

# Cementitious Grout *and* LEED Certification

*Detailed information on the LEED program and project certification process is available on the USGBC website, [www.usgbc.org](http://www.usgbc.org).*

## EXECUTIVE SUMMARY

The U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) certification program has been embraced worldwide and is the predominant green building certification system in the US. Success with the goals of the LEED certification process—environmental performance, improvement of occupant well-being, and economic return—are well documented, and the program continues to evolve with the addition of new ratings systems.

As the program evolves and grows, so too does the need to understand the fit—both in cost and performance—of a wide range of effective materials and processes to meet the requirements.

As product use alone does not provide LEED points, the information in this white paper focuses on identifying the LEED categories and options where cementitious grouts can be valuable contributors to the goal of LEED certification for a building project.

Not all cementitious grouts are created equal, nor is the ease-of-use, effective performance, and companies manufacturing and providing the technical expertise behind those grouts. Hence, the information that follows is attuned specifically to the grout products produced by US Grout and distributed and supported world-wide by Avanti International.

CONSULTATION on the LEED-specific information in this white paper was provided by Sarah Andrews CSI, CDT; LEED AP BD+C; a member of the USGBC Faculty and an AGC Approved Instructor

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## Possible LEED Points Available Using Cementitious Grout Products

**BROWNFIELD REDEVELOPMENT AND REMEDIATION:** *Rehabilitate damaged sites, reducing pressure on undeveloped lands.*

- US Grout Microfine and Ultrafine pozzolanic cementitious grouts can be used to solidify and stabilize contaminated soils and reduce leachate concentrations to below regulatory levels. The grouts fully permeate soils, effectively eliminating or substantially mitigating water infiltration and exfiltration of contaminants in polluted soils. Cementitious grouts are economical, effective, enduring, and non-hazardous to use.

The original formulation for the US Grout product was developed by the U.S. Department of Energy's Sandia National Laboratory to seal microfractures in the salt rock



*Pozzolanic cementitious grouts economically stabilize soils and mitigate leachate*

around the underground isolation chambers at the DOE's Waste Isolation Pilot Plant (WIPP). The grout successfully penetrated and sealed microfractures as small as 6 microns against water infiltration from without and the migration of radionuclides and other contaminants from within.

While US Grout products continue to effectively seal fractures in the rock of tunnels, mines and storage caverns throughout the world, the same cementitious grout formulation is also used to effectively and efficiently penetrate soils in a variety of geotechnical stabilization and strengthening projects.

It's true that cementitious (suspended-particle) grouts are often rejected as unsuitable for soil-improvement projects when the soil structure contains fine-grained sands or silts that resist complete and effective suspended-particle grout permeation. It's also true that soil types and compositions vary widely—even within the same project site.

US Grout, in recognition of the above facts, tweaked their patented grout formulation and developed a demand-driven product (type VX) that utilizes a variable-dosage liquid superplasticizer (USG-Super) that allows for quick, effective, and complete permeation of a wide range of soil types. This gives geotechnical engineers an economical, environmentally benign, non-hazardous, chemical-free solution to reclaiming and rehabilitating otherwise unusable sites.

SEE ALSO: [www.usgrout.com](http://www.usgrout.com)

**VARIOUS CATEGORIES:** *Sustainability and Environmental Considerations addressed by utilizing permeation grouting.*

■ If a potential site meets the LEED Site Selection criteria and/or is located in a developed area with existing infrastructure, but is found to have existing soil conditions that do not support the project in terms of soil stability, load-bearing capacity, compaction requirements—or any of the other concerns brought on by poor native soil or underlying structure—it need not be rejected outright. A demand-adjustable soil-permeating cementitious grout can be employed to provide the needed soil stability and/or compressive strength for a building, thus reducing the environmental impact in undeveloped areas or greenfields. The flexible mix design of the US Grout VX product in particular makes it viable in many soil types. Sites that were built up using indiscriminate infill methods, soil types, and junk fills can often be stabilized and made usable with permeation grouting.

■ If, following the performance of a site assessment study to assess pre-design conditions, the soils of a potential site are not up to engineer-specified requirements for supporting a larger structure (or if the soil anatomy contributed to the demise of the existing structure), permeation grouting with a cementitious grout can provide the proper conditions necessary to provide load-bearing capacity, control ground water infiltration below grade, or meet other code requirements, such as the strict code requirements in high rainfall and/or earthquake-prone regions concerning building on soil types susceptible to liquefaction.

*LEED Category and credits possible using a cementitious grout product:*

- 1) **Location and Transportation** – Sensitive Land Protection, Surrounding Density and Diverse Uses
- 2) **Sustainable Sites** – Site Selection, Site Assessment, Site Development – Protect or Restore Habitat, Open Space

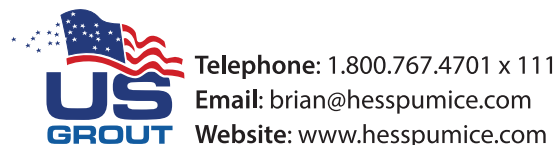
**REDUCE CEMENT CONTENT:** *An Innovation in Design credit may be available if a portion of the cement in concrete (or cementitious grout) is replaced with supplementary cementitious materials (SCMs).*

■ The US Grout cementitious grouts are unique in the marketplace in that the formulation replaces a portion of the Portland cement with pumice—a natural pozzolan that ignites an extremely beneficial secondary reaction within the curing grout that consumes deleterious byproducts from the Portland cement-meets-water hydration reaction. This “molecular reclamation” reaction both mitigates the problems caused by the deleterious compounds and effectively densifies and strengthens the grout.

SEE: *detailed explanation of the pozzolanic reaction at [www.usgrout.com/pozzolanic-charge-defined.html](http://www.usgrout.com/pozzolanic-charge-defined.html)*

Please consult a LEED accredited professional for the latest details of meeting LEED requirements for certification.

—by **Brian Jeppsen**, VP-R&D, US Grout LLC



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