



2019-06-04 | Version 1.03

# Coolselector<sup>®</sup>2 User Guide

User guide for Coolselector<sup>®</sup>2. Not for use as a design guide. Always remember that selection software is only as good as the person using it.



## We did complex – you do awesome





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## 1 Installing Coolselector<sup>®</sup>2

In order to get Coolselector<sup>®</sup>2 up and running, if you have not done so already, you can download and install Coolselector<sup>®</sup>2 from <u>http://coolselector.danfoss.com</u>.

Coolselector<sup>®</sup>2 is free to use and runs on all Windows PCs.

If you are running a mac or other non-Windows PC, you can access Coolselector<sup>®</sup>2 online from <u>http://coolselectoronline.danfoss.com</u>.

## 2 Check for latest version

Before you start using the standard PC version of Coolselector<sup>®</sup>2, please make sure you have the latest version, by going to the "About | Updates" menu:

ntitled.csprj									
About	Selections Report		Bill of						
Ne	ws		1						
<b>-</b> Co	olselector2 On	YouTube	- <b>-</b> +						
E Co	Coolselector2 On YouKu								
Co	Coolselector2 Survey								
Up	dates 🛛 🖊								
Ab	out Coolselect	or2							

Once you see the Updates screen, click on the "Check for new version" button:

ates	×
Automatic Updates	
✓ Automatically check for new versions of Coolselector2	
Your privacy is important to us! Danfoss does not store any personal information about you, apart from your address which is needed in order to provide the automatic updates service. Should you have any data privac concerns regarding your use of Coolselector ©2, please contact the Danfoss data protection officer at: SDPO@danfoss.com	
Please also refer to the Danfoss general privacy policy: https://www.danfoss.com/en/terms/privacy/	
Check for new version Status	
Email Updates	
f you for any reason cannot receive automatic updates (Network/firewall issues, etc.), hen please visit this website to subscribe to information mails:	
nttps://www.danfoss.com/en/service-and-support/downloads/dcs/coolselector-2#tab-news	
Manual Updates	
You can also check for new versions manually by visiting the Coolselector2 website: http://coolselector.danfoss.com	
e installed version is: 2.3.3   Database 35.35.1.14.3.16	ОК

Note that, if you cannot update automatically (i.e. due to your company policies), it is possible to subscribe to an email service which will notify you whenever a new version is released.



Once you have clicked the button, Coolselector<sup>®</sup>2 will notify you if there is a newer version available. If that is the case, you can install the new version directly from the prompt.

#### 3 Country and language settings

Before first use, please also ensure you have set the country and language based on your preferences.

You can set the preferences for country and language in "Options | User, Language, Country" menu:

Options	Tools About	Selections	Re			
Pret Uni	ferences ts	1	•			
Use	User, Language and Country					
Styl	e					

As an example, you can change your country to 'USA' as in the following example;

ser, Language and	Country	×
Default name used	in reports:	
Name:		
Language and Cou	ntry:	
Changing language	will require a restart of Coolselector2	
Language:	English (United States)	$\sim$
Country:	United States	~
Show all produc	ts regardless of selected country	
Enable selection of	non-standard products:	
User name:		
Password:		
Non-standard prod	ucts will be shown in brackets	
	(	OK Cancel

From the drop down, set your country to 'United States' and click OK:

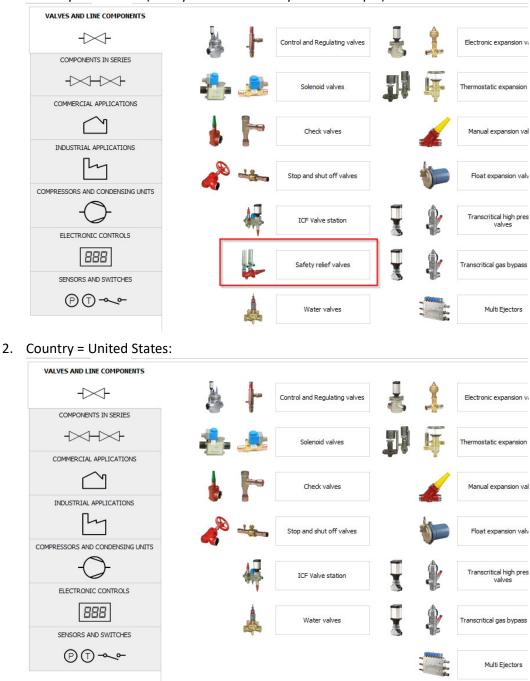
When you change your country to USA, you will see that the available components in "Valves and Line Components" have changed. You will no longer be able to select "Safety relief valves" – the reason being that Danfoss does not sell safety valves for the US market (this might change in the future).

The important thing to note here is that Coolselector<sup>®</sup>2 will use your country setting to display as relevant as possible information to you (this is even more pronounced for condensing units, where each unit has a specific sales region).

On the next page, you will find some examples of this:



1. Country = Denmark (or any other EU country as an example):

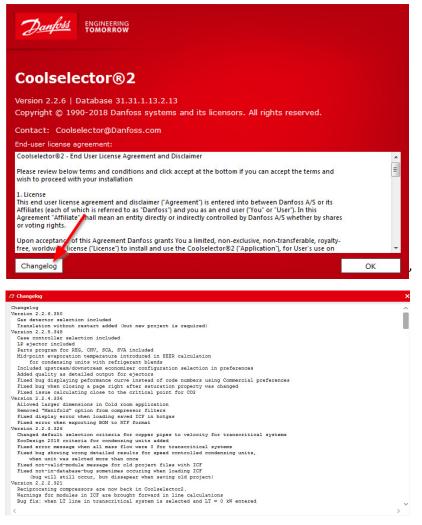


Do not forget to change the settings back to your preferred ones (i.e. your own country).

#### 4 How to find out what is new in Coolselector®2

To see the latest changes in Coolselector<sup>®</sup>2, go to the "About | About Coolselector2" menu and click the <Changelog> button:





Also, check out the "About | News" menu item for new product releases.

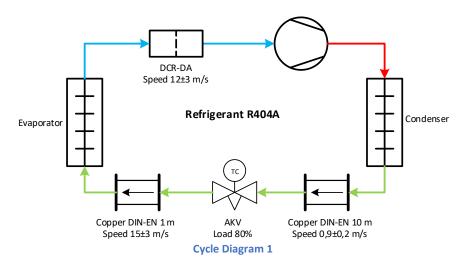
#### 5 Basic component selection

In the following part of this user guide, we will go through creating a project in which we try selection and calculation for a few components in a very simplified refrigeration cycle as it can be seen in the following graph and properties snippet. We will also discuss how to customize the project with your own name, how to get bill of materials and how to generate a report for this project. Make sure your preferences choice is set to "all applications' in "Options | Preferences | All applications" (refer to chapter 21 if in doubt how you do this).

Capacity:		Evaporation:		Condensation:		Additional:
Cooling capacity:	∨ 15,00 kW	Dew point temperature: $\lor$	-15,0 °C	Dew point temperature: $\sim$	20,0 °C	Discharge temperature: 39,9 °C
lass flow in line:	386,7 kg/h	Useful superheat:	8,0 K	Subcooling:	2,0 K	
leating capacity:	18.41 kW	Additional superheat:	0 K	Additional subcooling:	0 K	



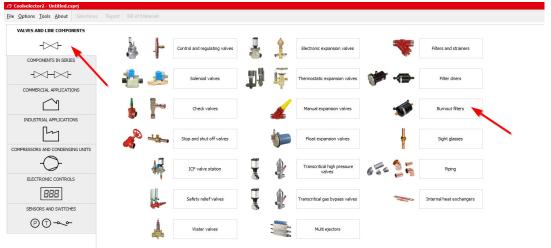




For the following explanations on basic component selection, we will use the information in <u>System Properties 1</u> and <u>Cycle Diagram 1</u> above.

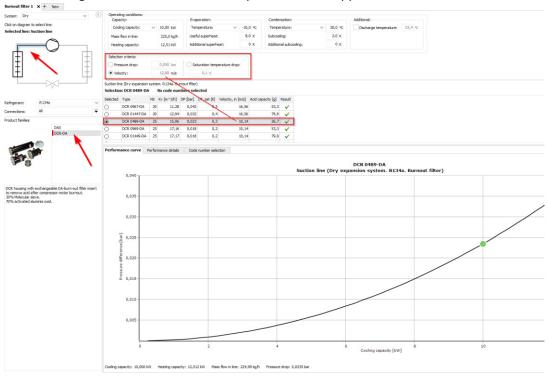
First, and to give you an overview of the "Valves and Line Components" part of Coolselector<sup>®</sup>2, we will start by selecting a DCA-DA burnout filter for the suction line in a dry system with the default operating conditions.

To do this, open Coolselector<sup>®</sup>2. Upon doing so, you will find that the program starts on the tab for 'Valves and Line Components'. From this screen, among the different component functionalities, we will choose "Burnout filters".



Coolselector<sup>®</sup>2 creates a dry system by default, and we then select the suction line and then click on the DCR-DA in the product families. You will see the list of valid products and the best





one matching the selection criteria as depicted in the snippet below:

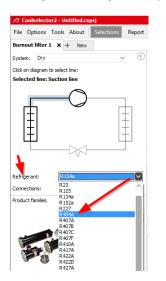
Here you can also see the other parameters for the filter in the table, such as acid capacity, as well as the pressure-drop as a function of changing the cooling capacity and keeping the other parameters constant.

## 6 Changing the refrigerant

Coolselector<sup>®</sup>2 also allows you to change the refrigerant during product selection.

In our previous example we selected a DCR-DA using the standard settings (the default refrigerant for DCR-DA is R134a). Now, let us try to change this to R404A.

Change the refrigerant by choosing R404A in the drop down 'Refrigerant' on the left-hand side:





You may notice, that when you change the refrigerant, Coolselector<sup>®</sup>2 asks for a confirmation, as this change means you are creating a new selection procedure.

Confirm	×
?	Changing line type, refrigerant or connections will delete the current selection. Do you want to continue?
	<u>Y</u> es <u>N</u> o

By clicking "Yes", a new selection will be made.

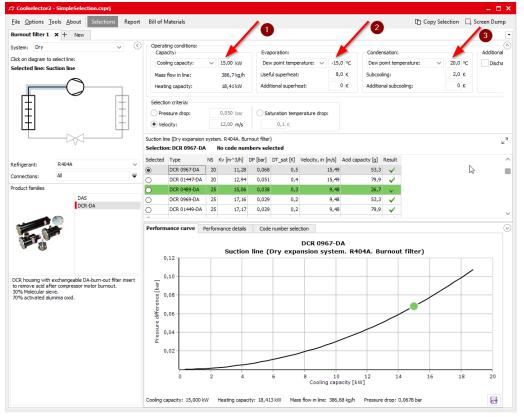
Please note that the 'evaporation temperature' and 'condenser temperature' are now changed to 'dew point temperature'. This is due to the fact that R404A is a glide-refrigerant and hence there is reference required for the evaporator and condenser temperatures.

The current suggestion from Coolselector<sup>®</sup>2 for a best match to the operating conditions is "DCR 0967-DA", which is different from the suggestion made by the exact same properties in the system running with R134a; this is of course due to the different properties of the two refrigerants.

## 7 Description of operating conditions

Using our examples with selection of a DCR-DA using the standard Coolselector<sup>®</sup>2 settings, but with refrigerant R404A, we now try to adjust the cooling capacity, and dew point temperatures for evaporation and condensation, respectively.

Increasing the capacity would increase the mass flow in line and hence the speed in the component which results in a larger component. Decreasing the evaporation temperature increases the mass flow-rate as the cycle COP would be lower. Decreasing the condensation temperature has the opposite effect, which is the cause of the changes in the suggestion.



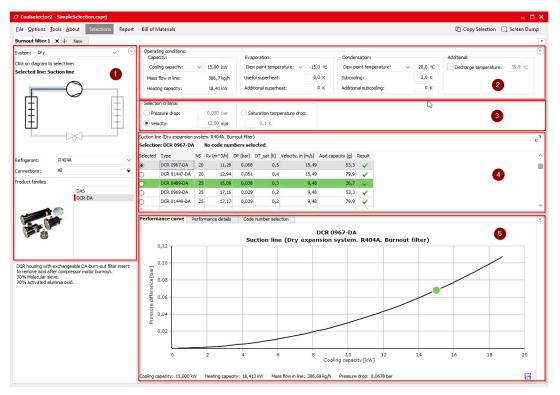


Changing the system properties as shown in the snippet above, means that Coolselector<sup>®</sup>2 now suggests the "DCR 0489-DA" as the best match instead of the previous "DCR 0967-DA".

These are merely some examples to show you that the Coolselector<sup>®</sup>2 suggestion can change and is easily affected by even small changes to the system properties.

#### 8 Different screen segments

In the calculation and selection interface of Coolselector<sup>®</sup>2, you will find that the screen is separated in to five different segments:



- 1. Segment "1" is dedicated to the application criteria for your selection. These criteria include, but are not exclusive to, system type, line, refrigerant, connection type, and product family.
- 2. Segment "2" is where you insert your system operating conditions, such as cooling capacity, evaporation and condensation temperature, and useful superheat. These operating conditions have significant impact on the calculations and a lack of due care when filling them in might lead to inapplicable results. Whereas great care has been taken to set meaningful default conditions, there is no guarantee that these will mirror the operating conditions for your system design.
- 3. Segment "3" is dedicated to the product selection criteria for the suggestion to be made in the next segment based on your inputs in functionality criteria and operating conditions segments.
- 4. In segment "4" you will find the selection table. In this area you will see the options matching the functionality criteria and operating conditions that you specified in the selected family. For each calculation, Coolselector®2 has a 'suggestion' which remains highlighted in green based on your input in the product selection criteria input. The selection table also includes some of the most relevant information for the product.

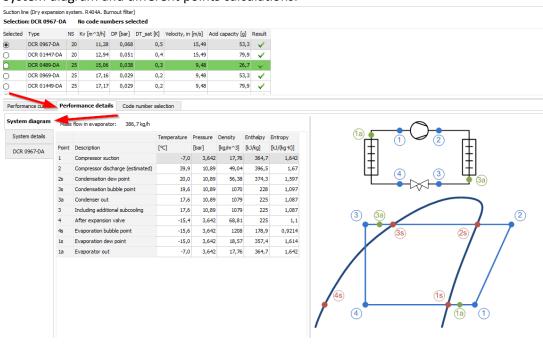


5. In segment "5", you will find the performance details and information about the chosen product from the previous segment. This information updates as you choose other products from the list.

## 9 Check the calculations details

After making any calculation and/or selection within Coolselector<sup>®</sup>2, you can click on the "performance details" tab, and check the system diagram calculations, system details and the performance of the selected product from the list in the corresponding tabs.

#### System diagram and different points calculations:



#### System calculation details:

Suction line (Dry expansion system. R404A. Burnout filter)
Selection: DCR 0967-DA No code numbers selected

Selected	Туре	NS	Kv [m^3/h]	DP [bar]	DT_sat [K]	Velocity, in [m/s]	Acid capacity [g]	Result
۲	DCR 0967-DA	20	11,28	0,068	0,5	15,49	53,3	-
0	DCR 01447-DA	20	12,94	0,051	0,4	15,49	79,9	<ul> <li>Image: A second s</li></ul>
0	DCR 0489-DA	25	15,06	0,038	0,3	9,48	26,7	× -
0	DCR 0969-DA	25	17,16	0,029	0,2	9,48	53,3	<ul> <li>Image: A second s</li></ul>
0	DCR 01449-DA	25	17,17	0,029	0,2	9,48	79,9	<ul> <li>Image: A second s</li></ul>

Performance curve	Performance details Code number selection		
System diagram	System:	Line	
	Capacity	~ To	tal pressure drop [bar]= 0,068
System details	fooling capacity [kW] = 15,00	To	tal saturation temperature drop [K]= 0,5
-,	Specific cooling capacity [kJ/kg]= 139,7	Ma	x available pressure difference [bar] = 3,64
DCR 0967-DA	Heating capacity [kW] = 18,41	Li	ne mass flow [kg/h] = 386,7
DCR 0967-DA	Specific heating capacity [kJ/kg]= 171,4		
	Compressor mass flow [kg/h]= 386,7		
	Evaporator mass flow [kg/h]= 386,7		
	Evaporation		
	Evaporating temperature [°C]= -15,0		
	Evaporating dew point temperature [°C]= -15,0		
	Evaporating bubble point temperature [°C]= -15,6		
	Evaporating pressure [bar] 3,642		
	Useful superheat [K] 8,0		
	Additional superheat [K] 0		
	Compressor discharge		
	Discharge temperature [°C] 39,9		
	Condensation		
	Condensing temperature [°C]= 20,0		
	Condensing dew point temperature [°C]= 20,0		
	Condensing bubble point temperature [°C] 19,6		
	Condensing pressure [bar]= 10,89		
	Subcooling [K]= 2,0		
	Additional subcooling [K] 0		
	Additional		
	Max liquid line pressure drop (before flashing) [bar] = 0,581		



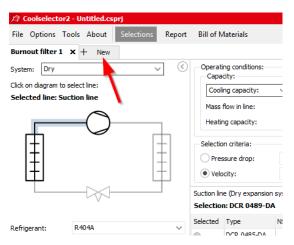
#### Product performance details:

lected	Туре		N	S	Kv [m^3/h]	DP [bar]	DT_sat [K	] Velocit	:y, in [m/s]	Acid capacity [g]	Resul	ult	
	DCR	0967-0	A	20	11,28	0,068	0	,5	15,49	53,3			
С	DCR	01447-	DA	20	12,94	0,051	0	,4	15,49	79,9	-		
C	DCR	0489-D	A	25	15,06	0,038	0	,3	9,48	26,7			
)	DCR	0969-D	A	25	17,16	0,029	0	,2	9,48	53,3	-		
)	DCR	01449-	DA	25	17,17	0,029	0	,2	9,48	79,9	-	*	
-	1												
Perform	iance o	urve	Perf	orn	nance detail	s Code	number se	election					
Syster	n diagi	ram	Value			Unit	Inlet	Outlet	Difference	Additio		-	
Sunto	met	aile	Pressu	ıre		bar	3,64	2 3,574	-0,06			king pressure (PS/MWP) gauge [bar] = operating temperature [°C]	46,00 70,0
Syste		0115	Tempe	erat	ure	°C	-7,	0 -7,2	0,	Minimum operating temperature [°C]=			
DCR (	967-	DA	Bubble	e po	oint temperatu	ire °C	-15,	5 -16,1	0,			degree [%]=	100,00 False
			Dew p	oin	t temperature	°C	-15,	0 -15,5	· -0,			ate= size inlet [mm]=	Open 20.00
	T		Densit	y		kg/m²	3 17,7	5 17,41	-0,351	Nomir	al s	size inlet [inch]=	0,75
	Т		Enthal	рy		kJ/kg	364,	7 364,7				ameter [mm]=	22,30
			Qualit	у		-	1,0	0 1,00	0,0	Nomir	al s	size outlet [inch]=	0,75
	L		Velocit	ty		m/s	15,4	9 15,80	0,3			iameter [mm]=	22,30
										DIN-B Suggest	N Bu ed c	dering ODF. Size: 7/8" utt weld. Size: 20 t=2,3 mm connection: utt weld. Size: 20 t=2,3 mm	

Notice that the performance details are presented for the selected product only. You can click on any of the products in the list and see the calculations for the selected product.

#### 10 Adding a new tab

You can add a new tab for any new selection by clicking the "+ New" tab on the top next to your existing tabs:



NB! Note that Coolselector<sup>®</sup>2 keeps your operating conditions for the system based on your selection in the previous tab.



## 11 Saving your project

To save the project, open File | Save Project... or click "Ctrl+S" on the keyboard. You will then be asked for the name and the location of your project:

🔆 Save As				×
Save in:	CS2 Projects	~	G 🤌 📂 🖽 -	
-	Name		Date modified	Туре
Quick access		No items match your s	earch.	
Desktop				
-				
Libraries				
This PC				
<b>S</b>				
Network	<			>
	File name:	Simple Selection.csprj	~	Save
	Save as type:	Coolselector2 project (*.csprj)	~	Cancel
				lh

You can also use the "Save Project As..." option to save it with a different name or "Save and Send..." option to save and send it to a customer or a colleague.

#### 12 Loading a saved project

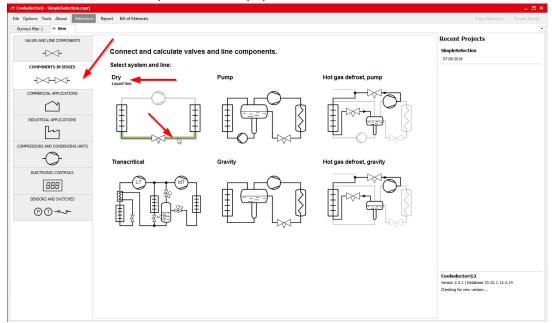
You can load the previously saved project from the menu "File | Open Project"... or by clicking "Ctrl+O" on the keyboard.



🏵 Open				×
Look in:	CS2 Projects	~	🌀 🏂 📂 🛄~	
	Name		Date modified	Туре
Quick access	SimpleSelecti	on.csprj	07-08-2018 13:06	Danfoss C
Desktop				
Libraries				
_				
This PC				
<b>1</b>				
Network	<			>
	File name:	SimpleSelection.csprj	$\sim$	Open
	Files of type:	Coolselector2 project (*.csprj)	~	Cancel
				14

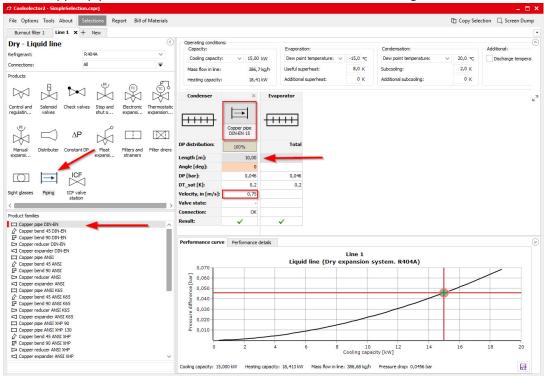
#### 13 Selection of components in series

To calculate on components in series, first, create a new tab and select the option "Components in Series" and then the liquid line in a dry system:



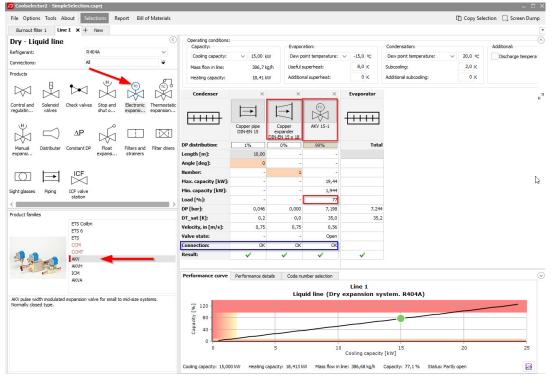
Now you need to add the components to the line. To do so, first you need to select the functionality you would like to add to the line, and then double click on the family or drag the family and drop it in the location that you need it.





#### Add a Copper pipe with DIN-EN connection to the line and set its length to one meter:

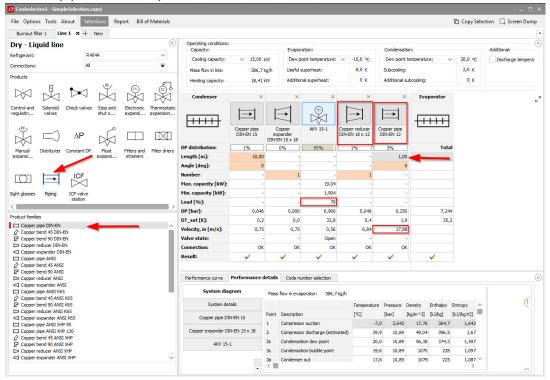
Now you need the AKV electronic expansion valve:



Notice that Coolselector<sup>®</sup>2 automatically added a "Copper expander DIN-EN 15 × 18" between the two components. The software recognizes the material of the piping as well as the connection sizes and standard between two components. When two connections do not match, it adds the required expander/reducer between the two componets for common cases, or informs you in the row shown by the blue triangle and you can fix the connection problem manually by adding an expander/reducer from the proper family in the piping function.



#### Now the pipe after the expansion valve:

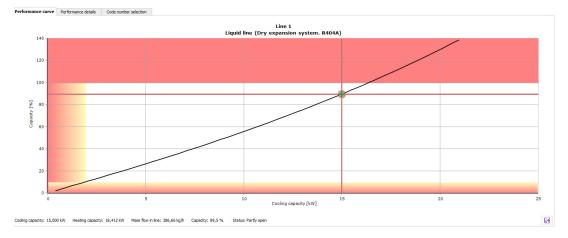


As can be seen, there are no warnings in the selected pipe, since the expansion is happening entirely in the expansion valve.

It is also interesting to notice that the load for the AKV valve has increased. This is due to the fact that the added pipes after the valve increase the pressure drop and hence the opening load of the valve increases. Additionally, as can be seen, the target criteria for the pipe suggestion after the expansion valve are clearly different to the one before the expansion valve.

Correct selection of an AKV valve or any other pulse modulated valve requires extra care, so please be sure to pay close attention to your selection criteria, before making your selection.

The benefit of using components in series, is that in this case, Coolselector<sup>®</sup>2 calculates components one after another. Furthermore, you can see the collective effect on the performance curve for the components in the liquid line and the need for an expander/reducer if you want to select the suggested components. The detailed calculation of each component with the right inlet condition as shown by numbers 1-5 on the snippet can also be extracted.





	Mas	s flow in evaporator: 386,7 kg/h					
System details			Temperature	Pressure	Density	Enthalpy	Entropy
Copper pipe DIN-EN 15	Point	Description	[°C]	[bar]	[kg/m^3]	[k]/kg]	[k]/(kg·K)]
	1	Compressor suction	-7,0	3,642	17,76	364,7	1,642
Copper expander DIN-EN 15 x 18	2	Compressor discharge (estimated)	39,9	10,89	49,04	396,5	1,67
AKV 15-1	2s	Condensation dew point	20,0	10,89	56,38	374,3	1,597
	3s	Condensation bubble point	19,6	10,89	1070	228	1,097
Copper reducer DIN-EN 18 x 12	3a	Condenser out	17,6	10,89	1079	225	1,087
Copper pipe DIN-EN 12	3	Including additional subcooling	17,6	10,89	1079	225	1,087
	4	After expansion valve	-15,4	3,642	68,81	225	1,1
	4s	Evaporation bubble point	-15,6	3,642	1208	178,9	0,9214
	1s	Evaporation dew point	-15,0	3,642	18,57	357,4	1,614
	1a	Evaporator out	-7,0	3,642	17,76	364,7	1,642

Note that if you need to replace components in the line, you can do so by simply dragging the component to the preferred position and dropping it there.

The suggestions for components in series calculation use the default selection targets and values in Coolselector<sup>®</sup>2. However, if you want to select another component from the same family, you can do so by clicking on the icon of the component in the line and choosing the preferred one in the pop-up menu. In this case, as a good design practice, it is better to avoid having a reducer after the expansion valve. To do so, you can simply remove the reducer using the close sign on the top right-hand side of the reducer and select the size of the pipe which fits the expansion valve outlet:

Condenser	×	×	×		X	×	Evaporator	2 Select	ion: Copper	pipe D	IN-EN 18				-	. 🗆 :
		$ \rightarrow $	тс				2	Selected	Туре	NS	DP [bar]	DT_sat [K]	DP [K/m]	Velocity, in [m/s]	Velocity, out [m/s]	Result
	E		$\bowtie$		4/1		<del></del>	0	DIN-EN 8	8	2,714	16,7	16,677	19,72	55,21	-
<u></u>	Copper pipe	Copper	AKV 15-1	Copper re		Copper pipe		0	DIN-EN 10	10	0,704	5,0	5,046	23,26	31,05	-
	DIN-EN 15	expander DIN-EN 15 x 18		DIN-EN 18	3 × 12	DIN-EN 12		0	DIN-EN 12	12	0,250	1,9	1,869	17,88	19,88	4
OP distribution:	1%	0%	95%	1%		3%	Total	0	DIN-EN 15	15	0,075	0,6	0,569	11,39	11,76	-
Length [m]:	10,00	-				1,00	3	0	DIN-EN 16	16	0,053	0,4	0,406	9,91	10,14	-
Angle [deg]:	0	-	-			0		•N	DIN-EN 18	18	0,029	0,2	0,222	7,67	7,76	- 🗸
lumber:		1	-	V		-	-	0 "	DIN-EN 22	22	0,011	0,1	0,081	4,95	4,97	- 🗸
1ax. capacity [kW]:	12	-	19,04	X		-		0	DIN-EN 28	28	0,004	0,0	0,029	3,17	3,18	-
fin. capacity [kW]:	-		1,904			-		0	DIN-EN 35	35	0,001	0,0	0,010	1,94	1,94	-
.oad [%]:	15		79					0	DIN-EN 42	42	0,001	0,0	0,004	1,31	1,31	
DP [bar]:	0,046	0,000	6,900		0,049	0,250	7,244	0	DIN-EN 54	54	0,000	0,0	0,001	0,79	0,80	-
DT_sat [K]:	0,2	0,0	32,8		0,4	1,9	35,2	0	DIN-EN 64	64	0,000	0,0	0,001	0,55	0,55	-
/elocity, in [m/s]:	0,75	0,75	0,56		6,84	17,88		0	DIN-EN 76	76,1	0,000	0,0	0,000	0,38	0,38	-
Valve state:	1.5		Open			-		0	DIN-EN 89	88,9	0,000	0,0	0,000	0,28	0,28	-
Connection:	ОК	ОК	OK		QK	ОК		0	DIN-EN 108	108	0,000	0,0	0,000	0,19	0,19	-
Result:	~	×	×	1 1	V	1	~									

You can see the share of each component on the pressure drop on top of the calculation details. As you can see, the connections fit and, furthermore, the pressure drop after the expansion valve is reduced significantly and is happening correctly in the AKV valve. You can also see the relevant calculation details such as min and max capacity in the details.

Condenser	×	×	×	×	Evaporator
<del></del>	Copper pipe DIN-EN 15	Copper expander DIN-EN 15 x 18	AKV 15-1	Copper pipe DIN-EN 18	- <del></del>
DP distribution:	1%	0%	99%	0%	Total
Length [m]:	10,00	-	-	1,00	
Angle [deg]:	0	-	-	0	
Number:	-	1	-	-	
Max. capacity [kW]:			19,40	-	
Min. capacity [kW]:	-	-	1,940	-	
Load [%]:		-	77	· -	
DP [bar]:	0,046	0,000	7,169	0,029	7,244
DT_sat [K]:	0,2	0,0	34,8	0,2	35,2
Velocity, in [m/s]:	0,75	0,75	0,56	7,67	
Valve state:	-	-	Open	-	
Connection:	ОК	OK	OK	OK	
Result:	<ul> <li>Image: A second s</li></ul>	<ul> <li>Image: A set of the set of the</li></ul>	<ul> <li>Image: A second s</li></ul>	<b>V</b>	<ul> <li>Image: A set of the set of the</li></ul>

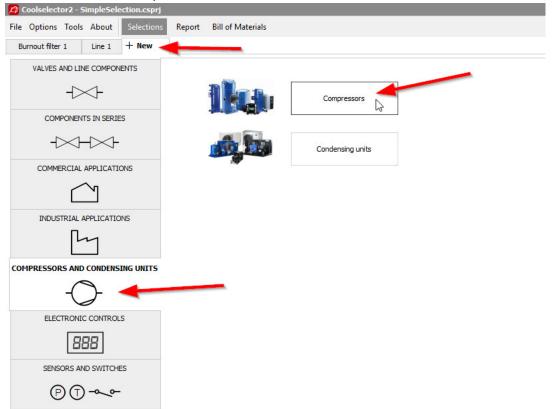


#### 14 Compressor selection

To select a compressor for a system, we will use the following requirements:

- 1. Application: Refrigeration
- 2. Power supply: 50 Hz
- 3. Refrigerant: R404A
- 4. All compressor types.
- 5. Fixed speed

To begin selection, create a new tab and choose the option "Compressors and condensing units". Then select "Compressors".



Check the operating conditions are set to:

Required capacity:	Evaporation:			Condensation:	
Cooling capacity: V 15,00 kW	Dew point temperature: $\checkmark$	-15,0	c	Dew point temperature: $\checkmark$	20,0
Show all models	Useful superheat:	8,0	(	Subcooling:	2,0
● Show: 11	Additional superheat:	0	c	Additional subcooling:	0
Rating conditions:	Return gas temperature:	-7,0	c	Total subcooling:	2,01
Custom 👻				Liquid temperature:	17,6

Set the application criteria as they were specified in the beginning of this section:

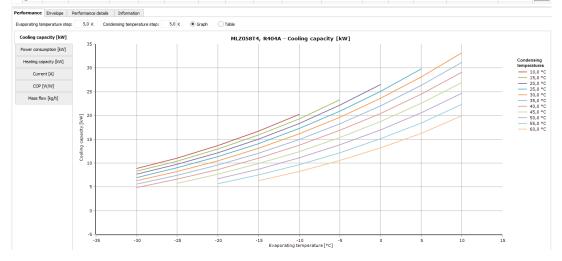
- 1. Application: Refrigeration
- 2. Power supply: 50 Hz
- 3. Refrigerant: R404A
- 4. All compressor types.
- 5. Fixed speed



Application: Refrigeration Low temperature, LT Medium temperature, MT Air conditioning
Refrigerant:
R404A
Power supply:
*: for dual frequency voltage
Compressor types: Reciprocating Scroll Fixed speed Fixed speed
Variable speed Variable speed

#### Coolselector<sup>®</sup>2 now suggests MLZ058T4 as the best possible match:

Selected	Model	Technology	Configuration	Refrigerant	Capacity control	Speed [rpm]	Cooling [kW]	Heating [kW]	COP cooling [W/W]	COP heating [W/W]	Power [kW]	Current [A]	Frequency [Hz]	Power supply	Mass flow [kg/h]	Mate
)	MLZ048T2A	Scrol	l Single	R404A	Fixed speed	2900	12,70	15,67	4,27	5,27	2,974	12,26	50	200 - 220 V 3 ph	327,3	8
)	MLZ048T4	Scrol	l Single	R404A	Fixed speed	2900	12,77	15,66	4,42	5,42	2,888	7,468	50	380 - 400 V (415 V) 3 ph*	329,3	8
С	MLZ048T4	Scrol	l Single	R404A	Fixed speed	2900	12,77	15,66	4,42	5,42	2,888	7,468	50	380 - 400 V (415 V) 3 ph*	329,3	8
С	MLZ048T4A	Scrol	l Single	R404A	Fixed speed	2900	12,77	15,66	4,42	5,42	2,888	7,468	50	380 - 400 V (415 V) 3 ph*	329,3	8
С	MLZ048T4A	Scrol	l Single	R404A	Fixed speed	2900	12,77	15,66	4,42	5,42	2,888	7,468	50	380 - 400 V (415 V) 3 ph*	329,3	8
۲	MLZ058T4	Scrol	l Single	R404A	Fixed speed	2900	15,03	18,57	4,24	5,24	3,541	8,595	50	380 - 400 V (415 V) 3 ph*	387,3	3 10
C	MLZ058T4A	Scrol	l Single	R404A	Fixed speed	2900	15,03	18,57	4,24	5,24	3,541	8,595	50	380 - 400 V (415 V) 3 ph*	387,3	3 10
0	MLZ058T4A	Scrol	l Single	R404A	Fixed speed	2900	15,03	18,57	4,24	5,24	3,541	8,595	50	380 - 400 V (415 V) 3 ph*	387,3	3 10

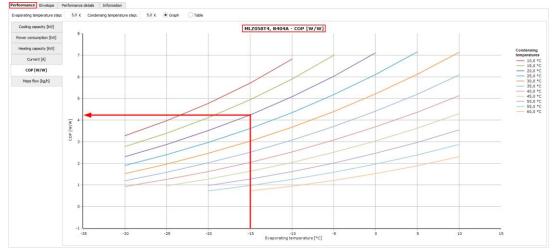


The suggested compressor can achieve the requirement for this cycle and match the demand. You can check that in the last column which indicates the match of the compressor to the given operating conditions.

You can check the details about the compressors in the list on the performance tab in the product performance and information segment. To check the COP at the working conditions, choose the performance tab, then select the COP. Now you can check the COP for the



#### compressor on working conditions:



You can also check the COP at this exact working condition in the selection segment:

Selected	Model	Technology	Configuration	Refrigerant	Capacity control	Speed [rpm]	Cooling [kW]	COP cooling [W/W]	Heating [kW]	COP heating [W/W]	Power [kW]	Current [A]	Frequency [Hz]	Power supply	Mass flow [kg/h]	Match
0	MLZ048T4A	Scroll	Single	R404A	Fixed speed	2900	12,77	4,42	15,66	5,42	2,888	7,468	50	380 - 400 V (415 V) 3 ph*	329,3	85%
0	MLZ048T4A	Scroll	Single	R404A	Fixed speed	2900	12,77	4,42	15,66	5,42	2,888	7,468	50	380 - 400 V (415 V) 3 ph*	329,3	85%
۲	MLZ058T4	Scroll	Single	R404A	Fixed speed	2900	15,03	4,24	18,57	5,24	3,541	8,595	50	380 - 400 V (415 V) 3 ph*	387,3	100%
0	MLZ058T4A	Scroll	Single	R404A	Fixed speed	2900	15,03	4,24	18,57	5,24	3,541	8,595	50	380 - 400 V (415 V) 3 ph*	387,3	100%
0	MLZ058T4A	Scroll	Single	R404A	Fixed speed	2900	15,03	4,24	18,57	5,24	3,541	8,595	50	380 - 400 V (415 V) 3 ph*	387,3	100%

#### 15 Understanding superheat

Some superheat is required for the refrigerant at the compressor inlet to ensure avoidance of liquid droplets in the compressor.

The useful superheat is the superheat inside the evaporator which contributes to the cooling capacity. However, a very high useful superheat decreases the evaporator efficiency as well as the density at the evaporator outlet which results in higher compressor consumption. This value is set to 8 K by default in Coolselector<sup>®</sup>2.

Additional superheat happens after the evaporator in the suction line. A longer length of the suction line would result in a higher additional superheat. This is set to zero by default as it is highly affected by the length and size of the suction line which is not provided to Coolselector<sup>®</sup>2. However, you should try to provide an accurate value or estimation for a good selection.

If you change the additional superheat to 5 K, the suggested compressor in Coolselector<sup>®</sup>2 will change to MLZ058T2, which allows a slightly higher volumetric flow rate to support the given cooling capacity.

The reason is that increasing the useful superheat would result in decrease of density after the suction line at the compressor inlet. The mass flow rate required for the cooling capacity would be the same (you can check that in the performance details tab), but a lower density means a higher volumetric flow rate which results in demand for a slightly larger compressor. Another important aspect regarding additional superheat is the discharge temperature which can be affected significantly and would affect selection of components in the discharge line, as well as compressors or condensing units.

Hence providing additional superheat correctly is important for proper selection and suggestion.



### 16 Electronic controller selection

To select a controller for our system, we will use the following requirements:

- 1. Expansion Valve Type: EEV AKV
- 2. Number of Compressors: Single compressor
- 3. Communication: MOD bus

To begin selection, create a new tab and choose the option "electronic controls". Then select "case controllers":

🛱 Coolselector2 - Si	mpleSele	ction.csprj									
File Options Tools	About	Selections	Report	Bill of Ma	terials						
Burnout filter 1	Line 1	Compresso	ors 1	+ New							
		ENTS				Case controllers					
COMPONENTS	S IN SERIE	s		*55 Å	11.1 WA						
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ELECTRONIC	CONTROL	5									
88	18										
SENSORS AND	SWITCHE	S									
PO	<u>م</u> ره										

If you apply the requirements in the selection criteria segment, Coolselector<sup>®</sup>2 will suggest the controllers that can satisfy the requirements:





You can add additional criteria such as the "Dual case sections" requirement in the "Refrigeration System" section:

Burnout filter 1 Line 1 Compressors 1	Case controller 1 × + New
The Depand All         The Collapse All           Image: Collapse All         Image: Collapse All <t< td=""><td>e<sup>7</sup></td></t<>	e <sup>7</sup>
EEV 0-10V  Refrigeration System  Single evaporator  OC2 systems  Up to 4 evaporators  Dup to 4 evaporators  Number of Compressors  Number of Compressors  Single compressors  Single compressors	Number of Compressors     Single compressors     Control Features: Electrical defrost, Fan c     Digital Inputs: Retransmission of conta     Communication: MOD bus: Card     Mounting: DIN Rail
Compressors     Control Features     Digital Inputs     Communication     MoD bus     Dis     LON bus     Dis     You Mounting     Software Functionality	

As is evident from above, Coolselector<sup>®</sup>2 suggests the AK-CC 550B as the best matched alternative for the given selection criteria.

#### 17 Creating a report

Now, after going through the selections and calculation phase, we will create a report.

View the report by clicking on "Report" in the menu bar of Coolselector<sup>®</sup>2. This opens the report section:

パ Coolselector2 - SimpleSelection.csprj		_ = ×
File Options Tools About Selections Report Bill of Materials		Copy Selection Screen Dump
🚔 Print	PDF         Export         ▼         I	
√ Update	A hor Export V N V V V V V V V V V V V V V V V V V	
Project information:	October la start	Danfoss
Project name:	Coolselector2	
Comments:	Project information	
	Project name:	
Created by:	Comments:	
	Created by:	
Items to include in report:	Coolselector2 version: 2.3.2. Database: 34.34.1.13.3.15	
Select All	Printed: 8. august 2018	
	Preferences used: All applications	
Deselect All		
Burnout filter 1	Burnout filter: Burnout filter 1	
B- ✓ Line 1 B- ✓ Compressors 1	On section a secondition of	
Compressors 1	Operating conditions Refrigerant: R404A Cooling capacity:	15.00.111
	5 1 5	15,00 kW
	Mass flow in line: 386,7 kg/h Heating capacity: Evaporating dew point temperature: -15,0 °C Condensing dew point temperature:	18,41 kW 20,0 °C
	Evaporating dew point temperature: -15,0 °C Condensing dew point temperature: Evaporating pressure: 3,642 bar Condensing pressure:	10.89 bar
	Evaporating pressure: 5,642 bar Condensing pressure. Evaporating mean temperature: -15,2 °C Subcooling:	2.0 K
	Useful superheat: 8,0 K Additional subcooling:	0 K
	Additional superheat: 0 K	U IX
	Discharge temperature: 39,9 °C	
	System and line: Dry expansion system. Suction line	
	Selection criteria: Velocity: 12,00 m/s	
	Selection: DCR 0489-DA	
		×



The segment for the project information will be blank if you did not enter this information before (in the settings). You can fill this in and modify the report to suit your requirements, the following steps will show you how.

1. To add your name to Coolselector<sup>®</sup>2, open "Options | User, Language and Country ..." and then add your name and click "OK"

Ele Options     Selections     Report     Bill of Materials     Copy Selection     Servern Dump       Units     Print     Prop     Export     NI     NI     NI     Print     Print       Voids     Syle_     Propert vial     NI     NI     NI     Print     Definition       Project mane:     Coolselector2     Definition     Viewer, Language and Country     X	2 Coolselector2 - SimpleSelection.csm		- ¤ ×
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Use, Language and Country	Print .	1 PDF Export ▼ 🕅 4 🕨 🕅 🔍 100% ∨ 🔍	Page 1 of 7
Prok Style Project name: Connents: User, Language and Country X			<b>^</b>
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		Default name used in reports:	
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Dereket All Star Collapse All Country Dermark V	Deselect All		
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Case controller 1 Enable selection of non-standard products: 15.00 kW		Enable selection of non-standard products:	15.00 kW
User name: 18,41 kW		User name:	
Password: emperature: 20,0 °C		Password:	emperature: 20,0 °C
Non-standard products will be shown in brackets 10,89 bar		Non-standard products will be shown in brackets	
2.0 K			
OK Cancel OK		OK Cancel	U K
ersenarge temperature, satja e			
System and line: Dry expansion system. Suction line			
Selection criteria: Velocity: 12,00 m/s		Selection criteria: Velocity: 12,00 m/s	
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Selection: DCR 0489-DA		Selection: DCR 0489-DA	
			¥

Now your name should be on the report preview section. You can also add a project name. After that, click "Update" to update the report preview:

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oject information: roject name:		Coolselector2			Danfoss	
Simple Selection		COUISEIECIUIZ		C		
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reated by:		Comments:				
Janfoss	1	Created by: Danfoss				
ns to include in report:			atabase: 34.34.1.13.	3.15		
		Printed: 8. augus	t 2018			
-		Preferences used: All applie				
Deselect All						
Burnout filter 1		Burnout filter: Burnout filter				
V Line 1						
Compressors 1		Operating conditions				
✓ Case controller 1		Refrigerant:	R404A	Cooling capacity:	15,00 kW	
		Mass flow in line:	386,7 kg/h	Heating capacity:	18,41 kW	
		Evaporating dew point temperature:	-15.0 °C	Condensing dew point temperature:	20.0 °C	
		Evaporating pressure:	3,642 bar	Condensing pressure:	10,89 bar	
		Evaporating mean temperature:	-15.2 °C	Subcooling:	2.0 K	
		Useful superheat:	8.0 K	Additional subcooling:	0 K	
		Additional superheat:	0 K	riaditional objectioning.		
		Discharge temperature:	39.9 °C			
			system. Suction lin	10		
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				4 H		
				×1,		
		Selection: DCR 0489-DA				

2. You can add/remove included information in the report. To do so, click on the "+" sign beside each list to see the available options, or click on the "Collapse all"

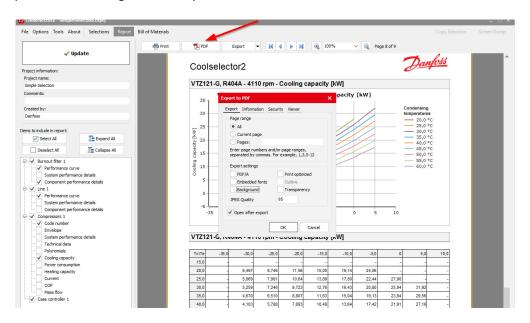


button. Add the required fields and click update and check the result. Note that each list belongs to one tab on your "Selections" section:

•	out Selections Report	Bill of Materials											
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imple Selection			V 12121	-G, R404A -	4110 rpm -	Cooling o	capacity	[KVV]					
mments:			35 -	VTZ121-G,	R404A - 41	10 rpm -	Cooling	capacity	[kW]				
eated by:			55								Condensing		
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Component perf	ormance details		5-										
✓ Line 1			0-				-						
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Polynomials				-35.0 -3	0.0 -25.0	-20.0		-10.0					
✓ Cooling capacity			Tc\Te	-35,0	0,0 -25,0	-20,0	-15,0	-10,0	-5,0	0	5,0	10,0	
Power consumpt			15,0	-		-	-	-	-	-	-		
Heating capacity			20,0		497 8,746	11,56	15,00	19,14	24,06	-	-		
Current COP			25,0		869 7,991	10,64	13,89	17,80	22,44	27,90	-		
Mass flow			30,0		259 7,246	9,723	12,76	16,43	20,80	25,94	31,92		
✓ Case controller 1			35,0		6,510	8,807	11,63	15,04	19,13	23,94	29,56		
			40,0		103 5,788	7,893	10,49	13,64	17,42	21,91	27,16		
			45,0		559 5,079	6,983	9,341	12,22	15,70	19,84	24,71		
			50.0	- 3	4,386	6,080	8,193	10,79	13,95	17,74	22,23	-	
				-									
			55,0	-	- 3,713	5,186 4,307	7,044	9,356 7,917	12,19	15,62 13,49	19,72 17,18	-	



3. Click the "PDF" button at the top of the report preview to export your report as a PDF. You have multiple options for your exported PDF, such as printing specific pages in the report, adding extra information, or securing your pdf file with a password. Investigate those options for further details.



You will then be asked for the name and the location of the document and you can click "save". If you selected the option "Open after export", the report will then automatically open.

#### 18 Selecting a code number

Coolselector<sup>®</sup>2 will enable you to select the relevant code numbers for the selected products. Depending on the product type, this code number can be accessed/modified differently.

If you are currently in the 'report' (following section 17), first, go to the "Selections" section by clicking on the "Selections" button in the menu bar (see "1" in the snippet below).

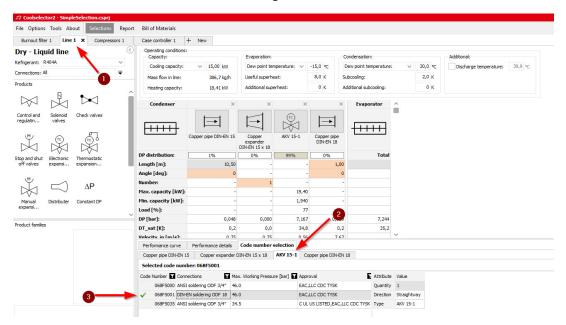
Next, go to any open tab (in this case "Burnout filter  $1^{"}$  – see "2" in the snippet below) and select the tab for code number selection ("3" in the snippet below). Then select the proper casing and filters. E.g. in an example with a burnout filter, we would like to have the DIN connection casing with copper connection to match our installation and a pack of 8 filter cores:

#### Coolselector<sup>®</sup>2 User Guide



	1 × Line 1	Compressors 1	Case co	ntroller 1 +	New												
stem Dry		~ @		ting conditions: acity:				oration:		Conder				ditional:			
k on diagrum	to select line:	\						oration: point temperat			oint tempe						
ected line:	<b>Fuction line</b>	1		ing capacity:		5,00 kW								Discharge to	emperature: 39	9 °C	
				flow in line:		386,7 kg/h		ul superheat:	8,0 K		-		2,0 K				
	-2		Heati	ing capacity:	1	18,41 kW	Addit	ional superheat	. 0 к	Addition	nal subcoo	ling:	0 К				
ΓT Ι			Selection	on criteria:													
±		11	OPre	ssure drop:	0	,050 bar	◯ Sat	uration tempera	ture drop:								
+		+	• Vel	ocity:	1	2,00 m/s		0,1 K									
		1T	Suction in	ne (Dry expansion	system.	R404A, Burn	out filter)										
	EV.	7		n: DCR 0489-D/				rs: (023U7268	3, 023U5381)								
			Selected	Туре	NS K	/ [m^3/h] D	P [bar]	DT_sat [K] Ve	locity, in [m/s] Aci	d capacity [g]	Result						
gerant:	R404A	~	0	DCR 0967-DA	20	11,28	0,068	0,5	15,49	53,3	1						
ections:	All	¥	0	DCR 01447-DA	20	12,94	0,051	0,4	15,49	79,9	1						
uct families			۲	DCR 0489-DA	25	15,06	0,038	0,3	9,48	26,7	1						
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move acid a Molecular s			02 02 02 Selection	23U7053 ANSI Bu 23U7285 ANSI so 23U7252 DIN-EN	tt weld 1 dering O soldering	" Sch. 80. Af DF 1 1/8" ODF 28	VSI solder		DCR 0489 DCR 0489s	Steel Copper			4 57024283 57024283	102466 149614	Common values		
emove acid a % Molecular s		6	02 02 02 Selection Code Nur	23U7053 ANSI Bu 23U7285 ANSI so 23U7252 DIN-EN n: 48-DA mber <b>1</b> Quantity	tt weld 1 dering O soldering	" Sch. 80. Al DF 1 1/8" ODF 28	VSI solder		DCR 0489 DCR 0489s	Steel Copper			4 57024283 57024283	102466 149614	Attribute	Value	_
remove acid a % Molecular s		5>	Selection Code Nur ✓ 02	23U7053 ANSI Bu 23U7285 ANSI so 23U7252 DIN-EN	tt weld 1 dering O soldering r T EAI 570	" Sch. 80. Af DF 1 1/8" ODF 28	ISI solder		DCR 0489 DCR 0489s	Steel Copper			4 57024283 57024283	102466 149614	Attribute Gasket induded		_

Then go to the tab for liquid-line calculation and select the code number for the AKV valve. E.g. we select the one with DIN-EN connection again to match our selection:



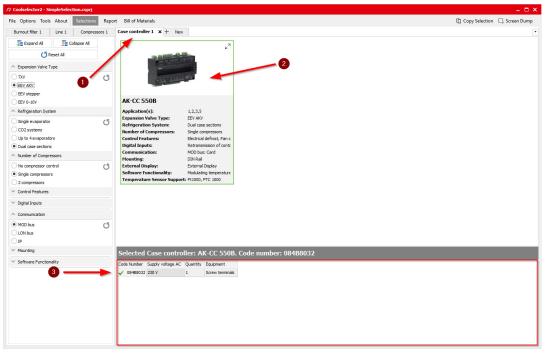
Now, for the compressor code number you need to go the "Information" tab, where you can select the code number and also see other information about the compressor, including the



#### spare parts available for the compressor:

File Options Tools About Selections Report	Bill of Materials								Co Co	py Selection	🗒 Screen Dun
Burnout filter 1 Line 1 Compressors 1 ×	Case controller 1 + M	lew									
5 Select compressor:			21 22			0 2 2					
Application:	Required capacity:		Evaporation:			Condensation					
✓ Refrigeration Heating	Cooling capacity:	✓ 15,00 kW	Dew point temperat	ure: V	-15,0 °C	Dew point te	emperature: v	20,0 °C			
✓ Low temperature, LT	Show all models		Useful superheat:		8,0 K	Subcooling:		2,0 K			
✓ Medium temperature, MT	Show:	11 C models	Additional superheat	:	0 K	Additional sub	pcooling:	0 К			
Air conditioning	ating conditions:		Return gas temp	erature:	-7,0 °C	Total subcool	ina:	2,0 K			
Refrigerant:	Custo	m 👻				Liquid temper	-	17.6 °C			
R404A 👻											
Power supply:	Selection: VTZ121-G, R404	A - 4110 rpm									
50 Hz     60 Hz     DC	Selected Model	Technology Co	nfiguration Refrigerant	Capacity control S	Speed [rpm] (	Cooling [kW] CO	OP cooling [W/W] Heating	[kW] COP	heating [W/W]	Power [kW] O	urrent [A] Fre
	O MLZ048T4A	Scroll	Single R404A	Fixed speed	2900	12,77	4,42	15,66	5,42		7,468
		Reciprocating	Single R404A	Variable speed	5400	14,40	2,83	19,14	3,76		8,218
: for dual frequency voltage		Reciprocating	Single R404A	2 jable speed	4110	15.00	2,65	20.25	3,58		9.067
Compressor types:	0 VTZ121-G	Reciprocating	Single R49	Variable speed	1800	6,343	2,76	8,484	3,69	2,302	4,225
Reciprocating Scroll	O VT7121/G	Derinroration	Sinda Danas	Variable meed	2100	7 472		0 079	3 70		4 854
✓ Fixed speed ✓ Fixed speed	<										)
✓ Variable speed ✓ Variable speed	Performance Envelope	Performance details	Information								
Product filters:											
	Select code number:		Information								
Discontinued models	Select code number: Select Code number M			v							
Discontinued models	Select Code number M		g format Packing quantit	у							
Discontinued models	Select Code number M	todel number Packing TZ121AGNR 1B Single p	g format Packing quantit					Selecter	d spare parts (do	uble-dick will rem	ove from Repor
Discontinued models	Select Code number M      12080004 V      Spare parts	todel number Packing TZ121AGNR 1B Single p	g format Packing quantit pack 1			^		Selecte: Type	l spare parts (do Description		ove from Repor
Discontinued models	Select Code number M 120B0004 V	Iodel number Packing TZ121AGNR1B Single p Available spare parts (dr	g format Packing quantit pack 1 puble-click will add to Repor	t):		Â	Add to Report ->				ove from Repor
Discontinued models	Select Code number M      12080004 V      Spare parts	lodel number Packing TZ121AGNR1B Single p Available spare parts (dr Type	g format Packing quantit pack 1 puble-click will add to Repor Description	t): cylinder compressor			Add to Report ->				ove from Repor
Discontinued models	Select Code number M	todel number Packing TZ121AGNR1B Single p Available spare parts (dr Type Acoustic hood	g format Packing quantit aack 1 ouble-dick will add to Repor Description Acoustic hood for two-	t): cylinder compressor cylinder (UL-approve	ed)		Add to Report -> Remove from report				ove from Repor
Discontinued models	Select Code number M 12080004 V Spare parts Dimensions	todel number Packing TZ121AGNR1B Single p Available spare parts (dr Type Acoustic hood Acoustic hood 2	p format Packing quantit pack 1 ouble-dick will add to Report Description Acoustic hood for two- Acoustic hood for two-	t): cylinder compressor cylinder (UL-approve ater, 65 W, 400 V, 6	ed) CE mark, UL						ove from Repor
Discontinued models	Select Code number M	todel number Packing TZ121AGNR1B Single p Available spare parts (dr Type Acoustic hood Acoustic hood 2 Belt 09	p format Packing quantit pack 1 Deuble-click will add to Repor Description Acoustic hood for two- Acoustic hood for two- Belt type cranicase he	t): cylinder compressor cylinder (UL-approve ater, 65 W, 400 V, 6	ed) CE mark, UL						ove from Repor
Discontinued models	Select Code number M Display 2080004 V Spare parts Dimensions Electrical Specifications Mechanical Connections Of Data	Iddel number Packing TZ121AGNR 1B Single p Available spare parts (dr Type Acoustic hood Acoustic hood 2 Belt 09 Belt 11	p format Packing quantit pack 1 Deuble-click will add to Repor Description Acoustic hood for two- Acoustic hood for two- Belt type cranicase he	t): cylinder compressor cylinder (UL-approve ater, 65 W, 400 V, 6	ed) CE mark, UL						ove from Repor
Discontinued models	Select Code number M © 12080004 V Separe parts Dimensions Electrical Specifications Mechanical Connections	Available spare parts (d) Type Acoustic hood Acoustic hood 2 Belt 11 Converter 1	p format Packing quantit pack 1 Deuble-click will add to Repor Description Acoustic hood for two- Acoustic hood for two- Belt type cranicase he	t): cylinder compressor cylinder (UL-approw teter, 65 W, 400 V, 0 teter, 65 W, 460 V, 0	ed) CE mark, UL CE mark, UL						ove from Repor
Discontinued models	Select Code number M Display 2080004 V Spare parts Dimensions Electrical Specifications Mechanical Connections Of Data	Available spare parts (d) Type Acoustic hood Acoustic hood Acoustic hood Acoustic hood Belt 11 Converter 1 Converter 2	y format Padding quantit aack 1 Description Acoustic hood for two- Acoustic hood for two- Acoustic hood for two- Belt type crankcase he Belt type crankcase he	t): cylinder compressor cylinder (UL-approv ater, 65 W, 400 V, c ater, 65 W, 230 V, c	ed) CE mark, UL CE mark, UL						ove from Repor
Discontinued models	Select Code number M Description of the selection of the	Avalable spare parts (d Type Acoustic hood Acoustic hood Acoustic hood 2 Belt 01 Converter 1 Converter 2 Converter 2	g format Packing quantit pack 1 Description Acoustic hood for two- Acoustic hood for two- Belt type crankcase he Belt type crankcase he Belt type crankcase he	t): cylinder compressor cylinder (UL-approv ater, 65 W, 400 V, c ater, 65 W, 230 V, c	ed) CE mark, UL CE mark, UL						ove from Repor
Discontinued models	Select Code number M Description of the selection of the	Available spare parts (d Type Acoustic hood Acoustic hood	a format Packing quantit back 1 back 1 back 4 back	t): cylinder compressor cylinder (UL-approv atter, 65 W, 400 V, 6 ster, 65 W, 230 V, 6 atter, 65 W, 230 V, 6 ark, UL	ed) CE mark, UL CE mark, UL CE mark, UL						ove from Repor
	Select Code number M Description of the selection of the	Indel number Padong T2121AGRR18 Single p Type Acoustic hood Acoustic hood Acoustic hood Acoustic hood Belt 11 Converter 1 Converter 2 Carkcase heater Carkcase heater	a format Packing quantit pack 1 Description Acoustic hood for two- Acoustic hood for two- Acoustic hood for two- Belt type crankcase he Belt type crankcase he PTC heater 27W, CB Gasket, 1:1/4*	t): cylinder compressor cylinder (UL-approv ater, 65 W, 400 V, 0 ater, 65 W, 400 V, 0 ater, 65 W, 230 V, 0 ark, UL (4" rotolock, 3/4" O	ed) CE mark, UL CE mark, UL CE mark, UL						ove from Repor

And for the case controller the code number is just visible after you click on your selected controller:



#### 19 Bill of materials

After you have selected the relevant code numbers for the products in your Coolselector<sup>®</sup>2 project, you can check out the bill of materials. You just need to click on the "Bill of Materials" button in the menu bar:



File Options Tools About Selections Report Bill of Matchiels Copy Selection   Project information:   Project name:   Simple Selection   Comments:   Created by:   Danfoss
✓ Update       Project information:       Project name:       Simple Selection       Comments:       Created by:       Danfoss       Project name:       Simple Selection       Comments:
Comments: Created by: Danfoss Project name: Simple Selection Comments: Simple Selection Comments:
Comments: Created by: Denfoss Comments: Commen
Created by: Danfoss Version 2.3.3   Database 35.35.1.14.3.16 Project name: Project name: Comments:
Danfoss Project name: Simple Selection Comments:
Denfoss Project name: Simple Selection Comments:
Comments:
Created by: Danfoss
Printed: 18. September 2018
Preferences used: All applications
Quantity Product Description Code Type Code Sales number Price
Code numbers for Burnout filter: DCR 0489-DA
1 DCR 023U7268
1 48-DA 023U5381
Dry - Liquid line. Line 1
1 Electronic expansion valve: AKV 15.1 068F5001
1 Compressor VT2/21-G, R404A - 410 rpm. 12080004
1 AK-CC 5508. Application(s): 12.3,5 08488032

To include the piping, you just need to click on the option "include piping":

					1								
				Da	infoss								
Coc	lselector	3 <b>2</b>		0-									
Version	2.3.3   Database 35.35.1.1	4.3.16											
Project na	me:	Simple Selection											
Comments													
Created b	y:	Danfoss	Janfoss										
Printed:		18. September 2018											
Preferenc	es used:	All applications											
Quantity	Product [	Description	Code number	Type Code	Sales Price								
	Code numbers for Bu	rnout filter: DCR 0489-DA											
1	DCR		023U7268										
1	48-DA		023U5381										
	Dry - Liquid line. Line 1												
1	Copper pipe DIN-EN 15. L												
1	Piping: Copper expander												
1	Electronic expansion valv		068F5001										
1	Copper pipe DIN-EN 18. L												
1	Compressor: VTZ121-G,	-	120B0004										
1	AK-CC 550B. Application	(s): 1,2,3,5	084B8032										

To export the bill of materials as an Excel file, click on the "Excel" button at the top of the bill of materials preview. Then specify the destination and the name for the exported file:



Save As				>
Save in	: CS2 Project	s V	· 🗿 🎓 📂 🛄~	
-	Name		Date modified	Туре
Quick access		No items match yo	ur search.	
Quick Decess				
Desktop				
-				
Libraries				
This PC			×	
	<			>
Network	File name:	SimpleSelection	~	Save
	Save as type:	Excel files (* xls)	~	Cancel

#### 20 Customization - units and conversions

To convert all units in Coolselector<sup>®</sup>2 from the default international units to e.g. American or SI units is very simple. To change the unit system to e.g. American units, you simply need to select it in "Options | Units | American":

⊅ Coolse	elector2 - Simpl	eSelection.csprj														□ ×
<u>F</u> ile Opt	tions <u>T</u> ools <u>A</u> l	oout Selections Repor	rt Bill of I	Materials									🗋 Сору	Selection	Screen D	ump
Burn	Preferences	•		ontroller 1	+ New											-
Syste	Units	•	SI	5:												0
	User, Languag	e and Country	Internatio	onal		E	/aporation			Condensation:			Additional:			
Cicle	Style	✓	American	n	✓ 4,265	TR D	ew point t	temperature:	√ 5,0 %	Dew point temp	erature: 🗸 🗸	68,0 ºF	Discharge te	mperature:	103,9 ºF	
<b>7</b> –	style		Custom.		14,2	1 lb/min Us	eful super	heat:	14,4 ⁰≓	Subcooling:		3,6 ⁰₽				
С. н	(	<b>_</b>	Heat	ting capacity:	62,8	3 kBTU/h Ad	ditional su	perheat:	0 %	Additional subcod	ling:	0 %F				
- r±			Colocti	ion criteria:												
17		IT I			0.7			temperature d								
1±				essure drop:	0,73				rop:							
ц		Ψ	• Ve	locity:	39,33	ft/s	0,2	9F								
		$\swarrow - \square$		ine (Dry expans												×7
			Selectio	on: DCR 0489	DA Selec	ed code num	bers: (02	307253, 023	U5382)							
Refrigerar	nt: R4044	~	Selected		NS		DP [psi]	DT_sat [%]	Velocity, in [ft/s]	Acid capacity [oz]						î
Connectio			0	DCR 0485-D/					90,59							
			0	DCR 0487-D/					50,81							
Product fa	amiles		0	DCR 0967-D/					50,81							
		DAS DCR-DA	0	DCR 01447-0					50,81							
			۲	DCR 0489-D/	A 25 (1"		0,55	0,5	31,11	0,9418	×					~
1			Perform	nance curve	Performance	detaile Co	de number	r selection								V
1					1 critorinarioc		ac namec	Sciection								
	3						Suction	line (Dry		489-DA system. R404		filter)				
				0,90			Juction	·	capanision	system it is						
				0,80												
DCR hous	sing with exchange	able DA-burn-out filter insert		0,70										/		
	e acid after compr ecular sieve.	essor motor burnout.	[ba										/			
70% acti	vated aluminia oxi	d.	nce	0,60									-			
			Pressure difference [psi]	0,50								/				
			e dif	0,40							/					
			anss	0,30												
			Pre													
				0,20												
				0,10			-									
				0,00												
				0,0	0,5	1,0	1	,5	2,0 2, Con	5 3,0 ling capacity [TR]	3,5	4,0	4,5	5,0	5,5	
									000	appacity [1K]						
			Cooling	capacity: 4,265	2 TR Heatin	g capacity: 62,8	327 kBTU/	h Mass flow	in line: 14,208 lb/i	min Pressure drop	o: 0,546 psi				E.	¥
																- 1



You can also select the "Tools | Show operating conditions" menu and see the equivalent of operating conditions in different unit systems:

rnout filter Show Operating Conditions Overvi		oller 1 + New							
stem: Dry Products and Refrigerants Overview		conditions:							
k on diagram to select line:	Capacit		Evapo	ration:			nsation:		Additional
lected line: Suction line	Cooling	g capacity: V 15,00 kW	Dew p	point temperatur	e: 🗸 -15,0 °C	Dew p	oint temperature: V	20,0 °C	Discha
	Mass flo	ow in line: 386,7 kg/r	n Useful	superheat:	8,0 K	Subcool	ling:	2,0 K	
	Heating	capacity: 18,41 kW	Additio	nal superheat:	0 к	Addition	al subcooling:	0 к	
		Operating conditions overvi	iew			×			
	Selection		Current	American	International	SI			
	O Press	System:	Dry	Dry	Dry	Dry			
+	Veloc	Line	Suction line	Suction line	Suction line	Suction line			
	<u> </u>	Refrigerant	R404A	R404A	R404A	R404A			
	Suction line Selection:	Cooling capacity:	15,00 kW	4,265 TR	15,00 kW	15000 W			
		Heating capacity:	18,41 kW	62,83 kBTU/h	18,41 kW	18410 W			
rigerant: R404A V	Selected	Mass flow in line:	386,7 kg/h	14,21 lb/min	386,7 kg/h	0, 1074 kg/s	Result		
nections: All	0 1	Evaporating temperature:	-15,0 °C	5,0 °F	-15,0 °C	258 K	✓		
	0	Evaporating pressure:	3,642 bar	52,82 psi	3,642 bar	364200 Pa	$\checkmark$		
duct families	•	Useful superheat:	8,0 K	14,4 °F	8,0 K	8,0 K	×		
DAS DCR-DA	0	Additional superheat:	0 K	0 °F	0 K	0 K	✓		
DCK-DA	0 1	Total superheat:	8,0 K	14,4 °F	8,0 K	8,0 K	✓		
	-	Suction temperature:	-7,0 ℃	19,4 °F	-7,0 °C	266 K	- * 1		
	Performa	Discharge temperature:	39,9 °C	103,9 °F	39,9 °C	313 K			
		Condensing temperature:	20,0 °C	68,0 ºF	20,0 °C	293 K			
vr &		Condensing pressure:	10,89 bar	157,9 psi	10,89 bar	1089000 Pa	rnout filter)		
	0,0	Subcooling:	2,0 K	3,6 ⁰F	2,0 K	2,0 K			
	0,0	Additional subcooling:	0 K	0 °F	0 K	0 K			
R housing with exchangeable DA-burn-out filter insert	- <sup>0,0</sup>	Total subcooling:	2,0 K	3,6 ⁰F	2,0 K	2,0 K		/	
remove acid after compressor motor burnout. % Molecular sieve.	.0,0 [pai	Liquid temperature:	17,6 °C	63,6 ºF	17,6 °C	291 K			
% activated aluminia oxid.	9,0,0								
	ē 0,0 ∰ 0,0								
	9,0 E								
	Pressure difference [bar] 0 0 0 0 0 0 0 0 0								
	S 0,0								
	0,0								
	0,0								
	0,0								
			4 (	6 8	10	12	14 16	18	20
					Cooling capacity	/[KW]			

## 21 Customization – change application

Coolselector<sup>®</sup>2 allows you to customize your product view to either 'all applications', 'commercial applications' or 'industrial applications' respectively.

You can set the preferred application to e.g. commercial applications in "Options | Preferences | Commercial applications":

🖄 Co	olselec	tor2	- Sin	pleSele	ction	.csprj			
<u>F</u> ile	<u>Option</u>	is <u>T</u> o	ools	<u>A</u> bout	Se	lections	R	eport	Bill of Materials
Bu	P	refere	ences				×		All applications
	U	nits					×	~	Commercial applications
	U	ser, L	.angu	age and	Cour	ntry			Industrial applications
	S	tyle							Edit preferences

You will notice that following this change, the "new" tab interface has changed in the order as well as the available options. This is to provide a better overview for you.

You can see that, following the change to 'commercial applications', some of the options which are more specific to industrial applications such as "ICF valve station" are now no longer part of



Coolselector2 - SimpleSelection.csprj le Options Tools About Selections Report	Bill of Materials					Copy Selection	🗕 🗖 Screen Dump
Burnout filter 1 Line 1 Compressors 1	Case controller 1 +	New					
COMMERCIAL APPLICATIONS							
COMPRESSORS AND CONDENSING UNITS	-	Control and regulating valves	1	Electronic expansion valves	🐦 🖘	Filter driers	
		Solenoid valves	Ē.	Thermostatic expansion valves	-	Burnout filters	
VALVES AND LINE COMPONENTS			- Y				
	-	Check valves		Transcritical high pressure valves	+	Sight glasses	
ELECTRONIC CONTROLS	-				-		
SENSORS AND SWITCHES	-	Stop and shut off valves	-	Transcritical gas bypass valves	25	Piping	
@ (T -~~~		Water valves	1000002	Multi ejectors	*	Internal heat exchangers	
COMPONENTS IN SERIES			1	Hard Cjector S		Internament extendingers	

#### the "new" tab interface:

## 22 Customization - columns in selection table

You can modify which columns you see in your selection table and change the order for the calculations and selections made in the "Valve and Line Components" option as well as "Compressors". To do so, right click on the table header and select "Manage Columns...". This is step 1 and 2 in the following snippet:



1. To remove the columns e.g. after the "Mass flow", you can simply uncheck them in the list as shown by step 3.



2. To replace "Heating" with "COP cooling", you should click on Heating and then click on the top arrow as shown by steps 4 and 5.

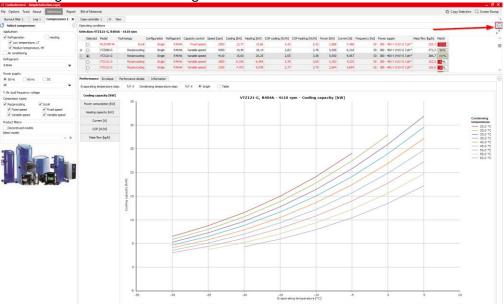
Then you can click OK to update the table. Coolselector<sup>®</sup>2 will remember your modifications next time you run it and you can always go back to the default table by clicking on default in "Manage Columns...":

Selecter	Model	Technology	Configuration	Refrigerant	Capacity control	Speed [rpm]	Cooling [kW]	Heating [kW]	COP cooling [W/W]	COP heating [W/W]	Power [kW]	Current [A]	Frequency [Hz]	Power supply	Mass flow [kg/h]	Match
0	MLZ048T4	Scrol	Single	R404A	Fixed speed	2900	12,77	15,66	4,42	5,42	2,888	7,468	50	380 - 400 V (415 V) 3 ph*	329,3	85%
0	MLZ048T4	Scrol	Single	R404A	Fixed speed	2900	12,77	15,66	4,42	5,42	2,888	7,468	50	380 - 400 V (415 V) 3 ph*	329,3	85%
0	MLZ048T4A	Scrol	Single	R404A	Fixed speed	2900	12,77	15,66	4,42	5,42	2,888	7,468	50	380 - 400 V (415 V) 3 ph*	329,3	85%
0	MLZ048T4A	Scrol	Single	R404A	Fixed speed	2900	12,77	15,66	4,42	5,42	2,888	7,468	50	380 - 400 V (415 V) 3 ph*	329,3	85%
0	VTZ086-G	Reciprocating	Single	R404A	Variable speed	5400	14,40	19,14	2,83	3,76	5,095	8,218	50	380 - 400 V (415 V) 3 ph*	371,2	96%
•	VTZ121-G	Reciprocating	Single	R404A	Variable speed	4110	15,00	20,25	2,65	3,58	5,650	9,067	50	380 - 400 V (415 V) 3 ph*	386,7	100%
۲	VTZ121-G	Reciprocating	Single	R404A	Variable speed	1800	6,343	8,484	2,76	3,69	2,302	4,225	50	380 - 400 V (415 V) 3 ph*	163,5	42%
۲	VTZ121-G	Reciprocating	Single	R404A	Variable speed	2100	7,473	9,978	2,77	3,70	2,694	4,854	50	380 - 400 V (415 V) 3 ph*	192,6	50 <mark>%</mark>
۲	VTZ121-G	Reciprocating	Single	R404A	Variable speed	2400	8,601	11,48	2,78	3,71	3,098	5,483	50	380 - 400 V (415 V) 3 ph*	221,7	57%
۲	VTZ121-G	Reciprocating	Single	R404A	Variable speed	2700	9,727	13,00	2,77	3,70	3,516	6,112	50	380 - 400 V (415 V) 3 ph*	250,7	65%
۲	VTZ121-G	Reciprocating	Single	R404A	Variable speed	3000	10,85	14,52	2,75	3,68	3,946	6,740	50	380 - 400 V (415 V) 3 ph*	279,7	72%
۲	VTZ121-G	Reciprocating	Single	R404A	Variable speed	3300	11,97	16,06	2,73	3,66	4,389	7,369	50	380 - 400 V (415 V) 3 ph*	308,7	80%
	VTZ121-G	Reciprocating	Single	R404A	Variable speed	3600	13.10	17.60	2.70	3.63	4.845	7.998	50	380 - 400 V (415 V) 3 ph*	337.6	87%

#### 23 Customization – user interface

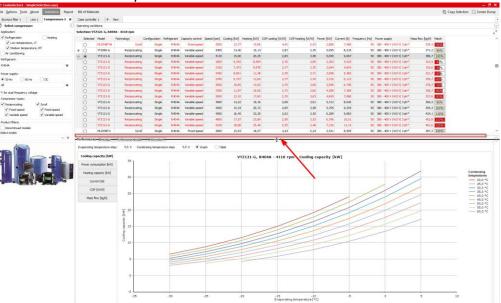
Coolselector<sup>®</sup>2 allows you to resize different segments or minimize the segments to see the information more clearly. Coolselector<sup>®</sup>2 will remember previous modifications, but sizes will reset to default when you start Coolselector<sup>®</sup>2 again.

1. You can minimize the "Operating conditions" segment by clicking on the button at the top right-hand side of the segment:



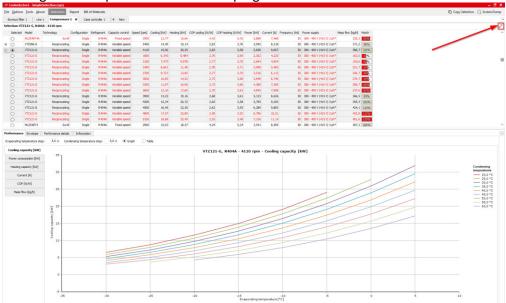


2. To resize any of the segments, you can click and drag on the border in order to see information more easily:





3. After setting the general criteria and operating conditions and the product suggestion criteria, sometimes it is handy to expand the segments for the selection table and product performance and information to fullscreen. You can do that by clicking on the expand button in the top right-hand corner of the selection table:





## 24 Customization - preferences

The settings we discuss in this part of the user guide do not need to be modified in most cases, as we, in the Coolselector<sup>®</sup>2 team, constantly try to optimize the default preferences based on our customer requirements.

To create custom preferences, use "Options | Preferences | Edit preferences...":

🋱 Cool	selector2 - SimpleSelection.cs	prj	
<u>F</u> ile Op	ptions <u>T</u> ools <u>A</u> bout Select	ons Report Bill of Materials	
Burn	Preferences	<ul> <li>All applications</li> </ul>	
Syste	Units	<ul> <li>Commercial applications</li> </ul>	
Click	User, Language and Country.	Industrial applications	
Sele	Style	Edit preferences	5,0
-		Mass flow in line:	386

You will see the "Preferences" window. On top you have the different preferences which are customizable.

You can select "Dry expansion systems" among the options for the "Default system" and add/remove options for your selection and calculations among the product pages as well as control their sorting order within the interface:

Preferences [All applications]		×
General Operating conditions Valves and Line Components Compressors and com	densing units Refrigerant equations	Available preferences:
Default system:		Name preferences:
Dry expansion system		
Flooded evaporator, pump circulation		
<ul> <li>Flooded evaporator, gravity circulation</li> </ul>		All applications
O Transcritical booster system		Commercial applications
	+   +	Industrial applications
	Щ Ц	
Note: Compressors and condensing units always use dry expansion system.		
Product pages:	New page:	
Valves and Line Components	✓ Show "Recent Projects" panel	
Components in series	Show Recent Projects panel	
Commercial Applications		
Industrial Applications		
✓ Electronic Controls		
Sensors and Switches		
		Rename preferences
		ОК



Next, you can go to the "Operating conditions" tab by clicking on the top bar and changing the default operating conditions:

rences [All applications]				
ral Operating conditions Valves and	Line Components Compresso	rs and condensing units Refrigerant equations		Available preferences:
erating conditions:	Name preferences:			
Use default operating conditions each				
Use values from previous session as d	lefault when Coolselector 2 start	15		Add preferences
critical systems Transcritical systems	Hot gas defrost			All applications Commercial applications
efault operating conditions				Industrial applications
Default refrigerant:		Condensing unit ambient:		
		Ambient temperature:	32,0 °C	
R404A	~			
✓ All refrigerants for compressors an	d condensing units	Subcooling:	0 K	
		1		
Capacity:				
Cooling capacity:	✓ 15,00 kW	<b>—</b>		
Evaporation:		Condensation:		
Temperature:	-15,0 °C	Bubble point temperature: $\checkmark$	20,0 °C 🛹	
Useful superheat:	8,0 K	Subcooling:	2,0 K	
Additional superheat:	0 κ	Additional subcooling:	0 κ	
Additional:		Power supply:		
Circulation rate:	3,00	● 50 Hz 060 Hz 0C		
DP pump:	2,000 bar	All		
Liquid height:	2,00 m	*: for dual frequency voltage		

You can also go to the "Valves and Line Components" tab and select the type of components you would like to see for your selections/calculations and the families in each functionality, as well as connection sizes and some more options:

neral Operating conditions Valves and Line Components Compressor	and condensing units Refrigerant equations	Available preferences:
nponents Advanced		Name preferences:
Produced     Produced	Steel connections:         DIN-EN Butt weld         DIN-EN SS Butt weld (stainless)         ANSI Butt weld         ANSI Socket weld         ANSI Socket weld         ANSI SS Butt weld (stainless)         Steel pipes:         DIN-EN         DIN-EN         DIN-EN SS (stainless)         ANSI Soldering         Copper pipes:         DIN-EN         DIN-EN         DIN-EN         DIN-EN         DIN-EN SS (stainless)         Copper pipes:         DIN-EN         DIN-EN         Copper pipes:         DIN-EN         DIN-EN         Include ICF valve station         Include discontinued products         Discontinued products will be shown in parenthesis	Add preferences          Add preferences         Add preferences         Commercial applications         Industrial applications
Performance curve and performance details		
<ul> <li>Show Performance curve and Performance details</li> </ul>		

In the tab for compressors and condensing units, you will find the relevant settings for those products. You can choose which products to see and even see the rating conditions and create



custom ones. You can also set the limits to those you prefer:

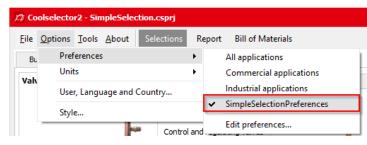
eral Operating conditions Valves and Line Components Compressors and condensing units Refrigerant	
ielection limits	Name preferences:
isplay warning if capactity is less or larger than the following limits:	
Lower limit: 90 % Show all models	Add preferences
Upper limit: 110 %	All applications     Commercial applications     Industrial applications
Include compressors and condensing units with envelope warnings in selection	
Rating conditions:	
Compressor rating conditions	
Condensing units rating conditions	
efault Compressor Filters _ Default Condensing Unit Filters _ Economizer configuration	
efault Compressor Filters Default Condensing Unit Filters Economizer configuration Application:	
Refrigeration	
Application:       Refrigeration     Image: Constraint of the string       Low temperature, LT	
Application:  Refrigeration  Low temperature, LT  Medium temperature, MT	
Application:       Image: Constraint of the streng of the str	
Application: V Refrigeration Low temperature, LT V Medium temperature, MT	
Application:          Image: Constraint of the stress of the str	
Application:	
Application:	
Application:                 Refrigeration                  Low temperature, LT                  Medium temperature, MT                  Miclium temperature, MT                 Miclium temperature, MT                  Medium temperature, MT                 Miclium temperature, MT                 Viscolum temperature, MIClium temperature, MIClium temperature,	
Application:            \Refrigeration             \Low temperature, LT             \Medium temperature, MT             \Arc conditioning             Compressor types:             \Refrigeration             \Product filters:	
Application:         V Refrigeration         V Low temperature, LT         V Medium temperature, MT         V Air conditioning         Compressor types:         V Redprocating         V Fixed speed         V rainable speed         V Variable speed         V roduct filters:         V Include manifold	Rename preferences

If you click the "OK" button to apply your settings, Coolselector<sup>®</sup>2 will ask you to name your preferences and save them. Coolselector<sup>®</sup>2 will keep the default settings intact so you can always go back to the predefined preferences easily:

neral Operating conditions Valves and Line Components	ompressors and condensing units Refrigerant equations	Available preferences:
Selection limits		Name preferences:
isplay warning if capactity is less or larger than the following lim	nits:	
Lower limit: 90 %	O Show all models	Add preferences
Upper limit: 110 %	Show: 15      models	All applications Commercial applications
Include compressors and condensing units with envelope warn	nings in selection	Industrial applications
Rating conditions:		
Compressor rating conditions		
Condensing units rating conditions		
efault Compressor Filters Default Condensing Unit Filters Ec	Name preferences	×
Application:	name preferences	
✓ Refrigeration ✓ Heating	Name SimpleSelectionPreferences	
✓ Low temperature, LT	Name SimpleSelectionPreferences	
	Name SimpleSelectionPreferences	ĸ
✓ Low temperature, LT ✓ Medium temperature, MT		ĸ
✓ Low temperature, LT ✓ Medium temperature, MT ✓ Air conditioning		ĸ
Low temperature, LT     Medium temperature, MT     Air conditioning     Compressor types:		к.
Low temperature, LT     Medium temperature, MT     Air conditioning Compressor types:     Reciprocating     Scroll		K
✓ Low temperature, LT         ✓ Medium temperature, MT         ✓ Air conditioning         Compressor types:         ✓ Reciprocating         ✓ Fixed speed         ✓ Fixed speed		K
✓ Low temperature, LT         ✓ Medium temperature, MT         ✓ Air conditioning         Compressor types:         ✓ Reciprocating         ✓ Fixed speed         ✓ Fixed speed         ✓ Variable speed		K.
✓ Low temperature, LT         ✓ Medium temperature, MT         ✓ Air conditioning         Compressor types:         ✓ Reciprocating         ✓ Fixed speed         ✓ Variable speed         ✓ Variable speed         Product filters:		
✓ Low temperature, LT         ✓ Medium temperature, MT         ✓ Air conditioning         Compressor types:         ✓ Reciprocating         ✓ Fixed speed         ✓ Fixed speed         ✓ Variable speed         ✓ Variable speed         ✓ Product filters:         ✓ Include manifold		Rename preferences



Next time you open Coolselector<sup>®</sup>2, it will keep your preferences and you can see that in the list of the preferences. You can come back to this menu and edit, rename or delete your preferences at any time.



You can also see that the new tab menu has changed based on your new preferences.

12 Coolselector2 - Untitled.csprj								_ 8 X
File Options Tools About Selections Report B								Copy Selection Screen Dump
VALVES AND LINE COMPONENTS								Recent Projects
->>>-	-	Control and regulating valves	1	Electronic expansion valves	1 -0	Filter driers		SimpleSelection
COMPONENTS IN SERIES								_
	<u>ی</u>	Solenoid valves	ų.	Thermostatic expansion valves		Burnout Riters		
COMPRESSORS AND CONDENSING UNITS			٨					
ELECTRONEC CONTROLS		Check valves	\$	Transcribcal high pressure valves	1	Sight glasses		
BBB			đ			-		
000	10	Stop and shut off valves	Ł	Transcritical gas bypass valves	2	Pping		
			. Mainta					
	4	Water valves	-	Multi ejectors	-	Internal heat exchangers		
								Coolselector@2 Version 2.3.2   Database 34.34.1.13.3.15 You are running the latest version
								and the second second second

On the top right-hand side of the window you will be able to see the recent projects and load them easily.

#### 25 Advanced settings - calculation and selection criteria

Please note that changing the following settings can affect the results of the selection or calculation process and lack of due care can have a negative effect on the suggestions and default calculations. However, the advanced settings enable you to customize and improve your experience and even modify the calculations if you find it necessary.



The default values for the calculations can be changed in "Valves and Line Components | Advanced | Default values" in the preferences window:

Preferences [SimpleSelectionPreferences]					×
General Operating conditions Valves and Line Components Comp	ressors and conde	ensing units Refrigerant equations		Available preferences:	
Components Advanced				Name preferences:	
Please note:				SimpleSelectionPreferences	
Changing advanced values below is for experts only and may resul	t in unpredictable	results.		Add preferences	
Any changes are at your own responsibility.           Default values         Calculation limits         Selection criteria         Additional				All applications Commercial applications Industrial applications	
Manual and electronic control valves:	Mechan	nical control valves:		SimpleSelectionPreferences	
Default opening degree: 80	% Default	offset:	0,600 bar		
ICF Control valve modules:	Expans	ion valve load percentage selection	criteria:		
Default opening degree: 70	% Electron	nic expansion valves:	80 %		
Pipes:	Thermo	static expansion valve:	100 %		
Default length: 5 m Default roughness:	Manual	expansion valves:	80 %		
Steel pipes: Stainless steel pipes: Copper pipes: 45 µm 30 µm 1,5	rioace	kpansion valves:	80 %		

The selection criteria for all the components supported by Coolselector<sup>®</sup>2 can be found in "Valves and Line Components | Advanced | Selection critera":

nponents Advanced					SimpleSelectionPreferences
a <b>se note:</b> hanging advanced values belo	w is for experts only and	anay result in unpredictable results.			Add preferences
ny changes are at your own re	-				All applications
fault values Calculation limits	Commercial applications Industrial applications				
ubcritical systems Transcritica					SimpleSelectionPreferences
Default selection criteria Defa	ault velocities Default sa	aturation temperature drops			
Component	Discharge line	Liquid line	Liquid line after expansion valve	Suction line	
Control and regulating valves	Pressure drop	Pressure drop	Pressure drop	Pressure drop	
Solenoid valves	Pressure drop	Velocity	Velocity	Pressure drop	
Check valves	Velocity	Velocity	Velocity	Velocity	
Stop and shut off valves	Velocity	Velocity	Velocity	Velocity	
Expansion valves	Load	Load			
Constant pressure valves	Load	Load	Load	Load	
Filters and strainers	Velocity	Velocity	Velocity	Velocity	
Filter driers	-	Velocity	Velocity	Velocity	
Burnout filters	-	Velocity	Velocity	Velocity	
Sight glasses	5	Velocity	Velocity	Velocity	
Steel pipes	Velocity	Velocity	Velocity	Velocity	
Steel fittings	Velocity	Velocity	Velocity	Velocity	
Copper pipes	Velocity	<ul> <li>Saturation temperature drop</li> </ul>	Velocity	Saturation tempe	
Copper fittings	Velocity	Velocity	Velocity	Velocity	
ICF valve station	Velocity	Velocity	Velocity	Velocity	
					Rename preferences
<				>	Delate auforman
					Delete preferences



#### 26 Advanced settings – custom unit system

To create a custom unit system, you need to go to "Options | Units | Custom...". Then you will find the unit used for each of the default unit systems and you can create your own:

Units [American]			
Selected units:			Available unit sets:
Temperature:	[°F] degree Fahrenheit	~ ^	Name unit set:
Temperature difference:		~	
Pressure:	[psi] Pound-force per square inch	~	SI
Pressure difference:	[psi] Pound-force per square inch	~	International American
Saturation temperature drop:	[°F/ft] Fahrenheit per foot	$\sim$	
Cooling capacity:	[kW] Kilowatt	~	
Heating capacity:	[kBTU/h] Kilo British thermal unit per hour	<ul> <li></li> </ul>	
Mass flow:	[W] Watt [kW] Kilowatt		<b>`</b>
Volume flow:	[KDTO/H] NIO DHUSH UTERMALUTIL PER HOUR		
Power:	[BTU/s] British thermal unit per second [TR] Ton of refrigeration		
Diameter:	[kcal/h] Kilocalorie per hour		
Length:	[ft] Feet	$\sim$	
Roughness:	[in] Inches	~	
Velocity:	[ft/s] Foot per second	$\sim$	
Density:	[lb/ft^3] Pound per cubic foot	~	
Specific volume:	[ft^3/b] Cubic foot per pound	~	
Specific entropy:	[BTU/(b $^\circ \text{F})]$ British thermal unit per pound degree Fahrenheit	$\sim$	<b>\</b>
Specific enthalpy:	[BTU/lb] British thermal unit per pound	$\sim$	
	$[\mbox{BTU}/(\mbox{b}{}^\circ\mbox{F})]$ British thermal unit per pound degree Fahrenheit	~	Rename unit set.
Volume:		~	Delete unit set
Area:		~	
Rotational speed:	[rpm] Revolution per minute	~ ~	ОК

By clicking OK, you will be asked to save your custom unit system and give it a name. It will then appear on the list of unit systems similar to your custom preferences.



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