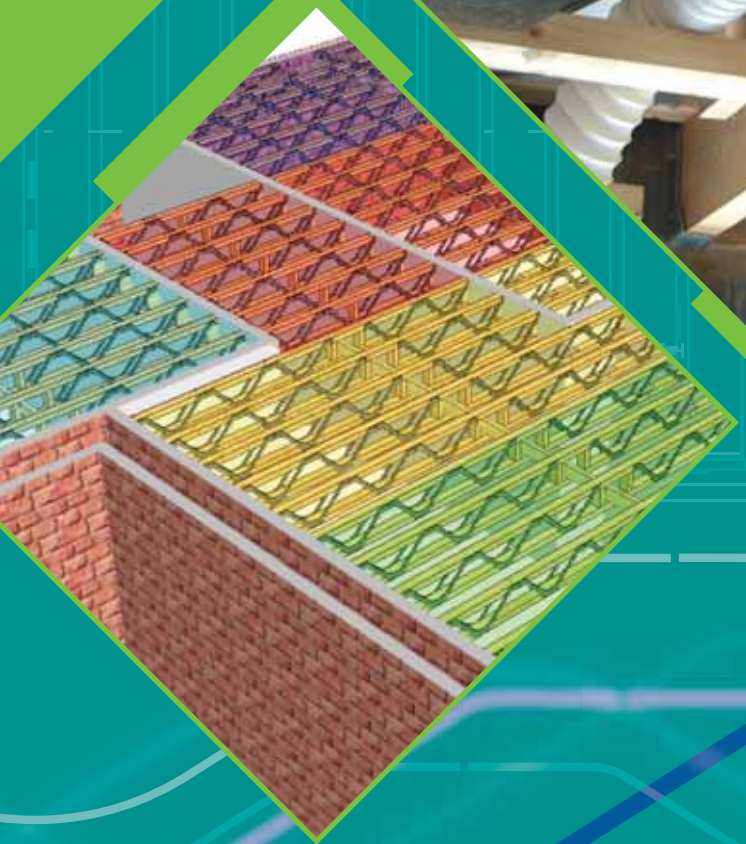
GANG-NAIL

an Eleco plc company

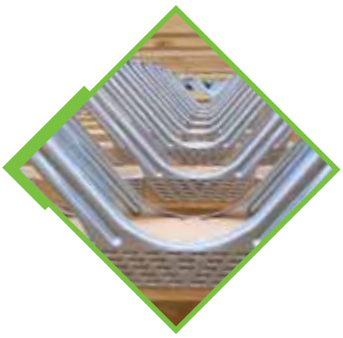
Ecojoist®



Practical benefits of Ecojoist®.

www.eleco.com/gang-nail

Gang-Nail Systems, an Eleco plc company, offer integrated solutions for the timber engineering industry which assist in reducing design, production and overall construction time. Ecojoist®, the precision engineered open web joist is used within domestic, commercial and retail build programs and is supplied by Gang-Nail Systems' national network of fabricators.



Ecojoist®

Ecojoist® beams consist of parallel stress graded timber flanges joined together with V shaped galvanised steel webs. The Ecojoist® is both lightweight and easy to handle on site. The open web design allows for the quick installation of services and utilities, as a result, reducing labour costs and on site build times.

The application of Ecojoist® with its design practicalities of being an open web based system, is used in a wide variety of construction areas in loose or cassette form for floors and roofs and is applicable for houses, flats and commercial buildings.

Loads

Ecojoist® is a precisely engineered structural component, the design of which is dependent on the loads applied. The following serves to assist the specifier/designer in understanding and evaluating design loads. Further information is provided in the Ecojoist® Technical Manual.

Robust Detail Load

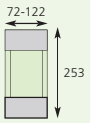
SPAN TABLE FOR ECOJOIST BEAMS

FLOOR LOADING:

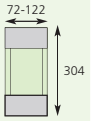
Live load	1500 N/m²
Top chord dead load	720 N/m²
Bottom chord dead load	420 N/m²

Includes an allowance of 250 kN/m² for Partition Load.
Spans limited by max. deflection limit of 14mm where applicable.
Timber Strength Class = TR26
Self weight included. Spans include 100mm bearing at each end.

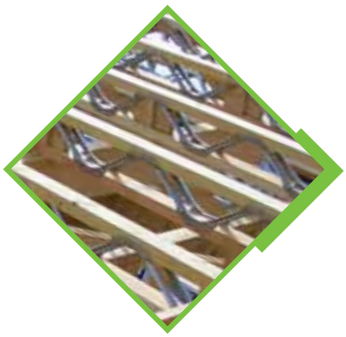
	CENTRES mm	TIMBER SIZE mm	SPAN mm
V2-10 253mm	400	47 x 72 47 x 97 47 x 122	4350 4700 4910
	600	47 x 72 47 x 97 47 x 122	3630 3910 4140



	CENTRES mm	TIMBER SIZE mm	SPAN mm
V2-12 304mm	400	47 x 72 47 x 97 47 x 122	4930 5190 5390
	600	47 x 72 47 x 97 47 x 122	4150 4480 4700



www.eleco.com/gang-nail



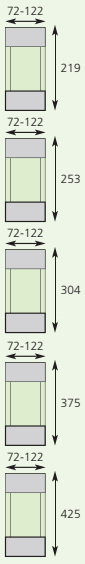
Domestic Load

SPAN TABLE FOR ECOJOIST BEAMS

FLOOR LOADING: Live load 1500 N/m²; Top chord dead load 450 N/m²; Bottom chord dead load 200 N/m²

Includes an allowance of 250 N/m² for Partition Load.
Spans limited by max. deflection limit of 14mm where applicable.
Timber Strength Class = TR26
Self weight included. Spans include 100mm bearing at each end.

	CENTRES mm	TIMBER SIZE mm	SPAN mm
V2-8 219mm	400	47 x 7	4870
		47 x 97	5170
		47 x 122	5350
	600	47 x 7	4120
		47 x 97	4480
		47 x 122	4740
V2-10 253mm	400	47 x 72	5290
		47 x 97	5620
		47 x 122	5850
	600	47 x 72	4830
		47 x 97	5120
		47 x 122	5330
V2-12 304mm	400	47 x 72	5890
		47 x 97	6250
		47 x 122	6540
	600	47 x 72	5240
		47 x 97	5540
		47 x 122	5720
V2-14 375mm	400	47 x 72	6560
		47 x 97	6920
		47 x 122	7220
	600	47 x 72	5840
		47 x 97	6150
		47 x 122	6370
V2-16 425mm	400	47 x 72	6950
		47 x 97	7350
		47 x 122	7650
	600	47 x 72	6190
		47 x 97	6530
		47 x 122	6770



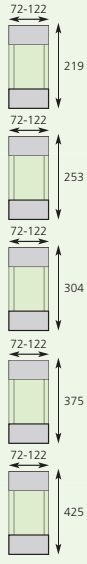
Office Load

SPAN TABLE FOR ECOJOIST BEAMS

FLOOR LOADING: Live load 2500 N/m²; Top chord dead load 1200 N/m²; Bottom chord dead load 200 N/m²

Includes an allowance of 1 kN/m² for Partition Load.
Spans limited by max. deflection limit of 14mm where applicable.
Timber Strength Class = TR26
Self weight included. Spans include 100mm bearing at each end.

	CENTRES mm	TIMBER SIZE mm	SPAN mm
V2-8 219mm	400	47 x 72	3870
		47 x 97	4170
		47 x 122	4350
	600	47 x 7	3120
		47 x 97	3420
		47 x 122	3630
V2-10 253mm	400	47 x 72	4350
		47 x 97	4700
		47 x 122	4910
	600	47 x 72	3630
		47 x 97	3910
		47 x 122	4140
V2-12 304mm	400	47 x 72	4930
		47 x 97	5190
		47 x 122	5390
	600	47 x 72	4150
		47 x 97	4480
		47 x 122	4700
V2-14 375mm	400	47 x 72	5480
		47 x 97	5800
		47 x 122	6000
	600	47 x 72	4780
		47 x 97	5050
		47 x 122	5220
V2-16 425mm	400	47 x 72	5840
		47 x 97	6130
		47 x 122	6380
	600	47 x 72	4950
		47 x 97	5400
		47 x 122	5580



Fire Resistance

All timber floors rely on a contribution from the ceiling towards the overall fire resistance of the floor structure. The required fire resistance for domestic floor structures is 30 minutes and for compartment floors is 60 minutes. Full details of resistance are provided within section 2 of the Ecojoist® Technical Manual and are based on full scale test and calculated assessments.

30 minute fire resistance

JOIST DEPTH	WEB SIZE	JOIST CENTRES	BOARD THICKNESS & TYPE	SCREW FIXING	INTERMEDIATE NOGGINS REQUIRED	PERIMETER NOGGINS REQUIRED	FLOORBOARD THICKNESS
219mm or 253mm or 304mm or 375mm or 425mm	V2-8 or V2-10 or V2-12 or V2-14 or V2-16	400	12.5mm Fireline	150mm	No	Yes	18mm
		480	12.5mm Fireline	150mm	Yes	Yes	22mm
		600	12.5mm Fireline	150mm	Yes	Yes	22mm
		400	15mm Wallboard	150mm	No	Yes	18mm
		480	15mm Wallboard	150mm	No	Yes	22mm
		600	15mm Wallboard	150mm	No	Yes	22mm

60 minute fire resistance

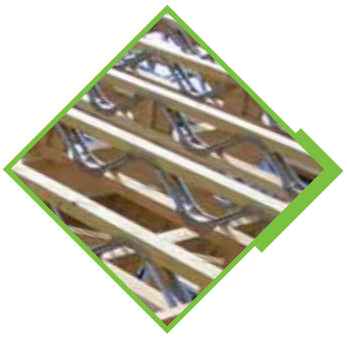
JOIST DEPTH	WEB SIZE	JOIST CENTRES	BOARD THICKNESS & TYPE	SCREW FIXING	INTERMEDIATE NOGGINS REQUIRED	PERIMETER NOGGINS REQUIRED	FLOORBOARD THICKNESS
219mm or 253mm or 304mm or 375mm or 425mm	V2-8 or V2-10 or V2-12 or V2-14 or V2-16	400	2 x 12.5mm Fireline	150mm	No	Yes	22mm
		480	2 x 12.5mm Fireline	150mm	No	Yes	22mm
		600	2 x 12.5mm Fireline	150mm	No	Yes	22mm

Fireline and Wallboard are products of Gypsum Industries Limited and may be contacted for further advice.

TOP PRODUCT FEATURES:

- Robust Standard Detail
- Depth compatible with solid joist sizes
- Made to measure, reducing on site wastage
- Minimal shrinkage or swelling
- 72mm wide flanges provide a large area for the fixing of floor deck and ceiling
- Reduction or elimination of surface run pipework
- Lightweight construction
- Erected in approximately 50% of the time for conventional joists
- Can be top chord supported

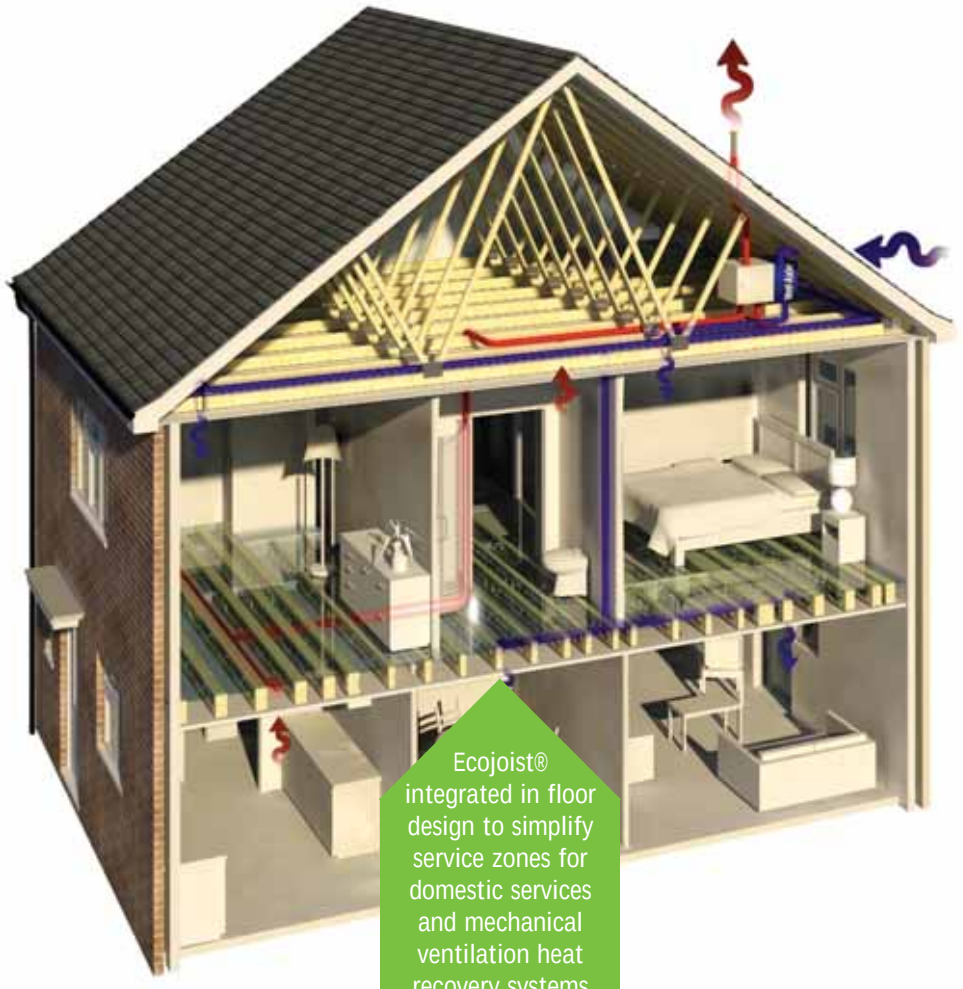
GANG-NAIL
an Eleco plc company



Code for Sustainable Homes

In the Sustainable Energy Act 2003 the Government set out its statutory aim to save 3.5 million tonnes of carbon from residential properties in England through energy efficiency measures by 2010. For new properties the Code for Sustainable Homes promises a step change in sustainable building practice. With six levels of compliance being introduced from 2010 through to 2016, national builders and construction companies are looking at ways of introducing the new requirement within the design process without having to add in costly and timely solutions.

MVHR - Mechanical Ventilation & Heat Recovery



Ecojoist® integrated in floor design to simplify service zones for domestic services and mechanical ventilation heat recovery systems (MVHR).

The first area of change is considered around the whole house Mechanical Ventilation with Heat Recovery (MVHR). This can be used for properties built or refurbished to current Building Regulations Part F and L standards where air permeability can be down to 3 to 4 m^3/h at 50pa pressure difference.

Everyone of us exhales 10 to 75 litres of CO_2 per hour and up to 175 grams of water per hour. A family of four produces 10-15 litres of water vapour a day through breathing washing, showering and cooking.

This system extracts warm moist air via ducts to the wet rooms and passes this air through a heat recovery cell before it is discharged outside. At the same time fresh air from outside is drawn through the cell where it is warmed and distributed to the living rooms and bedrooms.

Whole house systems can prove very effective at reducing the heat load in energy efficient homes since they recover heat which would have otherwise been vented outside and therefore lost. Single room systems are proving an increasingly popular choice for small scale renovation projects.

The introduction of additional mechanical and ventilation equipment within domestic homes creates one question: how are the service runs designed into existing house designs without going back to the drawing board?

The answer is by incorporating Ecojoist®. By using the open web floor joist system, clear passage lines of service runs are automatically created without having to consider span directions and general layout of joist zones.

This open web system is successfully used in all forms of construction, whether domestic, commercial or retail in the floor or in the roof as the benefits of overall build time surpasses all other systems when taking into account the follow-on trades.

With a national network of Ecojoist® fabricators, Gang-Nail Systems is supplying solutions for construction that provides not only benefits during the build process but added value to the end user. In years to come when modifications are required, the designs integrated with the Ecojoist® metal floor web solution will assist in further enforced energy efficient compliances due to the ease of open service zones which would negate expensive and time consuming structural changes to the building.

Current Specification — Just passes building regulations

Building Fabric:		Heating, Ventilation and Lighting:	
U values:	W/m²K	Ventilation:	Natural + 3 intermittent fans
Walls:	0.27	Air-tightness, q_{50}:	8 m³/m²/hr @ 50 Pa
Floor:	0.23	Main Heating:	Gas - Ideal Icos HE 12, 90.3% Efficiency.
Ceiling:	0.14	Heating Controls:	Programmer, Thermostat + TRV's
Doors:	3.00	Hot water storage:	Range Tribune TI 150 litre.
Windows:	1.85 (g_L = 0.65)	Lighting:	9 Low-Energy light fittings
Thermal Bridging y value:	0.08 (Robust Details)		
Orientation of front door:	South		

Results: DER: 22.02 kgCO_2/m²/yr TER: 22.08 kgCO_2/m²/yr DER/TER Improvement : 0.27%

Code for Sustainable Home — Level 2 Solution

Building Fabric:		Heating, Ventilation and Lighting:	
U values:	W/m²K	Ventilation:	Natural + 3 intermittent fans
Walls:	0.19	Air-tightness, q_{50}:	4 m³/m²/hr @ 50 Pa
Floor:	0.18	Main Heating:	Gas - Baxi Potterton 15HE, 91.3% Efficiency.
Ceiling:	0.10	Heating Controls:	Programmer, Delayed Start Thermostat + TRV's
Doors:			
Windows:	1.20	Hot water storage:	Range Tribune TI 150 litre.
	1.49 (g_L = 0.78)	Lighting:	9 Low-Energy light fittings
Thermal Bridging y value:	0.07 (BRE IP 1/06)		
Orientation of front door:	South		

Results: DER: 17.66 kgCO_2/m²/yr TER: 22.08 kgCO_2/m²/yr DER/TER Improvement : 20.02%

Notes
A wall U value of 0.19 W/K/m2 can be achieved with a typical brick and block wall with a cavity of 140mm fully filled with Springvale's "Platinum Ecobead."
A window U value of 1.49 W/K/m2 can be achieved by using Pilkington's newly released "Energikare" glazing in 89mm softwood frames.

Code for Sustainable Home — Level 3 Solution

Building Fabric:		Heating, Ventilation and Lighting:	
U values:	W/m²K	Ventilation:	Vent-Axia HRE 350 configured for a kitchen + 2 wet rooms. Insulated ductwork
Walls:	0.19		
Floor:	0.18	Air-tightness, q_{50}:	4 m³/m²/hr @ 50 Pa
Ceiling:	0.10	Main Heating:	Gas - Baxi Potterton 15HE, 91.3% Efficiency.
Doors:	1.20	Heating Controls:	Programmer, Delayed Start Thermostat + TRV's
Windows:	1.49 (g_L = 0.78)		
Thermal Bridging y value:	0.07 (BRE IP 1/06)	Hot water storage:	Range Tribune TI 150 litre.
Orientation of front door:	South	Lighting:	9 Low-Energy light fittings

Results: DER: 16.51 kgCO_2/m²/yr TER: 22.08 kgCO_2/m²/yr DER/TER Improvement : 25.23%

Notes
As Level 2 solution except the natural ventilation system is replaced by a balanced MVHR system with insulated rigid ductwork.

Ecojoist® and MVHR Systems

The building, a house type of approx. 86m² floor area was initially modelled using a typical house specification and as such only just passed Building Regulations Part L.

Level 2 Solution

However, with an improvement of wall, window and heating control specifications, combined with higher air tightness the dwelling can achieve CSH Level 2.

Level 3 Solution

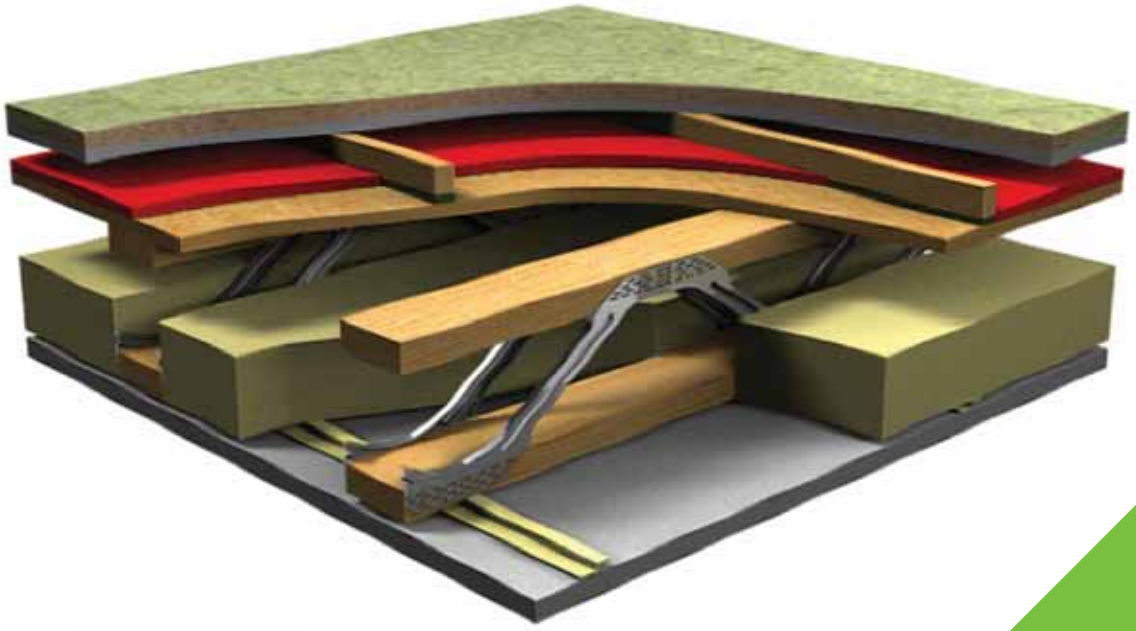
If a Vent-Axia HRE 350 MVHR unit is then added, an extra 5.2 DER/TER percentage points are gained immediately making the property Code Level 3 compliant. Without the open web system of EcoJoist®, the ducting installation through the first floor would be severely hampered, thus affecting the viability of what is a simple and cost effective method of raising the standard of a dwelling from CSH Level 2 to CSH Level 3, which becomes mandatory in 2010.

GANG-NAIL
an Eleco plc company

Robust Standard Detail (RSD's)

RSD's were developed by the House Builders Federation as an alternative to pre completion testing, which was thought would be disruptive and difficult to manage on site. The premise behind RSD's is to provide a type of construction which can demonstrate, by on site testing, that its acoustic performance exceeds the requirements of Part E by 5dB in both airborne and impact

sound insulation. This 5dB safety margin is designed to compensate for variances in workmanship and provides a factor of confidence that, with reasonable standards of workmanship, the RSD construction is unlikely to fall below the requirements of Part E if it were to be subject to pre completion testing. For full details refer to the Robust Details handbook.



EOTA

Bord Agrément na hÉireann
Irish Agrément Board

robustdetails

GANG-NAIL
an Eleco plc company

www.eleco.com/gang-nail

Gang-Nail Systems Limited
Christy Estate, Ivy Road
Aldershot, Hampshire GU12 4XG

Tel: +44 (0) 1252 334691
Fax: +44 (0) 1252 334562
gang-nail@eleco.com