

Technibond

bonding industry together

Bonding Georgian bars to glass



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Technibond Ltd., Millboard Road, Bourne End, Bucks

Tel: 01628 642800 Fax: 01628 642801 E.mail: techservice@technibond.co.uk

Introduction

We have prepared this report to demonstrate the suitability of **Technibond HSA** for bonding decorative PVCu Georgian glazing bars to glass. The use of double-sided foam tapes for bonding PVCu Georgian bars is now a well established practice, with Technibond known as a supplier of a range of proven high performance double-sided foam tapes.

It contains results of tests made in our own laboratories specific to this application, and results of tests made for similar outdoor applications, such as the Sign Industry.

HSA is the tape we recommend for this application.

It uses the highest specification crosslinked PURE solvent based Acrylic adhesive system, capable of passing the established motor industry tests for mounting exterior badges and body side mouldings.

The high quality adhesive is coated on a special crosslinked PE foam that is very flexible to ensure good gap-filling between the glazing bar and the glass, but which has improved strength over other similar products to provide an extremely strong bond. This construction gives the most reliable results in application, bond strength, UV resistance and weathering.

HSA is also provided with our '*production aid film liner*,' which allows simple location of the part before exposing the adhesive to form the bond.

As with all our tests, we have tried to make them as realistic of actual end use conditions as possible.



Application Testing

Accelerated Weathering

The most accurate way of determining whether or not a product is suitable for an application or not is to try it and see. Unfortunately, the expected life of a window bar is in excess of 10 years, therefore it is not practical to make up a test unit and put it outside for a 10 year period. Therefore, Technibond use an accelerated weathering machine (QUV weatherometer) to mimic the effects of the external environment at an accelerated rate.

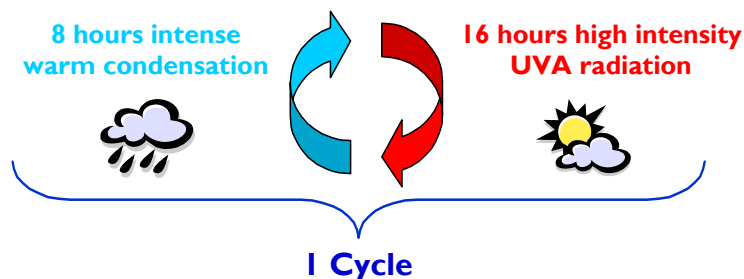
The subject of UV weathering is extremely complex, because the damage caused depends on the wavelength (short wave lengths being the most damaging) as well as the intensity of the light. Short wavelengths, however, are more readily absorbed by materials such as glass.

We therefore use a UVA 340 light source, that produces a spectrum almost identical to natural sunlight through the UVA and UVB range, at an intensity similar to the solar maximum, i.e. the intensity at noon on the summer solstice. We expose the samples as they would be in practice, bonded to window glass or whatever is relevant for the application.

In nature, as the sun becomes lower in the sky due to season as well as time of day, the intensity of the UV light drops rapidly; and the spectrum shifts significantly, as the more the damaging rays are absorbed by the atmosphere. Add to this the random but very significant effect of cloud, and natural sunlight becomes very unpredictable, with significant variations in quality and quantity from year to year.

It is unfortunately not possible therefore, to correlate our accelerated weathering with real time exposure, but certainly our testing is highly accelerated, and is as realistic as possible.

Accelerated Weathering



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A wide range of uPVC glazing bars, including flat, hollow, composite and bars with coextruded fins, have been tested in conjunction with Technibond **HSA**. They have been subjected to accelerated weathering, with excellent results. The bars have remained firmly bonded to the window glass with no sign of failure. Also when exposed to ultra-violet light for long periods of time some tape adhesives can develop a yellow appearance that can sometimes be seen from the interior side of the window, this is NOT the case with Technibond **HSA**. This is because the **HSA** adhesive is solvent-based pure acrylic adhesive with extremely high UV stability.

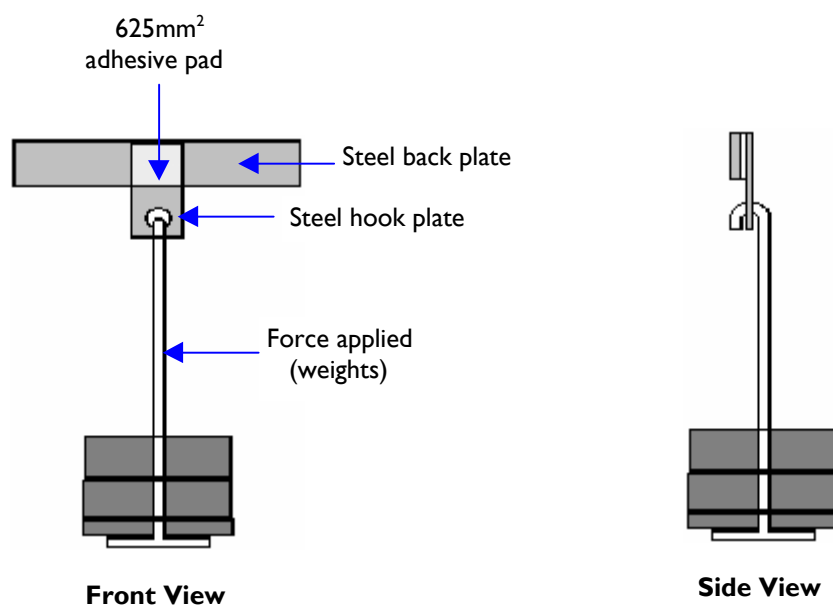
Holding Power (Static Shear Testing)

Any bonding tape in a long term application must withstand sustained loads. Tapes with insufficient cohesive strength will, over time, fail by 'creep' or plastic flow. We measure cohesive strength by a shear test between stainless steel test plates.

Since we are measuring the internal adhesive strength, the substrate is relatively unimportant and steel can conveniently be drilled and mounted in a jig.

The time to fail is measured. Again, most laboratories test only at quite high loads to produce a quick result, which may not be realistic. We test under a range of loads, up to very long periods. After all, the customer really wants to know that the product will not fail, rather than know how long or how high a load will give failure.

Static Shear Test



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Shear test results of Technibond HDF at 23°C

Force applied (N/625mm ²)	Force applied (Lbs/in ²)	Time to fail (Hours)
150	33	8
100	22	250
50	11	4000
30	6.6	20,000 +

The shear performance is quite exceptional, and far higher than any similar product we have tested. It is clearly well in excess of the requirements of this application.

Twenty thousand hours represents testing for well over two years at quite a high loading many times higher than what would be encountered in real use.

Thermal Movement

The shear performance and construction indicate to us that **HSA** will withstand a reasonable amount of thermal movement. We tested this in practice by bonding 600mm long strips of acrylic ("Perspex") to rigid aluminium extrusions, and subjecting these test pieces to a continuous temperature cycle of 2 hours at 70°C then 4 hours at 23°C. These four cycles per day were continued for a month and at the end of this time the **HSA** remained firmly bonded. Some other tapes had lost their bond at one or both ends, due to thermal movements.

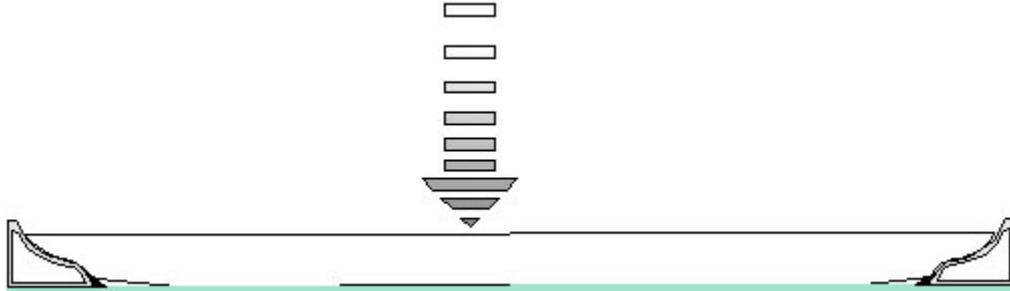
Comments

Most plastics have similar coefficients of expansion, about ten times higher than materials such as metals and glass, which causes problems when plastics are bonded to non-plastics and subjected to fluctuating temperatures. We were unable to cycle down to low temperatures, so we compensated by taking the upper temperature higher than normal. The temperature range of 47°C is reasonably wide, and would show up most problems. The 600mm test length was the maximum that could be accommodated in our oven.

These results should be valid for most combinations of different materials, and show that **HSA** will accommodate a high degree of cyclic movement without bond failure.

Problems Encountered

The most common problem encountered with Georgian Bar complaints is as a result of the trims being applied with tension, causing the tape to eventually release from either the glass or the bar



No matter how much pressure is applied to the bar, if there is a tension factor creating a peel force, the trim will eventually release and come away from the glass.



Here, the trim is being placed on the weatherseal, and as the bar expands, it moves up the sloping surface and a peel force is created and the tape releases from the glass.



Be aware of fin angle - generally these are soft and pliable, but if extruded too fast, the quick cooling can affect the angle of the fin placement. The left example will allow the tape to make contact with the receiving surface and form a good bond - the right example is difficult to press into place and in time will release from the surface. Fins are normally decorative and should only just kiss the glass surface. If they are too long it is difficult to put sufficient pressure on the tape, and the return tension may push the bar off the glass.

The HSA tape itself does not require protection from exposure to weather conditions

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Glass Cleaners

One area which is often overlooked is glass cleaners, many industrial glass cleaners contain surfactants which remain on the surface of the glass to improve the appearance (sparkle and shine). When applying tapes to such surfaces the adhesive bonds to any residue on the glass surface and not the glass, resulting in a poor bond.

Technibond recommend two surface cleaners, Isopropanol and Fast Dry Precision Cleaner (formally called DE-SOLV-IT 1000FD), as these solvents are relatively gentle, non-hazardous and do not leave a residue.

Isopropanol will flash off quickly, is a good general purpose cleaner for light contamination, but is rated 'highly flammable'. Technibond have not found any substrates adversely affected by brief contact with isopropanol.

Fast Dry Precision Cleaner is a stronger solvent more suitable for heavy contamination and for oils and greases, and still relatively non-hazardous. It is also quite effective at removing adhesive residues, but many of our adhesives are solvent resistant and require soaking for some time. This product is rated 'flammable', and flashes off slightly more slowly than isopropanol. It is compatible with most surfaces.

Isopropanol is also known as iso-propyl alcohol, propan-2-ol, IPA and IPS. It is no longer available over the counter but can be bought from virtually all chemical suppliers. Request the "pure" grade, which is usually 99.5% pure.

Fast Dry Precision Cleaner is made by:

Mykal Industries Ltd
Farnsworth House
Morris Close
Park Farm Ind Estate
Wellingborough
Northants NN8 6XF
01933 402822

It is available as liquid, as impregnated tissues (Myquip high performance wipes) and as an aerosol. Contact the company for details of a local distributor.

Application Guidance

This is a guide to the correct use of the **Technibond** products when bonding plastic, metal or wood to glass.

Technibond HSA PE Foam product with **PURE Acrylic Adhesive** is now approved by many of the larger Window Systems companies for bonding Georgian Bars on to glass.

HSA 1mm thick (White or Black)
2mm thick (White or Black)

(Rolls cut any width required to match the bar size)

HSA is supplied with a *Production Aid Film Liner*. **HSAP** is supplied with a crisp, easy to remove paper liner.

*(Same basic products but with different release liners - hereafter for simplicity sakes, it is referred to **HSA**, but bonding performance for both references are identical)*

Pure acrylic adhesive

HSA has a very dry and hard adhesive hence its high shear bonding capability, but it does take time to fully adhere. Once correctly bonded, the HSA will perform well in exposed external environments for many years without degradation. However, under constant peel conditions they will release their bond. It is therefore, important to apply the tape to overall flat surfaces and avoid any bowing or distortion in the length of the bar.

Clean

All surfaces should be clean and free from dust, moisture and oil residues. Normally a clean paper towel should be sufficient to remove most surface contaminants, but some metals may need degreasing and most surfaces will benefit from an isopropanol wipe.

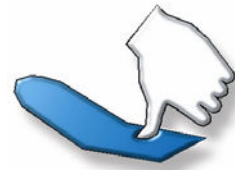


Be aware of condensation factors, especially in high humidity conditions. A dry clean cloth should be used to clean surfaces.

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Pressure

These products are 'pressure sensitive' and overall pressure must be applied to ensure that the adhesive has made full contact with receiving surface.



Be aware that tapes should be able to compress to allow the adhesive to make full contact with the receiving surface. Deep channels on the back of the glazing bars should be avoided as they could restrict full compression of the tape.

Time

Pure acrylic adhesives take time to flow (wet out) and fully bond to the substrate. In cold conditions this will take longer than in warm environments. Preferably, allow at least four hours to rest and condition before using in the final application. Best results will be obtained after 24 hours.



Temperature

For the adhesive to perform correctly, the taped glazing bar must be applied in temperatures above 15°C. The ideal temperature is between 20°C and 25°C.



Full Surface Contact

Full, flat overall contact must be made with the receiving surface.

*If there is any distortion or flexing in the bar it will, in time, come away from the glass, **this is a hard and fast rule**, no matter how much pressure is applied, or how many times it is pushed back into place. If there is a peel force, it will dislodge the bar and cause bond failure.*

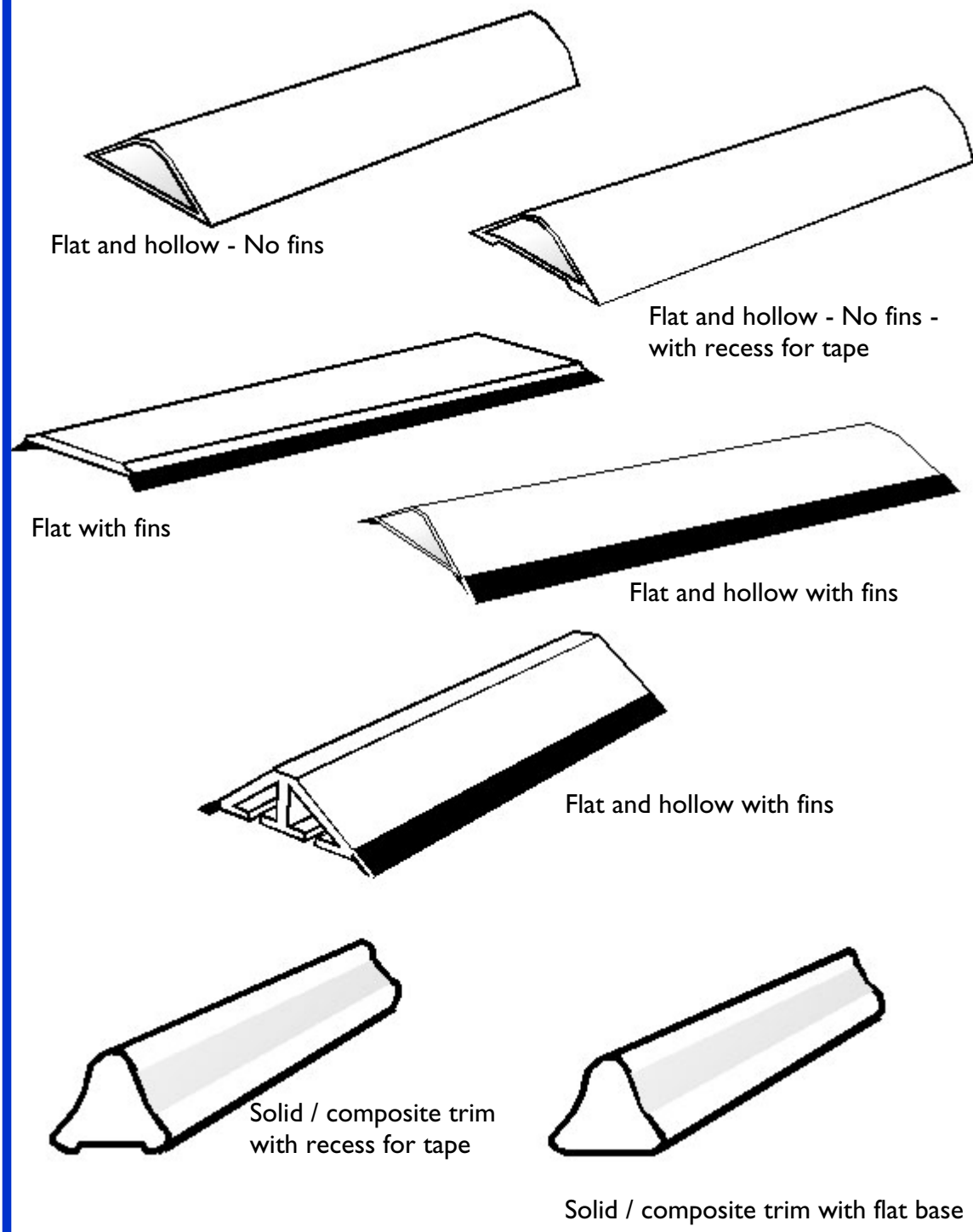
This is not a tape fault, but the nature of tape adhesives. Tape adhesives do not cure like many wet adhesives, instead they remain a highly viscous liquid. Therefore if subjected to a constant peel force the adhesive will slowly flow like a liquid and peel off the surface to which they are bonded.

Storage

To keep the tape in good condition, keep it in its original carton, upright, and in warm conditions until required for use.



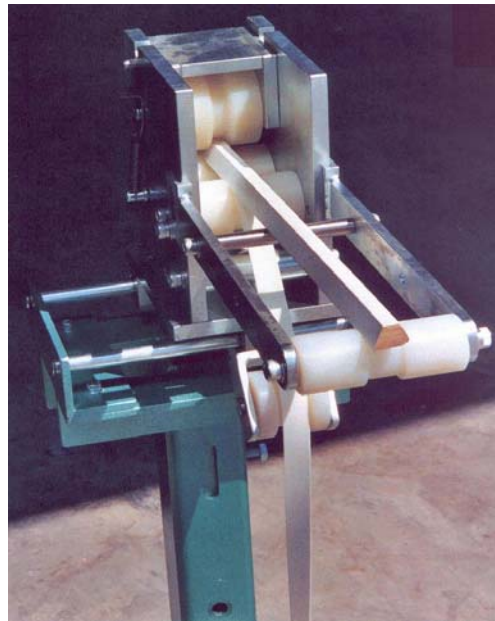
Typical Georgian Bars / Cottage Bars



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Applicators

Technibond have developed a number of applicators to aid tape application. An applicator helps ensure sufficient pressure is applied and locates the tape precisely on the glazing bar, many times faster than applying the tape by hand. All applicator have made-to-measure rollers to fit your glazing bar profiles.



Applicators for applying Technibond HSA tape

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Availability

Rolls - cut to any width
in 50M or 100M length rolls (76mm cores)

Bobbins - made in widths up to 28mm
1000+M in length
(150mm x 280mm cores)

Technical Support

Please contact either our Technical Department or one of our Nationwide Account Managers for further product details and advice on your particular application requirements.

**Technical Support
can be reached on :**

Tel : 01628 642800 Fax : 01628 642801

Email: techservice@technibond.co.uk