

**DNV**  
**2.7-1**  
STANDARD

# SMARTER

*Global Solutions*



WORLD CLASS SOLUTION IN OFFSHORE INDUSTRY



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**DNV**  
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STANDARD

REDEFINING  
*Better*  
OFFSHORE FOOD  
STORAGE SOLUTIONS



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**DNV**  
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**ICE** ✨  
**STORM**  
BY  
**MGS** ✨

WORLD'S  
*First* ✨  
OFFSHORE SATELITE  
REEFER TECHNOLOGY



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# ALL ROUNDED *Solutions*

**COST  
SAVING  
FACTORS** ✦



SUPREME  
FRESH AIR  
SETTINGS



MAINTAIN  
FOOD  
QUALITY



LESS  
CARGO  
WEIGHT LOSS

**30%**

LOWER  
30%  
FOOD WASTAGE



EFFICIENCY  
IN  
INSULATION

**EASIER . SAFER . EFFICIENT**

**ICE  
STORM**  
BY  
**MGS** ✦

POWERED BY



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# MIGHTIER *Solutions*

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## EXTERNAL DIMENSION

|        |          |
|--------|----------|
| LENGTH | 2,991 mm |
| WEIGHT | 2,438 mm |
| HEIGHT | 2,591mm  |

## INTERNAL DIMENSION

|                                    |          |
|------------------------------------|----------|
| LENGTH (FOR THERMO KING REF. UNIT) | 2,342 mm |
| WIDTH                              | 2,290 mm |
| HEIGHT                             | 2,274 mm |
| CARGO ACCESS HEIGHT                | 2,175mm  |

Max. Gross Weight 10,000 kg 22,046 lb.  
Tare weight (excluding Ref. Unit) 2,400 kg±2% 5,290 lb.  
For T.K. Magnum Plus Ref. Unit: as per actual weight of Ref. Unit  
Tare weight (Including Ref. Unit) 2,800 kg±2% 6,173 lb. Payload 7,200 kg 15,873 lb.



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# BIGGER *Solutions*

## DOOR OPENING (NOMINAL)

|        |          |
|--------|----------|
| WIDTH  | 2,298 mm |
| HEIGHT | 2,258 mm |

## FORKLIFT POCKET

|                 |          |
|-----------------|----------|
| WIDTH           | 360 mm   |
| HEIGHT          | 95mm     |
| CENTER DISTANCE | 1,150 mm |

## INSIDE CUBIC CAPACITY (NOMINAL)

|                     |             |
|---------------------|-------------|
| 12.2 M <sup>3</sup> | (431cu.ft.) |
|---------------------|-------------|



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# COMPETITIVE *Advantages*

## KEY FEATURES ✦

- Temperature settings ranging from -30C to +20C with humidity controller to meet required conditions
- ICE STORM Designed so cargo reaches optimum temperature and set point as quickly as possible
- Even air : better uniformity so all cargo in reefer container are at same temperature
- Temperature distribution : Quicker recovery so after door opening and returns back to set temperature
- Hygienic, An easy-to-clean-interior made of sanitized aluminium or Stainless Steel Material
- Strong welding on M.G.S.S containers supports Offshore heavy duty applications
- High internal volume capacity provides maximum space for cargo 12.2cu.m
- Low tare weight maximizes payload lowest in Offshore Reefer market



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# COMPETITIVE *Advantages*

## CONTAINER FLOOR / WALL INFORMATION

The base frame is composed of corrugation type steel base frame and "T" section aluminum floor rail with Insulation.

The T-bar floor is made of aluminium and designed to optimize the airflow in the container.

The new generation of the container side lining panels (walls) are made of polypropylene material. This material ensures maximum strength, with reduced risk of foam delamination.

The insulation material used in the reefer container is patented environment-friendly foam insulation, meeting tomorrows environmental requirements.

## HUMIDITY

The relative humidity level is important when it comes to controlling the quality of your products. It particularly affects the shelf life of fruits and vegetables – and thus their condition upon arrival.

The recommended relative humidity for most fresh fruit and vegetables is between 85% and 95%, depending on variety. This level of humidity is generated automatically in a reefer container, where correct ventilation and packaging is applied. De-Humidification can be applied to products which are sensitive to high humidity.

Ice Storm reefer containers can dehumidify the air in the range of 65% to 85%

- Too high level of humidity may cause mould and/or fungi development.
- Too low level of humidity may result in dehydration/weight loss and further lead to wilt and/or shrivel.



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# QUALITY *Assurance*

The majority of MGS OFFSHORE reefer containers are manufactured at MGS OFFSHORE Ltd Container Industry's facilities in China.

## The unique reefer design ensures:

- Low tare weight to maximize payload and reduce CO2 emissions during transit.
- Low heat leakage and good air tightness to maintain optimal product temperature.
- Integrated reefer design for reduced energy consumption and further improvement of the above.
- Patented insulation foam for zero ozone depletion and significant reduction of CO2 emission.
- The production of Ice Storm is conducted under the strict Health, Safety, and Security and Environment (HSSE) regulation of the MGS OFFSHORE Group



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EXPERIENCE THE *Difference*



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ICE STORM REEFER**

- Microprocessor controls the fresh air exchange rate
- Record of fresh air exchange data
- Helps assure consistent product quality
- Protects product against high, damaging CO2 levels ( to control food freshness )
- provides "ventilation on demand" and is the ultimate protection afforded perishable cargo because it provides venting in response to continuing changes in respiratory gases.

**OLD TYPE REEFER**

- No Microprocessor
- No Record data
- No Food detection sensor
- No Control CO2 system
- Bad Ventilation



**IN CONCLUSION**

ICESTORM employs technology not used elsewhere. By virtue of its microprocessor controller, which integrates solid state electronics and ebormous processing powerm, it can far more accurately ride the "sweet spot" of the ideal refrigeration cycle.

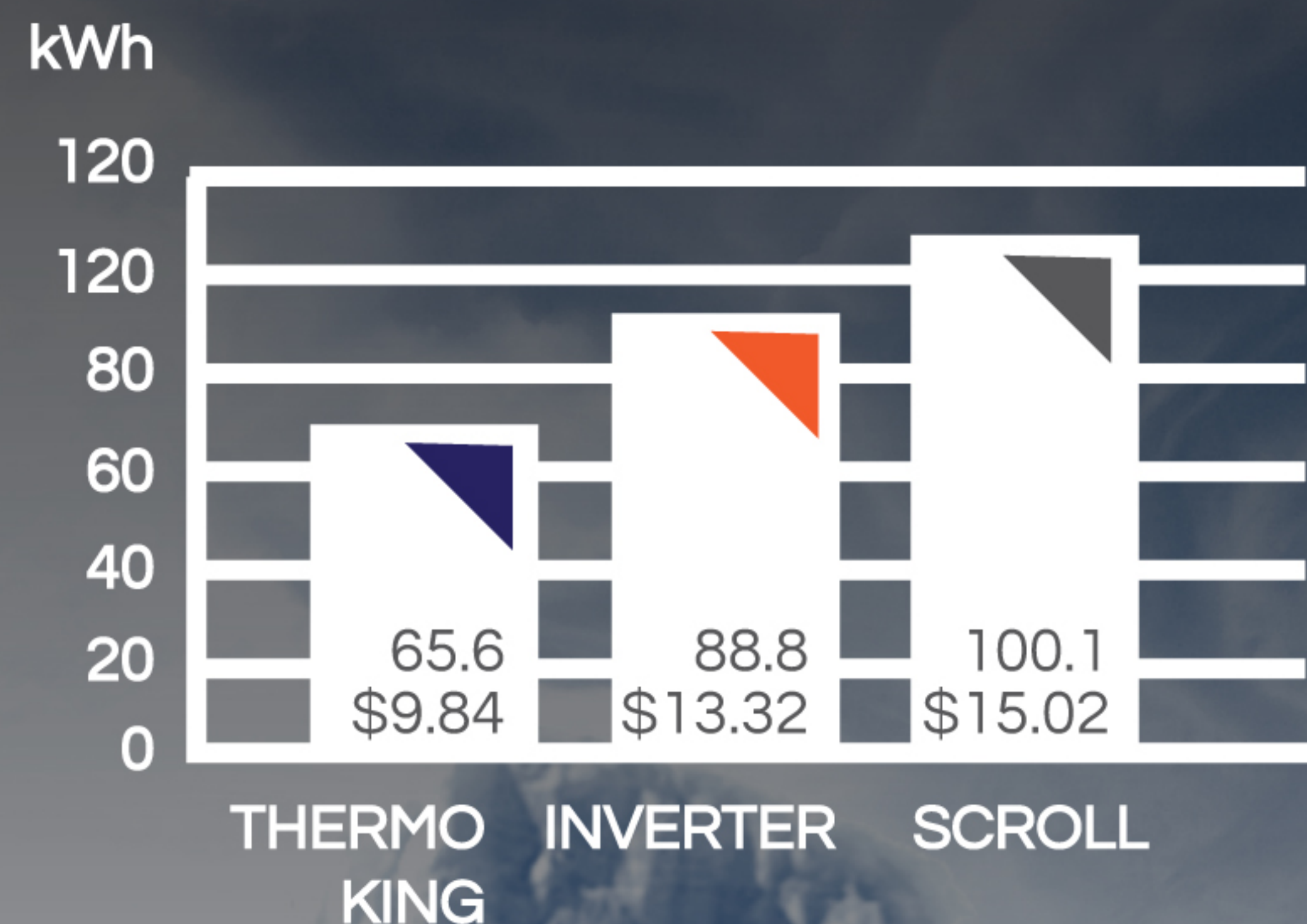
THERMO KING Offers the lowest energy consumption, the lightest weight, the fastest pull-down, the widest range of carrying temperatures, the tightest floorspread, and the most advanced controller. ICESTORM Is undoubtedly the best in its class.



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**ENERGY CONSUMPTION TEST RESULTS**  
MAY 2017 - FIRST TRIAL

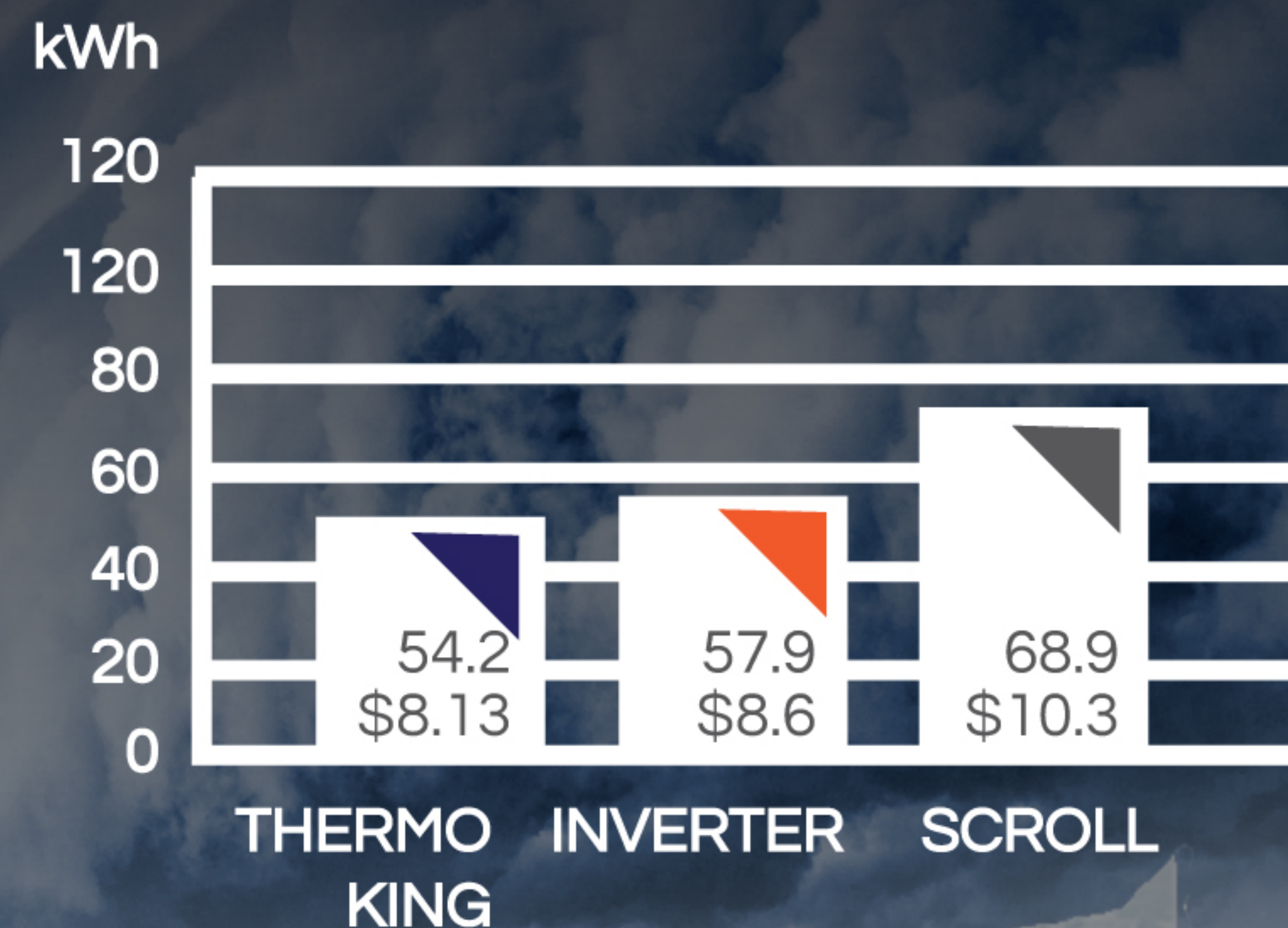


**THE RESULTS**

Parallel trials were run at +2°C, 1000W of heat, a ventilation. Three competing units were run for 24 hours, and 20 CFM side-by-side. The results were very clear and simple. The First set of trials covered standard operation (i.e. with no 'energy-saving software' active). Assuming that on-board energy costs US \$0.15/kWh, then the Thermo King unit consumed \$9.84 of energy.

The competing machines used from \$13.30 up to \$15.02 of energy. This results in a very significant, \$3.48 to \$5.18 Per day savings with the Thermo King Technology.

**ENERGY CONSUMPTION TEST RESULTS**  
MAY 2017 - SECOND TRIAL



**THE RESULTS**

The second set of test was run as the first, but this time with "energy-saving software" activated. There have been a number of such softwares released in recent years by various parties. What is occasionally forgotten is that THERMO KING has been fitting energy saving software for more than 25 years, as standard. It is called ECONOMY MODE. If a slightly looser temperature control is acceptable, it can be switched on. In the case of THERMO KING, it is designed to NOT undershoot a temperature setpoint. The trials, however, proved that other "software" solutions DO undershoot temperature setpoint. This has the effect of reduced shelf life in the fruit or vegetable, a cost to the cargo, and zero cost benefits to the cargo owner.

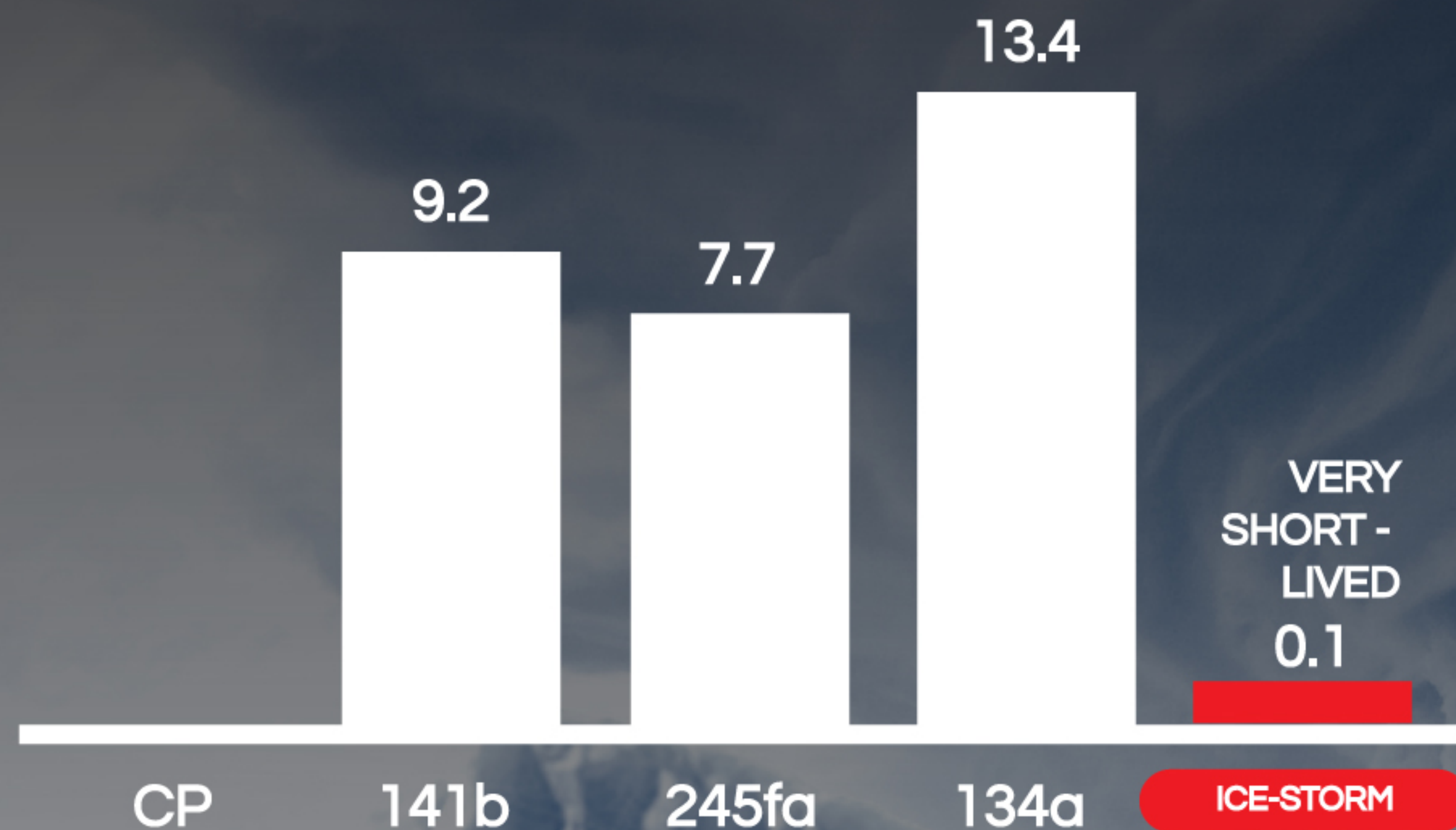
Despite not understanding, or otherwise compromising the cargo care, the THERMO KING unit outperformed both competitor units on this test also. The real lesson in this trials? THERMO KING to eliminate cargo quality compromise and reduce the amount of energy burned.



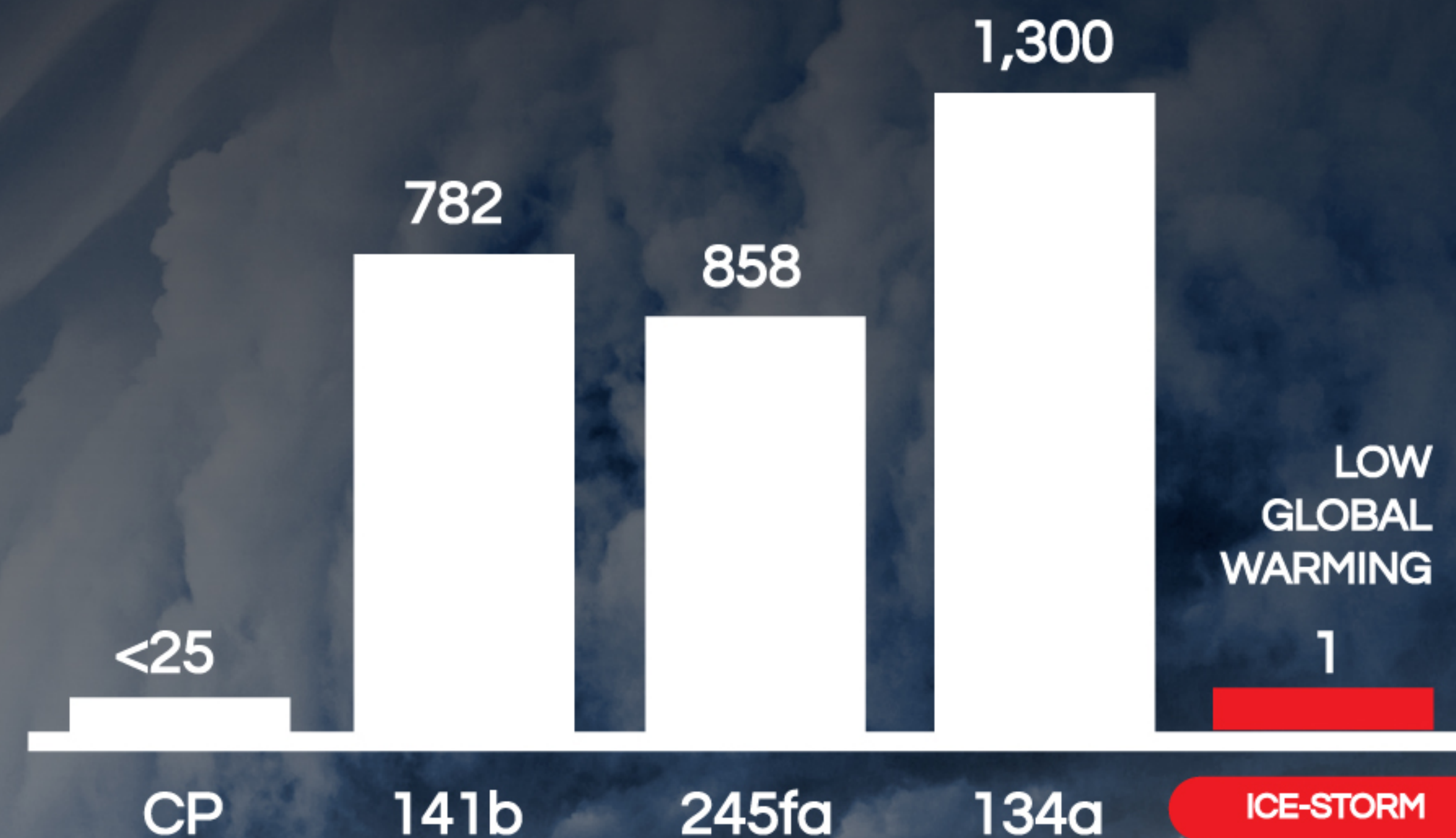
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**SAFE FOR USERS & THE ENVIRONMENT**  
LIFETIME (YEARS)



**GLOBAL WARMING POTENTIAL (GWP)**



| FLAMMABLE           | NOT FLAMMABLE    |
|---------------------|------------------|
| CYCLOPENTANE        | 141b             |
| 365mfc              | 245fa            |
|                     | 134a             |
| <b>HIGHEST COST</b> | <b>ICE-STORM</b> |

| VOC / HIGH POCP     | NOT VOC / LOW POCP |
|---------------------|--------------------|
| CYCLOPENTANE        | 141b               |
| 365mfc              | 245fa              |
|                     | 134a               |
|                     | 365mfc             |
| <b>HIGHEST COST</b> | <b>ICE-STORM</b>   |

\* US EPA APPROVAL for VOC Exemption  
\* Note : See Previous slide for references on GWP values

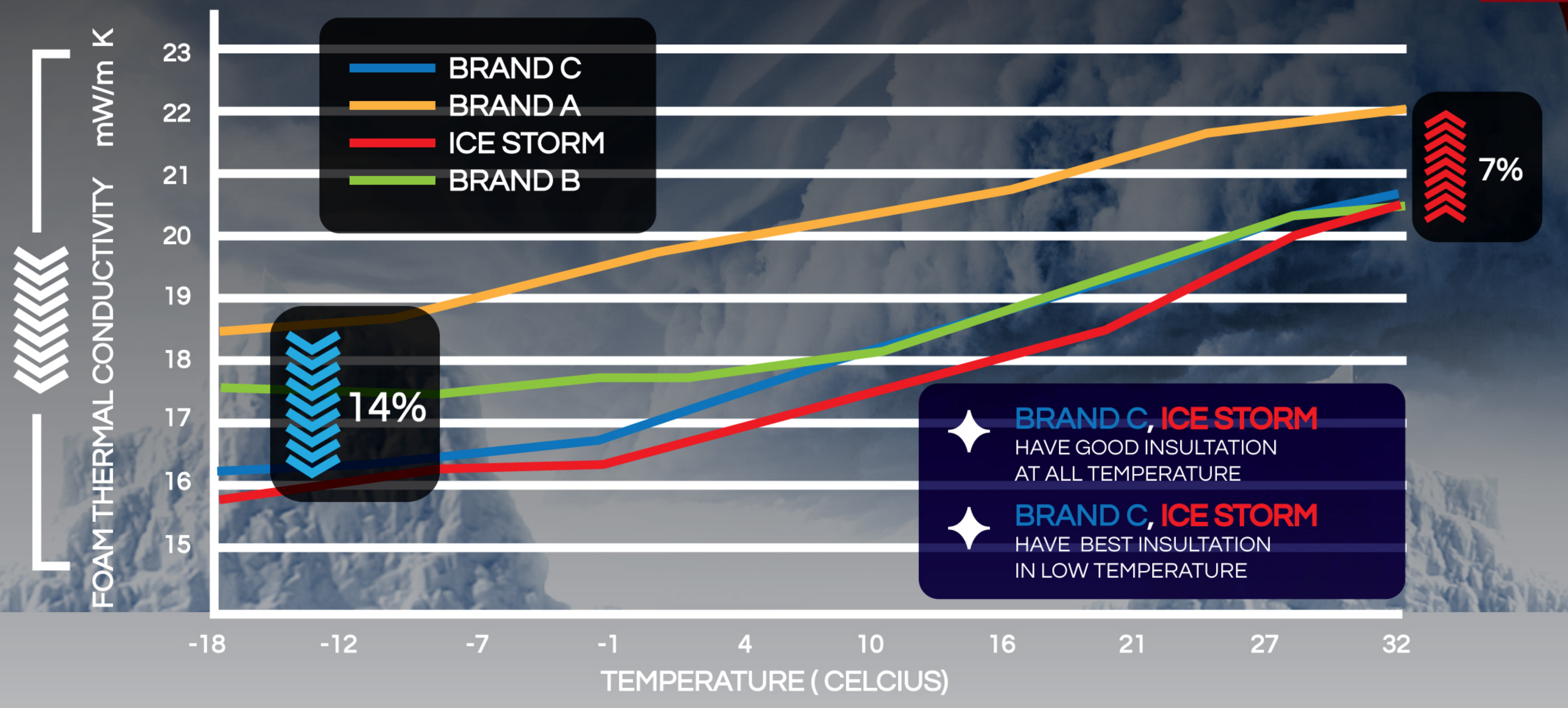
\*SOURCE PROVIDED BY HONEYWELL INTERNATIONAL INC.



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THERMA CONDUCTIVITY OF DIFFERENT INSULATION AGENT



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