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Sealant Compatibility

Compatibility of Glazing Sealants and Compounds with IG Sealants

INTRODUCTION

Two materials are compatible if there is no change in the physical properties of either when they are in direct contact or close proximity. Conversely if there is an inter-reaction which causes a change in the properties of one or both of the materials they are said to be incompatible. Incompatibility may result from a chemical reaction between the materials or physical changes due to migration of components from one material into the other. In the case of migration of volatile components from the materials in the form of vapour there does not have to be direct contact for the effects of incompatibility to become apparent.

INFLUENCE OF THE TYPE OF IG EDGE SEALANT

In general, chemically curing IG edge sealants such as polyurethanes, silicones or polysulfides are not greatly affected by glazing materials in common use. IG edge sealants where there is no chemical cure mechanism are more susceptible to inter-reaction with certain other materials. These types of sealant are thermoplastic in nature and are often based on a butyl rubber polymer. They include hot melt butyl, polyisobutylene (PIB) primary sealant, Swiggle Strip, TPS sealant etc. These butyl based sealants are particularly susceptible to hydrocarbon solvents which act to soften and dissolve the rubber.

INFLUENCE OF THE GLAZING MATERIAL

There are a number of different types of glazing material in common use and within each of these types there are many different formulations of product available from the various suppliers.

One of the most commonly used types of glazing sealants is one component silicone sealant. These products cure by reaction with atmospheric moisture vapour and produce a by-product as a result of this reaction. In the case of acetoxy cure silicones the by-product is acetic acid vapour. In the case of the neutral cure silicones the by-product is non-acidic, usually an alcohol. However, of itself, the type of cure mechanism is not an indication of compatibility or incompatibility. Certain silicone sealant formulations (which may be acetoxy cure or neutral cure) contain organic solvents, usually added to cheapen the product and modify the viscosity. Depending on the chemical nature and quantity of solvent present there is a potential for incompatibility. Thus it is possible for a specific neutral cure silicone product to be incompatible with an IG edge sealant, contrary to the common misconception that all neutral cure silicones are compatible. Conversely it is possible for an acetoxy cure silicone to be compatible with the IG edge sealant, although it may not be suitable for use in all glazing situations due to the potential for the acetic acid to react with other glass or frame components.

POSSIBLE EFFECTS OF INCOMPATIBILITY

As the properties of the IG edge sealant are changed by inter-reaction with the incompatible glazing sealant there is the possibility that the long term durability of the IG unit may be affected. Although in many cases the effect of incompatibility is not visually apparent in the short term, there are situations where an effect on the unit aesthetics is observed within a relatively short period.

The extent of the effects of incompatibility depends on the type of the IG edge sealant(s), as discussed above, and the concentration and type of incompatible constituents of the glazing sealant. Thus in a mild case of incompatibility a hot melt butyl sealant might suffer only slight softening at the surface in contact with the glazing material. In a more extreme case the softening might be much greater, so that the hot melt sealant takes on the consistency of a soft, sticky paste, and extend throughout the depth of the IG sealant.

A particular situation where incompatibility becomes visually very apparent is where a sealant containing a volatile hydrocarbon solvent is used with a dual seal IG unit constructed with a PIB primary seal and a chemically curing secondary seal. The solvent vapours are able to permeate through the outer, secondary seal and attack the primary seal. In less severe cases the secondary sealant is not significantly affected but the PIB is softened and exudes past the spacer bar into the sight area of the unit. In more extreme cases the PIB is dissolved by the solvent which also extracts plasticiser from the secondary sealant. The visual effect of this is greatest at the top edge of the unit, where dribbles of the black PIB mixed with a clear liquid run down the internal surfaces of the glass.

AVOIDING INCOMPATIBILITY

Glazing materials should be chosen which are stated by the supplier to be compatible with the edge sealants of the IG unit. Such a statement is more likely to be forthcoming and to carry greater weight if the glazing material and the edge sealants are from the same supplier.



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If this assurance is not available, or as a further re-assurance, a simple test for compatibility can be carried out if samples of all the materials to be used are available. A small quantity of the glazing sealant is applied to a sample of the IG edge sealant (both the primary sealant and the secondary sealant in the case of dual seal units). Two component curing sealants should be allowed to fully cure before commencing this test. The test specimen is left for seven days after which the glazing sealant is removed and it and the edge sealant examined for any physical changes.

Where this test is used in the absence of a statement of compatibility of the glazing sealant from the supplier it should be borne in mind that the composition of the material may be subject to change without notification and that the results of earlier tests may be no longer valid.

EFFECT OF EDGE TAPING OF IG UNITS

Edge tape applied to the IG unit should not be relied upon to form a barrier between the glazing sealant and the edge seal of the unit.

Plastic coated cloth tapes are permeable to solvent vapours and may themselves be degraded by an incompatible glazing sealant. Aluminium foil tapes may constitute an impermeable barrier but their use is likely to contribute to other effects which reduce the life expectancy of the unit and should be avoided.

DISCLAIMER

No liability can be accepted for the information provided in this leaflet although it is published in good faith and believed to be correct.