

Warani factory for manufacturing Ponza block units.

**Manufacturing special technical details - Standard
Lightweight aggregate concrete masonry unit**



➤ Introduction:

This document has been prepared by the technical and engineering staff of Warani manufacture with support of consultant agency in standard professionalism for the production of light weight aggregate concrete masonry unit.

1- Scope:

This standard specifies the characteristic and performance of required of lightweight aggregate concrete masonry unit known commercially as (Ponza block) for which the main intended use are common, facing or exposed masonry in non-load building and civil engineering application the units are suitable for all form of walling , including single leaf, external leaf to chimneys , cavity wall, partitions, retaining, and basement, they provide fire protection, thermal insulation, sound insulation and sound absorption.

It defines the performance related to e.g. strength, density, dimensional accuracy, and provides for the assessment and verification of constancy of performance of the product to this special standard.

2- Normative references:

- ASTM C140 Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
- ASTM C1825-19 Standard Guide for Developing Specifications for Masonry Units
- ISO 19595 Natural aggregates for concrete
- ASTM c90 Standard Specification for Loadbearing Concrete Masonry Units
- ASTM C129-22 Standard Specification for Nonloadbearing Concrete Masonry Units
- BS EN - 771-3 - Specification for masonry units - Aggregate concrete masonry units (Dense and lightweight aggregates)

3- Terms, definitions and symbols:

For the purpose of this document the following terms and definitions apply.

Masonry unit: performed component intended for use in masonry construction.

Common masonry unit: masonry unit normally intended for use with no faces left visible.

Exposed masonry unit: facing masonry unit exposed to external climatic conditions without render or other equivalent protection.

Aggregate concrete masonry unit: masonry unit manufactured from cementitious binder, aggregates and water and which may contain admixtures and additions and coloring pigments and other materials incorporated or applied during or subsequent to unit manufacture.

Co-ordinating size: size of a coordinating space allocated to a masonry unit including allowances for joints.

Work size: size of a unit specified for its manufacture, to which the actual size conforms within permissible deviations.

Actual size: size of a unit as measured.

Regular shaped masonry unit: masonry unit with and overall rectangular parallelepiped shape.

Specially shaped masonry unit: masonry unit which is not a rectangular parallelepiped

Accessory unit: unit which is shaped to provide a particular function e.g., to complete the geometry of the masonry.

Interlocking features: shaped match projections and indentations on masonry units.

Hole: formed void which may or may not pass completely through a masonry unit.

Frog: depression formed in one or both of the bed faces of a unit, the total volume of all such depressions which does not exceed a certain limit of the overall volume of the unit, i.e. length * width*height.

Shell: peripheral solid material between the hole(s) and the face or the header of a unit.

Web: solid material between the formed voids in a masonry unit.

Declared value: value that a manufacturer is confident of achieving, bearing in mind the precision of the best and the variability of the manufacturing process.

4- Requirements for aggregate concrete masonry units:

4.1 General:

The requirements and properties specified in this Standard shall be defined in terms of the test methods and other procedures referred to in this Standard.

It should be noted that the standard test methods are not always applicable to specially shaped and accessory

The conformity criteria given in the following subclauses relate to product type determination. and, when relevant, to consignment testing.

For production evaluation, the manufacturer shall define the conformity criteria in the factory production control documentation.

4.2 Dimensions and tolerances:

4.2.1 Dimensions:

the manufacturer declares the dimensions of the aggregate concrete masonry units in **mm** for length, width and height, in that order. They will be given in terms of work size.

Based on the manufacture molding types, the web thickness of each unit must be not less than (22 **mm**) and the shell thickness of each unit must be not less than (24 **mm**).

4.2.2 tolerances:

The tolerances on declared work sizes of individual regular shaped units conform to Table 1. Closer tolerances may be declared for one or more dimensions. The manufacturer declares the tolerance category of the units.

Table 1 tolerance category of each individual unit blocks

<i>Tolerance category</i>	<i>Type 1</i>
<i>Length(mm)</i>	+5
	-5
<i>Width (mm)</i>	+5
	-5
<i>Height (mm)</i>	+5
	-5

Tolerances for non-regular shaped and accessory units shall be as given in Table 1 or as declared by a document.

These tolerances shall not apply to the dimensions between the surfaces of units which are manufactured to be nonplanar.

4.3 Flatness of bed faces:

When aggregate concrete masonry units are declared as tolerance category T4 for use with thin layer mortar, the manufacturer also declare the maximum deviation from flatness of the bed faces.

4.4 Plane parallelism of bed faces:

When aggregate concrete masonry units are declared as tolerance category T4 for use with thin layer mortar, the manufacturer also declare the maximum deviation from plane parallelism of the bed faces.

4.5 Configuration and appearance

Configuration

When relevant to the uses for which aggregate concrete masonry units are put on the market, the configuration is declared according to table 1 (no. of walls) . it may include one or more items such as those in the following list, as relevant: shape and features, including the direction of any formed voids (by means of a drawing or illustration, when relevant);

- volume of all formed voids as a percentage of the length x width x height of the unit;
- volume of the largest of any formed voids as a percentage of the length x width x height of the unit;
- volume of grip holes as a percentage of the length x width x height of the unit,
- thickness of webs;
- thickness of shells;
- combined thickness of webs and shells from face to face;
- combined thickness of webs and shells from header to header;
- area of voids on a bed face as a percentage of the length x width of the unit.

The requirements for shape and features will normally apply to regular shaped units, but need not apply to the surfaces or arises of units with special shapes or to accessory units.

Units may be provided with recesses or interlocking features and with sharp, rounded or chamfered arises.

The total volume of frogs will not exceed 20 % of the overall volume of the unit,
i.e. length x width x height.

Each declared value will be stated as either an upper limit or a lower limit or as a range of values, test sample shall be within the range or limit declared.

4.6 Appearance:

Flatness of surfaces of facing units

When the surface of facing units declared to be plain, they shall not deviate from a plane by more than (2 mm), where is the length of the diagonal of the surface of the unit declared plain, based on the actual size of the unit.

The requirements for flatness shall not apply to the surfaces of units which are manufactured to be non-planar.

4.7 Surface appearance of facing units:

When required the surface of facing units may have compliance established on the basis of comparison with any approved samples. Comparison shall be made from a distance of 3 m in normal daylight conditions. This compliance shall be established before the units are used.

4.8 Density

Dry density of the units ,according to the previous laboratory test results.

The dry density of the units will be declared in kg/m^3 by the manufacturer.

The declaration may be made for the evaluation of

- Loading;
- airborne sound insulation;
- thermal insulation;
- fire resistance.

In addition, the manufacturer declares the minimum individual values of oven dry density according to table 2.

4.9 Mechanical strength

Compressive strength (net area)

according to the previous laboratory test results.

- The strength of the masonry units in compression will be declared in (N/mm^2 , Mpa) by the manufacturer. The values have to be complied with the table (2).

4.10 Water absorption

according to the previous laboratory test results.

When relevant to the uses for which units are put on to the market and in all cases for units intended to be used in exposed external walls, the maximum absorption rate will be less than (33%) for all units in any cases of use.

Table 2 physical characteristics for all types (type 1)

No.	No. of walls in each block unit	Compressive strength (net area) minimum (Mpa)		density oven dry (Kg/m^3)	Dimensions		
		Individual units	Average of 3 units	lightweight	Length (mm)	Height (mm)	Width (mm)
1	2	1.4	1.5	≤ 1500	380	190	100
2	2	1.5	1.6		380	190	120
3	3	1.6	1.7		380	190	120
4	3	1.8	1.9		380	190	150
5	4	1.8	1.9		380	190	150
6	5	2	2.2		380	190	150
7	3	1.8	1.9		380	190	190
8	4	2	2.2		380	190	190
9	5	2.1	2.3		380	190	190
10	4	2.3	2.4		380	190	240

5 Sampling procedure for an assessment of product compliance.

5.2 Random sampling

Whenever possible, the random sampling method shall be used, in which every masonry unit in the consignment has an equal chance of being selected for the sample. The appropriate number of masonry units shall be selected at random from positions throughout the consignment without any consideration being given to the quality of those selected except that units damaged in transit shall not be selected.

5.3 Representative sampling

5.3.1 General

When random sampling is impracticable or not convenient, e.g. when the masonry units form a large stack or stacks with ready access to only a limited number of units, a representative sampling procedure shall be used.

5.3.2 Sampling from a stack

The consignment shall be divided into at least six real or imaginary sections, each of a similar size. An equal number of not more than four masonry units shall be selected at random from within each section in order to give the required number without any consideration being given to the quality of those selected except that units damaged in transit shall not be selected.

5.3.3 Sampling from a consignment formed of banded packs

At least six packs shall be selected at random from the consignment. From each pack an equal number of not more than four AAC masonry units shall be sampled at random in order to give the required number without

any consideration being given to the quality of those selected except that units damaged in transit shall not be selected.

5.4 Dividing the sample

When the sample is to provide AAC masonry units for more than one test, the total number shall be collected together and then divided by taking masonry units at random from within the total sample to form each successive sub-sample.

5.5 Number of units required for testing

The sample size for each test shall be in accordance with Table 3

Table 3

<i>Property</i>	<i>Number of units</i>
<i>Dimensions</i>	3
<i>Compressive strength</i>	3
<i>Water absorption</i>	3
<i>Density</i>	3

If appropriate, e.g., when the units are not affected by a test procedure the same units may be used for different tests.

5.6 Test methods

The Compressive strength, absorption, density, and dimensional tolerances shall be based on tests of concrete masonry units of any configuration or dimensions made with the same materials, concrete mix design, manufacturing process, and curing method, conducted in accordance with Test Methods ASTM C140.