

TECHNICAL SPECIFICATION
(OUTLINE SPECIFICATION)

NO. FS-SP-0307

TITLE: SHOTCRETE
DIVISION 3 - CONCRETE
SUBDIVISION - CAST IN PLACE CONCRETE

APPROVED BY *H. Allen* DATE 4-26-88
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PART ONE - GENERAL

1.1 WORK INCLUDED

The work under this specification includes providing initial support to the shaft excavation wall by pneumatically applying a low slump concrete at high velocity onto a prepared rock surface.

1.2 REFERENCED PUBLICATIONS

The publications listed below form a part of this specification.

1.2.1 U. S. Department of Commerce, National Bureau of Standards (NBS)

- o Handbook Specifications, Tolerances and Other Technical
No. 44 Requirements for Commercial Weighing and Measuring
Devices

1.2.2 American Concrete Institute (ACI):

- o 506.3R Guide to Certification of Shotcrete Nozzlemen
- o 201.2R Guide to Durable Concrete
- o 506 Recommended Practice for Shotcreting
- o 506.2 Specification for Materials, Proportioning, and
Application to Shotcrete
- o 301 Specifications for Structural Concrete for Buildings

1.2.3 American Society for Testing and Materials (ASTM):

- o C33 Concrete Aggregates
- o C42 Obtaining and Testing Drilled Cores and Sawed Beams of
Concrete
- o C87 Effect of Organic Impurities in Fine Aggregate on
Strength of Mortar
- o C94 Ready-Mixed Concrete

- o C150 Portland Cement
- o C231 Air Content of Freshly Mixed Concrete by the Pressure Method
- o C260 Air-Entraining Admixtures for Concrete
- o C309 Liquid Membrane-Forming Compounds for Curing Concrete
- o C330 Lightweight Aggregates for Structural Concrete
- o C494 Chemical Admixtures for Concrete
- o C595 Blended Hydraulic Cements
- o C618 Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
- o C666 Resistance of Concrete to Rapid Freezing and Thawing
- o C685 Concrete Made by Volumetric Batching and Continuous Mixing
- o C989 Ground Iron Blast-Furnace Slag for Use in Concrete and Mortars

1.3 SYSTEM DESCRIPTION

1.3.1 Furnish, place and cure shotcrete for the following:

- a. Initial protection and support for the excavated shaft walls.
- b. Protection and support of underground excavation surface where deemed necessary.
- c. Creation of fireproof ventilation barriers at selected locations in the underground openings.

1.4 QUALITY ASSURANCE

1.4.1 The Quality Assurance Level Assignment for Shotcrete is II.

1.4.2 The Vendor shall have an approved Quality Assurance Program.

PART TWO - PRODUCTS

2.1 MATERIALS

2.1.1 Portland Cement ASTM-C150

2.1.2 Concrete Aggregates ASTM-C33

2.1.3 Air Entraining Admixtures ASTM-C260

2.1.4 Chemical Admixtures ASTM-C494

2.1.5 Liquid Membrane Forming Compounds for Curing Concrete ASTM-C309

PART THREE - EXECUTION

3.1 MIXING

3.2 DELIVERY

3.3 PLACEMENT

3.4 REINFORCEMENT

3.5 CURING

3.6 SAMPLING

3.7 INSPECTION AND TESTING

3.8 ACCEPTANCE