

TMC HFE-347E Fluoro-Solvent

TMC HFE-347E Fluoro-Solvent is an engineered fluorinated fluid designed as an economical alternative to Novec® 7100, Novec® 7200, Asakalin AE-3000 and other hydro-fluoro-ether fluids. It is ideal for precision cleaning of metals, alloys, composites and plastics. Other uses include use as a quick drying agent and particle removal.

TMC HFE-347E has no flash point and zero ODP (Ozone-Depletion Potential) and very low GWP (Global Warming Potential). It is an environmentally friendly solvent with fast evaporation rate and compatibility.

Features

- ZERO OZONE DEPLETION POTENTIAL (ODP)
- LOW GLOBAL WARMING POTENTIAL (GWP)
- SNAP APPROVED
- NONFLAMMABLE
- NON-CORROSIVE
- EXCELLENT THERMAL, CHEMICAL AND HYDROLYTIC STABILITY
- RECLAIMABLE BY TMC INDUSTRIES, INC.
- LOW SURFACE TENSION PENETRATES TIGHT SPACES FOR IMPROVED CLEANING
- CAN BE USED WITH ULTRASONIC CLEANERS
- RoHS COMPLIANT

Packaging Information

Sold in:

- 1 gal. Bottle - 12 lbs (5 kg)
- 5 gal. Pail - 50 lbs. (25 kg)
- 55 gal. Drum - 550 lbs. (250 kg)

Applications

This solvent is suited for heat transfer; heavy-duty cleaning (co-solvent) - heavy oils, greases, fluxes; Medium-duty cleaning (azeotrope) - oils, greases, waxes; Light-duty cleaning (neat) - particulates, fluoro-lubricants, light oils, fluoropolymers; CFC, HCFC, HFC and PFC replacement.

Materials Compatibility

Item (at boiling for 3 days)	Weight change (%)	Linear swell (%)
Polypropylene	<2.5	<1.0
Polystyrene	<0.1	<0.1
Polymethyl methacrylate	Affected	Affected
ABS	<0.1	<0.1
PTFE	<2.5	<0.1
Fluoroelastomer	>86	>24
Silicon rubber	<12.5	<2.5
EPDM	<0.1	<0.1

Properties

Surface Tension (25° C)	16.4 mN/m
Boiling Point	56° C / 133° F
Freezing Point	-94° C / -137° F
Flash Point	None
Viscosity (25° C)	0.65 mPa.s
Purity	>99.5%
MW	200.06
Density (25° C)	1.470 Kg/m ³
Latent heat of evaporation	163 KJ/Kg
Evaporation rate	67 (Ether=100)
Specific Heat (25° C)	1.26 KJ/kg.K
Solubility in water	900 ppm
Water content	<100 ppm
ODP	0
GWP	580 (CO ₂ =1; 100 yrs)
Specific Heat Capacity	1.26 KJ/Kg*(-K)
Thermal Conductivity	89mW•(m-1)•(K-1)

Kinetic Viscosity Test of TMC HFE-347E

1. Purpose of Test

Test of Kinetic Viscosity under Temperature range 10°~50°

2. Instruments and Solvent

Instrument: Viscometer SD265D, Stopwatch, Washing ear ball, Thermometer, pipette, Thermostatic waterbath (One set)

3. Methods

According to Test Standard of GB/T 265-1988

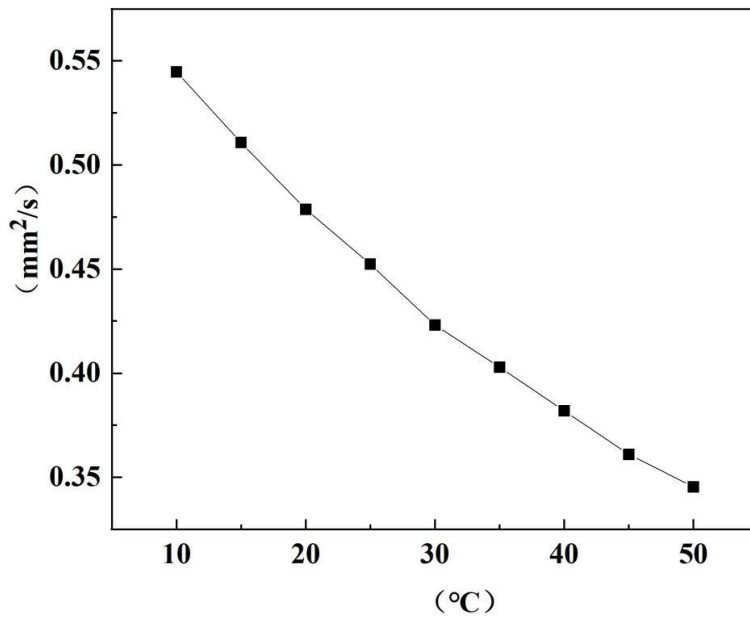
4. Data Processing and Record

1 Determination of Kinematic Viscosity of Hydrofluoroethers

Sample	Temp(°C)	Flow-out time <i>t</i> (s)	Mean <i>t</i> (s)	Viscometer constant (mm ² /s ²)	Viscosity <i>η</i> (mm ² /s)
(TMC HFE-347)	10	207.37	206.64	0.002636	0.5447
		206.75			
		206.69			
	15	193.88	193.79		0.5108
		193.78			
		193.71			
	20	181.56	181.60		0.4787
		181.69			
		181.54			

Sample	Temp(°C)	Flow-out time t (s)	Mean t (s)	Viscometer constant (mm^2/s^2)	Viscosity η (mm^2/s)
(TMC HFE-347)	25	171.68	171.63	0.002636	0.4524
		171.41			
		171.81			
	30	160.00	160.51		0.4231
		160.87			
		160.65			
	35	152.65	152.83		0.4029
		152.91			
		152.93			
	40	145.18	144.89		0.3819
		144.94			
		144.56			
	45	136.88	136.96		0.3610
		137.06			
		136.94			
50	130.75	131.02	0.3454		
	131.09				
	131.22				

Graph of Kinetic Viscosity and Temperature:



1 Hydrofluoroether 10~50°C Kinematic Viscosity Curve

Saturate Vapor Pressure Test of TMC HFE-347E

1. Purpose of Test

Test of saturate vapor pressure of TMC HFE-347E.

2. Instruments and Solvent

Instrument: Saturate Vapor Pressure gauge VP2000, Washing ear ball.

3. Methods

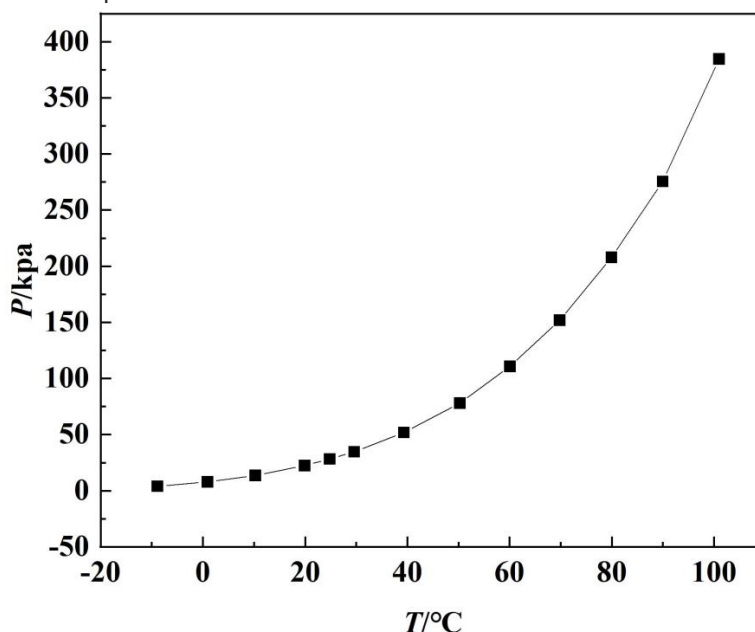
According to Test Standard of NYJC/FX(S)-009-2023-A0

4. Data Processing and Record

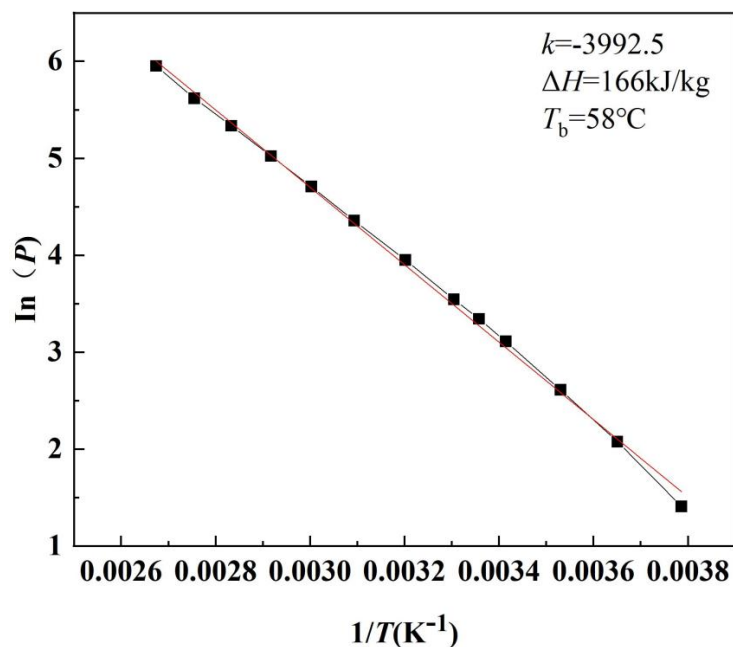
2 Determination of Saturation Vapor Pressure of Hydrofluoroethers

Sample	Target T (°C)	Actual T (°C)	Saturate VP (kPa)
(TMC HFE-347)	-10	-8.894	4.094
	0	0.927	7.984
	10	10.250	13.609
	20	19.883	22.437
	25	24.829	28.309
	30	29.626	34.619
	40	39.325	51.941
	50	50.270	78.051
	60	60.073	110.939
	70	69.798	151.841
	80	79.947	207.779
	90	89.961	275.524
	100	100.998	384.519

Graph of Vapor Pressure and Temperature



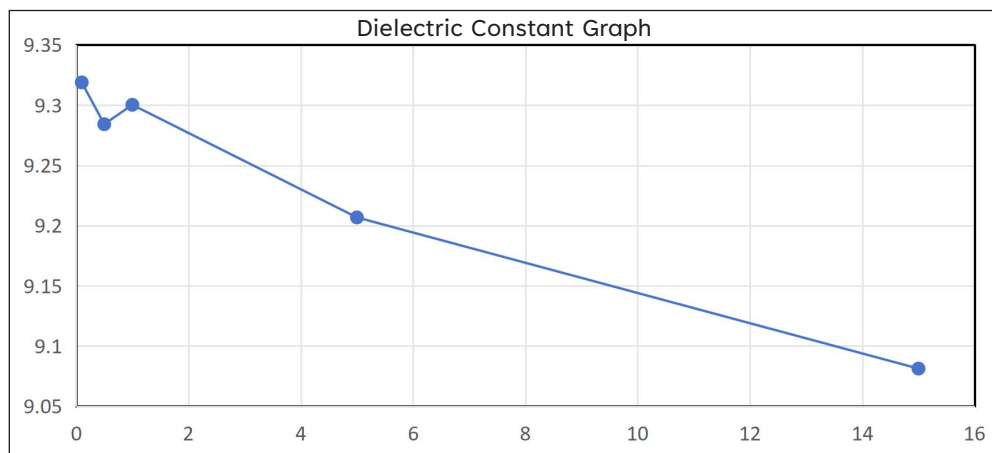
2 The relationship between temperature and pressure of hydrofluoroether



3 Hydrofluoroether linear relationship curve

The linear graph is fitted according to Graph 1 ; The Slope $K = -3992.5$ is calculated by fitting $\ln P$ and $1/T$; Vapor Latent heat is calculated by Clausius Equation $= -kR = -(-3992.5) \times 8.314 = 33.194 \text{ kJ/mol} = 166 \text{ kJ/kg}$.

Sample	(MHz)	Dielectric Constant
TMC HFE-347E (water < 50ppm, Temp @ 20°C)	15	9.0813
	5	9.2068
	1	9.3003
	0.5	9.2842
	0.1	9.3189



Comparing the above test results, as the frequency changes, the dielectric constant changes slightly, but the difference is not significant.

Health & Safety

TMC HFE-347E is not a flammable or toxic liquid. It requires few conditions during application. For more information, please refer to the Safety Data Sheet (SDS).

Keep in room temperature and ventilation and dry. Keep the container sealed when not using.

Recycle and Reclaim Options

TMC Industries Inc. reclaim service provides significant savings over the cost of new fluid and helps protect the environment by drastically reducing the amount of your waste stream. Reduce your hazardous waste disposal and achieve better environmental stewardship. TMC Industries, Inc. properly disposes of the contaminants.

Quality Assurances

We guarantee our reclaimed solvents to have new qualities and performance capabilities. To support our confidence, pre- and post-processing analytical data accompanies each shipment.

Save on Disposal Costs

Reduce your hazardous waste disposal. Have TMC Industries reclaim your contaminated fluids to their original state and purity and return them to you at about 1/3 the cost of replacing them with new fluids.



TMC Industries, Inc. • 1423 Mill Lane • Waconia, MN 55387
800-772-8179 • 952-442-1140 • sales@tmcindustries.com
www.tmcindustries.com

