Technical Note No 76 – supersedes TN52

Impact performance of building envelopes: method for impact testing of cladding panels

This Technical Note describes methods of testing cladding panels for impact. Technical Note TN 75 describes the requirements for impact testing of facades and gives guidance on specification and assessment of impact performance.

Introduction

The CWCT Standard test methods for building envelopes describes hard and soft body impact tests however the description of the tests does not give sufficient detail particularly in relation to the number and location of impacts and the design of the test specimen. This Technical Note provides this additional information.

The tests described in this Technical Note require an impactor to be suspended in front of the test specimen. The impactor is then raised and allowed to swing in pendulum manner so that it strikes the test sample. The severity of the test is given in terms of the impact energy which is given by the relationship:

E= mgh, where:

E is the impact energy in J (or Nm)
m is the mass of the impactor in kg
g is the acceleration due to gravity in ms^{-2}
h is the height through which the impactor falls in m

Tests may be carried out on a project basis or on a generic system made from standardised manufactured units.

The impact performance of a cladding panel may be influenced by many factors including the flexibility of the support structure (see TN 75). For a project test the test arrangement should represent the proposed construction as closely as possible. For a generic product test, the product manufacturer should specify the appropriate form of support structure. In the absence of alternative guidance it is recommended that a rigid support structure such as a concrete wall is used. This will normally be more onerous than a more flexible support structure but this may not always be the case. Manufacturers should be aware that tests may not satisfy all potential clients and additional tests may be required to satisfy specific project requirements.

The results of the tests described in this Technical Note allow the performance to be given in the form of a class for both serviceability and safety. These classes can be used by the specifier to assess acceptability for a particular purpose. The use of simple pass/fail criteria is not considered appropriate as the damage that is acceptable will depend on the location in which the product is used. Even fracture causing pieces of the sample to fall may be acceptable where the panel is readily replaceable and used at low level. In addition to the classification, the test report should accurately record the effects of the test as this may aid the specifier in the assessment of acceptable performance.

This Technical Note describes both hard and soft body tests. Hard body tests are carried out with a steel ball of 50 or 62.5mm diameter and soft body tests are carried out with a spheroconical bag containing glass spheres.

Scope

The test methods described in this Technical Note are applicable to the following:

- Rainscreen panels
- Spandrel panels in curtain walling
- Brick slip systems on a framed backing
- Insulated render systems
- Stone cladding.

Curtain wall framing members should be assessed using the method described in EN 14019. Impact tests to classify safety glass are given in EN12600. The tests in this Technical Note can be used to assess the impact performance of glass used as cladding panels.