Hebel Slab Panel
Autoclaved Aerated Concrete
1 Technical Sheet

1.1 Hebel Slab Panel

General Features
Hebel Autoclaved Aerated Concrete (AAC) Floor and Roof Slab Panels are lightweight, fire resistant, fast and easy to install and provide lifelong superior thermal insulation. Hebel Slab Panels are steel reinforced (Grade 70) Autoclaved Aerated Concrete elements. The interior steel wire reinforcement is covered with an anti-corrosion coating. Hebel Slab Panel is produced in an ASTM C1452 strength class: AAC-6.

Uses
Hebel Slab Panels are used as floor and roof simply-supported slabs on Hebel Masonry Components or CMU load-bearing walls, wood, concrete or steel beams. These panels are used in residential, multi-family housing, hotels, offices and industrial buildings. Hebel AAC meets the diverse demands better than any other material due to the numerous advantages of its physical, mechanical, energy efficiency and safety properties.

Dimensions

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Unit</th>
<th>Strength Class AAC-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressive Strength (f'acon)</td>
<td>psi</td>
<td>870</td>
</tr>
<tr>
<td>Nominal Density</td>
<td>pcf</td>
<td>37</td>
</tr>
<tr>
<td>Design Weight</td>
<td>pcf</td>
<td>45</td>
</tr>
<tr>
<td>Drying Shrinkage</td>
<td>%</td>
<td>0.02</td>
</tr>
<tr>
<td>Thermal Expansion Coefficient</td>
<td>K⁻¹</td>
<td>8 x 10⁻⁴</td>
</tr>
<tr>
<td>Thermal Conductivity</td>
<td>BTU-in/ft²·h·°F</td>
<td>0.9811</td>
</tr>
<tr>
<td>Water Vapor Permeability</td>
<td>ng/Pa·s·m</td>
<td>0.226</td>
</tr>
<tr>
<td>Modulus of Elasticity</td>
<td>psi</td>
<td>377,000</td>
</tr>
<tr>
<td>Modulus of Rupture (MOR)</td>
<td>psi</td>
<td>142</td>
</tr>
<tr>
<td>Allowable Bearing Stress</td>
<td>psi</td>
<td>523</td>
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Table 1: Physical and design properties.

<table>
<thead>
<tr>
<th>Class</th>
<th>Dimensions</th>
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<tr>
<td>Thermal Conductivity</td>
<td></td>
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<tr>
<td>Steady-State Class AAC-6</td>
<td>0.9811 BTU-in/ft²·h·°F</td>
</tr>
<tr>
<td>Unit: BTU = british thermal unit, in = inches, ft = foot, h = hour, °F = fahrenheit</td>
<td></td>
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</table>

Table 2: Hebel Slab Panel thermal conductivity.

<table>
<thead>
<tr>
<th>Fire Performance</th>
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<tbody>
<tr>
<td>Hebel Slab Panel</td>
<td></td>
</tr>
<tr>
<td>Reinforced Slab Panel AAC-6</td>
<td></td>
</tr>
<tr>
<td>Thickness (in)</td>
<td>4</td>
</tr>
<tr>
<td>Fire Ratings (Hours)</td>
<td>1</td>
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<tr>
<td>UL Design Number</td>
<td>K909 P932</td>
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Table 3: Hebel Slab Panel fire rating.

<table>
<thead>
<tr>
<th>Maximum Allowable Service Load – Hebel Slab Panel AAC-6</th>
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<tbody>
<tr>
<td>Uniform Load – [psf]</td>
</tr>
<tr>
<td>Length [ft]</td>
</tr>
<tr>
<td>6.6</td>
</tr>
<tr>
<td>8.2</td>
</tr>
<tr>
<td>9.8</td>
</tr>
<tr>
<td>11.5</td>
</tr>
<tr>
<td>13.1</td>
</tr>
<tr>
<td>14.8</td>
</tr>
<tr>
<td>16.4</td>
</tr>
<tr>
<td>18.0</td>
</tr>
<tr>
<td>20.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel Thickness [in]</th>
<th>Panel Thickness [in]</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAC Roof Panels</td>
<td>AAC Floor Panels</td>
</tr>
<tr>
<td>14.8</td>
<td>22.1</td>
</tr>
<tr>
<td>14.8</td>
<td>22.1</td>
</tr>
<tr>
<td>88</td>
<td>156</td>
</tr>
<tr>
<td>45</td>
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<tr>
<td>42</td>
<td>73</td>
</tr>
<tr>
<td>45</td>
<td>73</td>
</tr>
</tbody>
</table>

Table 4: Allowable service loads for AAC Slab Panels.
2 Design Considerations

2.1 General Considerations

- Hebel Autoclaved Aerated Concrete (AAC) Slab Panels can be used as floor or roof systems and shall be designed in order to comply with strength and serviceability requirements as specified by ACI-523.4R-09.

- The Slab Panel thickness and the span will determine the allowable service load (see Table 4). The load (dead and live) must comply with the Local and Regional Building Code.

- Floor and roof panels can be supported by AAC Masonry Walls, reinforced concrete, concrete masonry walls (CMU), wood or steel beams.

- AAC Slab Panels are reinforced with two layers of high strength smooth bars (Fy = 70,000 psi) which are protected with an anti-corrosive coat.

- The longitudinal bars develop their tensile stress using mechanical anchorage provided by cross bars.

3 Installation Guide

Before installation of Hebel Slab Panels

3.1 General Installation Guidelines

1. Clear the unloading and provisional storage area

- Consult an appropriate safety professional or knowledgeable OSHA trainer for “rigging” or other safety considerations. Insure adherence to Leading Edge Support OSHA Guidelines.

- Carefully unload panels using pallet forks (forklift, nylon straps, slings or pallet fork on a crane cable). Place pallets over wood blocks (panels must not be in contact with ground).

- Storage areas should be accessible to delivery trucks and convenient to staging areas. If possible, drop-deliver the material right to the material staging areas.

- Material should always be stored away from other construction activities on a flat-grade area that is not susceptible to standing water, erosion or settling.

2. Check material and installation logistic

- Verify dimensions, positions and quantity of the panels according to Hebel shop drawings.

- Define sequence of panel installation according to Hebel shop drawings. To help speed installation, place the panels with the groove side at the beginning and continue.

- Define type of installation equipment (crane or similar).

- Evaluate quantity of personnel required for installation (4 to 5 assistants for panel installation plus crane operator).

- Keep the material covered and banded until ready for installation. Excessive handling may cause damage. Set delivery schedule to match the erection sequence.

- Chips and spalls can be repaired. If any reinforcing is visible, contact an authorized AAC representative. All damaged surface areas may be repaired using a compatible AAC patching compound.

- All panels that have surface or minor cracks are usable. Contact an authorized AAC representative when a crack is extended completely through the panel.

3. Check existing steel accessories (not supplied by Xella AAC Texas).

- Steel accessories for holes (ducts) –1 or 2 panels width– in floor and roofs.

- Steel plate for connecting Slab Panels to steel structure.

4. Check support structure

- All support elements (load-bearing walls, concrete or steel beams, etc) must be already finished before receiving floor and roof panels.

- Check layout and top of supporting structure. AAC top block adjustments must not be less than 2” in height, or else cement-sand mortar [1:4] must be used [see Fig. 12-A].
3.2 Installation Requirements

The actual list of tools, equipment and other materials will depend on type of project and workforce.

Tools:
- Hammer-Ax.
- Rubber Mallet.
- Scrub Brush.
- Hebel Sanding Float.
- Hebel Plastic Bucket.
- Chasing Tools.
- Spatula.
- Chalk-Line.
- Tape Measure.
- Finishing Trowels.
- Ripping Bar (36”).

Equipment:
- Hebel Slab Panel Lifting Gear or Clamp (optional).
- Telescopic Crane or similar.
- Circular Saw (8¼” diam min) with metal cutting blade or Gasoline-Powered Circular Saws (12” min).
- ½” Power Drill / Stirrer.
- Router / Bits.
- Hebel Hand Saw
- Hebel Turners (2 pc).
- Safety Equipment (Hard hat, face-shield, goggles, dust mask, ear plugs, gloves, safety shoes, etc.).

Other materials:
- Hebel Thin Bed Mortar and Repair Mortar.
- Hebel Rebar Spacers.
- Anticorrosive Paint.
- Fiberglass Mesh
- 4x4 in. Wood Block (2 ft long).
- Rebar #3, #4
- Cement-Sand Mortar.
- Concrete (3,000 psi).
- Steel Plates.
- Hebel Stucco, Base-Coats, Textures, etc.
- Anchors & Hebel Nails.

- Bearing lengths for AAC floor and roof panels should comply with Table 5.
- Mark guidelines on top of the supporting elements according to bearing lengths in Hebel shop drawings.
- For non-load-bearing elements, put a layer of a compressible material (polystyrene or similar) on top.

Precaution: Always wear proper personal protection equipment when using a circular saw, band saw or an angle grinder, including goggles, face-shield, hearing protection and dust mask.

Table 5: Minimum bearing length for Slab Panels.

<table>
<thead>
<tr>
<th>Support Elements</th>
<th>Minimum Bearing Length (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hebel Masonry</td>
<td>Ld/80 or 2¾” (min)</td>
</tr>
<tr>
<td>Concrete or Reinforced Concrete</td>
<td>Ld/80 or 2.0” (min)</td>
</tr>
<tr>
<td>Wood</td>
<td>Ld/80 or 2.0” (min)</td>
</tr>
<tr>
<td>Steel Beams</td>
<td>Ld/80 or 1.5” (min)</td>
</tr>
</tbody>
</table>

Note: Ld = Effective span length, Le = Clear span, where Ld = Le + 3 inches.
3.3 Installation of Hebel Slab Panels

a. Identify Hebel Panels to be installed according to previous logistics (see section 3.1 (2) and Fig. 3).

b. Carefully unpack panels using scissors or a hammer ax. Verify that panels are in a stable position prior to cutting the banding.

c. Over 4x4” wood blocks, rotate Slab Panel 90° or until tongue and groove profiles are facing up. Mark center of panel -Panel length/2- [see Fig. 8].

d. Clean the tongue and groove surface using a sanding float, hammer and a brush.

e. Place lifting gear at center of panel [see Fig. 8].

f. Using the pulleys, close clamps, clipping the tongue and groove sides of the panel.

g. Fasten safety chains avoiding excessive tightening, lower the locking lever [unlock position] and indicate to crane operator to lift the panel [see Fig. 9].

h. Two people will lead the panel to place it on the support (masonry, steel beams, etc).

i. Remove safety chains [see Fig. 10].

j. Place the panel on the guidelines previously traced. Verify minimum bearing length [see Fig. 11].

k. Once the panel is placed, open the clamps, raise the locking lever [lock position] and remove the lifting gear.

l. This procedure should be followed for each successive panel.

**IMPORTANT:**
- Handle panels with care to avoid damage.
- Make chases needed prior to installation.
- It is strictly forbidden at any time for people to be under the load during lifting.
- Never put hands, arms, feet or legs between the jaws of the clamp.
- The load must always be hoisted; it may not dragged along the ground.
- Avoid sudden movement to prevent accidental release of the load.
Fig. 12: Hebel Slab panels over masonry.
3.4 Cast and Reinforcement of longitudinal joints and ring beams

After panel installation, place steel reinforcement in longitudinal joints (see Fig. 12 to 15 and 17) and ring beams surrounding panels (see Fig. 14 and 17). Forms must be placed in perimetral ring beams.

One #3 rebar is required in longitudinal joints (shear joints), wedged with rebar spacers (2 per panel), and filled with cement-sand mortar (1:4) - see Fig. 14. Moist Panel joints before application.

Ring beams require 2#4 rebars (along) and a #3 every 16” (diagonal) and filled with regular concrete f’c= 3 ksi. The maximum size of coarse aggregate is 3/8” and 5” to 6” of slump. Ring beam and form surfaces must be moist before concrete casting.

Fig. 13: Slab panel cross-section view.

Fig. 14: Longitudinal joint and ring beam.

Fig. 15: Five-story hotel built with AAC (floor panels).

Fig. 16: Conduit and ceiling fixtures.
Fig. 17: Hebel Slab panel over steel structure.

SECTION A-A

Load bearing element

Variable Panel thickness

1\#3 + cement-sand mortar

Plate (1/4” thickness)

Steel plates (every 2 joints, alternated)

Load bearing element

Absolute position

Transversal joint (Non reinforced)

Hebel rebar spacer (2 per panel)

Hebel Slab Panel

Longitudinal joint (Reinforced)

Ring beam

Transversal joint (Non reinforced)

Steel plates (every 2 joints, alternated)

Panel position

Load bearing element

See joint and steel plate detail

SLAB PANEL

JOINT DETAIL

Steel plates (every 2 joints, alternated)

Hebel Slab Panel

Longitudinal joint (1\#3 continuous + cement-sand mortar)

LOAD BEARING ELEMENT

PLATE DETAIL

Load bearing element
When Hebel Panels are installed on a steel structure, steel plates must be welded (every 2 longitudinal joints, alternated) to the structure for connection (see Fig. 17 to 21). Place steel plates after panel installation to ensure correct location.
3.5 Utilities Installation

Openings

Openings in floor and roofs for A/C ducts, staircases, roof windows, air exhausters, etc. are built using steel support. For more information, please call Xella Technical Department.

Electrical conduits

Electrical conduits with a diameter <1” can be lodged through longitudinal joints on top or bottom of the panels. For electrical conduits >1” or several electrical conduits, longitudinal joints can be widened to lodge them. It is not recommended to chase on top and across the panel width -transversal chase- (see Fig. 16).

It is possible to define cut surfaces in Panels regarding installations. For more information, please call Xella Technical Department.

Piping lines

When required, PVC and other piping lines can pass through holes in the panels. The maximum hole diameter permitted in one panel is 6” or 12” in a joint between panels (6” each panel). If more than one hole is required, they must be aligned along the length of the panel. Only two longitudinal rebar in the bottom reinforcement of the panel can be cut (see Fig. 22 and 24).

3.6 Panels Cutting

According to shop drawings, identify Hebel Slab Panels to be cut. Permissible cutting length is indicated on shop drawings, otherwise contact Xella Technical Department. Along its length, Hebel Slab Panel can be cut 1/3” the width.

Cutting equipment options

- Electric Circular Saw (8¼” blade diameter).
- Power Cutter [gasoline-powered] 12” blade or greater (see Fig. 23).

Cutting procedures

a. Prepare a flat surface for cutting site.
b. Check dimensions of cuts to be made.
c. For transversal cuts, wood pieces must be placed along the sides of the cut and at the edges of the panel.
d. For longitudinal cuts, wood pieces must be placed at every 6 ft. (max) for 6 to 12 in thick panels and every 4 ft for panels 4 to 5 in thick.
e. Check for full contact between wood pieces and panel. Wedge if necessary.
f. Place a ruler as a guide and trace the cut dimensions.
g. Proceed with panel cutting, verifying that cutting dimensions comply with specifications. Transversal and longitudinal cuts must be made with panel in horizontal position; if full thickness is to be cut, perform cut from both sides.
h. Apply anticorrosive paint at reinforced bar tips.

Caution: Wear protective helmet & visor, goggles, hearing and respiratory protection. Read equipment instruction manual. Inhalation of concrete dust above recommended exposure levels may be harmful. Wet sawing is recommended. Please consult the Xella Material Safety Data Sheet for further details.

Fig. 22: Sanitary utilities.
Fig. 23: Power cutter.
Fig. 24: Maximum dimensions of holes through slab panel.
4 Renders and Finishes

4.1 Products

Surface patching

Use Hebel Repair Mortar to patch chips, breaks and other imperfections on surfaces of Hebel Slab Panels.

Hebel Repair Mortar is prepared in a plastic bucket, adding water and mortar from the bag (see instructions on the bag) and mixed with a stirrer using a power drill or by manual means (depending on quantity to be used). It is applied using a spatula.

Fiberglass Mesh

Fiberglass mesh, 6” minimum width, should be installed directly over one layer of render (without nails) en every inferior joint between panels (see Fig. 13) and in places according to construction details. Fiberglass mesh is not required in case of suspended or false ceilings.

Render and Finishes

Underneath Hebel Slab Panels can be finish with Hebel Stucco, gypsum plaster, acrylic texture coat, elastomeric finishes, cement based finishes; on floor panels ceramic or clay tiles, laminated stone, concrete pieces, carpet, etc. can be used (see Fig. 27).

Roof panels can be finished using membrane systems (SBS, APP, etc), elastomeric roof coatings, concrete or ceramic roof tiles, asphalt roof shingles.

For more information and technical assistance, please contact AAC Texas.