leuna harze

EPILOX® – CHEMICAL RESISTANCE :: RELIABILITY AND DURABILITY

:: Epilox® EPOXY RESINS
:: Epilox® HARDENERS

LEUNA-HARZE.DE

PRODUCT OVERVIEW

	EPILOX® SYSTEM		MIXING RATIO (PBW)		NH EQUIVALENT WEIGHT (g/Eq)	VISCOSITY @25 °C (mPa·s)		MIXTURE VISCOSITY @25 °C (mPa·s)	POT LIFE (min. up to 40 °C) 100 g	NOTE
Components	A	B	A	B	B	A	B	A | B	A | B	
	M 1049	H 10-69	100	24	46	4000	30	1000	15	Special system for chemical resistant, nonylphenol-free coatings.
	T 19-34/700	M 1180	100	65	122	700	6000	1600	20	Nonylphenol-free, good finish with good early water resistance.
	T 19-34/700	M 1128	100	54	93	700	300	600	10	Standard system with medium chemical resistance.
Main focus: Viscosity	T 19-34/700	M 1178	100	40	75	700	200	500	< 10	Very low-viscosity, nonylphenol-free primer.

WHAT DETERMINES CHEMICAL RESISTANCE?

The chemical resistance of epoxy resin formulation is not determined solely by the binder. Best results are achieved when binders, fillers and additives are formulated correctly. Fillers should be as chemically inert as possible, with good packing density.

The crosslinking density of the binder system should be as high as possible. The rule of thumb is that the higher the crosslinking density, the better the chemical resistance.

When choosing a suitable binder system the following questions must first be answered regarding chemical exposure:

:: How long is the expected exposure time?
:: What is the concentration of the chemicals?
:: What is the composition of the chemicals?
:: What is the expected temperature range?

Generally, epoxy resin systems show very good resistance to alkaline media. In contrast, organic acids and some solvents are more problematic for epoxy resin systems. That is why a thorough examination of each case is necessary in order to recommend a suitable binder. ::

ADHESION INTERFACE BETWEEN BINDER AND MINERAL FILLERS

The interface between the binder and filler is a weak point where chemicals can attack. A film of water on the fillers should be avoided, which is why only oven-dried fillers should be used.

On the construction site, mixed fillers can be a source of error if they are not stored correctly.

The addition of silanes can significantly improve interfacial adhesion.

It should be noted that the silane should be added to the unfilled component, otherwise the effectiveness is reduced by the attachment of the silane to the mineral fillers wears off over time. Generally the hardener is unfilled. In these cases, the use of aminosilanes is recommended. ::

THE CHEMICAL RESISTANCE OF VARIOUS EPILOX®-SYSTEMS

The following diagrams show the change in mass of the test plates ([50 x 50 x 3] mm^3) from the aforementioned Epilox® systems after storage in liquid media according to test groups for approval according to the Water Resources Act (WHG). ::

- Test Group 4: 60% toluene + 30% xylene + 10% methylnaphtaline
- Test Group 5: 48% Methanol + 48% Isopropanol + 4% Water
- Test Group 9: 10% acetic acid
- Test Group 10: 20% sulphuric acid
- Test Group 11: 20% sodium hydroxide

Figure 1: Epilox® M 1049 + Epilox® hardener H 10-69

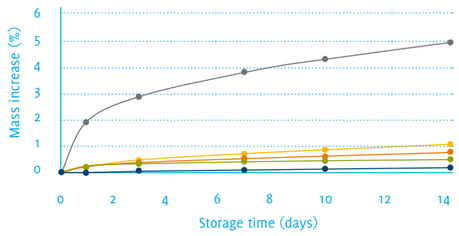


Figure 2: Epilox® T 19-34/700 + Epilox® hardener M 1180

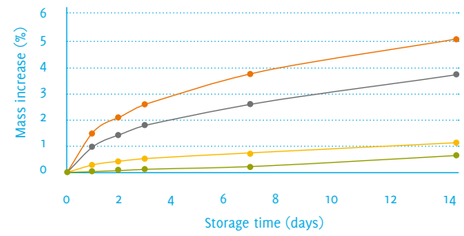


Figure 3: Epilox® T 19-34/700 + Epilox® hardener M 1178

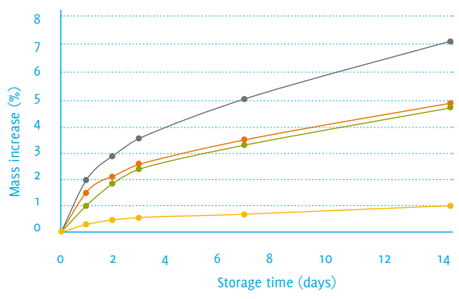
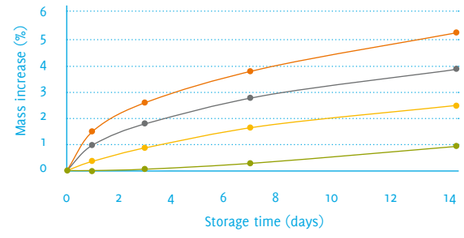


Figure 4: Epilox® T 19-34/700 + Epilox® hardener M 1128



TEST FLUID	EPILOX®-PRODUCTS e.g T 19-36/T 1000 + hardener M 1128 alternative hardener M 1131-1	EPILOX® M 1049 + hardener H 10-69
Acetic acid (1%)	+	+
Acetic acid (5%)	+	+
Acetic acid (10%)	+	+
Acetic acid (30%)	o	
Acetic acid (80%)	-	
Acetone	-	
Amines, e. g., dipropylenetriamine	-	
Ammonia (10%)	+	+
Ammonia (25%)	+	+
Antifreeze (Glycol-containing)	+	+
Aromatic hydrocarbons	+	+
Benzene	+	+
Butanol	+	+
Butyl acetate	o	
Citric acid (30%)	+	+
Crude oil	+	+
Cyclohexane	+	+
Dibutyl ether	+	+
Dibutyl phthalate	+	+
Diesel oil	+	+
Ethanol	-	
Ethanol (10%)	o	
Ethyl acetate	o	
Ethylene glycol	+	+
Fatty acid (tall oil)	+	+
Formaldehyde (35 %)	+	+
Glycerol	+	+
Grape juice, 20 °C	+	+
Grape juice, 80 °C	+	+
Hexane	+	+
Hydraulic fluid (Aerosafe 2300)	+	+
Hydraulic fluid (Skydrol B 500)	+	+
Hydrochloric acid (5%)	+	+
Hydrochloric acid (10%)	+	+
Hydrochloric acid (30%)	+	+
Hydrochloric acid (37%)	o	
Hydrogen peroxide (3%)	+	+
Isopropanol	o	
Jet fuel	+	+
Lactic acid (1%)	+	+
Linseed oil	+	+
Lubricants	+	+
Methanol	-	
Methylene chloride	-	
Methyl isobutyl ketone	o	

TEST FLUID	EPILOX®-PRODUCTS e.g T 19-36/T 1000 + hardener M 1128 alternative hardener M 1131-1	EPILOX® M 1049 + hardener H 10-69
Milk	+	+
Mineral oil	+	+
Nitric acid (5%)	+	+
Nitric acid (10%)	o	+
Nitric acid (30%)	o	-
Nitric acid (40 %)	-	-
Olive oil	+	+
Oxalic acid	+	+
Petrol	+	+
Petroleum	+	+
Phenol	-	
Phosphoric acid (5%)	+	+
Phosphoric acid (10%)	+	+
Phosphoric acid (45%)	o	
Phosphoric acid, conc.	-	
Potassium hydroxide	+	+
Propyl alcohol	o	
Sewage	+	+
Silicone oil	+	+
Soap solution, 5% Strength	+	+
Sodium chloride (3%)	+	+
Sodium chloride (30%)	+	+
Sodium chloride, conc.	+	+
Sodium Hydroxide (10%)	+	+
Sodium Hydroxide (30-40%)	+	+
Sodium Hydroxide (50%, 50 °C)	+	+
Sodium hypochlorite (16%, + 12% NaCl)	o	
Styrene	o	
Sulphuric acid (5%)	+	+
Sulphuric acid (10%)	+	+
Sulphuric acid (20%)	+	+
Sulphuric acid (30%)	o	+
Sulphuric acid (60%)	o	+
Sulphuric acid (78%)		+
Sulphuric acid (80%)	-	+
Sulphuric acid, conc.	-	o
Terpentine	+	
Toluene	-	
Trichloroethylene	-	
Vegetable juice	+	+
Vegetable oils, general	+	+
Water, 100 °C	+	+
Water, dist.	+	+
White spirit	+	+
Whisky	-	
Wine	+	+
Xylene	+	o

Evaluation on the result of the increase in weight of a sample placed in the test liquid with the dimensions (50 x 50 x 3) mm^3 at 25 °C after 14 days.
+ resistant, o conditionally resistant, - unstable

TEST GROUPS AND TEST FLUIDS ACCORDING TO THE PRINCIPLES OF CONSTRUCTION AND TESTING

No.	GROUP
1	Petrol as per DIN 51 600 and DIN 51 607
2	Aircraft fuel
3	Heating oil EL (DIN 51603-1) Diesel motor fuel as per DIN EN 590) Unused internal combustion engine oils Unused automotive gear oils Mixtures of saturated and aromatic hydrocarbons with an aromatic content of , 20 weight per cent and a flash point › 55 °C
4	All hydrocarbons and benzene-containing mixtures with max. 5 volume per cent of benzene (including 2, 3, 4b and 4c, except 4a and 1)
4a	Benzene and benzene-containing mixtures (including 4)
4b	Crude oils
4c	Used internal combustion engine oils and used vehicle gear oils with a flash point › 55 °C
5	Single or multiple alcohols (up to a max. 48 % methanol), glycol ethers
5a	All alcohols and glycol ethers (including 5 and 5b)
5b	Single and multiple alcohols . C2
6	Halohydrocarbons . C2 (including 6b)
6a	All halohydrocarbons (incl. 6 and 6b)
6b	Aromatic halohydrocarbons
7	All organic esters and ketones (including 7a)
7a	Aromatic esters and ketones
7b	Biodiesel
8	Aqueous solutions of aliphatic aldehydes up to 40 %
8a	Aliphatic aldehydes and their aqueous solutions (including 8)
9	Aqueous solutions of organic acids (carboxylic acids) to 10 % and the salts thereof (in aqueous solution)
9a	Organic acids (carboxylic acids, other than formic acid) and the salts thereof (in aqueous solution)
10	Mineral acids up to 20 % as well as acidic hydrolysing inorganic salts in aqueous solution (pH ‹ 6), except hydrofluoric acids, oxidising acids and their salts
11	Inorganic alkalis and alkaline-hydrolysing inorganic salts in aqueous solution (pH › 8), excluding ammonia solutions and oxidising solutions of salts (e. g. hypochlorite)
12	Aqueous solutions of inorganic, non-oxidising salts having a pH between 6 and 8
13	Amines as well as their salts (in aqueous solution)
14	Aqueous solutions of organic surfactants
15	Cyclic and acyclic ethers (including 15a)
15a	Acyclic ethers

QUICK GUIDE :: APPLICATIONS WITH EPILOX® SYSTEMS

PRIMING IN UNIVERSAL APPLICATIONS

Epilox® T 19-38/700
Epilox® hardener H 14-50

This low viscosity, nonylphenol-free resin/hardener combination shows excellent adhesion to difficult and damp substrates.

HIGH UV STABILITY SYSTEM

Epilox® T 19-38/700
Epilox® hardener M 1142

Epilox® hardener M 1142 is a nonylphenol-free hardener with a very good UV stability and excellent surface properties.

SYSTEM FOR QUICK ACCESSABILITY AND QUICK TRAFFICABILITY

Epilox® T 19-38/700
Epilox® hardener M 1178 plus Epilox® hardener M 1128 (1:1)

The Epilox® hardener M 1178 can be used together with standard hardeners such as the Epilox® hardener M 1128 to accelerate and achieve faster curing.

Please contact us for more information on the reported system.

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