S T A T E **O F** **T E N N E S S E E**

(Rev. 12-15-21) January 1, 2021
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(Rev. 12-26-24)
(Rev. 1-8-25)

Supplemental Specifications – 600SS

of the

Standard Specifications for Road and Bridge Construction

January 1, 2021

Subsection 602.04.A, (pg. 429), 12-15-21; **Shop Inspection;** Revise A:

Fabricators of steel bridges shall hold the following certifications in accordance with the AISC Certification Program – Bridge QMS Certification:

1. As a minimum, all fabricators shall be certified in the category of Certified Bridge Fabricator – Intermediate Bridge (IBR) with applicable supplemental requirements.

2. Fabricators of advanced type bridges, as defined in the AISC Standard for Steel Bridges, shall be certified in the category of Certified Bridge Fabricator – Advanced (ABR) with applicable supplemental requirements.

3. Fabricators of diaphragms, cross-frames, floor beams, stringers (rolled beams) and laterals shall be certified in the category of Certified Bridge Fabricator – Intermediate Bridge (IBR), as a minimum.

4. Fabricators of bridge bearings, expansion joints, sign structures and other metal highway components as listed in the AISC standard shall hold certification under the AISC Certification Program – Bridge Component QMS Certification (CPT). As an alternative, fabricators of bridge bearing or expansion joints may hold certification under the Bridge QMS Certification in the category of Certified Bridge Fabricator – Intermediate Bridge (IBR).

Subsection 602.04.B, (pg. 429), 12-27-23; **Quality Assurance (QA) Shop Inspection;** Revise 1st & 3rd and Remove 2nd Paragraphs:

At least 6 weeks before starting shop fabrication, provide written notification to the Materials and Tests Division, with a copy to the Engineer, as to the location and schedule of the fabrication of structural steel, so that the Department may arrange for QA shop inspection.

Subsection 602.18.B, (pg. 460), 12-27-23; **Visual Inspection and Repair of Plate Cut Edges;** Revise Paragraph:

Visually inspect and repair plate cut edges in accordance with Article 5.2.6 of the AASHTO/AWS *Bridge Welding Code*, D1.5, current edition.

Subsection 602.19, (pg. 460, 461), 12-27-23; **Welds;** Revise Numbers 1 thru 9 and Add Table 602.19-1:

The following are revisions to the AASHTO/AWS *Bridge Welding Code*:

1. Add the following sentence to Article 8.1.1.1:

   After fabrication, Quality Control (QC) shall mark each piece (girders, beams, diaphragms, X-frames, bearings, etc.) with the fabricator's logo and the CWI Number of the QC Inspector accepting the piece. These stamps will signify that Quality Control (QC) has inspected the piece and that it meets the requirements of the plans and specifications.

2. Delete Article 8.1.3.1(3).

3. Delete Article 8.1.3.2.

4. Delete the last sentence in Article 8.1.3.4 and substitute the following:

   Only individuals certified for NDT Level II may perform nondestructive testing.

5. Delete 8.1.3.4(1) and 8.1.3.4(2).

6. Delete the period at the end of Article 8.6.1 and add the following:

   and access to all records necessary to verify conformance to plans and specifications.

7. Delete Article 8.7.1 and substitute the following:

   Complete joint penetration groove welds in main members, as identified in the contract documents shall be QC tested by nondestructive testing.

   Radiographic and ultrasonic testing shall both be performed using methods and frequencies required in the revised AWS Table 8.1 specified in Table 602.19-1.

   Longitudinal butt joints in beam or girder webs shall be 100% QC tested by nondestructive testing.

8. Add the following Article 8.22.4:

   Each Ultrasonic Unit shall be certified for general operational performance at a minimum time interval of 12 months with a method approved by the instrument manufacturer.

Table 602.19-1: NDT Methods and Frequency (revised AWS Table 8.1)

Weld Type	Joint Type	Process	Member Design Stress Type	NDT Method	Frequency
CJP groove welds	Butt joints other than in webs of flexural members	Other than ESW or EGW	Tension or reversal	RT and UT	100% of each joint
			Compression or shear	RT and UT	25% (See 8.7.4)
		ESW or EGW	Tension or reversal	RT and UT	100% of each joint
			Compression or shear	RT and UT	25% (See 8.7.4)
	Butt joints in webs of flexural members, transverse to the direction of bending stress	Other than ESW or EGW	Tension	RT and UT	1/6 of the web depth beginning at the tension flange or flanges for each joint
		ESW or EGW		RT and UT	
		Other than ESW or EGW	Compression	RT and UT	25% of the remainder of the web depth for each joint
		ESW or EGW		RT and UT	
	Butt joints in webs of flexural members, parallel to the direction of bending stress	Other than ESW or EGW	Shear	RT and UT	100% of each joint
		ESW or EGW		RT and UT	
	T- or corner joints	Any	Tension or reversal	UT	100% of each joint
			Compression or shear (including web to either flange)		25% (See 8.7.4)
PJP groove welds and fillet welds, Grade HPS 690W (HPS 100W)	Any	Any	Any	MT	100% of each joint
PJP groove welds and fillet welds, all other grades					10% (See 8.7.4)

Subsection 602.29, (pg. 465), 12-XX-23; **Annealing and Stress Relieving;** Revise 4th Paragraph:

Stress relieve members, such as bridge shoes, pedestals, or other parts that are built up by welding sections of plate together, according to Section 6.4 of AASHTO/AWS *Bridge Welding Code* D1.5 when required by the Contract.

Subsection 602.39, (pg. 470), 12-XX-23; **Erection, Shear Stud Connectors;** Revise 1st Paragraph:

After erecting the beams, attach the shear stud connectors in compliance with OSHA standards. Install the studs in the locations shown on the Plans. Install and test shear studs in accordance with the latest version of AASHTO/AWS D1.5, Chapter 9 Stud Welding. Clean the surface receiving the stud by shot blasting or grinding to a bright metal surface immediately before welding. Weld studs using automatically timed stud welding equipment only. At the beginning of each day or shift, each individual welder/operator and equipment must complete the Production Control/Pre-production Testing described in paragraph 9.7.1 of AASHTO/AWS D1.5. Only allow individuals, who repeatedly demonstrate satisfactory installation, to install the shear studs. The Contractor is responsible for the quality of all welds.

Subsection 603.01.B, (pg. 481), 12-26-24**; Certification Requirements;** Revise Subsection:

All contractors or subcontractors involved in field surface preparation or coating application shall be certified according to the Association for Materials Protection and Performance (AMPP) ~~Society for Protective Coatings (SSPC) Painting Contractor Certification Program (PCCP) or NACE International Institute Contractor Accreditation Program (NHCAP~~).

Contractors or subcontractors performing field coating application shall be certified according to ~~SSPC~~AMPP QP1, Field Application. ~~or equivalent, including NHCAP AS-1 Field.~~

Contractors and subcontractors performing field surface preparation of existing structures shall be certified according to ~~SSPC~~AMPP QP2, Field Removal of Hazardous Coatings. ~~or equivalent, including NHCAP AS-2 Hazard Waste Removal.~~

Ensure that all contractors and subcontractors that perform field surface preparation or field coating application are certified to the requirements of ~~SSPC~~AMPP; QP1 or QP2~~, or NHCAP; AS-1 Field or AS-2~~ before Contract award and remain certified for the duration of the Project. If a contractor's or subcontractor's certification expires or is suspended, do not allow that contractor to perform any work until the certification is reissued or reinstated. The Department will not consider any requests for time extensions for any delay in the completion of the Project due to an inactive certification and may apply liquidated damages. Provide a copy of the certifications to the Engineer before beginning work and notify the Engineer of all changes in certification status.

Subsection 603.06.A, (pg. 484), 12-26-24**; Schedule of Painting, New Structures;** Revise Table:

Table 603.06-1: System A – Inorganic/Organic Zinc

Paint System	Specification	Minimum Dry Film Thickness (mils)	Maximum Dry Film Thickness (mils)
Primer (shop coat)	Inorganic/Organic Zinc Silicate Paint, **910.03**	2.5	5.0
Intermediate Tie Coat	**910.03**, as modified below	2.0	5.0
Finish Coat (color coat)	Urethane Finish, **910.03** (match color shown on the Plans)	2.0	5.0

Subsection 604.03.A.1.a, (pg. 502), 12-19-22; **Design and Production Parameters;** Revise Table 604.03-1 and 4th paragraph:

Table 604.03-1: Composition of Various Classes of Concrete

Class of Concrete	Min 28-Day Compressive Strength (psi)	Min Cement Content (pound per cubic yard)	Maximum Water/Cement Ratio (pound/pound)	Air Content % (Design ± production tolerance)	Slump (inches)
A	3,000	564	0.45	6 ± 2	3 ± 1 (1)
D, DS (2, 3)	4,000	620	0.40	7 (3)	8 max
L (3, 4)	4,000	620	0.40	7 (3)	8 max
S (Seal)	3,000	682	0.47	6 ± 2	6 ± 2
X (5)					

(1) For slip forming, the slump shall range from 0 to 3 inches.

(2) Use Class D concrete in all bridge decks except box and slab type structures unless otherwise shown on the Plans. Use Class DS concrete in bridge decks with polish-resistant aggregate described in **903.03** and **903.24**.

(3) Design Class D, Class DS, and Class L concrete at 7% air content. Acceptance range for pumping and other methods of placement is 4.5-7.5%. Sampling will be at the truck chute.

(4) The unit weight of air dried Class L concrete (lightweight concrete) shall not exceed 115 pounds per cubic foot as determined according to ASTM C567.

(5) Plan specific requirements

Include chemical admixtures in the concrete mixture based on the ambient air temperature and expected weather conditions.

If using chemical admixtures, the allowable slump shall be a maximum of 8 inches. Do not exceed the water cement ratio.

Subsection 604.03.A.1.a, (pg. 502), 12-26-24; **Design and Production Parameters;** Revise Table 604.03-1 and Add Tables 604.03-1(a) and 604.03-1(b) after the last paragraph:

Table 604.03-1: Composition of Various Classes of Concrete

Class of Concrete	Min 28-Day Compressive Strength (psi)	Min Cement Content (pound per cubic yard)	Maximum Water/Cement Ratio (pound/pound)	Air Content % (Design ± production tolerance)	Slump (inches)
A	3,000	564	0.45	6 ± 2	3 ± 1 (1)
D, DS (2, 3, 6, 7)	4,000	620	0.40	7 (3)	8 max
L (3, 4, 6)	4,000	620	0.40	7 (3)	8 max
S (Seal)	3,000	682	0.47	6 ± 2	6 ± 2
X (5)					

(1) For slip forming, the slump shall range from 0 to 3 inches.

(2) Use Class D concrete in all bridge decks except box and slab type structures unless otherwise shown on the Plans. Use Class DS concrete in bridge decks with polish-resistant aggregate described in **903.03** and **903.24**.

(3) Design Class D, Class DS, and Class L concrete at 7% air content. Acceptance range for pumping and other methods of placement is 4.5-7.5%. Sampling will be at the truck chute.

(4) The unit weight of air dried Class L concrete (lightweight concrete) shall not exceed 115 pounds per cubic foot as determined according to ASTM C567.

(5) Plan specific requirements

(6) Class D, Class DS and Class L require the surface resistivity in accordance with AASHTO T 358 for design approval, acceptance, and verification requirements in accordance with Table 604.03-1(a) and Table 604.03-1(b).

(7) Class D and Class DS shall have a minimum supplementary cementitious material(s) replacement of 25% and in accordance with Table 604.03-4.

Table 604.03-1(a): Surface Resistivity Requirements for Mix Design Approval

Chloride Ion Penetration	Apparent Surface Resistivity[a] 4 by 8 in. (100 by 200 mm) Cylindrical Specimens (kΩ·cm) a = 3.8 cm	Action
High	< 12	Not approved; must redesign
Moderate	12 - 36	Approved with project verification
Low	≥ 37	Fully approved

[a] Wenner probe tip spacing; determined from 28-day acceptance cylinders

Table 604.03-1(b): Surface Resistivity Requirements for Project Acceptance and Verification

Chloride Ion Penetration	Apparent Surface Resistivity[a] 4 by 8 in. (100 by 200 mm) Cylindrical Specimens (kΩ·cm) *a* = 3.8 cm	Action
High	< 12	Redesign before next pour
Moderate	12 - 20	Monitor results
Low	≥ 21	Mix Design is verified

[a] Wenner probe tip spacing; determined from 28-day acceptance cylinders

Subsection 604.03.A.1.d, (pg. 504), 12-19-22; Add Subsection d:

d. **Performance Engineered Mixtures (PEM) Design and Production Parameters**

Proportion the concrete based on a water-cement ratio that does not exceed the maximum shown in Table 604.03-3. The fine aggregate shall not exceed 50% by volume calculation of the total aggregate volume. The volume of paste shall not exceed 25%. The Contractor may elect to use PEM as an alternate/option in replacement of Class A concrete.

Document mixture adjustments, for moisture corrections, on the daily concrete report. Ensure that the adjusted mix complies with all the performance criteria specified in Table 604.03-3.

Table 604.03-3: Composition of Performance Engineered Concrete

Class of Concrete	Min 28-Day Compressive Strength (psi)	Min Cement Content (pound per cubic yard)	Maximum Water/Cement Ratio (pound/pound)	Air Content % (Design ± production tolerance)
PEM (1,2,3,4,5)	3,000(1)	-	0.45	6 ± 2

(1) Or as shown on the Plans or approved shop drawings.
(2) Air Content must be accompanied with the Super Air Meter (SAM) number AASHTO T 395 for data collection only.
(3) Resistance of Concrete to Rapid Freezing and Thawing AASHTO T 161 for data collection only.
(4) Surface Resistivity Indication of Concrete's Ability to Resist Chloride Ion Penetration AASHTO T 358 for data collection only.
(5) Determining the Reactivity of Concrete Aggregates and Selecting Appropriate Measures for Preventing Deleterious Expansion in New Concrete Construction ASTM R80 for data collection only.

All Standards of Practice for Developing Performance Engineered Concrete Pavement Mixtures AASHTO R 101 are for data collection only.

Include chemical admixtures in the PEM mixture based on the ambient air temperature and expected weather conditions. Dosage rates for any admixtures incorporated into the concrete shall be stated during the mix design submittal process. All admixtures shall be compatible and incorporated into the concrete in accordance with the manufacturer's recommendations. Concrete mixtures utilizing multiple admixture manufacturers shall prove compatibility in accordance with the Departmental procedures.

Subsection 604.03.A.1.d, (pg. 504), 12-26-24; **Performance Engineered Mixtures (PEM) Design and Production Parameters;** Revise Table 604.03-3:

Table 604.03-3: Composition of Performance Engineered Concrete

Class of Concrete	Min 28-Day Compressive Strength (psi)	Min Cement Content (pound per cubic yard)	Maximum Water/Cement Ratio (pound/pound)	Air Content % (Design ± production tolerance)
PEM (1,2,3,4,5)	3,000(1)	-	0.45	6 ± 2

(1) Or as shown on the Plans or approved shop drawings.
(2) Air Content must be accompanied with the Super Air Meter (SAM) number AASHTO T 395 for design approval.
(3) Resistance of Concrete to Rapid Freezing and Thawing AASHTO T 161 for data collection only.
(4) Surface Resistivity Indication of Concrete's Ability to Resist Chloride Ion Penetration AASHTO T 358 for design approval, acceptance, and verification requirements in accordance with Table 604.03-1(a) and Table 604.03-1(b).
(5) Determining the Reactivity of Concrete Aggregates and Selecting Appropriate Measures for Preventing Deleterious Expansion in New Concrete Construction ASTM R80 for data collection only.

All Standards of Practice for Developing Performance Engineered Concrete Pavement Mixtures AASHTO R 101 are for data collection only.

Subsection 604.03.A.2, (pg. 504-505), 12-19-22; **Mix Design Submittal;** Revise 1st and 3rd Paragraphs, and Add 6th Paragraph:

2. **Mix Design Submittal.** Submit, for approval, the proposed design in accordance with Departmental procedures at least 14 days prior to use. Develop the design using saturated surface dry aggregate weights. The design shall be prepared in an approved testing laboratory by a TDOT Certified Concrete Mix Design Technician. The TDOT Certified Concrete Mix Design Technician shall certify that the information contained on the design submittal is correct and is the result of information gained from the actual trial batch. Build trial batches for design no more than 90 days before submitting the design. The trial batch shall produce an average compressive strength to

indicate that the specified 28-day strength can be obtained in the field. Make all strength determinations using equipment meeting the requirements of, and in the manner prescribed by, AASHTO T 22. The design shall provide concrete of the strength specified in all applicable Special Provisions, Plans, and Specifications. The approved mix design will expire at the end of each calendar year or if it does not meet the minimum 28-day strength requirements. Assume responsibility for all costs of concrete design, preparation, and submittal.

Self-consolidating concrete (Classes SCC, SH-SCC, and P-SCC) shall be verified prior to placement either at the ready mix, precast, or prestressed facility. The concrete producer shall notify Regional Materials and Tests a minimum of 1 business day prior to performing a trial batch verification of the submitted design. The trial batch will ensure that all batched quantities and target admixture dosage rates are acceptable and meet specification prior to design approval. All quantities and identified admixture target dosage rates shall meet the tolerances specified in **604.11**.

Performance engineered concrete (Class PEM) shall be verified prior to placement. The concrete producer shall perform trial batching in the presence of a Headquarters Materials and Tests representative. All quantities and admixture dosage rates shall meet the tolerances specified in **604.11**. Gradations shall be submitted with each request.

Subsection 604.03.A.2, (pg. 505), 1-8-25; **Mix Design Submittal;** Add 7th Paragraph:

For Class D, Class DS, Class PEM, and Class L concrete mixtures, surface resistivity values shall be submitted in accordance with Table 604.03-1(a) and Table 604.03-1(b).

Subsection 604.03.A.3, (pg. 506), 12-19-22; **Partial Cement Replacement with Fly Ash or Slag Cement;** Revise 3rd Paragraph, Table 604.03-03, and 4th Paragraph:

When designing Portland cement concrete with Type I or Type IL cement modified by the addition of fly ash and/or slag cement, meet the maximum cement replacement rates (by weight) and minimum substitution ratios (by weight) specified in Table 604.03-4 for the applicable type of modifier.

Table 604.03-4: Type I or Type IL Cement Modified by Fly Ash or Slag Cement

Modifier	Maximum Cement Replacement Rate % (by weight)	Minimum Modifier Cement Substitution Rates (by weight)
Slag Cement (Grade 100 or 120)	35.0	1:1
Class “F” Fly Ash	25.0	1:1
Class “C” Fly Ash	25.0	1:1

The Contractor may use ternary cementitious mixtures (mixtures with Portland cement, slag cement, and fly ash) for Class A, Class D, Class DS, Class PEM concrete provided that the minimum Portland cement content is 50%. The maximum amount of fly ash substitution in a ternary cementitious mixture shall be 20%. The Department will allow Type IS cement with ternary cementitious mixtures. When using a Type IS cement, do not use any additional slag cement as a partial replacement for the hydraulic cement. The Department will allow a maximum of 20% fly ash as a partial hydraulic cement replacement in Class A concrete using only Type IS cement.

Subsection 604.03.B, (pg. 507-510), 12-19-22; **Quality Control and Acceptance of Concrete;** Revise 2nd and 5th Paragraphs, Add Sentence after 5th Paragraph, Revise Nos. 7,8,10,11, and 9th Paragraph:

The minimum size of a batch shall be 2.5 cubic yards. If less than 2.5 cubic yards is needed, the concrete must be provided by a Volumetric Continuous Mixer as specified in **604.04.C.**

The concrete producer shall develop for the Engineer's approval and maintain at the plant a plant-specific Process Control Plan that shall apply to all Department contracts for the calendar year. Communicate all changes made to the Process Control Plan during the year to the Regional Materials and Tests Supervisor. Develop for the Engineer's approval a placement site Process Control Plan stating the procedures for sampling, testing, and inspection of the concrete. Maintain a record of all tests and inspections performed at the facility and placement site. Provide these documents to the Engineer upon completion of the Project for inclusion in the Project records. Provide a binder of current records in accordance with Departmental procedures.

No water shall be added in the field for Class PEM concrete.

7. Conduct slump AASHTO T 119 or slump flow ASTM C1611 and air tests AASHTO T 152. For Class PEM provide the Super Air Meter (SAM) number for informational purposes only.

8. Conduct yield tests AASHTO T 121. If yield varies more than plus or minus 2% from that shown on the design, stop all batching operations until the problem has been identified and corrected or a new concrete design has been obtained. Additionally for Class PEM only, determine Unit Weight by AASHTO T 121.

10. Conduct tests for concrete and ambient air temperatures AASHTO T 309.

11. Provide a daily report to the Engineer that identifies the date, Contract and Project, Item number(s), batch weights, aggregate gradations, moisture corrections, admixtures, slump, air content, temperatures, and similar pertinent information.

The Department or its representative will be responsible for performing all acceptance tests. A TDOT Concrete Field-Testing Technician or ACI equivalent will sample and test in accordance with Departmental 604.04 510 procedures. The Department will ensure the Contractors initial curing conditions are properly maintained during the initial curing period as specified in **722.09** and all acceptance cylinders are transported according to AASHTO R 100.

Subsection 604.03.B, (pg. 507-510), 1-8-25; **Quality Control and Acceptance of Concrete;** Revise 5th and 6th Paragraphs, Revise No. 7, and 10th Paragraph:

The concrete producer shall develop for the Engineer's approval and maintain at the plant a plant-specific Process Control Plan that shall apply to all Department contracts for the calendar year. Communicate all changes made to the Process Control Plan during the year to the regional Materials and Tests Field Services Team Lead. Develop for the Engineer's approval a placement site Process Control Plan stating the procedures for sampling, testing, and inspection of the concrete. Maintain a record of all tests and inspections performed at the facility and placement site. Provide these documents to the Engineer upon completion of the Project for inclusion in the Project records. Provide a binder of current records in accordance with Departmental procedures.

No water shall be added in the field for Class PEM concrete above the approved water-cement ratio submitted and approved during trial batching.

7. Conduct slump AASHTO T 119 or slump flow ASTM C1611 and air tests AASHTO T 152. For Class D, Class DS, Class PEM, and Class L provide the Sequential Air Meter (SAM) AASHTO T 395 number for design approval and Surface Resistivity AASHTO T 358 for design approval, acceptance, and verification requirements in accordance with Table 604.03-1(a) and Table 604.03-1(b).

The Department or its representative will be responsible for performing all acceptance and verification tests. A TDOT Concrete Field-Testing Technician or ACI equivalent will sample and test in accordance with Departmental 604.04-~~510~~ procedures. The Department will ensure the Contractors initial curing conditions are properly maintained during the initial curing period as specified in **722.09** and all acceptance cylinders are transported according to AASHTO R 100.

Subsection 604.04.A.1, (pg. 511), 12-19-22; **Batching Plant, Multi-Aggregate Feed System, and Equipment, General;** Revise 2nd Paragraph:

All producers of concrete shall be on the Department's Producer List.

Subsection 604.04.B.3, (pg. 513), 12-19-22; **Truck Mixers and Truck Agitators;** Revise 1st Paragraph:

Ensure that truck mixers used for mixing and hauling concrete, as well as the truck agitators used for hauling central-mixed concrete, meet all the applicable requirements specified in **604.04.B.1**. Truck mixers shall have a manufacturer's plate indicating the various uses for which the equipment is designed, the gross volume of the drum, and the minimum and maximum speed of rotation of the drum or blades for charging, mixing and agitating. Equip truck mixers with an approved device for recording the number of revolutions of the drum or blades.

Subsection 604.15.A, (pg. 532), 12-19-22; **Compressive Strength Tests of Concrete, General;** Revise 2nd Paragraph:

The frequency of testing for compressive strength to determine when forms may be removed, or when a structure may be put into service, shall be as requested by the Contractor or as deemed necessary by the Engineer in accordance with **604.15.C** or **604.15.D**.

Subsection 604.15.B, (pg. 532-533), 12-19-22; **Concrete Acceptance Cylinders;** Revise 1st, Remove 2nd and Revise 3rd, 5th, and 6th Paragraphs:

The Department will test the specimens for compressive strength according to AASHTO T 22. Provide the necessary concrete for making test specimens and adequate curing and storage facilities specified in **722.09** at no additional cost to the Department. Provide hourly temperature data for each day the specimens were kept in the initial curing environment.

~~Concrete cylinders submitted for testing beyond 28 days shall comply with the design strength requirements specified in **604.03** or the Plans.~~

If the acceptance cylinders fail to meet the specified strengths, the Contractor must provide QC data from the batching operation for the suspect concrete delivered and a letter of intent to core the suspect location. When these requirements are met, the Contractor may then elect to drill a minimum of two or maximum of three concrete core samples per set of cylinders from the hardened concrete. The cores shall be obtained in accordance with Departmental procedures. Obtaining the concrete cores and repairing the concrete core holes shall be at no cost to the Department.

The Engineer will not accept cores submitted for testing beyond 56 days.

The average compressive strength of all the cores taken to represent the failing concrete acceptance cylinders will be considered to be the acceptance strength of record for the in-place concrete. Any core that fails to meet the standard for cores in the Departmental procedures will be discarded untested and not considered in the average compressive strength. In accordance with **604.31**, the Engineer will accept at a reduced pay concrete that meets the required strengths specified in **604.03** or the Plans for the respective class.

Subsection 604.15.B, (pg. 532-533), 1-8-25; **Concrete Acceptance Cylinders;** Revise 1st and Add 6th Paragraph:

The Department will test the specimens for compressive strength according to AASHTO T 22 and surface resistivity for Class D, Class DS, Class PEM, and Class L according to AASHTO T 358 and Table 604.03-1(b). Provide the necessary concrete for making test specimens and adequate curing and storage facilities specified in **722.09** at no additional cost to the Department. Provide hourly temperature data for each day the specimens were kept in the initial curing environment.

If acceptance cylinders fail to meet the specified surface resistivity values for Table 604.03-1(b) for Class D, Class DS, Class PEM, and Class L concrete mixtures, the entire surface shall be sealed with an approved penetrating sealer listed on the Department's Qualified Producer List at no additional cost to the Department.

Subsection 604.15.C, (pg. 534), 12-19-22; **Compressive Strength Tests of Concrete, Early Break Cylinders;** Revise 1st Paragraph**:**

Make and cure all test specimens according to AASHTO R 100, and the applicable procedures therein defined for Field Cured Specimens, unless otherwise specified by the Engineer. The Department will test the specimens for compressive strength according to AASHTO T 22. Provide the necessary concrete for making test specimens at no additional charge to the Department.

Subsection 604.15.D, (pg. 534), 12-19-22; **Compressive Strength Tests of Concrete, Maturity Method;** Add Subsection D:

D. Maturity Method

Strength of concrete in-place may be estimated by the Standard Practice for Estimating Concrete Strength by the Maturity Method AASHTO T 325 and Departmental procedures for critical activities. (open pavement to traffic, removing forms, post tension, shipping, cold weather).
The Department will break a set of cylinders made from the pour in question to verify the strength-maturity relationship, the concrete will be accepted on the basis of the 28 day strength as defined by the strength-maturity relationship. If the cylinders break within 10% of the estimated strength based on the strength-maturity relationship, the concrete will be accepted on the basis of the 28 day strength as defined by the strength-maturity relationship. If the cylinders break outside of the 10% tolerance, the 28 day cylinders will be broken and the concrete will be accepted per **604.15.B**.

Subsection 604.16.E, (pg. 539), 12-27-23; **Placing Concrete, Joints;** Remove 4th and Revise 5th Paragraphs:

For box culvert construction, place the concrete in the walls and allow to set at least 4 hours before constructing the top slab.

Subsection 604.19, (pg. 541), 12-19-22; **Removal of Forms and Falsework;** Revise 3rd Paragraph:

Release and remove falsework and supports under concrete structures only when the following conditions are met:

1. Representative specimens of the concrete, made and cured in accordance with **604.15.C**, attain a compressive strength of 3,000 pounds per square inch or when Strength Maturity relationship indicates the concrete has achieved 3000 pounds per square inch and has been verified per **604.15.D**.

2. The concrete has been in place a minimum of 7 days, not counting days of 24 hours each in which the temperature falls below 40 °F, or 21 calendar days, whichever occurs first.

Subsection 604.27.C, (pg. 551), 12-27-23; **Pay Factor and Required Corrective Action;** Revise 3rd Paragraph:

A grinding strategy plan is required before any corrective action begins. Software such as ProVAL is required to generate a grinding plan. Submit a copy of the grinding plan for approval to the Engineer at least 5 days prior to starting any work. The grinding plan must include existing profile, proposed profile, start and stop grinding locations, length of proposed grinding, and direction of grinding. Perform corrective action, including grinding of bridge decks and approach slabs, removal of pavement tie-ins, resurfacing, and application of sealants, at no additional cost to the Department.

Subsection 604.31, (pg. 557), 12-19-22; **Basis of Payment;** Revise 6th & 7th Paragraphs and Revise Equation:

Where concrete mixture does not meet the specified strength but is allowed to be included in the permanent construction as specified in **604.20** or the acceptance strength of record fails to meet the strength specified in **604.15**, the Department will use the following equation to determine the price deduction for the invoiced price of the defective concrete mixture.

$$PD = (3 \times Ds) \text{ x } IP \text{ x } Q$$

Where:

PD = Price Deduction by the Dollar

$$Ds = \left[\frac{(\text{Specified Strength-Actual Strength})}{\text{Specified Strength}}\right]$$

IP = Invoice Price by the Cubic Yard

Q = Quantity of Defective Concrete by the Cubic Yard

The price deduction shall only apply to the invoiced delivery cost of the defective concrete mixture. The deduction shall not apply to incidental items associated with the bid items such as labor, reinforcing steel, etc. Supply the Engineer with a certified invoice from the producer for the defective concrete mixture. The certified invoice will be for the cost of the concrete mixture with taxes and fees delivered to the project.

Subsection 607.02.B, (pg. 579), 12-15-21; **Materials, Pipe Culverts, Cross Drains, Side Drains, & Storm Drains;** Remove 1st Sentence:

B. Pipe Culverts, Cross Drains, Side Drains, & Storm Drains

~~Where Pipe Culverts (Cross Drains & Median Drains) are specified, provide them in accordance with the following:~~

Subsection 607.07, (pg. 582), 12-15-21; **Joining Pipe:** Revise 5th paragraph.

HDPE, PP, SRTRP, and PVC pipe shall be joined in accordance with ASTM D3212 and meet the performance requirements for water-tight. Install joints so that the connection of pipe sections, for a continuous line, will be free from irregularities in the flow line.

Subsection 615.09, (pg. 624), 12-19-22; **Proportioning and Mixing of Concrete;** Revise 5th Paragraph:

Make concrete test specimens for Class P and Class P-SCC, in accordance with AASHTO R 100 and ASTM C1758 respectively, to determine the adequacy of the concrete design and the minimum time at which the stress may be applied to the concrete. Cure the test specimens used to determine the time at which stress may be applied in the same manner and under the same conditions as the bridge members. The initial curing of specimens to determine the design strength of the concrete shall be specified above with additional curing water, as provided in AASHTO R 100. The compressive strength of the concrete will be estimated using the Maturity Method in accordance with **604.15.D.** The frequency of sampling and testing will be in accordance with Departmental procedures.

Subsection 619.04.A, (pg. 652-653), 12-15-21; **Volumetric Continuous Mixers;** Revise No. 3 & Ticket List:

3. The volumetric mixing plant shall be operated and calibrated by a Volumetric Mixer Operator with a TDOT Concrete Field Testing Technician Certification or equivalent. In the presence of the Engineer, perform the calibration of gate settings according to the manufacturer's recommendations for the mix design to be used before starting work. The calibration procedure shall account for the moisture content of the aggregates. The yield shall be maintained within a tolerance of plus or minus 1% and verified using a minimum 2 cubic feet container every 50 cubic yards. Recalibrations will be necessary when indicated by the yield checks, and at any other times the Engineer deems necessary to ensure proper proportioning of the materials.

Each load of concrete produced by a volumetric continuous mixing plant shall be accompanied by a Concrete Delivery Ticket. The ticket shall include as a minimum the following:

a. Date
b. Contract number
c. County
d. Class of concrete
e. Concrete design number
f. Number of cubic yards
g. Load number
h. Truck number
i. Maximum water allowed by design
j. Total water added
k. Water-cementitious materials ratio
l. Time loaded
m. Time discharged
n. Signature of producer's Volumetric Mixer Operator

Subsection 619.04.A, (pg. 653), 12-19-22; **Volumetric Continuous Mixers;** Revise Ticket List:

Each load of concrete produced by a volumetric continuous mixing plant shall be accompanied by a Concrete Delivery Ticket. The ticket shall include as a minimum the following:

a. Date
b. Contract number
c. County
d. Class of concrete
e. Concrete design number
f. Number of cubic yards
g. Load number
h. Truck number
i. Maximum water allowed by design
j. Total water added
k. Water-cementitious materials ratio

l. Time discharged
m. Signature of producer's Volumetric Mixer Operator

Subsection 622.03.A, (pg. 665), 12-19-22; **Proportioning and Quality Assurance of Shotcrete, Proportioning;** Revise 3rd Paragraph:

Shotcrete shall meet the performance requirements specified in Table 622.03-1 and meet the requirements for cement replacement in **604.03.A.3**.

Subsection 623.02.C.1, (pg. 673), 12-15-21; **Modular Roadway Expansion Joints, Fabrication and Construction;** Revise No. 1:

1. Construct the expansion joint systems as shown on the shop drawings. Meet the tolerance requirements included in AASHTO specifications. Perform all welding according to AWS specifications and by certified welders only. Ensure that fabricators are certified under the AISC Certification Program – Bridge Component QMS Certification (CPT). As an alternative, fabricators of bridge bearing or expansion joints may hold certification under the Bridge QMS Certification in the category of Certified Bridge Fabricator - Intermediate Bridge (IBR).

Subsection 623.03.C.2, (pg. 676, 677), 12-15-21; **Strip Seal Expansion Joints, Fabrication and Construction;** Revise No. 2:

2. Shop drawings shall also supply information regarding material specifications, geometry, a table of variable temperature and dimensions, and a bill of material. The maximum joint opening shall be 4 inches. Construct the expansion joint systems in accordance with the details shown on the shop drawings. Tolerance requirements shall be in accordance with AASHTO Specifications. Perform all welding in accordance with AWS specifications and by certified welders only. Ensure that fabricators are certified under the AISC Certification Program – Bridge Component QMS Certification (CPT). As an alternative, fabricators of bridge bearing or expansion joints may hold certification under the Bridge QMS Certification in the category of Certified Bridge Fabricator - Intermediate Bridge (IBR).