Technical Update 2

Site testing: method statement for the simplified cabinet test

General

Cabinet testing is based on the procedure outlined in Standards, typically BS 5368: Part 2 and the CWCT Standard for curtain walling (1996), which define parameters such as water flow rate, and nozzle position and spacing. A greater flow rate (3.4 litres/min/m^2) is required when testing a curtain walling system and may be required by the specifier for situations where windows are fitted into curtain walling.

This test is suitable for checking for watertightness under static pressure. However it should be used with caution when measuring air permeability, as achieving laboratory conditions on site is more difficult.

The basic apparatus comprises a cabinet, which can be sealed to the cladding system, a means for pressurising or de-pressurising the cabinet, and a spray system, usually a spray bar or grid of nozzles.

The basic requirement of cabinet testing is the creation of a positive pressure difference on the cladding system or window, whilst spraying water onto the external face. A decision as to whether the cabinet is best fitted to the external or internal face of the test component needs to be made on a contract basis.

A rigid cabinet can be built on site but a simpler method may be used by sealing the test area internally with polythene. The enclosure is then de-pressurised with a suction fan, such as an industrial vacuum cleaner with variable speed control, measured with a pressure gauge. The polythene sheet allows good visual access to detect any leaks on the inside of the area under test. If better visual access is required then sheets of clear acetate can be taped over holes cut in the polythene at critical locations.

The polythene must not come into contact with any of the sample area on the inside of the wall to ensure that air is drawn through any leaking joints. This is achieved using a frame of battens, scaffold tubes, or similar means. The frame must be braced against the building structure and transmit no loads to the component under test, which should carry only the pressure difference generated by the cabinet.

It should be noted that the results achieved are not comparable with the standard cabinet test unless the full net pressure across the wall is developed over sufficient area that the true deflections of the wall or component occur.

The possibility and extent of lateral air movement through the wall must be assessed. Pressurising or de-pressurising a section of wall may draw in air from adjacent areas of the wall or a cavity space, rather than directly through the part of wall under investigation.

Note

An industrial vacuum cleaner may produce pressure differentials far in excess of design wind pressures and care should be taken to avoid overstressing the unit under test.

Method statement

1 Preparation of the specimen for testing

The area or component to be tested shall be determined.

Areas of potential lateral air leakage shall be assessed.

The requirements for, and positioning of, the support frame shall be determined.

The frame shall be erected and the polythene sheet fitted, ensuring that it is sealed to the wall at the perimeter. A self-sealing action will be generated when the pressure difference is applied.

The air extract pipe shall be fitted and sealed to the polythene.

The calibrated pressure gauge or manometer shall be fitted.

The air flow meter shall be fitted, if a measure of airflow is required.

The test specimen shall be cleaned with a mild detergent, rinsed with clean water and dried. This prevents dirt being forced into the system and blocking the normal drainage paths, and the detergent also helps break surface tension.

A check should be made that the required pressure differential can be achieved (see 2.2).

2 Optional check for extraneous air leakage

The outer face of the specimen to be tested shall be sealed with polythene and the suction fan started.

Airflow and pressure measurements shall be taken up in steps up to the required maximum pressure.

The process shall be repeated with the polythene removed from the face of the specimen.

The difference in airflow rates will give an indication of the extent of extraneous air leakage.

3 Preparation for static water test

Indoor and outdoor temperatures shall be measured and recorded, together with the prevailing weather conditions.

The temperature of the water used shall be maintained between +8^{o}C and +25^{o}C and the surface tension of the water shall not be less than 0.06 N/m.

The water nozzle spray grid shall be positioned at the correct distance from the face of the specimen.

Ensure that all nozzles are functioning and that a full spray coverage is achieved.

The volume of water used shall be checked by suitable means, such as a calibrated flow meter (CWCT Standard for curtain walling, 1996, Clause 5.3).

4 Static test pressure sequence

To start the test, the external face of the test specimen shall be completely sprayed with water using the spraying method and rate specified for a period of fifteen minutes with zero air pressure differential on the facade.

While water is applied to cover the exterior face of the test specimen completely and continuously, the positive pressure differential shall be applied in steps, with each step lasting for five minutes.

The pressure levels shall be 50, 100, 150, 200, 300 Pa, and then in increments of 150 Pa maximum up to the required peak test pressure. (These steps may differ depending on the test standard in use.)

The pressure is then returned to zero in one step and the spraying stopped.

5 Observations and presentation of results

Throughout the tests, the inside face of the specimen shall be examined through the polythene for water penetration.

The emergence of any water on the inside face shall be recorded, together with the pressure level at which the leakage occurred.

The location and extent of the leakage shall be noted on a drawing of the test specimen.

When the test sequence has been completed, remove polythene and check the specimen for signs of water leakage into undrained areas or areas that should remain dry.