

## TECHNICAL DATA SHEET OF HS 33N

*savE<sup>™</sup>* Phase Change Materials (PCM) are organic or inorganic chemical compound that have large amount of heat energy stored in the form of Latent Heat which is absorbed or released when the materials change state from solid to liquid or liquid to solid. The PCM retains its latent heat without any change in physical or chemical properties over thousands of cycles. Various specific temperature PCM's are commercially available in the market (varying between -37°C to 90°C) depending upon the applications.

### Applications

PCM provides energy efficient solutions for many industries including:

- Insulation for Building and Piping Products
- Biopharmaceutical Transportation
- Telecommunications and Heat Sinks
- Hot and Cold Storage
- Food / Poultry / Milk Products Transportation
- Boiler and Hot Water Systems Industry looking to exploit Off-Peak Electricity Tariffs / Reducing Chilling Equipment Costs by Storing Energy at Off-Peak Hours

However there is no limit as to who can apply PCM technology to their operation, to improve thermal management, cost and energy efficiencies.

### PLUSS<sup>®</sup> Encapsulation

Pluss<sup>®</sup> pioneered the use of HDPE panels as encapsulation for PCMs in India. Our calculations for total heat transfer across thin membranes show that HDPE / PP is as good as aluminium, stainless steel, etc. Pluss<sup>®</sup> encapsulations are thin enough to give good overall heat transfer coefficient as good as many metals with better mechanical strength.

### *savE<sup>®</sup>* HS 33N

*savE<sup>®</sup>* HS 33N is an inorganic chemical based PCM having melting temperature of -33<sup>0</sup>C. It stores thermal energy as latent heat in its crystalline form. On changing phase this latent heat is released or absorbed, allowing the ambient temperature within the system to be maintained

HS 33N is constituted of the right mix of various additives allowing equilibrium between solid and liquid phases to be attained at the melting point. Also HS 33N is free flowing in molten state and can be encapsulated in various forms.

### Why savE® HS 33N?

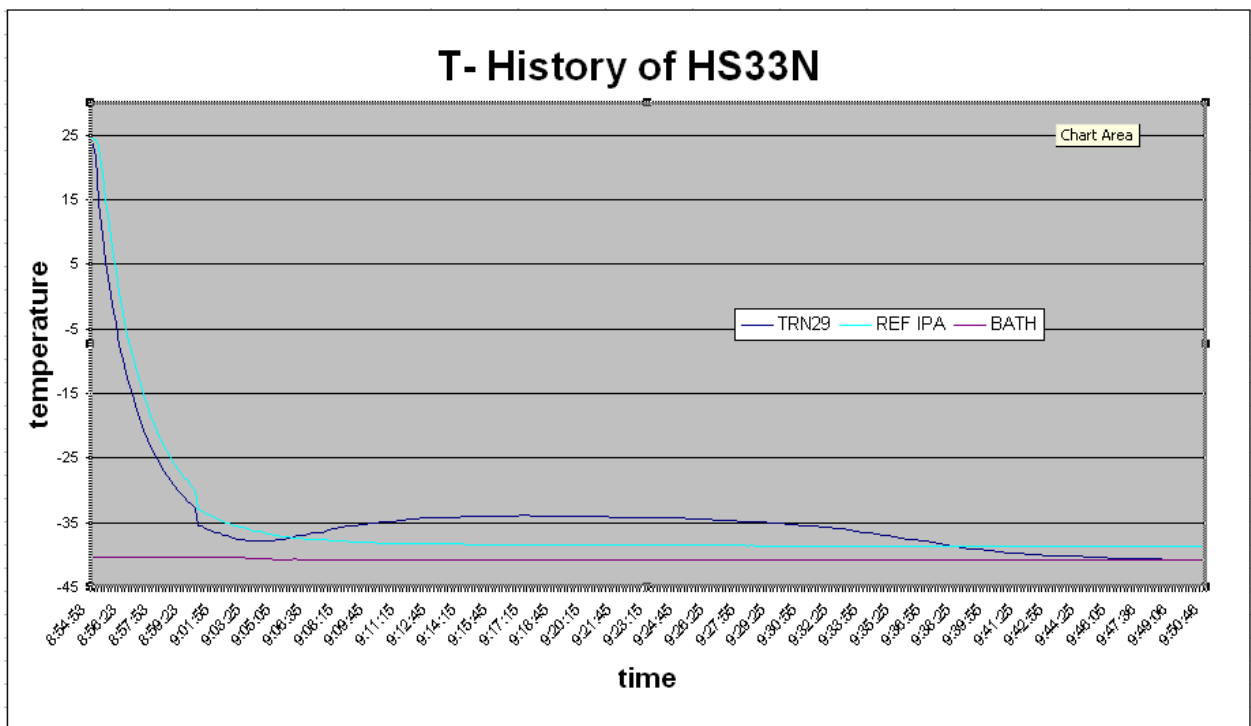
savE® HS 33N has a phase change temperature of  $-33^{\circ}\text{C}$ , a temperature that makes it ideal for many cold storage applications. Some of its salient features are:

- The salt is chemically and thermally stable by using Pluss® proprietary additives.
- It is non-flammable.
- All the ingredients are food/Pharma grade additives.

### Technical Specification:

Product : savE™  
Series : HS 33N  
Description : Mixture of Inorganic salts  
Appearance : Transparent liquid

### T-History Test



A 20g sample is taken in a test tube in molten condition and placed in a temperature controlled bath. A temperature sensor is placed in the test tube and bath to record the temperatures using a datalogger. The bath is maintained at -41 °C during the freezing cycle.

Property	Typical Value	Test Method	Test Conditions (if any)
Melting Temp. (°C)	-32.3	T - History	At 25 °C (maximum) Bath
Freezing Temp. (°C)	-33	T - History	At -41 °C Bath
Solid Density (kg/m <sup>3</sup> )	1400	PLUSS <sup>®</sup> Internal	At -40 °C
Latent Heat (kJ/kg)	250	T- History	from -38° to -28°C
Base Material	Inorganic Chemical		-
Congruent Melting	Yes		-
Sub Cooling	Low	T-History	-
Thermal Stability (cycles)	Under test	PLUSS <sup>®</sup> Internal	
Max.Operating Temp. (°C)	~45		

**Pluss Polymers Pvt. Ltd.**

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