CHAPTER 2

Process Integration

Energy Targets

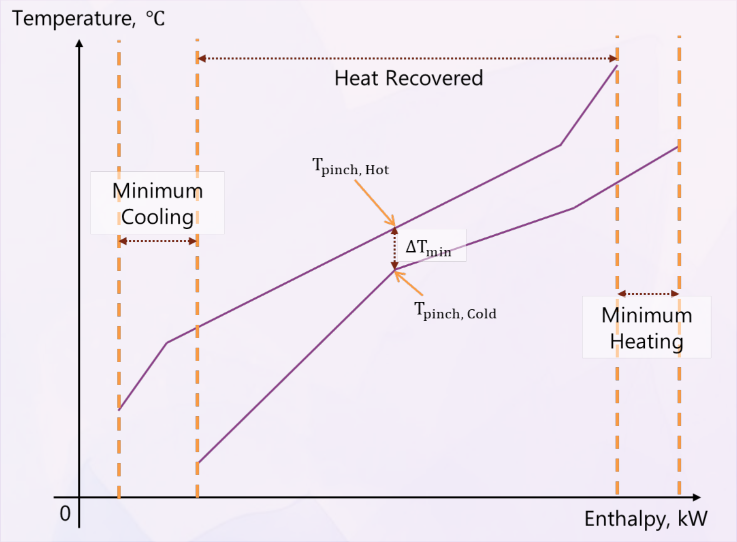
Obtaining the minimum utility requirements and heat recovery.

Two METHODS to obtain energy targets

- Composite curve (CC)
- Problem table analysis (PTA)

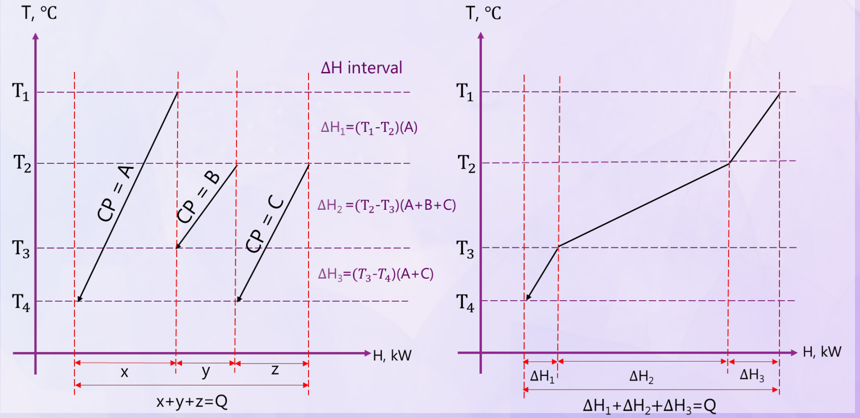
Composite Curves

- Resulting T-H diagram of multiple hot and cold streams on a single curve
- Consists of hot and cold composite curves



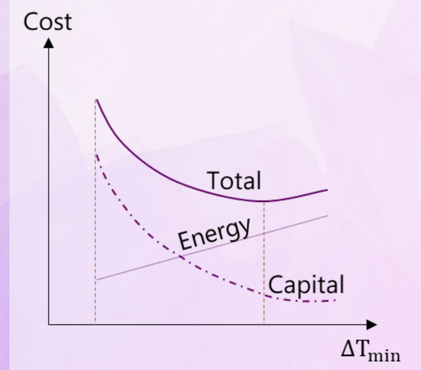
How to produce composite curves

- Add heat capacity flowrates of all streams existing over any temperature range



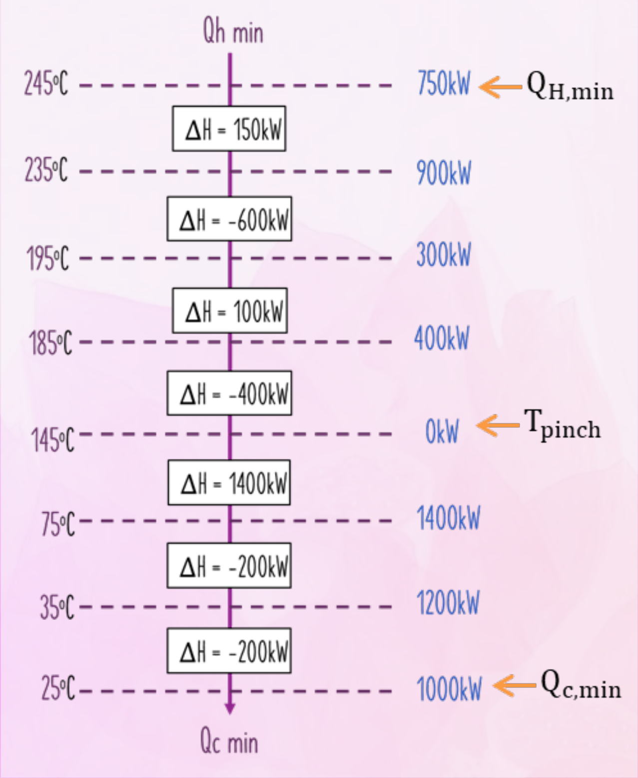
Effects of ΔT_{min}

- ΔT_{min} is the smallest approach temperature for heat exchange
- Smaller ΔT_{min} generally maximizes recovery and minimizes utilities



Problem Table Analysis

- PTA utilizes shifted interval temperature ($\pm\Delta T_{min}/2$)
- Cascades ΔH downwards cumulatively
- Any heat available in a higher interval is <u>hot enough</u> to supply any duty in the interval directly below
- $\Delta H_i = (S_i - S_{i+1})(\Sigma CP_H - \Sigma CP_C)_i$



- $Q_{Recovery} = \Sigma\Delta H_{Coldstream} - Q_{H,min}$
- $Q_{Recovery} = \Sigma\Delta H_{Hotstream} - Q_{C,min}$

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