

Benex Performance Evaluation under Compressive Forces

Compressive strength

The characteristic compressive strength of Benex masonry for use in design can be expressed as:

$$200\text{mm hollow block masonry: } f_m = 0.74f_{uc}$$

Benex masonry laid with a thin-bed mortar behaves somewhat differently to conventional masonry when subjected to compression stresses. In Conventional masonry, the mortar being softer than the units, undergoes a state of biaxial tension and compression. However, softer Benex blocks could induce a state of tri-axial compression under uniform compression, and hence tends to enhance the strength of the units compared to conventional masonry.

The default value for the coefficient of variation provided in Appendix B of AS3700-2001 (0.15) can be used with Benex masonry when small samples are tested.

The Unconfined Unit Compressive Strength of the Benex Hollow block has been independently assessed by the CSIRO* to be 4.92MPa.

Compression Strength of 200mm Benex Hollow Block

Test Date: 20-Apr-07

Preparation: The protrusions and recesses were cut off
 Blocks were cut into halves in order to accommodate in the testing machine
 Nominal loading strip at block faces is 35mm
 Hence, minimum face shell thickness = 35 mm
 Hence, bedding width = 70 mm

Spec. No.	Height (mm)	Length (mm)	Thickness (mm)	Failure Load (kN)	Failure Stress (MPa)
1	186.0	300.0	199.0	120.0	5.71
2	187.0	301.0	199.0	132.0	6.26
3	188.0	301.0	198.0	172.0	8.16
4	188.0	301.0	199.0	154.0	7.31
5	186.0	300.0	199.0	130.0	6.19
6	186.0	299.0	198.0	188.0	8.98
7	186.0	301.0	198.0	154.0	7.31
8	187.0	300.0	199.0	124.0	5.90
9	187.0	300.0	199.0	158.0	7.52
10	185.0	300.0	199.0	154.0	7.33

Average = 7.07
 S.D. = 1.05
 C. of V. = 0.15

Ch. Unit Compressive Strength of Hollow Block (MPa) = 4.92 for Kk = 0.86 for CV = 0.15
 Aspect Ratio = 5.33
 Aspect Ratio Factor = 1.00
 Ch. Unconfined Unit Compressive Strength of Hollow Block (MPa) = 4.92

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*All testing was conducted by the CSIRO and a copy of the full report entitled "Structural Performance of Benex Masonry" October 2007 can be made available from Benex on request.

7 day Compression strength of 3 course high prisms built with 200mm hollow blocks

Test Date: 29-Aug-07
 Laid on: 22-Aug-07 Age: 7days
 Test: Compression Tests on 3-block high prisms

Preparation: The protrusions and recesses were cut off
 Blocks were cut into halves in order to accommodate in the testing machine
 Nominal loading area at block faces 35mm x 320mm
 Hence, minimum face shell thickness = 35 mm
 Hence, bedding thickness = 70 mm

Spec. No.	Height (mm)	Length (mm)	Thickness (mm)	Failure Load (kN)	Failure Stress (MPa)
1	600.0	297	200.0	118.0	5.68
2	603.0	297	200.0	113.0	5.44
3	600.0	298	200.0	134.0	6.42
4	600.0	298	200.0	105.0	5.03
5	600.0	295	200.0	100.0	4.84
6	601.0	299	200.0	106.0	5.06
7	599.0	298	200.0	110.0	5.27
8	600.0	300	200.0	116.0	5.52
9	598.0	299	200.0	100.0	4.78
10	600.0	299	200.0	119.0	5.69

Average = 5.37
 S.D. = 0.49
 C. of V. = 0.09

Ch. Compressive Strength of Masonry (MPa) = 4.05 for Kk = 0.85 for CV = 0.15
 Aspect Ratio = 17.15
 Aspect Ratio Factor = 1.00
 Ch. Unconfined Compressive Strength of Masonry (MPa) = 4.05