

Eco Block Aust Pty Ltd, Design Considerations – February 2009

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Eco-Block™ (Aust) Pty Ltd

(Saving Australian Energy)

Application

Eco-Block™ ICF can be used for below and above grade construction. It can be used for single level and multistory residential, commercial, institutional and industrial construction. They can be used for fire and noise resisting party walls and provide the necessary sound blocking for building next to airports, highways and railroad tracks.

The Eco Block building product is purchased from **Eco Block agents** in your State or Territory as a package of forms and connectors. Accessories resources such as screws, steel ties, "C" channel etc can be purchased from hardware stores.

The building owner must engage an Architect or Building Designer to design their project by using the technical details within the design manual. Note that the Design Manual and Technical drawings CD do not exhaust how a building is to be designed.

The Eco-Block™ Advantages

- **Environmentally friendly** – use of wood products is significantly reduced and **green house gas emissions**
- **Saves water in your construction** – There is 25% less water used in the concrete than other comparable construction.
- **Energy efficient** – provides excellent insulation and air infiltration resistance that can reduce heating / cooling costs by up to fifty percent (50%).
- **Sound suppressing** – interior spaces are effectively shielded from environmental noise and from adjacent space noise.
- **Reduced labor costs** – due to the speed of construction, less trades, less craning and handling, less coordination hold ups.
- **Extremely strong** – the structure is reinforced cast in place monolithic concrete.
- **Easy to work** – EPS panels can be cut and shaped using wood working tools. Chases can be made with a router or a hot knife.
- **Versatile** – The concrete wall can be of any thickness (100mm – 610mm) using the same side panels. Any standard interior or exterior finish can be applied. Pre-formed ninety degrees (90) corners are catalog items. Corners other than ninety degrees and **curved** walls can easily be created. Can be used for insulation on tilt-slab wall systems a under elevated slabs.
- **Precision rebar placement**- rebar is accurately placed into notches in the connectors.
- **Steel Fibers**- For single story construction steel fibers can replace all N12 shrinkage reinforcing steel in horizontal and vertical directions except for above openings doors and windows. Refer to the Engineering tables for details.
- **Precision walls**- block to block alignment is perfect due to panel interlocks. Forms can be moved into plumb and flatness after assembly. Simple alignment tools maintain the perfect wall during concrete placement.
- **Concrete curing** – concrete remains moist during curing. Because of the slow hydration process this allows 125% realization of compressive strength. Tests conducted by Coffey Geosciences Pty Ltd confirm that after 7days the compressive strength (Mpa) is 45.5 and then after 30 days the Mpa had increased to 59.5.
- **Easier to transport** – Components allow assembly on site; almost no “dead air” is shipped during transport.
- **Less expensive** – Single EPS panels reduce mold and manufacturing costs, which are passed on to the customer. Inventory cost is reduced because one size panel fits all wall thickness.
- **Structure life** – there is no limit to the life expectancy of the Eco-Block™ wall.

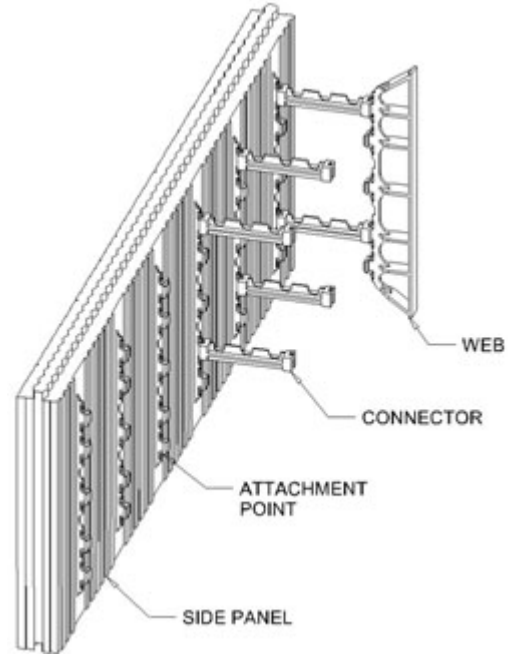
Design Considerations.

Construction Process

The ECO-Block ICF is composed of three components (See Cutaway View):

- Side panels
- Webs
- Side panel connector elements

The ECO-Block ICF system consists of two types of plastic: Expanded Polystyrene (EPS) and high-density plastic. Each block has two side panels, each measuring 1219 mm long by 406 mm high by 64 mm thick. These side panels are made of flame-retardant EPS. Every 203 mm on the horizontal axis of the side panel, there is a **high-density plastic web** that has been moulded into the EPS side panel. These webs provide a surface on both the exterior and interior to attach finishing materials.



The **connector element** spans the cavity between the two side panels and connects the two side panels together to make the blocks. The connector elements and the EPS side panels are easily and quickly assembled on site. The cavity made by the connector element can be varying sizes from 101 mm to 254 mm or more depending on the length of the connector element. It is in this cavity that concrete is placed to make the concrete walls of the building. After the concrete cures, the ECO-Block side panels remain in place and provide the insulation for the building.

Stack-and-Pour for Fast Walls

ECO-Block's easy-to-use process eliminates several steps that are necessary with wood-frame construction, such as sheathing and insulating the exterior walls. Made of expanded polystyrene (EPS), ICFs stack and lock into place much like LEGO's™. Extreme heat, frigid cold, rain or sun — it doesn't matter — EPS insulates concrete, allowing it to wet-cure as it strengthens.

After the concrete cures, the plumbing and electrical installation can begin. The foam is easy to cut and remove so electrical lines can be installed. Plus, any exterior or interior finish can be applied.

ECO-Block features a bracing system with unique alignment features to ensure a smooth wall finish. Only basic hand tools are needed to position and secure our lightweight blocks. High-density webs, integral to ECO-Block, provide furring strips for any standard wall-finishing product.

High-density plastic webs are recessed by 10mm, providing a uniform exterior to which any stucco or EIFS material can be applied. Having such a uniform surface provides superior adhesion and crack resistance.

Radius walls and angled walls can also be constructed with ease through simple mitering techniques.

ECO-Block leads the ICF industry in research and development. It's this dedication to continuous improvement that allows our customers to rest easy. We stand behind our products.

1.1 Product Details.

Eco-Block flat panels

ECO-Block 2000 - Dimensions and Characteristics

	101mm Cavity Block	152mm Cavity Block	203mm Cavity Block
Block Dimensions (Standard Block)	1219 x 406 x 229 mm	1219 x 406 x 279 mm	1219 x 406 x 330 mm
Concrete Thickness	102 mm	152 mm	203 mm
Concrete Volume per block	0.05 m ³	0.07 m ³	0.1 m ³
EPS Thickness (total)	127 mm	127 mm	127 mm
Wall Surface Area per block	0.5 m ²	0.5 m ²	0.5 m ²
Fire Rating*	2 hours	4 hours	4 hours
Sound Insulation*	42 dB	51 dB	51+ dB
Thermal Insulation* U- Value	R-3.78 0.26	R-3.78 0.26	R-3.78 0.26
Block Dimensions (90 deg Corner) * concrete-filled	Long side: 813 mm Short side: 406 mm	Long side: 813 mm Short side: 406 mm	Long side: 813 mm Short side: 406 mm



(1) Eco Blocks packaged in bags of 6, weigh approximately 15kg

Eco Block is delivered in bags of six blocks and the bag weighs approximately 15 kilos each. So they are very easy to load and unload, saving costs and time. Most importantly from an occupational health and safety perspective there is much less stress on workers.



(2) Example of a 152mm thick concrete cavity

An Eco-Block™ concrete wall can be of any thickness (101mm to 610mm) using the same side panels. Our patented connector system of various sizes allows the flexibility to expand and contract the Eco-Block™ forms.

1.2 THERMAL PERFORMANCE

The BCA contains energy provisions with the objective of reducing greenhouse gas emissions by efficiently using energy. The requirement is that building must have, to the degree necessary, a level of thermal performance to facilitate the efficient use of energy for artificial heating and cooling.

**Eco Block has a total R-Value of 3.78
U-Value of 0.26**

The total R-Value achieved with the Eco Block wall exceeds that required in all climate zones both under the current BCA and under the amendments proposed for mid 2006.

1.3 Acoustic Performance.

The acoustic test for airborne sound has been completed by Palmer Acoustics (Australia) Pty Ltd. Palmer Acoustics is a member firm of the Association of Australian Acoustical Consultants. The airborne test, a weighted standardised level difference with spectrum adaptation term (Dnt,w + Ctr) of not less than 45, when determined under AS/NZA 1276.1 or ISO 717.1.

The 152mm Eco-Block wall with 63.5mm of EPS on either side and one layer of 10mm plasterboard each side has a Dnt,w+Ctr of 51. This rating meets the Deemed to satisfy rule of the BCA.

1.4 Impact Acoustic performance.

Expert opinion / judgment given by Palmer Acoustics (Australia) Pty Ltd
Consulting Acoustic Engineers and Scientists
Member Firm- Association of Australian Acoustical Consultants AAAC

Certified to Meet the FP5.2 dated 22/11/2004

Mr Ross H. Palmer CPEng, RPEQ (3534)

- **Meets the performance requirements of the Building Code of Australia FP5.2.**

1.5 Fire Performance.

Eco-Block™ EPS is manufactured to AS 1366 part 3 – 1992 and contains a flame retardant. Early fire hazard indices (Test to AS/NZS 1530.4- 1997) demonstrate compliance with AS 3600-2001.

Ignitability Index	0
Spread of flame Index	0
Heat evolved index	0
Smoke development index	0 – 1

1.6 Smoke Toxicity.

A CSIRO and a report commissioned by the National Research Council of Canada titled “Toxic combustion products of wood and polystyrene no 76 and dated September 1971, confirms that EPS is no greater risk than that associated with White Pine.

Result.

Polystyrene Co = 0.09 plus Co2 = 0.01 Total = 0.10
 White pine Co = 0.09 plus Co2 = 0.003 Total = 0.09.

BRANZ assessment report FAR 2251 states that the Eco-Block™ wall complies with AS 3600 and provide a Fire Resistance level (FRL) as follows.

Eco-Block™ Core thickness in mm.	Fire Resistance Level in Minutes. Structural Adequacy/ Integrity/Insulation
100mm	90 /90 /90
150mm	180 /180 / 180
170mm	240 /240 / 240

1.7 Termite treatments

Eco-Block™ Aust Pty Ltd does not recommend a particular termite treatment. Eco-Block™ recommends that you refer to the Building Code of Australia “Termite Risk Management” and AS 3660 to determine the appropriate termite barriers for the State, Territory or Region where the construction is to take place.

EPS or Concrete does not hold any nutritional value for ants or rodents.

- One measure agreed upon by all parties is the need for a minimum 152mm bare concrete inspection strip at grade level. This is required if foam is used below grade or only above grade. This is extremely easy to accomplish with ECO-Block, since it is a panelised system. A 152mm horizontal strip of EPS is cut out to allow the formation of a solid concrete barrier at grade. This creates a solid concrete barrier, forcing the termite to the outside of the foam where it is visible. Additional steps, together or separately, may meet the “approved method” requirements:
- Protect the foam with a termite barrier made from stainless steel mesh.
- Install “bait systems” on exposed concrete strips or treat the soil as usual.
- Treat footings and backfill with termiticides.
- Eliminate as much wood in the structure as possible by using steel and plastic replacements.
- Remember, in a solid concrete home there is little to eat. The concrete also acts as a solid barrier to termite infestation inside the home.

1.8 Internal and exterior wall finishes

Interior

Plaster Board / Cement sheets

Plasterboard or any other wall paneling system can be screwed to the plastic wall studs (which are recessed 4mm below the surface) using normal plasterboard screws just as you attach to a timber or steel frame construction in accordance with the BCA. Ensure that you use a foam compatible adhesive, **such as the following,**

MANUFACTURER	PRODUCT	USE	TYPE
H.B.FULLER	BORAL NEW ACRYLIC	PLASTERBOARD AND CEMENT SHEET TO ECO BLOCK	MASTIC
H.B. FULLER	BORAL GOLD BOND	PLASTERBOARD AND CEMENT SHEET TO ECO BLOCK	MASTIC
ADHEFOAM MBS STAFFORD QLD	AHHESEAL	PLASTERBOARD AND CEMENT SHEET TO ECO BLOCK	SPRAY ON FOAM

Note that Eco Block does not represent the above companies. The above is for information purposes only and there will be other adhesives that will be compatible with this form of construction.

Recommended Fasteners

No. 6, coarse-thread (single thread) plasterboard wallboard screw
No. 8, fine-thread gypsum wallboard screw
No. 10 wood screw
No. 16 gage staple (13mm crown width)
No. 10, Type S dual-thread Rock-on Hi-Lo screw

For the proper installation requirements, consult the manufacturer of the product you choose to use.

Exterior

Any nailed or screwed product (weather board, vinyl board, aluminum or steel cladding) attaches directly to the Eco-Block™ plastic wall studs. Eco-Block™ **recommends that you consult the manufacturer of the siding for specific installation instructions.**

Cement and Acrylic render from the following manufacturers,

MANUFACTURER	PRODUCT	TYPE	APPLICATION
ROCKCOTE YANDINA QLD	ROCKCOTE REINFORCED RENDER	EPS	HAND TROWEL FIBRE MESH
DULUX AUSTRALIA	ACRATEX REINFORCED RENDER	EPS	HAND TROWEL FIBRE MESH
UNITEX DANDENONG	UNITEX SURFACING SYSTEM	EPS	HAND TROWEL FIBRE MESH
QUICKWALL	QUICKWALL QUICKCLAD 4 COAT SYSTEM	EPS	HAND TROWEL FIBRE MESH
UNITEX	UNITEX	EPS	HAND TROWEL FIBRE MESH

Note that Eco Block does not represent the above companies. The above is for information purposes only.

Eco-Block can accommodate render or external finishes from many other manufacturers. **For the proper installation requirements, consult the manufacturer of the product you choose to use for their warranties.**

Note: Products with solvents in them can dissolve the foam, so check with the manufacturer or distributor prior to application.

Attachment of Accessories to Eco Block wall:

Normal wall anchors can be used to hang fixtures such as photos etc the same as a normal cavity wall construction. Note that the Eco Block panel is 64mm thick so the anchor that you use should be less than or equal too 64mm or else the concrete wall will not allow full insertion into the wall. Examples of common anchors are as follows:



1.9 Services

Electrical and plumbing lines are easily installed into the Eco-Block™ wall. To create channels in the foam for electrical wiring and plumbing you can use a hot knife or router. **Angle the channel so it has a lip on the bottom** to hold the cable or plumbing lines in place. You can then spot glue the electrical cable and plumbing line in place with EPS compatible foam adhesive.



(4) Example of plumbing installation



(5) Example of electrical installation

1.10 Penetrations.

Gaps created by service penetrations through the exterior wall will require waterproofing. The most common method is to use an EPS compatible foam adhesive and if required seal with a long lasting, exterior gap sealant.

1.11 Waterproofing- Below grade

There are many different waterproofing products available. These range from self-adhesive membranes too spray on and roll-on products **so long as they are foam compatible**. Products with solvents in them can dissolve the foam so always check with the manufacturer or distributor of the water proofing product concerning application to EPS, prior to the application.

Waterproofing products such as the following,

PARGING

MANUFACTURER	PRODUCT	TYPE	APPLICATION
HITCHINS RESEARCH LABS PTY LTD NSW	POLYEU H7	FIBERGLASS REINFORCED POLYMER COATING	ROLL ON
TREMCO RYDALMERE NSW	TREMPROOF 3000	SELF ADHESIVE EXTRUDED SHEET	HAND
TREMCO RYDALMERE NSW	PARASEAL LG	MULTI COMPONENT GRANULAR SHEET MEMBRANE	HAND
TREMCO RYDALMERE NSW	SALTWATER PARASEAL	ELASTOMERIC SHEET MEMBRANE SPECIFICALLY DESIGNED FOR AREAS SUBJECTED TO SALINE, ALKALINE, ACID ETC	HAND
PASCO RICHMOND VICTORIA	AQUAPROOF 301BL	ACRYLIC BASED LAYTEX BITUMUN COATING	HAND ROLL ON
CHEMIND CONSTRUCTION PRODUCTS	NEWFLEX WAM FIBRE	POLYURETHANE MODIFIED SYNTHETIC RUBBER POLYMER	BRUSH OR ROLLER

1.12 Windows and doors

- Eco-Block™ can accommodate all types of window designs and materials. Windows and door connections are fixed in the same manner as you would fix too masonry.
- We have some window details please refer to appendices.



(6)An example of window & door frames. These frames are made from steel and powder coated. The frames **ARE MADE EXCLUSIVELY FOR ECO BLOCK**. The frames remove the need for traditional formwork, because they act as a permanent formwork as well as window frames with reveals. They are designed to allow plaster board to slip neatly inside reducing further time to set and fix around windows and doors.

Engineering

1.13 Walls to roof

- **Roof Rafter Eaves** detail, please refer to the technical drawing C/D, drawings numbered from M-60-0001

1.14 Footing details – External walls

- **Typical footing detail**, please refer to technical drawing C/D, drawings numbered from M-20-000. **Use N12 steel bars unless otherwise specified by your Engineer.**

1.15 Footing details – Internal walls

- For internal walls built from Eco Block a footing is to be located beneath each wall and in accordance with your Engineers design. The method of connection of the wall to the slab should be the same as for an external wall. **Use N12 steel bars unless otherwise specified by your Engineer.**

1.16 Hollow Core Precast Floor Slab – Ext, Bearing

- **Refer to technical C/D** drawings numbered from M-40-0001
- **The Eco Block technical C/D will provide examples of most details. Please review the index at the start of the C/D**

Whilst our engineering tables refer to two story building, Eco Block is not limited to that number of floors. You will require your engineer to calculate the appropriate steel and concrete tables applicable. We will be working towards further detailed engineering tables for buildings greater than two stories.



(7) Lintels over door and window openings are formed using Eco Block and rebar to provide additional strength. Please refer to our engineering tables for further details.

Note that the appendix details are examples and it is the responsibility of the Architect and Building Designer to ensure that they meet BCA requirements.

1.17 Product Support

Certified Eco-Block™ installers are trades people that have been trained by an Eco-Block™ certified trainer. Your authorised Eco-Block™ distributor shall supply all of the Eco-Block™ panels, connectors and braces. The Distributor also sells a wide variety of accessories and is fully trained on the Eco-Block™ building system.

We recommend you seek advice from all manufacturers or suppliers, regarding correct installation and maintenance requirements which may compromise the exterior coating, sealant, flashing, weatherproofing and waterproofing, will render any manufacturers warranty void.

Eco-Block™ (Aust) Pty Ltd regularly updates its literature to keep up with product development and BCA changes and therefore reserves the right, to revise and change its technical information without notice. To ensure the latest information contact your local distributor or Eco-Block™ (Aust) Pty Ltd direct on 1800 669 696. Email eco-block@eco-blockaustralia.com.au. Web address, www.eco-blockaustralia.com.au.

1.18 Health and Safety

- When cutting Eco-Block™ it is recommended that you wear an appropriate dust mask.
- Safety goggles to AS 1337 should be worn.
- We recommend that you always seek advice for recommended handling, health and safety requirements for products or components supplied by other suppliers and manufacturers. Consult your local Work Place Health and Safety Officer for specific advice.

1.19 Environmental Protection

- We recommend that when using an electric bench saw to cut the Eco-Block™ blocks that vacuum extraction device is fitted to the bench saw to pick up the saw waste.

1.20 Concrete Mixture / Slump

- The concrete mixture slump should be between 100 to 120 and no more. **(Never ask for block fill)**. Plasticizers and additives can be added to increase the concrete flow.
- Mpa of the concrete should be between 20 and 25 or, as specified by the Engineer.
- The recommended aggregate size should be between 7 to 10mm depending on the wall thickness.
- Vibrating the forms will also increase the pressure approximately 1.5 times. By using a smaller diameter vibrator of 18 – 25mm, can significantly reduce this pressure.

1.21 Storage and Handling

Care should be taken in handling Eco-Block™ walling system to avoid damage to the edges and ends. Panels should be stacked flat and off the ground and supported on a level platform. The plastic packaging is UV resistant. We recommend the product should not be removed from the packaging unless it is to be used.

Corner blocks should not be laid flat. They should be stacked up right in packs to avoid breakage.

1.22 Eco-Block™ (ICF) Installers

- Eco-Block™ (Aust) Pty Ltd has trained and certified installers that will be able to quote to install the Eco-Block™ walls and retaining walls.
- Our installers can install the footings, ground slabs and walls. This means that only one trade is required. Your construction time is quicker and you will have the best possible result.
- Please call **Eco-Block™ Aust Pty Ltd. 1800-669-699** for our installers to provide you with a quote in Queensland. In the other States, please call your local Agent listed below.
- In order to provide the most accurate quote it is preferable that your plans have been drawn to Eco-Block™ specification and that all the Engineering requirements has been certified.

(8) A home being built by Steve Fava (Eco Block builder & Distributor) in Canberra



1.23 Owner Builder

- If you are or want to be an owner builder you will be trained at the beginning of your building and at each stage of the Eco Block construction process. The Eco Block agent must ensure that product has been assembled and constructed in accordance with the Eco Block training manual. Before concrete can be placed the Eco Block Agent must check the structure to ensure it meets Eco Block guidelines.
- The system can be used by an inexperienced builder with training and guidance.

Disclaimer

Eco-Block™ (Aust) Pty Ltd provides the information in this manual in good faith and to the best of its knowledge the information is correct and covers most situations where its products may be used. However it is acknowledged that not every possible application of Eco-Block™ could be covered with in this manual, therefore, specific design and detailing must be undertaken by an architect or designer. The Specifier, Designer, Architect and Engineer for the project are responsible to ensure that the information and details in this manual are suitable for any intended application or specific design.



(9) Eco Block wall bracing system

What are Insulating Concrete Forms?

A: Insulating Concrete Forms (ICFs) are hollow blocks or panels made of EPS (expanded polystyrene) plastic foam that construction crews stack into the shape of the exterior walls of a residential or commercial building. Workers then add reinforcing steel and fill the gap (typically 101mm to 203mm) between the two layers of foam with concrete, which cures and hardens into a monolithic core. The foam panel stays in place. This combination of concrete, steel and foam creates an incredibly strong and energy-efficient structure.

Q: How does the homeowner benefit from this type of construction?

A: Homes built with ICFs offer resistance to natural disasters such as tornadoes, hurricanes, earthquakes, fires and floods. An ECO-Block home can dramatically reduce heating and cooling bills, plus provide an exceptionally comfortable and quiet indoor environment.

Q: What are the design possibilities and/or limitations with ECO-Block?

A: Today's concrete homes can be created with virtually any design or architectural feature. ECO-Block has furring strips every 8" imbedded in the panel to allow attachment of any finish — such as wood or aluminium siding, brick, stucco and stone on the exterior, and drywall or plaster on the interior. The result is a home that looks like any other structure in the neighbourhood but has all the benefits of solid concrete construction.

Q: Does it cost more to build this way?

A: Typically, a home built with ICFs will cost slightly more than a comparable wood-frame home. However, much or all of this cost can be recouped through significantly lower utility and energy bills, insurance savings and downsizing of heating and cooling equipment. An experienced ICF contractor may be able to further reduce the costs of construction.

Q: Is ECO-Block a difficult system for a builder to learn?

A: Conventional homebuilding crews adapt easily to ICF construction. Most of the work involved draws on standard carpentry skills and tools. The foam forms are lightweight, and power equipment moves the concrete.

Q: How well do ECO-Block walls hold up in a fire?

A: Experience shows that concrete structures are far more likely to remain standing through fire than are structures built of other materials. Concrete does not break down until it is exposed to thousands of degrees Fahrenheit — far hotter than a typical house fire. In “firewall” tests, ECO-Block walls were subjected to continuous gas flames and temperatures of up to 2,000°F for as long as four hours. None of the ICF walls ever failed structurally, in contrast to wood-frame walls, which typically collapse in one hour or less.

Q: What is the average R-value of ICF walls?

A: Walls made of ICFs perform, on average, like a wood-frame wall constructed with R-3.780 insulation. But that’s not the whole story. The equivalent R-value performance of ICFs consists of three factors. First is the R-value of the expanded polystyrene. Second, the thermal stability of massive concrete walls reduces the temperature fluctuations and, consequently, the heat load requirements that are images to wood-frame buildings. Finally, air leakage (infiltration) can account for 20 to 40 percent of the heat load requirements of a wood-frame building. ICFs eliminate this air infiltration through the wall assembly. As a result, with the combined performance of the R-value of the expanded polystyrene, the stabilizing effects of the thermal mass of the concrete, and the reduced air infiltration.

Q: Won’t the foam burn or give off harmful emissions?

A: The foams in ICFs are manufactured with flame-retardant additives. The National Research Council reviewed the numerous existing studies of fire emissions and concluded that the emissions from polystyrene foams are no more toxic than those of typical softwoods used in home construction.

Q: What about comfort?

A: Concrete walls built with ICFs effectively buffer a house’s interior from the outdoors. The thick ICF sandwich of a massive material (concrete) with a light one (foam) sharply cuts fluctuations in temperature, air infiltration and noise. ICFs keep the inside more comfortable and less drafty than ordinary wood-frame walls. With regard to noise, studies have shown that compared to a typical wood-frame house, only about one-third as much sound penetrates an ICF wall.

Q: How do ECO-Block homes resist tornado and hurricane-force winds?

A: Debris driven by high winds presents the greatest hazard to homeowners and their property during tornadoes and hurricanes. Recent laboratory testing at Texas Tech University compared the impact resistance of residential concrete wall construction to conventionally framed walls.

Only concrete wall systems, such as ICFs and concrete masonry, successfully demonstrated the strength and mass to resist the impact of wind-driven debris. The wood-frame walls failed to stop the penetration of airborne hazards.

Q: Is this building technique approved by code organizations?

A: Yes. Eco Block meets the requirements of the Building Code of Australia. The 2000 and 2003 International Residential Codes have a section on ICF construction.

Q: Can ECO-Block homes be built in earthquake areas?

A: Yes. If properly reinforced, an ICF home can provide significant protection during earthquakes. If you live in an earthquake zone, you should consult a structural engineer to determine what the reinforcement requirements are in your area.

Q: Why is ECO-Block considered an environmentally friendly method of building?

A: In a building's life cycle (from construction to demolition); the greatest ecological impact is the amount of fuel needed to heat and cool the home. Insulating Concrete Homes are a preferred environmental choice because of significant savings in natural resources needed to maintain a comfortable temperature. Building with Eco Block (ICF's) reduces by up to 40% the consumption of green house gas emissions.

Q: Is it difficult for subcontractors to work with this material?

A: No. Subcontractors — such as electricians, plumbers and drywallers — can easily adapt to working in a house with ICF walls. Once they are familiar with the product, many tradespeople actually find it easier than working on a wood-frame home, brick and block construction.

EG NO CHASING THROUGH BRICKS TO CREATE PENETRATIONS FOR PIPING OR WIRING

Q: Can ECO-Block be used for tilt-up applications?

A: Yes. The ECO-Block system for insulating tilt-up concrete panels offers the speed of tilt-up construction with the benefits of an ICF wall. After setting the panels in the form, you install reinforcement and embed, and place the concrete. Once the concrete achieves the specified strength, the wall is lifted in place and screw-ties directly to the web system on the panel. For each additional inch of concrete penetration, attach 1" extensions to the web.

Q: Can termites eat through the foam in an ECO-Block wall?

A: Expanded polystyrene (EPS) has no nutritive value to insects, including termites. If left exposed and untreated, they may attempt to nest in the EPS foam. Foam is approved for use below grade, as well as above grade, by all building codes as long as "an approved method" of protecting the foam plastic and structure from termite damage is provided. Deciding what constitutes an approved method, however, is left to local code officials.

One measure agreed upon by all parties is the need for a minimum 152mm bare concrete inspection strip at grade level. This is required if foam is used below grade or only above grade. This is extremely easy to accomplish with ECO-Block, since it is a panelised system. A 152mm horizontal strip of EPS is cut out to allow the formation of a solid concrete barrier at grade. This creates a solid concrete barrier, forcing the termite to the outside of the foam where it is visible.

Additional steps, together or separately, may meet the “approved method” requirements:

- Protect the foam with a termite barrier made from stainless steel mesh.
- Install “bait systems” on exposed concrete strips or treat the soil as usual.
- Treat footings and backfill with termiticides.
- Eliminate as much wood in the structure as possible by using steel and plastic replacements.

Remember, in a solid concrete home there is little to eat. The concrete also acts as a solid barrier to termite infestation inside the home.



(10) An example of how to place termite protection

Q: *Will it take longer to build my home with ECO-Block?*

A: Experienced ICF crews report that building ICF homes can actually take less time than using wood-frame construction. The ICF construction method eliminates several steps — such as sheathing and insulating the exterior walls — that are necessary with wood-frame construction.

WE HAVE BUILT SINGLE STORY HOMES IN UNDER 6 DAYS

OR

INSTALLED THE EQUIVALENT OF 25,000 BRICKS IN JUST 10 DAYS WITH 4 MEN INCLUDING THE PLACEMENT OF CONCRETE

Q: Can I leave ECO-Block exposed to ultraviolet rays for extended periods of time?

A: Exposure of up to a year should not pose a serious problem. However, a light oxidation layer will develop on the surface of the forms after extended periods of exposure. This oxidation does not indicate any detrimental effects to the wall form. However, you may need to use a water spray to clean the oxidized layer prior to brushing the surface with a broom to provide a clean bonding surface.

Q: When building with ECO-Block, will mold and mildew in my new building be a problem?

A: ECO-Block ICFs can significantly contribute to a mould-free environment due to the inorganic nature of the material. They also create a very tight building envelope, reducing unintentional air infiltration. In high-humidity environments, interior moisture should then be controlled through the use of spot removal (e.g., bathroom fans) and properly sized air conditioning units that will cycle on long enough to dehumidify the air.

Q: Can radius and angled walls be constructed with ECO-Block ICFs?

Radius walls are easily constructed by mitre-cutting the form at the proper angle and using foam to join the edges.



(11) Eco Block is used for a cellar, note how simple it is to curve and shape your wall.



(12)Eco Block used as a retaining wall and basement







An example of Eco Block used as a retaining wall and basement