

# Masonry Unit Comparison

2023 Partanna Fact Sheet



## Overview

This document presents a comprehensive comparison between a Partanna Masonry Unit and a Concrete Masonry Unit (CMU) in terms of core specifications. Our findings illustrate the superior performance and environmental benefits of Partanna, and its game-changing potential in the construction industry.

Key advantages of our carbon-negative concrete include:

- **Enhanced Durability:** Our standard block exhibits greater durability than traditional cement, ensuring long-lasting performance and reduced maintenance costs.
- **Superior Compressive Strength:** Our concrete outperforms traditional cement in compressive strength tests, providing the necessary structural integrity for a wide range of construction applications.
- **Resilience to Seawater Exposure:** Our unique use of brine as an activator leads to increased strength when exposed to seawater, making our concrete an ideal choice for coastal and marine projects.
- **Versatility:** Our carbon-negative concrete offers the same versatility as traditional cement, allowing it to be used in a variety of construction scenarios and design requirements.
- **Enhanced Design Functionality:** Our innovative concrete technology enables the creation of unique textures and designs, providing architects and builders with greater creative freedom in their projects.

In conclusion, our carbon-negative concrete offers superior performance and design capabilities compared to traditional cement while significantly reducing the carbon footprint of construction projects. As a result, our concrete provides a viable, sustainable, and innovative solution for meeting the growing demands of the construction industry.

Description	Concrete Masonry Unit	Partanna Masonry Unit
	<p>A hollow concrete masonry unit made from Portland cement and suitable aggregates such as sand, gravel, crushed stone, bituminous or anthracite cinders, burned clay or shale, pumice, volcanic scoria, air-cooled or expanded blast furnace slags, without the inclusion of other materials.</p>	<p>A hollow masonry unit made from locally sourced pozzolanic material, recycled brine, recycled product as aggregate, curing naturally, without heat.</p>
<p><b>Compressive Strength in PSI</b></p>		
<p>per ASTM C90-12</p> <p>Total weight supported depends on the block size, shape, content and structure type</p>	<p>1,800 to 2,500 psi for a standard 8x8x16 inch unit (as is without additional reinforcement)</p>	<p>2,500 to 3,500 psi for a standard 8x8x16 inch unit (as is without additional reinforcement)</p> <p>The initial psi strength of a Partanna Masonry Unit can be increased through slight changes in mix ratios if desired.</p> <p>The process of carbonation also increases the strength in psi of Partanna masonry throughout the lifespan of the product.*</p> <p>In a saltwater environment, the alkaline conditions supply additional capacity to increase strength through a reaction of dissolved salts in the sea water with Partanna masonry material.*</p> <p>*See Partanna section under Sustainability/Longevity below.</p>

<b>Configurations</b>		
Shapes	2,4,6,8,10,12,16 inch units with multiple standard shapes and special units / full-blind, half-blind and thru-hole	2,4,6,8,10,12,16 inch units with multiple standard shapes and special units / full-blind, half-blind and thru-hole (same availability as a CMU)
Face Shell & Web Thickness of a nominal 8" unit	Face Shell Thickness: 1 1/4 inches Web Thickness: 3/4 inch	Face Shell Thickness: 1 1/4 inches Web Thickness: 1 1/4 inches
Face Shell & Web Thickness of a nominal 4" unit	Face Shell Thickness: 3/4 inches Web Thickness: 3/4 inch	Face Shell Thickness: 1 inch Web Thickness: 1 inch
Weight	A standard 8x8x16 inch, thru-hole unit is 28 to 38 lbs.	A standard 8x8x16 inch, thru-hole unit is 25 to 28 lbs.
Finishes	The most common type of CMU is a smooth faced block. The exterior face of the block is a flat and level surface. The block face is not actually smooth to the touch, but it gives the appearance of a smooth building. CMU can include several options for appearance to give a concrete block building a custom look that will improve the aesthetic of any facility. Those Architectural options include Split Face, Burnished Finish, Scored, Ribbed, Ground Blasted, Sandblasted, Raked, Glazed, Offset, Slumped and Custom Color.	The most common type of Partanna Masonry Unit is smooth faced block. The exterior face of the block is a flat and level surface. The block face is not actually smooth to the touch, but it gives the appearance of a smooth building. Partanna Masonry can include several options for appearance to give a concrete block building a custom look that will improve the aesthetic of any facility. Those Architectural options include Split Face, Burnished Finish, Scored, Ribbed, Ground Blasted, Sandblasted, Raked, Glazed, Offset, Slumped and Custom Color.

Sustainability		
Carbon Emissions vs. Carbon Absorption	Each block results in 37 lbs of CO <sub>2</sub> being EMITTED. Depending on the formula and manufacturing, between 298 and 405 kg/m <sup>3</sup> of CO <sub>2</sub> is emitted during clinker production.	<p>One Partanna CMU block avoids the emissions associated with a traditional CMU block and ABSORBS 19 lbs of CO<sub>2</sub>. Partanna actively removes carbon from the atmosphere at a rate of 0.72 kg CO<sub>2</sub>/m<sup>3</sup>/yr. Partanna avoids the high heat and energy required in clinker production. It does not require energy-intensive carbon capture and storage and instead absorbs carbon passively, through direct air capture without requiring CO<sub>2</sub> bottling, transportation or injection..</p> <p>* Values slightly vary depending on specific details of manufacturer</p>
Longevity	<p>Although Portland-cement based concrete mixes can carbonate, this process is not desirable as it can cause the decalcification of the main strength providing phase. The formation of a highly porous form of silica due to the carbonation can lead to lower strengths in PC-based mixes.</p> <p>Portland cement based mixes also lose strength in a saltwater environment, leading to degradation of material and structure. Therefore, these structures need to rebuild or replaced more frequently.</p>	<p>Partanna binder components absorb CO<sub>2</sub> as they cure in the presence of water, through a chemical reaction called carbonation. Since nearly all environments contain carbon dioxide and some water, the absorption continues throughout the life of the product. The process of carbonation also increases the strength in psi of Partanna masonry throughout the lifespan of the product.</p> <p>Partanna has the unique ability to become stronger in seawater instead of falling apart. Thus, structures made with Partanna are more resilient and have significantly less need to be rebuilt over time, further lessening the impact of construction waste and carbon emissions.</p> <p>In a saltwater environment, the alkaline conditions supply additional capacity to increase strength through a reaction of dissolved salts in the sea water with the Partanna concrete material. This reaction does not rely on</p>

		<p>consumption of the materials that make the water alkaline, rather they provide a condition under which those reactions will go forward. Hydraulic cement is cement that sets and hardens by chemical reaction with water (hydration) and is capable of doing so under water (ACI 225R). The hydration reactions result in the formation of calcium silicate. The process requires time and moisture. It is not an infinite reaction. Full hydration (chemical reaction) will be reached over time (decades) depending on available moisture.</p>
<p><b>Cost</b></p>		
<p>* Price ranges shown here are based on average US retail prices in 2022/23. Prices also vary based on region, availability and type of raw materials.</p>	<p>The most standard configuration is the 8x8x16 inch, thru-hole block (non-decorative, non-split face) that currently sells for \$1.25 - \$3.00 each, uninstalled.</p>	<p>The most standard configuration is the 8x8x16 inch, thru-hole block (non-decorative, non-split face) that currently sells for \$2.00 to \$3.50 each, uninstalled.</p>
<p><b>Ratings</b></p>		
<p>Fire Resistance Rating for an 8-inch CMU (unit only, not wall assembly) with empty cores</p> <p>Source: UL Fire Resistance Directory; Tested in compliance with ASTM E119</p>	<p>2 hours for standard 8x8x16 inch unit, using medium weight aggregate with an equivalent thickness of 4.0 inches and solid ratio of 53%.</p>	<p>4.8 hours for standard 8x8x16 inch unit, using expanded shale with an equivalent thickness of 3.6 inches and solid ratio of 45%.</p>

Thermal Resistance (R) and Transmittance (U) Ratings for 8-inch CMU, 85% density with empty cores	U: 0.391 R: 2.56	U: 0.391 R: 2.56
Sound Transmission Rating (STC) for 8 inch CMU with empty cores	42	42