

AstruPanel CRASH!

CHEMICAL RESISTANCE

The chemical resistance of a thermoplastic is dependent upon five major factors:

1. Stress level in the application
2. Temperature
3. Exposure time
4. Chemical concentration
5. Type of chemical involved

LEXAN sheet has a good chemical resistance, at room temperature, to a variety of dilute organic and inorganic acids. Water, vegetable oils, solutions of neutral salts, aliphatic hydrocarbons and alcohols are also included in this category. When a thermoplastic is attacked by a chemical it usually takes one of three forms. In the first case the chemical is absorbed into the plastic, and plasticisation and/or crystallisation occurs.

The visible signs of this type of attack are swelling or surface whitening. LEXAN resin is affected in this way by partial solvents such as low molecular weight aldehydes and ethers, ketones, esters, aromatic hydrocarbons and perchlorinated hydrocarbons. In addition, chemical attack ranging from partial to complete destruction of LEXAN sheet occurs in contact with alkalines, alkali salts, amines and high ozone concentrations.

The third type of attack is often the most difficult to predict since environmental conditions dictate whether or not the plastic will be affected. Combinations of certain environments, coupled with stress and/or strain upon the material, cause stress cracking or crazing of the polycarbonate.

Crazing can be induced at moderate to high stress levels by low molecular weight hydrocarbons. Products such as acetone and xylene may cause stress cracking even at very low stress levels and should therefore be avoided.

Taking into account the complexity of chemical compatibility, all chemicals which come into contact with polycarbonate should be tested.

For sheet products the most common contact is with sealants, gaskets and the various cleaning media. A complete list of recommended cleaners, gaskets and sealants is available upon request. However, a shortened list of some of the more common compounds is outlined in the respective sections in the table below.

LEXAN sheet chemical compatibility summary

Chemical class	Effects
Acids (Mineral)	No effect under most conditions of concentration and temperature.
Alcohols	Generally compatible.
Alkalis	Acceptable at low concentration and temperature. Higher concentrations and temperatures result in etching and attack as evidenced by decomposition.
Aliphatic Hydrocarbons	Generally compatible.
Amines	Surface crystallisation and chemical attack.
Aromatic Hydrocarbons	Solvents and severe stress-cracking agents.
Detergents and Cleaners	Mild soap solutions are compatible. Strongly alkaline ammonia materials should be avoided.
Esters	Cause severe crystallisation. Partial solvents.
Fruit Juices and Soft Drinks	Compatible at low stress levels. Some concentrates not recommended.
Gasoline	Not compatible at elevated temperatures and stress levels.
Greases and Oils	Pure petroleum types are generally compatible. Many additives used with them are not, thus materials containing additives should be tested.
Halogenated Hydrocarbons	Solvents and severe stress-cracking agents.
Ketones	Cause severe crystallisation and stress-cracking. Solvents.
Silicone Oils and Greases	Generally compatible up to 80°C.