5. Hempcrete Installation: Floors

5.1 Hempcrete Insulation Between Suspended Floor Constructions

5.1.1 The Mix

<table>
<thead>
<tr>
<th>Material</th>
<th>For 1m³</th>
<th>For 1m² (150mm thick insulation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulcore/Hemp wood</td>
<td>1000Ltr (100kg)</td>
<td>158Ltr (15.8kg)</td>
</tr>
<tr>
<td>Insulime</td>
<td>125kg</td>
<td>20kg (0.8kg bag)</td>
</tr>
<tr>
<td>Water</td>
<td>175 - 200Ltr</td>
<td>27.5 - 31.5Ltr</td>
</tr>
</tbody>
</table>

5.1.2 Hempcrete floor mix has the following properties:

- Density: 275 - 295kg/m³
- 41 - 44kg/m² (150mm thickness)
- Elasticity: 3 MPa after 90 days
- Resistance to compression: 0.1-0.15 MPa after 90 days
- R rating: 3.2

<table>
<thead>
<tr>
<th>Material</th>
<th>Proportion of Aggregates (Hemp Fragments) within Total Dry Weight</th>
<th>Dry Density (for information)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal Aggregate (strong mixture)</td>
<td>10%</td>
<td>1000 Kg/m³</td>
</tr>
<tr>
<td>Maximum Aggregate (weak mixture)</td>
<td>50%</td>
<td>200 Kg/m³</td>
</tr>
</tbody>
</table>

5.1.3 Support/underpin joists

At all times, the floor structure should be engineered with consideration of the additional weight of the hempcrete insulation. Freshly mixed hempcrete weighs approx. 70% more than when dry.

**IMPORTANT**: Support the floors with the wet hempcrete to avoid sagging due to the additional weight. It is crucial to reinforce joists and bearers until the floor has dried. Please refer to Appendix, Weight Properties chart.
5.1.4 Thermal Resistance Table

1m³ of hemp gives 950Ltr of mixed hempcrete material.

<table>
<thead>
<tr>
<th>Thickness (mm)</th>
<th>100</th>
<th>150</th>
<th>200</th>
<th>250</th>
<th>300</th>
</tr>
</thead>
<tbody>
<tr>
<td>R (m²·kW⁻¹)</td>
<td>R 1.1</td>
<td>R 1.6</td>
<td>R 2.1</td>
<td>R 2.7</td>
<td>R 3.2</td>
</tr>
</tbody>
</table>

The true calculation for the required m³ in material (hemp) is m³ X 1.05 plus an allowance for waste.

At all times the floor structure should be engineered to take into account the additional weight of the hempcrete insulation.

Engineered I joists are very suitable for hempcrete infill insulation. If hardwood is used a rough surface is preferred to create stronger adhesion.

Mixing method as described in Chapter 3: Installation General.

5.2 HEMPCRETE APPLIED IN FLOOR-CAVITY OF SUSPENDED FLOORS

5.2.1 Preparation

1. A minimum layer of 100-150mm hempcrete is recommended.
2. Ensure positioning of electrical conduits and plumbing is complete and affixed properly to the carrier.
3. Application is the easiest from the top.
4. Ensure the carrier (cladding or formwork under the floor joists) of the hempcrete insulation is fastened appropriately. See section 4.5.2 Permanent Formwork.
5. Support floor from below to stop bowing when mix is fresh and heavy.

5.2.2 Supporting materials / formwork affixed to the joists or perpendicular battens:

1. **Composite wood sheets** not exceeding 12mm thickness attached with:
   a. 10mm wide x 25mm deep galvanised/stainless flat staples at 150mm c/c;
   b. 3.5 x 25mm galvanised /stainless flat head screws at 400mm c/c; or
   c. both with the aid of a 40mm ø dot of adhesive at minimum 400mm c/c. See Figure 19 page 41.
2. **Magnesium board** not exceeding 12mm thickness attached with:
   a. 10mm wide x 25mm deep galvanised /stainless flat staples at 150mm c/c;
   b. 3.5 x 25mm galvanised /stainless flat head screws at 400mm c/c; or
   c. both with the aid of a 40mm ø dot of adhesive at minimum 400mm c/c.
3. **Magnesium board** placed between the webs of the I joists. See Figure 20.
4. **Bamboo or reed mats** attached with:
   a. 10mm wide x 25mm deep galvanised /stainless flat staples at 25mm c/c; or
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