VALVESTAR® 7

Training lectures – Walk through

LESER

The-Safety-Valve.com

Introduction

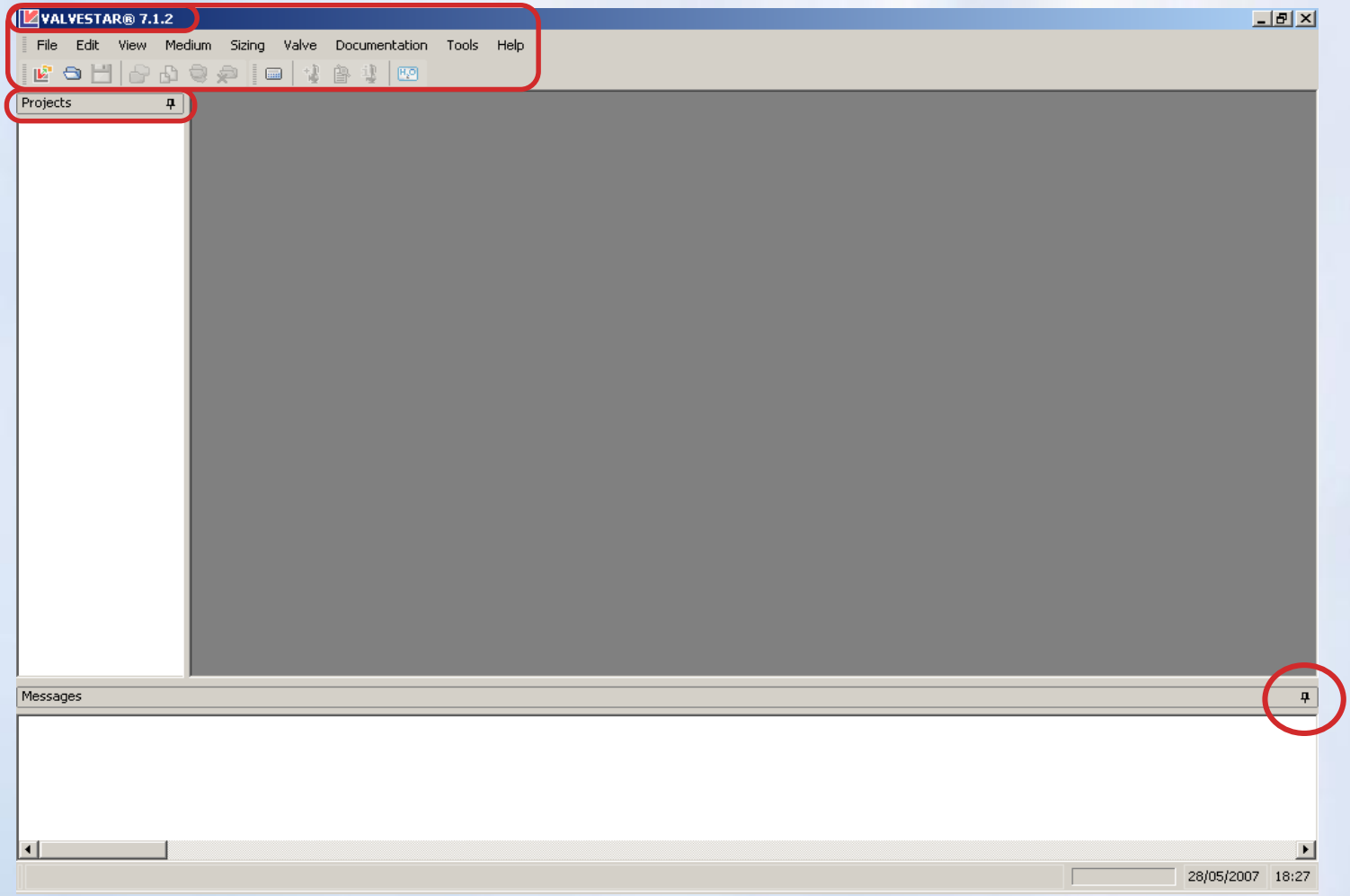
These **Training Lectures for VALVESTAR® 7** must be used by all teachers of VALVESTAR 7 to ensure the most efficient training and the highest quality of training.

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
- 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



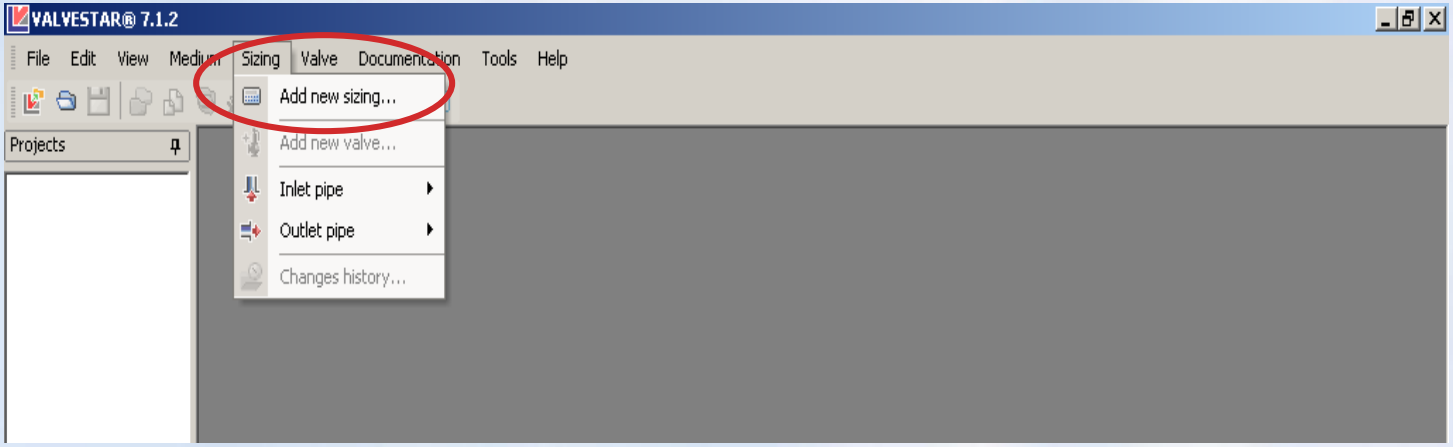
Sizing

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

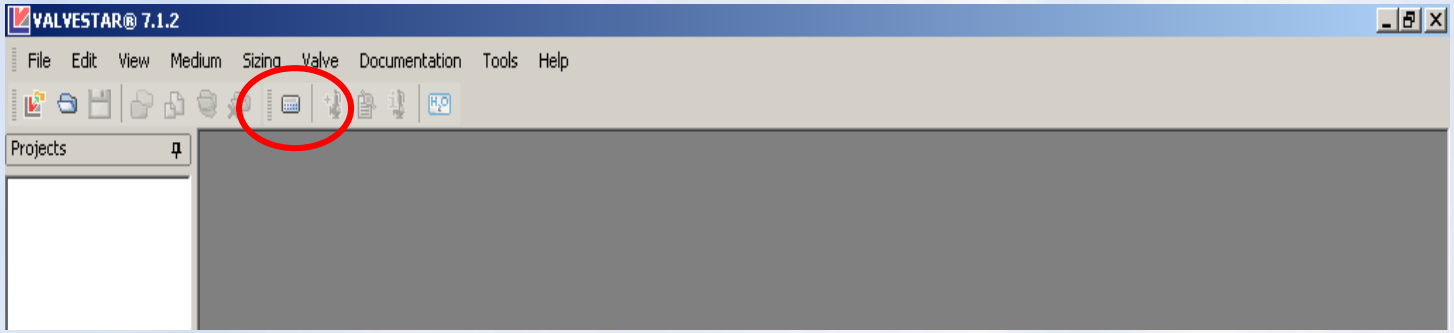


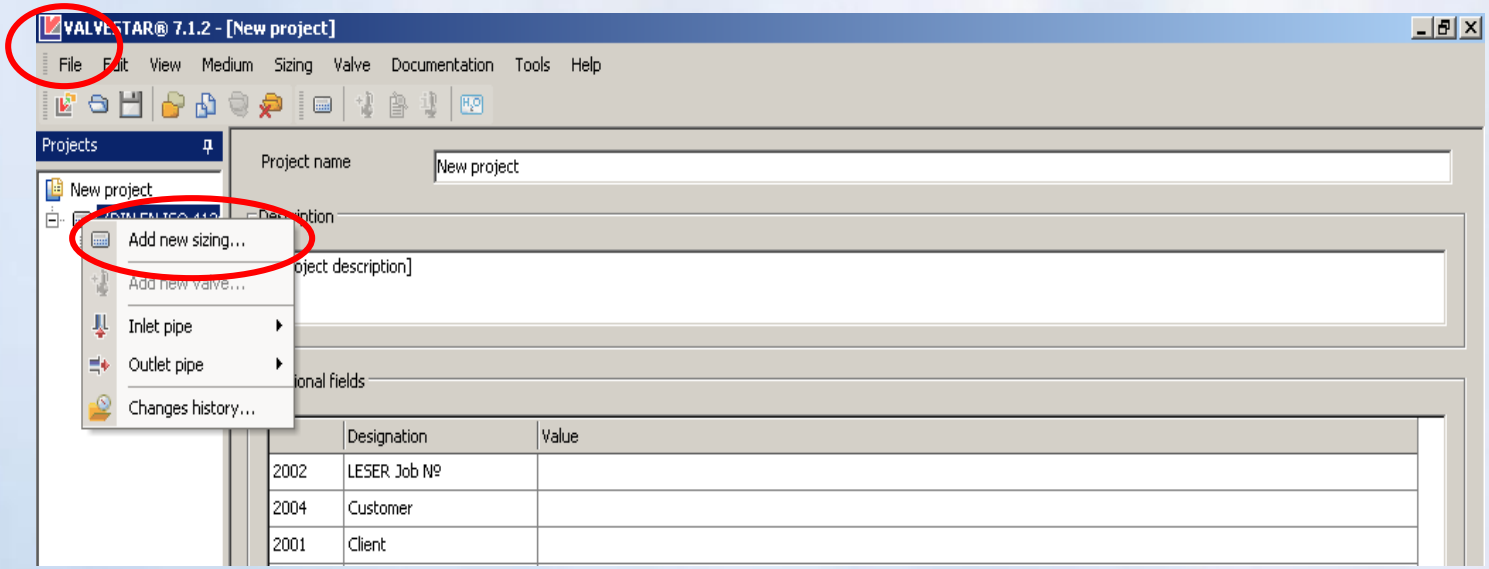
or: see next page

Sizing

Sizing according to ASME, (steam/gases)

1. Step: How to start

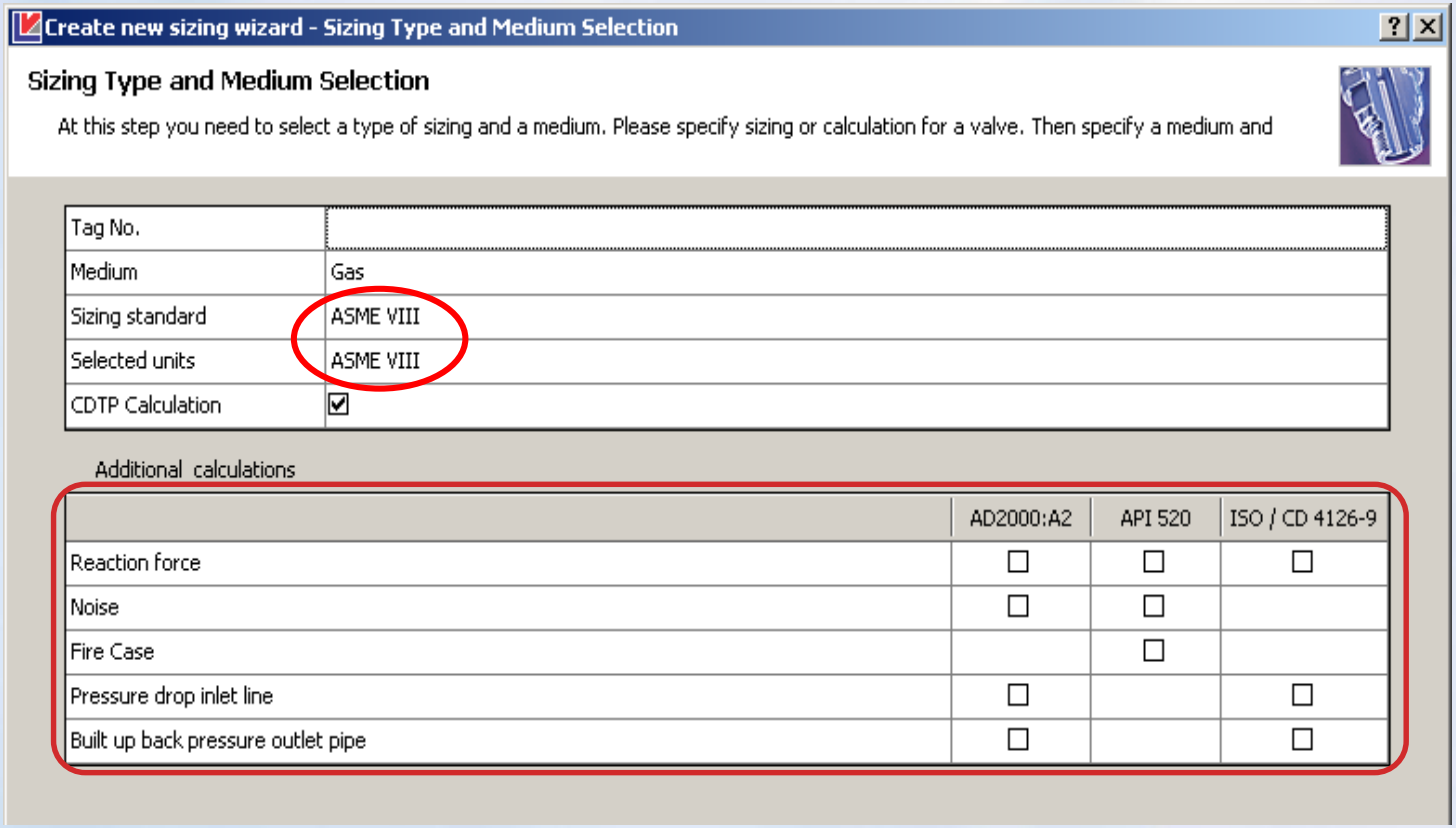




Sizing

Sizing according to ASME, (steam/gases)

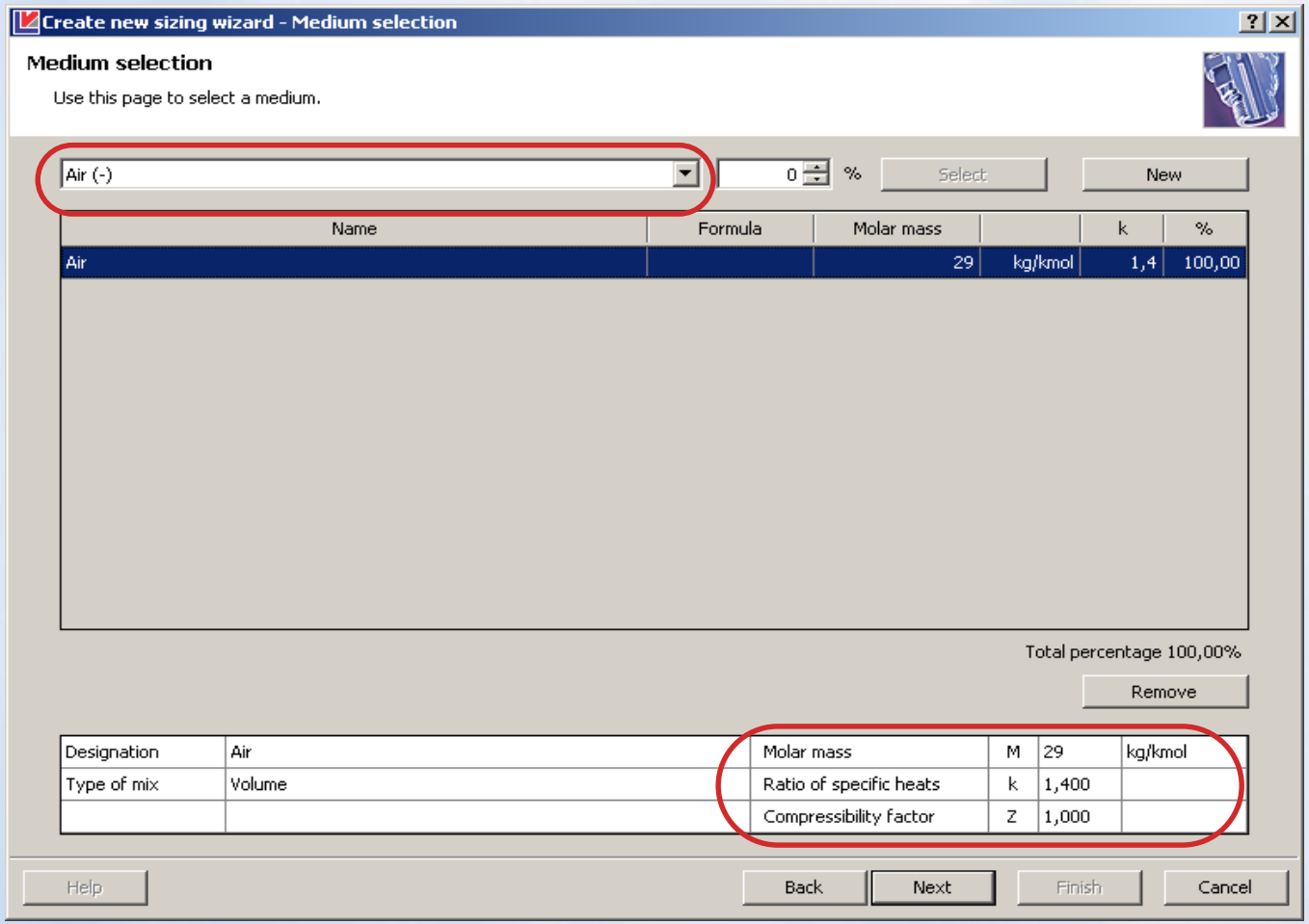
2. Step: Sizing standard and additional calculation



Sizing

Sizing according to ASME, (steam/gases)

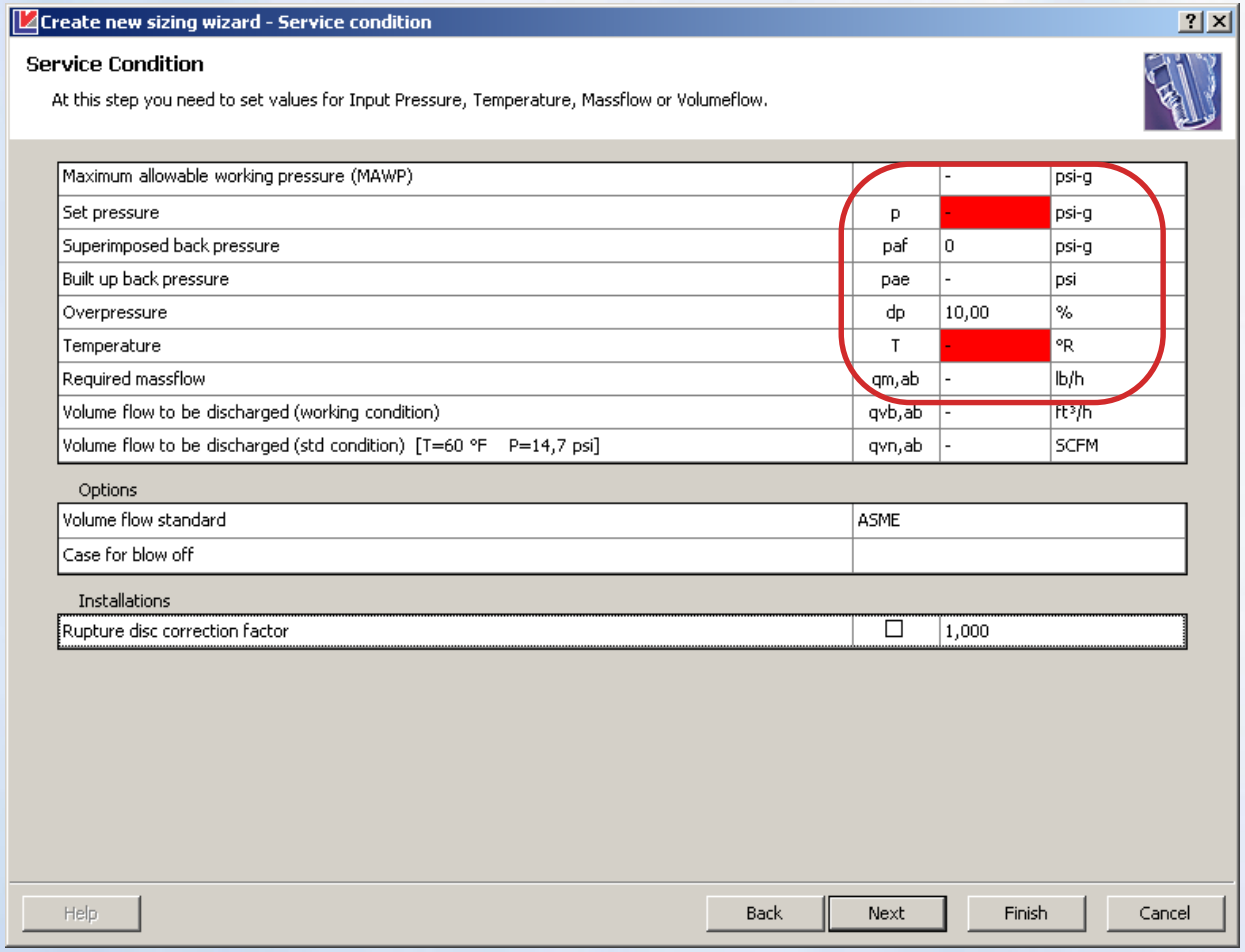
3. Step: Medium database and medium selection



Sizing

Sizing according to ASME, (steam/gases)

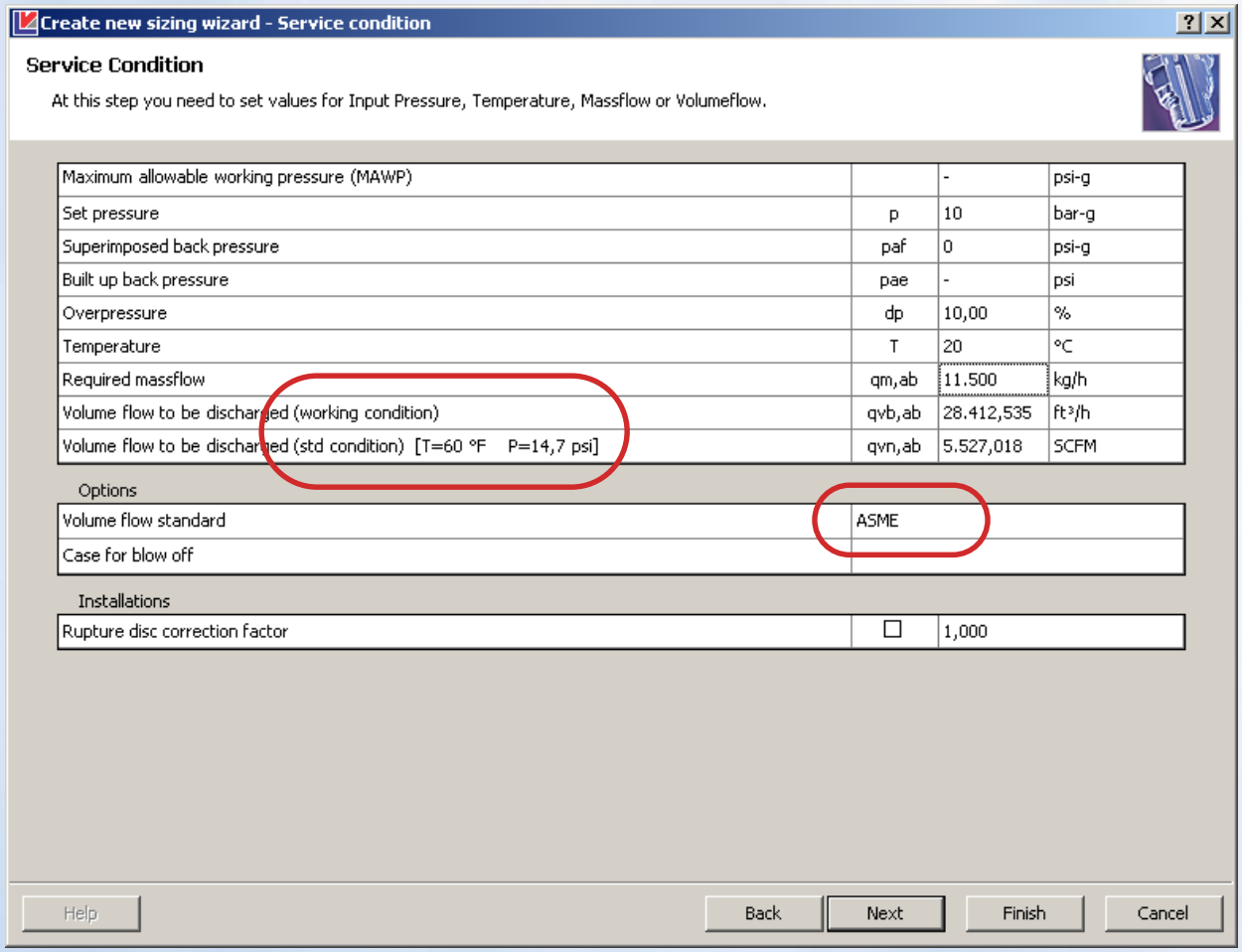
4. Step: Service condition



Sizing

Sizing according to ASME, (steam/gases)

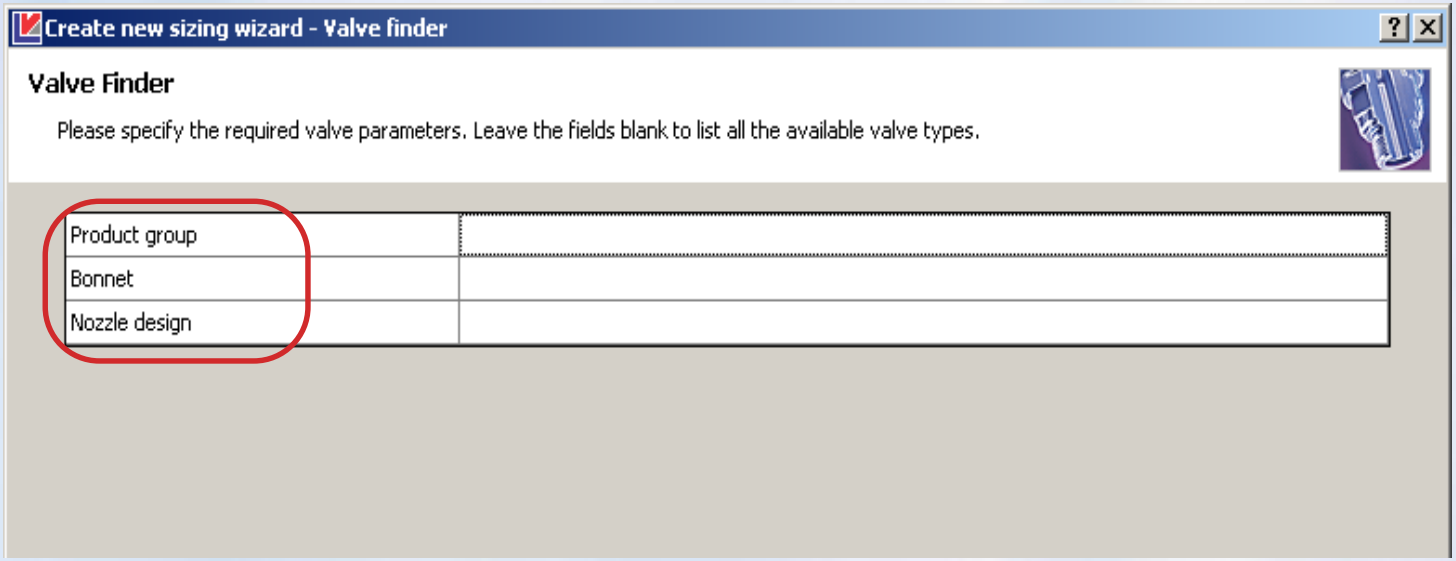
5. Step: Service condition



Sizing

Sizing according to ASME, (steam/gases)

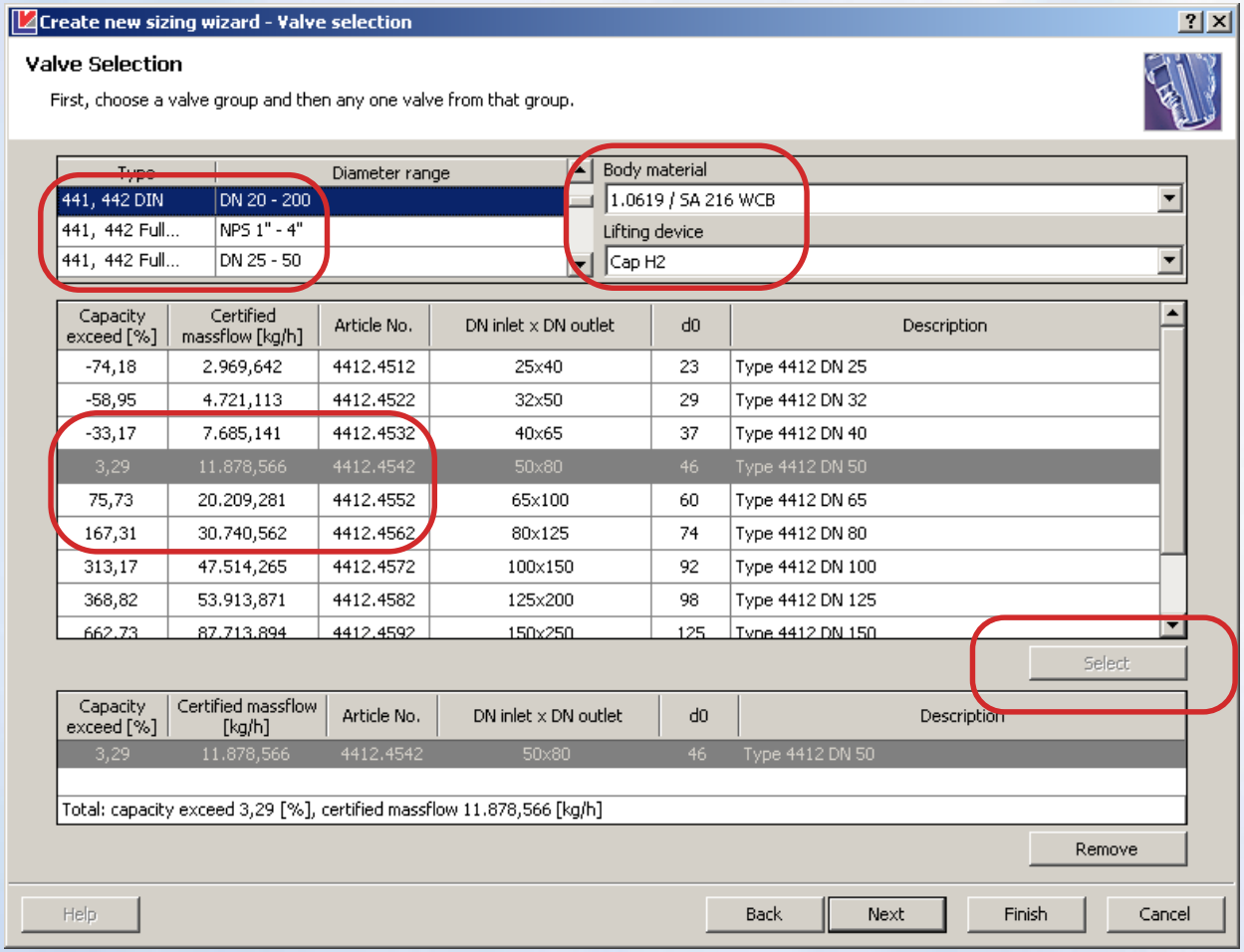
6. Step: Valve Finder



Sizing

Sizing according to ASME, (steam/gases)

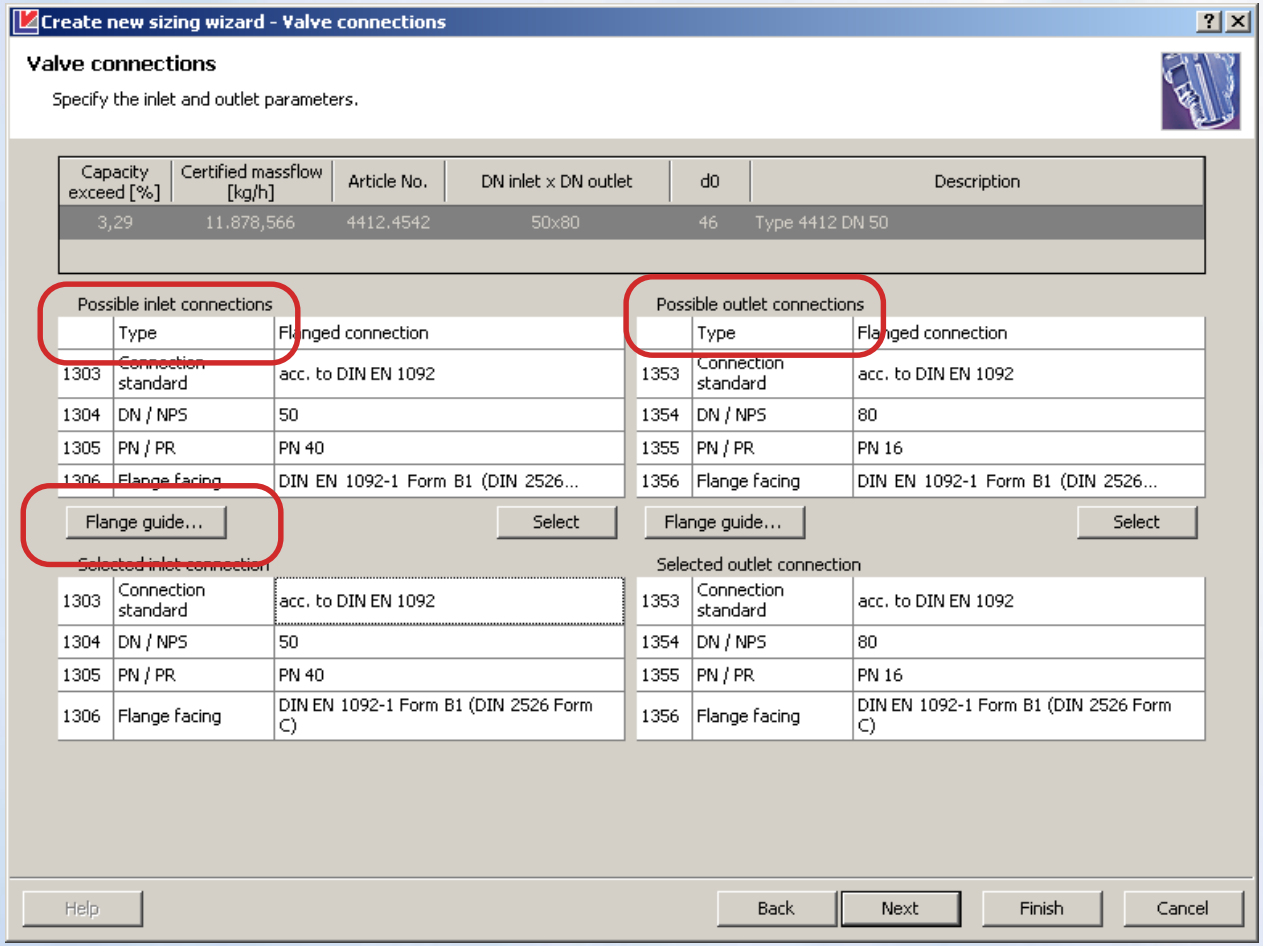
7. Step: Processing of all possible safety valves



Sizing

Sizing according to ASME, (steam/gases)

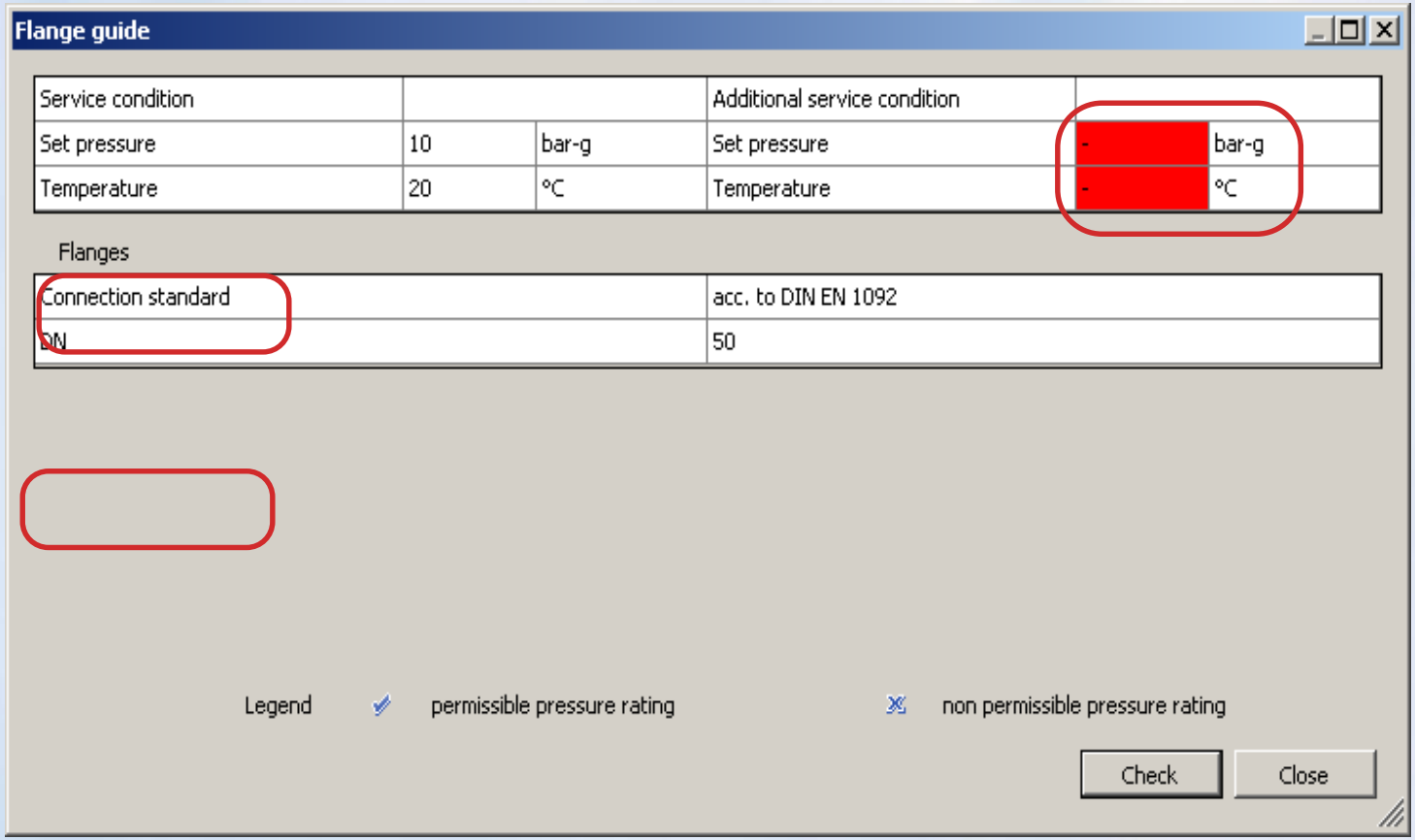
8. Step: Connections



Sizing

Sizing according to ASME, (steam/gases)

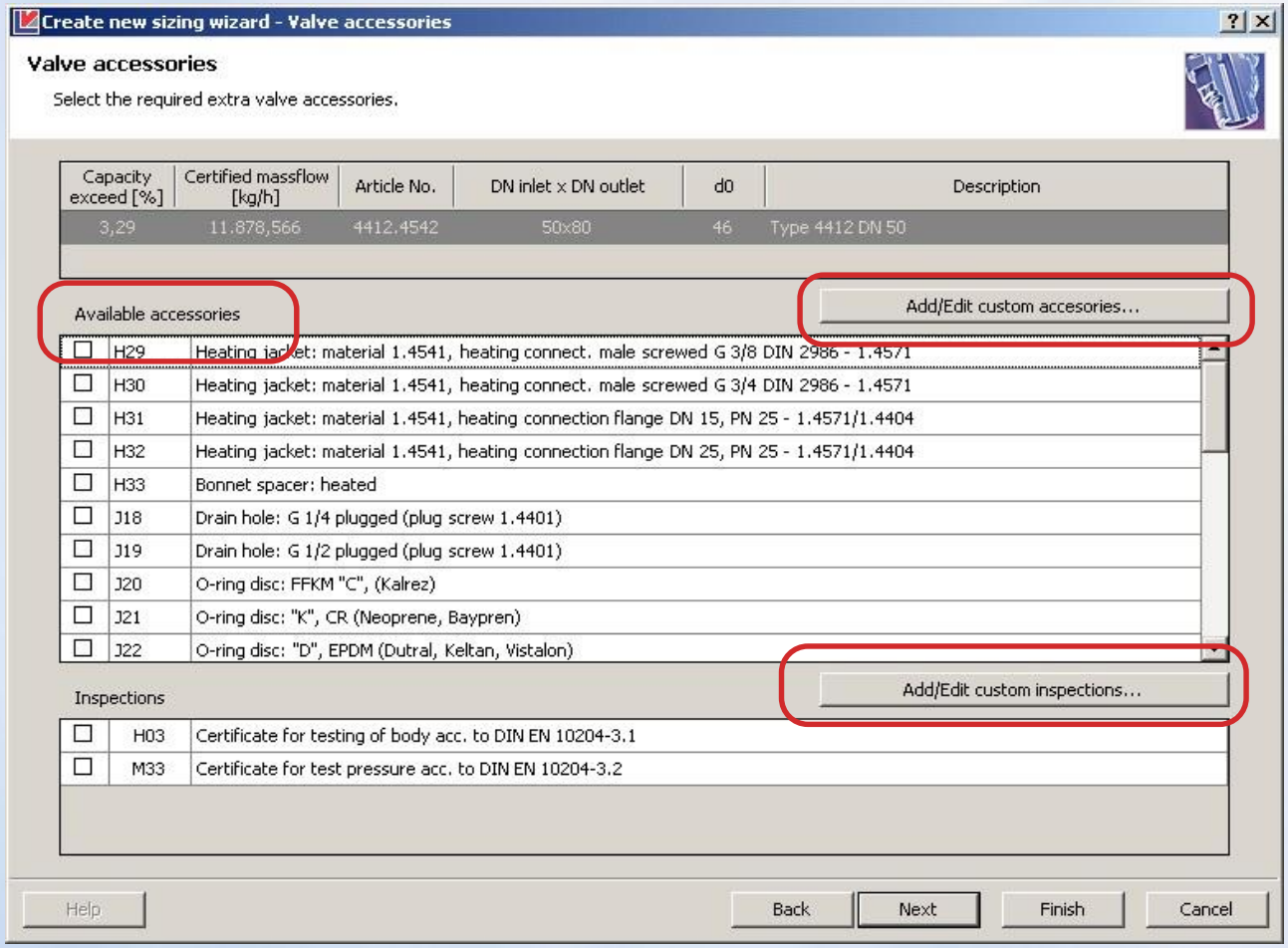
Flange Guide



Sizing

Sizing according to ASME, (steam/gases)

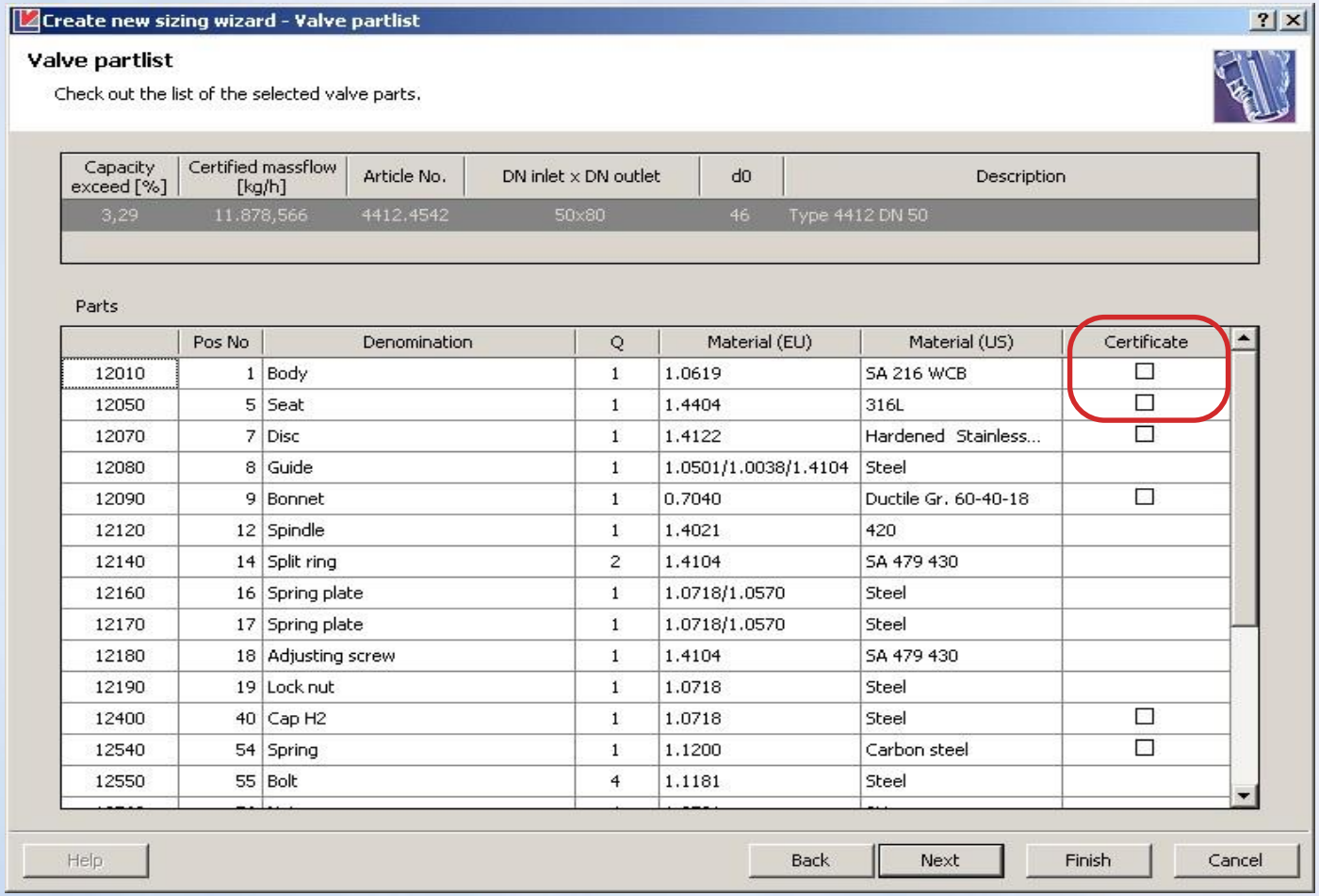
9. Step: Options



Sizing

Sizing according to ASME, (steam/gases)

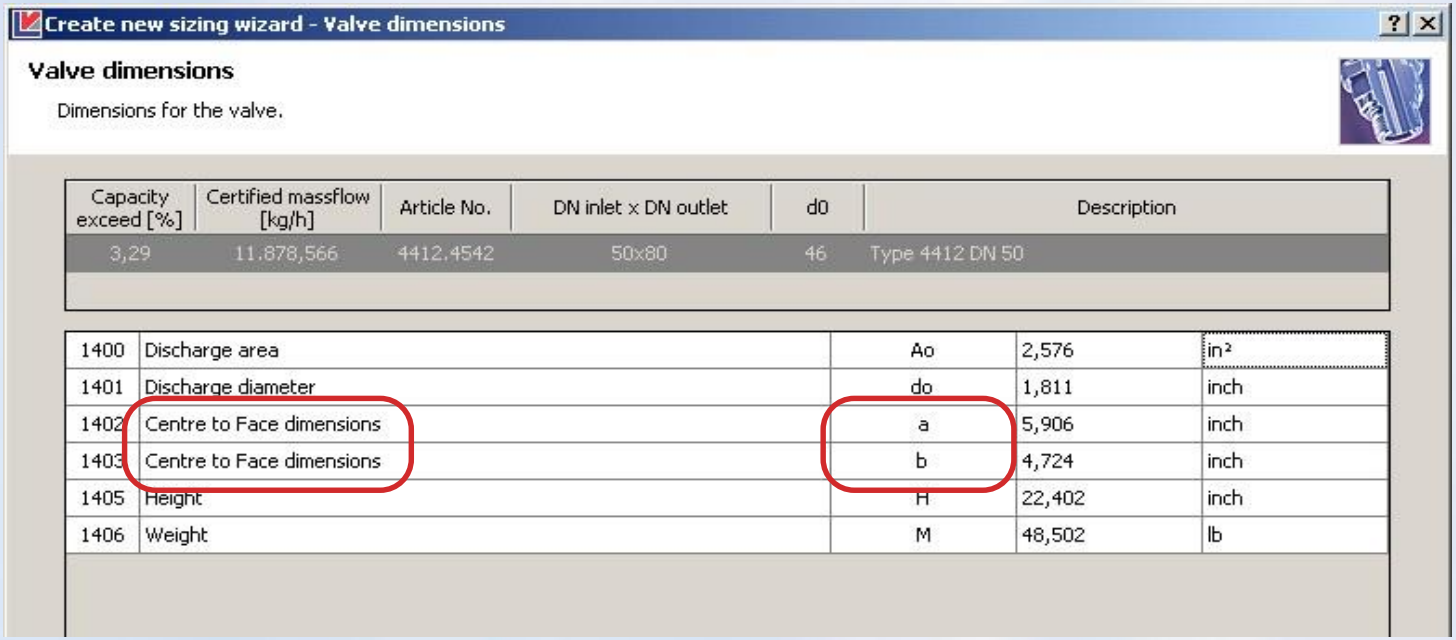
10. Step: Materialist



Sizing

Sizing according to ASME, (steam/gases)

11. Step: Valve Dimensions



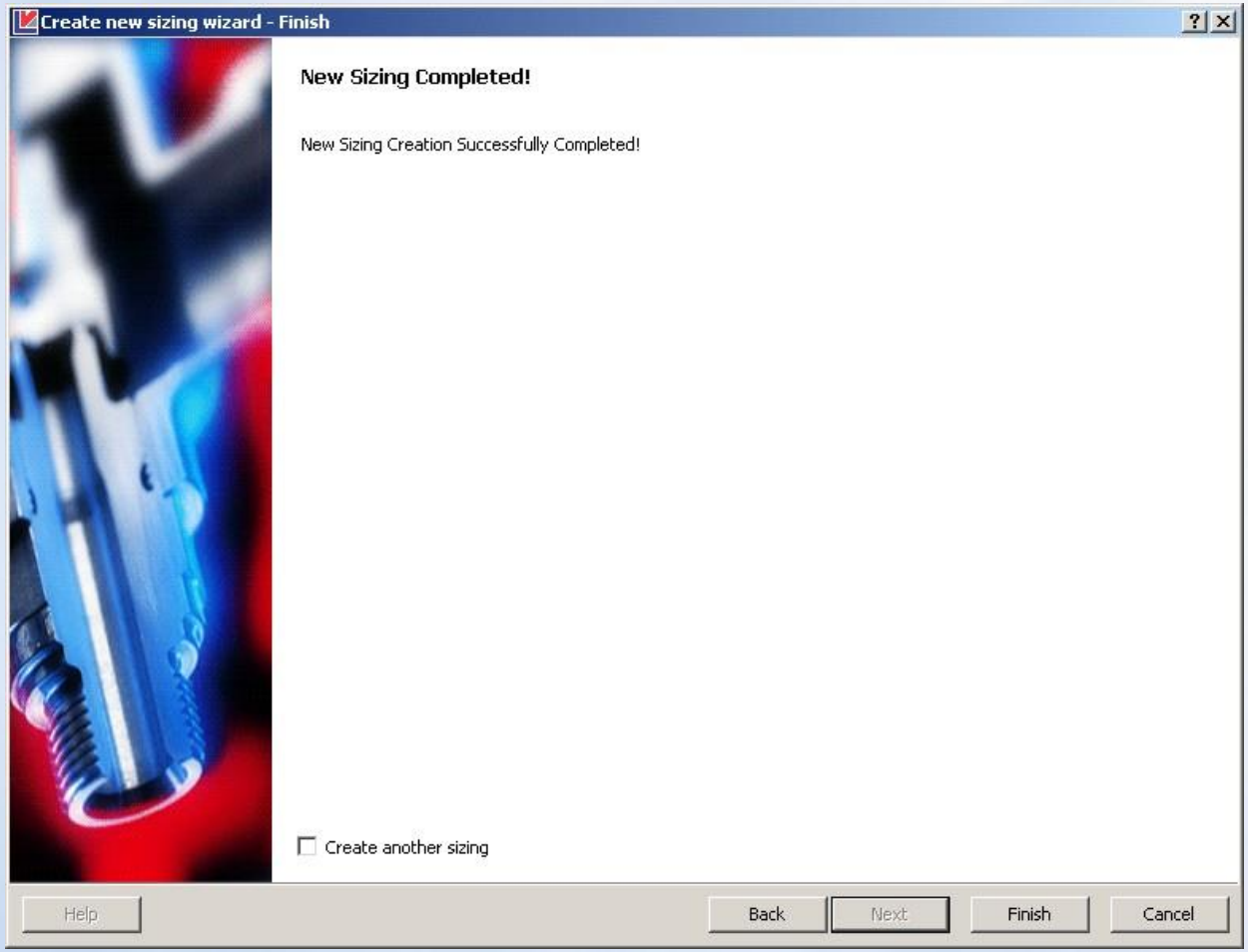
Capacity exceed [%]	Certified massflow [kg/h]	Article No.	DN inlet x DN outlet	d0	Description
3,29	11.878,566	4412.4542	50x80	46	Type 4412 DN 50

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

Sizing

Sizing according to ASME, (steam/gases)

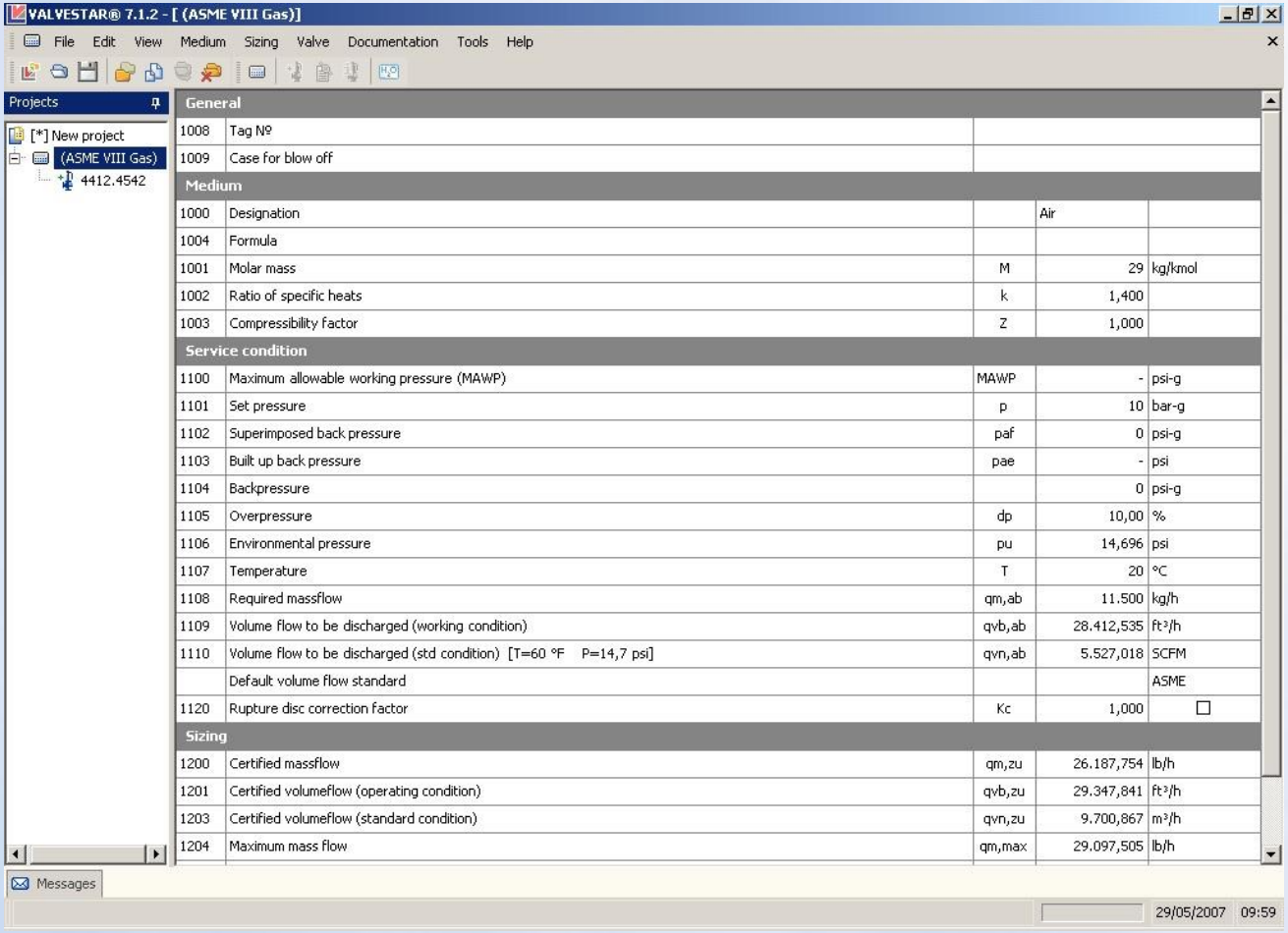
12. Step: Finish Sizing



Sizing

Sizing according to ASME, (steam/gases)

13. Step: Valve Calculation

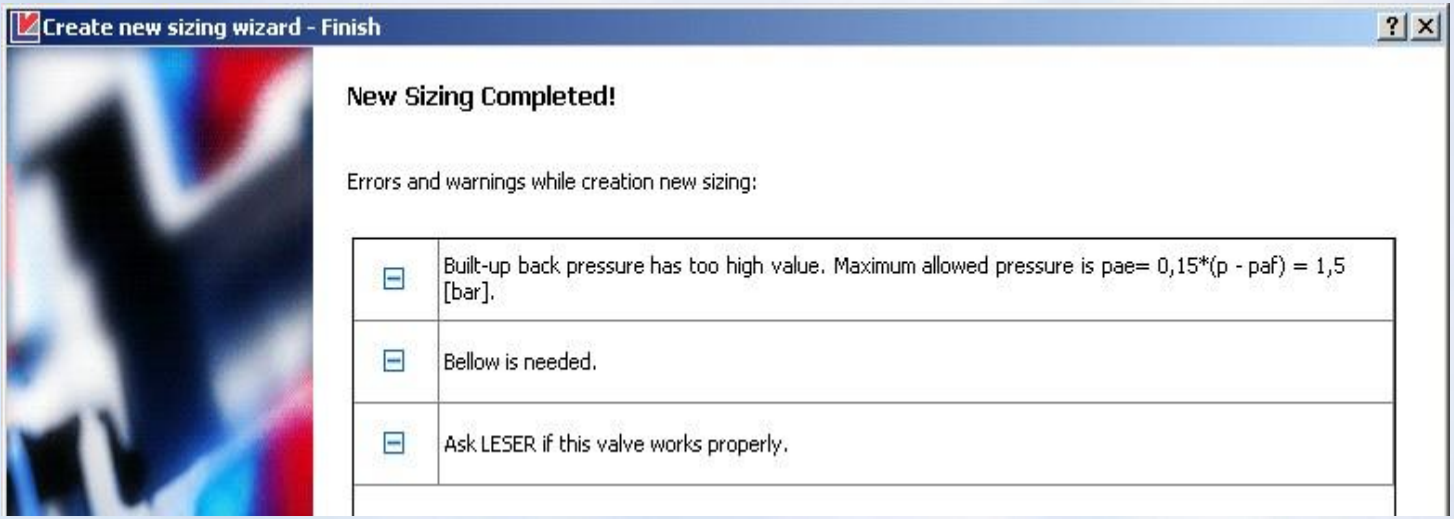


General				
1008	Tag №			
1009	Case for blow off			
Medium				
1000	Designation		Air	
1004	Formula			
1001	Molar mass	M	29	kg/kmol
1002	Ratio of specific heats	k	1,400	
1003	Compressibility factor	Z	1,000	
Service condition				
1100	Maximum allowable working pressure (MAWP)	MAWP	-	psi-g
1101	Set pressure	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

Sizing

Sizing according to ASME, (steam/gases)

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.

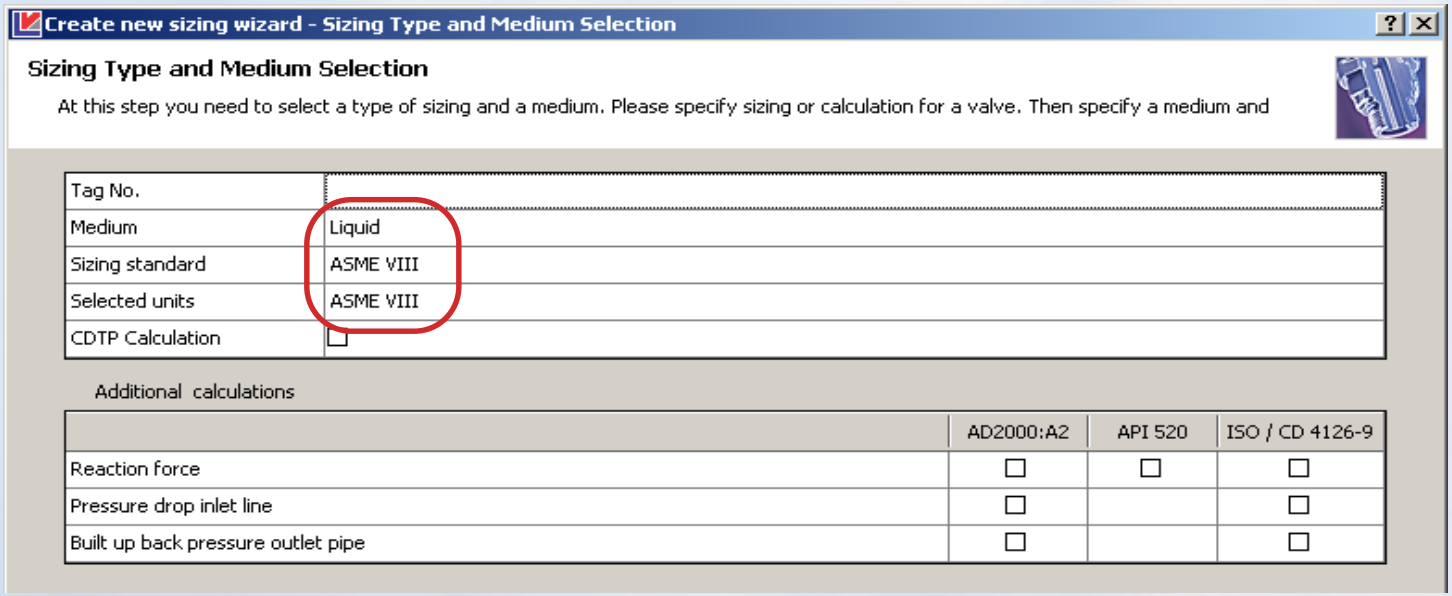
Sizing

Sizing according to ASME, (liquids)

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.

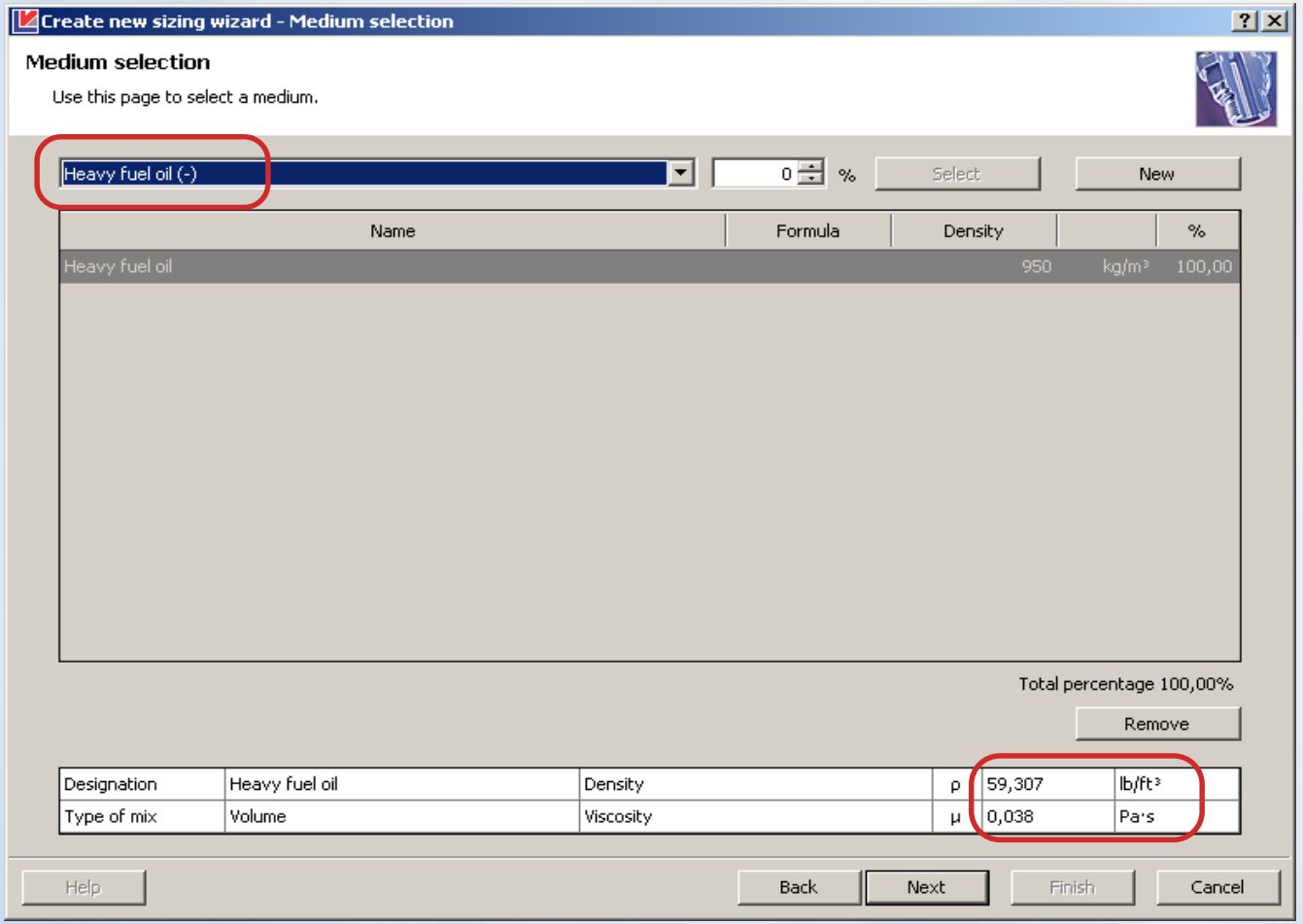
1. Step: Sizing Standard and additional calculation



Sizing

Sizing according to ASME, (liquids)

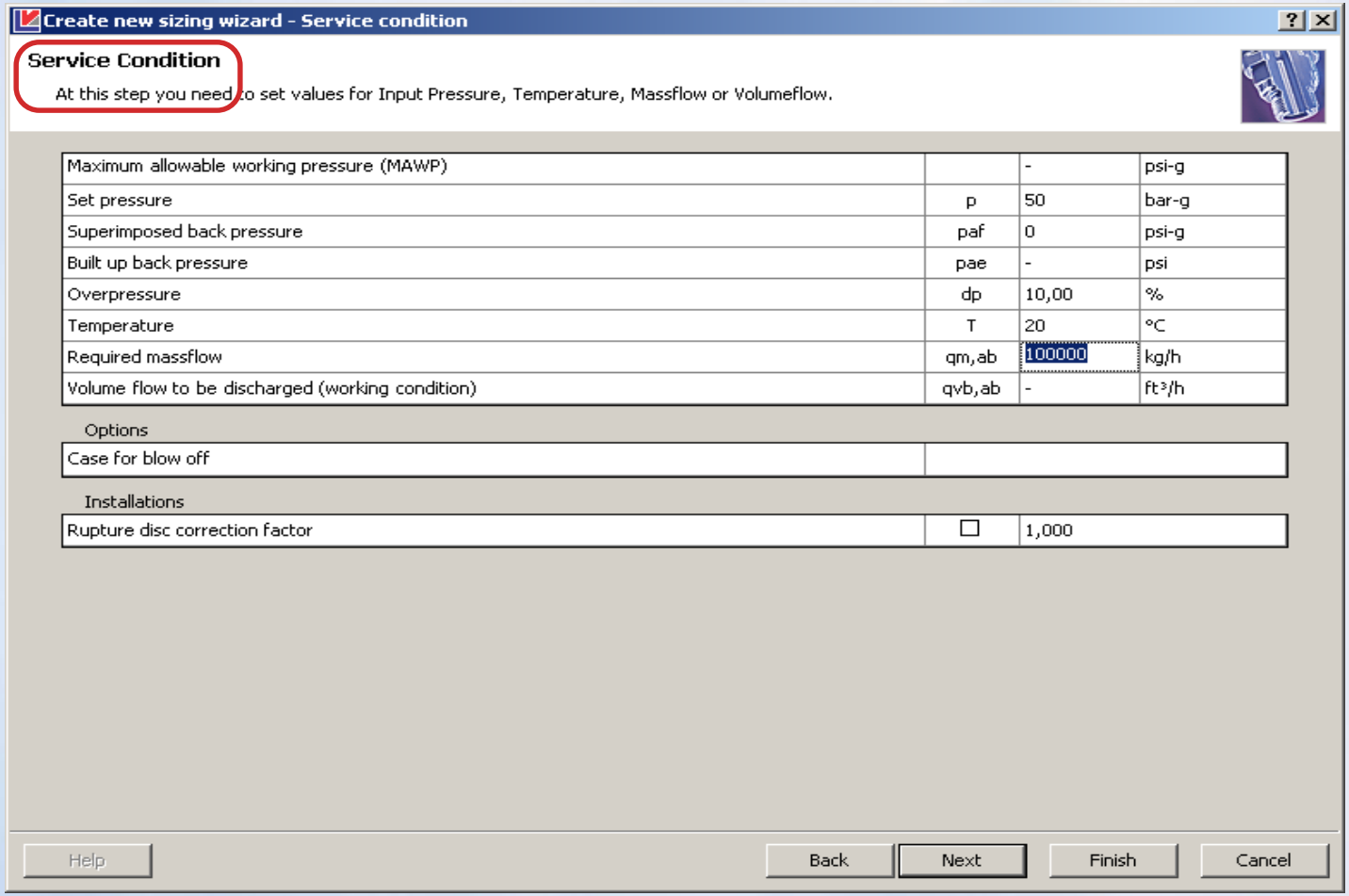
2. Step: Medium database and medium selection



Sizing

Sizing according to ASME, (liquids)

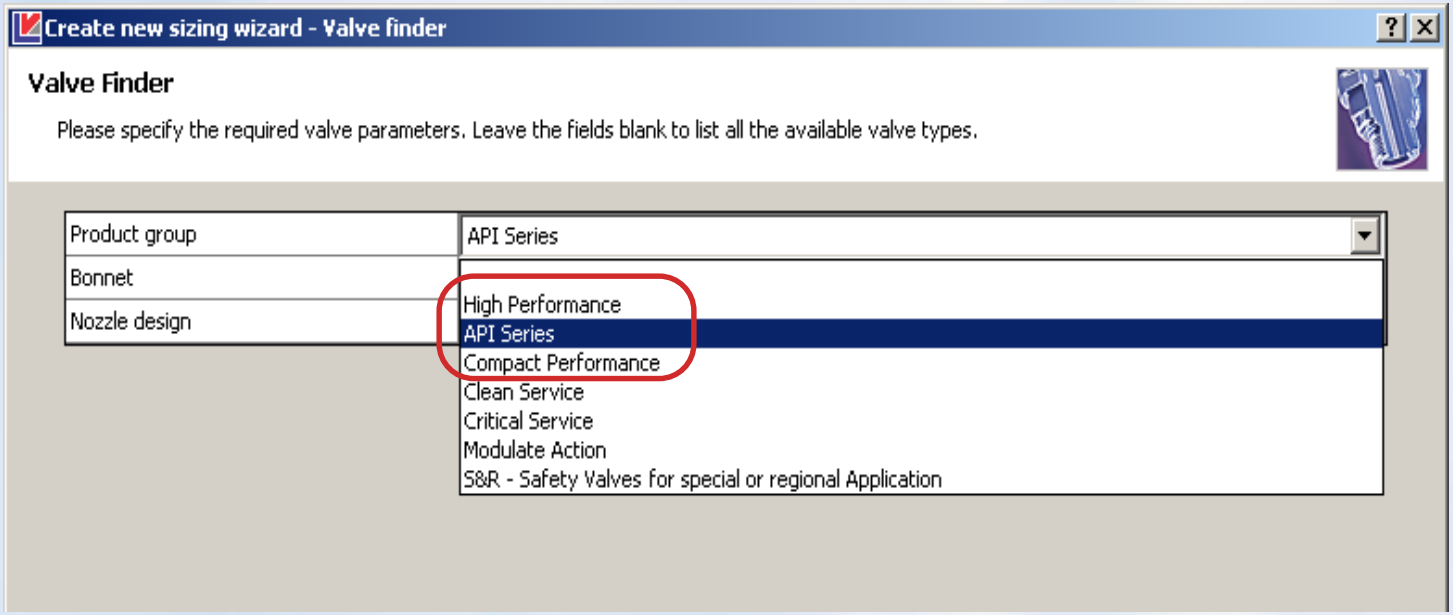
3. Step: Service condition



Sizing

Sizing according to ASME, (liquids)

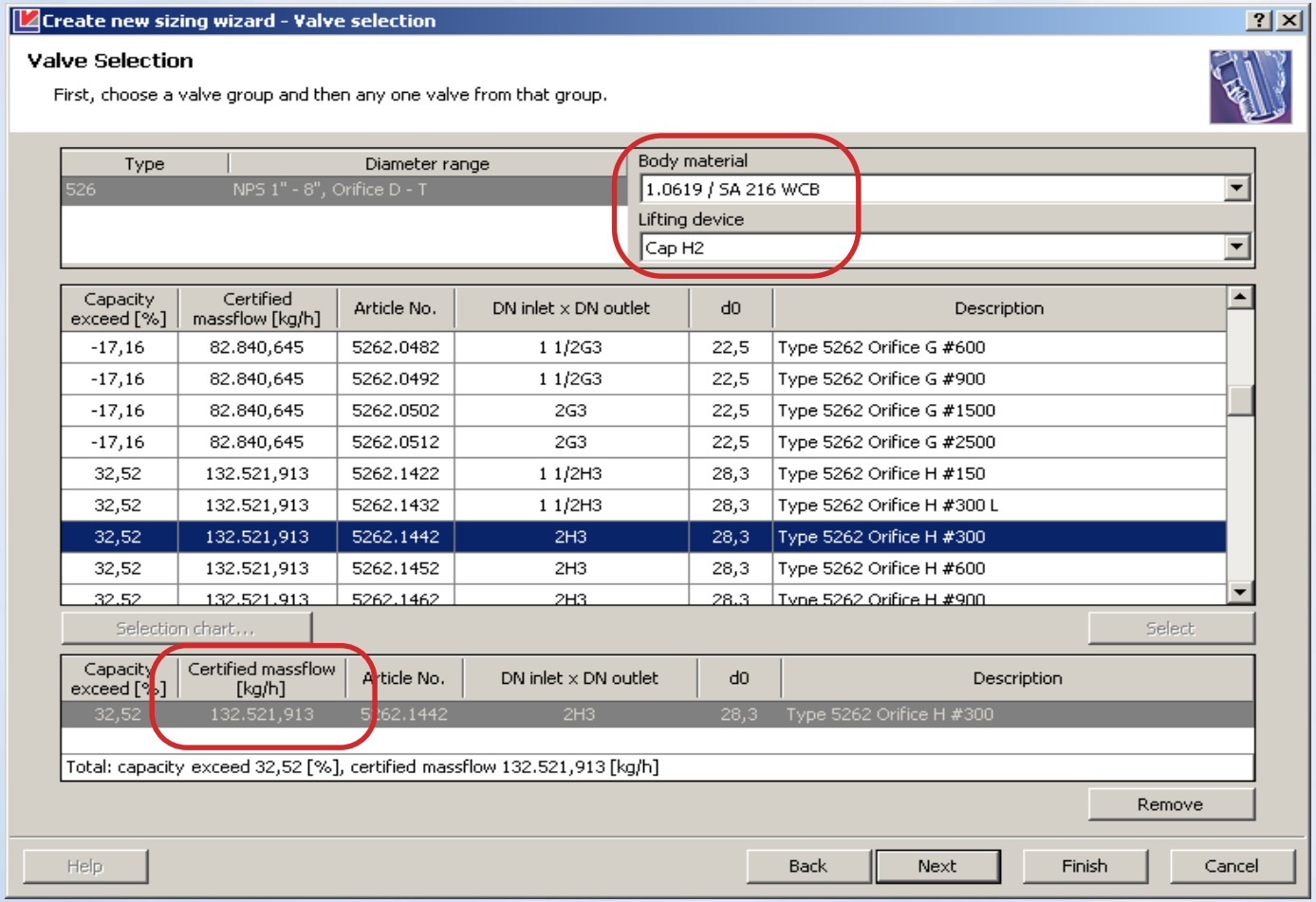
4. Step: Valve Finder



Sizing

Sizing according to ASME, (liquids)

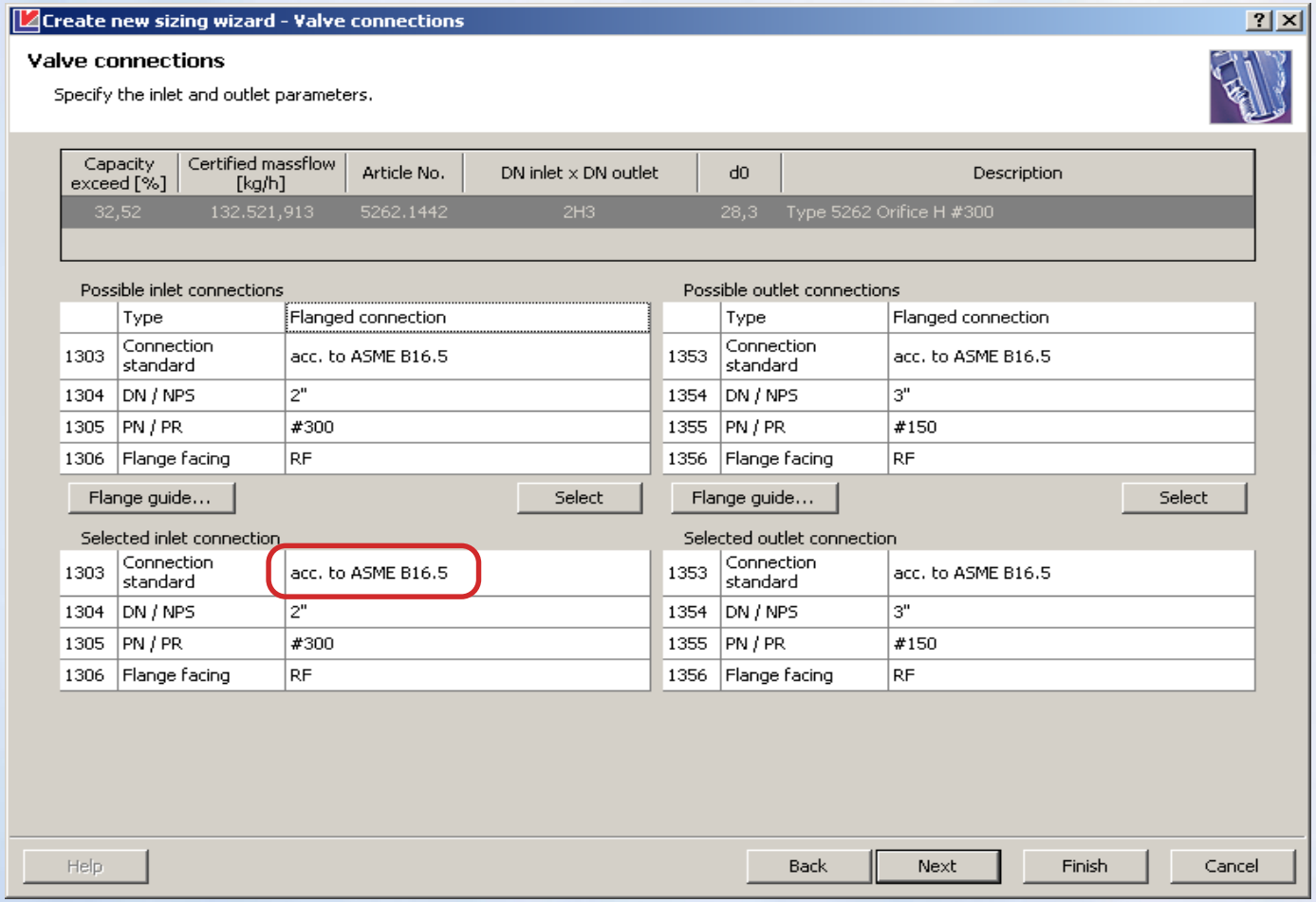
5. Step: Processing of all possible safety valves



Sizing

Sizing according to ASME, (liquids)

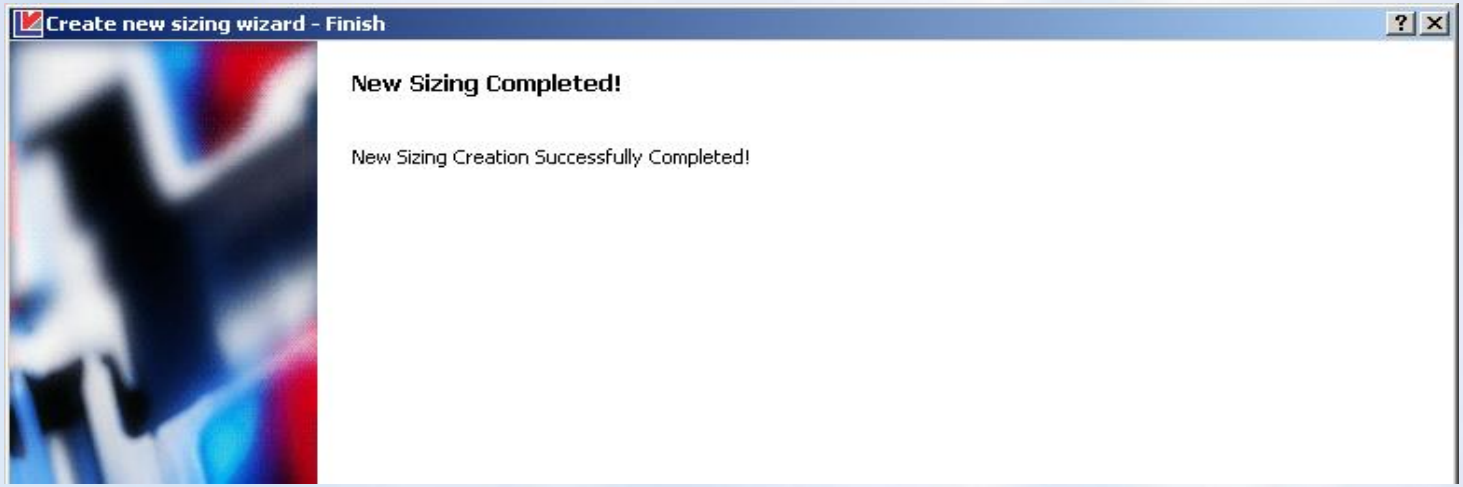
6. Step: Connection



Sizing

Sizing according to ASME, (liquids)

7. Step: Sizing finished

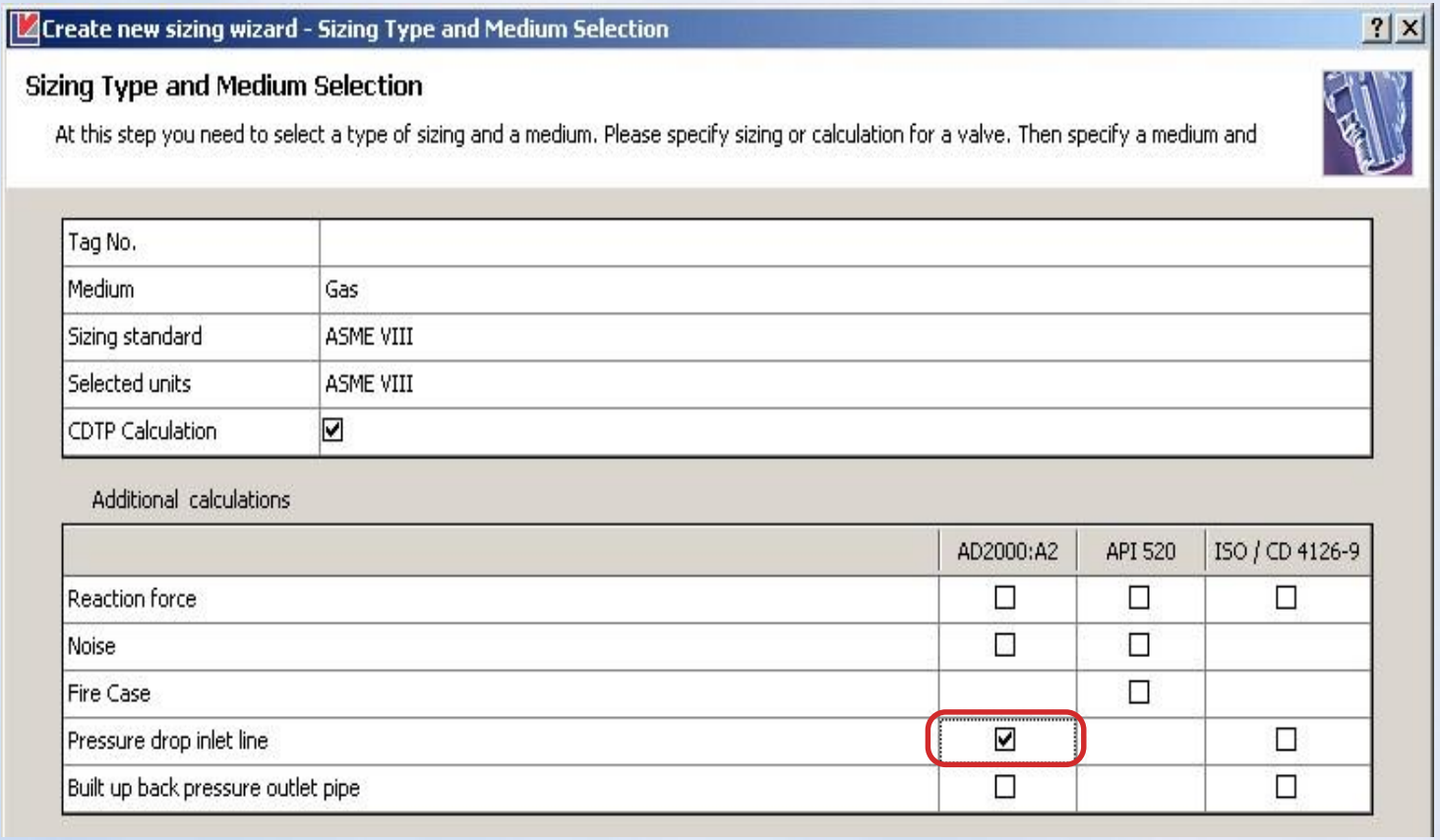


Sizing of inlet pressure drop

(according AD 2000-Markblatt A2)

1. Step: Additional calculation

When starting a new sizing:

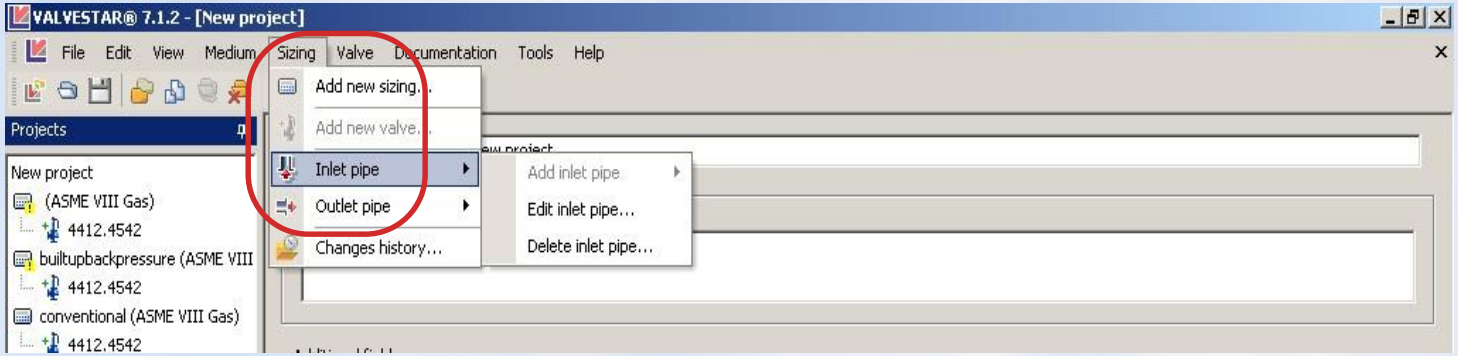


Sizing of inlet pressure drop

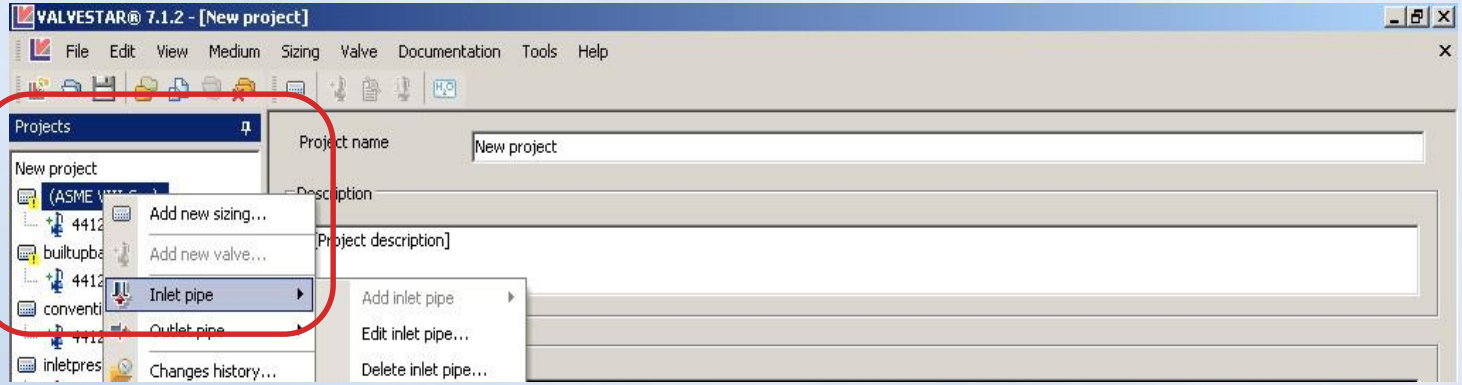
(according AD 2000-Markblatt A2)

1. Step: Additional calculation

You can also start inlet pressure drop calculation in menu



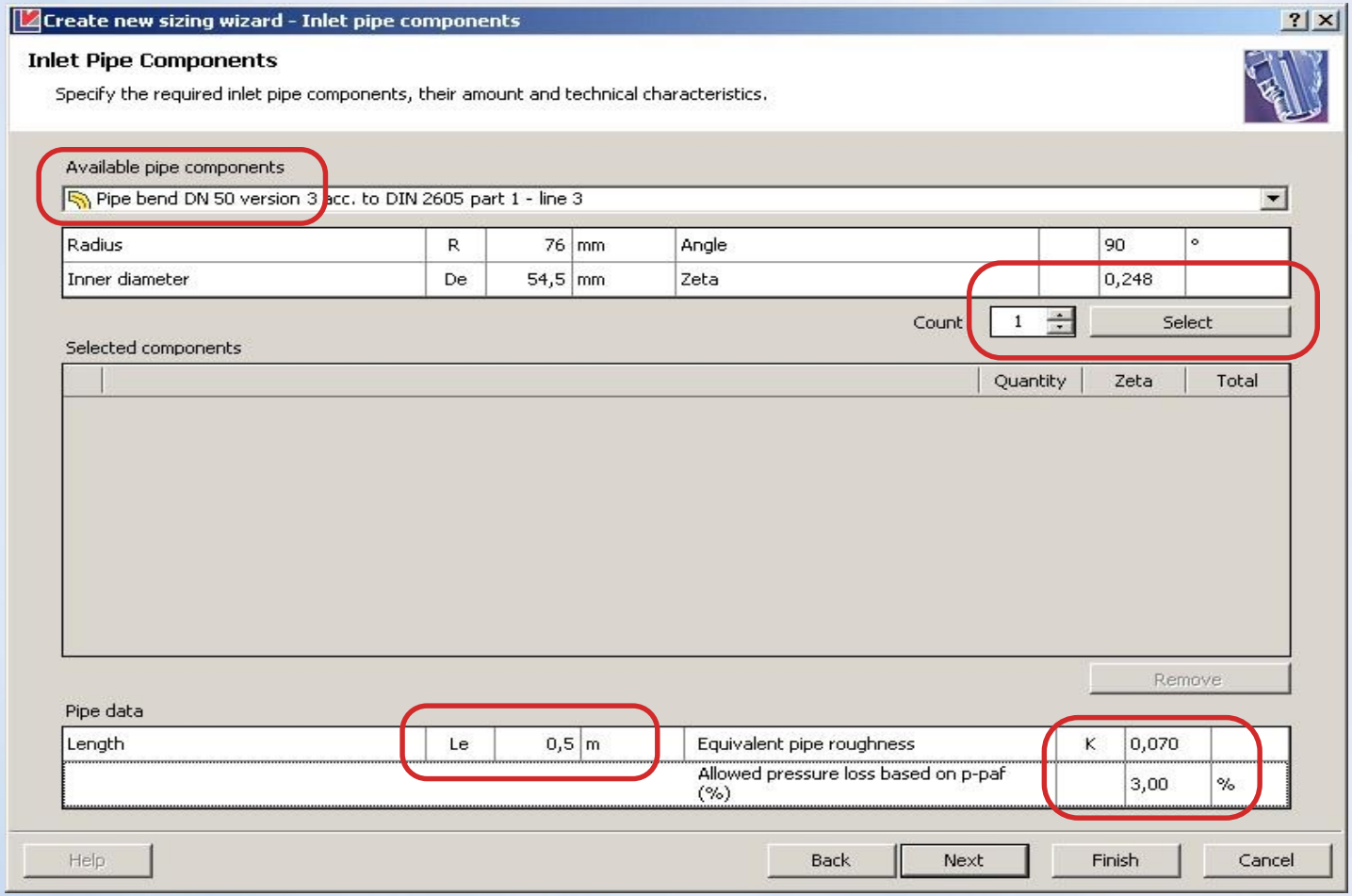
… or start in project tree



Sizing of inlet pressure drop

(according AD 2000-Markblatt A2)

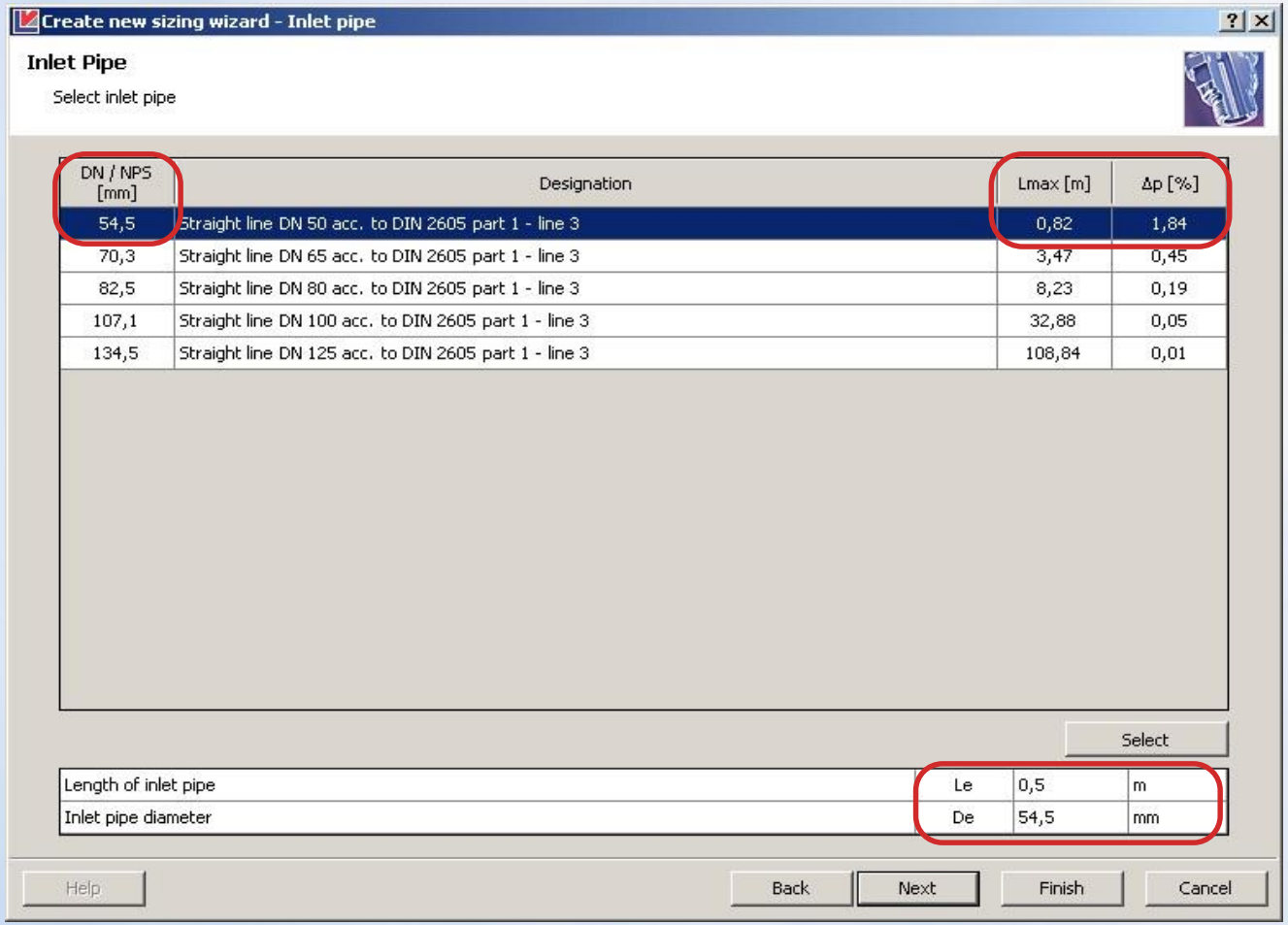
2. Step: Dimension of inlet pipe and pipe components



Sizing of inlet pressure drop

(according AD 2000-Markblatt A2)

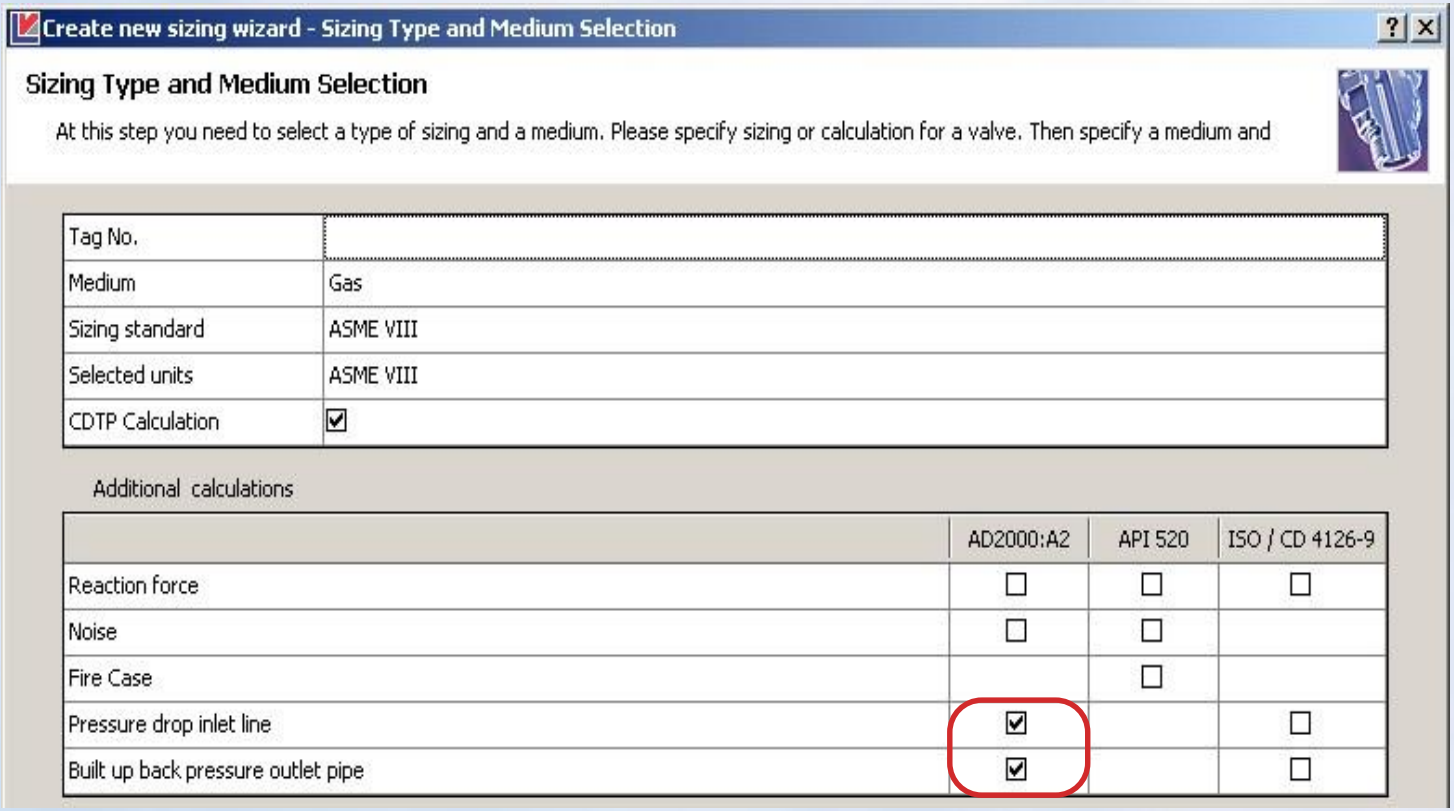
3. Step: Dimension of inlet pipe and pipe components



Sizing of built-up backpressure

1. Step: Dimension of inlet pipe and pipe components

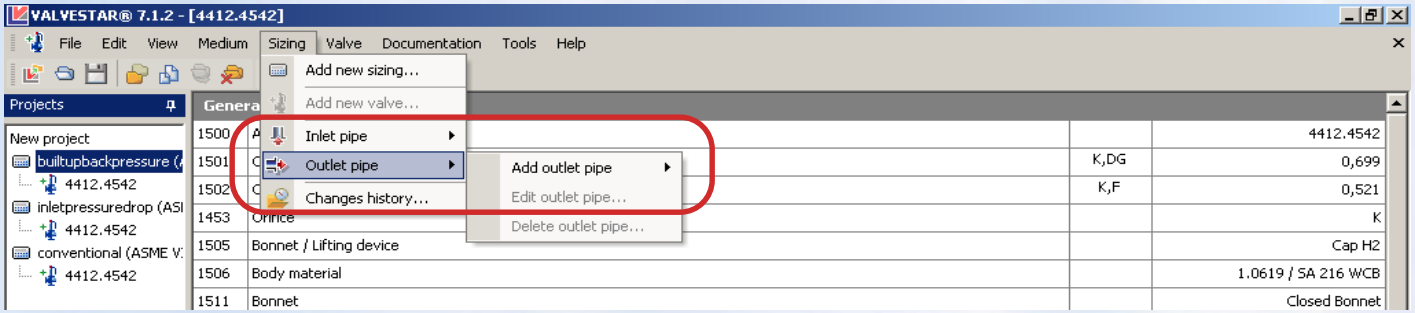
When starting a new sizing:



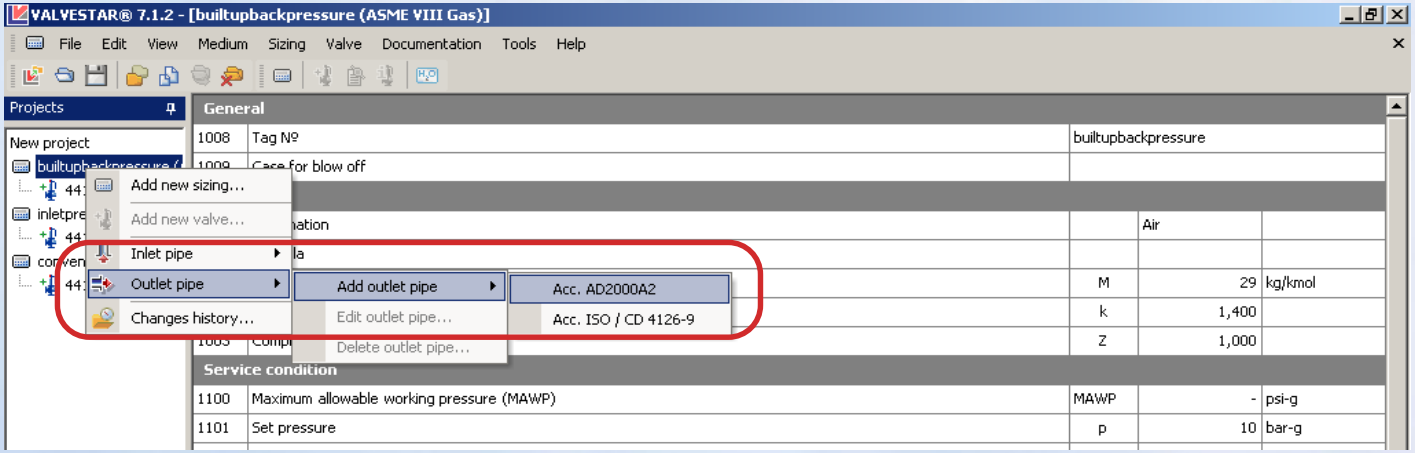
Sizing of built-up backpressure

1. Step: Dimension of outlet pipe and pipe components

You can also start built-up backpressure calculation in menu

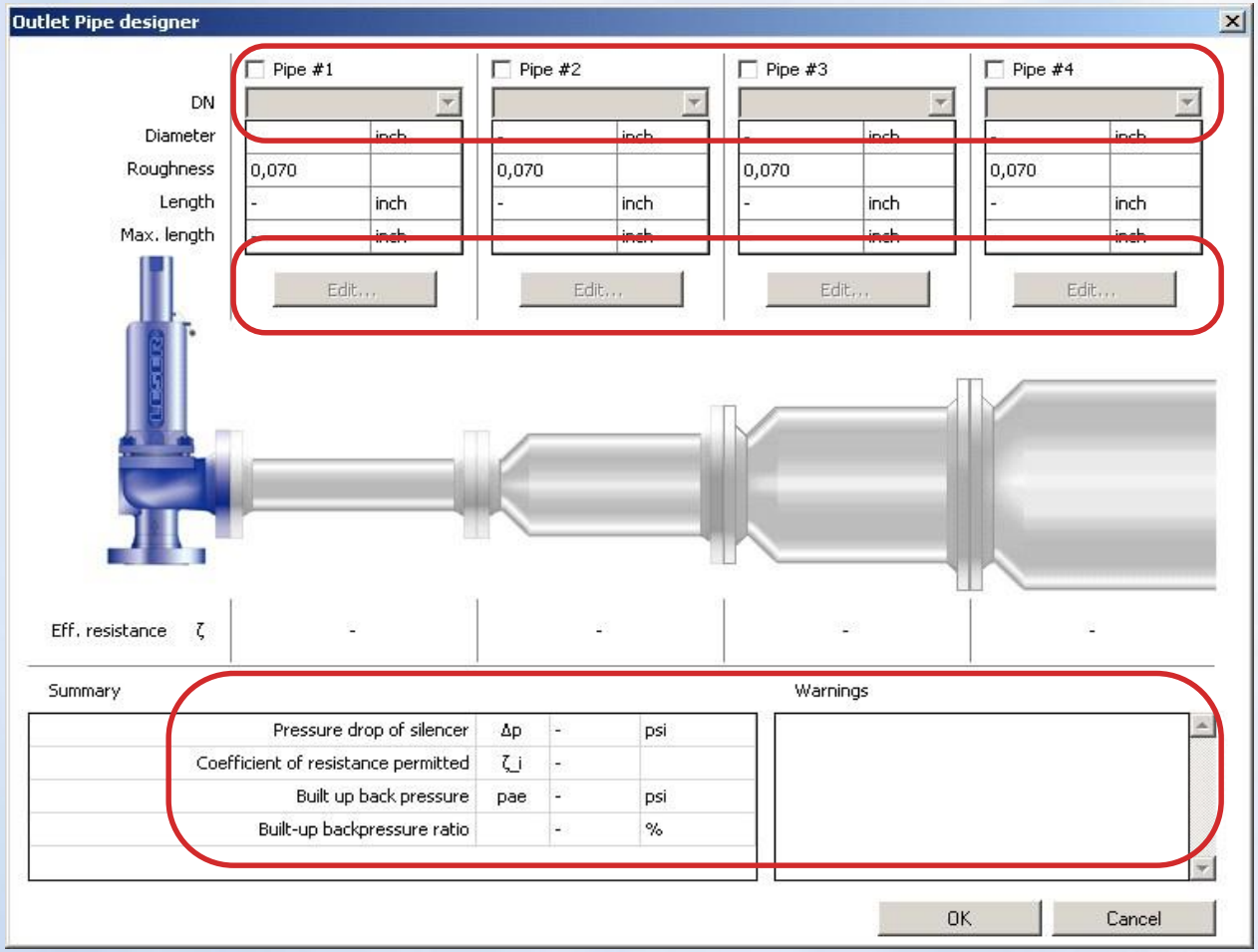


… or start in project three



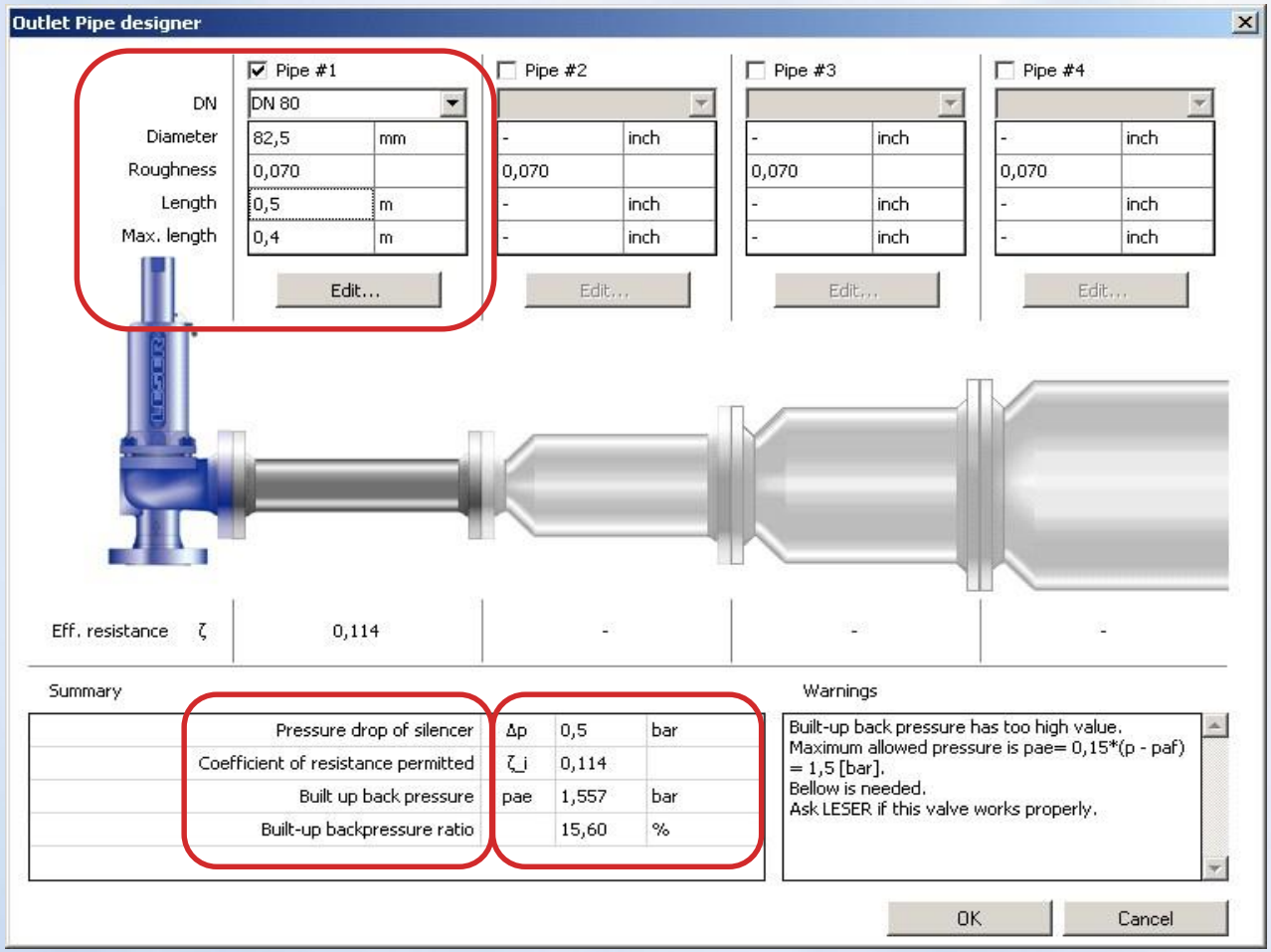
Sizing of built-up backpressure

2. Step: Dimension of outlet pipe and pipe components



Sizing of built-up backpressure

3. Step: Calculation and warning



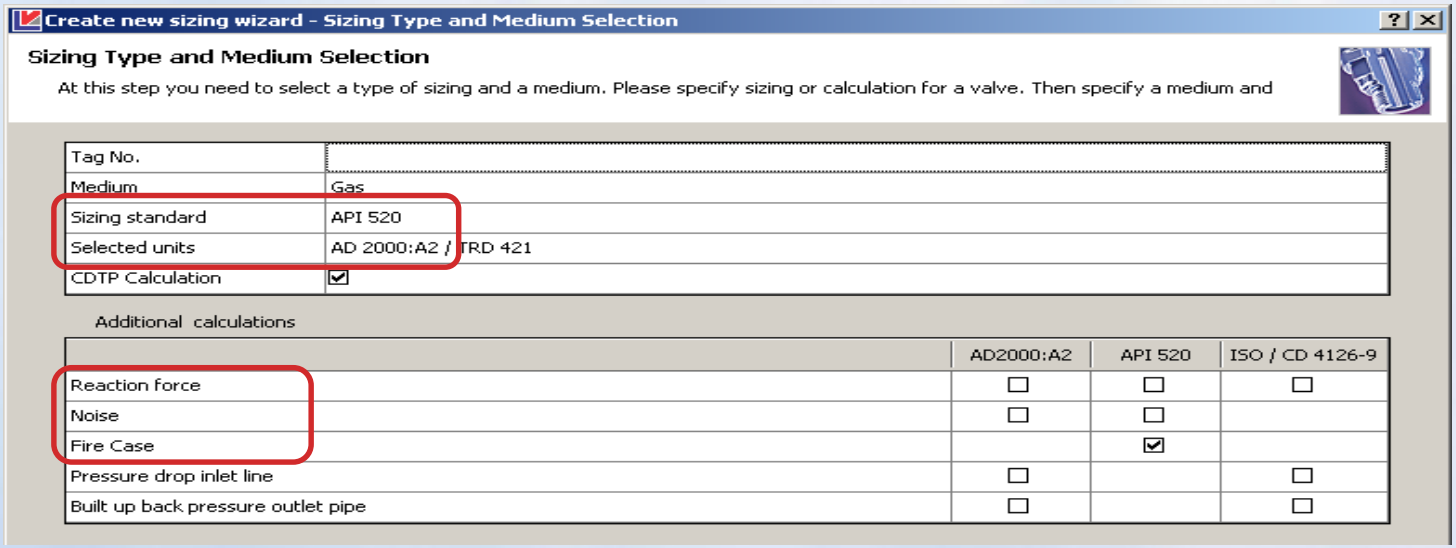
Fire case according to API RP 521

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

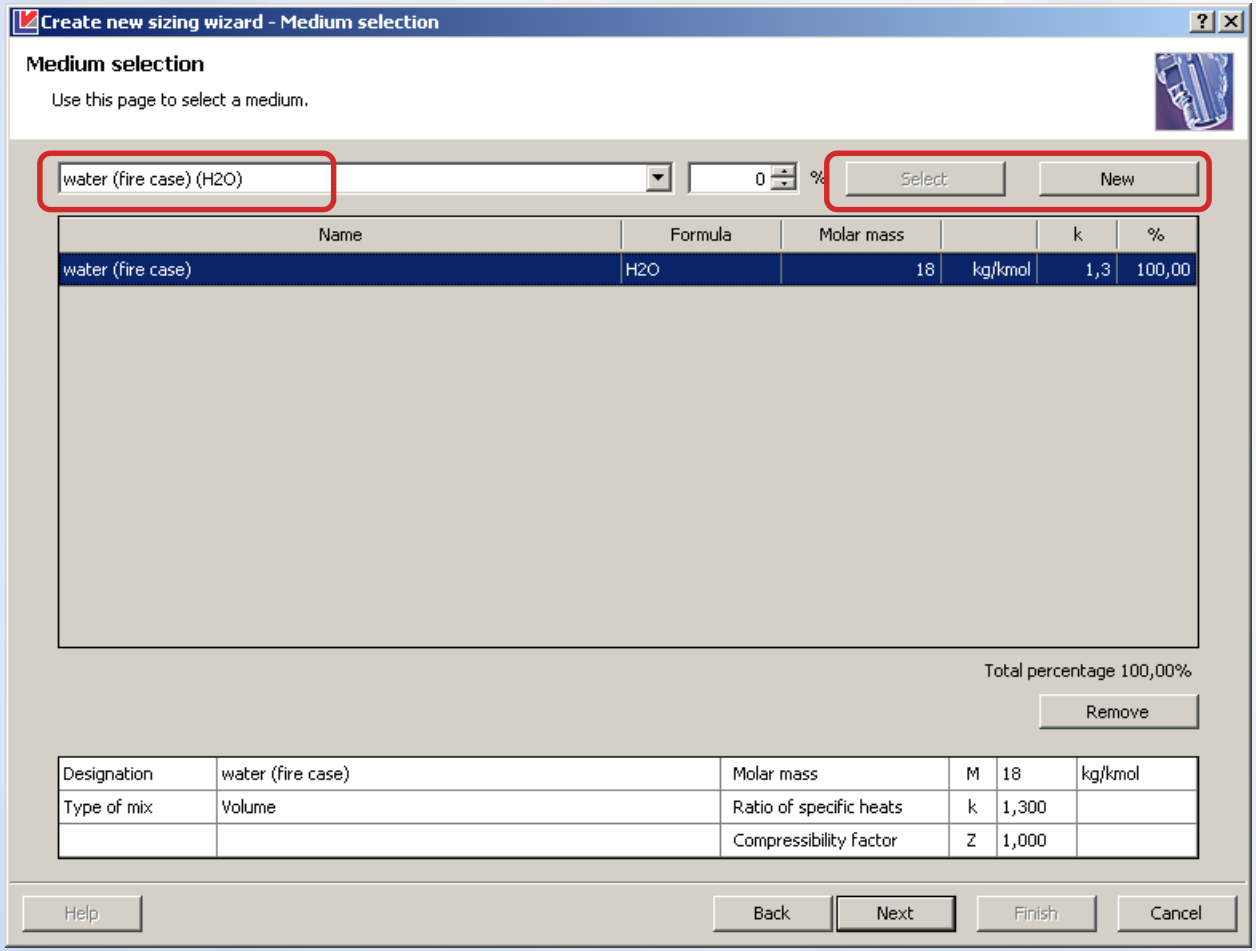
Valve construction: Type 526, full nozzle, Carbon Steel body (1.0619/WCB), closed bonnet, lifting device cap H2

API RP 521



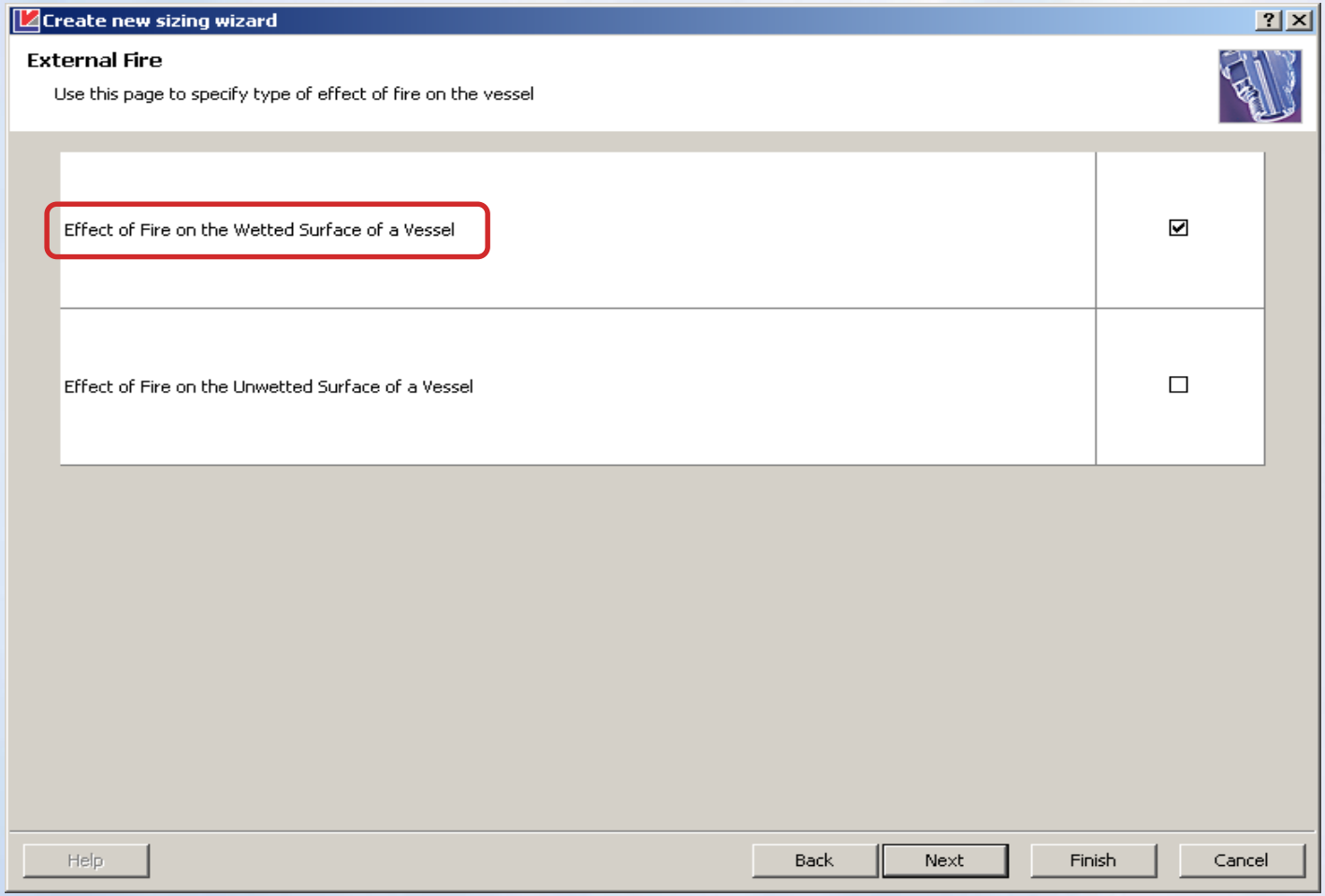
Fire case according to API RP 521

API RP 521



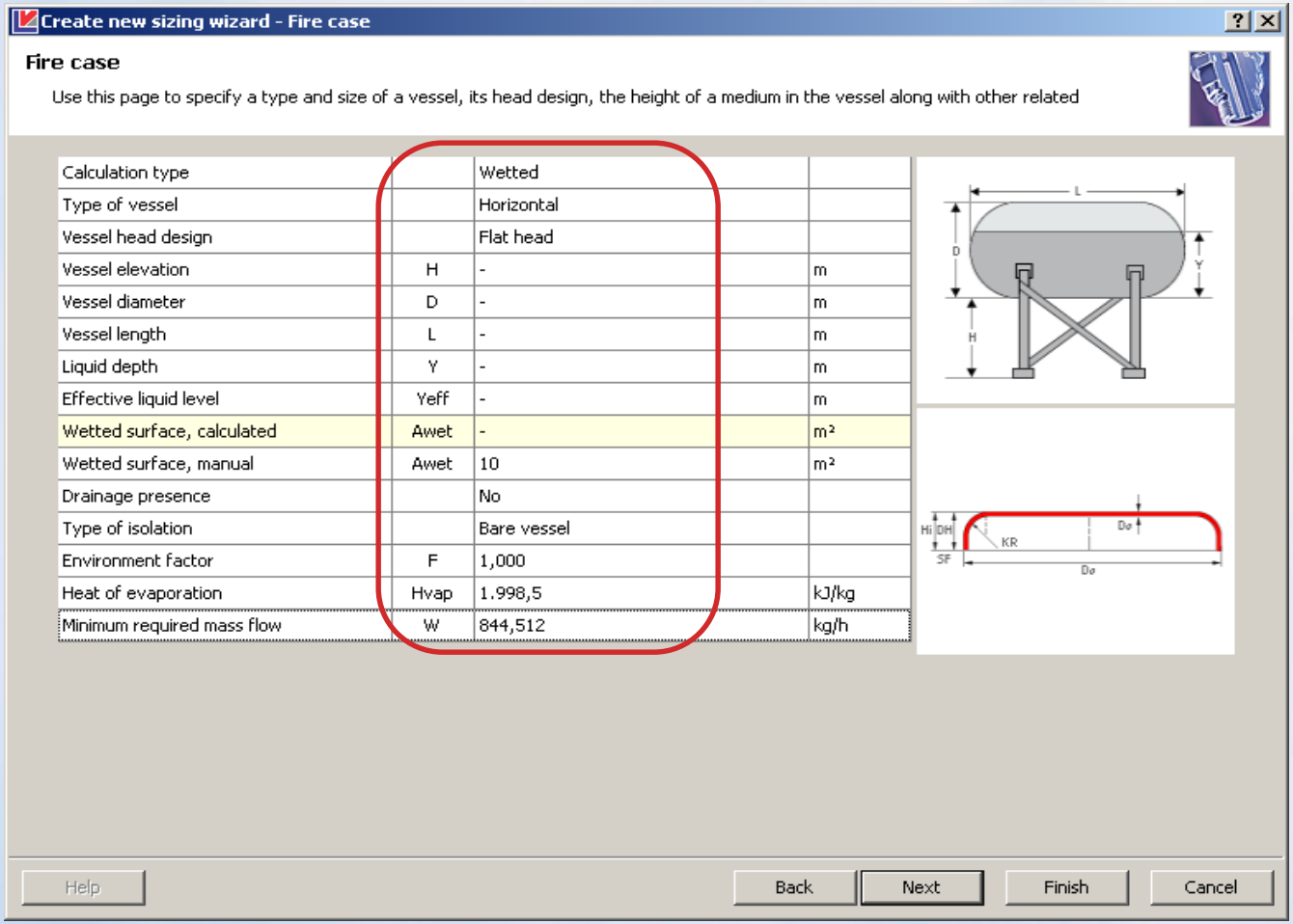
Fire case according to API RP 521

API RP 521



Fire case according to API RP 521

API RP 521

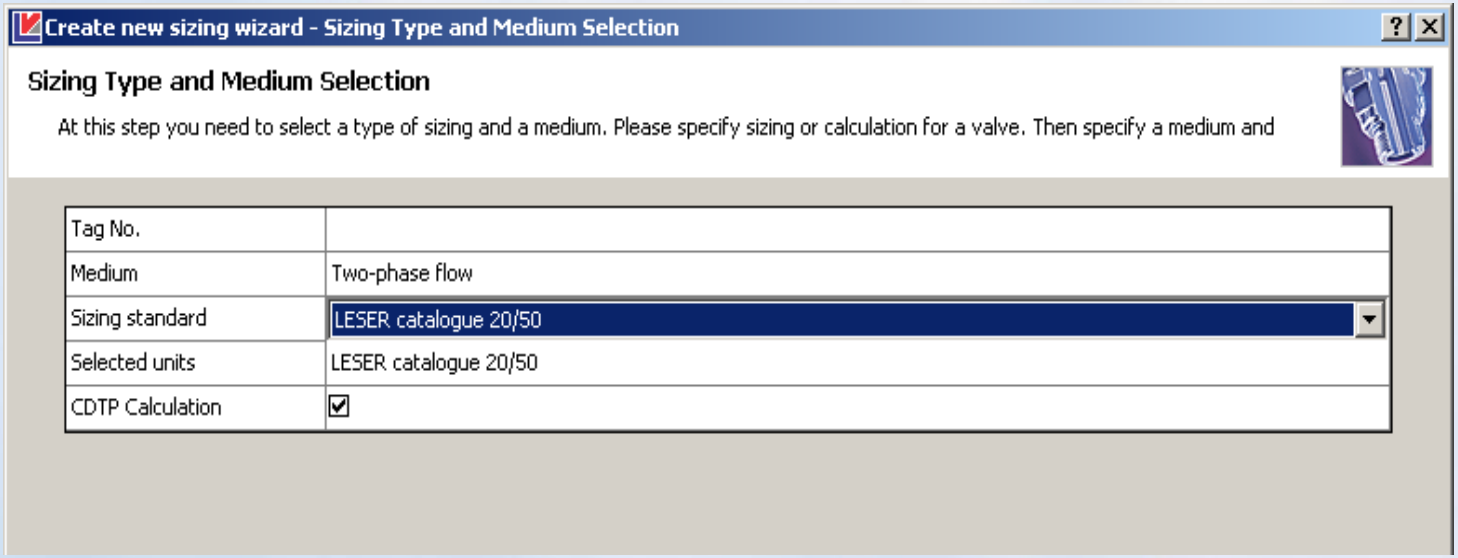


Two Phase Flow

LESER mixed formula

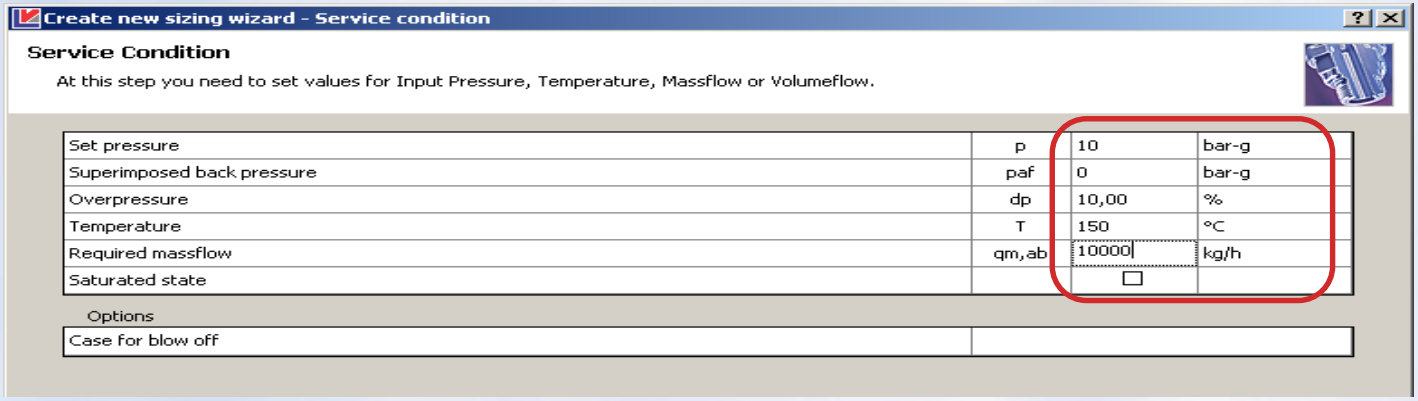
Service condition: hot water, temperature = 150°C, Set pressure = 10bar g, required massflow = 10000kg/h

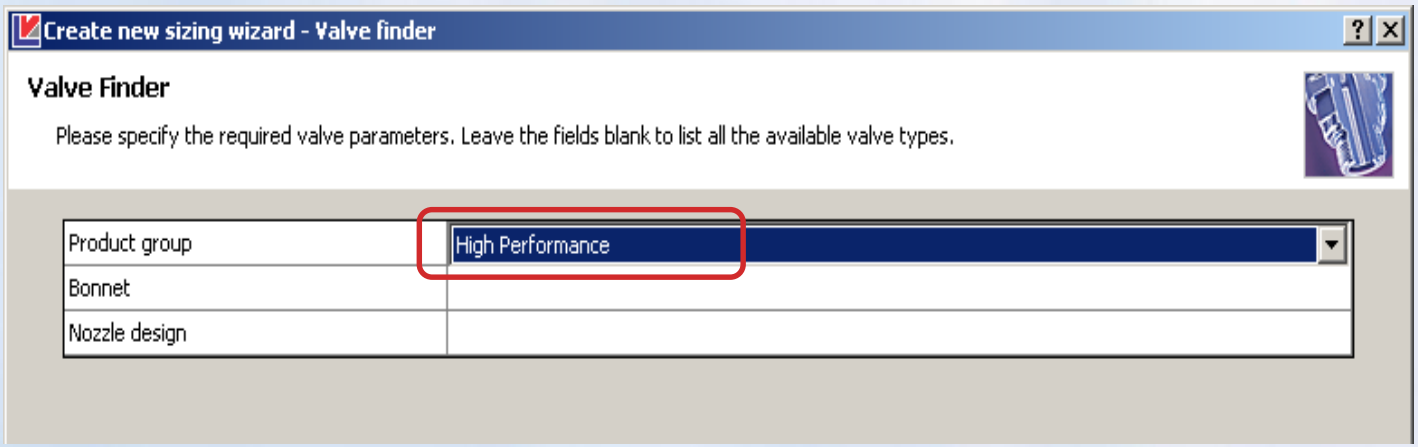
Valve construction: Type 441, semi nozzle, Carbon Steel body (1.0619/WCB), closed bonnet, lifting device cap H2, evaporation while depressuring from 10bar g to environmental pressure in case of blow off.



Two Phase Flow

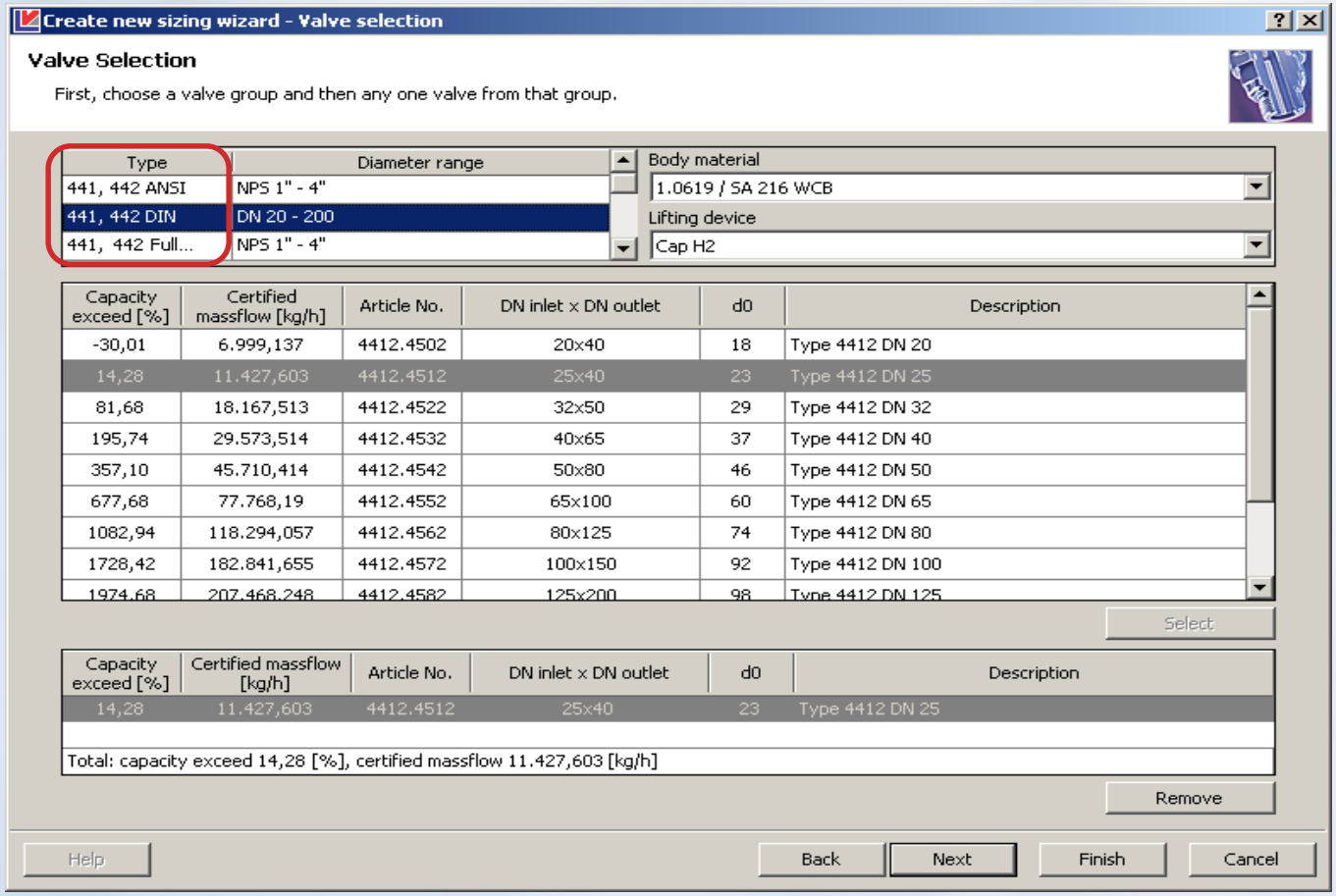
LESER mixed formula





Two Phase Flow

LESER mixed formula

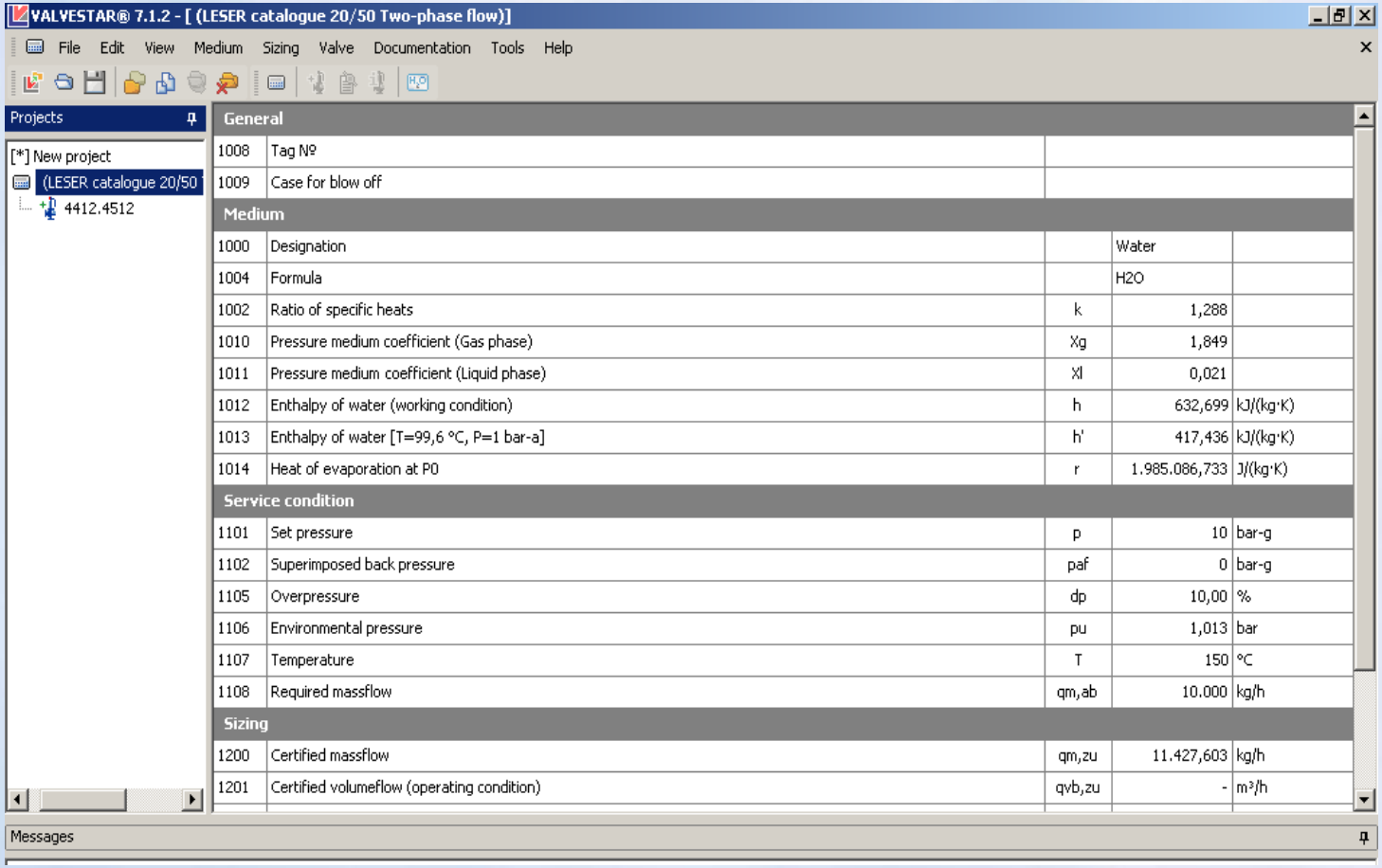


All the next steps until finish are not shown.

Two Phase Flow

LESER mixed formula

Result: Documentation on screen



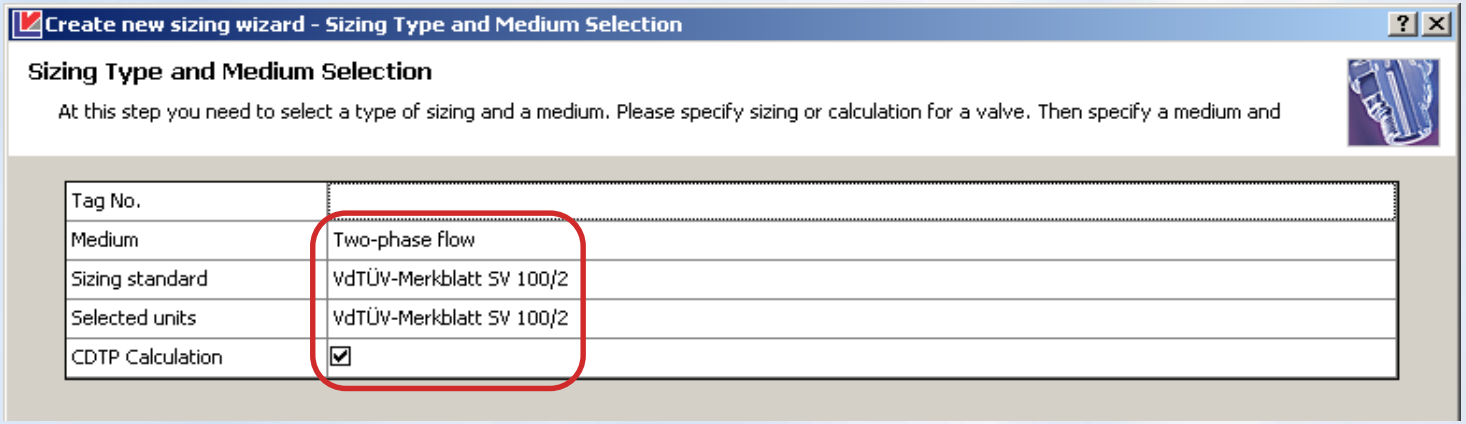
General				
1008	Tag №			
1009	Case for blow off			
Medium				
1000	Designation		Water	
1004	Formula		H2O	
1002	Ratio of specific heats	k	1,288	
1010	Pressure medium coefficient (Gas phase)	Xg	1,849	
1011	Pressure medium coefficient (Liquid phase)	Xl	0,021	
1012	Enthalpy of water (working condition)	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

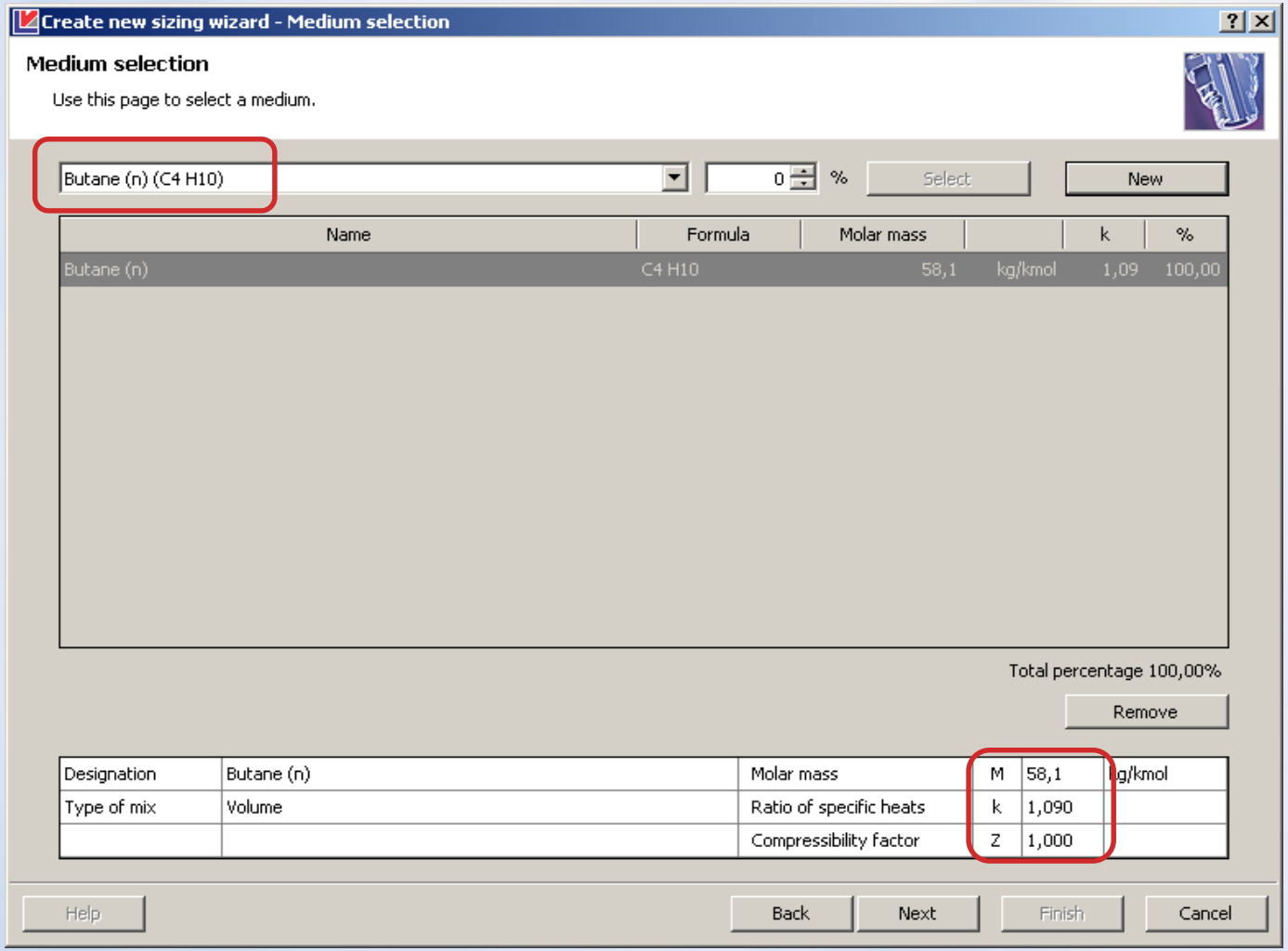
Service condition: Butane, Set pressure = 10bar g, required massflow = 10000kg/h

Valve construction: Type 441, semi nozzle, Carbon Steel body (1.0619/WCB), closed bonnet, lifting device cap H2



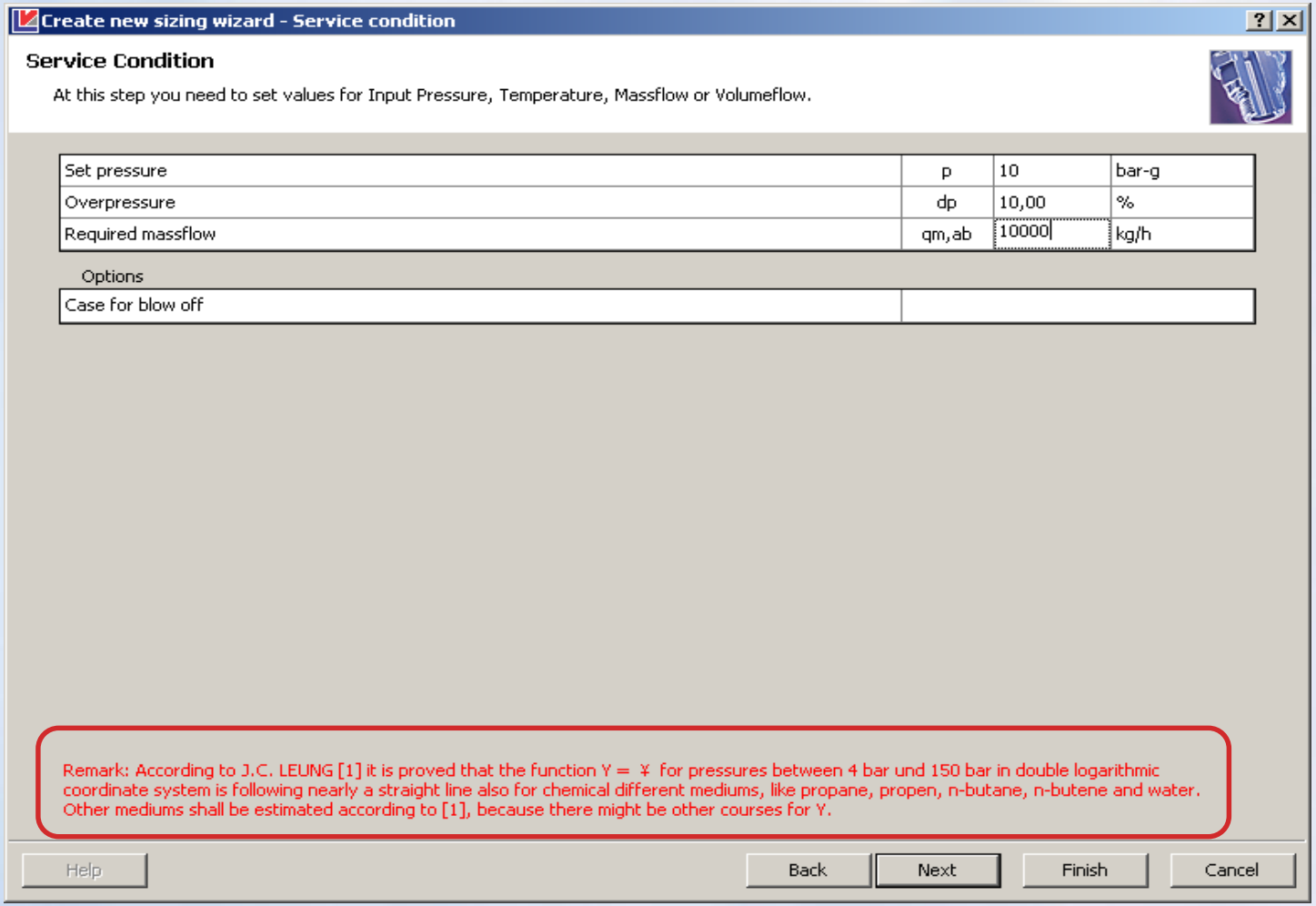
Two Phase Flow

VdTÜV Merkblatt 100



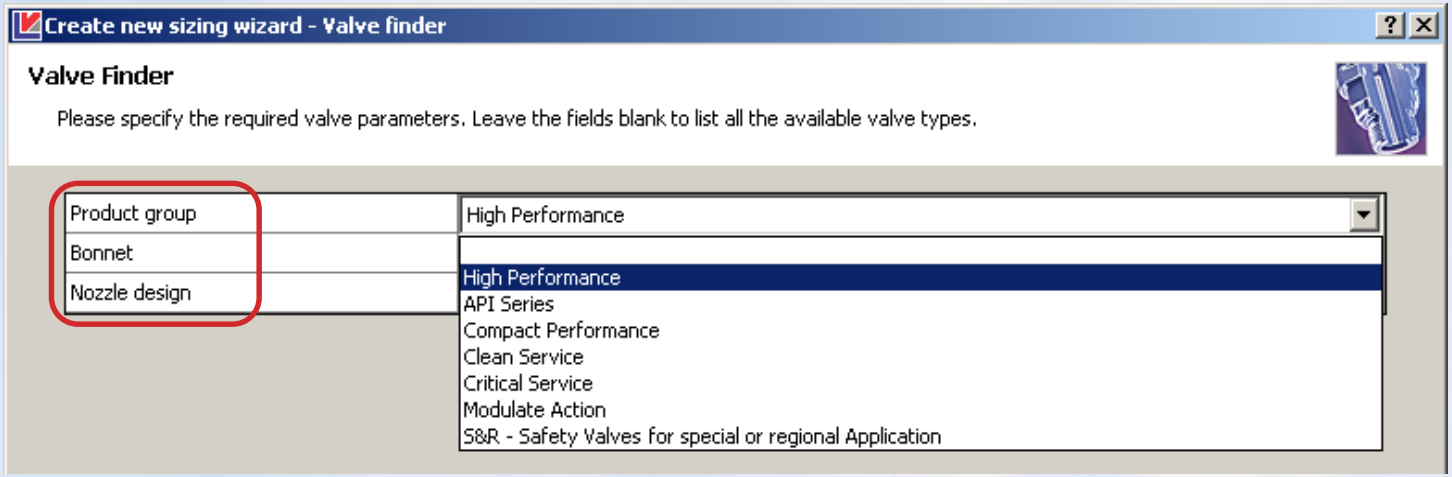
Two Phase Flow

VdTÜV Merkblatt 100



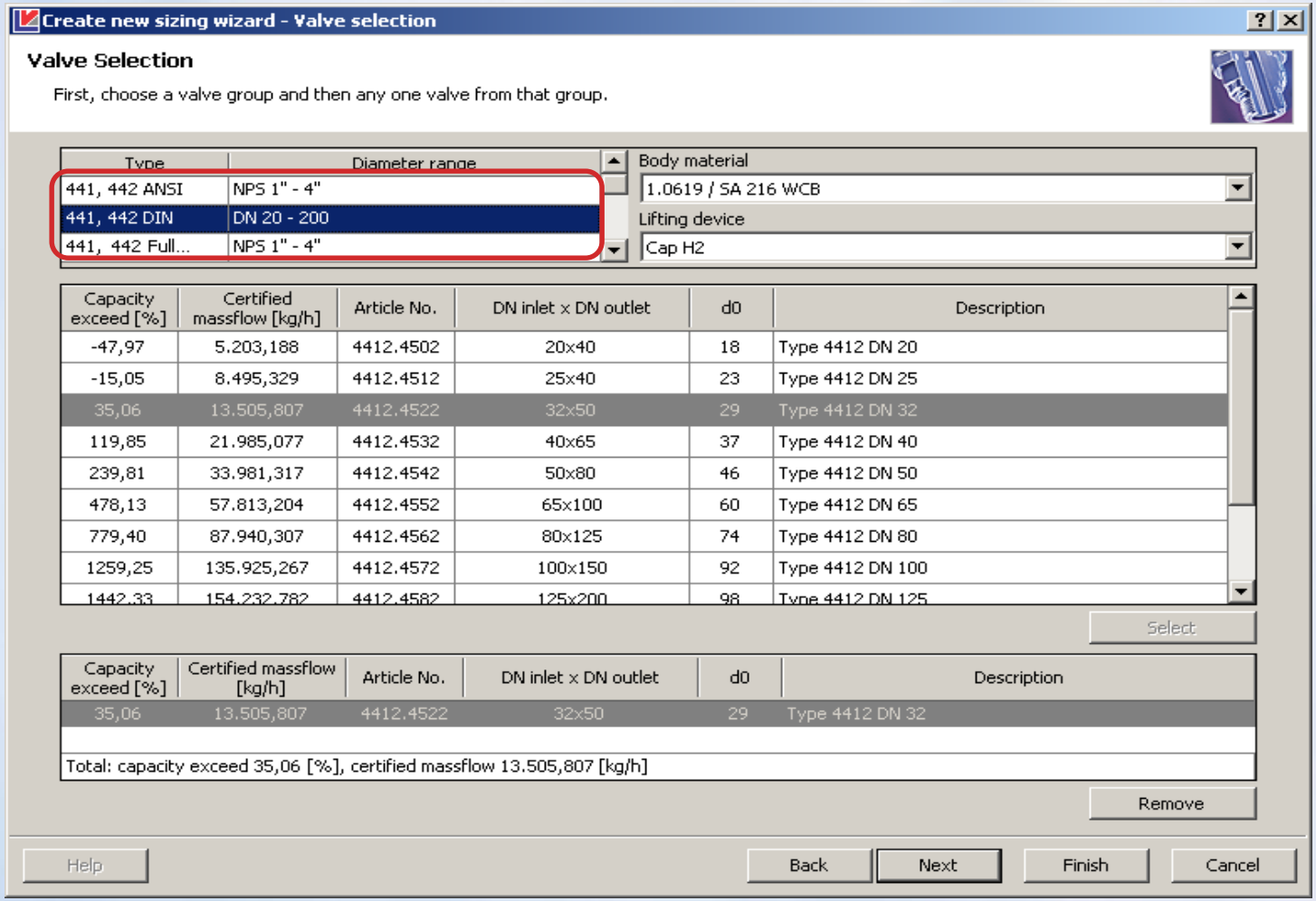
Two Phase Flow

VdTÜV Merkblatt 100



Two Phase Flow

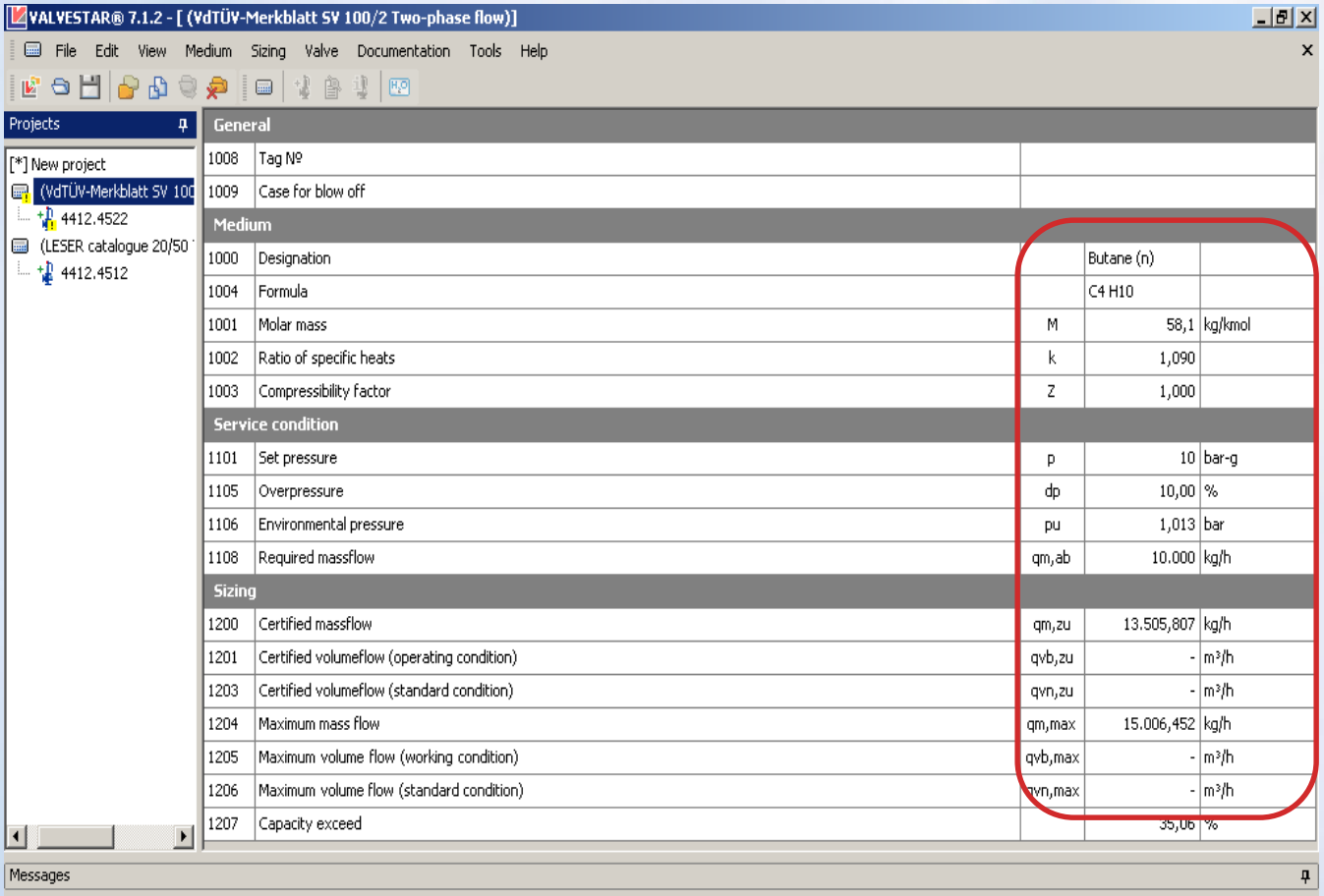
VdTÜV Merkblatt 100



Two Phase Flow

VdTÜV Merkblatt 100

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	%

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

Additional Sizings, Noise Level, Reaction Forces

1. Step: Reaction force and noise level

Create new sizing wizard - Sizing Type and Medium Selection

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

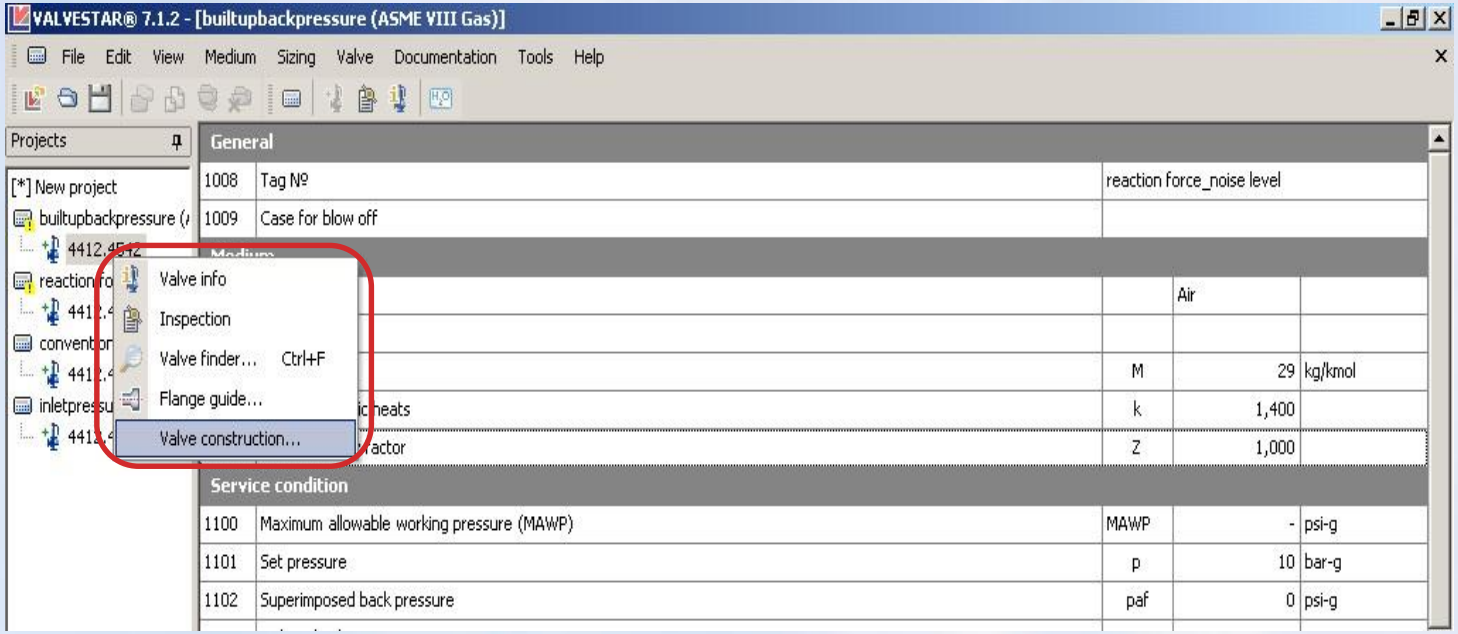
Tag No.	
Medium	Gas
Sizing standard	ASME VIII
Selected units	ASME VIII
CDTP Calculation	☑

Additional calculations

	AD2000:A2	API 520	ISO / CD 4126-9
Reaction force	☑	☐	☐
Noise	☑	☐	
Fire Case		☐	
Pressure drop inlet line	☐		☐
Built up back pressure outlet pipe	☐		☐

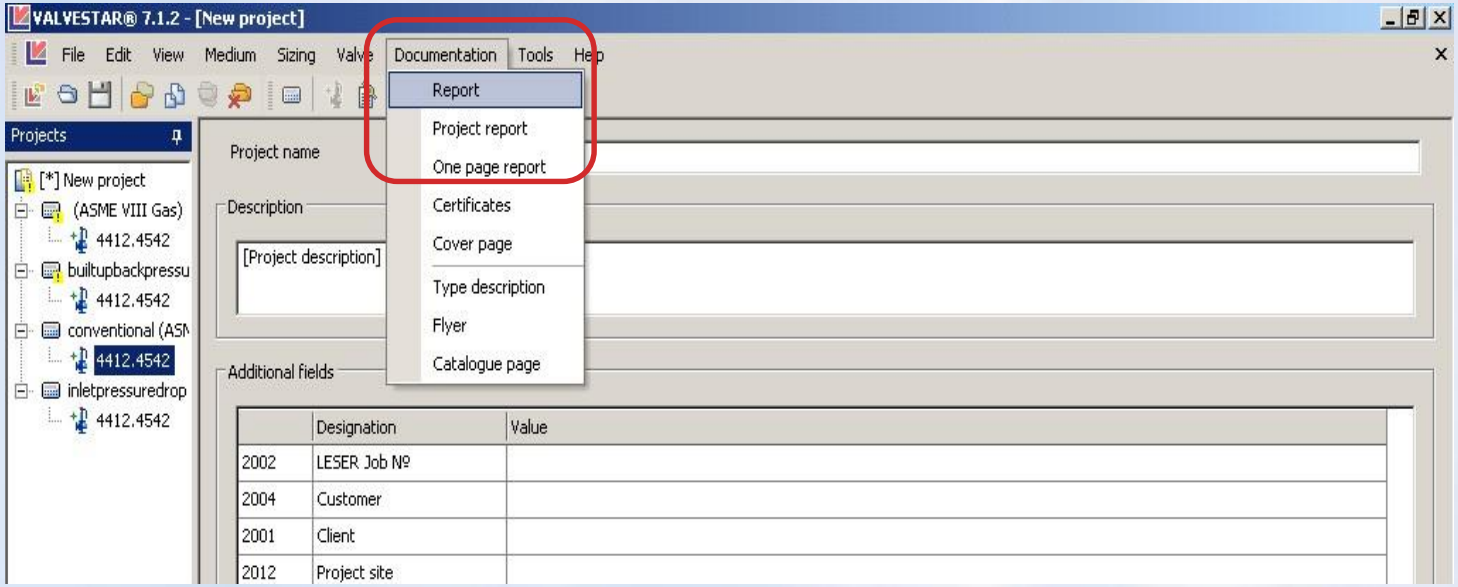
Additional Sizings, Noise Level, Reaction Forces

1. Step: Reaction force and noise level



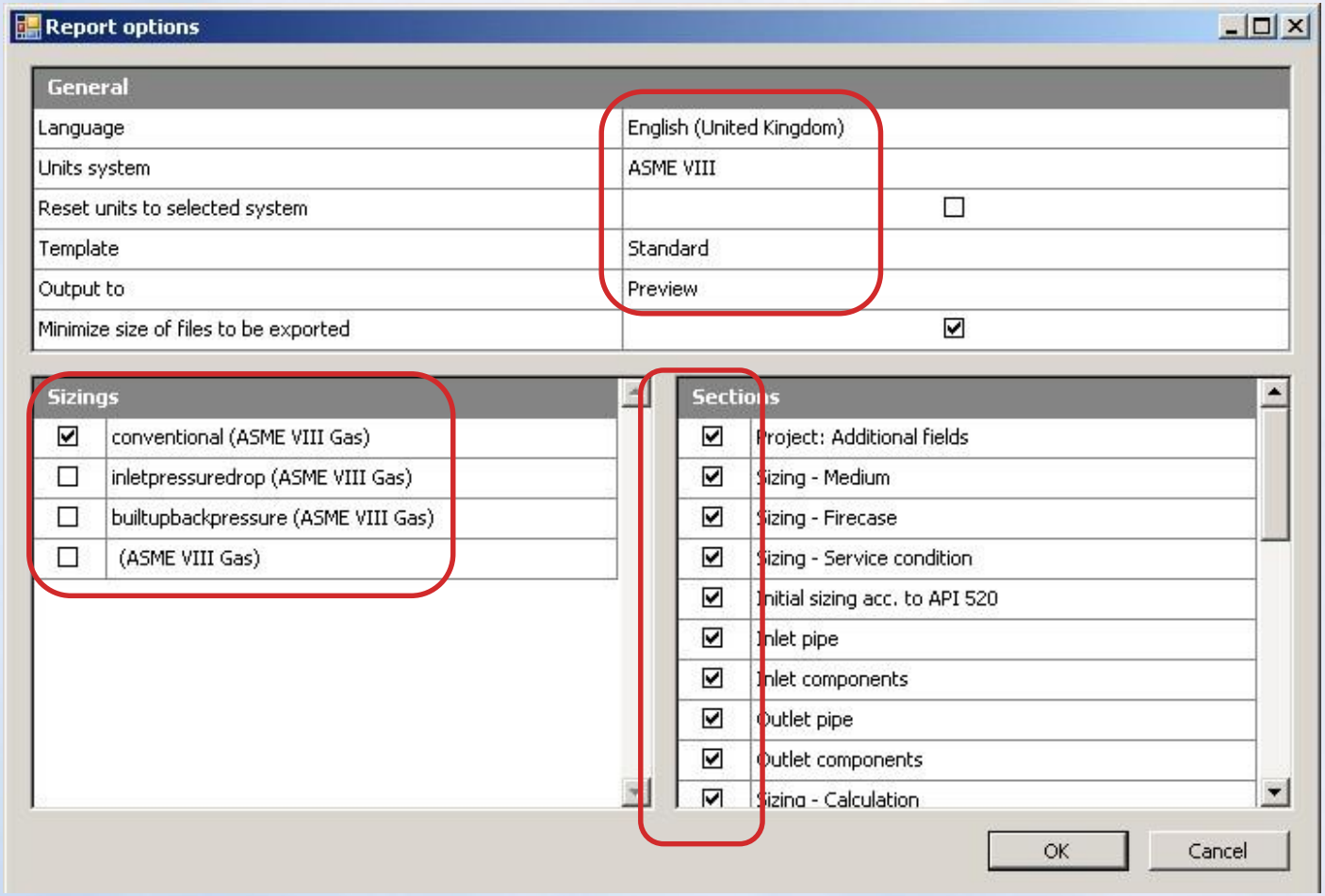
Reporting

1. Step: Create a report

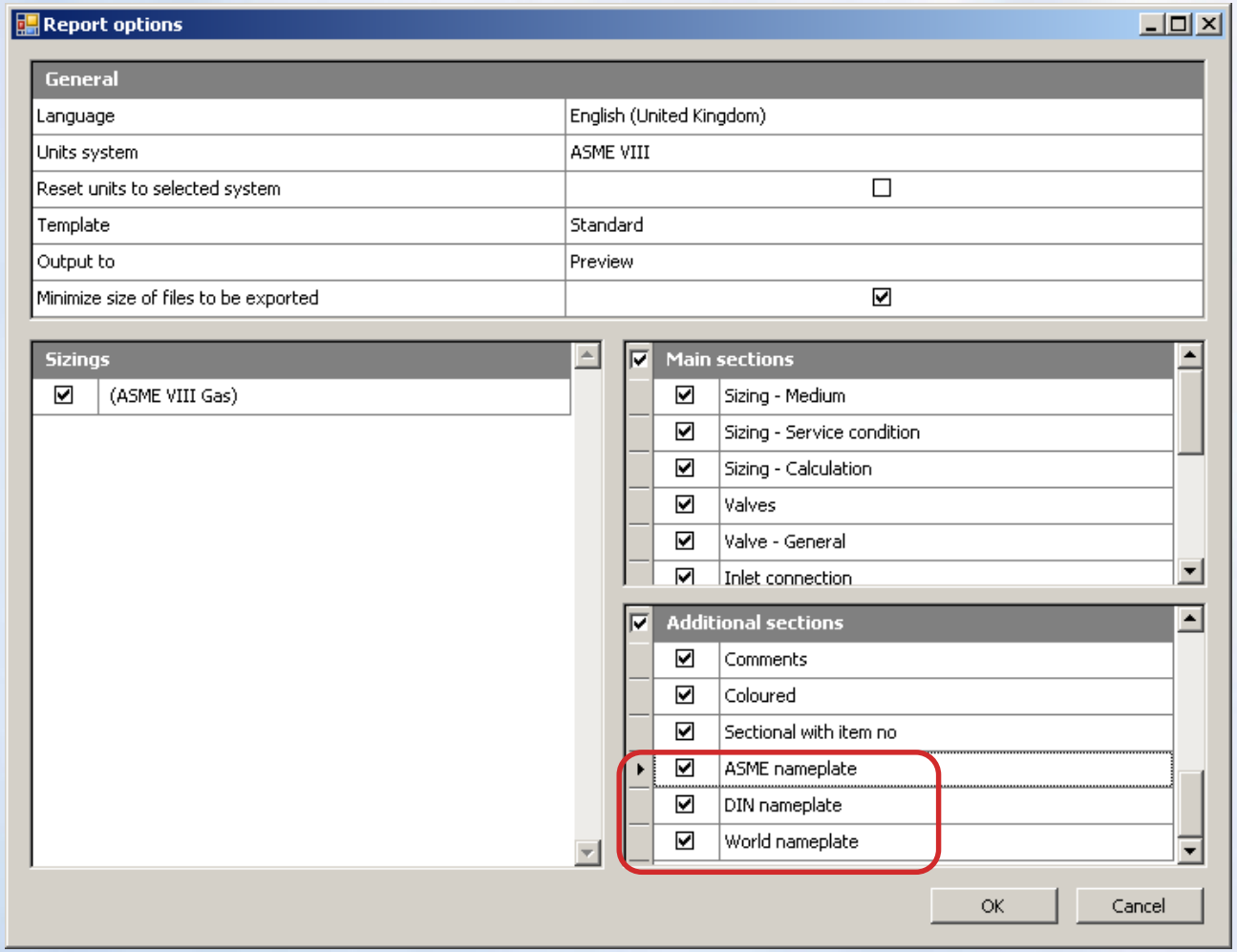


Reporting

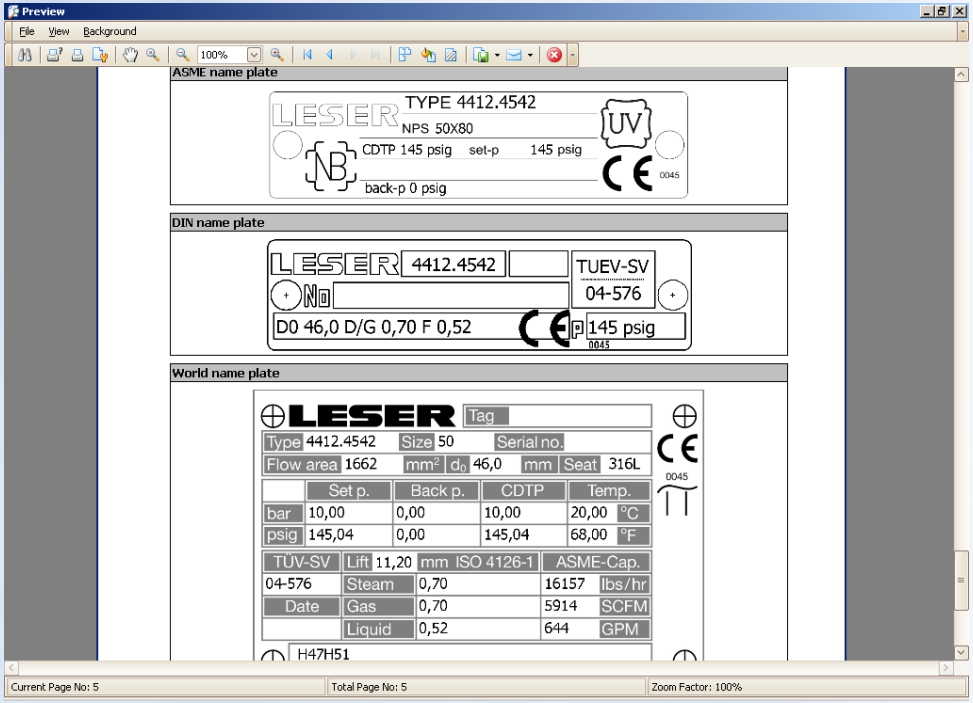
1. Step: Create a report

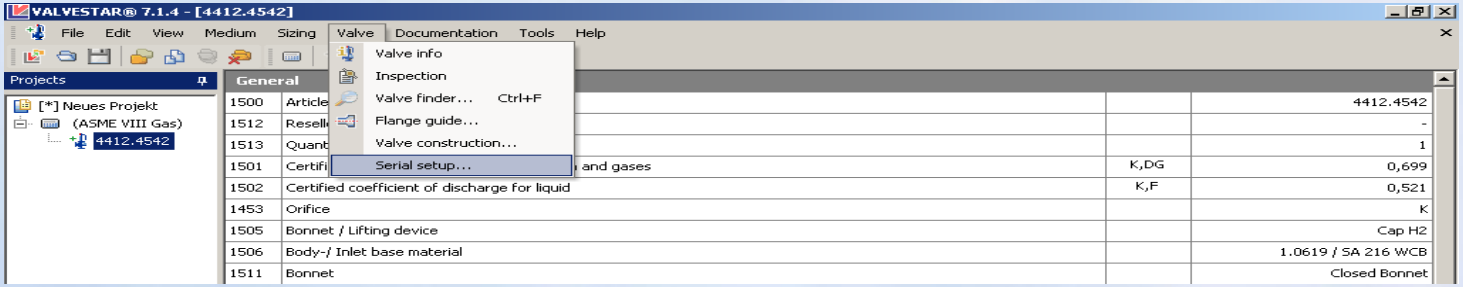


Reporting

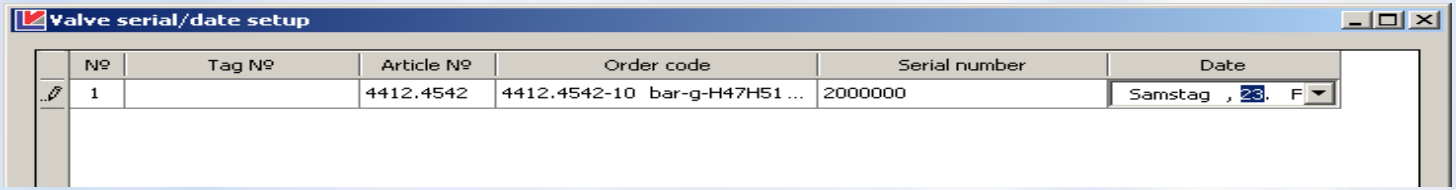


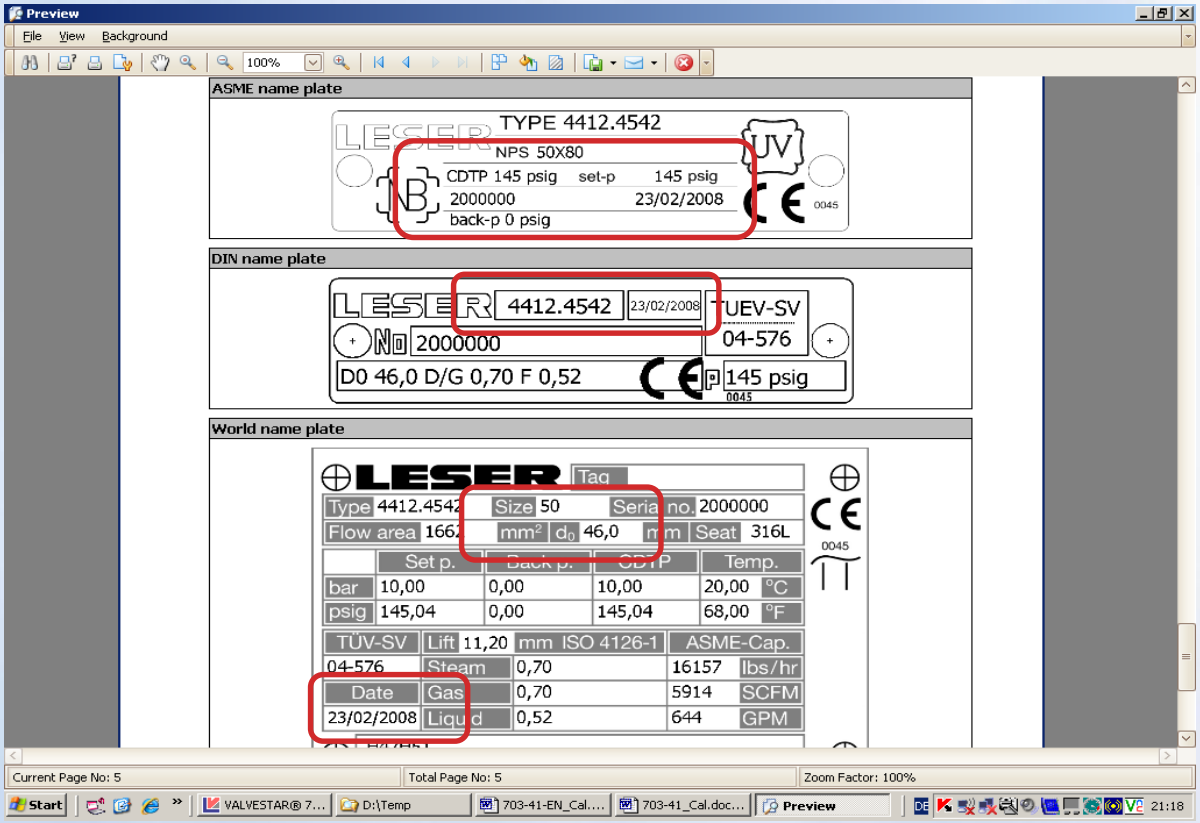
Reporting





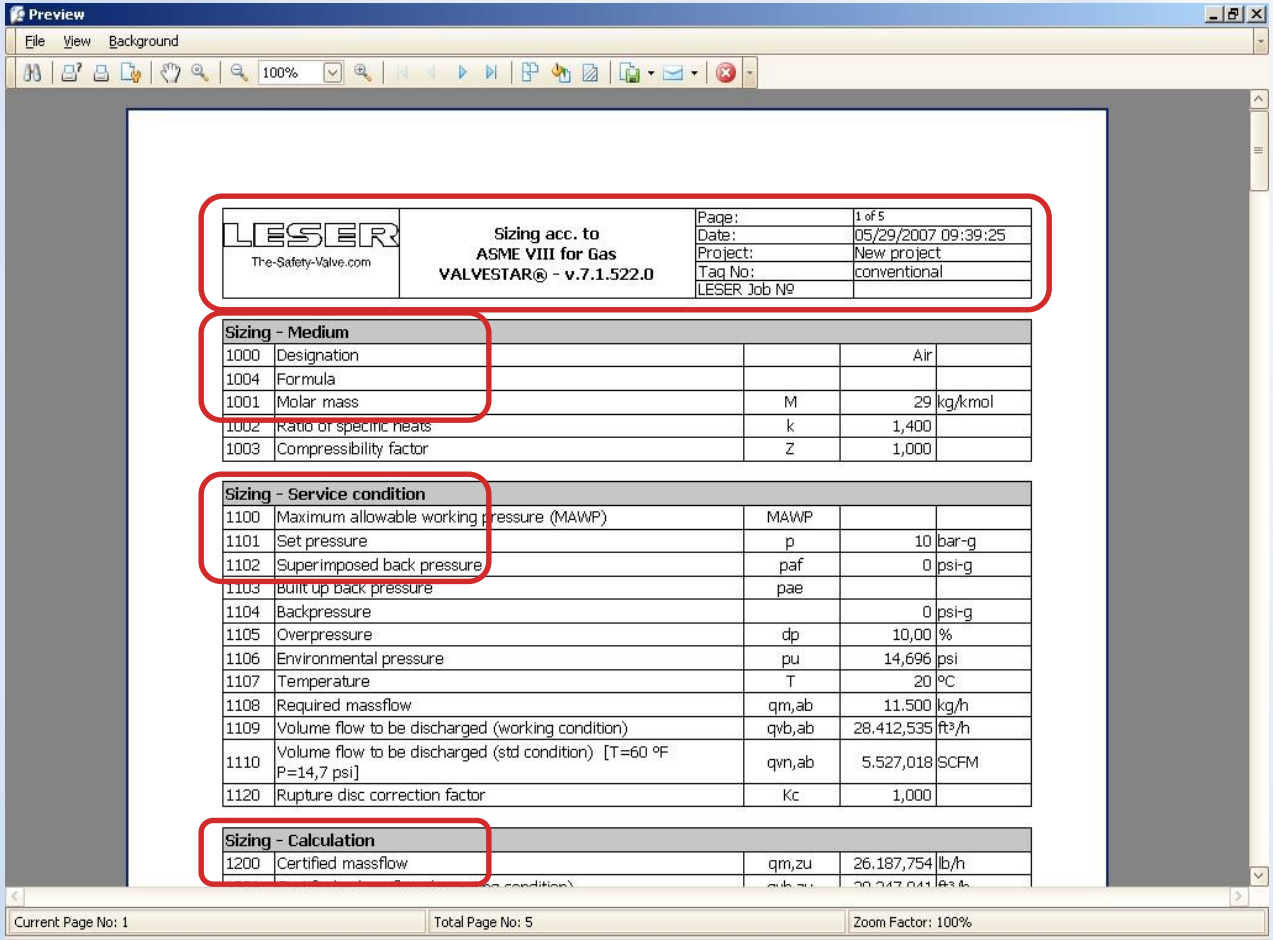
Reporting


Valve serial/date setup
№
Tag №
Article №
Order code
Serial number
Date
1
4412.4542
4412.4542-10 bar-g-H47H51 ...
2000000
Samstag , 23. F


Preview
File View Background
ASME name plate
TYPE 4412.4542
NPS 50X80
CDTP 145 psig set-p 145 psig
2000000 23/02/2008
back-p 0 psig
DIN name plate
4412.4542
23/02/2008
TUEV-SV
04-576
No 2000000
D0 46,0 D/G 0,70 F 0,52
145 psig
World name plate
Tag
Type 4412.4542
Size 50
Seat 316L
Set p.
Temp.
bar 10,00 0,00 10,00 20,00 °C
psig 145,04 0,00 145,04 68,00 °F
TÜV-SV
Lift 11,20 mm ISO 4126-1
ASME-Cap.
04-576
Steam 0,70 16157 lbs/hr
Date
Gas 0,70 5914 SCFM
23/02/2008
Liquid 0,52 644 GPM
Current Page No: 5
Total Page No: 5
Zoom Factor: 100%

Reporting

1. Step: Create a report



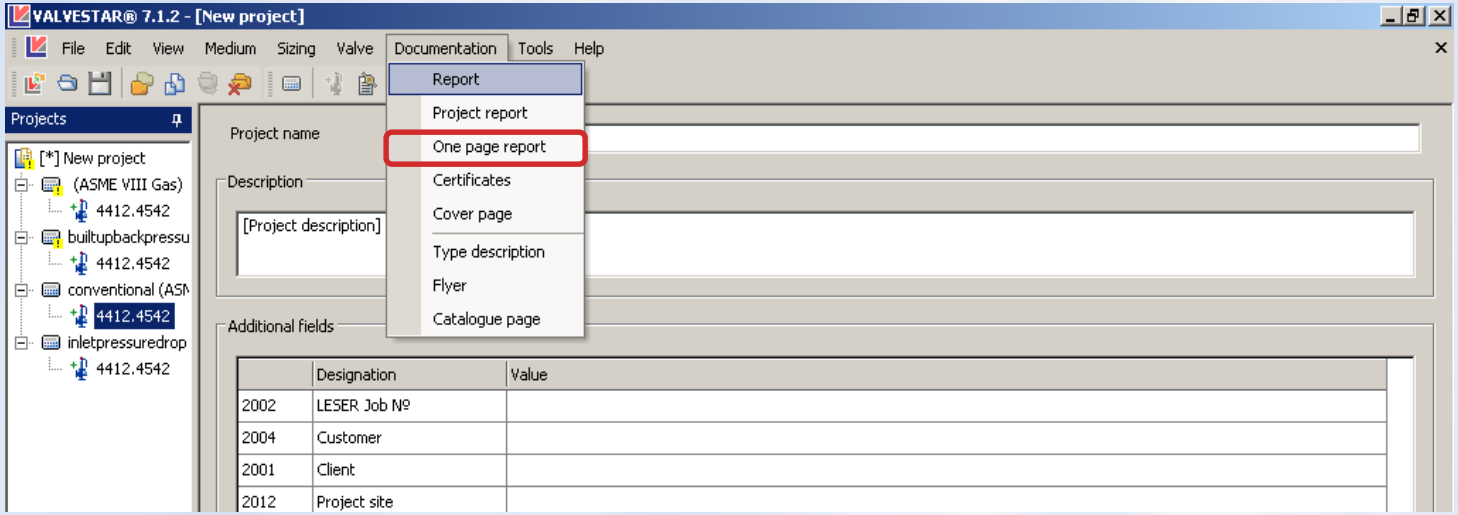
Sizing - Medium				
1000	Designation		Air	
1004	Formula			
1001	Molar mass	M	29	kg/kmol
1002	Ratio of specific heats	k	1,400	
1003	Compressibility factor	Z	1,000	

Sizing - Service condition				
1100	Maximum allowable working pressure (MAWP)	MAWP		
1101	Set pressure	p	10	bar-g
1102	Superimposed back pressure	paf	0	psi-g
1103	Built up back pressure	pae		
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
1120	Rupture disc correction factor	Kc	1,000	

Sizing - Calculation				
1200	Certified massflow	qm,zu	26.187,754	lb/h

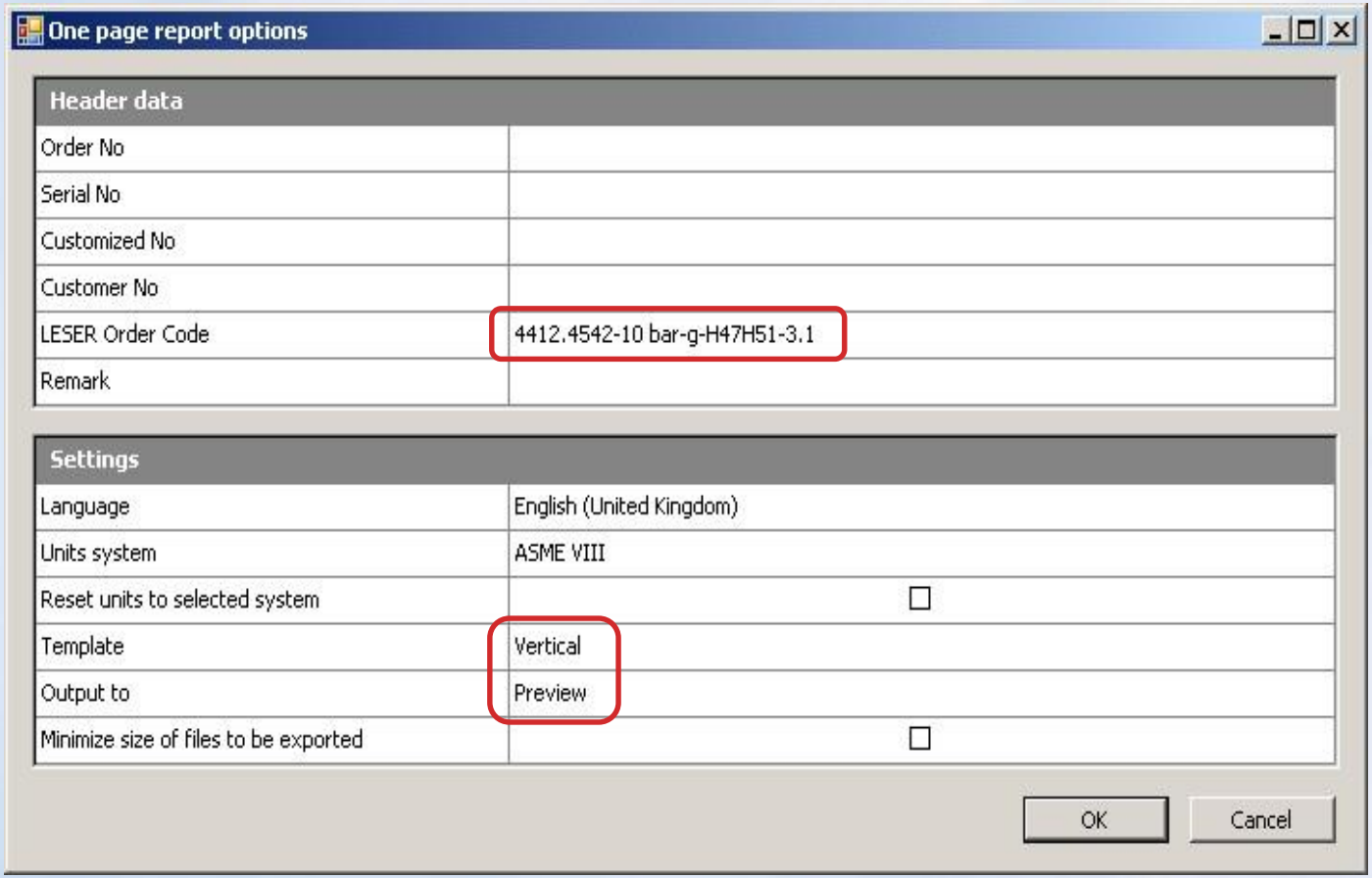
Reporting

2. Step: Create a one page report



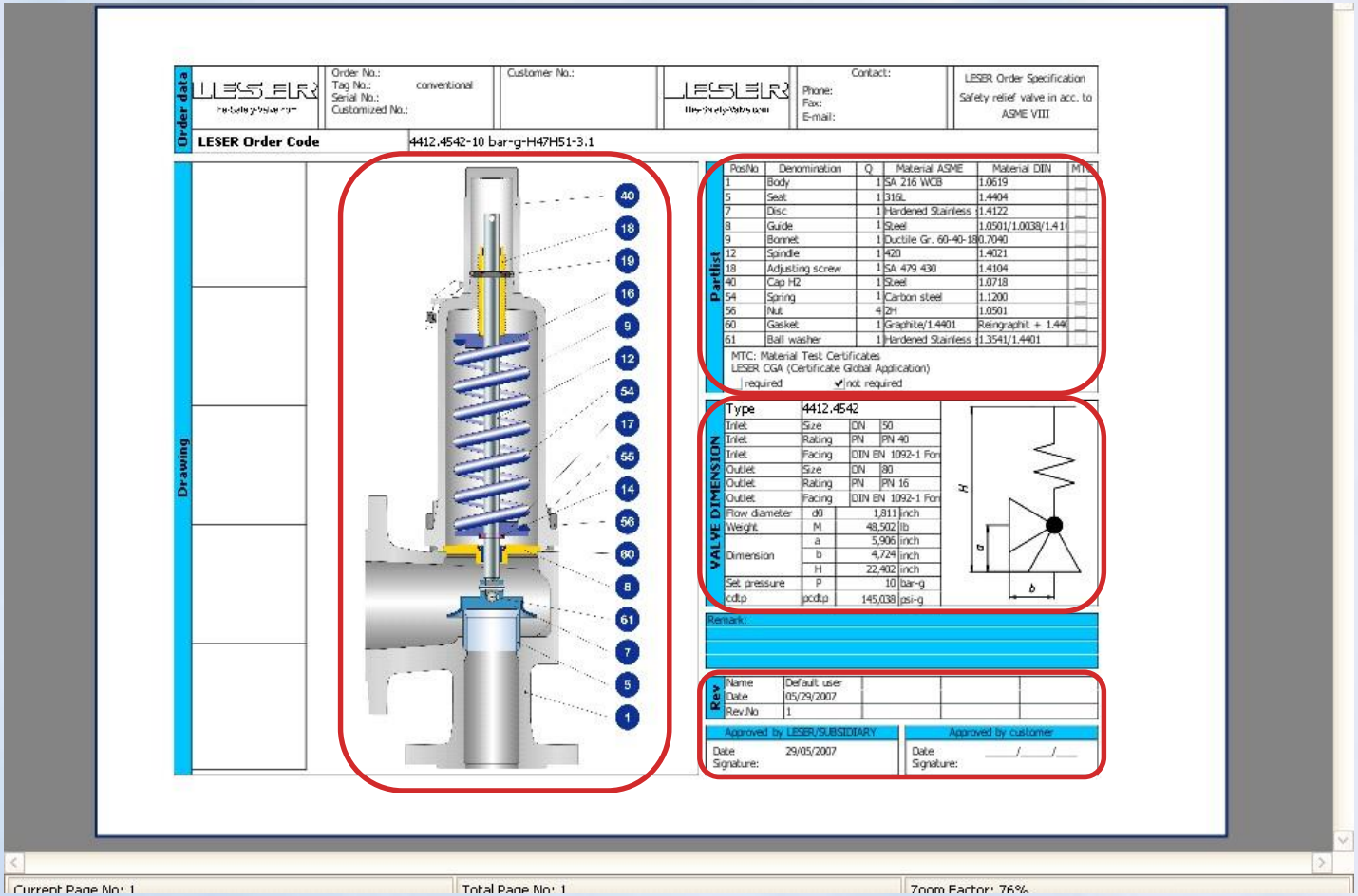
Reporting

2. Step: Create a one page report



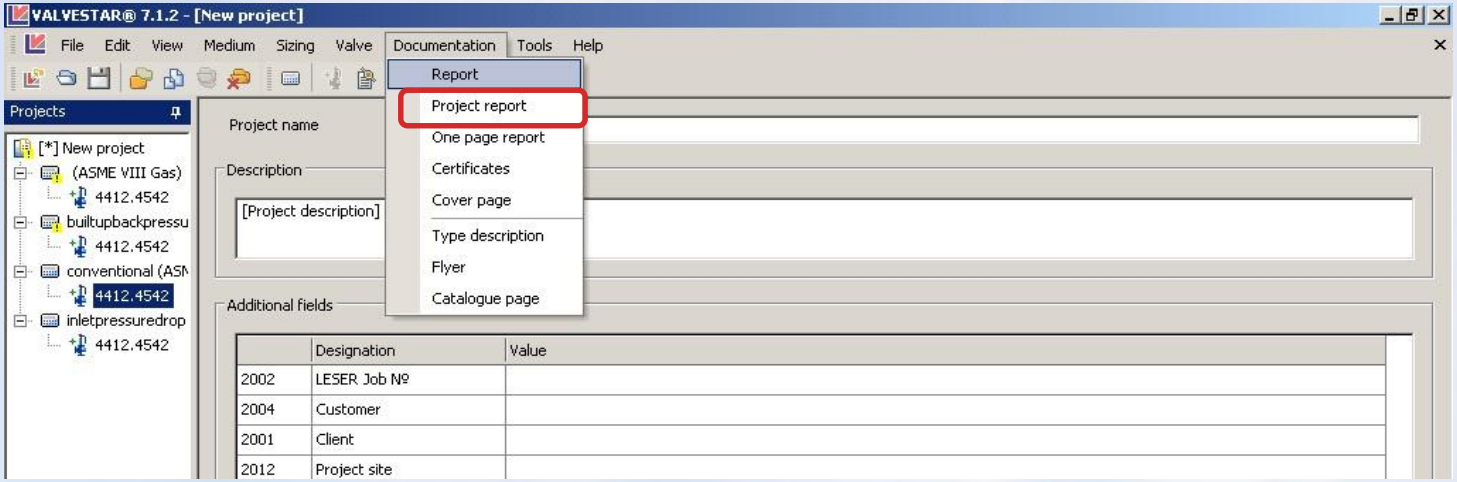
Reporting

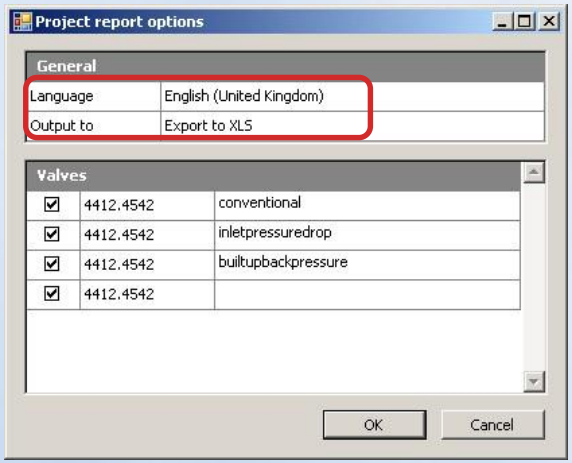
2. Step: Create a one page report



Reporting

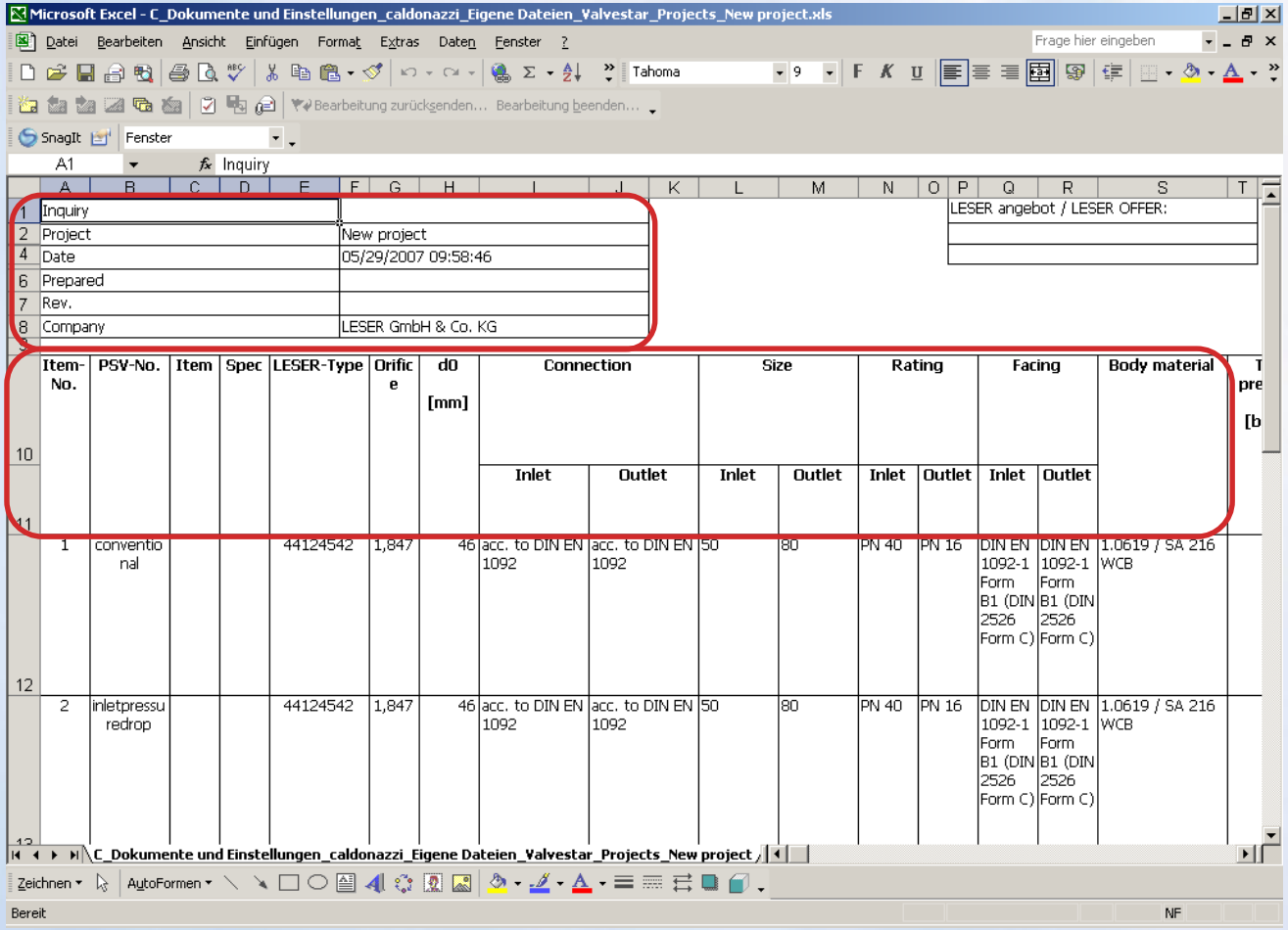
3. Step: Create a project report





Reporting

3. Step: Create a project report

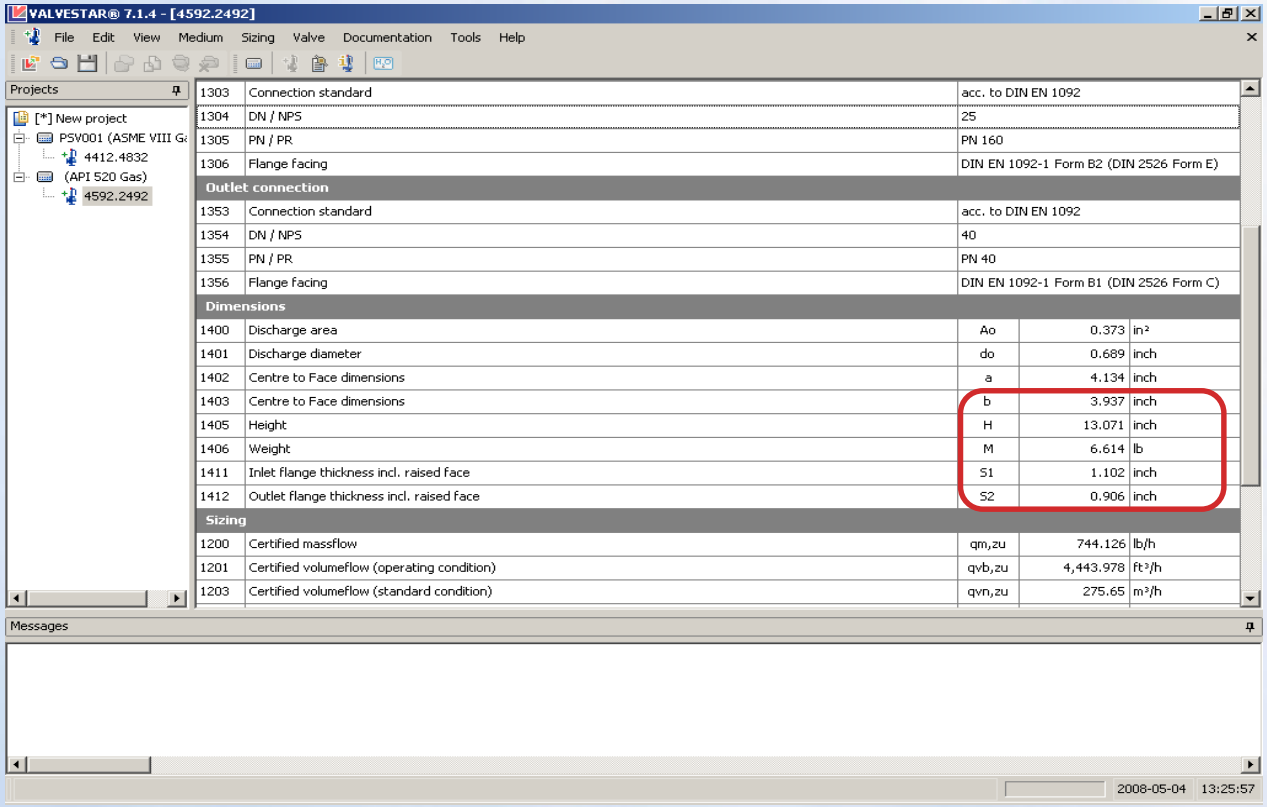


Item-No.	PSV-No.	Item	Spec	LESER-Type	Orifice	d0 [mm]	Connection		Size		Rating		Facing		Body material
							Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	
1	conventional			44124542	1,847	46	acc. to DIN EN 1092	acc. to DIN EN 1092	50	80	PN 40	PN 16	DIN EN 1092-1 Form B1 (DIN 2526 Form C)	DIN EN 1092-1 Form B1 (DIN 2526 Form C)	1.0619 / SA 216 WCB
2	inletpressuredrop			44124542	1,847	46	acc. to DIN EN 1092	acc. to DIN EN 1092	50	80	PN 40	PN 16	DIN EN 1092-1 Form B1 (DIN 2526 Form C)	DIN EN 1092-1 Form B1 (DIN 2526 Form C)	1.0619 / SA 216 WCB

Reporting

What is new for dimensions S1, S2, c?

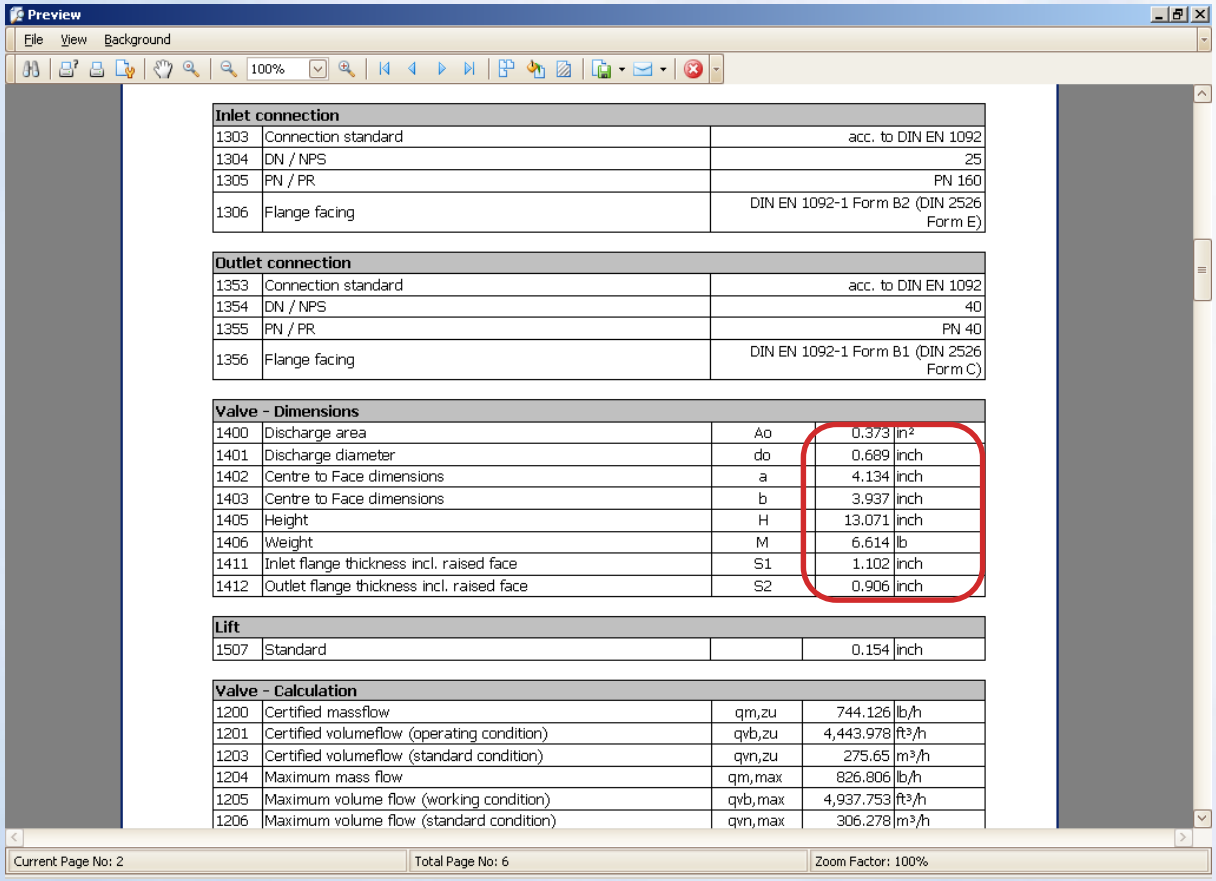
These data have been added to the database for all slip on flange based safety valve and all full nozzle safety valve to get the correct bolt length or thread length.



Reporting

How I find it in the documentation

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



Inlet connection		
1303	Connection standard	acc. to DIN EN 1092
1304	DN / NPS	25
1305	PN / PR	PN 160
1306	Flange facing	DIN EN 1092-1 Form B2 (DIN 2526 Form E)

Outlet connection		
1353	Connection standard	acc. to DIN EN 1092
1354	DN / NPS	40
1355	PN / PR	PN 40
1356	Flange facing	DIN EN 1092-1 Form B1 (DIN 2526 Form C)

Valve - Dimensions				
1400	Discharge area	Ao	0.373	in²
1401	Discharge diameter	do	0.689	inch
1402	Centre to Face dimensions	a	4.134	inch
1403	Centre to Face dimensions	b	3.937	inch
1405	Height	H	13.071	inch
1406	Weight	M	6.614	lb
1411	Inlet flange thickness incl. raised face	S1	1.102	inch
1412	Outlet flange thickness incl. raised face	S2	0.906	inch

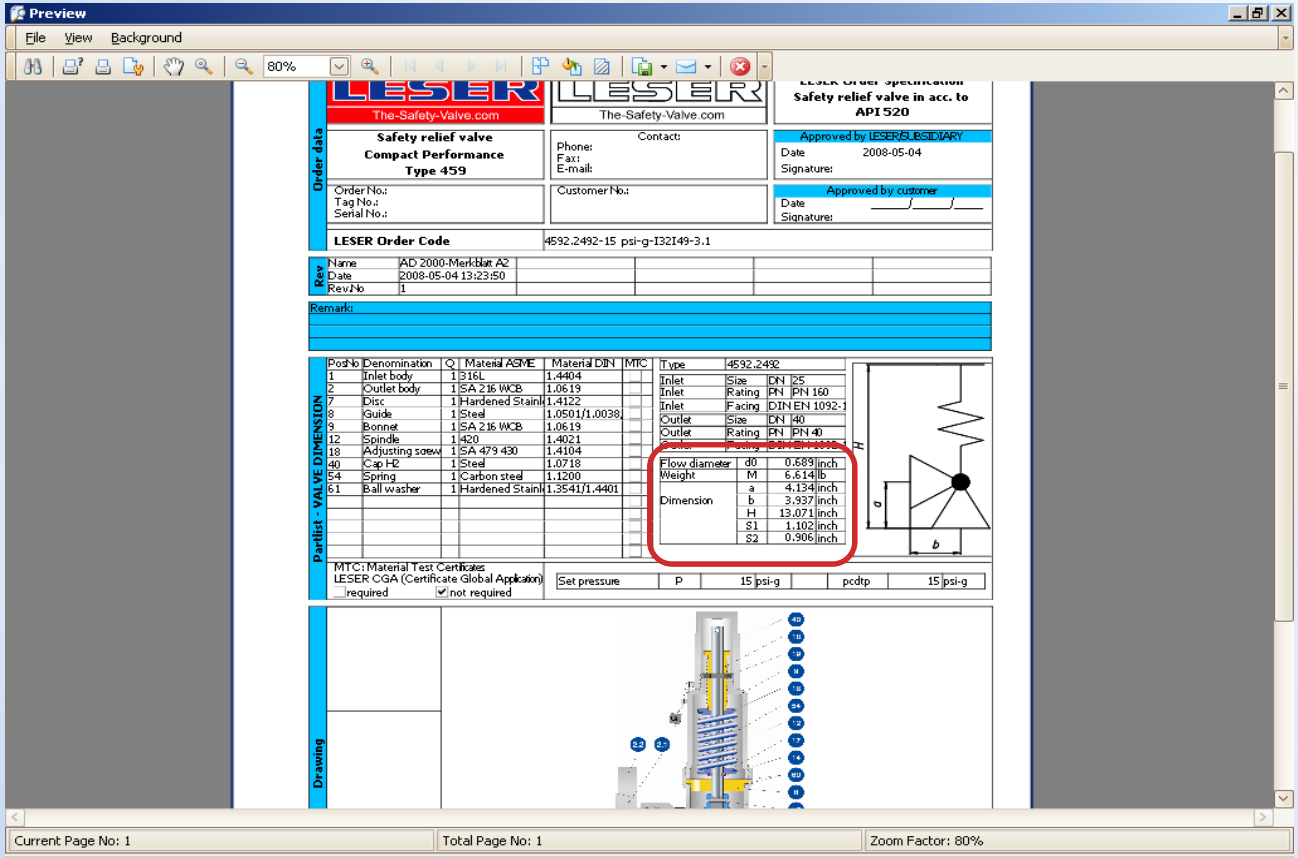
Lift				
1507	Standard		0.154	inch

Valve - Calculation				
1200	Certified massflow	qm,zu	744.126	lb/h
1201	Certified volumeflow (operating condition)	qvb,zu	4,443.978	ft³/h
1203	Certified volumeflow (standard condition)	qvn,zu	275.65	m³/h
1204	Maximum mass flow	qm,max	826.806	lb/h
1205	Maximum volume flow (working condition)	qvb,max	4,937.753	ft³/h
1206	Maximum volume flow (standard condition)	qvn,max	306.278	m³/h

Reporting

How I find it in the documentation

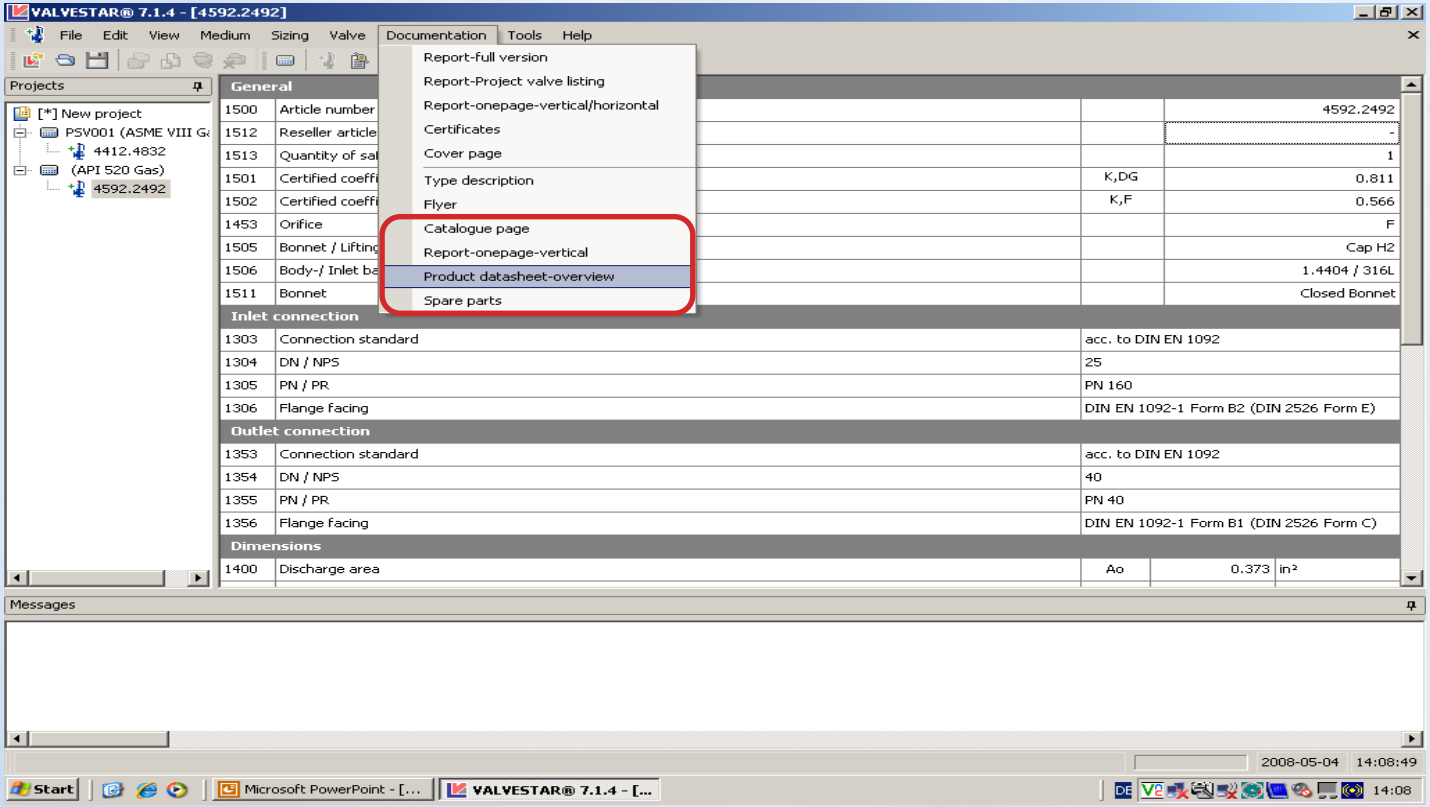
In the one-page report the additional dimensions are listed if these are available



Reporting

What is the Product datasheet ?

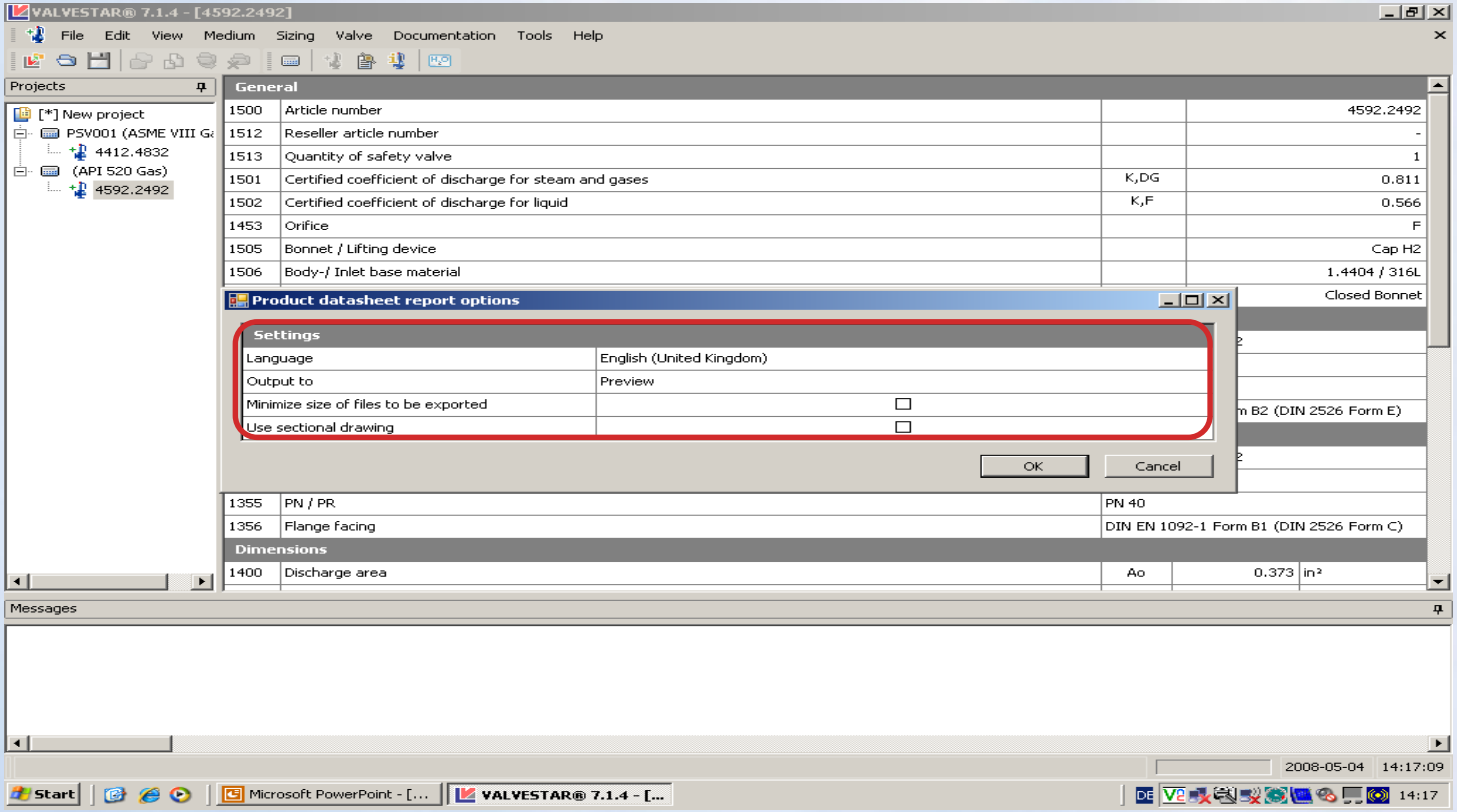
The product datasheet is an overview of a single safety valve and its main features like drawing, dimensions and weight, possible options, approval, ...



Reporting

What is the Product datasheet ?

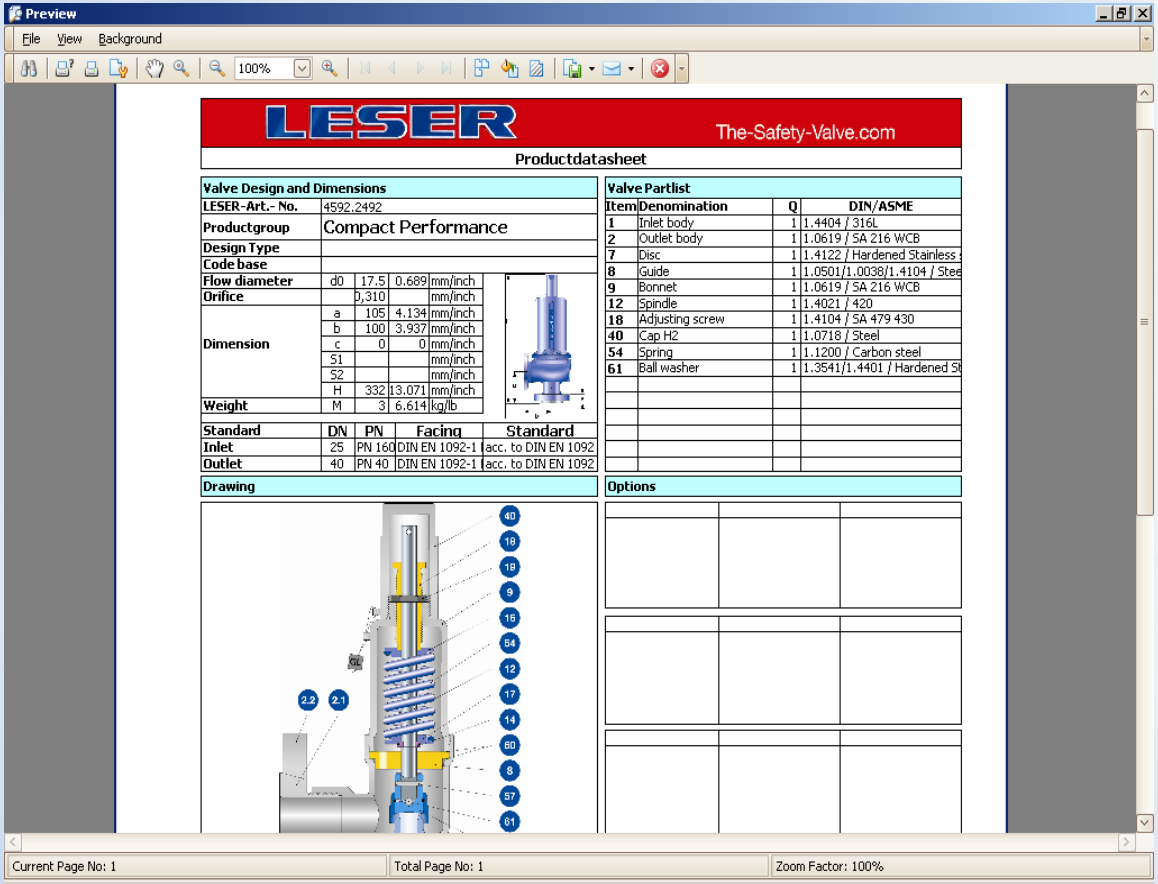
For product datasheet two different drawings as main drawing could be selected: coloured drawing as standard and sectional drawing if needed.



Reporting

What is the Product datasheet ?

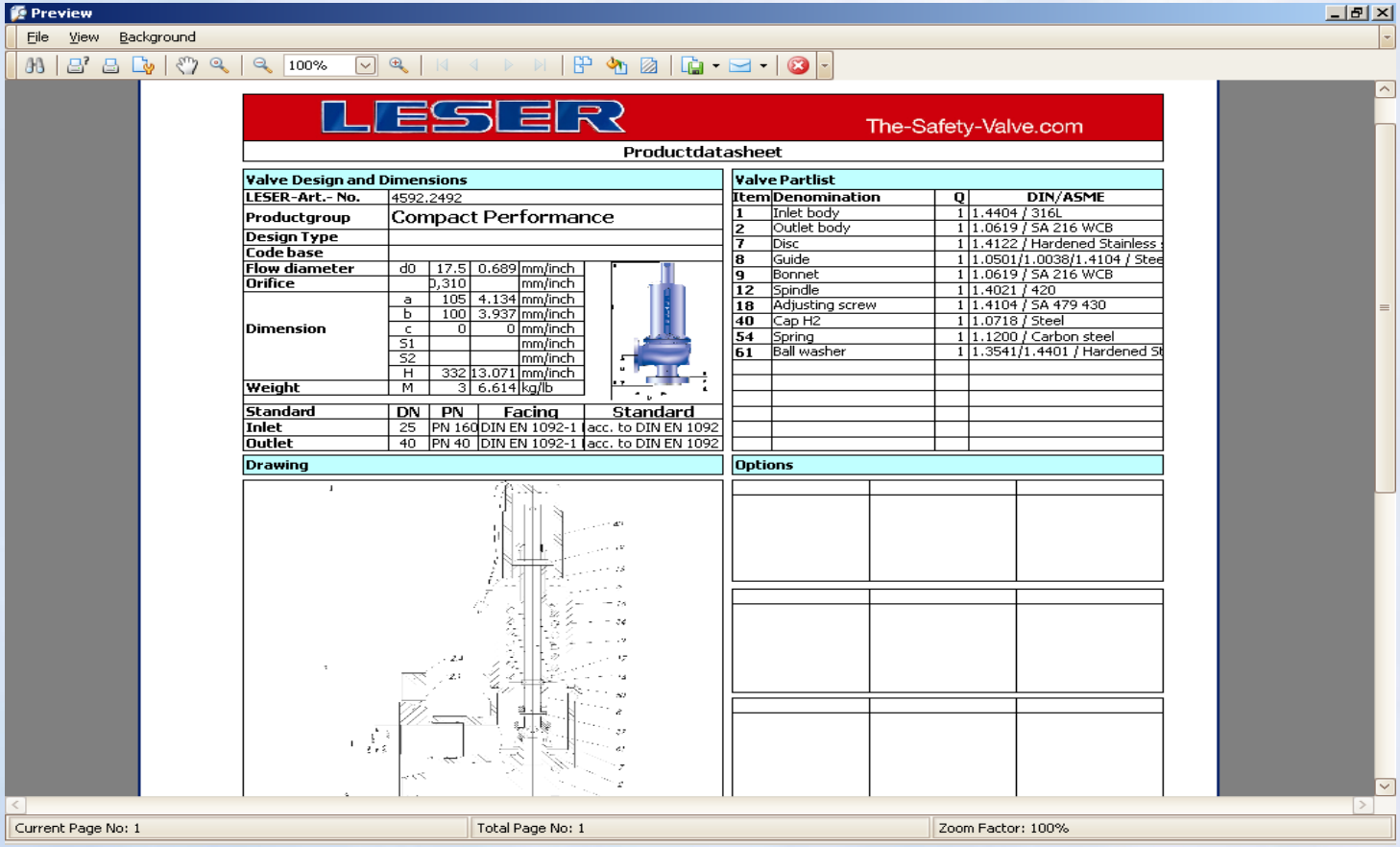
With coloured drawing as standard



Reporting

What is the Product datasheet ?

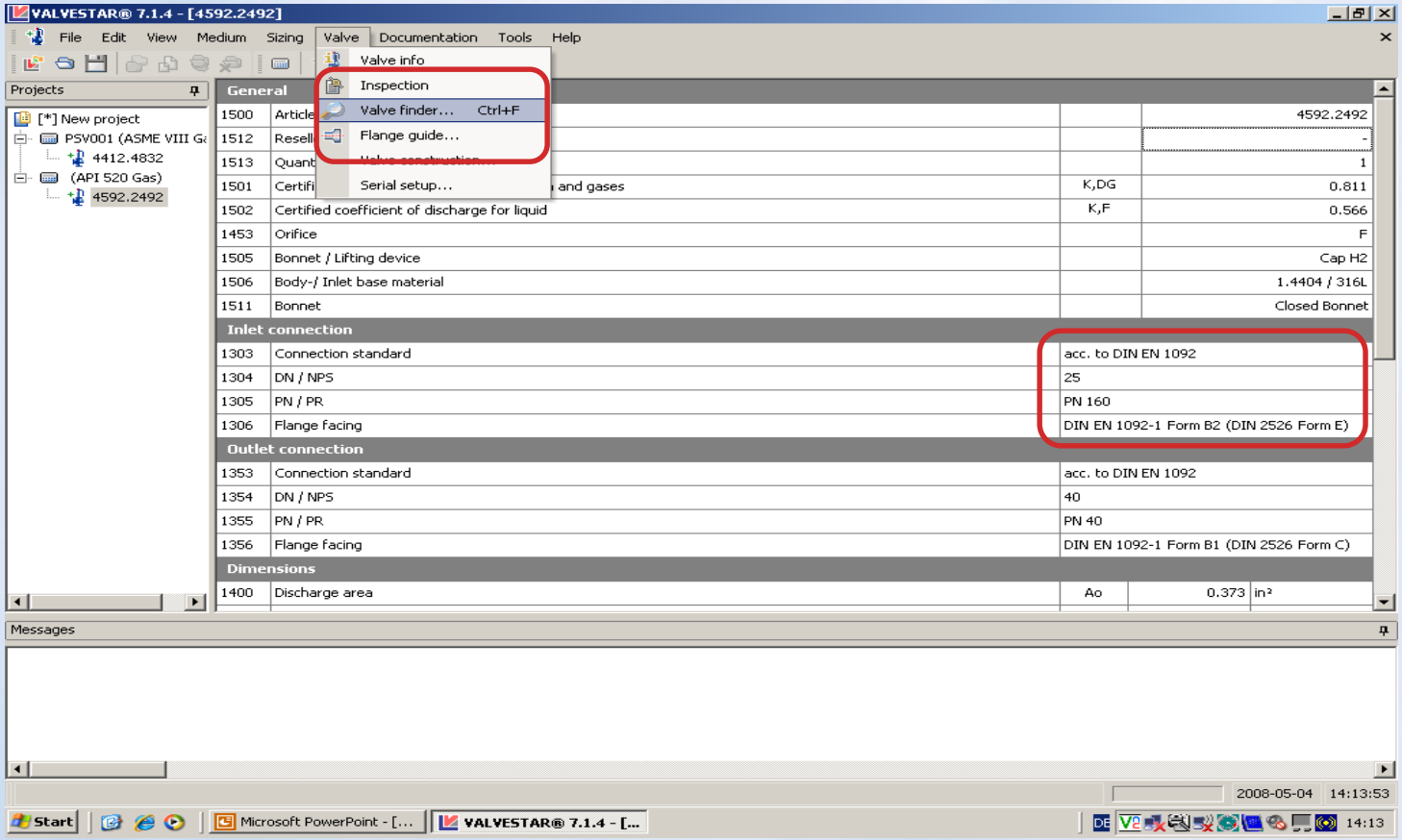
With sectional drawing



Reporting

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

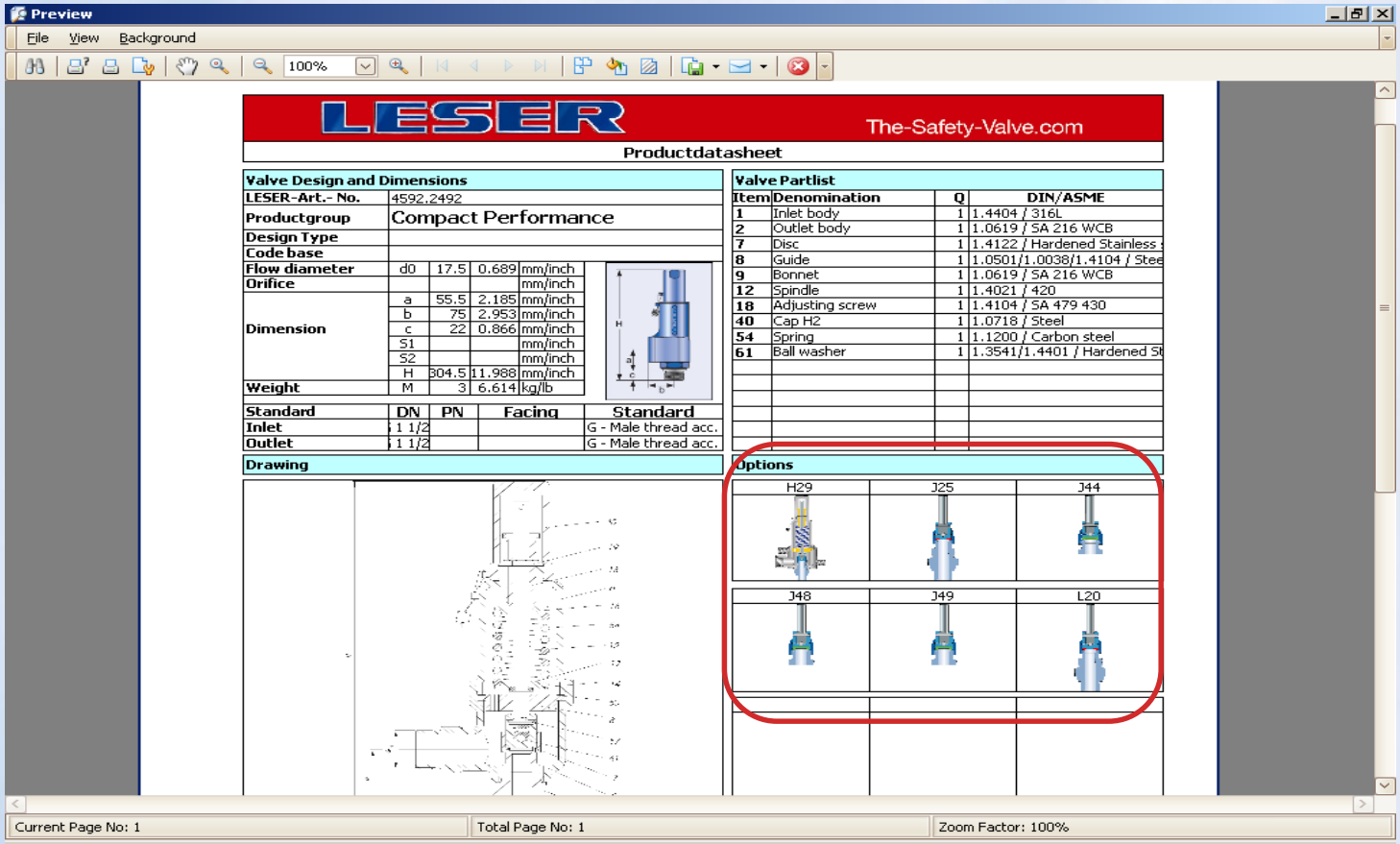
The product datasheet is also available without sizing, with the feature “Valve finder”



Reporting

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

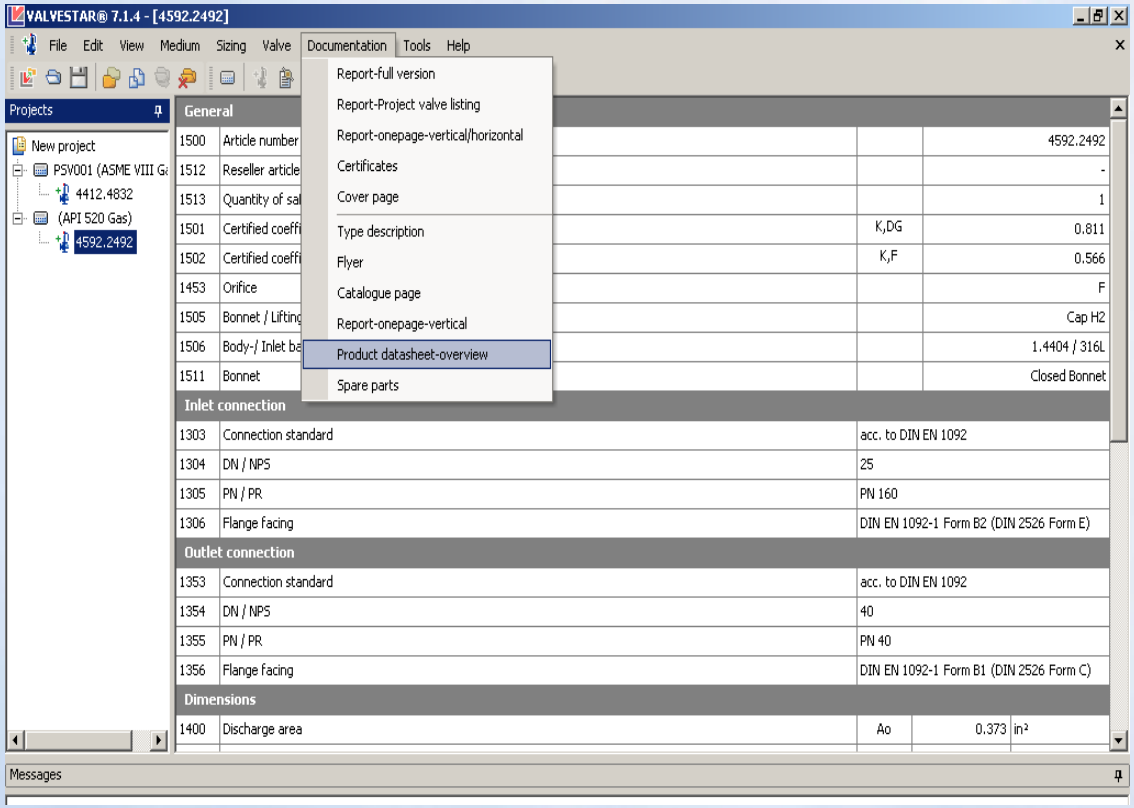
All possible options are listed and shown



Reporting

What is the report one-page-vertical ?

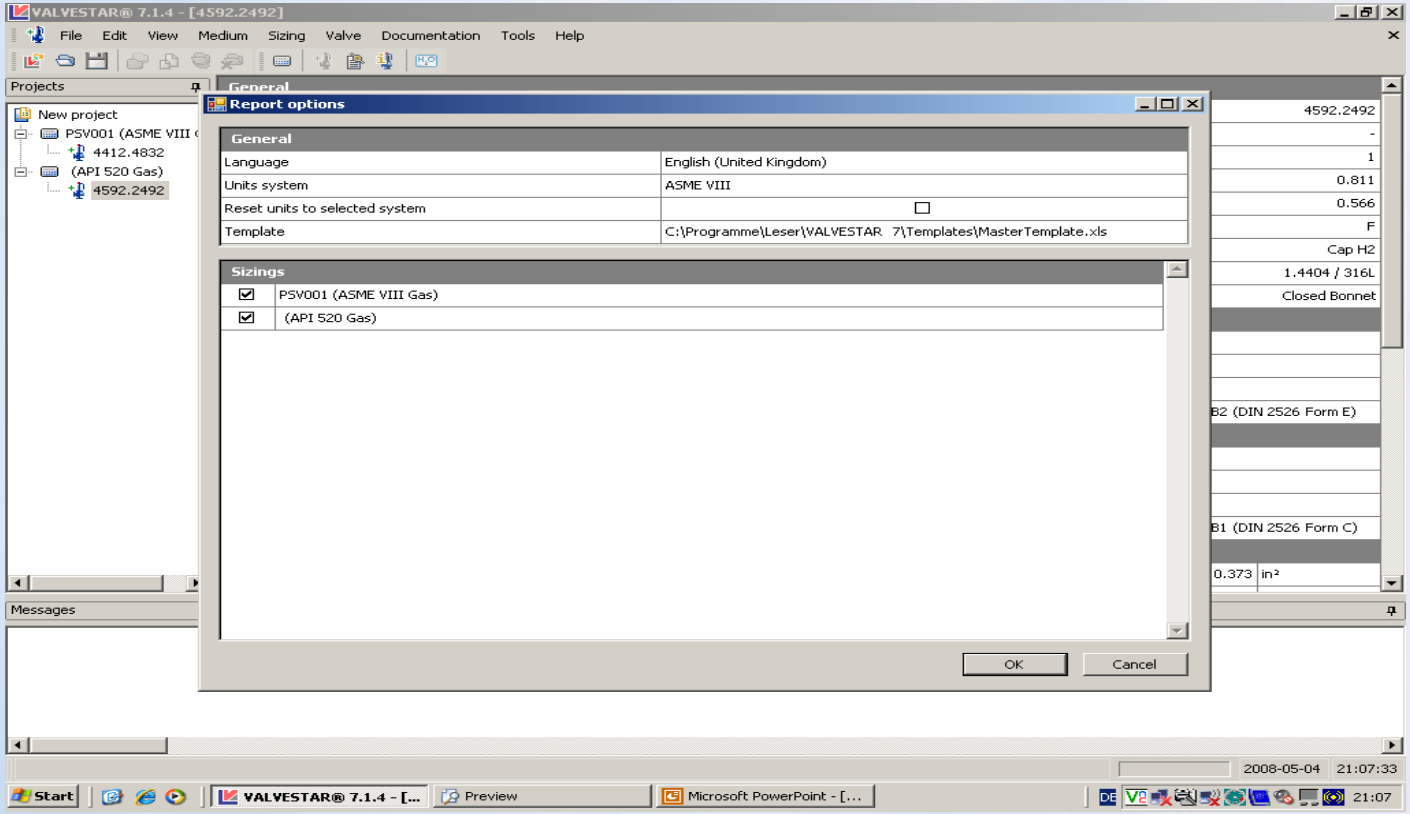
This report is an advanced one-page report with additional data which are necessary for completeness



Reporting

What is the report onepage-vertical ?

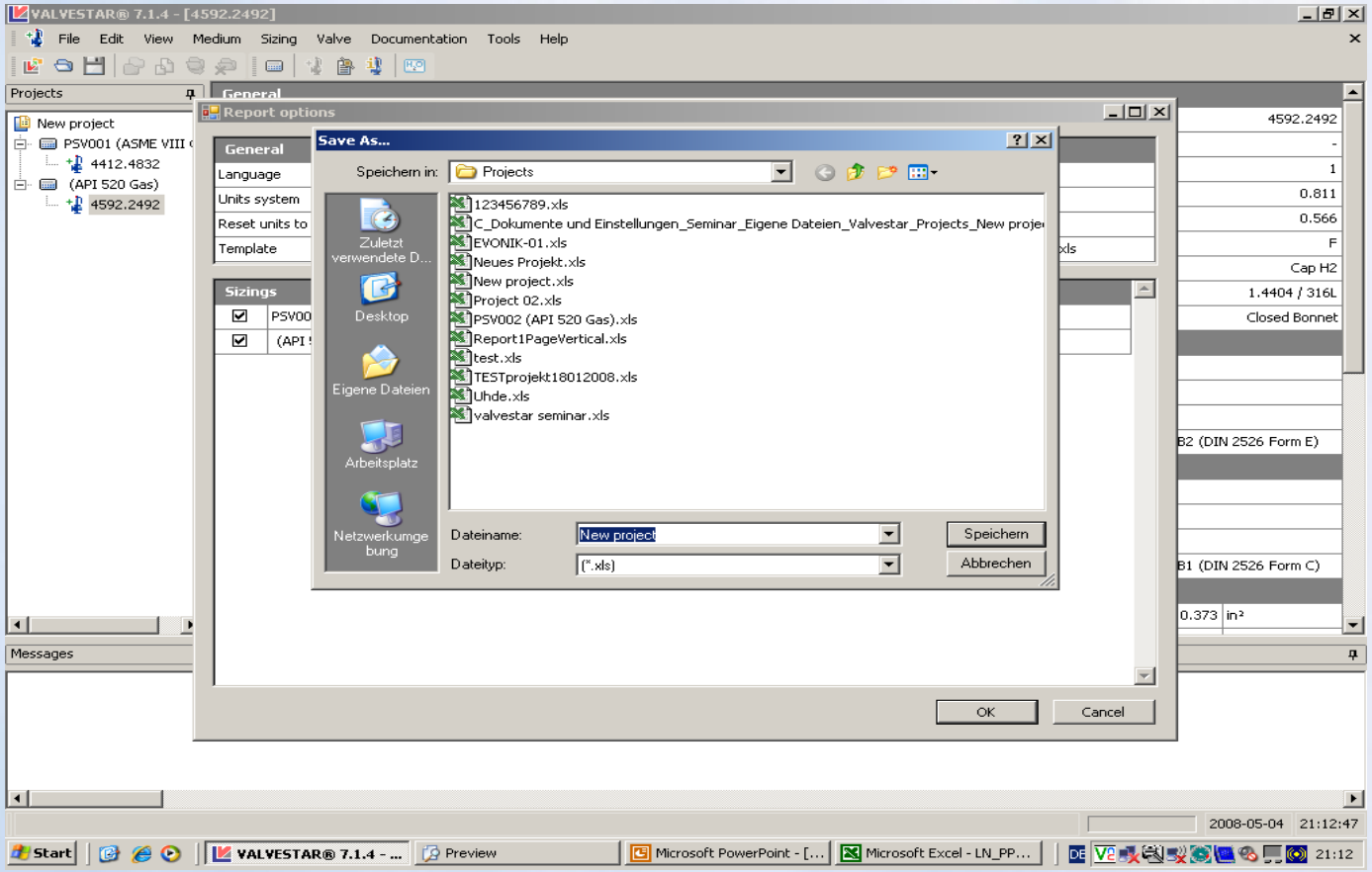
This report is available as xls-file to change data for future redesign. The source of template is preset.



Reporting

What is the report one-page-vertical ?

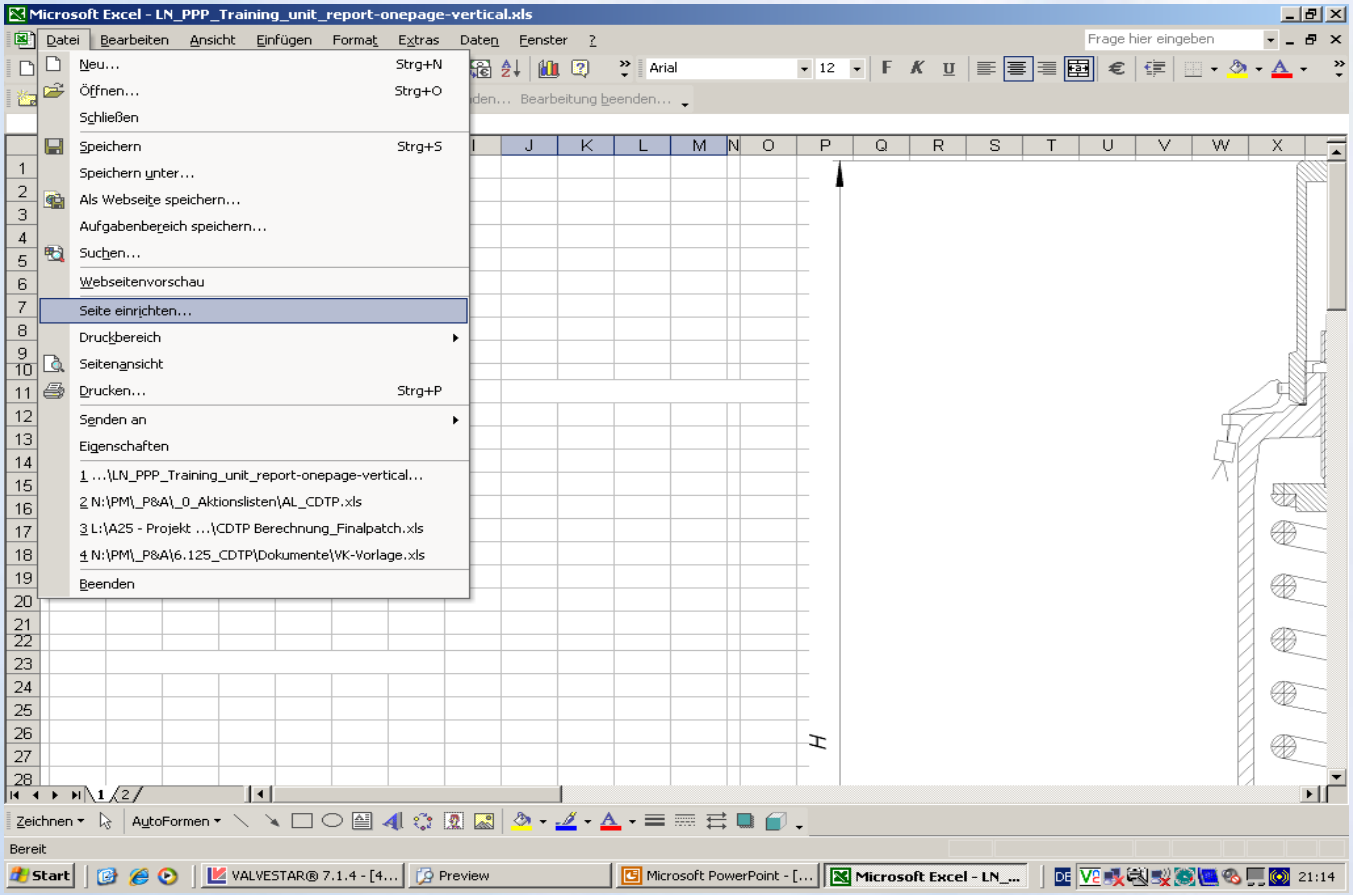
Define a file



Reporting

What is the report one-page-vertical ?

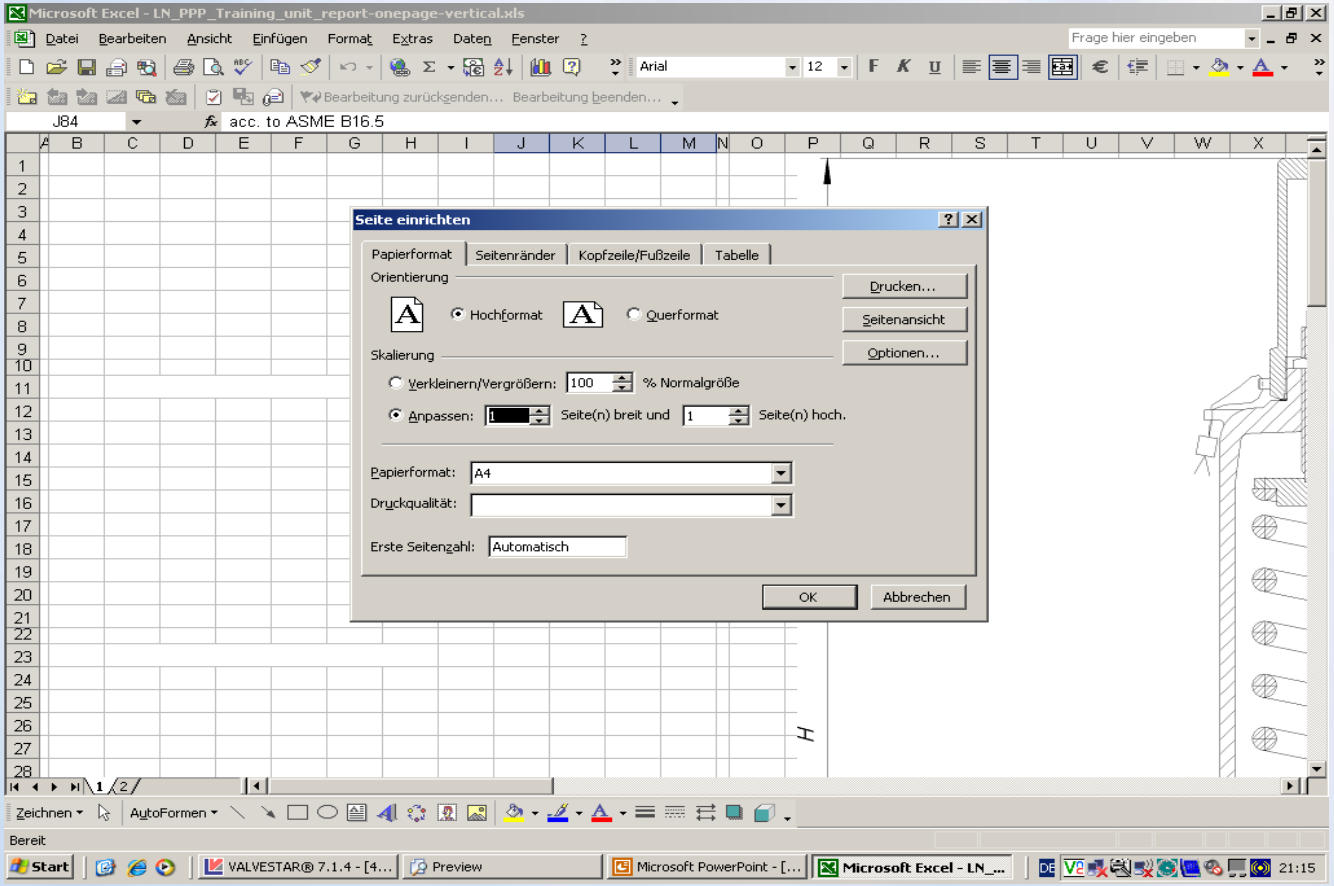
The page has to be adjusted to an A4-format



Reporting

What is the report one-page-vertical ?

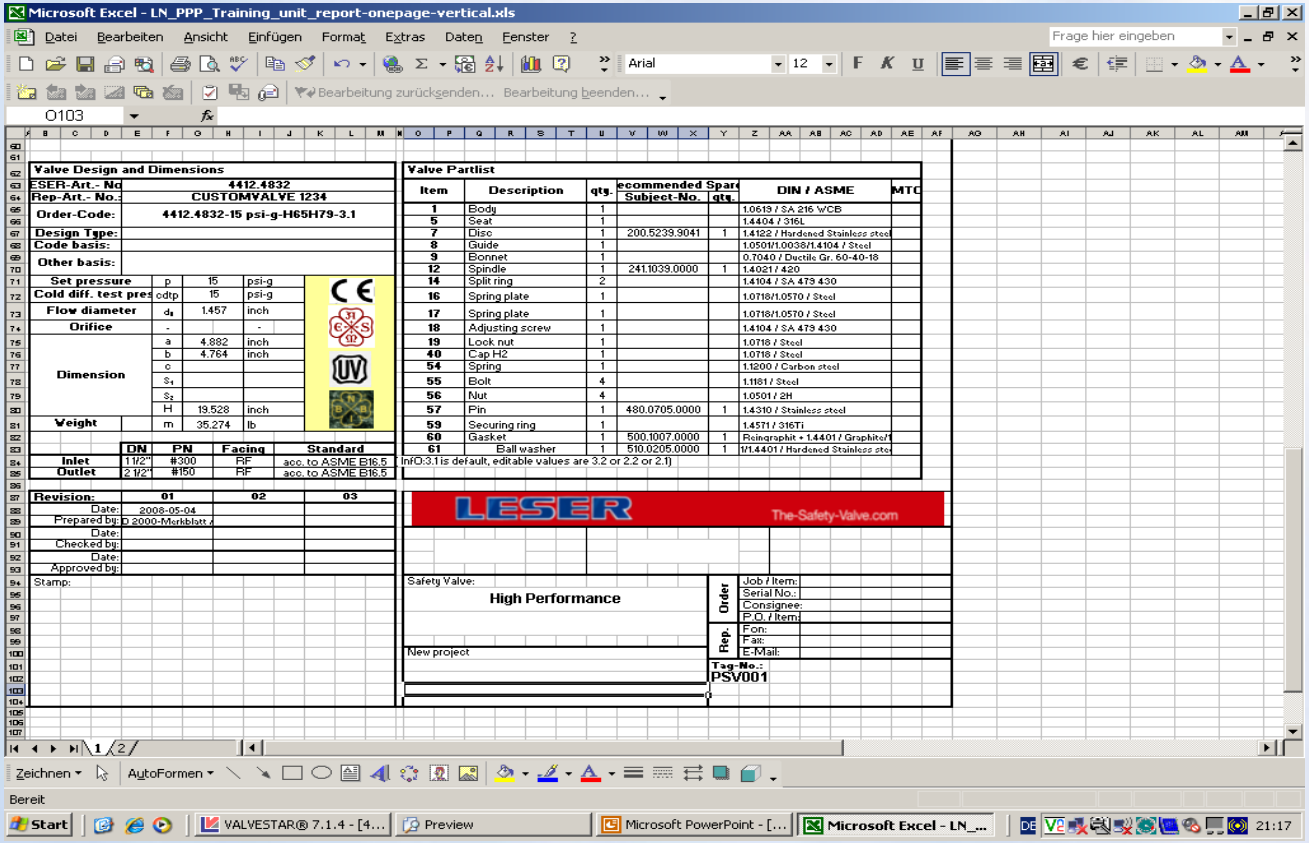
The page has to be adjusted to an A4-format



Reporting

What is the report one-page-vertical ?

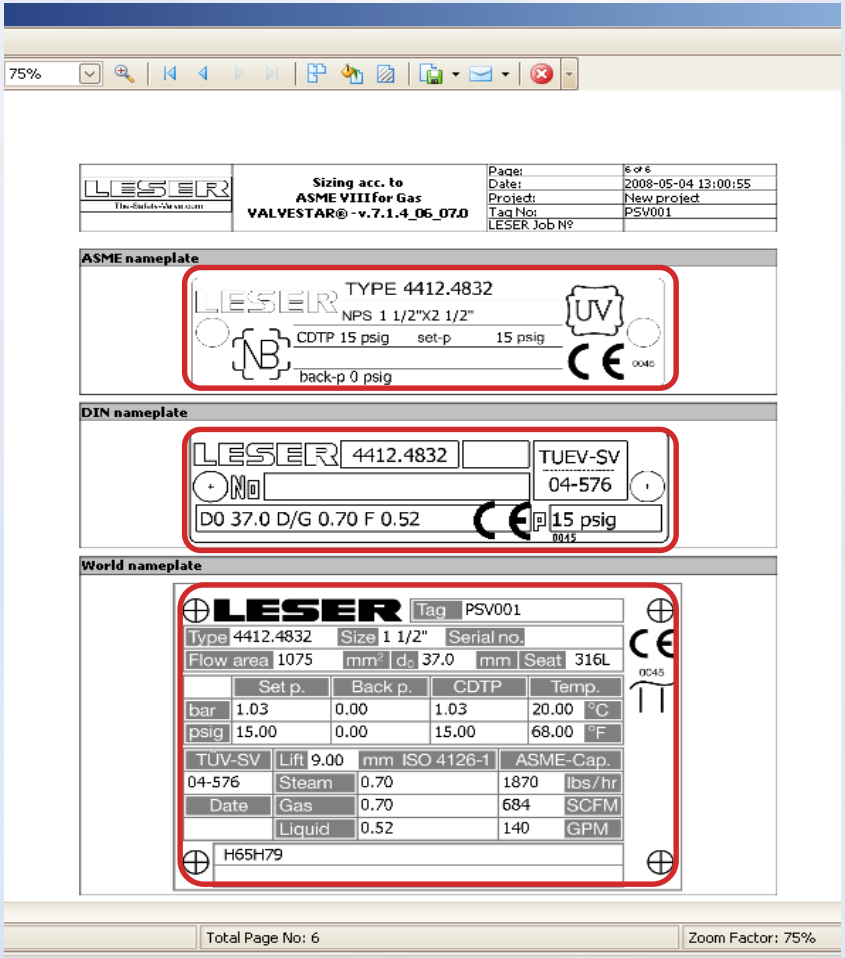
The EXCEL-file can be added with additional data from user.
Main data are picked from sizing data



Reporting

What is the feature “name plate”?

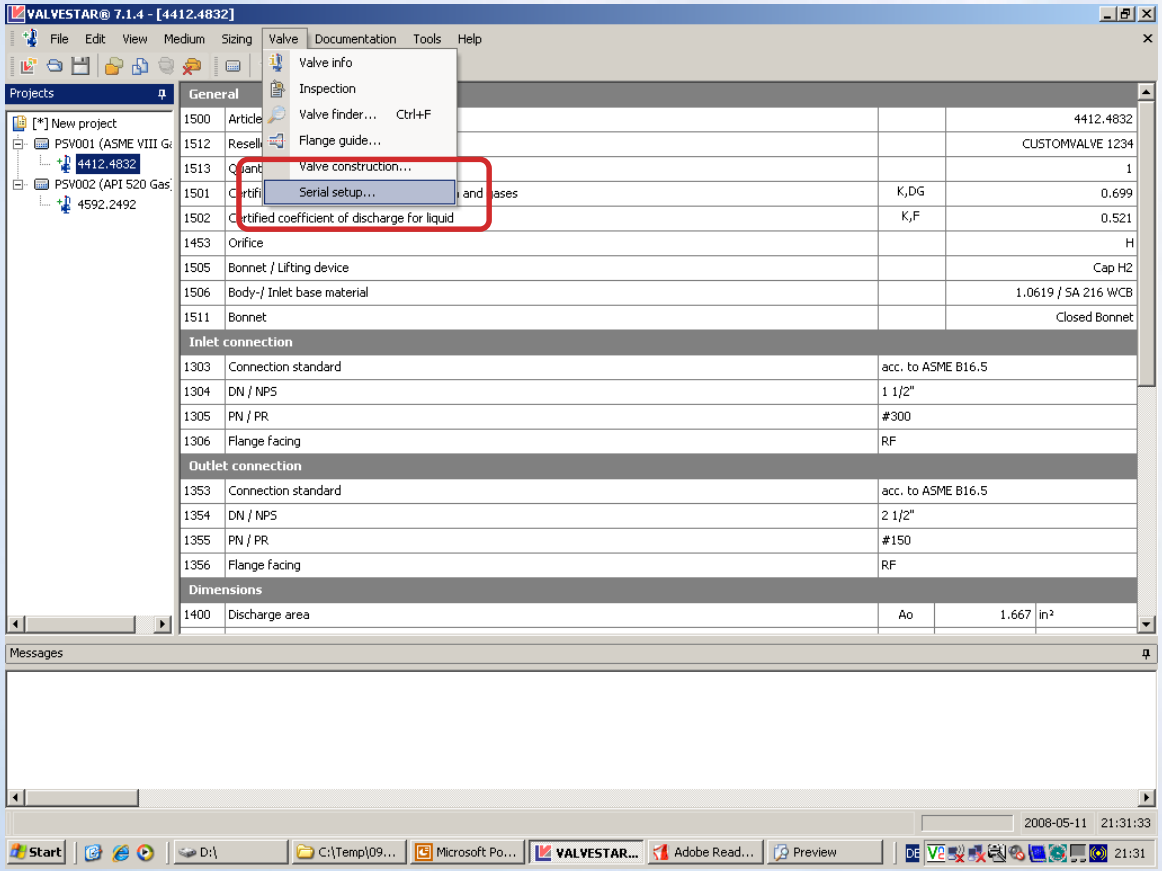
Three current nameplates are printed in the “report full-version”



Reporting

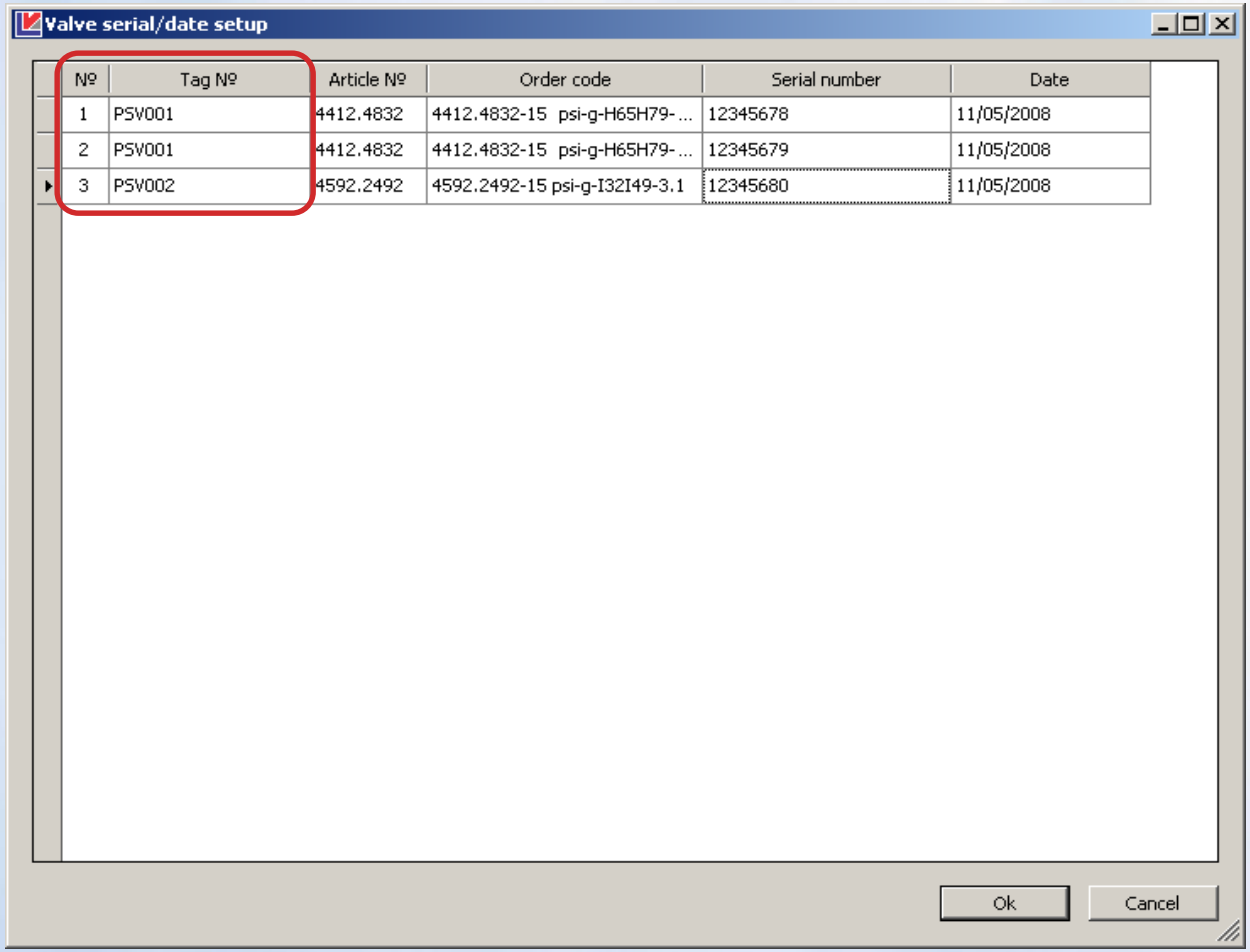
How can I add data to the initial “name plate”?

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



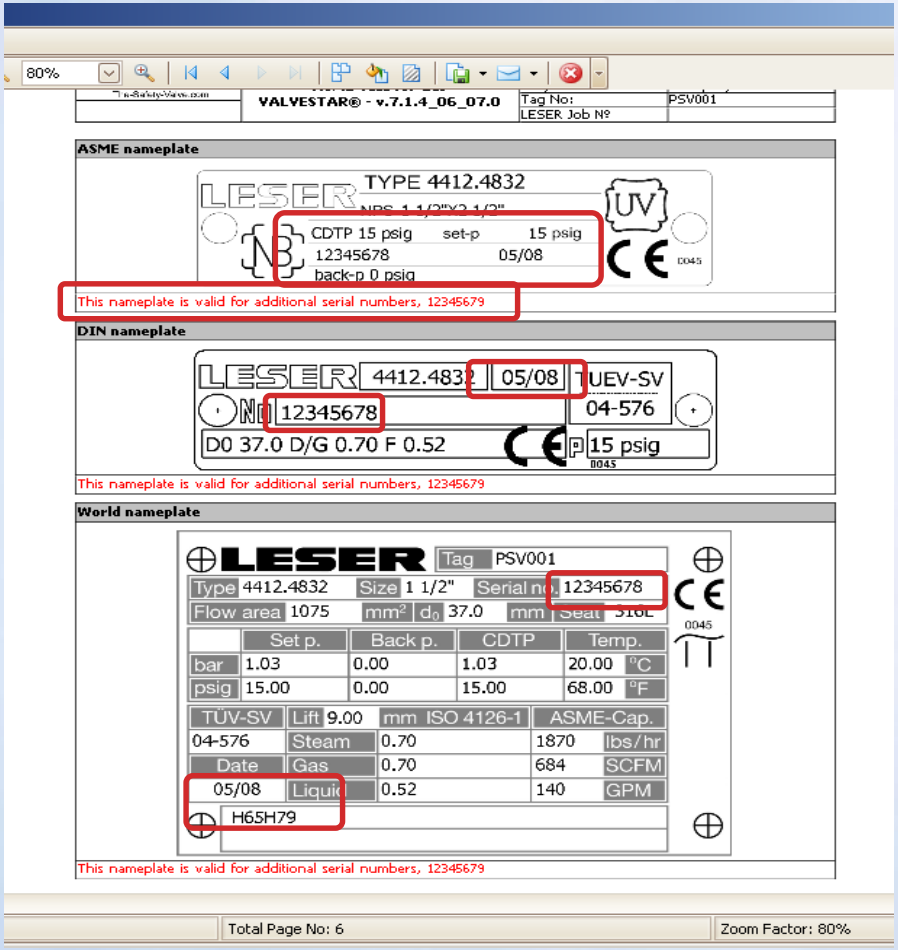
Reporting

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



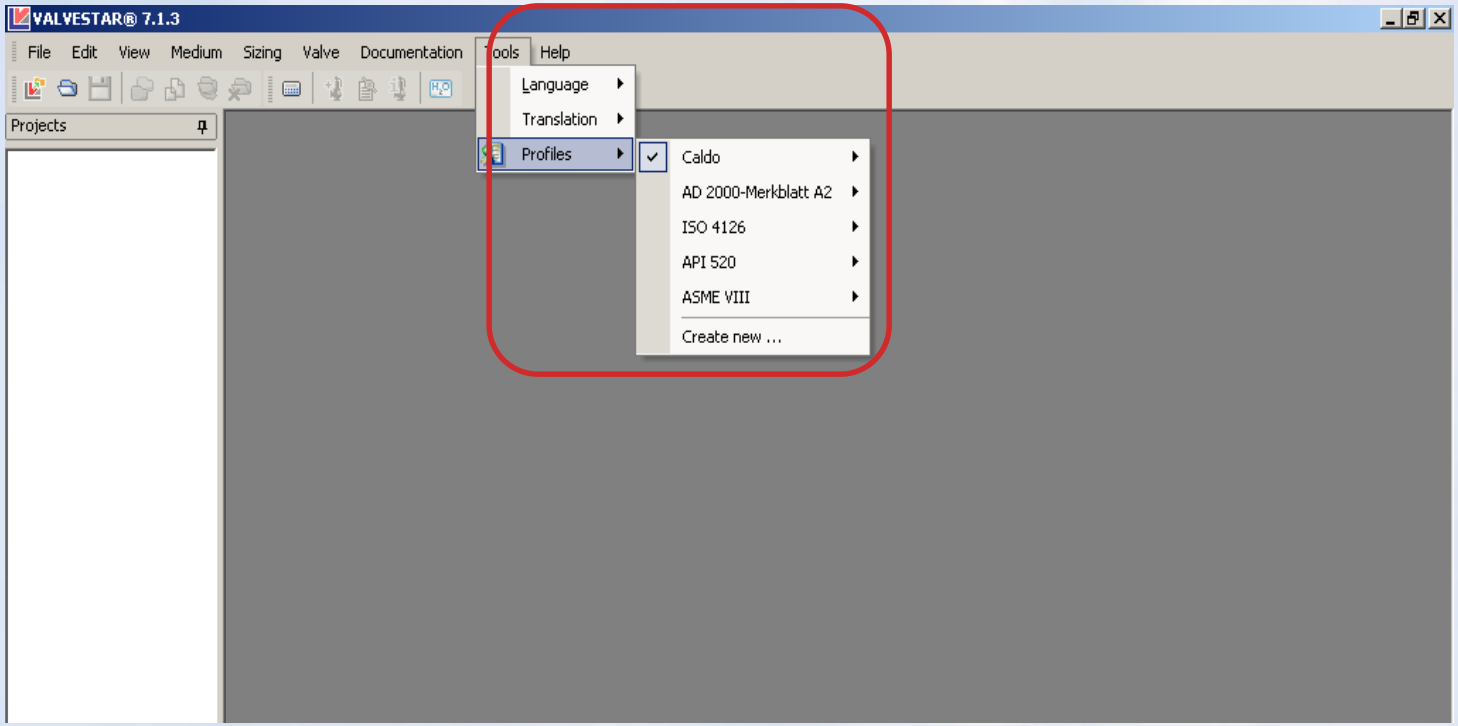
Reporting

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



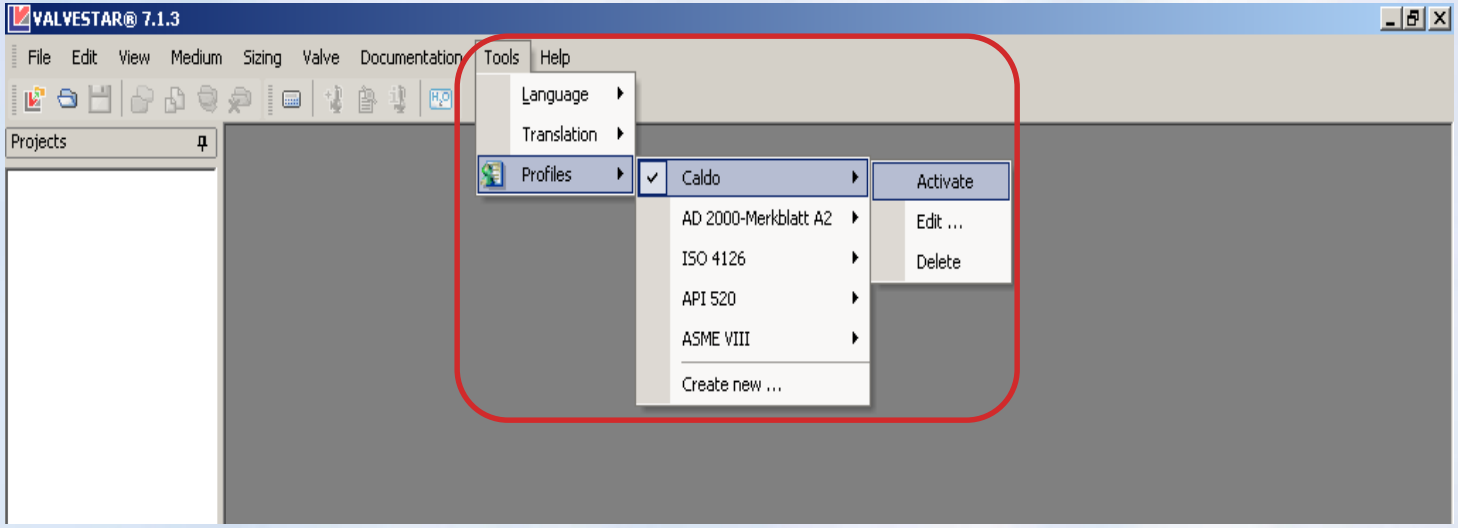
Settings

Profiles



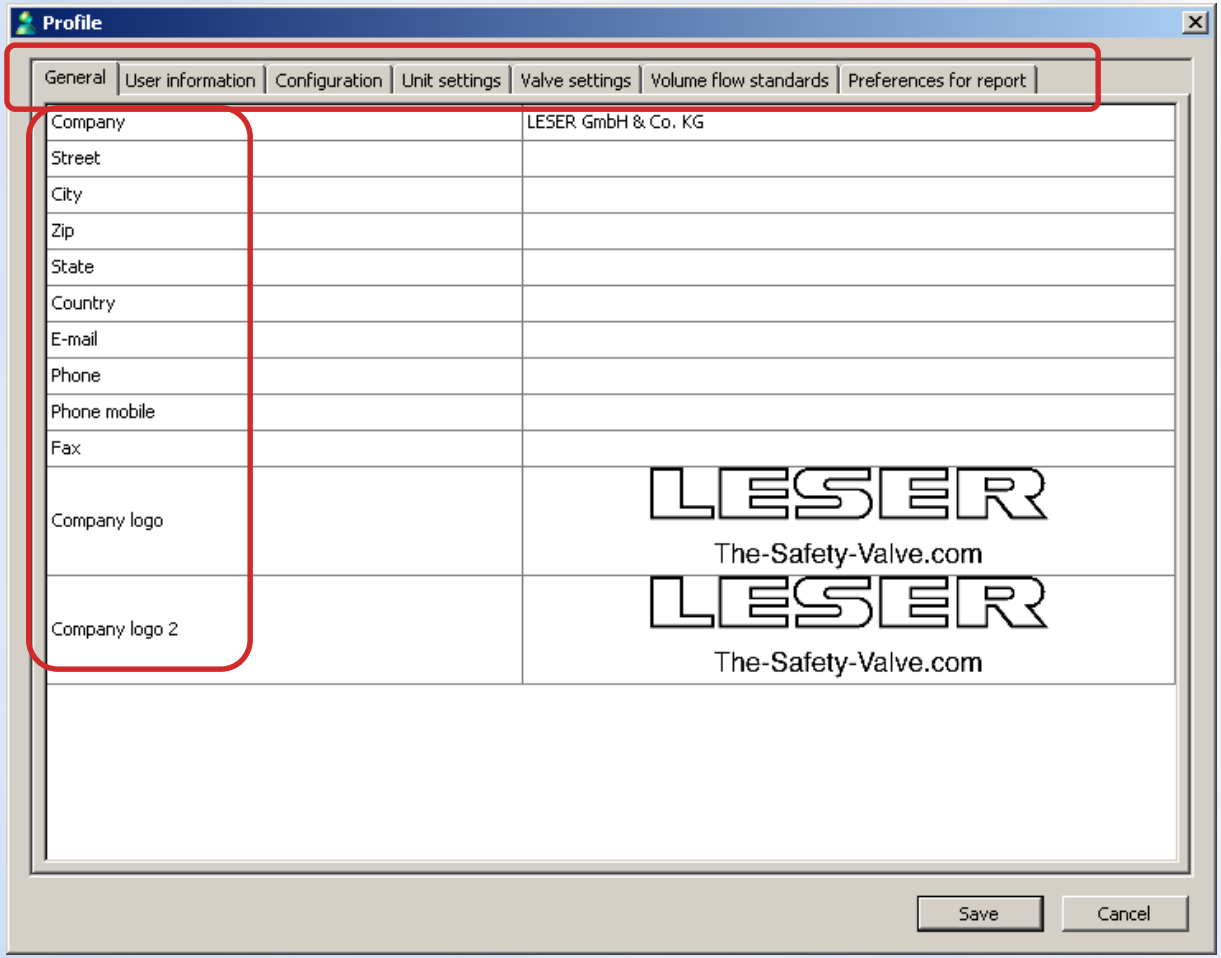
Settings

Profiles



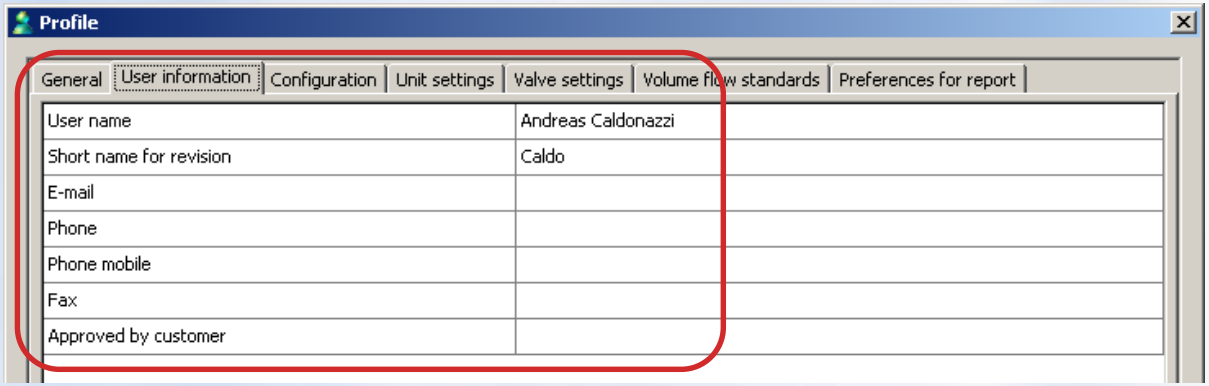
Settings

Profiles



Settings

Profiles



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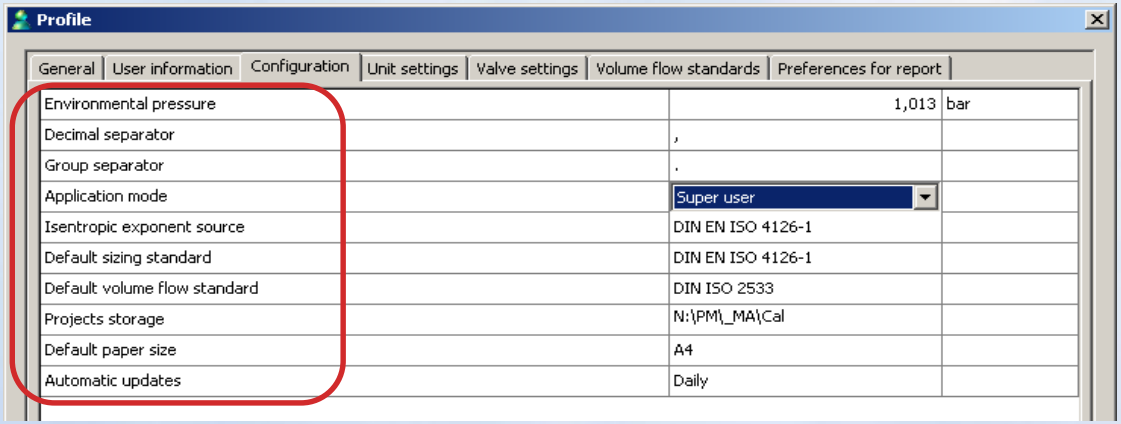
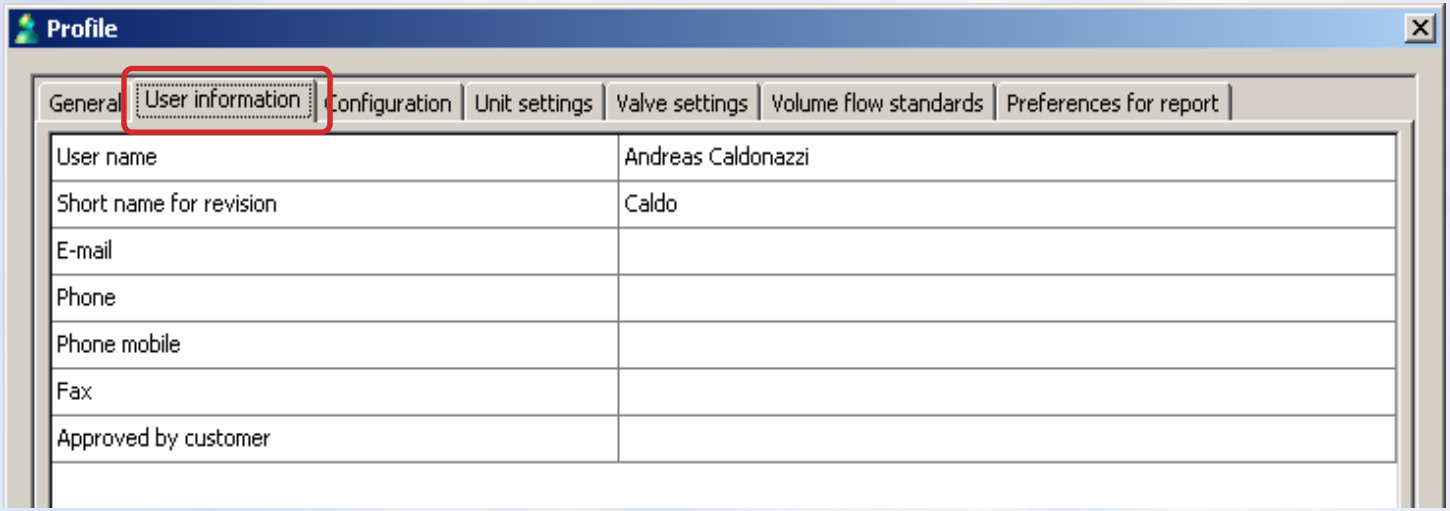
Date	08/15/2007 07:25:16	08/17/2007 11:47:28				
Rev.No	1	2				



Settings

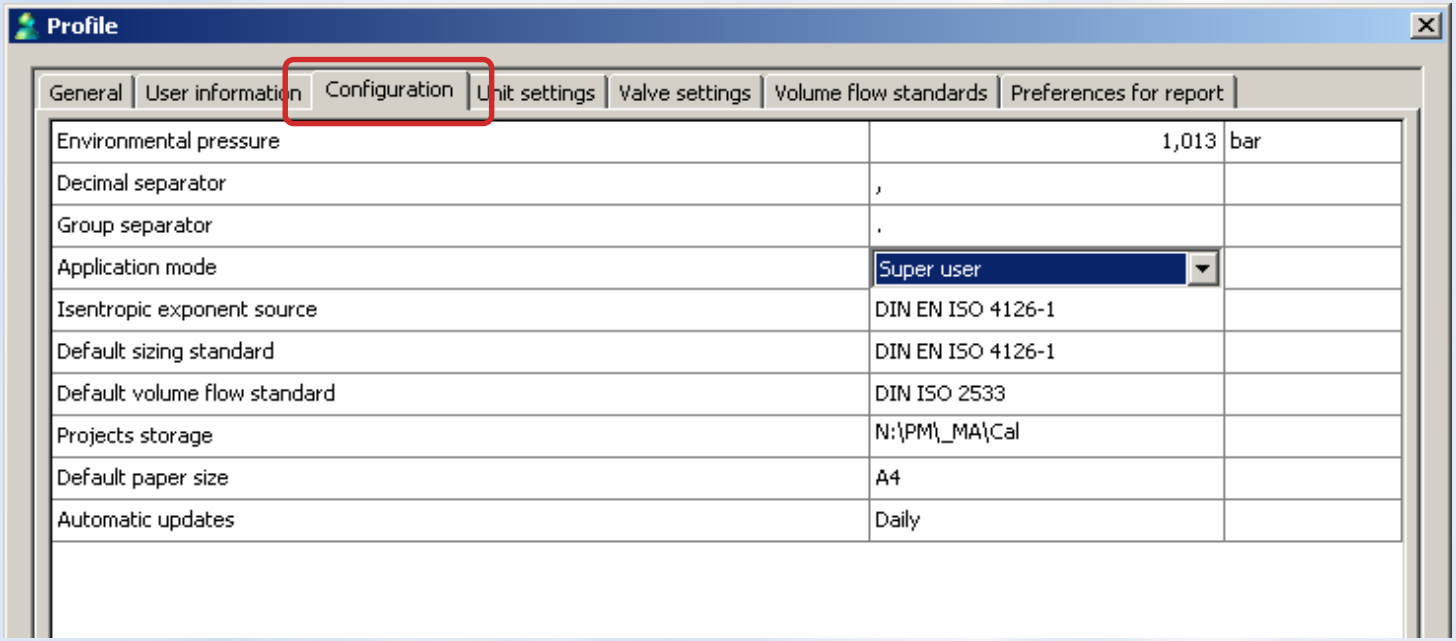
Profiles



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

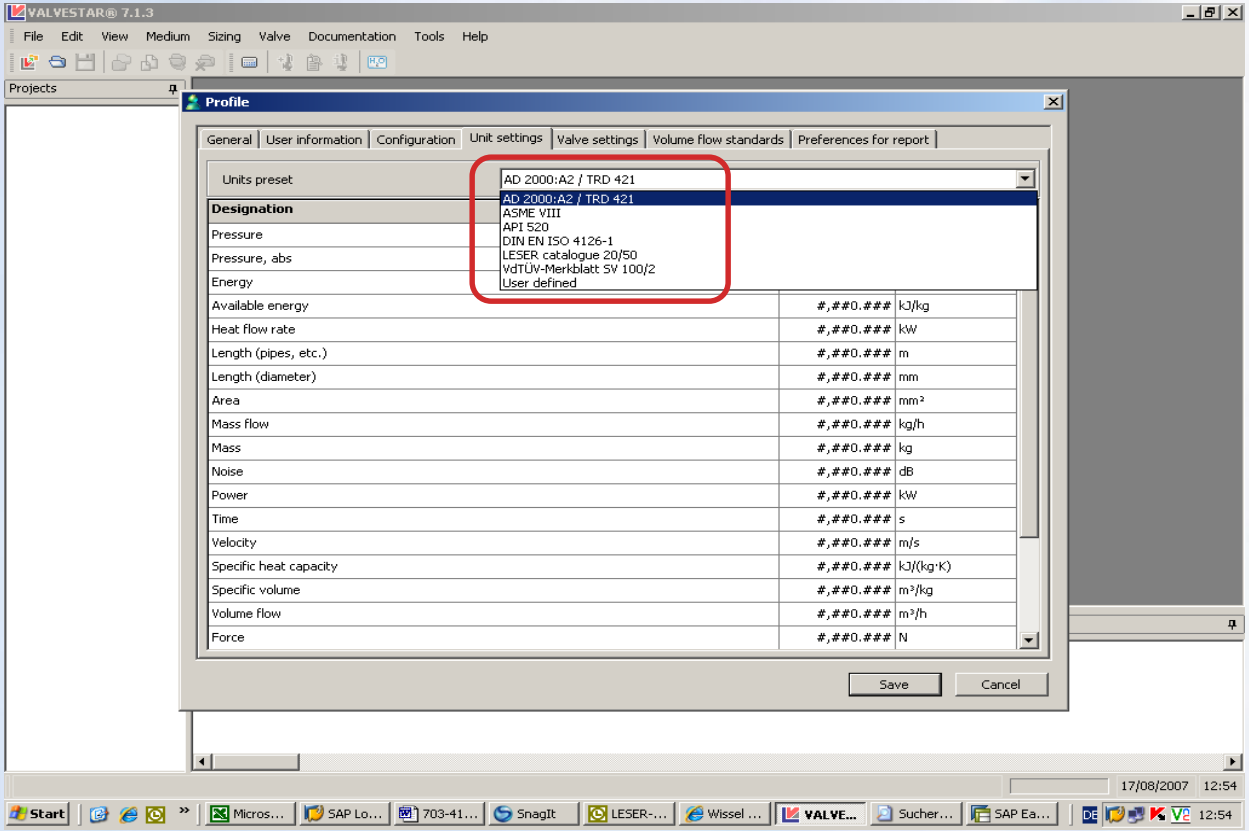
Settings

Profiles



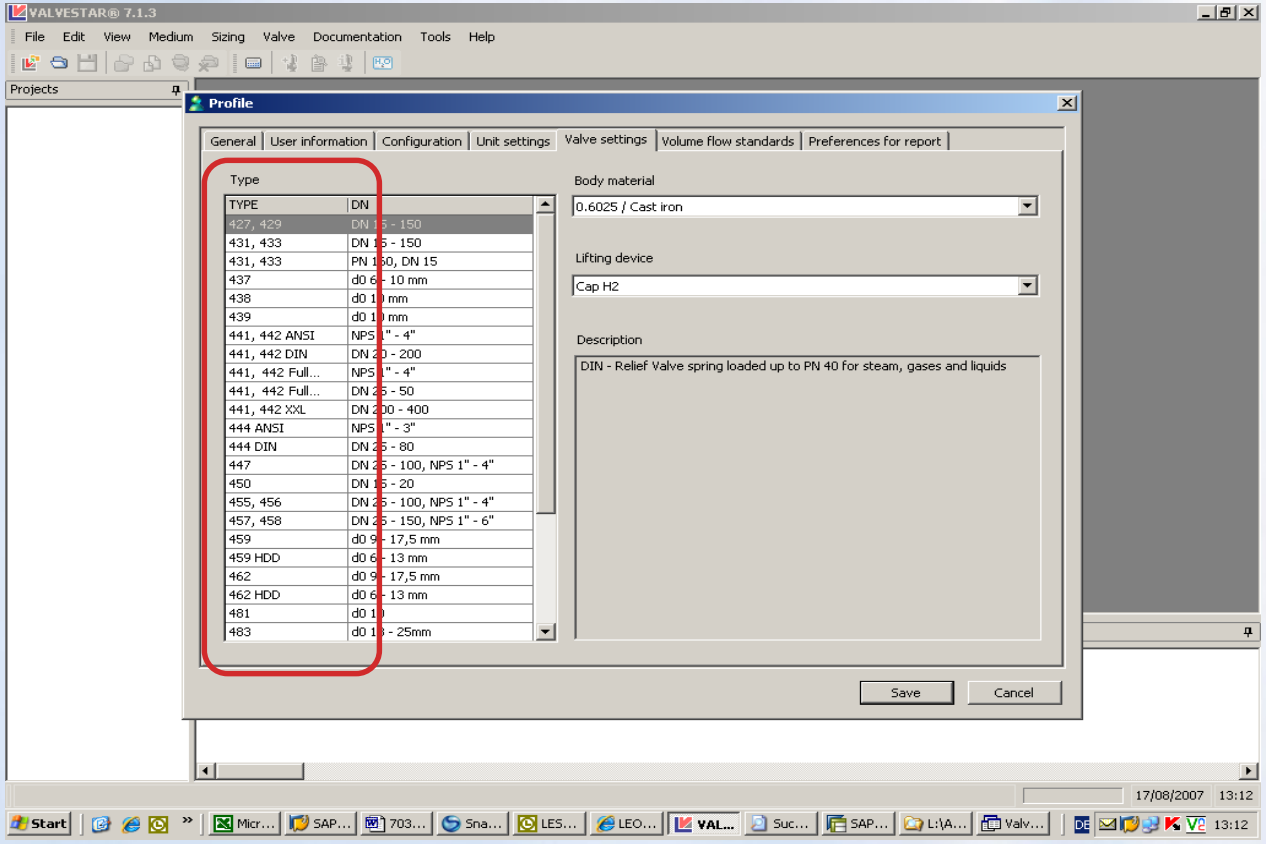
Settings

Profiles



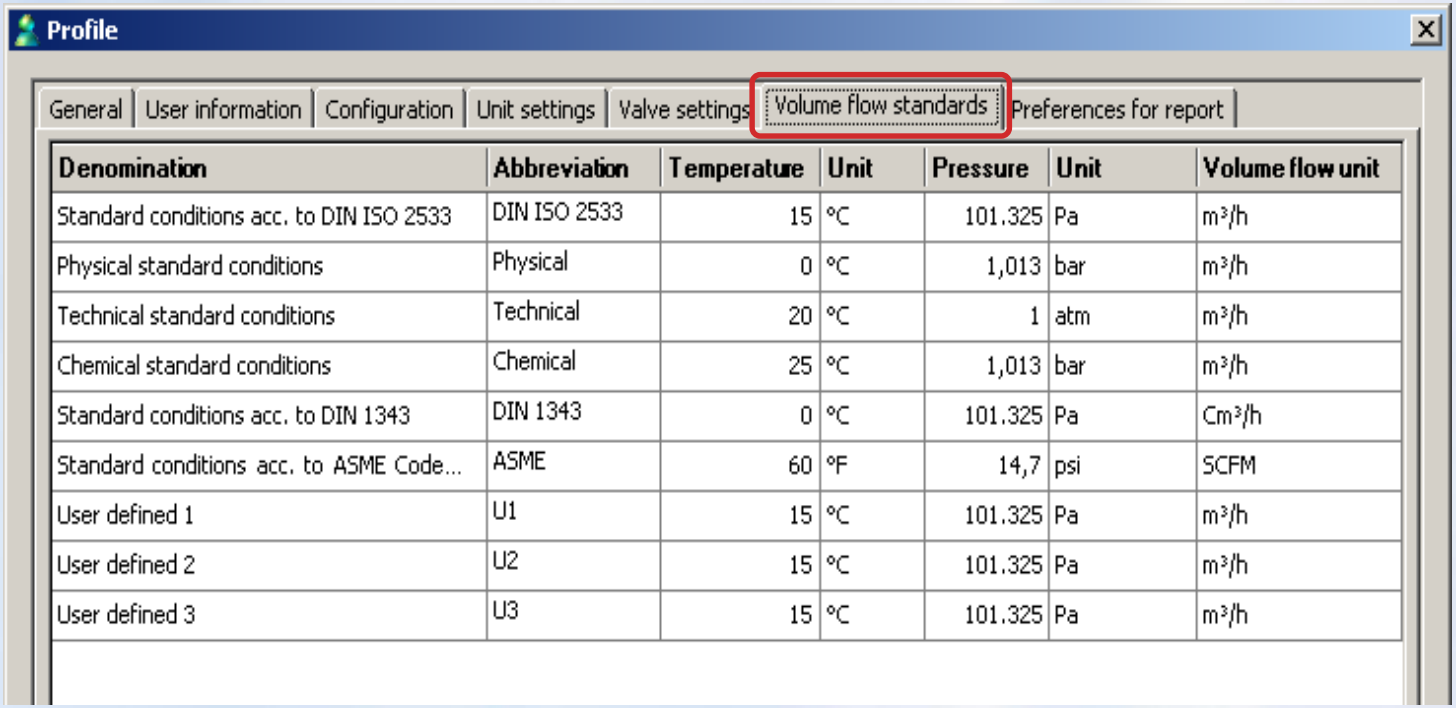
Settings

Profiles



Settings

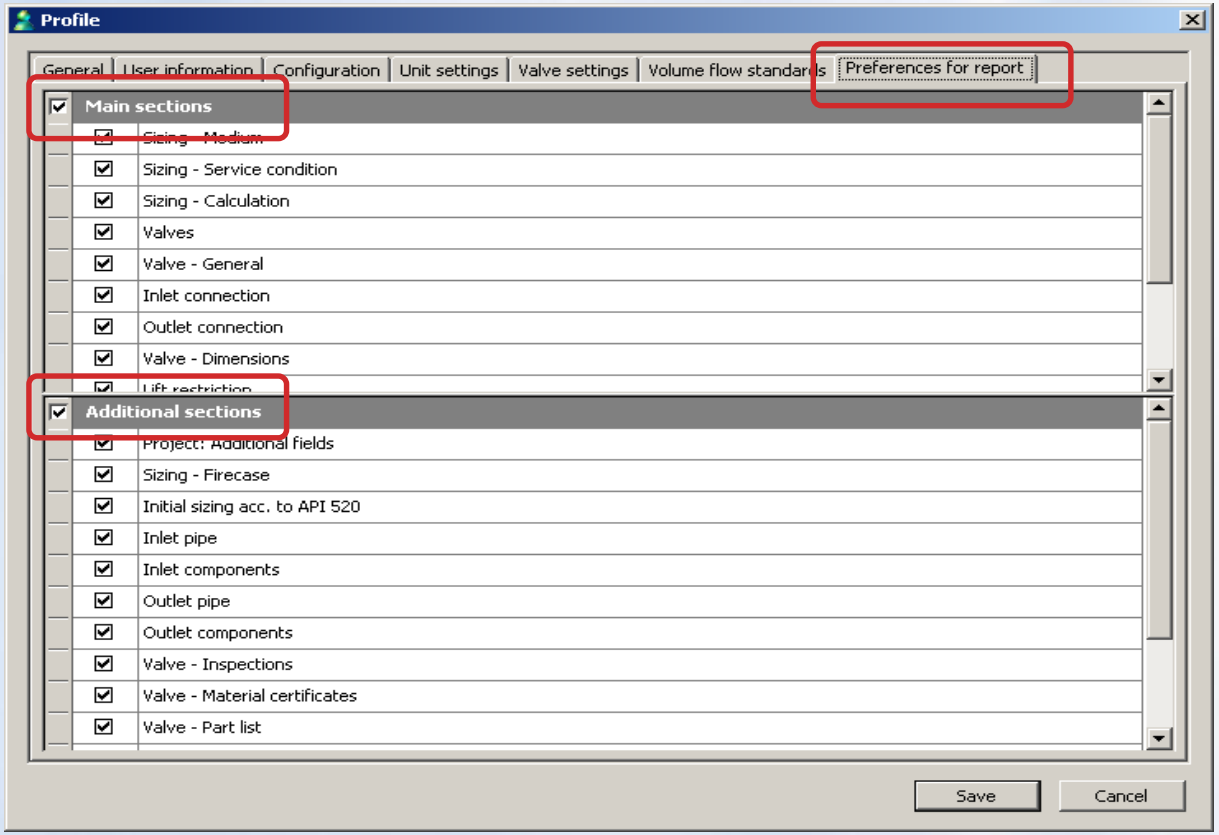
Profiles



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

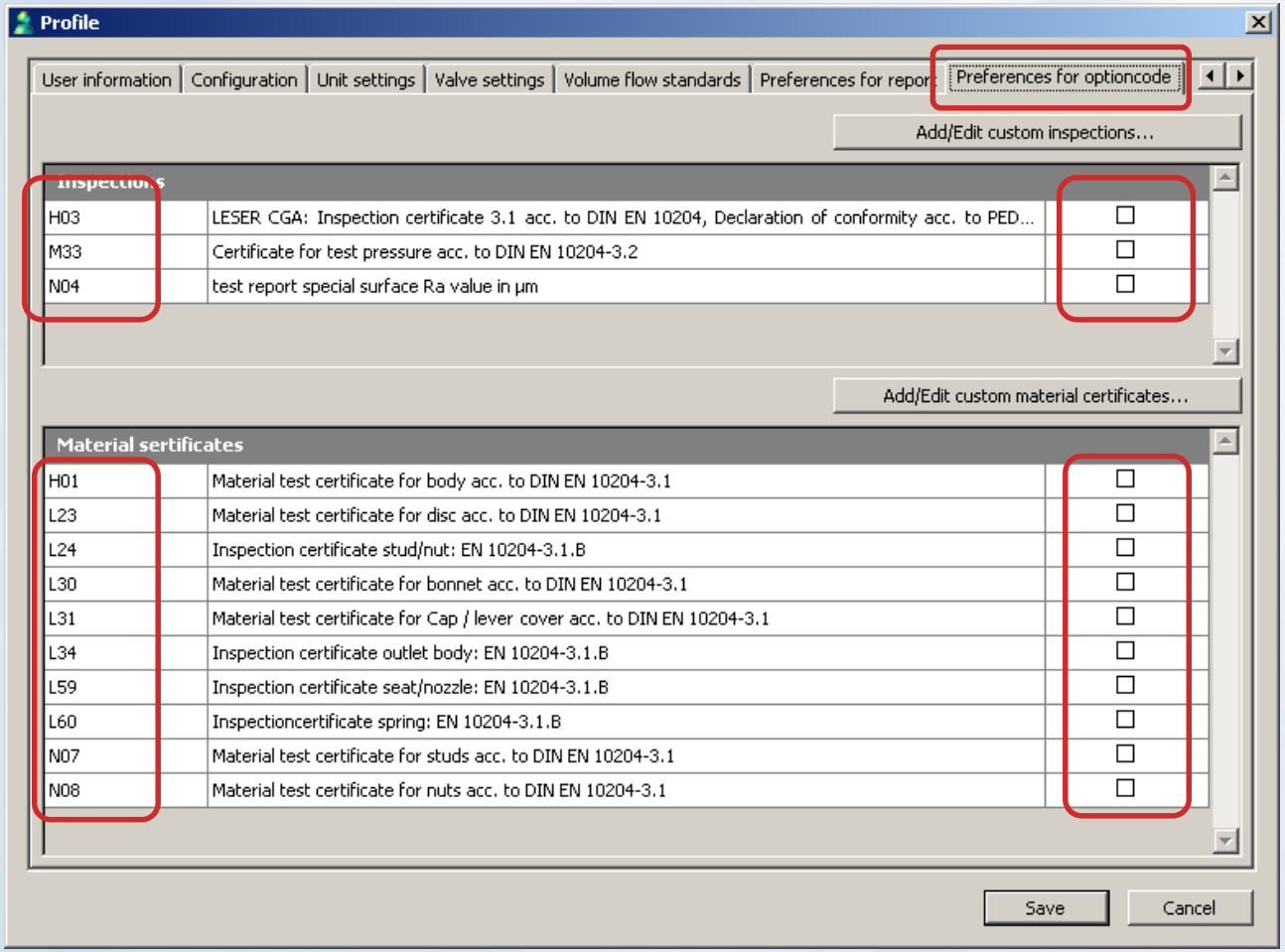
Settings

Profiles

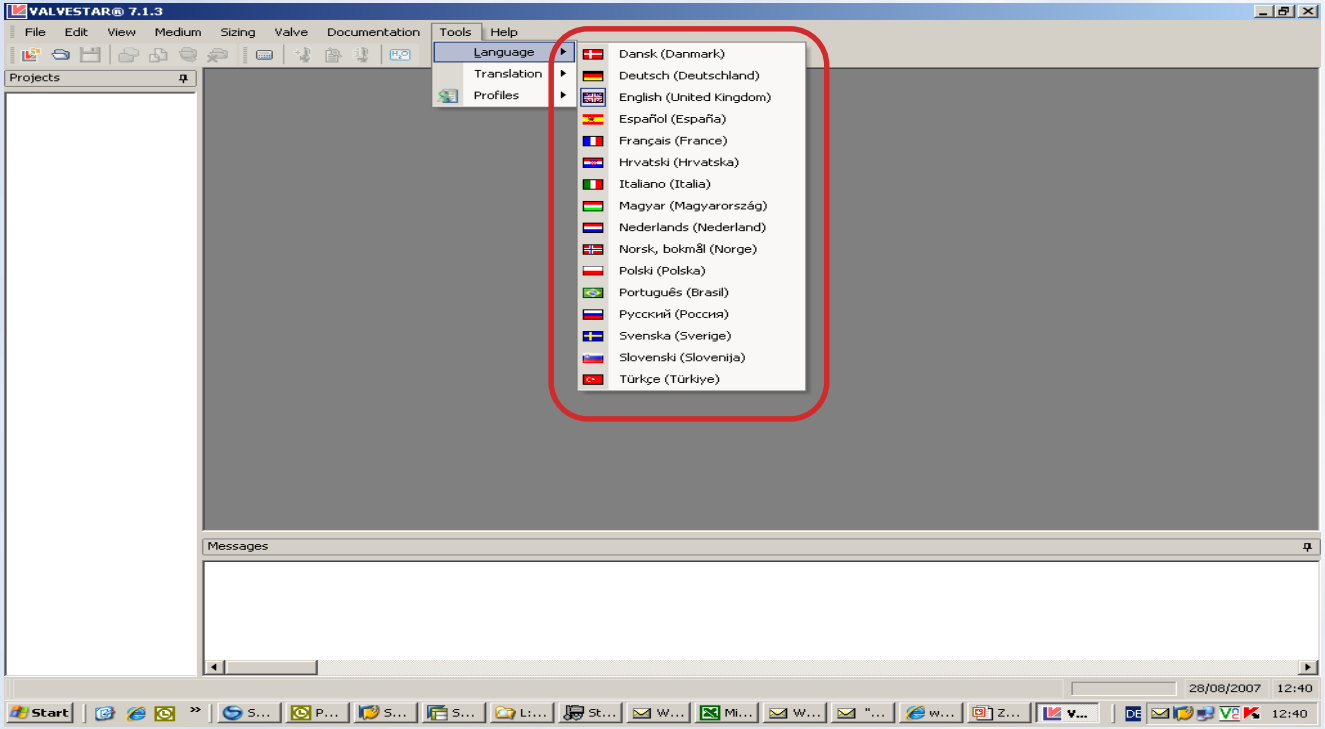


Settings

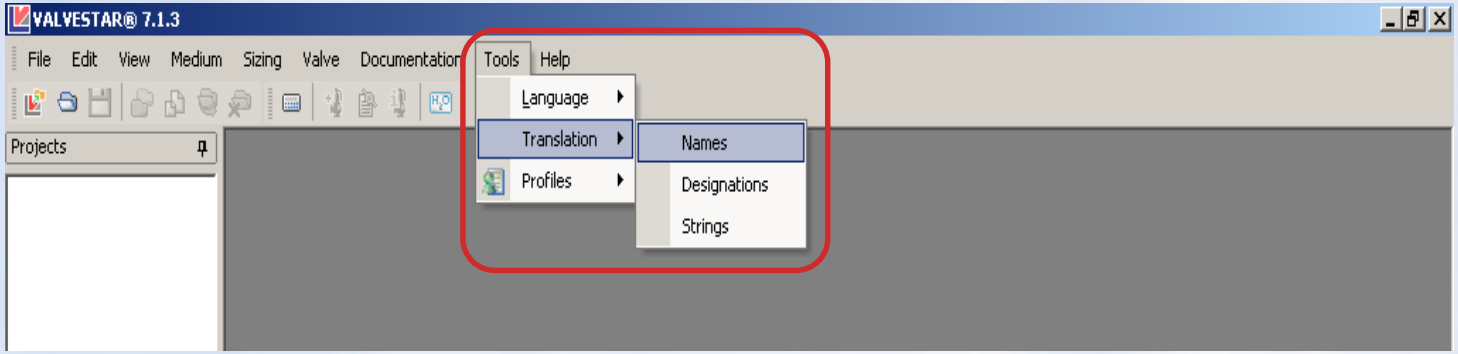
Profiles



Language



Translation



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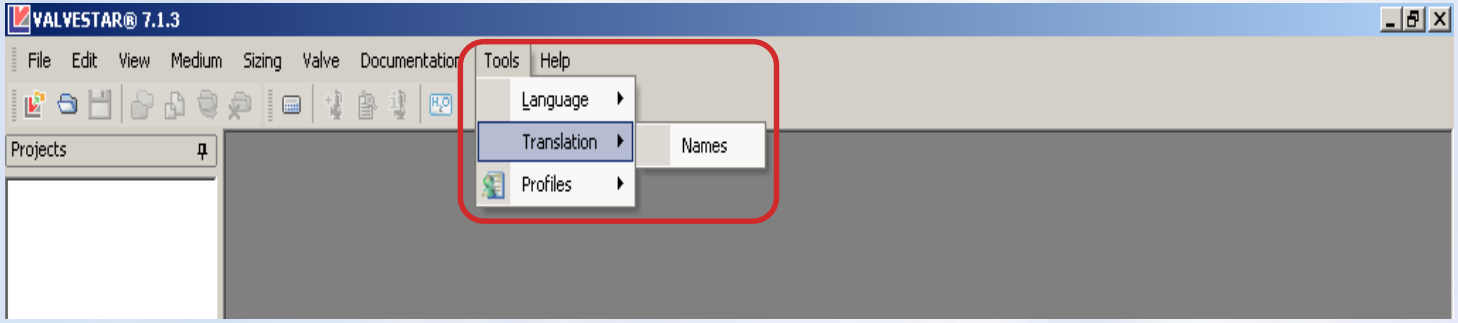
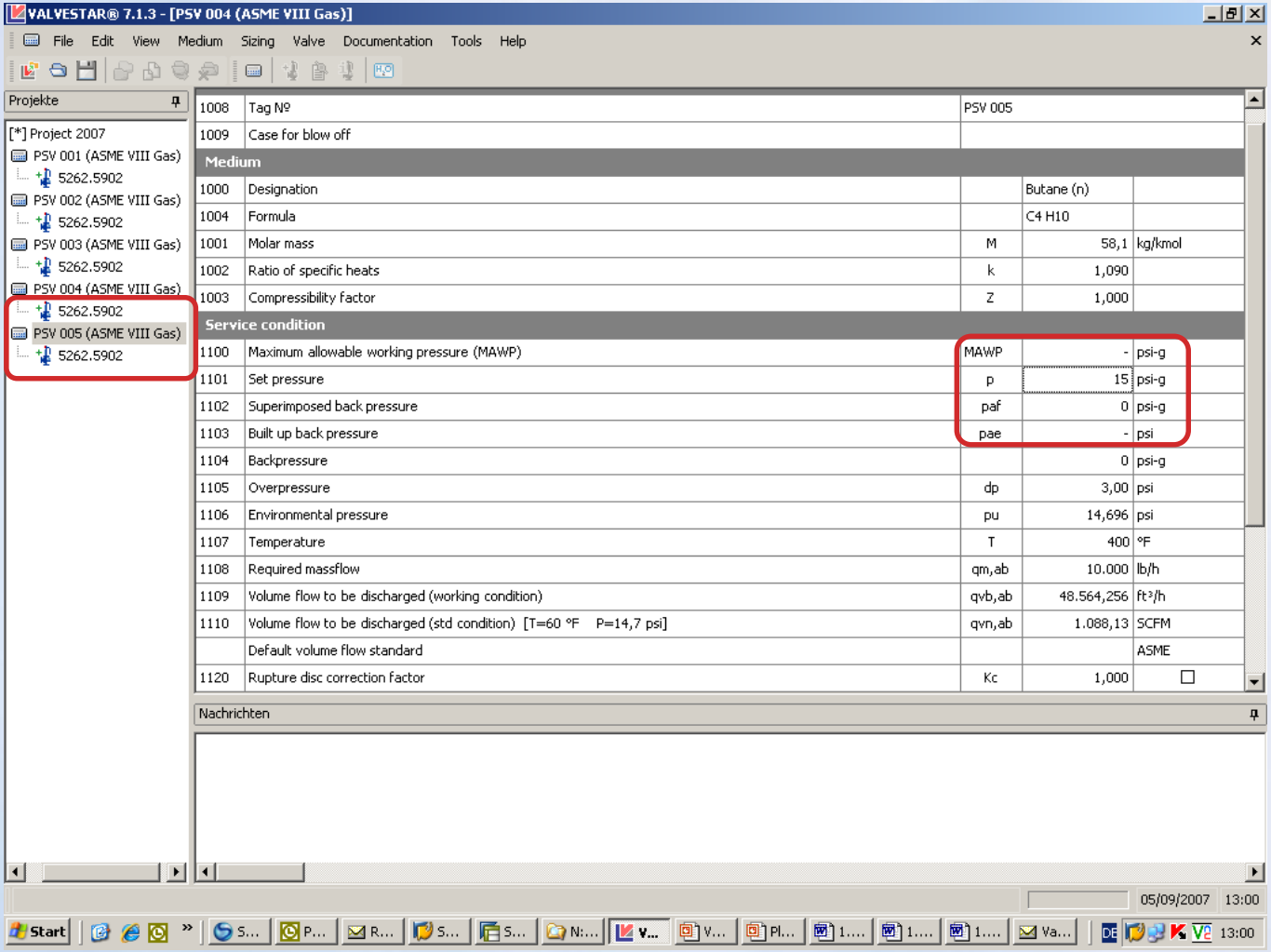
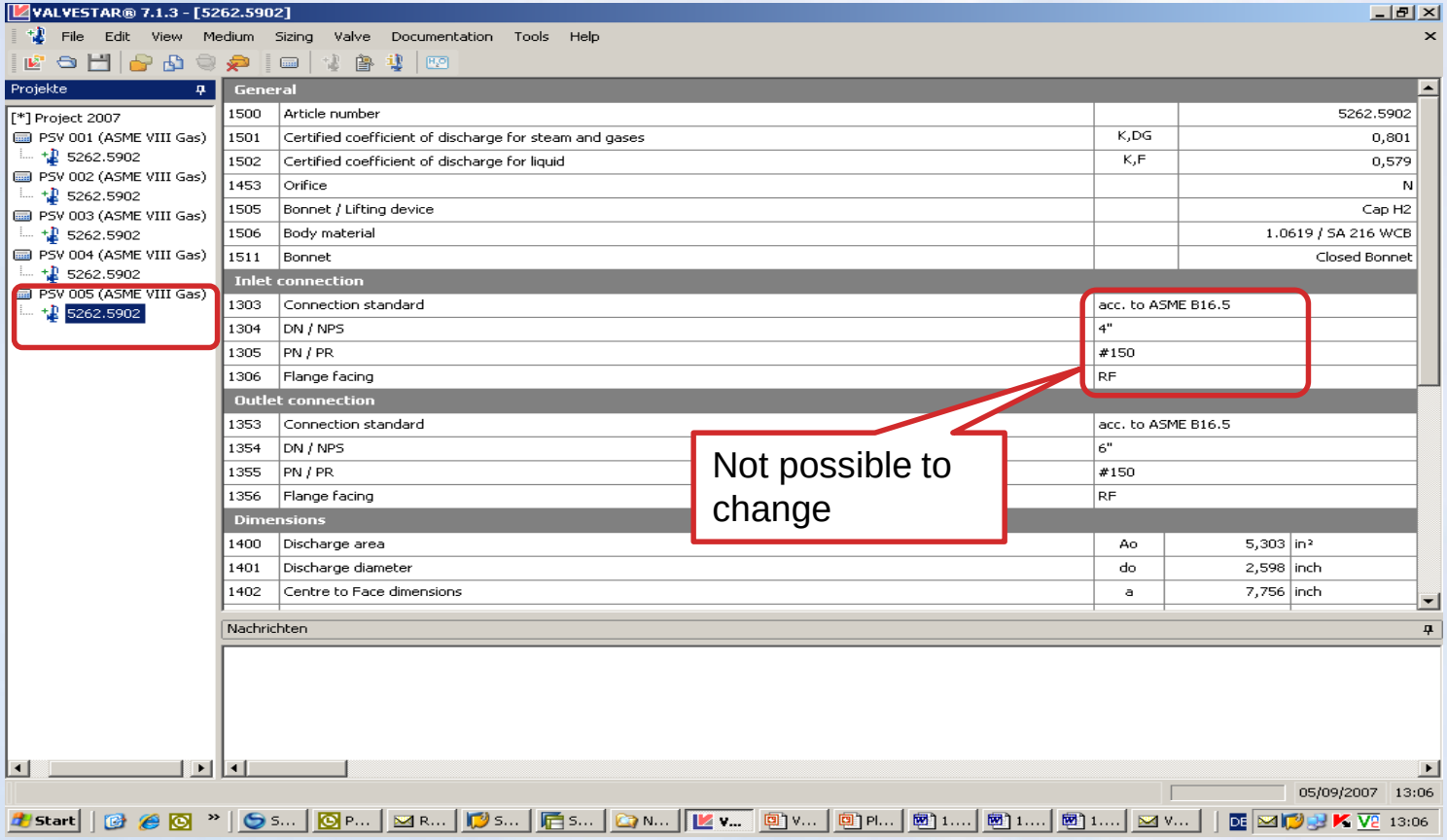


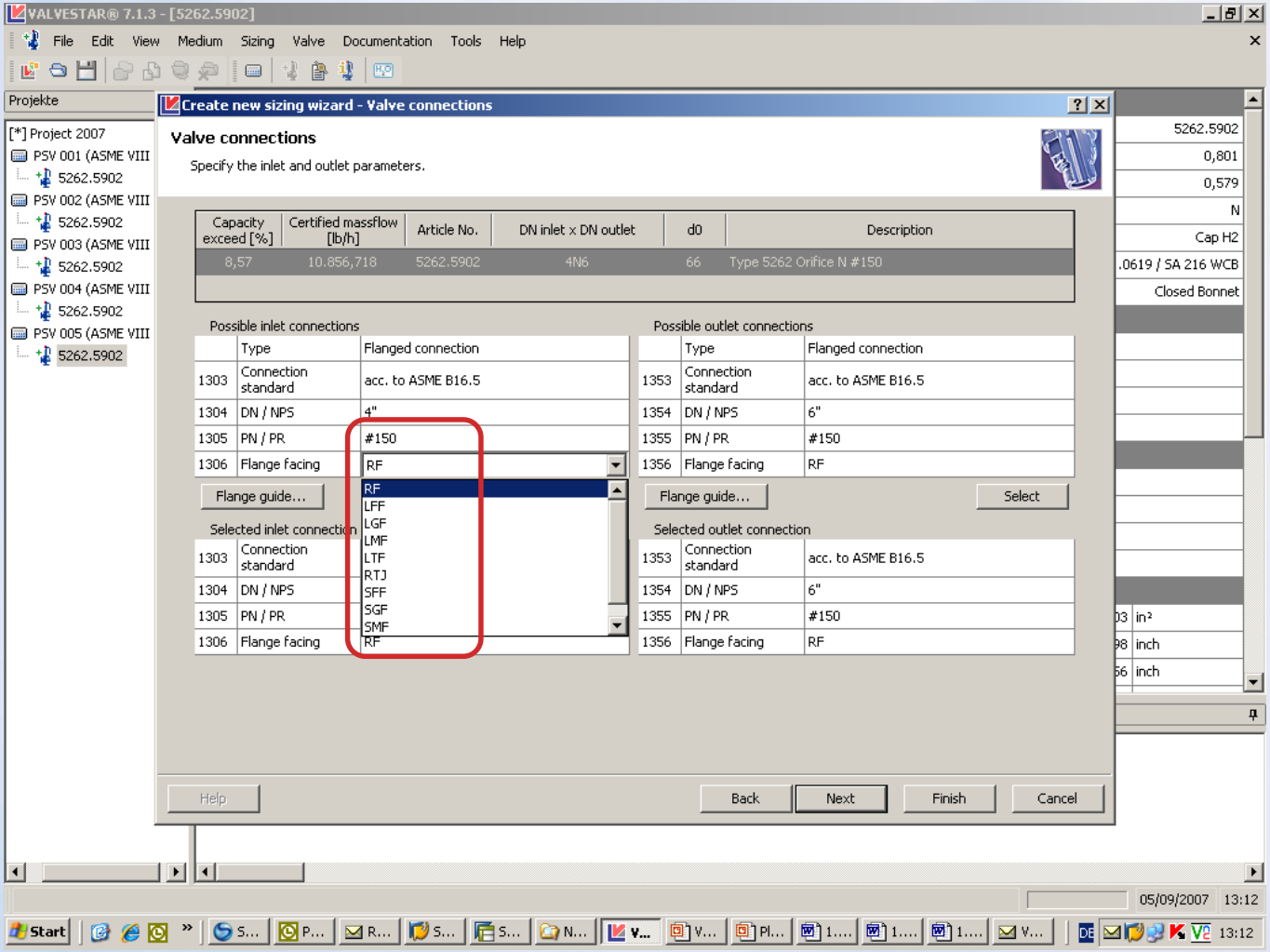
How to change data



How to change data



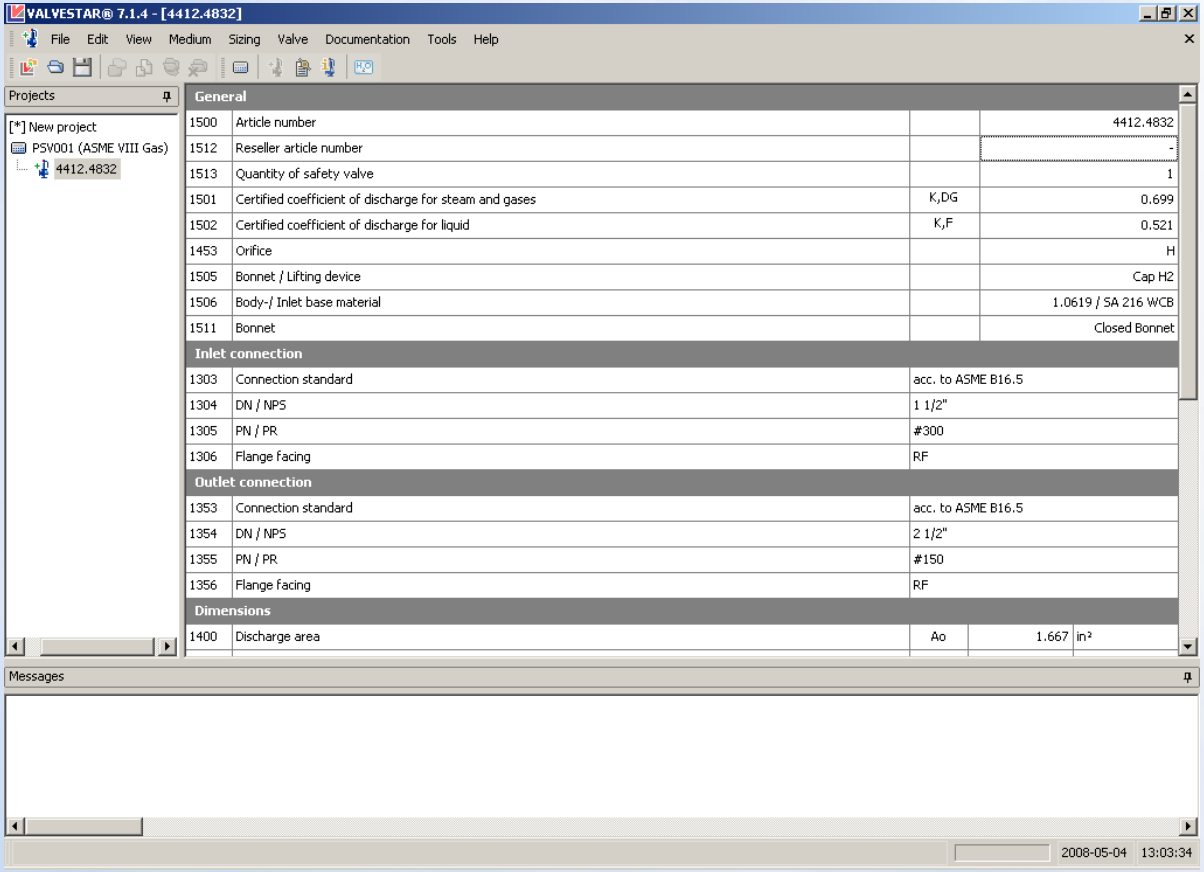
How to change data



How to change data

How to manually input a reseller article no.

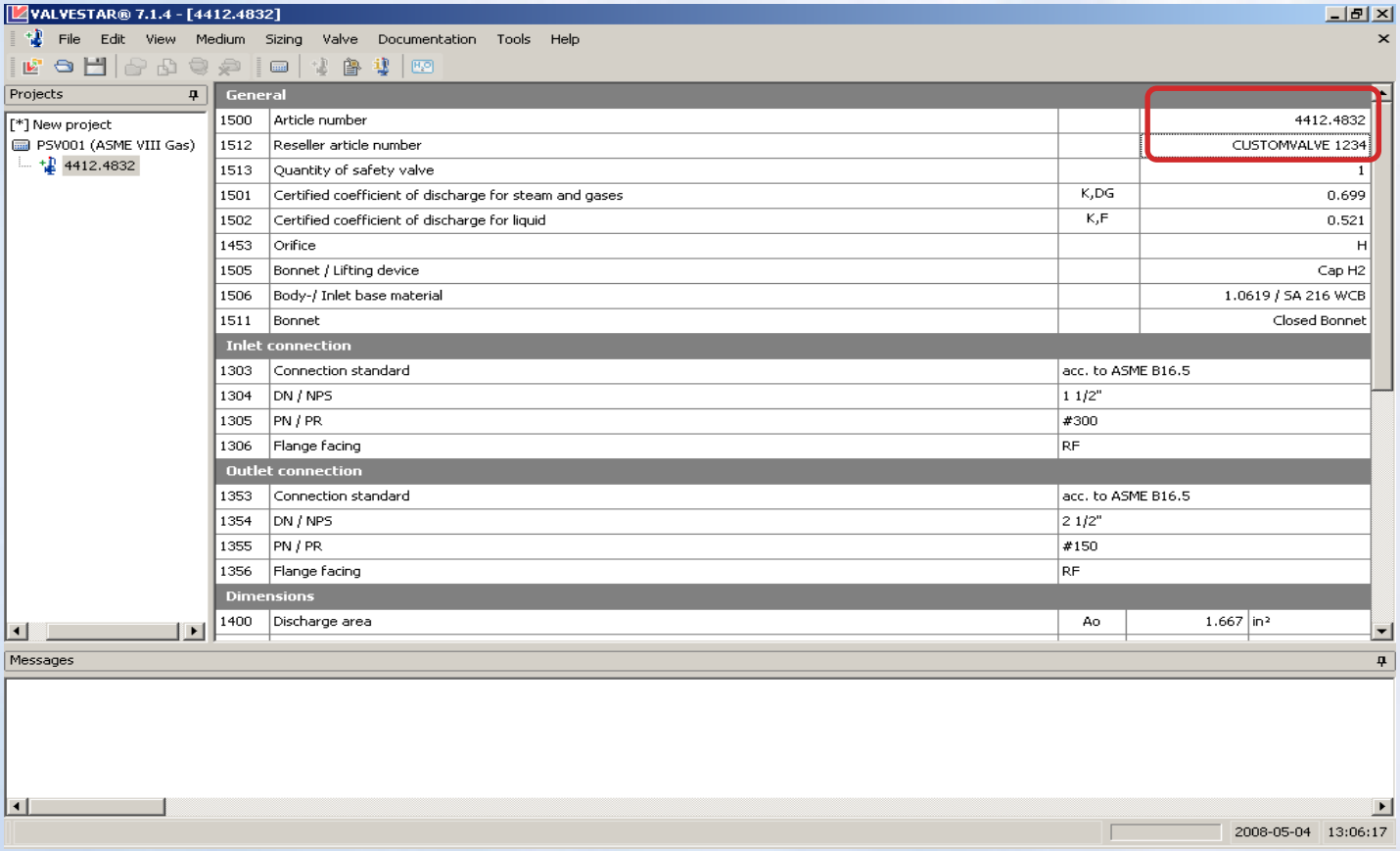
First: Do a standard sizing



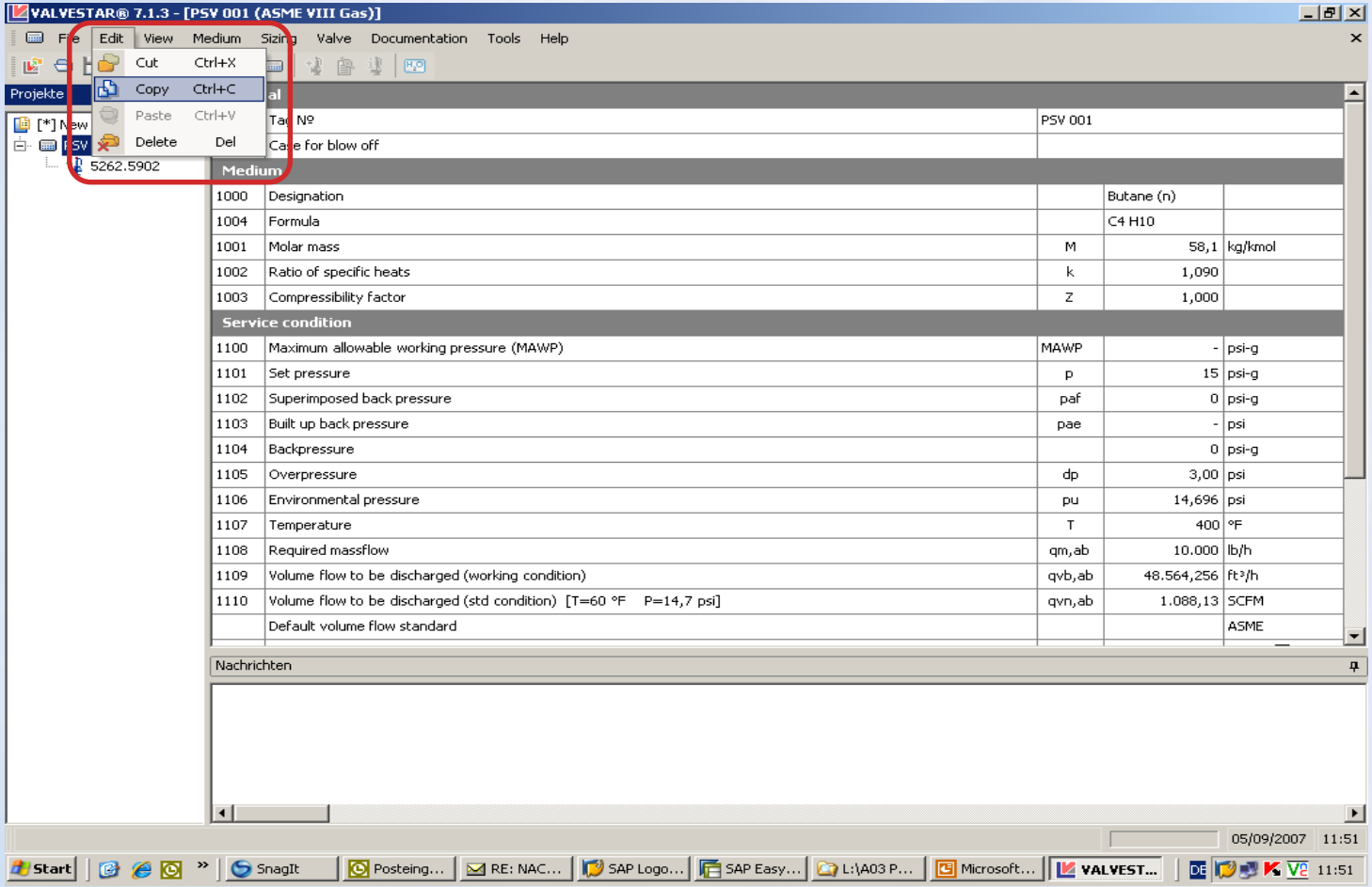
How to change data

How to manually input a reseller article no.

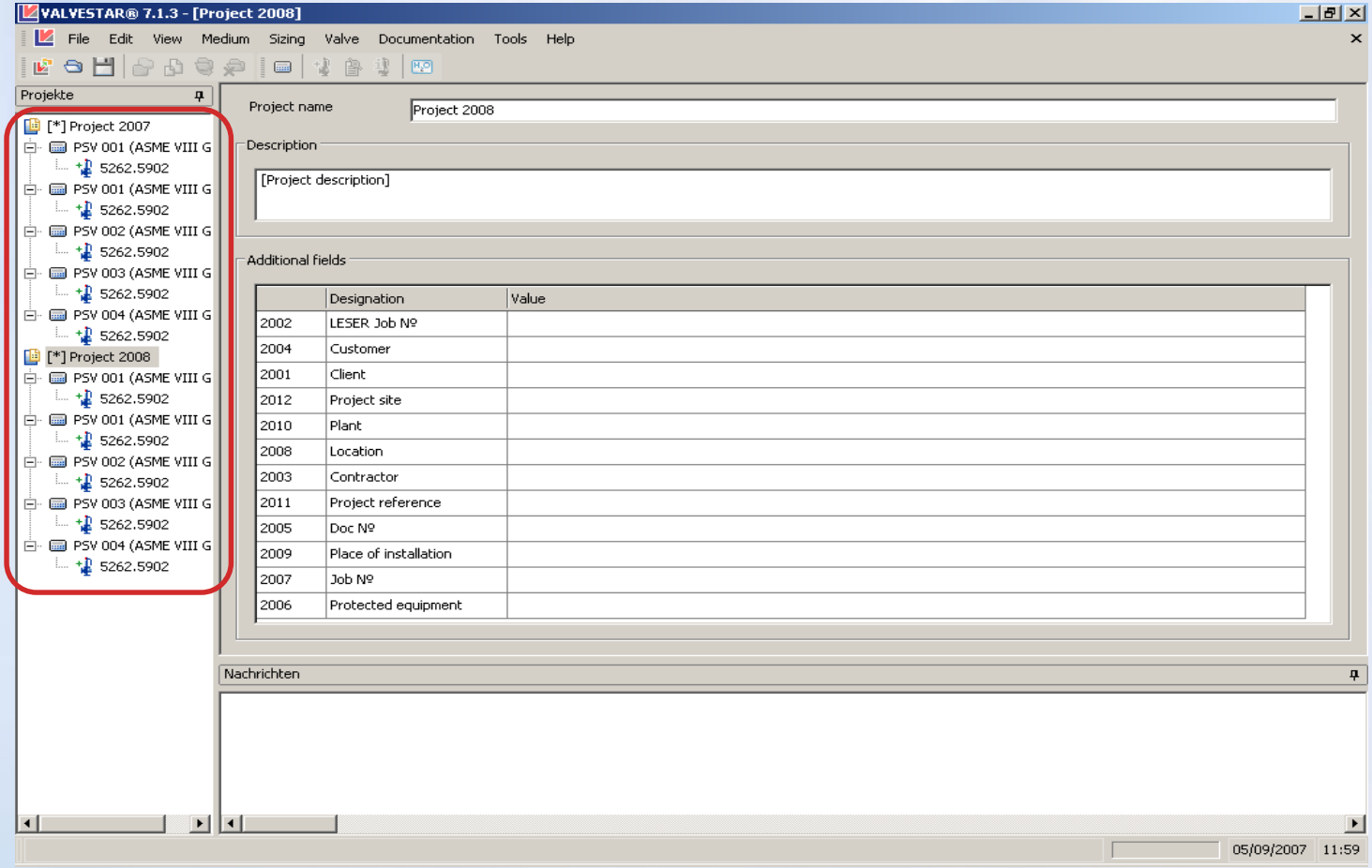
Second: Add a reseller article no.



Copy and Paste



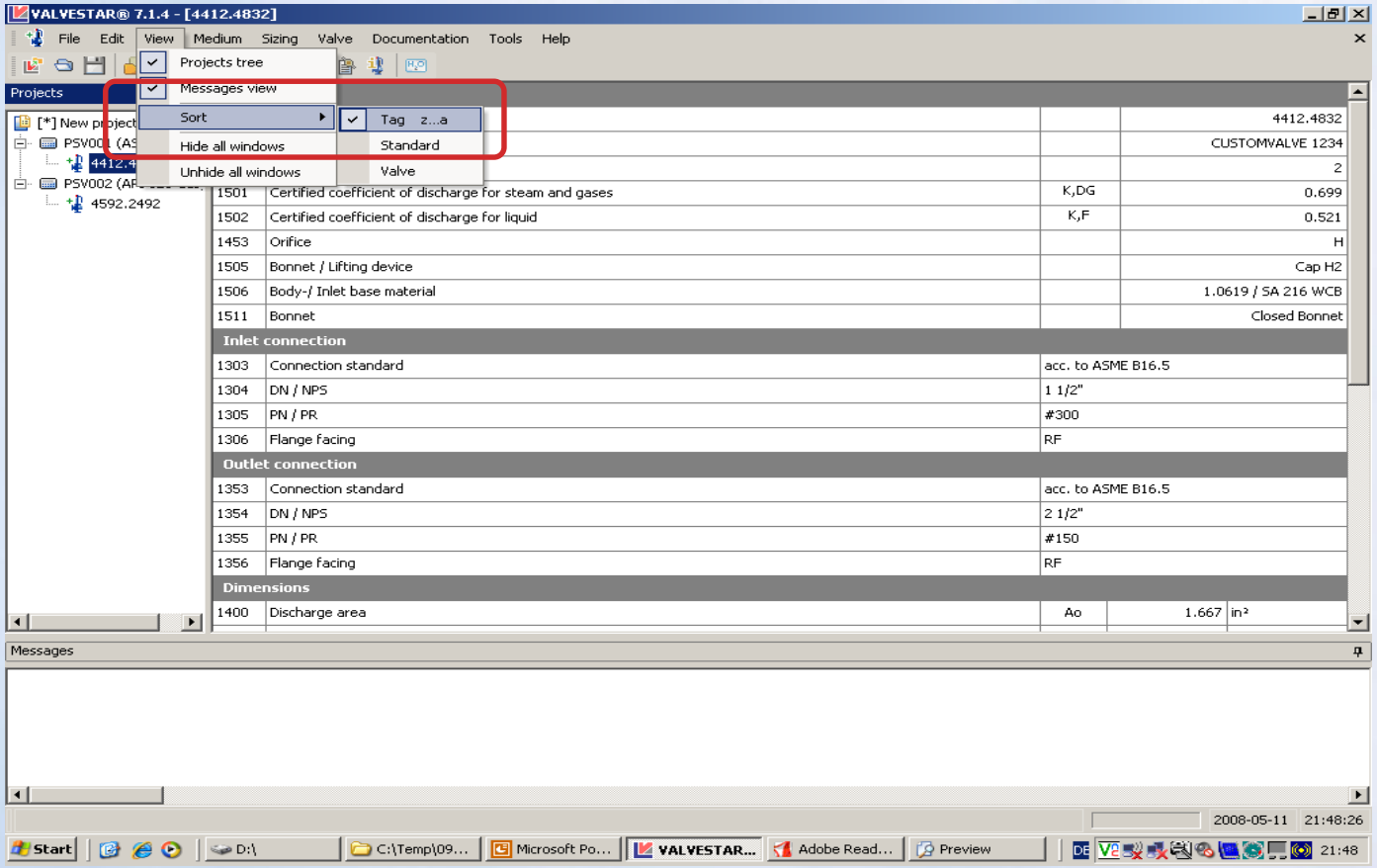
Copy and Paste



How to change data

What are the features for better handling?

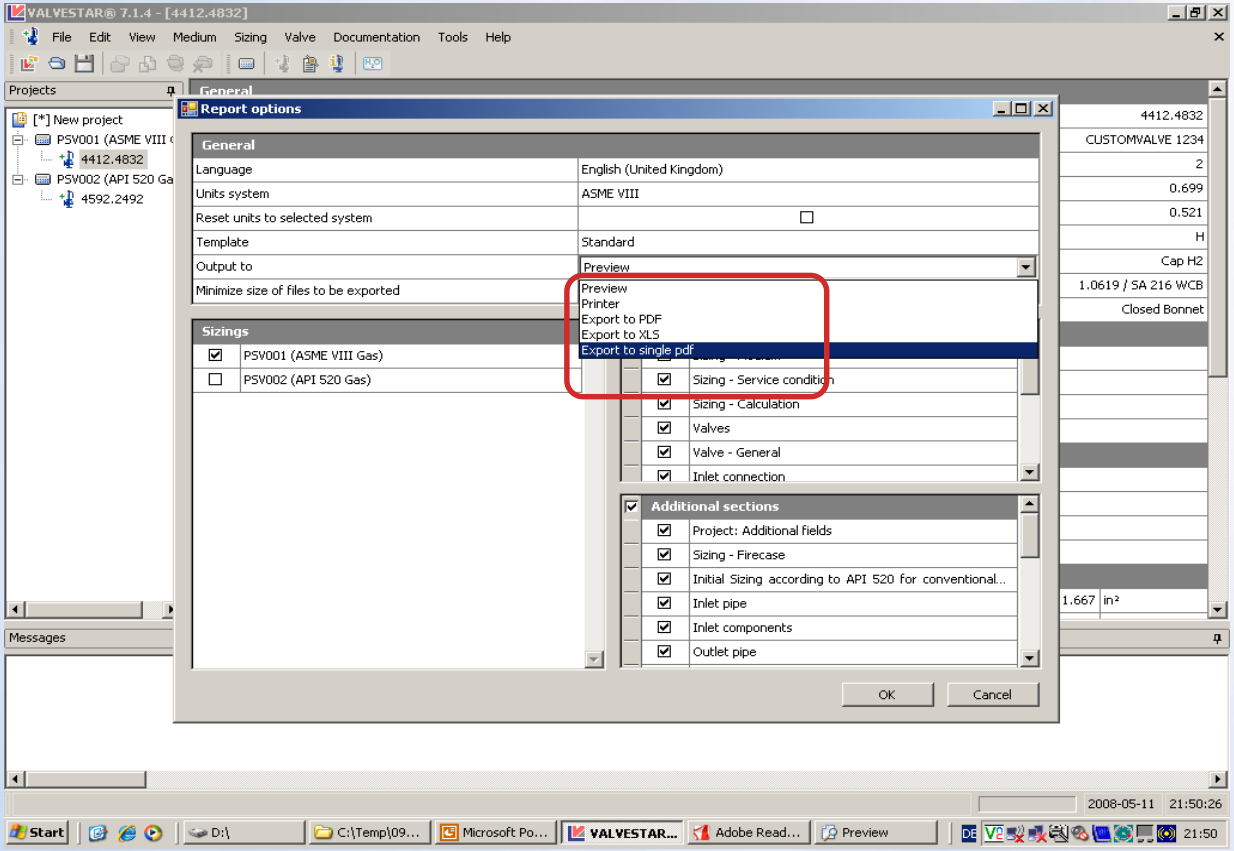
Sort function in menue “View”



How to change data

What are the features for better handling?

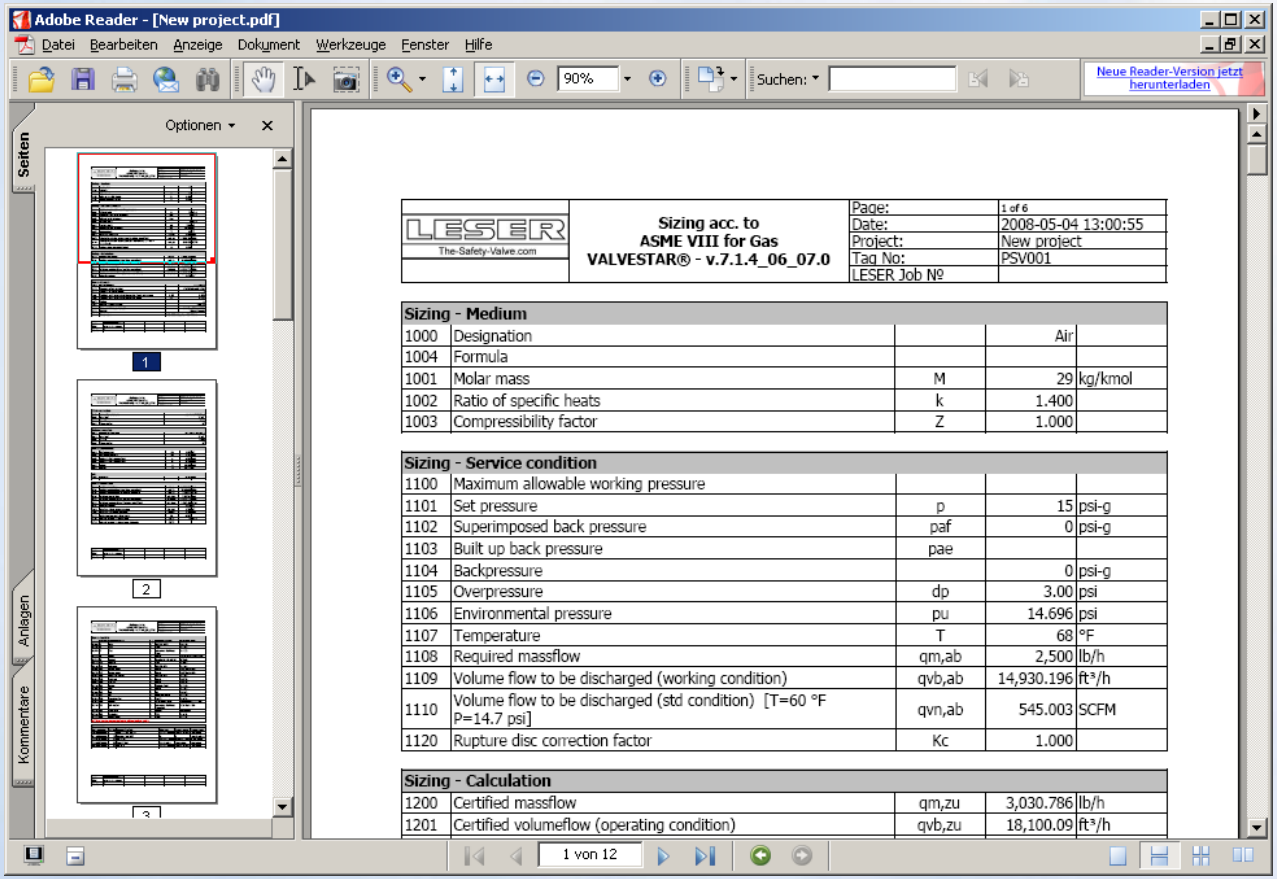
Printing in one pdf-file for all sizings of one project can be done with documentation “report full-version”



How to change data

Where is the pdf-filed automatically?

Filed in the project storage”



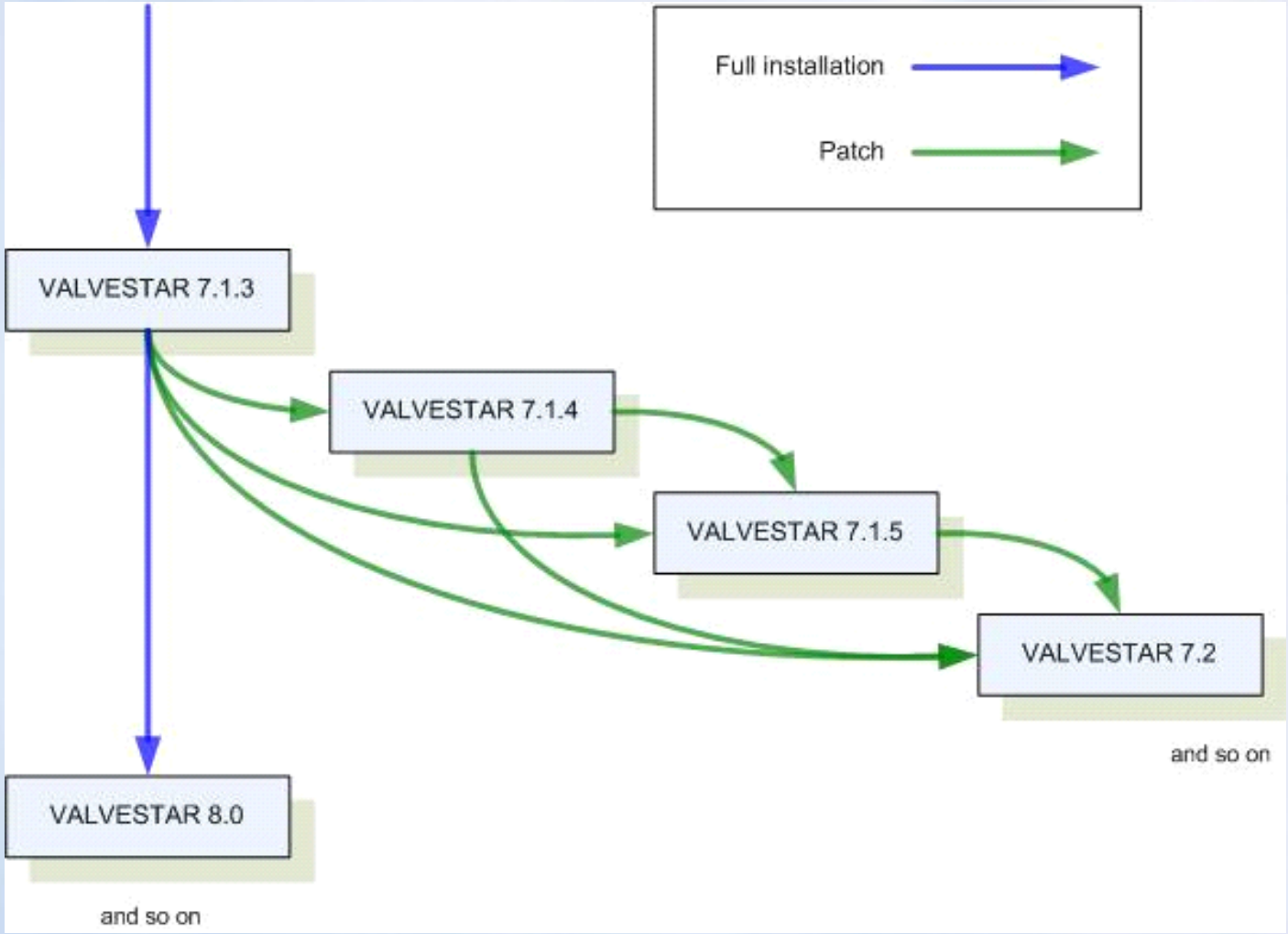
	Sizing acc. to ASME VIII for Gas VALVESTAR® - v.7.1.4_06_07.0	Page:	1 of 6
LESER The-Safety-Valve.com		Date:	2008-05-04 13:00:55
		Project:	New project
		Tag No:	PSV001
		LESER Job №	

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	

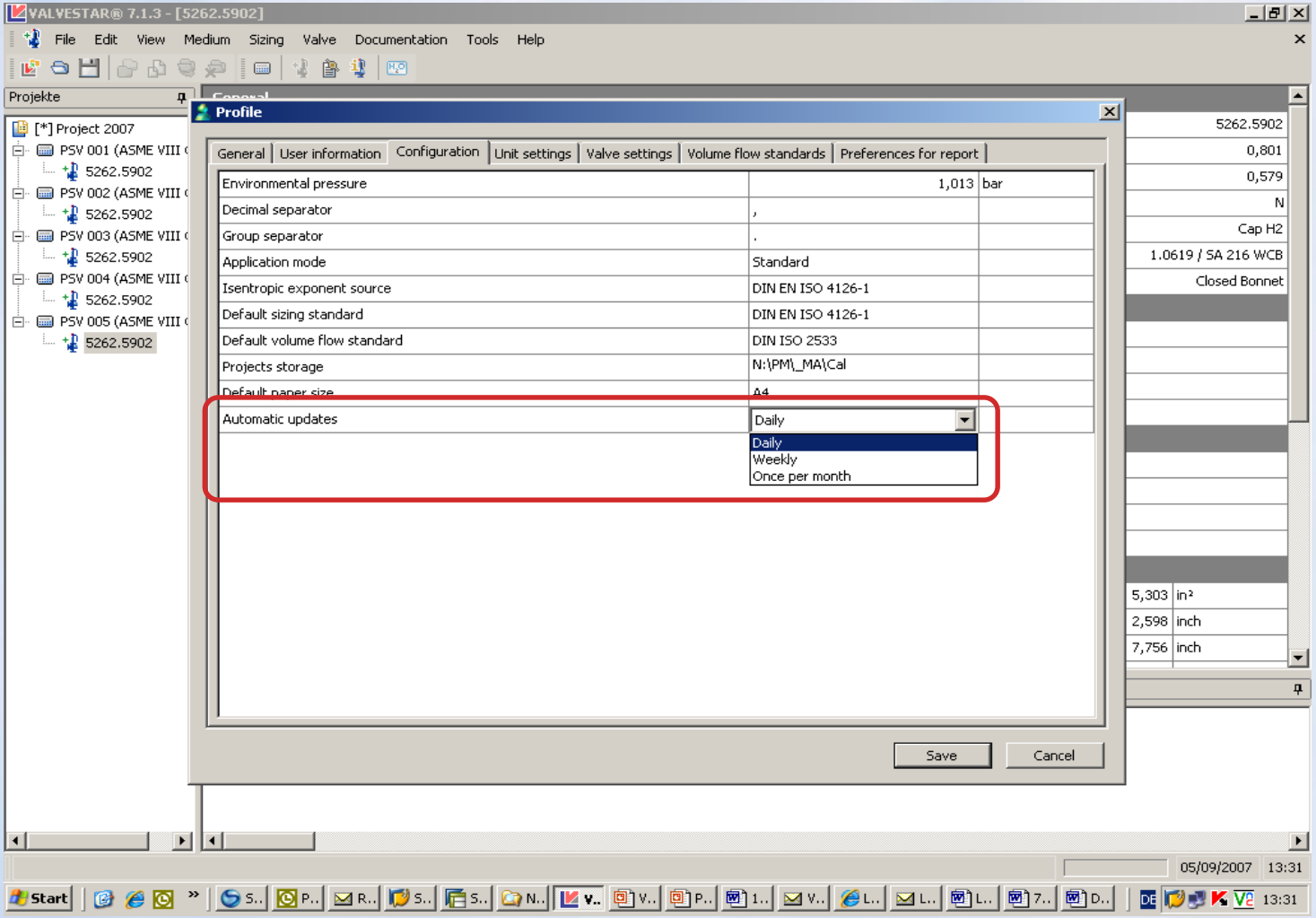
Sizing - Service condition				
1100	Maximum allowable working pressure			
1101	Set pressure	p	15	psi-g
1102	Superimposed back pressure	paf	0	psi-g
1103	Built up back pressure	pae		
1104	Backpressure		0	psi-g
1105	Overpressure	dp	3.00	psi
1106	Environmental pressure	pu	14.696	psi
1107	Temperature	T	68	°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

Update via Internet

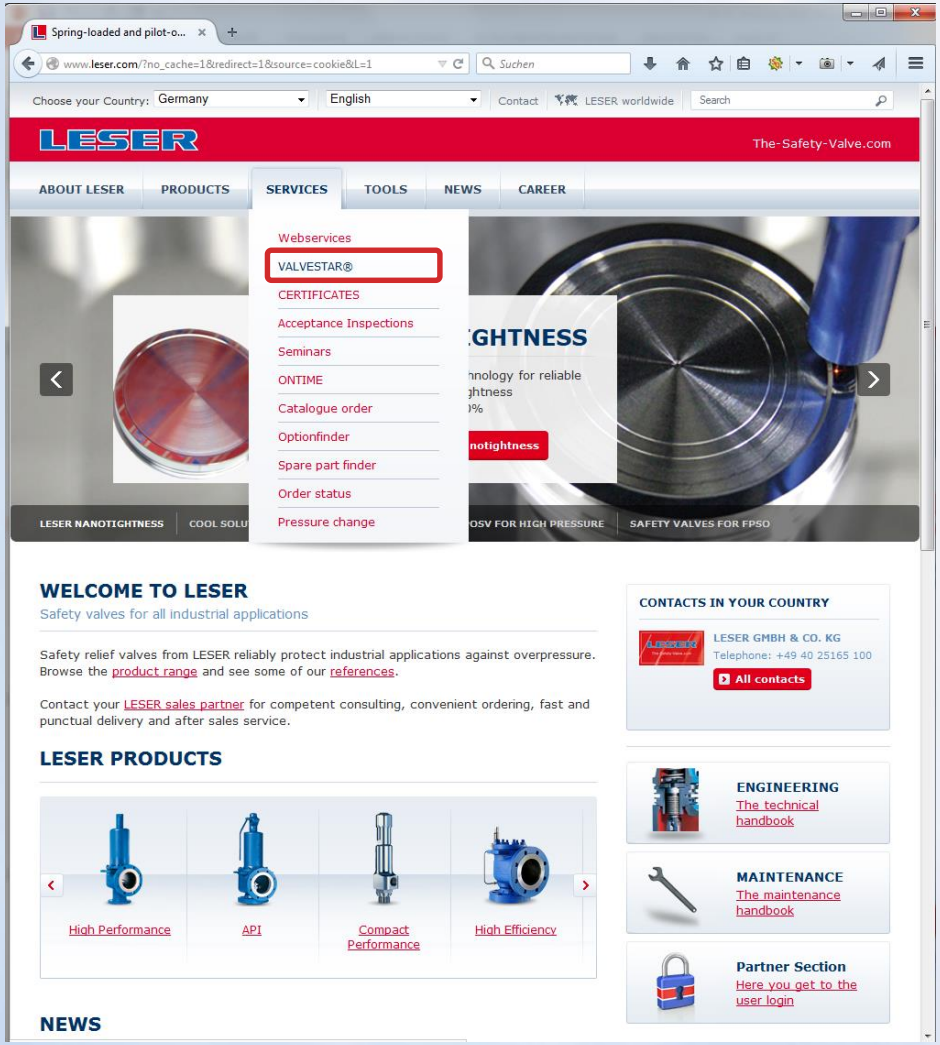


Update via Internet



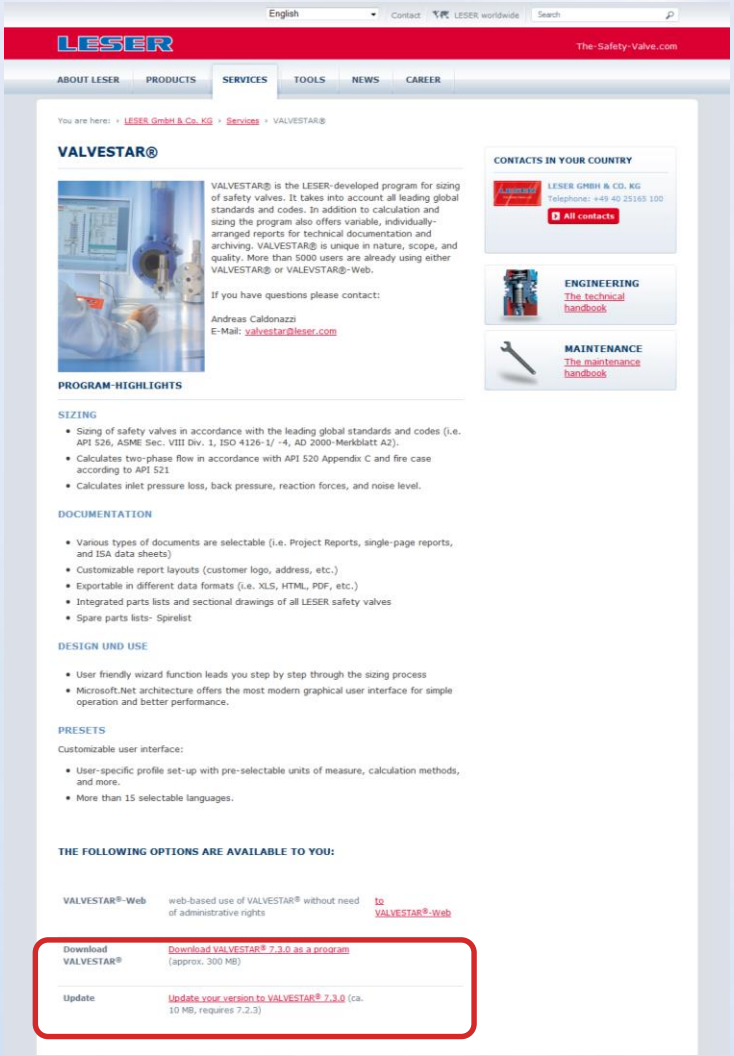
Update via Internet

Homepage – www.leser.com

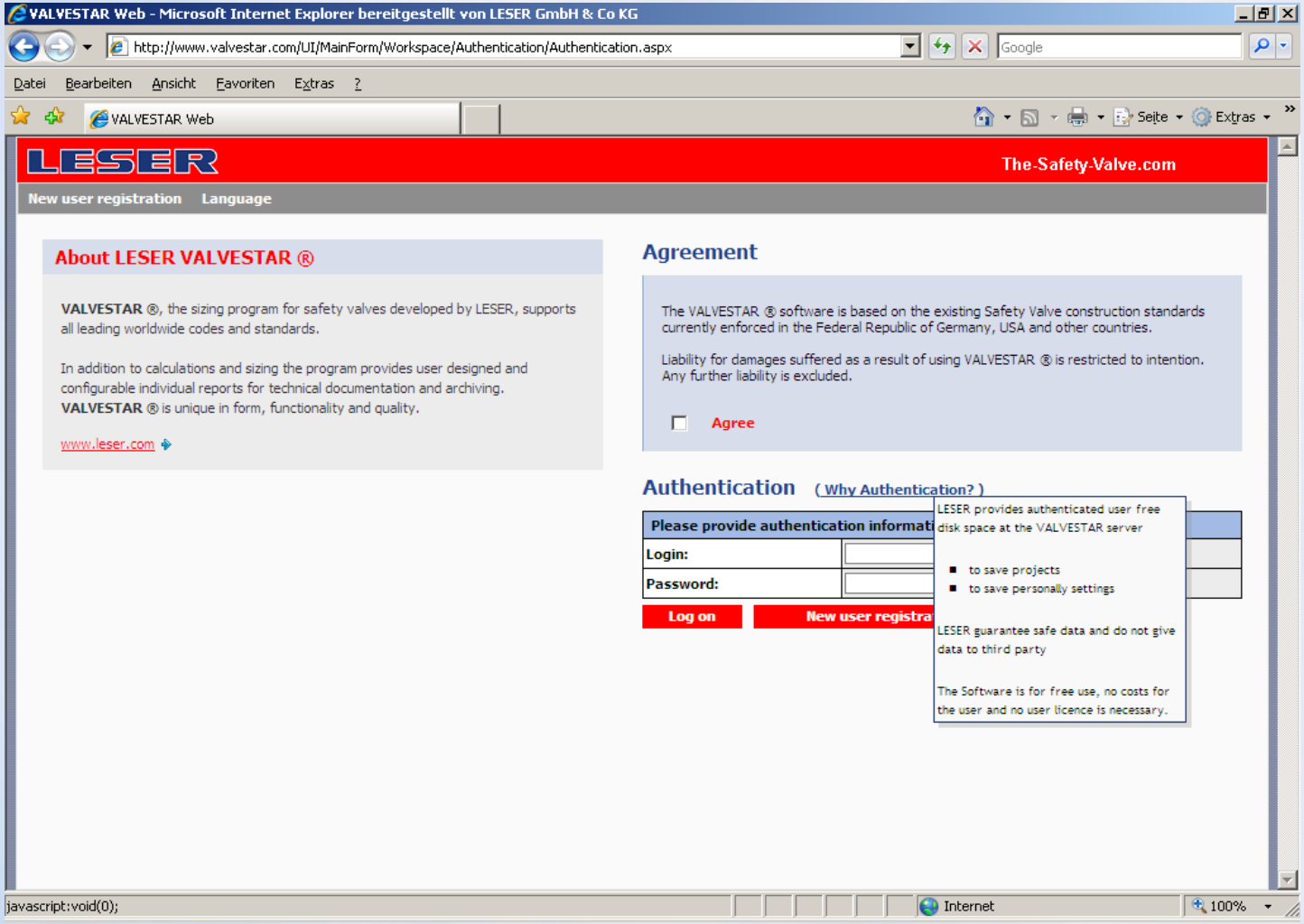


Update via Internet

www.leser.com/en/services/valvestar



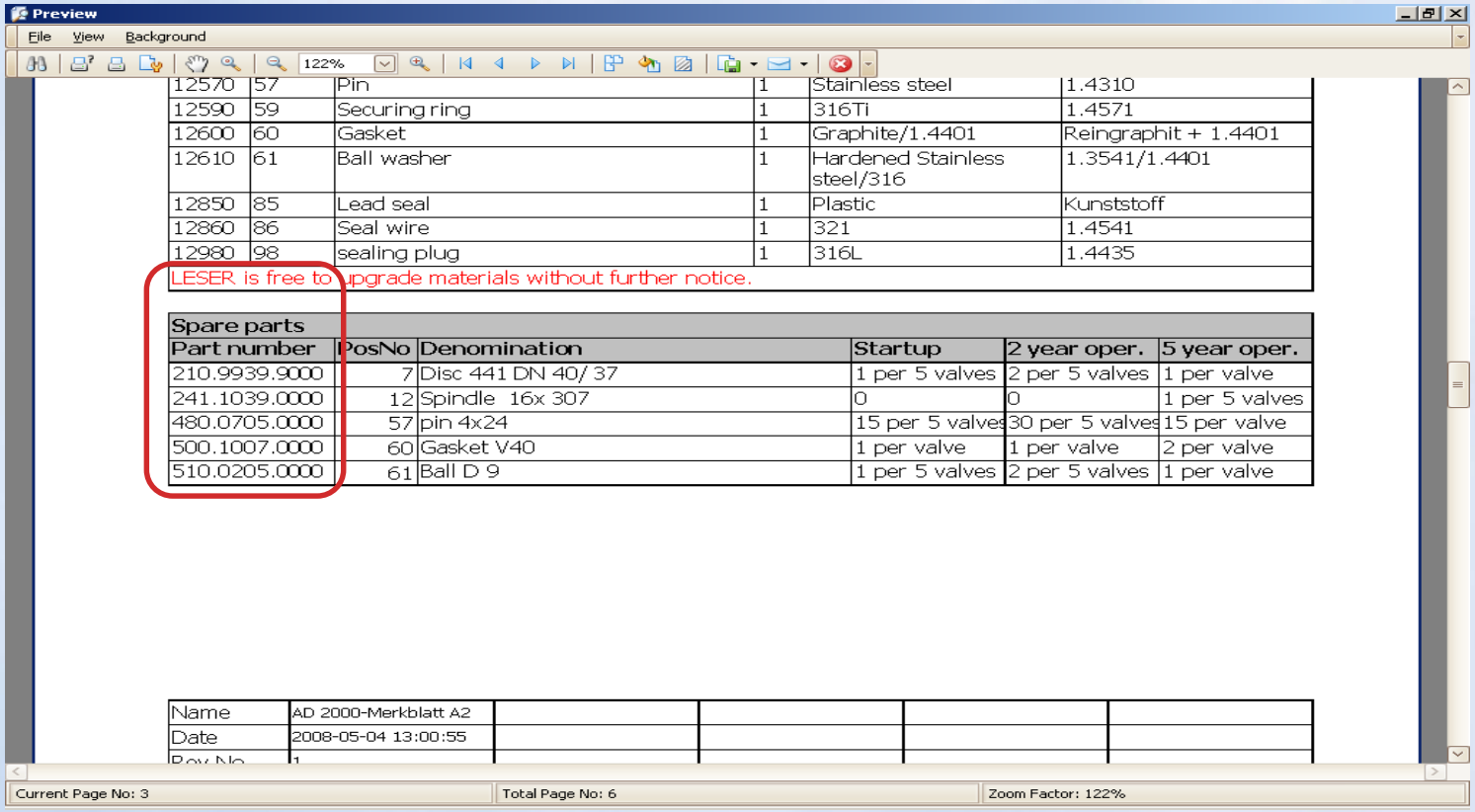
www.valvestar.com



Spare Parts

What is the new feature spare parts?

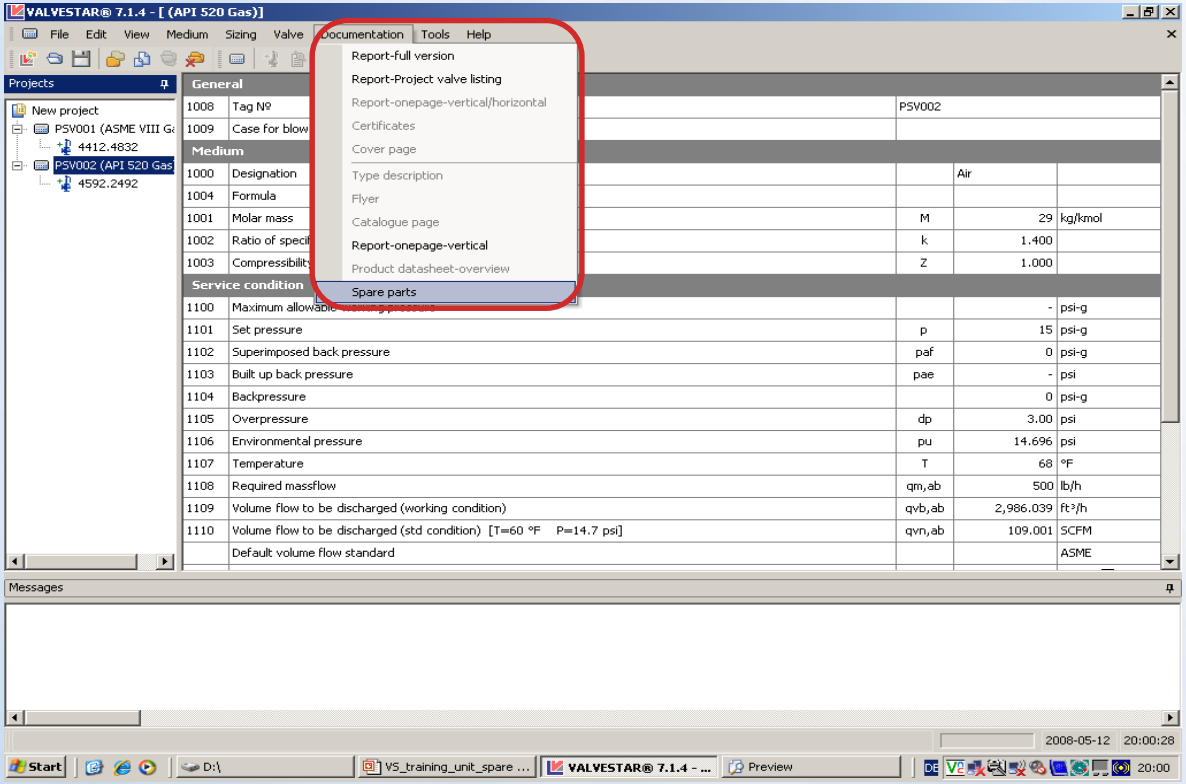
Two different listings of spare parts are available. Listing while single sizing in the “report full-version” and a spir list of complete project spare parts.



Spare Parts

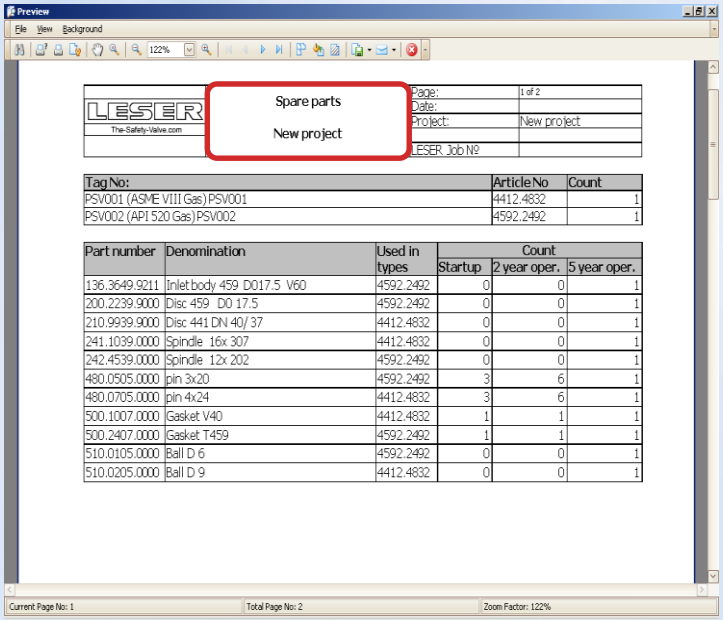
What is a spir list and how I generate a spir list?

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



Spare Parts

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



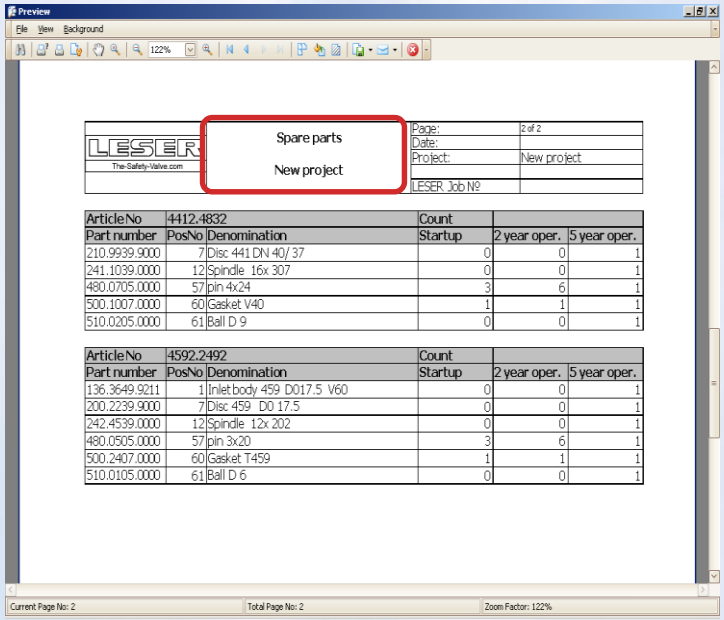
Spare parts

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



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