Technical Update No 8

CWCT Standards and European Standards

The CWCT has published a *Standard for Curtain Walling* together with a *Guide to Good Practice for facades* and *Test Methods for Curtain Walling*. These documents were produced in the absence of British Standards. The move towards European Standardisation has seen the production of a number of European Standards which have been adopted as British Standards. This has raised questions in the minds of some users over the continued validity of the CWCT Standards. This Technical Update seeks to clarify the position.

The European standards follow a hierarchy with the product standard at the top, performance and classification standards in the next tier and finally testing standards. The European standards for both classification and testing for air leakage watertightness and wind resistance have been published. These standards are listed with differences from the CWCT Standard in Appendix 1. Other performance and classification standards have still to be published. Even when all these documents are available they will not cover the full scope of the CWCT Standard.

The European standards generally follow the CWCT standard. Comparison of resistance to air penetration, water tightness and wind resistance needs to be done in two stages, namely the assessment of the appropriate classification levels (ie the air test pressures) and the quality required to meet the requirements of the standard for the given test pressure. In general the European Standards have a greater range of test classes and the lowest class is less onerous than the lowest class permitted by the CWCT Standard. For a given test pressure there is little difference in performance required by the European and CWCT Standards. Table 1 gives a comparison of the test requirements for the CWCT sequence B test regime using CWCT and European Standard test procedures. The one area where there is a difference in principle between the European and CWCT test procedures is the dynamic watertightness test and these test procedures are described in Technical Update 1.

The CWCT view is as follows:

- The European Standards do not introduce new concepts which would invalidate the CWCT Standard.
- The European Standards do not cover all the issues included in the CWCT Standard.
- The CWCT Standard remains valid and specifiers should continue to use it.
- Where there are differences between the CWCT Standard and the European Standards, any future revision of the CWCT Standard will bring the CWCT Standard into line with the European Standards unless there are good technical reasons for maintaining the difference.

Test	European Standards	CWCT Standard for curtain walling
Airtightness	Required accuracy of gauges 5% Air leakage only measured with increasing pressures	Required accuracy of gauges 2% Air leakage measured with increasing and decreasing pressures
	Air leakage of test chamber not to exceed permissible leakage through test sample	No requirement
	No recording of ambient temperature, wind speed or barometric pressure required	Ambient temperature, wind speed and barometric pressure to be recorded
Watertightness	Required accuracy of water flow gauge 10% Water flow rate 2 l/min/m^2	Required accuracy of water flow gauge 5% Water flow rate 3.4 l/min/m^2 Water temperature and surface tension to be recorded
Wind resistance serviceability	Limit on deflection of framing members between points of attachment to structure 15mm Residual deflection on unloading less than 5% of maximum Displacement at fixings to structure not greater than 1mm	Limit on deflection of framing members between points of attachment to structure 20mm Residual deflection on unloading less than 1mm
	Load applied once in 25% increments each maintained for 15 seconds	Load applied 5 times without increments and maintained for 3 seconds on each application
Repeat air tightness	Air leakage at peak pressure not to exceed result of initial test by more than 0.3m^3/h/m^2	Air leakage to comply with requirements for first test
Repeat watertightness		Required
Dynamic watertightness	Optional in all cases	Optional for test pressures less than 600Pa. Required for higher test pressures
	Roving fan method	Aero engine method
Wind resistance safety	No limit on deflection given	Permanent deformation of framing members shall not exceed 1/500 of the span measured between points of attachment to the building

Table 1 Comparison of test procedures for CWCT Option B test regime

prEN 13830 Curtain Walling - Product Standard.
Issued as a Draft for comment in February 2000.

BS EN 12152:2002 Curtain Walling - Air Permeability - Performance requirements and classification

- Classes:
  The EN Standard has a greater number of classes and a different basis of selection as follows:
  - The EN Standard has 5 classes which are related to the maximum test pressure:
    - Class A1 150Pa
    - Class A2 300Pa
    - Class A3 450Pa
    - Class A4 600Pa
    - Class AE >600Pa

    The choice of class is related to the design wind pressure.

  - The CWCT Standard has 3 classes 300, 600 or 0.25x design wind load and the choice of appropriate test pressure is left to the specifier with the guidance that it should be related to the required air tightness of the building rather than the exposure. A higher test pressure gives a more airtight building. In general the 300 Pa level is appropriate for normal buildings and the 600Pa level for air conditioned buildings.

- Permissible leakage
  For fixed lights, both standards allow air leakage of 1.5m3/m2/h at the maximum test pressure and give the same relationship for calculating the permissible leakage at lower pressures. The EN Standard differs in giving the option of assessing air leakage based on the length of joints rather than area with a limit of 0.5m3/m/h.

- Opening joints
  The CWCT Standard gives requirements for opening lights but allows the specifier the option of specifying opening lights in accordance with BS 6375. The EN Standard does not apply to opening lights and refers to EN 12207 which applies to windows. The requirements of both BS 6375 and EN 12207 are less onerous than those in the CWCT standard.

BS EN 12154:2000 Curtain Walling - Watertightness Performance requirements and classification

- Classes
  Both the CWCT Standard and the EN Standard have a number of classes defined by the maximum test pressure. The same maximum test pressures are used except that the EN Standard has an additional class with a pressure of 150 Pa which is lower than the lowest class in the CWCT Standard. In the CWCT Standard the maximum test pressure is related to the design wind pressure but the EN Standard does not state how the maximum test pressure is chosen except for pressures greater than 600 Pa where it is 0.25 of the design wind pressure.

- Dynamic test
  The CWCT Standard requires a dynamic watertightness test where the test pressure for the static test is greater than or equal to 600Pa. EN 12154 does not require a dynamic test.

BS EN 13116:2001 Curtain Walling - Resistance to windload Performance requirements

- Classes
  Both CWCT Standard and EN Standard assess wind resistance by a serviceability test under the design wind load and a safety test at 1.5 times the design wind load. For testing proprietary systems the CWCT gives a series of standard design wind pressures covering the range of possible wind pressures but the EN Standard does not. The CWCT has a minimum design wind pressure of 800Pa but the EN Standard has no lower limit for the design wind pressure although the test procedure subjects the sample to a bedding in test pressure of 500Pa.

- Deflection under maximum test pressure
  Limited to 1/200 span or 15mm measured between points of attachment to structure in BS EN 13116. The CWCT limit is 1/200 or 20mm. CWCT also limits deflection in relation to type of material supported (single glazing, multiple glazing stone, plasterboard, etc). The limits based on material supported are based on length of supported edge which is normally less than span between supports and the limit based on span of member will normally govern.

- Recovery of deflection
  The CWCT Standard requires permanent deformation after unloading to be no more than 1mm. The corresponding limit in BS EN 13116 is 5% of the maximum deflection which is difficult to measure reliably.

- Displacement at fixings
  BS EN limits permanent displacement at fixings to 1mm. There is no corresponding limit in the CWCT Standard but clearly displacement at fixings should be limited.

- Effect on air tightness
  Both the CWCT Standard and BS EN 13116 require a repeat air tightness test after the serviceability wind load test to check that performance has not been impaired. The CWCT Standard allows the performance to deteriorate provided it still meets the specified limits for the initial test. BS EN 13116 limits the increase in air leakage to $0.3m^3/h/m^2$ which allows the air leakage to exceed the limit for the first test.

BS EN 12153:2000 Curtain Walling - Air permeability Test method

- Pressure gauge accuracy 5% (CWCT 2%)
- Air flow gauge accuracy 5% (CWCT 2%)
- Air leakage of test chamber not to exceed permissible leakage through the test sample. There is no corresponding requirement in the CWCT Standard and this is a useful addition.
- 'Stair stepping' of pressures up only.
- No recording of ambient temperatures, wind speed or barometric pressure required.

BS EN 12155:2000 Curtain Walling - Watertightness Test method

- Pressure gauge accuracy 5% (CWCT 2%)
- Water flow gauge accuracy 10% (CWCT 5%)
- Circular cone nozzles on a variable layout, (CWCT square spray nozzles on uniform grid)
- No recording of water temperature or surface tension
- Water flow rate = 2 litres/minute/m^2(CWCT 3.4 litres/minute/m^2)

BS EN 12179:2000 Curtain Walling - Resistance to wind load Test method
method

- Pressure gauge accuracy 5% (CWCT 2%)
- Pressure applied once in increments of 25%, 50%, 75% and 100% of design load. Pressure maintained for 15 seconds at each stage and deflection measured (CWCT

pressure equal to design load applied five times, without increments, and maintained for 3 seconds,

DD ENV 13050:2001 Curtain Walling - Watertightness Laboratory test under dynamic air pressure and water spray Issued as DD ENV in 2001 as insufficient experience available to allow it to be issued as a full standard. Due for review in 2003.

- Optional test (CWCT Standard requires a dynamic test for severe exposures and only makes it optional for less severe exposure)
- Test uses movable fan and is very different from the CWCT aero engine test
- Described in Technical Update 1. This update is still valid, the only change being that the Standard was issued as a DD ENV in 2001 as in now due for review in 2003.

EN 13051:2001 Curtain Walling - Watertightness Field test without air pressure using a water spray bar

- Very different to the CWCT hose test.
- Test is designed to check that water running down surface does not penetrate wall due to poor detailing. No attempt to simulate effect of wind pressure driving water through façade.
- Can be used on walls with open joints where hose test in not appropriate.