CONCRETE PRODUCTS GROUP

INNOVATIVE CONCRETE MASONRY SYSTEMS

Thermal Properties Guide

KORFIL® HI-R® and HI-R-H™
HI-R® Half High and HI-R-H™ Half High

2020 Edition

Spec-Thermal® Energy-Efficient Masonry

Energy Code Compliant Masonry Systems

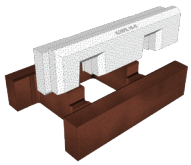
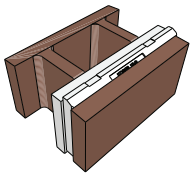
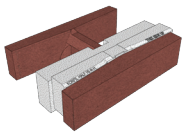
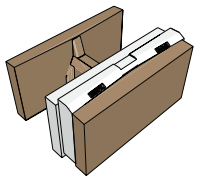
Spec-Thermal®
PRE-INSULATED MASONRY SYSTEM

Spec-Thermal Pre-Insulated Masonry Walls provide Energy Code compliance with double exposed masonry surfaces. The load bearing structural elements of the wall and the insulation are built into the masonry.

Spec-Thermal® Product Family

Innovative Masonry Designs Deliver Energy Efficiency

Spec-Thermal Pre-Insulated Masonry Walls feature Korfi® Hi-R® and HI-R-H pre-insulated concrete masonry units from Concrete Block Insulating Systems, Inc. These wall systems require minimal coordination of trades since the wall finishes, load bearing structural elements and the insulation are all built into the masonry itself. The product line includes HI-R® and HI-R-H™ pre-insulated masonry units in full and half heights.

Product	Shape	Unit Design	Energy Efficiency	Typical Fire Rating*	Finishes
 HI-R® Half High		4"x16" face (nominal) 2 cross webs 2.5" insulation insert 12" width only Suitable for fully or partially grouted walls.	Allows single wythe construction in most climate zones.	Fully Grouted: 12-4-16 4-Hour Fire Rating Partially Grouted: Varies based on unit width and density.	Smooth finish; Many color options Blended Colors: Spec-Brik Hi-R for brick appearance.
 HI-R®		8"x16" face (nominal) 2 cross webs 2.5" insulation insert 8***, 10, or 12" widths Suitable for fully or partially grouted walls.	Allows single wythe construction in most climate zones.	Fully Grouted: 12-8-16 4-Hour Fire Rating Partially Grouted: Varies based on unit width and density.	Multiple finishes: Ground face, split face, smooth, weathered. Many color options Blended Colors: Spec-Brik HI-R-H Jumbo for brick colors.
 HI-R-H™ Half High		4"x16" face (nominal) 1 cross web 4" insulation insert 12" width only Suitable for fully grouted walls.	Best performing option	Fully Grouted: 12-4-16 4-Hour Fire Rating.	Smooth finish; Many color options Blended Colors: Spec-Brik HI-R-H for brick appearance.
 HI-R-H™		8"x16" face (nominal) 1 cross web 3.5" or 4" insulation insert 12" unit width** Suitable for fully grouted walls.	Best performing option	Fully Grouted: 12-8-16 4-Hour Fire Rating. .	Multiple finishes: Ground face, split face, smooth, weathered Many color options Blended Colors: Spec-Brik HI-R-H Jumbo for brick colors.

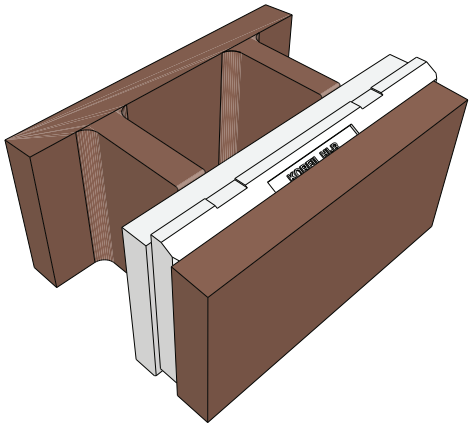
* Will vary based on unit density and other factors. For unit specific fire rating information, check with your manufacturer.
** 10" unit width is available on a regional basis only. Please check before specifying
*** 8" units have a small groutable area and may be difficult to grout

Applications for Hi-R and HI-R-H walls

Water Treatment Facilities
Schools
Athletic Facilities
Concession Stands
Grocery Stores
Multi-Residential Buildings
Detention Facilities
Manufacturing Facilities/Warehouses
Automotive Service Centers
Parking Structures
Indoor Swimming Pool Facilities
Single Family Housing
Cold Storage Facilities
Auditoriums and Music Venues
Film Production Stages
Public Safety Buildings (Police and Fire)

HI-R®

HI-R® is a two web, pre-insulated masonry unit that is suitable for partially or fully grouted walls.



Primary uses

- Single wythe walls for conditioned spaces in Climate Zones 1-5.
- Single wythe walls for conditioned spaces with furring/wallboard and/or interior or exterior insulation.

Additional Uses

- Single wythe walls for unconditioned or semi-conditioned spaces in all climate zones.
- Multi-wythe wall construction
- Diaphragm wall construction

Features

- Double exposed masonry -durable architectural finishes inside and out.

- Suitable for either full or partial grout construction
  - Great for regions where partially grouted walls are preferred.
  - Fire resistance: depends on unit width, density and whether partially or fully grouted.
  - May be constructed as a fully grouted wall to increase fire resistance.

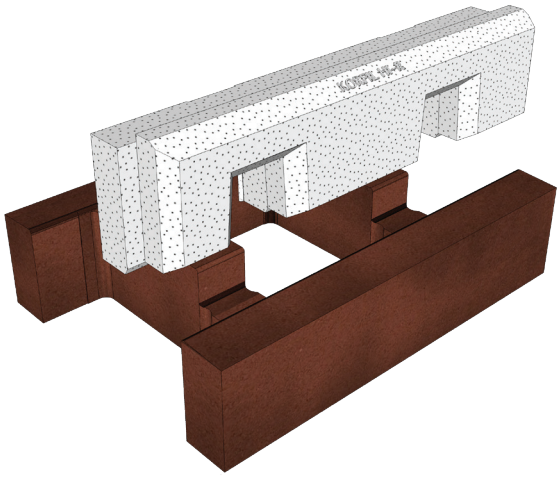
- Construction Efficiency
  - Utilities (plumbing and electrical) readily fit in unit cores and horizontal voids.
  - Single trade installs interior and exterior finishes, structure and insulation in one step.
  - Bond beam units are available.
  - Offered in 8", 10" and 12" unit widths.

- Thermal Performance (see comparison chart)
  - Two part 2.5" offset and interlocking insulation inserts.
  - Interlocking Insulation inserts covers all mortar joints.
  - Two web design offers reduced thermal bridging when compared to traditional CMU.
  - Thermal mass is exposed to the interior, conditioned space for optimal performance.
  - May comply using Prescriptive Methods or using COMcheck.

- Aesthetics:
  - Scale: 8"x16" face dimension
  - Offered with full range of masonry textures and colors
  - **Spec-Brik Jumbo HI-R** - with Spec-Brik Blended Colors

HI-R® Half High
SPEC-BRIK® HI-R®

HI-R® Half High is a two web pre-insulated masonry unit that is suitable for partially or fully grouted walls offered with 4" x 16" face dimensions. When made with Spec-Brik colors, the product is called **Spec-Brik HI-R**.



Primary uses

- Single wythe walls for conditioned spaces in Climate Zones 1-5
- Single wythe walls for conditioned spaces with furring/ wallboard and/or interior or exterior insulation.

Features

- Double exposed masonry with brick aesthetics provide durable architectural finishes inside and out.

- Suitable for either full or partial grout construction
  - Great for regions where partially grouted walls are preferred.
  - Fire resistance: depends on unit width, density and whether partially or fully grouted.
  - May be constructed as a fully grouted wall to increase fire resistance.

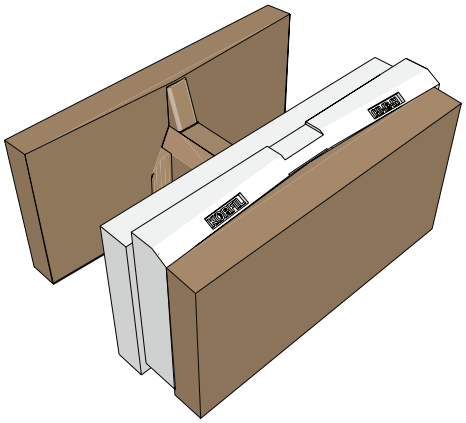
- Construction Efficiency
  - Utilities (plumbing and electrical) readily fit in unit cores and horizontal voids.
  - Single trade installs interior and exterior finishes, structure and insulation in one step.
  - Offered in 12" unit width.

- Thermal Performance (see comparison chart)
  - Two part offset interlocking 2.5" insulation inserts.
  - Interlocking insulation covers all mortar joints.
  - Two web design offers reduced thermal bridging when compared to traditional CMU.
  - Thermal mass is exposed to the interior, conditioned space for optimal thermal performance.

- Aesthetics:
  - Scale: 4"x16" face dimension
  - Offered with full range of masonry colors and smooth texture.
  - **Spec-Brik HI-R** made with Spec-Brik Blended Colors (see color chart on following page).

HI-R-H™

HI-R-H is a single web pre-insulated masonry unit that is suitable for fully grouted walls.



Primary uses

- Double exposed single wythe masonry walls for conditioned in all Climate Zones.
- Single wythe walls for conditioned spaces in all Climate Zones with furring/wallboard and/or interior or exterior insulation.
- Load-bearing above and/or below grade.

Features

- Double exposed masonry -durable architectural finishes inside and out.

- Fully Grouted Wall System
  - Barrier wall performance resists moisture penetration/condensation issues with use of integral water repellent in block and mortar and post-applied sealant.
  - No flashing and weep systems are required at bond beams.
  - Fire resistance: **Four hour** fire rating is typical.
  - No additional air barrier or vapor retarder is required with fully grouted masonry walls (assumes use of integral water repellent in unit and mortar)
  - Great choice for structures designed to be resilient against natural hazards.
  - Great choice for demanding applications requiring extensive reinforcement.

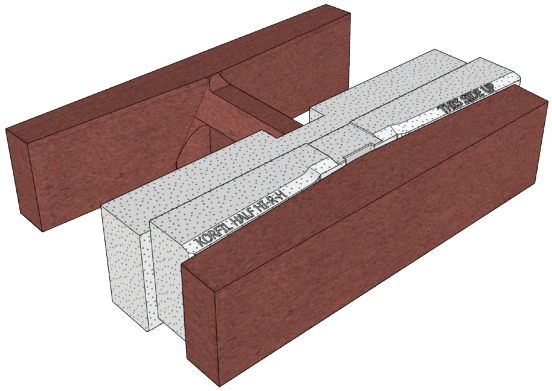
- Construction Efficiency
  - Shape eases placement even with tight reinforcement spacing.
  - No modification to stretcher unit required for bond beam construction.
  - Utilities (plumbing and electrical) readily fit in unit cores and horizontal voids.
  - Single trade installs interior and exterior finishes, structure and insulation in one step.
  - Unit Width: 12", 10" (regional only - please check with your representative)
  - Typically the most cost-effective option for pre-insulated masonry in terms of installed cost.

- Thermal Performance (see comparison chart)
  - Choose Insulation Insert based on thermal requirements:
    - Two part offset interlocking 3.5" insulation insert with lapped joints - lowest cost, less reinforcement.
    - Two-part interlocking 4" insulation insert with lapped joints for projects requiring higher thermal performance.
  - Interlocking Insulation covers all mortar joints
  - Single partial height web for reduced thermal bridging.
  - Thermal mass exposed to the interior, conditioned space for optimal thermal performance

- Aesthetics:
  - Scale: 8"x16" face dimension
  - Offered with full range of masonry textures and colors
  - **Spec-Brik Jumbo HI-R-H** when made with Spec-Brik Blended Colors

HI-R-H™ Half High
SPEC-BRIK HI-R-H™

HI-R-H Half High is a single web pre-insulated masonry unit that is suitable for fully grouted walls that has a 4" x 16" face dimension. When made with Spec-Brik colors, the product is called **Spec-Brik HI-R-H.** (Regional Availablity – please check with your local manufacturer)



Primary uses

- Pre-insulated walls where brick aesthetics are desired.
- Single wythe walls for conditioned spaces in all Climate Zones.
- Single wythe walls for conditioned spaces with furring/ wallboard and/or interior or exterior insulation.
- Load bearing above and/or below grade.

Features

- Double exposed masonry with brick aesthetics -durable architectural finishes inside and out.

- Thermal Performance (see comparison chart)
  - Two-part 4" nominal offset interlocking insulation insert - thickest insert currently available.
  - Interlocking insulation covers all mortar joints
  - Insert uses higher density EPS to enhance thermal performance
  - Single partial height web for reduced thermal bridging.

- Thermal mass exposed to the interior, conditioned space for optimal thermal performance Fully Grouted Wall System
  - Barrier wall performance resists moisture penetration/condensation issues with use of integral water repellent in block and mortar and post-applied sealant.
  - No flashing and weep systems are are required
  - Fire resistance: **Four hour** fire rating is typical.
  - No additional air barrier or vapor retarder is required with fully grouted masonry walls (assumes use of integral water repellent in unit and mortar).
  - Great choice for structures designed to be resilient against natural hazards.
  - Great choice for demanding applications requiring extensive reinforcement.

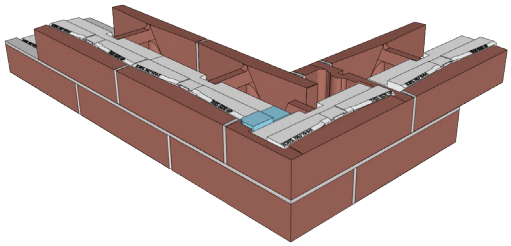
- Construction Efficiency
  - Shape eases placement even with tight reinforcement spacing.
  - No modification to stretcher unit required for bond beam construction.
  - Utilities (plumbing and electrical) readily fit in unit cores and horizontal voids.
  - Single trade installs interior and exterior finishes, structure and insulation in one step- no separate construction of framing, exterior veneer and insulation is required.
  - Unit Dimensions: 12x4x16 nominal

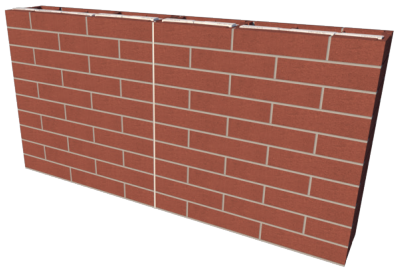
- Aesthetics:
  - Scale: 4"x16" face dimension
  - Offered in full range of masonry colors and smooth texture.
  - **Spec-Brik HI-R-H** when made with Spec-Brik Blended Colors (see color chart).

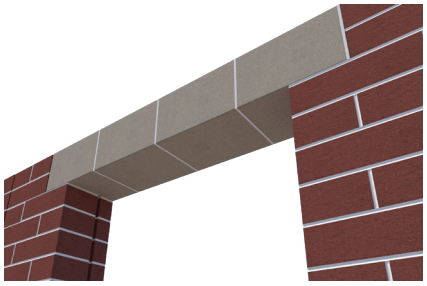
Thermal Properties for Wall Detailing

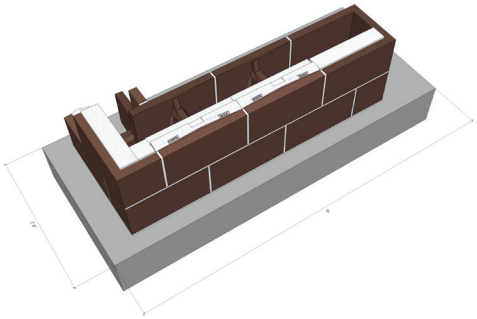
HI-R and HI-R-H walls are pre-insulated with Korfil® Inserts from Concrete Block Insulating Systems, Inc. for the field of the wall. When calculating the thermal values for the wall as a whole, the values associated with movement joints, jambs, corners, lintels and sills should be taken into account as part of the overall wall assembly. CPG has prepared an Addendum to this Thermal Properties Guide which addresses how to calculate thermal values for these details. These details include: Corners, Jambs, Movement Joints, and Lintels. These details can be constructed either using specialty HI-R-H units (available regionally) or through the use of the HI-R/HI-R-H units or conventional CMU fittings with added insulation.

For more information, please see our SpecThermal Detailing Manual, and Thermal Properties Guide Wall Detailing Addendum.









Product Selection Considerations

Which Spec-Thermal wall system is right for your project?

This will depend on several factors:

- What level of thermal performance is required for the wall system by Energy Code or otherwise?
- Is the project going to be fully or partially grouted?
- What type of wall finishes are optimal for your project?

Thermal Performance Considerations

All of the Spec-Thermal products offer significant increases in thermal performance compared to conventional concrete masonry units, even with foamed-in-place insulation. As the table below indicates, there are a variety of options available to meet a range of thermal requirements. The products are listed in order of ascending thermal performance capability. The following chart is meant to illustrate relative performance. Specific wall design should also take into account insulation detailing of corners, jambs and other features.

R-Values and U-Factors for HI-R and HI-R-H Masonry Units
(stretcher units only/regionally available densities vary)

Product (grouted cells)	Density (pounds per cubic foot)				
	95	105	115	125	135
HI-R **Two Webs, 2.5 inch insert** 8-8-16*	**R-10.00** **U-0.10**	**R-9.07** **U-0.110**	**R-8.18** **U-0.122**	**R-7.36** **U-0.136**	**R-6.59** **U-0.152**
HI-R **Two Webs, 2.5 inch insert** 10-8-16	**R-11.82** **U-0.085**	**R-10.82** **U-0.092**	**R-9.85** **U-0.10**	**R-8.94** **U-0.11**	**R-8.08** **U-0.124**
HI-R and HI-R Half High **Two Webs, 2.5 inch insert** 12-8-16/12-4-16	**R-12.58** **U-0.079**	**R-11.56** **U-0.086**	**R-10.57** **U-0.095**	**R-9.62** **U-0.104**	**R-8.72** **U-0.115**
HI-R-H **One Web, 3.5 inch insert** 10-8-16**	**R-15.11** **U-0.066**	**R-13.70** **U-0.073**	**R-12.57** **U-0.079**	**R-11.37** **U-0.088**	**R-10.17** **U-0.098**
HI-R-H **One Web, 3.5 inch insert** 12-8-16	**R-16.32** **U-0.061**	**R-14.98** **U-0.067**	**R-13.74** **U-0.073**	**R-12.50** **U-0.080**	**R-11.25** **U-0.089**
HI-R-H **One Web, 4 inch insert** 12-8-16	**R-17.56** **0.057**	**R-16.12** **U-0.062**	**R-14.78** **U-0.068**	**R-13.45** **U-0.074**	**R-12.11** **U-0.083**
HI-R-H Half High **One Web, 4 inch insert** 12-4-16	**R-17.87** **U-0.056**	**R-16.40** **U-0.061**	**R-15.04** **U-0.066**	**R-13.69** **U-0.073**	**R-12.32** **U-0.081**

* 8-8-16 HI-R typically is not specified currently. The groutable space is very restricted.

** check with your local CPG representative; 10" version has regional availability only.

For reference, the 2015 IECC prescriptive requirements for mass walls for commercial buildings require that the U-Factor for mass walls not exceed the following values per climate zone:

Climate Zone	1	2	3	4	5	6	7	8
U-Factor	U-0.151	U-0.151	U-0.123	U-0.104	U-0.090	U-0.080	U-0.071	U-0.061
U-Factor (R)	U-0.151	U-0.123	U-0.104	U-0.090	U-0.080	U-0.071	U-0.061	U-0.061

Fully or Partially Grouted Construction?

With the Spec-Thermal family of products, full or partial grout walls are both readily constructed. The HI-R products are suitable for both partially grouted and fully grouted walls. The HI-R-H products are suitable only for fully grouted construction, but are optimized to make grouting as efficient as possible since they use a partial height single web per unit, a design which allows grout to flow readily throughout the wall cores by minimizing obstructions.

Here are some considerations regarding the choice between full and partial grouting:

Full Grout	Partial Grout
Construction: Simpler construction process - all cores are grouted and no flashing/weeps at empty cores is required.	**Construction:** Requires less grout material and associated labor costs. As reinforcement spacing increases, the cost savings for partial grout become more significant, though additional costs are required for flashing/weeps and an air barrier.
Air barrier: Solid grouted walls are deemed by Code to comply with air barrier requirements so no additional air barrier is required.	**Air barrier:** Additional air barrier is required.
Thermal: Greater mass from a solid grouted wall is exposed to the conditioned interior of the building, optimizing thermal mass benefits of masonry.	**Thermal:** Ungrouted portions of the wall will have slightly higher R-Value than grouted portions. The overall U-Factor for the assembly will be the average of grouted and ungrouted areas.
Moisture Penetration Resistance: Multiple barriers (post-applied sealant on exterior surface; integral water repellent in block and mortar; and solid grouted cores).	**Moisture Penetration Resistance:** Barriers and interior drainage (post-applied sealant on exterior surface; integral water repellent in block and mortar; and flashing and weeps system to facilitate drainage from the cores of the walls to the exterior).
Fire Resistance: Fire Rating for Solid grouted walls with 12" units will typically exceed 4 Hours.	**Fire Resistance:** Varies by unit width and density.

* check with manufacturer for unit specific fire rating information.

Even in regions where partially grouted construction is the norm, the designer should consider the advantages of solid grouting; ask your CPG representative for assistance in estimating the cost impacts of choosing full or partial grout - often, the net cost difference is not significant.

What type of wall finish do you want?

The Spec-Thermal Family of products allows the construction of double exposed masonry walls with attractive and durable surfaces to both the interior and exterior at considerable savings when compared to veneer construction, where both a veneer and a structural backup wall must be built. With Spec-Thermal products, a single unit provides the interior and exterior finish, the load bearing structure, and the insulation needed to meet energy requirements.

Some additional aesthetic considerations:

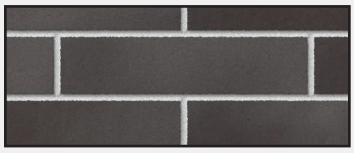
(1) Density. While using lighter weight density block will improve thermal performance, it will have an impact on available texture and color selections. Check with your manufacturer to confirm available densities and aesthetic choices. HI-R-H units, due to their superior thermal characteristics, will typically allow use of higher density concrete mixes at a given level of thermal performance, when compared to HI-R units.

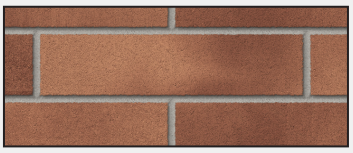
(2) Brick Aesthetics. All HI-R and HI-R-H products are available in Spec-Brik colors. Using these color blends with the half high HI-R or HI-R-H products allows designers the freedom to create the aesthetics of a brick veneer wall while using cost-effective single wythe masonry. As thermal performance requirements increase, the HI-R-H style block may be the best choice to get a finish that most closely resembles clay brick. The following table shows standard Spec-Brik Colors:

Spec-Brik® HI-R® and HI-R-H Colors

SPEC-BRIK is available in 12 Standard Colors (custom colors are also available)
Check concreteproductsgroup.com for downloadable Masonry Designer Rendering Software


Basalt Blend


Chesapeake Blend


Delaware Blend


Dixon Blend

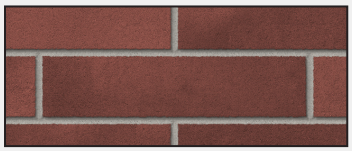

Flint Blend

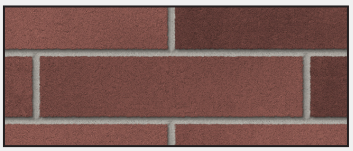

Gardner Blend

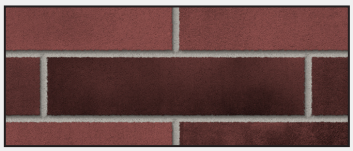

Houston Blend


Jefferson City Blend


Panama City Blend


Philadelphia Blend


Saint Cloud Blend


Stanton Blend

The colors above are digital renderings of blended Spec-Brik colors. Due to the limitations of the printing process and the importance of viewing masonry materials under realistic site lighting conditions, we strongly recommend viewing a sample board before making color selections and using a job site sample panel as the basis for acceptance of the final work.

(3) Other Finishes. A variety of masonry finishes and colors are available. Generally, the following textures are available by product, but please check with your local manufacturer to confirm local color and texture availability.

Product	Textures	Colors
HI-R 8-8-16	Smooth, splitface, ground	Manufacturer's color range; Spec-Brik blends
HI-R 10-8-16	Smooth, splitface, ground	Manufacturer's color range; Spec-Brik blends
HI-R 12-8-16	Smooth, splitface, ground	Manufacturer's color range; Spec-Brik blends
HI-R Half High/Spec-Brik HI-R 12-8-16/12-4-16	Smooth	Manufacturer's color range; Spec-Brik blends
HI-R-H 10-8-16*/12-8-16	Smooth, splitface, ground	Manufacturer's color range; Spec-Brik blends
HI-R-H Half High/Spec-Brik HI-R-H 12-4-16	Smooth	Manufacturer's color range; Spec-Brik blends

* 10-8-16 HI-R-H is available only regionally; check availabilty before specifying.

Using COMcheck to Demonstrate Energy Code Compliance for Pre-Insulated Wall Systems.

COMcheck is available from https://www.energycodes.gov. Demonstrating that concrete masonry wall systems, including pre-insulated systems, comply with the applicable Energy Code in jurisdictions where COMcheck is accepted is uncomplicated provided you use the correct approach. Counter-intuitively, using the obvious menu choice in COMcheck - "Concrete Block", leads you to the most conservative values and causes many COMcheck runs to fail.

Once you have reached the "Envelope" tab in COMcheck and you click on the "Exterior Wall" followed by "Assembly", a drop down menu appears. Therein are two options you can use to test your single wythe concrete masonry design: "Concrete Block" and "Other (U-Factor Option)". Here are the considerations that apply to the choice between the two options:

"Concrete Block" This drop down option is **not recommended** for pre-insulated single wythe insulated CMU walls.

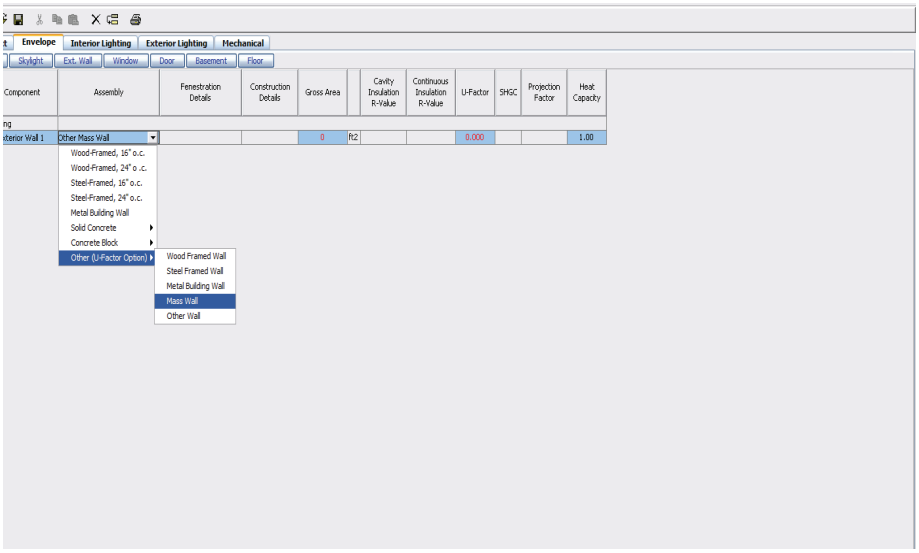
The "Concrete Block" section of COMcheck assumes the insulation is absent from the grouted cores and this greatly penalizes your design. Removing the insulation is not typical of systems like HI-R/HI-R-H or Korfil Icon or U-Shape. These systems have been designed and fully tested structurally for the insert to remain in cores of block. For these systems, both the vertical and horizontal reinforcement may be placed and grouted without removing insulation.

"Other U-Factor Option" When the "Other U-Factor Option" is selected in COMcheck, the user need not rely on the generic thermal values COMcheck provides and can instead enter the exact U-Factor and Heat Capacity values for the specific insulated block system under consideration. The biggest benefit in using this section is that for systems that have been designed and tested with the insulation remaining in the grouted cores, the true performance characteristics of the wall system can be used.

In order to evaluate wall assemblies in COMcheck, you will need the following information:

- Governing version of Code for the Authority Having Jurisdiction for your project
- Wall Assembly Dimensions (Gross Area) - from plans
- Net Masonry Wall assembly U-Factor (from Thermal Properties Tables included on the following pages). Remember to account for movement joint and fenestration perimeter losses/increases as well as increases from additional materials,
- Wall Heat Capacity (from charts above)

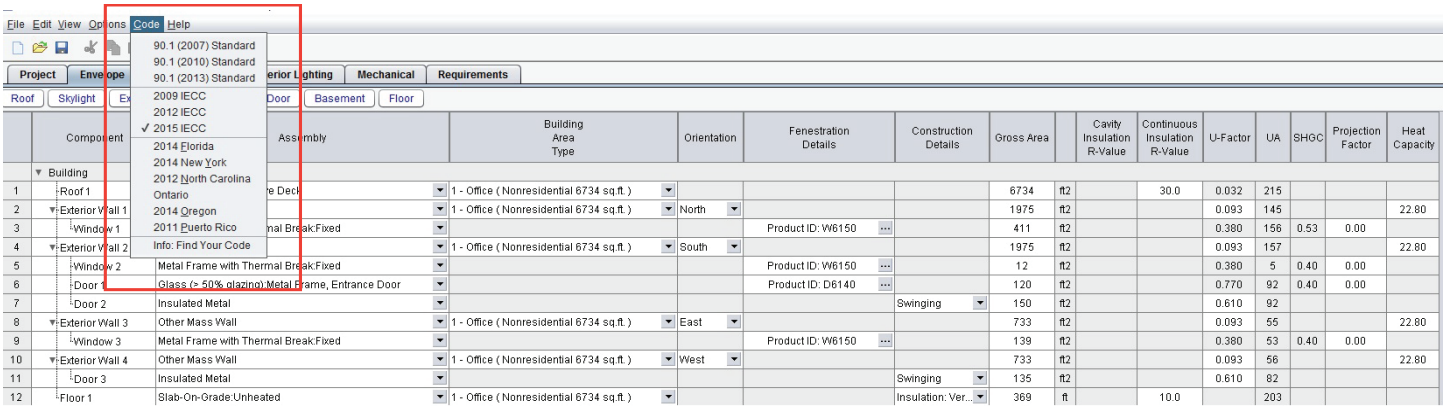
See next page for step by step data entry suggestions.



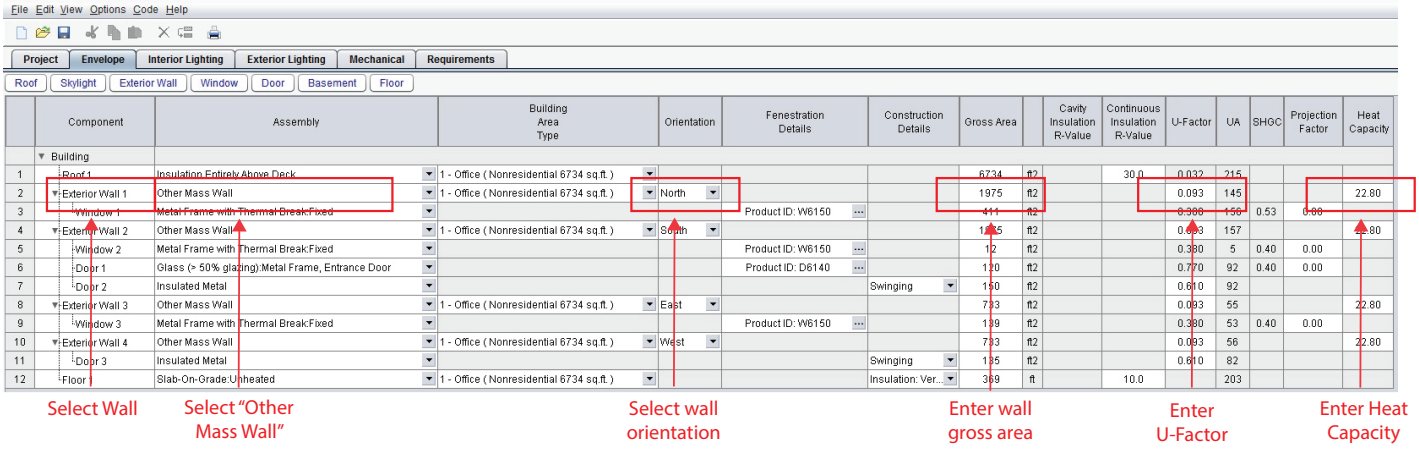
For Best Results, Choose **"Other (U-Factor Option)"/"Mass Wall"**

Basic Navigation in COMcheck

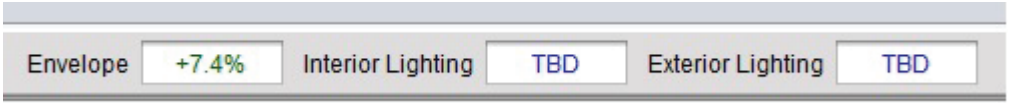
Step One: Choose Applicable Code.



Step Two: Enter Wall Assembly Data.



Results: In this case, the wall assembly exceeds Code requirements.



THERMAL PROPERTIES TABLES

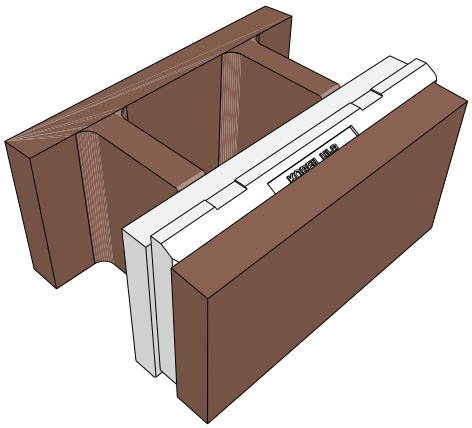
The following tables are based on thermal data certified by the manufacturer of the Korfil HI-R and HI-R H inserts, Concrete Block Insulating Systems, Inc. The tables are for use with hand calculations or Software (COMcheck, RE-Scheck, Energy Pro, etc.) Values are based on conventional 3/8" mortar joint construction and either ungrouted and/or grouted cells as indicated on the chart. For fully grouted walls, the values for Grouted Cells may be used for the field of the wall assembly after accounting for the thermal values for movement joints, fenestration perimeter areas, and increases from other materials/elements.

For partially grouted walls, the thermal properties of the wall will need to take into account the weighted average of the thermal values for the portions of the wall that are ungrouted vs. grouted. The method for calculating the U-Factor for a partially grouted wall is set out in NCMA TEK 6–2C R-VALUES AND U-FACTORS OF SINGLE WYTHE CONCRETE MASONRY WALLS (Available for download at: http://ncma-br.org/e-tek_chapter-nbs.asp?id=6.).

Check with your local manufacturer to confirm the density of concrete block they offer. Since this depends on locally available materials, density offerings will vary by location.

List of Tables:

Table 1.
HI-R®Ungrouted Cells



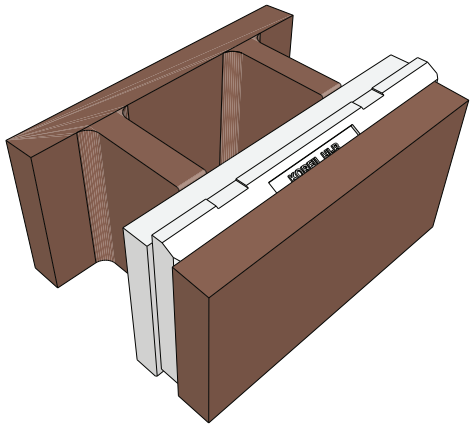
HI-R Ungrouted Cells					
Type of Block (inches)	95	105	115	125	135
8×8×16					
R_t Value	10.74	9.81	8.92	8.10	7.33
U Factor	0.093	0.102	0.112	0.123	0.136
Heat Capacity	5.60	6.09	6.67	7.25	7.73
Equivalent Thickness	3.86	3.86	3.86	3.86	3.86
10×8×16					
R_t Value	12.38	11.38	10.42	9.50	8.64
U Factor	0.081	0.088	0.096	0.105	0.116
Heat Capacity	6.32	6.99	7.57	8.24	8.91
Equivalent Thickness	4.31	4.31	4.31	4.31	4.31
12×8×16 and 12×4×16					
R_t Value	12.99	11.97	10.98	10.03	9.14
U Factor	0.077	0.084	0.091	0.100	0.109
Heat Capacity	7.03	7.70	8.47	9.15	9.82
Equivalent Thickness	4.91	4.91	4.91	4.91	4.91

Check with your local manufacturer to confirm the density of concrete block they offer. Since this depends on locally available materials, density offerings will vary by location.

8" HI-R units have restricted core area and may be difficult to grout.

Units: R_T Values: hr ft² F°/BTU; U-Factor: BTU/hr ft² F°; Heat Capacity (HC): BTU/hr ft² F°; Equivalent Thickness: Inches

Table 2.
HI-R®Grouted Cells



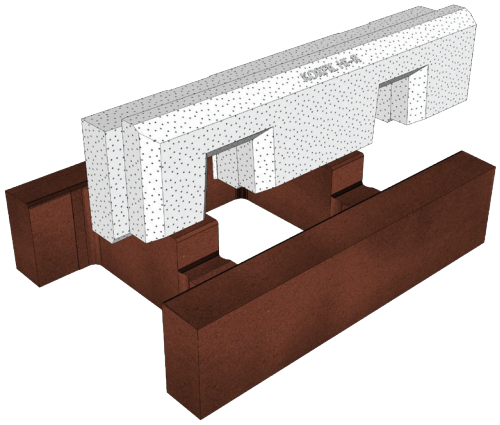
Korfil Hi-R Masonry Units (Grouted Cells)					
Type of Block (inches)	Density (pcf)				
	95	105	115	125	135
8×8×16					
R_t Value	10.00	9.07	8.18	7.36	6.59
U Factor	0.10	0.11	0.12	0.14	0.15
Heat Capacity	11.60	12.00	12.40	12.90	13.30
Equivalent Thickness	5.60	5.60	5.60	5.60	5.60
10×8×16					
R_t Value	11.82	10.82	9.85	8.94	8.08
U Factor	0.08	0.09	0.10	0.11	0.12
Heat Capacity	15.80	16.30	16.90	17.50	18.00
Equivalent Thickness	7.60	7.60	7.60	7.60	7.60
12×8×16					
R_t Value	12.58	11.56	10.57	9.62	8.72
U Factor	0.08	0.08	0.09	0.10	0.11
Heat Capacity	20.10	20.80	21.50	22.10	22.80
Equivalent Thickness	9.60	9.60	9.60	9.60	9.60

Check with your local manufacturer to confirm the density of concrete block they offer. Since this depends on locally available materials, density offerings will vary by location.

8" HI-R units have restricted core area and may be difficult to grout.

Units: R_T Values: hr ft² F°/BTU; U-Factor: BTU/hr ft² F°; Heat Capacity (HC): BTU/hr ft² F°; Equivalent Thickness: Inches
Assumed Grout Density: 140lbs/ft³

Table 3.
HI-R® Half High/Spec-Brik HI-R Grouted and Ungrouted Cells



FULLY GROUTED

Hi-R Half High/Spec-Brik Hi-R Masonry Units (Grouted)					
Type of Block (inches)	Density (pcf)				
	95	105	115	125	135
12×4×16					
R_t Value	12.58	11.56	10.57	9.62	8.72
U Factor	0.079	0.087	0.095	0.104	0.115
Heat Capacity	20.10	20.80	21.50	22.10	22.80
Equivalent Thickness	9.60	9.60	9.60	9.60	9.60

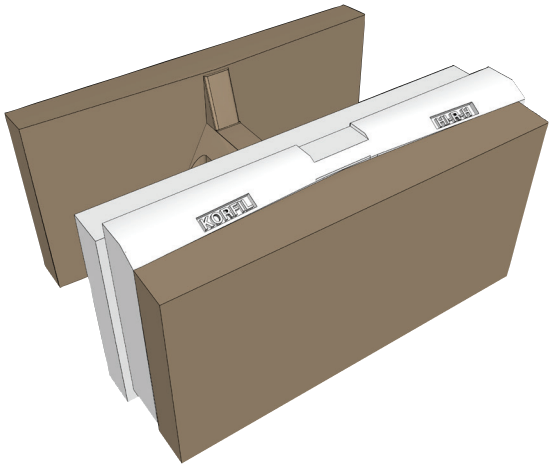
UNGROUTED

Hi-R Half High/Spec-Brik Hi-R Masonry Units (Ungrouted)					
Type of Block (inches)	Density (pcf)				
	95	105	115	125	135
12×4×16					
R_t Value	12.99	11.97	10.98	10.03	9.14
U Factor	0.077	0.084	0.091	0.100	0.109
Heat Capacity	7.40	8.11	8.92	9.63	10.34
Equivalent Thickness	5.17	5.17	5.17	5.17	5.17

Check with your local manufacturer to confirm the density of concrete block they offer. Since this depends on locally available materials, density offerings will vary by location.

Units: R_T Values: hr ft² F°/BTU; U-Factor: BTU/hr ft² F°; Heat Capacity (HC): BTU/hr ft² F°; Equivalent Thickness: Inches
Assumed Grout Density: 140lbs/ft³

Table 4.
HI-R-H (3.5" Insert)
Grouted Cells Only



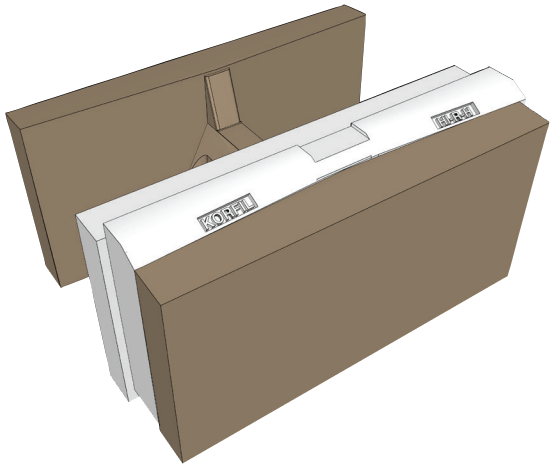
Hi-R H Masonry Units (Grouted)					
Type of Block (inches)	Density (pcf)				
	95	105	115	125	135
10×8×16					
R_t Value	15.11	13.70	12.57	11.37	10.17
U Factor	0.066	0.073	0.080	0.088	0.098
Heat Capacity	15.80	16.30	16.90	17.50	18.00
Equivalent Thickness	7.60	7.60	7.60	7.60	7.60
12×8×16					
R_t Value	16.32	14.98	13.74	12.50	11.25
U Factor	0.061	0.067	0.073	0.080	0.089
Heat Capacity	20.10	20.80	21.50	22.10	22.80
Equivalent Thickness	9.60	9.60	9.60	9.60	9.60

Check with your local manufacturer to confirm the density of concrete block they offer. Since this depends on locally available materials, density offerings will vary by location.

Note: Check with your local manufacturer on availabilty of 10" HI-R-H - not available in many regions.

Units: R_T Values: hr ft² F°/BTU; U-Factor: BTU/hr ft² F°; Heat Capacity (HC): BTU/hr ft² F°; Equivalent Thickness: Inches
Assumed Grout Density: 140lbs/ft³

Table 5.
HI-R-H (4" Insert)
Grouted Cells Only



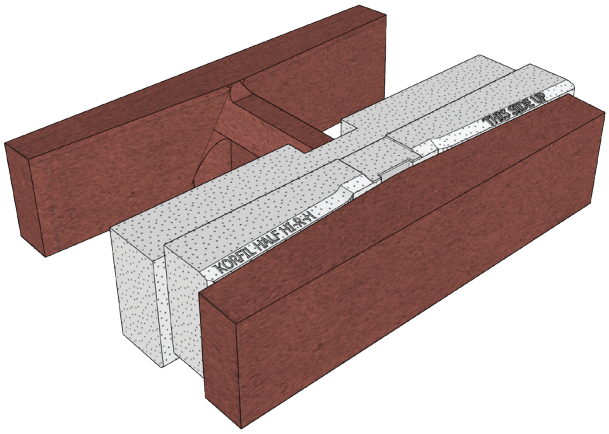
Hi-R H Masonry Units (Grouted)					
Type of Block (inches)	Density (pcf)				
	95	105	115	125	135
12×8×16					
R_t Value	17.56	16.12	14.78	13.45	12.11
U Factor	0.057	0.062	0.068	0.074	0.083
Heat Capacity	13.26	14.65	16.05	17.44	18.84
Equivalent Thickness	8.06	8.06	8.06	8.06	8.06

Check with your local manufacturer to confirm the density of concrete block they offer. Since this depends on locally available materials, density offerings will vary by location.

Note: 4" insert only available with 12x8x16 HI-R-H and not 10x8x16 HI-R-H

Units: R_t Values: hr ft² F°/BTU; U-Factor: BTU/hr ft² F°; Heat Capacity (HC): BTU/hr ft² F°; Equivalent Thickness: Inches
Assumed Grout Density: 140lbs/ft³

Table 6.
HI-R-H Half High/Spec-Brik HI-R-H (4" Insert)
Grouted Cells Only



HI-R-H HALF HIGH/SPEC-BRIK HI-R-H Masonry Units					
Type of Block (inches)	Density (pcf)				
	95	105	115	125	135
12×4×16					
R_t Value	17.87	16.40	15.04	13.69	12.32
U Factor	0.056	0.061	0.066	0.073	0.081
Heat Capacity	11.59	12.81	14.03	15.25	16.47
Equivalent Thickness	7.88	7.88	7.88	7.88	7.88

Check with your local manufacturer to confirm the density of concrete block they offer. Since this depends on locally available materials, density offerings will vary by location.

Units: R_T Values: hr ft² F°/BTU; U-Factor: BTU/hr ft² F°; Heat Capacity (HC): BTU/hr ft² F°; Equivalent Thickness: Inches
Assumed Grout Density: 140lbs/ft³

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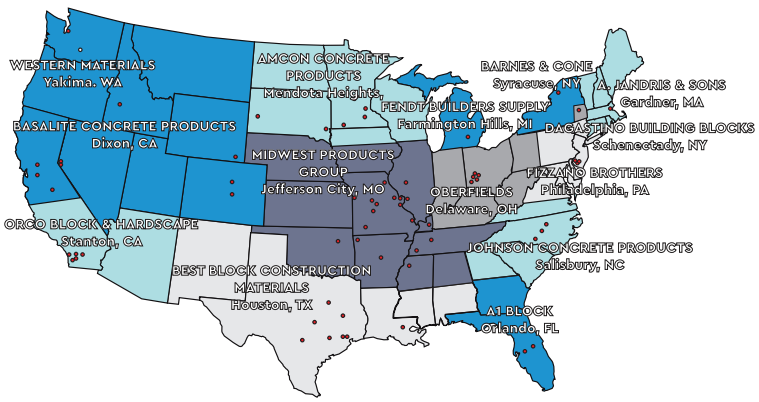

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