STEADY FLOW: HEAT EXCHANGERS

- Heat exchangers are devices in which a working fluid trades its thermal energy with another working fluid.
- These devices are typically insulated to prevent any heat exchange with the environment.

**CV analysis: conservation of mass principle**

<table>
<thead>
<tr>
<th>Fluid A</th>
<th>Fluid B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choice of the CV:</td>
<td></td>
</tr>
<tr>
<td>Conservation of mass:</td>
<td></td>
</tr>
<tr>
<td>Under steady flow:</td>
<td></td>
</tr>
</tbody>
</table>

**CV analysis: energy balance principle**

Choice of the CV:

Energy balance:
Simplifications:

- Steady flow:  
- No change in elevation:  
- No change in velocity:  
- Shaft work:  
- Adiabatic:  

Reduced energy equation: