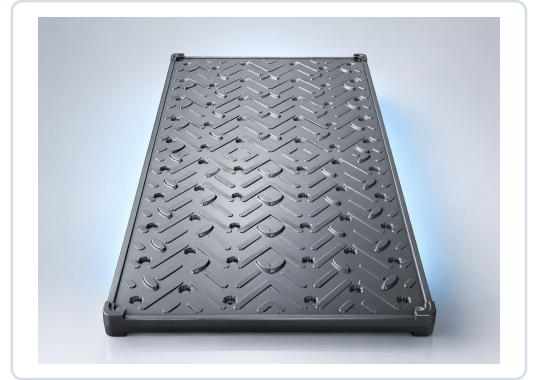




LNG COLD-ENERGY RECOVERY PRODUCT LINE

-21C PCM Cold-Energy Plate

LNG Cold Recovery standard product manual based on the 5.0 L plate fill rule.



PHASE POINT

-21C

NOMINAL FILL

5.0 L/plate

LATENT RANGE

0.560-0.560 kWh

MATERIAL OPTIONS

1 variants

Core Engineering Data - Plate Template

Parameter	Value	Unit	Source / status
Plate outer dimensions	800 x 400 x 18	mm	Standard plate rule
Nominal PCM fill volume	5.0	L/plate	Standard product rule
Phase point	-21	C	Product library
Material option count	1	-	Active Pure PCM products
HDPE single-side wall	1.5	mm	Current plate template
HDPE density	950	kg/m3	Current plate template
HDPE conductivity	0.45	W/mK	Current plate template

Data status: design-calculated; final deployment requires cycling, leakage, compatibility, thermal-curve, and compliance validation.

CORE ENGINEERING DATA TABLES

Material And Performance Data

Material options are active Pure PCM products at -21C, calculated under the 5.0 L fill rule.

Material Property Table - -21C Pure PCM Options

Source product	Type	Density kg/m3	Latent kJ/kg	k W/mK	Status
PCM-INO-PURE-138	Inorganic	1300	310	0.5	PCM cost library

Calculated Performance Table - Per 5.0 L Plate

Variant	PCM kg	Plate kg	Latent kJ	Latent kWh	vs water 10K	Context
Inorganic	6.50	7.22	2015	0.560	9.6x	Draft calc.

Calculation Basis And Boundary Conditions

Item	Basis	Unit	Status
PCM mass	5.0 L x density	kg	Calculated
Latent capacity	PCM mass x latent heat	kJ / kWh	Calculated
Water comparison	5.0 kg water x 4.186 x 10 K	kWh	Reference only
Plate mass	PCM mass + 0.722 kg HDPE estimate	kg	Estimate only

APPLICATION, SELECTION, VALIDATION

Material Selection And Quality

Select the -21C plate by operating window, material priority, plate count, and validation evidence.

Application Fit Matrix

Application	Problem	Engineering objective
LNG cold-source recovery	Cold exergy is usually wasted	Convert cold source into dispatchable storage
Process pre-cooling	Low-temperature load fluctuates	Buffer inlet conditions before process use
Low-temperature storage	Temperature stability is difficult	Hold a phase plateau near the target band

Selection Workflow

Step	Decision	Required input
01	Temperature window	Confirm charge/discharge temperatures and approach delta
02	Phase point	Select PCM transition point inside usable operating window
03	Material option	Balance kWh/plate, mass, conductivity, safety, and cost
04	Plate count	Convert required kWh into plate quantity and packaging layout

Qualification Gate Before Customer Release

Item	Evidence required	Status
Cycling stability	Cycle count, method, acceptance threshold	Required
Leakage / containment	Thermal cycling and hold test	Required
Compatibility	Coolant, HDPE, seals, metals, duration	Required
Thermal performance	Flow rate, approach temperature, charge/discharge curve	Required
Safety / compliance	SDS, transport/storage classification, regulatory status	Required