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Certified Thermal Details and Products Scheme

Farrat Isolevel Ltd – Structural thermal breaks in balcony details

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Table of Contents

1 Introduction 3

1.1 Certified Thermal Details and Products Scheme 3

1.2 Farrat Isolevel Ltd – Structural thermal breaks in balcony details 3

2 Assessment 5

2.1 Thermal assessment 5

2.2 Software 5

2.3 Geometry 5

2.4 Thermal conductivities 5

3 Assessment results 6

3.1 Assessment results 6

Appendix A Materials with heat flows and Temperature Distribution Profiles 7

1 Introduction

1.1 Certified Thermal Details and Products Scheme

The Certified Thermal Details and Products Scheme and database launched on 31st July 2015. The data allows users to search a range of accurate and independently assessed thermal junction details, products and elements, ensuring accuracy, consistency, credibility and quality throughout the design and specification process.

This scheme provides independent, third party assessment and certification of the ‘as designed’ thermal performance of:

- Building junction details (e.g. SAP Table K1 + some bespoke detail types)
- Opening products (e.g. windows, doors and rooflights)
- Major (plane) building elements (e.g. wall, roof and floor products)

This ensures that the performance, marking and classification requirements of the appropriate standards are met and maintained.

1.2 Farrat Isolevel Ltd – Structural thermal breaks in balcony details

Farrat Isolevel Ltd have submitted a range of junction details to BRE. These were assessed and certified as part of the Certified Thermal Details and Products Scheme database:

www.bre.co.uk/certifiedthermalproducts

Ψ-value (W/m·K) and temperature factor (*f*) calculations were undertaken for the following junction details:

- Farrat TBK (15mm) Balcony: Steel to steel connection (‘small’ beam)
- Farrat TBK (25mm) Balcony: Steel to steel connection (‘large’ beam)
- Farrat TBK (15mm) Balcony: Steel to concrete connection (‘small’ beam)
- Farrat TBK (25mm) Balcony: Steel to concrete connection (‘small’ beam)
- Farrat TBK (15mm) Balcony: Steel to concrete connection (‘large’ beam)
- Farrat TBK (25mm) Balcony: Steel to concrete connection (‘large’ beam)

The quantity which describes the heat loss associated with a thermal bridge is its linear thermal transmittance, Ψ. This is a property of a thermal bridge and is the rate of heat flow per degree per unit length of the bridge, that is not accounted for in the U-values of the plane building elements containing the thermal bridge

The temperature factor (*f*) is used to assess the risk of surface condensation or mould growth and is calculated under steady state conditions. To avoid problems of surface condensation or mould growth, the f_{Rsi} should not be less than a critical temperature factor (f_{CRsi}). A range of appropriate critical temperature factors, as identified in BRE Information Paper IP 1/06, are detailed in Table 1 below:

Type of Building	**Critical Temperature Factor (f_{CRsi})**
Storage Buildings	0.30
Offices, retail premises	0.50
Dwellings, residential buildings, schools	0.75
Sports halls, kitchens, canteens	0.80
Swimming pools, laundries, breweries	0.90

Recommended Critical Temperature Factors

2 Assessment

2.1 Thermal assessment

Thermal assessment models of junction details were created for each of the details. These were developed on the basis of information provided by the client, with representative thermal conductivities assumed for each material.

The assessments were undertaken in compliance with:

- BR 497 - Conventions for calculating linear thermal transmittance and temperature factors

2.2 Software

The assessment was undertaken using Physibel TRISCO (v 12.0) thermal modelling software.

2.3 Geometry

Within the models, the detailed geometry of the junction details were taken from drawings provided by the client, as per the detail drawings contained within Appendix B.

2.4 Thermal conductivities

The representative thermal conductivities used in the model were taken from Annex A of BS EN ISO 10077-2 and information provided the client, as detailed below in Table 1.

Material	Thermal conductivity (W/m·K)
Farrat TBK thermal break	0.187
Steel	50
Brick	1.16
Insulation	0.027
Blockwork	1.29
Plasterboard	0.21
Concrete slab	2.3
Timber	0.13

Table 1 – Representative thermal conductivities

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3 Assessment results

3.1 Assessment results

The results for the assessment of the junction detail variations are as follows:

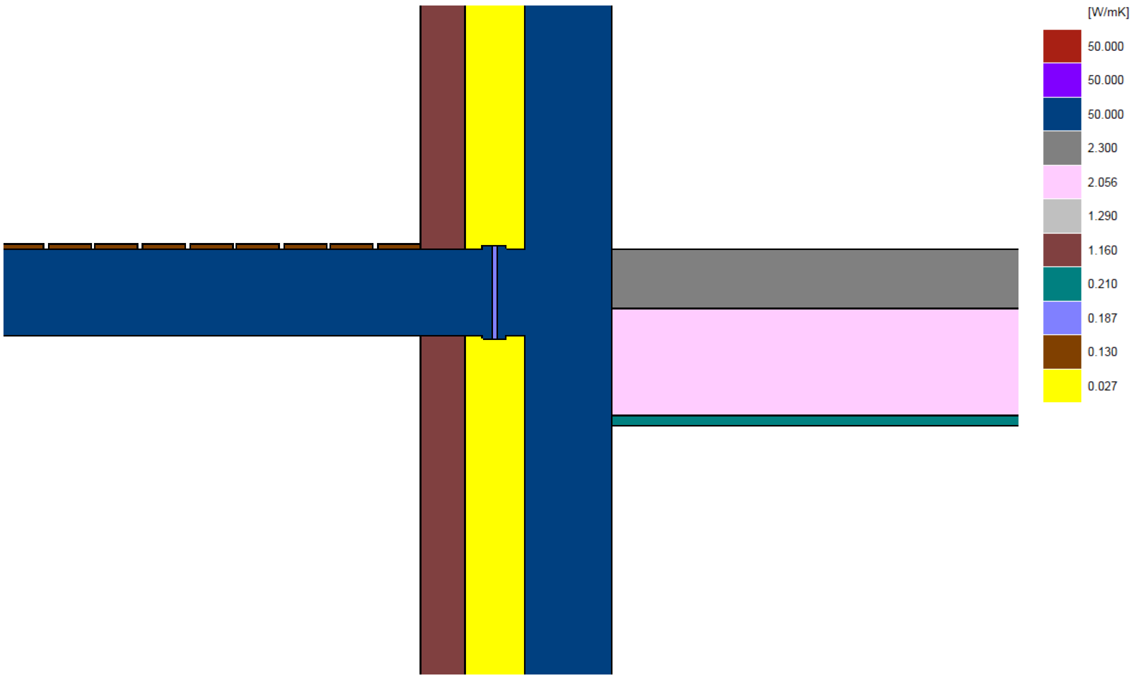
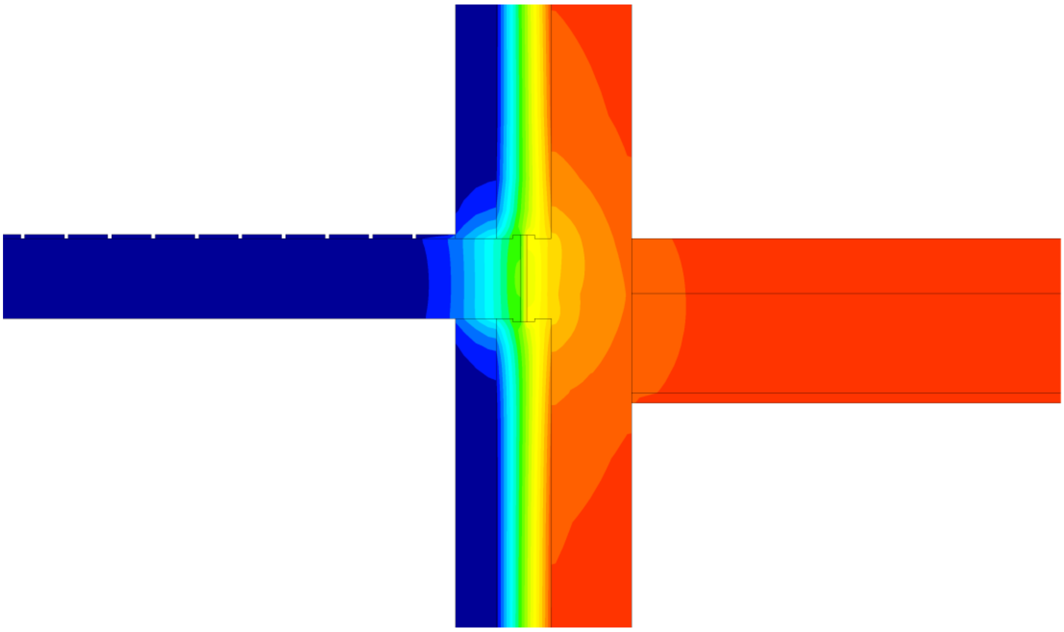
	SAP Reference	Description	Calculated Ψ-value (W/m·K)	Temperature Factor
600063	E23	Farrat TBK (15mm) Balcony: Steel to steel connection ('small' beam)	0.345	0.91
600064	E23	Farrat TBK (25mm) Balcony: Steel to steel connection ('large' beam)	0.429	0.89
600065	E23	Farrat TBK (15mm) Balcony: Steel to concrete connection ('small' beam)	0.420	0.89
600066	E23	Farrat TBK (25mm) Balcony: Steel to concrete connection ('small' beam)	0.408	0.89
600067	E23	Farrat TBK (15mm) Balcony: Steel to concrete connection ('large' beam)	0.489	0.86
600068	E23	Farrat TBK (25mm) Balcony: Steel to concrete connection ('large' beam)	0.464	0.87

Table 2 – Assessment Results

Graphics from the thermal modelling for each of the variations are given in Appendix A. This includes for:

- Geometry and heat flow
- Temperature distribution profile

Appendix A Materials with heat flows and Temperature Distribution Profiles

600063 - Farrat TBK (15mm) Balcony: Steel to steel connection (‘small’ beam)
Materials

Temperature profile


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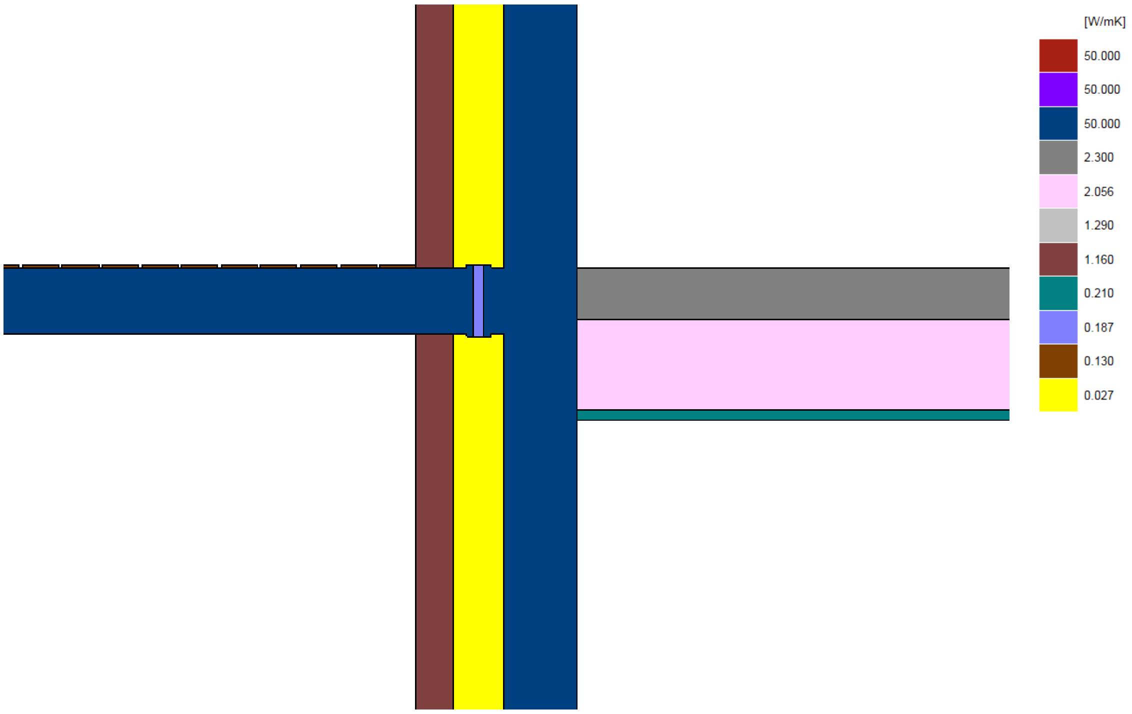
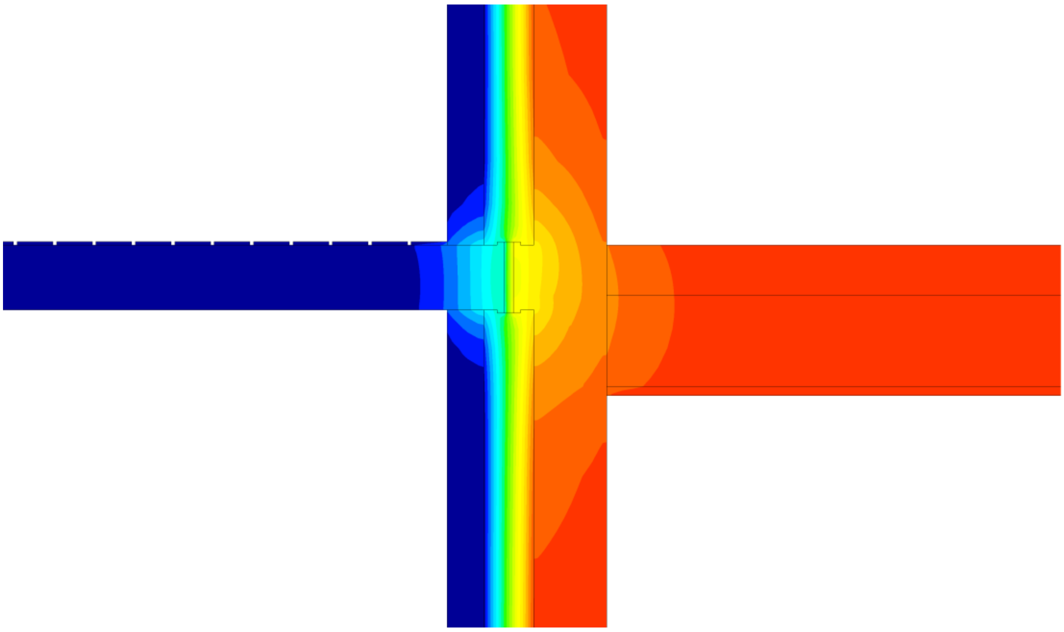
600064 - Farrat TBK (25mm) Balcony: Steel to steel connection ('large' beam)
Materials

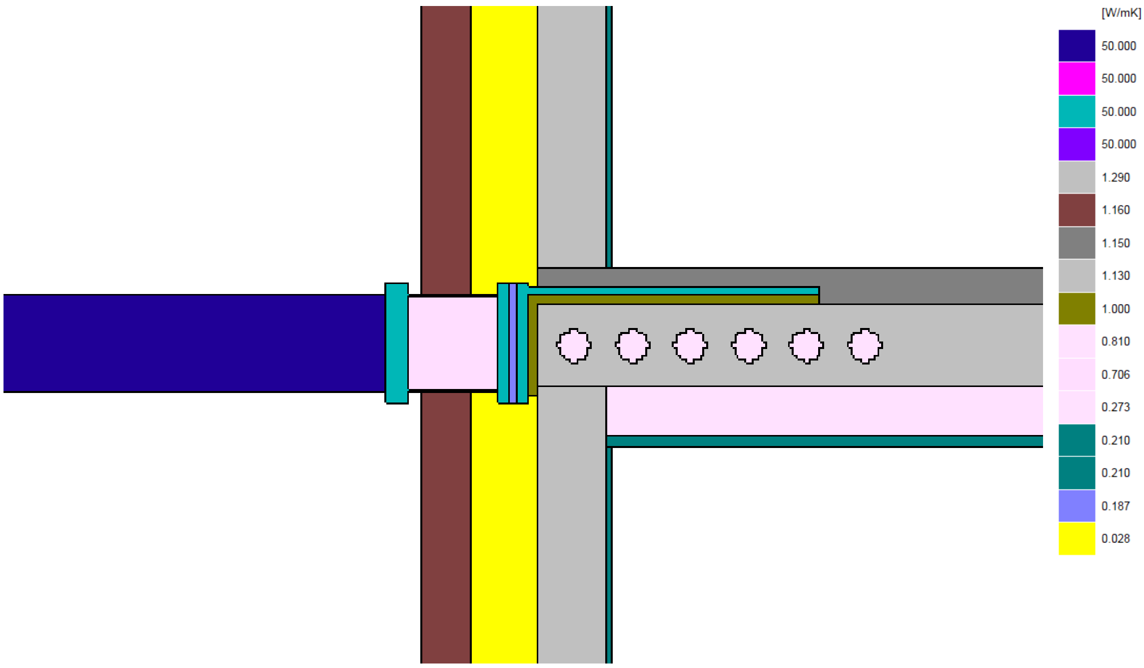


Temperature profile

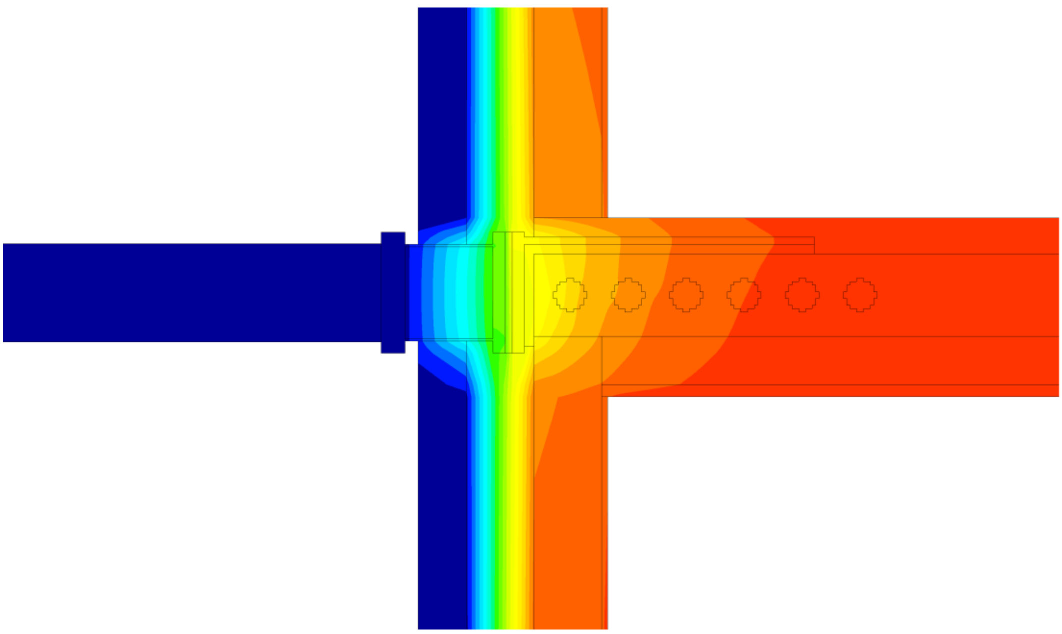


600065 - Farrat TBK (15mm)   Balcony: Steel to concrete connection (‘small’ beam)

Materials

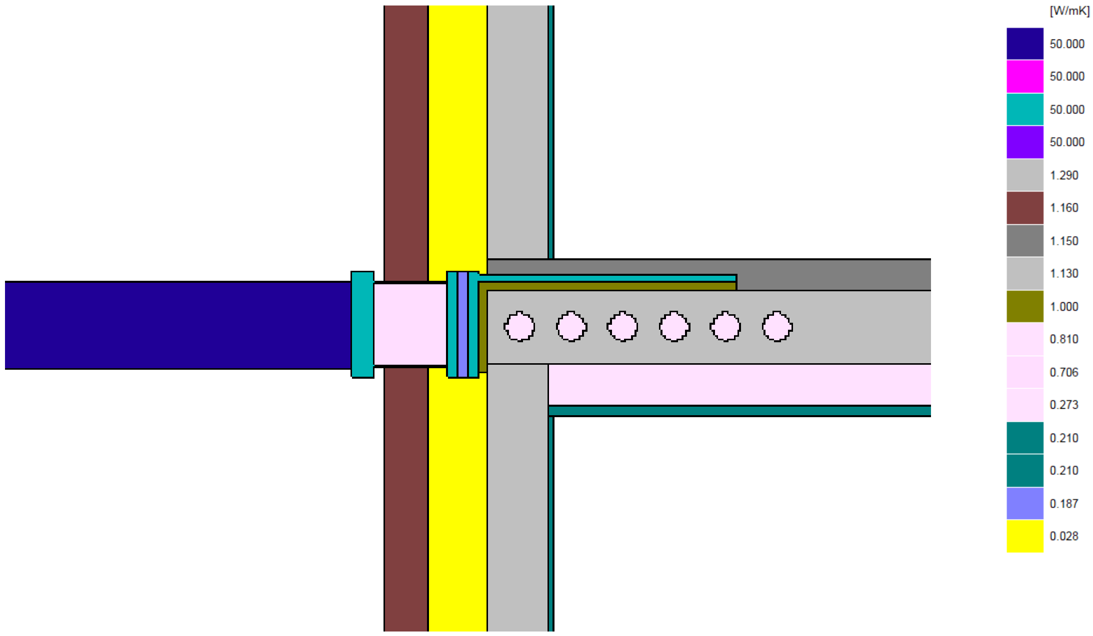


Temperature profile

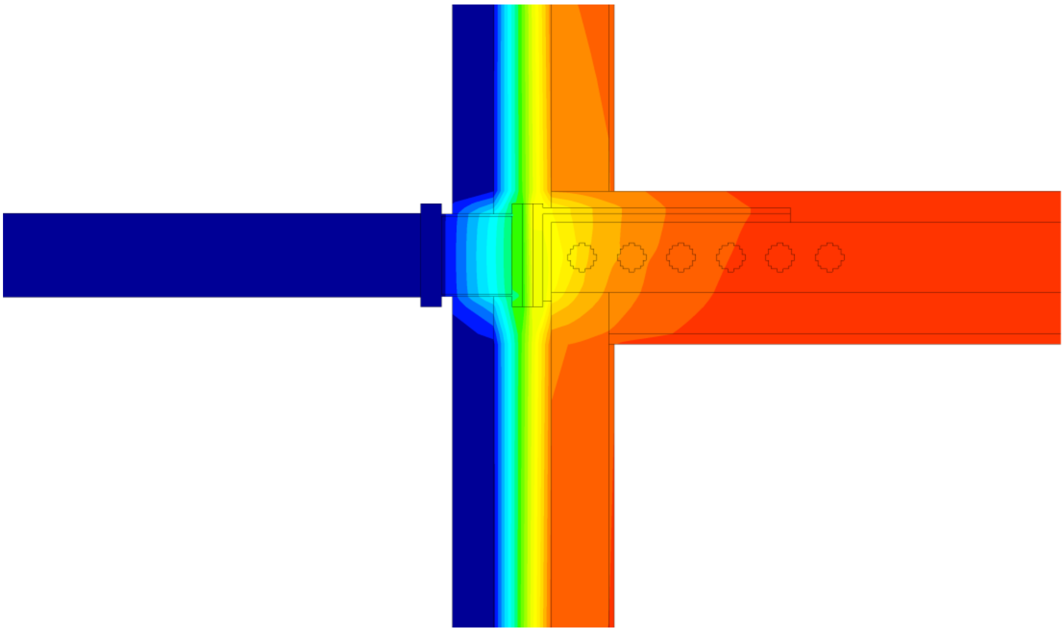


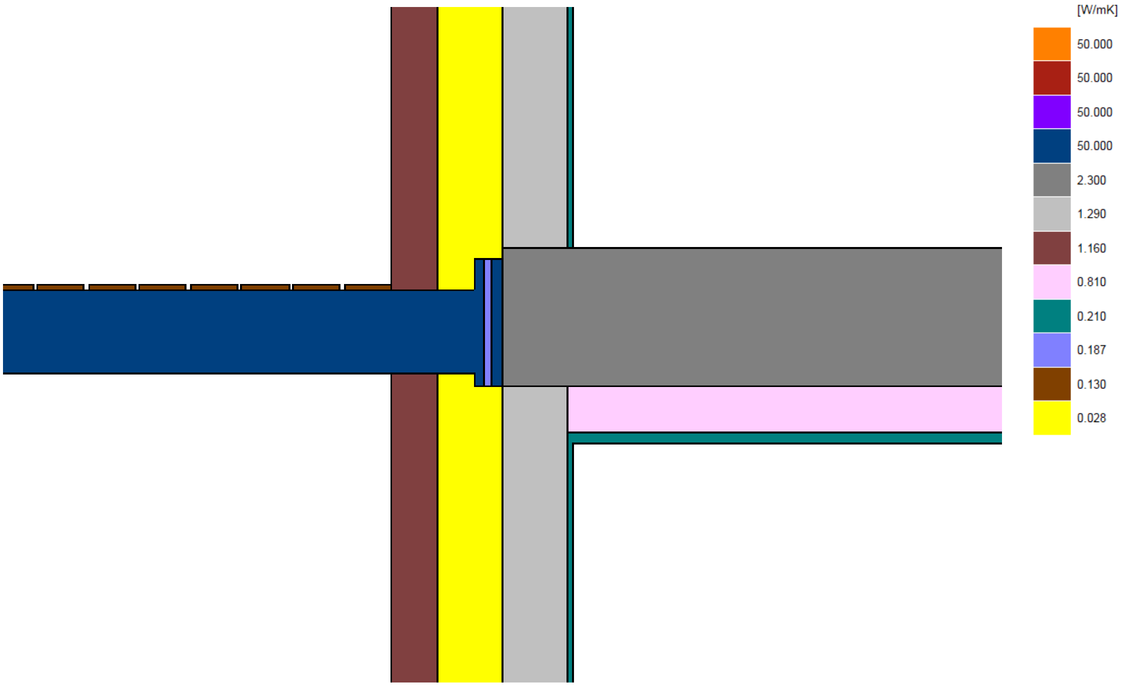
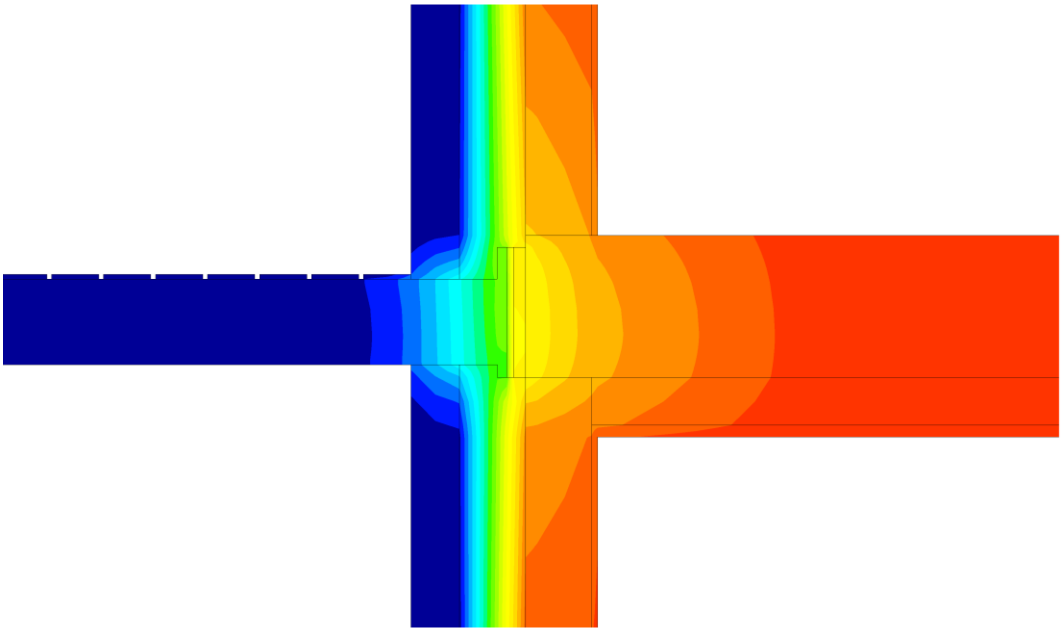
600066 - Farrat TBK (25mm)	Balcony: Steel to concrete connection ('small' beam)

Materials

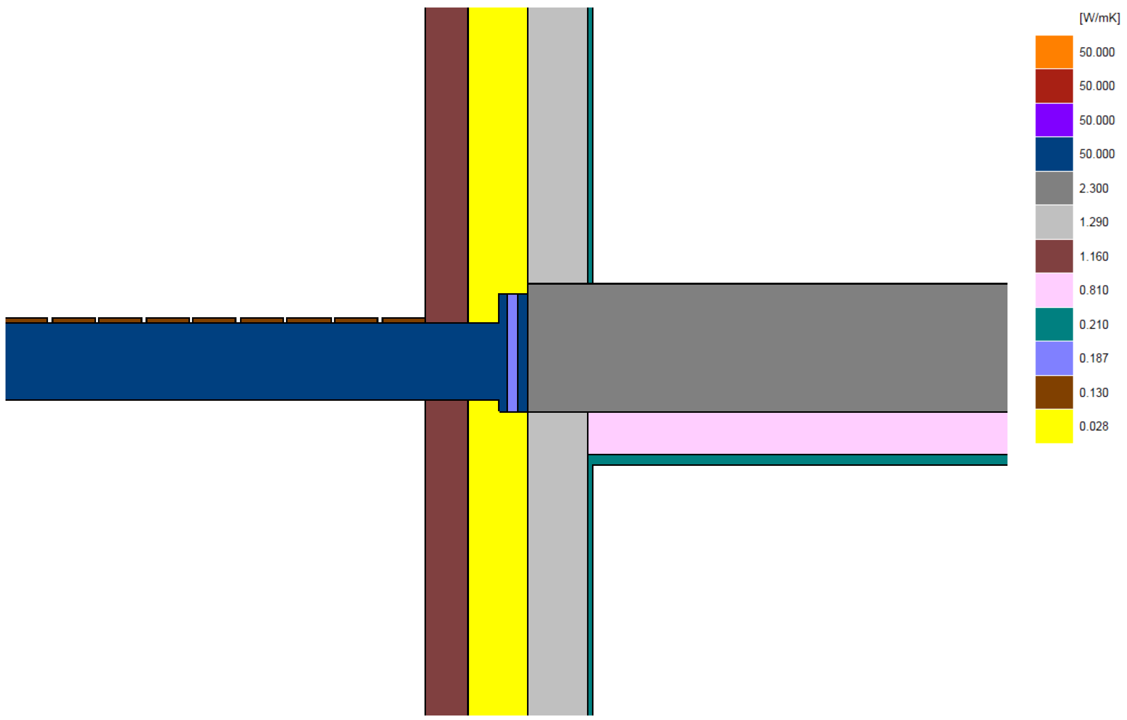


Temperature profile



600067 - Farrat TBK (15mm) Balcony: Steel to concrete connection (‘large’ beam)
Materials

Temperature profile


600068 - Farrat TBK (25mm) Balcony: Steel to concrete connection ('large' beam)
Material



Temperature profile