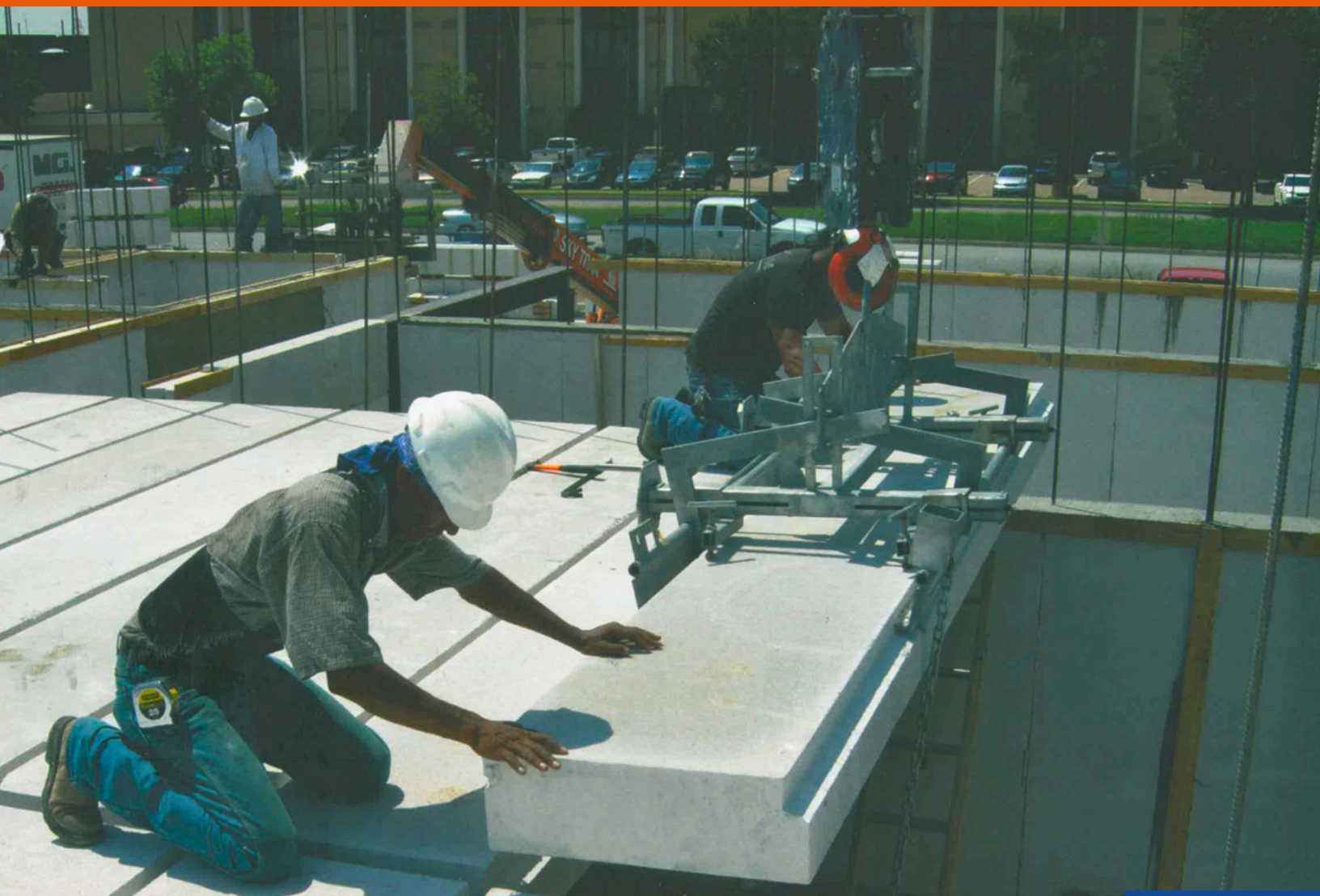


# Hebel RAAC® Roof Panels Installation Guide



Xella Aircrete North America, the leading manufacturer of Hebel RAAC® Autoclaved Aerated Concrete (AAC), is an amazingly innovative building material that has been used in Europe for more than 80 years and in the US for more than 15 years. Products and systems have been developed for all types of the construction industry: industrial, commercial, high-rise buildings, schools, hospitals, and more.

Hebel RAAC® AAC is a lightweight concrete that is formed into blocks and reinforced panels for a wide range of load-bearing and non-load-bearing construction applications. It is manufactured from sand, cement, recycled material, lime, gypsum, aluminum paste, and water. It is molded, cut, and steam-pressure cured in an autoclave before being packed, ready for transport.

Hebel RAAC® AAC delivers more benefits than the traditional materials, such as strength, acoustics, fire and pest resistance, and is installed faster, saving valuable construction time.

It has a unique combination of thermal mass and insulation providing a more comfortable living environment.

## Why Hebel RAAC

One of the world's leading manufacturer of Hebel RAAC autoclaved aerated concrete (MCI, Xella Aircrete North America is transforming the building industry with Hebel RAAC, its ultra lightweight concrete.

Committed to providing the United States with environmentally responsible building products that conserve material and energy usage, Xella's Hebel RAAC Aerated Concrete is recognized as the largest producer in Europe by capacity based on management estimates based on different sources and member of the Green Building Council. In addition, it has a high UL rating for fire resistance.

Xella Aircrete North America is a division of Germany-based Xella International.

More than 6,000 employees for Xella's total 97 plants and offices throughout 30 countries worldwide, including North America, Europe, and Asia.

Hebel RAAC Aerated Concrete provides contractors with strong, easy-to-install blocks and reinforced panels that are one-third the weight of traditional concrete and replace traditional multi-step construction processes. In addition, Hebel RAAC is energy efficient, fire resistant, and long lasting, which, over time, will reduce energy, insurance, and maintenance costs to building owners. A wide range of industries can benefit from Hebel RAAC's custom blocks and reinforced panels, including those in the commercial, educational, hospitality, industrial, institutional, governmental, and residential markets.



# Aerated Concrete Hebel RAAC®:

## Unique Properties in a single material

### Benefits



#### Thermal Insulation

Buildings constructed of HEBEL RAAC® provide substantial energy savings in both hot and cold climates. The unique closed cellular structure and the thermal mass contribute to a high R-value and air-tightness, which reduce heating and cooling costs and improve indoor air quality. Buildings have seen savings on air conditioning up to 35% by using HEBEL RAAC.



#### Structural Performance

Strength can resist wind pressures without reinforcement. Shear wall strength can resist lateral loads. High impact resistance.



#### Fire Resistant

HEBEL RAAC has proven to remain fully intact and withstand the stress of fire for up to 4 hours without any impairment to its stability. Even under intense heat, HEBEL RAAC® remains tightly sealed against smoke and gas, emitting no toxic fumes.



#### Acoustic Insulation

The solid wall construction of a building made of Hebel RAAC® provides exceptional acoustic insulation. Its porous structure and high surface mass, coupled with its ability to dampen mechanical vibration energy, greatly reduces outside environmental noise.



#### Resistance to humidity

Your works are always protected against moisture. It allows the passage of water vapor, reducing condensation. It is an inert material.



#### Green Building

Hebel RAAC and green building attributes Recyclable, inert & non-toxic. Energy saving, manufacturing through occupancy. Excellent life-cycle cost. Durable, natural finish options. Supports LEED credits.

Add up USG BC LEED Credits with Hebel RAAC

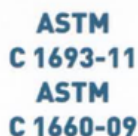
### Physical Properties

The physical properties of HEBEL RAAC® Autoclaved Aerated Concrete are unique to any other building material. Properties such as thermal insulation and fire resistance can not be met by another product alone.

- Speed of Construction
- Thermal Insulation & Energy Savings
- Superior Fire Resistance

- Sustainable
- Relatively High Strength for a low density
- Workability
- Acoustic Performance
- Precision

This product meets Standards and Evaluation issued by:



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## Hebel RAAC® Slab Panel Autoclaved Aerated Concrete



### Uses and applications

Hebel RAAC® Slab Panels are steel-reinforced units used to build roof or floor slabs that work supported over masonry walls [either Hebel RAAC® or traditional], and also by steel, concrete, or wood structures. Their design is based on span-load requirements.

### Construction Advantages

- Lightweight 37 pcfl.
- No propping required.
- No concrete topping required.
- Custom made.
- Excellent load-carrying capacity.
- Covers up to 20' span.
- Lightweight equipment needed to install.
- 5 people crew to install.
- Speed of construction.

### Application:

- Commercial
- Residential
- Industrial

### Certifications:

NOM, ONNCCE, ASTM, UL, IAPMO, ACI, USGBC, TOI.

### More benefits of the Hebel RAAC® Slab Panels:

- Fire resistance
- Acoustic performance.
- Thermal performance
- Pest and rot resistant
- Not Mildew
- Low maintenance
- Friendly to the environment and Sustainable.



**Hebel RAAC® Slab Panel**  
**Autoclaved Aerated Concrete**

**hebel** **RAAC USA Inc.**  
POWERED BY XELLA GROUP DE

**xella**

## 2 Design Considerations.

### 2.1 General Considerations.

- Hebel RAAC® 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 must comply with the local and regional building codes.
- Floor and roof panels can be supported by AAC masonry walls, concrete masonry walls [CMU], wood or steel beams.
- AAC slab panels are reinforced with two layers of high strength smooth bars [ $F_y = 70,000$  psi], which are protected with an anticorrosive coat.
- The longitudinal bars develop their tensile stress using mechanical anchorage provided by crossbars.



Fig. 2: Hebel® Slab Panel Pallets.

## 3 Installation Guide

### 3.1 General Installation Guidelines.

#### Before Installation of Hebel RAAC® Slab Panels

##### 1. Clear the unloading and Provisional Storage Area

- Consult an appropriate safety professional or knowledgeable OSHA trainer for "rigging" or others. Ensure edge safety considerations adhere to leading support to 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 the 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 Logistics

- Verify the dimensions, positions, and quantity of the panels according to shop drawings.
- Define a sequence of installation according to Hebel RAAC® shop drawings. To help the speed of installation, place panels with the groove side at the beginning and continue.
- Define the type of installation equipment [crane or similar].
- Evaluate the quantity of personnel required for installation [4 to 5 assistants for panel installation plus a crane operator].
- Keep the material covered and banded until ready for installation. Excessive handling may cause damage. Set the delivery schedule to match the erection sequence.
- Chips and spalls can be repaired. If any reinforcing is visible, contact an authorized Hebel RAAC representative. All damaged surface areas may be repaired using a compatible Hebel RAAC AAC patching compound.

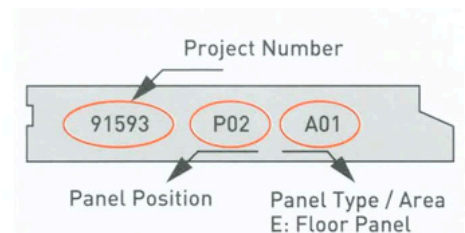


Fig. 3: Panel identification.



Fig. 4: Storage area close to job site.

## 3 Renders and Finishes

### 4.1 Products

#### Surface Patching

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

Hebel RAAC® Repair Mortar is mixed in a plastic bucket, adding water [see instructions on the bag] and mixed with a stirrer using a power drill or by on manual means (depending 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) on every inferior joint between panels (see Fig. 13) and in places according to construction details. Fiberglass mesh is not required in case of suspended ceilings.

#### Render and Finishes for ceiling

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

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

For more information and technical assistance, please contact Xella Aircret North America, Inc.



Fig 25: Industrial & Commercial Projects



Fig 26: Housing Projects



Fig 27: Floor Finish Marble



Fig 28: Multi Story Building

## 5 Fasteners

### Fasteners

Anchors used with AAC shall be made of plastic or nylon. Wood, fiber, lead, metal, or expansion anchors are not recommended. Use power drills to make holes for fasteners and masonry drill bits recommended (diameter) on table 6 [drill bit diameter may differ from that recommended by the fastener manufacturer; specifications have been adapted for AAC].

Percussion drilling or inverting the rotation direction when drilling shall be avoided. The anchor shall penetrate tightly in the hole to avoid rotation when placing the screw. When using Fischer anchors, the external finish layer surrounding the hole should be removed to allow the anchor to fully penetrate into the AAC element.

### Hebel RAAC® AAC Nail:

Hebel RAAC®galvanized AAC nails are designed specifically to provide a definitive anchorage in the AAC. Hebel RAAC® AAC nails are directly hammered into the AAC element - no drilling is required.

### Screws

Always use screws of the diameter recommended on table 6. Minimum length of screw is defined by the anchor length plus the thickness of the finish layer and the thickness of the element to be fixed.

### Precautions

Load values (pull-out strength) shown in chart shall be used only as a reference guide; field testing is suggested according to project requirements. The load values (lb) shown in chart are for direct pull-out and a safety factor of 5 is included in them. Full penetration of screws into the anchor is assumed to obtain such load values.



Fig 29: Recommended Nails and Anchors



Fig 30: Minimum Screw Length

Fasteners & Nails Autoclaved Aerated Concrete Technical Sheet		Anchor / Nail		Drill Bit for Masonry	Screw	Load Value* (pull-out strength)	
		Length	Ø Diam			AAC-4 Block	AAC-6 Panel
		in	in	Ø in	Ø in	Lb	Lb
	Hebel AAC Nails® Available at Xella AAC Texas, Inc.						
	Hebel AAC Nail 4 in. <sup>[3]</sup>	4"	1/4"	Fixed directly with hammer	Not Required	51	88
	Min. Penetration: 3 in.				Not Required	88	137
	Hebel AAC Nail 6 in. <sup>[3]</sup>	6"	5/16"				
Min. Penetration: 5 in.							
	Universal Plastic Anchor Available at Construction Depots						
	Anchor TP 14 - 1/4"	1 1/8"	1/4"	1/4"	#10	22	26
	Anchor TP 56 - 5/16"	1 1/2"	5/16"	5/16"	#12	26	31
	Anchor TP 38 - 3/8"	2"	3/8"	5/16"	1/4"	44	62
Note: For use in solid walls (Anclor® or similar).							
	THORSMAN® Available at Construction Depots						
	Anchor Red TP 2X <sup>[4]</sup>	1 3/8"	1/4"	3/16"	#8	37	---
				1/4"	#10	---	42
	Anchor Brown TP 2B <sup>[4]</sup>	1 1/2"	5/16"	1/4"	#10	49	62
Anchor Blue TP 3 <sup>[4]</sup>	1 3/4"	3/8"	5/16"	#12	73	84	
	TOX VLF® Available at <a href="http://www.demandproducts.com">www.demandproducts.com</a>						
				No pre-drilling for AAC-4 Class			
	Anchor 6/70 <sup>[5]</sup>	2 3/4"	1/4"	1/4"	Anchor with screws included (pre- assembled)	66	---
	Anchor 8/80 - 8/135 <sup>[5]</sup>	3 1/8" +	5/16"	5/16"		102	---
Anchor 10/100 - 10/160 <sup>[5]</sup>	4" +	3/8"	3/8"	120		---	
	HILTI® Plastic Anchors Available at Hilti Shops and Construction Depots						
	Anchor HUD-1 (10x50) <sup>[4]</sup>	2"	3/8"	3/8"	5/16"	71	90
	Anchor HUD-1 (12x60) <sup>[4]</sup>	2 3/8"	1/2"	7/16"	3/8"	128	185
More Products: <a href="http://www.us.hilti.com">www.us.hilti.com</a>							
	FISCHER® Available at Xella AAC Texas, Inc.						
	Anchor GB 10 <sup>[3]</sup>	2"	3/8"	3/8"	1/4"	126	---
				1/2"	1/4"	---	104
	Anchor GB 14 <sup>[3]</sup>	3"	5/8"	5/8"	3/8"	165	225
Anchor S10H80R <sup>[3]</sup>	3 3/8"	3/8"	3/8"	5/16"	123	150	

Notes:

<sup>(1)</sup>Anchors without screws, except TOX VLF anchors. <sup>(2)</sup>Drill bit diameter change between AAC-4 y AAC-6 classes. Notes: <sup>(3)</sup>Available at Xella Aircrete North America, Inc. <sup>(4)</sup>Available at Hilti Shops, Home Depot, Lowe's, etc. <sup>(5)</sup>Available at [www.demandproducts.com](http://www.demandproducts.com) <sup>(6)</sup>For AAC-6 (Block & Panel) use 1/4" drill bit. <sup>(7)</sup>For AAC-6 (Block & Panel) use 1/2" drill bit. \*Safety Factor [SF]=5. Use masonry drill bits.

IMPORTANT

Information has been adapted considering Autoclaved Aerated Concrete (AAC) material and may differ from original fastener manufacturer.

Table 6: Anchoring into Hebel® AAC Masonry Components.