

5.3.1 "EXCHANGE" PROCESSES

An "exchange" process is used to calculate the heating or cooling of a fluid between two states represented by upstream and downstream points.

Its screen (Figure 5.3.1) is similar to that of the compression process, with fewer options. You should refer to the beginning of section 4.1.5 for an overview of the process screens.

The middle-right part displays the following:

- a field that sets the minimum accepted pinch for this fluid. This parameter can be used in sizing heat exchangers;
- an option "pinch fluid method" used to indicate that the process must be taken into account in optimization calculations by thermal integration (see Volume 2 of the reference manual of the software).

Two complementary calculation methods can be chosen according to the option chosen in the bottom right of the screen:

- "Calculate $m \Delta H$, the outlet point being known" assesses the enthalpy $m \Delta h$ involved in the process;
- "Calculate $m \Delta H$ and modify the outlet point" recalculates downstream point temperature to ensure that the enthalpy $m \Delta h$ involved in the process is equal to the value entered in the field $m \Delta H$.

The screenshot shows the 'Exchange process' configuration window. At the top, the process name is 'gas regen' and the type is 'exchange'. There are navigation buttons '<' and '>' and a 'Save' button. Below this, there are buttons for 'links', 'Suppress', and 'Close'. The 'energy type' is set to 'other'. There are checkboxes for 'set flow' and 'set volume flow', and radio buttons for 'closed system' and 'open system'. The 'observed' checkbox is also present. The 'inlet point' is 4 and the 'outlet point' is 5. The 'flow rate (t/s)' is 1.02799. The 'm Δh (MW)' is -399.84. There is a 'Calculate' button. The inlet properties are: T (°C) 858.22, P (bar) 1, h (kJ/kg) 955.22, quality 1. The outlet properties are: T (°C) 536.73, P (bar) 1, h (kJ/kg) 566.26, quality 1. There are checkboxes for 'set volume flow' and 'set molar flow'. The 'inlet volume flow' is 3.4123244783, 'molar flow' is 0.036277300885, and 'minimum pinch' is 16. The 'pinch method fluid' checkbox is checked. At the bottom, there are two radio buttons: 'Calculate m ΔH, the outlet point being known' (selected) and 'Set m ΔH and modify the outlet point'.

Figure 5.3.1: Exchange process

5.3.2 CREATION OF A HEAT EXCHANGER IN THE DIAGRAM EDITOR

To represent the heat exchanger in the diagram editor, we use non-oriented links connecting two components of type "exchange".