



Wind Load Overview



Part 2: Euroclad Profiles Performance By:
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Profiled sheets for external cladding of both roofs and walls as produced by Euroclad are supported by load/span tables.

These tables allow a building designer to check that the sheet is capable of taking the wind (and snow) loadings to which it will be subjected.

The sheets must not become too stressed or deflect to an extent where the profiles primary functions of weathertightness, air tightness and durability are compromised.



Load Span Tables – Design Case Definitions

1. **Moment** - is the ultimate bending moment capacity of the profile under positive or negative loading either at the support or at mid-span.
 2. **Inertia** - is the moment of inertia or second moment of area of the profile and determines the deflection characteristics at working load within the elastic range.
 3. **Reaction capacity** - This is the capacity of the profile webs to support the concentrated reactions at the supports (either internal or ends).
 4. **Interaction** - This is a check to see if the combined bending and web crippling stresses at the internal supports do not exceed the critical stress capacity of the webs (e.g. control of web buckling under concentrated stress).
 5. **Bending & Shear** – This is the capacity of the profile to resist bending and shear forces
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BS EN 1993 Eurocode 3. Design of Steel Structures.

This European Standard, a further part of the BS EN 1991 Eurocode series covers several key areas of concern regarding cladding design eg:

BS EN 1993-1-1:2005 covers General Rules and Rules for Buildings. UK National Annex documents are expected to be published in Dec 2007.

BS EN 1993-1-3:2006 Supplementary Rules for Cold Formed Members and Sheeting. The UK National Annex to this part of the standard is expected to be published in 2008.



BS EN 1993 Eurocode 9. Design of Aluminium Structures.

This European Standard, a further part of the BS EN 1991 Eurocode series covers several key areas of concern regarding cladding design for aluminium sheet eg:

BS EN 1999-1-1:2007 covers General Rules. UK National Annex documents are expected to be published in May/June 2008.

BS EN 1999-1-4:2007 covers Supplementary Rules for trapezoidal sheeting. UK National Annex documents are expected to be published in May/June 2008.



Euroclad load span tables for our range of profiles, prepared by the SCI working to the new Eurocode standards, are due for publication early in 2008.

Alongside these the publication of load span tables working to the new Eurocodes for our range of Eurobar, Eurobar Extra and Mast spacer systems will enable designers and engineers to have ultimate confidence in our systems as a whole.

This is reinforced further by BBA Certification for Elite Systems which cross checks published performance data against a rigorous testing regime.



For a System covered by a BBA certificate, the whole system will be tested including spacers, liners and fixings etc.

Tests include both imposed and suction UDL (Uniform Distributed Load) tests at a number of different to establish:

(i) the loading under deflection criteria for both positive and negative loading.

(ii) the failure load and method of failure when tested to destruction for both positive and negative loading.



The current recommended deflection parameters for profiled metal sheets are given in BS 5427-1: 1996.

For roofs:

Dead load: $L/500$, Dead and imposed loads: $L/200$,

Dead and wind loads: $L/90$

For wall cladding : Dead and wind loads: $L/120$.

Where L = the span distance for the sheet (in most cases the distance between supports which are dictated by steelwork positions.



Sheet deflection limits are calculated dependent on the material specification and geometry of the sheet and are cross checked against test data for validity.

The sheets deflection limit is a Serviceability Limit State rather than an Ultimate Limit State and as such can be checked against unfactored loads.

However, a further check for Ultimate Limit State is required which uses factors of safety from BS 5427. They are 1.6 for normal imposed loads, 1.4 for wind loads and 2 for attachment.



The attachment of the SF500 profile side lap, for example is BBA tested to Ultimate Failure.

The failure is checked under Ultimate Limit State factored to 2.0 (attachment) against the sheet deflection limit under Serviceability Limit State.

So long as the deflection limit is not exceeded at the design load and the Ultimate Failure load is 1.4, 1.6 or 2 times greater than the design load depending on the load case and failure mode, then the BBA Certification requirements will be satisfied.
