

## Controlled Density Fill



### 1. Scope

This standard covers the material requirements for controlled density fill (CDF).

This standard applies to the following Seattle City Light (SCL) stock numbers:

<b>Stock No.</b>	<b>Description</b>	<b>Unit</b>
013713	Pipe bedding CDF	cubic yard
013714	Structural fill CDF	"
013715	Trench backfill CDF	"

### 2. Application

CDF is a mixture of Portland cement, fly ash, aggregates, water, and admixtures proportioned to provide a non-segregating, free-flowing, low-strength, compacted, dense, and non-settling backfill material.

CDF is used in vault, handhole, and pad applications. Secondary and service conduits may also use CDF backfill.

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### 3. Industry Standards

CDF shall meet the applicable requirements of the latest revisions of the following industry standards:

**American Association of State Highway and Transportation Officials (AASHTO) M85**; Standard Specification for Portland Cement

**ASTM C150**; Standard Specification for Portland Cement

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### 4. Requirements

#### 4.1 Pipe Bedding and Backfill

Manufacturer mix numbers and requirements may change frequently. Refer to the City of Seattle Standard for Road Bridge and Municipal Construction (COSSRBMC) 2-10.2(3) and confirm with the supplier.

CDF mix designs do not have an expiration date.

SCL may require submittal of CDF for review and approval.

When specified in the contract or when approved by the SCL engineer, the contractor shall supply CDF as backfill material. The SCL engineer may require the contractor to use CDF.

**Table 4.1a. Pipe Bedding CDF Mix Design, Stock No. 013713**

<b>Material</b>	<b>Quantity/Cubic Yard</b>	<b>Reference</b>
Portland cement type I-II	94 pounds	COSSRBMC 2-10.2(3)A1
Fly ash Cl. F; or	2.2 cubic feet	"
Fly ash Cl. C	1.1 cubic feet	"
Mineral aggregate type 7 w/ Cl. F fly ash	16.8 cubic feet	"
Mineral aggregate type 7 w/ Cl. C fly ash	17.9 cubic feet	"
Water	4.8 cubic feet	"
Air entrainment	2.7 cubic feet	"

**Table 4.1b. Structural Backfill CDF Mix Design, Stock No. 013714**

<b>Material</b>	<b>Quantity/Cubic Yard</b>	<b>Reference</b>
Portland cement type I-II	50 pounds	COSSRBMC 2-10.2(3)A3
Fly ash Cl. F; or	2.2 cubic feet	"
Fly ash Cl. C	1.1 cubic feet	"
Mineral aggregate type 6 or type 7	17.2 cubic feet w/ fly ash class; or 18.1 cubic feet w/ fly ash class C	"
Water	4.8 cubic feet	"
Air entrainment	2.7 cubic feet	"

**Table 4.1c. Trench Backfill CDF Mix Design, Stock No. 013715**

<b>Material</b>	<b>Quantity/Cubic Yard</b>	<b>Reference</b>
Portland cement type I-II	30 pounds	COSSRBMC 2-10.2(3)A2
Fly ash Cl. F; or Fly ash Cl. C	2.2 cubic feet 1.1 cubic feet	"
Mineral aggregate type 7 w/ Cl. F fly ash Mineral aggregate type 7 w/ Cl. C fly ash	17.1 cubic feet 18.2 cubic feet	"
Water	4.8 cubic feet	"
Air entrainment	2.7 cubic feet	"

#### 4.2 CDF Certification

For all CDF materials, the producer shall provide a manufacturer's delivery ticket for each truckload of CDF. The delivery ticket shall verify that the delivered material complies with City of Seattle Standard Specifications for Road, Bridge and Municipal Construction section 2-10.2(3)A4.

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#### 5. Issuance

Cubic yard

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#### 6. Approved Manufacturers

Any manufacturer may be used as long as the general and certification requirements for mix are met.

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#### 7. References

**City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction – 2014 Edition**, Section 2-10.2(3)A1, Section 2-10.2(3)A2, Section 2-10.2(3)A3, 2-10.2(3)A4, and Section 9-01

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#### 8. Sources

**Hamlin, Pam**; SCL Senior Civil Engineer and subject matter expert for 7150.30  
(pam.hamlin@seattle.gov)

**Stewart, Bob**; SCL Civil Engineer and subject matter expert for 7150.30  
(bob.stewart@seattle.gov)

**Tilley, Kathy**; SCL Electrical Engineering Support Specialist and originator of 7150.30  
(kathy.tilley@seattle.gov)

**SCL Material Standard 0226.11**, "Backfill Operations, General Requirements"