

## DETAILED SPECIFICATIONS

### SHOTCRETE

**WORK** - All surfaces to receive shotcrete shall be sufficiently cleaned by Contractor, as well, all unsound structural concrete shall be removed by Contractor and replaced by the Contractor with shotcrete where indicated in the contract documents and where ordered by the Engineer. The Contractor will provide all necessary materials as per the following specifications. The Contractor shall use the Dry Mix Process unless otherwise authorized by the Engineer.

The Contractor is responsible for site clean up and removal of excess and waste materials. The site shall be deemed acceptable by the Engineer.

### DEFINITIONS

- A. Shotcrete** is mortar conveyed through a hose and pneumatically projected at high velocity onto a surface.
- B. Dry Mix Process:** This is a process in which the dry cement-sand mixture is carried by compressed air to the nozzle where water is injected and the resulting mixture is jetted from the nozzle at high velocity onto the surface to be shotcreted.
- C. Wet Mix Process:** This is a process in which all the ingredients including water are thoroughly mixed and then jetted from the nozzle at high velocity onto the surface to be shotcreted.
- D. Delivery System:** This consists of the nozzle, water ring or air ring, and any necessary valves, connected to the delivery hose.

**MATERIALS:** Materials used in this work shall conform to the following requirements:

- Portland Cement, Types 1 or 2
- Concrete Sand
- Water
- Quilted Covers (for curing)
- Polyethylene-Coated Burlap Blankets (for curing)
- Membrane Curing Compound

| TABLE 583-1                         |                          |                          |
|-------------------------------------|--------------------------|--------------------------|
| SIZE AND SPACING OF HOOK-TYPE BOLTS |                          |                          |
| Thickness                           | Underside & Vertical     |                          |
| Of                                  | Surfaces                 | Topside                  |
| Placement                           | Size and Spacing         | Side and Spacing         |
| 2"                                  | 1/4" diam. @ 1'-6" ctrs. | 1/4" diam. @ 2'-0" ctrs. |
| 4"                                  | 3/8" diam. @ 2'-0" ctrs. | 3/8" diam. @ 3'-0" ctrs. |
| 5"                                  | 3/8" diam. @ 1'-9" ctrs. | 3/8" diam. @ 3'-0" ctrs. |
| 6"                                  | 3/8" diam. @ 1'-8" ctrs. | 3/8" diam. @ 3'-0" ctrs. |
| 7"                                  | 3/8" diam. @ 1'-6" ctrs. | 3/8" diam. @ 3'-0" ctrs. |
| 8"                                  | 2" diam. @ 1'-11" ctrs.  | 2" diam. @ 3'-0" ctrs.   |
| 9"                                  | 2" diam. @ 1'-10" ctrs.  | 2" diam. @ 3'-0" ctrs.   |
| 10"                                 | 2" diam. @ 1'-9" ctrs.   | 3/8" diam. @ 2'-0" ctrs. |
| 11"                                 | 2" diam. @ 1'-8" ctrs.   | 3/8" diam. @ 2'-0" ctrs. |
| 12"                                 | 2" diam. @ 1'-6" ctrs.   | 3/8" diam. @ 2'-0" ctrs. |

Bolt diameters may be increased but not decreased. Spacing may be decreased but not increased.

**A. Wire Fabric for Concrete Reinforcement:** Wire fabric for concrete reinforcement shall meet the NYSDOT requirements and the following additional requirements: The wire fabric shall be galvanized. The wire fabric shall be fabricated from No. 12 wire spaced two inches in each direction or No. 10 wire spaced three inches in each direction. Wire used shall have a minimum yield strength of 35 ksi (241.32MPa).

**B. Expansion Bolt Anchors:** Expansion bolt anchors shall be fabricated from steel meeting U.S. Government G.S.A. Specification No. FF-S-325, Group III, Type 1, or Group VIII, Type 1.

**C. Bolts Inserted in Expansion Bolt Anchors:** These bolts shall be a hook-type bolt conforming to the requirements of ASTM A307, Carbon Steel Externally and Internally Threaded Standard Fasteners.

## EQUIPMENT

**A. Batching and Mixing Equipment:** The mixing equipment shall be capable of thoroughly mixing the materials in sufficient quantity to maintain placing continuity.

**B. Air Supply:** The compressor shall be of adequate capacity to maintain a sufficient, constant nozzle velocity for all parts of the work while simultaneously operating a blow pipe for cleaning away rebound. The air hose shall be equipped with a filter to prevent any oil or grease from contaminating the shotcrete.

### C. Delivery Equipment

- 1. Dry Mix Process:** The delivery equipment shall be capable of delivering a continuous, smooth, uniformly mixed material to the nozzle. The nozzle shall be equipped with a water ring and valve to permit adjustment of the water. The water added to the dry mix material at the nozzle shall be maintained at a pressure at least 15 psi greater than the air pressure. The nozzle shall be capable of delivering a conical discharge stream.
- 2. Wet Mix Process:** Only pneumatic-feed type of delivery equipment will be allowed. Positive displacement type of equipment will be allowed pending a qualification test prior to the beginning of the work which will also be the qualification test for the operator. The nozzle shall be equipped with an air ring for injecting compressed air into the material flow.

### QUALIFICATIONS

The Contractor must give references of work performed in the previous three (3) years.

### PREPARATION OF SURFACES

All unsound concrete shall be removed until there are no offsets in the cavity which would cause an abrupt change in thickness. No square shoulders shall be left at the perimeter of the cavity; all edges shall be tapered. The final cut surface shall be sound and properly shaped. The sound surface shall be sandblasted. Just prior to shotcreting, the sound surface shall be thoroughly cleaned, wetted and air blown. Chipping hammers shall weigh less than forty (40) pounds with the bit removed. No exceptions will be allowed under any circumstances. Only chisel point bits will be allowed.

Reinforcement may consist of either existing reinforcing bars or welded galvanized wire mesh, depending on the conditions and shall be clean and free from loose mill scale, loose rust, oil or other coatings that interfere with bonding.

Sufficient clearance shall be provided around the reinforcement to permit complete encasement with sound shotcrete. The minimum clearance between the reinforcement and the form or other backup material shall be 2 inch.

Where the chipped area is equal to or less than two inches in depth, the use of wire mesh or mechanical concrete anchors will not be required except for overhead surfaces. Where the chipped areas are overhead, and are one inch in depth or greater, galvanized wire mesh and mechanical concrete anchors shall be used. Mechanical concrete anchors shall be placed as required by Table 583-1.

Where the chipped area is over two inches in depth and existing bar reinforcement is available, galvanized wire mesh shall be attached to the bars with tie wires. If existing bar reinforcement is not available, wire mesh shall be installed by means of mechanical concrete anchors in accordance with the requirements of Table 583-1.

Wire mesh shall be cut in sheets of the proper size and shall be carefully bent in such a manner as to follow closely the contours of the areas to be repaired. The wire mesh shall be securely tied to the hook-type bolts or the reinforcing bars.

Where sheets meet, they shall be lapped a minimum of four inches and shall be securely fastened together.

Expansion bolt anchors shall be placed in holes drilled in the existing concrete surface to the diameter and depth recommended by the manufacturer of the expansion bolt anchors. Hook-type bolts of the proper length shall be inserted and securely attached to the expansion bolt anchors so as to provide a positive connection to sound concrete.

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Where the chipped area is six inches or greater in depth, the Contractor shall place galvanized wire mesh in layers four inches apart.

Where it is necessary to place more than one layer of galvanized wire mesh in an area to be repaired, the innermost layer shall be covered by a shotcreting prior to the installation of the next outermost layer.

### PREPARATION OF MATERIALS

**A. General:** The sand shall be measured either by volume or weight, by means of batch boxes approved by the Engineer. Wheelbarrows or shovels will not be permitted for measuring. The same source of sand shall be used throughout each structure.

**B. Dry Mix Process:** Dry mix shotcrete shall be composed of one part of cement to three to four and one-half parts of sand.

Prior to mixing, the moisture content of the sand shall be such that the sand cement mixture will flow at a uniform rate (without slugs) through the delivery hose. The sand shall be dampened or dried as required to bring the moisture to a satisfactory level. Moisture content fluctuations shall not exceed three percent.

A wetting agent approved by the Engineer may be used at the Contractor's option in the dry mix process.

Sand-cement mixtures shall be applied within 75 minutes of the time the sand initially contacts the cement. Sand-cement mixtures which exceed the 75 minute limit shall not be incorporated in the work. They shall be disposed of in a manner acceptable to the Engineer.

**C. Wet Mix Process:** Wet mix shotcrete shall be composed of one part of cement to three parts of sand. The cement, sand and water shall be premixed to a desired consistency.

### PLACEMENT

**A. Weather:** Shotcrete shall not be applied during any precipitation which is of sufficient intensity to cause the placed shotcrete to run. Shotcrete shall not be placed during a wind that disrupts the nozzle spray.

Shotcrete shall not be applied when the ambient air temperature is below 45 degrees F unless it is placed with External Heat. Receiving surfaces shall be heated to, and maintained at, approximately 45 degrees F by a method approved by the Engineer before shotcreting operations begin. Under no conditions shall shotcrete be applied against surfaces upon which any frost adheres.

**B. Application:** Before starting to shoot, precautions shall be taken to protect property in the area. Adjacent construction, openings, shrubbery, and all areas that might be discolored or damaged by rebound, cement, water or dust must be covered with tarpaulins or plastic sheets to protect them from damage.

When projecting the shotcrete, the stream of flowing materials shall be directed from the nozzle as nearly at a right angle as possible to the surface being treated, and shall be held uniformly at the same distance (usually between two and five feet) away from the surface at all times. Manufacturer's recommendations shall be followed. The size of the nozzle shall be consistent with the manufacturer's recommendation for the maximum size of the sand used. The use of rebound material shall not be permitted.

Shotcrete on vertical and overhead surfaces shall be built up in 3/4 inch maximum layers to prevent sloughing in heavy applications. Succeeding layers shall be applied just prior to the initial set to maintain a good bond.

When encasing reinforcing steel, the stream from the nozzle shall be directed at an angle so as to fill the space behind the bars. An air jet shall be used to blow out any rebound ahead of the application of shotcrete. Should any such deposit of sand rebound be covered with shotcrete, it shall be cut out and removed by the Contractor without compensation.

Ground wires may be installed to establish the thickness and surface planes of the shotcrete build up. Both horizontal and vertical ground wires may be installed at corners and offsets not clearly established by the formwork (at exterior corners of walls, column or beam corners, and other locations). They may also be used as screed guides. Eighteen or 20 gauge hard steel piano wire is recommended for this purpose. Ground wires shall be tight and true to line, and placed in such a manner that they may be further tightened.

**C. Finishing:** The natural gun finish will be sufficient unless the plans call for one of the following finishes:

**Screed Finish:** After the surface has taken its initial set, excess material outside the forms and ground wires shall be sliced off with a sharp-edged cutting screed. After screeding, the ground wires shall be removed.

**Broom Finish:** This type of finish may be applied after screeding.

**Flash Coat Finish:** This is a thin surface coating containing finer sand than normal, and the application nozzle is held well back from the work. This finish shall be applied to the surface as soon as possible after screeding.

Any of the remaining three types of finish may be applied following flash coat:

**Wood Float Finish:** This gives a granular finish.

**Rubber Float Finish:** This gives a coarse finish.

**Steel Trowel Finish:** This gives a very smooth finish.

**D. Curing:** Horizontal and vertical surfaces shall be cured with quilted covers which shall be kept wet. If polyethylene-coated blankets are used, the burlap side shall be wetted down and placed against the concrete surface. If and when the blankets dry out during the curing period, they shall be removed, rewetted and replaced. Adjoining blankets shall be lapped sufficiently to provide a moisture seal. Retention of moisture for curing shall be continued for a minimum of seven days.

Overhead surfaces shall be cured by applying White-Pigmented Curing Compound.

#### METHOD OF MEASUREMENT

The quantity to be paid for under this item will be the number of U.S. bags (94 lbs) of Portland cement actually used to complete the work.

#### BASIS OF PAYMENT

The unit price bid per U.S. bag of Portland Cement shall include the cost of furnishing all labor, materials and equipment necessary to complete the work.

The Contractor will be paid at the unit price bid for 100 percent of the quantity actually used.

**Payment will be made under:**

| Item      | Pay Unit |
|-----------|----------|
| Shotcrete | US Bag   |

**BID FORM**

**COMPANY NAME:** \_\_\_\_\_

**SHOTCRETE:** As per Jefferson County Highway Department specifications contained herein. Bidders must bid by the per bag pay unit as specified.

ITEM

PER BAG APPLIED PRICE

Shotcrete

\$ \_\_\_\_\_.

**Attached Bid Checklist, Signature/Non-Collusive Page, and Iran Notice must be signed to complete the bid.**

**BID CHECKLIST**

The documents required to complete this bid are indicated below.

- (X) Insurance Certificates See Exhibit A, Pages F-G
- (X) Iran Notice See Pages 19h – 19i

- \_\_\_\_\_ We have reviewed and have submitted the items required under the Mandatory Submission Requirements.
- \_\_\_\_\_ The Bid Page(s), Signature/Non-Collusive Page, and Iran Notice are completed and included.
- \_\_\_\_\_ Deviations are noted and explained.
- \_\_\_\_\_ Insurance Certificates are enclosed if required.

**WAIVER OF IMMUNITY/NON-COLLUSIVE BIDDING CERTIFICATE PURSUANT TO SECTION 103-D OF THE NEW YORK STATE GENERAL MUNICIPAL LAW**

- A. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organizations, under penalty of perjury, that to the best of knowledge and belief:
1. The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor.
  2. Unless otherwise required by law, the prices which have been quoted in this bid have not knowingly been disclosed by the bidder and will not knowingly be disclosed by the bidder, directly or indirectly, prior to opening, to any bidder or to any competitor.
  3. No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

A bid shall not be considered for award nor shall any award be made where 1, 2, and 3 above have not been complied with; provided, however, that in any case the bidder cannot make to foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons thereof. Where 1, 2, and 3 above have not been complied with, the bid shall not be considered for any award nor shall any award be made unless the head of the Purchasing Unit to the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customer of proposed or pending publications of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning of paragraph "A" above.

- B. Any bid hereafter made to any political subdivision of the state or any public department, agency or official thereof by a corporate bidder for work or services performed or to be performed or goods sold or to be sold, where competitive bidding is required by statute, rule, regulation, local law, and where such bid contains the certification referred to in paragraph "A" of this section, shall be deemed to have been authorized by the Board of Directors of the bidder, and such authorization shall be deemed to include the submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation.

**SIGNATURE PAGE ON REVERSE MUST BE SIGNED TO COMPLETE THE BID.**

**SIGNATURE PAGE**

The undersigned proposes to furnish products or services to specifications included in this bid document, at the price(s) set forth, as required to meet the County's needs. Any deviation to the specifications must be noted on the bid form and fully explained or the deviations will not be considered part of the bid.

Deviations: Yes \_\_\_\_\_ No \_\_\_\_\_

**By signing below I am certifying that I fully understand the complete requirements of the bid and agree to the non-collusive certification on the reverse of this page and additional documents as specified on the bid checklist. Bidder hereby acknowledges receipt of all addenda pertaining to this bid which are made part of the original bid specifications.**

\_\_\_\_\_ COMPANY NAME

\_\_\_\_\_ ADDRESS (Principal Office)

\_\_\_\_\_ CITY, STATE, ZIP CODE

\_\_\_\_\_ AREA CODE/TELEPHONE NUMBER

\_\_\_\_\_ FAX NUMBER

\_\_\_\_\_ AUTHORIZED SIGNATURE

\_\_\_\_\_ PRINTED NAME

\_\_\_\_\_ TITLE

\_\_\_\_\_ DATE

\_\_\_\_\_ ADDRESS (Local Office)

\_\_\_\_\_ CITY, STATE, ZIP CODE

\_\_\_\_\_ AREA CODE/TELEPHONE NUMBER

\_\_\_\_\_ FAX NUMBER

\_\_\_\_\_ E-MAIL ADDRESS

Check One: Corporation \_\_\_\_\_ Partnership \_\_\_\_\_ Individual \_\_\_\_\_

Incorporated under the laws of the State of \_\_\_\_\_

Federal Identification # \_\_\_\_\_

State if authorized to do business in the State of New York: Yes \_\_\_\_\_ No \_\_\_\_\_

Names and Addresses of Partners:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**Iranian Energy Sector Divestment**

Contractor hereby represents that said Contractor is in compliance with New York State General Municipal Law Section 103-g entitled “Iranian Energy Sector Divestment”, in that said Contractor has not:

- a. Provided goods and services of \$20 Million or more in the energy sector of Iran including but not limited to the provision of oil or liquefied natural gas tankers or products used to construct or maintain pipelines used to transport oil or liquefied natural gas for the energy sector of Iran; or
- b. Acted as a financial institution and extended \$20 Million or more in credit to another person for forty-five days or more, if that person’s intent was to use the credit to provide goods or services in the energy sector in Iran.

Any Contractor who has undertaken any of the above and is identified on a list created pursuant to Section 165-a (3)(b) of the New York State Finance Law as a person engaging in investment activities in Iran, shall not be deemed a responsible Bidder pursuant to Section 103 of the New York State General Municipal Law.

Except as otherwise specifically provided herein, every Contractor submitting a bid in response to this Request for Bids must certify and affirm the following under penalties of perjury:

- a. “By submission of this bid, each Bidder and each person signing on behalf of any Bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief, that each Bidder is not on the list created pursuant to NYS Finance Law Section 165-a (3)(b).”

Jefferson County will accept this statement electronically in accordance with the provisions of Section 103 of the General Municipal Law.

Except as otherwise specifically provided herein, any Bid that is submitted without having complied with subdivision (a) above, shall not be considered for award. In any case where the Bidder cannot make the certification as set forth in subdivision (a) above, the Bidder shall so state and shall furnish with the bid a signed statement setting forth in detail the reasons therefore. The County reserves its rights, in accordance with General Municipal Law Section 103-g to award the Bid to any Bidder who cannot make certification, on a case-by-case basis under the following circumstances.

1. The investment activities in Iran were made before April 12, 2012, the investment activities in Iran have not been expanded or renewed after April 12, 2012, and the Bidder has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or
2. The County of Jefferson has made a determination that the goods or services are necessary for the County to perform its functions and that, absent such an exemption, the County of Jefferson would be unable to obtain the goods or services for which the Bid is offered. Such a determination shall be made by the County in writing and shall be a public document.

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Attachment  
Certification Pursuant to Section 103-g  
of the New York State  
General Municipal Law

- A. By submission of this bid, each Bidder and each person signing on behalf of any Bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each Bidder is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the New York State Finance Law.
- B. A Bid shall not be considered for award, nor shall any award be made where the condition set forth in Paragraph A above has not been complied with; provided, however, that in any case the Bidder cannot make the foregoing certification set forth in Paragraph A above, the Bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefore. Where Paragraph A above cannot be complied with, the Purchasing Unit to the political subdivision, public department, agency or official thereof to whom the bid is made, or his designee, may award a bid, on a case by case basis under the following circumstances:
1. The investment activities in Iran were made before April 12, 2012, the investment activities in Iran have not been expanded or renewed after April 12, 2012, and the Bidder has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or
  2. The political subdivision makes a determination that the goods or services are necessary for the political subdivision to perform its functions and that, absent such an exemption, the political subdivision would be unable to obtain the goods and services for which the contract is offered. Such a determination shall be made in writing and shall be a public document.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

\_\_\_\_\_  
Company Name