MAY 2023

CARBONBUILT ULTRA-LOW CARBON CONCRETE PRODUCT DATA SHEET

Product Name

CarbonBuilt® CMUs

Product Description

Concrete masonry units produced using CarbonBuilt's technology ("CarbonBuilt CMUs") have a 70%+ carbon footprint reduction and meet the same strength and performance standards as those of traditional blocks.

Manufacturers producing CMU using CarbonBuilt's technology significantly reduce their cement use and cure with CO_2, which mineralizes into calcium carbonate. This CO_2 mineralization process enhances early compressive strength as a result of hydration and carbonation reactions.

Based on testing conducted by independent laboratories, CarbonBuilt CMUs meet the requirements of the ASTM C90 standard. These evaluations are available upon request.

Benefits and Sustainability Considerations

CarbonBuilt CMUs realize the following benefits:

- A carbon footprint of 70%+ via:
    a. Replacing carbon intensive cement with a proprietary blend of low-carbon materials
    b. Mineralizing CO_2 during curing
    c. Reducing steam curing duration which saves natural gas and fresh water
- Reduced water absorption and risk of efflorescence

CARBONBUILT

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Manufacturer(s)

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Note: This list is not exhaustive and subject to change.

Part 1 - General

Guidelines for Usage

Based on testing conducted by independent laboratories in accordance with ASTM C90, ASTM E518, TMS 402 and other standards, CarbonBuilt CMUs perform like traditional CMUs with regards to bond, modulus of elasticity, and breakage characteristics while exhibiting the same system performance once grouted and mortared. Reports are available upon request.

Composition and Materials

- Medium and normal weight
- Nominal 8” high, 8” depth, and 16” long units

Types

Standard Gray Block

Fire Resistance

Similar to traditional CMUs, CarbonBuilt CMUs can be tailored to meet desired fire rating specifications as defined in NCMA TEK Notes, available at www.ncma.org.

Limitations

No known limitations.

Part 2 – Technical Data

Applicable Standards

Code compliance is documented via the International Code Council Evaluation Service (ICC–ES) report process. ICC-ES reports document findings, conclusions, and recommendations from a particular evaluation, and aim to verify that new and innovative building products comply with code requirements.

The specific ICC-ES report applicable to CarbonBuilt CMUs products is ESR-4612, “Concrete Masonry Units Produced via CarbonBuilt Technology,” issued December 2021, which addresses use of CarbonBuilt CMUs for load-bearing or non-load-bearing applications under the IBC section 2103.1, and IRC Section R606.2.1.

Physical Properties

Based on the performance evaluation of CarbonBuilt CMUs tested by CMHA (FKA: ICPI-NCMA)

- **Stress-strain relationships:** No difference was observed. The stress-strain relationship of a prism assembly constructed using CarbonBuilt CMUs is like that of traditional blocks.

- **Compressive strength:** No difference was observed. All CarbonBuilt CMUs achieved a compressive strength over 13.8 MPa or 2,000psi, as specified by ASTM C90.
- **Modulus of elasticity and modulus of rupture:** No difference was observed. The modulus of rupture and failure mode are the same as traditional CMUs. The modulus of elasticity was higher than 900*fc (fc: compressive strength) as specified by TMS 402.
- **Weight/density:** The weight and density of CarbonBuilt CMUs can be adjusted to fulfill density classifications (lightweight, medium-weight, and normal weight blocks) based on customer needs.
- **Shrinkage and creep characteristics:** No difference was observed. The average linear drying shrinkage measurements of CarbonBuilt CMUs at 28 days were less than 0.065% as specified by ASTM C90.
- **Water absorption properties:** The water absorption of CarbonBuilt CMUs is compliant with ASTM C90 requirements.
- **Freeze-thaw durability:** No difference was observed. Like traditional blocks, CarbonBuilt CMUs can be treated with air-entraining or waterproofing admixtures to enhance freeze-thaw resistance if required.
- **Thermal properties:** This has not yet been evaluated. However, no difference is expected given that the aggregate types and fractions used in CarbonBuilt formulations are typical of traditional blocks.
- **Fire resistance:** No difference is expected given that aggregate types and fractions used in our formulations remain the same as traditional blocks.
- **Appearance:** Due to their lower cement content, CarbonBuilt CMUs can be slightly brighter than traditional blocks. They also are less susceptible to efflorescence due to the presence of residual calcium hydroxide following the manufacturing process. Like traditional blocks, CarbonBuilt CMUs can be treated with efflorescence-controlling admixtures to enhance color integrity if required. The final color depends on constituent materials and their proportions.

Summary of Recent Test Results

	Result		Result
Net Compressive Strength	**2,080**	Min. Faceshell Thickness (in)	**1.47**
Density (pcf)	**115.2**	Min. Web Thickness (in)	**1.20**
Absorption (pcf)	**12.7**	Equivalent Thickness (in)	**3.66**
Absorption (%)	**11.0**	Net Cross-sectional Area (in^2)	**56.5**
Max. Dimensional Variance (in)	**0.150**	Gross Cross-sectional Area (in^2)	**115.6**
Norm. Web Area (in^2/ ft^2)	**30.9**		

Part 3 - Execution

Installation

Lay units using best concrete masonry practices. Install only quality units; reject all defective units as defined by ASTM C90. Lay blocks with the faces level, plumb and true to the line strung horizontally at the finished face.

Maintenance

Regular CMU maintenance protocols apply.

General Note

CarbonBuilt provides technology and related services to enable production of CarbonBuilt CMUs. CarbonBuilt works with manufacturers who may have limited warranties for their products. Please ask your local CMU supplier for more information.