Energy-Efficient Vacuum Ice Maker (VIM)

for Deep Mine Cooling

IDE technologies ltd.

IDE's Vacuum Ice Maker

Most efficient ice maker - less than 1 kW/tonR

Use of transportable ice for mine cooling enables utilization of the latent heat of ice, and therefore allows up to four times reduction of the required mass flow of cooling water that needs to be pumped back to the surface.

The VIM is capable of producing up to 1,000 tonR (3,500 kW) cooling capacity at all ambient temperatures.

The VIM is based on IDE's proven technology, which has been operating worldwide for more than 20 years.

Mponeng Mine, *AngloGold Ashanti, South Africa*
Capacity: *7,700 tonR (27,000 kW)*

Benefits:

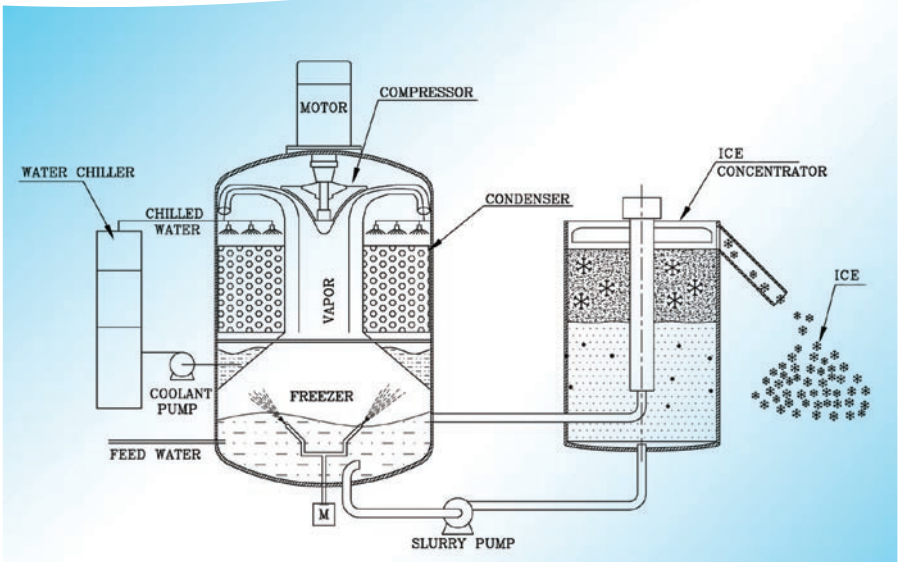
- Low energy consumption - less than 1 kW/tonR
- Utilization of the latent heat of ice & reduction of cooling mass flow
- Production of transportable ice
- 3.5 MW refrigeration per unit
- Usage of any type of feed water
- Optional desalination & Thermal Energy Storage (TES) abilities
- Environmentally friendly

IDE's Vacuum Ice Maker (VIM) Technology

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

The mixture is pumped from the freezer to an ice concentrator that separates the water from the ice crystals and delivers the ice to the mine ice distribution system.

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



Specifications	VIM 400 (Ice)	VIM 850 (Ice)
Cooling Capacity	1,750 kW	3,500 kW
Ice Making Mass Capacity [1]	560 ton ice/day	1,120 ton ice/day
Electrical Supply	400V / 50Hz / 3 Phase or 480V / 60Hz / 3 Phase	
Typical Power Consumption[2]	235 kW	397 kW
Specific Power per tonR	0.47 kW/ tonR	0.4 kW/ tonR
Typical Ice Mass Fraction (IMF)	75%	
Ice Grain Size	0.5-1.0 mm 0.02-0.04 inch	

(1) Considering IMF 75%

(2) The power consumption refers to the VIM unit only and does not include the supporting cooling system (Chiller, Cooling Tower and Cooling Tower circulation pump)

Hadera, Israel
World's Largest Sea Water Desalination Plant (SWRO)
Capacity: *127,000,000 m³/year*
Commission Date: *2009*

About IDE

IDE Technologies Ltd. is a world leader and pioneer in the development and construction of seawater desalination, water treatment and ice-making plants. Active since 1965, IDE has 400 plants installed in over 40 countries worldwide.

Tianjin SDIC, China
China's Largest Thermal Desalination Plant
Capacity: *100,000 m³/day*
Commission Date: *2010*

ANGLOGOLD ASHANTI

Follow AngloGold Ashanti and take advantage of our Vacuum Ice Maker for deep mine cooling.

IDE technologies ltd. | WE MADE OUR MARK IN WATER

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