

ECOMAX™ Compatibility with Metals, Plastics and Elastomers

TABLE OF CONTENTS OF TEST RESULTS

Metals Corrosion Test Results (Table 1)

Plastic Compatibility Test Results (Table 2)

Elastomer Compatibility Test Results (Table 3)

This *ECOMAX* Compatibility Test Results are offered solely for your information, consideration and investigation. **USERS SHOULD ALWAYS THOROUGHLY TEST THE *ECOMAX*® CLEANING SOLVENT FOR THEIR APPLICATION PRIOR TO USE.** Testing is the only way to ensure that the product meets user requirements. All products are sold on the understanding that the user is solely responsible for determining its suitability for any purpose and Enviro Tech International, Inc. is not responsible for uses for which the product is not intended.

The information below is supplied as a general guideline. Plastics and elastomers can be manufactured to a wide range of physical properties thereby necessitating thorough testing prior to usage. Any trade names supplied in brackets are the sole property of the owners of those names.

Enviro Tech International, Inc. provides no warranties, either expressed or implied, and assumes no responsibility for the accuracy or completeness of the data contained herein. The information contained herein is believed to be accurate but is not warranted to be so. **Users are advised to confirm in advance of use in production that the *ECOMAX*® Solvents are suited to the circumstances of use by the users own tests.**

Table 1:
METAL Corrosion Test Results for ECOMAX

METAL SPECIMENS	CORROSION TEST ¹	IMMERSION CORROSION TEST ²	IMMERSION CORROSION TEST ²	IMMERSION CORROSION TEST ²	VAPOR PHASE CORROSION TESTING ³
	TEST CONDUCTED PER MIL-SPEC T81533A 4.4.9	SAMPLES IMMERSSED FOR 2 WEEKS AT 120 ⁰ F	SAMPLES IMMERSSED FOR 1 MONTH AT 120 ⁰ F	SAMPLES IMMERSSED FOR 2 MONTHS AT 120 ⁰ F	SAMPLES IMMERSSED IN VAPOR FOR 60 MIN.
Aluminum ⁴	PASSED	No Effects	No Effects NONE	No Effects NONE	No Effects NONE
Beryllium ⁴	PASSED	No Effects NONE	No Effects	No Effects	No Effects
Boron ⁵	PASSED	No Effects	No Effects NONE	No Effects NONE	No Effects NONE
Naval Brass ⁴	PASSED	No Effects NONE	No Effects	No Effects	No Effects
Bronze ⁵	PASSED	No Effects	No Effects NONE	No Effects NONE	No Effects NONE
Carbon Steel ⁴	PASSED	No Effects NONE	No Effects	No Effects	No Effects
Chromium ⁵	PASSED	No Effects	No Effects NONE	No Effects NONE	No Effects NONE
Copper ⁴	PASSED	No Effects NONE	No Effects	No Effects	No Effects
Hastelloy-b, c & d ⁴	PASSED	No Effects	No Effects NONE	No Effects NONE	No Effects NONE
Inconel	PASSED	No Effects	No Effects	No Effects	No Effects
Iron Cast ⁵	PASSED	No Effects NONE	No Effects NONE	No Effects NONE	No Effects NONE
Iron, High Silicon ⁴	PASSED	No Effects	No Effects	No Effects	No Effects
Lead ⁵	PASSED	No Effects NONE	No Effects NONE	No Effects NONE	No Effects NONE
Magnesium ⁴	PASSED	No Effects	No Effects	No Effects	No Effects
Manganese ⁵	PASSED	No Effects	No Effects NONE	No Effects NONE	No Effects NONE
Nickel ⁴	PASSED	No Effects NONE	No Effects	No Effects	No Effects
Platinum	PASSED	No Effects	No Effects NONE	No Effects NONE	No Effects NONE
Silver ⁵	PASSED	No Effects NONE	No Effects	No Effects	No Effects
316 Stainless Steel ⁴	PASSED	No Effects	No Effects NONE	No Effects NONE	No Effects NONE
Tin ⁵	PASSED	No Effects NONE	No Effects	No Effects	No Effects
Titanium ⁴	PASSED	No Effects	No Effects NONE	No Effects NONE	No Effects NONE
Vanadium ⁵	PASSED	No Effects NONE	No Effects	No Effects	No Effects
Zinc ⁵	PASSED	No Effects	No Effects	No Effects NONE	No Effects NONE
Zirconium ⁵	PASSED	No Effects NONE	No Effects	No Effects	No Effects NONE

1. T81533A 4.4.9 Military Specification for corrosion tests for vapor degreasing solvents.
2. TM-01-69, Laboratory Corrosion Testing of Metals for the process Industry. The Total Immersion Test Method for Corrosion described within: Any oxides of the specimens were removed by scrubbing with bleach-free scouring powder (e.g. except for aluminum, magnesium and cooper and silver and other relatively soft metals) followed by through rinsing with acetone and air-dried. Specimens were totally immersed in ECOMAX for two weeks, one month and two months at 120⁰F. The test specimens were then examined for any signs of corrosion, pitting, discoloration and embrittlement and weight loss.
3. Vapor Degreaser Vapor Layer Test Procedure: Any oxides of the specimens were degreased by scrubbing with bleach-free scouring powder (e.g. except for aluminum, magnesium, copper, silver and other relatively soft metals) followed by thoroughly rinsing with acetone and air-dried. Specimens were placed into the vapor layer of the vapor degreaser for 60 minutes and then examined for any signs of any signs of corrosion, pitting, discoloration and embrittlement and weight loss.
4. Test Strip Coupons were 2" X 1" long X 1/16" thick.
5. Test Disk's were 1 1/2" in diameter X 1/8" thick.

Table 2
PLASTIC Compatibility Testing for ECOMAX

PLASTIC MATERIAL	24 Hour Immersion Testing at Elevated Temperatures ¹	60 Minute Vapor Phase Testing ²
ABS	Not Compatible	Not Compatible
Acrylic	Not Compatible	Not Compatible
Arlon (Polyether Ether Ketone)	No Effects	No Effects
Chlorinated Polyvinyl Chloride	No Effects	No Effects
Delrin	No Effects	No Effects
Epoxy Resins	No Effects	No Effects
Furane Resins	No Effects	No Effects
Fluoroethylpropylene	No Effects	No Effects
High Density Polyethylene	No Effects	No Effects
Ionomer Resin	No Effects	No Effects
Kynar (Polyvinylidene Fluoride)	No Effects	No Effects
Lexan	Not Compatible	Not Compatible
Methylmethacrylate	No Effects	No Effects
Mylar	No Effects	No Effects
Nylon	No Effects	No Effects
Polyamide	No Effects	No Effects
Polyethylene Terephthalate	No Effects	No Effects
Polyimide	No Effects	No Effects
Polyoxymethylene	No Effects	No Effects
Polypropylene	No Effects	No Effects
Polystyrene	Not Compatible	Not Compatible
Polyurethane	No Effects	No Effects
Polyvinyl Chloride (Rigid, Pipe Compound)	No Effects	No Effects
Teflon	No Effects	No Effects
Ultem (Polyetherimide)	No Effects	No Effects

1. The plastic coupon strips tested were 1 1/2" wide X 3" long X 1/8" thick. Each coupon was placed into 8 ounces of **ECOMAX** in a 16 ounce glass bottle. This allowed for both a vapor and a liquid phase during the test. The bottles were then placed in a 120°F oven for twenty four hours. The coupons were then removed and the **ECOMAX** was heated to boiling point until a vapor layer was clearly visible. The plastic coupons were then placed into the vapor layer of the **ECOMAX** within the glass bottle. After a 30 minute exposure to the vapor, each of the plastic coupons was examined under magnification. If the plastics coupons tested showed any indication of solvent attack such as dissolving, swelling or fraying were designated as "Incompatible". Those that showed no indication of solvent attack were designated as "Acceptable".
2. Vapor Degreaser Vapor Layer Test Procedure: Plastic test strips 1 1/2" wide X 3 "long X 1/8" thick were placed into the vapor layer of the vapor degreaser containing **ECOMAX** for 60 minutes and then examined under magnification. Plastic showing any signs solvent attack such as dissolving, swelling or fraying were designated as "Incompatible".

Table 3
ELASTOMER Compatibility Test Results for ECOMAX

ELASTOMER MATERIAL	ELASTOMER TEST ¹	VAPOR PHASE TEST ²
Acrylonitrile-Butadiene	ME	ME
Butadiene Nitrile	NE	NE
Butadiene Styrene	NE	NE
Butyl	NE	NE
Chloroprene	NE	NE
Chlorosulfonate Polyethylene	NE	NE
Epichlorohydrin 956	NE	NE
Ethylene Propylene	NE	NE
Ethylene-Propylene (Terpolymer)	ME	NE
Fluoroelastomer ("Viton A, B")	NE	NE
Isobutylene-Isoprene (Butyl)	ME	ME
Natural Rubber	SE	SE
Perfluoroelastomer ("Chemraz")	NE	NE
Polychloroprene (Neoprene)	SE	SE
Polyether Urethane	NE	NE
Polysiloxane (Silicone)	NE	ME
Polysulfide	NE	NE
Polyurethane	NE	ME
Vinyl-Methyl Siloxane	NE	NE

1. Elastomer Test Procedure: The elastomers coupon strips weighing approximately 10 grams each, plus or minus 0.1 gram were immersed in **ECOMAX** and the **ECOMAX** was then heated and the temperature maintained at boiling its boiling point. After 60 minutes of exposure, each of the elastomers were removed and examined and then re-examined 48 hours later. The results are noted in the Table above.
2. Vapor Phase Test Procedure: The elastomer coupon strips were placed into the vapor layer of the vapor degreaser containing **ECOMAX** for 60 minutes and then removed and examined and then re-examined 48 hours later. The results are noted in the Table above.

SIGNIFICANT EFFECT (SE): The elastomer was rated as having "significant change" if the elastomer gained 11% to 15% weight after exposure. These materials did not return to their original weights

MODERATE EFFECT (ME): The elastomer was rated as having "moderate change" if the elastomer gained 6% to 10% weight after exposure. These materials were weighed again after 48 hours and had returned to their original weight.

NOMINAL OR NO EFFECT (NE): The elastomer was rated as having "little or no change" if the elastomer gained 2% to 5% weight after exposure. These materials returned were weighed again after 24 hours and had returned to their original weight.