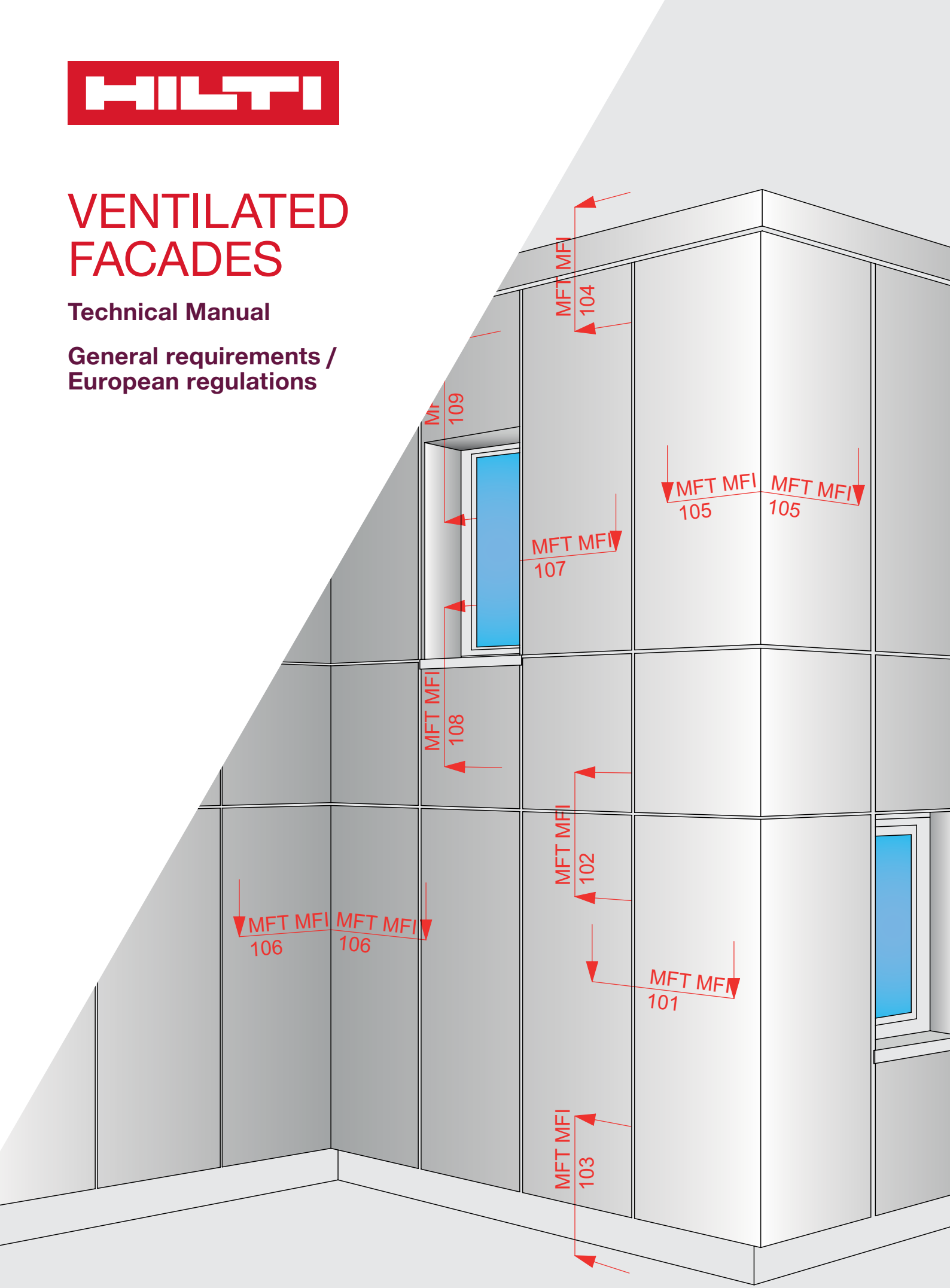
VENTILATED FACADES

Technical Manual

General requirements / European regulations



CONTENT AND OVERVIEW OF GENERAL REQUIREMENTS / EUROPEAN REGULATIONS

General requirements

Structural stability
Rain screen/ventilated facades are mechanically connected to the load-bearing structure of the building and must remain structurally stable at all times. When considering this point, the following loads must be taken into account:

- Dead weight
- Wind loads (wind uplift and wind pressure)
- Snow and ice
- Dynamic (shock) loads
- Special cases (seismic loads, signage)

Proof of the structural stability of the rain screen/ventilated facade system, including all individual certificates, must be provided in a verifiable form in accordance with the state of the art and the applicable European and/or national regulations. The proof of structural stability must, in particular, include the structural stability calculations for the substructure, the cladding and the anchoring and connecting or fastening components.
The dead weight (own weight) is the sum of the weight of the cladding plus the substructure. The corresponding values can be taken from, for example, national regulations or the manufacturer's specifications.
A difference must be drawn between the two types of wind loads, i.e. wind uplift and wind pressure. The values to be applied in calculations depend, above all, on the shape and dimensions of the building, the type of facade cladding and how it is installed, and the location of the building.
Where necessary, the applicable special loads (impacts, balls being thrown, etc.) must be taken into account (more closely spaced substructure members) in areas where special stresses of this kind are to be expected.

Fire protection
Rain screens/ventilated facades must comply with the applicable national requirements regarding fire protection. The planning of fire protection measures is the responsibility of the planning specialist.

Thermal insulation and protection from dampness
The facade, in terms of its cladding and substructure, must be planned and constructed in such a way that any rainwater that finds its way behind the cladding and any condensation is drained away to the exterior in a controlled manner.
This shall ensure that the thermal insulation or any timber components in the substructure, and the material to which it is anchored, do not remain damp.

Rain screens/ventilated facades with thermal insulation on the exterior of the wall present a very favorable solution in terms of building physics. In addition, the ventilation cavity allows any dampness that has found its way through the joints in the cladding to run off.

Airtightness
Requirements regarding the airtightness of the external envelope of the building are to be fulfilled by its design and construction. The rain screen/ventilated facade does not contribute to the airtightness of the building. Airtightness is ensured, for example, by the interior plasterwork and correctly installed doors and windows.

Soundproofing
Requirements in terms of soundproofing must be taken into account during planning of the complete structure and must comply with national regulations.
A high sound reduction index can be achieved due to the high sound absorption properties of mineral insulation material in conjunction with thick cladding.

Lightning protection
Lightning protection requirements must be taken into account by the applicable specialists at the planning stage and must comply with national regulations.

Attention must be paid to the compatibility of the materials used for lightning conductors and any parts of the facade cladding that they come into contact with.

Deformation
Deformation may occur, in particular, due to temperature fluctuations and changes in humidity. Attention must be paid to the local temperature differences (ΔT) (usually within the -20° to+80°C range).

Deformation must not cause individual parts of the facade to work loose and must have no detrimental effect on the structural stability of the facade. Such effects can be avoided, for example, by the following:

- Division of the substructure and cladding into separate areas (e.g. height of each floor)
- The positioning of joints
- Avoidance of forces of constraint during installation of the facade cladding and substructure through use of fixed and sliding points or other suitable measures

Building expansion joints must be taken into account by the substructure and cladding and allowance made accordingly.

Tolerances
The surface of the facade cladding must be flat and even. Any unevenness of the load-bearing surface must be taken into account right at the planning stage and evened out by the supporting substructure. The permissible degree of unevenness of the load-bearing surface or facade must be defined or the applicable values taken from national regulations.

European regulations

At a European level, harmonized standards in terms of general action and design of aluminum structures apply to ventilated facade substructures.
This harmonized standard is applicable and is required in all CEN member states.

For aluminum substructures for rain screens/ventilated facades, three European harmonized standards/codes are required:

- Eurocode EC-1: EN 1991-1-1 General actions – self-weight of structures
- Eurocode EC-1: EN 1991-1-4 General actions – wind loads
- Eurocode EC-9: EN 1999-1-1 Design of aluminum structures

If a product is not covered by a European harmonized standard or code, it is necessary to have an ETA (European Technical Assessment) that is valid in all EOTA member states or a national approval for the applicable country (Example: For Germany: National Approval from the DIBt-German Technical Approval body)