

PLASKOLITE

CLEANING, DISINFECTION and STERILIZATION of PARTS USING TUFFAK®

GENERAL:

TUFFAK® polycarbonate can be cleaned, disinfected and sterilized by almost any of the well-known methods employed in routine practice. The smooth surface of the parts is seen to be advantageous in these applications. Under certain conditions, however, contact with cleaning solutions, disinfecting and sterilizing media may cause some damage, which manifests itself in the form of stress cracking.

This cracking generally leads to a great reduction in mechanical strength, but there are also other effects, which are not always visible - such as swelling or chemical decomposition of the polymer, which can similarly impair the mechanical strength.

This Technical Information Sheet contains specific recommendations as to suitable cleaning agents and disinfectants for TUFFAK® parts.

Besides the nature and concentration of the contact medium, the appearance of stress-cracking effects is influenced by the following factors:

- Inherent stress state in the molded part or sheet
- Mechanical load during contact
- Temperature during contact

In regards to these points, experience has shown that the lower the degree of stress, the mechanical load and the temperature, the lower the tendency towards stress cracking.

In order to avoid mechanical stresses or to reduce them to a minimum, it is advisable not to clamp the parts and not to stack them during cleaning, disinfection or sterilization.

Care should also be taken about the effect of hot water, as well as hot aqueous solutions of cleaning, disinfecting and sterilizing media.

Although TUFFAK® can be treated with boiling water or steam at 250°F, permanent contact with water or steam above 212°F will lead to damage. Both boiling water and steam will cause gradual hydrolytic decomposition of the polymer, which will manifest itself in a reduction in a number of mechanical properties.

CLEANING

In many cases it is sufficient to clean with warm or hot water to which some weakly acidic or neutral cleaning agent has been added.

Standard cleaning

- Thoroughly pre-rinse with warm water to loosen and wash away surface material, grit and grime.
- Using a soft microfiber cloth or moist non-abrasive sponge, gently wash with a mild diluted soap or detergent.
- Rinse thoroughly with lukewarm clean water. To prevent water spots, thoroughly dry the glazing with a dry soft cloth.

In dishwashers, care should be taken to ensure that the manufacturer's recommended of a normally strongly alkaline cleaning solution is **not** used on polycarbonate sheet.

The subsequent rinsing cycle, which generally involves weakly acidic or neutral active substances being added to the water, can be carried out as usual at 185°F on account of the very short contact time (less than two minutes).

Here again, the manufacturer's instructions with respect to the concentration of clear rinsing agent employed should be carefully followed. However, avoid cleaning solutions that are basic (>pH 7).

DISINFECTION

Depending on their composition and concentration, disinfectants can damage TUFFAK® Polycarbonate. Care must be exercised with some products containing aldehydes, phenols, hydroxides or amines as the active ingredient. Avoid disinfectants containing bleach or ammoniated chloride. *Disinfectants containing Hydrogen Peroxide or Isopropyl Alcohol (aka isopropanol or 2-Propanol) have shown to be compatible with polycarbonate sheet.*

STERILIZATION

Any articles to be sterilized should previously have been cleaned. Otherwise, there is the danger that constituents of the contamination will cause severe turbidity, cracks, etc. during sterilization.

Sterilization by steam (saturated steam)

To prevent deformation of the molded parts, the sterilization temperature should not exceed 250 °F. Care must also be taken to ensure that TUFFAK® parts are not damaged by substances added to the boiler feed water, such as alkaline corrosion inhibitors, and that the article is positioned in such a way that no condensation can accumulate inside it.

As a rule, it is possible to sterilize molded parts made of TUFFAK® many times before gradual chemical decomposition reduces the mechanical strength to a level where it is no longer adequate for certain applications.

Sterilization tests on test specimens have shown that after 100 cycles of 30 minutes each at 250°F, the parts still retains comparatively good impact strength. This also generally applies even if the material exhibits hairline cracks and the molded part appears slightly milky as a result of the high stresses imposed on the material by repeated sterilization cycles.

In view of these gradually occurring changes, articles made of TUFFAK® sheet that are intended only for single use should not be repeatedly sterilized.

Sterilization with Ethylene oxide (ETO)

Suitable sterilization processes are those which use ethylene oxide, either undiluted or mixed with carbon dioxide or inert gases in the ratio 10 to 20 % ethylene oxide / 90 to 80 % remainder. The temperature during sterilization should not exceed 150°F.

Tests have shown that repeated sterilization can cause slight brittleness combined with crack formation. The impact strength of test specimens treated with pure ethylene oxide at 130°F for 50 cycles of 6 hours each is unchanged in comparison with the starting level despite slight crack formation.

Sterilization with high-energy radiation (γ-radiation)

TUFFAK® polycarbonate has a high resistance to the effects of high-energy radiation. Its resistance depends on the ambient conditions and the radiation dosage applied. Assuming that 28 kGy (2.8 Mrad) of energy is required to sterilize TUFFAK®, it can be sterilized 10 to 20 times before any appreciable reduction in mechanical strength occurs. Polycarbonate does, however, become progressively more yellow with each sterilization.

Sterilization with peracetic acid

TUFFAK® can be sterilized with 2 % concentration peracetic acid without suffering damage. Appropriate safety precautions must be observed when handling peracetic acid.

Sterilization with hot air plays only a minor role for parts made from TUFFAK® polycarbonate. No problems are to be expected with parts in TUFFAK® up to a hot air temperature of 275°F.

DISCLAIMER:

These suggestions and data are based on information we believe to be reliable. They are offered in good faith, but without guarantee, as conditions and methods of use are beyond our control. We recommend that the prospective user determine the suitability of our materials and suggestions before adopting them on a commercial scale.