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SOLUTIONS

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Chilled Water Fundamentals



Chilled water fundamentals

Advantages

- Efficiency?
- AHU Capacity and Duty
- Modulating Control
- Ease of Maintenance
- Centralisation of Plant / Noise

Disadvantages

- Capital Cost
- Plant Space
- Maintenance Cost
- Expertise

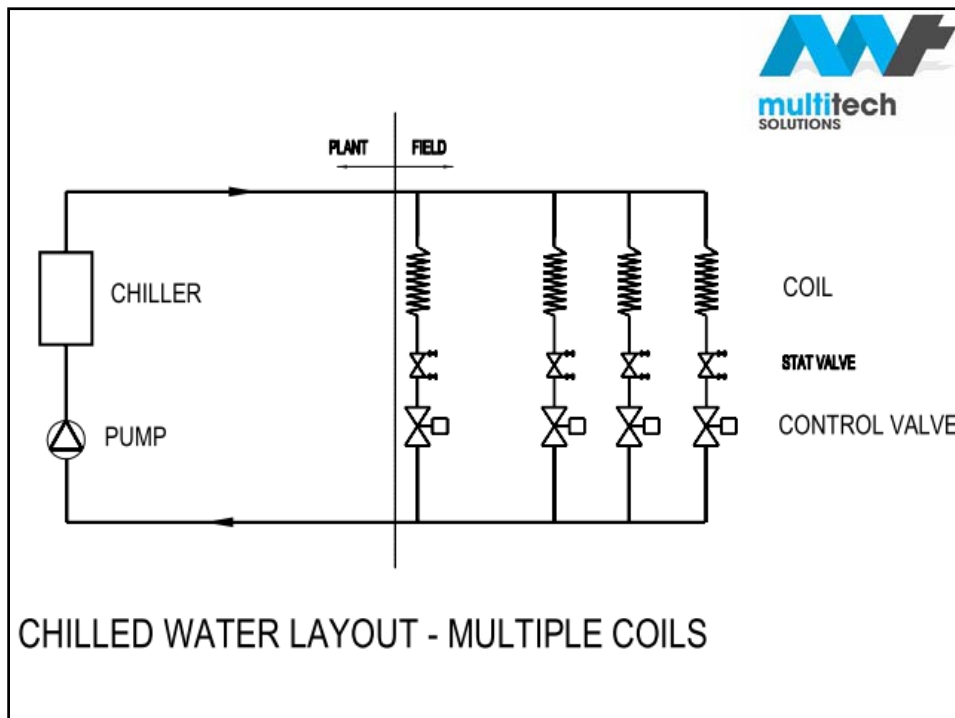
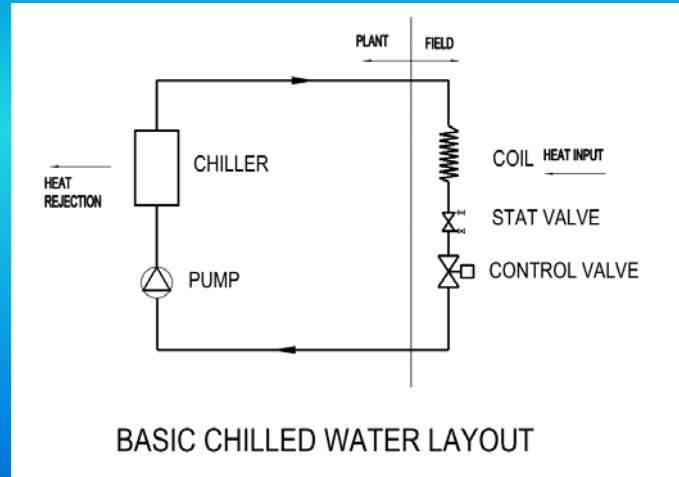


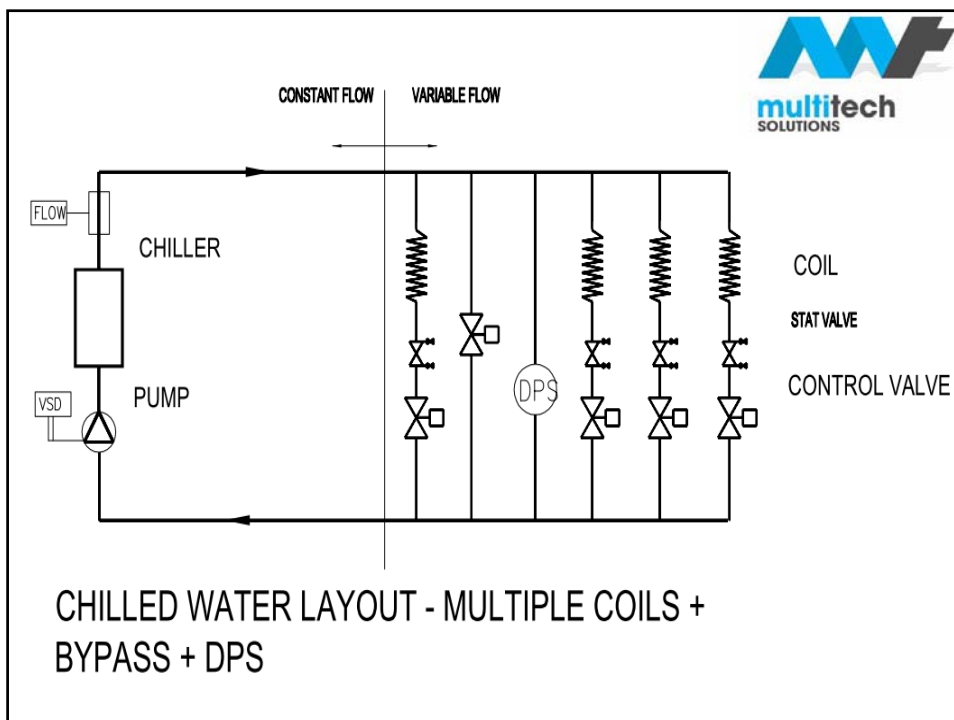
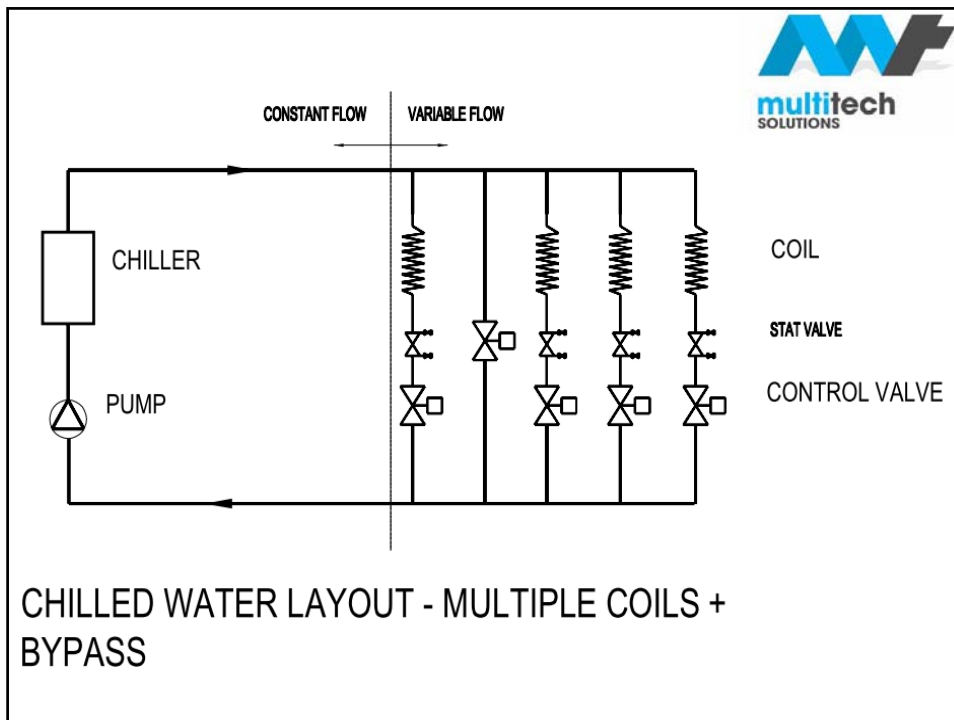
What does a chilled water system consist of?

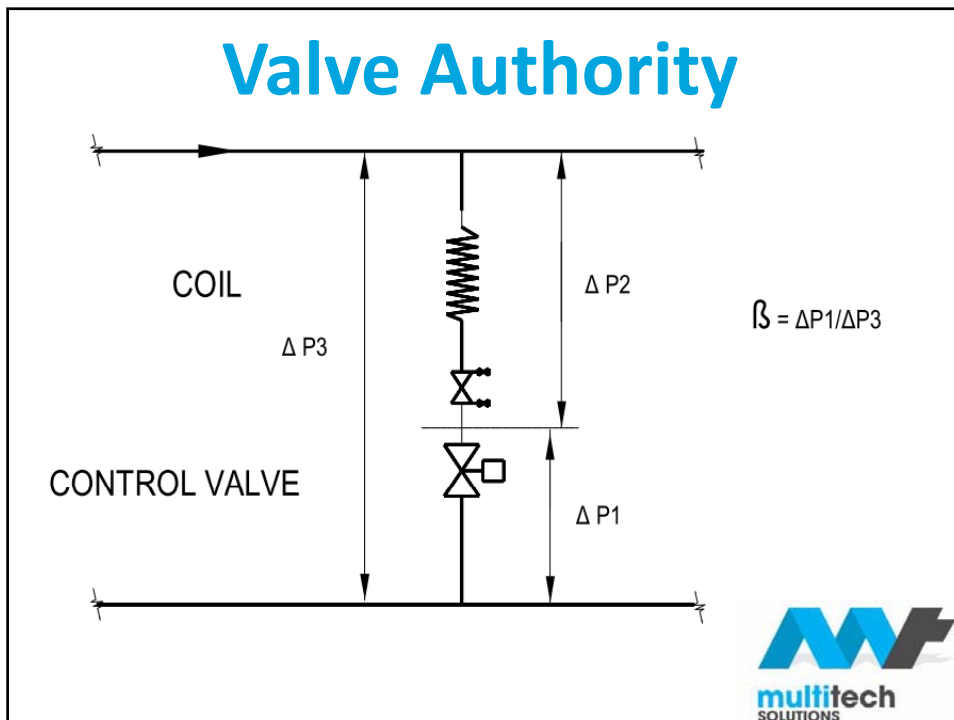
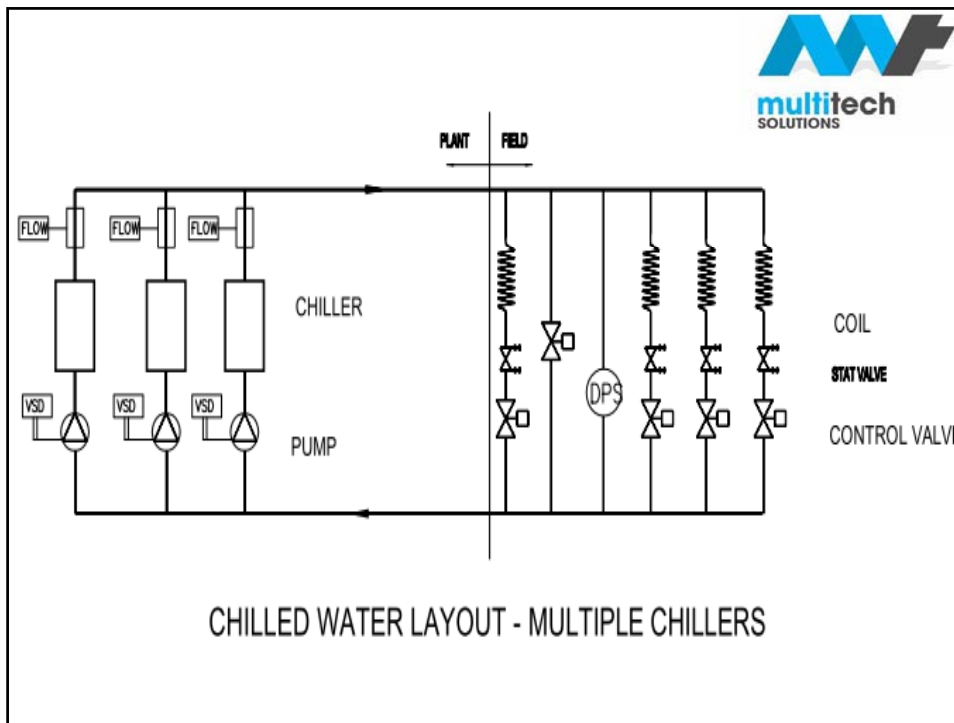
- Chiller
- Pump
- Pipework
- Cooling Coil
- Control Valve



How is a chilled water system arranged







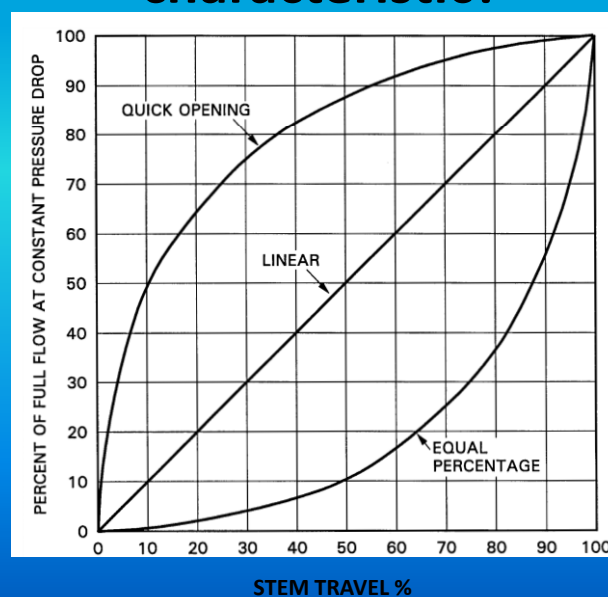
CHILLER EFFICIENCY

- DX Efficiency 0.3 kWe / kW_r
- Air Cooled Chiller Efficiency 0.3 kWe/kW_r
- Water cooled chiller Efficiency 0.17 kWe/kW_r

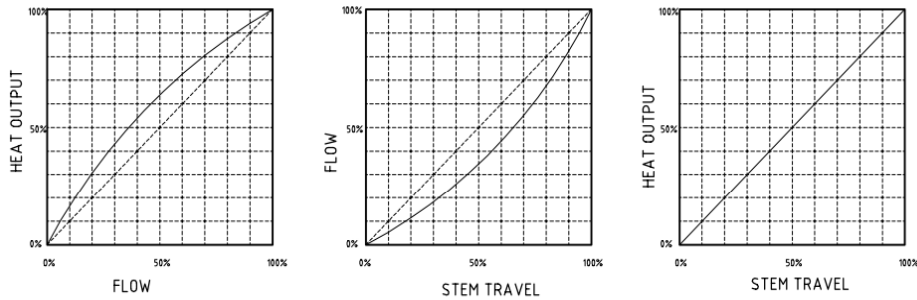
BUT

- Chiller Cooling Capacity – 1300 kW_r
- Compressor Power - 233 kW_e
- Chilled Water Pumps - 50 kW_e
- Cooling Tower Fans - 22 kW_e
- So net Water cooled chiller efficiency 0.24 kW_e/kW_r

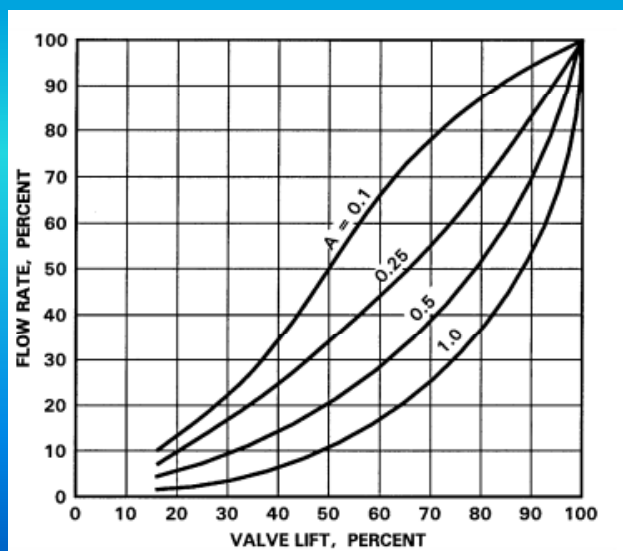
What is the control valve characteristic?

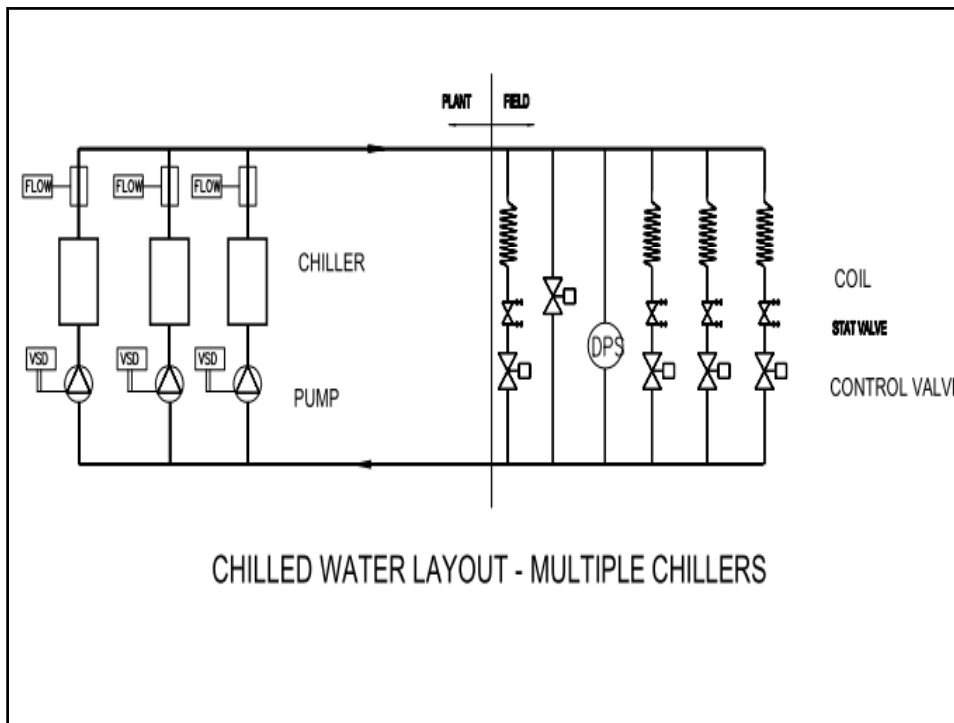


How does a control valve control heat output?

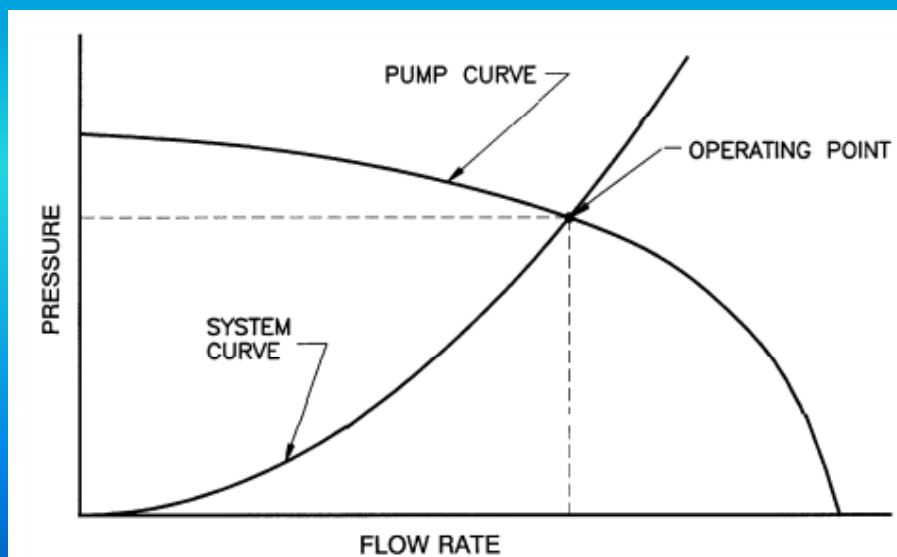


How does Valve Authority affect performance?

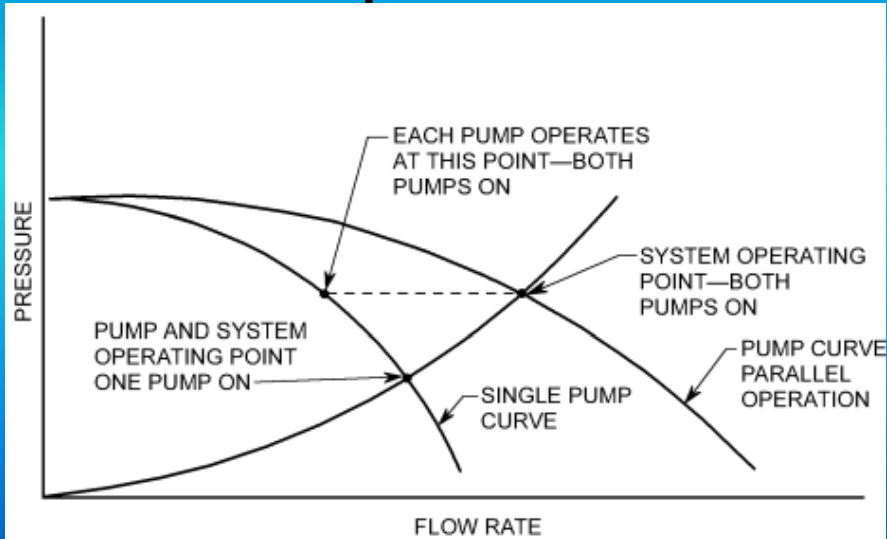




What is a Pump and System Curve?

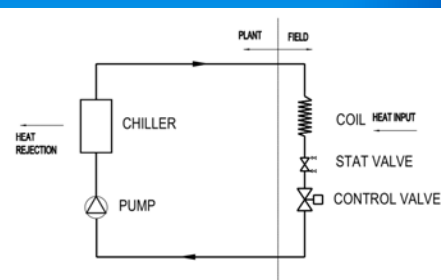


Pumps in Parallel – How does this affect performance



WHAT DOES A CHILLER NEED?

- MINIMUM LOOP VOLUME
Usually expressed as SECONDS of flow
- MINIMUM LOAD TO WORK AGAINST
- FLOW
- TEMPERATURE DIFFERENCE
- HEAT REJECTION SOURCE



BASIC CHILLED WATER LAYOUT

MINIMUM LOOP VOLUME =

ALL THE COOLING FLUID IN THE SYSTEM INCLUDING EVAPORATORS ETC FOR THE SHORTEST PATH THAT THE FLUID CAN RETURN TO THE CHILLER.

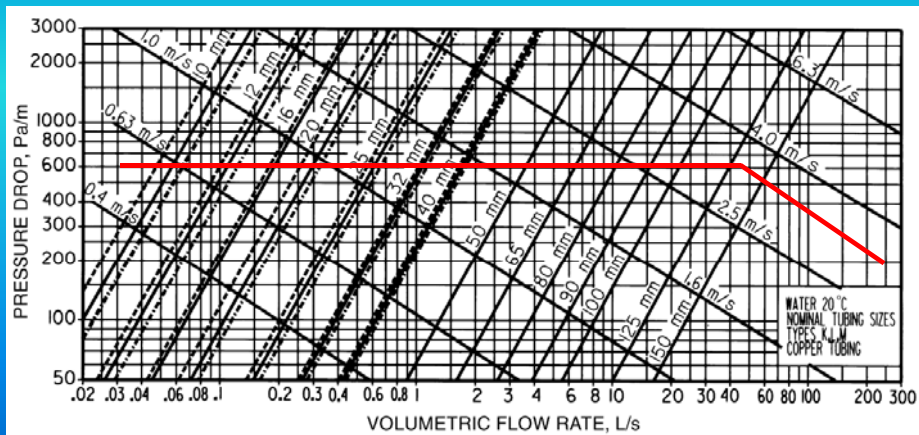
REFER TO MANUFACTURER!



Pipe Design

*Pressure Drop < 400 Pa/m

*Velocity < 3 m/s



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