

THERMAL BRIDGING

A GUIDE TO USE OF ψ -VALUES IN MERRONBROOK TIMBER FRAMED UNITS

INTRODUCTION

In accordance with **Building Regulations Approved Document Part L 2021**, (applicable from 15 June 2022) the **Standard Assessment Procedure (SAP10.2)** for new homes in England & Wales currently requires the thermal envelope to be modelled and evaluated for overall quality by a registered **On-Construction Domestic Energy Assessor**. That process involves simplifying the designed structure into distinct categories, based on the way energy is lost from the structure. These can be best summarised as follows:



Thermal Perimeter Losses

- These are the elements measurable as areas, where the flat plane area of the element is multiplied by the **U-Value**, to arrive at a total amount of energy lost through the flat-panel items such as walls, floors, roofs, windows etc.
- Your Energy Assessor will produce a U-Value calculation for each of the building's elements, and obviously we can assist in provision of data for the wall elements.



Party Wall Losses

- These are the same as the Thermal Perimeter losses, but are a special case, where the U-value is not measured by assessment of the build-up of the fabric, but rather summarised from one of 3 build-type categories.
- If a party-wall is present we can offer to **insulate the cavity** in a way that gives this loss perimeter 'Zero Value'. You should confirm with your Assessor whether you have ordered this service from us.



Thermal Bridging Losses

- These are the losses that occur through the junctions in the structure. They are measured as linear items, such as vertical corners and horizontal wall-to-floor junction lines. The quality of the junction is assigned a **ψ -Value**, which is applied as a multiple of the length of the measured item.
- Your Energy Assessor should use the appropriate ψ -Values from the lists overleaf, according to your chosen method of construction, but all the Merronbrook Special Details apply to our structures in all cases. Your Assessor will require you to fill-in a checklist and provide geo-tagged photographic evidence to confirm compliance.

APPLIED ψ -VALUES

When your appointed **Energy Assessor** is producing **SAP Calculations** for your project, we can liaise with them throughout to establish the correct thermal values to apply, only where it's appropriate for us to make comment. With specific regard to the **Thermal Bridging calculations**, this is increasingly becoming an area of intense scrutiny, as energy performance requirements become more and more challenging.

Merronbrook are proud to provide support and assistance to clients looking to achieve the very best in fabric efficiency, and as part of that commitment we have commissioned a set of tests that allow you to show a high level of performance, and limit the impact of other energy-saving measures (that might have been required if 'default' values were applied).

The process for assessing Thermal Bridging in SAP10.2 calls for a linear measurement of any given element to be taken, and for a **ψ -Value** to be applied in each case, based on the construction method used. This can be one of two methods, and can be chosen on a junction-by-junction basis:

1. **No known approach taken.** In this case a list of 'default' values is applied, or a single total γ -value is applied. Note: these are purposely pessimistic to encourage assessors to use other methods.
2. **"Merronbrook Psi-Value Details"** are applied. These details, in the following pages, apply to all our structures and are applied by us at no extra charge¹. However, they do not apply to details with which we have no actual involvement, so in these elements you should choose a default value, or one from another source.

"Accredited Construction Details" In previous versions of SAP, these used to be applicable where the developer could demonstrate compliance with a set of details provided by a competent body. From SAP10 onwards, these are no longer valid, and it is instead necessary to use values from a more robust source². Such values are generally better than default values, and worth making the effort to apply where possible.

¹ Merronbrook Psi-Values Details will be provided for your project, and should be applied on site, with photographic evidence being provided to your DEA as appropriate.

² Accredited Construction Details from the government are no longer valid. You must now refer to pre-modelled

values, use values from a Psi-values modeller, or model them yourself using appropriate software and methodology. Merronbrook Psi-Values are appropriate for use in this way

MERRONBROOK PSI-VALUE DETAILS



As a commitment to supporting our customers, we know that in this time of change in the Regulatory landscape, what is needed more than anything else is reassurance. To this end, Merronbrook have had all of our standard approaches measured by our Partners at **Galaxy Technical Services**, so that you can use these values with confidence, and take advantage of the high quality thermal performance that they provide.

There are clearly an unlimited variety of ways in which you might choose to design your thermal envelopes, but to keep things as simple as possible we have had our detailing measured in two principal strands:

1. **‘Standard Detailing’** – The details which are included ‘as standard’ in kits that we provide to clients in the primary specification format³
2. **‘Enhanced Detailing’** – The details which will apply if you decide to enhance the general thermal performance of the external wall envelope by adding an ‘over-board’ of 25-40mm of a rigid insulation product such as PIR (or, for example, a proprietary insulation-backed plasterboard) to our primary specification, as noted above⁴.

We also note the following reference values:



Default Values noted for each Thermal Junction type are those now listed by DLUHC as being applicable under Part L / SAP10.2.



Target Values noted for each Thermal Junction type are those now listed as the 2025 Future Homes Standard likely to be adopted in 2025. These are listed in SAP10.2, Appedix R.

The Junction Type references used are the official set used by DLUHC / SAP10.2, and we have excluded the junctions over which we don’t have influence, or which have limited impact on the general design approach.

³ Our primary specification can be summarised as:

*External walls of 140mm stud panels with a 9mm OSB or Class A1 sheathing board, a high performance reflective breathable membrane, and with 100mm of factory-fitted phenolic rigid-board insulation between studs. When clad with brickwork and a standard cavity this offers a U-Value of around 0.18 (to be qualified by your DEA);

*Party walls of 90mm stud panels with a 9mm OSB or Class A1 sheathing board, and set 50mm apart at the cavity. These panels form the core of a compliant separating wall-pair, when fitted with acoustic insulation and dry-lining (by others). We recommend following RSD Ltd’s “E-WT-2” detailing. A U-value of 0.00 can be claimed if you take our cavity-fill insulation service as an E/O – see “Energy 02”.

⁴ When applied in addition to our standard specification, this offers a U-Value of around 0.13-0.16 (to be qualified by your DEA).

LINTELS

E2 TIMBER FRAME LINTEL

Default

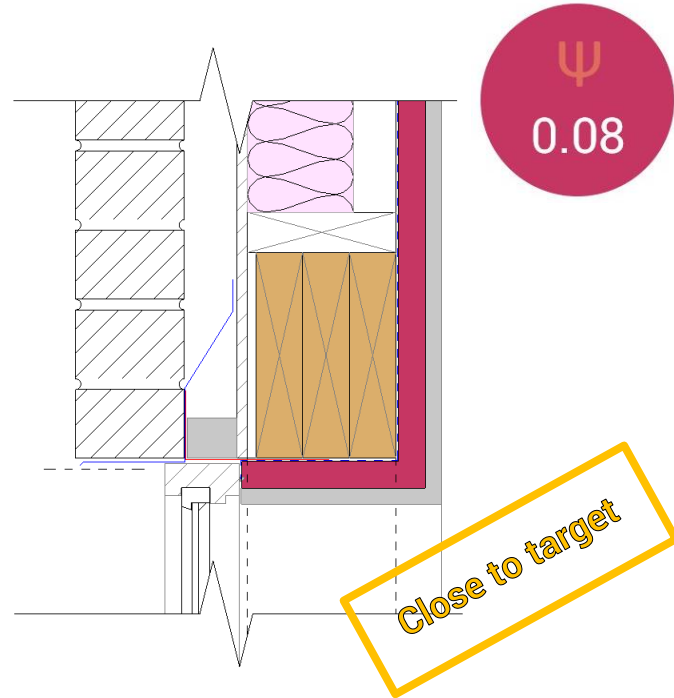
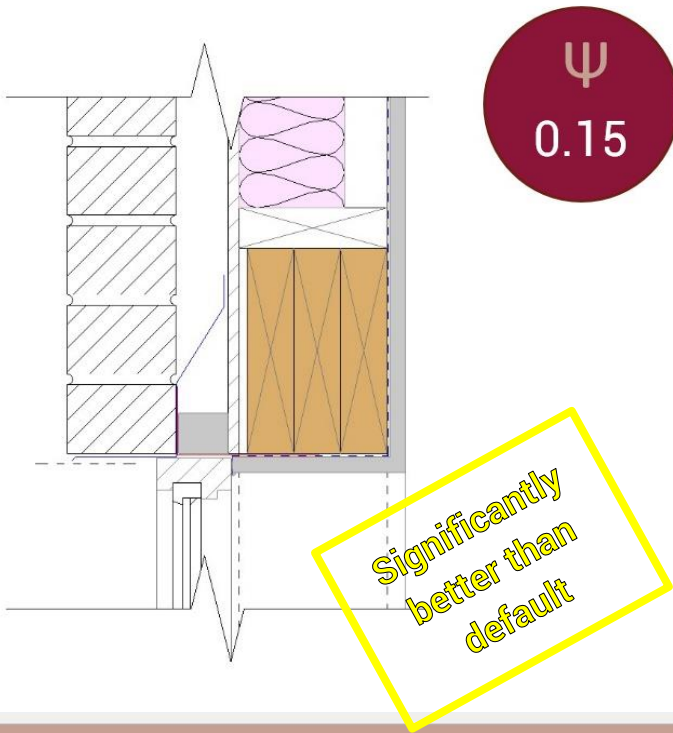


2025 target



STANDARD DETAIL

ENHANCED DETAIL



WINDOW

E3 SILL

Default

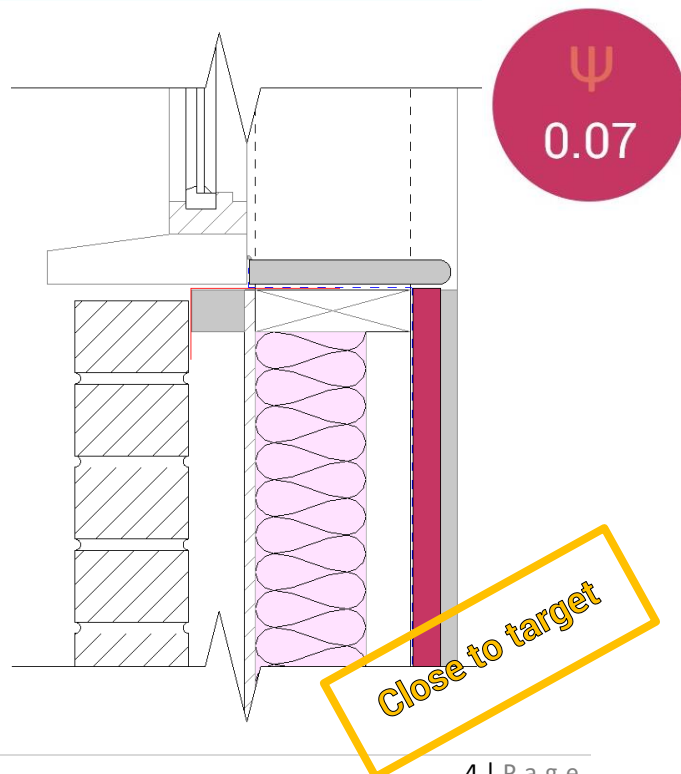
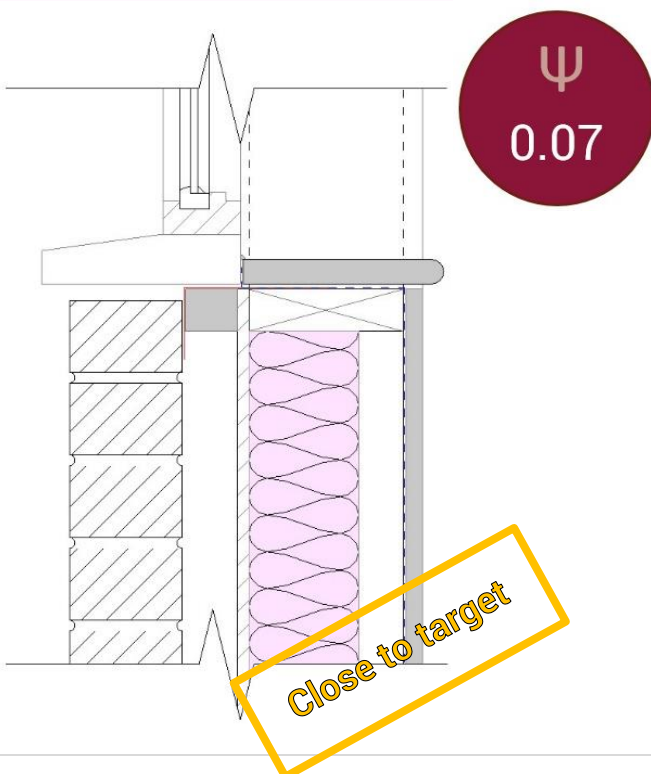


2025 target



STANDARD DETAIL

ENHANCED DETAIL



WINDOW E4 JAMB

Default

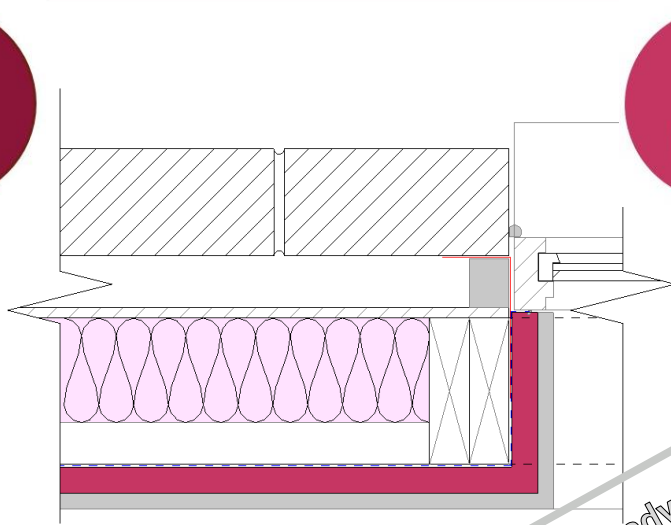
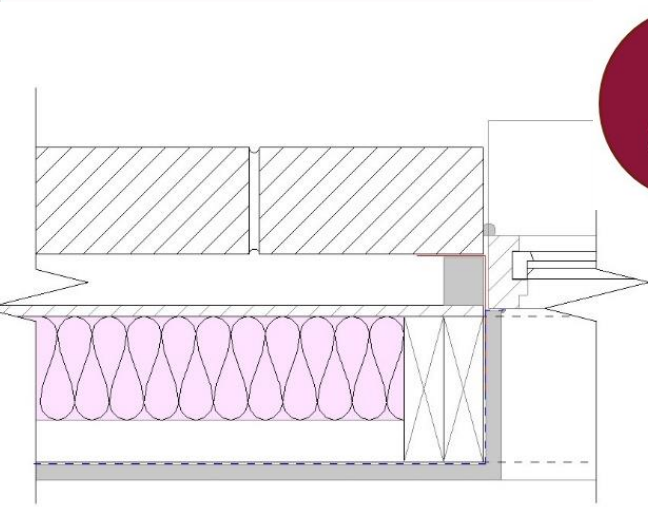


2025
target



STANDARD DETAIL

ENHANCED DETAIL



Already on target

GROUND FLOOR E5 EXTERNAL WALL

Default

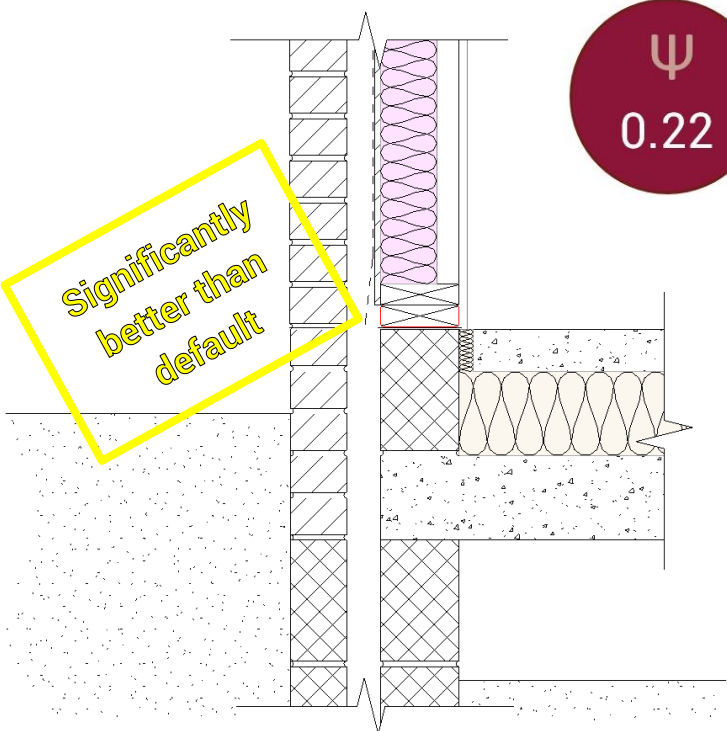


2025
target

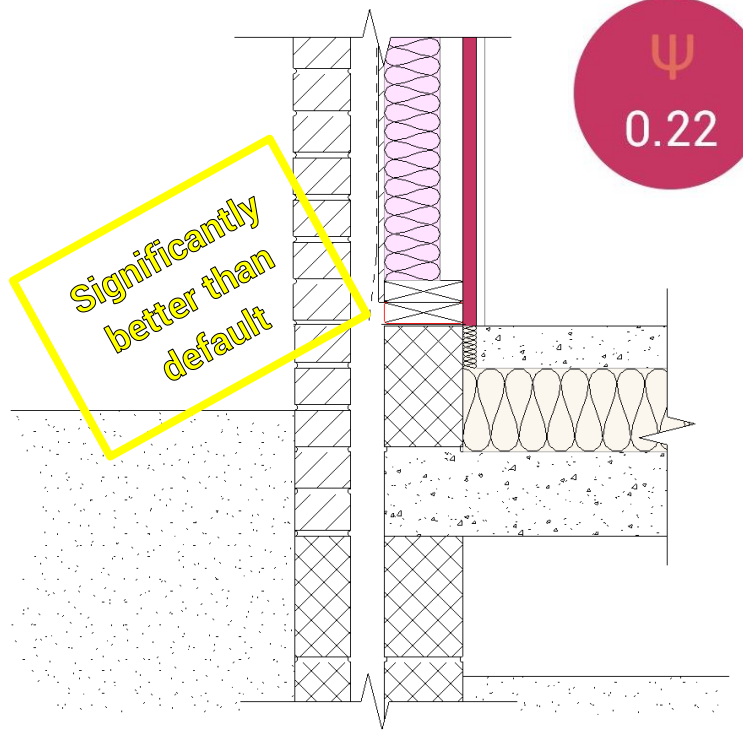


STANDARD DETAIL

ENHANCED DETAIL



Significantly better than default



Significantly better than default

GROUND FLOOR P1 PARTY WALL

Default

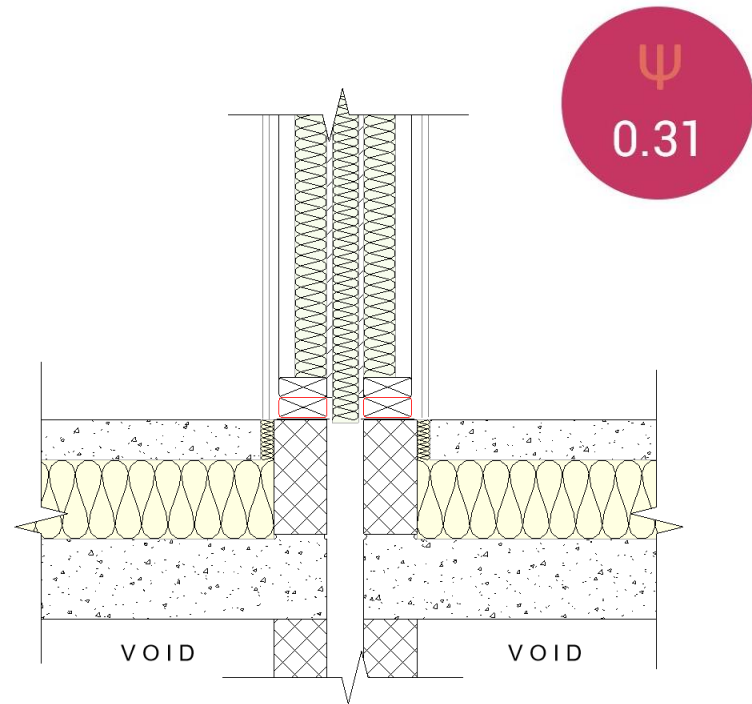
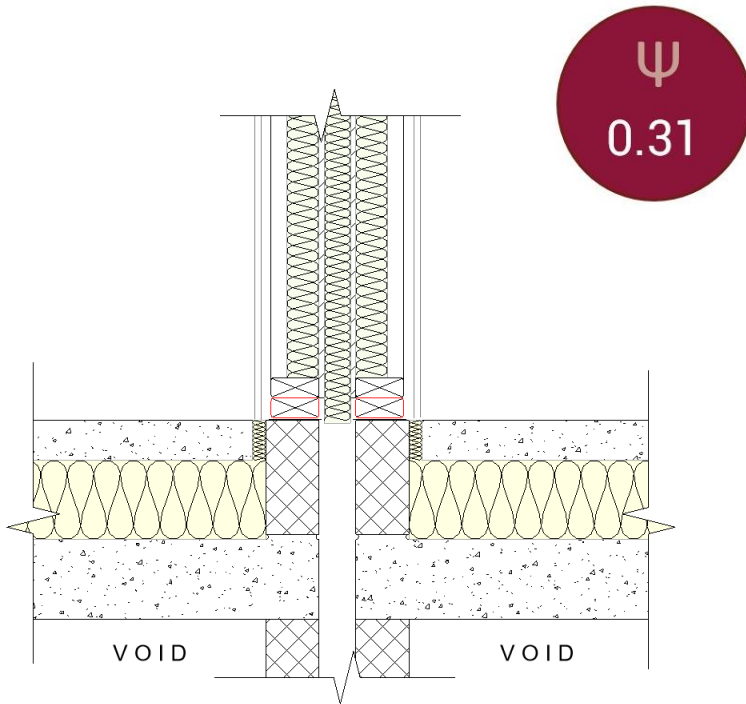


2025
target



STANDARD DETAIL

ENHANCED DETAIL



INTERMEDIATE FLOOR E6 EXTERNAL WALL

Default

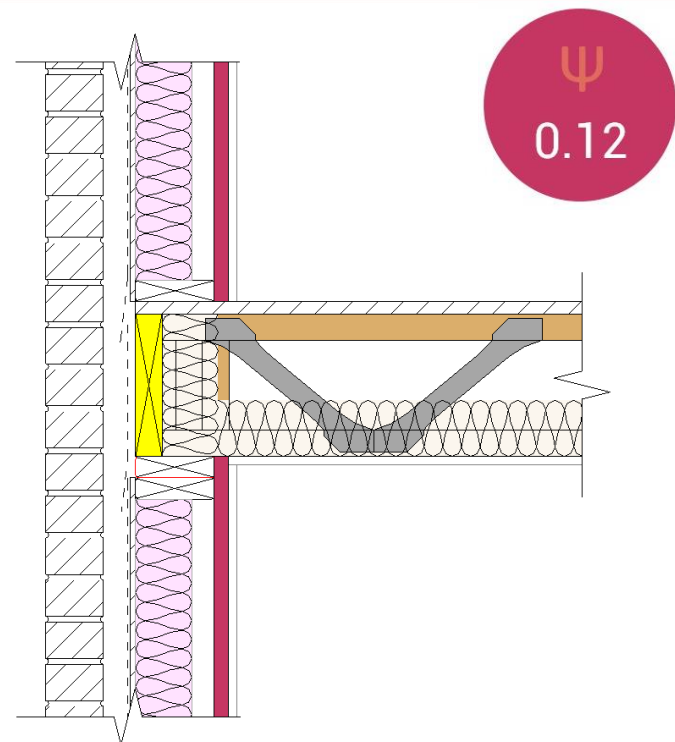
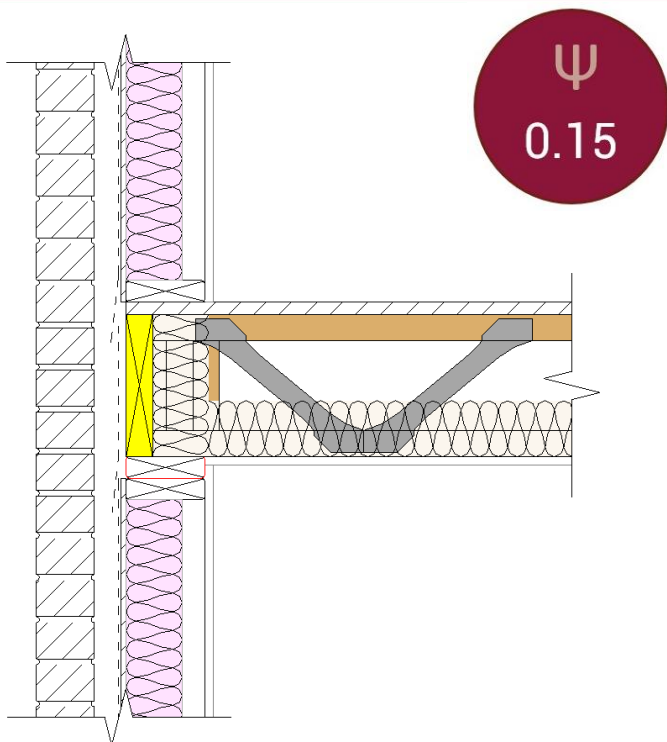


2025
target



STANDARD DETAIL

ENHANCED DETAIL



COLD ROOF

E10 EAVES – insulation at ceiling

Default

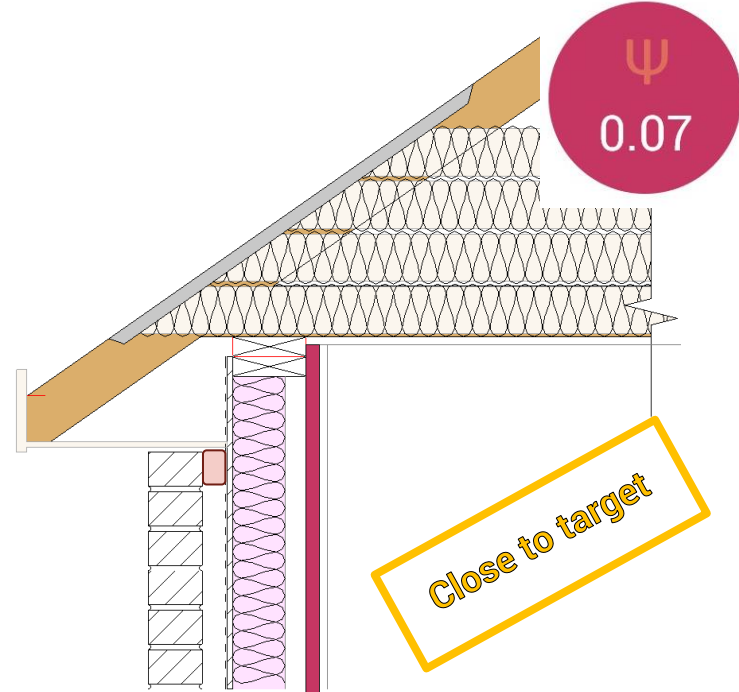
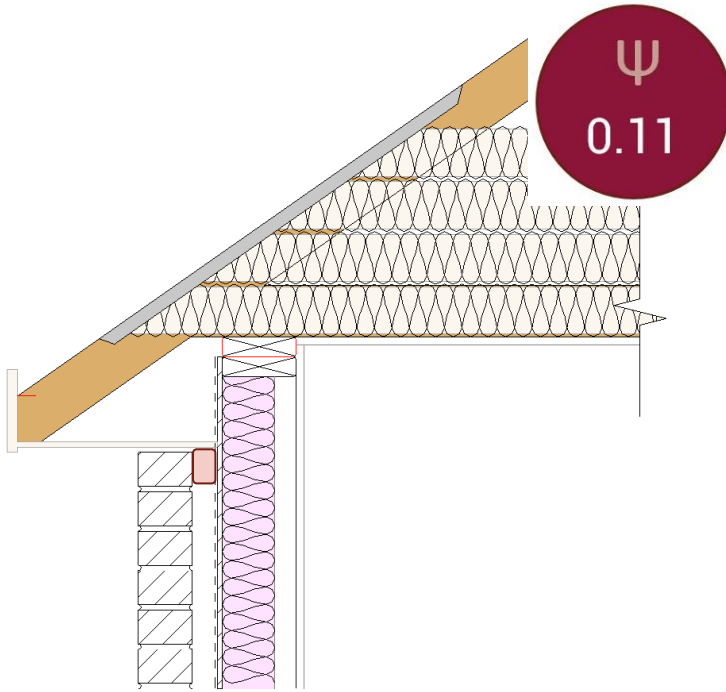


2025
target



STANDARD DETAIL

ENHANCED DETAIL



COLD ROOF

E11 EAVES – insulation at rafter

Default

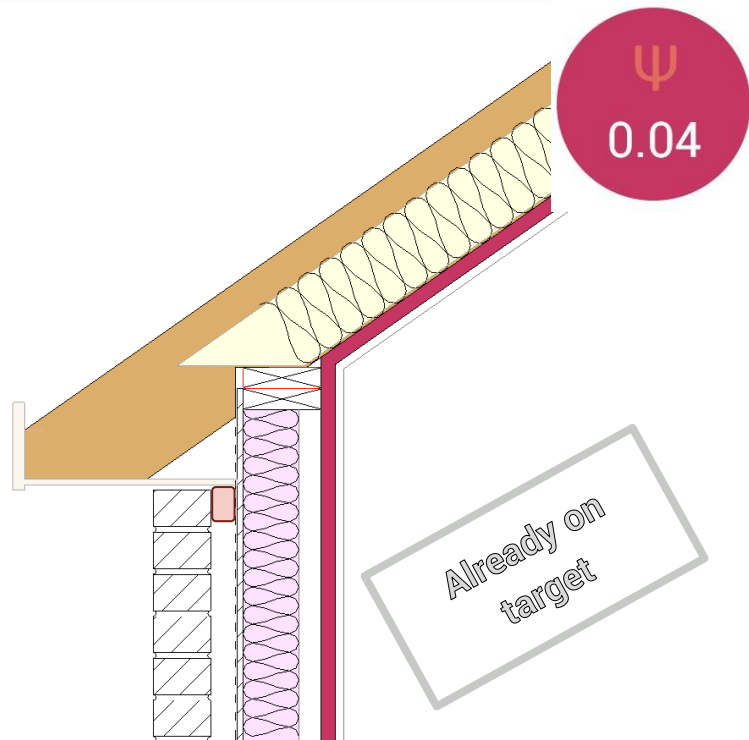
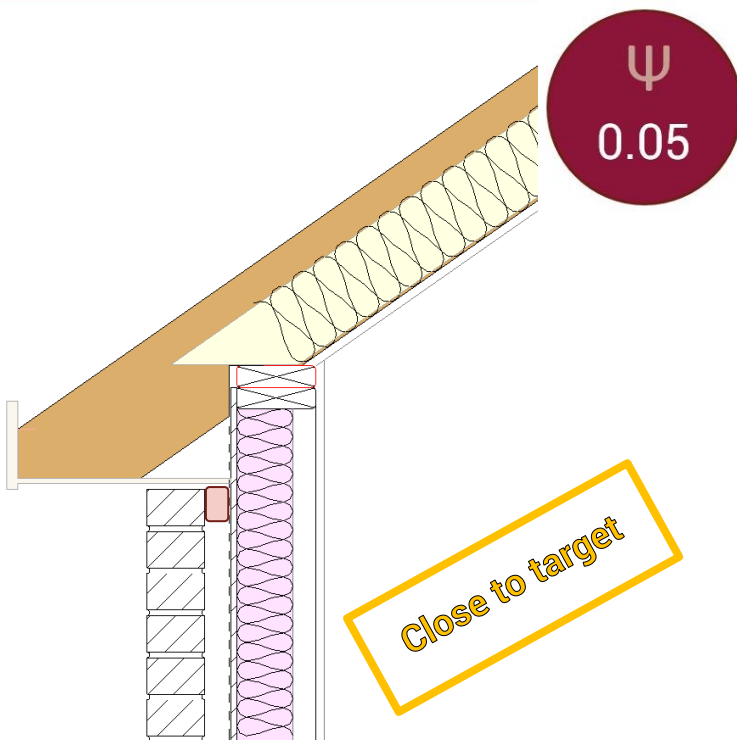


2025
target



STANDARD DETAIL

ENHANCED DETAIL



COLD ROOF

E12 GABLE – insulation at ceiling

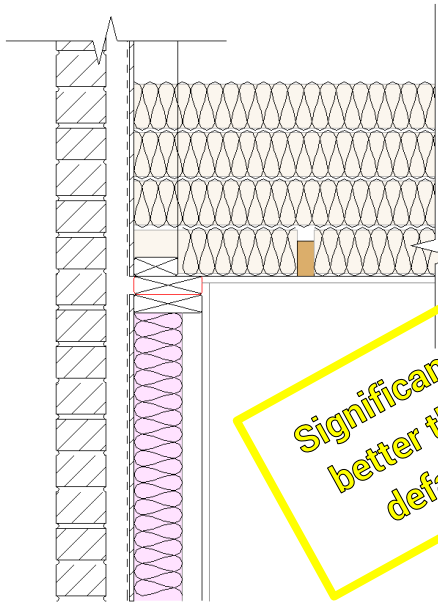
Default



2025 target

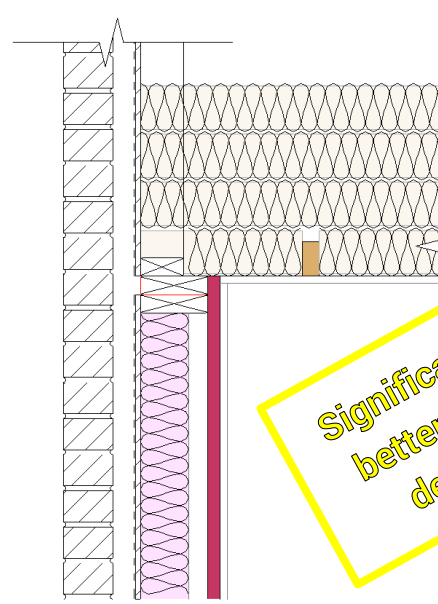


STANDARD DETAIL



Significantly better than default

ENHANCED DETAIL



Significantly better than default

COLD ROOF

E13 GABLE – insulation at rafter

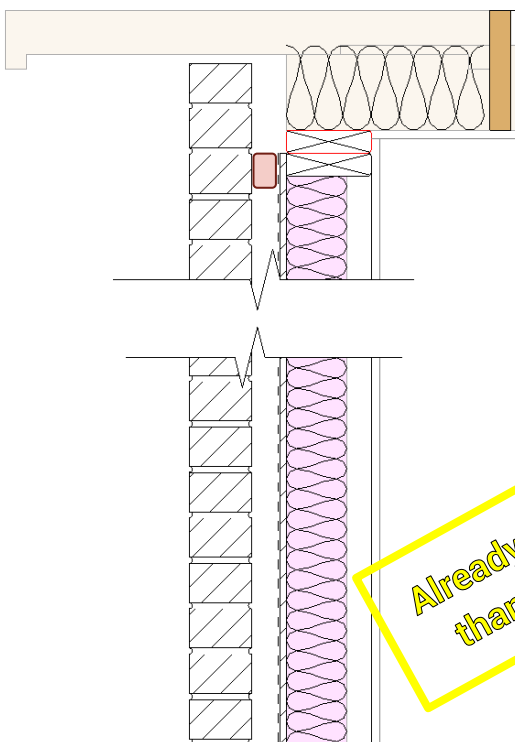
Default



2025 target

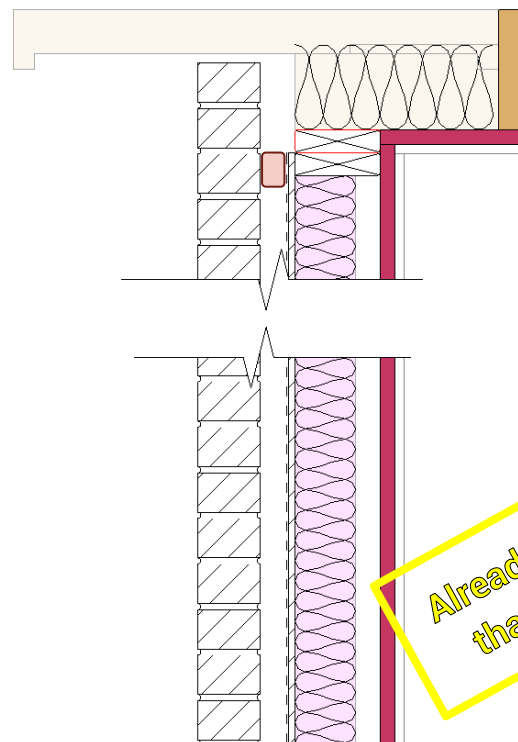


STANDARD DETAIL



Already better than target

ENHANCED DETAIL



Already better than target

WALL CORNER E16 EXTERNAL CORNER

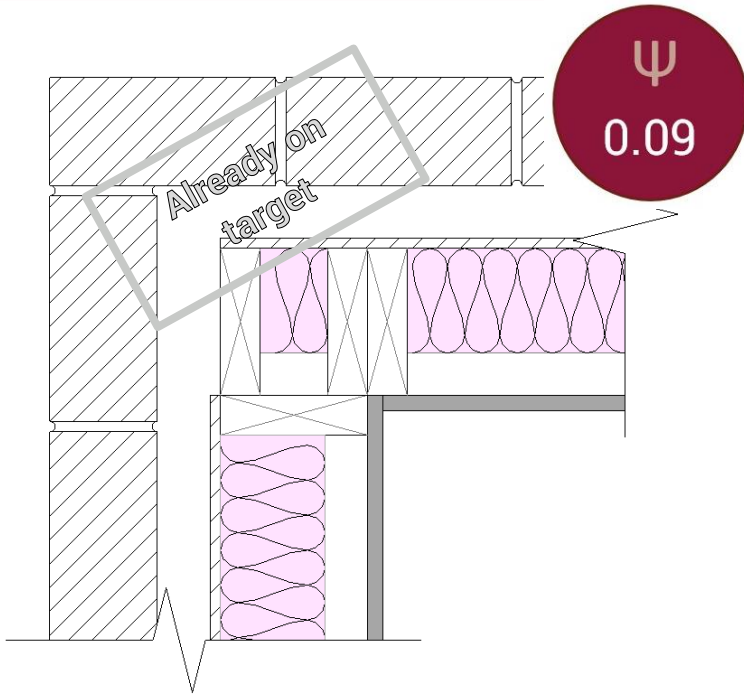
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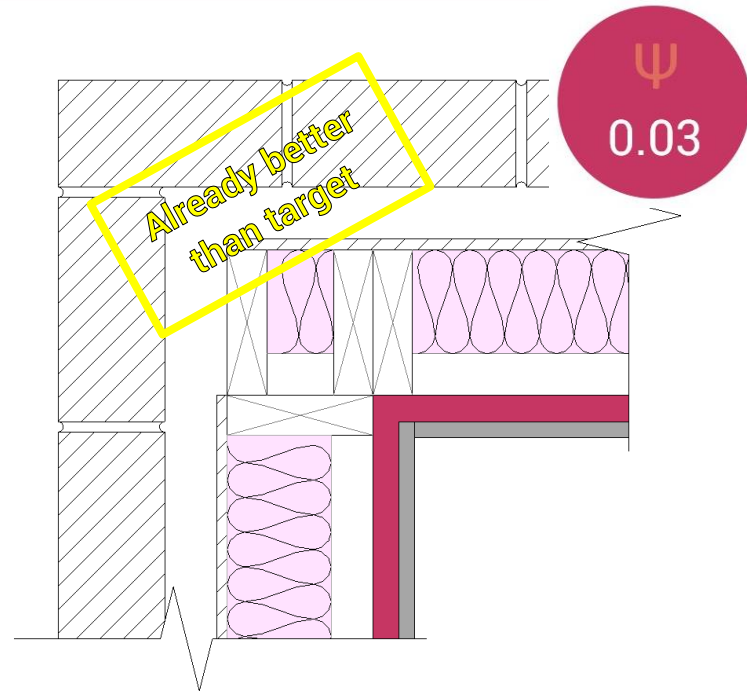
2025
target



STANDARD DETAIL



ENHANCED DETAIL



WALL CORNER E17 INTERNAL CORNER

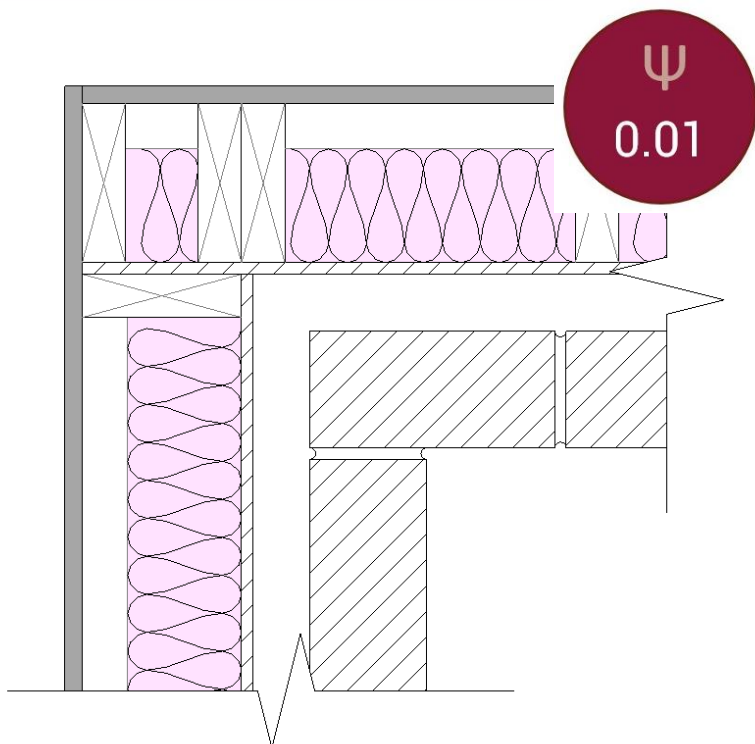
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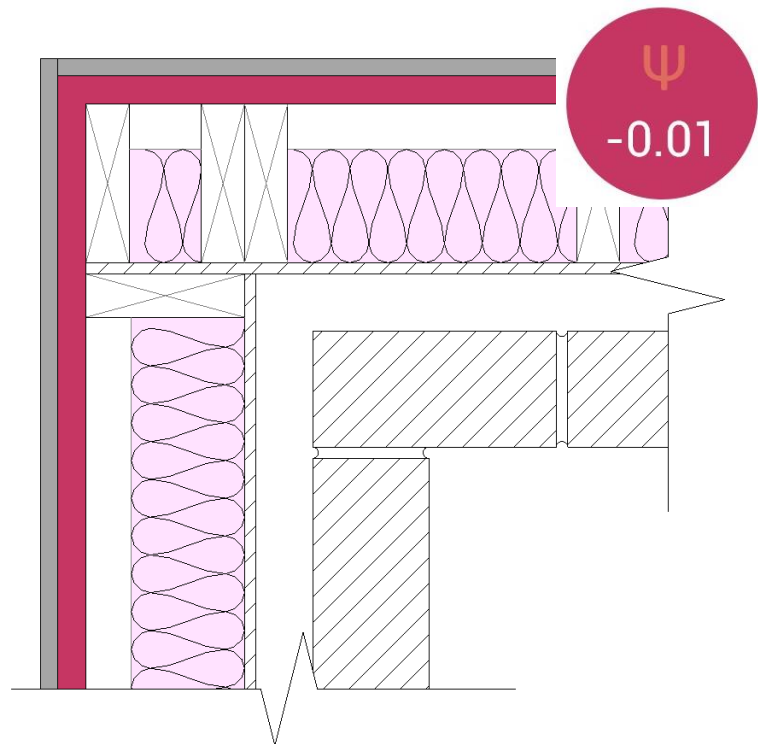
2025
target



STANDARD DETAIL



ENHANCED DETAIL



COLD ROOF

P4 PARTY WALL – INSULATION AT CEILING

Default

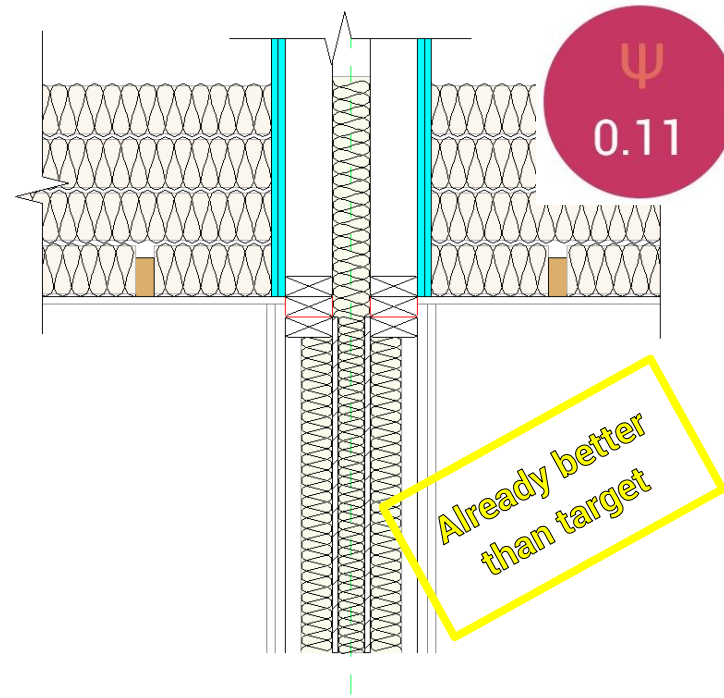
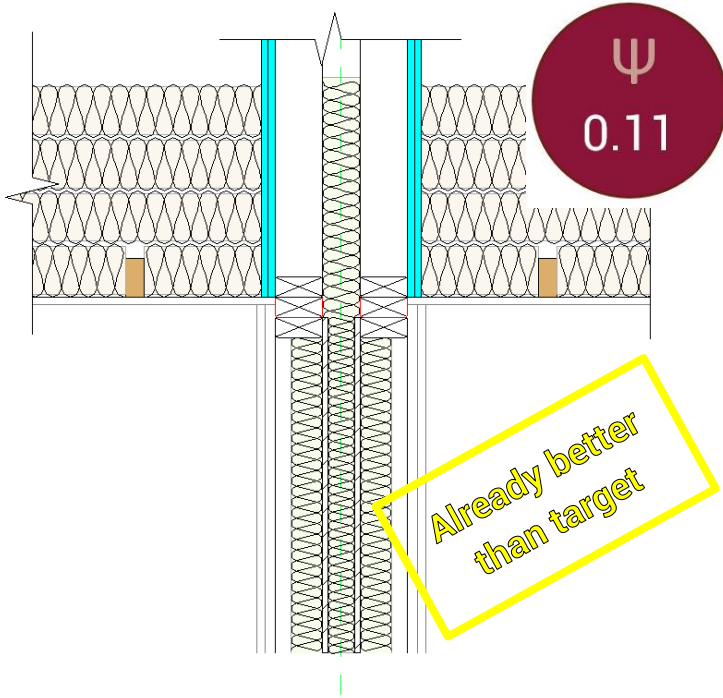


2025
target



STANDARD DETAIL

ENHANCED DETAIL



COLD ROOF

P5 PARTY WALL – INSULATION AT RAFTER

Default

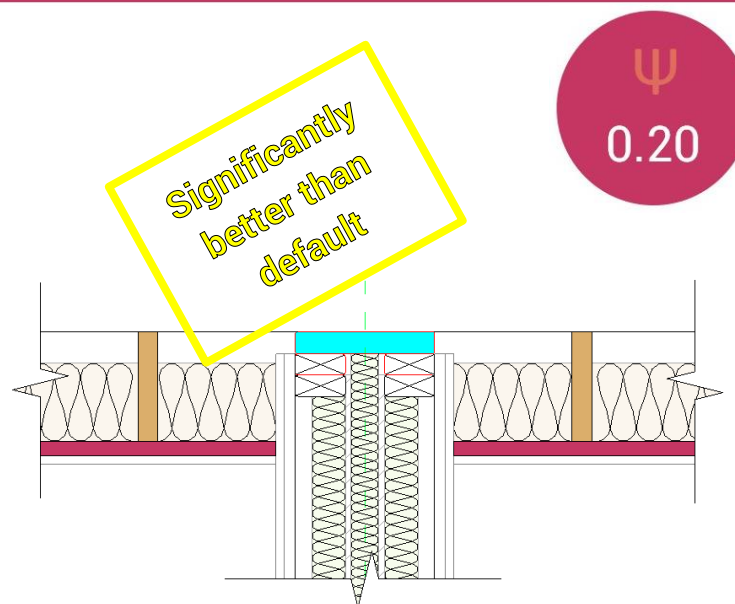
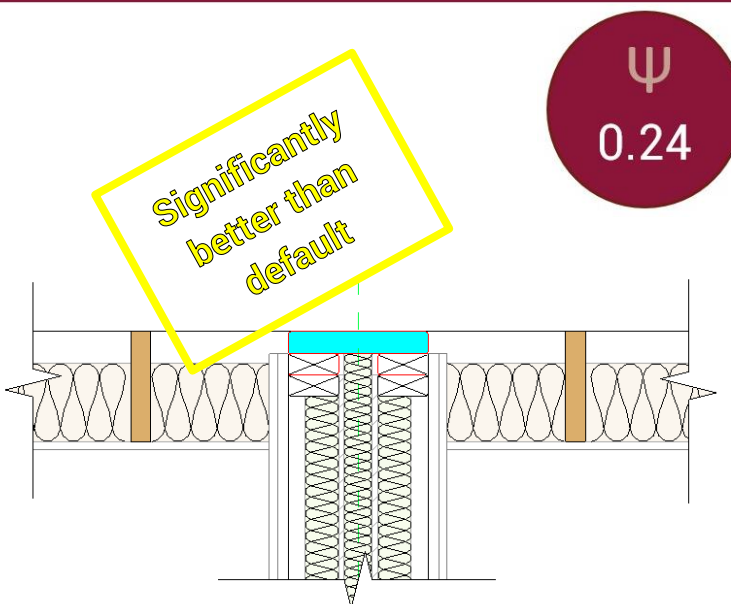


2025
target



STANDARD DETAIL

ENHANCED DETAIL



WALL CORNER E18 PARTY WALL

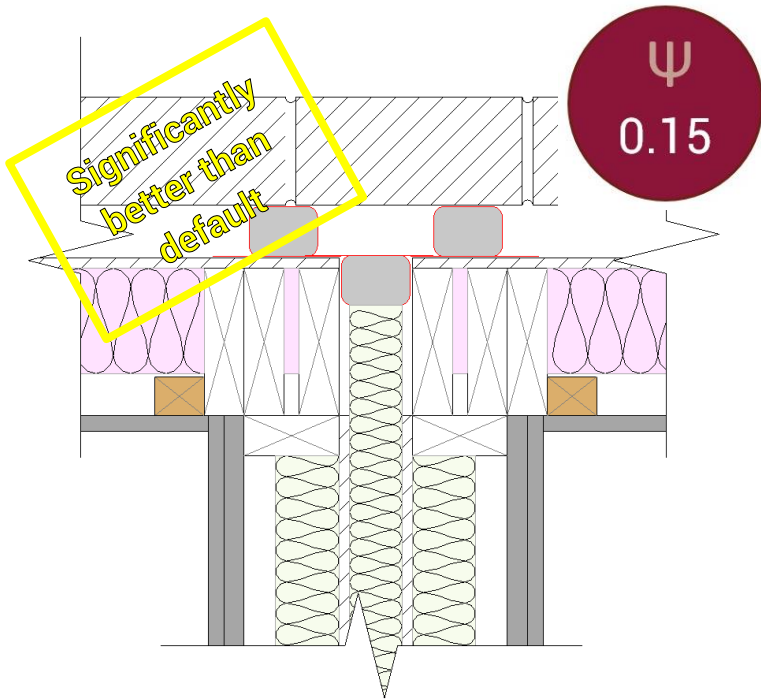
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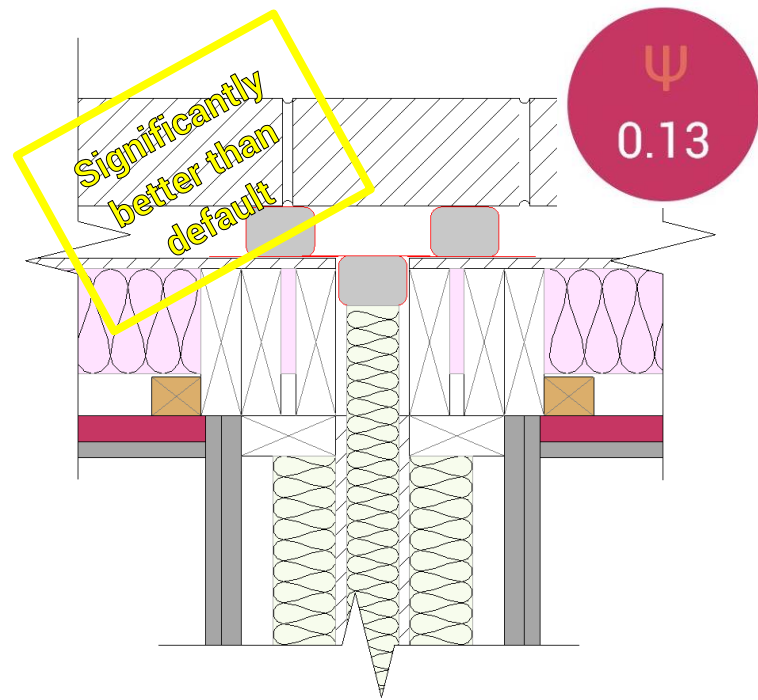
2025
target



STANDARD DETAIL



ENHANCED DETAIL



IF YOU HAVE ANY QUERIES ABOUT HOW TO APPLY ANY OF THE INFORMATION CONTAINED HERE, PLEASE CALL OUR DESIGN TEAM AT OUR OFFICES

01252 844747

OR EMAIL THE TECHNICAL DIRECTOR, ANDY GIBSON

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