



# Solstice® PF-HP

## CLEANLISS VERIFICATION SOLVENT

### PRODUCT BENEFITS AND PROPERTIES

Solstice PF-HP is an ultra-clean, highly effective, nonflammable cleaning solution with desirable safety and environmental attributes. It is ideally suited for oxygen system cleaning for propulsion and life support in commercial aircraft, military, and spacecraft applications.

Based on hydrofluoro-olefin (HFO) technology will effectively remove contamination from the desired lines or parts and then be completely dried leaving no residues behind. The vapor pressure of Solstice PF-HP facilitates quick evaporation and drying of cleaned materials.

#### Benefits

- Excellent cleaning and quick drying
- Non-volatile residue (NVR): < 2 ppm
- Good stability and materials compatibility
- NASA approved (preferred replacement for AK 225G in oxygen system cleaning)
- Contains no stabilizers or additives, which can contribute to NVR
- Replacement for HFE, IPA, HCFC, HFC, TCE, nPB, and other solvents
- No REACH SVHC

### INDUSTRY APPROVALS & CONFORMANCE

- Boeing: BAC 5402
- National Aeronautics and Space Administration (NASA): Solvent Replacement for Hydrochlorofluorocarbon-225 for Cleaning Oxygen System Components
- South Coast Air Quality Management District (SCAQMD): VOC Exempt
- United States Environmental Protection Agency (EPA): VOC Exempt

### TEST COMPLIANCE

Metals commonly used in the space industry were tested for compatibility with Solstice Performance Fluids. The solvent was shown to be compatible with all the following metals:

- ARP 1755B: Stock Loss (Cat. 10)
- ASTM E681: Concentration Limits of Flammability of Chemicals (Vapors and Gases)
- ASTM F502: Effect on Painted Surfaces
- ASTM F485: Residue
- ASTM F1110: Sandwich Corrosion
  - 2024-T3 Bare/Anodized per MIL-C-5541
  - 2024-T3 Bare/Anodized per MIL-C-865
  - 2024-T3 Clad/Anodized per MIL-C-5541
  - 2024-T3 Clad/Anodized per MIL-C-8625
  - 7075-T6 Clad/Anodized per MIL-C-5541
  - 2075-T6 Clad/Anodized per MIL-A-8625
  - 7075-T6 Bare/Anodized per BAC 5019
- ASTM F483: Immersion, Corrosion, Aluminum (Aluminum 7075-T6)
- ASTM F483: Cadmium Removal (4130 Steel Panels)
- ASTM F519: Hydrogen, Embrittlement (Cadmium plated per MILSTD-870)
- ASTM F502: Paint Softening (Type II and III primer)
- ASTM F945: Titanium Stress Corrosion
- ASTM G72: Autogenous Ignition Temperature of Liquids and Solids in a High-Pressure Oxygen-Enriched Environment

### MATERIAL COMPATIBILITY<sup>1</sup>

Metals commonly used in the aerospace industry were tested for compatibility with Solstice PF-HP. The solvent was shown to be compatible with all the metals listed below when tested according to the ARP 1755B method.

**Uncoated Panels:** AMS 4037 Aluminium • AMS 5040 Steel • AMS 5537 Cobalt • AMS 4375 Magnesium • AMS 5382 Cobalt • AMS 5596 Nickel • AMS 4442 Magnesium • AMS 5504 Corrosion Resistant Steel • AMS 5661 Nickel • AMS 4507 Copper • AMS 5508 Corrosion Resistant Steel • AMS 6431 Steel • AMS 4544 Nickel • AMS 5524 Corrosion Resistant Steel • AMS 4434 (AZ92) Magnesium • AMS 4640 Aluminum Bronze • AMS 5525 Corrosion Resistant Steel • MAR-M-002 • AMS 4911 Titanium • AMS 5536 Nickel • IMI 685

**Electroplated Panels:** AMS 4037/AMS 2470 Anodic Treatment • AMS 5504/AMS 2410 Silver Plating • AMS 5504/AMS 2424 Nickel Plating • AMS 5504/AMS 2400 Cadmium Plated • AMS 5504/AMS 2416 Ni-Cad Plating • AMS 5504/AMS 2406 Chromium Plating • AMS 5504/AMS 2418 Copper Plating

**Plasma Coated Panels:** AMS 4911/AMS 2437-3 • AMS 5504/AMS 2437-3 • AMS 5504/AMS 2437-6 • AMS 5504/AMS 2437-2 • AMS 5504/AMS 2437-5 • AMS 5504/AMS 2437-7

**Uncoated Panels (Intergranular End Grain Pitting/ASTM F2111 Testing):** AMS 4037 Aluminum • AMS 4911 Titanium • AMS 5504 Corrosion Resistant Steel • AMS 4375 Magnesium • AMS 5382 Cobalt • AMS 5536 Nickel

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### NASA MATERIAL COMPATIBILITY TESTS<sup>1</sup>

NASA also ran metal compatibility with Solstice PF-HP using the metals listed below, and the solvent showed good compatibility with each of them.

**Ferrous Metals:** A286 SST (Stainless Steel, Incoloy Alloy<sup>®</sup> A-286) • 304L (Stainless Steel, Austenitic Alloy) • 440C SST (Stainless Steel) • 17-4PH (SAE Type 630 Stainless Steel, UNS S17400) • AISI 4140 (Chromium & Molybdenum Alloy Steel)

**Non-Ferrous Metals:** Eligiloy • Inconel 718 • Monel 400 • Naval Brass • Tin Bronze 510 • 6061 T6 Al (Aluminum Alloy) • 2219 T6 Al (Aluminum) • 2195 T8 (Al Li) (Aluminum Lithium Alloy)

### SOILS

Some categories of soils that can be removed with Solstice Performance Fluids include\*:

Mineral Oils • Heavy Grease • Silicone Oils • Vacuum Oils • Silicone Grease • Refrigerant Oils • Cutting Oils • Fluorinated Oils

\* Material compatibility should always be confirmed via testing with specific contaminants under specific cleaning conditions.

### USE RECOMMENDATIONS

System	<ul style="list-style-type: none"><li>• Manual Cleaning</li><li>• Cleaning Station</li><li>• Open Top or Vacuum Vapor Degreasing</li></ul>
Dilution	Use Straight
Cleaning Temperature Range	Ambient
Cleaning Duration	As Required

### PHYSICAL PROPERTIES

Chemical Name	trans-1-chloro-3,3,3-trifluoropropene
Molecular Formula	CF <sub>3</sub> – CH = CClH
Molecular Weight	130
Boiling Point	66°F (19°C)
Latent Heat of Vaporization at Boiling Point	83.4 BTU/lb (194 kJ/kg)
Freezing Point	-161°F (-107°C)
Vapor Pressure at 77°F (25°C)	18.6 psia (126 kPa)
Liquid Density at 77°F (25°C)	10.5 lb/gal (1.26 gm/mL)
Surface Tension at 77°F (25°C)	12.7 dyne/cm
Liquid Viscosity at 77°F (25°C)	0.446 cP
Solubility of Water in Solvent at 25°C	460 ppm
KB Value	25
NVR (non-volatile residue) Solstice PF-HP	<2 ppm
NVR (non-volatile residue) Solstice PF	<10 ppm
Shelf Life	120 Months

### SHIPPING, STORAGE, DISPOSAL & PREVENTION

Please refer to the Safety Data Sheet for shipping, storage, disposal and prevention guidance.

### AVAILABILITY

- 1000 lb



Scan for product details

Solstice is a registered trademark of Honeywell International, Inc.  
<sup>1</sup>Information provided by Honeywell.

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