

Section 02752

CONCRETE PAVEMENT JOINTS

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes the following:
1. Joints for concrete paving; concrete sidewalks; concrete driveways, curbs, and curb and gutters.
  2. Saw-cutting existing concrete or asphalt pavements for new joints.

1.02 MEASUREMENT AND PAYMENT

- A. Unit Prices.
1. No separate payment for street pavement expansion joints, with or without load transfer, is on linear foot basis. Include payment in unit price for Concrete Paving.
  2. No separate payment for horizontal dowels is on a unit price basis for each horizontal dowel. Include payment in unit price for Concrete Paving.
  3. No separate payment will be made for formed or sawed street pavement contraction joints and longitudinal weakened plane joints. Include payment in unit price for Concrete Paving.
  4. No separate payment will be made for joints for Curb, Curb and Gutter, Saw-Tooth Curb, Concrete Sidewalks, and Concrete Driveways. Include payment in unit price for Curb and Gutter, Concrete Sidewalks, and Concrete Driveways.
  5. Refer to Section 01270 – “Measurement and Payment” for unit price procedures.
- B. Stipulated Price (Lump Sum). If the Contract is a Stipulated Price Contract, payment for Work in this Section is included in the total Stipulated Price.

1.03 REFERENCES

- A. ASTM A 615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- B. ASTM D 994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).

- C. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- D. ASTM D 6690 – Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements
- E. TxDOT Tex-525-C – Tests for Asphalt and Concrete Joint Sealers

#### 1.04 SUBMITTALS

- A. Conform to requirements of Section 01330 – “Submittal Procedures”.
- B. Submit product data for joint sealing compound and proposed sealing equipment for approval.
- C. Submit samples of dowel cup, metal supports, and deformed metal strip for approval. Submit manufacturer’s recommendation for placing sealant(s).

#### 1.05 RELATED REQUIREMENTS

- A. Section 01270 – “Measurement and Payment”
- B. Section 01330 – “Submittal Procedures”

#### 1.06 – 1.13 NOT USED

### PART 2 PRODUCTS

#### 2.01 MANUFACTURER(S) (NOT USED)

#### 2.02 MATERIALS AND/OR EQUIPMENT

- A. Board Expansion Joint Material
  - 1. Filler board of selected stock. Use wood of density and type as follows:
    - a. Clear, all-heart cypress weighing no more than 40 pounds per cubic foot, after being oven dried to constant weight.
    - b. Clear, all-heart redwood weighing no more than 30 pounds per cubic foot, after being oven dried to constant weight.
- B. Preformed Expansion Joint Material

Bituminous fiber and bituminous mastic composition material conforming to ASTM D 994 and ASTM D 1751.
- C. Joint Sealing Compound

1. Conform joint sealants to one of sealant classes described in this section.
2. Conform hot-poured rubber-asphalt compound conforming to ASTM D 6690.
3. Two-component Synthetic Polymer.
  - a. Curing is to be by polymerization and not by evaporation of solvent or fluxing of harder particles.
  - b. Cure sufficiently at average temperature of  $25 \pm 1^\circ\text{C}$  ( $77 \pm 2^\circ\text{F}$ ) so as not to pick up under wheels of traffic in maximum 3 hours.
  - c. Performance requirements, when tested in accordance with TxDOT Tex-525-C, shall meet above curing times and requirements as follows:

<b>Cold-Extruded and Cold-Pourable (Self-Leveling) Specifications</b>	
<b>Property</b>	<b>Requirement</b>
Penetration, 25°C (77°F) 150 g Cone, 5 s, 0.1 mm (in.), maximum	130
Bond and Extension 50%, -29°C (-20°F), 3 cycles: <ul style="list-style-type: none"> <li>• Dry Concrete Block</li> <li>• Steel blocks (Primed, if recommended by manufacturer)</li> <li>• Steel blocks shall be used when armor joints are specified</li> </ul>	Pass Pass
Flow at 70°C (158°F)	None
Water content % by mass, maximum	5.0
Resilience: <ul style="list-style-type: none"> <li>• Original sample, % min. (cured)</li> <li>• Oven-aged at 70°C (158°F), % min.</li> </ul>	50 50
Cold-extruded material only – Cold Flow (10 minutes)	None

After bond and extension test, there shall be no evidence of cracking, separation, or other opening that is over 3 millimeters ( $\frac{1}{8}$  inch) deep in sealer or between sealer and test blocks.

- d. Provide cold-extruded type for vertical or sloping joints.
  - e. Provide self-leveling type for horizontal joints.
4. Self-Leveling, Low Modulus Silicone or Polyurethane Sealant for Asphaltic Concrete and Portland Cement Concrete Joints. This shall be a single component self-leveling silicone or polyurethane material that is compatible with both asphalt and concrete pavements. The sealer shall not require a primer for bond; a backer rod shall be required which is compatible with the sealant; no reaction shall occur between rod and sealant.

When tested in accordance with TxDOT Tex-525-C, self-leveling sealant shall meet following requirements:

<b>Self-Leveling, Low Modulus Silicone or Polyurethane Sealant</b>	
<b>Property</b>	<b>Requirement</b>
Tack Free Time, 25 ± 1°C (77 ± 2°F), minutes	120 maximum
Nonvolatile content, % by mass	93 minimum
Tensile Strength and 24 Hour Extension Test: • Initial, 10-day cure, 25 ± 1°C (77 ± 2°F), kPa (psi) • After Water Immersion, kPa (psi) • After Heat Aging, kPa (psi) • After Cycling, -29°C (-20°F), 50%, 3 cycles, kPa (psi) • 24 Hour Extension	<ul style="list-style-type: none"> <li>• 21 to 69 (3 to 10)</li> <li>• 21 to 69 (3 to 10)</li> <li>• 21 to 69 (3 to 10)</li> <li>• 21 to 69 (3 to 10)</li> <li>• Pass (All Specimens)                      After 24 hours, there shall be no evidence of cracking, separation or other opening that is over 3 mm (1/8 in.) deep at any point in the sealer or between the sealer and test blocks.</li> </ul>

D. Load Transmission Devices

1. Smooth, steel dowel bars conforming to ASTM A 615, Grade 60. When indicated on Plans, encase one end of dowel bar in approved cap having inside diameter 1/16 inch greater than diameter of dowel bar.
2. Deformed steel tie bars conforming to ASTM A 615, Grade 60.

E. Supports For Reinforcing Steel and Joint Assembly

Employ supports of approved shape and size that shall secure reinforcing steel and joint assembly in correct position during placing and finishing of concrete. Space supports as directed by Project Manager.

PART 3 EXECUTION

3.01 – 3.02 NOT USED

3.03 ERECTION/INSTALLATION APPLICATION AND/OR CONSTRUCTION

A. Placement

1. When new Work is adjacent to existing concrete pavement and existing joint is an expansion joint, place joints at same location as existing joints in adjacent

pavement. Dowels at existing joints shall be saw cut to eliminate possible damage to adjacent pavement that is scheduled to remain.

2. If the limit of removal of existing concrete or asphaltic pavement does not fall on existing joint, saw cut existing pavement minimum of 2 inches deep to provide straight, smooth joint surface without chipping, spalling or cracks.

B. Construction Joints

Place transverse construction joint wherever concrete placement must be stopped for more than 30 minutes. Place longitudinal construction joints at interior edges of pavement lanes using No. 6 deformed tie bars, 30 inches long and spaced 18 inches on centers.

C. Expansion Joints

Place  $\frac{3}{4}$ -inch expansion joints at radius points of curb returns for cross street intersections, or as located in adjacent pavement but no further than 80 feet apart. Use no boards shorter than 6 feet. When pavement is 24 feet or narrower, use not more than two lengths of board. Secure pieces to form straight joint. Shape board filler accurately to cross section of concrete slab. Use load transmission devices of type and size shown on Plans unless otherwise specified or shown as "No Load Transfer Device." Seal with joint sealing compound.

D. Contraction Joints

Place contraction joints at same locations as in adjacent pavement or at spaces indicated on Plans. Place smoothed, painted, and oiled dowels accurately and normal to joint. Seal groove with joint sealing compound.

E. Longitudinal Weakened Plane Joints

Place longitudinal weakened plane joints at spaces indicated on Plans. If more than 15 feet in width is poured, longitudinal joint must be saw cut. Seal groove with joint sealing compound.

F. Sawed Joints

1. Use sawed joints as alternate to contraction and weakened plane joints. Use circular cutter capable of cutting straight line groove minimum of  $\frac{1}{4}$ -inch wide. Maintain depth of one quarter of pavement thickness. Commence sawing as soon as concrete has hardened sufficiently to permit cutting without chipping, spalling, or tearing and prior to initiation of cracks. Once sawing has commenced, it shall be continued until completed. Make saw cut with one pass. Complete sawing within 24 hours of concrete placement. Saw joints at required spacing consecutively in sequence of concrete placement.

2. Concrete Saw: Provide sawing equipment adequate in power to complete sawing to required dimensions and within required time. Maintain ample supply of saw blades at work site during sawing operations. Maintain sawing equipment on job during concrete placement.

G. Joints for Curb, Curb and Gutter

Place  $\frac{3}{4}$  inch preformed expansion joints through curb and gutters at locations of expansion and contraction joints in pavement; at end of radius returns at street intersections and driveways; and at curb inlets. Maximum spacing shall be 120-foot centers.

H. Joints for Concrete Sidewalks

Provide  $\frac{3}{4}$ -inch expansion joints conforming to ASTM A 1751 along and across sidewalk at back of curbs, at intersections with driveways, steps, and walls; and across walk at intervals not to exceed 36 feet. Provide expansion joint material conforming to ASTM D 994 for small radius curves and around fire hydrants and utility poles. Extend the expansion joint material full depth of the slab.

I. Joints for Concrete Driveways

Provide  $\frac{3}{4}$  inch expansion joints conforming to ASTM D 1751 across driveway in line with street face of sidewalks, at existing concrete driveways, and along intersections with sidewalks and other structures. Extend expansion joint material full depth of slab.

J. Joint Sealing

1. Seal joints only when surface and joints are dry, ambient temperature is above 50°F and less than 85°F, and weather is not foggy or rainy.
2. Use joint sealing equipment in like new working condition throughout joint sealing operation, and be approved by Project Manager. Use concrete grooving machine or power-operated wire brush and other equipment such as plow, brooms, brushes, blowers or hydro or abrasive cleaning as required to produce satisfactory joints.
3. Clean joints of loose scale, dirt, dust, and curing compound. The term joint includes wide joint spaces, expansion joints, dummy groove joints or cracks, either preformed or natural. Remove loose material from concrete surfaces adjacent to joints.
4. Fill joints neatly with joint sealer to depth shown. Pour sufficient joint sealer into joints so that, upon completion, surface of sealer within joint shall be  $\frac{1}{4}$  inch above level of adjacent surface or at elevation as directed

3.04 – 3.08 NOT USED

3.09 PROTECTION

- A. Maintain joints in good condition until completion of Work.
- B. Replace damaged joints material with new material as required by this Section.

3.10 SCHEDULES (NOT USED)

END OF SECTION