HTRI heat-exchanger (Xace) within ProSimPlus®

Use Case 5: Use of HTRI air cooler heat-exchanger (Xace) within ProSimPlus

Software & Services In Process Simulation

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ProSim

Introduction

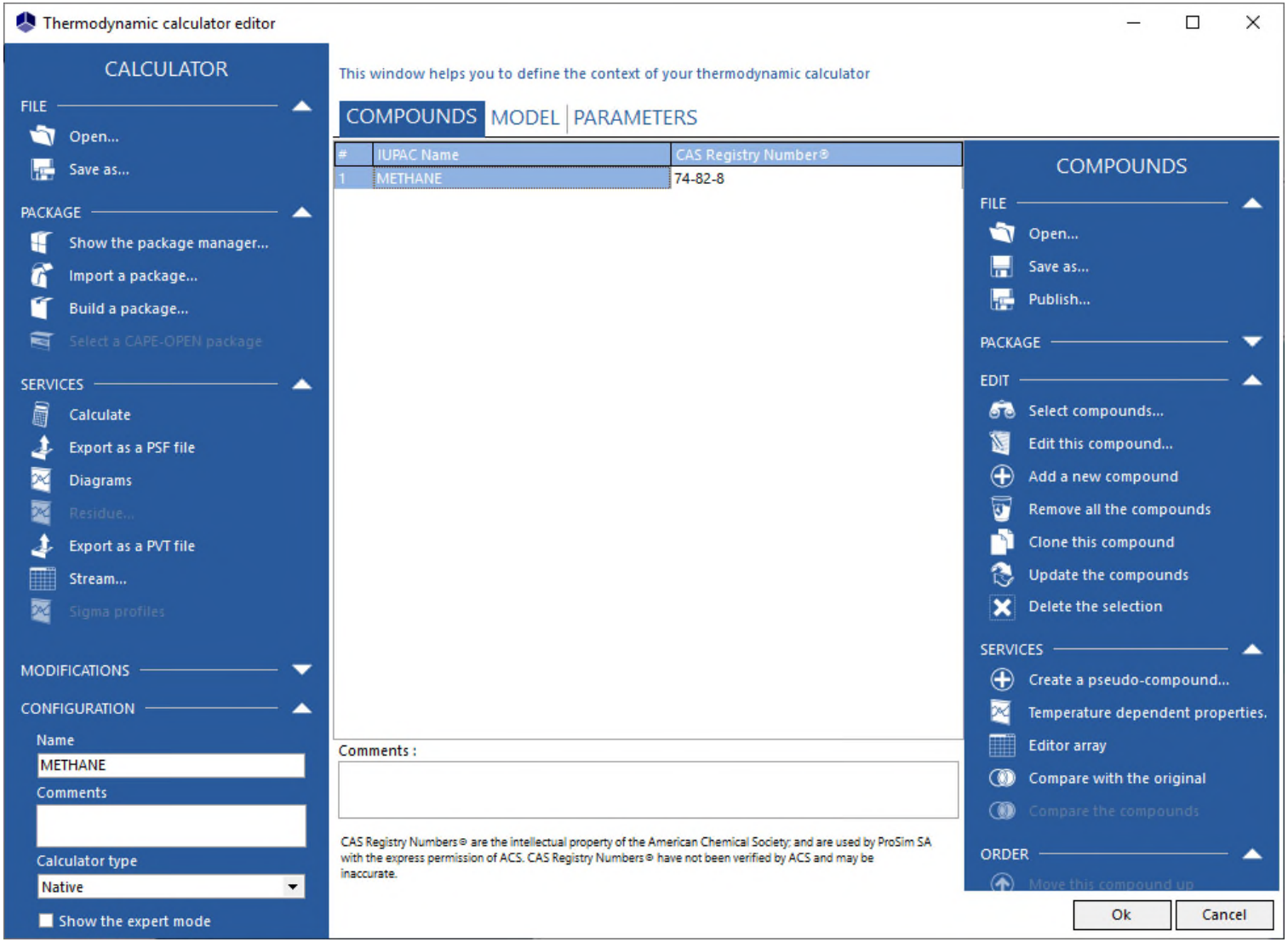
ProSimPlus® is a process engineering software that performs rigorous mass and energy balance calculations for a wide range of industrial steady-state processes. It is used in design as well as in operation of existing plants for process optimization, units troubleshooting or debottlenecking, plants revamping or performing front-end engineering analysis.

This document gives an example of use of HTRI (Heat Transfer Research, Inc.) air cooler heat-exchanger (Xace) within ProSimPlus®.

Note: as a prerequisite for a better understanding of this document, the user should know the general use of ProSimPlus®.

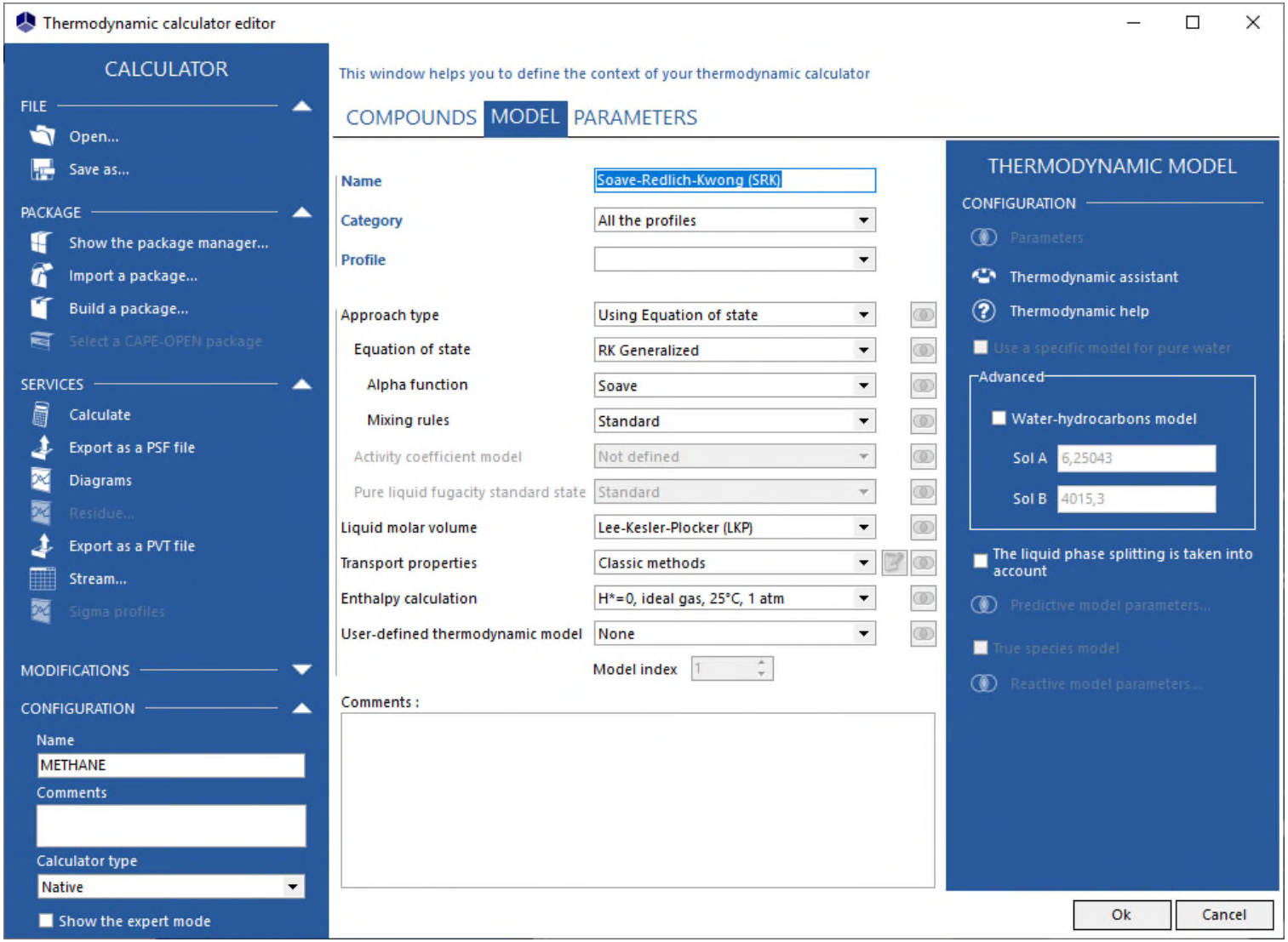
STEP #1: Select your compounds

Select your compounds like for any usual case:



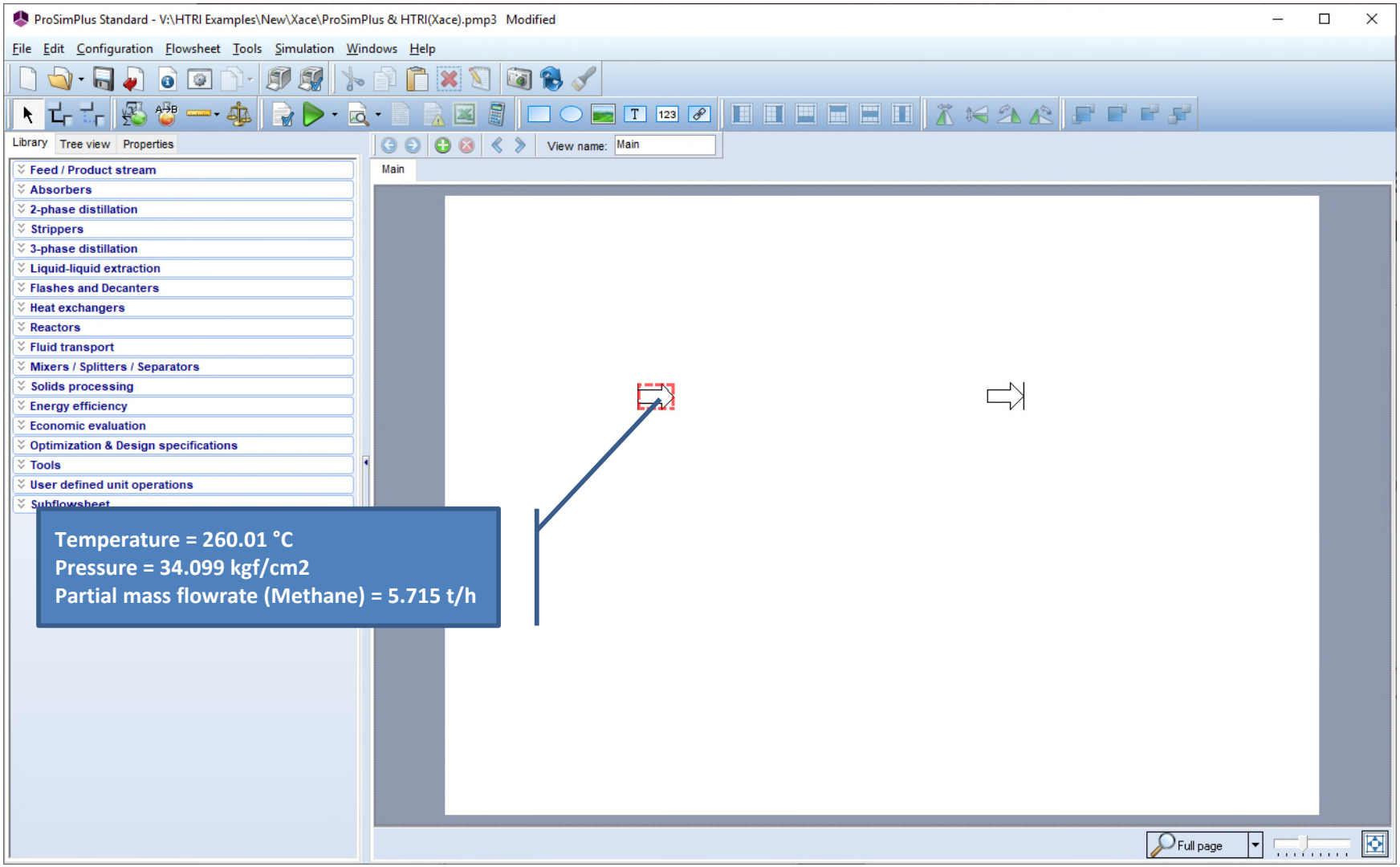
STEP #2: Select your thermodynamic model

Select your thermodynamic model like for any usual case:



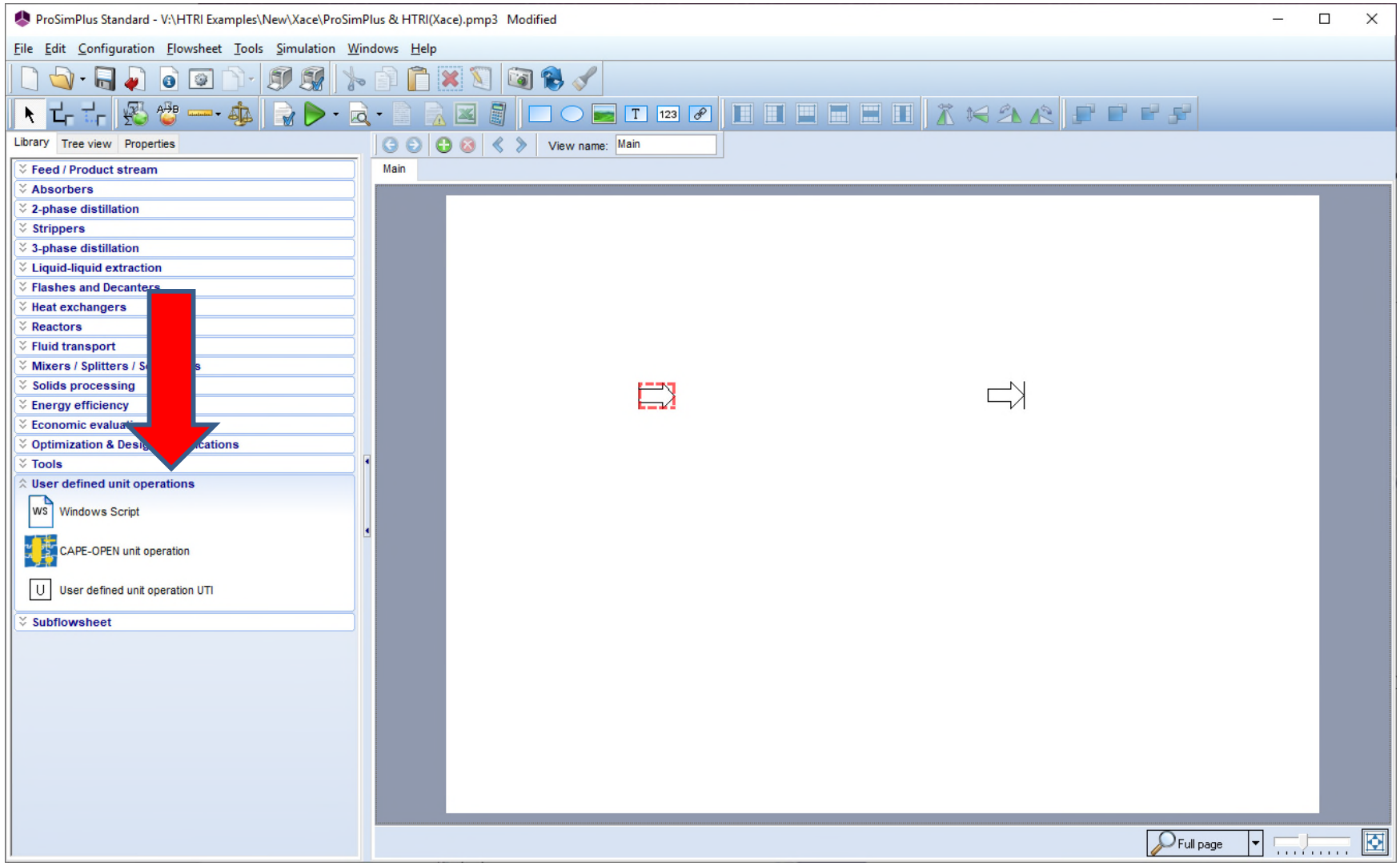
STEP #3: Create your flowsheet

Like for any usual case, add the feed and the product stream needed for your flowsheet, then edit the parameters (temperature, pressure, partial flowrates) for the feed:



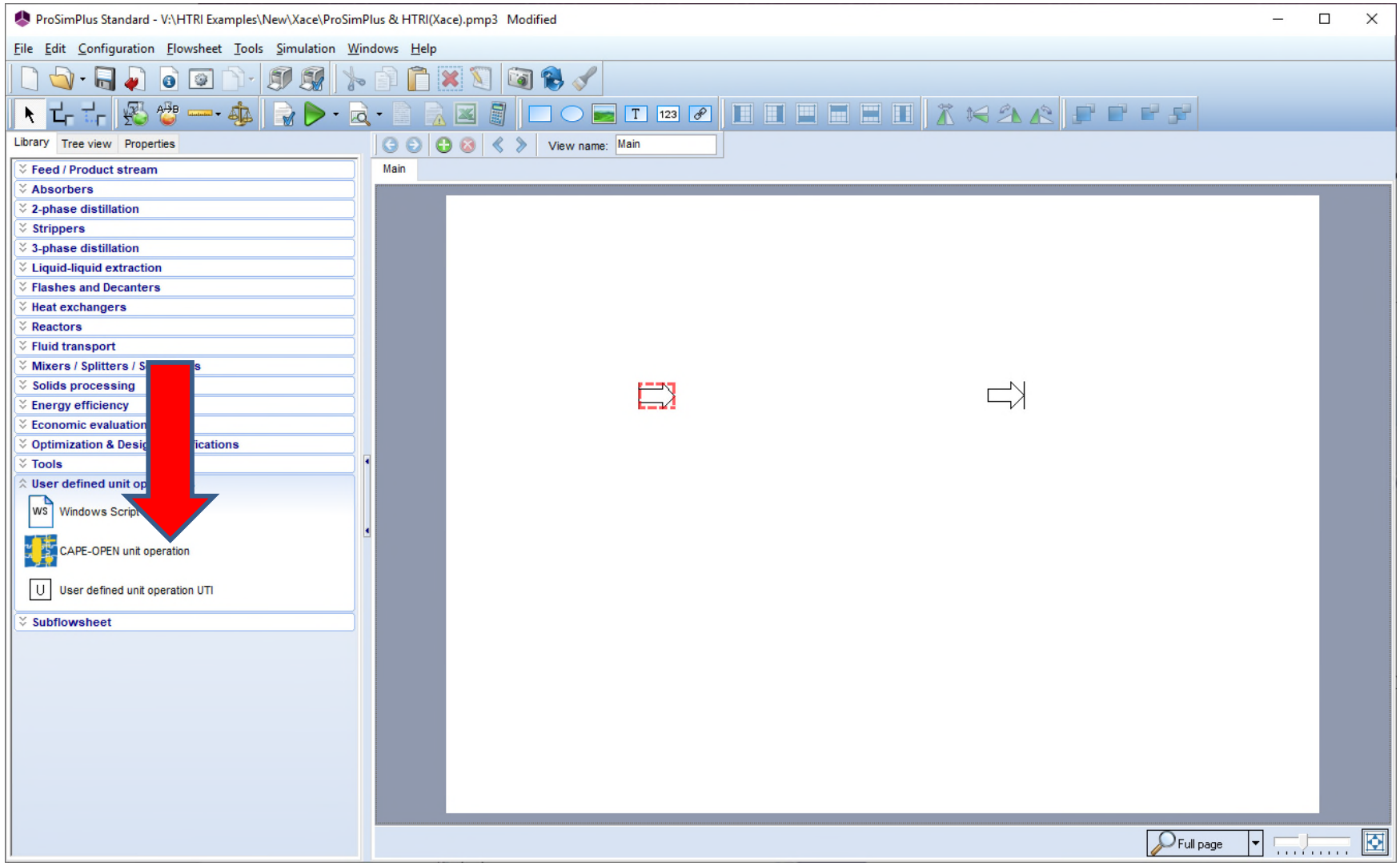
STEP #3: Create your flowsheet

To add a Xace heat-exchanger (air cooler), click on the category “User defined operations” in the “Library” of unit operations:



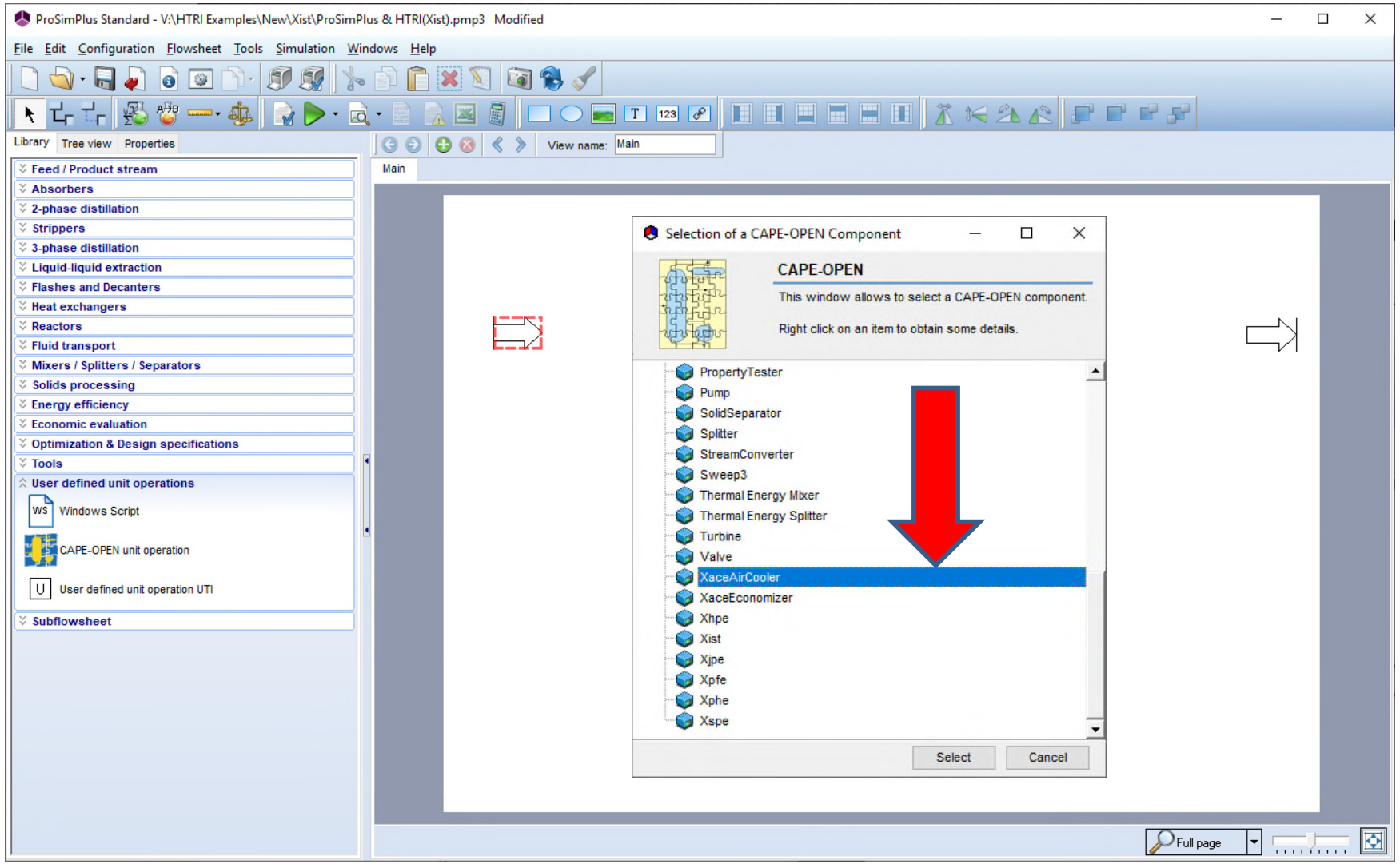
STEP #3: Create your flowsheet

Then click on “CAPE-OPEN unit operation”, then click on the flowsheet to add it:



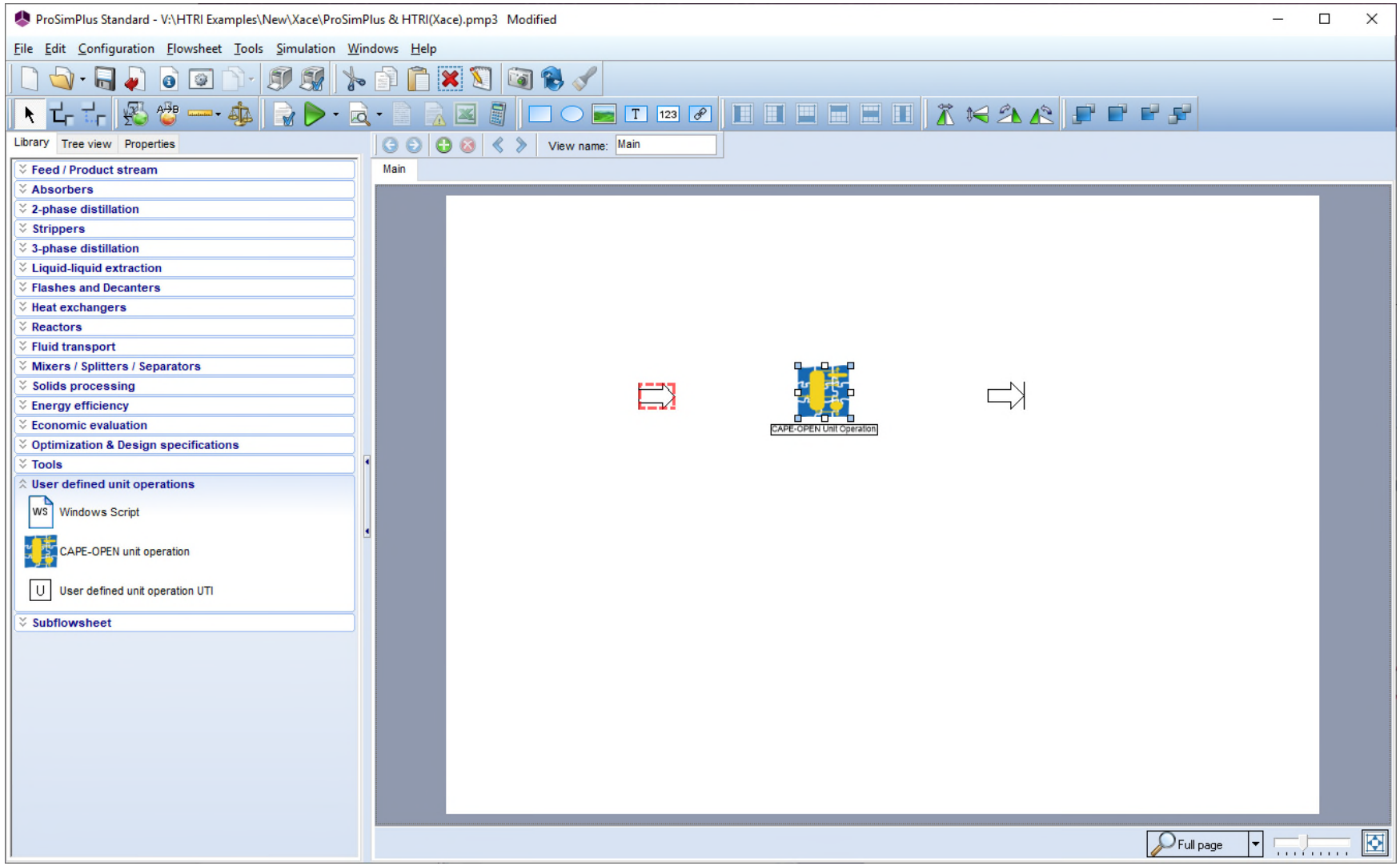
STEP #3: Create your flowsheet

The list of CAPE-OPEN unit operations available on your computer is displayed, select "XaceAirCooler" and then click on the button "Select" to validate your choice:



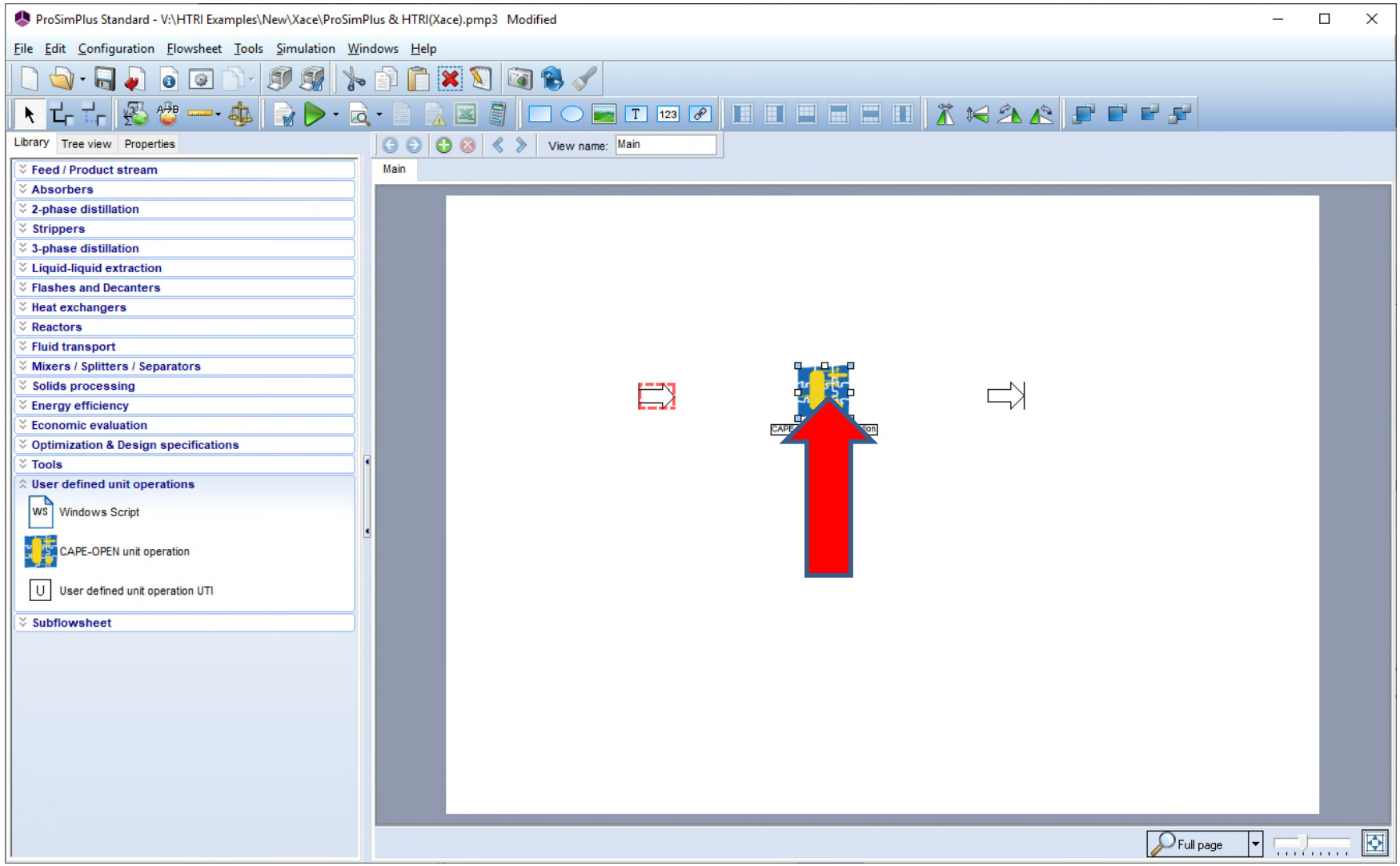
STEP #3: Create your flowsheet

The Xace heat-exchanger icon is added:



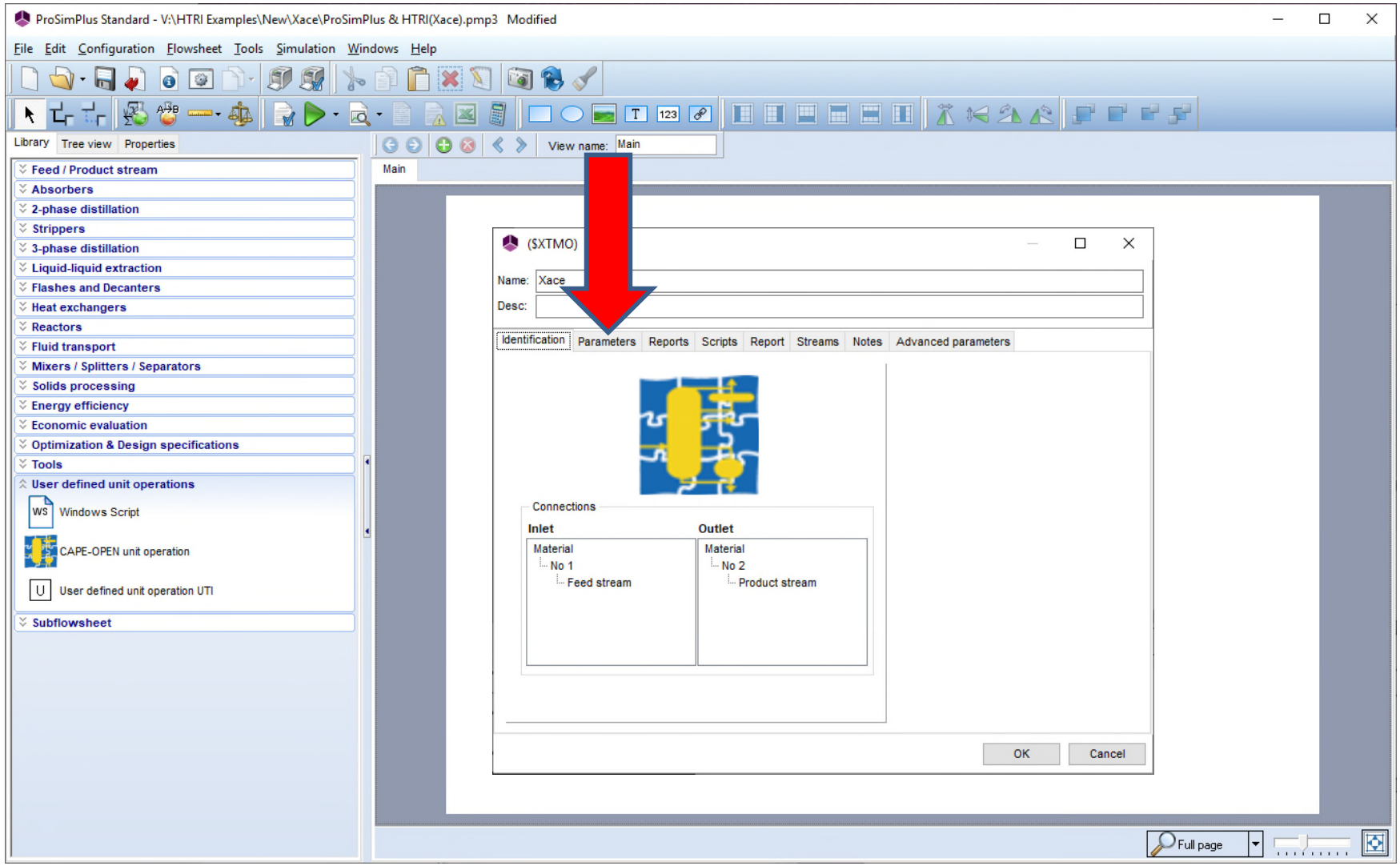
STEP #3: Create your flowsheet

Edit the parameters with a double-click on the selected unit operation:



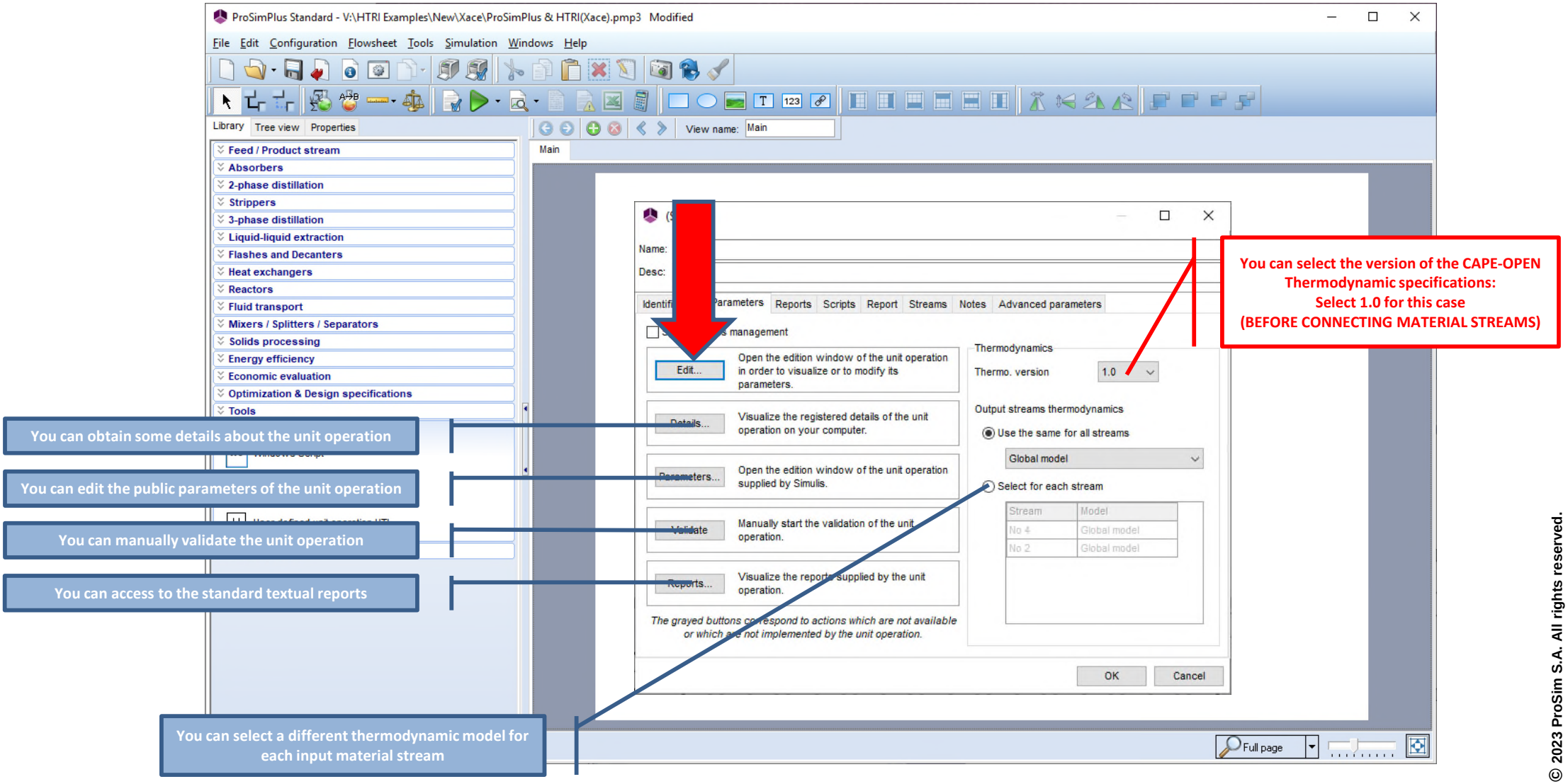
STEP #3: Create your flowsheet

Select the “Parameters” tab:



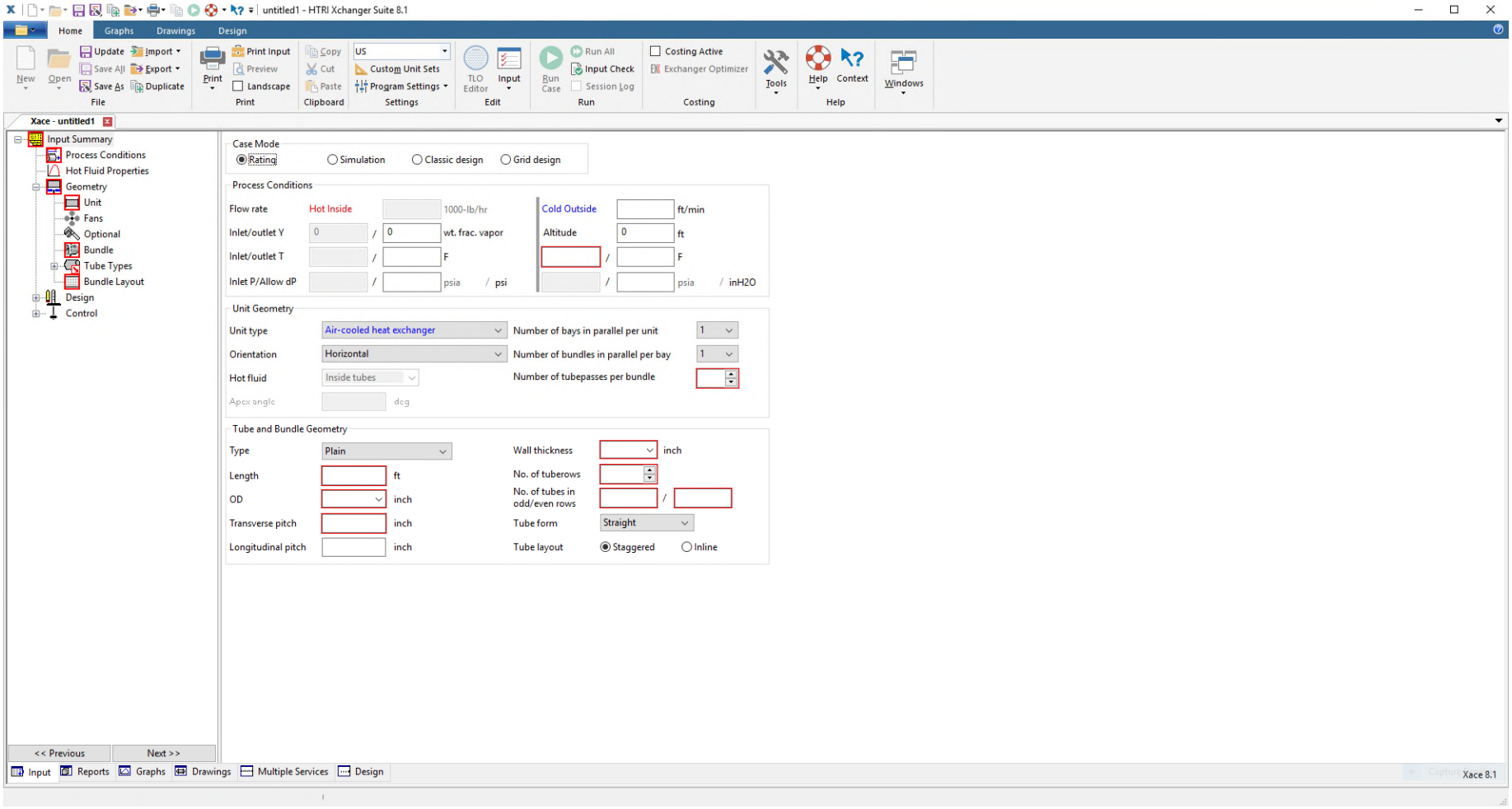
STEP #3: Create your flowsheet

Then click on the “Edit…” button to open the specific dialog of a Xace heat-exchanger:



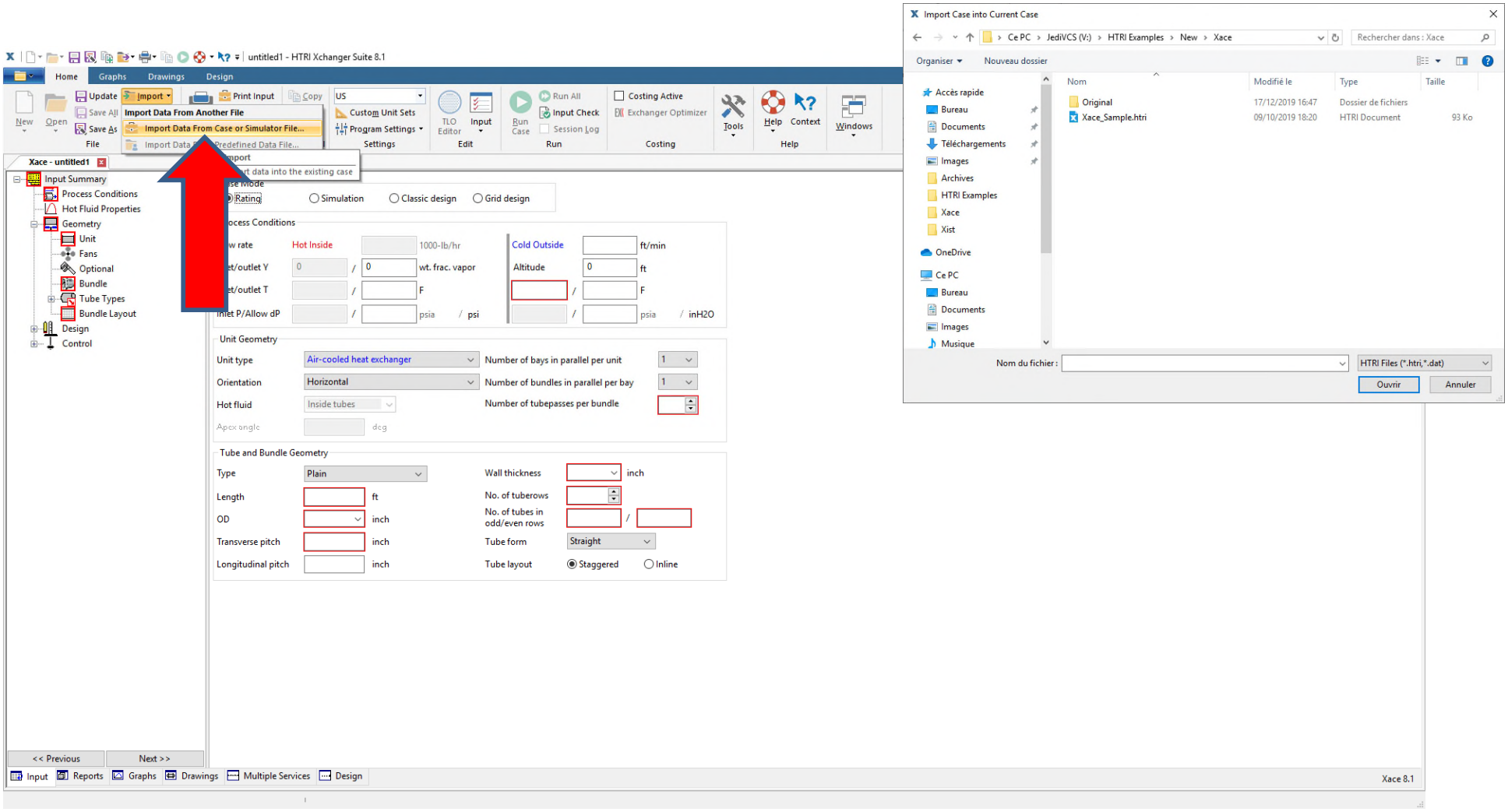
STEP #3: Create your flowsheet

Then enter the parameters of the heat-exchanger (see HTRI user guides):



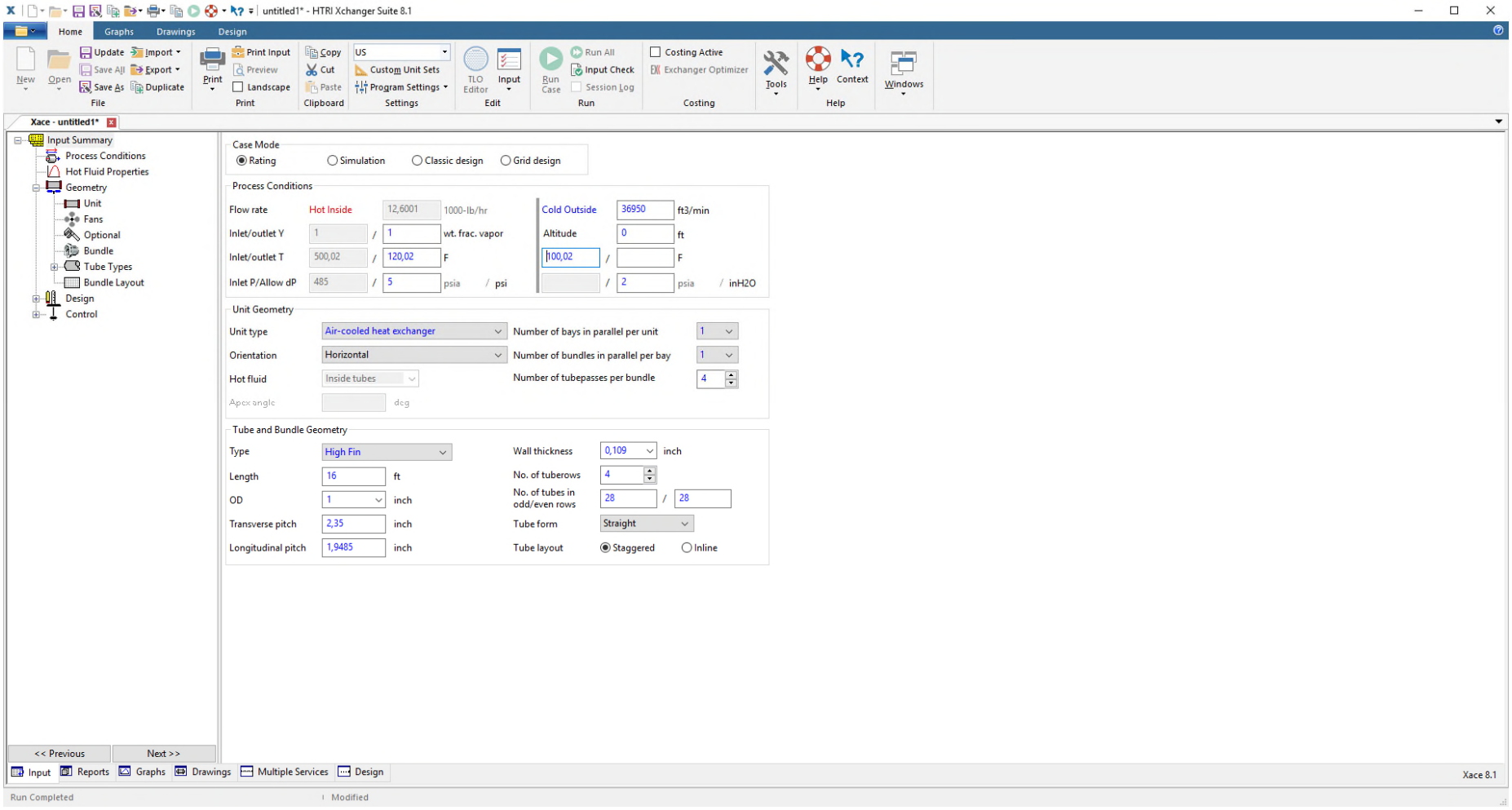
STEP #3: Create your flowsheet

Or import data from an existing Xace case:



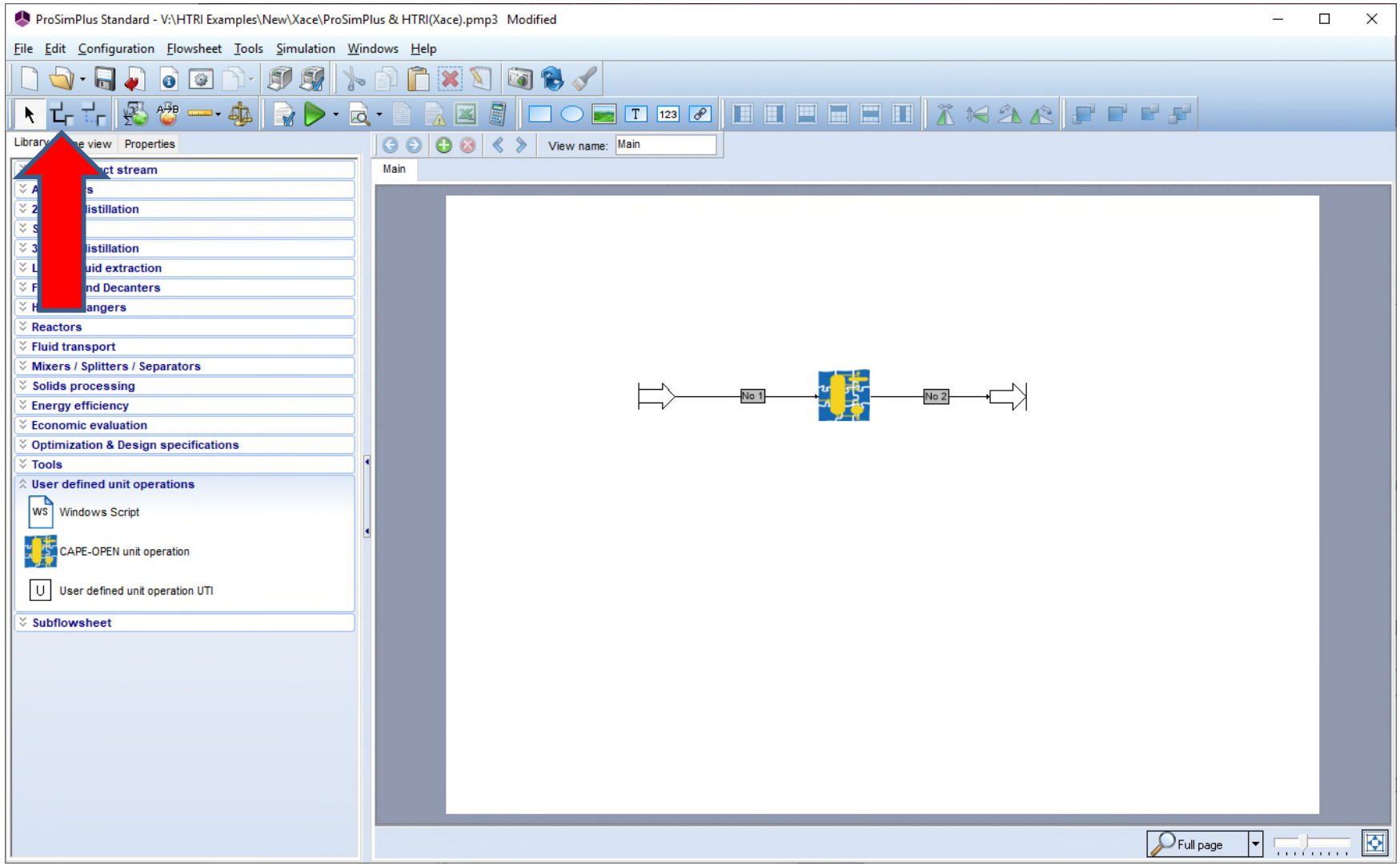
STEP #3: Create your flowsheet

Data for the heat-exchanger (summary)



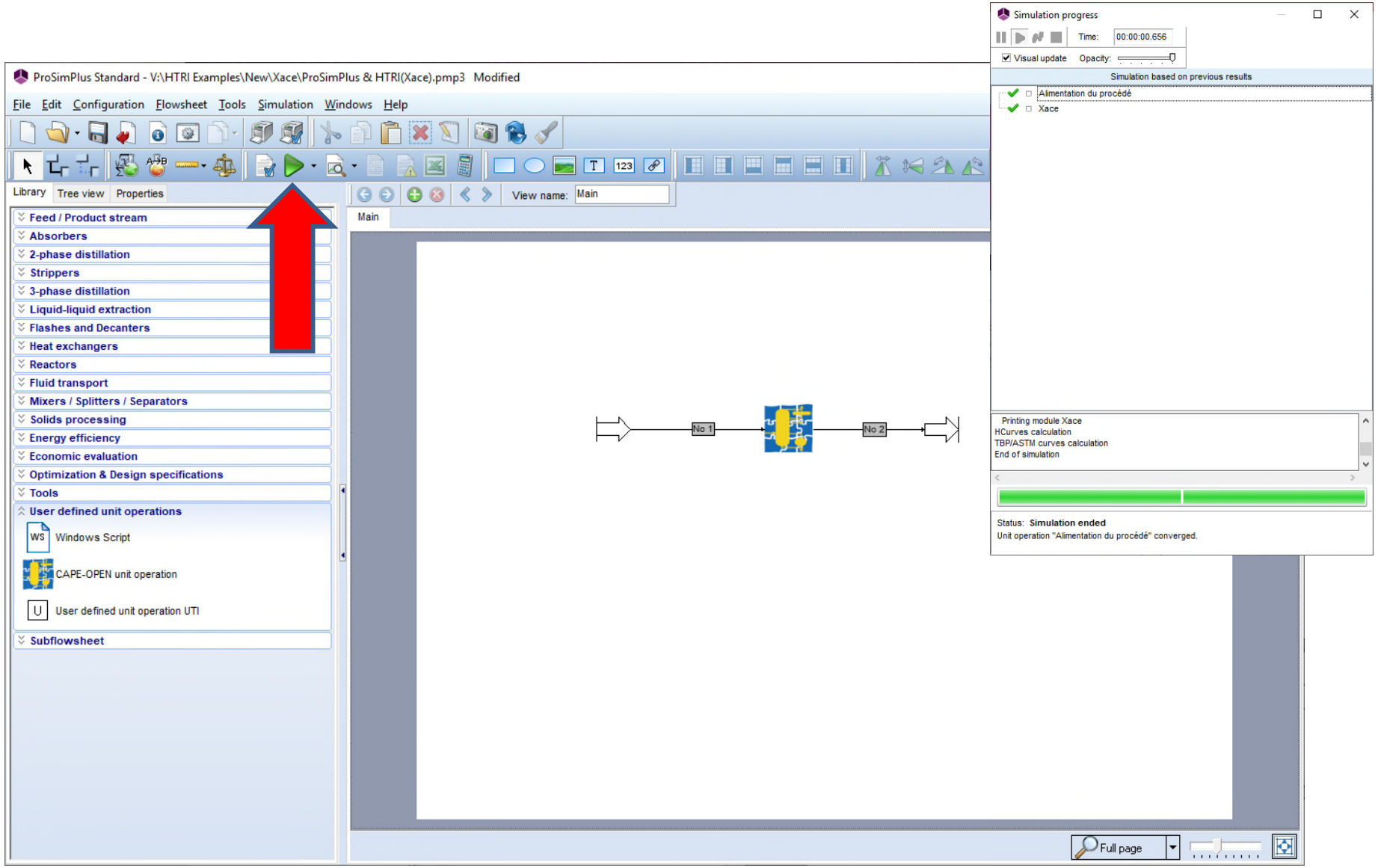
STEP #3: Create your flowsheet

Like for any usual case, connect your material streams between unit operations:



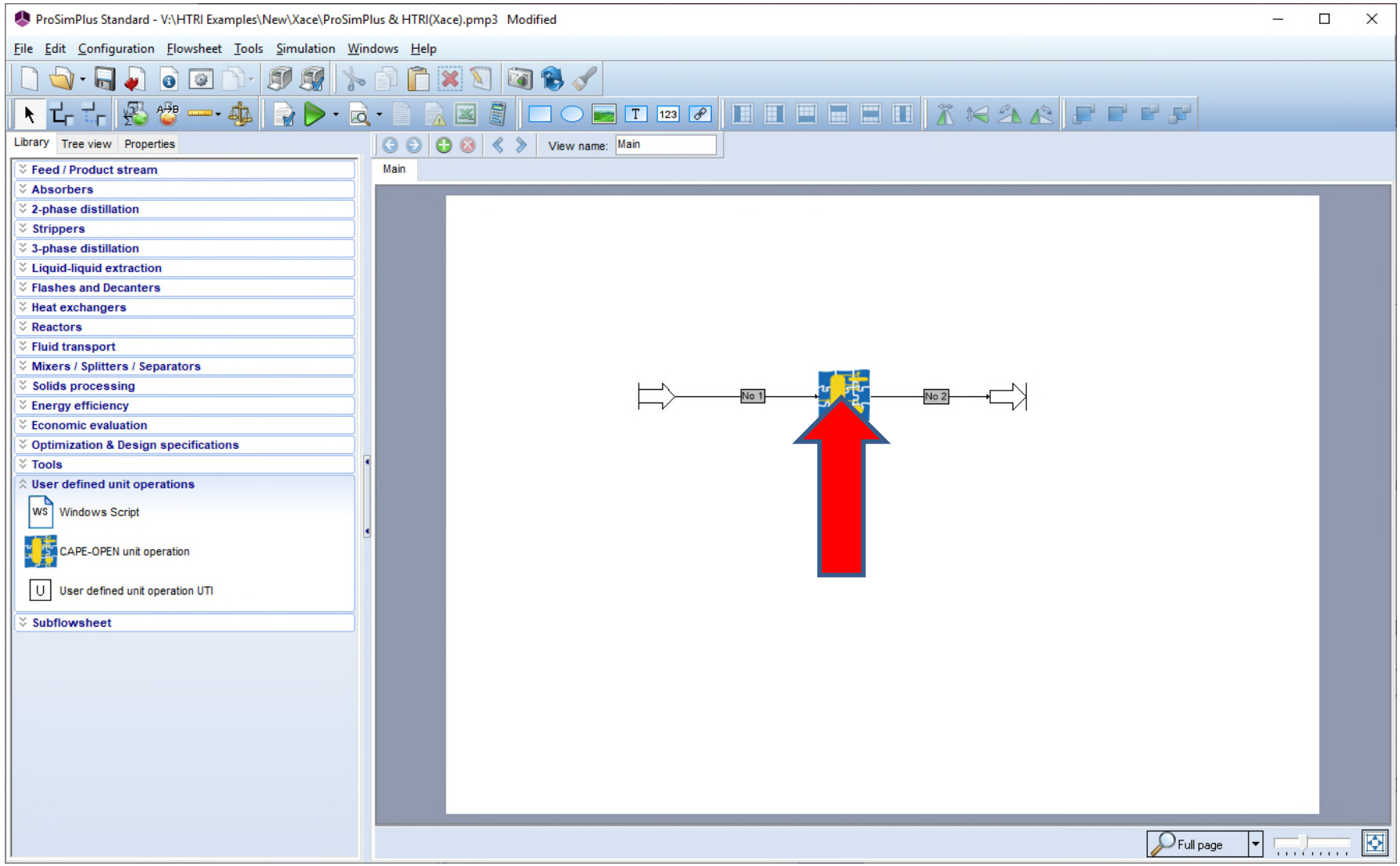
STEP #4: Run the simulation

When the input data is complete, click on the icon to run the simulation:



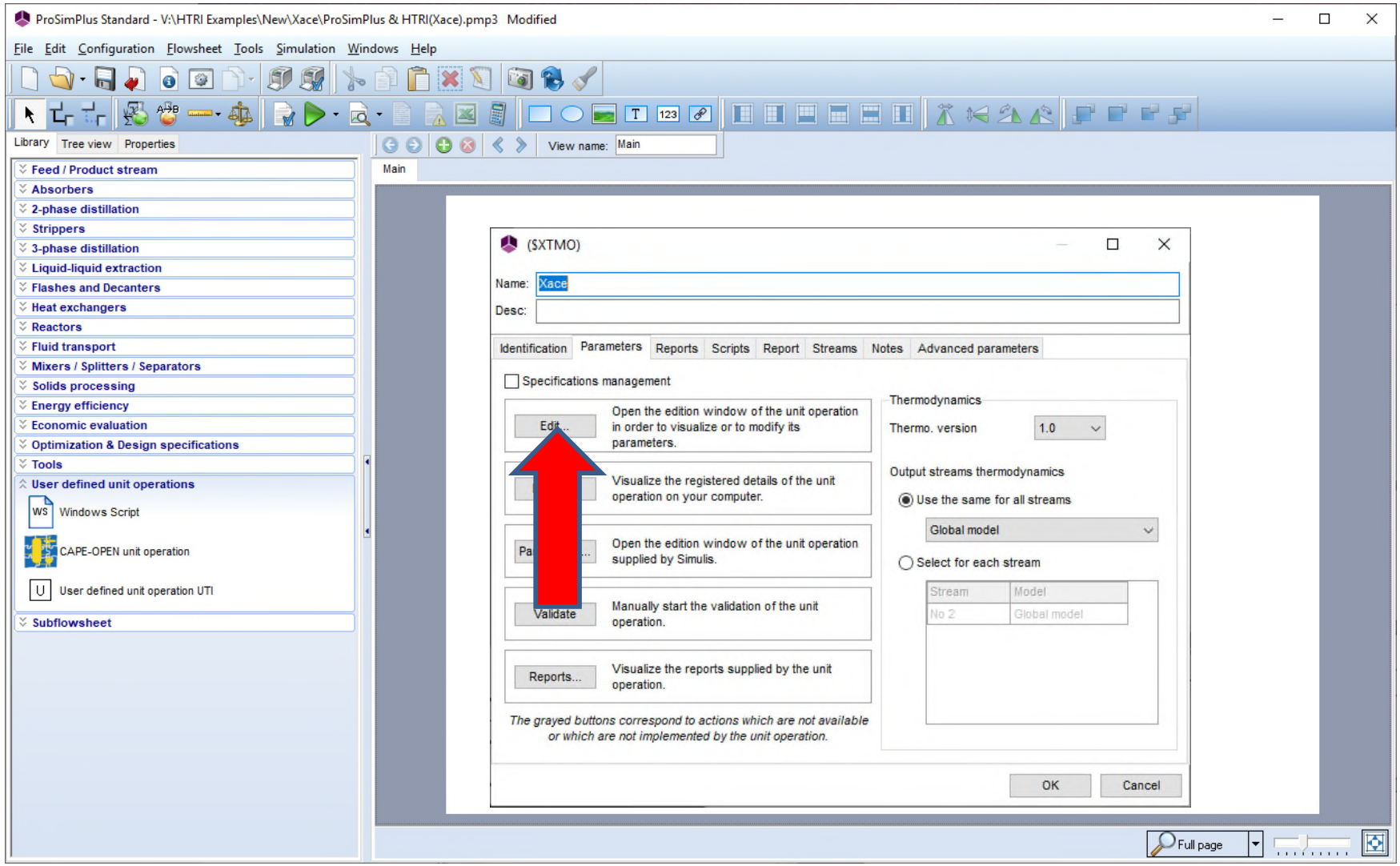
STEP #5: Analyze the results

When the simulation is complete, you can edit the reports of the Xace heat-exchanger with a double-click on the corresponding icon:



STEP #5: Analyze the results

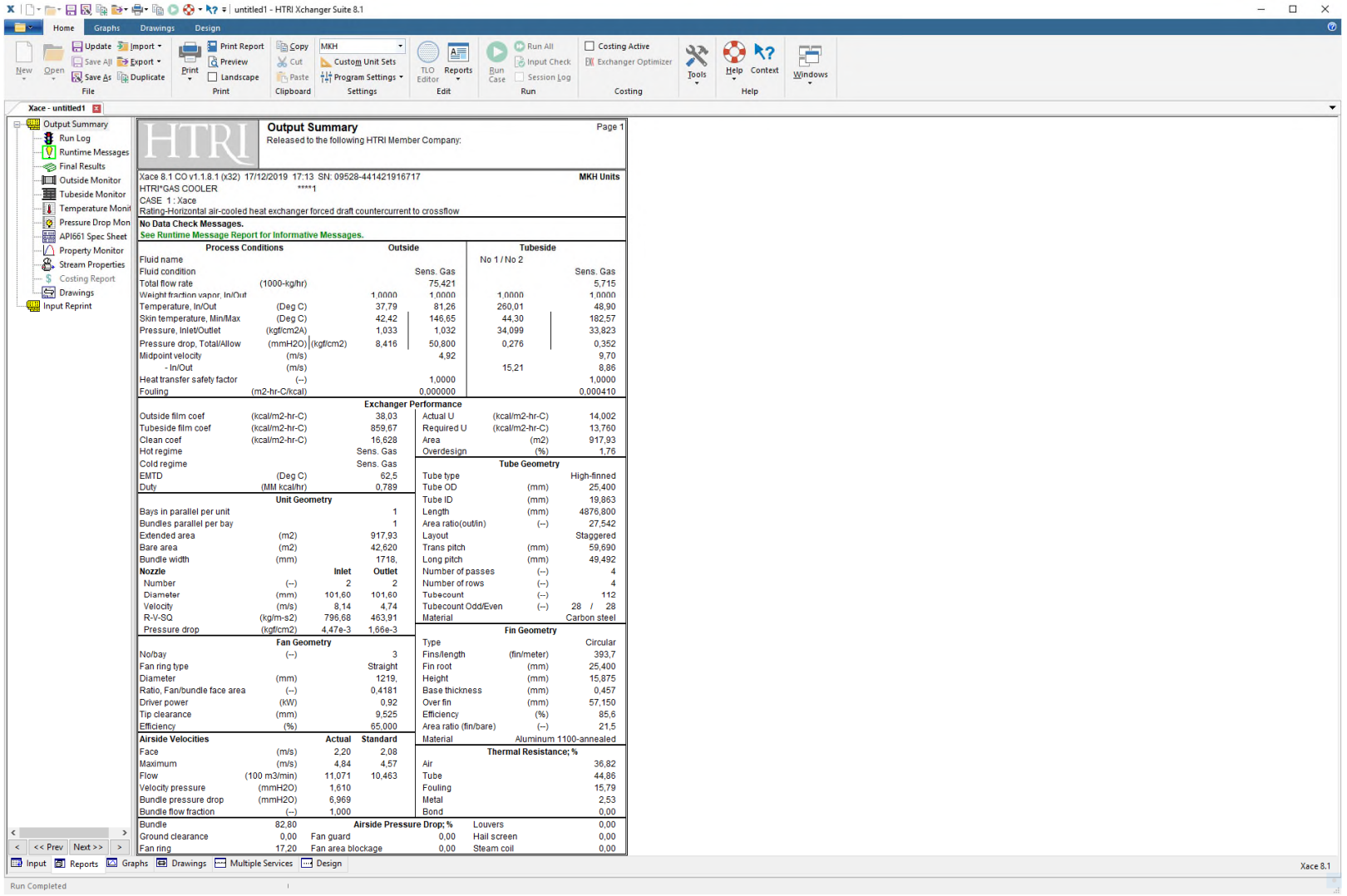
Then click on the “Edit…” button to access to the various specific reports of the Xace heat-exchanger:



STEP #5: Analyze the results

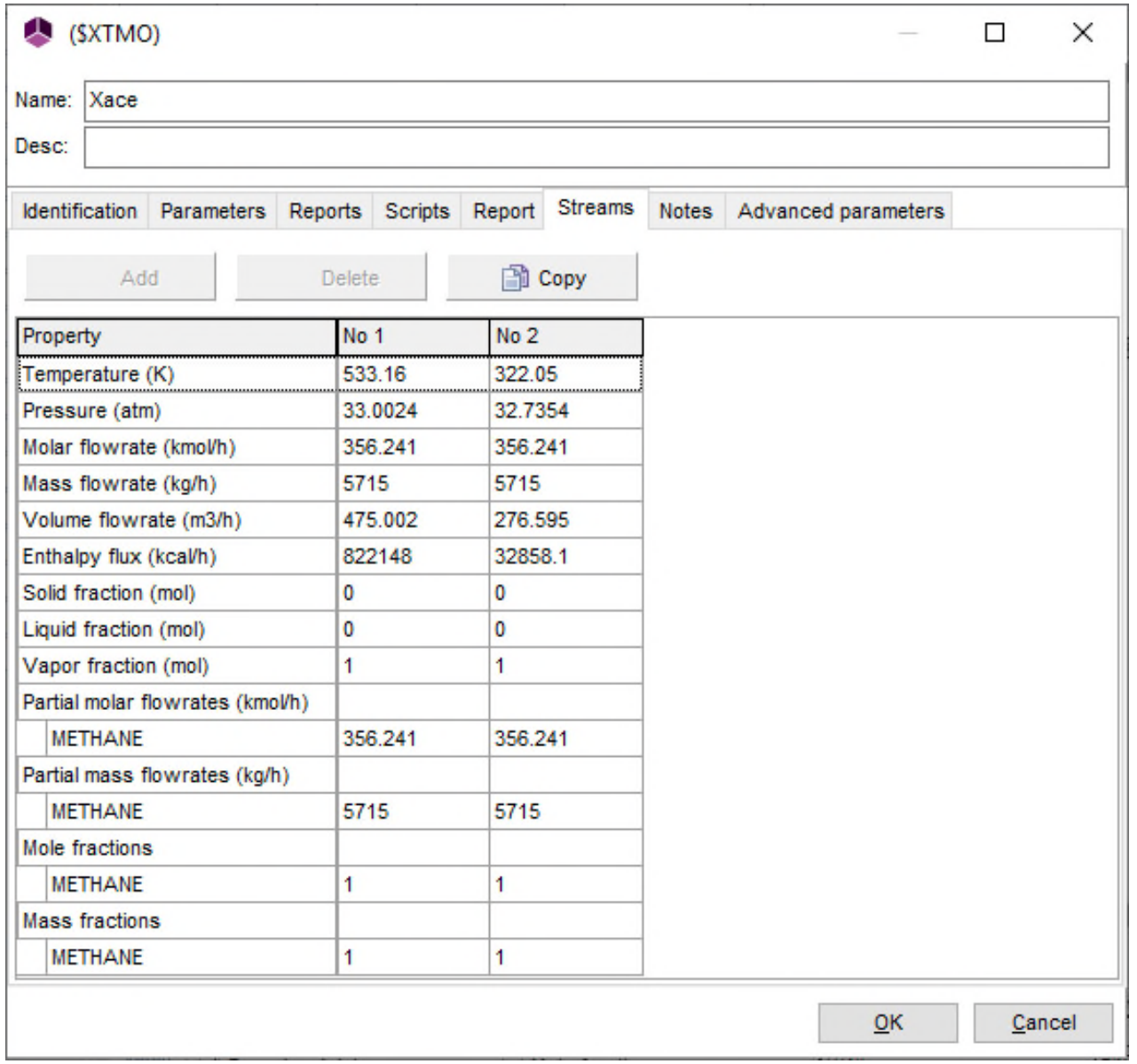
Analyze the reports of your heat-exchanger (see HTRI user guides):

Results (output summary)



STEP #5: Analyze the results

Material streams



Property	No 1	No 2
Temperature (K)	533.16	322.05
Pressure (atm)	33.0024	32.7354
Molar flowrate (kmol/h)	356.241	356.241
Mass flowrate (kg/h)	5715	5715
Volume flowrate (m3/h)	475.002	276.595
Enthalpy flux (kcal/h)	822148	32858.1
Solid fraction (mol)	0	0
Liquid fraction (mol)	0	0
Vapor fraction (mol)	1	1
Partial molar flowrates (kmol/h)		
METHANE	356.241	356.241
Partial mass flowrates (kg/h)		
METHANE	5715	5715
Mole fractions		
METHANE	1	1
Mass fractions		
METHANE	1	1

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