Fosroc Auracast Solutions for Pretensioned Spun High Strength Concrete Pile

www.fosroc.com
Since the company’s beginnings over 80 years ago, Fosroc has developed into an international leader in delivering Constructive Solutions for projects across a broad range of market segments including transport, utilities, industrial and general buildings.

Fosroc’s commitment to customer service and technical support is second to none. We work closely with architects, structural engineers, contractors and owners to best understand their requirements. Together we can develop a bespoke solution for a construction project, adding value and becoming more than just a materials supplier, but a solution provider.

Fosroc has an extensive network of offices and manufacturing locations across Europe, the Middle East, Africa, India, North, South and East Asia, and is further represented in other regions across the world by distributor and licensee partners.

Selecting from the full portfolio of Fosroc products and services and integrating expert technical support, world class customer service and innovation, Fosroc goes beyond just product selling to ensure that we partner with our customers to deliver complete constructive solutions.

WHAT IS PRETENTIATED SPUN HIGH STRENGTH CONCRETE PILE?

Compressive strength: more than 80 MPa

PHC Pile
- By NAC (Non Auto clave) and AC (Auto Clave).
- By Product length: 5m - 15m.
- By Diameter divide: Normally φ300 - φ1,200
  - By Vailli: Prestressed
    - A type - 3.92N/mm² (40kg/cm²)
    - B type - 7.85N/mm² (80kg/cm², Normal products)
    - C type - 9.81N/mm² (100kg/cm²)

More Information
- The quality depends on centrifugal force and speed
- Steam curing system
  - NAC: 65°C to 85°C
  - AC is 180°C.

Properties of PHC pile
> Design bearing capacity 78,5MPa(Nm²) Steam curing system
> Excellent resisting force for hitting power
> Offering competitive construction planning
> Resisting internal forces for bending moment
> Minimised drying creep & drying shrinkage
How to Manufacture PHC pile


Fabricating PC steel form:
PC steel bar > Fabricating PC steel > JIG Assembly

Cement + Sand + Gravel + Admixtures + Water

Compaction Condition

<table>
<thead>
<tr>
<th>Item</th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rpm</td>
<td>85</td>
<td>180</td>
<td>480</td>
<td>650</td>
<td>-</td>
</tr>
<tr>
<td>Time (sec)</td>
<td>150</td>
<td>60</td>
<td>150</td>
<td>270</td>
<td>630</td>
</tr>
</tbody>
</table>

The quality depends on centrifugal force & speed. The pile section is divided into several segregated layers such as laitance, paste, mortar, and concrete layers.

Fabricating PC steel form
Concrete input into
Tensioning steel member
Steam curing
High Temperature and Pressure Curing
Stockpile

Mixing Concrete
Form Assembly
Centrifugal casting:
Demoulding
Auto Clave
Shipment

2nd high temperature and high pressure curing (AC: 180°C & 10 Bar)

Total 8 hours curing

Steam curing

Maintenance: 4hrs
2nd high temperature and high pressure curing (AC: 180°C & 10 Bar)
AURACAST PHC 500

Auracast PHC 500 has been designed for PHC pile’s requiring high early strength, good surface finishing, excellent resisting force for hitting power & bending moment. Designed to help maximize production efficiency and saving costs.

**Benefits**
- High early strength
- Good surface finishing
- Excellent resisting force for hitting power
- Offer competitive construction planning
- Resisting internal forces for bending moment
- Minimised drying creep & drying Shrinkage
- Superior resistance to freezing, thawing, acid & chemical attack

**Performance**
- Compressive Strength: 60MPa and 90 MPa
- Workability: 30 minutes
- Initial 15 mins.: Pouring concrete to mould to reach spinning area
- Last 15 mins.: Waiting time at spinning area for mould to be spined.
- Compressive strength after steam curing min. 65.6 MPa (82% at 1 Day)
- Achieved target compressive strength: At 14 days
- Superior resistance to freezing, thawing, acid & chemical attack

**Applications**
- Bridges
- Building Foundations
- Civil Engineering Works
- Marine Structure
- Piled Embankments
- Utility poles

**TEST RESULTS**

<table>
<thead>
<tr>
<th>Type</th>
<th>Required Slump</th>
<th>1 Day</th>
<th>3 Day</th>
<th>7 Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPC</td>
<td>&gt;60</td>
<td>&gt;70</td>
<td>&gt;80</td>
<td></td>
</tr>
<tr>
<td>CEM III</td>
<td>&gt;60</td>
<td>&gt;70</td>
<td>&gt;80</td>
<td></td>
</tr>
<tr>
<td>Auracast PHC500</td>
<td>No Slump</td>
<td>66-70</td>
<td>72-75</td>
<td>80-83</td>
</tr>
</tbody>
</table>

**CONCRETE MIXING DESIGN**

<table>
<thead>
<tr>
<th>Type</th>
<th>W/B</th>
<th>S/A</th>
<th>W</th>
<th>B</th>
<th>C</th>
<th>GGBS</th>
<th>Additive for HSC</th>
<th>AD(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPC</td>
<td>25</td>
<td>37</td>
<td>0.25</td>
<td>470-520</td>
<td>80%</td>
<td>20%</td>
<td>4 - 8%</td>
<td>1.5 - 2.2%</td>
</tr>
<tr>
<td>CEM III</td>
<td>27</td>
<td>33</td>
<td>0.27</td>
<td>420-470</td>
<td>80%</td>
<td>20%</td>
<td>4 - 8%</td>
<td>1.5 - 2.2%</td>
</tr>
</tbody>
</table>

**FOSROC PRODUCTS & SOLUTIONS**

**FOSROC ADMIXTURE PRODUCTS:**

- **Auramix series**
  - Superplasticizers with extended workability and ultra high performance concrete for RMC.
- **Conplast A, N C & Resivit**
  - Accelerating admixtures for Precast.
- **Conplast WP Series**
  - Concrete integral waterproofing admixtures.
- **Sprayset Series**
  - High performance shotcrete accelerators.
- **Auracast Series**
  - Superplasticizers with excellent water reducing & compressive strength for Precast concrete industry.
- **Conplast AE Series**
  - Air entraining admixtures.
- **Auramix SP & V series**
  - High performance viscosity modifying agents.
- **Concure Series**
  - Concrete curing compound.
- **Structuro Series**
  - Superplasticizers with extended workability & ultra high performance concrete.
- **Conplast F Series**
  - Foaming agent.
- **Conplast UW**
  - Underwater concrete admixtures system.
- **Conplast AE Series**
  - Air entraining admixtures.
- **Auramix SP & V series**
  - High performance viscosity modifying agents.
- **Concure Series**
  - Concrete curing compound.
- **Structuro Series**
  - Superplasticizers with extended workability & ultra high performance concrete.
- **Conplast P & SP Series**
  - Plasticizers with high performance concrete.
- **Conplast Controller**
  - Shrinkage reducing admixtures.
- **Conplast CN & CNI**
  - Calcium nitrite corrosion inhibiting admixtures.
- **Reebol & Auramol**
  - Mould release agent.

**FOSROC SOLUTIONS:**

- **Admixtures**
  - Liquid or powder products, which modify and improve the properties of fresh and hardened concrete or mortar.
- **Surface Treatments**
  - Concrete curing membrane and other products to enhance the concrete surface.
- **Concrete Repair & Protection**
  - Primers, cement and resin based materials to reinstate defective concrete.
- **Grinding Aids**
  - Specially formulated to offer increased grinding efficiency for cement.
- **Waterproofing**
  - Liquid applied & preformed membranes for waterproofing of structures from basement to roof.
- **Grouts & Anchors**
  - Cement and epoxy resin grouts for construction applications including grouting baseplates, machine bases, rails and all sort of voids in new construction and repair work.
- **Flooring**
  - Coatings, toppings and screeds to provide improved performance to new and existing concrete floors.
- **Jointing Materials**
  - Flexible infill materials used for joints in pavements, cladding and other components.
Fosroc offers a full range of construction chemical solutions, helping to protect structures throughout the world. Please refer to our brochures, which include:

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