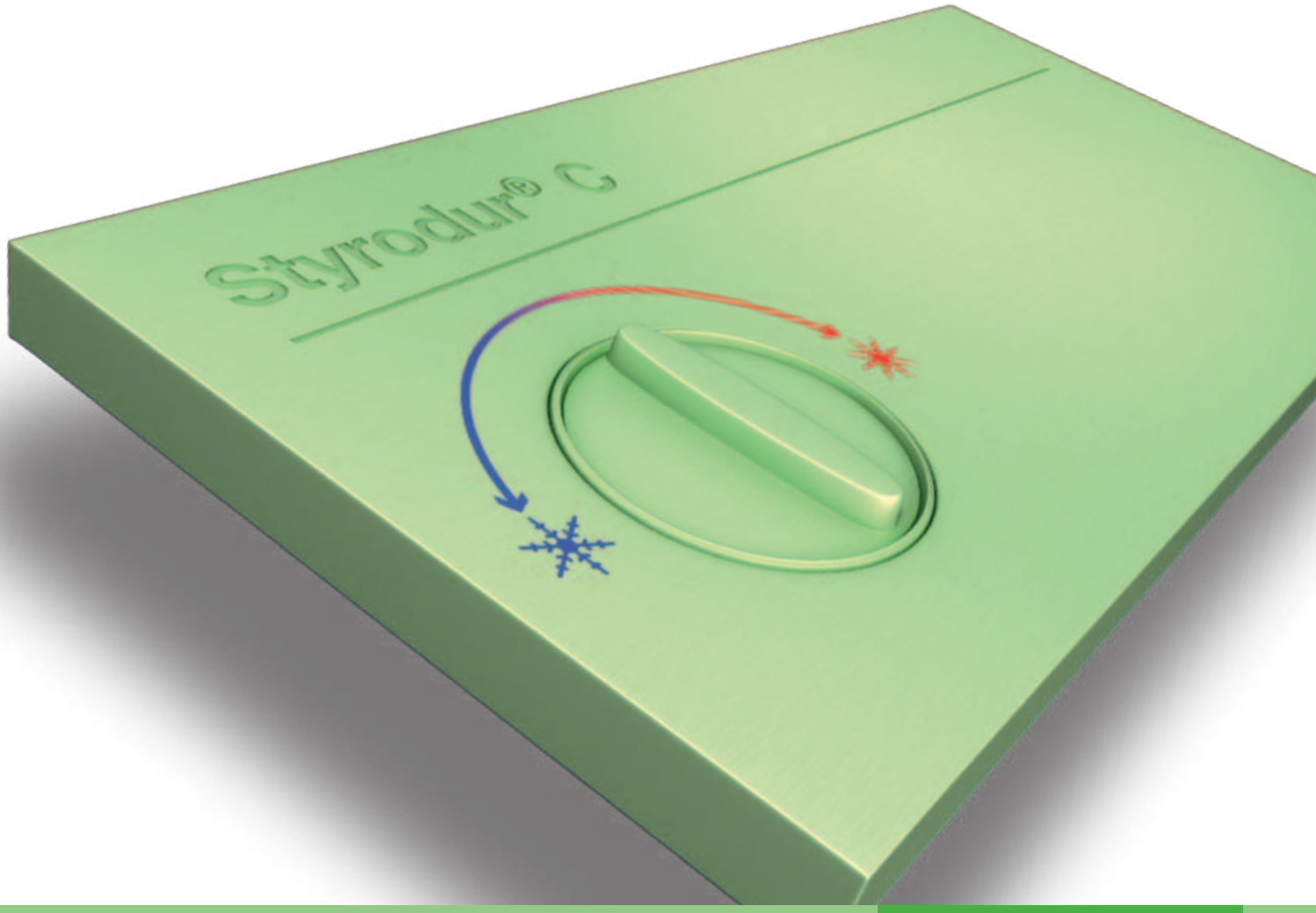
Styrodur® C
Europe's green insulation

Chemical Resistance



BASF
The Chemical Company

1. Resistance to Chemical Substances

The resistance of Styrodur® C rigid-foam panels to chemical substances is the same as that of molded parts made of polystyrene. However, chemical damage has a faster and stronger effect than in the case of compact polystyrene because the surface area was enlarged through foaming. On the other hand, the foam skin of Styrodur C panels exhibits greater resistance to a number of substances.

In order to avoid errors during application, it is thus important to know how Styrodur C will behave vis-à-vis substances found in actual practice (for example, in the building industry).

2. Testing

The resistance test is carried out on the basis of DIN 53 428 entitled "Determination of the behavior of cellular plastics when exposed to fluids, vapors, and solids." According to this standard, five rigid-foam cubes with an edge length of 5 cm are submerged into the test fluid at a temperature of +20°C [+68°F] and the weight increase after 28 days is measured.

This test can be simplified by placing foam specimens measuring 10 cm × 5 cm × the panel thickness in the test fluid for up to four weeks, and determining the length change as a percentage. If the test can be performed at about 50°C [86°F], the test duration can be considerably shortened.

If the influence of the test fluid on the foam skin is to be determined, it is recommended that a weighted, graduated glass tube with an inner diameter of 113 mm and a height of 75 mm be placed onto panel sections measuring 20 cm × 20 cm, and that the test fluid be filled into the glass tube. In the case of low-viscosity agents, the glass tube on the panel must be sealed on the outside.

The contact surface area amounts to 100 cm². The test measures the change in the fluid level in the glass as well as the volume change of the specimen. The latter is most advantageously ascertained by means of submersion in water. If sufficiently large tubes are not available, the work may also be performed with smaller specimens, but they should not be smaller than 125 mm × 125 mm. In order to achieve a contact area of 50 cm², which is still sufficient for the evaluation and suitable for the calculations, the inner diameter of the glass tube should be 80 mm.

The methods described here are basically sufficient to provide an orientation on the resistance of Styrodur C to chemical substances. However, if there is a need to ensure that certain substances do not cause any changes at all, for example, in the mechanical properties of the foam, or only produce changes within tolerable limits, then actual-practice tests or tests under conditions approximating actual practice are indispensable. The same applies if the composition of a substance is not known. For instance, paints and adhesives may contain a solvent that is harmful to the rigid foam. In this case as well, a test must be conducted in order to ensure that the Styrodur C panels will not be affected.

The compilation below provides information about the behavior of Styrodur C rigid-foam panels vis-à-vis some selected chemical substances.

3. Behavior Vis-à-vis Selected Substances

Substance	Resistance
1 Water/aqueous solutions	
water	+
seawater	+
salt solutions	+
hydrogen peroxide (3%)	+
2 Acids	
2.1 Diluted acids	
hydrochloric acid	+
nitric acid	+
sulfuric acid	+
phosphoric acid	+
hydrofluoric acid	+
formic acid	+
acetic acid	+
2.2 Concentrated acids	
hydrochloric acid	+
nitric acid	+
sulfuric acid	+
phosphoric acid	+
hydrofluoric acid	+
acetic acid	–
2.3 Weak acids	
humic acid	+
carbonic acid (also dry ice)	+
lactic acid	+
tartaric acid	+
citric acid	+
3 Lyes	
sodium hydroxide solution	+
potassium hydroxide solution	+
lime water	+
ammonia water	+
bleaching solutions (hypochlorite)	+
soap solutions	+

Substance	Resistance
4 Gases	
4.1 Inorganic gases	
ammonia	–
halogens (fluorine, chlorine, bromine)	–
sulfur dioxide, sulfur trioxide	–
4.2 Organic gases	
methane	+
ethane, ethene	+
propane, propene	+
butane, butene, butadiene	–
natural gas	+
4.3 Liquid gases, inorganic	
nitrogen, oxygen, hydrogen	+
noble gases	+
ammonia	+
carbon dioxide, carbon monoxide	+
sulfur dioxide	–
4.4 Liquid gases, organic	
propane, propene	–
butane, butene, butadiene	–
natural gas	+
5 Hydrocarbons	
5.1 Aliphatic hydrocarbons	
hexane, cyclohexane	–
heptane	–
paraffin oil	–
5.2 Aromatic hydrocarbons	
benzene, toluene, xylene	–
ethyl benzene	–
styrene	–
5.3 Halogenated hydrocarbons	–
5.4 Fuels	
gasoline (regular, premium)	–
diesel fuel, heating oil	–
6 Alcohols	
methanol, ethanol, propanol, butanol	+
cyclohexanol	+
glycols	+
glycerin	+

Substance	Resistance
7 Solvents	
7.1 Ketones, ethers, esters	
ketones (such as acetone, cyclohexanol)	–
ethers (such as diethyl ether, dioxane, THF)	–
esters (such as ethyl acetate, butyl acetate)	–
dibutyl phthalate	–
paint thinner	–
mineral greases and oils	H
7.2 Amines, amides, nitriles	
aniline	–
diethyl amine, triethyl amine	–
dimethyl formamide	–
acetonitrile	–
acrylonitrile	–
8 Construction materials	
cement	+
gypsum	+
lime	+
anhydride	+
tar	–
bitumen	+
rapid-curing cutback and bituminous filling compounds	
- water-based	+
- solvent-based	–
mortar and plaster systems	
- mineral-based	+
- synthetic-resin bonded	H
PUR assembly foam	+
joint fillers	
- acrylate-based	H
- silicone-based	+
adhesives	
- epoxy-based	+
- polyurethane-based	+
- bitumen-rubber-based	+
- solvent-based	–
paints/lacquers	
- dispersion paints	H
- water-based	H
- solvent-based	–
9 Material of biological origin	
liquid manure	+
biowaste	+
biogas	+
vegetable and animal fats and oils	#

resistant	+
not resistant	–
to be checked on a case-to-case basis	#
manufacturer's information to be observed	H

Further Information on Styrodur® C

- **Product Brochure: Europe's Green Insulation**

- **Applications**
  - Basement Insulation
  - Load-bearing Applications and Floor Insulation
  - Wall Insulation
  - Roof Insulation
  - Ceiling Insulation

- **Special Themes**
  - Reconstruction and Refurbishment
  - Thermal Insulation of Biogas Plants
  - Styrodur® 2500 CNS—Insulation for Underfloor Heating Systems

- **Technical Data**
  - Recommended Applications and Technical Data
  - Technical Data and Assistance Data for Dimensioning

- **Chemical Resistance**

- **Styrodur C Film: Europe's Green Insulation**

- **Website: www.styrodur.com**

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