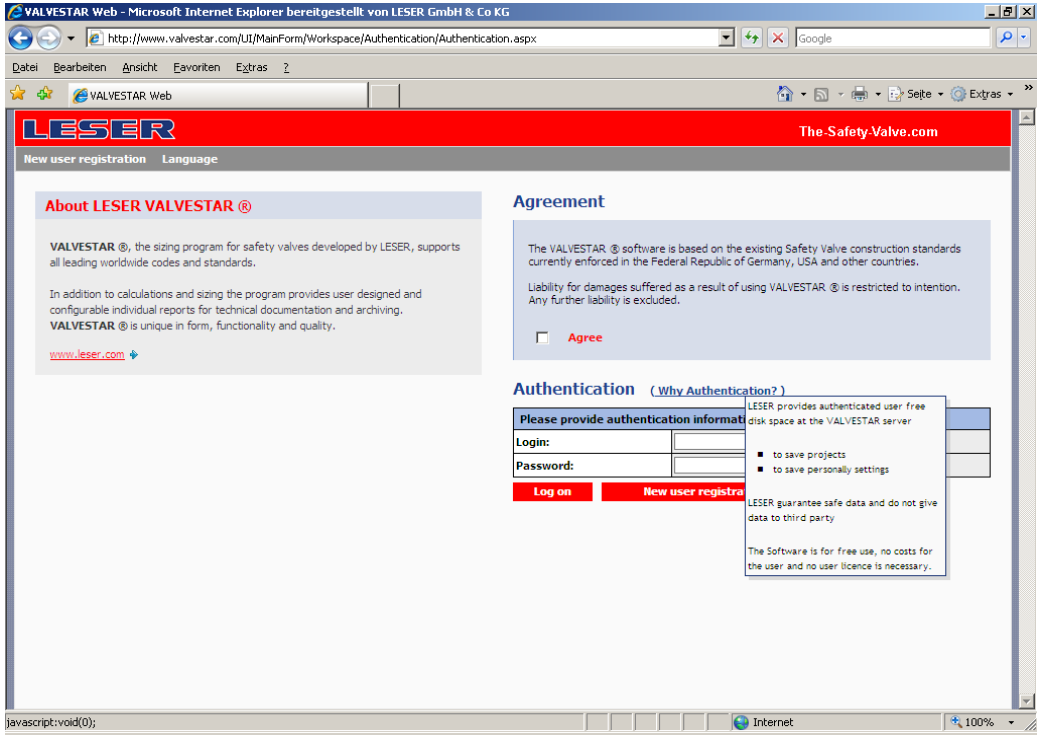
www.valvestar.com.



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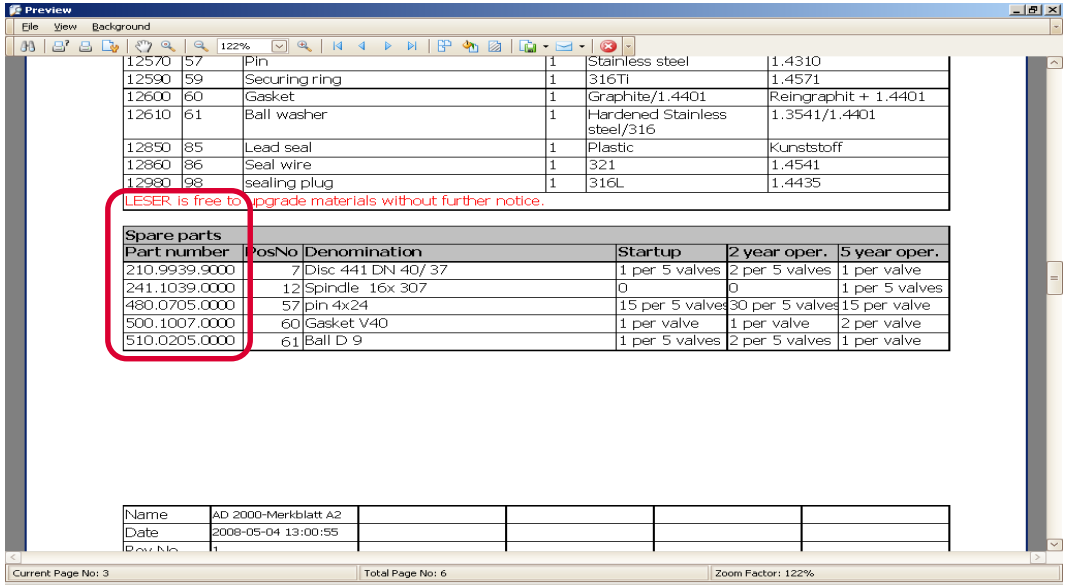
Spare Parts.

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 spir list of complete project spare parts.



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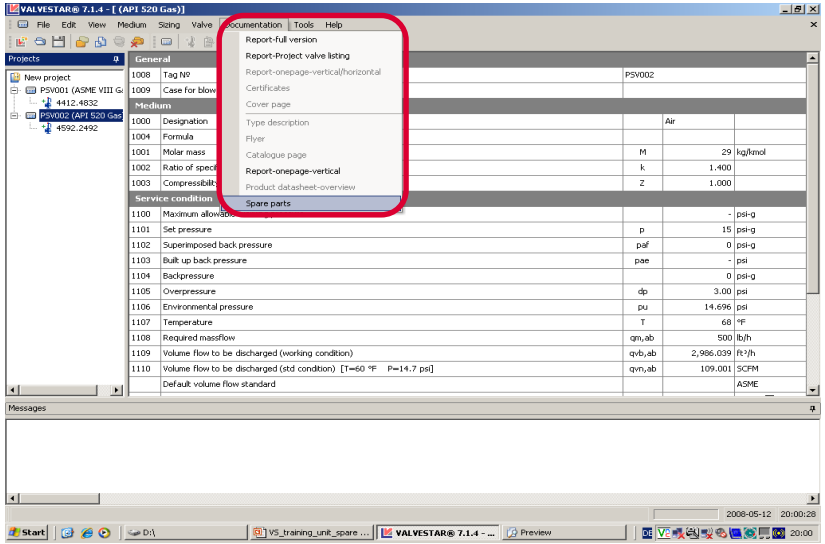
Spare Parts.

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



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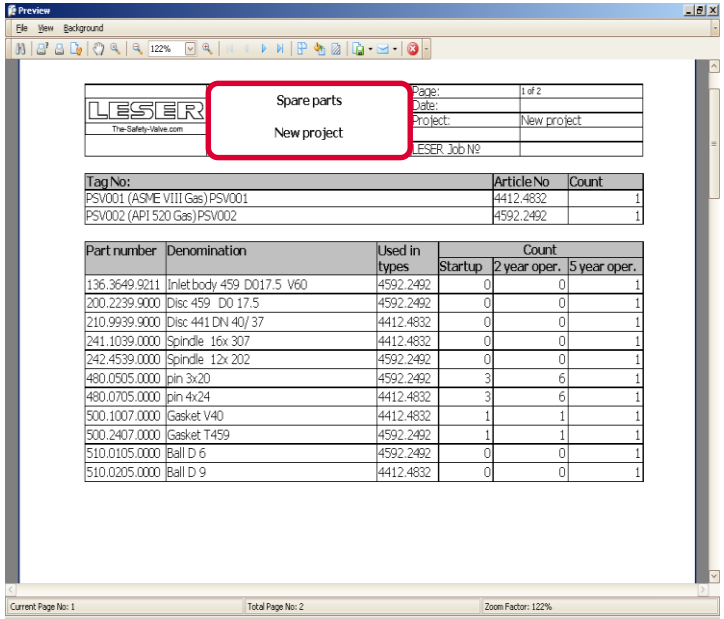
Spare Parts.

What is a spir list and how I generate a spir list?



Preview

File View Background

122%

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Spare parts

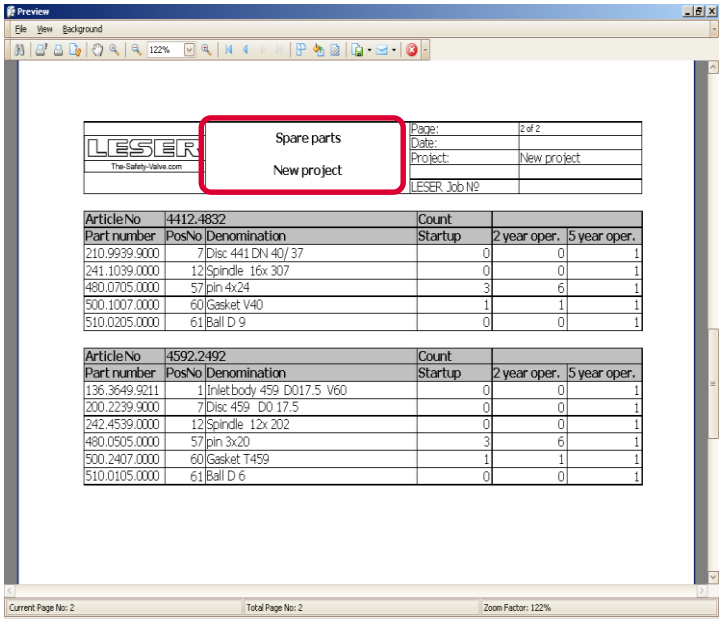
New project

Page:	1 of 2
Date:	
Project:	New project
LESER Job №	

Tag No:	Article No	Count
PSV001 (ASME VIII Gas) PSV001	4412.4832	1
PSV002 (API 520 Gas) PSV002	4592.2492	1

Part number	Denomination	Used in types	Count		
			Startup	2 year oper.	5 year oper.
136.3649.9211	Inlet body 459 D017.5 V60	4592.2492	0	0	1
200.2239.9000	Disc 459 D0 17.5	4592.2492	0	0	1
210.9939.9000	Disc 441 DN 40/ 37	4412.4832	0	0	1
241.1039.0000	Spindle 16x 307	4412.4832	0	0	1
242.4539.0000	Spindle 12x 202	4592.2492	0	0	1
480.0505.0000	pin 3x20	4592.2492	3	6	1
480.0705.0000	pin 4x24	4412.4832	3	6	1
500.1007.0000	Gasket V40	4412.4832	1	1	1
500.2407.0000	Gasket T459	4592.2492	1	1	1
510.0105.0000	Ball D 6	4592.2492	0	0	1
510.0205.0000	Ball D 9	4412.4832	0	0	1

Current Page No: 1 | Total Page No: 2 | Zoom Factor: 122%



Preview

File View Background

122%

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Spare parts

New project

Page:	2 of 2
Date:	
Project:	New project
LESER Job №	

Article No	4412.4832		Count		
Part number	PosNo	Denomination	Startup	2 year oper.	5 year oper.
210.9939.9000	7	Disc 441 DN 40/ 37	0	0	1
241.1039.0000	12	Spindle 16x 307	0	0	1
480.0705.0000	57	pin 4x24	3	6	1
500.1007.0000	60	Gasket V40	1	1	1
510.0205.0000	61	Ball D 9	0	0	1

Article No	4592.2492		Count		
Part number	PosNo	Denomination	Startup	2 year oper.	5 year oper.
136.3649.9211	1	Inlet body 459 D017.5 V60	0	0	1
200.2239.9000	7	Disc 459 D0 17.5	0	0	1
242.4539.0000	12	Spindle 12x 202	0	0	1
480.0505.0000	57	pin 3x20	3	6	1
500.2407.0000	60	Gasket T459	1	1	1
510.0105.0000	61	Ball D 6	0	0	1

Current Page No: 2 | Total Page No: 2 | Zoom Factor: 122%

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Thank you for your attention.