This standard provides Glass Fiber Reinforced Polymer (GFRP) reinforcement details for the top mat of slab reinforcement. The bottom mat reinforcement and other slab details are as shown elsewhere in the plans. Design is controlled by allowable crack width. The Contractor has the option to provide GFRP reinforcement, in accordance with the details shown, when epoxy-coated steel bars are specified for the top mat reinforcement. The Contractor may provide an alternate GFRP slab design with calculations signed and sealed by a Professional Engineer.

**GENERAL NOTES:**
- Designed according to AASHTO LRFD Bridge Design Specifications, and AASHTO URF Bridge Design Guide Specifications For GFRP-Reinforced Concrete Bridge Decks and Traffic Railings.
- These details are restricted to Prestressed Concrete I-Girder spans with a 8 ½" slab and up to a 10'-0" girder spacing.
- This standard provides Glass Fiber Reinforced Polymer (GFRP) reinforcement details for the top mat of slab reinforcement. The bottom mat reinforcement and other slab details are as shown elsewhere in the plans.
- Design is controlled by allowable crack width.
- The Contractor has the option to provide GFRP reinforcement, in accordance with the details shown, when epoxy-coated steel bars are specified for the top mat reinforcement. The Contractor may provide an alternate GFRP slab design with calculations signed and sealed by a Professional Engineer.

**MATERIAL NOTES:**
- Provide GFRP bars, conforming to Item 440, for all top mat reinforcement. Provide Grade 60 steel bars for all bottom mat reinforcement as shown elsewhere in plans.
- Provide bar laps, where required, as follows:
  - #5 GFRP bar = 3'-0" or 3'-4" (whichever is greater)
  - #6 GFRP bar = 3'-0"
- For bottom mat reinforcement, provide Grade 60 steel bars.
- Provide GFRP bars, conforming to Item 440, for all bottom mat reinforcement as shown elsewhere in plans.
- The Contractor has the option to provide GFRP reinforcement, in accordance with the details shown, when epoxy-coated steel bars are specified for the top mat reinforcement. The Contractor may provide an alternate GFRP slab design with calculations signed and sealed by a Professional Engineer.

**PLAN FOR SLABS WITHOUT BREAKBACKS**
- Showing top mat reinforcement only.

**PARTIAL TYPICAL TRANSVERSE SECTION**
- See Slab Design Table for details.

**SECTION OF THICKENED SLAB END**
- Showing PCP Option 1. Options 2 similar.

**SECTION A-A**
- Showing Thickened Slab End with PCP Option 1. Option 2 similar.

**NOTE:**
- Face of abutment backwall or face of slab.
- Bars are continuous through joint.
- Thickened slab end dimensioned perpendicular to face of slab, centerline interior bent or face of inverted-T stem.

**GENERAL NOTES:**
- Designed according to AASHTO LRFD Bridge Design Specifications, and AASHTO URF Bridge Design Guide Specifications For GFRP-Reinforced Concrete Bridge Decks and Traffic Railings.
- These details are restricted to Prestressed Concrete I-Girder spans with a 8 ½" slab and up to a 10'-0" girder spacing.
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**PLAN FOR SLABS WITH BREAKBACKS**

Showing top mat reinforcement only.

1. See Slab Design Table for Bar A spacing.
2. Bars are continuous through joint.
3. Thickness slab end dimension perpendicular to face of backwall, centerline interior bent or face of inverted-T stem.
4. Tie Bars AA to bottom of Bars G in this location.
5. \[ A = \frac{W_1 - \theta}{\tan \theta} \]
6. \[ C = \frac{W_2}{2} - \frac{W_1 - \theta}{\tan \theta} \]
7. Only required on slabs with breakbacks.

**BAR TABLE**

<table>
<thead>
<tr>
<th>Bar</th>
<th>Size</th>
<th>Order Spacing</th>
<th>Length of #5 GFRP bar per Sq Ft</th>
<th>Length of #6 GFRP bar per Sq Ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>#6</td>
<td>7.333' or less</td>
<td>7'-4&quot;</td>
<td>2'-9&quot;</td>
</tr>
<tr>
<td>K</td>
<td>#5</td>
<td>8.333' or less</td>
<td>6'-10&quot;</td>
<td>2'-12&quot;</td>
</tr>
<tr>
<td>T</td>
<td>#5</td>
<td>9.333' or less</td>
<td>5'-10&quot;</td>
<td>2'-1&quot;</td>
</tr>
<tr>
<td>10.000' or less</td>
<td>5'-10&quot;</td>
<td>2'-12&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DESIGN PROPERTIES TABLE**

<table>
<thead>
<tr>
<th>Bar Size</th>
<th>Ef</th>
<th>Fr</th>
<th>Ce</th>
<th>k</th>
</tr>
</thead>
<tbody>
<tr>
<td>#5</td>
<td>5.7x10^6</td>
<td>93</td>
<td>0.7</td>
<td>0.9</td>
</tr>
<tr>
<td>#6</td>
<td>5.7x10^6</td>
<td>90</td>
<td>0.7</td>
<td>0.9</td>
</tr>
</tbody>
</table>

GFRP properties assumed for design.

Ef = Modulus of elasticity (ksi)
Fr = Tensile strength for product certification (ksi)
Ce = Environmental reduction factor
k = Bond coefficient

**GFRP SLAB TOP MAT REINFORCEMENT PRESTRESSED CONC I-GIRDER SPANS**

<table>
<thead>
<tr>
<th>SPANS</th>
<th>PRESTRESSED CONC I-GIRDER SPANS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**IGFRP**

- **CONT**
- **HIGHWAY**
- **DIST**
- **SECT**
- **C**
- **AK**
- **T**
- **DW**
- **DN**
- **FILE**
- **DATE**
- **GPT**
- **DV**
- **TLD**
- **GPT**

**PRESTRESSED CONC I-GIRDER REINFORCEMENT**

Showing top mat reinforcement only.

**Continent Joint or Controlled Joint**

FOR SLABS WITH BREAKBACKS

- Bars AA (#6) (For slabs without breakbacks)
- Bars G (#6) (For slabs without breakbacks)
- Bars K (#5) (For slabs with breakbacks)