Technical information

Formation of tension cracks on acrylic panes

With **tension cracks** we mean chemical and/or electro-chemical corrosion of material under the equal effects of a **corrosive agent** and static tensile stress.

In technical jargon one speaks as well of stress corrosion cracking. The effects are cracks on acrylic panes which initially are very fine but which eventually could lead to the destruction of the component.

The molecule chains, which are under pressure, are attacked by the corrosive agents and destroyed. The first signs that cracking has started are little scratches which are visible as silver shimmering points when the pane is viewed at a certain angle. Cracks formed via a chemical reaction branch out at an advanced stage and it cannot be determined in which direction they are expanding. Cracks formed by mechanical forces, on the other hand, expand in a definite direction and do not branch out. The acrylic pane looks completely intact since the cracking leaves no tangible signs in the initial phases but the damaging effects have already started.

The window and Heki panes are produced using organic material (acrylic). They leave our automated production under very little tension. When the window is mounted and used, extra tension arises but as long as the window is used properly no cracks will form. During use, so-called surface tension builds on the surface, caused by temperature and the change between damp and dryness. This is completely harmless and will not lead to damage, even after many years of use, provided the material is taken care of properly. However, when detergents and care products which are unsuitable for acrylic are used (corrosive agents) the window's material is attacked.

For example, alcohol, certain tensides, organic solvents, softeners, to mention just a few, are considered corrosive. Furthermore such products could be contained in plastic care products such as polishing pastes and care products for rubber seals.

The cracks start forming in areas under high tension like, for example, in windows in the areas near the hinge profile or the catches. The formation of cracks is influenced by localised effects, time, corrosive element of the products used and the temperature. In isolated individual cases there is only a localised formation of cracks on the surface or in the corners. When the corrosive agent is contained in the care product for rubber seals, the cracks form along the area on which the seal comes to rest against the pane.

Attention: When cracks form on the area on which the seal comes to rest against the pane and the pane has to be changed, the rubber seal has to be changed as well, otherwise there is the danger that the new pane might get damaged as well.

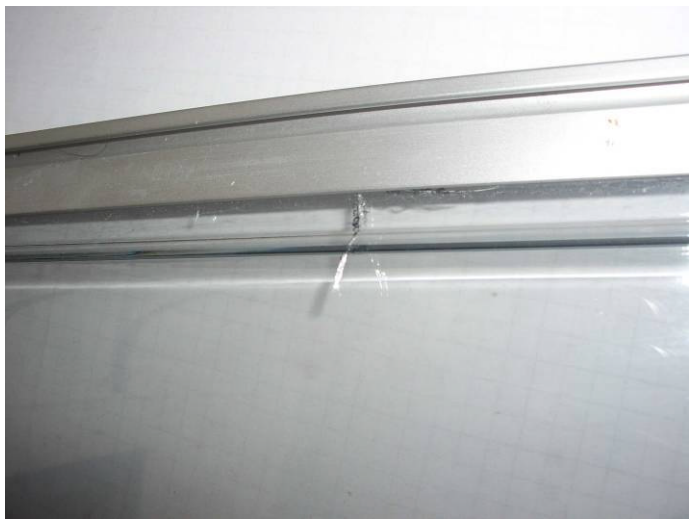
Even the thinning of corrosive detergents does not always help. In most cases the water part simply evaporates after use, leaving the detergent in **concentrated** form to cause cracks!

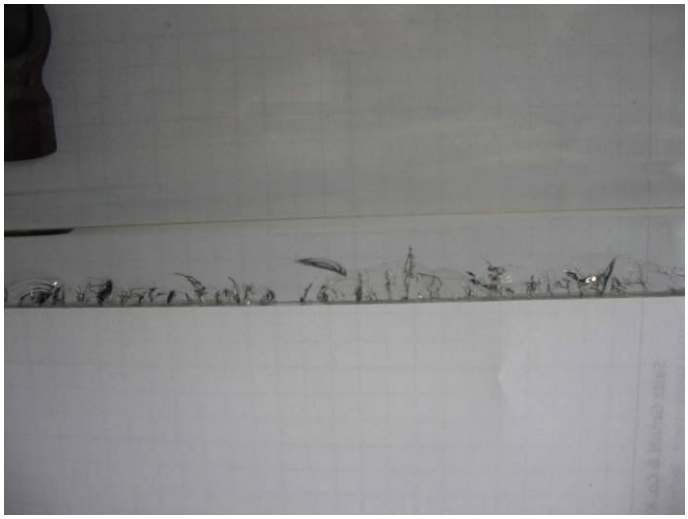
When cared for properly, acrylic keeps its pore-free surface for years and does not turn yellow or become brittle. We recommend using lukewarm water in which a little normal household washing liquid is poured to clean and care for the acrylic windows. It is important to always use plenty of water. Never wipe the windows dry. We recommend talcum powder or white Vaseline for the rubber seals.

We hope to have helped explain the causes of crack formations in acrylic components with these remarks.

In the following pages, please find pictures of typical crack formations and an explanation of their causes.

	Destruction of a C1 window pane in the hinge area. Cause: corrosive agent in detergent.
	Cracks start to form in hinge profile area and corner of a C1 window pane. The cause thereof is a corrosive agent in the detergent.
	Cracks form starting from under the hinge profile of an S4 window. Cause: caustic detergent concentrated under the profile.

	Big cracks in the hinge profile area. Outer pane already perforated. New cracks starting to form on the surface, initially visible as spots. Cause: concentrated corrosive agent.
	Cracks starting to form under the hinge profile. Cause: corrosive agent had a longer time to act in the profile's fissure.
	Cracks on outer pane start forming as spots. Cause: Drops of concentrated corrosive agent contained in a caustic detergent.



Cracks on lower edge of an S4 window.
Cause: Concentrated leftovers of a caustic detergent after evaporation of water part.

Cracks on the inner pane in the area of the anchorage of the catch.
Cause: caustic detergent.