

**BENEFITS THAT COVER YOUR NEEDS. . .**

# Forane<sup>®</sup> FBA 1233zd Blowing Agent

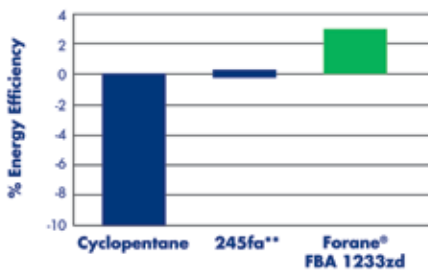


**ENERGY EFFICIENCY**  
**LOW ENVIRONMENTAL IMPACT**  
**SAFETY**  
**EASE OF USE**



# A Comprehensive Approach to Safely Meet Stricter Global Energy Standards With Low Environmental Impact

## % Energy Efficiency Improvement in Household Refrigerators



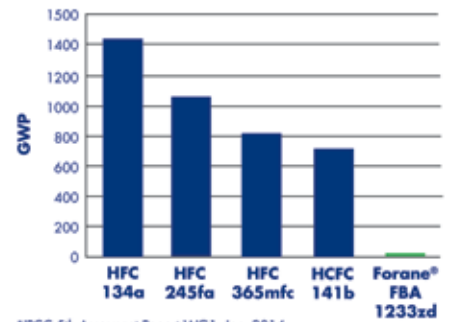
\*Cyclopentane vs 245fa from AHAM trials  
\*\*Commercial trials, unoptimized foam system with Forane® FBA 1233zd vs. HFC 245fa

## Thermal Performance

- Improved energy efficiency in household refrigerators and freezers
- Low lambda ( $\lambda$ ) value for critical cold chain and PU spray foam applications

## Low Environmental Impact

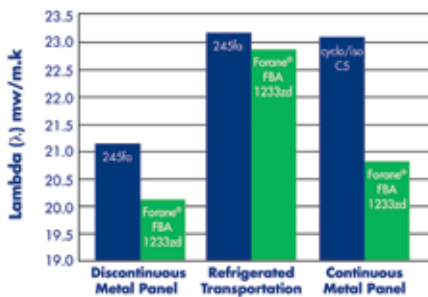
Forane® FBA 1233zd blowing agent has a GWP of 1\*



\*IPCC 5th Assessment Report WG1, Jan. 2014

## Lambda ( $\lambda$ ) for Cold Chain Applications\*

Forane® FBA 1233zd blowing agent provided excellent insulation values at low temperatures critical to all cold chain applications.



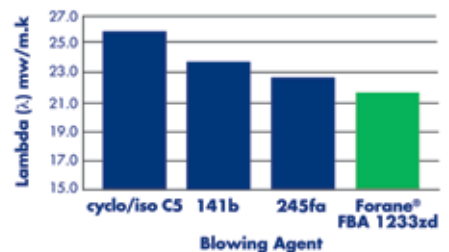
\*Tested @ 75°F Mean Test Temperature

## Low Environmental Impact

- Low global warming potential (GWP of 1)\*, a 99.9% reduction vs. HFC's
- Non-ozone depleting
- VOC exempt. 1233zd is not a volatile organic compound

## Typical Lambda ( $\lambda$ ) of Pour-in-Place Foam

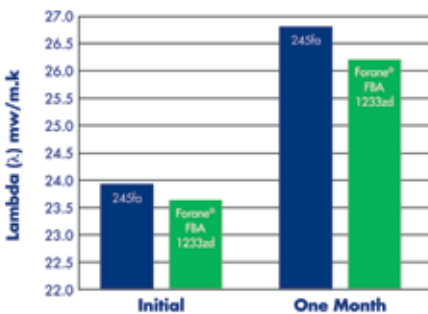
2.5cm thick sample



## Safety Performance

- Non-flammable
- Low vapor pressure

## Lambda ( $\lambda$ ) for Spray PUR Foam

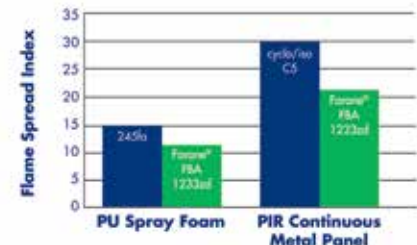


## Cost and Ease of Use

- Utilizes existing processing equipment and raw materials
- Easy to use liquid form

## Fire Performance\*

Forane® FBA 1233zd may allow for lower levels of flame retardants.



\*Spray Foam tested under ASTM E84 guidelines. Continuous Metal Panel burn tested under controlled lab conditions. These tests should not be used to predict burn behavior under actual fire conditions.

Arkema has granted patents on 1233zd use in Foam and Heat Transfer applications throughout the world.

## Benefits That Cover Your Needs... Forane® FBA 1233zd Blowing Agent

Please consult Arkema's disclaimer regarding the use of Arkema's products on <http://www.arkema.com/en/products/product-safety/disclaimer/index.html>

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[forane.com](http://forane.com)

**ARKEMA**  
INNOVATIVE CHEMISTRY

**Headquarters: Arkema France**  
420, rue d'Estienne d'Orves  
92705 Colombes Cedex – France  
Tel.: +33 (0)1 49 00 80 80  
Fax: +33 (0)1 49 00 83 96  
[arkema.com](http://arkema.com)