

Sustainable Concrete Solutions for LEED for Homes

LEED for Homes, created by the US Green Building Council, (USGBC), establishes a construction program for housing built upon the criteria of previous Leadership in Energy & Environmental Design (LEED) rating systems. The many sustainable benefits of concrete technologies provide residential architects and builders with solutions that can help a project more easily qualify for certification.

What is LEED for Homes?

LEED for Homes (LEED-H) was released by the USGBC in January, 2008. The program is intended to cover single-family houses, production and custom, as well as low-rise multifamily applications of three stories or less. The stated goal of the USGBC is to provide a residential sustainability system that transforms the design of mainstream homes. Designers and homebuilders can differentiate themselves by providing homes that are recognized as high-quality green homes. Homeowners can rely on an easily recognizable “brand” when purchasing a sustainable home. Table 1 shows the various certification levels and the number of points required for a home to meet each level. Table 2 provides a listing of the LEED-H Resource Categories where concrete can contribute to a project’s qualifying for certification.

Table 1: LEED for Homes

Certification Levels and Points

LEED for Homes Certification Levels	Number of LEED for Homes Points Required
Certified	45 - 59
Silver	60 - 74
Gold	75 - 89
Platinum	90 - 136
Total Available Points	136

How can home sites benefit from sustainable concrete technologies?

Contaminated soil can be reclaimed to make brownfield site reuse possible. Segmental masonry retaining walls reduce erosion potential on steeply sloped sites. Lot coverage can be minimized by using concrete basements to provide cost-effective additional space. Studies show concrete pavements reflect heat, keeping sites cooler. Captured runoff can be absorbed through interlocking permeable and pervious concrete pavements.

What about the exterior envelope?

Above-grade concrete wall systems deliver on durability, providing unparalleled disaster and wind resistance. Unlike conventional systems, they're inherently fire and pest resistant, will not promote the growth of mold and mildew, and will not decay. Panelized systems virtually eliminate construction waste. The cement in concrete systems can be supplemented with industrial by-products like fly ash, reducing burdens on landfills.

How about concrete finishes?

Finishes also have a big impact on the long term performance of a home. On the outside, the hardness and durability of exposed concrete, concrete masonry, or applied concrete finish systems like stucco or fiber cement siding and trim, will provide durability to reduce the frequency and cost of maintenance and replacement. Concrete roof tiles adhere more effectively in high winds, stand up to hail and fire, and last far longer than ordinary shingles.

And the indoor environment?

Inside, airtightness is improved because the continuous concrete wall systems reduce joints and penetrations. Higher levels of insulation, and the thermal mass of the concrete, make mechanical systems more efficient and more effective in maintaining good indoor air quality, with more constant temperatures and fewer drafts. Concrete floor systems can provide rich, high-quality, water-resistant floor finishes. Concrete roof tiles have been shown to keep attics cooler, further reducing mechanical loads.

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Table 2: LEED for Homes			
Potential Contribution to Project Credits - Sustainable Concrete Benefits			
Resource Category	Credits	Resource Sub-Category	Concrete Benefit
ID - Innovation and Design Process	Prerequisite	ID 2.1 Durability Planning (Pre-Construction)	Unparalleled disaster and wind resistance, durable long lasting finishes, low maintenance, less frequent replacement, mold and mildew resistance
		ID 2.1c Indoor Moisture Control	
LL - Location and Linkages	1.0 - 2.0	LL 3.2 Infill and/or LL 3.3 Previously Developed	Portland cement for soil solidification and stabilization to reclaim previously contaminated sites
SS - Sustainable Sites	1.0	SS 1.2 Minimize Disturbed Area of Site	Add more useable floor area with insulated concrete basements
	1.0	SS 3 Local Heat Island Effects	Standard concrete pavement with high solar reflectance
	1.0 - 4.0	SS 4.1 Permeable Lot	Use of cast-in-place pervious concrete or permeable interlocking modular concrete pavers
	1.0	SS 4.2 Permanent Erosion Controls	Use of concrete masonry for segmental retaining walls to control erosion on steep slopes
	0.5 - 1.0	SS 5 Nontoxic Pest Control	Concrete wall, floor and roof systems eliminate invasive, expensive and environmentally hazardous chemical termite treatments needed with wood framing
WE - Water Efficiency	1.0 - 5.0	WE 1.1 Rainwater Harvesting System	Capture and control of rainwater and graywater with concrete cisterns
		WE 1.2 Graywater Reuse System	
EA - Energy and Atmosphere	Prerequisite	EA 1.1 ENERGY STAR Performance	Unparalleled combination of high R-values, very low air infiltration, and thermal mass benefits of exterior walls
	2.0 - 34.0	EA 1.2 Exceptional Energy Performance	
	2.0 - 5.0	EA 2 Insulation EA 3 Air Infiltration	Inherent continuity of insulation and air barrier in concrete wall systems simplifies on-site detailing and required inspection procedures
MR - Material and Resources	4.0	MR 1.5 Off-Site Fabrication	Panelized concrete wall, floor, and roof systems can all be manufactured off-site to reduce waste
	0.5 - 3.5	MR 2.2 Environmentally Preferable Products	Concrete exterior walls and foundations with recycled fly ash or slag, recycled content in fiber cement siding, concrete masonry, concrete patios, countertops, and roof tiles, sealed concrete floors as alternative to high waste volume generated by carpet. All potentially locally derived materials.
	0.5 - 3.0	MR 3.2 Construction Waste Reduction	Demolished concrete can be crushed and reused as base material or fill
IEQ - Indoor Environmental Quality	13.0	EQ 1 ENERGY STAR with Indoor Air Package	Durable exterior envelope, effective mold and moisture resistance, reduced air infiltration, non-toxic pest control alternative, low-VOC sealed concrete floors
AE - Awareness and Education	Prerequisite	AE 1 Education of the Homeowner	Concrete systems are more durable, long lasting, presenting home owners with a more trouble free low maintenance environment

The information presented is intended to highlight and summarize the ways concrete can contribute to the ability of a home to qualify for points under LEED for Homes. The reader should consult the latest version of LEED-H for specific compliance requirements. More detail can be found at the US Green Building Council Site, www.usgbc.org. For more information on cement and sustainability visit the Concrete Thinker site at www.concretethinker.com.

Bottom Line:

By using concrete systems and finishes, homebuilders and designers can more easily achieve LEED-H certification for their homes. Whether through contributions based on the resource categories outlined here, or through accepted submissions for sustainable innovation credits, a concrete home provides the long-term, high-quality residential performance the USGBC is striving to encourage with LEED for Homes.

To learn more about the sustainable benefits of concrete www.cement.org
www.concretethinker.com



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