



EUROPEAN ASSESSMENT DOCUMENT

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RE-CYCLED CLAY MASONRY UNITS

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1 SCOPE OF THE EAD

1.1 Description of the construction product

The re-cycled clay masonry units are derived from de-installation of clay masonry construction. The masonry units are brought to the manufacturing plant where they are cleaned, sorted, controlled and packed. The controls are based on a described and implemented FPC system, which also forms the basis for the statistical calculation of the characteristics of the clay masonry units according to EN 771-1¹.

Only clay masonry units for which it cannot be documented that they were originally brought to the market as CE marked and manufactured in accordance with EN 771-1 and which have been mechanically cleaned are covered by this EAD

The product is not covered by a harmonised European standards (hEN) EN 771-1:2010+A1:2015, which covers new clay masonry units and defines the performance related to e.g. dimensional tolerances, strength, density measured according to the corresponding test methods contained in separate European Standards and it provides for the assessment and verification of constancy of performance (AVCP) including the FPC specifications.

The re-cycled clay masonry units cannot be CE marked in accordance with EN 771-1, since the standard specifies an FPC system, which is not applicable to the re-cycled clay masonry units. In addition, the FPC system forms the basis for the statistical determination of certain declared values for the clay masonry units, and therefore these characteristics for the re-cycled clay masonry units cannot be determined in accordance with EN 771-1.

This EAD does not cover assessment of the recycled clay masonry units for use in loadbearing structures.

Concerning product packaging, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport, storage, maintenance, replacement and repair of the product as he considers necessary.

It is assumed that the product will be installed according to the manufacturer's instructions or (in absence of such instructions) according to the usual practice of the building professionals.

Relevant manufacturer's stipulations having influence on the performance of the product covered by this European Assessment Document shall be considered for the determination of the performance and detailed in the ETA.

1.2 Information on the intended use(s) of the construction product

1.2.1 Intended use(s)

The re-cycled clay masonry units are intended for use in masonry construction. The re-cycled clay masonry units are used for protected or unprotected masonry structures (see definitions 3.3 and 3.4 of EN 771-1) e.g. facing and rendered masonry in self-supporting load transferring masonry structures, including external veneer walls, internal linings and partitions.

The unprotected re-cycled clay masonry units which may be exposed to rain, freeze/thaw and/or may be in contact with soil and ground water without a suitable protection, will contribute to durability of the works by providing enhanced protection from the effect of weathering.

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All undated references to standards or to EADs in this document are to be understood as references to the dated versions listed in clause 4

1.2.2 Working life/Durability

The assessment methods included or referred to in this EAD have been written based on the manufacturer's request to take into account a working life of the re-cycled clay masonry units for the intended use of 50 years when installed in the works. These provisions are based upon the current state of the art and the available knowledge and experience.

When assessing the product the intended use as foreseen by the manufacturer shall be taken into account. The real working life may be, in normal use conditions, considerably longer without major degradation affecting the basic requirements for works².

The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by EOTA when drafting this EAD nor by the Technical Assessment Body issuing an ETA based on this EAD, but are regarded only as a means for expressing the expected economically reasonable working life of the product.

² The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works is subject, as well as on the particular conditions of the design, execution, use and maintenance of that works. Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than the assumed working life.

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential characteristics of the product

Table 1 shows how the performance of the re-cycled clay masonry units are assessed in relation to the essential characteristics.

Table 1 Essential characteristics of the product and methods and criteria for assessing the performance of the product in relation to those essential characteristics

No	Essential characteristic	Assessment method	Type of expression of product performance
Basic Works Requirement 2: Safety in case of fire			
1	Reaction to fire	2.2.1	Class
Basic Works Requirement 4: Safety and accessibility in use			
2	Dimensions	2.2.2	Level
3	Density	EN 772-13	Level as gross dry density for whole clay units
4	Compressive strength	2.2.3	Level
5	Initial rate of water absorption	EN 772-11 for high density (HD) bricks	Level
6	Bond strength	EN 1052-5	Level as the calculated value of average initial shear strength for normal stress equal to zero
7	Determination of volume and percentage of voids and net volume	2.2.4	Level
Durability			
8	Freeze/thaw	2.2.5.1	Level
	Active soluble salt content	EN 772-5 method 5.2	Level

2.2 Methods and criteria for assessing the performance of the product in relation to essential characteristics of the product

This chapter is intended to provide instructions for TABs. Therefore, the use of wordings such as “shall be stated in the ETA” or “it has to be given in the ETA” shall be understood only as such instructions for TABs on how results of assessments shall be presented in the ETA. Such wordings do not impose any obligations for the manufacturer and the TAB shall not carry out the assessment of the performance in relation to a given essential characteristic when the manufacturer does not wish to declare this performance in the Declaration of Performance.

For all the tests mentioned below, the same principle for taking out samples applies.

The assessed performances are determined on the basis of the obtained test results, the spread of these and an assessment of the dispersion of current production, so that the assessed performance can continuously be complied with.

Specimens for assessments below are taken from the stock of sorted and cleaned masonry units in accordance with the principles in annex A of EN 771-1, i.e. shall be sampled from a consignment of masonry units not more than 20 m³.

10 bricks are taken for each of the below mentioned characteristics except for bond strength where 20 bricks are taken

2.2.1 Reaction to fire

The clay units shall be tested according to EN 13501-1 and classified according to EC Delegated Regulation 2016/364/EU.

The classification shall be stated in the ETA.

2.2.2 Dimensions

The dimensions of the clay units are determined in accordance with EN 772-16 method b) and are stated in the ETA. The dimensions are stated as outer measurements, i.e. maximum and minimum dimensions in mm and expressed as the length (lu), width (wu) and height (hu) of each specimen to the nearest 0,1 mm, 0,2 mm or 0,5 mm depending on the tolerance on the dimension being measured (see table 1 of EN 772-16).

2.2.3 Compressive strength

The compressive strength is determined in accordance with EN 772-1 with conditioning of the specimens according to section 7.3.2 b) and the level is stated in the ETA.

For the statistical determination of the compression strength, the 50 % fractile at a 95 % confidence level with uniform, unknown distribution is used

The stated level of compression strength is based on the statistical method described in "The stated level of compression strength is based on the statistical method described in CEN/TR 16886: Technical Report CEN/TR 16886 Guidance on the application of statistical methods for determining the properties of masonry products" (2015).

2.2.4 Determination of volume and percentage of voids and net volume

The volume and percentage of voids and net volume is determined in accordance with EN 772-9 and the level is stated in the ETA.

2.2.5 Durability

2.2.5.1 Freeze/thaw

The resistance to freeze/thaw is determined by determining the ratio of pore volume by boiling as described in annex A and the ratio of pore volume is given in the ETA.

3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

3.1 System(s) of assessment and verification of constancy of performance to be applied

For the products covered by this EAD the applicable European legal act is: Decision 97/740/EC as amended by 2001/596/EC

The system is: 2+ for category I masonry units in in walls, columns and partitions

3.2 Tasks of the manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of the product in the procedure of assessment and verification of constancy of performance are laid down in Table 3.

Table 3 Control plan for the manufacturer; cornerstones

No	Subject/type of control (<i>product, raw/constituent material, component - indicating characteristic concerned</i>)	Test or control method (<i>refer to 2.2 or 3.4</i>)	Criteria, if any	Minimum number of samples	Minimum frequency of control
Factory production control (FPC)					
1	Incoming materials Sorting of bricks: – Continuous control in <i>italics</i> below – Batch control	The FPC shall include instruction on registration of incoming bricks based on their type, origin, weight etc. and instruction on cleaning and sorting procedures. A continuous mixing of incoming batches is performed to ensure a uniform mix of bricks for continuous control	-	See below	See below
2	Compression strength	2.2.4		24 bricks 20 bricks	Every 20.000 bricks Every 15.000 bricks
3	Density	2.2.3		24 bricks 10 bricks	Every 20.000 bricks Every 15.000 bricks
4	Water absorption	2.2.5		24 bricks 10 bricks	Every 20.000 bricks Every 15.000 bricks
5	Initial rate of water absorption	2.2.5		24 bricks 10 bricks	Every 20.000 bricks Every 15.000 bricks
6	Ratio of pore volume by boiling	2.2.8		24 bricks 10 bricks	Every 20.000 bricks Every 15.000 bricks

3.3 Tasks of the notified body

The corner stones of the actions to be undertaken by the notified body in the procedure of assessment and verification of constancy of performance for the re-cycled clay masonry units are laid down in Table 4.

Table 4 Control plan for the notified body; corner stones

Subject/type of control (<i>product, raw/constituent material, component - indicating characteristic concerned</i>)	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Initial inspection of the manufacturing plant and of factory production control				
Initial inspection of the manufacturing plant and of factory production control carried out by the manufacturer regarding the constancy of performance.	As defined in control plan	As defined in control plan	As defined in control plan	According to the control plan
Continuous surveillance, assessment and evaluation of factory production control				
Continuous surveillance, assessment and evaluation of the factory production control carried out by the manufacturer regarding the constancy of performance.	As defined in control plan	As defined in control plan	As defined in control plan	According to the control plan

4 REFERENCE DOCUMENTS

EN 13501-1:2018	Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests
EN 771-1:2015	Specification for masonry units – Part 1: Clay masonry units
EN 772-16:2011	Methods of test for masonry units – Part 16: Determination of dimensions
EN 772-13:2002	Methods of test for masonry units – Part 13: Determination of net and gross dry density of masonry units (except for natural stone)
EN 772-1:2015	Methods of test for masonry units – Part 1: Determination of compressive strength
EN 772-11:2011	Methods of test for masonry units – Part 11: Determination of water absorption of aggregate concrete, autoclaved aerated concrete, manufactured stone and natural stone masonry units due to capillary action and the initial rate of water absorption of clay masonry units
EN 1052-5:2005	Methods of test for masonry – Part 5: Determination of bond strength by the bond wrench method
EN 772-9:1998	Methods of test for masonry units – Part 9: Determination of volume and percentage of voids and net volume of calcium silicate masonry units by sand filling
EN 772-20:2000	Methods of test for masonry units – Part 20: Determination of flatness of faces of aggregate concrete, manufactured stone and natural stone masonry units
EN 772-5:2016	Methods of test for masonry units. Part 5: Determination of the active soluble salts content of clay masonry units

ANNEX A RESISTANCE TO FREEZE/THAW

The ratio of pore volume, p_t is a number < 1

The ratio of pore volume is determined by the following method:

10 samples of clay masonry units are tested.

The sampled are immersed in water for 72 hours at ambient laboratory temperature.

The weight of each sample is determined before and after immersion in water and the mean value is determined

The water absorption w_w is derived from the volume of absorbed water to the volume of the dry clay masonry unit (deducting possible voids in the unit), and is expressed as a mean value of the volume-%

Successively after having determined the water absorption, the clay masonry units are boiled for 5 hours in normal tap water.

The masonry units are weighed before and after boiling and the mean value is determined. The absorbed amount of water corresponds to the applicable pore volume for the clay masonry unit, p_e expressed as mean value of the volume-% of the masonry units net volume.

The ratio of pore volume is determined from the following equation:

$$p_t = w_w / p_e$$

The mean value of the ratio of pore volume is stated in the ETA