"Great British Refurbishment – Case Studies"

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Business Development Manager –

Residential Refurbishment

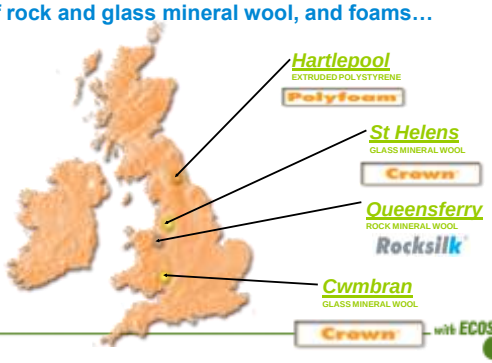
Knauf Group

- The Knauf Group was founded in 1932.
  - 150 factories in 40 countries employing over
  - 22,500 people
  - European Market Leader in gypsum based materials
  - Insulation operations worldwide and the
  - fastest growing ins
  - manufacturer on t

Knauf Insulation U.K.

- UK market leader in insulation formerly Owens Corning / Pilkingtons / Fibreglass formed in 1946. Fully owned by Knauf since 2002 with over £100 million inves
- 4 insulation manufactur
  - St Helens & Cwmbran
  - (Glass Mineral Wool)
  - Queensferry
  - (Rock Mineral Wool)
  - Hartlepool
  - (Extruded Polystyrene)

Knauf Insulation - the only UK manufacturer of rock and glass mineral wool, and foams…



Plants & Products

Cwmbran glass mineral wool	St Helens glass mineral wool	Queensferry rock mineral wool	Hartlepool Extruded Polystyrene
			

…supplying products in rolls, slabs and also as loose wool

Knauf Insulation has always had trusted product brands in the UK…

Crown - glass mineral wool

Rocksilk - rock mineral wool

Polyfoam – extruded polystyrene and extruded polyethylene

Retrofitting

“Standard” package:

- Cavity wall insulation
- Loft insulation
- Condensing Gas Boiler
- Heating controls
- Low energy lighting
- Draft proofing
- Floor insulation

- Circa £3,000 to £4,000

Retrofitting

“Hard/Expensive to treat” package:

- Solid wall insulation- EWI/IWI
- Loft insulation
- Condensing Gas Boiler / Biomass boiler
- Heating controls
- Low energy lighting
- Draft proofing
- Floor insulation
- Party Wall insulation

- Circa £12,000 to £20,000

External Wall Insulation

External Wall Insulation – before / after

Wetherby Building Systems

Solid Wall Houses

Are all walls suitable for External Wall Insulation?

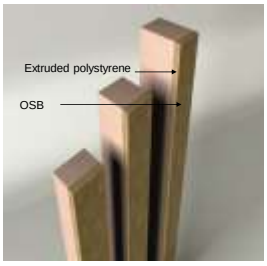
Advantages of Internal Wall Insulation

- It costs less to install than external insulation
- It is easier to maintain than external insulation
- No scaffolding is required
- The external appearance of the building is maintained so it can be installed in conservation areas
- No specialist skills or equipment are required to install the insulation
- Materials are readily available
- It can be installed on a room-by-room, single façade or whole house basis, as part of a full refurbishment plan
- Installation is not delayed by bad weather

ThermoShell IWI System

- **Four component system**
- EcoStuds
- EcoBatt Glass wool insulation
- Vapour check plasterboard
- Thermal Laminate for reveals and returns

EcoStud - Composite Stud



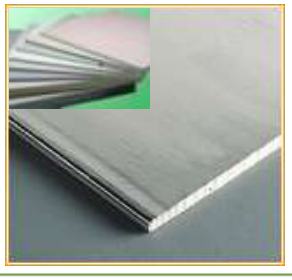
Extruded Polystyrene:

- No thermal bridge through insulation
- Unaffected by moisture
- Lightweight but with high compressive strength
- Excellent pullout strength
- Moisture resistant OSB

Insulation – EcoBatt

- Water repellent glass mineral wool
- Manufactured with ECOSE Technology
- Compression fits between studs, no air gaps in system
- Green guide A+

12.5mm Vapour Check Plasterboard



- Readily available standard products
- Specialist board for a specialist application

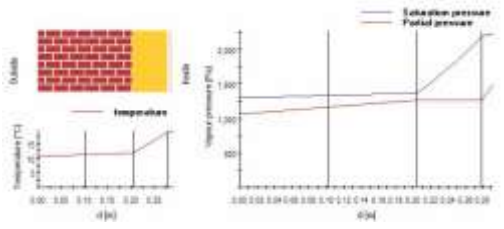
System Ancillaries

- Masonry fixings in accordance with BS1210 (140-150mm long)
- Masonry wall plugs
- Knauf Multi Purpose Sealant (solvent-free)
- Knauf Drywall screws for plasterboard
- Knauf Drywall taping & jointing
- Vapour control layer – polyethylene membrane with a minimum vapour resistance of 260MN.s/gramme (for use instead of vapour check plasterboard)
- RPE / Goggles / Gloves

Installation Process

- EcoStuds mechanically fixed to substrate with 140mm fixings at 600mm centres and sealed where needed
- 555mm EcoBatt friction fitted between EcoStuds
- Polyfoam Linerboard fitted to reveals and return walls
- 12.5mm Vapour check plasterboard screwed to EcoStuds
- Seal perimeter edges
- Taped and jointed or skim finish as appropriate

Condensation Analysis



Dickenson Road, Manchester

- Victorian 2 Storey Terrace with front cellar
- Attractive Frontage
- Not So Attractive Rear
- Typical of millions of properties in the UK
- Partial whole house low carbon refurbishment whilst still occupied

Stud in position on inner face of wall, spacing designed to suit standard size plasterboard

Packing and trimming needed on uneven walls

Stud passes right through changes in floor level to minimise levels of thermal bridging

Kitchen side wall - preparation

Kitchen - Installing EcoStuds




Kitchen – Installing EcoBatts




Kitchen – Ready to decorate

Bedroom Front Wall - Before

Bedroom Front Wall - During

Bedroom Front Wall - After

Suspended Timber Floor with Access

Suspended Timber Floor complete

What was installed and what was achieved

- **75mm IWI EcoStuds & EcoBatts** on kitchen external walls
- **75mm IWI EcoStuds & EcoBatts** on front bedroom wall
- Window reveals and Cellar wall / door insulated with **27mm Thermal Laminate Board**
- Loft upgraded with **Glass mineral wool** from 100mm to 300mm
- Suspended timber floor insulated with **200mm encapsulated glasswool**
- **Glasswool** installed in the intermediate floor zone below IWI system

- External doors, cellar door and insulated loft hatch **draught proofed**
- All lighting changed to **low energy bulbs**
- Wireless **thermostatic control** added
- **Future refurbishment plan** provided to highlight the next steps
- **Overall cost was £2,300**
- **Carbon reduced by 1.07 tonnes per annum**
- **Energy bills reduced by circa £235 per annum**

Manor Farm, Binsey

- 200 Year old cottage

Doncaster Whole House Refurb

Doncaster Whole House Refurb

- Voided property for total refurbishment
- Plaster removed on all walls
- Kitchen and bathroom units replaced
- Ceilings downstairs replaced
- **Allowed us to do the following**
- 75mm IWI System to all external walls and cellar stairs
- Thermal Laminate Board to reveals & returns
- 150mm insulation in suspended timber floor
- Loft upgraded from 100mm to 300mm
- Intermediate floors zone insulated
- Underside of staircase to first floor insulated
- New tightly sealed UPVC door to cellar

- Install monitoring equipment to external walls

Pre Treatment Energy Performance

- **Condensing Combi boiler**
- **UPVC windows and doors**
- **100mm Insulation in loft**
- **SAP 63 D**
- **3810 kg CO2 /annum**

Post Treatment Energy Performance

Walls Upgraded
2.1 to 0.35 W/m2K

Floor Upgraded
0.71 to 0.21 W/m2K

Loft Insulation Upgraded
0.43 to 0.13 W/m2K

Stairs above and Walls to Cellar Stairs Upgraded
0.28 and 0.27 respectively
Assumed Air leakage has improved to 10 m3/h.m2

SAP now 82B
1833 kg CO2 per annum

52% reduction in CO2

Doncaster whole house conclusions

- **Energy Performance** → SAP 82B from 63D with 2 tonnes of CO2 emissions saved per year
- **The builders** → easy to use and replicate the system
- **Costs** → only £2,800 added to the renovation costs
- **Predicted payback period** → 7 years based on current energy prices
- **Lost space** → 87.5mm on both front and rear walls represents less than 2% of floor area

Phoenix Cottage, Surrey

- See separate slides

Hampstead, London

- See separate slides

Smithy Wood, Sheffield

- See separate slides

GBR - Will and Catherine await their fate!

Assessing for underfloor insulation

EcoBatts fitted in the lounge

EcoStuds into the floor zone

Main bedroom window reveal

Main bedroom complete

Will – proud owner of an array of pv's

Summary of the works

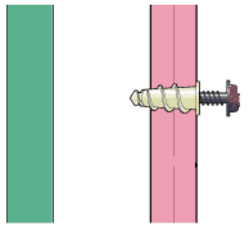
- 139 year old Victorian solid wall property not suitable for EWI
- 1.92 kWp Sunsation installed
- 150mm insulation added to the internal solid walls
- 200mm insulation added to the suspended timber floor
- 400mm insulation added to the loft space
- Downsized the radiators, and major draught proofing
- Total cost of £23,000

Summary of savings

- **73 %** reduction in energy use
- **85%** reduction in carbon emissions
- **123 %** reduction in bills (surplus sold back to the grid)

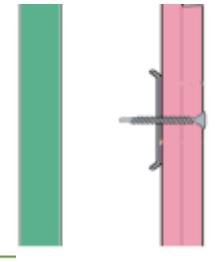
- 1.92 kWp Sunsation installed saving 913 kgs of CO2 pa
- £129 pa saving on bills
- £667 income generated on pay-in tariff

Fixtures and Fittings - Lightweight



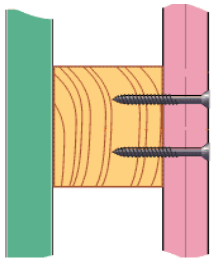
- Knauf Drywall Anchors
- Pictures
- Mirrors
- Dado rails
- Picture rails

Fixtures and Fittings - Medium



- Knauf Fixing Channel
- Most radiators
- Small cupboards
- Handrails

Fixtures and Fittings - Heavyweight



- Timber Battens
- All radiators
- Kitchen cupboards
- Bathroom fittings

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