

# Chemical Compatibility of Carbon Resins

This document contains information on the following resins:

- CE 221
- EPU 40
- EPU 41
- EPX 82
- RPU 70
- RPU 130
- SIL 30

# Chemical Compatibility

## Introduction

Currently, Carbon has one "standard" chemical compatibility test for our materials. We evaluate our materials per ASTM D4060 on the basis of percent weight gain of a fully submerged standard sample after 1 week.

## What this tells you

Carbon defines chemical resistance level based on the below chart. This data tells you exactly how much weight the sample gained after being fully submerged in the solution at room temperature and normal atmospheric pressure. It is assumed that weight gain over 5% starts to indicate material degradation and incompatibility.

This test is aggressive in the sense that it requires a full and continuous submersion. It is important to take into consideration the functional application of a product in service when considering this data.

## What this doesn't tell you

Unless otherwise noted, this weight gain does not necessarily specify *how* the material degrades if at all. While high weight gain does commonly accompany dimensional changes, the change doesn't reflect in what manner and there is no establish relationship. In addition, the weight gain also does not note color change or effect on material properties, such as tensile performance, impact strength, and so on, and so forth. Color change is not reported in the official release—ask the materials team if this information is available for the material and solvent.

# Chemical Compatibility

## Chemical Compatibility Chart

CLASS	CHEMICAL	CE 221	EPU 40	EPU 41	EPX 82	RPU 70	RPU 130	SIL 30
Household Chemicals	Bleach (NaClO, 5%)	E	E	E	E	E	-	E
	Sanitizer (NH <sub>4</sub> Cl, 10%)	E	E	E	E	E	-	G
	Distilled Water	E	E	E	E	E	-	G
	Sunscreen (Banana Boat, SPF 50)	E	G	P	E	E	G	G
	Detergent (Tide, Original)	E	E	G	E	E	-	G
	Windex Powerized Formula	E	G	G	E	E	-	G
	Hydrogen Peroxide (H <sub>2</sub> O <sub>2</sub> , 30%)	E	F	F	E	E	-	F
	Ethanol (EtOH, 95%)	E	P	P	G	F	-	P
Industrial Fluids	Engine Oil (Havoline SAE 5W-30)	E	E	E	E	E	E	E
	Brake Fluid (Castrol DOT-4)	E	F	F	E	E	-	P
	Airplane Deicing Fluid (Type I Ethylene Glycol)	E	E	-	-	E	-	E
	Airplane Deicing Fluid (Type I Propylene Glycol)	E	E	-	-	E	-	G
	Airplane Deicing Fluid (Type IV Ethylene Glycol)	E	E	-	-	E	-	E
	Airplane Deicing Fluid (Type IV Propylene Glycol)	E	E	-	-	E	-	G
	Transmission Fluid (Havoline Synthetic ATF)	E	E	G	E	E	E	E
	Engine Coolant (Havoline XLC, 50%/50% premixed)	E	E	E	E	E	-	E
	Diesel (Chevron #2)	E	P	P	E	E	E	F
	Gasoline (Chevron #91)	E	P	-	-	P	-	P
	Skydrol 500B-4	E	P	P	E	G	-	P
	Strong Acid/Alcohol/Base	Sulfuric Acid (H <sub>2</sub> SO <sub>4</sub> , 30%)	E	P	F	E	E	-
Sodium Hydroxide (NaOH, 10%)		E	E	E	E	E	-	E

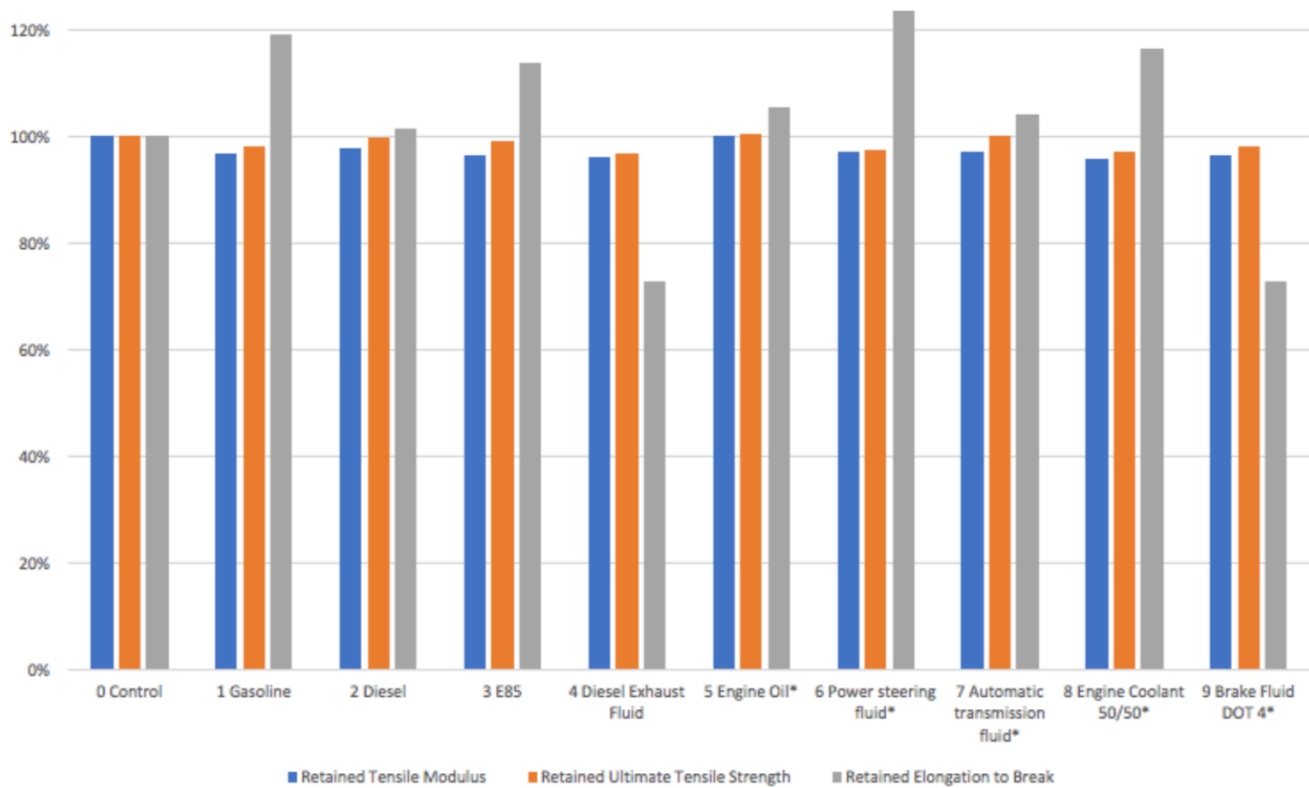
**Note:** Due to variability in part geometry and level of exposure in actual use, it is required that adequate validation is done for production applications.

KEY	RATING	GAIN*	DESCRIPTION
E	Excellent	< 5% gain	The solvent is unlikely to degrade the material during prolonged exposure
G	Good	5% - 15% gain	The solvent is unlikely to degrade the material during short-term exposure
F	Fair	15% - 30% gain	The solvent will likely degrade the material during short-term exposure
P	Poor	> 30% gain	The solvent will likely attack and aggressively degrade the material when exposed

\*Percentages are percent weight lost after a 1 week submersion per ASTM D543. This is only a value of **weight** lost and not representative of changes in dimension or mechanical properties.

## EPX 82 Chemical Compatibility USCAR2

Epoxies as a chemical family exhibit excellent chemical resistance. EPX 82 shows similar performance, showing no surface blemishes and minimal change in tensile properties after chemical exposure simulating splash contact per USCAR2 conditions.



**Treatment Method:** Samples submerged in test liquid for 30 minutes at 23 °C or 50 °C (starred) then removed from test liquid and allowed to sit at ambient room temperature conditions for 1 week (samples were not wiped).

**Test Method:** ISO 527-2, Type I, 5 mm/min