



# FluoSolv<sup>®</sup> FR-110

## Technical Information

### Contact Cleaning & Degreasing Solvent

#### Introduction

FluoSolv<sup>®</sup> FR-110 is a proprietary blend of non-flammable hydrofluoroethers (HFEs) and acetone engineered for precision cleaning of electrical parts to remove light oils, particulates and fingerprints.

FluoSolv<sup>®</sup> FR-110 is a drop-in replacement for Asahi AK-225 (blend of HCFC-225 ca/cb) & HCFC-141b both of which are ozone depleting substances and have been banned from production.

FluoSolv<sup>®</sup> FR-110 solvent blending technology leverages the chemical solvency of the fluid as well as its physical properties such as high density, low surface tension and low viscosity for optimal performance. Our research has shown that to clean metal surfaces in the shortest amount of time the solvent must flow extremely close to the surface to “catch & release” contaminants

#### User Benefits

NuGenTec FluoSolv<sup>®</sup> FR-110 is ideally balanced to deliver performance, worker safety and desirable environmental properties.

- Non-ozone depleting chemical (ODC)
- Drop-in replacement; no equipment modifications
- Low global warming potential (GWP)
- Low toxicity; high allowable exposure limit (AEL);
- Zero VOC solvent blend

#### Material Compatibility

FluoSolv<sup>®</sup> FR-110 is compatible with all metals, ceramic and other non-conducting materials. Most elastomeric materials are compatible except fluoroelastomers such as Viton & Kalrez which tend to swell. It is recommended that all materials be tested prior to use. See Table 1.

## Table 1: Material Compatibility

	Compatible	Additional Testing Required
<b>Metals</b>	Aluminum, Copper, S/S Titanium, Brass, Tungsten	-
<b>Elastomers</b>	Neoprene, Butyl Rubber	Viton, Kalrez
<b>Plastics</b>	HDPE, PTFE, Nylon, PVC Epoxy, Phenolic	Acrylic, ABS

## Table 2: Physical Properties

Property	NuGenTec FluoSolv® FR-110	Asahi AK-225	Honeywell Solstice®	nPB
Boiling Point °C [°F]	46-47 [114-116]	54 [129]	19 [66]	71[160]
Density at 25°C (77°F) kg/liter [lb/gal]	1.21 [10.1]	1.55 [12.9]	1.27 [10.6]	1.35 [11.26]
Surface Tension at 25°C (77°F) dyne/cm	17.5	16.2	12.7	25.9
Viscosity at 25°C (77°F), cPs	0.41	0.59	0.53	0.49
Vapor Pressure at 25°C (77°F) kPa	70	38.5	152	20.3
Heat of Vaporization @bp cal/g	41.3	35	45.6	58.8
Global Warming Potential	<20	370	1	n/a
Ozone Depleting Chemical	No	Yes	No	No
Volatile Organic Compounds (VOC) g/l	0	0	0	1,350
Allowable Exposure Limit (AEL) ppm	865	100	800	<10
Worker Exposure Ceiling (ppm)	No	No	No	10
KB Value	28	31	25	125

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a: Has a ceiling of 400 ppm due to its acute toxicity. None of the above solvents have any stipulated ceiling on AEL



## Worker Safety

FluoSolv® FR-110 has a calculated AEL (Acceptable Exposure Limit) of 865 ppm based on its individual components. This indicates that the blend has low toxicity. None of the ingredients in FluoSolv® FR-110 have any chronic or acute toxicity associated with them which makes it a worker friendly solvent.

*Please refer to the SDS for information on detailed exposure limits and toxicity-related data.*

NuGenTec FluoSolv® FR-110 exhibits no closed cup or open cup flash point and is not classified as a flammable liquid per established definitions by NFPA or DOT, however being volatile, vapors may become flammable in air. Flash point data and vapor flammability limits in air are shown in Table 3 below .

**Table 3: Flammability**

	Test Method	FluoSolv® FR-110
Flash Point (CC)	ASTM D93	None
Flash Point (OC)	ASTM D1310	None
Flammability in Air	ASTM E681	
Lower Explosivity		2.6 vol%
Upper Explosivity		13.0 vol%

## Storage

FluoSolv® FR-110 is thermally & chemically a very stable solvent. It is non-reactive, low water solubility and will not oxidize or degrade when exposed to air. It is not affected by any sunlight or other sources of UV radiation. Common industrial practice should be implemented for storage such as away from human food source and extreme temperature conditions. Freezing temperatures will cause the drums to compress and hot conditions will balloon the drum. The product in any case is perfectly usable.

## Solvent Recycling

FluoSolv® FR-110 is a stable azeotropic blend easy to reclaim and reuse by simple distillation process. Commercially available modular recycling units can easily be added to realize sizable savings in solvent usage. Solvent recovery yields are typically in the range of 80 to 95%.

Please contact the FluoSolv® Technical Services group for information.

## Product Specifications

### FluoSolv® FR-110 Composition (Typical)

Fluorinated Fluid Mixture	> 85 wt%
Acetone	> 15 wt%
Water	< 100 ppm
Non-volatile residue	<100 ppm (drums) <200 ppm (pails)
Appearance	Clear, colorless

## Packaging & Availability

FluoSolv® FR-110 is available in three package sizes

- 55-gal lined metal drums (net wt. 55)
- 5-gal lined pails (net wt. 55 lb.)
- 1 gal amber glass bottles (net wt. 11 lb.)

*Note: Drum & Pail have phenolic liner*

All package sizes are inventoried at Emeryville, CA. Lead times are 1-3 business days after receipt of order.

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For further information about FluoSolv® FR-110 and purchasing please contact office listed below closest to you.

### FluoSolv Technical Services

**Product & Technology Development**  
1155 Park Ave  
Emeryville, CA 94608

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