Spacer Technologies
Parchem / Max Frank

Parchem Construction Supplies is the National Distributor of the Max Frank range of concrete fibre spacers. Combined with the controlled and permeable formwork liner, Zemdrain®, offers an unrivalled concrete durability solution, particularly for the cover zone of reinforced structures. This brochure gives an overview of the concrete fibre spacers available in the market. Special spacer requirements are also possible, please contact your local Parchem sales office for more information.

® Denotes DuPont registered trademark.
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</table>
Spacers made of fibre concrete

The correct quality and depth of concrete cover to the reinforcement is of great importance, both for the durability of reinforced and prestressed concrete structures and for their fire resistance. According to EN1992-1-1:2004 Design of concrete structures. General rules for building “the reinforcement is to be placed with a fixing cover $c_v$, so that there is a high degree of probability that the minimum reinforcement cover $c_{min}$ is achieved”. For this spacers are required to maintain cover before and during concreting and they must not affect the serviceability and durability of the structural member after concreting.

FRANK fibre concrete spacers match all of the above requirements and more.

Durability
Protection of reinforcement against carbonation, chloride ingress and other aggressive substances

Stability
Safe transmission of static forces into the concrete

Fire resistance
Protection of reinforcement against high temperatures during fire events

45 years experience in the manufacture and site use of fibre concrete spacers and distance tubes.

Quality fibre concrete spacers with different properties
We manufacture spacers to meet your requirements.

Material quality “Standard”
Spacer properties match the standard requirements of most international specifications.
Certified to most international standards (DIN, BS, etc.).

Material quality “Premium”
Spacer properties match the highest durability requirements of most international specifications.
Certified to most international standards (DIN, BS, etc.).

Applications for Standard and Premium grade fibre-reinforced concrete spacers
This chart allows you to select the appropriate grade of spacers.

<table>
<thead>
<tr>
<th>Application</th>
<th>Standard</th>
<th>Material quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural elements with normal durability requirements</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Structural elements with higher durability requirements</td>
<td>no</td>
<td>yes*</td>
</tr>
<tr>
<td>Resistance to high levels of sulphate</td>
<td>no</td>
<td>yes*</td>
</tr>
<tr>
<td>Acid resistance (down to $pH = 2$)</td>
<td>no</td>
<td>yes*</td>
</tr>
<tr>
<td>Approved for potable water use</td>
<td>yes**</td>
<td>no</td>
</tr>
<tr>
<td>Resistance to fire</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>White cement or colour mixtures</td>
<td>no</td>
<td>yes*</td>
</tr>
<tr>
<td>Specific customer requirements</td>
<td>no</td>
<td>yes*</td>
</tr>
</tbody>
</table>

* Premium grade is adapted for specialist applications
** Standard grade is adapted for this application
Fibre concrete – the optimum material in combination with in-situ concrete

- Consistent high compressive strength with resistance to tilting
- Excellent bond with in-situ concrete – no hairline cracks between the spacer and the concrete
- Extremely suitable for impermeable concrete
- Excellent physical and chemical resistance
- Fire resistant to the highest requirements specified in EN 13501-1:2002 – class A1
- Consistent and accurate dimensional tolerances and do not deform under temperature fluctuations
- Quick and easy installation with a number of fixing options
- Spacers with special dimensions and shapes can be manufactured at short notice
- Manufactured in accordance with EN ISO 9001: 2000
**Tunnel construction**
Secure fixing in any position even with overhanging reinforcement

**Precast Plants**
Spacers for lightly loaded applications

**Drinking water applications**
Certified products for use in drinking water applications

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![Diagram of spacers application](image)

- **Formwork panel – fibre concrete permanent formwork**
- **Zemdrain® – Controlled Permeability**
- **Formwork Liner**
- **Bar spacers**
- **Sealing cones**
- **Single spacers**
- **Distance tubes**
Consider deflection of thin supporting bars during concreting. Check resistance of spacers to extra loading for heavy reinforcement.

The fixing interval is based primarily on the accepted deflection at maximum loading, e.g. when the reinforcement is walked on especially during concreting. When placing bar spacers in the tension zone, we also recommend the use of short lengths staggered across the formwork.

### Structural element: slabs

**Spacer fixing distances $S_1$**

- **Supporting bar diameter** $d_s$  | **Max. $S$** | **Columns** | **Beams**
- ≤ 10 mm | 0.50 m | 0.25 m | 0.50 m
- 12 to 20 mm | 1.00 m | 0.25 m | 0.50 m
- > 20 mm | 1.25 m | 0.75 m | 0.75 m

**Spacer fixing distances $S_2$**

- **Bar diameter $d_s$**  | **Columns** | **Beams**
- ≤ 10 mm | 2 pieces | 2 pieces
- > 10 mm | ≥ 3 pieces | ≥ 3 pieces
- max. $S_2$ | 0.75 m | 0.50 m

### Structural element: beams and columns

**Supporting bar diameter $d_s$**  | **Max. $S_1$ in longitudinal direction**
- ≤ 6.5 mm | 0.50 m | 3.0 | 2.5 | 1.33
- > 6.5 mm | 0.70 m | 1.6 | 1.4 | 0.84

**Spacer fixing distances $S_1$ and number per m$^2$ of wall**

- **Supporting bars** $d_s$  | **Max. $S_1$** | **Required quantity m$^2$ wall**
- ≤ 8 mm | 0.70 m | 4 | 1.0 | 1.4
- > 10 mm | 1.00 m | 2 | 1.0 | 0.8

1) and per wall side

### Structural element: walls

- **Supporting bars** $d_s$  | **Max. $S_1$** | **Required quantity m$^2$ wall**
- ≤ 8 mm | 0.70 m | 4 | 1.0 | 1.4
- > 10 mm | 1.00 m | 2 | 1.0 | 0.8
**Single spacers**

The use of spacers manufactured from fibre concrete ensures that the concrete cover specified for structures and structural elements made of reinforced concrete is adhered to, both before and during concreting. We offer you the optimum spacer for every application.

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### Single Spacers Summary of Features

**Without tying wire**

**With tying wire**

**With steel clips**

**With plastic clip**

<table>
<thead>
<tr>
<th>Type of products</th>
<th>AO</th>
<th>AD</th>
<th>AK</th>
<th>AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawing</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>Horizontal reinforcement</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>Vertical reinforcement</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>Exposed concrete</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
</tbody>
</table>

### Material Quality

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Standard</th>
<th>Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete cover</td>
<td>15 – 100 (other dimensions are possible)</td>
<td>20 – 100</td>
</tr>
<tr>
<td>Load-bearing capacity</td>
<td>N &gt; 3000</td>
<td>N &gt; 3000</td>
</tr>
<tr>
<td>Performance class</td>
<td>P2</td>
<td>P2</td>
</tr>
<tr>
<td>Compressive strength</td>
<td>N/mm² 50</td>
<td>N/mm² 60 (&gt; 100 N/mm² can be produced)</td>
</tr>
<tr>
<td>Permitted deformations</td>
<td>mm ≤ 1</td>
<td>mm ≤ 1</td>
</tr>
<tr>
<td>Water absorption</td>
<td>% after 30 min ≤ 3</td>
<td>% after 30 min ≤ 2</td>
</tr>
<tr>
<td>Exposure class2)</td>
<td>X0/XC/XD/XS/XF/XA</td>
<td>X0/XC/XD/XS/XF/XA</td>
</tr>
<tr>
<td>Construction materials class</td>
<td>A1 – not flammable</td>
<td>A1 – not flammable</td>
</tr>
<tr>
<td>Fire resistance class</td>
<td>F30 – F180</td>
<td>F30 – F180</td>
</tr>
<tr>
<td>Requirement CS3)</td>
<td>F / T / A</td>
<td>F / T / A</td>
</tr>
<tr>
<td>I.S.A.T (after 10 sec.)</td>
<td>m³/sec &lt; 0.5</td>
<td>m³/sec &lt; 0.25</td>
</tr>
<tr>
<td>Chloride diffusion</td>
<td>m²/sec x 10⁻¹² &lt; 5.0</td>
<td>m²/sec x 10⁻¹² &lt; 1.0</td>
</tr>
<tr>
<td>Rapid chloride permeability (RCP)</td>
<td>n/a &lt; 1000 (very low)</td>
<td>n/a &lt; 1000 (very low)</td>
</tr>
<tr>
<td>Adhesion to concrete</td>
<td>N/mm² 0.4</td>
<td>N/mm² 0.4</td>
</tr>
</tbody>
</table>

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1) provided that tilting or displacement is not possible
2) group type according to CS data sheet “spacers”
   - B1 = point-supporting, not fixed
   - B2 = point-supporting, fixed
   - C1 = linear-supporting, not fixed
   - C2 = linear-supporting, fixed
3) Certified to the requirements of the CS data sheet “spacers”:
   - F = increased freeze-thaw resistance
   - T = Suitability for structural elements subject to extreme temperature variations
   - A = watertight and resistant to chemical attack
Bar spacers

The excellent material properties of fibre concrete ensure high compressive strength, impermeability to water, fire resistance, application stability and thus guarantee the durability of the concrete surface. The shape and design of our bar spacers provides for safe and cost-effective use on site.

<table>
<thead>
<tr>
<th>Type</th>
<th>FAHD</th>
<th>FAHV</th>
<th>FAHKS</th>
<th>FAHKB</th>
<th>FAHSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triangular</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Square</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snake + Snake N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Banana + Banana N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rail</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Material quality summary of features**

<table>
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<tr>
<th>Material property</th>
<th>Standard</th>
<th>Premium</th>
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<tbody>
<tr>
<td>Concrete cover</td>
<td>mm</td>
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<td>N</td>
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<tr>
<td>Performance class</td>
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<td>P2</td>
</tr>
<tr>
<td>Compressive strength</td>
<td>N/mm²</td>
<td>50</td>
</tr>
<tr>
<td>Permitted deformations</td>
<td>mm</td>
<td>&lt; 2</td>
</tr>
<tr>
<td>Permitted tolerances</td>
<td>mm</td>
<td>± 1</td>
</tr>
<tr>
<td>Water absorption</td>
<td>% after 30 min</td>
<td>&lt; 3</td>
</tr>
<tr>
<td>Exposure class</td>
<td>X0/XC/XD/XS/XF/XA</td>
<td>X0/XC/XD/XS/XF/XA</td>
</tr>
<tr>
<td>Construction materials class</td>
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<td>Fire resistance class</td>
<td>F30 – F180</td>
<td>F30 – F180</td>
</tr>
<tr>
<td>Requirement CS</td>
<td>F / T / A</td>
<td>F / T / A</td>
</tr>
<tr>
<td>I.S.A.T (after 10 sec.)</td>
<td>ml/m²/sec</td>
<td>&lt; 0.5</td>
</tr>
<tr>
<td>Chloride diffusion</td>
<td>m²/sec x 10⁻¹²</td>
<td>&lt; 5.0</td>
</tr>
<tr>
<td>Rapid chloride permeability (RCP)</td>
<td>coulomb</td>
<td>n/a</td>
</tr>
<tr>
<td>Adhesion to concrete</td>
<td>N/mm²</td>
<td>0.4</td>
</tr>
</tbody>
</table>

* Exposure class to EN 206-1:2001
** with longitudinal dead limit (350 mm or ≤ 2 x h or ≤ 0.25 x b, whereby h = structural element thickness and b = structural element

Our complete programme of single spacers and bar spacers is manufactured in “Standard” material quality.

“Premium” are manufactured on request.
**Spacers without tying wire**

**For horizontal reinforcement**
Spacer type 4013 without tying wire – can be used for horizontal single bar reinforcement or mesh reinforcement.

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**Spacers with tying wire**

**For horizontal and vertical reinforcement**
Spacer type 3572 D – this type of multi-cover spacer gives the option of reduced stock levels.

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**Spacers with steel clips**

**For vertical reinforcement**
Spacer type ZS with 2 steel clips - secure fixing at the crossing point for vertical reinforcement by means of a 2 mm thick steel clip and the preformed groove.

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**Spacers with shuttlecock clips**

**No tying wire within the concrete cover**
Spacers with shuttlecock clips secure the exact concrete cover for reinforcing steel mesh or reinforcement not subject to foot traffic, e.g. in a precast plant.
**Reinforcement end supports**

*Used as stands for vertical single rebars*

Just press onto rebar end – self-clipping; very high loading capacity – cannot tip over.

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**RONDO round spacer with metal clip**

*For use with prefabricated reinforcement cages*

Round spacers help to minimise damage to the formwork face during installation of the reinforcement.

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**Triangular bar spacers**

*For horizontal mesh and rod reinforcement – made with continuous reinforcing fibres*

Application stability – triangular bar spacers always provide the same concrete cover in any position.

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**“Snake” type bar spacers**

*For horizontal mesh and rod reinforcement*

Suitable for rapid and inexpensive fixing of mesh and rod reinforcement

Stable and non-tipping, simple laying

Available with notches for reduced contact with formwork. “Snake N” type.
"Rail” type bar spacers
For horizontal mesh and rod reinforcement
Suitable for rapid and inexpensive fixing of mesh reinforcement
Large supporting surface for insulation

Triangular concave bar spacers
For horizontal mesh and rod reinforcement – lightweight version made with continuous reinforcing fibres
Triangular concave bar spacers do not provide the same concrete cover in every position they are placed. If there is a danger that they will tip over, you should use triangular bar spacers instead.

"Banana” type bar spacers
For horizontal mesh reinforcement
Suitable for rapid and inexpensive fixing of mesh reinforcement
Standard length 0.33 m specially made for R-mats and standard length 0.25 m specially made for Q-mats provide an optimum application stability and are non-tipping
Available with notches for reduced contact with formwork. “Banana N” type.

"Rail B” type bar spacers
For horizontal mesh reinforcement
High load bearing capacity
Excellent bond to concrete
Protects formwork
Rapid and efficient laying
Secure application
Distance tubes made of fibre concrete

Distance tubes are used to secure the concrete wall thickness using reusable tie bars.

- High compressive strength
- Large contact area, therefore no pressing into the formwork
- Conforms to EN1992-1-1:2004 (concrete and reinforced concrete) and to DIN 18216 (formwork ties for concrete formwork)
- Can be manufactured as impermeable shutter ties
- Fire resistance class F30 – F180, suitable for fire walls F90 to EN 13501-1:2002
- Sound-proof due to glued stoppers

The appropriate distance tube system for every wall structure.

<table>
<thead>
<tr>
<th>Wall Thickness</th>
<th>System Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 0.40 m</td>
<td>With sealing cap</td>
</tr>
<tr>
<td>0.40 – 0.60 m</td>
<td>With cone 10 mm</td>
</tr>
<tr>
<td>0.60 m+</td>
<td>With cone 30/50 mm</td>
</tr>
</tbody>
</table>

The appropriate distance tube system for every wall structure.

Frank distance tubes can also be used in the construction of watertight concrete structures.
FRANK products are approved for drinking water applications and fulfil these strict requirements. Their use in the drinking water sector is permitted without any restrictions. It is therefore possible to build impermeable drinking water structures.

Zemdrain® formwork liner - for uncontaminated, virtually blowhole free, low porosity concrete surfaces.

For more detailed information on the Zemdrain® product visit our website at www.parchem.com.au.
ISO 9001 Quality Assurance
With its manufacturing facilities fully accredited to ISO 9001, Parchem offers its customers the assurance of independently audited quality systems.

We’ve got the gear you need

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