

Corrective work shall be done in areas where 30 or more consecutive depressions have less than one-half inch depth. Corrective measures shall be as follows: The Contractor shall deepen every third depression to a depth of at least one-half inch by sawing or other approved methods. Width of the deepened portion shall be one (1) inch minimum. Length of the deepened portion shall be the unbeveled indentation. Corrective work shall not begin until 12 hours after rolling. Corrective measures delayed longer than 10 days will require approval of the Engineer.

**456.04 MEASUREMENT:** Indentation Rumble Strips will not be measured separately for payment. The Plan Quantity will be the Pay Quantity unless authorized changes are made by the Engineer, and will be the roadway length minus bridge lengths for each shoulder on which rumble indentations were constructed.

**456.05 PAYMENT:** Payment will be made at the Contract Unit Price bid per mile. Such payment shall be full compensation for furnishing all equipment and satisfactorily performing Work.

Payment will be made under:

Item No. 456. Indentation Rumble Strips – 3-foot Width .....per Mile

## **SECTION 461—RESEALING ROADWAY AND BRIDGE JOINTS AND CRACKS**

**461.01 DESCRIPTION:** This Work shall consist of removing the existing sealant material, cleaning the joint, and installation of silicone sealant in the roadway and bridge joints specified on the Plans. The Plans will designate the type of joint (transverse or longitudinal) location of joint (mainline, shoulders, ramps, acceleration/deceleration lanes) and type of joint (roadway, bridge) to be resealed and which type silicone to use (Type A, B, or C). The Engineer will determine the roadway and bridge cracks to be resealed and which type silicone to use. (If the Plans do not specify which joints to reseat, the Engineer will designate which ones are to be resealed after consulting with the State Maintenance Engineer.)

**461.02 MATERIALS:** All materials shall meet the requirements of the following:

Silicone Sealant and Bond Breakers .....Sub Section 833.06  
Epoxy Resin Adhesives .....Section 886

**461.03 CONSTRUCTION:**

A. REMOVE EXISTING SEALANT: The existing sealant in the joints is to be completely removed. The Contractor shall exercise utmost care in this removal and cleaning operation to minimize damaging or enlarging the existing width of the joint. Any damaged areas are to be repaired by the Contractor at no cost to the Department.

- B. **DETERMINE DEPTH OF EXISTING JOINT:** The depth of joint required shall be measured in order to determine if it is deep enough to accommodate the required thickness of sealant, any required bond breaker and provide the required recess below the riding surface. The backer rod is thicker after it is squeezed into the joint and this extra thickness must be taken into account when determining the required depth of joint. If necessary, the Contractor shall saw the existing joint deeper and wider to provide the required depth and width of joint specified on the Plans.
- C. **CLEANING THE JOINT:** The joint shall be thoroughly cleaned of all foreign material including oil, asphalt, curing compound, sealant adhesive, paint, rust, etc., and existing sealant, if still present. The Contractor shall demonstrate to the Engineer, that the proposed method of cleaning old sealants or foreign material from joints will not widen the joints by more than 0.040 inches. In addition, the method shall not alter the joint profile including rounding of the top corner, or alter the texture of the concrete riding surface. Cleaning of the joint using chemical agents will not be allowed. The cleaning process shall produce a new, clean concrete face on the vertical faces of the joint.
- D. **INSTALLING BOND BREAKERS:** Bond breakers (backer rod or tape) shall be selected and used in accordance with Section 833.06.B. Prior to installing a bond breaker, the joint or crack must be clean and dry. Any necessary cleaning, air blasting, or air-drying will be completed before placing the bond breaker and sealant. The backer rod shall be installed in the joint at the depth specified on the joint detail in the Plans or as directed by the Engineer and in accordance with Sub-Section 461.03.B. The diameter of backer rod used shall be at least 25% larger than the joint width. The width of some bridge joints may necessitate the use of a back up material other than the typically shaped round backer rod. Material is available in square or rectangular shapes. Also strips may be cut from sheet stock to fit properly into the joint. Approved bond breaking tapes may be used in place of backer rod in some applications. See Plan Details for various joint types.
- E. **INSTALLING SILICONE SEALANT:** Silicone sealant shall be installed as soon as possible after the joint or crack has been cleaned and the bond breaker installed. This will ensure that the joint or crack remains clean and dry. If the joint or crack does become contaminated, damp, or wet, the bond breaker must be removed, if it has been installed, the joint or crack cleaned and dried, and a new bond breaker installed prior to placing the sealant. The air temperature at time of placement must be 40 degrees F. or higher. Normally silicone sealant shall be applied by pumping only. The pump shall be of sufficient capacity to deliver the necessary volume of material to completely fill the joint to the specified width and height of sealant in one pass. The nozzle shall be of sufficient size and shape to closely fit into the joint and introduce the sealant inside the joint with sufficient pressure to prevent voids occurring in the sealant and to force

the sealant into contact with the joint faces. A caulking gun with cartridge may be used for touch up work, small applications such as vertical runs with Type A silicone in a bridge deck joint when Type B or C silicone is being used, and to seal voids and cracks with Type A silicone where Type B or C silicone might leak through. A caulking gun may also be used when sealing small cracks in the concrete.

Type A silicone sealant shall be tooled, after being placed, to provide the specified recess, thickness, and shape as shown on the Plans. Sufficient force shall be applied to the sealant in this tooling operation to force the sealant against the joint faces and ensure satisfactory wetting and bonding of the sealant to the joint faces.

Type B and C silicones are self-leveling and do not normally require tooling. Because of the consistency of these silicones it is imperative that the bond breaker completely close off all gaps and voids where the silicone might leak through. This may require that small pieces of backer rod be stuffed into these gaps and voids, a piece of bond breaking tape be put over the void, or the use of Type A silicone in that area. If Type "B" or "C" silicone is used and a backer rod is to be used it must be Type "M." Type "L" backer rod cannot be used with Type "B" and "C" silicone. Sealant shall be placed to conform to the specified recess and thickness shown in the plans.

- F. **CLEANING PAVEMENT:** After a joint or crack has been sealed, all surplus sealant or other residue on the pavement or structure surfaces shall be promptly removed.
- G. **OPENING TO TRAFFIC:** Traffic will not be permitted over sealed joints or cracks until the sealant is tack free, cured sufficiently to resist displacement of the sealant due to slab movement or other causes, and until debris from traffic does not imbed into the sealant.
- H. **SPECIAL REQUIREMENTS:** The following special requirements apply to this Work:
1. Air compressors used for cleaning joints and cracks shall be equipped with suitable traps capable of removing all surplus water and oil in the compressed air. The compressed air will be checked daily by the Engineer for contamination. No contaminated air shall be used. The compressor shall be capable of delivering compressed air at a continuous pressure of at least 90 psi.
  2. Unless otherwise specified on the Plans, the joints and cracks are to be resealed after any specified grinding and they shall be resealed within 30 calendar days after grinding in any one area is completed. If the Plans call for resealing prior to any specified grinding, the specified recess depth and depth of joint is to be increased by  $\frac{1}{4}$  -  $\frac{3}{8}$  inches to compensate for the depth of removal of pavement during grinding operation.

- 3. The Engineer shall determine the type (roadway or bridge), number, and location of cracks to be resealed. The crack is to be routed to depth specified on Plans by either wet or dry sawing with diamond or abrasive blades and any sawing residue or other contaminants thoroughly removed. The sealant shall then be applied following procedures previously specified for placing sealant in joints. The quantities of crack sealing on either roadways or bridges are to be included in pay quantities for resealing roadway joints and cracks.
- 4. The bridge joints, including approach slab, to be resealed will be specified on the Plans. Unless otherwise indicated on the Plans, only non-armored joints (one sealant receptacle and all concrete surfaces on joint faces) are to be resealed.
- 5. Any failure of the sealed joint due to: (a) adhesion or cohesion failure of joint material (b) unsatisfactory or improper workmanship by Contractor (c) damage by Contractor's operations or public traffic (d) damage to the sealant due to displacement of the sealant from slab movements or insufficient cure before opening to traffic will be cause for rejection, and the joint shall be repaired to the Engineer's satisfaction at no additional cost to the Department.

**461.04 MEASUREMENT:** Joints and cracks resealed in accordance with these Specifications and Plan details will be measured in linear feet.

**461.05 PAYMENT:** Work performed and materials furnished and used as specified in the Contract and measured as noted above will be paid for as follows:

- A. Roadway joints and cracks and bridge cracks resealed will be paid for at the Contract Price bid per linear foot.
- B. Bridge joints resealed will be paid for at the Contract Price bid per linear foot.

Such payment will be full compensation for furnishing all materials and for all equipment, tools, labor, and incidentals necessary to satisfactorily complete the Work.

Payment will be made under:

- Item No. 461. Resealing Roadway Joints and Cracks,  
Type\_\_\_\_\_per Linear Foot
- Item No. 461. Resealing Bridge Joints,  
Type\_\_\_\_\_per Linear Foot