Iowa Department of Transportation

MINUTES
OF
IOWA DOT SPECIFICATION COMMITTEE MEETING

July 12, 2007

Members Present:	John Adam	Statewide Operations Bureau
	Tom Reis, Chair	Specifications Section
	Daniel Harness, Secretary	Specifications Section
	Gary Novey	Office of Bridges & Structures
	Jim Berger	Office of Materials
	Doug McDonald	District 1-Marshalltown RCE
	John Smythe	Office of Construction
	Keith Norris	District 2-District Materials
	Bruce Kuehl	District 6-District Construction
	Roger Bierbaum	Office of Contracts
Members Not Present:	Troy Jerman	Office of Traffic & Safety
	Mike Kennerly	Office of Design
	Larry Jesse	Office of Local Systems
Advisory Members Present:	Lisa Rold	FHWA
	Larry Stevens	SUDAS
Others Present:	Deanna Maifield	Office of Design
	Donna Buchwald	Office of Local Systems

Tom Reis, Specifications Engineer, opened the meeting. The following items were discussed in accordance with the agenda sent July 5, 2007:

1. Article 2507.02, B, 2, Cement.

The Office of Materials requested a change to allow the use of other cements, such as Type IS cements.

2. Article 2529.02, B, 4, Cement.

The Office of Materials requested a change to set the minimum mix temperature when a mid range is used to be same as for Type IS as it is for Type I/II for both 5 hour and 10 hour patches.

3. Article 2530.03, B, 4, d, Cement.

The Office of Materials requested a change to set the minimum mix temperature when a mid range is used to be same as for Type IS as it is for Type I/II for both 5 hour and 10 hour patches.

4. DS-01057, Trenchless Construction.

The Office of Construction requested changes to clarify welding requirements.

5. SS-01046, Quality Management Concrete (QM-C).

The Office of Materials requested a change to remove Appendix A and include an allowance for mix design approval without a laboratory mix if contractors fall within Zone II-A.

6. Discussion of Developmental and Supplemental Specifications.

The Specification Section requested a discussion regarding which Developmental and Supplemental Specifications should be included in the new book.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger	**Office:** Materials	**Item 1**
Submittal Date: July 3, 2007	**Proposed Effective Date:** April 2008	
Article No.: 2507.02, B, 1 **Title:** Cement	**Other:**	

Specification Committee Action: Approved as is.

Deferred:	**Not Approved:**	**Approved Date:** 7/12/07	**Effective Date:** 4/15/08

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None.

Specification Section Recommended Text:

2507.02, B, 1, Cement.

Replace the entire article:

Cement shall be ~~Type I or Type II~~ in accordance with Section 4101, at the rate of 10 sacks (940 pounds) per cubic yard (558 kg per cubic meter).

Comments:

Member's Requested Change (Redline/Strikeout):

B. Grout.

1. Cement.

Cement shall be ~~Type I or Type II~~ in accordance with Section 4101, at the rate of 10 sacks (940 pounds) per cubic yard (558 kg per cubic meter).

Reason for Revision:

County or City Input Needed (X one)	**Yes**	**No**

Comments:

Industry Input Needed (X one)			**Yes**	**No**	
Industry Notified:	**Yes** X	**No**	**Industry Concurrence:**	**Yes** X	**No**

Comments: To allow the use of other cements such as Type IS cements. Many ready mix plants have Type IS as their only source. This is a similar to change in Article 2506 (Flowable Mortar). Need for change noted by several ready mix producers.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger	**Office:** Materials	**Item 2**
Submittal Date: July 3, 2007	**Proposed Effective Date:** April 2008	
Article No.: 2529.02, B, 4 **Title:** Cement	**Other:**	

Specification Committee Action: Approved as is.

Deferred:	**Not Approved:**	**Approved Date:** 7/12/07	**Effective Date:** 4/15/08

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: The Office of Materials noted that Industry agrees with the changes.

Specification Section Recommended Text:

2529.02, B, 4, Cement.

Replace the second row of the table and the note:

Patch Type	Cement Type	Maximum Allowable Substitution	Minimum Mix Temperature
5 Hour	Type I, Type II Type IS	0% Fly Ash 0% Fly Ash	75ºF (24ºC) 80ºF (27ºC)*
10 Hour	Type I, Type II Type IS	10%Fly Ash 0% Fly Ash	65ºF (18ºC) 70ºF (21ºC)*
* When a Type A Mid Range Water reducing admixture is used, the minimum mix temperature shall be that required when Type I/II cement is used ~~75ºF (24ºC)~~.			

Comments:

Member's Requested Change (Redline/Strikeout):

4. Cement.
Cement for Class M mixes shall meet requirements of Section 4101.

The cement types and maximum allowable substitution rates shall be as follows:

Patch Type	Cement Type	Maximum Allowable Substitution	Minimum Mix Temperature
5 Hour	Type I, Type II Type I(SM)	0% Fly Ash 0% Fly Ash	75ºF (24ºC) 80ºF (27ºC)*
10 Hour	Type I, Type II Type I(SM)	10%Fly Ash 0% Fly Ash	65ºF (18ºC) 70ºF (21ºC)*

	* When a Type A Mid Range Water reducing admixture is used, the minimum mix temperature shall be that required when Type I/II cement is used ~~75ºF (24ºC~~.				
Reason for Revision:					
County or City Input Needed (X one)			**Yes**	**No**	
Comments:					
Industry Input Needed (X one)			**Yes**	**No**	
Industry Notified:	**Yes** X	**No**	**Industry Concurrence:**	**Yes** X	**No**
Comments: Industry requested minimum mix temperature when a mid range is used to be same as Type I/II for both 5 hour and **10 hour** patches.					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger	**Office:** Materials	**Item 3**
Submittal Date: July 3, 2007	**Proposed Effective Date:** April 2008	
Article No.: 2530.03, B, 4, d **Title:** Cement	**Other:**	

Specification Committee Action: Approved as is.

Deferred:	**Not Approved:**	**Approved Date:** 7/12/07	**Effective Date:** 4/15/08

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: The Office of Materials noted that Industry agrees with the changes.

Specification Section Recommended Text:

2530.03, B, 4, d, Cement.

Replace the second row of the table and the note:

Patch Class	Cement Type	Maximum Allowable Substitution	Minimum Mix Temperature
B	Type I, Type II Type IS	0% Fly Ash 0% Fly Ash	75ºF (24ºC) 80ºF (27ºC)*
C	Type I, Type II Type IS	10% Fly Ash 0% Fly Ash	65ºF (18ºC) 70ºF (21ºC)*
* When a Type A Mid Range water reducing admixture is used, the minimum mix temperature shall be that required when Type I/II cement is used ~~75ºF (24ºC)~~.			

Comments:

Member's Requested Change (Redline/Strikeout):

d. Cement.
Cement for Class M concrete mixtures shall meet the requirements of Section 4101.

The cement types and maximum allowable substitution rates shall be as follows:

Patch Class	Cement Type	Maximum Allowable Substitution	Minimum Mix Temperature
B	Type I, Type II Type I(SM)	0% Fly Ash 0% Fly Ash	75ºF (24ºC) 80ºF (27ºC)*
C	Type I, Type II Type I(SM)	10% Fly Ash 0% Fly Ash	65ºF (18ºC) 70ºF (21ºC)*

	* When a Type A Mid Range water reducing admixture is used, the minimum mix temperature shall be that required when Type I/II cement is used ~~75ºF (24ºC)~~.				
Reason for Revision:					
County or City Input Needed (X one)			**Yes**	**No**	
Comments:					
Industry Input Needed (X one)			**Yes**	**No**	
Industry Notified:	**Yes** X	**No**	**Industry Concurrence:**	**Yes** X	**No**
Comments: Industry requested minimum mix temperature when a mid range is used to be same as Type I/II for both 5 hour and **10 hour** patches.					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: John Smythe / Kyle Frame	**Office:** Construction	**Item 4**
Submittal Date: 06/12/07	**Proposed Effective Date:** 10/16/07	
Article No.: DS-01057 **Title:** Developmental Specifications for Trenchless Construction	**Other:**	

Specification Committee Action: Deferred to the next meeting.

Deferred: X	**Not Approved:**	**Approved Date:**	**Effective Date:**

Specification Committee Approved Text:

Comments: The Specifications Section asked that this item be deferred to allow time to include some additional changes to bring this DS more in line with SUDAS specifications.

Specification Section Recommended Text: See attached Draft DS-01XXX

Comments:

Member's Requested Change: **(Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.**

2418.02 Materials
B. Steel Pipe
Replace the second paragraph:

~~Joints shall comply with American Welding Society Code. Fully weld all joints with full penetrating weld, including joints of casing pipes laid in open pipe trenches.~~

Joints and welding shall comply with American Welding Society Code D1.1M / D1.1. Fully weld all joints with full penetrating weld, including joints of casing pipes laid in open pipe trenches. Welders shall be qualified according to IM 560. Welds shall be in accordance with IM 558.

Reason for Revision: Clarify welding requirements

County or City Input Needed (X one)	**Yes**	**No** x
Comments:		

Industry Input Needed (X one)			**Yes**	**No** x	
Industry Notified:	**Yes** x	**No**	**Industry Concurrence:**	**Yes**	**No**
Comments:					

Draft DS-01XXX
(Replaces DS-01057)

Iowa Department of Transportation

DEVELOPMENTAL SPECIFICATIONS
FOR
TRENCHLESS CONSTRUCTION

Effective Date
October 16, 2007

THE STANDARD SPECIFICATIONS, SERIES 2001, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

Replace Section 2418 of the Standard Specifications with the following:

Section 2418. Trenchless Construction.

2418.01 DESCRIPTION
This work involves the installation of pipe that is forced through existing embankment from side to side by application of force. Installation of pipe may be by one of the following methods unless otherwise indicated in the contract documents:

A. Auger Boring
A boring method that utilizes a rotating cutting head to form the bore and a series of rotating augers inside a casing pipe to remove the spoil.

B. Compaction Method
Boring methods that displace soil radially rather than removing spoil. Bore hole may be formed with a push rod or impact mole.

C. Directional Drilling
A boring method for installing pipe from a surface launched drilling rig. A pilot bore is formed and then enlarged by back reaming. The pipe is then pulled in.

D. Pipe Ramming
A boring method that involves driving a steel casing pipe with a percussive hammer. The front end of the casing pipe may be open ended or closed. If open, spoil must be removed from the pipe.

E. Slurry Boring
A boring method which first forms a pilot bore by forcing a drill tube through the embankment. The pilot hole is then enlarged by reaming. As the hole is enlarged with the reamer, drilling fluid (slurry) is pumped into the hole to hold the soil cuttings in suspension. After reaming, the pipe is pulled into place.

F. Microtunneling
A boring method that consists of a remotely controlled pipe jacking operation utilizing a tunnel boring machine. Personnel entry is not required.

G. Pipe Jacking
A jacking method in which pipe is pushed into the ground with hydraulic rams while soil is simultaneously excavated. Excavation is normally completed with a tunnel boring machine. This method requires personnel to enter the tunnel during the excavation process.

H. Utility Tunneling
A method of forming large diameter tunnels. As excavation takes place at the front of the tunnel, a liner is constructed to temporarily support the tunnel. Upon completion of the tunnel the pipe is pushed in place.

I. Other methods not described here may be allowed upon approval of the Engineer.

2418.02 MATERIALS.

A. Concrete Pipe
Concrete pipe for culverts or casing to be installed by trenchless methods shall meet requirements of Section 4145 for the type specified and the following requirements:

Pipe may be furnished as a single unit or sectional. If sectional, it shall have joints of a type that will assure positive engagement of the sections during and after placement. Square end pipe without proper connecting devices will not be permitted. Pipe having projections on exterior surfaces that requires an excavation larger than the body of the pipe will not be permitted.

B. Steel Pipe
Steel pipe for culverts or casing shall be new and meet the requirements of ASTM A 139, Grade B; ASTM A 252, Grade 2; or ASTM A 53, Grade B. Hydrostatic test should be waived for non-pressure applications and can be designated as (no hydro).

Joints and welding shall comply with American Welding Society Code D1.1M/D1.1. Fully weld all joints with full penetrating weld, including joints of casing pipes laid in open pipe trenches. Welders shall be qualified according to Materials I.M. 560. Welds shall be in accordance with Materials I.M. 558.

Upon approval of the Engineer, connecting adjacent pieces of steel pipe during installation may be achieved by a CNC machined integral press fit connection such as Permalok, or approved equal, as long as loading and installation design criteria are met. The press fit connection of the pipe shall be installed in accordance with the pipe manufacturer's recommendation.

Casing Pipe Minimum Wall Thickness:

NOMINAL DIAMETER INCHES (mm)	WALL THICKNESS, MINIMUM INCHES (mm)	
	UNDER HIGHWAY	UNDER RAILROAD
6 thru 14 (150 thru 350)	0.188 (4.78)	0.25000 (6.35)
16 (400)	0.188 (4.78)	0.28125 (7.14)
18 (450)	0.25 (6.35)	0.31250 (7.94)
20 (510)	0.25 (6.35)	0.34375 (8.73)
22 (560)	0.25 (6.35)	0.34375 (8.73)
24 (600)	0.281 (7.14)	0.37500 (9.53)
26 (660)	0.281 (7.14)	0.40625 (10.32)
28 (710)	0.312 (7.92)	0.43750 (11.11)
30 (750)	0.312 (7.92)	0.46875 (11.91)

32 (815)	0.312 (7.92)	0.50000 (12.70)
34 (865)	0.312 (7.92)	0.53125 (13.49)
36 (900)	0.344 (8.74)	0.53125 (13.49)
38 (965)	0.344 (8.74)	0.56250 (14.29)
40 (1015)	0.344 (8.74)	0.59375 (15.08)
42 (1050)	0.344 (8.74)	0.62500 (15.88)
44 (1120)	0.344 (8.74)	0.65625 (16.67)
46 (1170)	0.344 (8.74)	0.65625 (16.67)
48 (1200)	0.344 (8.74)	0.68750 (17.46)
50 (1270)	For sizes greater than 48 inch (1200 mm) diameter, consult the Engineer	0.71875 (18.26)
52 (1320)		0.75000 (19.05)
54 (1370)		0.78125 (19.84)
56 (1420)		0.81250 (20.64)
58 (1470)		0.81250 (20.64)
60 (1525)		0.84375 (21.43)
62 (1575)		0.87500 (22.23)
64 (1625)		0.90625 (23.02)
66 (1675)		0.93750 (23.81)
68 (1725)		0.93750 (23.81)
70 (1780)		0.96875 (24.61)
72 (1830)		1.00000 (25.40)

C. Casing Pipe Diameter

Minimum inside diameter as shown in the contract documents. If not shown, casing diameter shall not be less than 4 inches (100 mm) greater than the greatest outside diameter of the carrier pipe, including pipe bells.

D. Casing Pipe Filler

1. The space between the carrier pipe and casing pipe shall not be filled unless required by the contract documents. The space shall not be completely filled to avoid transfer of earth and live loads from the casing to the carrier pipe.

2. Fill material: Fill sand or flowable mortar.

E. Carrier Pipe Guide

1. Manufactured guide to position carried pipe in casing. Wood skids will not be allowed.
2. Material requirements for carrier pipe guide shall be in accordance with the following:
   a. Band/Panel: ASTM A 240, Type 304 stainless steel or ASTM A 36 for carbon steel.
   b. Riser: ASTM A 240, Type 304 stainless steel or ASTM A 36 for carbon steel.
   c. Liner: Elastomeric PVC per ASTM D 149.
   d. Chock Skid/Runner: Abrasion resistant polymer with a low coefficient of friction.
   e. Fasteners: ASTM A 193 Type 304 (18-8) Stainless Steel.

2418.03 CONSTRUCTION.
Before installation begins, the pipe or initial section of pipe shall be aligned on a prolongation of the line and grade shown in the contract documents or staked by the Engineer, and shall be held by braces, guideways, and other devices, to follow these lines and grades as close as possible as it progresses through the embankment.

A. Pipe Installation.

1. Casing Pipe or Un-cased carrier pipe Installation:

a. Install pipe by auger boring, pipe jacking, microtunneling, open-ended pipe ramming, directional drilling (back-reaming required), or utility tunneling.

b. Methods which displace excess soil, rather than removing it, such as impact moling, push rod, or closed end pipe ramming will not be permitted.

c. Water jetting will not be allowed.

d. Use a jacking collar, timbers, and other means as necessary to protect the driven end of the pipe from damage.

e. Fully support borehole at all times to prevent collapse. Insert pipe as earth is removed, or support bore with drilling fluid.

f. Fill annular space between the inside of the bore hole and the outside of the pipe if the space is greater than 1 inch (25 mm) using flowable mortar.

2. Carrier Pipe Installation Through Casing:

a. Clean dirt and debris from the casing pipe after installation.

b. Attach pipe guides or casing chocks to pipe sections as necessary to support pipe barrel in accordance with pipe manufacturer's recommendation. Do not allow pipe to be supported by joint bells.

1). Pipe guides: At least one per pipe section.

2). Lubricant for pipe guides: Drilling mud or flax soap. Do not use petroleum-based lubricants or oils.

c. Assure that thrust loads will not damage carrier pipe joints. Provide thrust collars between joint shoulders of concrete pipe.

d. Provide timbers for sufficient cushioning between the end of the pipe pushed and the jacking equipment to prevent damage to the pipe. Do not allow steel jack face to thrust against unprotected pipe end.

e. Position jacks so that resultant force is applied along the centerline of the pipe, and that force is applied evenly to the entire end of the pipe.

f. Assemble pipe joints in the jacking pit before pushing the carrier pipe into the casing.

g. Close end of casing pipe around the carrier pipe with open joint masonry plug.

Excavation for a limited distance ahead of the forward end of the pipe will be permitted when the soil is sufficiently stable to stand without danger of caving. In this case, the hole shall be trimmed to the outside diameter of the pipe to reduce resistance to jacking and to maintain contact between embankment material and outside surface of the pipe. In soft or unstable soil, the pipe shall be allowed to cut its way through the soil to avoid danger of caving and subsidence of the overlying embankment and roadway. If the pipe is of metal with a coating of corrosion resisting material, care shall be taken to protect the coating from damage during installation and excavating processes.

A small, high pressure, low volume water jet (4 gal/min maximum (15 L per minute maximum)) may be used to cut the soil within a steerable shield at the leading edge of the pipe being installed. The water and the operation shall be controlled so there is no change in the condition of the soil adjacent to the pipe and no flow of water along the outside of the pipe.

Obstructions to the progress of the pipe, such as roots, boulders, or parts of former structures, shall be removed. Deviations from line or grade to pass obstructions shall be avoided if such deviation will result in unsatisfactory fitting joints. The use of explosives for removing obstructions will not be allowed.

Provisions shall be made for keeping the excavation free from surface and seepage water during the jacking operation.

After the excavation is opened, the installation of the pipe shall follow immediately to avoid unnecessarily disturbing the stability of the embankment.

Backfilling shall be done in accordance with Article 2402.09. Surplus excavated material may be uniformly spread in the immediate vicinity of the work, as directed by the Engineer.

B. Accuracy of Placement.
When the location and grade line of the culvert have been determined by the position or elevation of the available outlet, insertion of the pipe shall be from the outlet end. When the location and grade have been determined by the position of the inlet and the elevation to which water must be lowered at the upstream end, insertion of the pipe shall be from the inlet end.

Install pipe at line and grade according to the following tolerances:

1. Carrier pipe shall be installed at its true starting elevation and grade within a maximum alignment deviation of the pipe centerline as specified in the contract documents.

2. When no deviation tolerances are specified in the contract documents, the following shall apply:

a. Gravity Pipe: horizontal ± 1.0 foot per 100 feet (0.3 m per 30 m) of tunneling and vertical ± 0.2 feet up to 200 feet (0.06 m per 60 m) of tunneling. An additional ± 0.1 foot (0.03 m) between 200 feet and 300 feet (60 m and 90 m) or a total of ± 0.3 feet (0.09 m) deviation between 200 feet and 300 feet (60 m and 90 m).

b. Pressure Pipe: horizontal ± 0.2 feet (0.06 m) and vertical ± 1.0 foot (0.3 m).

3. The Contractor shall provide additional fittings, utility accesses, or appurtenances needed to accommodate any horizontal or vertical misalignment, if allowed by the Engineer, at no additional cost to the Contracting Authority.

4. The Contractor will be allowed to correct errors in grade of a casing pipe in order to achieve design grade of the carrier pipe by pouring an invert in the casing pipe, or by shimming the carrier pipe to a uniform grade, provided adequate clearance remains for proper installation of the carrier pipe.

Deviation from the prescribed line that reverses the fall of the grade line through the culvert shall be cause for rejection.

Openings more than 1/4 inch (5 mm) in width between adjacent sections of concrete pipe shall be filled with 1:2 cement/sand mortar.

Abandoned tunnels shall be filled with either a PCC 3,000 psi (21 MPa) mixture of approximately 4 inch (100 mm) slump or flowable mortar.

2418.04 METHOD OF MEASUREMENT.
The quantity of Pipe Installed by Trenchless Construction, of the size and type specified, in feet (meters), will be the quantity shown on the contract documents, for each pipe to the nearest foot (0.1 m), but not including aprons. The quantity of pipe will be determined along the axis.

Normal excavation for pipe installed by trenchless construction will not be measured for payment, but shall be considered incidental to the pipe installed. Excavation for boulders smaller than one-third the diameter of the pipe being installed, or parts of existing structures identified in the contract documents will not be measured for payment, but shall be considered incidental to the price bid for trenchless construction. Excavation and removal of boulders larger than one-third the diameter of the pipe being installed, or parts of existing structures not identified in the contract documents will be paid for in accordance with Article 1109.03, B.

2418.05 BASIS OF PAYMENT.
The Contractor will be paid the contract unit price for Pipe Installed by Trenchless Construction, of the type and size specified, per linear foot (meter). This payment shall be full compensation for equipment, labor, and materials to complete the work including sheeting, shoring, bracing, dewatering, pipe connections, excavation, and backfill. Installations that consist of both trenchless and conventionally placed pipe will include separate bid items for each portion.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger / Todd Hanson	**Office:** Materials	**Item 5**
Submittal Date: 7/2/07	**Proposed Effective Date:** 11/20/07	
Article No.: SS-01046 **Title:** Quality Management Concrete (QM-C)	**Other:**	

Specification Committee Action: Approved as is. In the discussion to decide which Supplemental Specifications to include in the new book, it was decided that this should be a Developmental Specification rather than a Supplemental Specification.

Deferred:	**Not Approved:**	**Approved Date:** 7/12/07	**Effective Date:** 10/16/07

Specification Committee Approved Text: See attached Draft DS-01XXX.

Comments: None.

Specification Section Recommended Text: See attached Draft SS-01XXX.

Comments:

Member's Requested Change: **(Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.**

See attached Draft SS-01XXX

Reason for Revision:

This update is to remove the Appendix from the past revision. The appendix was essentially IM 530 that was added to include the new FHWA acceptance requirements.

Another change is the allowance for mix design approval without a laboratory mix if they fall within Zone II-A (If not in Zone II-A an laboratory mix is required.) The Contractor would then be required to cast and test beams on the first day of paving. Based on history of mixes from the past seven years, we are comfortable with the mixes the contractors are achieving if they fall within Zone II-A. The contractors also agree that the mix designs are becoming more routine and agree with this change.

County or City Input Needed (X one)			**Yes**	**No**	
Comments:					
Industry Input Needed (X one)			**Yes**	**No**	
Industry Notified:	**Yes** X	**No**	**Industry Concurrence:**	**Yes** X	**No**
Comments:					

Draft DS-01XXX
(Replaces SS-01046)

Iowa Department of Transportation

DEVELOPMENTAL SPECIFICATIONS
FOR
QUALITY MANAGEMENT CONCRETE (QM-C)

Effective Date
October 16, 2007

THE STANDARD SPECIFICATIONS, SERIES 2001, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

01XXX.01 DESCRIPTION.
This specification identifies a concrete mixture design with an optimum combined aggregate gradation and the Contractor's testing and quality control responsibilities. Optimization of the aggregates should produce concrete with low water requirement as well as with improved workability and finishing characteristics. While concrete strength is important and shall be measured, it is not the basis for optimization of the concrete mixture design.

Testing and quality control shall apply to all Contractor produced concrete, utilizing the Concrete Design Mixture (CDM). The CDM shall apply to mainline slip form pavement. At the Contractor's option, the CDM may apply to any other slip form paving.

01XXX.02 MATERIALS.
All materials shall meet the quality requirements for the respective items in Division 41 of the Standard Specifications. Compatibility of all material combinations shall be the responsibility of the Contractor based on acquired field experience with proposed materials.

A. Coarse and Fine Aggregate.
The Gradation Table in Article 4109.02 of the Standard Specifications will not apply to coarse aggregate. Fine aggregate sources shall meet the requirements of Section 4110 of the Standard Specifications. A course, uncrushed sand may be produced from an approved Class 2, Class 3, or Class 3I gravel source meeting the requirements of Section 4110 of the Standard Specifications and the following gradation limits:

Table 01XXX.02, A

Sieve	% Passing
1/2 inch (12.5 mm)	100
3/8 inch (9.5 mm)	90-100
No. 4 (4.75 mm)	75-95
No. 8 (2.36 mm)	60-90
No. 30 (600 µm)	10-60
No. 200 (75 µm)	0-1.5

B. Intermediate Aggregate.
Any limestone intermediate aggregate material shall be produced from approved beds and meet the durability class required for the coarse aggregate. Intermediate aggregate shall be considered coarse aggregate for gradations and correlations.

Uncrushed pea gravel produced from an approved Class 2 or Class 3 gravel source and meeting the quality requirements of Section 4110 of the Standard Specifications shall not exceed 10% of the total aggregate for a Class 2 gravel source, or 15% of the total aggregate for a Class 3 gravel source.

01XXX.03 LABORATORY DESIGN MIXTURE.
The Contractor shall develop a CDM based on a unit volume of 1.000 according to industry standard practice. The CDM shall contain proportions of materials, including admixtures. Proportions shall be based upon saturated surface dry aggregates and shall produce a workable concrete mixture meeting the following constraints:

Table 01XXX.03-1

Nominal Maximum Coarse Aggregate Size	Greater than or equal to 1 inch (25 mm)
Gradation	Materials I.M. 532
Cementitious Content	Minimum, 560 lbs./cy* (333 kg/m^3*)
Fly Ash Substitution Rate	See Article 2301.04 Paragraph E
Water/Cementitious Ratio	Maximum, 0.45
Air Content	6% ± 1%, Design Absolute Volume = 0.060
28 Day Flexural Strength, Third Point	Minimum, 640 psi (4.40 MPa)

*The minimum cement content assumes the use of Type I/II cement with a specific gravity of 3.14 for an absolute volume of 0.106. The absolute volume shall be 0.106 and the weight (mass) of cement shall be determined from the specific gravity of the cement, if other than Type I/II cement. The absolute volume of cement for Type IP cement shall be 0.111. Cement content may need to be increased to maintain water to cementitious ratio during hot weather conditions.

Normal production gradations shall be used to determine the relative percentage of each individual aggregate used in the CDM. The relative percentage of each individual aggregate shall be selected to produce the desired combined aggregate gradation using the following sieves: 2 inch, 1 1/2 inch, 1 inch, 3/4 inch, 1/2 inch, 3/8 inch, No. 4, No. 8, No. 16, No. 30, No. 50, No. 100, and No. 200 (50 mm, 37.5 mm, 25 mm, 19 mm, 12.5 mm, 9.5 mm, 4.75 mm, 2.36 mm, 1.18 mm, 600 µm, 300 µm, 150 µm, and 75 µm). A target combined gradation shall be developed for each CDM based on normal production gradations and the relative percentages of each individual aggregate. Percent passing the No. 200 (75 µm) sieve shall not exceed 1.5% for the combined aggregate gradation. When the coarse aggregate used meets the increase in percent passing the No. 200 (75 µm) sieve, in accordance with Article 4115.05 of the Standard Specifications, the percent passing the No. 200 (75 µm) sieve shall not exceed 2.0% for the combined aggregate gradation. Water reducing admixture, Type A, or water reducing and retarding admixture, Type D, may be used in the CDM.

Laboratory development of the CDM shall be in accordance with AASHTO T 126. Mix designs may be conducted in a ready mix or central mix batch plant provided the following conditions are met:

1. All non-mix design materials are emptied.
2. Mix design materials are used.
3. Batch size at least 3 cubic yards (2 m^3).

Personnel overseeing the development of the CDM shall be an Iowa DOT PCC Level III Certified Technician. The Engineer shall be allowed to witness the development of the CDM. Notice shall be given 7 calendar days prior to this event. The following tests shall be performed in the development of the CDM:

Table 01XXX.03

Specific Gravity of Each Individual Aggregate	Materials I.M. 307
Gradation of Each Individual Aggregate	Materials I.M. 302
Unit Weight of Plastic Concrete	AASHTO T 121
Air Content of Plastic Concrete	Materials I.M. 318
28 Day Flexural Strength	AASHTO T 97
Temperature of Plastic Concrete	ASTM C 1064

01XXX.04 MIX DESIGN DOCUMENTATION.
At least 7 calendar days prior to the start of paving the Contractor shall submit a CDM report to the District Materials Engineer for approval. Contract extensions will not be allowed due to inadequate or additional CDMs. The CDM report shall include the following:

Table 01XXX.04

Cover Page	Contractor name Project number Date and location of CDM laboratory development Date Submitted Signature of Contractor representative
Material Source Information	Brand Type Source
Material Proportion Information	Specific gravity Relative percentage of each individual aggregate Target combined gradation % passing (Materials I.M. 531) Target combined gradation charts (Materials I.M. 532) Design batch weight (mass) (SSD) As mixed batch weight (mass) (SSD)
Mix Properties	Unit weight (mass) of plastic concrete Air content of plastic concrete 28 day flexural strength Slump Temperature of plastic concrete

The District Materials Engineer may approve the mix design without laboratory mixture testing if the proposed mix design proportions fall within Zone II-A of Materials I.M. 532. If the mix design is approved without laboratory testing, the Contractor shall cast a set of three beams on the first day of paving from concrete meeting the mix design criteria. The Contractor shall test the beams for 28 day flexural strength, third point loading. When the coarse aggregate for the mix design is quartzite, an additional set of three beams shall be cast and tested by the Contractor at 90 days. The strength results shall be submitted to the Engineer.

01XXX.05 QUALITY CONTROL.
Quality control of the concrete shall be the responsibility of the Contractor. Personnel overseeing quality control operations shall be an Iowa DOT PCC Level II Certified Technician. Personnel conducting testing on grade shall be an Iowa DOT PCC Level I Certified Technician or Concrete Field Testing Technician Grade I in accordance with ACI CP-2. The Contractor shall calibrate and correlate testing equipment prior to and during paving operations. The Quality Control Plan and Project Information Quality Control Plan, in accordance with Materials I.M. 530 ~~Appendix A of this specification~~, shall be submitted to the Engineer at least 7 calendar days prior to the preconstruction conference. Paving shall not begin until the plan is reviewed for conformance with the contract documents. The Contractor shall maintain equipment and qualified personnel who shall direct and perform all field quality control sampling and testing necessary to determine the various properties of the concrete governed by the contract documents and to maintain the properties described in this specification.

A. Quality Control Testing.
The Contractor shall perform all quality control tests necessary to control the production and construction processes applicable to this specification and as set forth in the Quality Control Plan. All

samples for quality control testing shall be taken in a random manner according to the prescribed sampling rate. The Contractor shall perform the following tests described herein:

Table 01XXX.05, A-1
QUALITY CONTROL TABLE

	Limits	**Minimum Testing Frequency**	**Test Methods**
Unit Weight (Mass) of Plastic Concrete	±3% of the CDM	Twice/day	AASHTO T 121
Gradation Combined % Passing	See below	1/1500 cy (1/1200 m^3)	Materials I.M. 216, 301, 302, & 531
Aggregate Moisture Contents	See Materials I.M. 527	1/1500 cy (1/1200 m^3)	Materials I.M. 308
Air Content Plastic Concrete In Front of Paver	See Article 2301.04, C	1/350 cy (1/275 m^3) See below	Materials I.M. 318
Water/Cementitious Ratio	0.45 maximum	Twice/day	Materials I.M. 527
Vibrator Frequency	See Article 2301.07,A,6,a	With Electronic Vibration Monitoring: Twice/day Without Electronic Vibration Monitoring: Twice/Vibrator/Day	Materials I.M. 384

Gradation shall be performed at a frequency listed in the table above. The running average of three combined aggregate gradation tests shall fall within the limits established by the CDM target gradation and the following working ranges:

Table 01XXX.05, A-2	
Sieve Size	**Working Range**
No. 4 or greater (4.75 mm or greater)	± 5%
No. 8 to No. 30 (2.36 mm to 600 µm)	± 4%
No. 50 (300 µm)	± 3%
No. 100 (150 µm)	± 2%
minus No. 200 (75 µm)	See Article 01XXX.03

B. Corrective Action.
For QM-C mixes only, the Contractor shall plot all quality control test results on control charts as described in Materials I.M. 530 ~~Appendix A of this specification~~.

1. Aggregate Tests.
When the running average approaches the working range limits, the Contractor shall take corrective action. When a combined gradation test result for a sieve exceeds the working range limits, the target shall be adjusted and the Engineer shall be notified. If the verification test result for the minus No. 200 (75 µm) exceeds the limits in Article 01XXX.03 of this specification for the combined gradation, the material represented by that test for this sieve will be considered non-complying. Pay factors will be assessed based on Coarseness/Workability Factors as described in Article 01XXX.07 of this specification.

2. Concrete Tests.
When an individual test result approaches the control limits, the Contractor shall take corrective action. The Contractor shall notify the Engineer whenever an individual test result exceeds the control limits.

C. Acceptable Field Adjustments.
All mix changes shall be documented by the Contractor on the QM-C Mix Adjustment form and mutually agreed upon between the Contractor and Engineer. Batch weights shall be determined using a basic water cement ratio of 0.40. When the water cement ratio varies more than ±0.03 from the basic water cement ratio, the mix design shall be adjusted to a unit volume of 1.000. A change in the source of materials or an addition of admixtures or additives shall necessitate a new CDM. The following are small adjustments that may be made without a new CDM being required:

- Increase cementitious content
- Decrease fly ash substitution rate
- Aggregate proportions may be adjusted from CDM proportions by a maximum of ± 2% for the coarse aggregate and ± 2% for the fine aggregate. The coarse and intermediate aggregates may be adjusted from CDM proportions by a maximum of ± 5% in the coarse fraction.
- Change water reducer to water reducer retarder
- Adjustment in water reducer or water reducer retarder admixture dosage
- Change in source of fly ash
- Change in source of sand, provided target gradation limits are met

When circumstances arise, such as a cement plant breakdown, that create cement supply problems, a change in cement source may be allowed with approval of the Engineer. The District Materials Engineer shall be consulted for approval of other changes to the mix design. A set of three beams for 28 day flexural strength testing may be required to document the changes. The Contractor will be allowed to utilize a Class C mix or a mix based on Class C mix proportions utilizing project materials in the event conditions beyond the Contractor's control prevent completion of the work with the CDM. This shall be by mutual agreement between the Contractor and Engineer and at no additional cost to the Contracting Authority.

Prior to 28 days strength test results, paving with QM-C mix may begin when the mix design strength, based on the average of three beams, meets or exceeds 640 psi (4.4 MPa) with the approval of the Engineer.

D. Hand Finished Pavement.
Contractor produced concrete for hand finished pavement shall utilize project materials, based on Class C or Class M concrete mix proportions. Quality control, as specified in this specification, shall not apply to hand finished concrete. Hand finished pavement may utilize Class C or M ready mix concrete without the requirements of this Supplemental Specification.

01XXX.06 METHOD OF MEASUREMENT.

A. Quality Management Concrete (QM-C).
The Engineer will compute the number of cubic yards (cubic meters) of QM-C based on the number of batches produced upon which quality control and testing were performed. This QM-C quantity will also include the quantity of QM-C produced at the Contractor's option as referenced in Article 01XXX.01 of this specification and Class C mixture used in accordance with Article 01XXX.05, C, of this specification. All quantity of waste will be excluded from this quantity.

B. Standard or Slip-Form Portland Cement Concrete Pavement, QM-C.
The quantity of Standard or Slip-Form Portland Cement Concrete Pavement, QM-C, in square yards (square meters), will be the quantity shown in the contract documents.

C. Portland Cement Concrete Overlay, QM-C, Furnish Only.
Article 2310.04, A, of the Standard Specifications will apply.

D. Portland Cement Concrete Overlay, QM-C, Placement Only.
Article 2310.04, B, of the Standard Specifications will apply.

E. Class C and Class M Mixtures.
The Engineer will compute the number of square yards (square meters) of Standard or Slip-Form Portland Cement Concrete Pavement, QM-C, constructed utilizing Class C or Class M mixtures. For overlays, the Engineer will compute the number of square yards (square meters) of Portland Cement Concrete Overlay, QM-C, Placement Only, constructed utilizing Class C or Class M mixtures and the number of cubic yards (cubic meters) of Class C and Class M mixtures used.

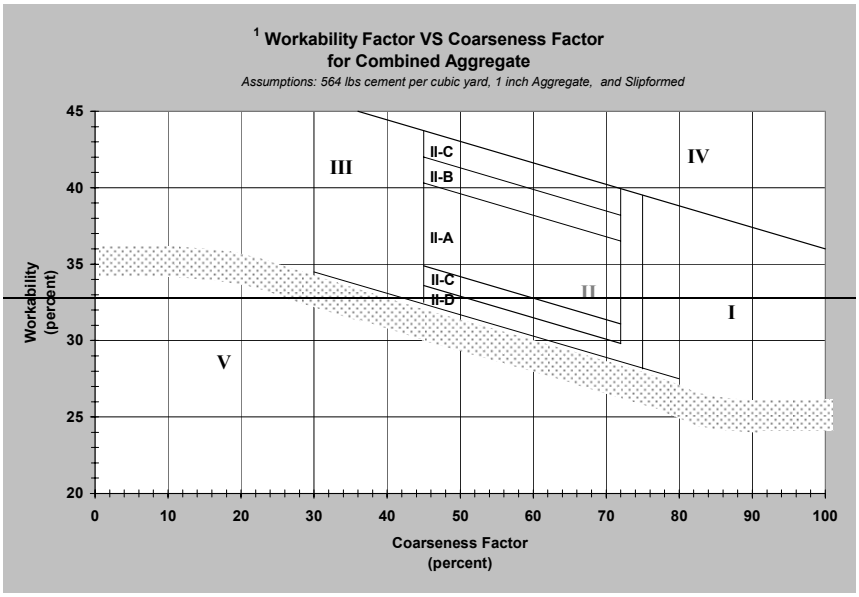
01XXX.07 BASIS OF PAYMENT.
For construction of concrete pavement and other construction in connection therewith, the Contractor will be paid the contract unit prices for the following items of work:

A. Quality Management Concrete (QM-C).
For the number of cubic yards (cubic meters) of QM-C computed as provided above, the Contractor will be paid the predetermined contract unit price for Quality Management-Concrete per cubic yard (cubic meter). This price will be considered full compensation for furnishing all labor, equipment, and materials for the work required by the Contractor to design, test, and provide process control for the production of QM-C.

B. Standard or Slip Form Portland Cement Concrete Pavement, QM-C.
For the number of square yards (square meters) of Standard or Slip-Form Portland Cement Concrete Pavement, QM-C, constructed, the Engineer will determine the average coarseness and workability factors for each lot in accordance with Materials I.M. 530 ~~Appendix A of this specification~~.

The contract unit price per square yard (square meter) for Standard or Slip-Form Portland Cement Concrete Pavement, QM-C, constructed will be adjusted in the following manner:

Table 01XXX.07, B Pay Factor Chart	
Gradation Zone (Materials I.M. 532)	**Pay Factor**
II-A	1.03
II-B	1.02
II-C	1.01
II-D	1.00
IV	0.98
I	0.95



C. Portland Cement Concrete Overlay, QM-C, Furnish Only
Article 2310.04, A, of the Standard Specifications will apply. The Engineer will determine the average coarseness and workability factor for each lot according to Materials I.M. ~~532~~ 530. The contract unit price will be adjusted according to Table 01XXX.07 B, of this specification.

D. Portland Cement Concrete Overlay, QM-C, Placement Only
Article 2310.04, B, of the Standard Specifications will apply. The Engineer will determine the average coarseness and workability factor for each lot according to Materials I.M. ~~532~~ 530. The contract unit price will be adjusted according to Table 01XXX.07, B, of this specification.

E. Class C and Class M Mixtures.
For the number of square yards (square meters) of Class C and Class M mixtures constructed, the Contractor will be paid the contract unit price per square yard (square meter) for Standard or Slip-Form Portland Cement Concrete Pavement, QM-C. For overlays, the Contractor will be paid the contract unit price per square yard (square meter) for Portland Cement Concrete Overlay, QM-C, Placement Only, and the contract unit price per cubic yard (cubic meter) for Portland Cement Concrete Overlay, QM-C, Furnish Only. Pay Factor incentives/disincentives in Article 01XXX.07, B, of this specification, will not be applied to Class C and Class M mixtures.

APPENDIX A: QUALITY MANAGEMENT & ACCEPTANCE PCC PAVEMENT

GENERAL

This Appendix is based on the concept of mutual benefit partnership between the Contracting Authority and Contractor during progress of the work. Technical partnering shall be a part of this work and a formal partnership agreement may or may not be in effect.

The Contractor shall submit and comply with a Quality Control Program. The Contractor shall be responsible for the design of a PC Concrete Design Mixture (CDM) for use in pavement. The CDM shall be approved by the District Materials Engineer. The Contractor shall perform process control sampling, testing, and inspection during all phases of the concrete work at the rate specified in the contract documents, with monitor inspection by the Engineer. Inspection of all other aspects of the concrete paving operation will be the responsibility of the Engineer.

The Contractor shall have an Iowa DOT PCC Level II Certified Technician responsible for all process control sampling and testing and execution of the Quality Control Plan as specified in this Specification. An Iowa DOT PCC Level I Concrete Field Testing Technician or Technician Grade I (in accordance with ACI CP-2) may perform the sampling and testing duties for which they are certified.

MIX DESIGN PROCEDURE

An Iowa DOT PCC Level III Certified Technician shall perform the mix design. The Contractor shall obtain the Engineer's concurrence.

The CDM shall be developed using the Excel spreadsheet developed by the Office of Materials. ACI 211 procedure, PCA procedure, or alternative methods may also be used. Aggregate proportions are contained on Form #955QMC (Materials I.M. 532, Appendix A). When a CDM is developed, the absolute volume method shall be used.

The Contractor shall submit the CDM with test data, including a list of all ingredients, the source of all materials, target gradation, and the proportions, including absolute volumes.

A CDM with a satisfactory record of performance strength may be submitted in lieu of a new CDM. The concrete used for paving per this specification shall be produced with the same material sources and batched and mixed with the same equipment used to produce the concrete represented by the performance strength documentation.

For each proposed aggregate proportion, the 28-day flexural strength shall be determined at the proposed cementitious content. The CDM shall be based on the 28-day strength and the average of a minimum of three tests per mixture.

QUALITY CONTROL PLAN

The Contractor shall submit a Quality Control Plan listing the type and frequency of inspection, sampling, and testing deemed necessary to measure and control the various properties of materials and construction governed by the contract documents. As a minimum, the sampling and testing plan shall detail sampling location, sampling procedures, and the test frequency to be utilized. This Contractor Quality Control Plan shall be submitted to the Office of Materials PCC Engineer and will be retained for use on all QM-C projects. A copy of the Quality Control Plan shall be available on the project at all times. Periodic updates may be required as necessary.

A Project Information Quality Control Plan shall be submitted for each project. The plan shall identify the personnel responsible for the Contractor quality control. This shall include the company official who will act as liaison with the Engineer, as well as the certified technician who will direct the inspection program. The certified technician shall be responsible to an upper level company manager and not to those responsible for daily production. The project information plan shall also include the mix design and mix design properties.

A. Elements of the Quality Control Plan.

The plan shall address all elements that affect the quality of the concrete including, but not limited to, the following:

1. Stockpile management.

2. Mixing time and transportation, including time from batching to completion of delivery and batch placement rate (batches per hour).

3. Placement and consolidation.

4. The frequency of sampling and testing, coordination of activities, corrective actions to be taken, and documentation.

5. How the duties and responsibilities are to be accomplished and documented, and whether more than one certified technician would be provided.

6. The criteria used by the technician to correct or reject noncompliant materials, including notification procedures.

B. Personnel Requirements.

1. Perform and utilize process control tests and other quality control practices to ensure that delivered material and proportioning meets the requirements of the mix design(s).

2. Periodically inspect all equipment utilized in transporting, proportioning, mixing, placing, consolidating, finishing, and curing to ensure proper operation. Monitor placement, consolidation, finishing, and curing to ensure conformance with the mix design and other contract requirements.

The Project Information Quality Control Plan shall be submitted in writing to the Engineer. The Contractor shall not start paving until receipt of the approval of the Project Information Quality Control Plan.

C. Elements of Project Information Quality Control Plan

1. Mix design(s).

2. Mix design properties, as specified in the contract documents.

3. The Contractor shall furnish name(s) and credentials of the quality control staff to the Engineer prior to the beginning of construction.

4. Project-related information.

DOCUMENTATION

The Contractor shall maintain records of all inspections and tests. The records shall indicate the nature and number of observations made, the number and type of deficiencies found, the quantities represented by the test, and any corrective action taken. The Contractor's documentation procedures shall be subject to the approval of the Engineer prior to the start of the work and prior to regular monitoring during the progress of the work. Standard Iowa DOT forms shall be used. Batch tickets and gradation data shall be documented in accordance with the contract documents. Copies shall be submitted to the Engineer as work progresses.

A control chart and running tabulation of individual test results shall be prepared for the tests listed below. An Excel spreadsheet is available from the Office of Materials to plot the test results. These shall be available to the Engineer at any time and submitted to the Engineer weekly.

1. Gradation (% passing) for each of the following sieves: 1 1/2 inch, 1 inch, 3/4 inch, 1/2 inch, 3/8 inch, #4, #8, #16, #30, #50, #100, #200, and pan (37.5 mm, 25 mm, 19 mm, 12.5 mm, 9.5 mm, 4.75 mm, 2.36 mm, 1.18 mm, 600 µm, 300 µm, 150 µm, 75 µm, and pan).

2. Moisture: Coarse Aggregate(s) & Sand.

3. Unit Weight.

4. Plastic Air Content.

5. Coarseness & Workability Factors.

6. Water/Cementitious Ratio.

Charting shall be completed within 24 hours after testing. Working range limits shall be indicated on the control charts.

The Contractor shall notify the Engineer whenever the process approaches a specification limit and shall take action which results in the test results moving toward the specification target and away from the limit.

All charts and records documenting the Contractor's quality control inspections and tests shall become property of the Contracting Authority upon completion of the work.

The PCC Level II Technician shall document the changes to the mix design, allowed by the contract documents, on the Iowa DOT QM-C Mix Adjustment form (Materials I.M. 530, Appendix A). Changes shall have the PCC Level III Technician's concurrence. The PCC Level III Technician shall periodically review mix change affects on workability and placement in the field.

FIELD VERIFICATION TESTING

For continuous construction operation, a lot will be defined as a week of paving. Lots less than 3 days of paving will be grouped with lot from the previous week. For days of paving less than 500 cubic yards (500 m^3) the Engineer may waive verification sampling. The Engineer will perform verification testing at the following minimum test frequencies:

MINIMUM VERIFICATION TEST FREQUENCIES

ITEM	MINIMUM FREQUENCY	REFERENCE
Unit Weight Plastic Concrete	None	Materials I.M. 340
Gradation (individual aggregate, % passing)	1st day, then twice per lot	Materials I.M. 302
Flexural Strength, Third Point Loading – 28 days*	1/10,000 cu. yd. (1/10,000 m^3)	Materials I.M. 328
Air Content Unconsolidated Concrete	1/700 cu. yd. (1/700 m^3)	Materials I.M. 318
Water/Cement Ratio	None	Materials I.M. 527
Vibration Frequency	1/week	Materials I.M. 384
*One set of two beams at the above rate shall be cast for pavement design purposes. The beams shall be delivered to the Central Laboratory in Ames for testing. Transported beams shall be stripped and wrapped in wet burlap and plastic to ensure adequate curing during delivery. Include information on project number, contractor, date cast, and air content with delivery.		

CONTROL & ACCEPTANCE PROCESS OF PLASTIC AIR TESTING

On the first air test of each day, the Contractor and Engineer shall run side by side tests to ensure both air meters are within the tolerance in Materials I.M. 216. If the air tests are outside the tolerance, both air meters shall be calibrated in accordance with Materials I.M. 318 to resolve the difference.

Thereafter, the Engineer will randomly test the plastic air content at the minimum frequency in the table above. The Contractor may elect to run side by side comparison at the same time as the Engineer to ensure both meters are operating properly. When a verification test is outside the tolerance for target air content, the Contractor will be notified immediately.

The unconsolidated air content limits will be established according to Article 2301.04, C, of the Standard Specifications using Contractor test results. The Contractor shall notify the Engineer whenever an individual quality control test result is outside the tolerance for the target air content. Lot acceptance will be based on the Contracting Authority's verification test results on the unconsolidated mix on the grade.

DETERMINING COARSENESS & WORKABILITY INCENTIVE

On the first day of paving, the Engineer will direct and witness sampling and splitting of one sample of each aggregate. The split sample shall meet the requirements of Materials I.M. 216. If correlation is not established, the District Materials Engineer will resolve the differences.

Thereafter, the Engineer will direct and witness sampling of one random independent sample per day. The Engineer will take immediate possession of the samples. The Engineer will randomly test a minimum of two samples per lot. The Engineer will determine aggregate percentages based on the batch weights at the time the sample was obtained, compute the average coarseness and workability factors for the combined samples tested, and average the results for the lot. The Engineer will plot the results for the lot on the Coarseness Workability Chart in accordance with Materials I.M. 532. If results obtained by the Engineer fall within the same pay zone as the Contractor, appropriate incentive will be paid for the lot.

If the average results obtained by the Engineer are not in the same pay zone as the Contractor, the Engineer will test the remaining samples representing the lot and average all results for the lot. If the average results of all verification samples for the lot fall within the same pay zone as Contractor results for the lot, incentive will be paid for the lot. If the average results of all verification samples for the lot are in a different pay zone than the Contractor, the Engineer's results will govern for the basis of incentive for the lot.

CORRECTIVE ACTION

The Contractor shall take prompt action to correct conditions that have resulted, or could result, in the incorporation of noncompliant materials.

NONCOMPLIANT MATERIALS

The Contractor shall establish and maintain an effective and positive system for controlling noncompliant material, including procedures for its identification, isolation and disposition. Reclaiming or reworking of noncompliant materials shall be in accordance with procedures acceptable to the Engineer.

All noncompliant materials and products shall be positively identified to prevent use, shipment, and intermingling with complying materials and products.

AVOIDANCE OF DISPUTES

Every effort should be made by the Contractor and Engineer to avoid any potential conflicts in the Quality Assurance Program prior to and during the project by using partnering concepts. Potential conflicts should be resolved at the lowest possible levels between the Contractor and Engineer. Correction of problems and performance of the final product should be the primary objective of this resolution process.

TESTING

If less than 500 cubic yards (500 m^3) are produced in one day that day's production may be grouped with the following day's production.

Item 6

The Specifications Committee discussed which Developmental Specifications and Supplemental Specifications should be included in the new book. The following active Developmental Specifications and Supplemental Specifications have been proposed to be included:

Number	Title	Location in New Book
DS-01013	High Performance Concrete for Prestressed Concrete Beams	Incorporate into Section 2407
DS-01023	Full Depth Reclamation	Discuss with Mike Heitzman
DS-01037	Erosion Control	Incorporate into Section 2601
DS-01061	A + B Bidding	Incorporate into Section 1103
DS-01063	Disc Bearing Assembly	Section 2434
DS-01064	Barrier Intakes	Compare with SUDAS specs. May belong in Section 2503.
DS-01071	Sliplining Existing Pipe Culverts	Section 2419
DS-01072	Portable Changeable Message Signs	Incorporate into Section 2528
DS-01076	Cold In-Place Recycled Asphalt Pavement (Will be revised)	Discuss with Mike Heitzman
DS-01079	Wick Drains	Section 2112
DS-01081	Night Work Lighting	Section 2529
DS-01083	Fabric Formed Concrete Structure Revetment	Section 2550
DS-01096	Water Main (SUDAS)	Section 2549
DS-01097	Sanitary Sewer (SUDAS)	Section 2504
DS-01098	Storm Sewer (SUDAS)	Section 2503
DS-01099	Lane Rental (Hourly) (A + B Bidding with Incentive/Disincentive) (Will be revised)	Possibly Section 1113
DS-01105	Mechanically Stabilized Earth (MSE) Retaining Wall	Section 2432
SS-01012	Furnish and Apply Granular Shoulder Material	Section 2128
SS-01017	Mobilization for Erosion Control	Incorporate into Section 2601
SS-01021	Modular Glare Screen	Incorporate into Section 2528
SS-01024	Pre-splitting and Production Blasting of Rock Slope Cuts	Section 2103 (Renumber current 2103 as 2106)
SS-01025	Cleaning, Surface Preparation, and Painting of Galvanized Surfaces	Section 2509 (Renumber current 2509 as 2551)

SS-01032	Concrete Drilled Shaft	Section 2428
SS-01045	Recycled Asphalt Pavement	Discuss with Mike Heitzman
SS-01047	Milled Shoulder Rumble Strips - HMA or PCC Surface	Section 2548
SS-01048	High Tension Cable Guardrail	Incorporate into Section 2505
SS-01049	Quality Control Program for Small HMA Paving Quantities	Incorporate into Section 2303
SS-01050	Primary and Interstate Pavement Smoothness	Section 2317 (Renumber current 2317 as 2414 and current 2414 as 2433)
SS-01051	Pre-Engineered Steel Truss Recreational Trail Bridge	Section 2429
SS-01052	Modular Block Retaining Wall	Section 2430
SS-01053	Segmental Retaining Wall	Section 2431

The following active Developmental Specifications and Supplemental Specifications were deemed as unique enough to remain as Developmental Specifications or Supplemental Specifications:

Number	**Title**
DS-01003	Hot Mix Asphalt Mixtures - Job Mix Formula Approval by Test Strip Method
DS-01025	Colored Sealer Coating for Structural Concrete
DS-01031	Compaction with Moisture Control
DS-01045	Traffic Signalization (SUDAS) (This will be re-written after completion of research being done by CTRE)
DS-01050	Airport Safety Requirements
DS-01055	Transverse Joint Leveling for HMA Pavements
DS-01057	Trenchless Construction
DS-01074	Portable Temporary Traffic Signals for Flagger Stations
DS-01078	Precast Noise Wall (Make Dan Ohman the controller)
DS-01080	Fiber Reinforced Polymer Repair for Concrete Containment of Collision Damaged Pretensioned Prestressed Concrete Beams (Ahmad Abu-Hawash to be the controller)
DS-01085	Added Options Bidding
DS-01086	Best Value Alternative (A - D) Bidding
DS-01088	Improved Durability Concrete for Bridge Decks
DS-01089	High Performance Concrete for Structures (Convert to SS after rewriting)

DS-01091	Construction Progress Schedule
DS-01092	High Performance Concrete for Structures (Council Bluffs Interstate System) (Convert to SS after rewriting)
DS-01094	Reduction of HMA QC/QA Criteria for Local Agencies
DS-01100	Construction Work on Railroad Right of Way with A + B for Bidding Railroad Flaggers (Union Pacific)
DS-01101	Maintenance Work on Railroad Right of Way (Union Pacific)
DS-01103	Global Positioning System Machine Control Grading
DS-01104	Removal of Concrete Box Girder Bridges
DS-01106	Quality Management Concrete (QM-C)
SS-01033	Work on Railroad Right of Way (Burlington Northern and Santa Fe)
SS-01043	On-Call Contracting - Patching

The following Developmental Specifications have been proposed to be eliminated:

Number	**Title**
DS-01005	Quality Management - Structural Concrete (QM-SC)
DS-01027	Water Main (Des Moines Water Works)
DS-01032	Quality Management - Contractor
DS-01065	High Performance Steel for Bridge Applications
DS-01066	Bridge Deck Smoothness

The Office of Construction expressed concern with placing SS-01046 in the GS. They fear that it could be inappropriately applied. The Committee decided that to ensure SS-01046 is properly applied, it should be converted to a Developmental Specification (This has been done. It is now DS-01106). The Office of Construction also noted that although they are in favor of including SS-01050 in the book, it must be done in a manner such that zero blanking band smoothness is applied appropriately. The Office of Design noted everything that is in DS-01064 should apply to all intakes, not just barrier intakes. This should be included in the new book and be applied to all intakes.

The Office of Construction asked when Developmental Specifications and Supplemental Specifications would be available to review for inclusion in the book. The Specifications Section explained that they are ready to include in the book, except references need to be checked.

SUDAS is completing their revisions to their Water Main, Sanitary Sewer, and Storm Sewer sections. The Specifications Section will update the SUDAS DSs once SUDAS has completed their revisions. The Specifications Section will work on incorporating the revised SUDAS DSs into the Standard Specifications.

The Office of Construction asked if there is a procedure for submitting comments. This is the procedure the Specifications Section is suggesting:

- Comments be placed, within parentheses, into the text of the documents on the W drive (neither the Track Changes or Comments functions are to be used). This will allow reviewers to see each other's comments.
- Reviewers include their initials with their comments so other reviewers know who made the comments.