



# **SOLSTICE®** **GAS BLOWING AGENT**

Technical Information

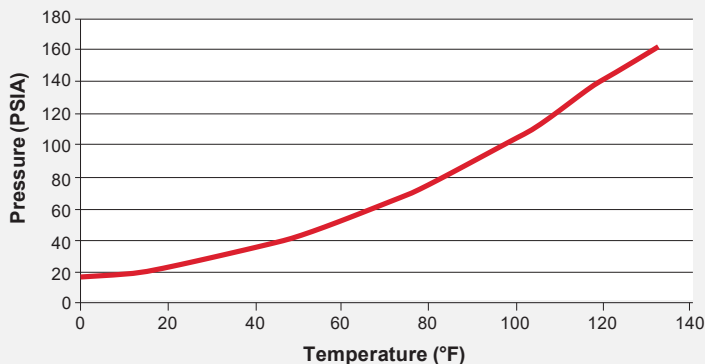
# Honeywell Solstice® Gas Blowing Agent Technical Data

Honeywell Solstice® Gas Blowing Agent (GBA) is the tradename for trans-1, 3, 3, 3-tetrafluoropropene, also known as HFO-1234ze(E). Solstice® GBA has been developed for extruded polystyrene and pressurized one- and two-component polyurethane foams and other foams where gaseous blowing agents are used. It is a replacement for HFC-134a, CO<sub>2</sub>, 152a, and other fluorocarbon and non-fluorocarbon foam blowing agents.

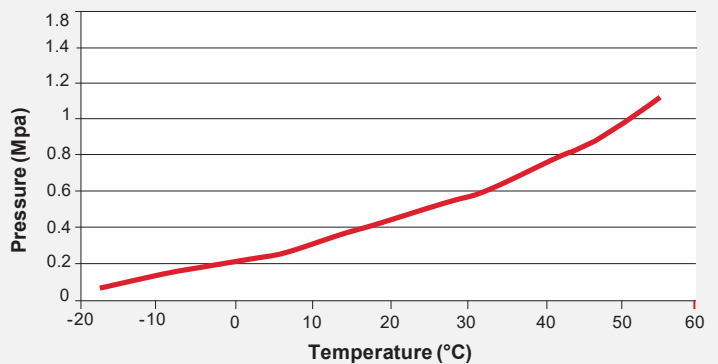
Specification	Limit
Assay as trans – 1,3,3,3-tetrafluoropropene	99.5 wt. % minimum
Moisture	0.0050 wt. % maximum
Acidity as HCL as mg KOH/gm	0.0001 wt % maximum 0.0015, maximum
Non-volatile residue	0.0050 wt.% maximum

General Properties	
Molecule name	trans – 1,3,3,3-tetrafluoroprop-1-ene
CAS #	29118-24-9
ELINCS # (EU)	471- 480- 0
Formula	(E)CHF=CHCF <sub>3</sub>
Molecular Weight	114
Boiling Point	- 2.2° F /-19°C
Vapor Pressure @ 70°F/21°C	49 psig / 3.4 bars
Vapor Pressure @ 130°F/54°C	147 psig / 10.1 bars
Liquid Density @70°F/ 21° C	1.17 g/cm <sup>3</sup>
Heat of Vaporization @ normal boiling point	84 BTU/lb    195kJ/kg    22.2 kJ/mole
Solubility of Water in Solstice GBA @68°F/20°C	225 ppm
Solubility of Solstice GBA in Water @68°F/20°C	373 ppm
Vapor Thermal Conductivity	13.0 mW / m• °K (@ 25°C)
Flame Limits- EC Testing Method A11: Flammability of Gases	None to 82.4°F /28°C
Flashpoint	N/A Method: ISO 2719
Exposure Level (AIHA WEEL– 8 hr TWA)	800 ppm
Ozone Depletion Potential	Non-ozone-depleting
Global Warming Potential, 100 year time horizon	<1
Volatile Organic Compound (VOC) Status	U.S. EPA – Exempt    POCP less than ethane

Vapor Pressure vs. Temperature – English Units



Vapor Pressure vs. Temperature – Metric Units



---

## MATERIALS COMPATIBILITY

Solstice® GBA is non-reactive and non-corrosive toward all commonly used metals in polyurethane processing equipment. This includes carbon steel, stainless steel, copper and brass. There is a concern with use of aluminum in contact with any halogenated material, which includes Solstice GBA, due to the reactive nature of aluminum – particularly if aluminum fines are present. This is especially true if the oxide layer on the surface of the aluminum is removed.

In general, Solstice GBA is similar in compatibility toward plastics and elastomers as HFC-134a. Gaskets and seals that were changed to accommodate HFC-134a should be compatible with Solstice GBA. In most situations, PTFE is the recommended seal and gasket material.

***The final determination of suitability for use is the responsibility of the end user.***

## HEALTH, SAFETY, AND ENVIRONMENTAL

### Toxicity

The American Industrial Hygiene Association has assigned a Workplace Environmental Exposure Level (WEEL) of 800 PPM (8-hour time weighted average) to this material. It was found not to be an irritant in a human skin sensitization study.

### Flammability

Solstice GBA is a non-flammable gas by test methods ASTM E-681, and by EU Test method A-11.

Flammability characterization was performed by Chilworth Technologies Ltd – UK, with the finding, “It has been concluded beyond reasonable doubt that the material (Honeywell HFO- 1234ze blowing agent) will not possess oxidizing or explosive properties.” It should be noted that flammability characterization and flammability regulations for gaseous materials are evaluated at room temperature, 21°C.

Solstice GBA exhibits narrow vapor flame limits at temperatures above 28°C. At 30°C, it exhibits flame limits LEL/UEL at 7.0/9.5 volume percent in air. Product is also used widely in Japan.

Further investigation into the flammability characterization of Solstice GBA has yielded evidence that even at elevated temperatures (60°C), the minimum ignition energy is significantly high – 61,000 mJ. This is several orders of magnitude higher than other commonly used low GWP blowing agents, such as hydrocarbons, meaning that Solstice GBA is very difficult to ignite even at 60°C. Safe handling and use in processes utilizing this, as well as any other halogenated materials include: avoidance of fire, open flame, smoking, and hot surfaces in the vicinity of these materials.

The material safety data sheet (MSDS) for Solstice GBA (HFO-1234ze(E)) contains comprehensive and the most current detail for the health, safety and environmental aspects and considerations.

## PACKAGING AND STORAGE

Honeywell Solstice GBA is categorized as a “liquefied gases under pressure.” It is a moderate pressure gas, and containers (bulk storage tanks or packages) should be pressure-rated to 1725 kPa (250 psig). Approved packages (containers), should be stored in a cool, well-ventilated area. Do not puncture or expose to open flames, excessive heat or direct sunlight. Solstice GBA should not be mixed with oxygen or air at elevated pressures. Applications necessitating pressurization should use dry nitrogen. If an inert atmosphere is required on a vessel, Honeywell recommends that dry nitrogen be utilized. Air must not be used. Check local code requirements to ensure compliance.

## For more information

To learn more about the benefits of Solstice® Liquid Blowing Agent, visit [sustainability.honeywell.com](https://sustainability.honeywell.com)

## Honeywell Advanced Materials

115 Tabor Road  
Morris Plains, NJ 07950  
[www.honeywell.com](https://www.honeywell.com)

Although Honeywell International Inc. believes that the information contained herein is accurate and reliable, it is presented without guarantee or responsibility of any kind and does not constitute any representation or warranty of Honeywell International Inc., either expressed or implied. A number of factors may affect the performance of any products used in conjunction with user's materials, such as other raw materials, application, formulation, environmental factors and manufacturing conditions among others, all of which must be taken into account by the user in producing or using the products. The user should not assume that all necessary data for the proper evaluation of these products are contained herein. Information provided herein does not relieve the user from the responsibility of carrying out its own tests and experiments, and the user assumes all risks and liabilities (including, but not limited to, risks relating to results, patent infringement, regulatory compliance and health, safety and environment) related to the use of the products and/or information contained herein.



Solstice is a registered trademark of Honeywell International Inc.  
Version 4 | February 2022  
© 2022 Honeywell International Inc. All rights reserved.

**THE  
FUTURE  
IS WHAT  
WE  
MAKE IT**

---

**Honeywell**