

The logo for IESPress, featuring the letters 'IES' in a bold, sans-serif font with a red-to-white gradient, followed by 'Press' in a blue, sans-serif font. The logo is centered within a white rectangular box that has a subtle, wavy texture, set against a background of blue ocean waves.

INTEGRATED ENGINEERING SOLUTION



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The Application of Thermal Energy Storage Tank for Data Centre

Data centre uses a lot of electricity, research from Forbes indicates that global data centre consumed about 3% of the world total electricity. It is estimated that this consumption will double in every four years.

Depending on the type of cooling systems, water cooled chillers are commonly used as the key cooling equipment for supplying cold air to computer room air conditioner (CRAC) or computer room air handler (CRAH). Since data centres are designed to operate non-stop throughout the year for end-users, with no downtime of the systems during fault or maintenance. A Back-up cooling system (Thermal Energy Storage Tank) is required to reserve & supply sufficient chilled water during chiller plant down-time.

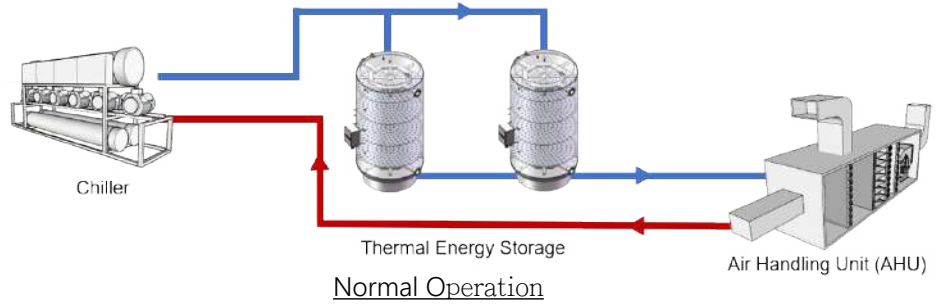
IES Thermal Energy Storage Tank "Cooling Battery"

IES has developed an innovative first of its kind Thermal Energy Storage Tank in Hong Kong, which stores the thermal energy in the form of chilled water for the chiller.

Hybrid Mode

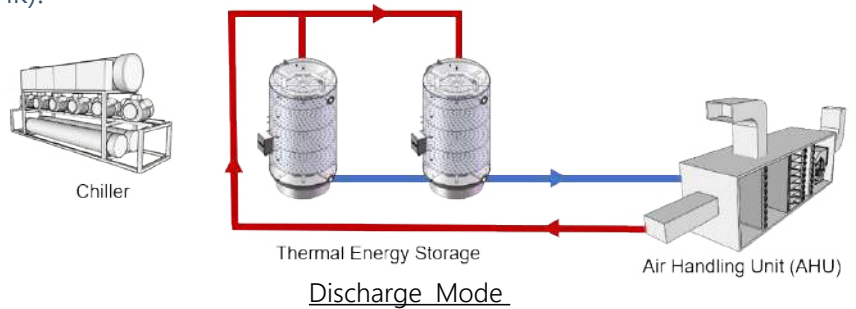
The advantage is that chilled water can be produced and stored during off – peak hour. During peak hour, the chilled water is pumped from the bottom of the storage tank and distributed to the facility, whilst the

warmer water enters from the top of the tank hence smoothing out the energy consumption of the chiller system.



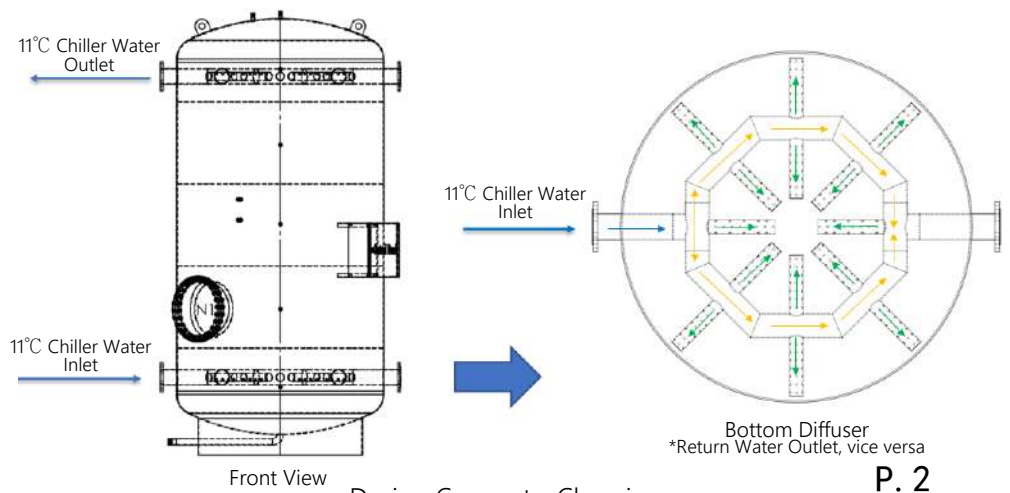
Back-up Mode

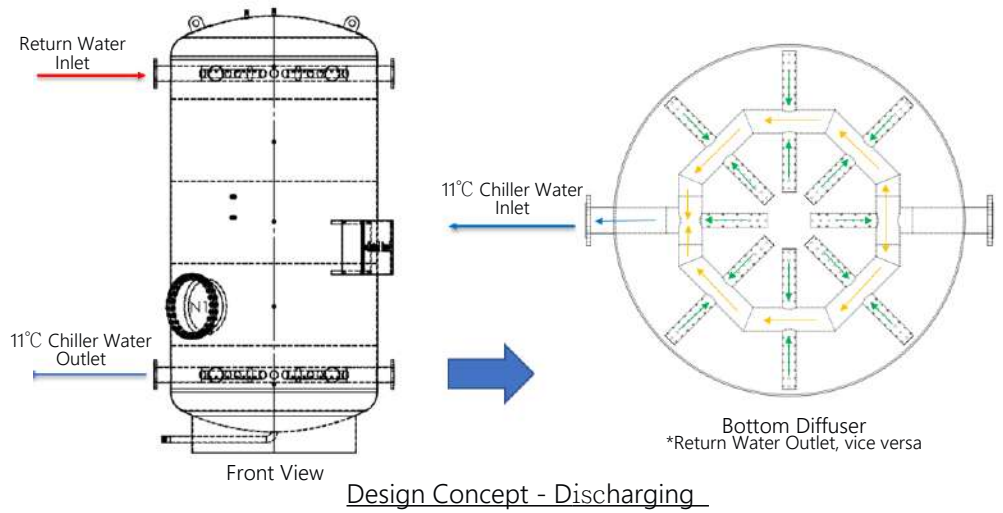
Thermal Energy Storage Tank works as a back-up storage tank. When chiller plant is down, the chilled water stored in the thermal storage can serve as back-up. (The back-up time is set as the time the chiller plant required for restart, which also determines the size of the thermal storage tank).



Design Concepts

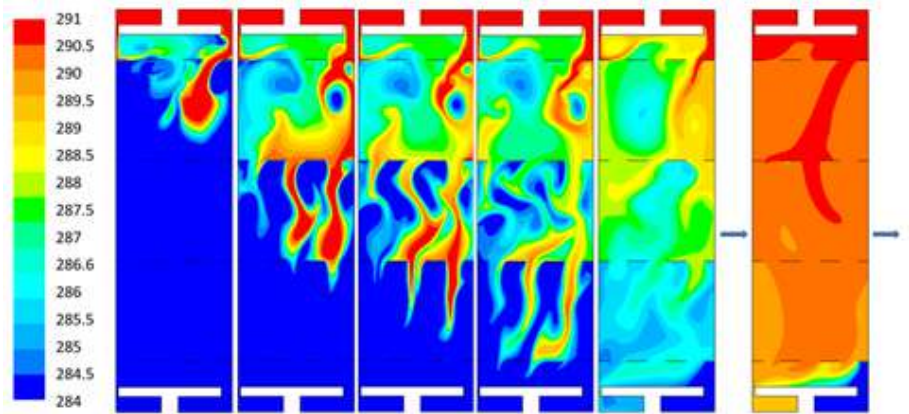
Due to the differential density of chilled water and warm water, it allows natural stratification (Turbulent Flow) of the warm water and chilled water, rising to top and settled at the bottom within the tank. To control stratification (Laminar Flow) and achieve even distribution, minimal mixing and turbulence within the tank must be ensured such that a narrow and sharply defined thermocline is formed. In doing so, IES has adopted advanced diffuser design in the inlet and outlet piping to control the fluid profile to laminar flow.





IES Strength

IES innovative Thermal Energy Storage Tank design has been tested with CFD analysis to achieve stratification. It is noticeable a defined thermo-cline appears in the contour plots during discharge, indicating that although during discharge the warmer fluid does not mix with colder fluids as separated by the thermo-cline. In addition, the effect of wall on the thermal behaviour is visualized.



CFD Analysis - IES Thermal Energy Storage



It is known that data centres often have limited space with stringent environmental restrictions, IES provide custom made solution with in-house manufacturing and engineering team to meet any design requirements (material, size & shape).

IESPress

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What's Next

The Introduction of
Indirect Gas-fired Desiccant Dehumidifier