



Date

08/04/2022

Calcs by

TJH

Job number

Technical

Reference

THERMAL 0.15

REF

CALCULATIONS

RESULT

System Details : Layers and thermals

Internal Surface Resistance

External Surface resistance

m2K/W

0.1

0.04

Heat Path 1 - Insulation - Insulation - Insulation

Layer	Material	Thermal Conductivity (W/mK)	Thickness (mm)	Thermal Resistance (m2K/W)
1	Metrotile	0	3	0.000
2	Breather Membrane	0.5	1	0.002
3	Ply	0.13	12	0.092
4	Air	0	42	0.000
5	Foil backed PIR insulation	0.022	50	2.273
6	Foil backed PIR insulation	0.022	50	2.273
7	Foil backed PIR insulation	0.022	60	2.727
9	Plasterboard	0.19	12.5	0.066
10	Plaster	0.5	2	0.004
Total Thermal Resistance Value for Heat Path 1 (m2K/W)				7.437

Heat Path 2 - Insulation - Timber Battens - Insulation

Layer	Material	Thermal Conductivity (W/mK)	Thickness (mm)	Thermal Resistance (m2K/W)
1	Metrotile	0	3	0.000
2	Breather Membrane	0.5	1	0.002
3	Ply	0.13	12	0.092
4	Air	0	42	0.000
5	Foil backed PIR insulation	0.022	50	2.273
6	Timber Batten	0.13	50	0.385
7	Foil backed PIR insulation	0.022	60	2.727
9	Plasterboard	0.19	12.5	0.066
10	Plaster	0.5	2	0.004
Total Thermal Resistance Value for Heat Path 1 (m2K/W)				5.549

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	Heat Path 3 - Insulation - timber - Aluminium Rafters <table><tr><th>Layer</th><th>Material</th><th>Thermal Conductivity (W/mK)</th><th>Thickness (mm)</th><th>Thermal Resistance (m2K/W)</th></tr><tr><td>1</td><td>Metrotile</td><td>0</td><td>3</td><td>0.000</td></tr><tr><td>2</td><td>Breather Membrane</td><td>0.5</td><td>1</td><td>0.002</td></tr><tr><td>3</td><td>Ply</td><td>0.13</td><td>12</td><td>0.092</td></tr><tr><td>5</td><td>Aluminium Rafter</td><td>160</td><td>92</td><td>0.001</td></tr><tr><td>6</td><td>Timber Batten</td><td>0.13</td><td>50</td><td>0.385</td></tr><tr><td>7</td><td>Foil backed PIR insulation</td><td>0.022</td><td>60</td><td>2.727</td></tr><tr><td>9</td><td>Plasterboard</td><td>0.19</td><td>12.5</td><td>0.066</td></tr><tr><td>10</td><td>Plaster</td><td>0.5</td><td>2</td><td>0.004</td></tr><tr><td colspan="4">Total Thermal Resistance Value for Heat Path 1 (m2K/W)</td><td>3.277</td></tr></table> Heat Path 4 - Insulation - Insulation - Aluminium Rafters <table><tr><th>Layer</th><th>Material</th><th>Thermal Conductivity (W/mK)</th><th>Thickness (mm)</th><th>Thermal Resistance (m2K/W)</th></tr><tr><td>1</td><td>Metrotile</td><td>0</td><td>3</td><td>0.000</td></tr><tr><td>2</td><td>Breather Membrane</td><td>0.5</td><td>1</td><td>0.002</td></tr><tr><td>3</td><td>Ply</td><td>0.13</td><td>12</td><td>0.092</td></tr><tr><td>5</td><td>Aluminium Rafter</td><td>160</td><td>92</td><td>0.001</td></tr><tr><td>6</td><td>Foil backed PIR insulation</td><td>0.022</td><td>50</td><td>2.273</td></tr><tr><td>7</td><td>Foil backed PIR insulation</td><td>0.022</td><td>60</td><td>2.727</td></tr><tr><td>9</td><td>Plasterboard</td><td>0.19</td><td>12.5</td><td>0.066</td></tr><tr><td>10</td><td>Plaster</td><td>0.5</td><td>2</td><td>0.004</td></tr><tr><td colspan="4">Total Thermal Resistance Value for Heat Path 1 (m2K/W)</td><td>5.165</td></tr></table> <table><tr><th>Heat Path</th><th>m2K/W)</th><th>Roof Coverage (%)</th><th></th></tr><tr><td>Heat Path 1</td><td>7.437</td><td>76.5</td><td>5.689</td></tr><tr><td>Heat Path 2</td><td>5.549</td><td>8.5</td><td>0.472</td></tr><tr><td>Heat Path 3</td><td>3.277</td><td>1.5</td><td>0.049</td></tr><tr><td>Heat Path 4</td><td>5.165</td><td>13.5</td><td>0.697</td></tr></table> <table><tr><td colspan="4">Overall Thermal Resistance Value over Roof (m2K/W)</td><td>6.907</td></tr><tr><td colspan="4">Overlall U-Value of Solid Roof</td><td>0.14478</td></tr></table> Bar width = 60 Bar centre = 400 Batten width = 35 Batten Centre = 350 total area = 140000 mm² heat path 1 = 107100 mm² heat path 2 = 11900 mm² heat path 3 = 2100 mm² heat path 4 = 18900 mm²	Layer	Material	Thermal Conductivity (W/mK)	Thickness (mm)	Thermal Resistance (m2K/W)	1	Metrotile	0	3	0.000	2	Breather Membrane	0.5	1	0.002	3	Ply	0.13	12	0.092	5	Aluminium Rafter	160	92	0.001	6	Timber Batten	0.13	50	0.385	7	Foil backed PIR insulation	0.022	60	2.727	9	Plasterboard	0.19	12.5	0.066	10	Plaster	0.5	2	0.004	Total Thermal Resistance Value for Heat Path 1 (m2K/W)				3.277	Layer	Material	Thermal Conductivity (W/mK)	Thickness (mm)	Thermal Resistance (m2K/W)	1	Metrotile	0	3	0.000	2	Breather Membrane	0.5	1	0.002	3	Ply	0.13	12	0.092	5	Aluminium Rafter	160	92	0.001	6	Foil backed PIR insulation	0.022	50	2.273	7	Foil backed PIR insulation	0.022	60	2.727	9	Plasterboard	0.19	12.5	0.066	10	Plaster	0.5	2	0.004	Total Thermal Resistance Value for Heat Path 1 (m2K/W)				5.165	Heat Path	m2K/W)	Roof Coverage (%)		Heat Path 1	7.437	76.5	5.689	Heat Path 2	5.549	8.5	0.472	Heat Path 3	3.277	1.5	0.049	Heat Path 4	5.165	13.5	0.697	Overall Thermal Resistance Value over Roof (m2K/W)				6.907	Overlall U-Value of Solid Roof				0.14478	
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