

## Exemplars: Resource Efficiency in Construction Products

# Insulated concrete wall forms made with waste timber fibres

**Durisol interlocking wall form units are made from recycled waste wood fibre bonded with cement. The units provide a fast, cost effective and resource efficient alternative to traditional blockwork walls. Durisol has been used to construct The Hayridge, a new community facility in Devon, and the Regain Building in Wales.**

### Product details

Durisol has been making Insulated Concrete Form (ICF) walling units from waste wood for 60 years in Europe and Canada. Durisol walling units have been manufactured from end-of-life timber pallets in the UK since 2008.

Durisol walling units are dry-stacked (no mortar required) and in-filled with concrete to create single-skin solid walls. The finished wall provides a strong structure with good acoustic and thermal insulation properties.

Various thicknesses are available to suit different applications. The walling units can be constructed as a free-standing wall. Even greater cost and efficiency benefits are available when the units are used as load-bearing external walls or internal walls.

### Resource efficiency benefits

- Made using recycled wood fibre from waste timber pallets.
- 100% of factory off-cut waste is re-processed to produce new walling units.
- Approximately 45% less embodied carbon than similar ICF products made from polystyrene.
- Single skin construction requires less design detailing and no mortar in construction.
- Durable and resilient to rot or decay.
- By harvesting rainwater at their factory Durisol has reduced the embodied water content of Durisol walling units.

### Business Case

There is a strong business case for Durisol when compared to conventional wall construction as it can:

- offset the cost of a conventional steel or concrete structure;
- offset the cost of internal acoustic finishes;
- achieve a u-value of 0.15 W/(m<sup>2</sup>K) without a finish;
- be constructed by fewer and less skilled tradespersons; and
- provide a time saving for wall construction.

There is a strong time saving benefit over traditional blockwork walls. 1.5 metres (vertical) of concrete can be poured without displacement (equivalent to six courses of Durisol). This can provide a time saving of up to 30%, depending on the comparative wall construction technique.



**Durisol interlocking walling unit.** The version shown above incorporates mineral fibre insulation

## Resource efficiency

### Materials quantity

- Single skin construction reduces material consumption - no mortar, vapour barrier, breathable membrane or wall ties are required.
- Durisol walling units are engineered to precise dimensions so order numbers can be more exact.

### Materials wastage

- Factory off-cuts are reprocessed into new units.
- Factory dust can be used in lime or plaster render.
- Unusable timber pallet waste is sent to local stables for reuse as animal bedding.
- Insulation off-cuts are returned to Knauf.

### Recycled content (by volume)

- 82% waste timber pallets.
- 4% flyash.
- 4% reprocessed 'woodcrete' from off-cuts.
- 10% non-recycled content (cement and insulation).

### Embodied carbon

- Durisol 'locks in' the carbon contained in waste wood over the unit's lifecycle.
- Durisol's Environmental Product Declaration (EPD) \* evidences the unit's low embodied carbon over a 60 year period relative to other constructions.

\* Durisol is covered by Environmental Product Declaration (EPD) 418a

External wall construction	kgCO <sub>2</sub>
Durisol ICFs with render, plasterboard and paint	67
Polystyrene ICFs with render, plasterboard and paint	110-130
Cement rendered aerated concrete block cavity wall with insulation, plasterboard and paint	73
Cement rendered dense concrete block cavity wall with insulation plasterboard and paint	69

### Embodied water

- Rainwater is harvested to supply the manufacturing process.
- Water is recycled during the manufacturing process.

### Life span (e.g. durability)

- The walling units do not rot or decay.
- Highly resistant to vermin, wood-boring insects, fungi and bacteria.
- The first Durisol building was constructed in Austria 60 years ago and is still in 'as new' condition despite its un-rendered exterior.

### End of life (e.g. reuse; recyclability)

- The walling units can be recycled as aggregate, for instance for road construction.

## The Hayridge

Project type: Library and learning centre  
Location: Cullompton, Devon  
Client: Devon County Council  
Architect: NPS South West Ltd  
Contractor: Pearce Construction Ltd  
Value: £3.2m

The designers wanted to specify an alternative to insitu concrete construction. Due to the long spans a steel frame was specified, with a single skin of Durisol wall. The walls were finished externally using StoRender and internally plastered. Some additional detailing was required as the joints between the walling units and steel frame meant the external render did not have to ideal uniform surface to adhere to.

The benefits of Durisol were that it:

- created an acoustically quiet library;
- achieved a wall u-value of 0.19W/m<sup>2</sup>K and a warm and comfortable internal environment;
- provided a fast construction method as six unit courses (1.5 metres) of concrete could be poured at a time without displacement;
- virtually eliminated concrete waste as each pour used only the required amount; and
- was a cost effective solution, according to Matt Stone, Devon County Council's Project Manager.



**The Hayridge:** Collompton, Devon

### Lesson learned

Additional steel reinforcement within the walling units was specified by the engineer. Pearce Construction's Site Manager Peter Hamley is convinced Durisol would provide an even faster and cost-effective approach if used in a load-bearing capacity without the additional reinforcement.

"I'd like to work with Durisol walling units again. I like the fact you're not affected by weather and you can get the walls up quickly."

Peter Hamley, Pearce Construction Ltd



**Durisol wall construction:** The Hayridge

### The Regain Building

Project type: Business incubator (EU funded)

Client: Blaenau Gwent County Council

Contractor: Kier Western



**The Regain Building:** Ebbw Vale, Wales

Durisol was specified as the load-bearing external walls. The higher material costs (when compared to concrete block) were offset as Durisol provided:

- simple detailing;
- strong single skin construction;
- excellent thermal and acoustic performance;
- a low maintenance structure; and
- a rapid speed of construction.

### Company contacts

Durisol,  
Parkway, Pen-y-Fan Industrial Estate,  
Crumlin, Gwent, NP11 3EF  
Tel: 0800 434 6458  
E-mail: [enquiries@durisol.net](mailto:enquiries@durisol.net)  
Web: [www.durisol.net](http://www.durisol.net)

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#### Waste & Resources Action Programme

The Old Academy  
21 Horse Fair  
Banbury, Oxon  
OX16 0AH

Tel: 01295 819 900  
Fax: 01295 819 911  
E-mail: [info@wrap.org.uk](mailto:info@wrap.org.uk)

Helpline freephone  
0808 100 2040

[www.wrap.org.uk/construction](http://www.wrap.org.uk/construction)

