Process Simulation Cup (PSC2018)
Increase the Profit of a Bacteria-Based PDO Production Facility

Part 3: Step-by-Step Instructions
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Is this document for me?

• This document is for you, if you are new to CHEMCAD or to the use of Data Maps in CHEMCAD
• For users of other flowsheet simulators, this document shows how nice the CHEMCAD-Excel integration works

• This document
  – explains how the 2 flowsheets are linked, and
  – how Data Maps are used to set the design variables (in both flowsheets) and to calculate the profits, but
  – does not explain the PSC2018 task. See “Part 1: The Story” for this.
  – takes you through 15 steps:
    • set parameters and run the Fermenter flowsheet (steps 1-7)
    • transfer values, set parameters, and run the Downstream flowsheet (steps 8-13)
    • examine the resulting profit (steps 14-15)
A shortcut, before we start

- PSC2018 starts with 1 unlocked design variable: Evaporator Vapor Fraction (VFOOut) in the Downstream flowsheet
- We use Data Maps as an interface to enter the design variables
  - **Shortcut**: Go to Step 12 directly to enter VFOOut, proceed to the cost analysis, and submit your design variable VFOOut [here](#).

- Data Maps override parameter settings in the flowsheet. You can disable the Design Data Maps (in both flowsheets) and work on the parameters directly.
  - Go to Data Map - Execution Rule and change the Design rule to “Before simulation / Do Nothing”. In the Downstream flowsheet, you must leave the Cost Analysis rule in place to calculate the profit in Excel!
- The Data Maps show all 19 design variables of PSC2018 as yellow input fields, although not all design variables may be unlocked yet
  - Make sure that you leave all design variables, which are not yet unlocked on the [submission page](#), at their default values!
Step 1: Start CHEMCAD and open the Fermenter flowsheet
Step 2: Open „Design“ of Data Maps

Click here!
Step 3: Open the embedded Excel table

<table>
<thead>
<tr>
<th>Map Rule</th>
<th>CC Obj Type</th>
<th>CC Obj ID</th>
<th>For ID</th>
<th>Component</th>
<th>Walk Start Cell</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
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<td>S1</td>
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<td>C1</td>
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<td></td>
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<tr>
<td>2</td>
<td>Stream</td>
<td>2</td>
<td>S2</td>
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<td>&lt;None&gt;</td>
<td>C3</td>
<td>2.0000</td>
<td></td>
</tr>
</tbody>
</table>

Referenced Data Map 'Design' executed successfully.
Step 4: Alter selected design variables of the Fermenter flowsheet

Alter yellow cells only!

Close Excel and save table!
Step 5: Start the dynamic simulation of the Fermenter flowsheet

Click „Run Dynamic Simulation“
Step 6: Wait for the calculation to terminate

Watch the PDO production!
Step 7: View the reactor content

Double-click here!
Step 8: Open the Downstream flowsheet
Step 9: Transfer stream from Fermenter flowsheet

Right-click to copy stream 8 from fermenter to stream 1 (Broth)

Click “Browse” to select “Fermenter_x.y.cc7”
Step 10: Transfer results from Fermenter flowsheet

Double-click!
Step 11: Open „Design“ of Data Maps in the Downstream flowsheet
Step 12: Alter selected design variables of the Downstream flowsheet

Alter yellow cells only! Close and save!

In the first phase of PSC2018, only VFOut is an unlocked design variable
Step 13: Run simulation

Click „Run All“
Step 14: Open cost analysis

Click here!
Step 15: Check the profit and submit your design variables!

Is your value higher than -386.70 $/h?

Submit your design variables here!