



Advantage ICF System™

Insulating Concrete Forming System



The Plasti-Fab™ patented Advantage ICF System is an insulating concrete forming system consisting of two layers of expanded polystyrene (EPS) insulation connected with web connectors moulded into the EPS insulation. The top and bottom edges of Advantage ICF System blocks have a preformed interlocking mechanism which ensures web connectors align vertically for attachment of surface finish materials.

When the installed Advantage ICF System blocks are filled with concrete, an insulated, monolithic concrete wall of uniform thickness is formed. The result is a superior, energy efficient wall that will provide long-term energy cost savings and add resale value to the building.



Advantage ICF System



Effective Thermal Resistance

Walls built with the Advantage ICF System provide improved energy efficiency that result in reduced operating costs for the life of the building. In addition, since less energy is being used, related greenhouse gas emissions are proportionately reduced. Today, more than ever, building an energy efficient structure is the right environmental choice and will provide savings in energy costs.

A 2001 Natural Resources Canada (NRCAN) report highlights the fact that space heating and cooling accounts for 61% of total energy consumption for residential buildings and 56% for commercial and institutional buildings.

The thermal resistance (R-Value) of a wall assembly provides a measure of its ability to resist heat flow through it. Walls constructed with the Advantage ICF System have a higher R-Value than other construction methods. It is important to distinguish between the overall “effective” R-Value of a wall assembly calculated using the methods detailed in model energy codes versus “nominal” R-Values.

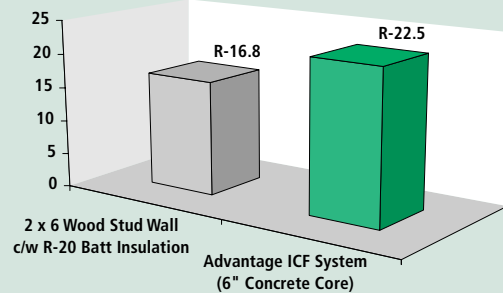
Minimum thermal insulation requirements in building codes are typically nominal values based on the centre-of-cavity R-value at the point in a wall cross-section containing the most insulation. In wood-frame construction, this nominal value indicates the thermal insulation required between framing members. The “effective” R-value of a wall assembly, on the other hand, refers to the complete assembly, including the effect of thermal bridges such as wood framing members.

The higher effective R-Value of the Advantage ICF System significantly reduces heat transfer compared to other construction methods resulting in lower energy consumption for heating and cooling.

Wall assemblies built with the Advantage ICF system incorporate a monolithic layer of expanded polystyrene (EPS) insulation over the interior and exterior face. Walls built using wood-frame construction include framing members at 406 or 600 mm (16” or 24”) on center with insulation between them. The effective R-Value of a wall assembly provides a better measure of thermal resistance because it includes the effect of thermal bridges in the wall assembly.

A home built using the Advantage ICF System will provide a wall structure at least 40% more energy efficient than a new home constructed using wood stud framing and batt insulation. This will translate into a savings in energy consumption of at least 30%. The graph below provides a comparison of the effective R-Value for a wall assembly constructed using the Advantage ICF System versus a wood frame system with R-20 insulation.

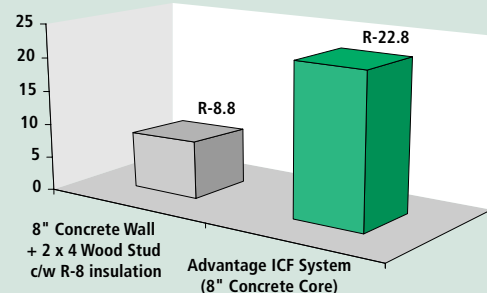
**Effective R-Value Comparison: Above-Grade Wall Assembly
Advantage ICF System versus Wood Frame System**



Attention to maintaining energy efficiency can not be focused solely on the above-grade portion of the construction. A poorly insulated below-grade wall can account for more than 50% of total heat loss from a house. The graph below provides a comparison of the effective R-Value provided by a below-grade wall constructed with the Advantage ICF System wall versus a typical concrete wall with wood frame wall and R-8 insulation.

The higher effective R-Value of the Advantage ICF System significantly reduces heat transfer compared to other construction methods resulting in lower energy consumption.

**Effective R-Value Comparison: Below-Grade Wall Assembly
Advantage ICF System versus Wood Frame System**



Advantage ICF System Features

Advantage ICF System Benefits

- More energy efficient
- Lower utility bills, saves money, more environmentally responsible
- Reduced sound transmission
- Comfort, privacy
- Resistant to storms and high winds
- Safe and secure
- Virtually dust and pollen free
- Healthier living
- Specialty 45° and 90° corner blocks and brick ledge block
- Flexibility in design
- Wide window sills
- Versatile interior decoration
- Fast, year round construction
- Convenient construction schedules
- Superior insulation
- Comfortable living with warm consistent temperatures throughout house
- Local supply
- High comfort level - dealing with established local building supply dealer

Reduced Noise Transmission

A widely accepted system of classifying walls or partitions for sound insulation value is the Sound Transmission Class (STC) rating for a structure. Essentially, the STC rating provides a basis for comparison against a standard for sound deadening of a structure at various frequencies. A high STC rating indicates a more efficient sound absorption characteristic.



A wall constructed using the Advantage ICF System provides superior protection against sound transmission from outside sources.

Many builders design for an STC 55 or more in high quality accommodations. Designing for a higher value provides a margin of safety to allow for problems during construction.

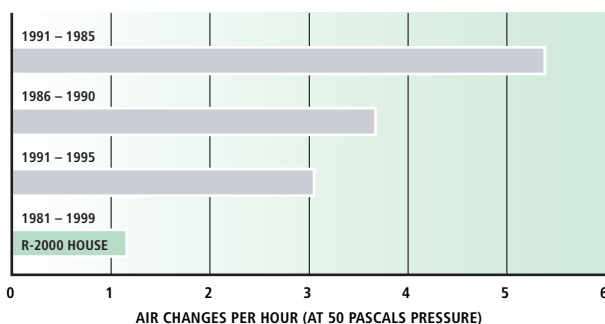
A typical 2" x 4" wood stud wall construction with batt insulation in the stud cavity would provide an STC 32. A monolithic concrete wall constructed using the Advantage ICF System with 12.7 mm (1/2") gypsum board interior finish would be expected to provide a rating in excess of the STC 55 as recommended for high quality accommodations.

Reduced Air Leakage

A blower door test is commonly used to assess the energy efficiency of new building construction. The test quantifies the air leakage rate from a structure in terms of air changes per hour.

Unintentional air leakage can be one of the biggest sources of heat loss in many buildings. Air leakage rates vary widely for different types of construction methods as illustrated in the chart below (excerpted from a review of national trends in air leakage for houses in Canada).

National Trends in Air Leakage in Houses by Construction Period



A 3,900 square foot bungalow constructed using the Advantage ICF System for both above and below grade walls was tested for air tightness in comparison to energy efficient design requirements. The air leakage rate was found to be 0.22 air changes per hour indicating a very airtight structure. This confirms that the solid wall construction provided by the Advantage ICF System can result in significant reduction in air leakage versus other types of wall construction.

It is important to note that the air tightness of a building built with the Advantage ICF System also depends upon other components incorporated into the building construction to maintain an energy efficient design. Components used in the building would be typical of those recommended for the R-2000 or Energy Star residential energy efficiency programs.

Providing adequate fresh air supply is an important consideration in energy efficient buildings. Plasti-Fab recommends that home owners incorporate use of a heat recovery ventilator in their design.

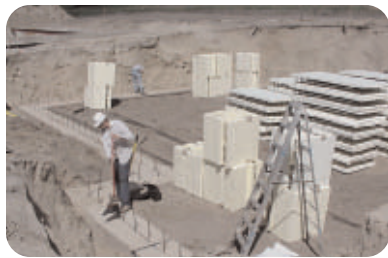
Installation Ease & Training

The Advantage ICF System provides benefits for trades installing other parts of the wall assembly. The web connectors are designed to support reinforcing steel cast into the concrete in the correct location.

The patented Advantage ICF System features a unique web connector and panel interlock system that ensures the recessed attachment surfaces in the interior and exterior EPS insulation panels always line up vertically. This simplifies the attachment of surface finishes, such as drywall, stucco and siding. The combination of the two EPS insulation layers and the solid concrete core eliminate the need for separate air and vapour barrier materials.

Plasti-Fab recognizes the need for installation training to ensure that Advantage

ICF System wall assemblies are constructed correctly. For this reason, a detailed Installation Manual is available along with on-site training. Installation videos may be viewed at: www.plastifab.com/homeowners/build/advantage_icfs/educational



1 Footing in place: dowels to match vertical steel; hole loaded with block and rebar



2 Stacking Advantage block: simple hand tools required



3 Cutting fillers: first 2 rows set the Advantage block pattern for the entire project



4 Install scaffold: at 3 rows high set scaffolding



5 Work platform in place: continue setting block; follow the set pattern established in rows 1 and 2



6 Set window bucks: cut block to fit around bucks



7 Place steel over doors and windows: stirrups may be required; brace door and window bucks



8 2 x 4 ribbon: attach around the top perimeter; set stringlines



9 Placing concrete: make sure mix design is appropriate for job; follow proper placing techniques



10 Placing concrete and vibrating: proper crew size required; 1" vibrator; clean site



11 Vibrating concrete: in fast, out slow; straighten walls to string line



12 This is an Advantage Homes with a Difference project

Building Code Compliance

The Advantage ICF System has been reviewed for compliance with building code requirements in Canada and the United States. The Advantage ICF System has been evaluated for performance as a stay-in-place insulating concrete forming system.

Canadian Construction Materials Centre (CCMC) Report 13101-R confirms compliance with the National Building Code of Canada. The CCMC report includes design tables for above and below grade concrete walls for residential construction.

ICC Evaluation Service Report ESR-1578 confirms compliance with the International Building Code (IBC), the International Residential Code (IRC), and the Uniform Building Code (UBC). Design of concrete walls formed by the Advantage ICF System can be completed using the requirements in the Portland Cement Association (PCA) publication *Prescriptive Method for Insulating Concrete Forms in Residential Construction* (publication No. EB118).

The Advantage ICF System can be used for above or below grade walls in a variety of applications.

Residential homes



Recreational homes and cottages



Multi-family projects



Party walls for residential projects



Industrial buildings



Commercial buildings



Case Study: Inner City Condominium

“Using the Advantage ICF System will result in energy savings that will lead to lower overall condo fees and maintenance costs.”



Safe, quiet living close to downtown

Traffic noise, interior noise, fire safety and high energy costs are all serious concerns that builders of new inner city residential condominiums must overcome to attract buyers.

The 12-unit, three storey Villaggio Kensington condominium development, just minutes from the city's downtown core, overcomes all these concerns by using the Advantage ICF System as its foundation and primary wall assembly system.

The builders of Villaggio Kensington, La Costa Housing Ltd., chose the Advantage ICF System after researching residents' expectations and determining that, to be a success, the project had to provide residents with the quietest living environment and the lowest condominium fees possible.

La Costa is convinced that, overall, the savings in energy use that the residents will experience as a result of ICF construction, expected to be up to fifty per cent, will lead to lower overall condo fees and maintenance costs.

ICF Construction Foundation, exterior and interior walls

The condominium's Advantage ICF System exterior walls begin at the parkade and foundation levels and are carried through to the top storey. These walls, which sandwich a core of reinforced, cast-in-place concrete between two panels of Plasti-Fab EPS insulation, provide a concrete mass with superior soundproofing and insulating qualities when compared to a typical wood-frame exterior wall.

Residents will be protected from urban noise by the sound dampening effect of the ICF interior and exterior wall systems.

VILLAGGIO KENSINGTON



WALL
FIRE RATING
3 HOURS

11.25"

ADVANTAGE
ICF
SYSTEM

R-23

EFFECTIVE
INSULATION
VALUE



WALL SOUND
TRANSMISSION
CLASS

42 percent R-Value improvement

Residents will appreciate their lower heating and cooling costs as a result of the ICF construction. The effective R-Value provided by the Advantage ICF System is R-23.2 which is 42 per cent greater than the R-16.8 for typical above-grade construction using 2x6 inch wood stud walls with R-20 batt insulation. Higher effective R-Value means lower heating and cooling costs.)

Internal Soundproofing

To address concerns about internal noise, La Costa increased the internal soundproofing of the individual residences by also building the interior walls with the Advantage ICF system.

Residents will find that the Advantage ICF System more than adequately addresses their concerns regarding fire safety. The six inch thick steel reinforced concrete walls formed by the Advantage ICF System with gypsum board on the interior face will provide a three-hour fire rating.

La Costa did not experience any construction delays relating to building codes or inspections as a result of the use of the ICF technology. "Everyone that has walked through has commented on the quality of the construction, even the engineer sent over by the bank," says La Costa.

La Costa is already planning their next project – using the Advantage ICF System.

Advantage ICF Product Specifications

Advantage ICF 6"

Advantage ICF 8"

Standard Block



Height: 419 mm (16-1/2")
 Width: 286 mm (11-1/4")
 Length: 1219 mm (48")

Shipped in bundles of 5

Height: 419 mm (16-1/2")
 Width: 337 mm (13-1/4")
 Length: 1219 mm (48")

Shipped in bundles of 5

Corner Block



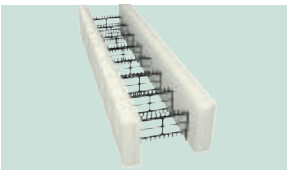
Height: 419 mm (16-1/2")
 Width: 286 mm (11-1/4")
 Length: 813 x 406 mm (32 x 16")

Shipped in bundles of 4

Height: 419 mm (16-1/2")
 Width: 337 mm (13-1/4")
 Length: 737 x 432 mm (29 x 17")

Shipped in bundles of 4

Half Block



Height: 209 mm (8-1/4")
 Width: 286 mm (11-1/4")
 Length: 1219 mm (48")

Shipped individually

Height: 209 mm (8-1/4")
 Width: 337 mm (13-1/4")
 Length: 1219 mm (48")

Shipped individually

Taper Top Block



Height: 419 mm (16-1/2")
 Width: 286 mm (11-1/4")
 Length: 1219 mm (48")

Shipped in bundles of 5

Height: 419 mm (16-1/2")
 Width: 337 mm (13-1/4")
 Length: 1219 mm (48")

Shipped in bundles of 5

45° Corner Blocks



Height: 419 mm (16-1/2")
 Width: 286 mm (11-1/4")

SMALL BLOCK:

Outside: 467 mm (18-3/8")
 Inside: 346 mm (13-5/8")

LARGE BLOCK:

Outside: 873 mm (34-3/8")
 Inside: 753 mm (29-5/8")

Shipped as a pair

Height: 419 mm (16-1/2")
 Width: 337 mm (13-1/4")

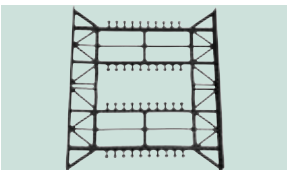
SMALL BLOCK:

Outside: 432 mm (17")
 Inside: 295 mm (11-5/8")

LARGE BLOCK:

Outside: 889 mm (35")
 Inside: 753 mm (29-5/8")

Web Connector



Height: 366 mm (14-3/8")
 Flange Width: 41 mm (1-5/8")
 Spacing: 203 mm (8")

Height: 366 mm (14-3/8")
 Flange Width: 41 mm (1-5/8")
 Spacing: 152 mm (6")

Brick Ledge



Height: 419 mm (16-1/2")
 Width: 286 x 400 mm (29 x 17")
 Length: 1219 mm (48")

Shipped as top or bottom row

Advantage ICF System Specifications

General Product Description

EPS Insulation:	Complies with CAN/ULC-S701, Type 2 and ASTM C578, Type II Contains no CFC's, HCFC's, HFC's or formaldehyde. ECP-Certified Insulation
Concrete:	20 MPa (2900 psi) at 28 days Nominal thickness 152-mm (6") or 203-mm (8")
Sound Transmission:	STC rating > 55
Fire Resistance Rating:	3-hour rating for 152-mm (6") or 4-hour 203-mm (8") concrete wall per National Building Code of Canada 1995, Table D-2.1.1.
Air & Vapour Barrier:	Provided by combination of monolithic concrete thickness and EPS insulation
Code Evaluation Reports:	CCMC 13101-R (Canada) and ICC-ES ESR-1578 (USA)

Energy Efficiency – Typical Effective Thermal Resistance (R-Value):

Below Grade:	6" Advantage ICF System @ R-21.7 8" Advantage ICF System @ R-22.8
Above Grade:	6" Advantage ICF System @ R-22.5 8" Advantage ICF System @ R-23.6

www.plastifab.com

Be sure to visit our comprehensive website
for all of your insulating needs.



Use Insulspan SIP System for roof construction, ideal for vaulted or cathedral ceilings.



Use PlastiSpan Insulation to insulate your radiant floor system.