MITA
cooling technologies

COOLING SYSTEMS

Needs and Applications

Dissipation Systems

>> Chiller

>> Once through

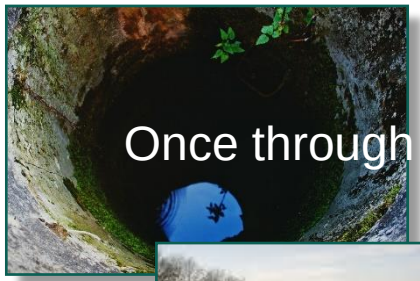
>> Evaporative : cooling water, water + glycol ; condensing refrigerants

>> Adiabatic : cooling water, water + glycol ; condensing refrigerants

>> Air : cooling water, water + glycol

Dissipation Systems

Chiller



Evaporative System

Adiabatic System

Air Systems

Chiller

>> «Mechanical» cooling, compressor / evaporator => **low temperatures but high energy consumption**.

>> Some processes require **very low temperatures** (below 20/25 ° C).

>> Possibility of free-cooling with an evaporative tower to reduce chiller operation during the year.

Dissipation Systems

Throwaway Water

>> "Old style solution"

>> This solution consists in **taking water directly from natural sources**, rivers, lakes, wells - sending it to an exchanger and then returning it to the environment

>> Advantages:

- *No noise*
- *Low energy consumption*
- *Low-temperature water availability*

>> Disadvantages:

- *High water consumption*
- *Limits of use (regulations) / excessive loads to the area water treatment plant*
- *Irregular loads*
- *Plant dirtying (with river or well water use)*

Cooling Tower (Evaporative System)

Dissipation Systems

Evaporative System

>> Advantages

- ❑ *Solution for small, medium and large capacities.*
- ❑ *Efficiency through the whole year.*
- ❑ *Fluid temperature lower than air temperature up to 10°C (+2°C above wet bulb)*
  - ✓ Low energy consumption
  - ✓ Reduced footprint

>> Disadvantages

- ❑ *Water consumption.*
  - ✓ More careful system management.

Adiabatic Cooler and Condenser

Dissipation Systems

Adiabatic System

>> Advantages

- *Solution for small and medium capacities.*
- *Efficiency through the whole year ; water is used only if necessary.*
- *Fluid temperature lower than air temperature up to 4 / 5 °C.*
- *Extremely low water consumption.*

>> Disadvantages

- *Wider footprint compared to evaporative systems.*
- *Higher start-up costs compared to evaporative systems.*

Air Cooler

Dissipation Systems

Air System

>> Usually consisting of:

- *Multi-fan systems.*
- *Horizontal or vertical finned coils.*

>> Advantages

- *Simple solution, generally for small and medium capacities.*
- *Efficiency during winter (cold months).*
- *No water consumption (for 100% air cooled systems).*

>> Disadvantages

- *Fluid temperature higher than the outside air temperature.*
- *Very high energy consumption.*
- *Efficiency decreases in the mid and hot season.*
- *High footprint.*

What should I choose ?

What should I choose = What am I looking for ?

- **Water** savings
- **Energy** savings
- **“Green” refrigerants**
- Return on investments (**ROI**) focus
- **Noise**

What should I choose ?

COMPARING COOLING TECHNOLOGIES					
Focus	**Air**	**Adiabatica**	**Hybrid**	**Evaporative**	**Mechanical (chiller)**
Electric kW/thermal kW	X	XX	XXX	XXX	X
Size/power limit	X	XX	XX	XXX	X
Output temperature limit	X	XX	XXX	XXX	XXX
Footprint	X	XX	XX	XXX	XXXX
System complexity	XX	X	X	XX	XX
Water savings	XXX	XX	XX	X	XXX
Easy maintenance	XXX	XX	XX	XX	XX
Efficiency	X	XX	XXX	XXX	XX
Expected life cycle	XXX	XXX	XXX	XXX	XX
Equipment cost	XX	XX	XX	XXX	X
Applicability to different sectors	X	XX	XXX	XXX	XX

Applications

Main Application Sectors

- *Steelworks and metal production generically*
- *Power generation plants*
- *Chemical and pharmaceutical plants*
- *Food & beverage industries*
- *Air conditioning plants (supermarkets, hospitals, exhibition centers)*
- *Technical gas production plants*
- *Engine test benches*
- *Air compressors*
- *Vapor condensers*
- *Dry cleaners and tanneries*
- *Paper mills*
- *Plastic processing*
- *Snowmaking plants*

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