

Vulcan

Materials Company
WESTERN DIVISION



Environmental Product Declaration

This Environmental Product Declaration (EPD) is for 13 concrete aggregate products manufactured by Vulcan Materials Company at their Corona Stone facility in Corona, CA.

Vulcan Materials Company, Western Division
500 North Brand Blvd.
Suite 500
Glendale, CA 91203-1923

Vulcan Materials Company

Environmental Product Declaration

General Information

Environmental Product Declaration

This declaration has been prepared in accordance with ISO 14025, ISO 21930, and ASTM International's EPD program operator rules.

PCR review was conducted by:

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The PCR peer review report is available upon request: cert@astm.org

Independent verification of the declaration and data, according to ISO 14025: internal external

Third-party verifier:

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Industrial Ecology Consultants

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(617) 553-4929 ▪ <http://www.industrial-ecology.com>

Product Category Rule:

ASTM Product Category Rules (PCR) for Construction

Aggregates: Natural Aggregate, Crushed Concrete, and Iron/Steel Furnace Slag, issued January, 2017.

Declared Unit: 1 metric ton (dry weight).

Program Operator:

ASTM International

<http://www.astm.org/EPDs.htm>



EPD Owner:

Vulcan Materials Company

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Date of Issue:

June 22, 2020 (valid for 5 years until June 22, 2025)

ASTM Declaration Number: EPD-154

Products

The 13 concrete aggregates covered in this EPD are produced at:

Corona Stone
1709 Sherborn Street
Corona, CA 92879

Corona is a drill and blast hard rock quarry.

Each aggregate is compliant with the standards and specifications listed in Table 1.

Table 1: Aggregates Covered in this Study

| Aggregate | Standards |
|---|---|
| MSE (Mechanically Stabilized Embankment) | ASTM D2940, Caltrans section 19, 25 and 47 |
| Class 2 (3/4" Class 2 Base) | ASTM D2940, Caltrans section 25, 26, and 47 |
| W 1.5" (Washed 1.5" Crushed) | ASTM C33, AREMA, Caltrans section 90, Greenbook section 200 |
| 1" (1" Crushed) | ASTM D692, Greenbook section 200, Caltrans sections 19 and 39 |
| 3/4" (3/4" Crushed) | ASTM D692, Greenbook section 200, Caltrans sections 19 and 39 |
| 1/2" (1/2" Crushed) | ASTM D692, Greenbook section 200, Caltrans sections 19, 39 and 68 |
| 3/8" (3/8" Crushed) | ASTM D692, Greenbook section 200, Caltrans sections 19, 39 and 68 |
| RD (Rock Dust) | ASTM D1073, Greenbook section 200, Caltrans sections 19, 37 and 39 |
| W1" (Washed 1" Crushed) | ASTM C33, Caltrans section 90, Greenbook section 200 |
| #57 (Washed 3/4" Crushed #57) | ASTM C33 |
| #67 (Washed 3/4" Crushed #67) | ASTM C33 |
| W1/2" (Washed 1/2" Crushed) | ASTM C33, Caltrans section 90, Greenbook section 200 |
| W3/8" (Washed 3/8" Crushed) | ASTM C33, Caltrans section 90, Greenbook section 200 |

Material Composition

The material composition of the aggregates covered in this study is 100% hard rock.

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Mechanically Stabilized Embankment (MSE)



This product is a combination of coarse and fine crushed rock with 100% passing the 1" sieve. MSE is ideal for any fill application where compaction is required and corrosion limits may be in place.

3/4" Class 2 Base (Class 2)



This product is a combination of coarse and fine crushed rock with 100% passing the 1" sieve. 3/4" Class 2 Aggregate Base is ideal for any application where compaction is required and corrosion limits may be in place.

Washed 1.5" Crushed (W1.5")



A washed, coarse, 100% crushed aggregate with a topsize of 1.5". Typically used as a concrete aggregate or mainline railroad ballast, it is referred to as Caltrans 1.5" x 3/4", Greenbook size No.2, ASTM C33 size #4 and AREMA Size 4. Also used in a variety of landscape, drainage and filtration applications including Caltrans Pervious Backfill.

1" Crushed (1")



A coarse aggregate with a topsize of 1", this product is 100% crushed and primarily used in HMA production and as a coarse component of many aggregate base products and concrete aggregate blends. Also used in a variety of landscape, drainage and filtration applications including Caltrans Pervious Backfill.

3/4" Crushed (3/4")



A coarse aggregate with a topsize of 3/4", this product is 100% crushed and primarily used in HMA production and as a coarse component of many aggregate base products and concrete aggregate blends. Also used in a variety of landscape, drainage and filtration applications including Caltrans Pervious Backfill.

1/2" Crushed (1/2")



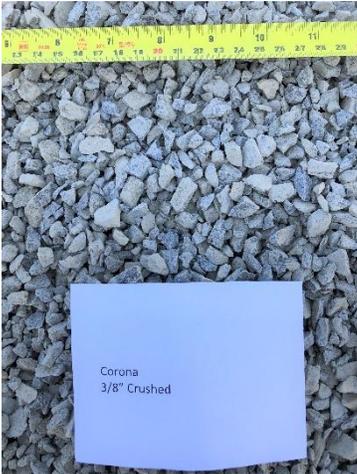
A coarse aggregate with a topsize of 1/2", this product is 100% crushed and primarily used in HMA production and as a coarse component of many aggregate base products and concrete aggregate blends. Also used in a variety of landscape, drainage and filtration applications including Caltrans Pervious Backfill and Class 1 Type B Permeable Material.

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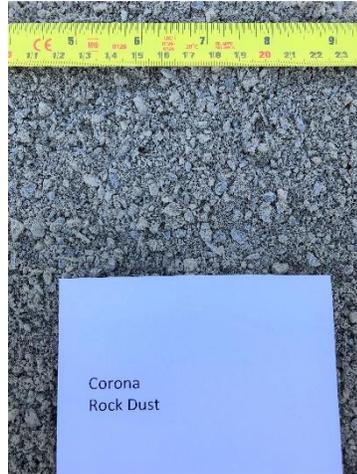
General Information

3/8" Crushed (3/8")



A coarse aggregate with a topsize of 3/8", this product is 100% crushed and primarily used in HMA production and as a coarse component of many aggregate base products and concrete aggregate blends. Also used in a variety of landscape, drainage and filtration applications including Caltrans Pervious Backfill and Class 1 Type A Permeable Material.

Rock Dust (RD)



A fine aggregate with 100% passing the 3/8" sieve, this product is primarily used in HMA production, as the fine component of many aggregate base products, and as the aggregate portion of slurry seal and micro-surfacing. Rock Dust also compacts well and is suitable for fill and structure backfill applications.

Washed 1" Crushed (W1")



A washed, coarse, 100% crushed aggregate with a topsize of 1". Typically used as a concrete aggregate, it is referred to as Caltrans 1" x #4, Greenbook size No.3, and ASTM C33 size #56. Also used in a variety of landscape, drainage and filtration applications including Caltrans Pervious Backfill.

Washed 3/4" Crushed #57 (#57)



A washed, coarse, 100% crushed aggregate with a topsize of 3/4". Typically used as a concrete aggregate, it is referred to as ASTM C33 size #57. Also used in a variety of landscape, drainage and filtration applications including Caltrans Pervious Backfill.

Washed 3/4" Crushed #67 (#67)



A washed, coarse, 100% crushed aggregate with a topsize of 3/4". Typically used as a concrete aggregate, it is referred to as ASTM C33 size #67. Also used in a variety of landscape, drainage and filtration applications including Caltrans Pervious Backfill.

Washed 1/2" Crushed (W1/2")



A washed, coarse, 100% crushed aggregate with a topsize of 1/2". Typically used as a concrete aggregate, it is referred to as ASTM C33 size #7. Also used in a variety of landscape, drainage and filtration applications including Greenbook and Caltrans Pervious Backfill.

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Washed 3/8" Crushed (W3/8")



A washed, coarse, 100% crushed aggregate with a topline of 3/8". Typically used as a concrete aggregate, it is referred to as Caltrans 3/8" x #8, Greenbook size No.4, and ASTM C33 size #8. Also used in a variety of landscape, drainage and filtration applications including Greenbook and Caltrans Pervious Backfill and Caltrans Class 1 - Type A Permeable.

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Environmental Product Declaration

LCA Study

Study

System boundary

This study captures the following mandatory cradle-to-gate (A1-A3) life cycle product stages (as illustrated in Figure 1):

A1 - Extraction and processing of raw materials including blast media and fuels used in extraction and transport within the process;

A2 – Specific transportation of raw materials (including recycled materials) from extraction site or source to manufacturing site (including any recovered materials from source to be recycled in the process) and including empty backhauls and transportation to interim distribution centers or terminals;

A3 – Manufacturing of the product, including all energy and materials required and all emissions and wastes produced.

| PRODUCTION Stage (Mandatory) | | | CONSTRUCTION Stage | | USE Stage | | | | | END-OF-LIFE Stage | | | |
|------------------------------------|----------------------|---------------|--------------------|--------------|-----------|-------------|--------|-------------|---------------|----------------------------|---|------------------|-------------------|
| Extraction and upstream production | Transport to factory | Manufacturing | Transport to site | Installation | Use | Maintenance | Repair | Replacement | Refurbishment | De-construction/Demolition | Transport to waste processing or disposal | Waste processing | Disposal of waste |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | C1 | C2 | C3 | C4 |

Figure 1. Life-Cycle Stages and Modules

Except as noted above, all other life cycle stages as described in Figure 1 are excluded from the LCA study. The following processes are also excluded from the study:

1. Production, manufacture, and construction of manufacturing capital goods and infrastructure;
2. Production and manufacture of production equipment, delivery vehicles, and laboratory equipment;
3. Personnel-related activities (travel, furniture, office supplies);
4. Fuel used to transport personnel around the drill and blast hard rock quarry;
5. Energy and water use related to company management and sales activities.

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LCA Study

The main processes included in the system boundary are illustrated in Figure 2.

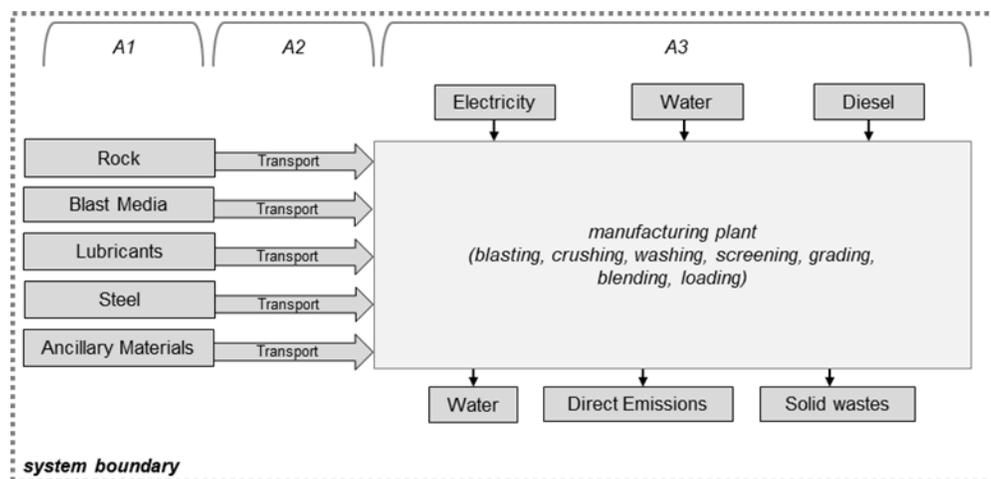


Figure 2. Main Processes Included in System Boundary

Electricity impacts are calculated based on the 2014 resource mix at the level of North American Electricity Reliability Council (NERC) WECC region. The 2014 grid mix contains: 29.2% Natural Gas, 22.6% Hydro, 14.3% Lignite, 13.9% Coal, 8.1% Nuclear, 6.6% Wind, 2.2% Geothermal, 1.7% BC import, 0.6% Wood Chips, 0.4% Biogas, 0.3% Solar.

Explanatory materials may be requested by contacting:

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Environmental Impacts

Cradle to Gate (A1-A3) impact results per 1 metric ton (dry weight) of product are outlined in Table 2 and Table 3 for each aggregate.

Table 2: Cradle-to-Gate Impact Results for Aggregates Covered in Study

| Impact category | Unit | MSE | Class 2 | W1.5" | 1" | 3/4" | 1/2" | 3/8" |
|--|-----------------------|------------|----------------|--------------|-----------|-------------|-------------|-------------|
| Global warming potential | kg CO ₂ eq | 3.48 | 3.49 | 4.97 | 4.88 | 4.89 | 5.06 | 5.08 |
| Acidification potential | kg SO ₂ eq | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 |
| Eutrophication potential | kg N eq | 0.01 | 0.01 | 0.03 | 0.02 | 0.02 | 0.03 | 0.03 |
| Smog creation potential | kg O ₃ eq | 2.45 | 2.46 | 2.43 | 2.41 | 2.42 | 2.43 | 2.44 |
| Ozone depletion potential | kg CFC-11 eq | 9.68E-08 | 9.71E-08 | 2.16E-07 | 2.10E-07 | 2.10E-07 | 2.23E-07 | 2.24E-07 |
| Nonrenewable fossil | MJ | 46.1 | 46.2 | 65.2 | 64.0 | 64.2 | 66.5 | 66.7 |
| Nonrenewable nuclear | MJ | 3.04 | 3.05 | 6.73 | 6.54 | 6.56 | 6.95 | 6.97 |
| Renewable (biomass) | MJ | 0.33 | 0.33 | 0.64 | 0.63 | 0.63 | 0.66 | 0.66 |
| Renewable (solar, wind, hydroelectric, and geothermal) | MJ | 2.48 | 2.48 | 6.92 | 6.70 | 6.72 | 7.18 | 7.20 |
| Nonrenewable material resources | kg | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| Renewable material resources | kg | 0.02 | 0.02 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| Net fresh water | m ³ | 0.12 | 0.12 | 0.08 | 0.07 | 0.08 | 0.08 | 0.09 |
| Non-hazardous waste generated | kg | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| Hazardous waste generated | kg | 1.35E-04 | 1.35E-04 | 1.30E-04 | 1.30E-04 | 1.30E-04 | 1.30E-04 | 1.31E-04 |

This EPD only covers the cradle-to-gate impacts of aggregates using a declared unit and the results cannot be used to compare between products. EPDs from different programs (using different PCR) may not be comparable.

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Environmental Impacts

Table 3: Cradle-to-Gate Impact Results for Aggregates Covered in Study

| Impact category | Unit | RD | W1 | #57 | #67 | W1/2" | W3/8" |
|--|-----------------------|----------|----------|----------|----------|----------|----------|
| Global warming potential | kg CO ₂ eq | 4.98 | 5.33 | 5.32 | 5.34 | 5.47 | 5.53 |
| Acidification potential | kg SO ₂ eq | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 |
| Eutrophication potential | kg N eq | 0.02 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| Smog creation potential | kg O ₃ eq | 2.47 | 2.46 | 2.44 | 2.44 | 2.46 | 2.49 |
| Ozone depletion potential | kg CFC-11 eq | 2.14E-07 | 2.42E-07 | 2.42E-07 | 2.44E-07 | 2.52E-07 | 2.55E-07 |
| Nonrenewable fossil | MJ | 65.5 | 69.9 | 69.8 | 70.1 | 71.7 | 72.5 |
| Nonrenewable nuclear | MJ | 6.66 | 7.54 | 7.55 | 7.60 | 7.87 | 7.95 |
| Renewable (biomass) | MJ | 0.64 | 0.71 | 0.71 | 0.72 | 0.74 | 0.75 |
| Renewable (solar, wind, hydroelectric, and geothermal) | MJ | 6.82 | 7.88 | 7.90 | 7.96 | 8.27 | 8.36 |
| Nonrenewable material resources | kg | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| Renewable material resources | kg | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| Net fresh water | m ³ | 0.10 | 0.09 | 0.08 | 0.08 | 0.09 | 0.10 |
| Non-hazardous waste generated | kg | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| Hazardous waste generated | kg | 1.33E-04 | 1.31E-04 | 1.31E-04 | 1.31E-04 | 1.32E-04 | 1.33E-04 |

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Air Quality efforts

Vulcan implements pollution control devices including particulate filters, water sprays, and frequent watering of haul roads and stockpiles to control emissions to the air. Our unpaved haul roads are often treated with nonhazardous products as dust suppression to reduce water usage, in turn reducing overall vehicle exhaust emissions from our water trucks. We operate under permits granted by the South Coast Air Quality Management District. You can learn more about air quality operating requirements in the aggregates industry by visiting <https://www.aqmd.gov>.

Water Management

Vulcan facilities re-use water extensively. Water used to produce our products is often captured for re-use to minimize our water usage footprint. Water we can't recapture is often placed in designated basins, where it seeps through the underlying soil to recharge local groundwater resources. Stormwater is captured, controlled and monitored in compliance with California's General Permit for Stormwater Discharges Associated with Industrial Activities.

Mining and Reclamation

Mining and reclamation of our properties is conducted in conformance with established plans that are approved by local authorities, and performance bonded to ensure funding is available for reclamation when mining is complete. Once mining is complete, the mining area is reclaimed so that the property can be used for its designated beneficial use.

Used Oil and Battery Recycling

Used oil and batteries from our locations are picked up by recycling vendors in accordance with State and Federal regulations. The used oil and batteries are then recycled by licensed facilities.

Sustainability

Our operations strive to reduce environmental impacts as much as possible, principally by reducing the use of or recycling resources as much as possible. We recycle our aggregate wash water to reduce freshwater consumption. We also limit our diesel-powered equipment to 5 minutes idling and have implemented a large-scale preventative maintenance program for diesel equipment to maximize efficiency.

Where feasible, technology is implemented that allows for greater efficiencies and potential for recycling. At our Corona facility we recognized an opportunity in a conveyor system used to move raw material from the quarry to a processing plant. Because the conveyor moves the material downhill, the facility developed a system that uses gravity to move the material and generate electricity in the process.

Community

In addition to providing high quality aggregate to serve the needs of California's ever-expanding economy, Vulcan's objective is to build strong communities and be a good corporate partner. To this end, Vulcan established the Vulcan Materials Company Foundation to actively support many public and charitable projects. By working with area schools, supporting environmental education, wildlife habitat conservation and encouraging employee involvement, Vulcan has proven itself to be an asset to the communities where we

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operate. Our current priorities include: education programs, community event sponsorships, partnerships with land conservation organizations and establishing / maintaining certified wildlife habitats.

Some examples of Vulcan's commitment to the community in Corona include support of the following organizations and events:

- o American Cancer Society - Riverside Chapter
- o American Legion Post 742
- o All American Riders
- o Circle City Rotary Foundation
- o Corona Public Library
- o Corona Rotary Club
- o Corona Norco YMCA
- o Crystal Roses Helps
- o Feeding America
- o Orange Elementary School
- o Lincoln Alternative Elementary School
- o Patricia Beatty Elementary School
- o Operation Community Cares
- o Riverside National Cemetery
- o Teen Challenge