

Structural performance of systemised walls – Design charts and profile data

This Technical Note is one of a series describing the structural design and assessment of wall framing systems and brackets. The series comprises:

- TN 84 Structural performance of systemised walls – Introduction*
- TN 85 Structural performance of systemised walls – Design charts and profile data*
- TN 86 Structural performance of systemised walls – Connections*
- TN 87 Structural performance of systemised walls – Closed profiles*
- TN 88 Structural performance of systemised walls – Buckling and torsion*
- TN 89 Structural performance of systemised walls – Open profiles*
- TN 90 Structural performance of systemised walls – Bracket requirements and principles*
- TN 91 Structural performance of systemised walls – Bracket calculations*

This Technical Note describes the development and use of design charts and equivalent software. It also describes the supporting information required to allow full structural analysis of a profile used as a mullion or transom.

Introduction

Systemised curtain walling is constructed from a system comprising profiles, normally of aluminium, which can be connected together to form a grillage. The profiles are designed for use in many applications and configurations and it is necessary to select an appropriate profile for a given configuration and loading.

The selection and validation of a profile for any particular use may be undertaken on the basis of detailed structural calculations. However, for many common applications with simple configuration and loading, selection of a suitable profile is undertaken using a simple design chart or equivalent software. For simplicity the term design chart will be used throughout this Technical Note but the same considerations apply to the development and use of equivalent software.

Design charts are provided by the system (profile) supplier. This Technical Note describes the advantages and limitations of using design charts and the development of design charts by the system supplier.

To facilitate more detailed structural calculations, the system supplier also provides profile properties. This Technical Note describes the properties that are required to facilitate structural checks in accordance with BS EN 1999-1-1 (Eurocode 9).

This Technical Note adopts the terminology and symbols used in the Eurocode. A list of symbols is given in Appendix A.

General principles

A design chart enables the curtain wall designer to select a suitable profile for use as a mullion based on the three parameters:

- Span
- Spacing
- Wind load

However, the calculations used to derive the design chart also include assumptions about how the load is distributed and the configuration of the mullion and its supports.

Design charts should always give a safe outcome. They are therefore based on assumptions of load and configuration that always give a safe answer provided the rules and limitations for application of the design chart are followed.

Load included in design charts is wind load that is usually assumed to be a uniformly distributed load. In practice glazing and infill panels are normally supported on four edges with loads transferred through the transoms. This gives a loading comprising trapezoidal load distributions and point loads. Assuming a uniformly distributed load always gives