
Standard Practice for NTPEP Evaluation of Highway Guardrail Components

AASHTO Designation: [GRL-01-15]



**American Association of State Highway and Transportation Officials
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1. SCOPE

- 1.1 This standard practice covers the requirements, auditing and testing criteria for the National Transportation Product Evaluation Program (NTPEP) evaluation of Highway Guardrail Manufacturers. The National Transportation Product Evaluation Program (NTPEP) serves the member departments of the American Association of State Highway and Transportation Officials (AASHTO).
- 1.2 The purpose of the program is to establish a list of Manufacturers and products that conform to 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 AASHTO M180 and M30 and follow the minimum quality control provisions of the program.
- 1.3 NTPEP validates this program through testing the Manufacturer's product(s) to verify compliance with the applicable standard and auditing the Manufacturer's in-plant quality control facilities and procedures. 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 Specification(s). If compliance is demonstrated, the NTPEP will list the product(s) and plant(s) in the NTPEP listing of products and facilities conforming to this program. This is an Audit Program for Highway Guardrail as defined in SP01-13, Qualification of Highway Product Manufacturers Through the Use of NTPEP Audits.,
- 1.4 *This standard practice 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 standard practice 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:
- AASHTO M111 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - AASHTO M232 Zinc Coating (Hot Dip) on Iron and Steel
 - AASHTO T65 Mass of Coating on Iron and Steel Articles with Zinc
 - AASHTO T244 Mechanical Testing of Steel Products
- 2.2 ASTM Standards:
- ASTM A123 Standard Specification for Zinc Coatings on Iron and Steel Products
 - ASTM A307 Standard Specification for Carbon Steel Bolts and Studs
 - ASTM A563 Standard Specification for Carbon and Alloy Steel Nuts

- ASTM A653 Standard Specification for Steel Sheet, Zinc Coated or Zinc-Iron Alloy Coated by the Hot Dip Process
- ASTM B6 Standard Specification for Zinc
- ASTM E376 Standard Practice for Measuring Coating Thickness by Magnetic Field or Eddy Current Methods
- ASTM B695 Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel

3. TERMINOLOGY

- 3.1 *Auditor* – A NTPEP representative to review submittals, coordinate auditing and testing, and report audit findings and product and verification sample test results.
- 3.2 *Audits* – 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.
- 3.3 *Highway Guardrail Administrative Group* – The Highway Guardrail Administrative Group includes members from each AASHTO Region. The HIGHWAY GUARDRAIL Technical Committee Chairman is a Co-Chairman of this Administrative Group and the full HIGHWAY GUARDRAIL Technical Committee elects the other members. The majority of the members of the Administrative Group must be in agreement to reach a decision.
- 3.4 *Independent Laboratory* – An outside laboratory that performs raw material or 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/Producer/Supplier.
- 3.5 *Initial Audit*- The first audit conducted at a Manufacturer, which has not had an audit conducted by another independent agency.
- 3.6 *Lot* – The amount of product produced per type per machine per production run.
- 3.7 *Manufacturer*- An individual producer of Highway Guardrail. The corporate name (actual location) will be included in the NTPEP program.
- 3.8 *NTPEP*- The entity responsible for overseeing all areas of the program are being run according to what is noted in this Standard Practice as well as assisting in the resolution of any conflicts which may arise.
- 3.9 *NTPEP Designated Laboratory* – A laboratory qualified by NTPEP to perform the specific tests as outlined in the Standard Practice and has on site qualified technicians and equipment necessary to perform the tests per ASTM and AASHTO standards.
- 3.10 *NTPEP Follow-Up Audit*- An audit of a Manufacturer’s location and associated laboratory which are included in the program. These audits are conducted by NTPEP and/or an AASHTO member department to determine compliance with the program requirements. These audits may be performed due to: an incomplete initial/annual audit where nonconformities are found, reports of noncompliant product from an AASHTO member department, or any other reason deemed significant to NTPEP.
- 3.11 *NTPEP Highway Guardrail Technical Committee* – The NTPEP Technical Committee that includes member departments of the AASHTO and members of Industry. The members are volunteers who are interested in the advancement of the product. The Technical Committee appoints a Chairman and a Co-Chairman.

- 3.12 *NTPEP Verification Testing* – Sample(s) selected from the manufacturing line or stockyard to be tested by the NTPEP designated laboratory. The results are then compared to the appropriate specification and accompanying certification
- 3.13 *Periodic Testing*- Additional testing completed on specimens collected aside from what is tested during the annual on-site audit.
- 3.14 *Plant*- An individual manufacturing facility.
- 3.15 *QMS Desktop Audit* – Complete review of a Manufacturer’s Quality Management System (QMS) and the corresponding documentation by NTPEP or its designee.
- 3.16 *Quality Management System (QMS)* – The documented process used by the Manufacturer for quality control/quality assurance.
- 3.17 *Surveillance Audit* – An audit of any Manufacturer’s plant and associated laboratory included in the program by AASHTO member departments to determine compliance with the program requirements. (An audit conducted at a plant when major deficiencies are noted during a previous on- site audit. A local DOT may go into a plant, which is not the annual inspection by NTPEP. If major problems are detected, a follow up audit would be conducted.)
- 3.18 *Zinc Bath Lot* – A zinc bath lot for a manufacturing facility is the molten zinc in the dipping bath at any given time.
- 3.19 *Zinc Lot* – A lot of zinc for a manufacturing facility is a railcar or truckload.
- 3.20 Additional terminology can be found in applicable AASHTO and ASTM Standards.

4. OVERVIEW OF THE PROGRAM

- 4.1 The program for Highway Guardrail assesses the conformance of both manufacturing and products with this practice and includes the following:
- 4.2 Manufacturer’s Quality Management System Desk Top Audit:
- 4.2.1 A complete review of the Manufacturer’s Quality Management System (QMS) written procedures is performed by NTPEP prior to the on-site audit. The requirements for this document are referenced in Section 6.
- 4.3 Initial and Annual NTPEP Audits:
- 4.3.1 NTPEP will perform initial and annual quality control audits of each facility that a Manufacturer desires to be included in the program. These audits will include evaluation of production and testing associated with the product along with review of the following documents: Quality Management System (QMS) implementation, test reports, equipment calibration, verification of results, and check records. The Qualification Agency will conduct these audits assisted by co-auditor(s) from any AASHTO member department(s) that want to participate.
- 4.4 Verification Testing of Highway Guardrail Samples:
- 4.4.1 Samples of component material and/or finished product will be taken from production and/or from stock and will be tested, in accordance with the appropriate AASHTO/ASTM specifications, at the NTPEP designated laboratory.
- 4.4.2 Companion samples may be obtained for testing by the fabricator or material manufacturer.

- 4.5 The NTPEP Website Listing:
- 4.5.1 A listing of Highway Guardrail producers and Highway Guardrail materials tested and found to conform to the requirements of this Standard Practice and AASHTO M180 or M30 Material Specifications.
- 4.5.2 A listing of every Manufacturer with a QMS found to be compliant to this Standard Practice.
- 4.5.3 A document library containing this Standard Practice and a secure area where AASHTO member departments can view the Manufacturer's: QMS, audit results, and all sample test results.

5. APPLICATION FOR AUDIT AND PRODUCT TESTING

- 5.1 Any Manufacturer of Highway Guardrail as defined in AASHTO M180 and/or M30 may participate in the program. All costs for participation in the program, including sample shipping, testing and other NTPEP auditing and administrative fees, are to be borne by the Manufacturer. Any testing above and beyond the basic NTPEP program requirements will be at the expense of the state DOT/transportation agency or as provided in its specifications.
- 5.2 The Manufacturer will make a formal request through the NTPEP website to participate in the program. The request will list the Manufacturer's plant location(s), testing facilities, and products to be evaluated and describe the Manufacturer's Quality Management System (QMS).
- 5.3 Log onto the NTPEP website, <http://data.ntpep.org> to review and download the following documents:
- Pre-Audit Application
 - Audit Worksheet
- 5.4 Once the QMS is found to conform, the Manufacturer and all associated testing facilities the Manufacturer desires to qualify will be scheduled for audit. Guardrail and samples of the steel used in construction and zinc used for coating will also be sampled for testing in accordance with the appropriate AASHTO specification. Each unique Highway Guardrail product requested for inclusion into the program will be separately tested.
- 5.5 The on-site audit will be scheduled approximately 4 weeks in advance of the actual audit. The Manufacturer will receive an Announcement Letter from NTPEP showing the anticipated date of the audit.
- 5.6 Each manufacturer will submit the following documentation annually with the application for audit and product testing:
- Brand Registration and Guarantee Certificate (See Attachment A for an example certificate)
 - Marking Scheme Document which indicates how guardrail materials will be marked. Any deviations from the requirements of AASHTO M-180 shall be detailed on this document and submitted (See Attachment B for an example document)
 - Certificate of Compliance which lists of all manufacturers, suppliers, and/or galvanizers which will be furnishing material or performing work for the company. This list shall include plant name and address, type of work being performed for the manufacturer. (See Attachment C for an example list)
 - Certificate of Compliance acknowledging conformance to 23 U.S.C § 313 – Buy America; 23 C.F.R. § 635.410 (See Attachment D for an example certificate)

6. QUALITY MANAGEMENT SYSTEM (QMS) REQUIREMENTS

6.1 NTPEP Audits will be based on the Manufacturer following an established quality control program that provides assurance that the products produced meet the requirements of the AASHTO/ASTM Materials Specifications and that these products conform to this NTPEP Standard Practice. The Manufacturer will implement a documented Quality Management System (QMS). Each Manufacturer will include elements that it considers necessary to assure that products meet AASHTO M180 or M30 requirements and other requirements stated herein, but as a minimum the QMS will include or address the following:

- Organization and Organizational Policies
- Quality Mission Statement
- Position Descriptions
- Quality Control Personnel Training and Competency Evaluation
- Contract Review
- Customer Feedback
- Internal Quality Audits of Each Facility Producing Product
- Management Reviews of Each Facility Producing Product
- Corrective Action Procedures
- Sampling Plan for Quality Control and Quality Assurance
- Testing Plan for Quality Control and Quality Assurance
- Retesting Plan for Quality Control and Quality Assurance
- A List of Physical and Chemical Test Equipment
- Lab Equipment Plan for Calibrating and Standardizing Equipment
- Recording and Maintaining Product Information and Test Results
- Handling Raw Material and Finished Product for DOT Products
- Quality Control Inspection
- Labeling and Storage of Finished Product
- Control of Nonconforming Product
- List of all material suppliers and subcontractors.

6.1.1 *Organization and Organizational Policies* – The QMS will indicate the line of authority from the QC testing technicians to the QC manager, ensure that QC testing technicians have the authority to require corrective action, and ensure that the QC manager is independent of production management and of equal status.

6.1.2 *Quality Mission Statement* - The quality mission statement will describe the Manufacturer's mission and be endorsed by the Manufacturer's Chief Executive Officer. It will also be made available to all employees.

6.1.3 *Position Descriptions* - The QMS will describe the duties associated with each position included on the organization chart. These descriptions will also include the required skills, education, and experience associated with each specific position and indicate the supervision exercised and received.

6.1.4 *Quality Control Personnel Training and Competency Evaluation* -

6.1.4.1 The QMS will ensure that:

- Manufacturer's QC manager meets the requirements established by the Manufacturer;
- QC manager qualifies technicians performing QC raw material and final product testing;
- QC personnel are familiar with the tests they perform; and
- QC personnel have sufficient authority to assure that corrective actions are carried out when necessary.
- Only QC personnel will document testing and other pertinent quality control information.

- 6.1.4.2 The QMS will describe the Manufacturer's QC technician qualification program. As a minimum the program will include:
- Training in the AASHTO, ASTM, or Manufacturer test procedures, operation of equipment, the procedures to be used, calculations required, and reporting;
 - Demonstration of competency in each required test;
 - Demonstration of ability to properly document test results;
 - Annual auditing of each technician's ability to satisfactorily perform the required tests; and
 - Retraining when a test method is revised
- Training and competency reviews will be documented in such a way that compliance with the requirements for the initial and updated training and the initial and annual competency reviews can be demonstrated for each technician and for each test the technician performs. The documentation will include the date of the training or competency review and contain the hand written signature or initials of the trainer/reviewer and the technician. This documentation will be retained, for a minimum period of 7 years, at each location where quality control testing occurs, and will be made available to NTPEP for review upon request.
- 6.1.5 *Contract Review* -The QMS will include a procedure for processing Highway Guardrail orders and the review of contracts for producing Highway Guardrail. This procedure will ensure that:
- The requirements are adequately defined, documented, and understood
 - Records of contract reviews are maintained
 - The client will be informed of any deviations from the contract
- 6.1.6 *Customer Feedback* - The QMS will include a procedure describing the customer feedback system. This procedure will indicate the following:
- What position(s) or employee(s) are responsible for customer feedback
 - Methods used to solicit, evaluate and respond to customer feedback
 - Conditions under which corrective action will be implemented
- 6.1.7 *Internal Quality Audits of Each Facility Producing Product* -
- 6.1.7.1 The QMS will include a description of the procedures used to conduct internal audits. The Manufacturer, or an independent auditor hired by the Manufacturer, will perform these audits at least annually unless problems in the quality control program or with the quality of the product indicate more frequent audits are necessary. The internal audit procedures will include the following as a minimum:
- What position(s) or employee(s) are responsible for ensuring the internal audits are performed;
 - Frequency, scope, and criteria used for performing the audits;
 - Conditions under which corrective action will be implemented;
 - Evaluation of plant inspection;
 - Inspection of testing equipment and calibrations;
 - Observation of resin sampling and lot control procedures;
 - Observation of product sampling and testing procedures;
 - Review of product certification procedures;
 - Review of inspection and testing report documentation; and
 - Review of nonconforming product documentation and actions taken.
- 6.1.7.2 The QMS will ensure that:
- Audit findings are discussed with management and testing technicians and documented in a report;
 - Corrective actions are taken as necessary and documented in the report; and
 - Most recent report is included in QMS documentation submissions.