## GE Healthcare

# UNICORN 5.1

Evaluation for Cross Flow Filtration / User Reference Manual





● UNICORN<sup>™</sup>

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# 1 Introducing UNICORN for ÄKTAcrossflow evaluations

Introduction

Results from the ÄKTAcrossflow<sup>™</sup> systems can be evaluated using a special evaluation wizard that is available in the UNICORN<sup>™</sup> software.

This chapter contains:

- A general presentation of the UNICORN software.
- A general description of the software functions and concepts that are specific for ÄKTAcrossflow.
- A description of the software help functions.

In this chapter

This chapter contains the following sections

Торіс	See
About ÄKTAcrossflow	1.1
About UNICORN	1.2
ÄKTAcrossflow concepts	1.3
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1 Introducing UNICORN for ÄKTAcrossflow evaluations 1.1 About ÄKTAcrossflow

#### 1.1 About ÄKTAcrossflow

What is ÄKTAcrossflow is an ÄKTA Design™ membrane filtration system for cross flow filtration applications. A comprehensive description of the system and its applications can be found in the ÄKTAcrossflow User Manual.



## Controlling soft-ÄKTAcrossflow systems can be controlled and monitored by UNICORN software fromwareGE Healthcare. The results can also be evaluated using the UNICORN Evaluation<br/>module.

UNICORN is a trademark of GE Healthcare.

**Note:** The ÄKTAcrossflow control strategy is designed to operate using the UNICORN software version that is designed for general liquid chromatography applications as a framework.

**System networks** UNICORN can be installed on a stand-alone computer to control and monitor only a single, locally attached system. However, a stand-alone computer can control up to a maximum of four separate locally attached systems depending on the installed controller interface. Please refer to the UNICORN Administration and Technical Manual for information about the controller options.

In a network installation each computer workstation can operate many systems regardless if they are locally connected or not. Each system can only be operated by one workstation at a time, but several may view the output data. A workstation that is set up to monitor an ÄKTAcrossflow system may also control one or more liquid chromatography systems, e.g. an ÄKTAexplorer™ system.

1.2	About UI	NICORN	
What is UNICORN?	UNICORN is a complete package for control and supervision of biotechnical systems. It consists of control software, and when applicable a controller card or interface unit for interfacing the controlling PC to the liquid handling module.		
Operating environ- ment	UNICORN runs on a PC under Microsoft® Windows® XP. It is designed to run under English keyboard settings.		
Software installa- tion	The UNICOR general UNIC is described included in t	IN software version for ÄKTAcrossflow is available as a selection on the CORN software installation CD from version 5.10. The installation procedure in detail in the UNICORN Administration and Technical Manual, which is the user documentation package.	
	Note:	The examples in the text are based on a different application of UNICORN. However, all steps in the procedure are similar for an ÄKTAcrossflow installation.	
Windows func-	Most Windo	ws functions are also available in UNICORN, including	
LIOIIS	• cut and p	paste	
	• right-clic Note:	k short-cut menus Drag and drop is not available. File and folder handling in UNICORN also differ from the general Windows file manager standard.	
UNICORN user documentation	UNICORN co chromatogr ÄKTAcrossfle liquid chrom this version, The example 100 system are specific	an be used with a number of systems including ÄKTA design liquid aphy systems. For practical reasons the user documentation for ow also include the user reference manuals for the UNICORN general natography version. ÄKTAcrossflow shares many of the functions with e.g. file and folder handling etc. es in the UNICORN User Reference Manual are based on an ÄKTAexplorer operating with the E100F400 strategy. Certain parts of the manuals that for liquid chromatography are not applicable for cross flow filtration	
	users.		

Software modules	The control software	consists of four	integrated modules:
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Module	Function
UNICORN Manager	File handling and administration, e.g. definition of systems and user profile etc.
Method Editor	To create and edit methods for pre- programmed system control.
System Control	To monitor processes online.
Evaluation	To evaluate and present stored results.

**Note:** All modules are active when the program is operating, and are not closed when they are minimized. All modules will normally open when the program is started. However, a user profile may be set up so that not all modules are available. Only the available modules will be displayed. The modules and their functions are described in more detail in the UNICORN User Reference Manual. However, not all functions are applicable for ÄKTAcrossflow users.

#### Work flow

The work flow for ÄKTAcrossflow can be divided into three distinct stages. This manual only describes the final stage, the Evaluation. The first two stages are described in the User Manual for the ÄKTAcrossflow instrument. The flow chart below shows the work flow stages.

1. Create a method

2. Run the method

3. Evaluate the results

Security

The table below describes the main security functions in UNICORN for ÄKTAcrossflow:

Feature	Function
Access Security	Only authorized users can access UNICORN. Each user is assigned an ac- cess level, which defines the functions that the user is permitted to use.

Feature	Function
Data Security	Result files from an ongoing run can be saved automatically at preset intervals to minimize data loss if the system fails. The results are saved locally if the net- work communication fails.
Electronic Signatures	Method and result files can be signed electronically for enhanced security and accountability.

### 1.3 ÄKTAcrossflow concepts

Introduction	This section contains explanations and definitions of a number of concepts that are used in this manual. Concept definitions that are common with other ÄKTA systems are, for the most part, explained and defined in the corresponding section of the UNICORN User Reference Manual.
	The concepts are organized in alphabetical order.
Chromatogram	A chromatogram is a collection of data represented by a number of curves that have been created during a filtration run, including cross flow, flux, UV etc. The original raw data curves cannot be deleted or modified. They can be used as a basis for evaluation procedures in the ÄKTAcrossflow Evaluation Wizard.
	A chromatogram can also contain other curves that have been created and saved using other operations that are available in the UNICORN <b>Evaluation Module</b> .
Cross flow	Cross flow is the flow that passes the membrane surface, typically a denoted retentate flow.
Curves	The monitor signals from the run are displayed graphically as curves.
Delta P	The Delta Pressure is defined as the difference between the feed pressure and the retentate pressure.
Flux	The Flux is the permeate or filtrate flow that passes through the membrane area during a given time period, typically expressed as LMH (Liter/M <sup>2</sup> /Hour).
Membranes	Porous materials used for separating molecules by size sieving.
Method	The program instructions for a run are defined in a <b>Method</b> . A Method can be divided into blocks that represent steps in the process. Each block consists of a series of instructions that request specific operations in the system.
Method Wizard	The <b>Method Wizard</b> is a user-friendly tool to create new methods. The <b>Wizard</b> takes the user step-by-step through the creation process. <b>Method Wizards</b> are supplied with UNICORN installations for ÄKTAdesign systems.

Permeate	The volume of liquid passing through the membranes (also called the <b>filtrate</b> ).		
Result files	UNICORN creates <b>Result files</b> when a method is run. The <b>Result files</b> contain run data from the monitors in the system.		
	<i>Example</i> : Ret_Flow, flux etc.		
	The <b>Result files</b> may also contain additional documentation from the run, e.g. text method, and saved evaluation results.		
	The latest ten results from manual runs are automatically saved in a special folder <b>Manual runs</b> and can be opened and saved permanently if desired.		
	<i>Note:</i> Edited evaluations from filtration runs are saved using a special file format (.emr)		
Retentate	The volume of liquid exiting a membrane system after flowing over the membrane, not through it. It is expressed as feed flow minus permeate flow. It is also called <b>concentrate</b> .		
Strategy	Part of the UNICORN software is specific for the system that it is set up to operate. The system specific part is usually referred to as the <b>Strategy</b> . The <b>Strategy</b> defines available method and manual instructions, system settings, run data, curves and wizards.		
ТМР	TMP is an acronym for the Transmembrane pressure.		

1.4	Help functions		
Introduction	There are three different ways to get help and instructions specific for ÄKTAcrossflow in UNICORN:		
	From the context-sensitive help button in each dialog box		
	<ul> <li>By selecting the Online Manual from the Help menu (this toolbar menu is not available when the ÄKTAcrossflow evaluation wizard is open)</li> </ul>		
	• By pressing the <f1> key while the ÄKTAcrossflow evaluation wizard is open.</f1>		
	<b>Note:</b> The <b>Help</b> index that is available in other UNICORN modules or accessed from the <b>Help</b> menu and the <f1> key in the <b>Evaluation</b> module when the ÄKTAcrossflow evaluation wizard is NOT open will not include the specific crossflow instructions. This help index only contains general UNICORN information.</f1>		
Manuals	Manuals covering both the software and selected instruments may be selected for installation when the UNICORN software is installed. However, the ÄKTAcrossflow manuals are installed and added to the <b>Manuals</b> menu when the ÄKTAcrossflow software is installed. The installed ÄKTAcrossflow manuals include the online HTML-manual for the UNICORN software and ÄKTAcrossflow application, as well as manuals for the instrument in PDF-format.		
	How to open a manual		
	To open a manual:		
	• choose Help:Manuals		
	<i>Result</i> : The <b>Manuals</b> dialog box is opened.		
	• Select the manual and click the <b>OK</b> button.		
The Help menu	• From the <b>Help</b> menu in each module you can access the general UNICORN <b>Help</b> file.		
	<ul> <li>From the Help menu you can also access the installed manuals.</li> </ul>		
	The illustration below shows the <b>Help</b> menu of the <b>Evaluation</b> module:		
	Help Help for Evaluation Index Manuals About UNICORN		

index and not the specific ÄKTAcrossflow Help index.

Context-sensitiveIn each dialog box in the ÄKTAcrossflow evaluation wizard there is a Help button. Ifhelpyou press that button, the following will be displayed:

• The Help file, with relevant information displayed in the right pane.

If you right-click in the graph pane of the wizard, a menu containing specific help dialog for the graph functions will open. This information is also available in the general **Help** file under the heading **How to format the graphs**. This information is also available in the manual section **2.6 How to format the graphs** on page 69.

How to search theThe table below describes how to open and search for a topic in the Help file in theHelp fileÄKTAcrossflow evaluation wizard:

Step	Action
1	Click a <b>Help</b> button or press the <f1> key.</f1>
	<i>Result</i> : The <b>Help</b> file is displayed
2	• Type a word you want help on in the text box in the left pane.
	Result: The closest matches are displayed in the list.
	• Select a match and click the <b>Display</b> button.
	Result: The associated help text is displayed in the right pane.
3	• You can also click the <b>Contents</b> tab to view the contents of the Help file divided into sections.
	Click the plus signs to expand the tree structure.
	• Click a topic to read the associated help text.
Note:	The ÄKTAcrossflow help file contains information for both the ÄKTAcrossflow application and general UNICORN functions. Information matches found in the general UNICORN material may sometimes be valid only for liquid chromatography applications. The search functions in the general UNICORN help file that is available in the other software modules works as described in the table above, but items specific for

crossflow evaluations are not available.

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# How to use the ÄKTAcrossflow evaluation wizard

**Introduction** This chapter describes the alternative options that are available in the **ÄKTAcrossflow** evaluation wizard and how to use them.

#### In this chapter This chapter contains the following sections

Торіс	See
How to compare process data using the process optimization option	2.1
How to calculate Normalized Water Flux values	2.2
How to perform a Diafiltration time optimization	2.3
How to make a Capacity plot	2.4
How to compare process data using the Any vs any operation	2.5
How to format the graphs	2.6

## 2.1 How to compare process data using the process optimization option

## Introduction This section describes how to use the **Process Optimization** option of the **ÄKTAcrossflow evaluation wizard**.

**Process Optimization** is used to analyze a special type of process characterization experiment where a series of setpoints are tested. The most common experiments are excursions of TMP at different Ret\_Flow rates and protein concentrations.

**Process Optimization** makes a new plot from user-identified points along original data curves (i.e. flux vs. TMP). **Process Optimization** also allows the user to overlay multiple plots (i.e. flux vs. TMP at different Ret\_Flow rates or protein concentrations). This capability can be used for any process parameter.

How to start the	The table below describes how to select the <b>Process Optimization</b> operation.	
the operation	Step	Action
	1	Click the <b>Evaluation Wizard</b> icon in the <b>Evaluation</b> module or choose <b>File:Membrane System Evaluation</b> .
		<i>Result</i> : The <b>Evaluation Wizard</b> dialog box appears.
		Select operation  Process optimization           Normalized Water Flux

Diafiltration time optimization

Capacity plots

 Any vs. any

<u>O</u>pen Previous Analysis 2.1 How to compare process data using the process optimization option

Step	Action	
2	Select the <b>Process optimization</b> operation.	
	• Click the I	Next button.
	Note:	The <b>Open Previous Analysis</b> button is used to open results that already have been evalu- ated once and saved using the wizard.
	Note:	You can use the <b>Back</b> button in each step of the wizard to return and change selections in the previous steps.

## select curves to compare

How to locate and The table below describes how to locate and select result curves for the process optimization in the evaluation wizard.

Step	Action	
1	Select search criteria to locate the curves to compare:	
	<ul> <li>Select a r</li> </ul>	esult file
	• Select a c	hromatogram
	Note:	The default selection for result files and chromatograms is the wildcard character *, which will display all files in the selected folder and all chromatograms in the located files. The <b>All</b> button will restore the wildcard character if desired.
2	Select default curves to compare	
	Note:	The first selected parameter will be plotted as the Y-axis in the <b>Graph View</b> .
	Note:	You can select other curves than the default curves listed in the selection text boxes. See the instruction topic "How to select other curves" for information about how to use the <b>Advanced</b> selections.

Step	Action
3	<ul> <li>Click the Search button.</li> <li>Result: All chromatograms containing curves corresponding to the selected search criteria are displayed in the Found chromatograms list.</li> <li>Section Section Secti</li></ul>
	(Back Ned) (Cancel Meb)         Note:       Curves that have been edited in the UNICORN Evaluation module are not available until the result has been saved.
4	<ul> <li>Click the check boxes to select the data that you want to include in the comparison.</li> <li>Click the <b>Next</b> button to proceed to define the plot data.</li> </ul>
Note:	Use the <b>Clear</b> button to remove all chromatograms from the list if needed. You must do this first if you want to select other curves to compare.

## How to create data groups

If data points, e.g. flux and TMP, are stored in several chromatograms, these can be combined into a group to be displayed together. This will typically be the case when the method includes a New Chromatogram instruction or if a New Chromatogram instruction is entered in a manual run. The table below describes how to create data groups from these chromatograms.

Step	Action
1	Click the <b>Bundle chromatograms</b> check box.
	• Click the check boxes to select the chromatograms that you want to include in the group.
	• Click the <b>New data group</b> button to create a group of the selected chromatograms.
2	Select more chromatograms if desired.
	• Click the <b>Add to data group</b> button to include the selected chroma- tograms in the group
	or
	• Click the <b>New data group</b> button to create a new group.
3	Click the <b>Next</b> button to proceed to define the plot data.



**Note:** The **Remove** button deletes the selected group or chromatogram from the list of groups, but the chromatograms are still available for selection in the search result list.

	Note:	The group window and the selection buttons are not displayed until the <b>Bundle chromatograms</b> check box is selected.
How to select oth- er curves	Other curv table belo	ves than the default combinations may be selected for comparison. The w describes how to do this:
	Note:	The <b>Advanced</b> selections are only available if the <b>Found</b> <b>chromatograms</b> field is empty. Click the <b>Clear</b> button to remove all chromatograms before proceeding with the instructions below.
	Step	Action
	1	<ul> <li>Click the Advanced button.</li> <li>Result: The Advanced Process optimization dialog box opens.</li> <li>Select any combination of the available curves in the drop lists.</li> <li>The Selection of the available curves in the drop lists.</li> </ul>
		Note:The search through all folders to determine the available curves and populate the menus may take a long time.

2.1 How to compare process data using the process optimization option

Step	Action		
2	• If needed, e.g. to reduce noise levels, drag the slide control to adjust the <b>Average calculation window</b> length.		
	Advanced Process optimization		
	Flux     vs.       Average calculation window       15       sec       OK       Cancel		
	<b>Note:</b> The window length will be calculated for the selected time before the marker point. The default value is 15 seconds.		
3	Click the <b>OK</b> button.		
Note:	When a curve has been selected once it will be added to the default curve menus.		

## How to define plotAll sample points in the selected result files are detected and listed in a data table asdatashown in the illustration below.



Note:	The tab for the displayed curve and the table cells for the data points in the displayed curve are marked in yellow. The cells for the selected marker point is highlighted in blue.
Note:	The values at the marker position are shown in the <b>Marker position</b> pane to the right of the curves. The values are expressed as averages for the defined <b>Average calculation window</b> , with the exact value at the marker point within brackets. The run time is also displayed.

It is best to place the marker after a period of baseline stability to Note: perform this calculation.

When you want to	do this:
display the data table for a curve,	Click the tab with the name of the curve
display the next chro- matogram in a group,	Click the <b>Next chromatogram</b> button
display the previous chromatogram in a group,	<ul> <li>Click the Previous chromatogram button</li> </ul>
add a data point,	Select the desired chromatogram
	<ul> <li>Move the cursor to the data point in the chromato- gram (the average and exact data values at the marker position are displayed in the Marker posi- tion boxes)</li> </ul>
	Click the Add Point button
	Note: Data points are available if a Set_Eval_Mark was used with the parameter Pro- cessOptimisation in the method. If not, data points must be added manually.
delete a data point,	Select a table cell in the row for the data point
	Click the <b>Delete point</b> button

The table below describes the available actions in this wizard dialog box:

2.1 How to compare process data using the process optimization option

When you want to	do this:
replace a data point,	<ul> <li>Select a table cell in the row for the data point</li> <li>Move the cursor to the data point in the chromato- gram (the average and exact data values at the marker position are displayed in the Marker posi- tion boxes)</li> <li>Click the Replace point button</li> </ul>
add a point at the same run time for all chromatograms in the group,	<ul> <li>Move the cursor to the desired run time position in the chromatogram</li> <li>Click the Add point from all chromatograms button</li> </ul>
rename the selected point list,	<ul> <li>Click the tab to display the desired point list</li> <li>Click the Rename point list button</li> <li><i>Result</i>: The Rename Point List dialog box opens.</li> <li>Type a new name in the text box</li> <li>Click OK</li> </ul>
export all point tables to an Excel file,	<ul> <li>Click the Export to Excel button Result: The Export to Excel dialog box opens. </li> <li>Navigate to the folder where you want to save the file</li> <li>If desired, type a new filename in the File name text box.</li> <li>Click the Save button Note: The point tables for all groups or curves will be exported to the same file.</li></ul>
display the plotted graphs for all curves,	Click the <b>Next</b> button

#### Actions in the Graph View

The plotted data points for all curves are now presented in a graph as shown in the illustration below:



**Note:** Only a maximum of 14 selected curves can be displayed in the graph.

The following actions can be performed in the **Graph View** dialog box:

- rename the Curve labels (if more than one curve was plotted)
- copy the graph via the Windows clipboard to other applications
- print the graph
- save the plotted results

Note:

The graph formats (f.ex. changing scale, switching from linear to logarithmic etc.) can also be edited in this dialog box by double-clicking in the graph area. The available formatting options are described in detail in the section **2.6 How to format the graphs** on page 69. How to rename
 The default curve label names are the file names (for a group, the group name). The
 label name that is currently displayed in the top text box of the Curve labels pane
 can be replaced with a new text. This pane is only available if more than one curve
 or group was selected for plotting.

- Click the droplist arrow by the top text box to select another label name for editing.
- Type the new label text in the lower text box.
- Click the **Rename** button.

*Result*: The label is renamed.

Curve label:	Is Rename a curve by selecting it in the list box. Type the new name in the edit field and click the Rename button to confirm.	
	processoptwizard04jun22002	
	test curve 1  Rename N	

**Note:** Only the label name is changed. The result file name is not changed. The label name can also be changed by renaming the group or curve point list in the **Define plot data** dialog box.

How to copy the graph can be copied to the Windows clipboard and then pasted into other applications, e.g. Excel, Word etc. The graph is exported as a bitmap image.
Click the Copy to clipboard button.

*Result*: The graph is copied and available on the clipboard.

How to print the<br/>graphThe graph can be printed directly on a selected printer without first being exported<br/>to another application. This option can also be used to create a pdf-file of the graph<br/>provided a suitable printer driver is installed.

The table below describes how to print the graph:

Step	Action
1	Click the <b>Print Graph</b> button. <i>Result</i> : The <b>Print</b> dialog box opens with the default Windows printer selected.
	Printing Flux vs. TMP         Printer:         EPSON Stylus Photo 900 on LPT1:         Orientation:         Paper:         Size: A4 210 x 297 mm         Source Ark         Cancel         Setup         Help
2	<ul> <li>Select a printer if the default printer is not to be used.</li> <li>Click the Setup button to adjust the printer settings if needed.</li> <li>Click the OK button.</li> <li>Result: The graph is printed on the selected printer.</li> </ul>

data	Step	Action
uutu	1	<ul> <li>Click the Save Result button.</li> <li>Result: The Save CrossFlow analysis result dialog box opens.</li> </ul> Save CrossFlow analysis result   Save in: Process Optimization   Proc_opt_20041107_114843.emr   Proc_opt_20041107_114909.emr   File name: Proc_opt_20041107_114920 Save
	2	Save as type: CFF analysis results (".emr) Cancel
	2	<ul> <li>If required, save the graph data in a folder other than the default home folder.</li> <li>If required, type a new name for the result file.</li> <li>Click the Save button.</li> <li>Result: The plotted graph data is saved.</li> </ul>
		<b>Note:</b> The default file name is the type of opera- tion/date and time when saved.
	Note:	The graph data is saved in a special file format (.emr). All the original result files used in the evaluation must be stored in the same folder where they were stored when the graph was created to avoid problems with changed search paths when the evaluation is re-opened. For the same reason, the files may not be renamed after the evaluation.
	Note:	Click the <b>Open Previous Analysis</b> button in the evaluation wizard to locate and open saved data files for editing. Only .emr-format files can be opened using this button. The <b>Open Previous Analysis</b> button is also the only way to access and open a saved analysis result. The .emr analysis files are not displayed in the <b>UNICORN ManagerResult</b> window or in the <b>File Navigator</b> of the <b>Evaluation</b> module.
	Note:	Changes in the graph formatting are not saved.

# 2.2 How to calculate Normalized Water Flux values

Introduction	This section describes the steps to calculate normalized water fl the membrane permeability and monitor the effectiveness of t lifetime of the filter.	ux values to measure he cleaning and the	
In this section	This section contains the following sub-sections		
	Торіс	See	
	How to make a Normalized Water Flux analysis	2.2.1	
	How to manage the temperature correction table	2.2.2	

2.2.1 How to make a Normalized Water Flux analysis

#### 2.2.1 How to make a Normalized Water Flux analysis

Introduction The membrane permeability can be tested using the Normalized Water Flux operation. This test is used to ensure that the cleaning process is still effective and to determine the lifetime of a filter. The Normalized Water Flux is calculated using the following formula:

Normalized Water Flux  $[Lm^{-2}h^{-1}bar^{-1}] = (flux \times temperature correction factor)/TMP$ 

**Normalized Water Flux** enables the user not only to automatically calculate the normalized water flux from a result file, but also to plot results from multiple filter cycles on a single plot.

This section describes how to use the **ÄKTAcrossflow evaluation wizard** to make a **Normalized Water Flux** analysis.

How to start the wizard and select the operation	The table l	below describes how to select the <b>Normalized Water Flux</b> operation.
	Step	Action
	1	Click the <b>Evaluation Wizard</b> icon in the <b>Evaluation</b> module or choose <b>File:Membrane System Evaluation</b> .
		Result: The Evaluation Wizard dialog box appears.  Select operation  Process optimization  Normalized Water Flux  Diafiltration time optimization  Capacity plots  Any vs. any  Deen Previous

Step	Action	
2	<ul> <li>Select the Normalized Water Flux operation.</li> <li>Click the Next button.</li> <li><i>Result:</i> The Data selection dialog box opens.</li> </ul>	
	Note:	The <b>Open Previous Analysis</b> button is used to open results that already have been evalu- ated once and saved using the wizard.
	Note:	You can use the <b>Back</b> button in each step of the wizard to return and change selections in the previous steps.

How to locate and
select curves for
the analysis

The table below describes how to locate and select the curves for the the analysis.

Step	Action		
1	Select search criteria to locate the curves to compare:		
	Select a result folder		
	Select a result file		
	Select a chromatogram		
	Note:	The default selection for result files and chromatograms is the wildcard character *, which will display all files in the selected folder and all chromatograms in the located files. The <b>All</b> button will restore the wildcard character if desired.	

2 How to use the ÄKTAcrossflow evaluation wizard

2.2 How to calculate Normalized Water Flux values

2.2.1 How to make a Normalized Water Flux analysis

Step	Action
2	<ul> <li>The temperature curve will normally be selected by default. However for some systems, e.g. process systems, the curve must be selected.</li> <li>If your system uses the standard ÄKTAcrossflow strategy, proceed with step 3. Continue with this step to select the curve manually.</li> <li>Click the Advanced button and select a temperature curve.</li> <li>Click the OK button.</li> </ul>
	Advanced Normalized Water Flux         (Fks) * [Temp cont] / TMP         Pace       Temperature orrection table         See Press       Permin Flow         Peed Flow       Peed Flow         Peed Flow       Peed Flow         Peed Flow       Peed Flow         Peed Flow       Peed Flow         Peed Flow       Feed Flow         Peed Flow       Feed Flow         PeenVol       PeenVol         PeenVol       PeenVol         PeenVol       PeenVol         PeenVol       PeenVol         PeenVol       PeenVol
	Note:Temperature correction will be applied using the default temperature correction table, if the option isn't de-selected in this dialog box. The temperature table is always displayed and saved in Celsius. For instructions how to edit the table and set a new default table, see 2.2.2 How to manage the temperature cor- rection table on page 36.Note:The search through all folders to determine the available curves and populate the menus may take a long time.

Step	Action
3	Click the <b>Search</b> button.
	<i>Result</i> : All chromatogram containing curves corresponding to the se- lected search criteria are displayed in the <b>Found chromatograms</b> list.
	- Found chromatograms
	Select     File     Chrom     Curves       50mgmlConc2×001     10     Flux;TMP       TMP scout004     10     Flux;TMP       TMP scout005     10     Flux;TMP       Water Flux Test delta p10     Flux;TMP       Water Flux Test delta p10     Flux;TMP
	Search Clear
	<b>Note:</b> Curves that have been edited in the UNICORN Evaluation module are not available until the result has been saved.
4	• Click the check boxes for all chromatograms that you want to in- clude in the comparison.
	Click the <b>Next</b> button to proceed to define the plot data.
	<b>Note:</b> Use the <b>Clear</b> button to remove all chromatograms from the list if needed. You must do this first if you want to select other curves to compare.
Note:	You may also select to add Snapshots from other curves in this dialog box. See "How to add snapshots" below in this section.

- 2 How to use the ÄKTAcrossflow evaluation wizard
- 2.2 How to calculate Normalized Water Flux values

2.2.1 How to make a Normalized Water Flux analysis

How to define plotAll sample points in the selected result files are detected and listed in a data table asdatashown in the illustration below.



- **Note:** The table cells for the data points in the displayed chromatogram are marked in yellow. The cells for the selected marker point is highlighted in blue.
- **Note:** The values at the marker position are shown in the **Marker position** pane to the right of the curves. The values are expressed as averages for the defined **Average calculation window**, with the exact value at the marker point within brackets. The default value for the calculation window is 15 seconds before the marker position. This value can be changed in the **Advanced Normalized Water Flux** dialog box. The run time is also displayed.

The table below describes the available actions in this wizard dialog box:

When you want to	do this:
display the next chro- matogram in a group,	Click the <b>Next chromatogram</b> button
display the previous chromatogram in a group,	Click the <b>Previous chromatogram</b> button

When you want to	do this:
add a data point,	<ul> <li>Select the desired chromatogram</li> <li>Move the cursor to the data point in the chromatogram (the exact data values at the marker position is displayed in the Marker position boxes)</li> <li>Click the Add Point button</li> </ul>
	Note: Data points are available if a Set_Eval_Mark instruction was used with the parameter NormalisedWaterflux in the method. If not, data points must be added manually.
delete a data point,	<ul><li>Select a table cell in the row for the data point</li><li>Click the <b>Delete point</b> button</li></ul>
replace a data point,	<ul> <li>Select a table cell in the row for the data point</li> <li>Move the cursor to the data point in the chromatogram (the average and exact data values at the marker position are displayed in the Marker position boxes)</li> <li>Click the Replace point button</li> </ul>
rename the point list,	<ul> <li>Click the Rename point list button</li> <li>Result: The Rename Point List dialog box opens.</li> <li>Type a new name in the text box</li> <li>Click OK</li> </ul>
export the point list to an Excel file, display the plotted	<ul> <li>Click the Export to Excel button</li> <li>Result: The Export to Excel dialog box opens.</li> <li>Navigate to the folder where you want to save the file</li> <li>If desired, type a new filename in the File name text box.</li> <li>Click the Save button</li> <li>Click the Next button</li> </ul>
graph,	

2.2 How to calculate Normalized Water Flux values

2.2.1 How to make a Normalized Water Flux analysis



The plotted curves are now presented in a graph as shown in the illustration below:

Note: Only a maximum of 14 selected curves can be displayed in the graph.

The following actions can be performed in the **Graph View** dialog box:

- copy the graph via the Windows clipboard to other applications •
- print the graph •
- save the plotted results •
- create and print a report
- Note: The graph formats (f.ex. changing scale, switching from linear to logarithmic etc.) can also be edited in this dialog box by double-clicking in the graph area. The available formatting options are described in detail in the section 2.6 How to format the graphs on page 69.

How to copy the The graph can be copied to the Windows clipboard and then pasted into other graph to the clipapplications, e.g. Excel, Word etc. The graph is exported as a bitmap image. board • Click the Copy to clipboard button.

Result: The graph is copied and available on the clipboard.

How to print the<br/>graphThe graph can be printed directly on a selected printer without first being exported<br/>to another application. This option can also be used to create a pdf-file of the graph<br/>provided a suitable printer driver is installed.

The table below describes how to print the graph:

Step	Action		
1	Click the <b>Print Graph</b> button. <i>Result</i> : The <b>Print</b> dialog box opens with the default Windows printer selected.		
	Printing Normalized Water Flux       Image: Comparison of the second secon		
2	<ul> <li>Select a printer if the default printer is not to be used.</li> <li>Click the Setup button to adjust the printer settings if needed.</li> <li>Click the OK button</li> </ul>		
	Result: The graph is printed on the selected printer.		

2 How to use the ÄKTAcrossflow evaluation wizard

2.2 How to calculate Normalized Water Flux values

2.2.1 How to make a Normalized Water Flux analysis

How to save the plotted graph	The table below describes how to save the plotted graph data:		
data	Step	Action	
	1	Click the <b>Save Result</b> button.	
		<i>Result</i> : The <b>Save CrossFlow analysis result</b> dialog box opens.	
		Save CrossFlow analysis result	
		Save m: Normalized Water Flux NWF_20041107_165150.emr NWF_20041107_165206.emr File name: NWF_20041107_165212 Save	
		Save as type: CFF analysis results (*.emr)	
	2	<ul> <li>If required, save the graph data in a folder other than the default home folder.</li> <li>If required, type a new name for the result file.</li> </ul>	
		Click the <b>Save</b> button.	
		Result: The plotted graph data is saved.	
		tion/date and time when saved.	
	Note:	The graph data is saved in a special file format (.emr). All the original result files used in the evaluation must be stored in the same folder where they were stored when the graph was created to avoid problems with changed search paths when the evaluation is re-opened. For the same reason, the files may not be renamed after the evaluation.	
	Note:	Click the <b>Open Previous Analysis</b> button in the evaluation wizard to locate and open saved data files for editing. Only .emr-format files can be opened using this button. The <b>Open Previous Analysis</b> button is also the only way to access and open a saved analysis result. The .emr analysis files are not displayed in the <b>UNICORN ManagerResult</b> window or in the <b>File Navigator</b> of the <b>Evaluation</b> module.	
	Note:	Changes in the graph formatting are not saved.	
How to print a re-<br/>portYou can print a compiled report of the Normalized Water Flux analysis on your<br/>default Windows printer by clicking the Print Report button. This report will include<br/>the plotted graph and a table containing the following items for all data points:

- The result file names
- The filter area
- The normalized water flux values
- The transmembrane pressure values
- The Flux values
- The temperatures
- The corresponding snapshot values, if selected (see "How to add snapshots" below)

The report is sent straight to the printer and cannot be edited.

How to add snap-<br/>shotsThe data selection for the Normalized Water Flux analysis can include snapshots of<br/>other curve data. This data is included in the point lists and reports. The table below<br/>describes how to add snapshots.

Step	Action	
1	• Click the <b>Advanced</b> button in the <b>Data Selection</b> dialog box.	
	<i>Result</i> : The <b>Advanced Normalized Water Flux</b> dialog box opens.	
2	<ul> <li>Select a curve in the Snapshot parameters pane.</li> <li>Repeat selecting to add more snapshot curves if desired.</li> </ul> Snapshot parameters <ul> <li>ConcFactor</li> <li>Cond%</li> <li>DettaP</li> <li>DFX_Fact</li> <li>Feed_Flow</li> <li>FeedPress</li> <li>PH</li> <li>Press982</li> <li>Ret_Flow</li> </ul> e. Click the OK button to close the dialog box.	
3	• Select the <b>Snapshot</b> check box. <i>Result</i> : A list of the selected curves is displayed and snapshots from these curves will be added to the point lists and reports, corresponding to the selected data points in all chromatograms.	

2.2. How to calculate Normalized water Flux values 2.2.2 How to manage the temperature correction table

# 2.2.2 How to manage the temperature correction table

Introduction This section describes how to open saved temperature correction tables, create new tables, e.g. for use with different liquids, and how to set the default table for the normalized water flux calculations.

How to open aThe table below describes how to open a saved Temperature correction table in<br/>the Normalized Water Flux evaluation wizard.

Step	Action		
1	Click the <b>Evaluation Wizard</b> icon in the <b>Evaluation</b> module or choose <b>File:Membrane System Evaluation</b> .		
	<i>Result</i> : The <b>Evaluation Wizard</b> dialog box opens.		
2	Select the <b>Normalized Water Flux</b> operation.		
	Click the <b>Next</b> button.		
	Result: The Data Selection dialog box opens.		
3	Click the <b>Advanced</b> button.		
	Result: The Advanced Normalized Water Flux dialog box opens.		
	Advanced Normalized Water Flux         (Flux) * (Temp con) / TMP         Empendure correction table         Plux       Tempendure correction table         Plux       Tempendure correction table         Plux       Tempendure correction table         V       Cond       Cond       Rew         Save       Save       Save       Save         Sonpshot parameters       Feed Flow       Perm, Flow       Set as default         Perm, Flow       PermPiess       PermPiess       © °C         DF_X_Fact       Defase       PermPiess       © °C         PermPiess       PermVol       FaceFlosts       © °C         PermPiess       PermVol       FaceFlosts       © °C         PermVol       FaceFlosts       © °C       © °C         DK       Cancel       Heip       Heip		
	<b>Note:</b> The search through all folders to determine		
	the available curves and populate the menus may take a long time.		

Step	Action				
4 4	<ul> <li>Click the Open button in the Temperature correction table pane.</li> <li>Result: The Open temperature correction table dialog box opens.</li> <li>Open temperature correction tables         <pre>             TempCorr             Test 2</pre></li></ul>				
5	<ul> <li>Select the temperature correction table.</li> <li>Click the <b>Open</b> button.</li> <li><i>Result</i>: The values from the selected temperature correction table are entered in the table in the <b>Advanced Normalized Water Flux</b> dialog box.</li> </ul>				
Note:	The temperature correction table can be displayed either in Celsius o Fahrenheit by selecting the corresponding radio button, but the table is saved and re-displayed in Celsius by default. A <b>Temperature</b> <b>correction</b> check box is selected by default. De-select this check box temperature correction is not to be applied.				

How to create a

The table below describes how to create a new temperature correction table.

#### new table

Step	Action	
1	• Click the <b>New</b> button in the <b>Temperature correction table</b> pane.	
	<i>Result:</i> The table is cleared of all correction values and reset with a range from 1 to 60 degrees Celsius in 1 degree steps.	

2 How to use the ÄKTAcrossflow evaluation wizard

2.2 How to calculate Normalized Water Flux values

2.2.2 How to manage the temperature correction table

Step	Action			
2	<ul> <li>Double-click a correction value in the table and type in the correct new value.</li> <li>Repeat this step until the table is complete.</li> <li>Temperature correction table         <ul> <li>Temperature correction table</li> <li>New</li> <li>Save</li> <li>Save</li> <li>Set as default</li> <li>Tool 1.000</li> <li>Tool 1.000</li></ul></li></ul>			

How to save the<br/>tableThe table below describes how to save the new temperature correction table:

Step	Action
1	• Click the <b>Save</b> button.
	<i>Result</i> : The <b>Save temperature correction table</b> dialog box opens.
	Save temperature correction table  Stored temperature correction tables  Test 1 Test 2  Temperature correction table name Test 3  Save Cancel Help
2	• Type a name for the table in the <b>Temperature correction table name</b> text box.

3	Click the <b>Save</b> button.
	<i>Result</i> : The table is saved in the special format for temperature correction tables, <b>.emx</b> . The saved tables can only be accessed by using the <b>Open</b> button.

How to set a default correction table

the default temperature correction table.

• Click the **Set as default** button.

**Note:** When the default temperature correction table is open, or before a new table has been saved, this button is grayed out and not available.

# 2.3 How to perform a Diafiltration time optimization

Introduction For a given UF process, Diafiltration Time Optimization allows the user to identify the factor of volume concentration where the least time is required to complete the diafiltration. This is a function of the increase in concentration versus the subsequent decrease in flux.

**Diafiltration Time Optimization** creates a plot of the diafiltration time optimization parameter (concentration factor X flux) versus concentration factor. The concentration factor that corresponds to the highest value of the DF time optimization parameter (y) along the plot is the optimal concentration factor to perform diafiltration (for the conditions tested).

This evaluation protocol is performed on a result file from a concentration process which was run to the desired maximum concentration factor.

This section describes how to use the **Diafiltration Time Optimization** operation of the **ÄKTAcrossflow evaluation wizard** to find the optimal diafiltration time.

 How to start the wizard and select the operation
 The table below describes how to select the Diafiltration time optimization operation.

 Step
 Action

 1
 Click the Evaluation Wizard icon in the Evaluation module or choose

 File:Membrane System Evaluation.
 File:Membrane System Evaluation.

 Result: The Evaluation Wizard dialog box appears.
 Select operation

Select operation		
○ Normalized Water F	lux	
Diafiltration time opt     Connection line	imization	
O <u>C</u> apacity plots O Any vs. any		

Step	Action		
2	• Select the	Diafiltration time optimization operation.	
	Click the <b>Next</b> button.		
	Note:	The <b>Open Previous Analysis</b> button is used to open results that already have been evalu- ated once and saved using the wizard.	
	Note:	You can use the <b>Back</b> button in each step of the wizard to return and change selections in the previous steps.	

# select curves to optimize

How to locate and The table below describes how to locate and select result curves to use for the optimization in the evaluation wizard.

Step	Action	Action	
1	Select searc	h criteria to locate the curves to compare:	
	Select a result folder		
	<ul><li>Select a result file</li><li>Select a chromatogram</li></ul>		
	Note:	The default selection for result files and chromatograms is the wildcard character *, which will display all files in the selected folder and all chromatograms in the located files. The <b>All</b> button will restore the wildcard character if desired.	

Step	Action			
2	The <b>ConcFac</b> for some sys If your syste with step 3. (	ctor curve will normally be selected by default. However stems, e.g. process systems, the curve must be selected. m uses the standard ÄKTAcrossflow strategy, proceed Continue with this step to select the curve manually.		
	Click the A     Diafiltrat	Advanced button and select the ConcFactor curve in the ion time optimization dialog box.		
	Data Selection Search Rev setup Folder: c-L-Vie Revuit: Dromalogans Found chromatogans Select 1 There Search	Next Example flet Distillation Time Optimite W Biowren. (A) Biowren. (A) Biowren. (A) ConcFactor * Flux vs. ConcFactor Advanced Disfiltration time optimization ConcFactor * Flux vs. Flat ConcFactor * Flux vs. Flat Flat Flat Flat Flat Flat Flat Flat		
	Note:	The search through all folders to determine the available curves and populate the menus may take a long time.		
	Note:	The <b>Advanced</b> selections are only available if the <b>Found chromatograms</b> field is empty. Click the <b>Clear</b> button to remove all chroma- tograms before clicking the <b>Advanced</b> button.		

Step	Action		
3	• Click the <b>Search</b> button.		
	<i>Result</i> : All chromatogram containing curves corresponding to the lected search criteria are displayed in the <b>Found chromatograms</b>		
Found chromatograms         Select       File       Chrom       Curves         Init K42001       10       ConcFactor;Flux         Concentration6xBufferf       10       ConcFactor;Flux         Search       Clear		File Chrom Curves 101 10 ConcFactor,Flux ation6xBufferf 10 ConcFactor,Flux Clear	
	Note: C E r	Curves that have been edited in the UNICORN Evaluation module are not available until the esult has been saved.	
4	• Click the check boxes for all chromatograms that you want to in- clude in the comparison.		
	Click the <b>Next</b> button to proceed to define the plot data.		
	Note: L g ti c	Jse the <b>Clear</b> button to remove all chromato- grams from the list if needed. You must do his first if you want to select other curves to compare.	

How to define plotThe table below describes how to define the plot data for the selected curves.dataImage: Image: Imag

Step	Action		
1	• Place the cursor over the left red boundary marker.		
	• Press the left mouse button and drag the boundary marker to where you want the plot data to begin.		



The plotting region between the markers can be defined by start and end Eval Window instructions in the method. If several windows were defined in the method you can select each one in the **Select analysis window** droplist. If the region is not defined in the result file, the mid 50% of the curve will be selected.





The plotted curves are now presented in a graph as shown in the illustration below:

**Note:** Only a maximum of 14 selected curves can be displayed in the graph.

The following actions can be performed in the **Graph View** dialog box:

- rename the **Curve labels** (if more than one curve was selected for plotting)
- copy the graph via the Windows clipboard to other applications
- print the graph
- save the plotted results

Note:

Actions in the

**Graph View** 

The graph formats (f.ex. changing scale, switching from linear to logarithmic etc.) can also be edited in this dialog box by double-clicking in the graph area. The available formatting options are described in detail in the section **2.6 How to format the graphs** on page 69. How to rename The default curve label names are the group names (for a single curve, the file name). the Curve labels The label name that is currently displayed in the top text box of the Curve labels pane can be replaced with a new text. This pane is only available if more than one curve or group was selected for plotting. Click the droplist arrow by the top text box to select another label name for editing. • Type the new label text in the lower text box. ٠ • Click the **Rename** button. Result: The label is renamed. Curve labels Rename a curve by selecting it in the list box. Type the new name in the edit field and click the Rename button to confirm. c:\...\Default\Example files\Diafiltration Time Optimization\ I 🗸 Rename c:\...\Default\Example files\Diafiltration Time Note: Only the label name is changed. The result file name is not changed. The label name can also be changed by renaming the group or curve point list in the **Define plot data** dialog box.

How to copy the graph to the clipboard
The graph can be copied to the Windows clipboard and then pasted into other applications, e.g. Excel, Word etc. The graph is exported as a bitmap image.
Click the Copy to clipboard button.

Result: The graph is copied and available on the clipboard.

How to print the<br/>graphThe graph can be printed directly on a selected printer without first being exported<br/>to another application. This option can also be used to create a pdf-file of the graph<br/>provided a suitable printer driver is installed.

The table below describes how to print the graph:

Step	Action		
1	Click the <b>Print Graph</b> button.		
	<i>Result</i> : The <b>Print</b> dialog box opens with the default Windows printer selected.		
	Printing ConcFactor*Flux vs. ConcFactor         Printer:         EPSON Stylus Photo 900 on LPT1:         Orientation:         Paper:         Size: A4 210 x 297 mm         Source Ark         Cancel         Setup         Help		
2	• Select a printer if the default printer is not to be used.		
	Click the <b>Setup</b> button to adjust the printer settings if needed.		
	Click the <b>OK</b> button.		
	<i>Result</i> : The graph is printed on the selected printer.		

How to save the	The table below describes how to save the plotted graph data:			
data	Step	Action		
	1	Click the <b>Save Result</b> button.		
		<i>Result</i> : The <b>Save CrossFlow analysis result</b> dialog box opens.		
		Save CrossFlow analysis result		
		Save in: Diafiltration Time Optimization V CO DF DF IIII -		
		DFTimeOpt_20041108_000430.emr  DiafiltrationOptB5A04sep27.emr		
		File name:     DFTimeOpt_20041108_000441     Save       Save as type:     CFF analysis results (".emr)     Cancel		
	2	• If required, type a new name for the result file.		
		Click the <b>Save</b> button.		
		<i>Result</i> : The plotted graph data is saved.		
		Note:The default file name is the type of opera- tion/date and time when saved.		
	Note:	The graph data is saved in a special file format (.emr). All the original result files used in the evaluation must be stored in the same folder where they were stored when the graph was created to avoid problems with changed search paths when the evaluation is re-opened. For the same reason, the files may not be renamed after the evaluation.		

- **Note:** Click the **Open Previous Analysis** button in the evaluation wizard to locate and open saved data files for editing. Only .emr-format files can be opened using this button. The **Open Previous Analysis** button is also the only way to access and open a saved analysis result. The .emr analysis files are not displayed in the **UNICORN ManagerResult** window or in the **File Navigator** of the **Evaluation** module.
- *Note:* Changes in the graph formatting are not saved.

## 2.4 How to make a Capacity plot

**Introduction** The analysis of experimental results in cell processing often includes the plotting of process parameters versus the membrane capacity. The formula for capacity is:

Capacity = accumulated permeate volume / surface area

**Capacity plots** allows the user to plot any process parameter versus the accumulating permeate volume normalized to the surface area (capacity).

**Capacity plots** also accepts input of a system-external result from sampling during a run (i.e. activity assay results and its corresponding permeate volume) and can plot the external result versus capacity.

This section describes how to use the **Capacity plots** operation of the **ÄKTAcrossflow** evaluation wizard to get a graphical analysis of the filter capacity.

How to start the	The table below describes how to select the <b>Capacity plots</b> operation.
------------------	--

wizard and select the operation

Step	Action		
1	Click the <b>Evaluation Wizard</b> icon in the <b>Evaluation</b> module or choose <b>File:Membrane System Evaluation</b> .		
	<i>Result</i> : The <b>E</b>	valuation Wizard dialog box appears.	
	Select operation <ul> <li>Process opti</li> <li>Normalized Y</li> <li>Diafiltration t</li> <li>Capacity plo</li> <li>Any vs. any</li> </ul> Open Previous Analysis	mization <u>M</u> ater Flux ime optimization ts	
2	Select the	Capacity plots operation.	
	Click the <b>Next</b> button.		
	Note:	The <b>Open Previous Analysis</b> button is used to open results that already have been evalu- ated once and saved using the wizard.	
	Note:	You can use the <b>Back</b> button in each step of the wizard to return and change selections in the previous steps.	

How to select a	The table below describes how to select a result curve for plotting.			
city plot	Step	Action		
	1	Select search criteria to locate the curves to compare:		
		Select a result folder		
		Select a result file		
		Select a chromatogram		
		Note:	The default selection for result files and chromatograms is the wildcard character *, which will display all files in the selected folder and all chromatograms in the located files. The <b>All</b> button will restore the wildcard character if desired.	

Step	Action		
2	Select the cu • Select on	<ul><li>Select the curve for the capacity plot:</li><li>Select one of the default curves</li></ul>	
	or • Click the in the <b>Ad</b>	<b>Advanced</b> button and select any of the available curves <b>vanced Capacity</b> dialog box.	
	<b>Note:</b> The <b>Advanced</b> selections are only available if the <b>Found chromatograms</b> field is empty. Click the <b>Clear</b> button to remove all chroma- tograms before proceeding.		
	Data Selection  Search filter setup Folder: c/_VD Result * Chromatogram: Curver: Flux  Found chromatograms  Found chromatograms  Search  Search	elasA'Example files/Capacity/	
	Note:	The search through all folders to determine the available curves and populate the menus may take a long time.	
	Note:	When a curve has been selected once it will be added to the default curve menus. The first selected parameter will be plotted as the Y- axis in the <b>Graph View</b> .	
	Note:	See <b>How to compare external vs capacity</b> in this section for information about this op- tion.	

Step	Action		
3	Click the <b>Search</b> button.		
	<i>Result</i> : All chromatogram containing curves corresponding to the se- lected search criteria are displayed in the <b>Found chromatograms</b> list.		
	- Found chromatograms		
	Select         File         Chrom         Curve           Any vs capacity         10         Flux		
	TMP scout long any vs permeal 10 Flux TMP scout External data vs Cap 10 Flux TMP scout External data vs Cap 10 Flux		
	Search		
	<b>Note:</b> Curves that have been edited in the UNICORN Evaluation module are not available until the result has been saved.		
4	• Click the check boxes for all chromatograms that you want to in- clude in the comparison.		
	Click the <b>Next</b> button to proceed to define the plot data.		
	<b>Note:</b> Use the <b>Clear</b> button to remove all chromato- grams from the list if needed. You must do this first if you want to select other curves to compare.		

How to define plotThe table below describes how to define the plot data for the selected curves.data

Step	Action			
1	• Place the cursor over the left red boundary marker.			
	• Press the left mouse button and drag the boundary marker to where you want the plot data to begin.			

Step	Action		
2	• Repeat step 1 with the right boundary marker to define the end of the plot data.		
	Define plot data         File: c:\UNICOBRVL.co.dkFR.Default/Result/Fichia 045mg/04nov25001.res         0:00       Image: c:\UNICOBRVL.co.dkFR.Default/Result/Fichia 045mg/04nov25001.res         0:00       Image: c:\UNICOBRVL.co.dkFR.Default/Fichia 045mg/04nov25001.res         0:00       Image: c:\UNICOBRVL.co.dkFR.Default/Fichia 045mg/04nov25001.res         0:00       Image: c:\UNICOBRVL.co.dkFR.Default/Fichia 045mg/04nov25001.res         0:00       Image: c:\UNICOBRVL.co.dkFR.Default/Fichia 045mg/04nov25001.res         File deal       Image: c:\UNICOBRVL.co.dkFR.Default/Fichia 045mg/04nov25001.res         0:00       Image: c:\UNICOBRVL.co.dkFR.Default/Fichia 045mg/04nov2500		
	(Beck New) Concel         Note:         The plotting region between the markers can be defined by the instructions Start_Ev-al_Window in combination with Stop_Ev-al_Window, with the parameter Capacity, in the method. If several windows were defined in the method you can select each one in the Select analysis window droplist. If the region is not defined in the result file, the mid 50% of the curve will be selected.		
3	<ul> <li>Click the Next chromatogram button (if more than one chromato- gram was selected).</li> <li>Repeat steps 1 and 2 above in the other selected chromatograms.</li> <li>If needed, click the Previous chromatogram button to adjust the previous plot region again.</li> </ul>		
4	<ul> <li>If needed, type the filter area for the filter used for the run in the Filter area text box.</li> <li>Note: This value is not retrieved automatically from the result file. It must be entered manually. The default value that is entered by the system is 45 cm<sup>2</sup>.</li> </ul>		
5	• Click the <b>Next</b> button to proceed to view the plotted graph.		

# Actions in theThe plotted regions of the selected curves are now presented in a graph as shownGraph Viewin the illustration below:



*Note:* Only a maximum of 14 selected curves can be displayed in the graph.

The following actions can be performed in the **Graph View** dialog box:

- rename the Curve labels (if more than one curve was selected for plotting)
- copy the graph via the Windows clipboard to other applications
- print the graph
- save the plotted results

#### Note:

The graph formats (f.ex. changing scale, switching from linear to logarithmic etc.) can also be edited in this dialog box by double-clicking in the graph area. The available formatting options are described in detail in the section **2.6 How to format the graphs** on page 69.

# How to rename The default curve label names are the search path and file name of the original result file. The label name that is currently displayed in the top text box of the Curve labels pane can be replaced with a new text. Click the droplist arrow by the top text box to select another label name for editing. This pane is only available if more than one curve was selected for plotting.

- Type the new label text in the lower text box.
- Click the **Rename** button.

*Result*: The label is renamed.

-Curve label:	s Rename a curve by selecting it in the list box. Type the new name in the edit field and click the Rename bu	itton to confirm.
	c:\\Default\Example files\Capacity\TMP scout long any 💌	
	c:\\Default\Example files\Capacity\TMP scout	Rename

**Note:** Only the label name is changed. The result file name is not changed.

How to copy the graph can be copied to the Windows clipboard and then pasted into other applications, e.g. Excel, Word etc. The graph is exported as a bitmap image.
Click the Copy to clipboard button.

• Click the **Copy to clipboard** button.

Result: A dialog box opens and the graph is copied and available on the clipboard.

How to print the graph can be printed directly on a selected printer without first being exported to another application. This option can also be used to create a PDF-file of the graph provided a suitable printer driver is installed.

The table below describes how to print the graph:

Step	Action				
1	Click the <b>Print Graph</b> button.				
	<i>Result</i> : The <b>Print</b> dialog box opens with the default Windows printer selected.				
	Printing Flux vs. Capacity       Image: Capacity         Printer:       Image: Capacity         Orientation:       Paper: Size: A4 210 x 297 mm         Discrete Ark       Cancel         Setup       Help				

data

Step	Action			
2	• Select a printer if the default printer is not to be used.			
	• Click the <b>Setup</b> button to adjust the printer settings if needed.			
	Click the <b>OK</b> button.			
	<i>Result</i> : The graph is printed on the selected printer.			

#### How to save the The table below describes how to save the plotted graph data: plotted graph Action Step 1 • Click the Save Result button. *Result*: The **Save CrossFlow analysis result** dialog box opens. Save CrossFlow analysis result ? 🗙 Save in: 🗀 Capacity 💌 🔇 🤣 📂 🖽+ 🖬 Capacity\_20041108\_143648.emr 🔤 Capacity\_20041108\_143702.emr File name: Capacity\_20041108\_143710 Save Cancel × Save as type: CFF analysis results (\*.emr) 2 • If required, save the graph data in a folder other than the default home folder. If required, type a new name for the result file. • • Click the **Save** button. Result: The plotted graph data is saved. The default file name is the type of opera-Note: tion/date and time when saved.

Note: The graph data is saved in a special file format (.emr). All the original result files used in the evaluation must be stored in the same folder where they were stored when the graph was created to avoid problems with changed search paths when the evaluation is re-opened. For the same reason, the files may not be renamed after the evaluation.

Note:	Click the <b>Open Previous Analysis</b> button in the evaluation wizard to locate and open saved data files for editing. Only .emr-format files can
	be opened using this button. The <b>Open Previous Analysis</b> button is
	also the only way to access and open a saved analysis result. The .emr
	analysis files are not displayed in the UNICORN ManagerResult window
	or in the File Navigator of the Evaluation module.
Note:	Changes in the graph formatting are not saved.

#### How to compare The table below describes how to plot an external result versus capacity. External vs Capa-Note: city

The method or the manual run must include the instruction Set\_Eval\_Mark with the parameter ExtData\_vs\_Capacity to enable input of external data.

Step	Action			
1	Select External from the Curves menu.      Search filter setup     Folder:         c:\\Default\Example files\Capacity\         Browse     Browse     All     Chromatogram:         Vs. Capacity         Advanced      Found chromato     CrossFlow     DetaP     File     Chrom     Curves			
2	<ul> <li>Select search criteria to locate the curves to compare:</li> <li>Select a result folder</li> <li>Select a result file</li> <li>Select a chromatogram</li> <li>Click the Search button.</li> <li>Result: All chromatogram containing curves corresponding to the selected search criteria are displayed in the Found chromatograms list.</li> </ul>			
3	<ul> <li>Click the check boxes for all chromatograms that you want to include in the comparison.</li> <li>Click the <b>Next</b> button to proceed to define the plot data.</li> </ul>			

Step	Action				
4	Set Una         Curve nome           Belte point         Permote Volume External         File         Area         Image: Curve nome           Belte point         Permote Volume External         File         Area         Image: Curve nome           Belte point         Image: Curve nome         Image: Curv				
	Kote:     No curve is plotted in this operation. Only the				
	<ul> <li>Enter the data from the external source:</li> <li>Click a cell in the External column and enter the corresponding value.</li> <li>Continue until the table is complete.</li> </ul>				
	<ul> <li>You can also do the following in this dialog box:</li> <li>Click the Set Unit button to change the name or enter a new unit for the external data.</li> </ul>				
	Define external signal				
	<ul> <li>Select a cell in the table and click the <b>Delete Point</b> button to remove a data point.</li> <li>Click the <b>Bengme point list</b> button and tupe a new pame for the</li> </ul>				
	<ul> <li>Click the <b>Rename point list</b> button and type a new name for the list.</li> <li>Click the <b>Export to Excel</b> button to save the list in Excel-format.</li> </ul>				



### 2.5 How to compare process data using the Any vs any operation

Introduction This section describes how to use the Any vs any operation of the ÄKTAcrossflow evaluation wizard to compare process data.

**Any vs any** is used to analyze results from routine concentration/diafiltration and cell processing runs. It provides the capability to plot any process parameter captured as a curve in a given result file on either the X axis or the Y axis. It also allows scaling of the X or Y axis to be linear or logarithmic.

How to start the wizard and select the operation	The table below describes how to select the <b>Any vs any</b> operation.			
	Step	Action		
	1	Click the Ev File:Memb	valuation Wizard icon in the Evaluation module or choose rane System Evaluation.	
		Result: The	<b>Evaluation Wizard</b> dialog box appears.	
		Select operation Process of Normalize Diafiltratio Capacity p Any vs. ar Open Previo Analysis	n ptimization d Water Flux n time optimization alots	
	2	Select t	he <b>Any vs any</b> operation.	
		Click the <b>Next</b> button.		
		Note:	The <b>Open Previous Analysis</b> button is used to open results that already have been evalu-ated once and saved using the wizard.	
		Note:	You can use the <b>Back</b> button in each step of the wizard to return and change selections in the previous steps.	

select curves to compare

How to locate and The table below describes how to locate and select result curves for comparison in the evaluation wizard.

Step	Action			
1	Select search criteria to locate the curves to compare:			
	• Select a r	Select a result folder		
	Select a result file			
	Select a chromatogram			
	Note:	The default selection for result files and chromatograms is the wildcard character *, which will display all files in the selected folder and all chromatograms in the located files. The <b>All</b> button will restore the wildcard character if desired.		

Step	Action		
2	Select the cu Select de or Click the a available Note: Data Selection Folder: ct.vp Result Ct.vp	Advanced button and select any combination of the curves in the Advanced Any vs. any dialog box. The Advanced selections are only available if the Found chromatograms field is empty. Click the Clear button to remove all chromatograms before proceeding.	
	Chemaloguer, * Curve: Flac Found chemalogues - F7 Select The Search	Image: Concluster     Advanced.       Image: Concluster     Advanced.       Image: Concluster     Image: Concluster       Image: Concluster     Image: Concluster	
	Note:	The search through all folders to determine the available curves and populate the menus may take a long time. When a curve has been selected once it will	
		be added to the default curve menus. The first selected parameter will be plotted as the Y- axis in the <b>Graph View</b> .	

Step	Action		
3	Click the <b>Search</b> button.		
	<i>Result</i> : All chromatogram containing curves corresponding to the selected search criteria are displayed in the <b>Found chromatograms</b> list.		
	Found chromatograms         Select       File       Chrom       Curves         ProteinY001       10       ConcFactor;Flux         Search       Clear         Note:       Curves that have been edited in the UNICORN		
	Evaluation module are not available until the result has been saved.		
4	• Click the check boxes for all chromatograms that you want to in- clude in the comparison.		
	Click the <b>Next</b> button to proceed to define the plot data.		
	<b>Note:</b> Use the <b>Clear</b> button to remove all chromatograms from the list if needed. You must do this first if you want to select other curves to compare.		

How to define plotThe table below describes how to define the plot data for the selected curves.dataImage: Image: Imag

Step	Action			
1	<ul> <li>Place the cursor over the left red boundary marker.</li> </ul>			
	• Press the left mouse button and drag the boundary marker to where you want the plot data to begin.			

2.5 How to compare process data using the Any vs any operation



#### Actions in the Graph View

The plotted regions of the selected curves are now presented in a graph as shown in the illustration below:



*Note:* Only a maximum of 14 selected curves can be displayed in the graph.

The following actions can be performed in the **Graph View** dialog box:

- rename the **Curve labels** (if more than one curve was selected for plotting)
- copy the graph via the Windows clipboard to other applications
- print the graph
- save the plotted results

Note:

The graph formats (f.ex. changing scale, switching from linear to logarithmic etc.) can also be edited in this dialog box by double-clicking in the graph area. The available formatting options are described in detail in the section **2.6 How to format the graphs** on page 69.

How to rename the Curve labels	The defau The label r pane can l curve or g • Click th • Type th • Click th <i>Result</i> : The	It curve label names are the search path and file name of the result file. name that is currently displayed in the top text box of the <b>Curve labels</b> be replaced with a new text. This pane is only available if more than one roup was selected for plotting. e droplist arrow by the top text box to select another label name for editing. ne new label text in the lower text box. e <b>Rename</b> button. e label is renamed.	
	c: c:	Type the new name in the edit field and click the Rename button to confirm.	
	Note:	Only the label name is changed. The result file name is not changed.	
How to copy the graph to the clip- board	<ul> <li>The graph can be copied to the Windows clipboard and then pasted into other applications, e.g. Excel, Word etc. The graph is exported as a bitmap image.</li> <li>Click the Copy to clipboard button.</li> <li><i>Result</i>: The graph is copied and available on the clipboard.</li> </ul>		
How to print the graph	The graph to another provided c	can be printed directly on a selected printer without first being exported application. This option can also be used to create a pdf-file of the graph suitable printer driver is installed.	
	The table l	pelow describes how to print the graph:	
	Step	Action	
	1	Click the Print Graph button. <i>Result</i> : The Print dialog box opens with the default Windows printer selected.      Printing Flux vs. ConcFactor     Printer:     [FPSON Stylus Photo 900 on LPT1:     Orientation:     Paper:     Size: A4 210 x 297 mm     OK     Source Ark     Cancel     Seture	
		Setup	

Step	Action			
2	<ul> <li>Select a printer if the default printer is not to be used.</li> </ul>			
	• Click the <b>Setup</b> button to adjust the printer settings if needed.			
	Click the <b>OK</b> button.			
	<i>Result</i> : The graph is printed on the selected printer.			

How to save the plotted araph	The table below describes how to save the plotted graph data:			
data	Step	Action		
	1	Click the <b>Save Result</b> button.		
		<i>Result</i> : The <b>Save CrossFlow analysis result</b> dialog box opens.		
		Save CrossFlow analysis result		
		Save in: 🗁 Any vs Any 🔽 🕑 🧭 🗁 🖽 •		
		Image: Any_vs_any_20041108_233959.emr         Image: Any_vs_any_20041108_234150.emr         File name: Any_vs_any_20041108_234217         Save as type: CFF analysis results (*.emr)         Cancel		
	2	• If required, save the graph data in a folder other than the default home folder.		
		• If required, type a new name for the result file.		
		Click the <b>Save</b> button.		
		<i>Result</i> : The plotted graph data is saved.		
		<b>Note:</b> The default file name is the type of opera- tion/date and time when saved.		
		The graph data is caused in a special file format (omr). All the original		

**Note:** The graph data is saved in a special file format (.emr). All the original result files used in the evaluation must be stored in the same folder where they were stored when the graph was created to avoid problems with changed search paths when the evaluation is re-opened. For the same reason, the files may not be renamed after the evaluation.

Note:	Click the <b>Open Previous Analysis</b> button in the evaluation wizard to
	locate and open saved data files for editing. Only .emr-format files can
	be opened using this button. The <b>Open Previous Analysis</b> button is
	also the only way to access and open a saved analysis result. The .emr
	analysis files are not displayed in the UNICORN ManagerResult window
	or in the File Navigator of the Evaluation module.
Note:	Changes in the graph formatting are not saved.

# 2.6 How to format the graphs

#### Introduction

This section describes the different available graph objects and how to use the formatting options. The graph objects that are available in the embedded plotting application are

- General format graphs
- Scientific graphs
- 3D scientific graphs
- Pie charts

Most of the ÄKTAxflow evaluation operations are plotted in Scientific graphs. The Normalized Water Flux analysis is plotted in a general graph format. The 3D scientific graphs and pie charts are not applicable for ÄKTAxflow evaluations. The formatting options that are specific for these graphs and charts are not described here. However, the options are presented in the help functions for the plotting application, which is available from a shortcut menu that can be opened by right-clicking in the graphs.

This section also contains a sub-section about how to export the graphs directly from the plotting application.

#### In this section

This section contains the following sub-sections

Торіс	See
How to format Normalized Water Flux graphs	2.6.1
How to format other ÄKTAcrossflow graphs	2.6.2
How to export the graphs	2.6.3

2 How to use the ÄKTAcrossflow evaluation wizard2.6 How to format the graphs2.6.1 How to format Normalized Water Flux graphs

# 2.6.1 How to format Normalized Water Flux graphs

IntroductionThis section describes how to format the general graphs, which are used for the<br/>Normalized Water Flux analysis.Note:In this section the formatting options are described as they are arranged

in the Customization dialog box.
 Note: Formatting changes are not saved when a result is saved. However, the changes will effect the printed output and also when the graph is copied to the clipboard.

The **Customization** dialog box is opened by double-clicking in the graph object.

The Customization dialog box and the formatting menu

The dialog box contains a number of tab panes and a row of function buttons. There is also a link from the dialog box to an **Export** dialog box.

Style         General       Plot       Subsets       Points       Axis       Font       Color         Main Title:       Show Annotations         Normalized Water Flux       Numeric Precision       0
G Graphed C All Subsets


The **formatting menu** is accessed by right-clicking in the graph object. The contents of the menu is determined by the type of graph object that is displayed.

The menu contains a list of many of the formatting options from the **Customization** dialog box, as well as links to this dialog box, the export function and the help function for the graph application: All descriptions of the formatting options in the **Customization** dialog box are also valid for the corresponding commands in the shortcut menu, but the options are limited to a few parameters that are effected immediately when they are selected.

Basic functions in	The following functions ar	e common for all tabs in the <b>Customization</b> dialog box:	
the Customization	• Click the <b>OK</b> button to apply the selected changes and close the dialog box.		
dialog box	• Click the <b>Cancel</b> button to close the dialog box without applying any changes to the araph.		
	• Click the <b>Apply</b> button opens for further editir	to apply the selected changes and leave the dialog box ng.	
	• Click the <b>Help</b> button to Help file is not an integ	o open the specific Help file for the graph application. This Irated part of the UNICORN Help.	
	Click the <b>Original</b> button to restore the graph to its original state, with the default formatting selections.		
	• Click the <b>Export</b> butto export the graphs on	on to open the <b>Export</b> dialog box. See section <b>2.6.3 How to</b> page 91 for information of how to use the <b>Export</b> options.	
	• Click the <b>Maximize</b> but	ton to display the graph in full screen size.	
	Note: Changes the the settings is reset to the	at are made while the graph is maximized are restored to made in the regular <b>Graph View</b> dialog box when the graph he <b>Graph View</b> display.	
General format- ting options	The table below describes the <b>Customization</b> dialog	the formatting functions available in the <b>General</b> tab of box.	
	Select this function	to do this:	
	Main Title	Type a new title for the graph in the text box.	
	Sub Title	Type a title that will be displayed in a smaller font be- neath the main title.	
	Viewing Style	Choose one of the following style options:	
		Graph elements in color	
		Monochrome graph elements	
		Monochrome graph elements and symbols	
		Note: You can choose to fill mono-	
		Note: You can choose to fill mono- chrome elements with color in the Color tab and use this	
		Note: You can choose to fill mono- chrome elements with color in the Color tab and use this as an alternative color	
		Note: You can choose to fill mono- chrome elements with color in the Color tab and use this as an alternative color scheme.	

LargeMediumSmall

Select this function	to do this:
Show annotations	Select this checkbox to show annotations, if available. However, this function is not used in ÄKTAcrossflow evaluations.
Numeric Precision	<ul> <li>Choose to display the number of decimals to be displayed when the graph is exported:</li> <li>None</li> <li>One</li> <li>Two</li> <li>Three</li> </ul>
Grid Lines	<ul> <li>Choose how to display grid lines in the graph:</li> <li>For both axes</li> <li>For the X-axis</li> <li>For the Y-axis</li> <li>None</li> <li>Select if the grid lines are to be displayed in front of the data.</li> </ul>
Display	<ul> <li>Choose the objects to display in the graph area:</li> <li>Only a graph</li> <li>Only a table</li> <li>Both a graph and a table</li> </ul>
Subsets to Table	Not applicable for Normalized Water Flux graphs.

Normalized Water Flux Customization		
General Plot Subsets	Style   Points Axis Font Color	
Main Title: Normalized Water Flux Sub Title:	Show Annotations Numeric Precision 0 0 1 0 2 0 3	
Viewing Style Color Monochrome Monochrome + Symbols Font Size Large Med Small	Grid Lines Both OY OX ONone Grid Lines Grid Lines Grid Lines Grid Lines ONone Display Graph O Table O Both Subsets to Table Graphed O All Subsets	
OK Cancel Apply	Help Original Export Maximize	

Plotting format-	The table below describes the formatting functions available in the <b>Plot</b> tab of the
ting options	Customization dialog box.

Select this function	to do this:
Axes	Select the axis to be edited. This option will be select- able only if more than one Y-axis is plotted. The plotting style for the selected axis can be chosen in the <b>Plot</b> <b>Style</b> pane.
3D	<ul> <li>Select how the objects in the graphs are to be presented:.</li> <li>With no shadows or depth dimensions</li> <li>With a simple shadow</li> <li>With a depth perspective (only bars and area charts)</li> </ul>
Plot Style	Choose one of the following style options: <ul> <li>Area</li> <li>Bar</li> <li>Histogram</li> <li>Line</li> <li>Points</li> <li>Points and Best Fit Curve</li> <li>Points and Best Fit Curve 2</li> <li>Points and Best Fit Line</li> <li>Points and Best Fit Line 2</li> <li>Points and Best Fit Line 2</li> <li>Points and Spline</li> <li>Spline</li> </ul> Note: The "Best Fit" calculations are made from a least squares approximation of the data set. The "Best Fit" calculations will consider all points in the graph regardless if they are visible or not. The "Best Fit2" calculations will only consider visible points, e.g. when a portion of a curve is zoomed in

Select this function	to do this:
Comparison Plot Style	Choose a style option for a secondary data set for comparison, if available.
Mark Data Points	Select this checkbox to display small circular marks at the data point locations.

Normalized Water Flux	Customization	
Council Dist	Style	Aria I. Early I. Color I.
Axes • [LMH/bar] Axis 2 Axis 3 Axis 4 Axis 5 Axis 6 3D • Off • Shadow • 3E • Mark Data Points	Subsets     Points       Plot Style       Area       Bar       Histogram       Line       Points       Points+BestFitCurve       Points+BestFitLine       Points+BestFitLine       Points+Spline       Spline	Axis Pont Color Comparison Plot Style Line Points Points+BestFitCurve Points+BestFitCurve Points+BestFitLine Points+BestFitLine Points+Spline Spline
OK Cancel Apply Help Original Export Maximize		

# **Subset selection** The subset selection options available in the **Subset** tab of the **Customization** dialog box is not applicable for the Normalized Water Flux graphs since only one curve is plotted.

**Point selection** The table below describes the point selection options available in the **Points** tab of the **Customization** dialog box.

Select this function	to do this:	
Sequential in the Points to Graph pane	Display all de end point.	ata points from the first to the selected
and scroll to the desired end point in the scroll bar box	Note:	Subsequent points are not visible but can be displayed by dragging the scroll bar under the graph pane. This scroll bar is only present when a limited number of data points are selected for display.

2.6 How to format the graphs

2.6.1 How to format Normalized Water Flux graphs

Select this function	to do this:
<b>Selected</b> in the <b>Points</b> <b>to Graph</b> pane and choose two or more data points	<ul> <li>Display only the selected data points in the graph.</li> <li>Click the first point to be displayed, hold the mouse button and drag to the last point to select a sequence.</li> <li>Press the Ctrl key and click each point to select individual points out of sequence.</li> </ul>
an option in the <b>Point</b> <b>Label Orientation</b> pane	<ul> <li>Choose how the point labels are displayed in the graph:</li> <li>Auto - either horizontal or vertical</li> <li>Vertical</li> <li>Horizontal</li> <li>Slanted</li> </ul>

Normalized Water Flux Customization		
Style		
General Plot Subsets <b>Points</b> Axis Font Color		
Points to Graph <ul> <li>Sequential</li> <li>Selected</li> </ul>		
Point Label Orientation O Auto O Vertical O Horizontal O Slanted		
OK Cancel Apply Help Original Export Maximize		

#### Y-axis formats

The table below describes the Y-axis formatting options available in the **Axis** tab of the **Customization** dialog box.

Select this function	to do this:
Linear	Display the Y-axis data on a linear scale.
Log	Display the Y-axis data on a logarithmic scale.
Auto	Define the minimum and maximum Y-axis scale values automatically.

Select this function	to do this:
Min	Type a minimum scale value for the Y-axis in the <b>Min</b> text box.
Μαχ	Type a maximum scale value for the Y-axis in the <b>Max</b> text box.
Min/Max	Type minimum and maximum scale values for the Y- axis in the <b>Min</b> and <b>Max</b> text boxes.

Normalized Water Flux Customization	X
Style	
General     Plot     Subsets     Points     Axis     Font     Color       Y Axis <ul> <li>Linear</li> <li>Log</li> <li>Auto</li> <li>Min</li> <li>Max</li> <li>Min/Max</li> <li>Min</li> <li>Max</li> <li>Max</li> <li>Min</li> <li>Max</li> <li></li></ul>	
OK Cancel Apply Help Original Export Maximize	

2.6 How to format the graphs

2.6.1 How to format Normalized Water Flux graphs

#### Font selections

Fonts can be selected and formatted in the **Fonts** tab of the **Customization** dialog box, for the following text items:

- Main Title
- Sub Title
- Subset, Point and Axis labels
- Table Data

Only scalable True Type fonts can be used. A sample of the text with the selected font and formatting is shown in the dialog box.

Normalized Water Flux Customization		
Style		
General Plot Subsets Points Axis <b>Font</b> Color		
Main Title:		
Times New Roman 🛛 🗹 bold 🗌 italic 🙀 underline		
Sub-Title:		
Times New Roman 🛛 🔽 bold 🗌 italic 🗌 underline		
Subset / Point / Axis Labels:		
Arial 🛛 bold 🗌 italic 🗌 underline		
Table Data:		
Arial		
sample: <u>AaBbCcDdEeFfGg</u>		
OK Cancel Apply Help Original Export Maximize		

#### **Color selections** The graph application features two alternative color sets that can be selected on the General tab, the Color set and the Monochrome set. Primarily, the Monochrome color set is used for printing on monochrome printers while the **Color** color set is used for screen display. You can toggle between the sets while keeping the selected colors in each set.

The Monochrome color set can also be edited so that elements are colored in the same way as in the **Color** set, as an alternative color scheme.

Follow the steps below to color a graph element:

- Select a graph element
- Select a color in the palette
- Click the **Apply** button

The table below describes what the graph elements are that can be colored using the selections that are available in the Color tab of the Customization dialog box.

Graph element	Description
Desk Foreground	The color used for all text in the <b>Desk Background</b> area

Graph element	Description
Desk Background	The color of the area immediately surrounding the outside borders of the graph's grid
Shadow Color	The graph's grid and the table is displayed with a shadow outline. Choose the same color for the shadow and the desk background if you want to remove the shadow.
Graph Foreground	The color used for all the borders, grid-lines and other boundary lines in the graph area
Graph Background	The color of the area inside the graph's borders
Table Foreground	The color used for the table borders and for all text in- side
Table Background	The color of the area inside the table's borders



How to edit line and point colors and style The table below describes how to edit the color and style of graph lines and data point markers in the **Style** tab of the **Customization** dialog box.

Step	Action	
1	• Select a d	ata subset from the subset pane.
	Note:	All changes will effect this subset only. The line and point style and colors that presently corresponds to this subset will be displayed and highlighted.

2.6 How to format the graphs2.6.1 How to format Normalized Water Flux graphs

Step	Action
2	• Select a color for the lines and points by clicking on one of the colored boxes in the palette.
	<i>Result</i> : The selected color is outlined and the point marker and line example colors are changed.
3	Choose a style for the data point markers from the <b>Point Type</b> droplist.
	Choose a line type from the Line Type droplist.
4	Click the <b>Apply</b> button to apply the changes.

Normalized Water Flux Customization 🛛 🔀
General Plot Subsets Points Axis Font Color <b>Style</b>
Water Flux Test Delta p
Point Type: Solid Square
OK Cancel Apply Help Original Export Maximize

#### 2.6.2 How to format other ÄKTAcrossflow graphs

Introduction This section describes how to format scientific graphs, which are used for the following operations:

- Process optimization
- Diafiltration time optimization
- Capacity plots
- Any vs. any
- **Note:** In this section the formatting options are described as they are arranged in the Customization dialog box.
- **Note:** Formatting changes are not saved when a result is saved. However, the changes will effect the printed output and also when the graph is copied to the clipboard.

The Customization dialog box and the formatting menu The **Customization** dialog box is opened by double-clicking in the graph object.

The dialog box contains a number of tab panes and a row of function buttons. There is also a link from the dialog box to an **Export** dialog box.





The **formatting menu** is accessed by right-clicking in the graph object. The contents of the menu is determined by the type of graph object that is displayed.

The menu contains a list of many of the formatting options from the **Customization** dialog box, as well as links to this dialog box, the export function and the help function for the graph application: All descriptions of the formatting options in the **Customization** dialog box are also valid for the corresponding commands in the shortcut menu, but the options are limited to a few parameters that are effected immediately when they are selected.

**Basic functions in** The following functions are common for all tabs in the **Customization** dialog box: the Customization • Click the **OK** button to apply the selected changes and close the dialog box. dialog box • Click the **Cancel** button to close the dialog box without applying any changes to the graph. • Click the **Apply** button to apply the selected changes and leave the dialog box opens for further editing. • Click the **Help** button to open the specific Help file for the graph application. This Help file is not an integrated part of the UNICORN Help. • Click the **Original** button to restore the graph to its original state, with the default formatting selections. • Click the Export... button to open the Export dialog box. See section 2.6.3 How to export the graphs on page 91 for information of how to use the Export options. • Click the Maximize button to display the graph in full screen size. Changes that are made while the graph is maximized are restored to Note: the settings made in the regular Graph View dialog box when the graph is reset to the Graph View display. **General format-**The table below describes the formatting functions available in the General tab of ting options the **Customization** dialog box. Select this function... ...to do this:

Main Title	Type a new title for the graph in the text box.
Sub Title	Type a title that will be displayed in a smaller font be- neath the main title.
Viewing Style	<ul> <li>Choose one of the following style options:</li> <li>Graph elements in color</li> <li>Monochrome graph elements</li> <li>Monochrome graph elements and symbols</li> <li>Note: You can choose to fill mono- chrome elements with color in the Color tab and use this as an alternative color scheme.</li> </ul>
Font Size	Choose one of the following sizes: • Large • Medium • Small

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Select this function	to do this:
Show annotations	This checkbox is selected to show annotations, if available. However, this function is not used in ÄKTAcrossflow evaluations.
Numeric Precision	Choose the number of decimals to be displayed when the graph is exported: • None • One • Two • Three
Grid Lines	<ul> <li>Choose how to display grid lines in the graph:</li> <li>For both axes</li> <li>For the X-axis</li> <li>For the Y-axis</li> <li>None</li> <li>Select if the grid lines are to be displayed in front of the data.</li> </ul>

<b>⊴eneral  </b> Plot   Subsets   Main Title: TMP vs. Flux	Axis Font Color Style
Sub Title:	
Viewing Style © Color O Monochrome O Monochrome + Symbols	Grid Lines Both OY OX ONone Grid in front of data
Font Size O Large O Med O Small	

Plotting format-	The table below describes the formatting functions available in the <b>Plot</b> tab of the
ting options	Customization dialog box.

Select this function	to do this:
Axes	Select the axis to be edited. This option will be select- able only if more than one Y-axis is plotted. The plotting style for the selected axis can be chosen in the <b>Plot</b> <b>Style</b> pane.
3D	Select how the objects in the graphs are to be presen- ted:.
	With no shadows or depth dimensions
	With a simple shadow
	• With a depth perspective (only bars and area charts)
Plot Style	Choose one of the following style options:
	• Area
	• Bar
	• Line
	Points
	Points and Best Fit Curve
	Points and Best Fit Line
	Points and Line
	Points and Spline
	• Spline
	Note: The "Best Fit" calculations are
	made from a least squares
	set.
Comparison Plot Style	Choose a style option for a secondary data set for comparison, if available.
Mark Data Points	Select this check box to display small circular marks at the data point locations.

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Kes	Plot Style	Comparison Plot Style
<b>bar</b> Axis 2 Axis 3 Axis 4 Axis 5	Area Bar Line Points Points+BestFitCurve Points+Line Points+Line Points+Spline	Line Points Points+BestFitCurve Points+BestFitLine Points+Line Points+Spline Spline
ff		

#### Subset selection

The table below describes the subset selection options available in the **Subset** tab of the **Customization** dialog box.

Select this function	to do this:
no subset selected in the <b>Subset to Graph</b> pane and 0 in the <b>Scrolling Subsets</b> box	Display all subsets.
one or more subsets selected in the <b>Subset</b> <b>to Graph</b> pane and 0 in the <b>Scrolling Subsets</b> box	Only the selected subsets are displayed.
no subsets selected in the <b>Subset to Graph</b> pane and the <b>Scrolling</b> <b>Subsets</b> box set to 1 or higher	Scroll through all subsets using a vertical scroll bar that is displayed to the right side of the graph. The number of subsets displayed in each panel is determined by the number in the box.
one or more subsets selected in the <b>Subset</b> <b>to Graph</b> pane and the <b>Scrolling Subsets</b> box set to 1 or higher	Display the selected subsets permanently, scroll through the remaining subsets. The selected subsets are displayed in all panels together with the number of the remaining subsets that have been selected in the box.

TMP vs. Flux Customizatio	n	
General Plot Subset	t <b>s  </b> Axis <b> </b> Font <b> </b> Color	Style
Group 1 Group 2 Group 3	Scrolling 1 C m >	
OK Cancel Ap	ply Help Original (	Export Maximize

#### Axis formats

The table below describes the X-axis and Y-axis formatting options available in the **Axis** tab of the **Customization** dialog box.

Select this function	to do this:
Linear	Display the axis data on a linear scale.
Log	Display the axis data on a logarithmic scale.
Auto	Define the minimum and maximum axis scale values automatically.
Min	Type a minimum scale value for the axis in the <b>Min</b> text box.
Μαχ	Type a maximum scale value for the axis in the <b>Max</b> text box.
Min/Max	Type minimum and maximum scale values for the axis in the <b>Min</b> and <b>Max</b> text boxes.

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Y Axis	Plot		ubsets	Axis	Font	Col	or   S	tyle	1
Linear	OLog								
Auto	O Min	⊖ Ma	k 💿 Mi	n/Max					
Min 0.60		Max	2.40						
X Axis D Linear	O Log	ОМа	/ 🕥 Mi	n/May					
Min 15.0		Max	400.0						
		TREASE AND							

Font selections

Fonts can be selected and formatted in the **Fonts** tab of the **Customization** dialog box, for the following text items:

- Main Title
- Sub Title
- Subset, Point and Axis labels
- Table Data

Only scalable True Type fonts can be used. A sample of the text with the selected font and formatting is shown in the dialog box.

TMP vs. Flux Custom	ization	
General   Plot	Subsets Axis Font Color Style	
Main Title:		
Times New Roman	🔽 🗹 bold 🔲 italic 🛒 underline	
Sub-Title:		
Times New Roman	💽 🔲 bold 🔲 italic 🔲 underline	
Subset / Point / Axis La	bels:	
Arial	Sold italic underline	
sample: <u>AaBbC</u>	CcDdEeFfGg	
OK Cancel	Apply Help Original Export Max	(imize)

# **Color selections** The graph application features two alternative color sets that can be selected on the **General** tab, the **Color** set and the **Monochrome** set. Primarily, the **Monochrome** color set is used for printing on monochrome printers while the **Color** color set is used for screen display. You can toggle between the sets while keeping the selected colors in each set.

The **Monochrome** color set can also be edited so that elements are colored in the same way as in the **Color** set, as an alternative color scheme.

Follow the steps below to color a graph element:

- Select a graph element
- Select a color in the palette
- Click the **Apply** button

The table below describes what the graph elements are that can be colored using the selections that are available in the **Color** tab of the **Customization** dialog box.

Graph element	Description
Desk Foreground	The color used for all text in the <b>Desk Background</b> area
Desk Background	The color of the area immediately surrounding the outside borders of the graph's grid
Shadow Color	The graph's grid and the table is displayed with a shadow outline. Choose the same color for the shadow and the desk background if you want to remove the shadow.
Graph Foreground	The color used for all the borders, grid-lines and other boundary lines in the graph area
Graph Background	The color of the area inside the graph's borders



#### How to edit line and point colors and style

The table below describes how to edit the color and style of graph lines and data point markers in the **Style** tab of the **Customization** dialog box.

Step	Action	
1	Select a data subset from the subset pane.	
	<b>Note:</b> All changes will effect this subset only. The line and point style and colors that presently corresponds to this subset will be displayed and highlighted.	
2	• Select a color for the lines and points by clicking on one of the colored boxes in the palette.	
	<i>Result</i> : The selected color is outlined and the point marker and line example colors are changed.	
3	• Choose a style for the data point markers from the <b>Point Type</b> drop list.	
	Choose a line type from the Line Type drop list.	
4	Click the <b>Apply</b> button to apply the changes.	

TMP vs. Flux Customiza	ition	
General Plot Sul	bsets Axis Font Color Style	
Group 1		
Group 3		
	Point Type: 🔺 Solid Upward Triangle 🛛 👻	
	Line Type:	
OK Cancel	Apply Help Original Export Max	imize)

#### 2.6.3 How to export the graphs

Introduction The graph can be exported directly from the graph application either as an image in bitmap or MetaFile format, or as text and data. The graph data can either be copied to the clipboard, saved as a file or sent to the printer.

The illustration below shows the **Exporting...** dialog box:

Exporting Normalized Water Flux	
Export CMetaFile OBMP OText	/ Data Only
Export Destination     O ClipBoard     File Browse     Printer	
Object Size         Image: Size Object Size O	Export Cancel Help

#### How to export a MetaFile

The table below describes how to use the different export options for a Windows MetaFile (**.wmf** format).

Destination	How to use the option
Clipboard	1. Select <b>ClipBoard</b> in the <b>Export Destination</b> pane.
	<ol> <li>Select a unit to define the image size in the Object Size pane; in millimeters, inches or points, or leave the size unspecified.</li> </ol>
	3. Type measurements in the <b>Width</b> and height boxes.
	4. Click the <b>Export</b> button.
	<i>Result</i> : The file is exported and the dialog box closes.

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Destination	How to use the option
File	<ol> <li>Select File in the Export Destination pane.</li> <li>Click the Browse button and navigate to the destination folder in the Save As dialog box.</li> </ol>
	3. Type a name in the <b>File name</b> text box and click <b>Save</b> .
	Export Destination     ClipBoard     File Browse C:\UNICORN\Local\Fil\Default\Result\Filtration     Printer
	<ol> <li>Select a unit to define the image size in the Object Size pane; in millimeters, inches or points, or leave the size unspecified.</li> </ol>
	5. Type measurements in the <b>Width</b> and height boxes.
	<i>Result</i> : The file is saved in <b>.wmf</b> format and the dialog box closes.
Printer	1. Select <b>Printer</b> in the <b>Export Destination</b> pane.
	2. Select <b>Full Page</b> in the <b>Object Size</b> pane or define a size for the print in millimeters, inches or points.
	3. Click the <b>Print</b> button.
	<i>Result</i> : The <b>Printing</b> dialog box opens.

## How to export as a bitmap file

The table below describes how to use the different export options for bitmap files (**.bmp** or **.dib** format).

Destination	How to use the option
Clipboard	1. Select <b>ClipBoard</b> in the <b>Export Destination</b> pane.
	<ol> <li>Define the image size expressed in pixels in the Object Size pane.</li> </ol>
	3. Click the <b>Export</b> button.
	<i>Result</i> : The file is exported and the dialog box closes.

Destination	How to use the option
File	1. Select File in the Export Destination pane.
	2. Click the <b>Browse</b> button and navigate to the destin- ation folder in the <b>Save As</b> dialog box.
	<ol> <li>Type a name in the File name text box and click Save.</li> </ol>
	<ol> <li>Define the image size expressed in pixels in the Object Size pane.</li> </ol>
	5. Click the <b>Export</b> button.
	<i>Result</i> : The file is saved in <b>.bmp</b> or <b>.dib</b> format and the dialog box closes.

### and data

How to export text The table below describes how to use the different export options for text and data only (.txt or .dat format).

Destination	How to use the option
Clipboard	• Select <b>ClipBoard</b> in the <b>Export Destination</b> pane.
	Click the <b>Export</b> button.
	<i>Result</i> : The <b>Export</b> dialog box opens.
	• Select the appropriate export options. See Actions in the Export dialog box below for detailed information.
	Click the <b>Export</b> button.
	<i>Result</i> : The data is exported to the Windows clipboard and the dialog box closes.

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Destination	How to use the option
File	<ul> <li>Select File in the Export Destination pane.</li> <li>Click the Browse button and navigate to the destination folder in the Save As dialog box.</li> </ul>
	<ul> <li><i>Result</i>: The Save As dialog box opens.</li> <li>Navigate to the destination folder.</li> <li>Type a name in the File name text box and click Save.</li> </ul>
	<ul><li><i>Result</i>: The Save As dialog box closes.</li><li>Click the Export button.</li></ul>
	<ul> <li><i>Result</i>: The Export dialog box opens.</li> <li>Select the appropriate export options. See Actions in the Export dialog box below for detailed information.</li> <li>Click the Export button.</li> </ul>
	<i>Result</i> : The file is saved in <b>.txt</b> or <b>.dat</b> format and the dialog box closes.

Use this field	to do this:
Select Subsets and Points	• Click the <b>All Data</b> radio button to export all curves and points.
	or
	1. Click the <b>Selected Data</b> radio button.
	2. Select one or more curves in the <b>Subsets to Export</b> field.
	3. Select one or more points in the <b>Points to Export</b> field.
	Note: To select several items in se- quence, click the first item, press and hold the shift key and click the last item. To se- lect several items not in se- quence, click the first item, press and hold the Ctrl key and click each subsequent item.
Export What	Select to export
	only the data points
	or
	• both the data points and the labels.
Data to Export	Select to export
	only the Y-axis values
	or
	• both the point numbers and the Y-axis values.
Export Style	Select to export
	• a list, choose a tab or comma delimited list
	or
	• a table, choose the order of column vs row data.

Actions in the Ex- The table below describes the options in the Export... dialog box.

#### port dialog box

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Use this field	to do this:
Numeric Precision	Select to export the values with the
	• <b>Current Precision</b> , i.e. the number of decimal posi- tions specified in the <b>General</b> tab of the <b>Customiza-</b> <b>tion</b> dialog box
	or
	• <b>Maximum Precision</b> , i.e. up to seven decimal positions.

The illustration below shows the **Export...** dialog box.

Export Normalized Water Flux		
<ul> <li>Select Subsets and Points</li> <li>All Data</li> <li>Selected Data</li> <li>Subsets to Export:</li> <li>Curve name</li> </ul>	Export What Data ③ Data and Labels Data to Export ④ Y Axis Value O Point Number, Y Axis Value	
Points to Export:	Export Style	

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