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# DMS-4300

## Traffic Buttons

*Effective Date: July 2016*



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### 1. DESCRIPTION

This Specification governs the material, composition, quality, sampling, and testing of ceramic and non-ceramic (polymeric or plastic) traffic buttons.

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### 2. UNITS OF MEASUREMENTS

The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.

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### 3. MATERIAL PRODUCER LIST

The Materials and Pavements Section of the Construction Division (CST/M&P) maintains the Quality Monitoring Program (QMP) and Material Producer List (MPL) of all materials conforming to the requirements of this Specification. Materials appearing on the MPL, entitled "[Pavement Markers and Traffic Buttons](#)," require no further sampling and testing before use unless deemed necessary by the Project Engineer or CST/M&P.

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### 4. 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.

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### 5. PRE-QUALIFICATION PROCEDURE

The pre-qualification procedure consists of several steps, listed below, which are described in more detail in the following sections:

- pre-qualification request,
- laboratory testing,
- provisional qualification,
- field evaluation, and
- full qualification.

5.1. **Pre-Qualification Request.** Submit **on company letterhead** a request for evaluation under DMS-4300 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; and
- type of material, as defined in Article 7 of this Specification.

5.2. **Laboratory Testing.** Submit 20 buttons of each type for 4-in. diameter buttons and 10 buttons of each type for all larger diameter buttons for laboratory testing and evaluation to the Texas Department of Transportation, CST/M&P (CP51), 9500 North Lake Creek Parkway, Austin, TX 78717.

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

5.2.1. **Provisional Qualification.** CST/M&P will grant provisional qualification after successful completion of the laboratory evaluation. CST/M&P will send notification of provisional qualification, including the date of placement on the MPL. Failure to complete all field evaluation requirements successfully is grounds for cancellation of provisional qualification and removal from the MPL.

5.2.2. **Failure.** If materials do not meet the requirements of this Specification after laboratory testing, the Department will cease evaluation and will not pre-qualify the materials. Producers may resubmit materials for evaluation after identifying the cause 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. The Director of CST/M&P will assess this cost at the time of testing, and amounts due will be billed to the producer.

5.3. **Field Evaluation.** Provide CST/M&P with project information for the first three jobs supplied with the material and additional projects if requested. Coordinate with CST/M&P to include placement of 100 control buttons on these jobs. Control buttons may include any button currently on the MPL. CST/M&P will monitor and evaluate the performance of the material placed on the roadway for 1 year.

The material must not exhibit a loss of adhesion greater than 10% or the percent loss of the control buttons, whichever is greater.

The Department will evaluate the buttons using a visual rating scale from 0 to 5, with the following definitions.

- 0—Missing
- 1—Very Poor (non-functional)
- 2—Poor (scarring over large areas)
- 3—Fair (some abrasion and scars)
- 4—Good (minor scrapes and scratches)
- 5—Excellent

Ninety percent of the buttons evaluated must meet a minimum visual rating of 3 or higher or an average rating equal to the average rating for the control buttons.

CST/M&P will notify prospective bidders and suppliers after completion of material evaluation.

5.3.1. **Full Qualification.** CST/M&P will accept materials meeting all requirements of this Specification to the QMP and will continue to list materials on the MPL.

To maintain qualified status, follow the requirements of Article 6.

Report changes in the composition or in the manufacturing process of any material to CST/M&P. Significant changes reported by the manufacturer, as determined by the Director of CST/M&P, 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.

- 5.3.2. **Failure.** Producers not qualified under this Specification may not furnish materials for Department projects and must show evidence of correction of all deficiencies before reconsideration for qualification.

Producers failing to qualify may submit a request for re-evaluation after 1 year has elapsed from the date of the original request. CST/M&P may waive this time limit at its discretion. In the request for re-evaluation, document the cause of the issue 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. The Director of CST/M&P will assess this cost at the time of testing, and amounts due will be billed to the producer.

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## 6. QUALITY MONITORING PROGRAM (QMP)

- 6.1. **General.** Materials in the QMP must re-qualify annually. CST/M&P will perform all quality monitoring (QM) tests when applicable. The producer will be responsible for quality control (QC) and independent assurance (IA) testing.

Materials must also meet the following requirements:

- be of stable design, i.e., no substantive design changes (changes in composition or manufacturing process) that might affect the quality of the product, and
- have been manufactured on a continuous basis for at least 6 months.

- 6.2. **QM Sample.** Producers must submit an annual sample of ten traffic buttons for each color and model of 4-in. diameter buttons approved and five traffic buttons for each color and model of larger diameter buttons approved. Producers must submit the annual sample during the same calendar month as the calendar month the product was initially approved.

- 6.3. **QC Testing.** All producers in the QMP must perform QC testing to ensure the quality of their product. Maintain records of all test results for a minimum of 3 years, available for Department review upon request.

- 6.4. **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 will sample in accordance with Tex-729-I and may sample material from the manufacturing plant, the project site, and the warehouse.

- 6.5. **Probation.** Failure of materials to meet the requirements of this Specification as a result of periodic evaluation will be cause for probation, during which CST/M&P will inspect all lots. CST/M&P will reinstate the QM sampling frequency if four consecutive lots meet the material requirements during probation.

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

- falsification of documentation,
- failure of two or more consecutive lots to meet any of the material requirements of this Specification,
- failure to report changes in the formulation or production process of the material to CST/M&P, or
- producer has unpaid charges for failing samples.

CST/M&P will remove disqualified producers from the MPL and will not allow submission of material for re-qualification for 1 year, at the discretion of the Department.

- 6.7. **Re-Qualification.** Once the disqualification period established by CST/M&P has elapsed, producers disqualified and removed from the MPL may begin the re-qualification process by submitting a request in accordance with Section 5.1., 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 5.

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

## 7. MATERIAL REQUIREMENTS

All traffic buttons must meet all requirements, except where there are specific requirements for ceramic and non-ceramic traffic buttons.

### 7.1. Types.

- Type W—white body
- Type Y—yellow body
- Type B—black body

- 7.2. **Appearance Requirements.** The top of the button must be solid with no holes or other indentations. The top and sides of the button must be smooth and free from surface irregularities, pits, cracks, checks, chipping, discoloration, and any other defects that adversely affect appearance and application.

The bottom of the button may be of a rough texture and must be free from gloss, glaze, or any other substance that may reduce its bond to the adhesive. Excluding any protrusions intentionally manufactured as functional characteristics of the button, the base must not deviate from a true plane by more than 1/16 in.

- 7.3. **Color Requirements.** The CIE chromaticity coordinates of the material, when determined in accordance with Tex-839-B, must fall within an area having the following corner points:

**Table 3  
CIE Chromaticity Coordinate Corner Points**

	1		2		3		4		Luminance
	x	y	x	y	x	y	x	y	Y
White	0.290	0.316	0.310	0.296	0.330	0.321	0.310	0.342	Min 70
Yellow	0.435	0.485	0.445	0.435	0.544	0.456	0.516	0.484	50.0–70.0
Black	0.355	0.355	0.305	0.305	0.285	0.325	0.335	0.375	Max 5.0

### 7.4. Physical Requirements

- 7.4.1. **Ceramic Traffic Buttons.** The ceramic glaze, when tested in accordance with Tex-449-A, must not discolor, craze, spall, or peel when subjected to one cycle of the autoclave test at 250 lb./sq. in.

Water absorption must not exceed 1-1/2% of the original dry weight when tested in accordance with ASTM C 373, except the specimens must be whole and the glaze not removed.

The Department will subject traffic buttons to the compressive load test as follows.

- The buttons must be 4 in. nominal diameter.
- A random sample of five buttons will be tested in accordance with Tex-434-A.
- The average compression results must have a quality index value equal to or greater than 1.23.

- The quality index value will be calculated from the lower specification limit of 1,200-lb. load using the following equation.

$$Q_L = (X - LSL) / s$$

Where:

$Q_L$  = quality index value

$X$  = average result from test

$LSL$  = lower specification limit

$s$  = standard deviation from test.

NOTE: The quality index value is a measure used to determine the percent within limits (PWL) for a given sample size. The PWL is the total percent of the normal distribution curve, calculated from the average and standard deviation from the test that is above or below the specification limit. A quality index value of 1.23 or greater, for a sample size of five, corresponds to a PWL of 90 or greater. This indicates 90% or greater of the normal distribution curve; therefore, 90% or greater of the lot the sample represents is above or below the specification limit.

The Department will test large-diameter traffic buttons as follows.

- The compressive (crushing) strength will be determined on a 1-in. diameter right cylinder test specimen, cut through the center portion of the button by core drilling.
- The specimen's top and bottom surfaces will be capped with high-strength capping compound to make them perpendicular to the axis of the specimen.
- Five specimens will be loaded in accordance with Tex-418-A.
- The average strength of the buttons must be within  $\pm 20\%$  of the product average obtained from the prequalification samples.

7.4.2.

**Non-Ceramic Traffic Buttons.** The body must be made of an approved material and must be uniform in color throughout the entire body.

Stability of the color must be such that the luminance (Y) change, after 400 hr. weatherometer exposure in accordance with ASTM G 155 using Exposure Cycle 1 with a quartz inner filter glass and Type "S" Borosilicate outer filter glass, does not exceed the following limits:

- three units for white buttons,
- five units for yellow buttons, or
- five units for black buttons.

The Department will subject traffic buttons to the compressive load test as follows.

- A random sample of five buttons will be tested in accordance with Tex-434-A.
- The average strength of the buttons must be within  $\pm 20\%$  of the product average obtained from the prequalification samples.

The Department will test infrared spectrum in accordance with Tex-888-B.

The non-ceramic traffic buttons must show no change in physical or optical properties when subjected to the requirements of Tex-846-B. The temperature will be 140°F with the button in a vertical position.

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## 8. ARCHIVED VERSIONS

Archived versions are available.