GraniteCrete™
Permanent. Permeable. Natural.
THE FUTURE OF PAVING

# Submittal Forms for Granitecrete®

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GraniteCrete™

Permanent. Permeable. Natural.

www.granitecrete.com

# Life-Cycle Cost Analysis

GraniteCrete initially costs more than traditional concrete flatwork. However, GraniteCrete is permeable and costs less than permeable concrete. It also has less of a maintenance issue. The use of GraniteCrete is accompanied by cost *savings* in the following areas: labor and time, equipment, and environmental.

**Labor and Time:** GraniteCrete requires less start-up time than traditional paving options. The prep work for a GraniteCrete installation consists solely of excavation, and base rock installation. There is no rebar used in GraniteCrete like with traditional concrete.

The disposal cost for GraniteCrete is the same as traditional concrete. It can be recycled, and spoils can either be left on-site, or reused.

**Equipment:** GraniteCrete uses standardized equipment similar to that used for concrete, so there are no additional expenses for specialized equipment. It does not require the use of a concrete drum truck or volumetric mixing truck; however, a volumetric mixing truck can be used for larger installations, if desired.

**Environmental:** As a permeable product, GraniteCrete meets stormwater C.3 requirements; the use of it contributes to stormwater management, flood control, and reduces repairs needed due to water runoff or weather erosion.

GraniteCrete also reduces the heat-island effect, leading surface temperatures to stay cooler.

GraniteCrete prevents weed and gopher infestation.

**Initial Costs:**

**Purchase -** $2.01 per cubic yard at 4" depth

**Acquisition -** MSRP before tax is $55 per 85 pound bag of GraniteCrete admixture for retailers

**Construction -** Dependent on number of labor employees, the depth of the lift, size of the installation, and accessibility of the installation site

**Fuel Costs:** Dependent on quantity of product and installation location. GraniteCrete is a sustainable product, and **on-site aggregates can be used instead of decomposed granite.**

**Maintenance Costs:** Same as concrete.

**Repair Costs:** GraniteCrete costs less than concrete to repair, because it's easier to sawcut and demolish, and spoils can be left on-site.

**Replacement Costs:** To replace GraniteCrete would be the same as the initial installation cost. It can be re-used at the same installation site.

**Longevity:** 20+ years

# GraniteCrete Specification Guide

**CRUSHED AGGREGATE BLENDED WITH GRANITECRETE ADMIXTURE SURFACING**

**COORDINATE WITH DRAWINGS:** Show location and extent of stabilized aggregate surfacing. Show details required at adjoining materials and special conditions. The depth of base course and the thickness of stabilized aggregate surfacing can be either shown on the drawings or described in the specifications; edit this section carefully to avoid conflicting requirements.

**FOR MORE INFORMATION:** Contact GraniteCrete Incorporated, www.granitecrete.com, email info@granitecrete.com, or call (800) 670-0849.

## PART 1: General

**1.1** SUMMARY

**A.** Section Includes: Crushed aggregate blended with GraniteCrete admixture surfacing

**B.** Related Work:

1. Section – Earth Moving [fill in here]: Grading
2. Section – Base Courses [type]: Base Course

**1.2** REFERENCES

**A.** ASTM C136-Sieve Analysis of Fine and Coarse Aggregates

**B.** ASTM D2419- Sand Equivalent Value of Soils and Fine Aggregates

**C.** Caltrans Standard Specifications for Public Works Construction

**D.** RIS-Redwood Inspection Services Grades of California Redwood

**1.3** SEQUENCING

**A.** Do not install work specified in this section prior to acceptance of earth moving. Coordinate work specified in this section with work specified in other sections to minimize cutting of - and operation of - heavy equipment over newly-installed surfacing.

**B.** Submit in accordance with Section [ ]--Submittal Procedures

a. Manufacturer's product data sheet and installation instructions indicating that product complies with specifications for:

i. Crushed aggregate blended with GraniteCrete admixture surfacing

ii. Edging [ ]

b. Submit a quart jar size [ ] sample[s] of crushed aggregate with admixture in color[s] specified [in manufacturer's standard colors for selection].

c. Redwood Edging: Submit evidence of chain-of-custody in accordance with Forest Stewardship Council

**1.4** QUALITY ASSURANCE/FIELD QUALITY CONTROL

A. GraniteCrete Approved Installers can be found on our website here: Professional Installation.

1. Installations 500 square feet and over up to 3,000 square feet – must be a recommended installer at a minimum. Installations 3,000 square feet and over – must be an Approved Installer.
2. An installer not approved, but with sufficient experience for the project as determined by Granitecrete, Inc., may fulfill this requirement by providing a current letter from Granitecrete, Inc. verifying their ability to complete a successful installation for this specific project. For assistance, contact GraniteCrete, Inc. at (800) 670-0849.
3. For installations 3,000 square feet and over - if the installer is not approved as noted above, GraniteCrete, Inc. requires a mandatory Pre-Construction Meeting on site with the company representative. The installers, foreman,and supervisor managing the installation are required to attend the meeting.
4. A representative from GraniteCrete, Inc. will also observe the installation on-site until the company feels confident the installer will successfully install the product to their specifications and satisfaction.
5. The installation instructions in this Specification are meant as a guide for bidding purposes and will be superseded by the approved Submittal of installation instructions from GraniteCrete, Inc., and any field direction provided by the company representative.

6. GraniteCrete, Inc. does not offer a warranty on any installation - even if completed by an Approved Installer - only on the product, bag-to-bag.

**B**. Porous Base Rock Testing:

1. Testing shall occur during installation at [ ] ton increments of shipping for sieve conformance. Results shall be submitted prior to completion of the stone base installation.
   a. The stone field area shall have a permeable rate no less than 14" per hour. The testing shall be per Din 8035 Part 7, ASTM 2434 (constant head), or ASTM F2898 testing methods.
   b. In addition to the lab testing, after installation of any aggregate base cross-section, designed to conduct rainfall to the sub-soils and/or under-drain system, the finished aggregate base shall be tested, *in situ* for infiltration rate, using method ASTM F2898. **The test shall be performed by a registered Geotechnical Engineer or certified agronomist.**
2. The Contractor is responsible to meet this performance specification, before proceeding with installation, and shall bear the cost of the on-site testing and the cost of any additional work necessary to achieve compliance with the specification.
3. All test results shall be logged and documented by the Owner's Technical Representative or Geotechnical Engineer. If at any time the processed stone base does not meet specifications, it shall be the Contractor's responsibility to restore, at his expense, the processed stone base to the required grade, cross-section and density.
4. After the contractor has independently confirmed compliance with all the above tolerances (planarity and elevation verified by a licensed surveyor and compaction, gradation, & permeability verified by Geotechnical Engineer, he shall notify the appropriate party and schedule a final inspection for approval. The contractor shall make available an orbital laser system to the Inspection Team for the inspection process.
5. The compaction rate for porous base rock should be 88%. The compaction rate for non-porous base rock should be 95%.

**C.** Standard Specifications: Shall mean the California Department of Transportation Standard Specifications, latest active edition.

## **1.5** MOCK-UP

**A.** Construct mockup of [ ] square feet minimum of crushed aggregate blended with GraniteCrete admixture surfacing, including [base course and] edging, at location approved by [Architect] [Engineer] [Owner's Representative]. Build mockup [ ] days prior to installation. Intent of the mockup is to demonstrate surface finish, texture, color and standard of workmanship

**B.** Notify [Architect] [Engineer] [Owner's Representative] [ ] days in advance of mockup construction.

**C.** Allow [Architect] [Engineer] [Owner's Representative] to view and obtain approval of mock-up before proceeding with rest of crushed aggregate blended with GraniteCrete admixture surfacing.

**D.** [Approved mock-up may remain as first in place construction] [Remove mock-up after acceptance of work specified in this Section.]

**1.6** DELIVERY, STORAGE, AND HANDLING

**A.** Deliver all GraniteCrete Admixture [bags] [bulk] materials in original, unopened packaging. Protect materials and aggregate from contamination with foreign matter. Store under waterproof cover and protect from dampness.

**1.7** FIELD CONDITIONS

**A.** Do not install crushed aggregate blended with GraniteCrete admixture surfacing when sub-base is wet at saturated field capacity.

**B.** Do not install GraniteCrete materials during rainy conditions or below 40 degrees Fahrenheit.

## PART 2: PRODUCTS

**2.1** CRUSHED AGGREGATE BLENDED WITH GRANITECRETE ADMIXTURE SURFACING MATERIALS.

**A.** Acceptance Manufacturer:

1. Specification is based on products by GraniteCrete, Inc.
   419 Webster Street, Suite 202
   Monterey, CA 93940
   Phone: (800) 670-0849; Fax: (800) 670-0849

www.granitecrete.com

GraniteCrete admixture is an all-natural product and does not contain oils, polymers, resins, or enzymes.

2. Substitutions: [Not allowed.] [Products by other manufacturers that comply with specifications will be considered in accordance with Section [ ]-Instructions to Bidders. [ ] –Substitution Procedures.

**B.** Decomposed Granite (DG), crushed aggregate.

1. DG shall have a 3/8” maximum gradation, produced from naturally friable rock/granite with enough fines to produce a smooth walking surface. Materials should be free from clay lumps, organic matter, and deleterious material. Blends of coarse sand and rock dust are not acceptable.
2. Use a single supply source for the entire quantity required.
3. Gradation, in accordance with ASTM C136:
4. Color: Should have gold to yellow hues. To be selected by [Architect] [Engineer] from manufacturer’s standard colors.
5. Supplier: Vineyard Rock Products, Hollister, CA. - (831) 637-6443[Or equal].

**C.** Aggregate binder: Provide GraniteCrete Admixture. Color: [Ash Gray] [Carmel Coast] [Charcoal Gray] [Desert Sand] [Natural Gold] [Sonora Adobe]

## 2.2 BASE COURSE MATERIAL

**A.** Class II Permeable Base Rock.

**B.** Soft stone materials (i.e. sandstone, limestone and shale materials) are not suitable. Stone supplier shall certify that all supplied stone will be clean of this type of stone. All types of stone shall meet the following stability requirements.

| TEST METHOD | CRITERIA |
|---|---|
| LA Abrasion (Calif. Test 211) | Not to exceed 40 |

| | |
|---|---|
| Durability Index (Calif. Test 229) | Not less than 40 |

In addition, if stone stability to water and vehicles is in question, Owner has the right to perform additional testing to ensure material shall adhere to requirements of Caltrans Section 68, as well as additional applicable ASTM tests.

**C.** All testing fees shall be paid for by the Contractor.

**D.** Permeable Stone: Stone base materials shall be washed, 100% fractured**,** by mechanical means, with elongated characters on each individual particle larger than 1/4”. Materials shall be devoid of mineral fines. All particles smaller than 1/4” shall be produced by manufactured means only. Rounded sands or aggregates are prohibited.

**E.** Delivery Moisture Content: Processed stone shall contain 90% to 110% of the optimum moisture content to ensure that fines do not migrate in transit or during placement and to facilitate proper compaction. The contractor shall ensure that aggregate leaving the source plant meets this requirement. The contractor is required to apply water to the processed stone on site to attain and maintain this minimum moisture content.

**F.** Aggregate or aggregate blends of permeable stone shall conform to the following gradation (please note this is for **base rock**, not for GraniteCrete):

| SIEVE | Sieve Sizes Metric (mm) | Percent Passing by Weight* **Intended Result** | Range |
|---|---|---|---|
| 1” | 25.0 | 100 | 100 |
| 3/4” | 19.0 | 100 | 90-100 |
| 3/8” | 9.52 | 78 | 40-100 |
| No. 4 | 4.75 | 36 | 25-40 |
| No. 8 | 2.36 | 26 | 18-33 |
| No. 30 | 0.600 | 11 | 5-15 |
| No. 50 | 0.300 | 6 | 2-10 |
| No. 200 | 0.075 | 2 | 0-5 |
| Durability Index (CTM# 229) | | 40 min | |
| Sand Equivalent (CTM# 217) | | 70 | |
| LA Rattler (CTM# 211) | | 500 Revs, less than or = 40% | |

* AASHTO Test Method T-27

**G.** Specs for ⅜" minus and ¾" minus Crushed Aggregate Following ASTM D 1140-17:

100% fractured on all sides with no rounded particles
Sieve 200 - Non-expansive Clay Fines - **not to exceed 18%**

The below test is for ⅜" minus stone, at approximately 90% compaction when tested.

## GraniteCrete Sieve Analysis
## Cumulative Percent Passing

| Sieve Size | % Passing Sieve Ranges | |
|---|---|---|
| 1/2" | 100 | 100 |
| 3/8" | 95 | 98 |
| #4 | 85 | 90 |
| #8 | 75 | 85 |
| #16 | 55 | 70 |
| #30 | 38 | 57 |
| #50 | 24 | 33 |
| #100 | 15 | 24 |
| #200 | 9 | 18 |
| #400 | 0 | 9 |

**2.3** ACCESSORIES

**A.** Water: Free from contaminants that would discolor or be deleterious to crushed aggregate blended with GraniteCrete admixture surfacing.

**Installation:** Do not use a vibratory plate to compact the GraniteCrete. Use a lawn roller filled with water to compact the GraniteCrete. Use a 36" drum roller or walk-behind roller in **static position** for driveways and larger installations. It is highly recommended to use a volumetric truck for driveways and larger installations; if possible, the use of a paver is highly recommended as well.

**B.** [Steel [Edging]]:
1. Dimensions: [3/16”] [1/4”] [ ] thick by [4-inch] [] deep, with overlapping joints.
2. Stakes: 3/16” x 1-3/4” wide at top tapering to point at bottom; located 36” o.c. maximum.
3. Finish: [Basked-on [green] [brown] [black] paint.] [Hot dipped galvanized.]

**C.** [Redwood [Edging]]:
1. Material: RIS Merchantable Heart Grade [from sustainably managed forests as certified by the Forest Stewardship Council.]
2. Dimensions: Nominal [2x6] [ ] inches
3. Stakes: Steel, 3/16” x 16” long x 1-3/4” wide at top tapering to point at bottom; located 36” o.c. maximum.
4. Finish: Provide in color to be selected by [Architect] [Engineer] from manufacturer’s standards.

## PART 3: EXECUTION

**3.1** EXAMINATION

**A.** Examine grading and subsoil conditions. Do not proceed until conditions are acceptable.

**3.2** PREPARATION

**A.** Excavation: Excavate to depth required so edges of crushed aggregate blended with GraniteCrete admixture surfacing will match adjacent grades and have a maximum cross slope of 1 percent. [Remove excavated soil from site.]

**B.** Sub-grade Preparation: Comply with Caltrans Standard Specifications Section 301-1 – "Sub-grade Preparation."

**C.** Base Course Installation: Class II permeable base rock at 90% compaction.

**D.** [Edging]: Install flush with crushed aggregate blended with GraniteCrete admixture. Provide sufficient stakes to secure in place.]

**3.3** INSTALLATION: There are two installation methods for GraniteCrete: "Dry" and "Wet."

The **dry method** is for installations up to 500 square feet (most home applications). The **wet method** is for installations over 500 square feet (most large, commercial installations) and may require the use of a volumetric truck.

**GRANITECRETE INSTALLATION – GENERAL**

A. Mixing method:

1. Installations less than 500 square feet may be mixed on-site.
2. Installations 500 square feet and over up to 3,000 square feet, must be delivered pre-mixed to the site from a GraniteCrete Inc. approved pre-mix facility. Approved retailers and pre-mix facilities can be found on the company website www.granitecrete.com.
3. Installations 3,000 square feet and over up to 5,000 square feet must be supplied by an approved pre-mix facility; GraniteCrete Inc. recommends the use of a volumetric truck.
4. Installations over 5,000 square feet require the use of a volumetric truck.
5. The volumetric truck must be calibrated for the GraniteCrete mixture. Contact GraniteCrete, Inc. at (800) 670-0849 for a list of approved volumetric truck operators.

**The following installation instructions have been developed to help ensure a blemish-free, high-quality installation. While GraniteCrete looks similar to concrete, the installation of GraniteCrete follows a different procedure. For best results, follow the instructions below carefully. For assistance, contact GraniteCrete, Inc. at 800-670-0849.**

**Installation Depth (also known as "lift")**

For **residential/pedestrian applications**, GraniteCrete is installed as a 3-inch thick layer ("lift") over a 4-inch subgrade of compacted Class II base rock. For **commercial/light vehicular applications** such as driveways, bicycle paths and cart paths, GraniteCrete is installed as a 4-inch thick layer (lift) over a 6-inch subgrade of compacted Class II base rock. Compaction rates for all applications are 88%–92%.

**Please note:** GraniteCrete compacts approximately ¼" per 1" of lift.

**Measurements**

An online calculator to assist you with estimating the amount of material needed to complete your project can be found on the GraniteCrete website here: https://www.granitecrete.com/paving-materials-estimator/

Please note this is **only** an estimator and GraniteCrete, Inc is not responsible for the quantity of materials at the job-site.

**GraniteCrete:**

Residential/Pedestrian Application - (2 bag mixture) One cubic yard of aggregate/decomposed granite and two (85 lbs) sacks of GraniteCrete admixture combined covers 108 square feet at a 3-inch thickness. **Note:** Aggregate/decomposed granite should be 3/8" minus material and follow our sieve percentages in this Specification Guide within a +/- 5% range.

Commercial /Light Vehicular Application - (3 bag mixture) One cubic yard of aggregate/decomposed granite and three (85 lbs.) sacks of GraniteCrete admixture combined covers 82 square feet at a 4-inch thickness. **Note:** Aggregate/decomposed granite should be 3/8" minus material and follow our sieve percentages in this Specification Guide within a +/- 5% range.

**Class II Base Rock:**

Residential/Pedestrian Application - After final compaction, baserock should have a 4-inch depth.

Commercial/Light Vehicular Application - After final compaction, baserock should have a 6-inch depth.

## Mixing Ratios

**GraniteCrete:** Residential/Pedestrian Application – (2 bag mixture) The aggregate/decomposed granite (DG) is mixed with GraniteCrete admixture at a 19:1 ratio (19 units of DG to 1 unit of GraniteCrete, measured in volume).

Commercial/Light Vehicular Application - (3 bag mixture) The ratio for commercial applications is 12.5:1 (12.5 units of decomposed granite to 1 unit of GraniteCrete, measured in volume).

## Installation Instructions - "Dry" Method

1. **Class II Base Rock**: Moisten and compact base rock on the entire installation area to an even depth of 4-inch or 6-inch, depending on residential or commercial application. A vibratory plate can be used to compact the base rock; it should **not** be used to compact the GraniteCrete for residential installations.
2. **GraniteCrete:** Wheelbarrow the prepared GraniteCrete/DG mixture to the installation site and place a layer of the mixture to one-half of the desired final lift. Be sure to spread the mixture out before proceeding to step 3; this will ensure the mixture is moistened and mixed thoroughly.
3. Moisten the material with a hose end trigger sprayer attachment, **avoiding puddling - oversaturation is detrimental and will negatively affect the integrity of the finished product.** Rake area lightly to evenly distribute water throughout the mix or "lift". Walking on the area is perfectly acceptable; initial compaction can be performed by walking on the edges and corners.
4. Install a second lift as above; when doing this, make sure to pay particular attention to the edges to ensure even material height, and moisten to dampen mixture.
5. Moisten until both lifts are damp. Proper moisture content can be checked by clenching your fist around the GraniteCrete, when the mixture just stays together and the color just starts to transfer to your hand, GraniteCrete is ready to compact.
6. **Compaction:** After proper moisture is achieved for compaction, hand tamp (with

a 10” hand tamp) around benches, sign posts, corners, boulders, et cetera. Pay particular attention to corners and edges to ensure tight compaction.

7. Make several passes with a 36” lawn roller (filled with water), or for larger installations, a 36” walk-behind or drum roller in static position. Hand tamp out any imperfections with a 6” wooden masonry float.
8. Make sure to keep your 10” hand tamp, lawn roller, and wooden floats clean at all times. Fill in any divots with fresh, loose material (removing any larger stone) and hand tamp with the wooden floats to match existing finish.
9. When laying GraniteCrete in batches, be sure to use the **cold joint** method below to ensure a blemish-free installation.
10. **Finishing:** If desired, lightly sweep the finished surface in a perpendicular pattern with a medium-bristled push broom. Then make several more passes with the lawn roller until the desired surface texture is achieved. With larger installations, a roller in a static position can be used, making sure to keep the drum clean at all times. Remove spoils off the surface.
11. **DO NOT ALLOW GRANITECRETE TO DRY DURING INSTALLATION. MIST LIGHTLY WITH A HOSE END SPRAY HEAD AS NECESSARY OR COVER WITH A PLASTIC TARP.**
12. The final step for a GraniteCrete installation is a dampening with water of all newly-installed and compacted GraniteCrete materials. Using a shower head/spray hose attachment, moisten the entire newly-installed GraniteCrete area - **avoid puddling**. For best results, moisten all newly-installed GraniteCrete paving a second time the following 1 to 5 days, as practical. **Slow curing of GraniteCrete is important to avoid cracking.**

    **Make sure there is no direct application of uncontrolled water (e.g. irrigation or sprinkler water) prior to final curing.**

**Installation Instructions - “Wet” Method**

**After DG and GraniteCrete have been mixed together but BEFORE installation has begun:** Mix thoroughly and moisten with water until the GraniteCrete mixture begins to marble or clump together. Squeeze the mixture in your fist and open your hand. When the color has just started to transfer onto your hand and the mixture just begins to stay together in a clump, it’s ready for installation.

1. **Class II Base Rock**: Moisten and compact base rock on entire installation area to an even depth of 4-inch or 6-inch, depending on residential or commercial application. A vibratory plate can be used to compact the base rock; it should **not** be used to compact the GraniteCrete for residential installations.
2. **GraniteCrete:** Wheelbarrow the prepared GraniteCrete/DG to the installation site and spread the mixture over the compacted base rock.
3. **Compaction:** Walking on the area is perfectly acceptable; initial compaction can be performed by walking on the edges and corners. Rake or grade area with the flat side of a landscape or asphalt rake (Do not use tang side), until the GraniteCrete is one inch above finish grade.
4. Once initial compaction has been completed, hand tamp (with a 10” hand tamp) around benches, sign posts, corners, boulders, et cetera. Pay particular attention to corners and edges to ensure tight compaction.
5. Make several passes with a 36” lawn roller (filled with water), or for larger installations, a 36” walk-behind or riding-roller in static position. Hand tamp out any imperfections with a 6” wooden masonry float.
6. Make sure to keep your 10” hand tamp, lawn roller, and wooden floats clean at all times. Fill in any divots with fresh, loose material (removing any larger stone) and hand tamp with the wooden floats to match existing finish.
7. When laying GraniteCrete in batches, be sure to use the **cold joint** method below to ensure a blemish-free installation.
8. **Finishing:** If desired, lightly sweep the finished surface in a perpendicular pattern with a medium-bristled push broom. Then make several more passes with the lawn roller until the desired surface texture is achieved. With larger installations, a roller in a static position can be used, making sure to keep drum clean at all times. Remove spoils off the surface.
9. **DO NOT ALLOW GRANITECRETE TO DRY. MIST LIGHTLY WITH A HOSE END SPRAY HEAD AS NECESSARY OR COVER WITH A PLASTIC TARP.**
10. The final step for a GraniteCrete installation is a dampening with water of all newly-installed and compacted GraniteCrete materials. Using a shower head/spray hose attachment, moisten the entire newly-installed GraniteCrete area - avoid puddling. For best results, moisten all newly-installed GraniteCrete paving a second time the following 1 to 5 days, as practical. Slow curing of

GraniteCrete is important to avoid cracking.

**Make sure there is no direct application of uncontrolled water (e.g. irrigation or sprinkler water) prior to final curing.**

**The following information is applicable to BOTH installation methods.**

You may walk on GraniteCrete immediately after installation. However, like concrete, GraniteCrete gets stronger with time. Ideally, stay off the newly-installed GraniteCrete areas for at least one day; after that, foot traffic is allowed. Vehicular traffic should avoid newly installed areas for 5 – 7 days.

Newly installed GraniteCrete paving surfaces are fully cured in 28 days. At that time, the entire surface should be blown or swept off to eliminate loose surface materials. Minor cracking may take place. However, over time, the aggregate fines will fill in the minor cracks and they should disappear. Occasional blowing off of the surface will help to minimize loose surface materials.

**Cold Joint Methods**

Cold joints can be used at the end of the work day.

Method One:

1. “Between pours,” stop at an area that makes the joint location look intentional. Take a chalk snap line just back from loose GraniteCrete into the compacted area and create a chalk line. Use either a masonry blade - or a square-nose shovel - and cut a straight line across the installation.
2. Continue with installation: Dampen the prior installation area. Place newly mixed GraniteCrete into the area, being careful not to overlap existing compacted material. Place a three foot length of 2"x4" carefully along the edge of the new pour and compact by hitting/tapping the board with a single jack. Then, take a medium-bristled push broom and very lightly "feather" the two pours together.

Method Two:

1. Place a 2”X4” or 2”X6” piece of wood across the installation, loosely stake it, and finish compacting the material. Leave the board in place overnight.
2. The next day, carefully lift the wood up and away from the installed GraniteCrete. Continue the installation process as per step 2 under Method One, making sure to dampen the prior installation area.

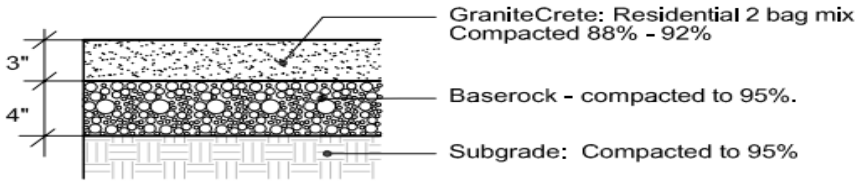
Method Three: (Suggested for large open edges at the end of the work day)

1. Install steel edging at a location that looks "intentional" and aesthetically "makes sense.” Permanently install using the stakes provided. Completely finish the first day's work.
2. The next day, simply continue with the installation. Make sure to dampen the prior installation area first. Leave the edging in place. Again, being careful not to leave any new material on the previously installed GraniteCrete.

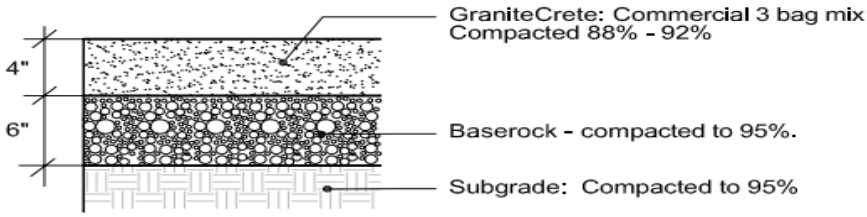
## Installing for Vehicular Traffic

Installing for vehicular traffic is nearly identical to the method above, **EXCEPT** you will use a vibratory plate or static riding roller to compact the GraniteCrete, after final compaction by a lawn roller. Please be aware the vibratory plate should be used carefully, as it can have negative effects on the GraniteCrete. Make sure to keep the plate clean. If any ridges or ruts occur, fill in with a hand tamp, compact, and broom over it as the finishing instructions above.

## Cross-section Details




1 GraniteCrete Paving - Residential/Pedestrian




2 GraniteCrete Paving - Commercial/Light Vehicle

## Recommended Equipment

| Tools | Materials |
|---|---|
| (3) Rounded point or flat edge shovels for moving product | GraniteCrete Admixture bags (85 lbs.) |
| 6 cubic foot cement mixer for mixing small installations | 3/8” minus aggregate/ decomposed granite |
| Wheelbarrow for moving material | Class II Base Rock or Class II Permeable Base |
| 8” or 10” hand-tamps for compacting edges and corners, step back fills, and small areas | Curbing or Header Board materials (if desired) |
| Hose with a shower spray nozzle for moistening dry product | Water source |
| Landscape and asphalt rake with flat edge for finish grading | |

| | |
|---|---|
| Heavy lawn roller filled with water to compact | |
| Medium bristled push broom for finishing | |
| (2-3) 6″-9″ wooden masonry float for finishing<br>(1) 6″-9″ steel float for cleaning hand tamp and roller | |

A large commercial project may require the use of a volumetric concrete truck.

Please refer to our website for further information:
https://www.granitecrete.com/installation/

### 3.4 Important Notes:

**A.** Do not allow GraniteCrete to dry during installation. Mist lightly with a hose end spray head as necessary - **avoid puddling** - or cover with plastic tarp.

**B.** Non-compacted - or poorly-compacted - GraniteCrete top layer will result in loose and pebbled materials. Edge and corner compaction may require special attention with a hand tamp during installation.

**C.** Non-compacted - or poorly-compacted - base rock may result in failure of the top layer of GraniteCrete.

**D.** Squeeze the mixture in your fist and open your hand. When the color has just started to transfer onto your hand and the mixture just begins to stay together in a clump, it's ready for installation. Excessive moisture level may result in "sticky" materials complicating the quality of the finish surface or proper compaction - if you squeeze the mixture and water oozes out, it is too damp. If the material is too wet, it may be placed on the bottom of the installation, with material that has a better moisture content on top.

**E.** Aggregate/decomposed granite materials should meet the sieve specifications in this Specification Guide

**F.** Surface shall follow overall contours of landscape. Flat areas shall be [sloped] [crowned] for drainage. Slope [2.0%] [ ] percent minimum to drain away from

structures.

**G.** Compaction rates for all applications are 88% – 92%.

**H.** Please Note: 3/8" minus aggregate comes in different colors. GraniteCrete™ samples reflect the use of a Golden Granite decomposed aggregates.. Mock-ups using your local aggregate source is strongly suggested.

**I.** Saw cut expansion joints every 5' in narrower paths, every 12' in wider paths, and at every engineered stress areas. Wait 48 hours before saw cutting.

**J.** Cover finished surface, when practical, to achieve maximum curing period. See Section 3.5.

**K.** Minimum Compacted Thickness (See Section Details):

1. [Residential/Pedestrian Paths] [ ]: [3] inches.
2. [Commercial/Light Vehicular Drives] [ ]: [4] inches.

**L.** Completed, finished surface shall be of consistent quality and free of deleterious materials such as organic materials, nails, stones, and loose material. Surface shall not have depressions or humps greater than [1/4] [ ] inch in ten feet. Cold joints, if any, should be inconspicuous.

## 3.5 CURING PERIOD / PROTECTION

**A.** **For Driveway Installations ONLY:** Do not allow traffic on crushed aggregate blended with GraniteCrete admixture surfacing for 5 days after placement or until compacted crushed aggregate blended with GraniteCrete admixture surfacing has fully cured. [Cover for extended curing period].

**B.** Protect crushed aggregate blended with GraniteCrete admixture surfacing from damage until project completion. [Repair damaged areas to match specified requirements].

## 3.6 MAINTENANCE & REPAIRS

**A.** Follow manufacturer's recommendations.

**B.** Maintenance: Depending on the end users desired finish surface, maintenance may require occasional blowing off or brooming of paved surface - DO NOT use a pressure washer to clean GraniteCrete. Depending on quality of

compaction at time of installation, a thin veneer of loose aggregate material is typical after the full 28 days cure period. If cracking appears in a GraniteCrete surface, broom loose aggregate “fines” into cracks and compact with a rubber mallet.

**C.** Repair: When repairing GraniteCrete it is important to use the original aggregate/decomposed granite and the original GraniteCrete Admixture color to match previously installed materials. If the paved surface has large areas of raveled material (loose aggregate/decomposed granite) the initial installation may not have been properly compacted, or blended materials did not have optimum moisture content during installation. **GraniteCrete must not be allowed to dry prior to final compaction.** The following are suggestions for repair of raveled materials:

1. For the large loose areas, a minimum of a 3-inch of GraniteCrete can be installed. The repair areas need to be saw-cut at agreed length, removed, and re-installed. A portable concrete mixer or wheelbarrow can be used.
2. In areas that collapse/fail due to equipment weight, re-form and re-install with original materials as per specifications.
3. Cracks: Repair by brooming existing surface fines into the cracks of filling with dry, pre-mixed materials, or both. The onsite aggregate/decomposed granite should be sieved to 1/8” minus material for better application and in-fill of cracks. Materials should be mixed as per ratio described above. Broom or fill the crack, moisten, compact (with rubber mallet or hand compaction plate) and “feather” material into the final finish. This process might have to be done two or three times.

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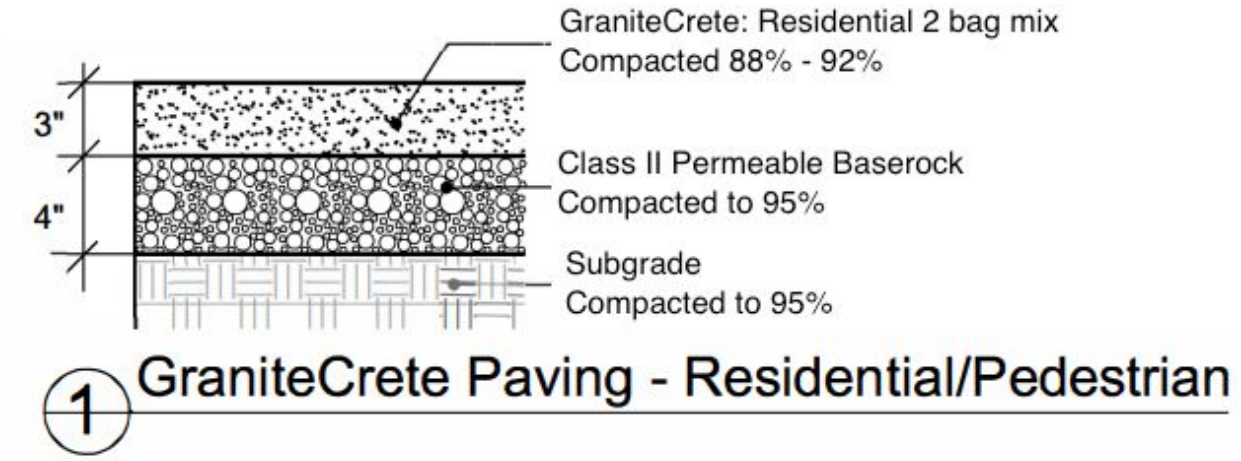
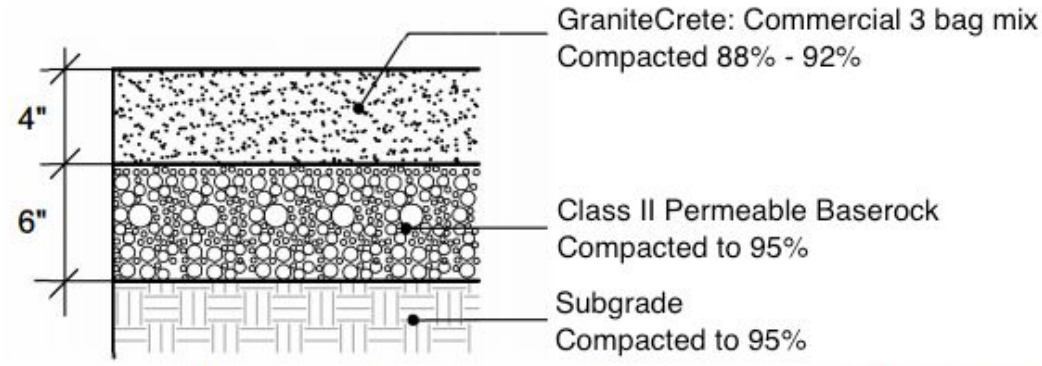



1 GraniteCrete Paving - Residential/Pedestrian




2 GraniteCrete Paving - Commercial/Light Vehicle

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# Leadership in Energy and Environmental Design (LEED) Credit Information

When GraniteCrete™ is used for landscaping features—such as walkways, patios, and small parking lots—on a building project, it can contribute to earning points under the following LEED credits*, using the LEED v4 as a guide.

## Sustainable Sites

- **Credit: Rainwater Management**

GraniteCrete™ helps decrease the amount of stormwater runoff on a site.

GraniteCrete™ helps reduce water pollution by increasing on-site filtration.

- **Credit: Heat Island Reduction**

GraniteCrete™ is a permeable surface and the high albedo colors provide a Solar Reflectance Index (SRI) value of 48..

## Materials & Resources

- **Credit: Construction and Demolition Waste Management**

GraniteCrete™ left over from a construction site or removed later can be reconstituted and used on other sites, thus diverted from a landfill.

- **Credit: Building Life-Cycle Impact Reduction**

GraniteCrete™ can be removed from one site and reused at another site.

- **Credit: Building Product Disclosure and Optimization – Environmental Product Declarations**

GraniteCrete™ is formulated with aggregate, which is considered pre-consumer recycled content.

GraniteCrete™ utilizes aggregate that is extracted from quarries and manufactured at sites local to the western United States.

*Use of GraniteCrete™ contributes toward the earning of LEED points in these specific categories. However, use of GraniteCrete™ alone does not guarantee achievement of point criteria or LEED certification of a building.

**GraniteCrete™ is the Superior Paving Solution:**

- All natural composition
- Truly porous
- Low cost installation
- Natural earth-tone pigments
- Look and feel of a crushed organic surface
- Superior erosion control and absorbtion
- Natural resistance to gopher/weed infestation

> "I have had great success with this product and it solved many problems for me in the past. I have known GraniteCrete for over 10 years now; it is unlike any product I have seen. Gatorstone and TechniSoil have tried to produce similar products; neither have been successful long term."
>
> — Jim Christensen
> *Sales Representative at HC Muddox.*

## GraniteCrete™ vs. Competitors

| | GraniteCrete™ Permanent. Permeable. Natural. www.granitecrete.com | TechniSoil | GatorStone | TerraPave | StaLok |
|---|---|---|---|---|---|
| Porosity | ✓ | ⛔ | ⛔ | ⛔ | ⛔ |
| Color | ✓ | ⛔ | ⛔ | ⛔ | ⛔ |
| Consistency | ✓ | ⛔ | ⛔ | ⛔ | ✓ |
| Installation Temperature | ✓ | ⛔ | ⛔ | ⛔ | ✓ |
| Wait Time for Install After Rain | ✓ | ⛔ | ⛔ | ⛔ | ✓ |
| Wait Time for Egress After Install | ✓ | ⛔ | ⛔ | ⛔ | ✓ |

# GraniteCrete™

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## Contact us to make your next project beautiful *and* sustainable:

Call: 1-800-670-0849 x90
email: info@granitecrete.com
Visit us on the web: www.granitecrete.com


# GraniteCrete™

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# GraniteCrete™

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## GraniteCrete's premium product and dedicated team will provide your company with a superior product.

GraniteCrete™ paths and walkways have the look and feel of a crushed organic surface with the near strength and erosion control of professionally installed concrete. Our pathways are porous, passing through over an inch of rain per hour, reducing or eliminating erosive runoff and addressing stormwater environmental concerns. Our pathways also reduce heat-island environmental concerns. Combined, this yields 13 points in three categories of the LEED rating system. Available in four organic colors, GraniteCrete™ is the natural path for your next landscaping project.

### GraniteCrete™ is the right choice for:

- Driveways
- Landscape Paths
- Patios
- Cart Paths
- Pedestrain Walkways
- Bike Paths
- Recreational Trails
- Off Street Parking
- Bocci Ball Courts

### Benefits of Choosing GraniteCrete™:

- Strong and long-lasting
- Can be mixed with existing surrounding native soils
- Manufactured using pre- and post-consumer recycled materials
- Porous where others aren't
- Erosion control others can't provide
- Natural resistance to weed and gopher infestation
- No oils, resins, polymers or enzymes to leach into the environment
- Contributes 13 LEED points as a stand-alone product
- Exceeds ADA compliance

## Permanent

GraniteCrete looks like decomposed granite, but it stays in place: no erosion, no spreading, no maintenance. Strong and lasting, small cracks self-heal with the fines from the GraniteCrete surface.

## Permeable

GraniteCrete allows water to pass through at over an inch per hour—reducing runoff and aiding groundwater reservoirs—all while providing 13 LEED points as a stand-alone product.

## Natural

GraniteCrete is made of mostly decomposed granite—a natural stone—mixed with a proprietary binder that acts like cement, but has no added chemicals and no threat of leaching. GraniteCrete provides a natural look just like a decomposed granite path, but it stays where it's put!

### GraniteCrete™ works for:

- Residential Installations
- Commercial Instalations
- Municipal Installations

## 3 Easy Steps for Installation:

### 1. Lay Crushed Base

### 2. Install GraniteCrete™ & Compact

### 3. Walk On Same Day

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# Quality Assurance Program

**What is the Quality Assurance Program?**

The Quality Assurance Program was developed as an extension of our Certified Installers Program as a way to reach 100% customer satisfaction—for the end customer, the architect, and the contractor—on each installation of GraniteCrete.

**What are the Actual Steps of the Quality Assurance Program?**

The Quality Assurance Program consists of six steps:

1. Through an initial phone call, we collect key information about the installation:

    - Location of the installation and if it's within our no-charge perimeter area to visit
    - The contractor completing the installation
    - Size of the installation

We will also discuss our Quality Assurance Program and the presence of GraniteCrete representatives during the installation process.

2. Pre-installation meeting with GraniteCrete representatives and the installer(s) to go over the installation process in detail, reviewing standard procedures, proper equipment, and important installation points.

3. Phone calls throughout the planning process to ensure there will be enough work staff at the installation, that the proper materials and equipment will be on-hand and ready, and the base rock will be laid and compacted prior to the arrival of GraniteCrete representatives.

4. GraniteCrete representatives will be on-site to advise and/or train during the installation. As needed, GraniteCrete representatives will take over to instruct the installation crew about common issues, such as the correct moisture content and finishing techniques on the surface of the installation.

5. GraniteCrete representatives will talk the installer through the entire installation process and post-installation process, and ensure the installer thoroughly understands each step so the installation turns out perfect.

6. Post-installation, a GraniteCrete representative will follow-up with a phone call to see how the installation went, to take pictures, and to make sure the installation meets our standards. We will also track both customer satisfaction with the installation process, and the final product.

**Why Use the Quality Assurance Program?**
GraniteCrete requires a somewhat specialized installation process to maintain its integrity. When installed properly, GraniteCrete not only looks beautiful, it will last for years to come.

We provide on-site project support for new contractors, including a pre-installation meeting to review procedures and key installation points and oversight by GraniteCrete personnel during installation. Equipment, calibrations, efficiency - we address it all.

**Who Benefits from the Quality Assurance Program?**
Everyone! GraniteCrete personnel will be on-site at every installation possible to work with the contractors and installers to ensure the product is installed according to our high standards. We are not afraid to get our hands dirty, and have been known to step in and assist with the installation process in any way we can.

**How to Take Advantage of the Quality Assurance Program?**
It's easy—just contact GraniteCrete and let us know about an upcoming installation. GraniteCrete personnel will make arrangements to be on-site for the installation process, providing guidance based off decades of knowledge and experience with the product.

**What About After the Installation is Complete?**
Post-installation, a member of the GraniteCrete team conducts an inspection to ensure the installation meets our standards. We track both customer satisfaction with the installation process, and the final product. We're not happy unless you are!

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# GraniteCrete Test Results

January 28, 2013

**The following are test results conducted by Kleinfelder Laboratory located in Hayward, California. The results were submitted on November 30, 2012 and were prepared as per our Installation Instructions using our "2 bag mix":**

1. **UNCONFINED COMPESSIVE STRENGTH: ASTM D558-635 psi, ASTM D558 (modified effort)-837 psi.**
2. **RESISTANCE VALUE (R-VALUE): ASTM D2844-R value at 300 psi Exudation-95**
3. **HYDRAULIC CONDUCTIVITY (PERMEABILITY): ASTM D5084--**

**88% density @ 7 days – 5.4 x10 $^{-4}$ cm/sec = 1.28 x 10 $^{-2}$ in/min=0.768 inches per hour**

**88% density @ 28 days – 7.6 x10 $^{-4}$ cm/sec = 1.80 x 10 $^{-2}$ in/min=1.08 inches per hour**

**92% density @ 7 days – 5.5 x10 $^{-4}$ cm/sec = 1.30 x 10 $^{-2}$ in/min=0.78 inches per hour**

**92% density @ 28 days – 6.0 x10 $^{-4}$ cm/sec = 1.42 x 10 $^{-2}$ in/min=0.852 inches per hour**

4. **STATIC COEFFICIENT OF FRICTION: ASTM C1028-Wet, Cf=0.71, Dry, Cf=0.85**
5. **SOLAR REFLECTANCE INDEX (NATURAL COLOR): ASTM C1549-SRI 42**
6. **MAXIMUM DRY DENSITY: ASTMD D558 Maximum Dry Density 127.5 pcf, Optimum Water Content 9.6%. ASTM D558 (Modified effort) Maximum Dry Density 132.9 pcf, Optimum Water Content 6.7%**

P.O. Box 1574
Carmel, CA 93921
Phone/Fax: 1-800-670-0849
www.GraniteCrete.com

# MATERIAL SAFETY DATA SHEET (MSDS) FOR GRANITECRETE ADMIXTURE (A

Proprietary Blend of Materials which Complies with OSHA and MSHA Hazard Communication Standards,
29 CFR 1910.1200and 30 CFR Part 47, Patent Pending)

GraniteCrete™

Permanent. Permeable. Natural.

THE FUTURE OF PAVING

**GraniteCrete, Inc.**
Telephone: 1-800-670-0849
Email: info@granitecrete.com

**Section 1 – IDENTIFICATION**

Type I/II"

Supplier/Manufacturer GraniteCrete, Inc.
419 Webster Street, Suite 202
Monterey, CA 93940
Telephone: 1-800-670-0849
Email: info@granitecrete.com

Chemical name and synonyms
Portland Cement (CAS #65997-15-1)

Chemical family
Calcium salts

Formula
$3CaO.SiO_2$ (CAS #12168-85-3)
$2CaO.SiO_2$ (CAS #10034-77-2)
$3CaO.Al_2O_2$ (CAS #12042-78-3)
$4CaO..Al_2O_3Fe_2O_3$ (CAS #12068-35-8) $CaSO_2.2H_2O$ (CAS #13397-24-5)

Product name

Other salts: Small amounts of MgO, and trace amounts of $K_2SO_4$ and $Na_2SO_4$ may also be present.

**Section 2 – COMPONENTS**

Hazardous Ingredients
Portland cement clinker (CAS# 65997-15-1) – approximately – 93.5-96.0 % by weight
ACGIH TLV-TWA (2000) = 10 mg total dust/$m^3$
OSHA PEL (8-hour TWA) = 50 million particles/$ft^3$

Gypsum (CAS# 7778-18-9) – approximately - 4.0-6.5 % by weight
ACGIH TLV-TWA (2000) = 10 mg total dust/$m^3$
OSHA PEL (8-hour TWA) = 15 mg total dust/$m^3$
OSHA PEL (8-hour TWA) = 5 mg respirable dust/$m^3$

Respirable quartz (CAS# 14808-60-7) – greater than 0.1% by weight
ACGIH TLV-TWA (2000) = 0.05 mg respirable quartz dust/$m^3$
OSHA PEL (8-hour TWA) = (10 mg respirable dust/$m^3$)/(percent silica + 2)

Trace Ingredients
Trace amounts of naturally occurring chemicals might be detected during chemical analysis. Trace constituents may include up to 0.75% insoluble residue, some of which may be free crystalline silica, calcium oxide (Also known as lime or quick lime), magnesium oxide, potassium sulfate, sodium sulfate, chromium compounds, and nickel compounds.

**Section 3 - HAZARD IDENTIFICATION**

Emergency Overview
Portland cement is a light gray powder that poses little immediate hazard. A single short-term exposure to the dry powder is not likely to cause serious harm. However, exposure of sufficient duration to wet portland cement can cause serious, potentially irreversible tissue (skin or eye) destruction in the form of chemical (caustic) burns. The same type of tissue destruction can occur if wet or moist areas of the body are exposed for sufficient duration to dry portland cement.

Potential Health Effects

**Relevant Routes of Exposure:**
Eye contact, skin contact, inhalation, and ingestion
**Effects Resulting from Eye Contact:**
Exposure to airborne dust may cause immediate or delayed irritation or inflammation. Eye contact by large amounts of dry powder or splashes of wet portland cement may cause effects ranging from moderate eye irritation to chemical burns or blindness. Such exposures require immediate first aid (see Section 4) and medical attention to prevent significant damage to the eye.

**Effects Resulting from Skin Contact:**
Discomfort or pain cannot be relied upon to alert a person to hazardous skin exposure. Consequently, the only effective means of avoiding skin injury or illness involves minimizing skin contact, particularly with wet cement. Exposed persons may not feel discomfort until hours after the exposure has ended and significant injury has occurred.

Dry portland cement contacting wet skin or exposure to moist or wet portland cement may cause more severe skin effects including thickening, cracking or fissuring of the skin. Prolonged exposure can cause severe skin damage in the form of (alkali) chemical burns.

Some individuals may exhibit an allergic response upon exposure to portland cement, possibly due to trace elements of chromium. The response may appear in a variety of forms ranging from a mild rash to severe skin ulcers. Persons already sensitized may react to their first contact with the product. Other persons may first experience this effect after years of contact with portland cement products.

**Effects Resulting from Inhalation:**
Portland cement may contain trace amounts of free crystalline silica. Prolonged exposure to respirable free silica can aggravate other lung conditions and cause silicosis, a disabling and potentially fatal lung disease.

Exposure to portland cement may cause irritation to the moist mucous membranes of the nose, throat, and upper respiratory system. It may also leave unpleasant deposits in the nose.

**Effects Resulting from Ingestion:**
Although small quantities of dust are not known to be harmful, ill effects are possible if larger quantities are consumed. Portland cement should not be eaten.

**Carcinogenic potential:**
Portland cement is **not** listed as a carcinogen by NTP, OSHA, or IARC. It may however, contain trace amounts of substances listed as carcinogens by these organizations.

Crystalline silica, a potential trace level contaminate in portland cement, is now classified by IARC as known human carcinogen (Group I). NTP has characterized respirable silica as "reasonably anticipated to be [a] carcinogen".

**Medical conditions which may be aggravated be, inhalation or dermal exposure:**
Pre-existing upper respiratory and lung diseases
Unusual (hyper) sensitivity to hexavalent chromium (chromium$^{+6}$) salts.

**Section 4 - FIRST AID**

Eyes
Immediately flush eyes thoroughly with water. Continue flushing eye for at least 15 minutes, including under lids, to remove all particles. Call physician immediately.

Skin
Wash skin with cool water and pH-neutral soap or a mild detergent. Seek medical treatment in all cases of prolonged exposure to wet cement, cement mixtures, liquids from fresh cement products, or prolonged wet skin exposure to dry cement.

Inhalation of Airborne Dust
Remove to fresh air. Seek medical help if coughing and other symptoms do not subside.

Ingestion
Do not induce vomiting. If conscious, have the victim drink plenty of water and call a physician immediately.

**Section 5 - FIRE AND EXPLOSION DATA**

Flash point .....None Lower Explosive Limit.....……..…...None Upper Explosive Limit.....None Auto ignition temperature…….……Not Extinguishing media.....Not Combustible Combustible Special fire fighting Procedures.....None Hazardous combustion products.....None Unusual fire and explosion hazards.……..……None **Section 6 -**

**ACCIDENTAL RELEASE MEASURES**

Collect dry material using a scoop. Avoid actions that cause dust to become airborne. Avoid inhalation of dust and contact with skin. Wear appropriate personal protective equipment as described in Section 8.

Scrape up wet material and place in an appropriate container. Allow the material to "dry" before disposal. Do not attempt to wash portland cement down drains.

Dispose of waste material according to local, state and federal regulations.

**Section 7 - HANDLING AND STORAGE**

Keep portland cement dry until used. Normal temperatures and pressures do not affect the material.

Promptly remove dusty clothing or clothing which is wet with cement fluids and launder before reuse. Wash thoroughly after exposure to dust or wet cement mixtures or fluids.

**Section 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION**

Skin Protection
Prevention is essential to avoiding potentially severe skin injury. Avoid contact with unhardened portland cement. If contact occurs, promptly wash affected area with soap and water. Where prolonged exposure to unhardened portland cement products might occur, wear impervious clothing and gloves to eliminate skin contact. Wear sturdy boots that are impervious to water to eliminate foot and ankle exposure.

Do not rely on barrier creams: barrier creams should not be used in place of gloves.

Periodically wash areas contacted by dry portland cement or by wet cement or concrete fluids with a pH neutral soap. Wash again at the end of work. If irritation occurs, immediately wash the affected area and seek treatment. If clothing becomes saturated with wet concrete, it should be removed and replaced with clean dry clothing.

Respiratory Protection
Avoid actions that cause dust to become airborne. Use local or general exhaust ventilation to control exposures below applicable exposure limits.

Use NIOSH/MSHA approved (under 30 CFR 11) or NIOSH approved (under 42 CFR 84) respirators in poorly ventilated areas, if an applicable exposure limit is exceeded, or when dust causes discomfort or irritation. (Advisory: Respirators and filters purchased after June 10, 1998 must be certified under 42 CFR 84.)

Ventilation
Use local exhaust or general dilution ventilation to control exposure within applicable limits.

Eye Protection
Where potentially subject to splashes or puffs of cement, wear safety glasses with side shields or goggles. In extremely dusty environments and unpredictable environments wear unvented or indirectly vented goggles to avoid eye irritation or injury. Contact lenses should not be worn when working with portland cement or fresh cement products.

**Section 9 - PHYSICAL AND CHEMICAL, PROPERTIES**

Appearance.....Gray Powder Odor.....……..No distinct odor Physical state.....Solid (powder) pH (in water).....……....12 to 13 Solubility in water...Slightly soluble (0.1 to 1.0%) Vapor pressure.....Not applicable Vapor density.....Not applicable Boiling point.....…….Not applicable (i.e., > 1000 ˚C) Melting point.....Not applicable Specific gravity ($H_2O$ = 1.0).....3.15 Evaporation rate.....Not applicable

**Section 10 - STABILITY AND REACTIVITY**

Stability
Stable.

Conditions to avoid
Unintentional contact with water

Incompatibility
Wet portland cement is alkaline. As such it is incompatible with acids, ammonium salts and phosphorous.

Hazardous decomposition
Will not spontaneously occur. Adding water produces (caustic) calcium hydroxide

Hazardous Polymerization
Will not occur

**Section 11 - TOXICOLOGICAL INFORMATION**

For a description of available, more detailed toxicological information contact the supplier or manufacturer.

**Section 12 - ECOLOGICAL INFORMATION**

Ecotoxicity
No recognized unusual toxicity to plants or animals

Relevant physical and chemical properties
(See Sections 9 and 10.)

**Section 13 – DISPOSAL**

Dispose of waste material according to local, state and federal regulations. (Since portland cement is stable, uncontaminated material may be saved for future use.

Dispose of bags in an approved landfill or incinerator.

**Section 14 - TRANSPORTATION DATA**

Hazardous materials description/proper shipping name
Portland is cement is not hazardous under U.S. Department of Transportation (DOT) regulations.

Hazard class
Not applicable

Identification number
Not applicable.
Required label text

Not applicable.

Hazardous substances/reportable quantities (RQ)
Not applicable.

**Section 15 - OTHER REGULATORY INFORMATION**

Status under USDOL-OSHA Hazard Communication Rule, 29 CFR 1910.1200
Portland cement is considered a "hazardous chemical" under this regulation, and should be part of any hazard communication program.

Status under CERCLA/SUPERFUND 40 CFR 117 and 302
Not listed.

Hazard Category under SARA(Title III), Sections 311 and 312
Portland cement qualifies as a "hazardous substance" with delayed health effects.

Status under SARA (Title III), Section 313
Not subject to reporting requirements under Section 313.

Status under TSCA (as of May 1997)
Some substances in portland cement are on the TSCA inventory list.

Status under the Federal Hazardous Substances Act
Portland cement is a "hazardous substance" subject to statutes promulgated under the subject act.

Status under California Proposition 65
This product contains up to 0.05 percent of chemicals (trace elements) known to the State of California to cause cancer, birth defects or other reproductive harm. California law requires the manufacturer to give the above warning in the absence of definitive testing to prove that the defined risks do not exist.

**Section 16 - OTHER INFORMATION**

Other important information
Portland cement should only be used by knowledgeable persons. A key to using the product safely requires the user to recognize that portland cement chemically reacts with water, and that some of the intermediate products of this reaction (that is those present while a portland cement product is "setting") pose a more severe hazard than does dry portland cement itself.

While the information provided in this material safety data sheet is believed to provide a useful summary of the hazards of portland cement as it is commonly used, the sheet cannot anticipate and provide the all of the information that might be needed in every situation. Inexperienced product users should obtain proper training before using this product.
Chemical name and synonyms Product name
Metal Oxide Carbon Blend Iron Oxide Color

**1. PRODUCT IDENTIFICATION**
CHEMICAL FAMILY .....Inorganic Metal Oxide, Carbon Blend
CAS NUMBER.....1309-37-1, 1333-86-4
DOT CLASS .....Not regulated
CHEMICAL FORMULA..... Blends of $Fe_2O_3$, $Fe_3O_4$, $Fe_2O_3 \cdot H_2O$, and/or C

**2. INGREDIENTS**
COMPONENTS COMPONENTS % OSHA-PEL ACGIH-TLV Iron (III) Oxide (dust) $Fe_2O_3 \cdot H_2O$, $Fe_3O_4$ 100
None Est. None Est. No. 80, 85, 97 $Fe_2O_3$ proprietary None Est. None Est. Fe3O4 None Est. None Est.
C 3.5 $mg/m^3$ 3.5 $mg/m^3$

**3. PHYSICAL DATA**

APPEARANCE..... Fine, dry powder
ODOR..... None
MELT POINT/FREEZE POINT..... Not applicable
BOILING POINT..... Not applicable
VAPOR PRESSURE..... Not applicable
SPECIFIC GRAVITY ..... 4 to 5
BULK DENSITY ..... 55-80 lbs. per cubic ft.
SOLUBILITY IN WATER..... Insoluble %
VOLATILE BY VOLUME..... Nil

**4. FIRE AND EXPLOSION DATA**

FLASH POINT ˚F (˚C)..... Not applicable
IGNITION TEMPERATURE (˚C)..... Not applicable
EXTINGUISHING MEDIA..... Not flammable
SPECIAL FIRE FIGHTING PROCEDURES..... None
UNUSUAL FIRE & EXPLOSIVE HAZARDS..... None

FOR COLOR NOS. 80, 85, 97

FLASH POINT ˚F (˚C)..... Not applicable
IGNITION TEMPERATURE (˚C) ..... 500 to 700 in air
EXTINGUISHING MEDIA..... Water
SPECIAL FIRE FIGHTING PROCEDURES..... Normal fog or nozzle jet application of water and/or exclusion of air.
UNUSUAL FIRE & EXPLOSIVE HAZARDS..... Burning carbon black can produce carbon monoxide and sulfur dioxides. Use a NIOSH approved respirator for protection from possible exposure during a fire. Exercise caution as it may not be obvious that it is burning unless stirred and sparks are present.

**5. REACTIVITY DATA**

STABILITY..... Stable
INCOMPATIBILITY..... None
HAZARDOUS DECOMPOSITION OR BY-PRODUCTS..... Carbon may form carbon monoxide, carbon dioxide or sulfur oxides if present.
HAZARDOUS POLYMERIZATION..... Will not polymerize CONDITION TO AVOID..... Strong acids such as hydrochloric, hydroflouric, etc. Excessive heat and strong oxidizers such as chlorates, bromates or nitrates.

**THE INFORMATION AND RECOMMENDATIONS CONTAINED HEREIN ARE BASED UPON DATA BELIEVED TO BE CORRECT. HOWEVER, NO GUARANTEE OR WARRANTY OF ANY KIND EXPRESSED OR IMPLIED IS MADE WITH RESPECT TO THE INFORMATION CONTAINED HEREIN.**

**5. REACTIVITY DATA (continued)**

PRIMARY ROUTE(S) OF EXPOSURE ..... Eye and skin contact, inhalation
HUMAN EFFECTS AND SYMPTOMS OF OVEREXPOSURE ACUTE..... Nuisance Dust
CHRONIC..... No chronic health effects are known from repeated exposure to iron oxide pigments.
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE ..... None known
CARCINOGENICITY..... Not applicable

**6. HUMAN HEALTH DATA**

EXPOSURE LIMITS

OSHA PEL..... Not established for this product.

ACGIH TLV..... Not established for this product. The recommended guideline is the TLV for nuisance particulates, 10 mg/$m^3$ of total dust.

EMERGENCY & FIRST AID PROCEDURES

EYE CONTACT..... Flush eyes with plenty of water, lifting lids periodically for at least 15 minutes. Consult a physician if irritation persists.

SKIN CONTACT..... Wash with soap and water.

INHALATION..... Remove from dusty area to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

INGESTION..... Immediately contact a physician.

**7. PRECAUTIONS FOR SAFE HANDLING AND USE**

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED ..... Common housekeeping, vacuum or scoop material into a container for reclamation or disposal.

WASTE DISPOSAL METHOD..... Material which cannot be reclaimed should be land-filled in accordance with local, state, and federal regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ..... Store in a dry area.

OTHER PRECAUTIONS..... None

**8. CONTROL MEASURES**

RESPIRATORY PROTECTIONS..... NIOSH approved dust respirator when required for dust.

VENTILATION..... Local exhaust when required for dust.

PROTECTIVE GLOVES..... None

PROTECTIVE GLASSES..... None

OTHER..... None

WORK/HYGIENE PRACTICES..... Wash thoroughly after handling and before eating. Keep dust away from food and beverages.

**9. SPECIAL PRECAUTIONS**

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE ..... Material should be kept in a closed container to minimize dust. Keep dry. Avoid breathing dust. Avoid contact with eyes and skin. Wash thoroughly after handling.

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