

ByBlock® Product Data Sheet
PRODUCT NAME

ByBlock®

DESCRIPTION

ByBlock is a multi-purpose, high-performing insulating building material made entirely out of plastic waste - no additives or fillers. ByBlocks are designed to integrate harmoniously with traditional building materials such as lumber, steel and cement to meet the structural requirement of the project; offering excellent dimensional stability, water-resistant properties, and handles high-pressure load without cracking or crumbling.

SIZES AND DIMENSIONS
STANDARD BYBLOCK

WIDTH	DEPTH	HEIGHT
15 3/4"	7 7/8"	8 5/8"
396 mm	198 mm	227 mm
DENSITY		
Standard: 10 KG / 22 lbs.		
Customization densities: 8KG – 12KG / 16.6 – 26.4lbs		

Total height of ByBlock includes the “pins” on top of the product which recess into the ByBlock above. Actual exposed/finished height of ByBlock is 8”/205mm.

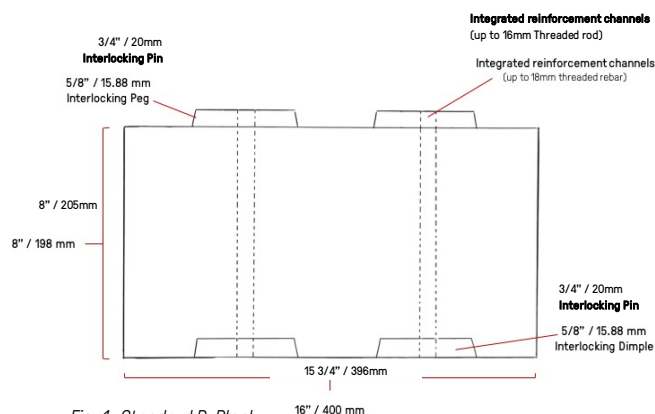


Fig. 1: Standard ByBlock

FLAT BYBLOCK

WIDTH	DEPTH	HEIGHT
15 3/4"	7 7/8"	8"
396 mm	198 mm	207 mm
DENSITY		
Standard: 10 KG / 22 lbs.		
Customization densities: 8KG – 12KG / 16.6 – 26.4lbs		

Flat ByBlock is intended to be used for the top course to make finishing easier. Actual exposed/finished height of ByBlock is 8”/205 mm.

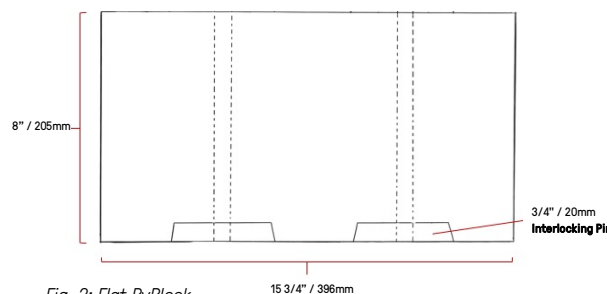


Fig. 2: Flat ByBlock

ENVIRONMENTAL

ByBlock is the most sustainable building block on the market because it is made entirely out of plastic waste. Every ByBlock prevents 22 lbs. from being landfilled or incinerated.

ByBlock is **CA Section 01350 Compliant** and meets GREENGUARD and GREENGUARD GOLD criteria for formaldehyde, total aldehydes, and CREL/TLV levels.

Testing followed **CDPH Standard Method v1.2** “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers” and UL 2821, “GREENGUARD Certification Program Method for Measuring and Evaluating Chemical Emissions

ByFusion Global, Inc.

from Building Materials, Finishes and Furnishings Using Dynamic Environmental Chambers”.

ByBlock will contribute to LEED credits in building projects.

TECHNICAL SPECIFICATIONS

- ICC-ES Report Listings
 - ESL-1255, Compressive Properties
 - ESL-1256, Thermal Transmission
 - ESL-1257, Airborne Sound Transmission

ADVANTAGES

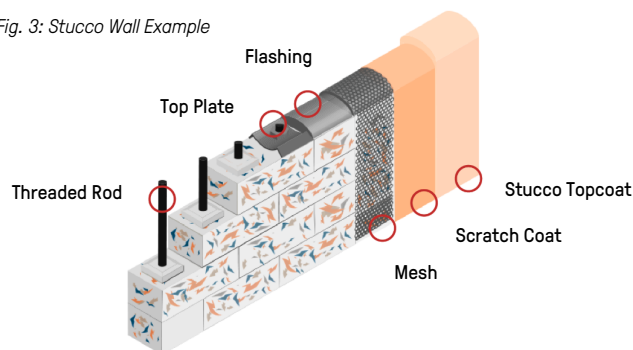
- Project Savings. ByBlocks are a highly-durable and easy to handle, mid-weight material that stack in place without additional glues, adhesives, additives, or mortars.

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Specialized trade skills are not required for installation of ByBlock which translates to approximately 54% project savings between materials and labor costs when compared to concrete block construction.

- **Environmentally Friendly.** 100% repurposed plastic waste. No additives or fillers.
- **Zero Breakage.** Does not crack or crumble. Minimizing unnecessary construction waste.
- **Water Resistant.** Since ByBlocks are made with plastic, they are able to resist water without additional products.
- **Insect Resistant.** Plastic is not consumable by termites and carpenter ants.
- **Workability.** ByBlock can be used alone for many applications, but also integrate easily with all other building materials to fit the demands of the project. They can be screwed, nailed, stapled, sawed and drilled through using standard, readily available tools and hardware.
- **Finishing.** ByBlock can be finished with any readily available finishing material including but not limited to stucco, sheet rock/drywall, plaster, siding, paneling and some specialized paints to meet the demands of any project.

Fig. 3: Stucco Wall Example


COLOR

Colors vary due to the nature of the material. No two ByBlock are alike.

FIRE RESISTANCE:

ByBlock are categorized as Type 5 construction. Approved thermal barriers must be applied as part of finishing to conform with the building code for fire safety as required for the application. Secondary fire retardants (spray, wraps or panels) can be applied.

PERFORMANCE

Standard, single unit un-reinforced 10kg/22lbs ByBlock offers unique performance and strength.

ByBlocks are intended to be reinforced using threaded rod (3/8"-5/8" / 10 – 16 mm) for assembly and added strength. ByBlocks can be integrated with other structural building materials such as wood, steel and concrete depending on the application and as directed by engineering. Refer to our [ByBlock Installation Guide](#) for a more detailed overview.

ByBlock is not intended as a sole component of a wall assembly in thermal applications. ByBlock will serve as an insulating, structural component; utilizing standard building materials to the interior and exterior of the wall assembly as per project design specifications.

COMPRESSION ¹	MAXIMUM LOAD
408 psi (<i>unreinforced</i>)	49,800 lbf

FASTENER ²	LOAD DIRECTION	RESULT
#10x 3" Screw 2" depth	Withdrawal	202.9 lb _f
	Shear Load	270 lb _f
3/8" x 4" Lag Screw 3" depth	Withdrawal	326.6 lb _f
	Shear Load	519 lb _f

THERMAL PROPERTIES ³		
R-Value / RSI	R - hr·ft ² ·°F / Btu RSI - m ² ·K/W	1.14 / 0.20
K-Factor	Btu-in/hr·ft ² ·°F	0.86

ACOUSTIC PERFORMANCE ⁴	
STC Rating	21
OITC Rating	15

THERMAL EXPANSION ⁵		
TEMP RANGE	CHANGE (mm)	CLTE [µm/(m·°C)]
-30°C to 40°C	0.89	61.947

1 : ASTM C165-07 (Reapproved 2017), Standard Test Method for Measuring Compressive Properties of Thermal Insulations, Procedure A

2 : ASTM D1761-12, Standard Test Method for Mechanical Fasteners in Wood

3 : ASTM C518-17, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

4 : ASTM E90-09 (2016), Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

5 : ASTM E831-19, Standard Test Method for Linear Thermal Expansion of Solid Materials by Thermomechanical Analysis

CLEANING

ByBlock walls do not require special cleaning. ByBlock structures/surfaces can be cleaned using an air gun to blow debris free from the product.

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BUILDING WITH BYBLOCK
REQUIRED TOOLS

- Standard torque wrench
- Rubber mallet
- Standard level
- Band saw, table saw with fence, chainsaw

REINFORCEMENT ESTIMATES & PREPARATION

ByBlock does not require glues or mortars during construction but, glues and adhesives can be applied if needed. ByBlock's strength is further enhanced from the use of threaded rod or rebar and post-tension.

ByBlocks are manufactured with an integrated reinforcement channel for speedy construction. The reinforcement channel can support **10 mm – 16 mm (3/8" -5/8") threaded rod** without drilling. Consult with a structural engineer and local building codes for guidance on structural requirements.

*Threaded rod may be used every 7 7/8" (200 mm) to provide additional support depending on the application.

**If your design includes windows, door or other openings, a rod should be placed on either side of the opening for additional support.

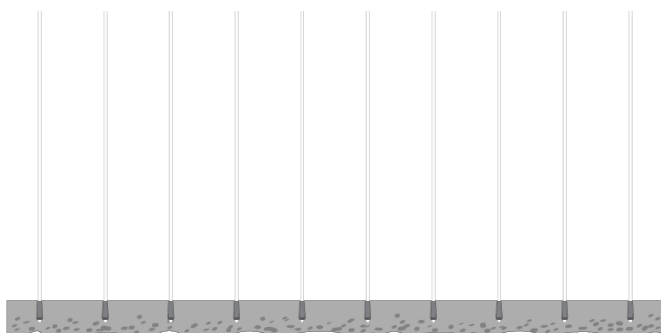


Fig. 4: Threaded rod in concrete footing with anchors (not to scale)

PREPARING FOOTING/FOUNDATION

ByBlock requires a level footing which can be concrete, steel bases, or framing. Regardless of new or existing construction, insert the first threaded rod 3 15/16" (100 mm) from the edge of the first wall then every 15 3/4" (400 mm) thereafter. Rebar can be added every 7 7/8" (200 mm) for additional support if required.

New Construction: Consult a structural engineer to design the footing most appropriate for the project.

Existing Footing: If you are installing ByBlock into existing concrete footings, install concrete anchors for threaded rod

as per manufacturers specifications. Use approved concrete anchors or anchoring epoxy to properly affix the threaded rod and cure as per manufacturer's specifications.

Bases or Framing: If you are assembling a ByBlock wall to a base or frame (for example, mobile sheds or movable walls), drill a hole slightly larger than the threaded rod.

Threaded rod must be a minimum of 2" taller than the anticipated finished wall height. Start by inserting the threaded rod through the bottom of the base/frame. We recommend using screw mounted flange nut to secure the threaded rod at the base and washers and lug nuts on the top course for tightening.

Retaining Walls: If you are using ByBlock for retaining walls, prepare the footing as instructed using foundation grade mixture of concrete. Prepare the threaded rod by bending into an L-shape and setting into the concrete while wet. The short part of the L should be at least 12" long.

Insert the first threaded rod 3 15/16" from the edge of the wall then every 15 3/4" thereafter. Threaded rod can be added every 7 7/8" for additional support if required.

Check your local building codes for specifications and/or consult with a structural engineer for footing depth and wall height requirements.

CUTTING

Best results are achieved using a **fine-tooth blade** (100+ tpi) band saw or radial saw with 12" blade. As the product is created using varying types of post-consumer waste, it is an irregular material and may grab during the cutting process. Ensure the ByBlocks are properly secured in position using fences or guides to hold the block firmly in place.

Do not cut while trying to hold with bare hands. **Always use the appropriate PPE** as edges are sharp. Best results are achieved using a steady medium pace.

Do not force a quick cut beyond 1" deep. Hand saws and grinders can be used for minor adjustments or material removal if required.

INSTALLING

Install ByBlock as you would any other "brick" type of application—staggering each course. Each ByBlock must have at least one threaded rod running through it.

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Slide the ByBlock down the threaded rod and into position; continuing the process until the wall unit is at finish height but, not exceeding 8' without guidance from a structural engineer. Use a rubber mallet to tap ByBlocks over threaded rod if needed.

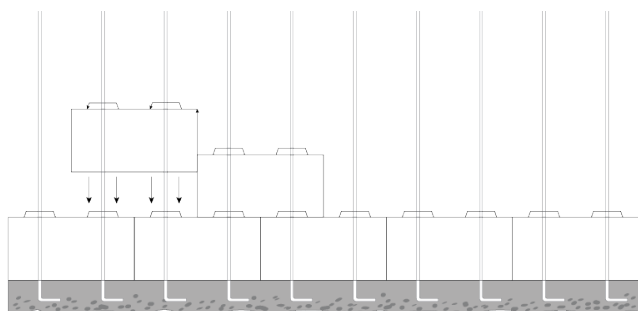


Fig. 5: ByBlock installation example with threaded rod every 7^{1/8}"

Once wall height is achieved, install top plate or beam, washers and lug nuts, and tightened to the desired wall height. Post-tensioning will lock ByBlocks in place and add integrity and strength to the wall unit.

OPENINGS

Window, door or other openings may require sections of the ByBlock to be removed to allow for lumber placement.

In the instance of a door header, for example, the lumber **must extend a minimum of 8" beyond the opening on either side** to allow for the threaded rod to pass through the lumber. This will fix the lumber into position within the wall assembly. When installing lumber as a bottom plate of a window opening, a grinder or hacksaw can be used to remove any threaded rod extending beyond the height of the lumber after post-tension has been applied (nuts and washer are to be recessed below the height of the lumber).

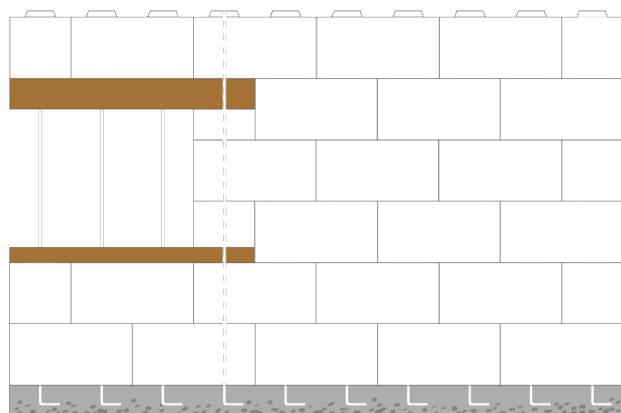


Fig. 6: Opening support example.

After final height has been achieved, apply your top-plate over the threaded rods, resting on top of the final course of Flat ByBlock and place washer and nut on each rod. Using a torque wrench, add post-tension to desired height.

JOINTING

No adhesives, mortars, or solvents are required for jointing. ByBlock is designed to hold firmly to the blocks above and below, creating one complete unit. The post-tension adds enhanced strength to the system.

LEVELING & SETTING

A ByBlock structure gets its strength from compressing the blocks together by tightening the top plate down; using post-tension.

For time savings, pre-drill the top plate or beam (metal or wood depending on the application) to match the measurements of the rods at the footing. It is not uncommon for slight movement in the rods during the installation of the ByBlock, but the rods need to be fastened in direct vertical alignment with their attachment point in the footing for maximum strength and sizing.

DO NOT over tighten. Refer the maximum loads on the threaded rod when in question. Tighten each wall down in equal increments until the ByBlock wall locks into place and the desired level height is achieved.

Ideal tensioning results in a 1/8" (2-3 mm) compression per ByBlock. Use a standard carpenter's level to keep the work you are doing plumb. If at any time ByBlock slips out of place, simply knock it back into place using a rubber mallet.

BYBLOCK FLASHING

Install flashing at locations in strict accordance with local building codes and best practices.

WEEP HOLES AND VENTS

Because the material is not bound together with adhesives, there is no need for additional ventilation. The material will allow for some ambient air to pass. For most residential and commercial purposes, most of your external walls will be covered and finished with an external covering/application which will prevent any water or liquid from penetrating into the internal structure of the ByBlock, negating the need for weep holes.

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INSPECTION

The final surfaces of any ByBlock wall using standard applications will present true, level and flush. To maintain plumb, additional metal bracing can be applied as per local building codes.

DELIVERY, STORAGE AND HANDLING

ByBlocks are delivered on pallets. Store pallets on level ground and keep dry. Avoid sitting in pooled water. While ByBlocks do not demonstrate capillary action as in traditional CMUs, they can accumulate water adding to weight. Saturated ByBlocks will require additional drying time before interior/exterior wall coverings can be applied.

MAINTENANCE

ByBlock requires no maintenance. Plastic will not deteriorate when covered and protected from the elements. If left exposed to sun, some surface color may bleach out.

LIMITATIONS

- ByBlocks are intended to be reinforced and assembled by means of post-tensioning.
- Consult a structural engineer for wall heights above 8' as additional reinforcement may be required.
- ByBlocks are fused together using our proprietary process. When cut in half, it is common for some particles of plastic to become loose. Use the collection bag that comes with every pallet to collect ByBlock construction debris and send back to ByFusion to make more ByBlock – zero waste.
- If the application requires ByBlock to be exposed to the sun, a UV sealer/protectant should be applied to limit the effects of UV as it will bleach out colors over time.
- ByBlocks are not intended to be used in environments where they are exposed to temperatures exceeding 140°F / 60°C over extended periods of time without a finished covering.

LIMITED PRODUCT WARRANTY

The manufacturer warrants that this product shall be of merchantable quality when used or applied in accordance with the manufacturer's instructions. This product is not warranted as suitable for any purpose other than the general purpose for which it is intended. This warranty runs for one (1) year from the date the product was purchased. ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ON THIS PRODUCT IS LIMITED TO THE DURATION OF THIS WARRANTY. Liability under this warranty is limited to replacement or defective product or, at the manufacturer's option, refund of the purchase price. CONSEQUENTIAL AND INCIDENTAL DAMAGES ARE NOT RECOVERABLE UNDER THIS WARRANTY.

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