

# Flow calculation

## Flow calculation based on heating/cooling capacity

$$Q = \frac{E \text{ [kW]}}{c_p \text{ [kJ/(kg}^\circ\text{K)]} * \rho \text{ [kg/dm}^3\text{]} * \Delta T \text{ [}^\circ\text{K]}}$$

- $c_p$  – heat capacity, kJ/(kg°K)
- $\rho$  – density, kg/dm<sup>3</sup>
- $\Delta T$  – supply and return temperature difference, °K
- $E$  – heat exchanger capacity, kW

Valve selection when medium is different from water.  
(Flow graphs and tables in the Technote are based on water)

### Correction for higher/lower densities than water:

$$Q_d = Q * \sqrt{\rho}$$

$Q$  = Flow water, m<sup>3</sup>/h

$Q_d$  = Flow with density different from water, m<sup>3</sup>/h

$\rho$  = fluid density, kg/dm<sup>3</sup>

### Example with Hycool:

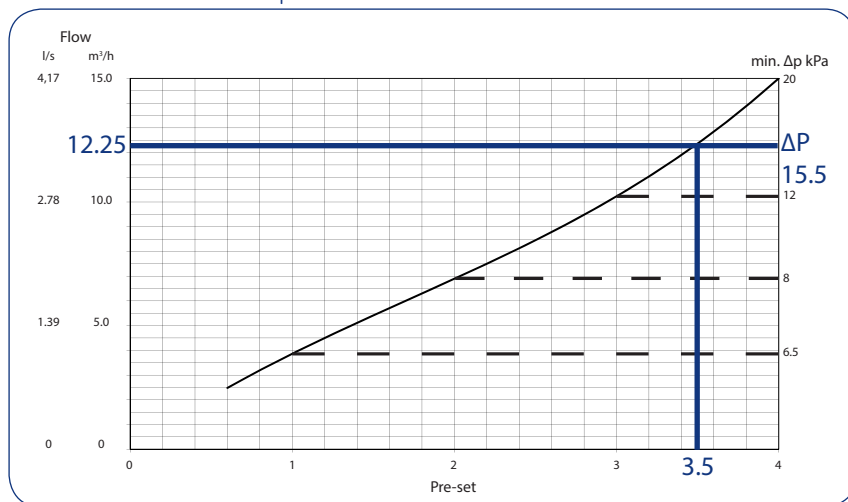
$Q = 10.0 \text{ m}^3/\text{h}$  (calculated flow for cooling capacity)

Hycool density: 1,5 kg/dm<sup>3</sup>

Flow  $Q_d$  for valve selection

$$Q_d = 10.0 * \sqrt{1,5} = 12.25 \text{ m}^3/\text{h}$$

## Frese OPTIMA Compact · Low Flow DN50



Preset the valve to position **3.5**

The required minimum  $\Delta P$  is **15.5 kPa**