

## A Breakdown of Chemical Behaviours

The different chemicals Expanded Polystyrene might come into contact with and how it will react with these chemicals.

The test for resistance is based on:

Testing of expanded foam materials; Determination of the reaction to liquids, vapours, gases and solid materials. In this DIN standard, 5 foam cubes without expansion skin and with sides measuring 5 cm are immersed in the test medium for a definite length of time and changes occurring in the samples, e.g. in mass and dimensions, are determined.

The exposure time depends on the test medium: for liquids it is 72 hours; for gases 24 hours and for liquefied gases, at least three hours. For liquefied gases the immersion temperature is at, or just under, the boiling point of the test medium in question; in other media, immersion takes place at room temperature. For visual assessment of damage, DIN 53428 suggests a scale of criteria from 0 (no change) to 5 (severely damaged).

To provide a simplified overview, the table contains the following assessment criteria:

**YES** = unchanged (0) = resistant

**LIMITED** = slight change = limited resistance (small change in dimensions)

**NO** = severely damaged = not resistant

Chemical	RESISTANT
<b>WATER</b>	
Sea Water	<b>YES</b>
Water	<b>YES</b>
<b>ALKALIS</b>	
Ammonia Water	<b>YES</b>
Bleaching Solutions (Hypochlorite, Hydrogen Peroxide)	<b>YES</b>
Potassium Hydroxide Solution	<b>YES</b>
Lime Water	<b>YES</b>
Caustic Soda Solution	<b>YES</b>
Soap Solutions	<b>YES</b>
<b>DILUTE ACIDS</b>	
Formic Acid, 50%	<b>YES</b>
Acetic Acid, 50%	<b>YES</b>
Hydrofluoric Acid, 4%	<b>YES</b>
Hydrofluoric Acid, 40%	<b>YES</b>

### A Breakdown of Chemical Behaviours

Phosphoric Acid, 7%	YES
Phosphoric Acid, 50%	YES
Nitric Acid, 13%	YES
Nitric Acid, 50%	YES
Hydrochloric Acid, 7%	YES
Hydrochloric Acid, 18%	YES
Sulphuric Acid, 10%	YES
Sulphuric Acid, 50%	YES
<b>CONCENTRATED ACIDS</b>	
Formic Acid, 99%	YES
Acetic Acid, 96%	NO
Propane Acid, 99%	NO
Nitric Acid, 65%	YES
Hydrochloric Acid, 36%	YES
Sulphuric Acid, 98%	YES
<b>FUMING ACIDS</b>	
Nitric Acid	NO
Sulphuric Acid	NO
<b>ANHYDRIDES</b>	
Acetic Anhydride	NO
Carbon Dioxide, Solid	YES
Sulphur Trioxide	NO
<b>WEAK ACIDS</b>	
Humic Acid	YES
Carbonic Acid	YES
Lactic Acid	YES
Tartaric Acid	YES
Citric Acid	YES

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INORGANIC GASES	
Ammonia	NO
Bromine	NO
Chlorine	NO
Sulphur Dioxide	NO
ORGANIC GASES	
Butadiene	NO
Butane	NO
Butene	NO
Natural Gas	YES
Ethane	YES
Ethene (Ethylene)	YES
Ethyne (Acetylene)	YES
Methane	YES
Propane	YES
Propene (Propylene)	YES
Propene (Propylene) Oxide	NO
INORGANIC LIQUEFIED GASES	
Ammonia	YES
Inert Gases	YES
Oxygen	YES
Sulfur Dioxide	NO
Nitrogen	YES
Hydrogen	YES
ORGANIC LIQUEFIED GASES	
Methane	YES
Ethane	YES
Ethene	NO
Ethene Oxide	NO

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Ethyne (Acetylene)	<b>NO</b>
Propane	<b>NO</b>
Propene	<b>NO</b>
Propene Oxide	<b>NO</b>
Butane	<b>NO</b>
Butene	<b>NO</b>
Butadiene	<b>NO</b>
Natural Gas	<b>YES</b>
<b>ALIPHATIC HYDROCARBONS</b>	
Cyclohexane	<b>NO</b>
Diesel Fuel, Heating Oil	<b>NO</b>
Heptane	<b>NO</b>
Hexane	<b>NO</b>
Paraffin Oil	<b>LIMITED</b>
White Spirit 55-95 °C	<b>NO</b>
White Spirit 155-185 °C	<b>NO</b>
Vaseline	<b>YES</b>
Gasoline	<b>NO</b>
<b>ALCOHOLS</b>	
Methanol	<b>LIMITED</b>
Ethanol	<b>LIMITED</b>
Ethylene Glycol	<b>YES</b>
Diethylene Glycol	<b>YES</b>
Isopropanol	<b>YES</b>
Butanol	<b>LIMITED</b>
Cyclohexanol	<b>YES</b>
Glycerine	<b>YES</b>
Coconut Oil Alcohol	<b>YES</b>

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AMINES:	
Aniline	NO
Diethylamine	NO
Ethylamine	YES
Triethylamine	NO
MISCELLANEOUS ORGANIC SUBSTANCES:	
Acetone	NO
Acetonitrile	NO
Acrylonitrile	NO
Dimethylformamide	NO
Esters	NO
Ethers	NO
Halogenated Hydrocarbons	NO
Ketones	NO
Paint Thinners	NO
Olive Oil	YES
Tetrahydrofuran	NO
INORGANIC BUILDING MATERIALS:	
Anhydrite	YES
Gypsum	YES
Lime	YES
Sand	YES
Cement	YES
ORGANIC BUILDING MATERIALS:	
Bitumen	YES
Water-Based Rapid-Curing Cutback And Bituminous Knife Fillers	YES
Solvent-Based Rapid-Curing Cutback And Bituminous Knife Fillers (Free From Aromatics)	NO

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AROMATICS	
Benzene	NO
Cumene	NO
Ethylbenzene	NO
Phenol, 1% aqueous solution	YES
Phenol, 33% aqueous solution	NO
Styrene	NO
Toluene	NO
Xylene	NO
VAPORS OF	
Camphor	NO
Naphthalene	NO