

GreenFill – An Innovative, 100% Recyclable, Controlled Low Strength Material

Flowable is an economical alternative to compacted granular fill, offering savings in terms of equipment cost, labor and time. Placing Flowable fill does not require people to enter an excavation, thus eliminating a significant safety concern. Since it does not need manual compaction, trench width can be significantly reduced. CLSM is an excellent solution for filling inaccessible areas where compacted soil cannot be placed.

Alchemy Geopolymer Solutions, LLC, (AGS) has developed Controlled low-strength material (CLSM) with 100% Green, recyclable material, which deploys geopolymer binder technology. The product, named *GreenFill*, utilizes only recyclable materials, offers a competitive price, significant green credits toward LEED certifications, an enhanced passivation protection for metallic pipes as well as offers high level of control over long-term strength gain, a challenge with conventional CLMS materials.

AGS mix design was subjected to a range of ASTM standards to confirm adherence to specifications commonly listed for flowable fill applications. Fresh and hardened properties of the AGS *GreenFill* product are listed in the table below

ATTRIBUTE	DESIGN PARAMETERS
Fly ash and aggregate	2,250 lbs/ yd ³
Water to Fly ash ratio	0.35 - 0.40
Air Content (ASTM D 6023)	20 - 30 %
Unit Weight (ASTM D 6023)	115 ± 5 pcf
Flowability (ASTM D 6103)	6 - 13 in.
Compressive strength (ASTM D 4832)	
Excavatable / Removable	35 - 200 psi
Non-excavatable	300 - 1200 psi

Additional information:

- a. AGS *GreenFill* is the overall most cost-effective option available in the flowable fill marketplace in North America.
- b. The product offers self-compacting and self-leveling characteristics.
- c. No air entraining admixture are needed to obtain the desired air content.
- d. The consistency of the CLSM slurry is such that the material flows easily into all openings between the hunches of the pipe and the bottom of the trench, providing uniform support around the invert region of pipeline.