

H-piece samples Testing Tool

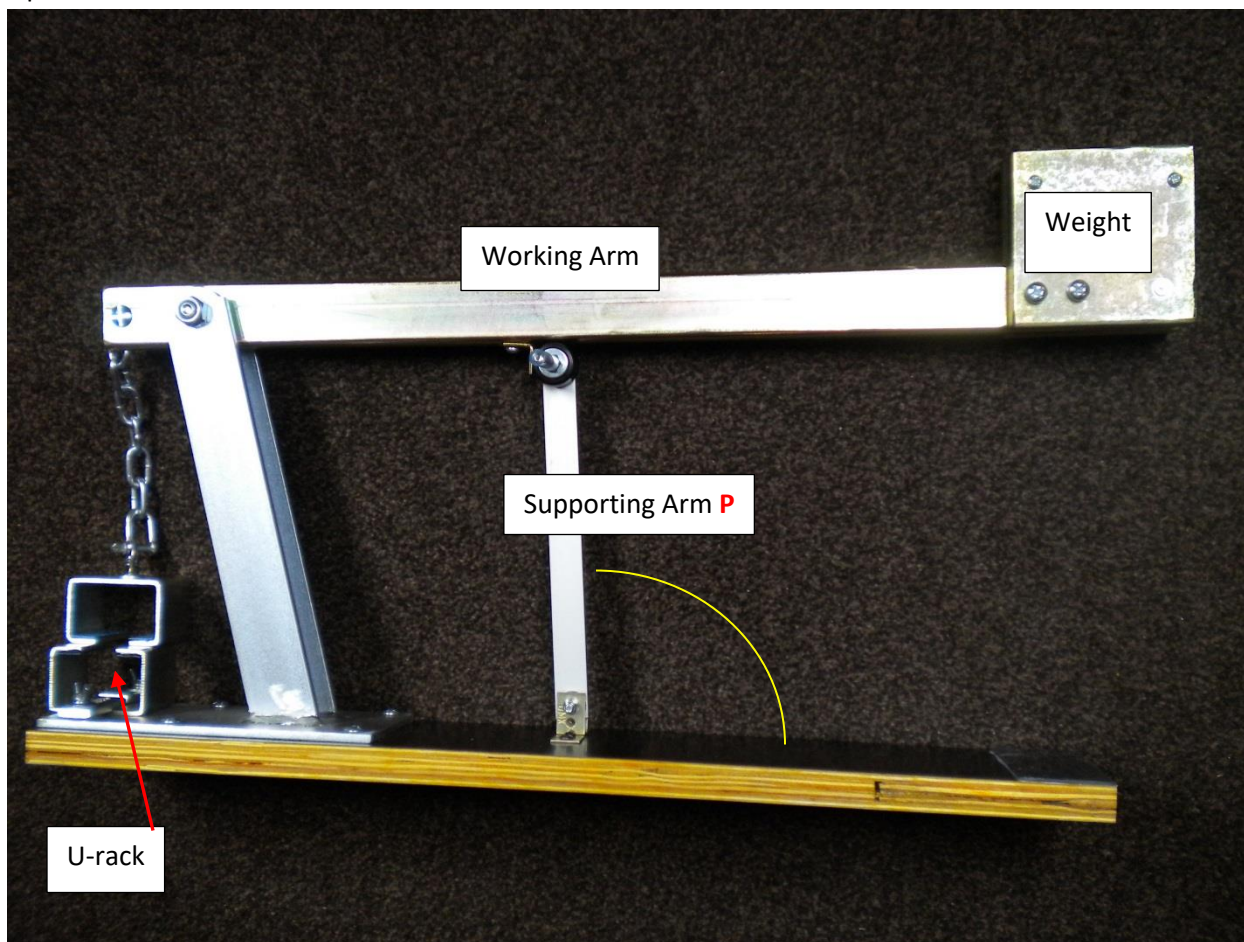
Description:

H-piece samples Testing Tool could be used to check the strength of the structural sealant in manufacturing of the structurally glazed facade elements.

The measuring range: 5kG up-to 250kG force – up to the sample rupture

Maximum breaking load to be measured = approximately 250kG

Operation: manual



Testing Tool has been designed to test the strength of H-piece samples having construction joint sizes of 12 x 12 x 50 mm, cross-section of silicone 12 x 50mm (600 mm²) and a height of 12 mm in accordance with ETAG 002 and EN 13022.

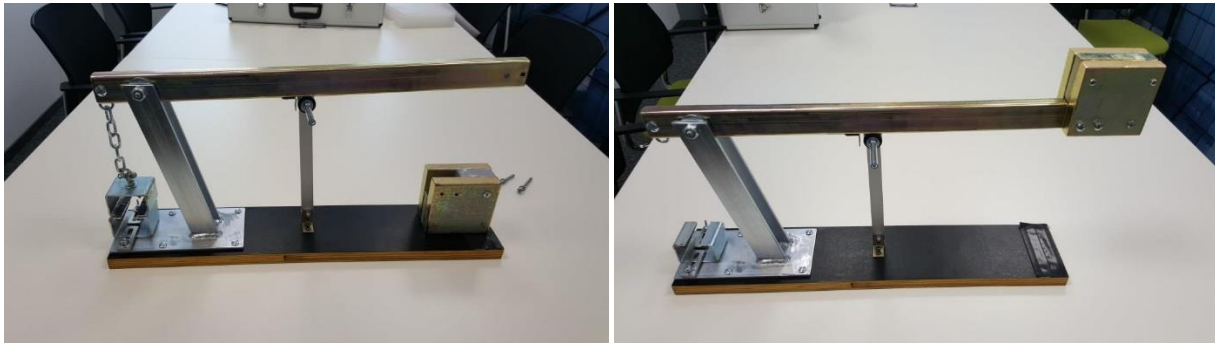
Always wear protective glasses. Mask is recommended that covers your face!

Workspace preparation:

Testing Tool has been supplied in wooden case containing all elements which eventually needs to be mended together prior to the tests proceeding *).



The "Weight" element has to be installed onto the "Working Arm" with a help of two screws (included).



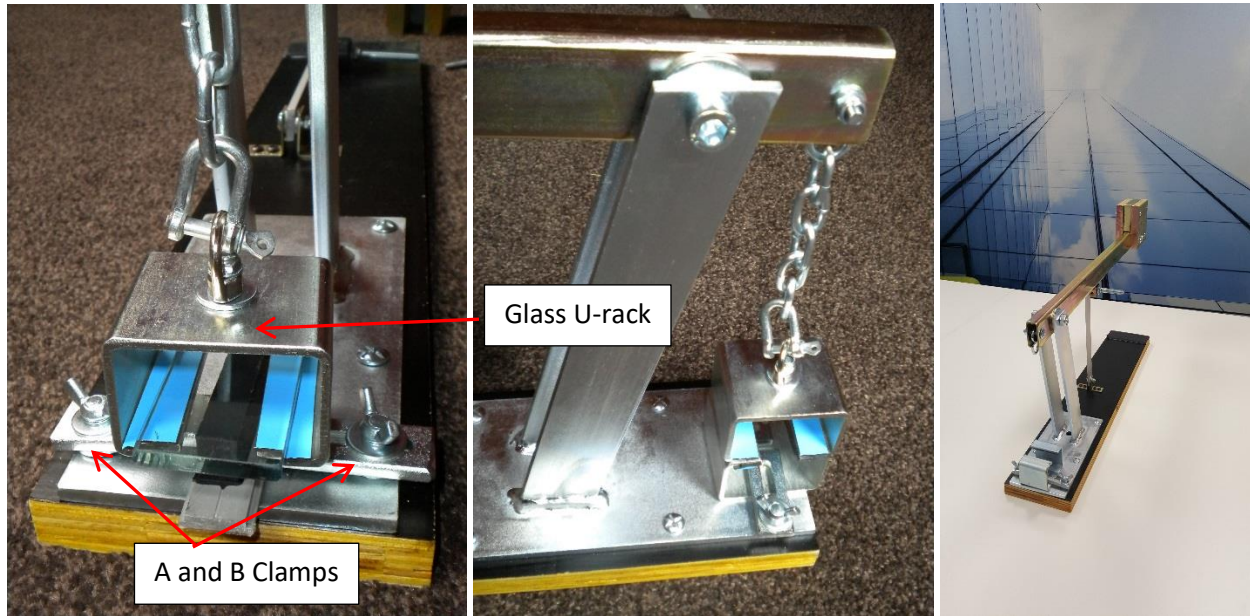
*) Please note that the pictures attached are only for the illustration matters and they may differ from the final design of the testing tool.

Method of measurement:

Testing Tool has been equipped with stable supporting element which needs to be positioned on the flat surface in a safely manner.

Place the H-piece into the designed "U-rack" and with the use of A and B clamps.

If the H-piece has been made of glass and glass pieces, fix the sample in the "U-rack" as shown on below image. In case of glass and aluminium profile samples to be tested, adopt the fixing by the use of A and B clamps directly into the supporting element.



The height could be easily adopted by the changing of the chain length *.

Releasing of the “Supporting Arm P” by moving it to the horizontal position will bring required force into the H-piece sample. Testing Tool has been calibrated in order to bring required stress of 42 kG into the sealant.

Manual pulling down the working arm will allow the pulling off the H-piece sample.

Operational instruction:

After the proper setting of the H-piece sample, release the “Supporting Arm P” by moving it to the horizontal position. Testing Tool has been calibrated in order to bring required stress of 42 kG into the sealant.

The result is consistent with the requirements of the standard if, within 10 seconds, the sample is not broken under the weight of 42 kG.

Release H-piece sample or push down the “Working Arm” to pull-off the sample.

CF – Cohesive Failure – pass/positive

AF – Adhesive Failure – failed/negative

H-piece Test Description

The H-piece test is the primary test used to evaluate sealant cure properties. This test should be performed once for every combination of base and curing agent. If a container is changed, an H-piece test should be used to confirm that the sealant cure properties are acceptable. In some instances, *Dow* may not require H-piece testing as a part of a comprehensive quality control program if other procedures such as peel adhesion and deglaze testing are performed at an appropriate frequency and if local standards and regulations do not require H-piece testing.

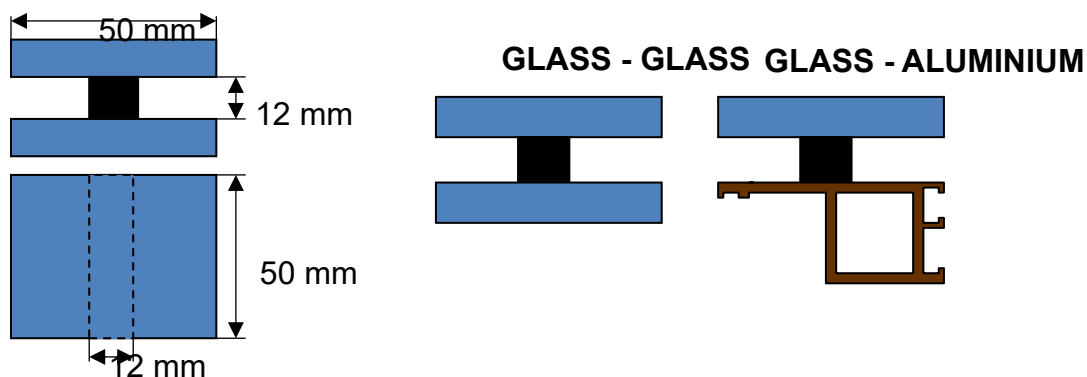
The H-piece test can be used as a daily adhesion quality control test but because the peel test is less complicated to perform, the peel test is the recommended daily adhesion quality control test.

Every time a container is changed, four H-piece test samples should be produced. Samples should be made using actual production substrates (aluminium profile and glass, typically). The substrates should be cleaned and primed in the same manner as production units are prepared. The test samples should be stored in the same temperature and humidity environment as the actual production units.

The first H-piece sample should be tested when production units are to be shipped to the jobsite. The peel adhesion tests should be used to verify full adhesion (100% cohesive failure). Full adhesion typically occurs after 1 to 3 days of cure for *Dowsil 993*, *Dowsil 994*, *Dowsil 121* and 1 to 4 weeks for *Dowsil 895*, depending on joint geometry, temperature and humidity. *Dowsil 895* must have full adhesion and cure in the actual production units before the units are shipped to the jobsite. If properly cured, the sealant should have a minimum strength of 0.70 MPa with 100% cohesive failure. If results are not acceptable, a second H-piece is available for additional testing.

When dry results are acceptable or when H-piece test is used as an alternate to Peel test for anodized aluminium, wet testing must also be operated after 15 minutes water immersion at room temperature. Full adhesion (100% cohesive failure) and minimum strength of 0.70 MPa must be achieved in dry and wet conditions.

Below is a detail of showing the dimensions of an H-piece sample:



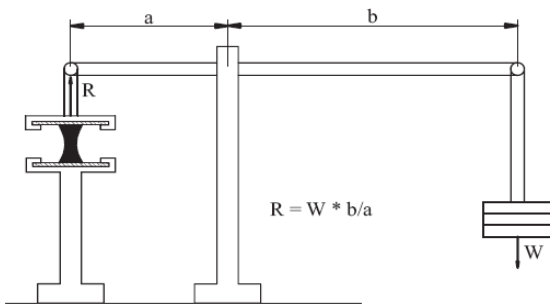
Test samples can be prepared using a wooden block which has been cut to allow a cavity to be filled with sealant in the dimension shown. The wooden block should be pre-treated with a soap solution or paraffin wax to provide a bond broken surface for the sealant. Alternatively, a polyethylene bond breaker tape can be applied to the wooden surfaces to contact the sealant.

A polyethylene U-channel specifically designed for this test method can also be used. Two H-piece samples should be produced for every combination of curing agent and base used in production. Test samples should be stored in the same conditions as the actual production units.

One sample should be tested at the same time that production units are to be shipped to the jobsite. Separately, peel adhesion testing should verify full adhesion (100% cohesive failure) at the same time.

H-piece samples can be tested with either a tensometer or through the use of a “Roman Scale”. A Roman Scale as represented below will allow the silicone user to test sealant cure and adhesion with a low cost piece of equipment.

The weight applied to the silicone joint is equal to the weight (W) on the Roman Scale plate times the ratio of b/a. The H-piece sample should be tested to rupture. The tensile strength at rupture should be a minimum of 0.70 MPa.



Roman Scale

This value corresponds to strength of $12 * 50 * 0.7 = 420$ N applied to the test piece. This strength corresponds to a load of 42 kg. If the Roman Scale is designed to have a b/a ratio of 10, a weight of 4.2 kg should be applied to the plate (W).

The load should be applied for a maximum of 10 seconds with no adhesive or cohesive failure of the H-piece. If no rupture occurs, incrementally add 0.5 kg to the scale until the H-piece ruptures. Record the load at rupture and percent cohesive failure observed on the test sample. In absence of local standards, H-piece testing of either *Dowsil 895* or *Dowsil 993* should meet a minimum strength of 0.70 MPa with 100% cohesive failure to actual production substrates. For anodized aluminum, same criteria must be achieved after the 15 minutes water immersion at room temperature. Results of H-piece testing should be recorded in a quality control log.



100% CF – positive result