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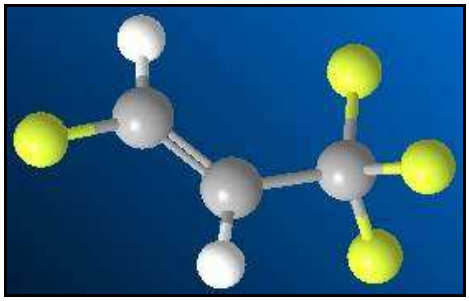
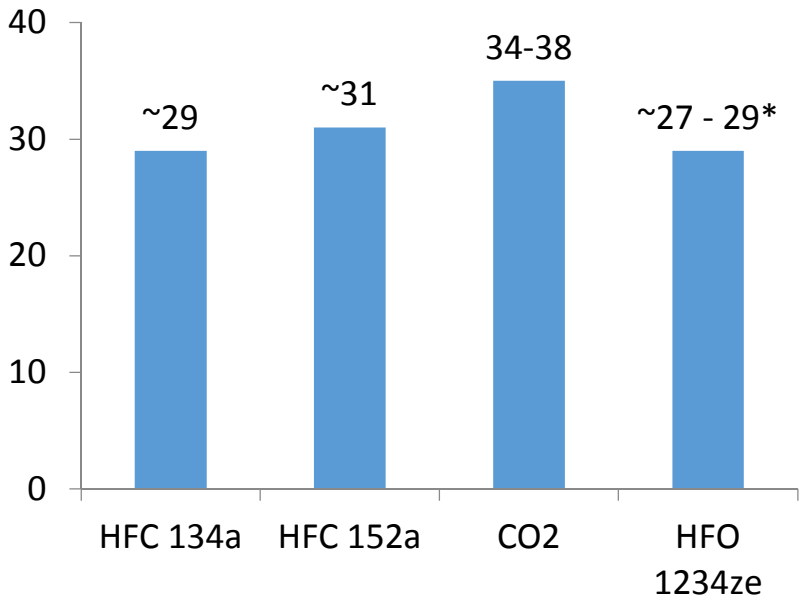


# SOLSTICE GBA

## Trans-1,3,3,3-tetrafluoropropene

## XPS LONG TERM INSULATION LAMBDA PERFORMANCE:




Production scale extrusion of **Solstice GBA** demonstrates:

- Extrudes 'good' foamed XPS: thermally and mechanically.
- Lambda (Insulation): 10% improvement to $CO_2$ and similar to HCFC-142b & HFC-134a.
- Affords extrusion of thick foam, unlike $CO_2$.
- Extrudes low density foam (w/ co-blowing agent):
- Compressive strength similar to HFC-134a.
- Dimensionally stable similar to HFC-134a.

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## Environmental and Safety Properties:

| Property | Solstice GBA | HFC134a |
|---|---|---|
| **Atmospheric Life** | 18 days | 7.6 years |
| **ODP** | ~0 | ~ 0 |
| **$GWP_{100}$** | < 6 | 1430 |
| **Flammable (ASTM E-681)** | No | No |
| **Flash Point (°C)** | None (at ~23°C) | None |

- **High energy performance in foam**
  - Lambda (Insulation): 10% improvement to $CO_2$ and similar to HCFC-142b & HFC-134a
  - Affords extrusion of thick foam, unlike $CO_2$
  - Compressive strength and dimensional stability similar to HFC-134a
- **Lower-cost solution (capital and operating costs)**
  - Depends on energy efficiency standard
  - Is a near drop-in for systems using 134a, 152a and $CO_2$
  - Avoids two transitions
- **Best environmental balance**
  - Low GWP (< 7)
  - No depletion of ozone layer
- **Safe: non-flammable and acceptable toxicology**

## Fluorocarbon Materials Physical Properties:

| *Molecule* | *Formula* | *Molecular Weight* | *Boiling Point °C* | *Vapor Thermal Conductivity mW / m°K* | *GWP (100 Year)* | *Flammable ASTM E-681* |
|---|---|---|---|---|---|---|
| **Solstice GBA** | **$CHF=CHCF_3$** | **114** | **-19.0** | **13.0** | **< 7** | **No** |
| HFC-134a | $CH_2FCF_3$ | 102 | -26.2 | 14.0 | 1430 | No |
| HFC-152a | $CHF_2CH_3$ | 66 | -24.7 | 13.0 | 126 | Yes |
| HCFC-142b | $CF_2ClCH_3$ | 100.5 | -9.8 | 12.1 | 2310 | Yes |
| HCFC-22 | $CHF_2Cl$ | 86.5 | -40.7 | 11.2 | 1810 | No |
| Carbon Dioxide | $CO_2$ | 44 | -76.5 | 16.6 | 1 | No |