

Q&A

Honeywell

Honeywell Solstice® Performance Fluid

What is Solstice® Performance Fluid?

Honeywell's Solstice Performance Fluid (PF), also known as HFO-1233zd, is a highly effective cleaning solution that is nonflammable, has favorable toxicity properties and a low global warming potential (GWP).

What is Solstice PF used for?

Solstice PF is suitable for metal, medical, precision cleaning and electronics.

How is Solstice PF used?

It can be used in a variety of vapor degreasing equipment and may be dispensed from a refillable spray container or an aerosol can.

How is Solstice PF different from other industrial solvents?

Solstice PF has a balance of desirable environmental properties and effective cleaning capabilities without requiring a co-solvent. On the environmental side, Solstice PF has negligible ozone depletion, ultra-low photochemical reactivity and a global warming potential of 1. With these exceptional environmental properties and good solvency, Solstice PF is an excellent choice for a variety of cleaning applications. Solstice PF also is a pure material which does not require any additives or stabilizers.

Why should I switch to Solstice PF instead of established HFC and HFE products?

Solstice PF offers equivalent or better cleaning performance and is cost effective. There is also minimal to no initial cost for adjustments to existing equipment. Unlike the HFC and HFE products available today, it does not require a co-solvent, like trans-1,2-dichloroethylene. In addition to exceptional cleaning power, Solstice PF can satisfy your long-term environmental and safety requirements. It is non-flammable, has a global warming potential of 1, and an occupational exposure limit (OEL) of 800 ppm established by WEEL. It is also not a volatile organic compound (VOC), as determined by the U.S. EPA.

Is Solstice PF an effective cleaner?

Solstice PF is an effective cleaning solution for aliphatic and fluorinated soils as well as silicone and glycol. As an indication of the high degree of solvency, mineral oil can be dissolved in Solstice PF at a level of at least 50% by weight and will remain completely dissolved even at temperatures as low as -30°C. The same results are observed with a high-viscosity silicone oil, a cutting oil and a silicone grease.

Solstice PF-A is an azeotropic blend of PF with an alcohol (methanol) that is also effective at removing RMA rosin fluxes for electronic applications.

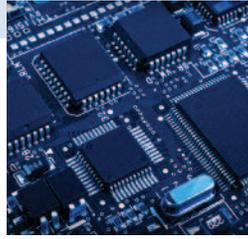
Solstice PF also exhibits very low surface tension, which contributes to good surface wetting and superior cleaning of intricate parts.

What is Solstice PF designed to replace?

With regard to solvency, Solstice PF performance is comparable to CFC-113, HCFC-141b, and AK-225.

When substituted for HCFC-225, HCFC-141b, HFC-4310mee, HFC-365mfc, and HFE-7100 the use of Solstice Performance Fluid can yield substantial improvements in environmental impact. With a global warming potential (GWP) of 1, its widespread adoption could save about 18 million metric tons per year of CO₂ equivalent emissions, comparable to eliminating carbon dioxide emissions from more than 3 million cars every year.

Source: GHG Equivalencies Calculator: <http://www.epa.gov/cleanenergy/energy-resources/calculator.html>



Solstice® PF has a lower KB value than my current solvent. Why is it better?

The KB value of Solstice PF is 25, which is very similar to the KB value of the benchmark solvent, CFC-113. Like CFC-113, Solstice PF is an effective cleaner but does not harm most substrates. The KB value is a crude measure of solvency. What is most important is the ability of a solvent to remove the soil while not damaging the substrate. Solstice PF has been shown to be a very effective cleaner with a variety of soils such as mineral, silicone, synthetic and refrigerant oils.

Solstice PF has a lower boiling point than my current solvent. Will it rapidly evaporate at room temperature?

When properly handled the lower boiling point can aid in quick drying and decreased processing times. As with any solvent it is important to properly handle the solvent. The lower boiling point of Solstice PF is complemented with a higher heat of vaporization so it does not instantly vaporize at room temperature. This allows ample time to work with Solstice PF. When handled in a vapor degreaser the loss rates have been shown to be similar to other solvents.

Is Solstice PF cost effective to use?

With best-in-class surface tension, balanced characteristics of boiling point and heat of vaporization, no need for additives and favorable HS&E attributes, initial tests show Solstice PF has the lowest total cost of ownership vs. competing technologies, including aqueous.

Can I use Solstice PF in my existing equipment?

As with most solvent replacement options, degreasers typically need some adjustments. A large percentage of degreasers may be retrofitted to accommodate Solstice PF for a nominal cost. If a new degreaser is desired we have worked with a couple of equipment manufacturers to develop versatile equipment that includes management of Solstice PF. Please contact us for specifics.

Is Solstice PF compatible with the specifications required for military and aerospace applications?

Solstice PF has been tested and found to conform to many of the solvent performance requirements in specifications typically used in military and aerospace applications. More information can be found in the *Superior Cleaning for Demanding Military and Aerospace Applications* brochure.

Is Solstice PF suitable for use with titanium, aluminum, high copper alloys and high nickel alloys?

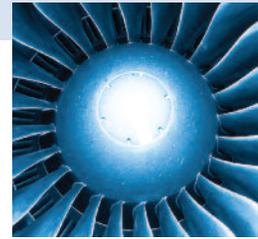
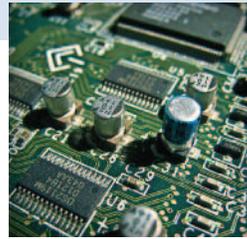
Solstice PF has been compatibility-tested with a wide variety of metals that are commonly used in aerospace and military applications, and has demonstrated very good compatibility. More information can be found in the *Superior Cleaning for Demanding Military and Aerospace Applications* brochure.

How does Solstice PF compare to nPB?

It has an occupational exposure limit (OEL) of 800, while nPB has an OEL of 0.1 per the American Conference of Governmental Industrial Hygienists (ACGIH).

What is the exposure limit for Solstice PF?

Solstice PF has an OEL of 800 ppm.



Is Solstice PF flammable?

No. Solstice PF has no flash point and no vapor flame limits.

What is the global warming potential of Solstice PF?

The global warming potential (GWP) of Solstice PF is 1. As a reference the GWP of CO₂ is 1, hydrocarbons are typically 10-15 and HFCs are typically 100-1000s.

Is Solstice PF affected by the Solvent Emission's Directive?

Solstice PF is a halogenated organic solvent under the definition of EU Directive 1999/13/EC on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations.

Solstice PF is classified as GHS chronic aquatic category 3. This is due to the acute aquatic toxicity data and the lack of ready biodegradation and is clearly marked on the SDS.

What is the registration status of Solstice PF in the US?

Solstice PF has received approval under EPA's Significant New Alternatives Policy (SNAP) program for use as an aerosol solvent (Federal Register, August 2012), in metal cleaning, electronics cleaning, precision cleaning, and as a carrier solvent in adhesives, coatings and inks (Federal Register, May 2013). It has also been added to the TSCA inventory (August 2012).

Is Solstice PF VOC exempt?

The U.S. EPA has determined that Solstice PF is VOC exempt. EPA's decision was based on the fact that Solstice PF exhibits extremely low photochemical reactivity and makes a negligible contribution to tropospheric ozone formation.

One measure of photochemical reactivity is Maximum Incremental Reactivity (MIR). In the U.S., a compound is generally considered not to be a VOC if it has an MIR value lower than that of ethane. Solstice PF has an MIR value of 0.04 g O₂/g VOC, which is approximately 85% lower than the value for ethane.

Has Solstice PF and all of its substances been registered under REACH?

Solstice PF has been registered under REACH up to 10 metric tonnes. Registration for the highest volume band above one thousand tonnes is scheduled to be completed by the end of 2014.

How does the EU F-Gas regulation apply to HFO-1233zd?

HFO-1233zd is not currently regulated by the European F-Gas regulation (842/2006). However, a revision of the regulation is currently being discussed by the Council and the EU parliament. We believe it is likely that in the future, HFO-1233zd will be classified as an "other fluorinated gas" (not as a greenhouse gas) in the regulation. This means that importers of the substance and of equipment containing HFO-1233zd would be subject to reporting requirements, but the gas would not be subject to a cap-and-phasedown scheme. The earliest this new regulation would be in effect is January 1, 2015.

What is the commercial status of Solstice PF?

Solstice PF is available for sale.

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April 2014 - version 12
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