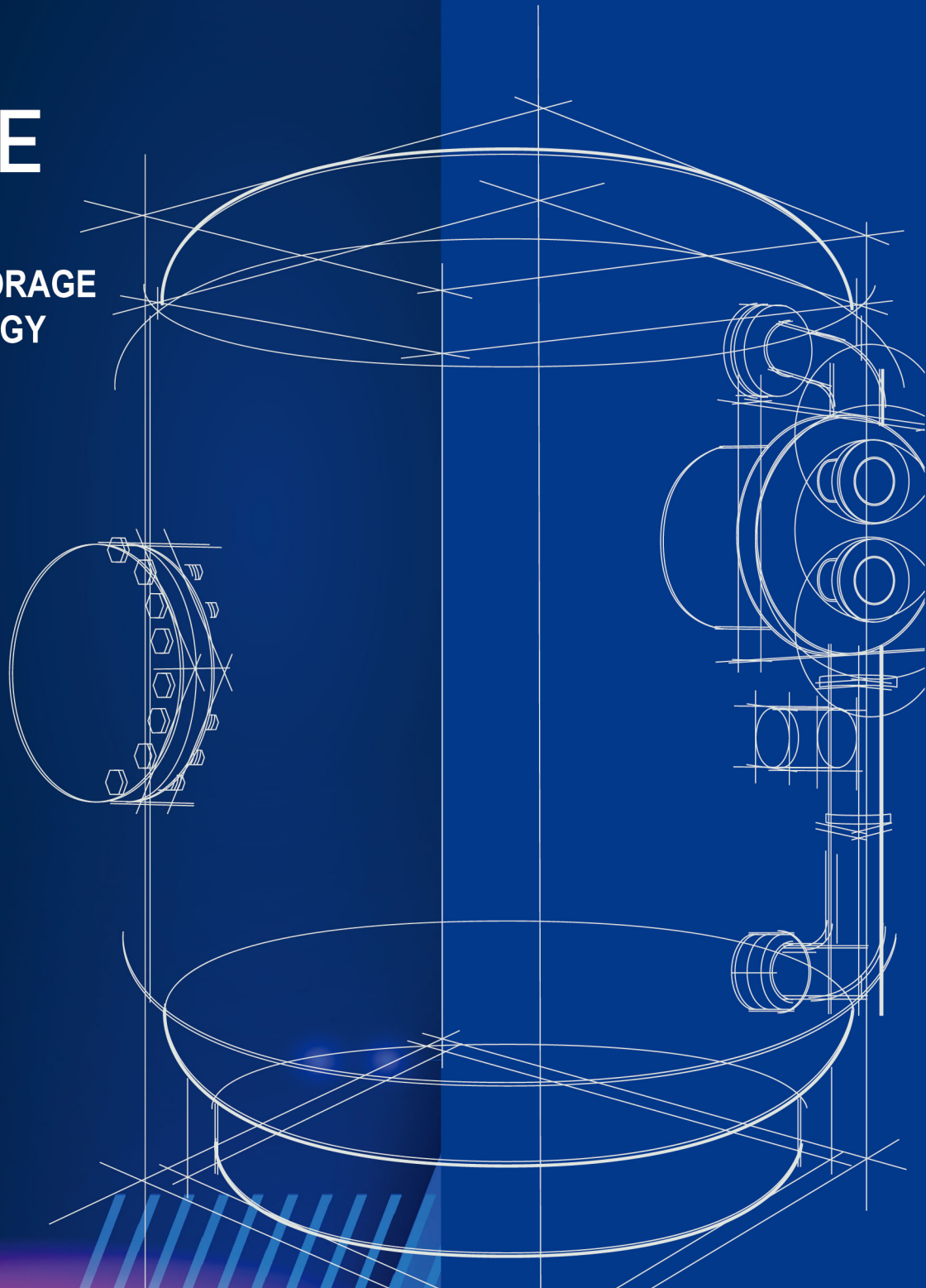


THERMAL ENERGY STORAGE

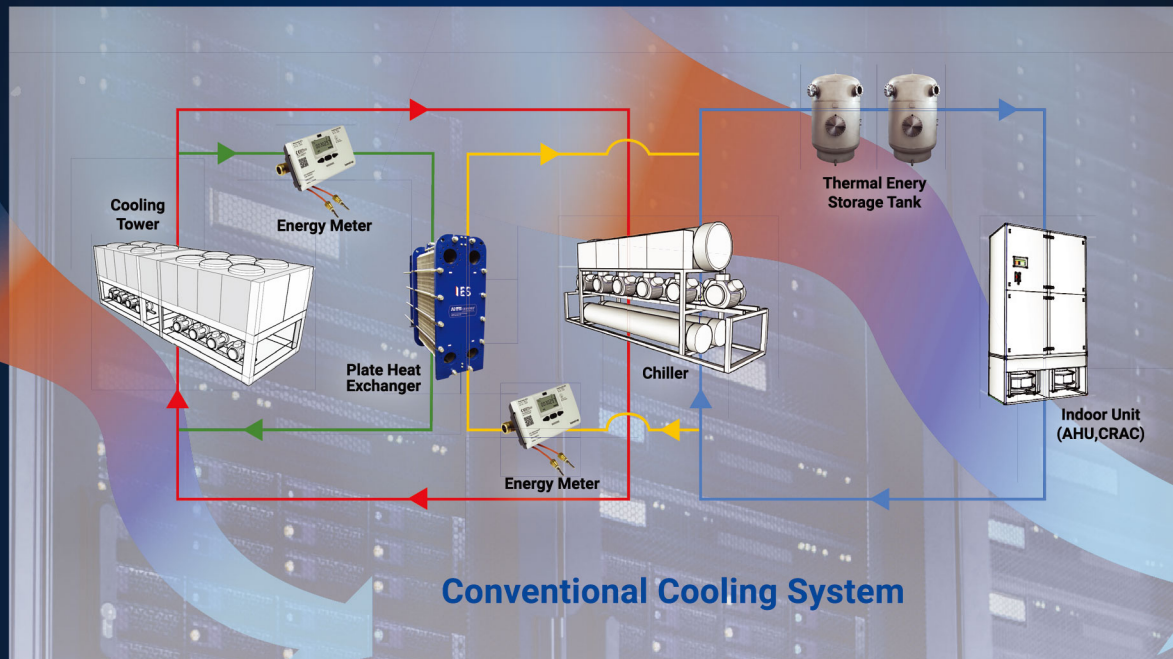
PERFECT FOR
INTERMEDIATE STORAGE
OF THERMAL ENERGY



Sustainable Cooling Solutions for Data Centre



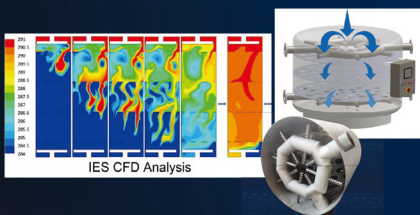
Data centre is an **energy-intensive industry**, it is estimated that the energy consumption of this industry will **double in every 4 years**.



5 MINUTES BACKUP FOR DATA CENTRE (DEPENDENT ON CHILLER RESTART TIME)

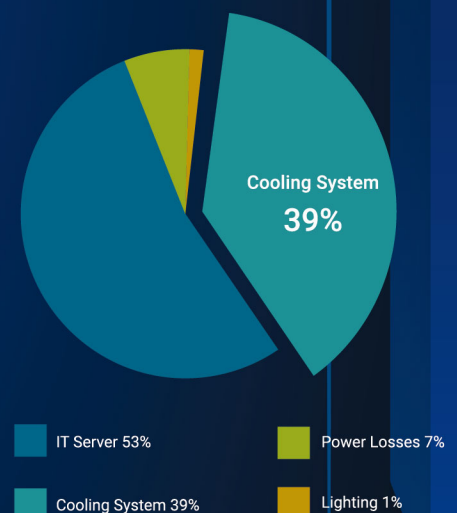
Data Centre operates under stringent condition which requires reliable and consistent energy system without any interruption. Thermal Energy Storage Tank (TES) plays an important role in supplying uninterrupted chilled water to data hall and operation centre.

Thermal Storage Tank acts like a backup battery for the cooling system, storing sensible energy. when temporary power failure or chiller malfunction, our TES will supply chilled water to sustain the data centre's design condition, whilst chiller restart (typically 5 minutes). In normal operation and under off-peak period, excess cooling capacity from the chiller will recharge the TES. In addition, TES can be used as a buffer tank to mitigate any cooling load fluctuations within the system.



Thanks to IES unique design, diffusers provide excellent thermal stratification, and laminar flow is guaranteed within the TES. The distinctive thermocline shows the separation of the chilled water return and chilled water supply hence the stored thermal energy is optimized.

ENERGY CONSUMPTION IN DATA CENTRE



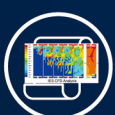
Benefits



Unique diffuser design for better thermal stratification



Enhanced flow separation through baffle plates



CFD analysis proves thermal stratification is significant



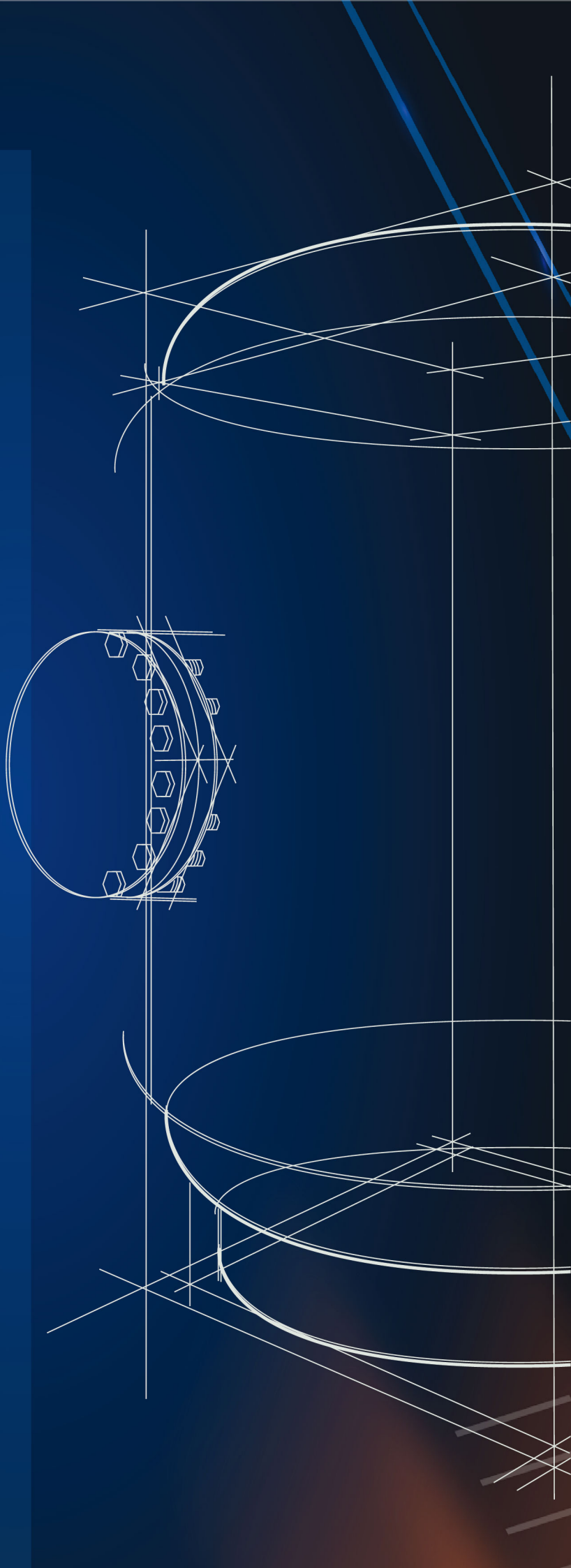
Custom made size (Vertical / Horizontal / Flat type etc)

OUR COMPANY

IES Group was established in 1998 and headquartered in Hong Kong. With perseverance and commitment to the idea of “creation of excellence”, IES has experienced a steady development and continual growth since our establishment.

With over 20 years of experience within the industry of manufacturing heat exchangers, as well as the integration of automated control systems. Our expertise ranges from R&D, manufacturing, sales & service: offering our customers a complete product and service experience. We specialize in the design and manufacturing of various types of high-efficiency heat exchangers, energy-saving and environmentally friendly products based on market demands and requirements. Our design and products adhere to ISO 3834 and BS PD 5500 and other related industry standards. With the versatility of our products, they have been applied in air conditioning, central heating systems, space and pool heating; and across multiple industries including power plants, metallurgy, petrochemical, food processing, data center and pharmaceutical covering China, Hong Kong, Macau and Southeast Asia.

IES Group's production site is based in Guangdong, covering over 10,000m² in area, featuring multiple production lines. The production facility is capable of providing customers with a wide spectrum of products through integrated systems, including Plate Heat Exchanger and Plate & Shell Heat Exchanger.

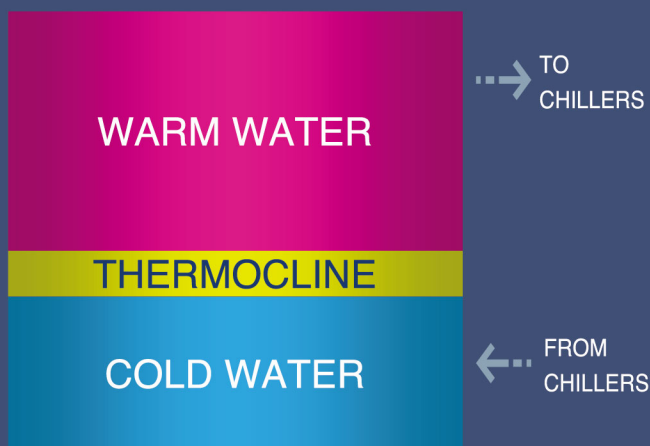


PRODUCT INTRODUCTION

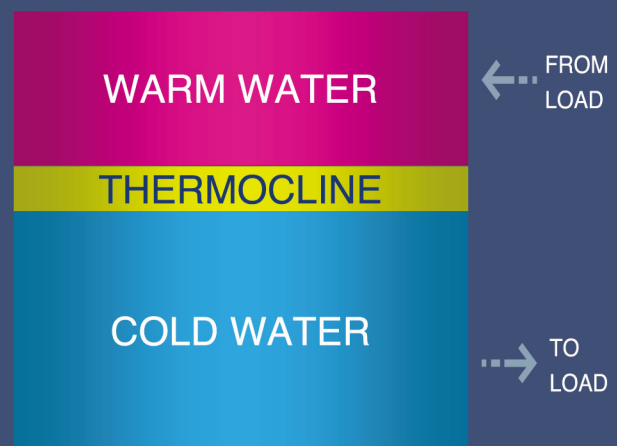
With the ongoing trend in energy saving , IES has integrated this theme into its product design and manufacturing philosophy. Intermittent cooling load causes fluctuations in energy consumption in chiller systems, hence incurs additional operation cost and significant wear on the system. Meanwhile, stringent operating condition in mission critical infrastructures (i.e. hotels, data center, etc.) requires continuous cooling. To address the problem, IES has developed a Thermal Energy Storage System.

The advantage of the system is that chilled water can be produced and stored during off-peak hour. During peak hour, 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. Due to the differential density of chilled water and warm water, it allows natural stratification of the warm water and chilled water, rising to top and settled at the bottom within the tank. In order to achieve stratification, minimal mixing and turbulence within the tank must be ensured such that a narrow and 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.

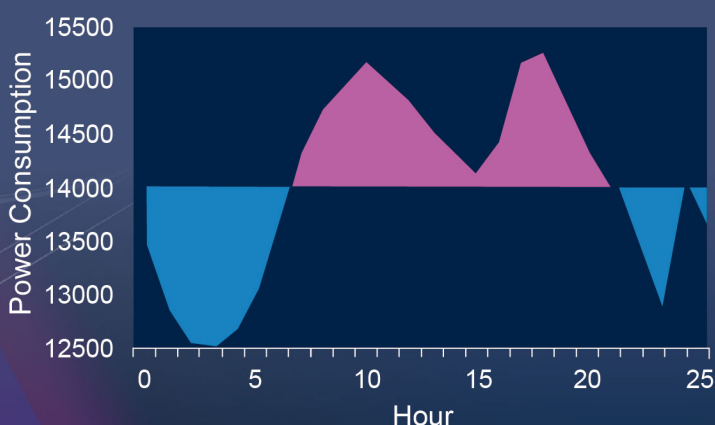
CHARGING



DISCHARGING



Power Consumption throughout the Day



During off-peak hours chilled water is being stored in the thermal storage tank, while during peak hours the water is being consumed without requiring the maximum power consumption load.

DESCRIPTION

STRATIFICATION

Our unique diffuser design allows even distribution of inlet and outlet water from the storage tanks, this would minimize turbulence and create stable thermocline effectivity stratifying the warm (top) and cold (bottom) inside the tank.

BUFFER PLATE

Restrain and regulate the flow of water inside the tank and lessen chances of hot/cold water mixing

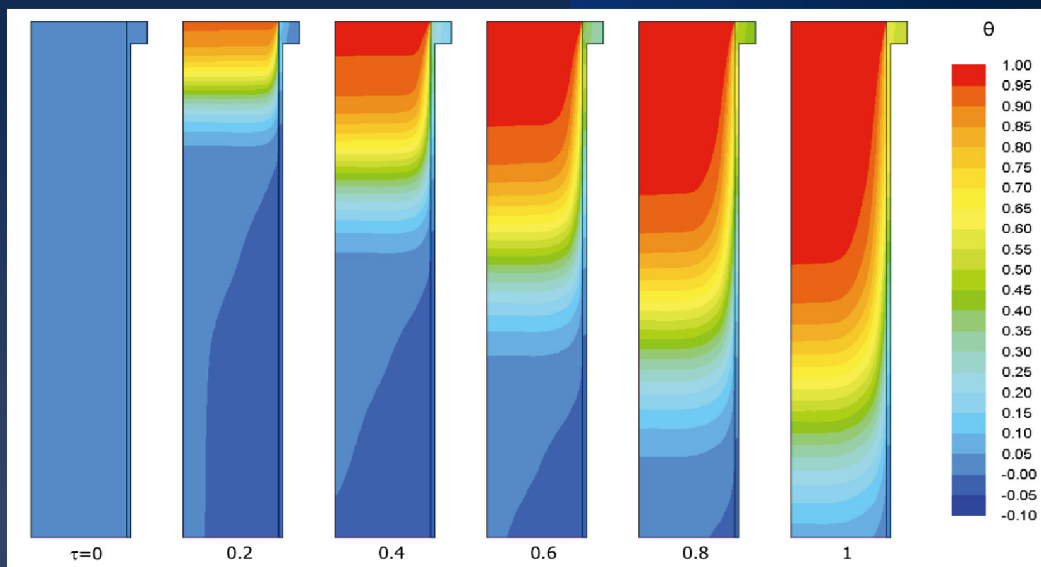
DATA LOG TEMPERATURE

Temperature sensors can be installed at different height on the water storage tank, for monitoring tank states and data collection.



PD 5500:2015
UK'S Manufacturing &
Assembly Standard of Pressure
Vessel

ISO 3834
International Welding Systems
Certificate



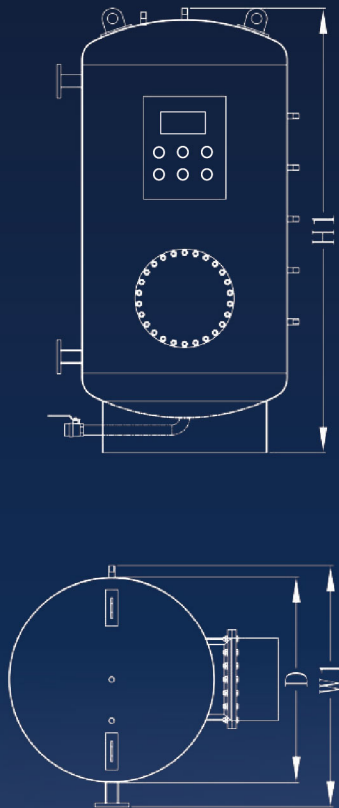
CFD

The use of CFD greatly improves the prediction and observation of the microscopic and macroscopic features within the thermal storage tank. It is noticeable a defined thermocline 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 thermocline. In addition, the effect of wall on the thermal behavior is visualized

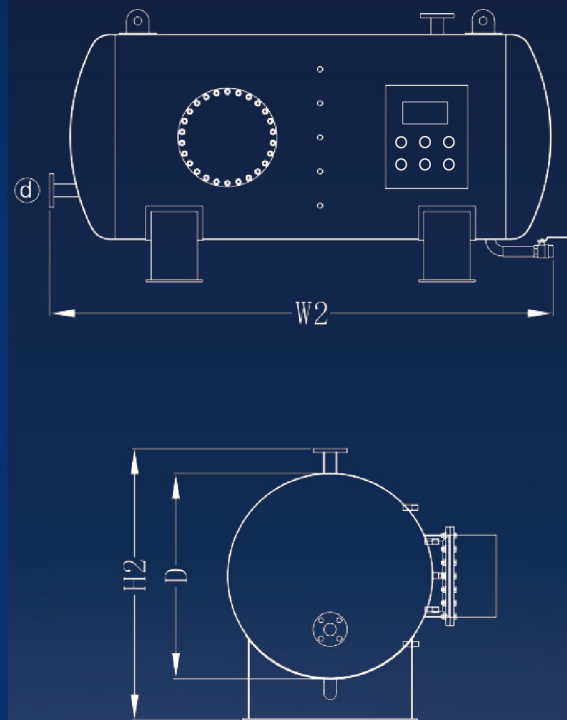
SPECIFICATIONS

- Pressure rating up to 25 bar, storage capacity from 1m³ to 100m³
- 100% Austenitic Stainless Steel 304, 316, and Carbon Steel Q345R
- World approved high quality Flux Cored Wire Welding and Plasma Arc Welding technique are used
- Standard conformity BS PD5500, ISO 3834

VERTICAL



HORIZONTAL

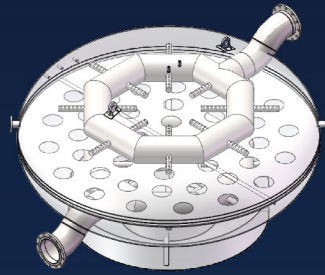
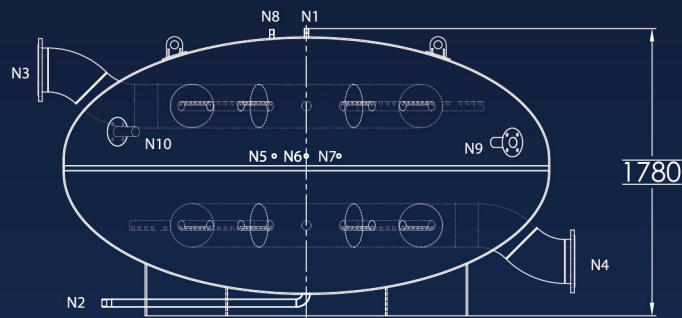


Model code	Capacity	Diameter	Width		Height		Net Weight (10Bar)		Connection Size	
		D	W ₁	W ₂	H ₁	H ₂	Vertical	Horizontal	Water inlet	Water outlet
	L	mm	mm		mm		kg		Connector/Flange (mm)	
TES	5000	1500	1710	3340	3245	1850	1000	1100	65	65
	10000	2000	2210	3755	3685	2350	2050	2350	100	100
	15000	2200	2410	4545	4475	2550	3200	3550	100	100
	20000	2400	2610	5050	4980	2750	3850	4250	150	150
	25000	2600	2810	5365	5355	2980	4450	4900	150	150
	30000	2800	3010	5555	5545	3180	5850	6400	150	150
	35000	3000	3210	5660	5650	3380	6450	7100	200	200
	40000	3200	3410	5710	5730	3600	8000	8800	200	200
	45000	3200	3410	6330	6350	3600	8750	9600	250	250
	50000	3200	3410	6955	6975	3600	9450	10300	250	250

Remarks :

The size of the above table is factory standard size, and other specifications can be customized according to customer requirements.

FLAT



IES Thermal Energy Storage Tank can be custom made to fit by different site requirement with vertical, horizontal and flat types.

PROJECT HIGHLIGHT

Project: PCCW Data Center, Fo Tan

Client: PCCW

Application: Free Cooling, Thermal Energy Storage, Exhaust System

IES was involved in the HVAC system within the PCCW Data Center, Located in Fo Tan. The required cooling load for the data center was approximately 2MW. Accordingly, the objective of the project was to minimize PUE and provide a reliable back-up system for continuous cooling.

IES provided an energy efficient and reliable cooling solution, by adopting our renowned plate heat exchanger for indirect free cooling and thermal energy storage system. Our indirect free cooling system, allowed heat transfer between ambient air and chilled water from data hall through our highly efficient plate heat exchanger, hence lowering PUE. Furthermore, to accommodate power/ chilled water supply disruption, PCCW adopted our thermal energy storage system. The system provided continuous cooling for mission critical infrastructures for at least 5.5 minutes; sufficient duration for the chiller system to restart.

SUNeVision iAdvantage

MEGA-i Fanling

Cable Landing Station at Chung Hom Kok

TWTL 428 Module 3 at Tsuen Wan

The Hong Kong Jockey Club

Shatin Communications and Technology Centre



IES Engineering (Hong Kong) Limited

Suite 1009, 10/F, Chevalier Commercial Centre,
8 Wang Hoi Road, Kowloon Bay, Kowloon,
Hong Kong

Tel : 852 2992 0830

Fax : 852 2992 0860

E-mail : info@ies-group.com.hk

REPRESENTATIVE OFFICE MACAU

Tel : 853 2830 0112

E-mail : sales@ies-group.com.mo

SINGAPORE

Tel : 65 6338 4613

E-mail : engineer@ies-group.com.sg

GUANGZHOU

Tel : 86 020 83811745

E-mail : sales@ies-group.com.cn



www.ies-group.com