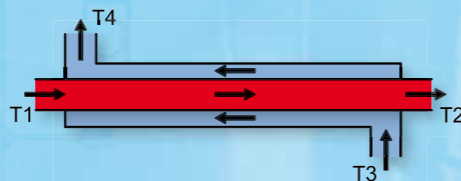
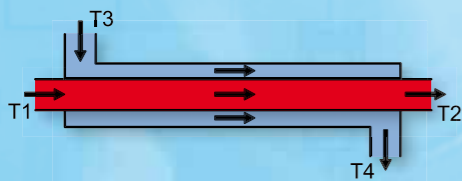
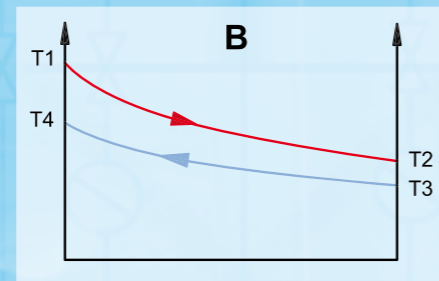
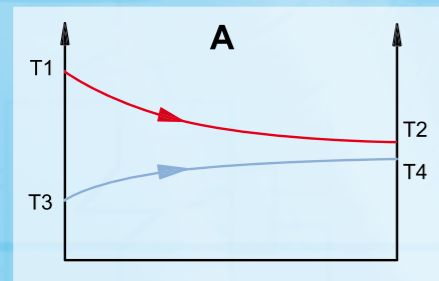


BASIC KNOWLEDGE

HEAT EXCHANGERS IN REFRIGERATION

In principle heat exchangers have the purpose to transfer heat from a flowing substance to another flowing substance of a lower original temperature. The substances are gaseous or liquid.

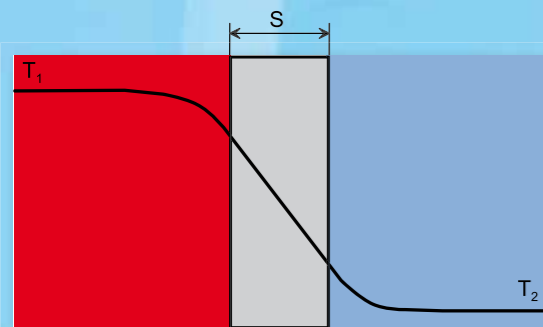
Important for the heat transfer is the temperature difference of the two media as a driving gradient. Dependent on the flow direction (e.g. counterflow, parallel flow) the progression of the temperature difference along the path can be different.



Temperature profile for a tubular heat exchanger:

A parallel flow, B counterflow;

T1 hot medium supply, T2 hot medium discharge, T3 cold medium supply, T4 cold medium discharge



Heat exchange at a flat wall:
 T_1 temperature of hot medium
 T_2 temperature of cold medium
 s wall thickness

The total transferred heat flow also depends directly on the transfer area. For this reason different wall geometries (e.g. fins) are used to enlarge the transfer area.

The heat transfer is divided into three sections:

- Heat transfer from the hotter medium to the wall
- Heat conduction through the wall
- Heat transfer from the wall to the colder medium

The heat transfer from the medium to the wall or from the wall to the medium depends on the following factors:

- Material type of the media
- Flow velocity of the media
- Aggregate states of the media

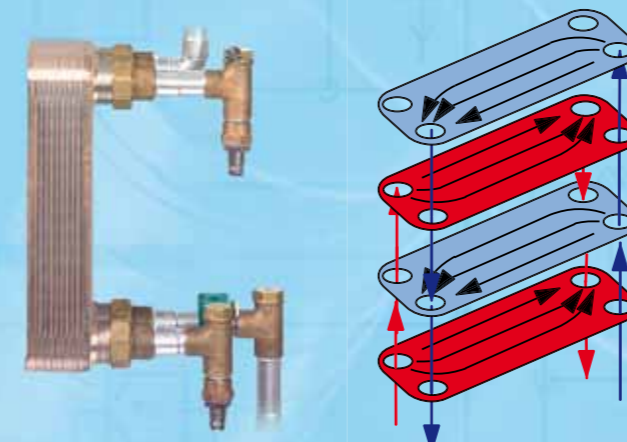
For heat exchangers in refrigeration circuits the aggregate state of the refrigerant changes frequently. In evaporators the aggregate state of the refrigerant changes from liquid to gaseous. For this the refrigerant must absorb heat through the wall.

The heat conduction in the wall depends e.g. on the following factors:

- Wall thickness
- Wall material

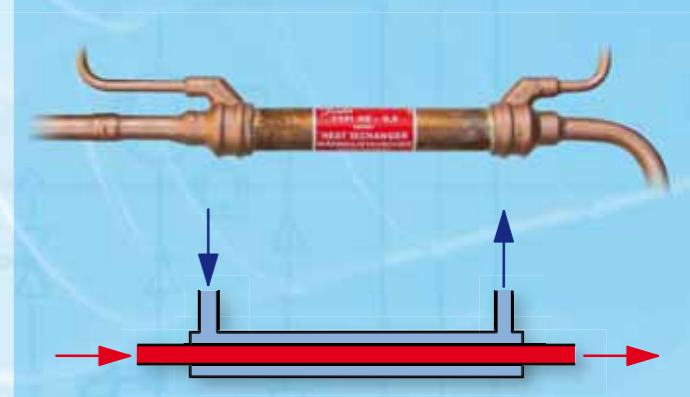
Dependent on the individual application, different types of heat exchangers are used in refrigeration engineering.

PLATE HEAT EXCHANGERS



Application: evaporator or oil cooler

TUBULAR HEAT EXCHANGER



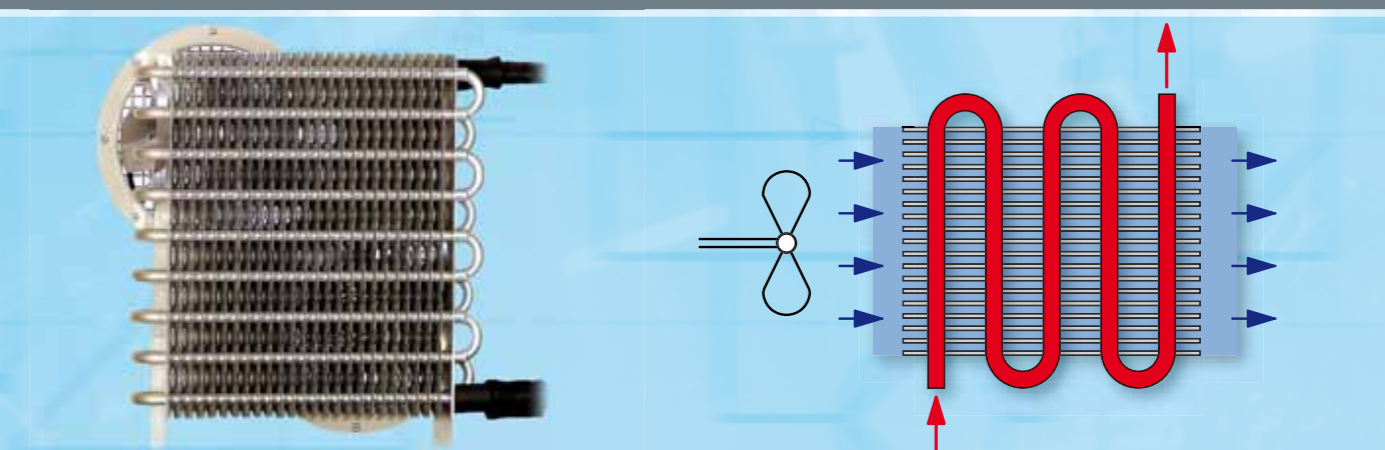
Application: internal heat exchanger for supercooling the refrigerant

COAXIAL COIL HEAT EXCHANGER



Application: water-cooled condenser or water cooling evaporator

FINNED TUBE HEAT EXCHANGER



Application: air-cooled condenser or air cooling evaporator