NTPEP Committee Work Plan for

Evaluation of Reinforcing Steel Manufacturers

NTPEP Designation: REBAR-18-01
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1. SCOPE

1.1 The National Transportation Product Evaluation Program (NTPEP) serves the member departments of the American Association of State Highway and Transportation Officials (AASHTO).

1.2 This NTPEP Committee Work Plan (hereafter referred to as the “Work Plan”) covers the product-specific criteria for the NTPEP evaluation of Reinforcing Steel Manufacturers. This work plan is intended to be utilized with NTPEP document SP01, Qualification of Highway Product Manufacturers Through the Use of NTPEP Audits, to provide a comprehensive audit program for reinforcing steel.

1.3 The purpose of the program is to establish a list of Manufacturers and products that comply with the quality control and product testing requirements of this program. AASHTO member departments can then use this information in their quality assurance program for Manufacturer/product acceptance. This may include utilizing this information to establish a qualified Manufacturer list, a qualified products list, or both. By participating in this program, the Manufacturer agrees to produce product that meets or exceeds the requirements in the applicable AASHTO/ASTM Designation Standard(s) and follow the minimum quality control provisions of their Quality Program.

1.4 Testing of the Manufacturer’s product(s) against the applicable standard(s) and auditing the Manufacturer’s in-plant quality control facilities and procedures are included in this program. The Manufacturer agrees that NTPEP may use the test results and audit reports along with other relevant information for review and verification of compliance with this NTPEP program and the applicable AASHTO/ASTM Designation Standard(s).

1.5 The Auditor (or Designee) shall have free entry, at all times, while work associated with the audit is being performed and to all parts of the Manufacturer’s works that concern the manufacture of the material. The Manufacturer shall afford the Auditor (or Designee) all reasonable facilities to satisfy the Auditor (or Designee) that the material is being furnished in accordance with this Work Plan. All tests (for the Manufacturer tested samples) and audit review shall be made at the place of manufacture, unless otherwise specified, and will be so conducted as not to interfere unnecessarily with the operation of the works.

1.6 This work plan may involve hazardous materials, operations, and equipment. It does not purport to address all safety problems associated with its use. It is the responsibility of the user of this work plan to establish the appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. REFERENCED DOCUMENTS

2.1 AASHTO Standards:
• M 336/M 336, Standard Specification for Steel Wire and Welded Wire, Plain and Deformed, for Concrete Reinforcement
• M 203M/M203, Steel Strand, Uncoated Seven-Wire for Concrete Reinforcement
• M 221M/M 221, Steel Welded Wire Reinforcement, Deformed, for Concrete
• M 225M/M 225, Steel Wire, Deformed, for Concrete Reinforcement
• M 227M/M 227, Steel Bars, Carbon, Merchant Quality, Mechanical Properties
• M 322M/M 322, Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
• T 244, Mechanical Testing of Steel Products

2.2 ASTM Standards:
• A370, Standard Test Methods and Definitions for Mechanical Testing of Steel Products
• A416, Standard Specification for Low-Relaxation, Seven-Wire Steel Strand for Prestressed Concrete
• A 615/A615M, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
• A 706/A 706M, Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
• A 995/A 995M, Standard Specification for Deformed and Plain Stainless-Steel Bars for Concrete Reinforcement
• A 996/A 996M, Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
• A 1064/A 1064M, Standard Specification for Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

2.3 NTPEP Documents:
• SP01, Qualification of Highway Product Manufacturers Through the Use of NTPEP Audits

3. TERMINOLOGY


3.2 Auditor – A NTPEP representative who reviews submittals, coordinates auditing and testing, and reports audit findings.

3.3 Audit – Documented reviews of a Manufacturer’s plant and associated test facilities by a NTPEP Auditor and any AASHTO member department co-auditor that wishes to participate.

3.4 Comparison Testing of Products– Sample(s) selected from the manufacturing line or stockyard to be tested by the Manufacturer and the NTPEP designated laboratory. The results from both testing locations are then shown for comparison.

NOTE 1: The results of testing are uploaded to NTPEP’s DataMine website for viewing. Consult the “Standard Usage Guide for NTPEP Audit Programs” for more information regarding data usage.
3.5 **Manufacturer** – An individual producer of steel bar, wire or welded wire reinforcement. The corporate name (actual location) will be included in the NTPEP program.

3.6 **Mill Test Report (MTR)** – Document provided by the Manufacturer certifying the steel’s chemical and physical properties.

3.7 **NTPEP** – The entity responsible for overseeing all areas of the program are being run according to what is noted in this work plan as well as assisting in the resolution of any conflicts which may arise.

3.8 **NTPEP Designated Laboratory** – A laboratory qualified by NTPEP to perform the specific tests as outlined in the Standard Practice and has an onsite qualified technician(s) and equipment necessary to perform the tests per AASHTO/ASTM Standard Specifications.

3.9 **Independent Laboratory** – An outside laboratory that performs raw material finished product tests for the Manufacturer. NTPEP reserves the right to audit the independent laboratory for the tests that are being performed for the Manufacturer.

3.10 **Quality Management System (QMS)** – The documented process used by the Manufacturer for quality control.

3.11 **Reinforcing Steel** – Bar, wire or welded wire steel reinforcement produced in accordance with and meeting the requirements of one or more AASHTO/ASTM Specifications.

### 4. ADDITIONAL QUALITY MANAGEMENT SYSTEM (QMS) REQUIREMENTS

4.1 **Handling Raw Materials for DOT Products** - The QMS will include a written procedure for documenting traceability of steel and iron materials to comply with “Buy America” requirements. This procedure will indicate the responsible individuals and how the steel (either foreign or domestic) is identified and tracked through each manufacturing step. The “Buy America” requirement for reinforcing steel begins with the melting process (i.e. melting of the scrap into the finished billet/bloom) through the finished product. In addition, the QMS will include how a product (either foreign or domestic) not manufactured by the particular location is identified, tracked and documented (on the MTR) for the manufacturing steps performed by the Manufacturer.

4.2 **Labeling and Storage of Finished Product** - The QMS will include a written procedure describing how finished product is labeled, packaged and stored. It will also include an explanation of the mill marks used for deformed reinforcing steel product, as required by the governing AASHTO/ASTM product specification(s).

4.3 The QMS shall include a written procedure for documenting traceability of steel and iron materials to comply with “Buy America” requirements.

4.3.1 This procedure shall indicate the individual(s) responsible for implementing and monitoring this procedure and how the steel items are identified and tracked through each manufacturing step. In addition, the QMS will include how foreign steel products (if used) are identified, tracked and documented for the manufacturing steps performed by the Manufacturer.

4.3.2 Additionally, the procedure shall include a description of the processes and documentation utilized to prove compliance of the furnished products.
5. **NTPEP ON-SITE AUDITS**

5.1 *Quality Control Testing Evaluation* - Each Manufacturer will be asked to demonstrate the quality control tests they perform as stated in their QMS. While performing each test, the most current AASHTO or ASTM test methods will be referenced. The equipment used for each test will be examined and applicable records will be reviewed.

5.2 *Comparison Testing of Products* – The auditor(s) will select samples of reinforcing steel available since the time of the last audit for testing in accordance with SP01, Section 8, “Annual Product Conformance Testing”. The auditor(s) may select reinforcing steel from the production line or from the yard. All sampling and testing will be in accordance with the applicable AASHTO/ASTM Designation Standard(s). The samples will be for testing at the Manufacturer’s testing facility and the NTPEP Designated Laboratory

*Note 2* - If major deficiencies are noted during an on-site audit, a follow-up audit will be required to be completed.

6. **ANNUAL PRODUCT CONFORMANCE TESTING**

6.1 The Auditor, or their representative, will select samples during each annual Manufacturer audit for testing by the Manufacturer and the NTPEP Designated Laboratory.

6.1.1 Samples:

6.1.1.1 **Reinforcing Bars or Wire Samples**: At a minimum, 10 separate heats (or lots), spanning the sizes, grades, and product specifications produced, are selected, cut into test specimens and tested for:
- Bend (ASTM A 615/A 706/A 1064)
- Tensile/Yield/Elongation (ASTM A 615/A 706/A 1064)
- Unit Weight and Deformations (*Deformed Samples Only*) (ASTM A 615/A 706/A 1064)
- Diameter Verification (*Plain Samples Only*) (ASTM A 615/A 706/A 1064)

6.1.1.2 **Welded Wire Reinforcement Samples**: At a minimum, 10 separate lots, spanning the styles, sizes, and grades produced are selected, cut into test specimens and tested for:
- Weld Shear (4 wires) (ASTM A 1064)
- Longitudinal Tensile (4 wires across weld) (ASTM A 1064)
- Longitudinal Bend Test (4 wires) (ASTM A 1064)
- Transverse Tensile (2 wires across weld) (ASTM A 1064)
- Transverse Bend Test (2 wires) (ASTM A 1064)
- Unit Weight (*all Deformed Samples*) (ASTM A 1064)
- Deformations and Yield (*demonstration of test only*) (ASTM A 1064)

6.1.1.3 **Seven-Wire Strand Samples**: At a minimum, 10 separate heats (or lots), spanning the sizes and grades produced, are selected, cut into test specimens and tested for:
- Tensile/Yield (ASTM A 416)
- Modulus of Elasticity (ASTM A 416)
- Diameter Verification (ASTM A 416)

6.1.1.4 **Stainless-Steel Reinforcing Bars Samples**: At a minimum, a total of 10 separate heats (or lots), spanning the sizes, grades & alloys produced, are selected, cut into test specimens and tested for:
- Bend (ASTM A995)
- Tensile/Yield/Elongation (ASTM A995)
- Unit Weight and Deformations (*Deformed Samples Only*) (ASTM A995)
- Diameter Verification (*Plain Samples Only*) (ASTM A995)
– Hardness, Corrosion Resistance & Magnetic Properties \( (when \ requested) \) \( (\text{ ASTM A995}) \)

6.1.1.5 The Auditor will instruct the Manufacturer on the proper labeling of the samples. The NTPEP Designated Laboratory test specimens will be located adjacent to the (Manufacturer) test specimens and from the same heats/lots. The Manufacturer will send (freight paid by the Manufacturer) these test specimens to the NTPEP Designated Laboratory for testing.

6.1.2 Retest Samples:

6.1.2.1 Additional material will be obtained from the same heat/lot and kept at the Manufacturer’s location in the event the Manufacturer or NTPEP Designated Laboratory tested specimens fail or are invalid. This material will be tested as directed by NTPEP and may be discarded only after being notified that the audit is complete.

6.1.2.2 Testing for product conformance performed by an independent laboratory will be witnessed as part of the audit. All conformance testing will be in accordance with this Section.

6.1.2.3 If during the testing portion of the audit or during NTPEP Designated Laboratory testing at least one tested sample fails to meet specification requirements or when the Manufacturer is found during an audit to have neglected one or more aspects of the governing QMS during manufacturing, the nonconformance will be addressed as outlined in SP01

6.1.3 Shipment of Samples:

6.1.3.1 The Manufacturer is responsible for the shipment of the reinforcing steel samples. Proper care (packaging, identification, tracking, etc.) to limit damage or loss of the sample shipment is the responsibility of the Manufacturer. Loss or damage of the samples will require re-sampling and testing at the Manufacturer’s expense.

6.1.4 Testing of Samples:

6.1.4.1 The Manufacturer will complete all in-house testing on the remaining pieces for bar, strand or welded wire reinforcement and send test results to AASHTO and the NTPEP Designated Laboratory within 15 business days of the completion of their audit.

7. KEYWORDS

7.1 NTPEP; reinforcing steel; steel; stainless-steel; Manufacturer