Cross Flow Horizontal Discharge Cooling Towers

FRS Series Cross Flow Cooling Towers
Protec FRS Series cooling towers are factory or field assembled, cross flow cooling towers, designed to serve commercial, institutional and industrial loads. The range of cooling towers offered in the FRS Series is for single, double and multi-cell configurations. This heavy-duty cooling tower designed of non-corrosive materials is energy efficient and its cross flow design offers ease of maintenance. All major components of the Protec FRS Series: motors, axial fans, fan drive assembly and fill/media have been developed to ensure maximum efficiency with low energy consumption. The FRS Series’ small footprint provides space savings, ensuring the cooling tower meets the limited space requirements of new construction projects as well as the strict space requirements of replacement projects.

**Design Features**

**WATER DISTRIBUTION SYSTEM**
The FRP open type gravity flow hot water distribution system is non-corrosive and is designed for non-clogging operation and ease of inspection.

**STEEL STRUCTURE & FASTENERS**
All supporting steel members are available in stainless steel or galvanized. All fasteners are stainless steel.

**FILL/MEDIA**
The special designed fill is vacuum formed of PVC film with chemical and distortion resistance and is suitable for operation with inlet water of 130 degrees F. The configuration of the filler incorporates the function of drift eliminator, louver and wet deck surface.

**MOTOR & DRIVE**
The fan motors are totally enclosed fan cooled (TEFC) foot mounting. The fans are belt driven and are located in the fan stack ensuring free, and smooth air discharge together with high efficiency and low energy consumption.

**AXIAL FAN**
Corrosion resistant fan blades are adjustable pitch for maximum utilization of rated horsepower and optimum performance. The aerodynamic shape together with tip speed ensure a lower noise level.

**WARRANTY**
Protec warrants that the Mechanical Equipment and accessories (whether factory or field installed) shall be free from defects in material or workmanship for a period of one (1) year from the date of shipment and agrees to repair or replace, at its option, any parts that fail during said one (1) year period due to any such defects which would not have occurred had reasonable care been taken, provided that such parts have been inspected by Protec and found defective and provided the mechanical equipment and accessories have been given normal and proper usage and all parts and controls remain unaltered. This warranty does not apply to accident, improper use, alterations or damage resulting from operation not conforming with Protec’s maintenance instructions and standards of operation.

Protec makes no warranty of merchantability of products or of their fitness for any purpose or any other express or implied warranty which extends beyond the limited warranty above. Protec’s liability for any and all losses and damages resulting from defects shall in no event exceed the cost of repair or replacement of parts found defective upon examination by Protec. In no event shall Protec be liable for incidental indirect or consequential damages or damages for injury to persons or property.

Protec shall not be responsible for freight to or from its plant in connection with the inspection, repair or replacement of parts under the terms of this limited warranty nor for cost of removal or installation.

Protec shall not be responsible for freight to or from its plant in connection with the inspection, repair or replacement of parts under the terms of this limited warranty nor for cost of removal or installation.
1. TEFC Motor
2. Fiberglass reinforced polyester gravity flow hot water distribution basin
3. Structural metal components available in stainless steel or galvanized steel. All fasteners stainless steel
4. Fiberglass reinforced polyester cold water basin
5. Belt drive assembly

6. Corrosion resistant axial fan
7. Access Ladder
8. Fiberglass reinforced polyester casing panels
9. PVC fill/media w/integral louvers and drift eliminators
10. Internal walkway
### FRS Series

#### Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>Nominal Tons</th>
<th>Length</th>
<th>Width</th>
<th>Height</th>
<th>Inlet</th>
<th>Outlet</th>
<th>Fan Diameter</th>
<th>Qty. of Fans</th>
<th>Motor H.P.</th>
<th>Qty. of Motors</th>
<th>Dry Weight</th>
<th>Operating Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRS 80-2.2</td>
<td>73</td>
<td>118</td>
<td>90 1/2&quot;</td>
<td>123 1/2&quot;</td>
<td>4&quot;</td>
<td>4&quot;</td>
<td>70 3/4&quot;</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2061</td>
<td>5059</td>
</tr>
<tr>
<td>FRS 80-4</td>
<td>89</td>
<td>118</td>
<td>90 1/2&quot;</td>
<td>123 1/2&quot;</td>
<td>5&quot;</td>
<td>5&quot;</td>
<td>70 3/4&quot;</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>2093</td>
<td>5091</td>
</tr>
<tr>
<td>FRS 80-5.5</td>
<td>98</td>
<td>118</td>
<td>90 1/2&quot;</td>
<td>123 1/2&quot;</td>
<td>5&quot;</td>
<td>5&quot;</td>
<td>70 3/4&quot;</td>
<td>1</td>
<td>7.5</td>
<td>1</td>
<td>2125</td>
<td>5124</td>
</tr>
<tr>
<td>FRS 100-4</td>
<td>115</td>
<td>118</td>
<td>102 1/2&quot;</td>
<td>141&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>70 3/4&quot;</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>2257</td>
<td>5596</td>
</tr>
<tr>
<td>FRS 100-5.5</td>
<td>128</td>
<td>118</td>
<td>102 1/2&quot;</td>
<td>141&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>70 3/4&quot;</td>
<td>1</td>
<td>7.5</td>
<td>1</td>
<td>2290</td>
<td>5628</td>
</tr>
<tr>
<td>FRS 100-7.5</td>
<td>142</td>
<td>118</td>
<td>102 1/2&quot;</td>
<td>141&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>70 3/4&quot;</td>
<td>1</td>
<td>10</td>
<td>1</td>
<td>2323</td>
<td>5661</td>
</tr>
<tr>
<td>FRS 150-5.5</td>
<td>160</td>
<td>132</td>
<td>118&quot;</td>
<td>158 1/2&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>94 1/2&quot;</td>
<td>1</td>
<td>7.5</td>
<td>1</td>
<td>2875</td>
<td>6897</td>
</tr>
<tr>
<td>FRS 150-7.5</td>
<td>178</td>
<td>132</td>
<td>118&quot;</td>
<td>158 1/2&quot;</td>
<td>8&quot;</td>
<td>8&quot;</td>
<td>94 1/2&quot;</td>
<td>1</td>
<td>10</td>
<td>1</td>
<td>2908</td>
<td>6930</td>
</tr>
<tr>
<td>FRS 150-11</td>
<td>201</td>
<td>132</td>
<td>118&quot;</td>
<td>158 1/2&quot;</td>
<td>8&quot;</td>
<td>8&quot;</td>
<td>94 1/2&quot;</td>
<td>1</td>
<td>15</td>
<td>1</td>
<td>3003</td>
<td>7025</td>
</tr>
<tr>
<td>FRS 250-11</td>
<td>266</td>
<td>185 1/2&quot;</td>
<td>145 3/4&quot;</td>
<td>175 3/4&quot;</td>
<td>6&quot; x 2</td>
<td>8&quot;</td>
<td>118&quot;</td>
<td>1</td>
<td>15</td>
<td>1</td>
<td>4640</td>
<td>11348</td>
</tr>
<tr>
<td>FRS 250-15</td>
<td>294</td>
<td>185 1/2&quot;</td>
<td>145 3/4&quot;</td>
<td>175 3/4&quot;</td>
<td>6&quot; x 2</td>
<td>8&quot;</td>
<td>118&quot;</td>
<td>1</td>
<td>20</td>
<td>1</td>
<td>4651</td>
<td>11358</td>
</tr>
<tr>
<td>FRS 250-18.5</td>
<td>315</td>
<td>185 1/2&quot;</td>
<td>145 3/4&quot;</td>
<td>175 3/4&quot;</td>
<td>6&quot; x 2</td>
<td>8&quot;</td>
<td>118&quot;</td>
<td>1</td>
<td>25</td>
<td>1</td>
<td>4849</td>
<td>11557</td>
</tr>
<tr>
<td>FRS 305-15</td>
<td>207</td>
<td>186 1/2&quot;</td>
<td>167&quot;</td>
<td>207&quot;</td>
<td>5&quot; x 2</td>
<td>8&quot; x 2</td>
<td>70 3/4&quot;</td>
<td>2</td>
<td>20 x 2</td>
<td>2</td>
<td>8756</td>
<td>19800</td>
</tr>
<tr>
<td>FRS 450-15</td>
<td>363</td>
<td>186 1/2&quot;</td>
<td>250&quot;</td>
<td>207&quot;</td>
<td>5&quot; x 3</td>
<td>8&quot; x 2</td>
<td>70 3/4&quot;</td>
<td>3</td>
<td>20 x 3</td>
<td>3</td>
<td>13134</td>
<td>31240</td>
</tr>
<tr>
<td>FRS 610-15</td>
<td>545</td>
<td>186 1/2&quot;</td>
<td>332 1/2&quot;</td>
<td>207&quot;</td>
<td>5&quot; x 4</td>
<td>10&quot; x 2</td>
<td>70 3/4&quot;</td>
<td>4</td>
<td>20 x 4</td>
<td>4</td>
<td>17512</td>
<td>39600</td>
</tr>
</tbody>
</table>

**NOTES:**
1. Nominal tons are based upon 95°F Hot Water - 85°F Cold Water - 78°F Wet Bulb and 3 GPM/Ton
2. For foundation dimensions and weight distribution, consult factory.
3. Continuing engineering research results in steady improvements. Therefore, these specifications and data are subject to change without notice. Consult with factory for current certified dimensions.
A. Provide and install a cross flow induced draft horizontal discharge cooling tower PROTEC Series FRS, flow rates, capacities and design temperatures shall be as indicated on the drawings.

B. Tower manufacturer must be a member of the Cooling Technology Institute (CTI) and cooling tower shall be certified as per CTI Std. 201. Cooling tower manufacturer shall also guarantee capacities.

C. Structural framework shall be bolted with stainless steel fasteners. Casing and basin shall be molded of corrosion-resistant fiberglass reinforced polyester (FRP) material.

D. The fill/media shall be film-type polyvinyl chloride (PVC). The fill shall have integral louvers and drift eliminators. The fill shall be able to withstand operating temperatures up to 130 degrees F. Fill shall be hung from longitudinal support tubes.

E. Hot water basin shall be molded of corrosion-resistant fiberglass reinforced polyester (FRP) material of the open gravity type. Standard inlet connection for customer piping shall be through a support attached to the splash boxes. A water diverter is to be provided on the hot water basin floor under the splash box to break the velocity of water and distribute it evenly throughout the hot water basin floor.

F. Fan shall be belt driven multi-blade adjustable pitch axial type, corrosion resistant construction. Motors shall be single speed, TEFC, 1.15 service factor with class F insulation, 1800 RPM and suitable for the electrical rating shown on the drawings.

G. Fan cylinder shall be constructed of corrosion-resistant fiberglass reinforced polyester (FRP) multi-segment type bolted together at vertical joints. A welded steel fan guard shall be furnished with all models.

H. A ladder to allow inspection and accessibility to the fan motor and upper portion of the tower cell shall be provided for all models. Each tower cell shall have an internal walkway.

I. All fiberglass reinforced polyester (FRP) materials shall contain UV (Ultraviolet) inhibitors and an exterior gel coat.

J. All fasteners shall be stainless steel and the rest of the structural steel components shall be (1) ______

Note: (1) Stainless steel or galvanized