



SQS Supplement D

**MnDOT
Supplier
Qualification
Standard**

**Elastomeric Bearing
Manufacturers**



Standard supports the Department's Approved Supplier Program for Structural Metals Suppliers as described in the current Standard Specification for Construction

**Supplier
Qualification
Standard for
Suppliers of
Fabricated
Structural
Metal Products**



Minnesota Department of Transportation
3485 Hadley Avenue North
Oakdale, MN 55128-3307



MnDOT Supplier Qualification Standard



Documentation Requirements

Supplier Quality Management System

Supplement D

Elastomeric Pad Manufacturers

Supplement D
Elastomeric Pad Manufacturers



Supplement D – Elastomeric Pad Manufacturers

2 General Information.....3

3 References.....3

6 Contract Review and Project Management.....3

6.1 Notification to the Owner.....3

6.2 Contract Review Record.....4

6.3 Quality Records4

7 Communication of Project Requirements.....4

7.1 Communication with Owner.....4

7.2 Contract documents.....4

7.3 Communicating Information for purchasing and production4

7.4 Notification and submittals before work begins.....5

7.5 Quality Records5

11 Material Identification5

11.1 Traceability.....5

11.2 Material Test Reports5

11.3 Marking of Finished Pads5

11.4 Quality Records6

12 Process Control6

12.1 Personnel6

12.2 Required Documented Processes6

12.3 Quality Records6





Supplement D – Elastomeric Pad Manufacturers

2 General Information

The purpose of this Supplement to the Supplier Qualification Standard is to outline the criteria for qualification to the Minnesota Department of Transportation (MnDOT) Metals Supplier Qualification Program for Manufacturers of Elastomeric Pads and Cotton Duck Bearings.

Several sections of the MnDOT Supplier Qualification Standard (SQS) address requirements for aspects of supplier Quality Management Systems that differ greatly amid the listed Supplier Category Processes. These sections have been omitted from the main Supplier Qualification Standard and included in this supplier-specific Supplement. The omitted sections include:

- Section 6: Contract Review
- Section 7: Communicating Project Requirements to Production
- Section 11: Material Identification
- Section 12: Manufacturing Process Control

3 References

The Supplier shall have the required references listed in AASHTO M-251 in addition to those State DOT Specifications and Special Provisions required by the Contract Documents.

The Supplier must have the ASTM specifications for materials (metals, elastomers, and textiles) used in the products produced.

Required references:

- MnDOT Standard Specification for Construction
- MnDOT Special Provisions
- ASTM Standards for materials used by the company

ASTM Standards:

These standards must be in the Supplier’s library and be understood if they are directly referenced for test methods that the Supplier will need to perform for their product.

- D 412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers—Tension
- D 746, Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact
- D 3183, Standard Practice for Rubber—Preparation of Pieces for Test Purposes from Products
- D 4014, Standard Specification for Plain and Steel-Laminated Elastomeric Bearings for Bridges
- E4, Standard Practices for Force Verification of Testing Machines

ANSI Standard:

- ANSI B46.1, Surfaces and Surfacing

Military Specifications:

- MIL-C-882-E 1989 (for Cotton Duck Pads)

SSPC Standards (as applicable):

- VIS 1
- SSPC SP6

Rubber Manufacturers Association, Inc. Standards:

- RMA F 3
- RMA T.063
- RMA F 2

6 Contract Review and Project Management

Address the following requirements in the Quality Management System Documentation. Assure Contract Review and Project Management documentation is readily available to appropriate personnel who need it.

Describe how all applicable original contract documents, revised contract documents, and changes received through clarification are thoroughly reviewed. Perform the review process again when contract requirements are clarified by a response to an RFI (request for information), revised in response to a Supplier request, or other official communication from the customer’s authorized representative. Require this review only for the areas affected by the changes.

Address these specific documents/criteria at a minimum:

- Contract documents (design drawings and specifications, Special Provisions and documented communications)
- Change orders
- Transmittals
- Answers to requests for information (RFI)
- Required delivery schedule, identifying sequences within the project.

Design the review to identify and address critical project requirements that impact project materials, quality, testing and schedule.

Describe the responsibility for conducting and organizing the review and the methods to communicate the review results to the next steps in the process. Describe the distribution of this information and those individuals responsible to ensure that it is incorporated in the work correctly and as scheduled.

6.1 Notification to the Owner

Describe the plans for transmitting information and records including the recording the transmittal of purchasing data (purchase orders, MTRs and other documentation) to assure that the documented





Supplement D – Elastomeric Pad Manufacturers

information is furnished to the Engineer or the QAI, as appropriate.

Identify the Supplier personnel or positions responsible for submitting these records and the owner or contractor positions who are to receive them. Specify timely transmittal targets to satisfy contract requirements.

Describe how the Supplier provides the owner's Engineer with a list of subcontracted fabricators, galvanizers, and painters, including addresses, and a list of products or services they will provide to the Supplier for the project.

Describe the internal controls to prevent project-specific material ordering until the Engineer approves the shop drawings. If materials is stock or must be ordered before all shop drawings are approved, describe the methods to prevent incorporating improper materials and to avoid schedule delays for the project.

6.2 Contract Review Record

Indicate in a Contract Review Record how these items were reviewed. Describe the method by which this information is conveyed to the responsible planning, detailing, procurement, production, or quality functions.

Describe a method to track the current status of contract drawings, specifications, addendums, and other documents that affect the supply of product. Include signatures, stamps, logs, files or lists. Clearly show the status, date received and revision date of customer design drawings and specifications.

Note: Specific details and directions typically may be communicated to shop personnel via a shop traveler, or other methods and lists may be described. The level and detail of control must be sufficient to meet customer requirements and prevent nonconformances.

Assure that the record addresses the project specific items listed here. Issues may include, but are not limited to:

- Bearing Type, Quantity, Project Sequence
- Bearing Design and Loading Requirements
- Shear Modulus requirements of the Elastomer
- Rubber Type (shall contain only either natural rubber or chloroprene rubber as the raw polymer. No reclaimed rubber shall be used)
- Rubber Grade
- Ozone Test Requirements
- External Load Plate requirements
- Provisions for destructive and non-destructive testing

6.3 Quality Records

- Contract review record

- Documented Contract clarifications or modifications including RFIs or other communication with the customer.
- Design change records, including contract construction changes and addendums

7 Communication of Project Requirements

7.1 Communication with Owner

Determine and describe a means of communication with the Owner and Contractor Representatives. Include how contact information is established with the Owner and/or Contractor Representatives, and identify who will coordinate production, inspection, sampling, and testing and who will communicate with the Engineer or the QAI.

7.2 Contract documents

Maintain a current copy of the contract documents at the facility. At a minimum these documents likely include

- Bearing Sheet from the project
- Bearing Specification
- Standard bearing detail (if available from the owner)

Describe a method to track the current status of contract drawings, specifications, addendums, and other documents that affect the supply of product. Include signatures, stamps, logs, files or lists. Clearly show the status, date received and revision date of customer design drawings and specifications.

7.3 Communicating Information for purchasing and production

Describe and document the method used to control elastomeric pad and production that assures that customer requirements are accurately communicated to cutting, processing and testing operations. Include these items in the documents (hard copy and/or electronic) that are transmitted from project management or production planning to production process personnel and supervision. This information may be standard practice that is invoked for each order, but document how unique order requirements are specifically communicated as well.

Specific details and directions are typically communicated to shop personnel via a shop traveler, or other methods and lists may be described. The level and detail of control must be sufficient to meet customer requirements and prevent nonconformances.

- Scheduled production and delivery dates, identifying items with project critical times
- Bill of materials
- Sizes and quantities
- Cut lists
- Raw material testing required





Supplement D – Elastomeric Pad Manufacturers

- Batch identification
- ASTM or AASHTO M specification
- Special order information
- Tolerances or allowances
- Bearing marking system per Owner specification
- Surface preparation of shims or inserts
- Coating requirements of shims or inserts (including coating materials and dry film thickness)
- Owner Testing and Owner witnessing requirements
- Bearing Identification
- State Department Structure Number
- State Project Number
- Federal Project Number (if applicable)
- Supplier’s Job Number
- Proper representation on plans or installation drawings including the notation of any necessary instructions and depiction of details necessary to conduct the work in the field. This includes bearing orientation to assure bearing identity after installation.

7.4 Notification and submittals before work begins

Describe how Owner’s representatives and inspectors are notified and involved in the required witness testing that their specifications require.

MnDOT specific requirement

For MnDOT projects, assure that methods allow notifying the Engineer at least 5 business days before the Manufacturer begins work (before the first fabrication operation; molding process, cutting or drilling) so that the Engineer can perform inspections. Do not begin work before notifying the Engineer.

7.5 Quality Records

- Schedules
- Supplier provided design calculations
- Drawing Approval Submittal Records
- Final (as-built) Shop drawings and/or cut sheets

11 Material Identification

Develop a documented procedure for the identification and traceability of materials and products used in transportation projects. The procedure describes how the Supplier assures appropriate identification at the purchasing and receiving process and then how the identification is marked or maintained from the point of receipt to the point of delivery to the transportation project.

11.1 Traceability

Supplier shall maintain traceability to a specific lot numbers for material in each pad or bearing.

11.1.1 Elastomer Material

For Elastomer material that is received premixed, a sample of each lot is taken and tested for applicable specification compliance prior to being used. The corresponding lot number shall be traceable to each specific project.

11.1.1 Steel Bundles – Gauge Material

Material that arrives in bundles shall maintain MTR traceability for any piece removed from the bundle and to any remnants returned to the stockpile area.

Retain Manufacturer’s Certified Mill Test Reports for all steel materials used for shims or inserts.

11.1.1 Coatings Consumables

Record batch numbers for coatings consumables used by the Supplier for steel within or bonded to pad assemblies for each project.

11.2 Material Test Reports

MTRs and Certificates of Conformance shall be reviewed by the Supplier to verify that the material conforms to the Contract Requirements before the first manufacturing process begins.

11.3 Marking of Finished Pads

Define how pads are marked with an indelible ink or flexible paint of contrasting color.

Marking information may include, but is not limited to:

- Identification number/mark number
- Contract Number
- Structure Number
- Orientation (abutment or pier#) (may also include a direction arrow that points up-station)
- Lot Number (including date and batch number of rubber materials)
- Elastomer Type (Durometer and NR or NE)
- Material Grade

Assure that marking provides traceability to this information

- Required testing
- Hardness (Durometer)
- Shear Modulus
- Bond strength
- Compressive strain
- Compressive load
- Inspection
- Dimensional
- Visual
- Marking
- De-bonding test

MnDOT Specific requirement

Testing rate: Two full size per lot where a lot is up to 100.





Supplement D – Elastomeric Pad Manufacturers

11.4 Quality Records

- Purchasing documents
- Shipping/Receiving Records
- MTRs / Certificates of Conformance / Testing Records
- Customer notification
- Final approved drawings
- Inspection records

12 Process Control

Address the following requirements in the Quality Management System Documentation. Assure Fabrication/Manufacturing Process Control documentation is readily available to appropriate personnel.

12.1 Personnel

Vulcanizers must be qualified to perform their duties and the associated, required documentation. Qualification can be gained on the job with experienced supervision. Determine the minimum requirements in time and specific capability. The Supplier's requirements may be satisfied by experienced senior personnel documenting the training and experience of their assigned workers under their supervision.

12.2 Required Documented Processes

Include information in the procedure that addresses these processes:

- Coating (for shims and other inserts)
- Extruding
- Molding Include: Material/Mix Identification, Material Prep/Mixing, Material Storage/Handling, Mold Condition
- Assembly Procedure
- Vulcanizing Include: molding cycle, Identifying time, temperature and pressure requirements
- Curing
- Testing procedure(s)
- Inspection

12.3 Quality Records

- Material Mix Batch Records
- Curing/Vulcanizing Records
- Maintenance Logs
- Testing Records
- Inspection Records





This page is intentionally left blank.



Supplement D Elastomeric Pad Manufacturers



Minnesota Department of Transportation:
Metals Supplier Qualification Program

