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Ingress of PIB Primary Seal into the Cavity of an Insulating Glass Unit or "IGU".

PIB is usually an essential component within an IGU, when using conventional spacer systems, if the manufacturer is to be able to claim the mandatory compliance with the Harmonised European Standard (hEN) EN 1279, particularly with some systems when claiming compliance with EN 1279 Part 3.

It is thought that the ingress of PIB into the cavity of the unit i.e. beyond the sightline of the inner surface of the spacer bar, is due to two reasons:- Chemical reaction or physical forces.

Chemical.

It is well documented that on occasions that:-

- There can be a chemical reaction between "plasticisers" contained within some incompatible glazing compounds (often Silicone Sealants) and the "Secondary Sealant" (outer seal). A chemical process takes place which results in this liquid component migrating into the PIB and causing it to become mobile with the result that the material "flows" down the glass or being squeezed up into the cavity in an unsightly manner. This is more common where the Secondary Sealant is a Two Part chemically cured system. Although with Hot Melt systems this incompatibility may cause other problems but the plasticizer may still to migrate into the PIB.

- There may be a similar chemical reaction between the adhesive on the Black Cloth and other tapes, often used around the edge of the IGU. See Technical Bulletin on taping of IGU's. It is thought that the resin rubber adhesive on the tape attracts the plasticiser out of the Two Part Sealant and this then migrates back into the PIB with similar results to the situation above.

Physical.

The presence of PIB on the shoulder of the spacer means that it is effectively a "fulcrum", where the glass pivots during the expansion and contraction movements caused by changes in atmospheric pressure and ambient temperature. These conditions causing the air (gas) within the unit to expand and contract. See Technical Bulletin on "The causes of glass deflection".

The PIB, which must be applied at recommended coating weights, is effectively "squeezed" and because it cannot be forced outwards (the secondary sealant prevents this) it will gradually over an extended period move very slightly inwards.

This may result in the PIB being visible as a very small band / bead along the spacer / glass sightline.

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Ameliorating actions.

In respect to plasticizer migration the use of compatible components should only be considered and reference to their suppliers should be made, so as to prevent the use of products that are incompatible with the components used in IGU manufacture.

In respect to the physical causes it should be noted that this migration is normal and its' presence shows that the unit is more likely to be of high quality in terms of life expectancy and gas retention.

However, it may be possible to reduce the amount of ingress by:-

- Reducing the coating weight slightly – although this must still be in line with the manufacturers recommendations.
- Positioning the extruded bead towards the back of the spacer shoulder – again the PIB must be continuous around the unit to ensure good unit performance in respect to life expectancy and gas retention.

The coating weight and position must comply with the manufacturers system description and be within the tolerances defined, so as to comply with EN 1279.

Conclusion.

The move by PVCu and Aluminium profile extruders to narrower profiles and timber window cross-sections having low up-stands means the sightline of IGU's is often in line with the top of the bead and as such this "problem" is now more visible. This is compounded when the use of white spacer bars are used; dark coloured spacer bars would not emphasise the presence of small intrusions of PIB into the cavity. Previous systems with bigger up-stands meant that the whole spacer system was contained within the glazing rebate and therefore not visible.

Although the risk of this migration caused by physical forces can be minimized it will be something that is expected to occur on a regular basis.

The presence of this visible PIB does not mean that the unit has failed in convention terms, i.e. misting up of the interior of the IGU and the thermal insulation properties of the IGU should not be affected.

The ingress caused by chemical reaction may mean the need to replace the unit, as this problem will probably get worse over time and the visual appearance will not be acceptable to the householder.

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