

# Vacuum Ice Maker (VIM) for Thermal Energy Storage (TES)

## Product Data Sheet

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### 1. Features

IDE's Vacuum Ice Maker (VIM) for Thermal Energy Storage (TES) is the most efficient ice maker with total power consumption of less than 1 kW per tonR. VIM produces environmentally friendly ice, which stored in a simple and low cost storage tank with no internals.

VIM for TES is based on proven Vacuum Ice Making Technology, which has been operating worldwide for more than 20 years.

### 2. Process Description

Inside the VIM freezer, water is exposed to a deep vacuum. The vacuum forces a small part of the water to evaporate while the other part of the remaining water freezes, forming a water-ice mixture.

The mixture is pumped from the freezer as ice slurry into the TES tank until ice concentration reaches 50%.

In order to maintain deep vacuum in the freezer, the water vapor is continuously evacuated from the freezer, compressed and fed into the condenser by IDE's unique centrifugal compressor. Condensing of the water vapor requires cooling water at 41°F (5°C), which is supplied from a standard water chiller.

During TES discharge cycle, chilled water at 32°F (0°C) from the bottom of the TES tank is circulated through the heat exchanger in order to meet the required cooling load demand.

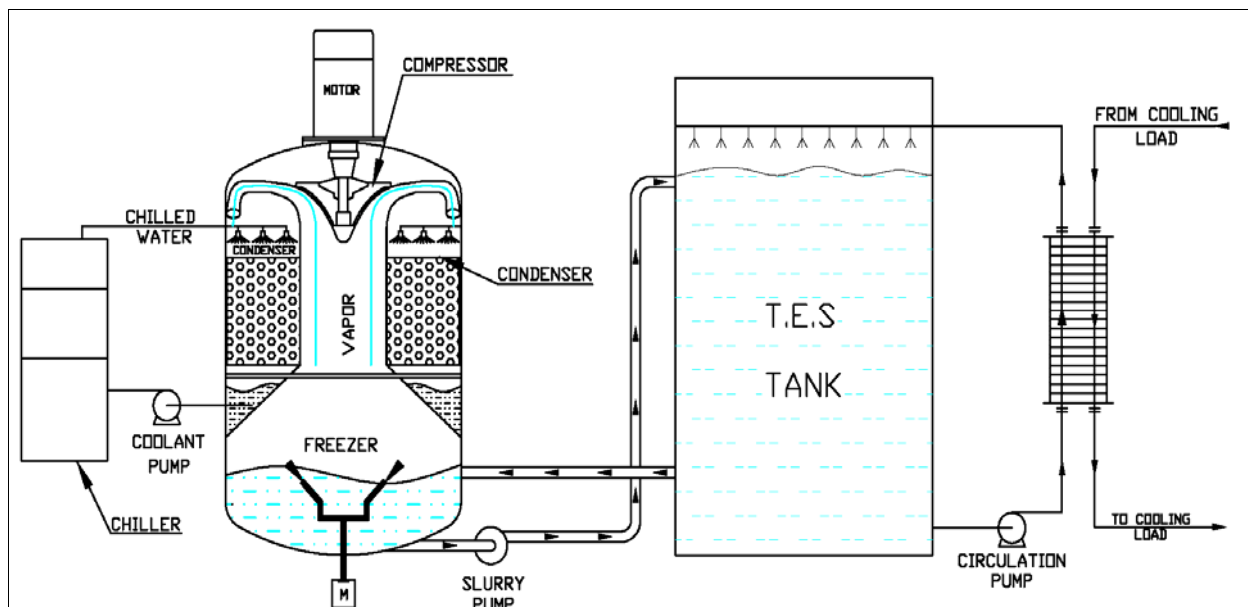


Figure 1: Flow Diagram

### 3. Technical Specifications

Specifications	VIM 400 (Ice)	VIM 850 (Ice)
Designed Cooling capacity	1,750 kW (500 tonR)	3,500 kW (1000 tonR)
Electrical supply	400V / 50Hz / 3 Phase or 480V / 60Hz / 3 Phase	
Designed Power Consumption <sup>1</sup>	218 kW	382 kW
Specific Power Consumption <sup>1</sup>	0.44 kW/tonR	0.38 kW/tonR
Ice Grain Size	0.02 – 0.04 in (0.5 – 1.0 mm)	
Freezer Type	Direct Contact Evaporator Chamber	
Refrigerant Type	Water	
Nominal Slurry Flow Rate <sup>2</sup>	528 US gals/min (120 m <sup>3</sup> /hr)	1,057 US gals/min (240 m <sup>3</sup> /hr)
Compressor	High speed centrifugal compressor with aluminum rotor and composite material blades	
Condenser Type	Direct contact	
Cooling Water Temperature	41°F (5°C)	
Cooling Water Flow Rate	2,113 US gals/min (480 m <sup>3</sup> /hr)	2,950 US gals/min (670 m <sup>3</sup> /hr)
TES Tank Type	Standard Empty Tank without Internals	
Typical TES Specific Tank Size	3 ft <sup>3</sup> /ton-hr (0.085 m <sup>3</sup> /ton-hr )	
Max. Ice Concentration in the TES Tank <sup>3</sup>	50%	
Dimensions:		
VIM Dimensions DxH	12.5ft x 37.4ft 3.8m x 11.4m	16.4ft x 41.3ft 5m x 12.6m
VIM Weight	32 tons	48 tons

<sup>1</sup> The above power consumption refers to the VIM unit only and does not include the supporting chiller cooling system (Chiller, Cooling Tower and Cooling Tower circulation pump)

<sup>2</sup> The flow between the VIM and TES Tank during TES charging

<sup>3</sup> Ice concentration at the end of the charge cycle

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