

**NATIONAL ANNEX
TO STANDARD
SFS-EN 1996-2 EUROCODE 6: DESIGN OF MASONRY STRUCTURES
Part 2: Design considerations, selection of materials and execution of masonry**

Preface

This National Annex is used together with the standard SFS-EN 1996-2: 2006.

This National Annex sets out:

- a) the national parameters for the following paragraphs in standard SFS-EN 1996-2 where national selection is permitted.

National choice is permitted in the following paragraphs of the standard SFS-EN 1996-2:

- 2.3.4.2(2)
- 3.5.3.1(1)

In addition, references may be made in the following paragraphs to non-contradictory complementary information:

- 1.1(2)P
- 2.3.1(1)
- 3.4(3)

- b) Guidance for the use of informative annexes A, B, and C.

1.1 Scope of Part 2 of Eurocode 6

1.1(2)P

Explanation:

The additional guidance concerning local conditions and practice is presented in the document “Additional instructions concerning execution”. The document is published as non-contradictory complementary information NCCI.

2.2.1 General

2.2.1(3)

Explanation:

The procedures used in Finland to establish conformity are described in the document “Additional instructions concerning execution” in its clause 2.2.1(3) Establishing the conformity of the product. The document is published as non-contradictory complementary information NCCI.

2.3.1 Detailing

2.3.1(1)

Explanation:

The additional guidance concerning local conditions and practice is presented in the document “Additional instructions concerning execution”. The document is published as non-contradictory complementary information NCCI.

2.3.3 Masonry movement

2.3.3(4)

Explanation:

The restrictions for use of non-movement tolerant ties are described in the document “Additional instructions concerning execution” in its clause 2.3.3.(4) Use of non-movement tolerant ties. The document is published as non-contradictory complementary information NCCI.

2.3.4.2 Spacing of movement joints

2.3.4.2(2)

The following table shows the maximum horizontal distance l_m for unreinforced external non-load-bearing masonry walls. The values apply for a structure 3 m high without openings. With lower masonry walls the spacing of movement joints must be made shorter; with masonry walls more than 3 m high the spacing of movement joints may be increased. The effect of the openings on the spacing of movement joints must be determined separately case by case.

Type of masonry	l_m (m)
Clay masonry ^a	15
Calcium silicate masonry ^a	10
Aggregate concrete masonry(lightweight aggregate) ^b	6
Aggregate concrete masonry(dense aggregate) ^b	6
Autoclaved aerated concrete masonry ^b	6
^a Values apply to external leaf of veneer wall or external walls in unheated structures	
^b Usually reinforcement fulfilling requirements given in SFS-EN 1996-1-1 clause 8.2.3(3) is used in external walls and for this reason the spacing of movement	

joints may be larger. The spacing of movement joints for such external walls is determined according to the manufacturer's instructions.

The spacing of movement joints for masonry made from other materials must be determined on project basis.

3.4 Permissible deviations

3.4(3)

Explanation:

The permissible deviations in Finland are described in the document "Additional instructions concerning execution" in its cause 3.4(3) Permissible deviations. The document is published as non-contradictory complementary information NCCI.

Note: If deviations are not defined in design specifications, then according to SFS-EN 1996-2 clause 3.4(3) tighter deviation values from those presented in Table 3.1 of SFS-EN 1996-2 and in Table 3.1 (FI) of the document "Additional instructions concerning execution" should be applied.

3.5.3.1 Pointing

3.5.3.1(1)

With non-load-bearing walls, the unhardened mortar should be raked out to a depth of at least $d_p=15$ mm for joints to be pointed. Pointing is not recommended in load-bearing structures.

3.6.3 Protection against freeze/thaw cycling

Explanation:

The additional instructions concerning winter time masonry execution are presented in the document "Additional instructions concerning execution" in clause 3.6.3 Winter time masonry execution. The document is published as non-contradictory complementary information NCCI.

Annex A

Classification of micro conditions of exposure of completed masonry

Appendix A may be used.

Explanation:

There is no need to use subdivisions of the basic classification in Finland when determining exposure class for the masonry structure.

Annex B

Acceptable specifications of masonry units and mortar for durable masonry in various exposure conditions

Appendix B should not be used.

Explanation:

The minimum requirements for masonry units and mortar concerning durability are presented in standard SFS 7001.

Annex C
Selection of materials and corrosion protection specifications for ancillary components according to exposure class

Appendix C should not be used

Explanation:

The minimum requirements for ancillary components concerning materials and corrosion protection are presented in the standard SFS 7001.

End of National Annex

Non-contradictory complementary information NCCI to standard SFS-EN 1996-2

Additional instructions concerning execution

2.2.1(3) Establishing the conformity of the product

When there is no harmonised European standard or when the material or the product deviates from the requirements of the applicable harmonised European standard, the conformity can be based either on:

- a European technical approval or
- a type approval or a certified product declaration or
- building-site-specific tests or alternatively a factory production control including third party continuous surveillance.

Note 1. Type approval is a voluntary national approval for building materials or products having technical approval instructions put in force as a decree of the Ministry of the Environment. VTT can grant an approval for a product for which regulatory requirements have been set in the decree. Such an approval shall be granted for a limited period not exceeding five years.

Note 2. Certified product declaration is a voluntary national approval for certain type of building materials or products or for methods used in the manufacturing of load-bearing structures having technical approval instructions drawn up by approved body. A certified product declaration includes the necessary information on the properties, type of use and suitability of the product in specified applications. Decision for the certified product declaration may set out rules for the factory production control. The manufacturer of the product may apply for the certified product declaration from a body approved by the Ministry of the Environment.

Note 3. Conformity with building site-specific tests is established based on pre-tests and additional tests made on-site. Alternatively, the manufacturer of the product may have factory production control including third party continuous surveillance. Continuous surveillance is performed by a body approved by the Ministry of the Environment.

2.3.3(4) Use of non-movement tolerant ties

Non-movement tolerant ties may be used in veneer walls less than 6 m in height. In veneer walls higher than this, the movement caused by moisture expansion and temperature variation between the leaves should be calculated when appropriate and a tie with sufficient movement capability should be used. The tie manufacturer should declare the tie movement capability according to the standard SFS-EN 845-1.

3.4(3) Permissible deviations

Table 3.1 (FI) presents the permissible deviations used in Finland.

Table 3.1 (FI) The permissible deviations of masonry structures

Location	Maximum deviation
Inclination	
- measured from the straight reference line between the centre points of the top and bottom of the wall/column	0,5%, but no more than 30 mm
- for the entire height of a building of at least three storeys measured from the straight reference line between the centre points of the top and bottom of the wall/column	± 50 mm
- tolerance from the planned centre line	± 8 mm
Curvature	
- measured from the straight reference line between the centre points of the top and bottom of the wall/column	0,4%
Thickness	
- thickness of one leaf of the wall ^a	± 5% of thickness of one leaf of wall
- distance between wall leaves	± 15 mm.
^a Excluding leaves of single masonry structures having width or length of the unit, where the dimensional tolerances of the masonry unit govern the leaf thickness.	

3.6.3 Execution in winter

Winter conditions are considered to prevail when the air temperature falls below 0°C, even if only occasionally. When this happens, special attention needs to be paid to the choice of the mortar, the execution, the storage of construction products and materials, the organising of the work, and the protection of the masonry structure. Masonry units should not be wet and they should be free from ice and snow. If necessary the masonry units may be heated. The mortar must be free from ice and from any icy substances.

Execution of masonry in winter time conditions can be performed by using mortar developed to winter conditions or using heated normal mortars and masonry laying technique suitable for winter conditions.

Execution using mortars developed for winter conditions

The execution is done according to the mortar manufacturer's instructions and following the operating temperature limits and protective measures set for the mortar.

Execution using normal mortar in winter conditions

Execution is done with normal mortar. The mortar is heated by using heated mixing water. When using heated mortars, it is necessary to take into account the faster setting of the mortar. However, the temperature of the mortar should not exceed +40°C and the temperature of the water used in mixing the mortar should not exceed +60°C.

Execution and the protection of the masonry structure in winter conditions should be performed so that the temperature of the mortar in the joints stays above 0°C for so long time that the freezing of the water no longer damages the adhesion between the mortar and the masonry unit. Where necessary, heaters may be used to keep the masonry warm enough.

The mortar may be allowed to freeze only after the water absorption in the masonry units has reduced the water content of the mortar to a acceptable level or when the mortar has cured for so long time that it has reached acceptable strength before freezing.

When using lime cement mortars having binding material at least 65 % by weight of Portland cement or masonry cement mortars the value for acceptable low water content from the point of view of freezing is 6 % by weight. The absorption of water from the mortar into the masonry units is determined experimentally or in other reliable way. Strength of the masonry structure should be assumed to be no more than 40% of the design strength when it thaws.

When using lime cement mortars having binding material at least 65 % by weight of Portland cement or masonry cement mortars with clay and calcium silicate masonry units, masonry can be considered to have reached acceptable strength from the point of view of freezing when masonry has cured for at least 48 hours at a temperature above 0°C. The temperature of the mortar should be monitored in a reliable way. Strength of the masonry structure should be assumed to be no more than 60 % of the design strength when it thaws.

When using masonry cement mortars with lightweight aggregate concrete and autoclaved aerated concrete masonry units, masonry can be considered to have reached acceptable strength from the point of view of freezing when masonry has cured for at least 72 hours at a temperature above 0°C. The temperature of the mortar should be monitored in a reliable way. Strength of the masonry structure should be assumed to be no more than 60 % of the design strength when it thaws.

Execution of the reinforced masonry should be performed so that the temperature in the masonry structure stays above 0°C for at least 48 hours.