See dowel assemblies for fabrication details.

See Bar Size Table for Contraction Joints on Sheet 2.

Locate "DW" joint at a mid-panel location between future 'C' or 'CD' joints. Place no closer than 5 feet to a 'C' or 'CD' joint.

Place bars within the limits shown under dowel assemblies.

Edge with 1/8 inch tool for length of joint. For HT joint, remove header block and board when second slab is placed.

Unless specified otherwise, use 'CD' transverse contraction joints in mainline pavement when 'T' is greater or equal to 8 inches. Use 'C' joints when 'T' is less than 8 inches.

'RT' joint may be used in lieu of 'DW' joint at the end of the day's work. Remove any pavement damaged due to the drilling at no additional cost to the Contracting Authority.

See detail C

See detail A or B

See detail C

See detail C

See detail C

See detail C

See detail C

See detail C

See detail C

See detail C

See detail C

See detail C

See detail C

See detail C

See detail C

See detail C

See detail C

See detail C

See detail C

See detail C

See detail C

See detail C

See detail C

See detail C
**BAR PLACEMENT**
(Appplies to all joints unless otherwise detailed.)

**DETAIL A**
(Saw cut formed by conventional concrete sawing equipment.)

**DETAIL B**
(Saw cut formed by approved early concrete sawing equipment.)

**SECTION A-A**
(Detail at Edge of Pavement)

**TRANSVERSE CONTRACTION**

Saw 'CD' joint to a depth of T/3 ± 1/4''; saw 'C' joint to a depth of T/4 ± 1/4''.

When tying into old pavement, represents the depth of sound PCC.

---

<table>
<thead>
<tr>
<th>Bar Size Table for Contraction Joints</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>T</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>&lt; 8''</td>
</tr>
<tr>
<td>≥ 8'' but &lt; 10''</td>
</tr>
<tr>
<td>≥ 10''</td>
</tr>
</tbody>
</table>

Tubular Dowel Bars will not be allowed for RD joints.

---

**LEGEND**
- **Existing Pavement**
- **Proposed Pavement**

**DETAIL C**
(Crack or Joint Line)
11 Bar supports may be necessary for fixed form paving to ensure the bar remains in a horizontal position in the plastic concrete.

12 Sawing or sealing of joint not required.

The following joints are interchangeable, subject to the pouring sequence:

- 'BT-1', 'L-1', and 'KT-1'
- 'KT-2' and 'L-2'
- 'KT-3' and 'L-3'

### Joint Bars

#### 'KT-1'
- 5 Bars, 30" Long at 12" Centers
- See Detail E

#### 'KS-1'
- 5 Bars at 12" Centers
- See Detail E

#### 'KS-2'
- 5 Bars 30" Long at 12" Centers
- See Detail E

#### 'KT-2'
- 6 Bars at 12" Centers
- See Detail E

#### 'L-1'
- 5 Bars at 12" Centers
- See Detail E

#### 'KS-3'
- 5 Bars at 12" Centers
- See Detail E

#### 'L-2'
- 5 Bars at 12" Centers
- See Detail E

#### 'L-3'
- 5 Bars at 12" Centers
- See Detail E

### Bar Length and Spacing

#### JOINTS

- **'BT'**
  - **Joint** Bars
  - < 8" 'BT-1' #4 36" Long at 30" Centers
  - ≥ 8" 'BT-2' #5 30" Long at 30" Centers

- **'KT'**
  - **Joint** Bars
  - ≥ 8" 'KT-1' #4 30" Long at 30" Centers
  - ≥ 8" 'KT-2' #4 30" Long at 15" Centers

- **'L'**
  - **Joint** Bars
  - < 8" 'L-1' #4 36" Long at 30" Centers
  - ≥ 8" 'L-2' #5 36" Long at 15" Centers

- **'KS'**
  - **Joint** Bars
  - ≥ 8" 'KS-1' #5 30" Long at 12" Centers
  - ≥ 8" 'KS-2' #5 30" Long at 12" Centers

### Keyed Joint for Adjacent Slabs

- **'K'**
  - (Where T is 8" or more)

- **'B'**
  - **Joint** Bars
  - ≥ 8" 'B-1' #5 30" Long at 12" Centers
  - ≥ 8" 'B-2' #5 30" Long at 30" Centers

### Longitudinal Contraction

- **'L'**
  - **Joint** Bars
  - ≥ 8" 'L-1' #4 36" Long at 30" Centers
  - ≥ 8" 'L-2' #5 36" Long at 15" Centers

### Keyed Joint

- **'K'**
  - **Joint** Bars
  - ≥ 8" 'K-1' #4 30" Long at 30" Centers
  - ≥ 8" 'K-2' #4 30" Long at 15" Centers
  - ≥ 8" 'K-3' #5 30" Long at 15" Centers

### Bar Length and Spacing

#### JOINTS

- **'K'**
  - **Joint** Bars
  - ≥ 8" 'K-1' #4 30" Long at 30" Centers
  - ≥ 8" 'K-2' #4 30" Long at 15" Centers
  - ≥ 8" 'K-3' #5 30" Long at 15" Centers

### Sawing or sealing of joint not required.
**KEYWAY DIMENSIONS**

<table>
<thead>
<tr>
<th>Keyway Type</th>
<th>Pavement Thickness</th>
<th>T/2</th>
<th>A/2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>8&quot; or greater</td>
<td>$\frac{1}{16}$</td>
<td>$\frac{2}{3}$</td>
</tr>
<tr>
<td>Narrow</td>
<td>Less than 8&quot;</td>
<td>$\frac{1}{4}$</td>
<td>2&quot;</td>
</tr>
</tbody>
</table>

---

**LEGEND**

- **Existing Pavement**
- **Proposed Pavement**

---

**TIE BAR PLACEMENT**

(Appplies to all joints unless otherwise detailed.)

**DETAIL D-1**

(Required when specified in the contract documents.)

- When tying into old pavement, $T$ represents the depth of sound PCC.
- Sealant or cleaning not required.

**DETAIL D-2**

(Required when the Department of Transportation is not the Contracting Authority, or when specified in the contract documents.)

**DETAIL D-3**

(Required when the Department of Transportation is the Contracting Authority, or when specified in the contract documents.)

**DETAIL E**

**LONGITUDINAL CONTRACTION**
FIGURE 7010.101

DOWEL PLACEMENT
(Appplies to all joints unless otherwise detailed.)

See Detail H

1'' EXPANSION JOINT
(View at Back of Curb)

1'' Nominal

Top of Curb
Top of Slab
Joint Filler

Resilient Joint Filler

Top of Curb
Top of Slab
Joint Filler

Resilient Joint Filler

Top of Curb
Top of Slab
Joint Filler

Resilient Joint Filler

Top of Curb
Top of Slab
Joint Filler

Resilient Joint Filler

Top of Curb
Top of Slab
Joint Filler

Resilient Joint Filler

Joint Sealant Material

Joint Sealant Material

Joint Sealant Material

Joint Sealant Material

Joint Sealant Material

Joint Sealant Material

Joint Sealant Material

Joint Sealant Material

Joint Sealant Material

Joint Sealant Material

Joint Sealant Material

Joint Sealant Material

Joint Sealant Material

Joint Sealant Material

Joint Sealant Material

JOINT IN CURB
(View at Back of Curb)

JOINT IN CURB
(View at Back of Curb)

JOINT IN CURB
(View at Back of Curb)

JOINT IN CURB
(View at Back of Curb)

JOINT IN CURB
(View at Back of Curb)

SECTION B-B

DETAIL F

DETAIL G

DETAIL H

DOWELED EXPANSION JOINTS

<table>
<thead>
<tr>
<th>Type</th>
<th>Width</th>
<th>Filler Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED</td>
<td>1''</td>
<td>Resilient (Detail F)</td>
</tr>
<tr>
<td>EE</td>
<td>2''</td>
<td>Flexible Foam (Detail F)</td>
</tr>
<tr>
<td>EF</td>
<td>3 1/2''</td>
<td>Flexible Foam (Detail F)</td>
</tr>
</tbody>
</table>

BAR SIZE TABLE FOR DOWELED EXPANSION JOINTS

<table>
<thead>
<tr>
<th>Diameter</th>
<th>&lt; 8''</th>
<th>≥ 8'' but &lt; 10''</th>
<th>≥ 10''</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4</td>
<td>1/4</td>
<td>1 3/4</td>
<td>1 1/2</td>
</tr>
</tbody>
</table>

Tubular Dowel Bars will not be allowed for expansion joints.

LEGEND

Existing Pavement

Proposed Pavement

Joint Filler Material

Tire Buffings

18'' Long Dowel at 12'' Centers

DOWELED EXPANSION JOINT

See Bar Size Table for Doweled Expansion Joints.

Edge with 1/4 inch tool for length of joint indicated if formed; edging not required when cut with diamond blade saw.

See Dowel Assemblies for fabrication details and placement limits. Coat the free end of dowel bar to prevent bond with pavement. At intake locations, dowel bars may be cast-in-place.

Predrill or preform holes in joint material for appropriate dowel size.

Compact tire buffings by spading with a square-nose shovel.
Use 18 inch long dowel bars with a tolerance of ± 1/8 inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within ± 1/8 inch.

Use wires with a minimum tensile strength of 50 ksi.

Details apply to both transverse contraction and expansion joints.

Weld alternately throughout.

0.306 inch diameter wire. Wire sizes shown are the minimum required.

Maximum 0.177 inch diameter wire, welded or friction fit to upper side rail, both sides.

Measured from the centerline of dowel bar to bottom of lower side rail + 1/4 inch.

Per lane width, install a minimum of 8 anchor pins evenly spaced (4 per side), to prevent movement of assembly during construction. Anchor assemblies placed on pavement or PCC base with devices approved by the Engineer.

If dowel basket assemblies are required for curbed pavements, the assembly length is based on the jointing layout. See PV-101, sheet 8.

Ensure dowel basket assembly centerline is within 2 inches of the intended joint location longitudinally and has no more than 1/4 inch horizontal skew from end of basket to end of basket.

<table>
<thead>
<tr>
<th>DOWEL ASSEMBLIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>21</td>
</tr>
</tbody>
</table>

LONGITUDINAL SECTION

Dowel Assemblies

Dowel Height and Diameter for Doweled Contraction Joints

<table>
<thead>
<tr>
<th>T</th>
<th>DH</th>
<th>23 (Solid)</th>
<th>23 (Tubular)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7&quot; to 7 1/2&quot;</td>
<td>3 1/4&quot;</td>
<td>3 1/4&quot;</td>
<td>3 1/4&quot;</td>
</tr>
<tr>
<td>8&quot; to 8 1/2&quot;</td>
<td>4 1/2&quot;</td>
<td>4 1/2&quot;</td>
<td>4 1/2&quot;</td>
</tr>
<tr>
<td>10&quot; to 10 1/2&quot;</td>
<td>5 1/4&quot;</td>
<td>5 1/4&quot;</td>
<td>5 1/4&quot;</td>
</tr>
<tr>
<td>12&quot; to 13&quot;</td>
<td>6 1/4&quot;</td>
<td>6 1/4&quot;</td>
<td>6 1/4&quot;</td>
</tr>
</tbody>
</table>

Tubular Dowel Bars will not be allowed for RD joints.

CONTRACTION JOINTS
19. Use 18 inch long dowel bars with a tolerance of ± 1/8 inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within ± 1/8 inch.

20. Use wires with a minimum tensile strength of 50 ksi.

21. Details apply to both transverse contraction and expansion joints.

22. Weld alternately throughout.

23. 0.306 inch diameter wire. Wire sizes shown are the minimum required.

24. Maximum 0.177 inch diameter wire, welded or friction fit to upper side rail, both sides.

25. Measured from the centerline of dowel bar to bottom of lower side rail + 1/4 inch.

26. Per lane width, install a minimum of 8 anchor pins evenly spaced (4 per side), to prevent movement of assembly during construction. Anchor assemblies placed on pavement or PCC base with devices approved by the Engineer.

27. If dowel basket assemblies are required for curbed pavements, the assembly length is based on the jointing layout. See PV-101, sheet 8.

28. Ensure dowel basket assembly centerline is within 2 inches of the intended joint location longitudinally and has no more than 1/4 inch horizontal skew from end of basket to end of basket.

29. Clip and remove center portion of tie during field assembly.

30. 1/4 inch diameter wire.

---

**Dowel Height and Diameter**

<table>
<thead>
<tr>
<th>Joint Type</th>
<th>Minimum Tube Length</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;ED&quot;</td>
<td>1&quot;</td>
<td>3 1/4&quot;</td>
</tr>
<tr>
<td>&quot;EE&quot;</td>
<td>2&quot;</td>
<td>4 1/4&quot;</td>
</tr>
<tr>
<td>&quot;EF&quot;</td>
<td>3/4&quot;</td>
<td>6 1/4&quot;</td>
</tr>
</tbody>
</table>

Tubular Dowel Bars will not be allowed for expansion joints.

---

**Dowel Assemblies**

---

**Section Thru Expansion Joint**

---

**Joint Opening and Expansion Tube Extension**

<table>
<thead>
<tr>
<th>Joint Type</th>
<th>Minimum Tube Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;ED&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>&quot;EE&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>&quot;EF&quot;</td>
<td>3/4&quot;</td>
</tr>
</tbody>
</table>

---

**Notes**

- Spaces between dowel bars are nominal dimensions with a 1/2" allowable tolerance.
- For doweled expansion joints, tubular dowel bars will not be allowed.
- Use wires with a minimum tensile strength of 50 ksi.
- Use 18 inch long dowel bars with a tolerance of ± 1/8 inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within ± 1/8 inch.
- Details apply to both transverse contraction and expansion joints.
- Weld alternately throughout.
- Maximum 0.177 inch diameter wire, welded or friction fit to upper side rail, both sides.
- Measured from the centerline of dowel bar to bottom of lower side rail + 1/4 inch.
- Per lane width, install a minimum of 8 anchor pins evenly spaced (4 per side), to prevent movement of assembly during construction. Anchor assemblies placed on pavement or PCC base with devices approved by the Engineer.
- If dowel basket assemblies are required for curbed pavements, the assembly length is based on the jointing layout. See PV-101, sheet 8.
- Ensure dowel basket assembly centerline is within 2 inches of the intended joint location longitudinally and has no more than 1/4 inch horizontal skew from end of basket to end of basket.
- Clip and remove center portion of tie during field assembly.
- 1/4 inch diameter wire.

**Dowel Assemblies**

---

**Notes**

- Spaces between dowel bars are nominal dimensions with a 1/2" allowable tolerance.
- Use wires with a minimum tensile strength of 50 ksi.
- Use 18 inch long dowel bars with a tolerance of ± 1/8 inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within ± 1/8 inch.
- Details apply to both transverse contraction and expansion joints.
- Weld alternately throughout.
- Maximum 0.177 inch diameter wire, welded or friction fit to upper side rail, both sides.
- Measured from the centerline of dowel bar to bottom of lower side rail + 1/4 inch.
- Per lane width, install a minimum of 8 anchor pins evenly spaced (4 per side), to prevent movement of assembly during construction. Anchor assemblies placed on pavement or PCC base with devices approved by the Engineer.
- If dowel basket assemblies are required for curbed pavements, the assembly length is based on the jointing layout. See PV-101, sheet 8.
- Ensure dowel basket assembly centerline is within 2 inches of the intended joint location longitudinally and has no more than 1/4 inch horizontal skew from end of basket to end of basket.
- Clip and remove center portion of tie during field assembly.
- 1/4 inch diameter wire.
FIGURE 7010.101
OPTIONAL LEG SHAPES

ANCHOR PIN
Anchor Pin #1/0 Gauge Wire (0.306" diameter)

2" 1" min. 12" min.
45°

Back of Curb
Top of Pavement
Longitudinal Joint
Edge of Pavement
Centerline Joint
Gutterline Joint

PLACEMENT LIMITS
(Rural Section)

PLACEMENT LIMITS
(Curb and Gutter - Gutterline Jointing)

PLACEMENT LIMITS
(Curb and Gutter - 1/4 or 1/3 Point Jointing)

BEND AROUND DOWEL
D + 1/8" max.

1/4 or 1/3 Point Longitudinal Joint

Back of Curb

Use 18 inch long dowel bars with a tolerance of ± 1/8 inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within ± 1/8 inch.

Use wires with a minimum tensile strength of 50 ksi.

Details apply to both transverse contraction and expansion joints.

Diameter of bend around dowel is dowel diameter + 1/8 to 3/16 inches.

For uniform lane widths: 3" - 6". For taper and variable width pavements: 3" - 12".

DOWEL ASSEMBLIES

REVISION
04-21-20

REVISIONS:
Modified Dowel Assemblies on Sheets 6 and 7 to eliminate reference to 8' 11-1/2" pavements.

For DJT Jointing:
18 inch long dowel bars with a tolerance of ± 1/8 inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within ± 1/8 inch.

For DJT Jointing:
Use wires with a minimum tensile strength of 50 ksi.

Details apply to both transverse contraction and expansion joints.

Diameter of bend around dowel is dowel diameter + 1/8 to 3/16 inches.

For uniform lane widths: 3" - 6". For taper and variable width pavements: 3" - 12".

DOWEL ASSEMBLIES

PV-101