

## Chapter 600

### Concrete & Item 600 - 13

This chapter is not part of the Project's specifications, but is a guide for project personnel in interpreting CDOT specifications, understanding ASTM, AASHTO, and Colorado test procedures, and for completing CDOT forms.

#### ITEM 601, STRUCTURAL CONCRETE

##### CONCRETE DESIGN MIXES

All concrete placed on the project shall conform to a design mix, which has been approved according to CP 62. The design mix is defined by the proportions and sources of all ingredients in the concrete.

The Contractor (or Supplier) will establish and is responsible for the concrete design mix proportions and source of all ingredients for each class of concrete used. The Region Materials Engineer (RME) or the Concrete & Physical Properties (CPP) Unit may verify any or all properties of the submitted mix design prior to approval. When a trial mix check is requested, aggregate sources will be sampled by the Contractor and the samples submitted to the CPP Unit.

The concrete Table 601-1 in Section 601 of the Standard Specification or in the Special Provisions for the project gives the data for each class of concrete. The column "Concrete Class" lists each class of concrete and the required field compressive strength. The cement content for each class of concrete is the minimum amount or range that will be used for designing the concrete mix.

For all classes of concrete, except Class H and HT, the compressive strength of the laboratory trial mix shall be at least 15% greater than the required field compressive strengths.

When a concrete mix design is approved, a CDOT Form #1373 will be issued for the project.

Standard approved mix designs will be placed on the Pre-Approved Concrete Mix Designs list:

[www.coloradodot.info/business/apl](http://www.coloradodot.info/business/apl)

Mix designs are approved for two years from the date the mix was trialed or when the aggregate were sampled, whichever occurs first.

##### REFERENCING PRE-APPROVED MIX DESIGNS

Projects may choose to reference existing pre-approved concrete mix designs. The concrete mix designs used on CDOT projects are to be referenced in the following manner:

1. Cross-reference the contractor's mix design number with the CDOT mix design number on the Pre-Approved Concrete Mix Design list.
2. Document the Concrete Mix Design on a CDOT Form #1188, listing the CDOT mix number.
3. Mixes must be reviewed and approved by the RME or CPP Unit prior to use.

Upon approval of the concrete mix design, a CDOT Form #1373 will be issued for the project.

##### REVIEW OF CONTRACTOR'S MIX DESIGN

Mix approval is required before concrete placement begins following the procedures of CP 62.

## AGGREGATES

A minimum of three 60 lb. sacks of the coarse (1-1/2 in. to 3/4 in.); three 60 lb. sacks of intermediate (3/4 in. to plus #4); and three 60 lb. sacks of sand (minus #4) per class of concrete are required when mix design checks are performed.

One additional sack of each aggregate will be required for Class H, HT S50, and P mixes.

### Aggregate Tests Required for Design Mixes

The following test will be performed by the Contractor:

- (1) specific gravity
- (2) absorption
- (3) organic impurities in sand
- (4) sieve analysis
- (5) sand equivalent
- (6) L.A. abrasion
- (7) percent passing the No. 200 sieve
- (8) fineness modulus
- (9) unit weight and voids in aggregate
- (10) potential alkali reactivity
- (11) soundness by the sodium sulfate method.

## COMPRESSIVE STRENGTH TESTING

Determination of compressive strength of concrete shall be done in accordance with ASTM C 39. This method consists of applying a compressive axial load to molded cylinders or cores at a rate within the prescribed range until failure occurs. The compressive strength of the specimen is calculated by dividing the maximum load attained during the test by the cross-sectional area of the specimen. The following details, from the test procedure, are noted:

1. Initial cure of specimens is in accordance with AASHTO T 23 as modified.

2. Testing machine. Calibration of the testing machine shall be performed at least annually, but not to exceed 13 months. Recalibration is required upon installation or relocation of the machine, or whenever there is reason to doubt the accuracy of test results. The diameter of the sphere of the top loading

head on the machine shall be at least 75% of the diameter of the specimen to be tested.

3. Concrete specimens shall not be tested if any individual cylinder diameter differs from other diameters of the same cylinder by more than 2%. No cylinder shall depart from perpendicularity to the axis by more than 0.5°; top of cylinder may not deviate by more than 1/16 inch in 12 inches. When neoprene caps are used, each end of the cylinder shall be planed within 0.125 inches across any diameter and no depression in the concrete surface deeper than 0.125 inches is tolerated. The diameter used for calculating the cross-sectional area of cylinder shall be determined to the nearest 0.01 inches by averaging two diameters measured at right angles about mid-height of the specimen. Core length shall be measured to the nearest 0.05 inch when length-to-diameter ratio is less than 1.8, or more than 2.2.

4. Procedure. Test the cylinders as molded in the field. The loading rate shall be within the range of 20 to 50 psi/second. During the first half of the anticipated load, a higher rate of loading is allowed. When using neoprene caps an additional three to five seconds of load is applied to ensure completion of the test and avoidance of premature breaks.

5. Neoprene Pads. Only one side of the pad shall be used when testing the cylinders. Each pad shall not be used to test more than 100 cylinders. Record the number of tests for each pad. The neoprene pad's shore hardness shall be the following for the specified compressive strengths:

- 50 for 1500 – 6000 psi
- 60 for 2500 – 7000 psi
- 70 for 4000 – 7000 psi

A 60 durometer pad is recommended for testing all classes of concrete except for Class S50 which requires sulfur capping.

The neoprene pads shall be removed from the retaining rings and inspected after each test.

## QUALITY ASSURANCE PROGRAM FOR CDOT CONCRETE CYLINDER TESTING

### Introduction

This defines a quality assurance program for testing of concrete cylinders. This program assures the conformance of CDOT equipment and procedures to ASTM Standards by the following:

1. Equipment checks using a standard checklist.
2. Procedure checks using a standard checklist.
3. Inter-Lab (Round Robin) testing with all labs testing replicate specimens at the same time.
4. Training offered by the Concrete Unit of Staff Materials & Geotechnical Branch.
5. ACI certification of CDOT employees.

Cylinders shall be tested with equipment that has been checked and found to be in conformance with ASTM criteria. Testing shall be conducted by an employee who is certified as an ACI Concrete Laboratory Testing Tech I or ACI Concrete Strength Testing Technician.

### Equipment

The cylinder testing equipment will be examined, using the equipment checklist, a minimum of once a year or when the equipment is moved. The person checking the equipment must meet one of the following criteria:

1. Examined by CCRL (Cement and Concrete Reference Laboratory) for procedures and equipment.
2. Trained by the Concrete Unit of Staff Materials & Geotechnical Branch.

### Procedures

The person will be observed conducting the test by a proctor using the procedures checklist a minimum of once a year. The proctor checking the procedures must meet one of the following criteria:

1. Examined by CCRL for procedures and equipment.
2. Trained by the Concrete Unit of Staff Materials & Geotechnical Branch.
3. Certified as an ACI Concrete Laboratory Testing Tech I or ACI Concrete Strength Testing Technician.

### Inter-Lab Testing (Round Robin)

The Concrete Unit will mold replicate cylinders and distribute these to each Region. All cylinders will be tested at approximately the same time. The Concrete Unit will compile the results and distribute a brief report. Excessive deviations will be investigated by the Region.

### Training

The Concrete Unit will conduct training for Region personnel who perform concrete cylinder testing. Classes will be approximately 4 hours and will normally have four trainees per class. The training will be conducted by an employee that has been examined by CCRL.

### ACI Certification

American Concrete Institute (ACI) offers one-day certifications. These certifications include testing of concrete cylinders and a complete battery of tests conducted on concrete aggregate and concrete. ACI Certifications are offered through the Colorado Ready Mixed Concrete Association. CRMCA may be contacted at 303-290-0303 or <http://www.crmca.org/>.

### Documentation

Region Materials Laboratories will maintain documentation on equipment calibration, equipment checks, procedure checks, employee training, employee ACI certification, and Inter-Lab results.

The Concrete Unit of the Central Laboratory will maintain documentation of equipment and procedure checks conducted by the Concrete Unit and Inter-Lab results.

## Equipment and Documentation Checklist for Compression Testing of Concrete Cylinders

Date \_\_\_\_\_ Location \_\_\_\_\_

Inspection Team \_\_\_\_\_

### Compression Machine

Mfg. & Model \_\_\_\_\_

Capacity \_\_\_\_\_

Installation Date \_\_\_\_\_

Calibration Date \_\_\_\_\_

\_\_\_\_\_ Calibration interval did not exceed 13 months or calibrated since moved.

\_\_\_\_\_ Loading head free moving ( $4^\circ$  in any direction).

\_\_\_\_\_ Head diameter: [A minimum dimension of at least 3% greater than the diameter of the specimen, to be tested.

\_\_\_\_\_ Head radius > radius of sphere.

### Other Equipment Noted and Available

\_\_\_\_\_ Condition of neoprene pads and extrusion controllers.

\_\_\_\_\_ Water temperature of cylinder storage area ( $73.4^\circ\text{F} \pm 3^\circ$ ).

\_\_\_\_\_ Temperature recording device operating.

\_\_\_\_\_ Water saturated with lime.

### Documentation / Records on File

\_\_\_\_\_ Compression machine calibration documentation immediately available.

\_\_\_\_\_ Water temperature, neoprene pad durometer, and neoprene pad usage recorded (100 uses per pad maximum).

\_\_\_\_\_ Diameter, load, and psi of cylinders recorded.

## Procedure Checklist for Compression Testing of Concrete Cylinders

Date \_\_\_\_\_ Location \_\_\_\_\_

**Proctor** \_\_\_\_\_

Proctor Credentials \_\_\_\_\_

Employee Observed \_\_\_\_\_

Employee Training and Certification \_\_\_\_\_

---

### Procedure

- \_\_\_\_\_ Remove specimen from moist storage, maintain moisture.
- \_\_\_\_\_ Measure diameter to nearest 0.01 in by averaging two diameters measured at right angles to each other, using calipers, at mid-height of specimen.
- \_\_\_\_\_ Wipe clean bearing surfaces of upper and lower blocks.
- \_\_\_\_\_ Center the cylinder to the spherical head.
- \_\_\_\_\_ Bring top block to bear gently and uniformly on specimen while rotating the movable portion by hand.
- \_\_\_\_\_ Load the cylinder (20 to 50 psi/sec. for hydraulically operated machines).
- \_\_\_\_\_ Take cylinders to failure (additional 3-5 seconds may be required to ensure completion of break).
- \_\_\_\_\_ Record maximum load.
- \_\_\_\_\_ Calculate the compressive strength and report to the required precision (nearest 10 psi)

**Comments:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## **UNIT WEIGHT, YIELD, AND GRAVIMETRIC AIR CONTENT OF CONCRETE**

### **AASHTO T 121**

The unit weight of the concrete is determined by AASHTO T 121.

Refer to AASHTO T 121 for full details of the test procedure and calculations for determining the following: Unit weight (pounds per cubic foot), yield (volume of concrete produced per batch), relative yield (ratio of the actual volume to the volume as designed for the batch), and air content (percentage of voids in the concrete).

### **EXCESSIVE WATER DEMAND**

Water-cement ratios, which exceed the specified maximum may result from one of the following:

1. Incorrect batch weights, due to mathematical errors or scales out of adjustment.
2. Stockpiles of aggregate drying to less than a saturated surface-dry condition, requiring more water than the design. Water added to the batch to bring the aggregates to SSD shall not be included in the w/cm ratio calculation.

It is the Contractor's responsibility to maintain water-cement ratios at or below the specified maximum.

## **MAKING AND CURING CONCRETE CYLINDERS IN THE FIELD**

### **Acceptance (QA) Cylinders**

Test cylinders made for determination of compliance with strength specifications are referred to as "acceptance cylinders". These cylinders are tested at 28 days after casting for all classes of concrete except H and HT which are tested at 56 days.

Acceptance cylinders made at the job site shall be made and cured in accordance with AASHTO T 23 except that initial cure shall be in a water tank with a temperature of  $73.4^{\circ}\text{F} \pm 3^{\circ}$ .

## **Information Cylinders**

Test cylinders made for determining form removal time or when a structure may be put into service are referred to as "information cylinders". Information cylinders shall be cured, in the same manner as the structure. Do not expose these cylinders to direct sunlight or do not store where they may be disturbed by Contractor personnel. They shall remain in the molds until they are tested. Information cylinders are for the purpose of determining relative structure strength and are not to replace acceptance cylinders.

### **Numbering and Marking Cylinders**

See the instructions and examples of CDOT Form #82 in this chapter for the correct method of numbering cylinders. Mark the identifying number and information on the cylinders with a water-proof marking. Do not scratch numbers on the end of the cylinders as it will affect test results.

## **DOCUMENTATION AND TRANSFER OF CONCRETE TEST CYLINDERS**

### **Field sheet Numbering System**

The CDOT Form #82, Concrete Cylinder Transmittal, is used to document and provide information for concrete cylinders submitted for compressive strength testing. Each Form #82 is assigned a field sheet control number. The Reproduction Branch is responsible for assigning the established numbers prior to printing.

### **Concrete Cylinder Transport**

Concrete specimens being transported prior to 48 hours after molding are left in the molds. Upon arrival at the designated testing facility, cylinders are removed from the molds and stored in a suitable curing area. Specimens to be transported after 48 hour age are removed from the molds in  $24 \pm 8$  hours. Curing shall be in saturated limewater @  $73.4^{\circ}\text{F} \pm 3^{\circ}$  until the time of transport. During transportation, the specimens must be protected and kept moist with cushioning material in padded boxes or suitable protective containers. Moisture loss shall be prevented by wrapping the specimens

in plastic, wet sand or burlap. The project tester or designated project representative will be responsible for proper transfer of the specimens. The cylinders shall be removed from the molds and marked with the project number, cylinder set number, and break date.

### Reporting Test Results

The cylinder test information is entered in a reporting program from the CDOT Form #82, Concrete Cylinder Transmittal Report. Compressive test results and cylinder measurements are performed on the specified break dates with compressive strength test results reported on CDOT Form #192, Report of Concrete Tests. The test results are sent to Project and Region personnel. It is the responsibility of the Engineer in charge of the laboratory to ensure the proper testing and reporting of compressive strength test results.

### TECHNICAL COMPLAINTS

Questions or problems should be directed to the Concrete / Physical Properties Unit Program Manager at 303-398-6541. The evaluation process will include an investigation ensuring that correct procedures were adhered to in the following areas:

1. Paperwork
2. Testing procedures
3. Machine Calibration and settings

A verbal reply will be issued, written replies upon request.

### AIR ENTRAINMENT

#### Definition

Air entrainment is the introduction of air that causes the development of a system of microscopic air bubbles in concrete during mixing.

#### Measurement

Determination of air content at the job site shall be made in accordance with AASHTO T 152 and the apparent air content reported. Do

not correct the air meter reading for air in the aggregate, but report total percent air.

The following may affect the quantity and quality of entrained air in concrete.

#### 1. Fly Ash

Fly Ash may substantially change the amount of air entraining admixture required to produce the required air content. Fly ash with a high loss of ignition (LOI) has a high content of carbon and it usually causes the greatest air reduction.

#### 2. Temperature

Rising temperatures generally require increased amounts of air entraining agents.

#### 3. Water

An increase in the water-cement ratio may increase the air content of the concrete. Contaminants present in many water sources, especially streams, can cause highly variable air content in the water.

#### 4. Mixing

A normal dosage of A.E.A. that does not produce adequate air entrainment may indicate inadequate mixing. Trucks with worn blades will not entrain satisfactory amounts of air within the specified number of mixing revolutions. However, prolonged mixing may increase concrete temperature and further reduce air content. The addition of more air-entraining agent to a truck on the job site is allowed.

#### 5. Cement

The ability of the mortar to entrain air will decrease with the increase of the fineness of the cement, and with an increase in the cement content of the mortar.

#### 6. Fine Aggregate

Changes in the sand may alter the volume of air entrainment in the mortar. An increase in quantity of very fine particles (minus No. 30 plus No. 100 sieve) will tend to increase the volume of air in the mortar.

## 7. Pumping Concrete

Pumping concrete may reduce the air content of the concrete. Several factors in the pump configuration may influence the quantity of air loss. It is the responsibility of the Contractor to ensure that the air content leaving the pump be within the specified limits.

## ADMIXTURES

*Pre-Approved Acceptance.* Admixtures are required to conform to applicable AASHTO or ASTM specifications. When using an admixture, attention should be given to the instruction provided by the manufacturer. The amount shown on the laboratory design mix is merely a guide and may require adjustment.

Check the Approved Products List at [www.coloradodot.info/business/apl](http://www.coloradodot.info/business/apl) for approved admixtures.

## Surface Retarders

To produce exposed aggregate textures, surface retarders may be used. Sample panels may be constructed on the job site using the design mix and surface retarder, if required by contract documents. This will not only provide a measure of the effectiveness of the retarder but will give a preview of the color and texture of the final result. It is important, as with other admixtures, to follow manufacturer's instruction. Sample panels, if required, should be a minimum of 2' X 2' for 3/4" exposed coarse aggregate. If larger sized coarse aggregate is required, the panel dimensions should be increased. Most surface retarders require an initial curing period prior to removal of the matrix.

## Workability Agents and Pumping Aids

Improved workability is important for concrete placed in heavily reinforced members or placed by pumping or tremie methods. Frequently, increasing the cement content or the amount of fine aggregate will give the desired workability. One of the best workability agents is entrained air. It acts as a "lubricant" and is especially effective in improving workability and preventing segregation.

Finely divided materials are also used as admixtures to improve workability of mixes deficient in material passing the No. 50 and No. 100 sieves. These materials may be chemically inert or pozzolanic. Inert materials include ground quartz, ground limestone, hydrated lime, and talc. Pozzolans include fly ash, volcanic glass, silica fume, diatomaceous earths, and some clays and shales heat-treated or raw.

Fly ash from an approved source may be used as a cement replacement in all classes of concretes, provided a design mix has been run using the substitution. Class C Fly Ash shall not be used in concrete that may be subjected to sulfate exposure in soil or water.

## Monomolecular Film Coatings / Water Fog Sprays

Monomolecular Film Coatings may be applied to concrete slabs or other flatwork as a method to effectively retard surface evaporation. When placing bridge deck concrete or roadway concrete pavement, a film coating shall only be used ahead of the finishing machine during emergency situations, such as a breakdown of the finishing machine. Under these conditions, this type of application is considered to be equivalent to water fog spray.

Accordingly, its usage shall be subject to the established construction guidelines, per approval of the Engineer. A monomolecular film coating may be used after the finishing operation to prevent evaporation until the wet curing material is in place. The film shall be applied as a fine mist in small quantities.

## Preformed Expansion Joint Material

Damage may occur during shipping, handling, and/or storage on the project. Therefore, immediately prior to use, project personnel shall inspect the material for physical damage, dryness, bleaching, etc. Any portion of a shipment may be rejected prior to use at the direction of project personnel.

## ITEM 602, REINFORCING STEEL (EPOXY COATED)

NOTE: Only producers of epoxy-coated reinforcing steel, in accordance with CP 11, that

are on CDOT's Qualified Manufacturers List can be used: [www.coloradodot.info/business/apl](http://www.coloradodot.info/business/apl) .

*COC Acceptance.* Bars shall meet the requirements of Subsection 709.01 prior to coating. Epoxy coated bars shall meet the requirements of the latest edition of AASHTO M 284.

Coated bars shall be tied with coated tie wires and placed on plastic supports or fully coated steel supports.

Field-inspect epoxy-coated steel carefully. Document field inspection and attach mill test reports to the CDOT Form #157. Retain all copies in the field Project Files.

## ITEM 602, REINFORCING STEEL

NOTE: Only Reinforcing Steel Mills, in accordance with CP 11, that are on CDOT's Qualified Manufacturers List can be used: [www.coloradodot.info/business/apl](http://www.coloradodot.info/business/apl)

Field inspections, by the Engineer, should indicate that the reinforcing steel is clean and if Epoxy-Coated, that the coating is not chipped, cracked, or scratched. The steel should also be checked for proper size and grade using information listed below.

The CDOT Staff Bridge Branch uses several different strengths of reinforcing steel for design purposes. It is necessary to watch the bar list on the bridge plans for higher strength grades, find their exact locations on the bridge plans, and be sure the correct steel is being used in that location.

Grade 60 has a yield strength of 60,000 psi and has either a "60" on the bar or a single continuous longitudinal line through at least five spaces offset from the center of the barside. This grade may be substituted on an equal basis for Grade 40 without prior approval. However, make note of this in the project records if substitution is made.

The metric equivalent to Grade 60 is Grade 420. It has either a "4" on the bar or a single continuous longitudinal line through at least five spaces offset from the center of the barside.

Grade 75 has a yield strength of 75,000 psi and has either a "75" on the base or two continuous longitudinal line through at least five spaces offset each direction from the center of the bar.

The metric equivalent to Grade 75 is Grade 520. It has either a "5" on the base or two continuous longitudinal line through at least five spaces offset each direction from the center of the bar.

Metric markings are being phased out by the Concrete Reinforcing Steel Institute (CRSI) to reduce confusion and the chance of errors/delays from the construction supply chain.

Information on bar markings at CRSI website: <http://www.crsi.org/index.cfm/steel/identification>

CSRI Plant Identification Guide for Concrete Reinforcing Bars available at CRSI website or <http://internal.dot.state.co.us/MAC/Resources.cfm> .

An effort should be made to note in the project diary and on appropriate CDOT forms the grades of reinforcing steel used and especially note when different grades were used in special locations.

Concrete blocks or chairs for support of reinforcing steel need not be tested or documented unless there is reason to believe they lack conformance with CRSI recommended practices.

Certain items contain reinforcing steel, which is not included in the quantities of Item 602. These include precast, concrete bridge caissons, drop inlets, manholes, sign footings, slope and ditch pavements, and dowels in concrete pavement. When totaling up the pay quantity for these items, be sure the steel for these items is not included in reporting Item 602.

## WIRE MESH

Wire mesh: Field-inspect. Document in the Project Files.

The term "gage" is used by the metal industry to denote a nominal dimension. This table defines those dimensions. Galvanized sheet steel is, or course, thicker than bare sheet

steel. This difference is caused by the application of a double surface coating of zinc representing 2 to 2.5 oz. per sq. ft.

Wire gage is the diameter of the finished product whether galvanized or bare. The galvanizing on wire may vary from a thin film to as much as 2 oz. per sq. ft. of area. In the case of chain link fence wire, a 2 oz. coating may contribute as much as 0.007 in. to the diameter.

The figures in the Table 600-1 pertain to actual thicknesses and diameters, but may vary because of manufacturer's tolerances. For example, culvert sheets may be 0.006 to 0.009 in. undersize. Multi-plate sheets may be as much as 0.012 in. undersize. Wire can vary as much as  $\pm 0.005$  in. from the given diameter. To determine spelter thickness, consider 1 oz. per sq. ft. of zinc coating to be 0.0017 in. thick.

**TABLE OF GAGE MEASUREMENTS**

SHEET STEEL		WIRE GAGE		SHEET STEEL		WIRE GAGE	
Bare <u>Inches</u>	Galv <u>Inches</u>	Diameter <u>Inches</u>		Bare <u>mm</u>	Galv <u>mm</u>	Diam. <u>mm</u>	
.2758	.280	1	.283	7.005	7.112	1	7.188
.2451	.249	3	.244	6.225	6.325	3	6.197
.2145	.218	5	.207	5.448	5.537	5	5.258
---	---	6	.192	---	---	6	4.877
.1838	.188	7	.177	4.668	4.775	7	4.496
.1793	---	7	.170	4.554	---	7	4.318
.1644	.168	8	.162	4.176	4.267	8	4.115
---	---	9	.148	---	---	9	3.759
.1345	.138	10	.135	3.416	3.505	10	3.429
---	---	11	.120	---	---	11	3.048
.1046	.109	12	.105	2.657	2.769	12	2.667
---	---	12	.099	---	---	12	2.515
.0747	.079	14	.080	1.897	2.007	14	2.032
---	---	14	.076	---	---	14	1.930
.0598	.064	16	.0625	1.152	1.626	16	1.588
.0478	.052	18	.0475	1.214	1.321	18	1.207
.0359	.040	20	.0348	0.912	1.016	20	0.884
.0299	.034	22	.0286	0.760	0.864	22	0.726

**TABLE 600-1**

- ITEM 603 Culverts & Sewers**
- 604 Manholes, Inlets, Meter Vaults**
- 624 Drainage Pipe**

**CORRUGATED METAL PIPE**

Final acceptance is based on field inspection by Project Personnel.

**SPELTER DAMAGE REPAIR**

Zinc rich paint conforming to Department of Defense DOD-P-21035A should be used for repainting damaged spelter. A Certificate of Compliance is required that indicates that the zinc rich paint meets the above referenced specification.

**CONCRETE CULVERT PIPE**

NOTE: Only Precast Concrete Manufacturers, in accordance with CP 11, that are on CDOT's Qualified Manufacturers List can be used:  
[www.coloradodot.info/business/apl](http://www.coloradodot.info/business/apl)

Inspection of the individual pieces of the lot is left to the supplier and the field personnel. The field inspection is to be done in accordance with AASHTO M 170.

After final pay quantities are known, document them on a CDOT Form #157.

## **VITRIFIED CLAY PIPE**

The project field personnel should field-inspect the pipe and document information in the Project Files.

## **PIPE JOINT SEALING COMPOUND**

Most joints will require some type of sealing material. The choice is limited to either performed plastic sealing compound or bituminous mastic. Both must meet AASHTO M 198 specification. Portland cement grout is not allowed. Rubber gaskets are required for siphon and sanitary sewers and also may be used without further approval on storm sewers and culverts.

The performed plastic sealing compound is supplied with removable paper strips between layers. A primer is required. Instructions require the primer to dry hard before applying the joint sealer. It is strongly recommended that the primer be applied by the contractor at the jobsite rather than by the pipe manufacturer in his plant. This helps keep dirt off the primer surface and coats any chipped surfaces. Cold and wet weather require special installation procedures.

On the CDOT Form #157 that accompanies the sample list trade name, manufacturer, and any analysis or specification data found on the label.

## **ITEM 604, MANHOLES**

Manholes will have stamped on each section the date of manufacture and name or trademark of the fabricator. Inspect these sections for the same characteristics listed and explained under Concrete Culvert Pipe. Document in the Project Files that the material was field-inspected and is acceptable, and add a statement to the effect that the material was in good condition when installed.

## **ITEM 606, GUARDRAIL**

### **Treated Timber Posts & Galvanized Steel Posts**

Project personnel will inspect all posts upon arrival on the project regardless of their source. This inspection will be documented on

CDOT Form #157, an example of which appears at the end of this chapter. See Special Notice to Contractors for additional information.

Final acceptance is based on field-inspection by project personnel.

## **Type 3 W-Beam Guard Rail**

When either the weathering steel or galvanized steel arrives on the job, it must be stored in such a way that water will not get in between the stacked rails. Water in a confined area, as it would be between these rails, causes a rapid loss of galvanizing in the form of white rust and definite kind of rusting in the weathering steel that leads to flaking and pitting, as well as an uneven rust pattern. The acceptance documentation can be done on the same CDOT Form #157 as used for acceptance of the posts. See example at the end of this Chapter.

## **ITEM 606, END ANCHORAGE**

For individual components of end anchors, and types, refer to the M & S Standards for description of parts on each type. Further details are shown in the Standard Specifications, Section 710 and Subsection 710.09. The acceptance documentation can be done on the same CDOT Form #157 as used for acceptance / verification of the posts. List the above information on the CDOT Form #157.

## **ITEM 607, FENCES**

### **Treated Timber Posts**

Project personnel will inspect posts and note the source, field-inspect for compliance, and document on CDOT Form #157

## **ITEM 613, LIGHTING\***

### **Luminaires**

Many manufacturers of luminaires that comply with our specification are "nationally known brands". It must be understood that they also manufacture luminaires that do not meet our specification and therefore, it is necessary to check the ratings of the luminaires furnished

against the requirements of the plans and specifications. Document this inspection on a CDOT Form #157. See Special Notice to Contractors for additional information.

#### **Metal Light Standards (pole and arms)\***

Many suppliers are capable of providing approved standards. Because the standards received on the job were made by a company previously approved, does not imply that they meet the requirements of the plans and specifications, since they also supply poles and arms in other sizes and to other specifications. It is necessary to check all features against the requirements of the plans and specifications. Document this inspection on a CDOT Form #157. See Special Notice to Contractors.

\* See the Schedule for Item 613

#### **ITEM 614, TRAFFIC CONTROL DEVICES**

##### **Sign Posts**

Structural Steel: These posts have the break-away feature which requires the bolts to be torqued. The upper, or fuse plate bolts, are normally shop tightened. Therefore, field checking of these fuse plate bolts should be necessary. The lower or break-away bolts are tightened more than the required torque so that during shipment and erection, the two parts stay attached. Therefore, it is necessary after erection, for the contractor to loosen these break-away bolts and retighten them with torque wrench to the torque values shown on the plans (Standard Drawing S-614-5). Be careful not to over-tighten them. It is very important to burr the threads of the break-away bolts to prevent the nuts from loosening. **Be sure to check the torque of all bolts because if they are not tightened properly, the sign will not function as designed.** Document in Project Files.

##### **Flashing Yellow Beacons**

Be sure that all features required by the standard drawing and the specifications are met by the models supplied.

#### **Anchor Bolts for Sign Bridge Structure**

The anchor bolts for wide flange posts and sign structures that go into these footings are part of the sign structure but are shipped ahead of them. Small structure anchor bolts and regular bolts should be field inspected and documented in Project Files. See Special Notice to Contractors.

#### **ITEM 615, WATER CONTROL DEVICES**

Drawing M-615-A requires the use of a joint sealer meeting Federal Specification SS-S-168 or approved equivalent to make the adjustable elbows watertight.

#### **ITEM 618, POST TENSIONING GROUT**

Each project will collect a sample and send it to the Central Lab prior to use. The Chemical Lab will test the 1<sup>st</sup> sample from particular grout and send that result to each project that sends a sample for that grout until the test results are greater than 6 months old. Then the next sample submitted after the 6 months would be tested.

#### **ITEM 624, DRAINAGE PIPE**

There are several different types of drainage pipe materials available, each with different abrasion and corrosive resistant characteristics. To take economic advantage of this, ten different classes have been defined and the available drainage pipe materials designated as useable or not useable for each class, so the contractor can select the most economical material.

Most projects will have no corrosive problems. However, when they are encountered, they should be recognized during the soil survey. The decision on what Class of pipe to use is detailed in the CDOT Pipe Material Selection. The Soils Survey portion of Chapter 200 gives details on what to look for and when to suspect the existence of a corrosive condition.

---

**CDOT Forms - Applicable for the Concrete Chapter, Examples and Instructions**

---

Form	Title	Page
# 1188	Concrete Mix Submittal [preceded by Contractor's supplemental documentation].....	15-20
# 1373	Concrete Mix Design Report.....	21
# 157	Field Report for Sample Identification or Materials Documentation .....	22-32
# 46	Concrete Truck Mixer Inspection Certification .....	33
# 82	Concrete Specimen Transmittal.....	34-36
# 156	Concrete Test Results Summary .....	37
# 192	Report of Concrete Tests .....	38-39
# 193	Inspection- Quality Assurance Acceptance Report .....	40
# 196-A	Physical Test Report.....	41
# 199	Concrete Core Tests .....	42
# 276	Report of Concrete Placed.....	43
# 281	Concrete Batched and Placed .....	44
# 389	Field Report for Joint Sealant Testing.....	45
# 1372	Reinforcing Bar Physical Test Report.....	46-48
# 1375	Concrete Field Tests Report.....	49

{This page was intentionally left blank.}

<b>COLORADO DEPARTMENT OF TRANSPORTATION CONCRETE MIX SUBMITTAL</b>  <input type="checkbox"/> Metric units <input checked="" type="checkbox"/> English units  This submittal form shall be used to submit a concrete mix design for review by the Concrete Unit of Staff Materials. No CDOT Form #157 is needed.	Project code (SA#) <b>11925</b>
	Project No. <b>IM 0253-151</b>
	Proj. location <b>SH 7 to WCR 16</b>
	Region <b>4</b> Date <b>9/8/03</b>
	Contractor <b>Kraemer and Sons</b>
	Concrete supplier <b>Western Ash</b>

Project contact person for this mix submittal:	Name <b>Hank Williams</b>	Phone# <b>(303) 828-2647</b> FAX# <b>(303) 828-0430</b>
--	------------------------------	--

Status

New mix

Resubmittal of existing mix. Existing CDOT mix number: \_\_\_\_\_

Item

412 - Pavement       601 - Structural

503 - Caisson      [ Other: \_\_\_\_\_

Class

B       P       D (Bridge Deck) \_\_\_\_\_       DT \_\_\_\_\_

BZ       S       D (Superstructure) \_\_\_\_\_       Other: \_\_\_\_\_

The Contractor is required to **submit the following information for mix approval**. Please indicate what information is attached:

Mix design proportions (cement, fly ash, aggregates, and; pounds per cubic yard or kilograms per cubic meter)

Source of each ingredient (supplier and type of cement and fly ash; pit names and sizes of aggregates; manufacturer and type of admixtures)

Trial mix data (slump, air content, unit weight, design yield, trial mix yield, water/cement ratio, and 28 day compressive strengths from trial mix conducted by Contractor. Include 28 day flexural strengths for paving concrete)

Aggregate test data (gradations, -#200, fineness modulus, specific gravities, absorptions, for each aggregate, plus sand equivalent for fine aggregate and LA Abrasion for coarse aggregate)

Attach index of project special provisions, index of standard special provisions and applicable specifications.

Explanation

(Please explain any information not supplied at this time. For example: The compressive strengths are not yet available, but will be phoned in next week.)

- Original - Project Files
- Materials & Geotechnical Branch - with attachments
- Region Mats Engr. - with attachments

CDOT Form #1188 3/04



## Mulligan Testing Laboratories

1301 South Birch Street, Denver, CO 80222

Freddy's Ready Mix Concrete Co. ID No.: 42352  
 Trial Date: 02-10-2003  
 CDOT Concrete Class D

### MIX DESIGN MATERIALS:

Material	Per Cubic Yard
Sand	1152 lbs.
Cement (I/II)	512 lbs.
Fly Ash (Class F)	128 lbs.
Aggregate Size # 67	1802 lbs.
Water	261.5 lbs. (33.0 gal.)
Water Reducing Agent	25.8 oz.
Air Entrainment Agent	2.7 oz.

The above weights are based upon aggregates in a saturated, surface dry condition. Batch plant corrections must be made for moisture in aggregates.

### PHYSICAL PROPERTIES:

Unit Weight:	141.1 pcf
Yield:	1.01
Water/Cement Ratio:	0.41
Air Content:	6.2 %
Slump:	3.50 in.

### COMPRESSIVE STRENGTH RESULTS:

(From laboratory trial)

Cylinder Break Time	Cylinder Number							Average Strength (psi)
	1	2	3	4	5	6	7	
3-Day	4040	4220	-	-	-	-	-	4130
7-Day	-	-	4720	4680	-	-	-	4700
28-Day	-	-	-	-	5730	5300	5380	5470



**Material Suppliers and Sources:**

Material	Company	Source
Fine Aggregate:	Blarney Sand & Gravel	Shamrock Pit East
Coarse Aggregate:	Blarney Sand & Gravel	Shamrock Pit West
Cement (Type I/II):	Celtic Cement Co.	Guffey, Colorado
Fly Ash (Class F):	Finnegan Fly Ash Co.	McClure, Colorado
Water Reducing Agent:	Antrim Admixtures Co.	Antrim H2O
Air Entrainment Agent:	Antrim Admixtures Co.	Antrim Super Air

**Coarse Aggregate**

Sieve Analysis

Sieve	% Passing	Spec
1"	100	100
3/4"	92	90-100
1/2"	54	
3/8"	41	20-55
#4	6	0-10
#8	3	0-5
#200	0.8	0-1.5

Specific Gravity: 2.64  
Absorption: 0.9 %  
Sodium Soundness: 1 % loss

L.A. Abrasion: 42 % loss  
Voids & Unit Weight: 38%; 103 pcf  
ASTM C1260: 0.182 % expansion

**Fine Aggregate**

Sieve Analysis

Sieve	% Passing	Spec
3/8"	100	100
#4	99	95 - 100
#8	94	80 - 100
#16	70	50 - 85
#30	50	25 - 60
#50	22	10 - 60
#100	8	2 - 10
#200	2.4	0 - 3.0

Specific Gravity: 2.65  
Absorption: 0.7 %  
Sodium Soundness: 1 % loss  
Fineness Modulus: 2.61

Sand Equivalent: 83  
Organic Impurities: Plate # 1  
ASTM C1260: 0.071 % expansion





## ***Mulligan Testing Laboratories***

1301 South Birch Street, Denver, CO 80222

---

March 24, 2003

Freddy's Ready Mix Concrete Company  
Attention: Frederick Fletcher  
52 Wesley Avenue  
Bailey, CO 80421

Dear Mr. Fletcher,

This letter reports the results of the potential reactivity tests (mortar bar method), which our lab performed for you. The materials were received at our facility in March 2003. The aggregates were defined as "Shamrock Pit Aggregates." The mix was compiled of 63.4% coarse aggregates and 36.6% fine aggregates. Along with the aggregates, Celtic cement Type I/II and Finnegan Class F fly ash were submitted.

The aggregate samples were prepared and tested in conformance with ASTM C 1260, "Potential Alkali Reactivity of Aggregates (Mortar Bar Method)". Since the coarse aggregate did not meet the CDOT requirement for expanding no more than 0.10% after 16 days, the aggregates, cement and fly ash were combined in proportion to the mix design and tested according to CPL 4202 "Determining the Potential Alkali Reactivity of Cementitious Materials and Aggregate (Accelerated Mortar Bar Method)". The 16-day expansion for the mix was 0.056%. These results are presented in Tables 1, 2 and 3 and graphed in Figure One.

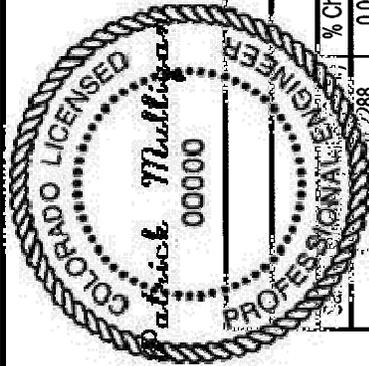
This data signifies that the potential for deleterious behavior of this concrete mix is low. Please feel free to contact me with any questions you may have regarding this report.

Sincerely,

Patrick Mulligan  
Laboratory Manager  
Mulligan Testing Laboratories

Enclosures





**Table 1 - ASR Sand Test**

Sample Number	Initial (24 hr)	% Change	Zero (48 hr)		3-Day Reading		7-Day Reading		10-Day Reading		14-Day Reading	
			0	% Change	3	% Change	7	% Change	10	% Change	14	% Change
1	0.288	0.0000	0.2296	0.2311	0.2336	0.015	0.2336	0.040	0.2355	0.059	0.2398	0.102
2	0.2304	0.0000	0.2314	0.2336	0.2351	0.022	0.2351	0.037	0.2364	0.050	0.2377	0.063
3	0.2265	0.0000	0.2276	0.2299	0.2307	0.023	0.2307	0.031	0.2316	0.040	0.2324	0.048
Average	-	0.000	-	0.020	-	0.020	0.036	-	0.050	-	0.071	-

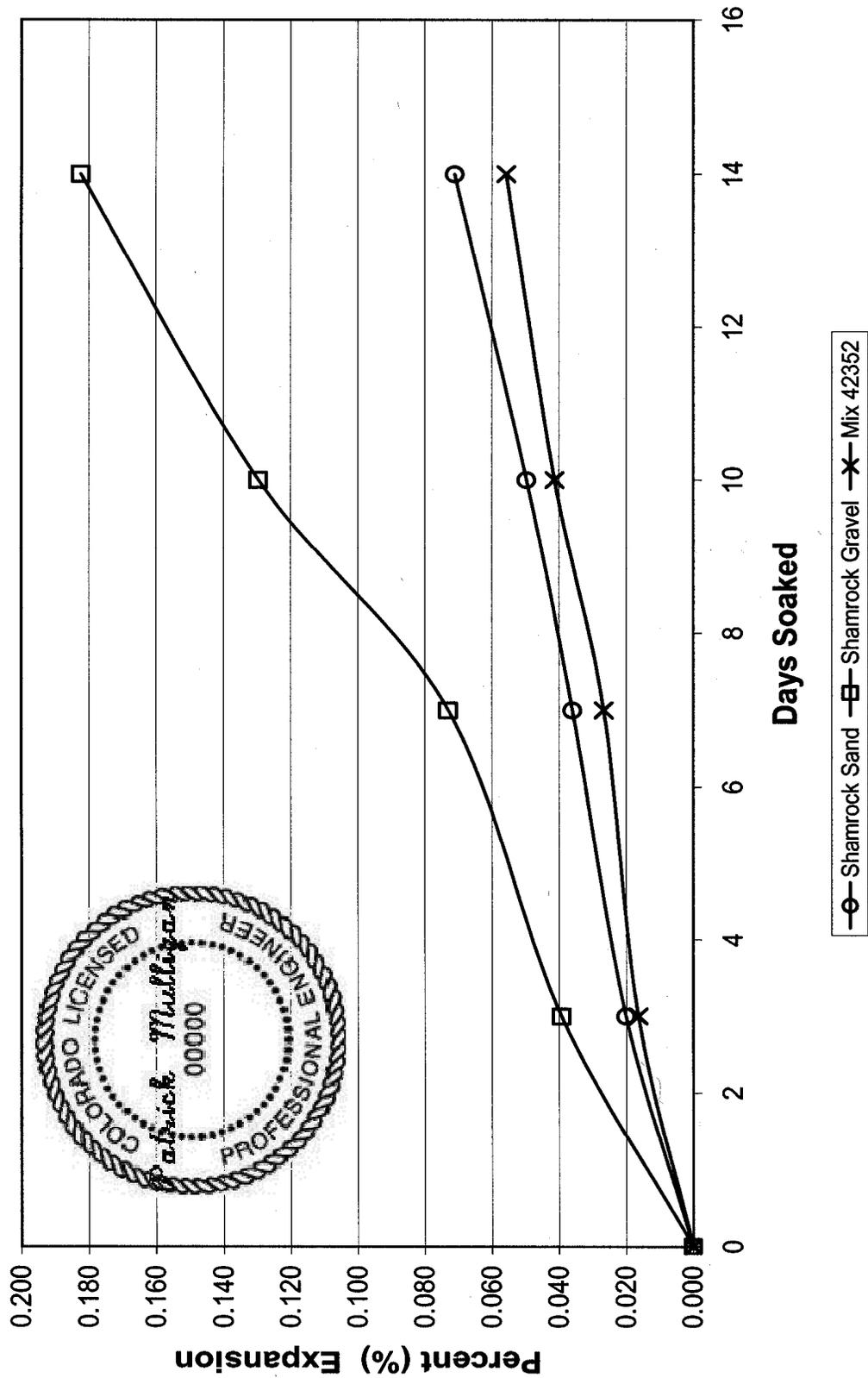
**Table 2 - ASR Gravel Test**

Sample Number	Initial (24 hr)	% Change	Zero (48 hr)		3-Day Reading		7-Day Reading		10-Day Reading		14-Day Reading	
			0	% Change	3	% Change	7	% Change	10	% Change	14	% Change
1	0.3688	0.0000	0.3604	0.3657	0.3694	0.053	0.3694	0.090	0.3738	0.134	0.3789	0.185
2	0.3484	0.0000	0.3492	0.3511	0.3536	0.044	0.3536	0.044	0.3598	0.106	0.3654	0.162
3	0.3622	0.0000	0.3648	0.3694	0.3733	0.085	0.3733	0.085	0.3797	0.149	0.3848	0.200
Average	-	0.000	-	0.039	-	0.073	0.130	-	0.182	-	0.200	-

**Table 3 - ASR Mix Test**

Sample Number	Initial (24 hr)	% Change	Zero (48 hr)		3-Day Reading		7-Day Reading		10-Day Reading		14-Day Reading	
			0	% Change	3	% Change	7	% Change	10	% Change	14	% Change
1	0.2128	0.0000	0.2185	0.2201	0.2213	0.016	0.2213	0.028	0.2230	0.045	0.2253	0.068
2	0.1731	0.0000	0.1764	0.1778	0.1787	0.014	0.1787	0.023	0.1800	0.036	0.1811	0.047
3	0.2034	0.0000	0.2093	0.2112	0.2122	0.019	0.2122	0.029	0.2136	0.043	0.2145	0.052
Average	-	0.000	-	0.016	-	0.027	0.041	-	0.056	-	0.068	-

### Figure 1 - Potential Alkali Reactivity



COLORADO DEPARTMENT OF TRANSPORTATION			Project No.	REGION	Contract ID
<b>Concrete Mix Design Report</b>			MR 2854-012	1	12345
			<b>Location</b>		
			West of Bailey		
<b>Concrete Supplier:</b> Freddy's Ready Mix		<b>CDOT Mix Number :</b> 2003000			
<b>Supplier Mix ID :</b> 777		<b>Item 601 Class D Concrete</b>			
<b>Field Compressive Strength:</b> 4500 psi		<b>Class 2 Sulfate Resistance and lower*</b>			
<i>*Class 3 Sulfate resistance requires a w/cm ratio ≤0.40</i>					
<b>Concrete Mix Proportions (SSD Batch Weights for 1 Cubic Yard)</b>					
<b>Cement:</b>	512	<b>Pounds</b>	Celtic (Guffey) <b>Type I/II Cement</b>		
<b>Fly Ash:</b>	128	<b>Pounds</b>	Finnegan (McClure) <b>Class F Fly Ash</b>		
<b>Silica Fume</b>		<b>Pounds</b>			
<b>Coarse Aggregate 1</b>	1802	<b>Pounds</b>	Blarney, Shamrock Pit; Size 57/67		
<b>Coarse Aggregate 2</b>		<b>Pounds</b>			
<b>Coarse Aggregate 3</b>		<b>Pounds</b>			
<b>Fine Aggregate</b>	1152	<b>Pounds</b>	Blarney, Shamrock Pit		
<b>Admixture</b>	2.7	<b>Ounces</b>	Antrim. Super-Air		
<b>Admixture</b>	25.8	<b>Ounces</b>	Antim, H2O		
<b>Admixture</b>		<b>Ounces</b>			
<b>Admixture</b>		<b>Ounces</b>			
<b>Water</b>	262	<b>Pounds</b>			
<b>Trial Batch Properties</b>					
<b>Unit Weight :</b>	141.1	<b>PCF</b>	<b>7-Day Compressive Strength :</b>	4700	<b>psi</b>
<b>W / Cm Ratio :</b>	0.41		<b>14-Day Compressive Strength :</b>		<b>psi</b>
<b>Slump :</b>	3.50	<b>Inches</b>	<b>28-Day Compressive Strength :</b>	5470	<b>psi</b>
<b>Air Content :</b>	6.20	<b>%</b>	<b>56-Day Compressive Strength :</b>		<b>psi</b>
<b>Relative Yield :</b>	1.01		<b>7-Day Flexural Strength :</b>		<b>psi</b>
			<b>28-Day Flexural Strength :</b>		<b>psi</b>
<b>Aggregate Test Results</b>					
	<b>Specific Gravity (SSD)</b>		<b>Absorption</b>		
<b>Coarse Aggregate 1 :</b>	2.64		0.9 %		
<b>Coarse Aggregate 2 :</b>			%		
<b>Coarse Aggregate 3 :</b>			%		
<b>Fine Aggregate :</b>	2.65		0.7 %		
<b>Comments:</b>					
<b>Reviewed by:</b> Miranda Roskop			<b>Review date:</b> 3/26/2003		
<b>Please contact CDOT Concrete and Physical Properties Lab at 303-398-6542 with any questions.</b>					
<b>CDOT Form #1373 03/11</b>					

<b>COLORADO DEPARTMENT OF TRANSPORTATION FIELD REPORT FOR SAMPLE IDENTIFICATION OR MATERIALS DOCUMENTATION</b>				Field sheet No. <b>120227</b>	Date <b>11/28/02</b>
<b>Metric units</b> <input type="checkbox"/> yes <input checked="" type="checkbox"/> no				Project No. <b>IM0253-151</b>	Project location <b>I-25, SH 7 to WCR 16</b>
				Project code (SA#) <b>11925</b>	Function <b>3200</b>
				Region <b>4</b>	Part. <b>P</b>
Sample submitted: <small>(ie.: Soil, ABC, Hydrated lime, HMA, concrete cores, steel, etc.)</small> <b>Cores</b>				Field office phone number <b>303-828-0386</b>	
				Field office FAX number <b>303-828-0430</b>	
Item <b>412</b>	Class <b>PFA</b>	Grading <b>Mix #98034</b>	Special provisions applicable: <input checked="" type="checkbox"/> yes <input type="checkbox"/> no		
Previously used on Project No.: <b>Air 7.1/Slump 5.5</b>		Previous CDOT Form #157 F/S No.(s): <b>Placed on 10/25/02</b>	<input type="checkbox"/> CDOT Form #633 (sack) <input type="checkbox"/> CDOT Form #634 (can)		
<ul style="list-style-type: none"> <li>● Sample Identification: Quantity &amp; Unit of material submitted, describe tests required, precise location sample removed from (stationing), etc.</li> <li>● Materials Documentation: Field inspected (describe appearance, weight/dimensions, model/serial number), COC &amp;/or CTR provided, etc.</li> </ul>					
<b>Submitting (3) cores for Compressive Strength.</b>					
<b>Time cored was 3 PM. Date 11/28/02</b>					
<b>Please call head tester @ 303-555-2525</b>					
<b>A) 93+780</b>					
<b>B) 93+785</b>					
<b>C) 93+775</b>					
<b>Cored at 35 days</b>					
APL/QML Acceptance: APL Ref. No.		Product name:		Date checked:	
APL/QML Acceptance: APL Ref. No.		Product name:		Date checked:	
Preliminary <input type="checkbox"/>		Construction <input checked="" type="checkbox"/>		Maintenance <input type="checkbox"/>	
		Emergency <input type="checkbox"/>		Date needed <b>ASAP</b>	
Contractor <b>Kraemer and Sons</b>			Supplier <b>LaFarge</b>		
Sampled from <small>(Pit, roadway, windrow, stock, etc.)</small> <b>Roadway</b>			Pit name or owner		
Quantity represented		Previous quantity		Total quantity to date	
Sample submitted: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Shipped to: <input checked="" type="checkbox"/> Central lab <input type="checkbox"/> Region lab		Via <b>Geocal</b>	
				Date <b>11/29/02</b>	
Sampled or inspected by (Name) <b>D. Elsbernd</b>		(Title) <b>Q. A. Tech</b>		Lab phone number <b>303-828-2644</b>	
Supervisor <small>(Pro./Res./Mats. Engr./Maint. Supt.)</small> <b>Corey Stewart</b>		Title <b>P. E. I</b>		Address <b>1050 Lee Hill Rd. Boulder, Co. 80302</b>	
Distribution: White copy - Staff Materials Branch <small>(submit white copy only if sample or information is directed to Staff Materials)</small> Canary copy - Region Materials Engineer Pink copy - Resident Engineer				CDOT Form #157 9/07	
Previous editions may be used until supplies are exhausted					

CDOT Form #157

Note: Within Date needed, ASAP is not a date.

<b>COLORADO DEPARTMENT OF TRANSPORTATION FIELD REPORT FOR SAMPLE IDENTIFICATION OR MATERIALS DOCUMENTATION</b>				Field sheet No. <b>120227</b>	Date <b>11/28/02</b>
Metric units <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		Project No. <b>IM0253-151</b>	Project location <b>I-25, SH 7 to WCR 16</b>		
		Project code (SA#) <b>11625</b>	Function <b>3200</b>	Region <b>4</b>	Part. <b>P</b>
Sample submitted: <small>(i.e.: Soil, ABC, Hydrated lime, HMA, concrete cores, steel, etc.)</small>				Field office phone number <b>303-828-0386</b>	
<b>Cores</b>				Field office FAX number <b>303-828-0430</b>	
Item <b>412</b>	Class <b>B</b>	Grading <b>Column A</b>		Special provisions applicable: <input checked="" type="checkbox"/> yes <input type="checkbox"/> no	
Previously used on Project No.: <b>Air 7.1/Slump 5.5</b>		Previous CDOT Form #157 F/S No.(s): <b>Mix #2001049</b>		<input type="checkbox"/> CDOT Form #633 (sack) <input type="checkbox"/> CDOT Form #634 (can)	
<ul style="list-style-type: none"> <li>● Sample Identification: Quantity &amp; Unit of material submitted, describe tests required, precise location sample removed from (stationing), etc.</li> <li>● Materials Documentation: Field inspected (describe appearance, weight/dimensions, model/serial number), COC &amp;/or CTR provided, etc.</li> </ul>					
<b>Submitting (3) cores for Compressive Strength.</b>					
<b>Time cored 5:00 PM Date 3/12/01</b>					
<b>1) 832+88.10</b>					
<b>2) 832+90</b>					
<b>3) 833+00</b>					
<b>Cored at 33 Days</b>					
APL/QML Acceptance: APL Ref. No.		Product name:		Date checked:	
APL/QML Acceptance: APL Ref. No.		Product name:		Date checked:	
Preliminary <input type="checkbox"/>		Construction <input checked="" type="checkbox"/>		Maintenance <input type="checkbox"/>	
		Emergency <input type="checkbox"/>		Date needed <b>ASAP</b>	
Contractor <b>Kraemer and Sons</b>			Supplier <b>Ready Mix</b>		
Sampled from <small>(Pit, roadway, windrow, stock, etc.)</small> <b>Roadway</b>			Pit name or owner		
Quantity represented <b>Placed 2/7/01</b>		Previous quantity <b>Removed 3/12/02</b>		Total quantity to date	
Sample submitted: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Shipped to: <input checked="" type="checkbox"/> Central lab <input type="checkbox"/> Region lab		Via <b>Geocal</b>	
				Date <b>3/12/01</b>	
Sampled or inspected by (Name) <b>D. Elsbernd</b>		(Title) <b>Q.A. Tech</b>		Lab phone number <b>303-828-2644</b>	
Supervisor <small>(Pro./Res./Mats. Engr./Maint. Supt.)</small> <b>Corey Stewart</b>		Title <b>P.E. I</b>		Address <b>1050 Lee Hill Rd. Boulder, Co. 80302</b>	
Distribution: White copy - Staff Materials Branch <small>(submit white copy only if sample or information is directed to Staff Materials)</small> Canary copy - Region Materials Engineer Pink copy - Resident Engineer				CDOT Form #157 9/07	
Previous editions may be used until supplies are exhausted					

CDOT Form #157

Note: Within Date needed, ASAP is not a date.

<b>COLORADO DEPARTMENT OF TRANSPORTATION FIELD REPORT FOR SAMPLE IDENTIFICATION OR MATERIALS DOCUMENTATION</b>  Metric units <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		Field sheet No. <b>120227</b>		Date <b>4/5/03</b>	
		Project No. <b>IM0253-151</b>		Project location <b>I-25, SH 7 to WCR 16</b>	
		Project code (SA#) <b>11925</b>		Function <b>3200</b>	
				Region <b>4</b>	
				Part. <b>P</b>	
Sample submitted: <small>(ie.: Soil, ABC, Hydrated lime, HMA, concrete cores, steel, etc.)</small>				Field office phone number <b>303-828-0386</b>	
<b>Reinforcing Steel</b>				Field office FAX number <b>303-828-0430</b>	
Item <b>602</b>		Class		Grading	
				Special provisions applicable: <input type="checkbox"/> yes <input checked="" type="checkbox"/> no	
Previously used on Project No.:		Previous CDOT Form #157 F/S No.(s):		<input type="checkbox"/> CDOT Form #633 (sack) <input type="checkbox"/> CDOT Form #634 (can)	
<ul style="list-style-type: none"> <li>● Sample Identification: Quantity &amp; Unit of material submitted, describe tests required, precise location sample removed from (stationing), etc.</li> <li>● Materials Documentation: Field inspected (describe appearance, weight/dimensions, model/serial number), COC &amp;/or CTR provided, etc.</li> </ul> <p style="text-align: center;"><b>The Material has been field inspected and is acceptable. Mill Test Reports are on file.</b></p> <p style="text-align: center;"><b>The Steel Mill is on the CDOT QML.</b></p>					
APL/QML Acceptance: APL Ref. No.		Product name:		Date checked:	
APL/QML Acceptance: APL Ref. No.		Product name:		Date checked:	
Preliminary <input type="checkbox"/>		Construction <input checked="" type="checkbox"/>		Maintenance <input type="checkbox"/>	
				Emergency <input type="checkbox"/>	
Date needed					
Contractor <b>Kraemer and Sons</b>			Supplier <b>Banner Rebar</b>		
Sampled from <small>(Pit, roadway, window, stock, etc.)</small>			Pit name or owner		
Quantity represented <b>12,591 lb</b>		Previous quantity <b>47,082 lb</b>		Total quantity to date <b>59,673 lb</b>	
Sample submitted: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Shipped to: <input type="checkbox"/> Central lab <input type="checkbox"/> Region lab		Via	
Date					
Sampled or inspected by (Name) <b>Mark Stadig</b>		(Title) <b>E/PS Tech III</b>		Lab phone number <b>303-828-2644</b>	
Supervisor <small>(Pro./Res./Mats. Engr./Maint. Supt.)</small> <b>Corey Stewart</b>		Title <b>P. E. I</b>		Address <b>1050 Lee Hill Rd. Boulder, Co. 80302</b>	
Distribution: White copy - Staff Materials Branch <small>(submit white copy only if sample or information is directed to Staff Materials)</small> Canary copy - Region Materials Engineer Pink copy - Resident Engineer					
CDOT Form #157 9/07					
Previous editions may be used until supplies are exhausted					

<b>COLORADO DEPARTMENT OF TRANSPORTATION</b> <b>FIELD REPORT FOR SAMPLE IDENTIFICATION</b> <b>OR MATERIALS DOCUMENTATION</b> Metric units <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		Field sheet No. <b>120227</b>	Date <b>9/9/02</b>
		Project No. <b>IM0253-151</b>	Project location <b>I-25, SH 7 to WCR 16</b>
		Project code (SA#) <b>11925</b>	Function <b>3200</b>
		Region <b>4</b>	Part. <b>P</b>

Sample submitted: <small>(ie.: Soil, ABC, Hydrated lime, HMA, concrete cores, steel, etc.)</small> <b>Epoxy Coated Reinforcing Steel</b>		Field office phone number <b>303-828-0386</b>
		Field office FAX number <b>303-828-0430</b>
Item <b>602</b>	Class	Grading
Special provisions applicable: <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		
Previously used on Project No.:		Previous CDOT Form #157 F/S No.(s):
		<input type="checkbox"/> CDOT Form #633 (sack) <input type="checkbox"/> CDOT Form #634 (can)
<ul style="list-style-type: none"> <li>● Sample Identification: Quantity &amp; Unit of material submitted, describe tests required, precise location sample removed from (stationing), etc.</li> <li>● Materials Documentation: Field inspected (describe appearance, weight/dimensions, model/serial number), COC &amp;/or CTR provided, etc.</li> </ul>		
<p><b>This Material has been field inspected and is acceptable.</b></p> <p><b>Mill Test Reports are on file.</b></p>		
<p><b>Epoxy Powder Coating is on the Approved Products List.</b></p> <p><b>The supplier is on the QML.</b></p>		
APL/QML Acceptance: APL Ref. No.		Product name:
APL/QML Acceptance: APL Ref. No.		Date checked:
Preliminary <input type="checkbox"/> Construction <input checked="" type="checkbox"/> Maintenance <input type="checkbox"/> Emergency <input type="checkbox"/>		Date needed
Contractor <b>Kraemer and Sons</b>		Supplier <b>Rio Grande</b>
Sampled from <small>(Pit, roadway, windrow, stock, etc.)</small>		Pit name or owner
Quantity represented <b>63,858 lb</b>	Previous quantity <b>14,076 lb</b>	Total quantity to date <b>77,934 lb</b>
Sample submitted: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Shipped to: <input type="checkbox"/> Central lab <input type="checkbox"/> Region lab	Date
Sampled or inspected by (Name) <b>Mark Stadig</b>		Lab phone number <b>303-828-2644</b>
Supervisor (Pro./Res./Matis. Engr./Maint. Supt.) <b>Corey Stewart</b>		Title <b>P.E. I</b>
		Address <b>1050 Lee Hill Rd. Boulder, Co. 80302</b>

**Distribution:**    White copy - Staff Materials Branch  
(submit white copy only if sample or information is directed to Staff Materials)  
 Canary copy - Region Materials Engineer  
 Pink copy - Resident Engineer

CDOT Form #157 9/07

Previous editions may be used until supplies are exhausted

<b>COLORADO DEPARTMENT OF TRANSPORTATION FIELD REPORT FOR SAMPLE IDENTIFICATION OR MATERIALS DOCUMENTATION</b>				Field sheet No. <b>120227</b>	Date <b>8/7/01</b>		
				Project No. <b>IM0253-151</b>	Project location <b>I-25, SH 7 to WCR 16</b>		
Metric units <input type="checkbox"/> yes <input checked="" type="checkbox"/> no				Project code (SA#) <b>11925</b>	Function <b>3200</b>	Region <b>4</b>	Part. <b>P</b>
Sample submitted: <small>(ie.: Soil, ABC, Hydrated lime, HMA, concrete cores, steel, etc.)</small>				Field office phone number <b>303-828-0386</b>			
<b>Reinforced Concrete Pipe</b>				Field office FAX number <b>303-828-0430</b>			
Item <b>603</b>	Class	Grading		Special provisions applicable: <input type="checkbox"/> yes <input checked="" type="checkbox"/> no			
Previously used on Project No.: <b>Yes</b>		Previous CDOT Form #157 F/S No.(s): <b>95277</b>		<input type="checkbox"/> CDOT Form #633 (sack) <input type="checkbox"/> CDOT Form #634 (can)			
<ul style="list-style-type: none"> <li>● Sample Identification: Quantity &amp; Unit of material submitted, describe tests required, precise location sample removed from (stationing), etc.</li> <li>● Materials Documentation: Field inspected (describe appearance, weight/dimensions, model/serial number), COC &amp;/or CTR provided, etc.</li> </ul>							
<b>Summary of final quantities of R.C.P. used on this project. The material has</b>							
<b>field inspected and is acceptable. No shipping/handling damage noted.</b>							
<b>Manufacturer has provided C.O.C.</b>							
<b>◆ Quantities are as follows:</b>							
<b>Diameter</b>		<b>Class</b>		<b>Total Lin. Ft.</b>			
<b>12"</b>		<b>V</b>		<b>48</b>			
<b>15"</b>		<b>IV</b>		<b>330</b>			
<b>30"</b>		<b>III</b>		<b>328</b>			
<b>The supplier is on the QML.</b>							
APL/QML Acceptance: APL Ref. No.		Product name:			Date checked:		
APL/QML Acceptance: APL Ref. No.		Product name:			Date checked:		
Preliminary <input type="checkbox"/>		Construction <input checked="" type="checkbox"/>		Maintenance <input type="checkbox"/>		Emergency <input type="checkbox"/>	
Contractor <b>La Farge</b>		Supplier <b>Carder Concrete</b>					
Sampled from <small>(Pit, roadway, windrow, stock, etc.)</small>				Pit name or owner			
Quantity represented		Previous quantity		Total quantity to date <b>See Above</b>			
Sample submitted: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Shipped to: <input type="checkbox"/> Central lab <input type="checkbox"/> Region lab		Via		Date	
Sampled or inspected by (Name) <b>Mark Stadig</b>		(Title) <b>E/PS Tech III</b>		Lab phone number <b>303-828-2644</b>			
Supervisor <small>(Pro./Res./Mats. Engr./Maint. Supt.)</small> <b>Corey Stewart</b>		Title <b>P.E. I</b>		Address <b>1050 Lee Hill Rd. Boulder, Co. 80302</b>			
Distribution: White copy - Staff Materials Branch <small>(submit white copy only if sample or information is directed to Staff Materials)</small> Canary copy - Region Materials Engineer Pink copy - Resident Engineer				CDOT Form #157 9/07			
<b>Previous editions may be used until supplies are exhausted</b>							

<b>COLORADO DEPARTMENT OF TRANSPORTATION</b> <b>FIELD REPORT FOR SAMPLE IDENTIFICATION</b> <b>OR MATERIALS DOCUMENTATION</b>  Metric units <input type="checkbox"/> yes <input checked="" type="checkbox"/> no				Field sheet No. <b>120227</b>		Date <b>8/7/03</b>	
				Project No. <b>IM0253-151</b>		Project location <b>I-25, SH 7 to WCR 16</b>	
Project code (SA#) <b>11925</b>		Function <b>3200</b>		Region <b>4</b>		Part. <b>P</b>	

Sample submitted: <small>(ie.: Soil, ABC, Hydrated lime, HMA, concrete cores, steel, etc.)</small>				Field office phone number <b>303-828-0386</b>			
<b>Corrugated Steel Pipe</b>				Field office FAX number <b>303-828-0430</b>			
Item <b>603</b>		Class		Grading		Special provisions applicable: <input type="checkbox"/> yes <input checked="" type="checkbox"/> no	
Previously used on Project No.:				Previous CDOT Form #157 F/S No.(s):		<input type="checkbox"/> CDOT Form #633 (sack) <input type="checkbox"/> CDOT Form #634 (can)	
<ul style="list-style-type: none"> <li>● Sample Identification: Quantity &amp; Unit of material submitted, describe tests required, precise location sample removed from (stationing), etc.</li> <li>● Materials Documentation: Field inspected (describe appearance, weight/dimensions, model/serial number), COC &amp;/or CTR provided, etc.</li> </ul>							
<b>Summary of final quantities of CSP and End Sections used on this project. The material has been field inspected and is acceptable. Manufacturer has provided a C.O.C.</b>							
<b>Total Lin. Ft.</b>							
<b>CSP</b>		<b>24"</b>		<b>14</b>			
<b>CSP</b>		<b>30"</b>		<b>32</b>			
<b>CSP</b>		<b>36"</b>		<b>12</b>			
<b>SES</b>		<b>30"</b>		<b>4 each</b>			

APL/QML Acceptance: APL Ref. No.		Product name:		Date checked:			
APL/QML Acceptance: APL Ref. No.		Product name:		Date checked:			
Preliminary <input type="checkbox"/>		Construction <input checked="" type="checkbox"/>		Maintenance <input type="checkbox"/>			
		Emergency <input type="checkbox"/>		Date needed			
Contractor <b>Kraemer and Sons</b>				Supplier <b>Marquo Inc.</b>			
Sampled from <small>(Pit, roadway, windrow, stock, etc.)</small>				Pit name or owner			
Quantity represented		Previous quantity		Total quantity to date			
Sample submitted: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Shipped to: <input type="checkbox"/> Central lab <input type="checkbox"/> Region lab		Via		Date	
Sampled or inspected by (Name) <b>Mark Stadig</b>				(Title) <b>E/PS Tech III</b>		Lab phone number <b>303-828-2644</b>	
Supervisor <small>(Pro./Res./Matis. Engr./Maint. Supt.)</small> <b>Corey Stewart</b>				Title <b>P.E. I</b>		Address <b>1050 Lee Hill Rd. Boulder, Co. 80302</b>	

**Distribution:**    White copy - Staff Materials Branch  
(submit white copy only if sample or information is directed to Staff Materials)  
 Canary copy - Region Materials Engineer  
 Pink copy - Resident Engineer

CDOT Form #157 9/07

Previous editions may be used until supplies are exhausted

<b>COLORADO DEPARTMENT OF TRANSPORTATION</b> <b>FIELD REPORT FOR SAMPLE IDENTIFICATION</b> <b>OR MATERIALS DOCUMENTATION</b>  Metric units <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		Field sheet No. <b>120227</b>	Date <b>7/31/02</b>	
		Project No. <b>IM0253-151</b>	Project location <b>I-25, SH 7 to WCR 16</b>	
Project code (SA#) <b>11925</b>	Function <b>3200</b>	Region <b>4</b>	Part. <b>P</b>	

Sample submitted: <small>(ie.: Soil, ABC, Hydrated lime, HMA, concrete cores, steel, etc.)</small>		<b>Guard Rail, End Anchor, Post &amp; Block</b>		Field office phone number <b>303-828-0386</b>								
				Field office FAX number <b>303-828-0430</b>								
Item <b>606</b>	Class	Grading	Special provisions applicable: <input checked="" type="checkbox"/> yes <input type="checkbox"/> no									
Previously used on Project No.:		Previous CDOT Form #157 F/S No.(s):		<input type="checkbox"/> CDOT Form #633 (sack) <input type="checkbox"/> CDOT Form #634 (can)								
<ul style="list-style-type: none"> <li>● Sample Identification: Quantity &amp; Unit of material submitted, describe tests required, precise location sample removed from (stationing), etc.</li> <li>● Materials Documentation: Field inspected (describe appearance, weight/dimensions, model/serial number), COC &amp;/or CTR provided, etc.</li> </ul>												
<b>Materials have been field inspected and are acceptable. Certificates of Compliance and Mill Test Reports are on file.</b>												
<table style="width:100%; border: none;"> <tr> <td style="width: 50%;"><b>Item:</b></td> <td style="width: 50%;"><b>Final Quantity:</b></td> </tr> <tr> <td><b>Guard Rail Ty 3(6-3)</b></td> <td><b>2,500 Lin Ft.</b></td> </tr> <tr> <td><b>End Anchor Ty 3E</b></td> <td><b>8 Each</b></td> </tr> <tr> <td><b>End Anchor (SRT)</b></td> <td><b>4 Each</b></td> </tr> </table>					<b>Item:</b>	<b>Final Quantity:</b>	<b>Guard Rail Ty 3(6-3)</b>	<b>2,500 Lin Ft.</b>	<b>End Anchor Ty 3E</b>	<b>8 Each</b>	<b>End Anchor (SRT)</b>	<b>4 Each</b>
<b>Item:</b>	<b>Final Quantity:</b>											
<b>Guard Rail Ty 3(6-3)</b>	<b>2,500 Lin Ft.</b>											
<b>End Anchor Ty 3E</b>	<b>8 Each</b>											
<b>End Anchor (SRT)</b>	<b>4 Each</b>											
APL/QML Acceptance: APL Ref. No.		Product name:		Date checked:								
APL/QML Acceptance: APL Ref. No.		Product name:		Date checked:								
Preliminary <input type="checkbox"/>		Construction <input checked="" type="checkbox"/>	Maintenance <input type="checkbox"/>	Emergency <input type="checkbox"/>								
Contractor <b>Kraemer and Sons</b>		Supplier <b>Trinity Industries</b>										
Sampled from <small>(Pit, roadway, windrow, stock, etc.)</small>		Pit name or owner										
Quantity represented		Previous quantity	Total quantity to date <b>See Above</b>									
Sample submitted: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Shipped to: <input type="checkbox"/> Central lab <input type="checkbox"/> Region lab	Via		Date								
Sampled or inspected by (Name) <b>Mark Stadig</b>		(Title) <b>E/PS Tech III</b>	Lab phone number <b>303-828-2644</b>									
Supervisor <small>(Pro./Res./Mats. Engr./Maint. Supt.)</small> <b>Corey Stewart</b>		Title <b>P. E. I</b>	Address <b>1050 Lee Hill Rd. Boulder, Co. 80302</b>									

Distribution: White copy - Staff Materials Branch (submit white copy only if sample or information is directed to Staff Materials)  
 Canary copy - Region Materials Engineer  
 Pink copy - Resident Engineer

CDOT Form #157 9/07

Previous editions may be used until supplies are exhausted

<b>COLORADO DEPARTMENT OF TRANSPORTATION</b> <b>FIELD REPORT FOR SAMPLE IDENTIFICATION</b> <b>OR MATERIALS DOCUMENTATION</b>  Metric units <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		Field sheet No. <b>120227</b>	Date <b>7/25/03</b>	
		Project No. <b>IM0253-151</b>	Project location <b>I-25, SH 7 to WCR 16</b>	
Project code (SA#) <b>11925</b>		Function <b>3200</b>	Region <b>4</b>	Part. <b>P</b>

Sample submitted: <small>(i.e.: Soil, ABC, Hydrated lime, HMA, concrete cores, steel, etc.)</small>		<b>Luminaires and Light Standards</b>		Field office phone number <b>303-828-0386</b>								
				Field office FAX number <b>303-828-0430</b>								
Item <b>613</b>	Class	Grading	Special provisions applicable: <input type="checkbox"/> yes <input type="checkbox"/> no									
Previously used on Project No.:		Previous CDOT Form #157 F/S No.(s):		<input type="checkbox"/> CDOT Form #633 (sack) <input type="checkbox"/> CDOT Form #634 (can)								
<ul style="list-style-type: none"> <li>● Sample Identification: Quantity &amp; Unit of material submitted, describe tests required, precise location sample removed from (stationing), etc.</li> <li>● Materials Documentation: Field inspected (describe appearance, weight/dimensions, model/serial number), COC &amp;/or CTR provided, etc.</li> </ul>												
<b>Materials have been field inspected and are acceptable. Certificates of Compliance are on file.</b>												
<table style="width:100%; border: none;"> <tr> <td style="width: 50%;"><b>Item:</b></td> <td style="width: 50%;"><b>Final Quantity:</b></td> </tr> <tr> <td><b>Light Standard Steel</b></td> <td><b>13 Each</b></td> </tr> <tr> <td><b>Concrete Foundation Pad</b></td> <td><b>13 Each</b></td> </tr> <tr> <td><b>Luminaire HPS (400 W)</b></td> <td><b>13 Each</b></td> </tr> </table>					<b>Item:</b>	<b>Final Quantity:</b>	<b>Light Standard Steel</b>	<b>13 Each</b>	<b>Concrete Foundation Pad</b>	<b>13 Each</b>	<b>Luminaire HPS (400 W)</b>	<b>13 Each</b>
<b>Item:</b>	<b>Final Quantity:</b>											
<b>Light Standard Steel</b>	<b>13 Each</b>											
<b>Concrete Foundation Pad</b>	<b>13 Each</b>											
<b>Luminaire HPS (400 W)</b>	<b>13 Each</b>											
APL/QML Acceptance: APL Ref. No.		Product name:		Date checked:								
APL/QML Acceptance: APL Ref. No.		Product name:		Date checked:								
Preliminary <input type="checkbox"/> Construction <input checked="" type="checkbox"/> Maintenance <input type="checkbox"/> Emergency <input type="checkbox"/>		Date needed										
Contractor <b>Kraemer and Sons</b>		Supplier <b>Acme Electric</b>										
Sampled from <small>(Pit, roadway, windrow, stock, etc.)</small>		Pit name or owner										
Quantity represented		Previous quantity	Total quantity to date									
Sample submitted: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Shipped to: <input type="checkbox"/> Central lab <input type="checkbox"/> Region lab		Via    Date								
Sampled or inspected by (Name) <b>Mark Stadig</b>		(Title) <b>E/PS Tech III</b>		Lab phone number <b>303-828-2644</b>								
Supervisor (Pro./Res./Mats. Engr./Maint. Supt.) <b>Corey Stewart</b>		Title <b>P.E. I</b>		Address <b>1050 Lee Hill Rd. Boulder, Co. 80302</b>								

<b>Distribution:</b> White copy - Staff Materials Branch (submit white copy only if sample or information is directed to Staff Materials) Canary copy - Region Materials Engineer Pink copy - Resident Engineer	CDOT Form #157 9/07  Previous editions may be used until supplies are exhausted
--	---

<b>COLORADO DEPARTMENT OF TRANSPORTATION FIELD REPORT FOR SAMPLE IDENTIFICATION OR MATERIALS DOCUMENTATION</b>				Field sheet No. <b>120227</b>	Date <b>9/13/02</b>
Metric units <input type="checkbox"/> yes <input checked="" type="checkbox"/> no				Project No. <b>IM0253-151</b>	Project location <b>I-25, SH 7 to WCR 16</b>
		Project code (SA#) <b>11925</b>	Function <b>3200</b>	Region <b>4</b>	Part. <b>P</b>
Sample submitted: <small>(i.e.: Soil, ABC, Hydrated lime, HMA, concrete cores, steel, etc.)</small>				Field office phone number <b>303-828-0386</b>	
<b>5 Samples of Prestressing Steel Wire</b>				Field office FAX number <b>303-828-0430</b>	
Item <b>618</b>	Class	Grading	Special provisions applicable: <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		
Previously used on Project No.:		Previous CDOT Form #157 F/S No.(s):	<input type="checkbox"/> CDOT Form #633 (sack) <input type="checkbox"/> CDOT Form #634 (can)		
<ul style="list-style-type: none"> <li>● Sample Identification: Quantity &amp; Unit of material submitted, describe tests required, precise location sample removed from (stationing), etc.</li> <li>● Materials Documentation: Field inspected (describe appearance, weight/dimensions, model/serial number), COC &amp;/or CTR provided, etc.</li> </ul>					
<b>See attached C.O.C's for samples submitted for Post-Tension Steel/Wire Strand.</b>					
◆ (2) Heat #618922 (white)					
◆ (1) Heat #R133932 (orange)					
◆ (1) Heat #618919 (pink)					
◆ (1) Heat #618122 (blue)					
<b>Visually inspected By Dave Buck when taking samples for testing.</b>					
APL/QML Acceptance: APL Ref. No.		Product name:		Date checked:	
APL/QML Acceptance: APL Ref. No.		Product name:		Date checked:	
Preliminary <input type="checkbox"/>		Construction <input checked="" type="checkbox"/>		Date needed <b>9/18/08</b>	
Maintenance <input type="checkbox"/>		Emergency <input type="checkbox"/>			
Contractor <b>Kraemer and Sons</b>			Supplier <b>Insted Wire Products</b>		
Sampled from <small>(Pit, roadway, windrow, stock, etc.)</small> <b>Coils</b>			Pit name or owner <b>N/A</b>		
Quantity represented <b>24 Coils</b>		Previous quantity <b>0</b>		Total quantity to date <b>24 Coils</b>	
Sample submitted: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Shipped to: <input checked="" type="checkbox"/> Central lab <input type="checkbox"/> Region lab		Via <b>Geocal</b>	
Date					
Sampled or inspected by (Name) <b>Dave Buck</b>		(Title) <b>QA Tech</b>		Lab phone number <b>303-828-2644</b>	
Supervisor <small>(Pro./Res./Matis. Engr./Maint. Supt.)</small> <b>Corey Stewart</b>		Title <b>P.E. I</b>		Address <b>1050 Lee Hill Rd. Boulder, Co. 80302</b>	
Distribution: White copy - Staff Materials Branch <small>(submit white copy only if sample or information is directed to Staff Materials)</small> Canary copy - Region Materials Engineer Pink copy - Resident Engineer				CDOT Form #157 9/07	
Previous editions may be used until supplies are exhausted					

<b>COLORADO DEPARTMENT OF TRANSPORTATION FIELD REPORT FOR SAMPLE IDENTIFICATION OR MATERIALS DOCUMENTATION</b>		Field sheet No. <b>120227</b>	Date <b>9/25/02</b>		
		Project No. <b>IM0253-151</b>	Project location <b>I-25, SH 7 to WCR 16</b>		
Metric units <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		Project code (SA#) <b>11925</b>	Function <b>3200</b>	Region <b>4</b>	Part. <b>P</b>
Sample submitted: <small>(ie.: Soil, ABC, Hydrated lime, HMA, concrete cores, steel, etc.)</small>			Field office phone number <b>303-828-0386</b>		
<b>Post-Tension Cable Tendons</b>			Field office FAX number <b>303-8280430</b>		
Item <b>618</b>	Class	Grading		Special provisions applicable: <input type="checkbox"/> yes <input checked="" type="checkbox"/> no	
Previously used on Project No.:		Previous CDOT Form #157 F/S No.(s):		<input type="checkbox"/> CDOT Form #633 (sack) <input type="checkbox"/> CDOT Form #634 (can)	
<ul style="list-style-type: none"> <li>● Sample Identification: Quantity &amp; Unit of material submitted, describe tests required, precise location sample removed from (stationing), etc.</li> <li>● Materials Documentation: Field inspected (describe appearance, weight/dimensions, model/serial number), COC &amp;/or CTR provided, etc.</li> </ul> <p style="text-align: center;"><b>2 Coils field inspected as per CDOT Standards. By Dave Buck and Monte Malik.</b></p> <p style="text-align: center;"><b>Submitting 2 Strands of cable from lot #132375-1 and lot #132375-5 of heat 6-34872 for all required testing as per the Standards &amp; the CDOT FMM.</b></p>					
APL/QML Acceptance: APL Ref. No.		Product name:		Date checked:	
APL/QML Acceptance: APL Ref. No.		Product name:		Date checked:	
Preliminary <input type="checkbox"/> Construction <input checked="" type="checkbox"/> Maintenance <input type="checkbox"/> Emergency <input type="checkbox"/>				Date needed <b>ASAP</b>	
Contractor <b>Kraemer and Sons</b>		Supplier <b>Insted Wire Products</b>			
Sampled from <small>(Pit, roadway, windrow, stock, etc.)</small> <b>Coils</b>		Pit name or owner <b>N/A</b>			
Quantity represented <b>1 Heat</b>		Previous quantity <b>4 Heats</b>		Total quantity to date <b>5 Heats</b>	
Sample submitted: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Shipped to: <input checked="" type="checkbox"/> Central lab <input type="checkbox"/> Region lab		Via <b>Geocal</b>	
Date <b>9/25/02</b>					
Sampled or inspected by (Name) <b>Dave Buck</b>		(Title) <b>QA Tech</b>		Lab phone number <b>303-828-2644</b>	
Supervisor <b>Corey Stewart</b>		(Title) <b>P.E. I</b>		Address <b>1050 Lee Hill Rd. Boulder, Co. 80302</b>	
Distribution:    White copy - Staff Materials Branch (submit white copy only if sample or information is directed to Staff Materials) Canary copy - Region Materials Engineer Pink copy - Resident Engineer					
Previous editions may be used until supplies are exhausted				CDOT Form #157 9/07	

CDOT Form #157

Note: Within Date needed, ASAP is not a date.

<b>COLORADO DEPARTMENT OF TRANSPORTATION FIELD REPORT FOR SAMPLE IDENTIFICATION OR MATERIALS DOCUMENTATION</b>				Field sheet No. <b>120227</b>		Date <b>3/8/02</b>			
				Project No. <b>IM0253-151</b>		Project location <b>I-25, SH 7 to WCR 16</b>			
Metric units <input checked="" type="checkbox"/> yes <input type="checkbox"/> no				Project code (SA#) <b>11925</b>		Function <b>3200</b>	Region <b>4</b>	Part. <b>P</b>	
Sample submitted: <small>(ie.: Soil, ABC, Hydrated lime, HMA, concrete cores, steel, etc.)</small>				<b>Pavement Marking Materials</b>				Field office phone number <b>303-828-0386</b>	
								Field office FAX number <b>303-828-0430</b>	
Item <b>627</b>		Class		Grading		Special provisions applicable: <input checked="" type="checkbox"/> yes <input type="checkbox"/> no			
Previously used on Project No.:				Previous CDOT Form #157 F/S No.(s):		<input type="checkbox"/> CDOT Form #633 (sack) <input type="checkbox"/> CDOT Form #634 (can)			
<ul style="list-style-type: none"> <li>● Sample Identification: Quantity &amp; Unit of material submitted, describe tests required, precise location sample removed from (stationing), etc.</li> <li>● Materials Documentation: Field inspected (describe appearance, weight/dimensions, model/serial number), COC &amp;/or CTR provided, etc.</li> </ul>									
<b>Materials have been field inspected and are acceptable. Materials used are on the Approved Products List. Certified Test Reports for Glass Beads are on file.</b>									
<b>Item:</b>					<b>Final Quantity:</b>				
<b>Epoxy Pavement Marking</b>					<b>2130 Liters</b>				
<b>Glass Beads</b>					<b>6390 Kg.</b>				
<b>Preform Pavement Marking(Type B)</b>					<b>150 Sq. Meters</b>				
APL/QML Acceptance: APL Ref. No.			Product name:				Date checked:		
APL/QML Acceptance: APL Ref. No.			Product name:				Date checked:		
Preliminary <input type="checkbox"/>		Construction <input checked="" type="checkbox"/>		Maintenance <input type="checkbox"/>		Emergency <input type="checkbox"/>		Date needed	
Contractor <b>Kraemer and Sons</b>					Supplier <b>Kolbe Striping</b>				
Sampled from <small>(Pit, roadway, windrow, stock, etc.)</small>					Pit name or owner				
Quantity represented			Previous quantity			<b>Final</b>			
Sample submitted: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Shipped to: <input type="checkbox"/> Central lab <input type="checkbox"/> Region lab		Via		Date <b>3/8/02</b>			
Sampled or inspected by (Name) <b>Fidel Gonzales</b>				(Title) <b>E/PS Tech III</b>		Lab phone number <b>303-828-2644</b>			
Supervisor <small>(Pro./Res./Matis. Engr./Maint. Supt.)</small> <b>Corey Stewart</b>				Title <b>P.E. I</b>		Address <b>1050 Lee Hill Rd. Boulder, Co. 80302</b>			
Distribution: White copy - Staff Materials Branch <small>(submit white copy only if sample or information is directed to Staff Materials)</small> Canary copy - Region Materials Engineer Pink copy - Resident Engineer						CDOT Form #157 9/07			
Previous editions may be used until supplies are exhausted									

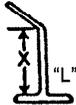
<b>COLORADO DEPARTMENT OF TRANSPORTATION CONCRETE TRUCK MIXER INSPECTION CERTIFICATION</b>	Project code (SA#)	<b>11925</b>	Date	<b>5/8/03</b>
	Project No.	<b>IM 0253-151</b>		
	Proj. location	<b>I-25, SH 7 to WCR 16</b>		
	Concrete company	<b>Varra Co. Plant #1</b>		

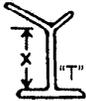
Unit number	252	251	250	247	248	245	239
Rated mixing capacity (1)	ok						
Blade wear (2)	ok						
Free of Hardened concrete (3)	ok						
Revolution counter	ok						
Water gauges	ok						
Meets operating speed requirements	ok						
Date inspected	5/9/03	5/9/03	5/9/03	5/9/03	5/9/03	5/9/03	5/9/03
INSPECTED BY (company employee)	Greg M.						

(1) Rated mixing capacity cannot exceed 63% of gross volume of drum

(2) Blade wear cannot exceed more than 25 mm (one inch) of the original height. For typical blade configurations see "x" dimensions below.

Mixer blade types:





(3) The drum cannot have an appreciable accumulation of hardened concrete inside.

I certify the truck mixers listed above were inspected and met the requirements for conformance with the AASHTO M157 specifications.

I DECLARE UNDER PENALTY OF PERJURY IN THE SECOND DEGREE, AND ANY OTHER APPLICABLE STATE OR FEDERAL LAWS, THAT THE STATEMENTS MADE ON THIS DOCUMENT ARE TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

Concrete company's principal executive, signature and title

**Completed and checked by CDOT personnel**

Batch plant scale certification (Certifiers name and date)	Batch plant water meter certification date
Signed	Title
Remarks:	

Distribution:

- original - Region laboratory
- 1st copy - Resident/Project Engineer
- 2nd copy - Concrete company

CDOT Form #46 3/04

**INSTRUCTIONS FOR CDOT FORM #82, CONCRETE SPECIMEN TRANSMITTAL**

- ◆ Under **Item #** list the Item for which this concrete was placed.
- ◆ List the 281 ticket number of the load or suppliers ticket no. from which cylinders were made.
- ◆ Design cylinder set numbers for each project and class of concrete will be numbered consecutively beginning with No. 1.
- ◆ Fill in the areas for; Concrete class (A, B, D, etc.), Days cured, Break dates, and No. of cylinders.

**Example, Design**

Mark Cylinders as indicated	Set no.	Conc. class	Days cured	Break date	No. of cylinders
Mix Design Cylinders marked	<i>1</i>	<i>A</i>	<i>7</i>	<i>8/16/99</i>	<i>2</i>
Mix Design Cylinders marked	<i>1</i>	<i>A</i>	<i>28</i>	<i>9/6/99</i>	<i>3</i>
Mix Design Cylinders marked					
<b>Total</b>					<i>5</i>
	Set no./class	Field Cylinder	Days cured	Break date	No. of cylinders
Information Cylinders marked		X			
Information Cylinders marked		X			
Information Cylinders marked		X			

**Example, Information**

Mark Cylinders as indicated	Set no.	Conc. class	Days cured	Break date	No. of cylinders
Mix Design Cylinders marked					
Mix Design Cylinders marked					
Mix Design Cylinders marked					
<b>Total</b>					
	Set no./class	Field Cylinder	Days cured	Break date	No. of cylinders
Information Cylinders marked	<i>1A</i>	<i>1</i> X	<i>10</i>	<i>8/19/99</i>	<i>1</i>
Information Cylinders marked	<i>1A</i>	<i>2</i> X	<i>10</i>	<i>8/19/99</i>	<i>1</i>
Information Cylinders marked		X			

Structural strength "Information" cylinders will be marked with the same set number as the Design cylinders from the same batch; Set No./Concrete class, Days cured, and Break date. Normally "X" cylinders will be cast at the same time as design cylinders and cured under the same conditions as the structure. In the column under "Days Cured" indicate the test data desired (7, 11, 14, 21, etc days cured) with the appropriate break date entered in the next column, and number of cylinders.

**Note:** Use separate Form #82s for Design and Information cylinders.

Under **QUANTITIES REPRESENTED** list the measurement applicable to the Pay Item. Report the previous placement quantity of the item under "To Date". Under "This Placement" list the quantity represented by the current Form #82 including any small quantity that did not require cylinders, and then list the total quantity of this class of concrete to date. Enter the specification for Compressive Strength Required.

FIELD SHEET NO. 120123

<b>COLORADO DEPARTMENT OF TRANSPORTATION CONCRETE SPECIMEN TRANSMITTAL</b>		Project No. <b>IM 0253-151</b>	Project code (SA#) <b>11925</b>	Proj. location <b>I-25, SH 7 to WCR 16</b>
Ready Mix Supplier: <input type="checkbox"/> English <input checked="" type="checkbox"/> Metric <b>Ready Mixed</b>		Date <b>11/05/03</b>	Resident Engineer <b>D. Forsyth</b>	CDOT Mix # <b>2007004</b>
Applicable CDOT Form #281 Field Sheet # OR Suppliers ticket #:		Region <b>6</b>	Station <b>Wall Cap</b>	Item & Description <b>601 Structural</b>
Slump <b>3.00</b>	inches (mm)	Entrained air <b>6.1</b>	%	Unitweight <b>143.4</b>
Cylinders for design adequacy		Date molded <b>11/5/03</b>	Cured hrs. <b>10:45 am</b>	Yield <b>1.01</b>
Cylinders for structural strength information		Date molded	Cured hrs.	Concrete temperature <b>78</b> °F (°C)
Mark Cylinders as indicated		Set no.	Conc. class	Days in molds
Specimen Identification	<b>1</b>	<b>D</b>	<b>7</b>	<b>1</b>
Specimen Identification	<b>1</b>	<b>D</b>	<b>28</b>	<b>3</b>
Specimen Identification	<b>4500</b>	QA/QC specification (broke @ 28 days) <input type="checkbox"/> yes <input checked="" type="checkbox"/> no		
Specimen type:	<input checked="" type="checkbox"/> 4 x 8 cylinder <input type="checkbox"/> 6 x 12 cylinder	<input type="checkbox"/> Beam <input type="checkbox"/> Splitting Tensile	<input type="checkbox"/> Cube	Days at structure site
Quantity represented cubic yards/meters	Previous <b>0</b>	This placement <b>100 CU YD</b>	To date <b>100 CU YD</b>	Days in molds
Field Comments:		Laboratory test results		
		Specimen age	Diameter (beam-H x W)	Total load
		<b>7</b>	<b>3.99</b>	<b>63096</b>
		<b>7</b>	<b>4.00</b>	<b>62031</b>
		<b>28</b>	<b>3.99</b>	<b>76840</b>
		<b>28</b>	<b>4.00</b>	<b>76514</b>
I.A.T./Remarks:		Shipped to <input type="checkbox"/> Central lab <input type="checkbox"/> Region lab		
Lab comments:				
Cast by: <b>T. Jones</b>		Transported by:(Name/Title/Company) <b>T. Jones E/PST I CDOT</b>		Phone number <b>303-555-1234</b>
Distribution: White - (Original with sample) - Central/Region Lab		Canary - Project File		FAX number <b>303-555-4321</b>

Previous editions are obsolete and may not be used   CDOT Form #82 8/07





STATE OF COLORADO  
DEPARTMENT OF TRANSPORTATION

DATE TRANSMITTED : 6/06/2007 (final)

PROJECT NO : STA 145A-037  
PROJECT CODE : 15201  
LOCATION : Keystone Hill  
REGION : 5  
FIELD SHEET : 116216  
SUPPLIER : Contractor on Site

REPORT OF CONCRETE TESTS

Item No. : 503  
Concrete Class : Grout Micropiles  
Date Molded : 5/8/2007  
Slump : N/A  
Cylinder Set No. : 11G

Placed at : Sta. 602+54  
Portion : Micropiles

Air : N/A

Unit Weight : N/A

Specimen Number	Date Tested	Age (Days)	Cubes	Cross - Sectional Area	Maximum Load (Lbs)	Compressive Strength (PSI)
11G	05/11/07	3	2"x 2"	4 sq. in.	16238	4060
11G	05/11/07	3	2"x 2"	4 sq. in.	18521	4630
11G	05/11/07	3	2"x 2"	4 sq. in.	16438	4110
11G	06/06/07	28	2"x 2"	4 sq. in.	20587	5147
11G	06/06/07	28	2"x 2"	4 sq. in.	22620	5655
11G	06/06/07	28	2"x 2"	4 sq. in.	18186	4547**

Average Break Strength:

3-day : 4270 psi

28-day : 5400 psi\*\*

Remarks : Cubes tested in accordance with AASHTO T - 106.

**\*\*NOTE: Last cube out of allowable tolerance, average calculated off 2 cubes.**

COMPRESSIVE STRENGTH REQUIRED: 3 day: 2500 psi, 28 day: 4000psi

MICHAEL COGGINS

Tested By : Robin S. DiFerdinando (3-day)  
Patrick R. Murphy (28-day)

REGION MATERIALS ENGINEER

Cc : Project Engineer  
Region Materials Engineer  
Resident Engineer  
Contractor  
Project File

CDOT Form 192  
Revised 11/06

STATE OF COLORADO

PROJECT NO : STA 062A-011

DEPARTMENT OF TRANSPORTATION

PROJECT CODE : 14556

DATE TRANSMITTED : 6/6/2007

LOCATION : Amelia Street

REGION : 5

FIELD SHEET : 108064

SUPPLIER : United Companies

REPORT OF CONCRETE TESTS

Item No. : 601

Placed at : 11+79 55' Rt.

Concrete Class : B

Portion :

Date Molded : 5/10/2007

Slump : 3.5"

Air : 5.0 %

Unit Weight : 137.6

Cylinder Set No. : 1B

Specimen Number	Date Tested	Age (Days)	Diameter	Cross - Sectional Area	Maximum Load (Lbs)	Compressive Strength (PSI)
1B	5/17/07	7	4"	12.57 sq. in.	40801	3246
1B	5/17/07	7	4"	12.57 sq. in.	38683	3077
1B	6/6/07	28	4"	12.57 sq. in.	54445	4331
1B	6/6/07	28	4"	12.57 sq. in.	52892	4208
1B	6/6/07	28	4"	12.57 sq. in.	52045	4140

**Average Break Strength:**

**7-day : 3160 psi**

**28-day : 4230 psi**

Remarks : Cylinders tested in accordance with ASTM C-39.

COMPRESSIVE STRENGTH REQUIRED: 3000 psi

MICHAEL COGGINS

Tested By : Robin S. DiFerdinando (7-day)  
Patrick R. Murphy (28-day)

REGION MATERIALS ENGINEER

Cc : Project Engineer  
Region Materials Engineer  
Resident Engineer  
Project File

CDOT Form 192  
Revised 11/06

<b>COLORADO DEPARTMENT OF TRANSPORTATION</b>	<b>Project No.:</b> IM 0253-151
	<b>Project Code:</b> 11925
<b>INSPECTION – QUALITY ASSURANCE ACCEPTANCE REPORT</b>	<b>Proj. Location:</b> SH 7 to WCR 16
	<b>Date:</b> 1/19/03
	<b>Report No.:</b> 12

Colorado Department of Transportation  
Staff Bridge Design Branch  
4201 E. Arkansas Avenue, Room 330  
Denver, Colorado 80222

Pay Item Number	<b>618</b>
Pay Item Description	<b>Prestressed Conc. Box/ 32" - 48" Depth</b>
Pay Item Units	<b>Square Foot (SF)</b>
Number of Units QA Inspected	<b>8080 SF</b>
Contract Unit Price	<b>35 \$ Per SF</b>
Structure Number & Construction Phase	<b>D-17-CT</b>
Fabricator	<b>Rocky Mountain Prestress</b>
Prime Contractor	<b>Kraemer and Sons</b>

The above referenced Items were inspected, tested, and accepted by the Contractors Quality Control Unit (QC). CDOT Staff Bridge Design performed random Quality Assurance Inspections and Testing (QA) to the extent necessary to verify that an acceptable product is furnished in accordance with the Contract. The Items were found by QA to be in reasonable conformance with the plans and specifications.

Mark A. Leonard  
CDOT Staff Bridge Design Engineer

Dana E. Christensen  
Professional Engineer II

Distribution:  
Leonard  
Inspection File  
Quarterly Report File

By: \_\_\_\_\_  
Quality Assurance Inspector

CDOT Form #193 04/04

**COLORADO DEPARTMENT OF TRANSPORTATION  
UNCOATED SEVEN-WIRE STEEL STRAND PHYSICAL TEST REPORT**

Field Sheet No. 176767 Project Code 13579  
 Sample Number 2008001 Project Number C 2706-033  
 Sample Date 1/4/2008 Project Location I-270 Phase VI  
 Region 6

Reel Number	Size	Yield Strength (lbf)	Breaking Strength (lbf)	Modulus of Elasticity (psi)	Elongation in 24" (%)	Nominal Steel Area of Strand (sq. in.)	Nominal Weight of Strand (lb/100 ft.)
4465	15	54,600	61,024	3.059E+07	>3.5	0.217	752
4465	15	54,995	61,330	2.825E+07	>3.5	0.217	755

Strand Designation Number	Nominal Diameter (in)	Minimum Yield Strength (lbf)	Minimum Breaking Strength (lbf)	Minimum Elongation in 24"
9	3/8"	20700	23000	3.5%
13	1/2"	37170	41300	3.5%
13a	0.520"	40500	45000	3.5%
15	0.600"	52740	58600	3.5%

Remarks: Tested in accordance with AASHTO T244

Tested By: Kelvin Jiron Report Date: 1/8/2008 Glenn Frieler  
 Concrete Physical Properties Engineer  
 CDOT FORM 196-A  
 Rev. 1/2008

STATE OF COLORADO  
Colorado Department of Transportation

Project ID: 12183  
Field Sheet #: 99986  
Project: IMD 0704-183(B)  
Location: I 70 WASH TO BRIGHTON  
PHASEIII

Report Date: 5/1/2001

CONCRETE CORE TEST

Item: 412  
Class: PFA  
Portion: PAVEMENT  
Aggregate Size: N/G

Date Placed: 11/28/2000  
Date Removed: 11/29/2000  
Date Tested: 12/1/2000  
Cure Time: 35  
Moisture Condition: DRY  
Age: 35

CORE ID	TRIM LENGTH (in.)	CAP LENGTH (in.)	DIAMETER (IN.)	MAX LOAD (lbs.)	STRENGTH (PSI)	FRACTUR TYPE	UNIT WEIGHT	CORRECT. FACTOR
01	10.90	11.08	5.55	88400	3654	CONE/SHEAR	10.90	1.00
02	10.87	11.10	5.55	87800	3629	SHEAR	10.87	1.00
03	11.12	11.23	5.62	96900	3906	SHEAR	11.12	1.00

Remarks: Cores were tested in accordance with CP 65-91.

Tested by:

cc:  
Central Laboratory  
Regional Materials Engineer

Glenn Frieler  
Concrete/ Physical Properties  
Program Manager

CDOT FORM 199  
Rev. 04/01



<b>COLORADO DEPARTMENT OF TRANSPORTATION CONCRETE BATCHED AND PLACED</b>		Project No. <b>IM 0253-151</b>		
		Project code (SA#) <b>11925</b>		
		Proj. location <b>I-25, SH 7 to WCR 16</b>		
		Date <b>1/24/02</b>		
		Contractor <b>Kraemer and Sons</b>		
Supplier <b>Ready Mix</b>	Truck # <b>0299</b>	Cu. Yds. <b>10.00</b>	Design # <b>2000139</b>	Class. <b>D-Spec</b>

Design weights and total batch weights (adjusted for moisture)

	Cement	Fly ash	Fine	Medium	Coarse	Water	Air E.A.	Admixture
1 CU. YD. Design Wt.	1 type <b>633</b> lb	3 type <b>70</b> lb	<b>500</b> lb	<b>1485</b> lb	<b>881</b> lb	<b>266</b> gal	1 type <b>18.0</b> oz	5 type <b>85.0</b> oz
Total adjusted batch Wt.	<b>6485</b> lb	<b>740</b> lb	<b>4980</b> lb	<b>15160</b> lb	<b>9140</b> lb	<b>1896</b> gal	<b>180.0</b> oz	<b>848</b> oz
Moisture in coarse agg.	<b>4.0</b> %		Moisture in medium agg.		Moisture in fine agg.		<b>2.50</b> %	
Time charged	<b>11:10</b>		Discharged time <b>12:40</b>		Truck water meter reading at plant			

Field mixing			Batch water		
Mixing revolutions on job	<b>20</b>		In agg.	<b>86.43</b>	gals.
Gallons of water added	<b>0</b>		At plant	<b>227.19</b>	gals.
Cubic yds. in truck	<b>10</b>		Total batch	<b>313.62</b>	gals.
Equivalent batch gallons	<b>313.62</b>		Max allowed per batch.	<b>381.48</b>	gals.
Equivalent batch gals. = $\frac{\text{Batch cu. yds.}}{\text{cu. yds. in Truck}} \times \text{gals. water added}$			Total allowed <b>67.86</b> gals.		

Water permitted:  $\frac{7225.0}{\text{(Batch Wt. Cement - lbs.)}} \times \frac{.44}{\text{(Maximum water Cement ratio)}} \times .12 = 381.48$  gals. (Maximum allowed per batch)

When taken	% total air	<b>6.2</b>	Slump	<b>3.0</b>	Mix temperature	<b>70 f</b>	Cyl. set #	<b>6</b>
	Yield	<b>1.04</b>	(Nomograph)		RPM range	<b>10-12</b>	RPM used	<b>12</b>
1. Placed at <b>Bridge Deck F 17-UK</b>				Portion <b>Span C</b>				
2. Air temp maximum <b>55 f</b>				Minimum <b>45</b>		Weather <b>Clear</b>		
Lines 1 & 2 represent ticket #				Thru				
Remarks								
Plant inspector					Job inspector			

1st: Project copy

2nd: Book copy

CDOT Form #281 3/04

<b>COLORADO DEPARTMENT OF TRANSPORTATION FIELD REPORT FOR JOINT SEALANT TESTING</b>	Project No. <b>IM 0253-151</b>	Date <b>4/8/03</b>
	Project code (SA#) <b>11925</b>	Proj. location <b>I-25, SH 7 to WCR 16</b>

**Project specific location of test**

<p>4 lane highway</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/></td> <td>WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/></td> <td>EB <input type="checkbox"/> or NB <input type="checkbox"/></td> <td>EB <input type="checkbox"/> or NB <input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;">X</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">12</td> <td style="text-align: center;">15</td> <td colspan="2" style="text-align: center;">feet</td> </tr> </table>	WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/>	WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>	X	X			12	15	feet		OR	<p>2 lane highway</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>WB <input type="checkbox"/> or SB <input type="checkbox"/></td> <td>EB <input type="checkbox"/> or NB <input type="checkbox"/></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td colspan="2" style="text-align: center;">feet</td> </tr> </table>	WB <input type="checkbox"/> or SB <input type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>			feet	
WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/>	WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>																	
X	X																			
12	15	feet																		
WB <input type="checkbox"/> or SB <input type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>																			
feet																				

Station <b>178+00</b>	Sealant material <b>Dow Corning 890 Self Leveling</b>	Placement date <b>3/8/03</b>	Temp <b>75</b> °F
Test method <input type="checkbox"/> CP 67-02 Method A <input checked="" type="checkbox"/> CP 67-02 Method B			
Test number <b>1</b>	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

**Project specific location of test**

<p>4 lane highway</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/></td> <td>WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/></td> <td>EB <input type="checkbox"/> or NB <input type="checkbox"/></td> <td>EB <input type="checkbox"/> or NB <input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;">X</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">12.5</td> <td style="text-align: center;">12</td> <td colspan="2" style="text-align: center;">feet</td> </tr> </table>	WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/>	WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>	X	X			12.5	12	feet		OR	<p>2 lane highway</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>WB <input type="checkbox"/> or SB <input type="checkbox"/></td> <td>EB <input type="checkbox"/> or NB <input type="checkbox"/></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td colspan="2" style="text-align: center;">feet</td> </tr> </table>	WB <input type="checkbox"/> or SB <input type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>			feet	
WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/>	WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>																	
X	X																			
12.5	12	feet																		
WB <input type="checkbox"/> or SB <input type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>																			
feet																				

Station <b>185+50</b>	Sealant material <b>Dow Corning 890 Self Leveling</b>	Placement date <b>3/8/03</b>	Temp <b>75</b> °F
Test method <input type="checkbox"/> CP 67-02 Method A <input checked="" type="checkbox"/> CP 67-02 Method B			
Test number <b>1</b>	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

**Project specific location of test**

<p>4 lane highway</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/></td> <td>WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/></td> <td>EB <input type="checkbox"/> or NB <input type="checkbox"/></td> <td>EB <input type="checkbox"/> or NB <input type="checkbox"/></td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> <td style="text-align: center;">X</td> </tr> <tr> <td style="text-align: center;">12</td> <td style="text-align: center;">12</td> <td colspan="2" style="text-align: center;">feet</td> </tr> </table>	WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/>	WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>		X		X	12	12	feet		OR	<p>2 lane highway</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>WB <input type="checkbox"/> or SB <input type="checkbox"/></td> <td>EB <input type="checkbox"/> or NB <input type="checkbox"/></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td colspan="2" style="text-align: center;">feet</td> </tr> </table>	WB <input type="checkbox"/> or SB <input type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>			feet	
WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/>	WB <input type="checkbox"/> or SB <input checked="" type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>																	
	X		X																	
12	12	feet																		
WB <input type="checkbox"/> or SB <input type="checkbox"/>	EB <input type="checkbox"/> or NB <input type="checkbox"/>																			
feet																				

Station <b>202+25</b>	Sealant material <b>Dow Corning 890 Self Leveling</b>	Placement date <b>3/8/03</b>	Temp <b>76</b> °F
Test method <input type="checkbox"/> CP 67-02 Method A <input checked="" type="checkbox"/> CP 67-02 Method B			
Test number <b>1</b>	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Tester
--------

**COLORADO DEPARTMENT OF TRANSPORTATION  
REINFORCING BAR PHYSICAL TEST REPORT**

Field Sheet No.: 1234  
 Sample Number: 1234  
 Sample Date: 9/18/2007

Project Code: 1  
 Project No.: SCM  
 Project Location: Colorado School of Mines  
 Region: \_\_\_\_\_

Manufacturer: Ameristeel  
 Plant: Charlotte  
 Heat Number: \_\_\_\_\_

Bar Grade: 60  
 Bar Type: S  
 Bar Size: 3

Bar	Yield Strength (psi)	Tensile Strength (psi)	Elongation (%)	Reduction of Area (%)	Unit Weight (lbs/ft)	Bar Diameter (Inches)
1	59,102	81,342	14.78	46.77	0.366	0.392
2	57,962	80,426	16.19	45.55	0.366	0.393
<b>ASTM A 615 SPECS</b>	Minimum	Minimum	Minimum			
Grade 40	40,000	60,000	*A	N/A	N/A	N/A
Grade 60	60,000	90,000	*B	N/A	N/A	N/A

\*A: 11 for bar size #3; 12 for bar sizes #4 to #6

\*B: 9 for bar sizes #3 to #6; 8 for bar sizes #7 to #8; 7 for bar sizes #9 to #18

Remarks: Tested in accordance with ASTM A 370

Glenn Frieler  
 Concrete Physical Properties Engineer  
 CDOT FORM 1372  
 Rev. 1/2007

Tested by: Kelvin Jiron Report Date: 9/19/2007

**COLORADO DEPARTMENT OF TRANSPORTATION  
REINFORCING BAR PHYSICAL TEST REPORT**

Field Sheet No.: 1234  
 Sample Number: 1234  
 Sample Date: 9/18/2007

Project Code: 1  
 Project No.: SCM  
 Project Location: Colorado School of Mines  
 Region: \_\_\_\_\_

Manufacturer: Ameristeel  
 Plant: Charlotte  
 Heat Number: \_\_\_\_\_

Bar Grade: 60  
 Bar Type: S  
 Bar Size: 3

Bar	Yield Strength (psi)	Tensile Strength (psi)	Elongation (%)	Reduction of Area (%)	Unit Weight (lbs/ft)	Bar Diameter (Inches)
1	59,102	81,342	14.78	46.77	0.366	0.392
2	57,962	80,426	16.19	45.55	0.366	0.393
<b>ASTM A 706 SPECS</b>	Range	Minimum	Minimum			
	60,000 - 78,000	80,000	*A	N/A	N/A	N/A

\*A: 14 for bar sizes #3 to #6; 12 for bar sizes #7 to #11; 10 for bar sizes #14 and #18

Remarks: Tested in accordance with ASTM A 370

Tested by: Kelvin Jiron Report Date: 9/19/2007

Glenn Frieler  
 Concrete Physical Properties Engineer  
 CDOT FORM 1372  
 Rev. 1/2007

**COLORADO DEPARTMENT OF TRANSPORTATION  
REINFORCING BAR PHYSICAL TEST REPORT**

Field Sheet No.: 1234  
 Sample Number: 1234  
 Sample Date: 9/18/2007

Project Code: 1  
 Project No.: SCM  
 Project Location: Colorado School of Mines  
 Region: \_\_\_\_\_

Manufacturer: Ameristeel  
 Plant: Charlotte  
 Heat Number: \_\_\_\_\_

Bar Grade: 60  
 Bar Type: S  
 Bar Size: 3

Bar	Yield Strength (psi)	Tensile Strength (psi)	Elongation (%)	Reduction of Area (%)	Unit Weight (lbs/ft)	Bar Diameter (Inches)
1	59,102	81,342	14.78	46.77	0.366	0.392
2	57,962	80,426	16.19	45.55	0.366	0.393
<b>ASTM A 722 SPECS</b>	Minimum	Minimum	Minimum			
	120,000	150,000	7.0	N/A	N/A	N/A

Remarks: Tested in accordance with ASTM A 370

Glenn Frieler  
 Concrete Physical Properties Engineer  
 CDOT FORM 1372  
 Rev. 1/2007

Tested by: Kelvin Jiron Report Date: 9/19/2007



{This page was intentionally left blank.}