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# DMS-4510

## Mechanical Couplers for Reinforcing Steel

Effective Date: **June 2023**



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### 1. DESCRIPTION

This Specification governs the pre-qualification procedure, **quality assurance**, material **requirements**, and **required documentation for** mechanical couplers for reinforcing steel.

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### 2. MATERIAL PRODUCER LIST

The Materials and Tests Division (MTD) maintains the Material Producer List (MPL) of all materials conforming to the requirements of this Specification. Materials appearing on the MPL, entitled "[Mechanical Couplers](#)," require project sampling and testing in accordance with **Section 5.1**, "**Project Sampling and Testing**," before use.

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### 3. BIDDERS' AND SUPPLIERS' REQUIREMENTS

The Department will only purchase or allow on projects those products listed by producer and product code or designation shown on the MPL.

Use of pre-qualified product does not relieve the Contractor of the responsibility to provide product that meets this Specification. The Department may inspect or test material at any time and reject any material that does not meet the specifications.

**Note 1**—Transitional couplers are pre-qualified individually. For example, pre-qualified No. 9 and No. 11 couplers does not constitute a pre-qualified No. 9 to No. 11 transitional coupler.

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### 4. PRE-QUALIFICATION PROCEDURE

- 4.1. **Pre-Qualification Request.** Submit a **written** request **on company letterhead** for evaluation under DMS-4510 to [DMS\\_Prequal@txdot.gov](mailto:DMS_Prequal@txdot.gov).

Include the following information in the request:

- company name;
- physical and mailing addresses;
- contact person, phone number, and email address;
- **product name; and**
- **any additional** product information such as bar size, up-threading, or any other distinguishing characteristics.

- 4.2. **Pre-Qualification Sample.** Submit the following samples to the **Texas Department of Transportation, Materials and Tests Division, Laboratory Building, 6230 E. Stassney Ln., Austin, TX 78744.**

- Four fully assembled mechanical coupler assemblies for each type, model, bar size, and grade intended for pre-qualification. **Assembled specimens must have at least 24 in. of reinforcing bar protruding from each end of the coupler body.**

- The connecting reinforcing steel must meet the requirements of the Department's Specification Item 440, "Reinforcement for Concrete."
- The connecting reinforcing steel should be straight and uniaxial to the assembly. Bent bars or bars that are not uniaxial may cause erroneously large slip readings caused by the action of straightening the bar during the performance of the slip test.

Include the following with the sample:

- completed [Form 1818](#) (a.k.a. Form D-9-USA-1), "Material Statement," with the proper attachments in accordance with Item 6, "Control of Materials," of the Department's *Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges*;
- certified test reports showing the couplers meet the requirements of Article 6., "Material Requirements," of this Specification;
- written instructions provided by the manufacturer to machine shops for operations such as threading or swaging of reinforcing steel;
- written assembly and installation instructions provided by the manufacturer to Contractors for each type, model, bar size, and grade for which the coupler assembly is designed, including a list of required tools, bar preparation, and necessary torque ranges for proper assembly and installation;
- mill test reports for each size and grade of reinforcing steel used for the connecting bars; and
- breakdown of the format used for die stamping, if applicable.

Submit all materials for pre-qualification at no cost to the Department.

- 4.3. **Evaluation.** The Department will test assembled specimens in accordance with [Tex-744-I](#). If there is any variance between the results provided by the producer and the results of the Department's tests, the Department's tests will govern. MTD will notify prospective bidders and suppliers after completion of material evaluation.

Mechanical coupler assemblies submitted with two different grades of steel reinforcing will be tested to meet the requirements of Article 6., "Material Requirements," of this Specification relative to the lower grade bar. Transitional mechanical coupler assemblies will be tested to meet the requirements of Article 6., "Material Requirements," of this Specification relative to the smaller bar.

- 4.3.1. **Qualification.** If all four of the assembled pre-qualification specimens meet the requirements listed in Article 6., "Material Requirements," of this Specification, MTD will add the material to the MPL.

Report changes in the composition or in the manufacturing process of any material to MTD. Significant changes reported by the producer, such as changes in materials, design, or assembly instructions, as determined by MTD, may require a re-evaluation of performance. The Department reserves the right to conduct whatever tests it deems necessary to identify a pre-qualified material and determine if there is a change in the composition, manufacturing process, or quality that may affect its durability or performance. In case of variance, the Department's tests will govern.

- 4.3.2. **Failure.** Producers not qualified under this Specification may not furnish materials for use on Department projects.

Producers failing to qualify may submit a request for re-evaluation after 12 mo. have elapsed from the date of the original request. MTD may modify this time limit at its discretion. In the request for re-evaluation, document the cause [for failing to meet the requirements of this Specification](#) and corrective action taken.

The Department normally bears the costs of sampling and testing; however, the producer will bear the costs associated with materials failing to conform to the requirements of this Specification [and any re-evaluation testing](#). MTD will assess this cost at the time of testing and amounts due will be billed to the producer.

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## 5. QUALITY ASSURANCE REQUIREMENTS

The Department will sample and test mechanical couplers for quality assurance from every Department project in which they are used. The Department also reserves the right to conduct periodic testing of all pre-qualified products and sizes.

5.1. **Project Sampling and Testing.** Project sampling of mechanical couplers is required for every Department project in which mechanical couplers are used.

5.1.1. **Project Sampling.** The Department will sample in accordance with [Tex-743-I](#).

5.1.2. **Project Testing.** The Department will test project samples in accordance [Tex-744-I](#)

5.1.3. **Evaluation.** The Department will accept or reject lots for a given Department project based on test results from two properly sampled and tested project specimens.

If one project specimen fails to meet the requirements of Article 6., "Material Requirements," the Department will conduct additional project sampling and testing. The remaining original project specimens will be discarded. The Department will sample additional project specimens in accordance with [Tex-743-I](#). The Department will notify the Contractor and coupler producer of the failed project sample before collecting the second project sample.

If any of the additional project specimens fails to meet the requirements of Article 6., "Material Requirements," the Department will reject the entire lot of mechanical couplers.

5.2. **Periodic Evaluation.** The Department reserves the right to conduct random sampling and testing of pre-qualified materials to verify performance and Specification compliance and to perform random audits of documentation. Department representatives may sample material from the manufacturing plant, machine shop, assembly location, project site, or warehouse. **The Department may also request samples for evaluation at any time from the producer.**

5.2.1. **Failure.** Failure of materials to comply with the requirements of this Specification, as a result of periodic evaluation, may be cause for removal of those materials from the MPL. In case of variance, the Department's tests will govern.

5.3. **Disqualification.** Causes for disqualification and removal from the MPL may include, but are not limited to:

- two consecutive project or random samples of the same type, model, bar size, and grade of coupler fail to meet the requirements of this Specification;
- falsification of documentation;
- producer fails to report any change in material composition, manufacturing process, or assembly instructions to MTD;
- material fails to meet the requirements of this Specification as a result of periodic evaluation; or
- producer has unpaid charges for failing samples.

MTD will remove disqualified producers from the MPL and will not allow submission of material for re-qualification for **up to 12 mo. From the date of notification**, at the discretion of the Department.

5.4. **Re-Qualification.** Once the disqualification period established by MTD has elapsed, producers disqualified and removed from the MPL may begin the re-qualification process by submitting a request in accordance with Section 4.1., "Pre-Qualification Request," including additional documentation identifying the cause of the problem and corrective action taken. The re-qualification process will then follow all subsequent Sections of Article 4., "Pre-Qualification Procedure."

The Department normally bears the costs of sampling and testing; however, the disqualified producer will bear the costs associated with re-qualification. MTD will assess this cost at the time of re-evaluation and amounts due will be billed to the producer.

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## 6. MATERIAL REQUIREMENTS

6.1. **General Requirements.** All mechanical couplers must be of uniaxial design and must be one or a combination of the following types:

- sleeve-filler,
- sleeve threaded,
- sleeve swaged, or
- sleeve shear screw.

Each component of the mechanical coupler must be die-stamped or permanently labeled to identify:

- bar size and grade for which the coupler is designed;
- manufacturer and model identification;
- production lot number; and
- date of manufacture.

**Note 2**—“ID Codes” traceable back to the above required information are acceptable.

Any person that machines, assembles, or installs the couplers must properly follow the instructions provided by the manufacturer.

All metal used in the final mechanical coupler must meet Buy America requirements.

6.2. **Test Requirements.** Each mechanical coupler assembly must be tested for slip, fatigue, and ultimate tensile strength. All three tests must be performed on the same assembly.

6.2.1. **Slip.** The total average slip must not exceed 0.010 in. for No. 14 bars and smaller or 0.030 in. for No. 18 bars and larger. Slip is tested in accordance with [Tex-744-I](#), Section 4.2., “Slip.”

6.2.2. **Fatigue.** The mechanical coupler assembly must withstand a minimum of 80,000 cycles. Fatigue is tested in accordance with [Tex-744-I](#), Section 4.3., “Fatigue.”

6.2.3. **Ultimate Tensile Strength.** The mechanical coupler assembly must develop at least 125.0% of the minimum required yield strength in tension of the bar of the lowest grade. Ultimate tensile strength is tested in accordance with [Tex-744-I](#), Section 4.4., “Ultimate Tensile Strength.”

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## 7. SHIPPING

7.1. **Documentation Required with each Shipment.** Provide the following documentation with each shipment. Maintain copies of this documentation and make available to the Department upon request.

- Completed [Form 1818](#) (a.k.a. Form D-9-USA-1), “Material Statement,” with the proper attachments for the mechanical couplers.
- Mill test report for the steel used to produce the mechanical coupler.
- Written assembly and installation instructions provided by the manufacturer to Contractors for each type, model, bar size, and grade for which the coupler assembly is designed, including a list of required tools, bar preparation, and necessary torque ranges for proper assembly and installation.

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**8. ARCHIVED VERSIONS**

Archived versions are available.