



Section 033000 – cast-in-place concrete

These samples are for pathway 1. Note: These specification samples do not constitute professional advice and should be incorporated at the discretion of professionals on the design team. See the DEQ Housing Guide for Drawings and Specifications Factsheet for more info.

Part 1 General

1.1 Submittals

- A. Product Data: _____.
- B. Sustainable Materials Documentation: Provide documentation per Section 018113 - Sustainable Design Requirements to demonstrate compliance with Oregon DEQ Housing Program requirements.
 - 1. Submit the Pathway 1 section of the DEQ Embodied Carbon Reporting Form, with evidence of compliance attached.
 - a. For all submittals, attach evidence of compliance from either the manufacturer or an independent agency.
 - 1) Acceptable evidence includes Acceptable Environmental Product Declarations.
 - b. Include Material Quantity and Cost data.
 - 1) Acceptable evidence of compliance may include receipts showing quantities and costs of specific products installed.
 - c. DEQ Embodied Carbon Reporting Form: Provide embodied carbon updates throughout construction for each optimized product type that includes the following:
 - 1) Declared quantity and unit of each applicable material.
 - 2) Required Global Warming Potential Baseline
 - 3) Actual embodied carbon emissions (declared unit quantity x kgCO₂e/declared unit).
 - 4) Environmental Product Declaration (EPDs) that document actual GWP
 - 5) Carbon emissions reductions achieved across the pathway

Translation or other formats

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Part 2 Products

2.1 Performance requirements

1. For products where a reduction claim is made, provide an Acceptable Environmental Product Declaration (EPD) that documents the following:
 - a. Actual Embodied Carbon: Product's GWP value as listed on EPD in kg CO₂e per Declared Unit.
 - b. System Boundary: Product Stage A1-A3.
 - c. Declared Unit: metric ton.
 - d. Product Category Rule (PCR): PCR used to create EPD, as listed on EPD.
2. Embodied Carbon Optimization Targets: EPDs for these product types are targeted to have a Global Warming Potential (Embodied Carbon, Actual) of 20% less than the Global Warming Potential Baseline.
3. Global Warming Potential Baseline: As expressed in kgCO₂e per Declared Unit.

Rebar Type (based on actual EPD)	Baseline Global Warming Potential (kg CO ₂ e per metric ton)
Unfabricated rebar	753
Fabricated rebar	854

4. Global Warming Potential Targets: As expressed in kgCO₂e per declared unit.

Rebar Type (based on actual EPD)	Baseline Global Warming Potential Target (kg CO ₂ e per metric ton)
Unfabricated rebar	602
Fabricated rebar	683

- a. Pursuing Pathway 1, the project has a goal to achieve a 20% embodied carbon reduction across the products covered by Pathway 1. For this reason, no individual product must meet the Global Warming Potential Targets in the above table. Instead these Global Warming Potential Targets are provided as indicative of product-level targets aligned with the project-level goal.

B. Embodied Carbon - Cast-in-Place Concrete Mixes:

1. For products where a reduction claim is made, provide an Acceptable Environmental Product Declaration (EPD) that documents the following:
 - a. Actual Embodied Carbon: Product's GWP value as listed on EPD in kgCO₂e per Declared Unit.

- b. System Boundary: Product Stage A1-A3.
 - c. Declared Unit: m³
 - d. Product Category Rule (PCR): PCR used to create EPD, as listed on EPD.
2. Global Warming Potential Baselines: As expressed in kg CO₂e per Declared Unit.

Concrete Class and Strength	Baseline Global Warming Potential (kgCO₂e per m³)
2500 psi(17.2 MPa), Normalweight	235
3000 psi (20.7 MPa), Normalweight	261
3500 psi (24.1 MPa), Normalweight	289
4000 psi (27.6 MPa), Normalweight	316
4500 psi (31.0 MPa), Normalweight	351
5000 psi (34.5 MPa), Normalweight	386
5500 psi (37.9 MPa), Normalweight	397
6000 psi (41.4 MPa), Normalweight	408
7000 psi (48.3 MPa), Normalweight	448
8000 psi (55.1 MPa), Normalweight	487
3000 psi (20.7 MPa), Lightweight	518
4000 psi (27.6 MPa), Lightweight	575
5000 psi (34.5 MPa), Lightweight	632

- a. All Baseline GWP values shall be based on the required compressive strength of concrete as listed in the Contract Documents.
3. Global Warming Potential Targets: As expressed in kgCO₂e per Declared Unit.

Concrete Class and Strength	Global Warming Potential Targets (kgCO₂e per m³)
2500 psi(17.2 MPa), Normalweight	188
3000 psi (20.7 MPa), Normalweight	209
3500 psi (24.1 MPa), Normalweight	231
4000 psi (27.6 MPa), Normalweight	252
4500 psi (31.0 MPa), Normalweight	281
5000 psi (34.5 MPa), Normalweight	309
5500 psi (37.9 MPa), Normalweight	318
6000 psi (41.4 MPa), Normalweight	326
7000 psi (48.3 MPa), Normalweight	358

8000 psi (55.1 MPa), Normalweight	390
3000 psi (20.7 MPa), Lightweight	414
4000 psi (27.6 MPa), Lightweight	460
5000 psi (34.5 MPa), Lightweight	506

- a. Pursuing Pathway 1, the project has a goal to achieve a 20% embodied carbon reduction across the products covered by Pathway 1. For this reason, no individual mix must meet the Global Warming Potential Targets in the above table. Instead these Global Warming Potential Targets are provided as indicative of mix-level targets aligned with the project-level goal.

2.2 Concrete materials

A. Cementitious Materials:

[This section typically includes the allowed materials for concrete mixtures. To allow flexibility for achieving lower carbon mixes, designers should consider including the following materials in their specifications: Blended Hydraulic Cement (ASTM C595), Performance-Based Hydraulic Cement (ASTM C1157), Fly Ash and Natural Pozzolan (ASTM C618), Slag Cement (ASTM C989), Ground Glass Pozzolan (ASTM C1866), Silica Fume (ASTM C1240). Consideration of code requirements for exposure class should be verified when selecting the types and grades of materials to be included.

Furthermore, high SCM contents do not always translate to lower embodied carbon intensities. Close coordination and cooperation between the design team, contractor, and ready-mix supplier must ensure that concrete mixes with alternative cements and/or high SCM contents meet the GWP targets set forth above.]
End of section.

Contact

Please email built.environment@deq.oregon.gov if you would like to connect with the program or inquire about our work.

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