

**SECTION 02840
CONCRETE PAVEMENT JOINTS**

PART I: GENERAL

1.1 GENERAL REQUIREMENTS

- A. Joints for concrete paving, concrete sidewalks, concrete driveways, mountable curbs, curbs and curb and gutters.
- B. Saw-cutting existing concrete or asphalt pavements for new joints.

1.2 MEASUREMENT AND PAYMENT

- A. Unit Prices:
 - 1. Payment for street pavement expansion joints, with or without load transfer, is on a linear foot basis.
 - 2. No separate payment shall be made for horizontal dowels. Include payment in the unit price for Concrete Paving, Concrete Driveways, Concrete Sidewalks or Curb and Gutter.
 - 3. No separate payment shall be made for formed or sawed street pavement contraction joints and longitudinal weakened plane joints. Include payment in the unit price for Concrete Paving.
 - 4. No separate payment shall be made for joints for Mountable Curbs, Curb, Curb and Gutter, Saw-tooth Curb, Concrete Sidewalks and Concrete Driveways. Include payment in the unit price for Mountable Curbs, Curbs, Curb and Gutter, Saw-tooth Curb, Concrete Sidewalks and Concrete Driveways.
 - 5. Payment shall be made for Preformed Expansion Joints on a linear foot basis only when field conditions require that sidewalk be moved adjacent to existing concrete structure (i.e., street, back of curb, etc.).
 - 6. Refer to Section 01270 – Measurement and Payment for unit price procedures.
- B. Stipulated Price (Lump Sum):
 - 1. If Contract is Stipulated Price Contract, payment for work in this Section is included in Total Stipulated Price.

1.3 REFERENCES

- A. ASTM – American Society for Testing and Materials.
 - 1. ASTM A615 – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 2. ASTM D994 – Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
 - 3. ASTM D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - 4. ASTM D3405 – Standard Specification for Joint Sealants, Hot-

Applied, for Concrete and Asphalt Pavements.

- B. CFTS – City of Friendswood Technical Specifications.
- C. TxDOT – Texas Department of Transportation.
 - 1. TxDOT Tex-525-C – Tests for Asphalt and Concrete Joint Sealers.

1.4 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 caps, metal supports and deformed metal strip for approval. Submit manufacturer's recommendation for placing sealant(s).

PART II: PRODUCTS

2.1 BOARD EXPANSION JOINT MATERIAL

- A. Filler board of selected stock: Use wood of density and type as follows:
 - 1. Clear, all-heart cypress weighing no more than forty pounds per cubic foot (40 Lbs/Cf), after being oven dried to constant weight.
 - 2. Clear, all-heart redwood weighing no more than thirty pounds per cubic foot (30 Lbs/Cf), after being oven dried to constant weight.

2.2 PREFORMED EXPANSION JOINT MATERIAL

- A. Bituminous fiber and bituminous mastic composition material conforming to ASTM D994 and ASTM D1751.

2.3 JOINT SEALING COMPOUND

- A. Joint sealants shall conform to one (1) of the sealant classes described in this Section.
- B. Hot-poured rubber-asphalt compound to conform to ASTM D3405.
- C. Two (2) component Synthetic Polymer.
 - 1. Curing is to be by polymerization and not by evaporation of solvent or fluxing of harder particles.
 - 2. Cure sufficiently at average temperature of seventy-seven degrees Fahrenheit (77° F) plus or minus two degrees Fahrenheit ($\pm 2^\circ$ F) so as not to pick up under wheels of traffic in a maximum of three hours (3 Hrs).
 - 3. Performance requirements, when tested in accordance with TxDOT Tex-525-C, shall meet above curing times and requirements as specified in TABLE 4.1 – COLD EXTRUDED AND COLD POURABLE (SELF LEVELING) SPECIFICATIONS in this Section.
 - 4. Provide cold-extruded type for vertical or sloping joints.
 - 5. Provide self-leveling type for horizontal joints.

- D. 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 shall be 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 requirements as specified in TABLE 4.2 – SELF-LEVELING, LOW MODULUS OR POLYURETHANE SEALEANT SPECIFICATIONS in this Section.

2.4 LOAD TRANSMISSION DEVICES

- A. Smooth, steel dowel bars conforming to ASTM A615, Grade 60. When indicated on the Drawings, encase one (1) end of dowel bar in approved cap having inside diameter one-sixteenth inch (1/16 In) greater than diameter of dowel bar.
- B. Deformed steel tie bars conforming to ASTM A615, Grade 60.

2.5 SUPPORTS FOR REINFORCING STEEL AND JOINT ASSEMBLY

- A. 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 the Project Manager.

PART III: EXECUTION

3.1 PLACEMENT

- A. When new Work is adjacent to existing concrete, place joints at same location as existing joints in adjacent pavement.
- B. If limit of removal of existing concrete or asphalt pavement does not fall on existing joint, saw cut existing pavement a minimum of two inches (2 In) deep to provide straight, smooth joint surface without chipping, spalling or cracks.
- C. All new concrete joints shall be placed as shown in the City of Friendswood Standard Details.

3.2 CONSTRUCTION JOINTS

- A. Place transverse construction joint wherever concrete placement must be stopped for more than thirty minutes (30 Min). Place longitudinal construction joints at interior edges of pavement lanes using #6 (3/4 In) deformed tie bars, thirty inches (30 In) long and spaced sixteen inches (16 In) on centers and use keyways.

3.3 EXPANSION JOINTS

- A. Place three-quarters inch (3/4 In) wide expansion joints at radius points of curb returns for cross street intersections or as located in adjacent pavement but no further than sixty feet (60 Ft) apart. Use no boards shorter than six feet (6 Ft). When pavement is twenty-four feet (24 Ft) or narrower, use not more than two (2) 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 the Drawings unless otherwise specified or shown as "No Load Transfer Device." Seal with joint sealing compound.

3.4 CONTRACTION JOINTS

- A. Place contraction joints at same locations as in adjacent pavement or at spaces indicated on the Drawings.
- B. Use sawed joints as alternate to contraction and weakened plane joints. Use circular cutter capable of cutting straight line groove a minimum of one-quarter inch (1/4 In) wide. Maintain depth of one-quarter (1/4) 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, continue until completed. Make saw cut with one (1) pass. Complete sawing within twenty-four hours (24 Hrs) of concrete placement. Saw joints at required spacing consecutively in sequence of concrete placement.
- C. 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.

3.5 LONGITUDINAL WEAKENED PLANE JOINTS

- A. Place longitudinal weakened plane joints at spaces indicated on the Drawings. If more than fifteen feet (15 Ft) in width is poured, longitudinal joint must be saw cut. Seal sawed or tooled groove with joint sealing compound.

3.6 EXPANSION AND CONTRACTION JOINTS FOR MOUNTABLE CURB, CURB, CURB AND GUTTER

- A. Place three-quarters inch (3/4 In) wide preformed expansion joints through mountable curb, curb, curb and gutters at locations of expansion and contraction joints in adjacent pavement, at end of radius returns, at street intersections, at driveways, at curb inlets and any other location directed by the Project Manager. Maximum spacing between joints shall be fifteen feet (15 Ft) for contraction joints and sixty feet (60 Ft) for expansion joints.

- 3.7 EXPANSION AND CONTRACTION JOINTS FOR CONCRETE SIDEWALKS
- A. Provide three-quarters inch (3/4 In) wide expansion joints conforming to ASTM A1751 across sidewalk at intervals no greater than sixty feet (60 Ft) and along sidewalks at back of curbs, at intersections with driveways, steps and walls. Provide expansion joint material conforming to ASTM D994 for small radius curves and around fire hydrants and utility poles. Extend expansion joint material full depth of slab. Saw-cut or tool contraction joints into sidewalk at intervals not exceeding five feet (5 Ft).
- 3.8 EXPANSION JOINTS FOR CONCRETE DRIVEWAYS
- A. Provide three-quarters inch (3/4 In) wide expansion joints conforming to ASTM D1751 across driveway at street pavement, at right-of-way line, at existing concrete driveways and intersections with sidewalks and other structures or as shown on the Drawings. Extend expansion joint material full depth of slab. Contraction joints are not normally required, unless shown on the Drawings or as directed by the Project Manager.
- 3.9 JOINT SEALING
- A. Seal joints only when surface and joints are dry, ambient temperature is above fifty degrees Fahrenheit (50° F) and less than eighty-five degrees Fahrenheit (85° F) and weather is not foggy or rainy.
 - B. Use joint-sealing equipment in like new working condition throughout joint sealing operation and be approved by the 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.
 - C. Clean joints of loose scale, dirt, dust and curing compound. The term joint includes wide joint spaces, expansion joints, contraction joints and cracks, either preformed or natural. Remove loose material from concrete surfaces adjacent to joints.
 - D. 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 one-quarter inch (1/4 In) above level of adjacent surface or at elevation as directed by the Project Manager.
- 3.10 PROTECTION
- A. Maintain newly-placed joints in good condition until completion of the Work.
 - B. Replace damaged joints material with new material as required by this Section.

PART IV: TABLES

4.1 COLD EXTRUDED AND COLD POURABLE (SELF LEVELING) SPECIFICATIONS.

| COLD EXTRUDED AND COLD POURABLE (SELF-LEVELING) SPECIFICATIONS | |
|---|--------------------|
| PROPERTY | REQUIREMENT |
| Penetration, 25° C (77° F), 150g Cone, 5 s, 0.1 mm (in.), maximum | 130 |
| Bond and Extension 50%, -29° C (-20° F), 3 cycles: | |
| Dry Concrete Block | Pass |
| Steel blocks (Primed, if recommended by manufacturer)* | Pass |
| Flow at 70° C (158° F) | None |
| Water content % by mass, maximum | 5.0 |
| Resilience: | |
| Original sample, % minimum (cured) | 50 |
| Oven-aged at 70° C (158° F), % minimum | 50 |
| Cold Extruded material only – Cold Flow (10 minutes) | None |

After bond extension test, there shall be no evidence of cracking, separation or other opening that is over one-eighth inch (1/8 in.) deep in sealer or between sealer and test blocks.

* Steel blocks shall be used when armor joints are specified.

4.2 SELF-LEVELING, LOW MODULUS OR POLYURETHANE SEALEANT SPECIFICATIONS

| SELF-LEVELING, LOW MODULUS SILICONE OR POLYURETHANE SPECIFICATIONS | |
|---|-------------------------|
| PROPERTY | REQUIREMENT |
| 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) | 21 to 69 (3 to 10) |
| After Water Immersion, kPa (psi) | 21 to 69 (3 to 10) |
| After Heat Aging, kPa (psi) | 21 to 69 (3 to 10) |
| After Cycling -29° C (-20° F), 50%, 3 cycles, kPa (psi) | 21 to 69 (3 to 10) |
| 24 Hour Extension | Pass (All Specimens) |

After twenty-four hours (24 Hrs), there shall be no evidence of cracking, separation or other opening that is over one eighth inch(1/8 in.) deep at any point in the sealer or between the sealer and test blocks.

END OF SECTION