VitroMinerals
SUSTAINABLE GLASS PRODUCTS

VCAS™ Pozzolans and LEED™

WHAT IS LEED™?

Leadership in Energy and Environmental Design(LEED)™ is a national standard developed by the United States Green Building Council to certify high-performance, sustainable buildings. Currently, there are six LEED-standards available for use or under development; however LEEDNC for new construction and major renovation, is the most widely used standard. Two versions of LEED-NC are currently used by practitioners: Version 2.1 and Version 2.2. Version 2.2 is the current version but Version 2.1 can still be used for projects that were registered prior to January 1, 2006.

LEED-NC™ utilizes a system where points are awarded for achieving specific levels of sustainable performance in six categories: sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and innovation in design.

Achieving LEED-NC™. Points with Concrete

Concrete is a superior material for building sustainable structures. Among its other attributes,it is durable, uses abundant, local materials in its manufacture, has high reflectivity for reduced urban heat island effect, and utilizes thermal mass to contribute to energy efficiency. In LEED-NC™, concrete can contribute in whole or in part toward 25 points that contribute to LEED-NC™ certification. At lease 26 points are required for LEED-NC™ certification and a total of 69 points are available from all credit categories.

VCAS POZZOLANS CAN:

- Reduce virgin material used in the manufacture of concrete
- Reduce disposal and increase use of a recovered industrial material
- Reduce cementitious material needed to achieve a specified strength Improve service life through greater concrete durability
- Increase whiteness/reflectivity of concrete
- Reduce energy by 3.5 million BTUs/ton cement replacement
- Reduce CO_2 emissions by 2000 lbs/ton cement replacement

VCAS™ pozzolans are value-added supplementary cementitious materials that exhibit pozzolonic activity comparable to silica fume and metakaolin when tested in accordance with ASTM C618 and ASTM C1240. VCAS pozzolans react with calcium hydroxide produced during the hydration of Portland cement to form additional cementitious compounds such as calcium silicate and alumino-silicate hydrates. Pozzolans are widely used in cement and concrete technology to increase concrete strength, density, and resistance to chemical attack as well as efflorescence control. The white color of VCAS is especially suited to architectural and decorative concrete products.

EARNING LEED™ CREDITS

LEED™ Points and any resulting certification can apply only to a finished building. There are no LEED™ certified products! There are only products that contribute to obtaining LEED certification. The architect working on a LEED™ certified building will be asking all his suppliers to provide products that contribute to his total LEED™ points. It will be up to the supplier to document how their product contributes in a certain LEED™ point category. A case can be made that concrete can contribute in whole or in part to 25 of the maximum 69 LEED™ points in LEED™ NC version 2.2 . However, with architectural precast products, the primary contributors will be recycled content and sourcing within 500 miles. The architect will add up the dollar value of all the recycled content of every component of the building and determine whether the total building meets a 10% (1 point) or 20% (2 points) recycled content threshold. Similarly, if 20% of the value of the building components are sourced within 500 miles, another point is earned. If 50% is within 500 miles, two points are earned. The LEED™ certification standards are evolving and increasing focus will be placed on maximizing LEED™ points attributes in every category possible.

MAKING CONCRETE GREENER WITH VCAS POZZOLANS

VCAS White pozzolans are a by product of reinforcement fiberglass made in a glass furnace. VCAS can replace 15-50% of cement powders used in concrete that adds sustainability to architectural precast products.

EARNING LEED CREDITS

MR 4.1 and 4.2 calculate the recycled content of every component of an entire building. The recycled content of any concrete component can be calculated in one of two ways. Option 1 is to calculate the value of cement, sand, gravel, pozzolans, rebar, admixtures, etc. Divide total cost of recycled material by total cost of all materials and you have a percentage of recycle content. An alternate method of calculating recycled content is allowed in LEED-NC version 2.2. This method calculates the value of cement versus the value of supplemental cementitious materials (such as VCAS). The recycled content of option 2 is the value of supplemental cementitious materials against the value of the cement.

VCAS Pozzolans can help achieve all of part of 9 points in the Leed-NC system. The specific credits are listed in the table below.

Category	Credit	LEED ver.	Description	Possible Points	Potential VCAS Pozzolan Contribution Vitro Minerals
Sustainable Sites	7.1	2.1 and 2.2	Heat Island Effect: Non Roof	1	VCAS Pozzolan is a white material which makes concrete more reflective than other cementitious materials.
Materials and Resources	MR 1.1 and MR 1.2	2.1	Maintains 75% and 100% of Existing Walls, Floors and Roof	2	VCAS Pozzolans can extend a structures useful service life because it improves concrete durability, corrosion resistance, sulfate attack and alkali-silica reaction.
		2.2	Maintains 75% and 100% of Existing Walls, Floors and Roof	2	
Materials and Resources	MR 4.1 and MR 4.2	2.1	Recycle Content: 5% and 10% of Total (Post Consumer at 100% and Post Industrial at 50%)	2	VCAS is a post-industrial material that contributes to the total recycled content of the structure.
		2.2	Recycle Content: 10% and 20% of Total (Post Consumer at 100% and Post Industrial at 50%)	2	
Materials and Resources	MR 5.1	2.1	Regional Materials: 20% Manufactured Regionally	1	VCAS White Pozzolans are sourced in Tennessee and South Carolina. Vitro Minerals can provide point of origin so the 500-mile radius requirement can be calculated for each project.
	MR 5.2	2.1	Regional Materials: 50% Manufactured Regionally	1	
	MR 5.1 and MR 5.2	2.2	Regional Materials: 10% and 2 20% Extracted, Processed & Manufactured Regionally	2	
Innovation in Design	ID 1.1	2.1 and 2.2	Credit Interpretation Ruling 1De11, Reduction of Total Portland Cement Content for Cast-in-Place Concrete	1	This Credit is meant to reduce greenhouse gas emissions in concrete. VCAS can replace up to 50% of Portland cement which reduces CO_2 emissions on a pound-for-pound basis.
Innovation in Design	ID 1.2	2.2	Exemplary Performance	2	Additional points can be obtained by exceeding the requirements of MR Credits 4 and 5. If a project demonstrates 30% or greater total recycled value, an additional point can be earned. Another point can be earned if a project demonstrates 40% or greater for regionally extracted, harvested and manufactured materials

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