

DECLARED R (THERMALLY BRIDGED) THERMAL PERFORMANCE CALCULATIONS TO AS/NZS 4859 Parts 1 & 2:2018

The following calculations by James M Fricker Pty Ltd are based upon:

- a) AS/NZS 4859.1:2018 "Thermal insulation materials for buildings. Part 1: General criteria and technical provisions",
- b) AS/NZS 4859.2:2018 "Thermal insulation materials for buildings. Part 2: Design",
- c) the Australian Institute of Refrigeration Air-conditioning & Heating (AIRAH) Handbook (Edition 5, 2013), and (if necessary) the ASHRAE Fundamentals Handbook.

This report contains calculations to determine the thermal performance of insulated sandwich panels.

Thermal bridging calculation techniques are used to determine the Equivalent Thermal Thickness of the particular panel for its profile, for each thickness. The thermal conductivity at the insulation mean temperature is then used to determine the Declared Thermal Resistance for the panel for the thickness.

The **Overall Surface Total R** is then determined by adding indoor and outdoor air film resistances. This is per AS/NZS 4859.2:2018 Clause 4.3 – *"A total resistance associated with a construction of materials, computed or measured over an area sufficient to be fully representative of the element of construction, and specified as a Total R-value, including surface film resistances and thermal bridging."*

Total R-values are based on product in-service conditions in accordance with AS/NZS 4859.2:2018 including the alteration of insulation Material R for temperature.

Each calculation result is subject to any specific notes and assumptions listed on the calculation.

If a construction differs from the described system, the thermal resistance may be different.

All calculations were done by James M Fricker, F.AIRAH F.IEAust CPEng NER APEC Engineer IntPE(Aus)



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THERMAL INSULATION EVALUATION BY CALCULATION

TRIDEK™ ROOFING SANDWICH PANELS - DECLARED THERMAL RESISTANCE & TOTAL R IN APPLICATION										
CORE: Class SL Expanded Polystyrene, k (at 23°C) = 0.0407 W/m.K assumed conductivity.										
Nominal Panel Thickness	Minimum Panel Thickness	Insulation Effective Thermal Thickness	Expanded Polystyrene Declared Material R-value* (m².K/W)			Total R Rating				Tridek Profile
						ROOFS		WALLS		
			R at 23°C	R at 15°C	R at 30°C	WINTER R at 15°C	SUMMER R at 30°C	WINTER R at 15°C	SUMMER R at 30°C	
Classic										
100	68	82	2.015	2.084	1.956	2.241	2.164	2.251	2.124	
125	93	107	2.629	2.719	2.553	2.876	2.760	2.886	2.720	
140	108	122	2.998	3.100	2.911	3.257	3.118	3.267	3.078	
165	133	147	3.612	3.735	3.507	3.892	3.714	3.902	3.674	
200	168	182	4.472	4.625	4.342	4.782	4.549	4.792	4.509	
250	218	232	5.700	5.895	5.535	6.052	5.742	6.062	5.702	
300	268	282	6.929	7.166	6.728	7.323	6.935	7.333	6.895	
Smart										
100	52	74	1.818	1.880	1.765	2.037	1.973	2.047	1.933	
125	77	99	2.432	2.516	2.362	2.673	2.569	2.683	2.529	
140	92	114	2.801	2.897	2.720	3.054	2.927	3.064	2.887	
165	117	139	3.415	3.532	3.316	3.689	3.523	3.699	3.483	
200	152	174	4.275	4.421	4.151	4.578	4.358	4.588	4.318	
250	202	224	5.504	5.692	5.344	5.849	5.551	5.859	5.511	
300	252	274	6.732	6.962	6.537	7.119	6.744	7.129	6.704	
Pro Series										
100	56	63	1.548	1.601	1.503	1.758	1.710	1.768	1.670	
125	81	88	2.162	2.236	2.100	2.393	2.307	2.403	2.267	
140	96	103	2.531	2.617	2.457	2.774	2.665	2.784	2.625	
165	121	128	3.145	3.252	3.054	3.410	3.261	3.420	3.221	
200	156	163	4.005	4.142	3.889	4.299	4.096	4.309	4.056	
250	206	213	5.233	5.412	5.082	5.569	5.289	5.579	5.249	
300	256	263	6.462	6.683	6.275	6.840	6.482	6.850	6.442	
Icon										
125	58	69	1.695	1.753	1.646	1.910	1.853	1.920	1.813	
140	73	84	2.064	2.134	2.004	2.292	2.211	2.302	2.171	
165	98	109	2.678	2.770	2.601	2.927	2.808	2.937	2.768	
200	133	144	3.538	3.659	3.436	3.816	3.643	3.826	3.603	
250	183	194	4.767	4.930	4.628	5.087	4.836	5.097	4.796	
300	233	244	5.995	6.200	5.821	6.357	6.029	6.367	5.989	
11mm OSB										
115	115	115	2.826	2.922	2.744	3.249	3.120	3.259	3.080	
145	145	145	3.563	3.684	3.459	4.011	3.836	4.021	3.796	
165	165	165	4.054	4.193	3.937	4.519	4.313	4.529	4.273	
215	215	215	5.283	5.463	5.129	5.789	5.506	5.799	5.466	
265	265	265	6.511	6.734	6.322	7.060	6.699	7.070	6.659	
315	315	315	7.740	8.004	7.515	8.330	7.892	8.340	7.852	

NOTES: Determinations based upon AS/NZS 4859 Parts 1&2:2018, Thermal insulation materials for buildings. The results are believed representative at the date of calculation, however the author reserves the right to revise calculations.
 "Nominal Thickness" is the thickness (mm) between containing parallel surfaces that touch the outside of skin profiles.
 "Minimum Thickness" is the thickness (mm) between parallel surfaces that would touch the inside of skin profiles.
Conductivities used: Material R calculated by R=t/k
 steel, k= 45 W/m.K 0.5mm steel sheet (top and bottom skins), R 0.00011
 OSB, k= 0.13 W/m.K 11mm OSB (Oriented Strand Board) (top and bottom skins), R 0.0846
 PU glue, k= 0.14 W/m.K 0.5mm PU glue lines against top and bottom skins, R 0.0036
CORE: Class SL Expanded Polystyrene, k (at 23°C) = 0.0407 W/m.K e.g. Material R for 100mm = thickness/conductivity, thus R=t/k = 2.457 m².K/W
 Insulation R adjusted for temperature per Clause 5.2 of AS/NZS 4859.2:2018
Common components:
 WINTER: Air temperature indoors 18°C, outdoors 12°C, mean 15°C. Exterior air film, R0.04. Interior air film, R0.11 (heat flow up).
 SUMMER: Air temperature indoors 24°C, outdoors 36°C, mean 30°C. Exterior air film, R0.04. Interior air film, R0.16 (heat flow down).
 Walls: Interior air film, R0.12 summer and winter (heat flow horizontal).

Calculated by James Fricker, F.AIRAH F.IEAust CPEng NER APEC Engineer IntPE(Aus)

Signed:   **ENGINEERS AUSTRALIA**
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THERMAL INSULATION EVALUATION BY CALCULATION

TRIDEK™ ROOFING SANDWICH PANELS - DECLARED THERMAL RESISTANCE & TOTAL R IN APPLICATION										
CORE: Class S Expanded Polystyrene, k (at 23°C) = 0.0394 W/m.K assumed conductivity.										
Nominal Panel Thickness	Minimum Panel Thickness	Insulation Effective Thermal Thickness	Expanded Polystyrene Declared Material R-value* (m².K/W)			Total R Rating				Tridek Profile
						ROOFS		WALLS		
			R at 23°C	R at 15°C	R at 30°C	WINTER R at 15°C	SUMMER R at 30°C	WINTER R at 15°C	SUMMER R at 30°C	
Classic										
100	68	82	2.081	2.150	2.023	2.307	2.230	2.317	2.190	
125	93	107	2.716	2.806	2.639	2.963	2.846	2.973	2.806	
140	108	122	3.096	3.199	3.009	3.356	3.216	3.366	3.176	
165	133	147	3.731	3.855	3.626	4.012	3.833	4.022	3.793	
200	168	182	4.619	4.773	4.489	4.930	4.696	4.940	4.656	
250	218	232	5.888	6.084	5.723	6.241	5.930	6.251	5.890	
300	268	282	7.157	7.395	6.956	7.552	7.163	7.562	7.123	
Smart										
100	52	74	1.878	1.940	1.825	2.098	2.032	2.108	1.992	
125	77	99	2.513	2.596	2.442	2.753	2.649	2.763	2.609	
140	92	114	2.893	2.989	2.812	3.147	3.019	3.157	2.979	
165	117	139	3.528	3.645	3.429	3.802	3.636	3.812	3.596	
200	152	174	4.416	4.563	4.292	4.720	4.499	4.730	4.459	
250	202	224	5.685	5.874	5.525	6.031	5.732	6.041	5.692	
300	252	274	6.954	7.185	6.759	7.342	6.966	7.352	6.926	
Pro Series										
100	56	63	1.599	1.652	1.554	1.809	1.761	1.819	1.721	
125	81	88	2.234	2.308	2.171	2.465	2.378	2.475	2.338	
140	96	103	2.614	2.701	2.541	2.858	2.748	2.868	2.708	
165	121	128	3.249	3.356	3.157	3.514	3.364	3.524	3.324	
200	156	163	4.137	4.274	4.021	4.431	4.228	4.441	4.188	
250	206	213	5.406	5.585	5.254	5.743	5.461	5.753	5.421	
300	256	263	6.675	6.897	6.487	7.054	6.694	7.064	6.654	
Icon										
125	58	69	1.751	1.809	1.702	1.967	1.909	1.977	1.869	
140	73	84	2.132	2.203	2.072	2.360	2.279	2.370	2.239	
165	98	109	2.766	2.858	2.689	3.015	2.896	3.025	2.856	
200	133	144	3.655	3.776	3.552	3.933	3.759	3.943	3.719	
250	183	194	4.924	5.087	4.785	5.244	4.992	5.254	4.952	
300	233	244	6.193	6.398	6.019	6.555	6.226	6.565	6.186	
11mm OSB										
115	115	115	2.919	3.016	2.837	3.342	3.213	3.352	3.173	
145	145	145	3.680	3.802	3.577	4.129	3.953	4.139	3.913	
165	165	165	4.188	4.327	4.070	4.653	4.446	4.663	4.406	
215	215	215	5.457	5.638	5.303	5.964	5.680	5.974	5.640	
265	265	265	6.726	6.949	6.537	7.275	6.913	7.285	6.873	
315	315	315	7.995	8.260	7.770	8.587	8.146	8.597	8.106	

NOTES: Determinations based upon AS/NZS 4859 Parts 1&2:2018, Thermal insulation materials for buildings.
 The results are believed representative at the date of calculation, however the author reserves the right to revise calculations.
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CORE: Class S Expanded Polystyrene, k (at 23°C) = 0.0394 W/m.K e.g. Material R for 100mm = thickness/conductivity, thus R=t/k = 2.538 m².K/W
 Insulation R adjusted for temperature per Clause 5.2 of AS/NZS 4859.2:2018
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CORE: Class M Expanded Polystyrene, k (at 23°C) = 0.0380 W/m.K assumed conductivity.																																																																																																																																																																																																																																																																																																																									
Nominal Panel Thickness	Minimum Panel Thickness	Insulation Effective Thermal Thickness	Expanded Polystyrene Declared Material R-value* (m².K/W)			Total R Rating				Tridek Profile																																																																																																																																																																																																																																																																																																															
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100	68	82	2.158	2.227	2.099	2.384	2.306	2.394	2.266																																																																																																																																																																																																																																																																																																																
125	93	107	2.816	2.906	2.739	3.063	2.947	3.073	2.907																																																																																																																																																																																																																																																																																																																
140	108	122	3.211	3.313	3.123	3.470	3.331	3.480	3.291																																																																																																																																																																																																																																																																																																																
165	133	147	3.868	3.992	3.763	4.149	3.971	4.159	3.931																																																																																																																																																																																																																																																																																																																
200	168	182	4.789	4.943	4.659	5.100	4.867	5.110	4.827																																																																																																																																																																																																																																																																																																																
250	218	232	6.105	6.300	5.940	6.458	6.147	6.468	6.107																																																																																																																																																																																																																																																																																																																
300	268	282	7.421	7.658	7.220	7.815	7.427	7.825	7.387	Smart										100	52	74	1.947	2.010	1.894	2.167	2.102	2.177	2.062		125	77	99	2.605	2.689	2.535	2.846	2.742	2.856	2.702	140	92	114	3.000	3.096	2.919	3.253	3.126	3.263	3.086	165	117	139	3.658	3.775	3.559	3.932	3.766	3.942	3.726	200	152	174	4.579	4.725	4.455	4.882	4.662	4.892	4.622	250	202	224	5.895	6.083	5.735	6.240	5.942	6.250	5.902	300	252	274	7.211	7.441	7.015	7.598	7.222	7.608	7.182	Pro Series										100	56	63	1.658	1.711	1.613	1.868	1.820	1.878	1.780		125	81	88	2.316	2.390	2.253	2.547	2.460	2.557	2.420	140	96	103	2.711	2.797	2.637	2.954	2.844	2.964	2.804	165	121	128	3.368	3.476	3.277	3.633	3.484	3.643	3.444	200	156	163	4.289	4.427	4.173	4.584	4.380	4.594	4.340	250	206	213	5.605	5.784	5.453	5.942	5.660	5.952	5.620	300	256	263	6.921	7.142	6.733	7.299	6.940	7.309	6.900	Icon										125	58	69	1.816	1.874	1.766	2.031	1.974	2.041	1.934		140	73	84	2.211	2.281	2.151	2.438	2.358	2.448	2.318	165	98	109	2.868	2.960	2.791	3.117	2.998	3.127	2.958	200	133	144	3.789	3.911	3.687	4.068	3.894	4.078	3.854	250	183	194	5.105	5.268	4.967	5.426	5.174	5.436	5.134	300	233	244	6.421	6.626	6.247	6.783	6.454	6.793	6.414	11mm OSB										115	115	115	3.026	3.123	2.944	3.449	3.321	3.459	3.281		145	145	145	3.816	3.938	3.712	4.264	4.089	4.274	4.049	165	165	165	4.342	4.481	4.224	4.807	4.601	4.817	4.561	215	215	215	5.658	5.839	5.504	6.165	5.881	6.175	5.841	265	265	265	6.974	7.197	6.784	7.523	7.161	7.533	7.121	315	315	315	8.289	8.554	8.064	8.881	8.441	8.891	8.401
Smart																																																																																																																																																																																																																																																																																																																									
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200	156	163	4.289	4.427	4.173	4.584	4.380	4.594	4.340																																																																																																																																																																																																																																																																																																																
250	206	213	5.605	5.784	5.453	5.942	5.660	5.952	5.620																																																																																																																																																																																																																																																																																																																
300	256	263	6.921	7.142	6.733	7.299	6.940	7.309	6.900	Icon										125	58	69	1.816	1.874	1.766	2.031	1.974	2.041	1.934		140	73	84	2.211	2.281	2.151	2.438	2.358	2.448	2.318	165	98	109	2.868	2.960	2.791	3.117	2.998	3.127	2.958	200	133	144	3.789	3.911	3.687	4.068	3.894	4.078	3.854	250	183	194	5.105	5.268	4.967	5.426	5.174	5.436	5.134	300	233	244	6.421	6.626	6.247	6.783	6.454	6.793	6.414	11mm OSB										115	115	115	3.026	3.123	2.944	3.449	3.321	3.459	3.281		145	145	145	3.816	3.938	3.712	4.264	4.089	4.274	4.049	165	165	165	4.342	4.481	4.224	4.807	4.601	4.817	4.561	215	215	215	5.658	5.839	5.504	6.165	5.881	6.175	5.841	265	265	265	6.974	7.197	6.784	7.523	7.161	7.533	7.121	315	315	315	8.289	8.554	8.064	8.881	8.441	8.891	8.401																																																																																																																																																																		
Icon																																																																																																																																																																																																																																																																																																																									
125	58	69	1.816	1.874	1.766	2.031	1.974	2.041	1.934																																																																																																																																																																																																																																																																																																																
140	73	84	2.211	2.281	2.151	2.438	2.358	2.448	2.318																																																																																																																																																																																																																																																																																																																
165	98	109	2.868	2.960	2.791	3.117	2.998	3.127	2.958																																																																																																																																																																																																																																																																																																																
200	133	144	3.789	3.911	3.687	4.068	3.894	4.078	3.854																																																																																																																																																																																																																																																																																																																
250	183	194	5.105	5.268	4.967	5.426	5.174	5.436	5.134																																																																																																																																																																																																																																																																																																																
300	233	244	6.421	6.626	6.247	6.783	6.454	6.793	6.414		11mm OSB										115	115	115	3.026	3.123	2.944	3.449	3.321	3.459	3.281		145	145	145	3.816	3.938	3.712	4.264	4.089	4.274	4.049	165	165	165	4.342	4.481	4.224	4.807	4.601	4.817	4.561	215	215	215	5.658	5.839	5.504	6.165	5.881	6.175	5.841	265	265	265	6.974	7.197	6.784	7.523	7.161	7.533	7.121	315	315	315	8.289	8.554	8.064	8.881	8.441	8.891	8.401																																																																																																																																																																																																																																								
11mm OSB																																																																																																																																																																																																																																																																																																																									
115	115	115	3.026	3.123	2.944	3.449	3.321	3.459	3.281																																																																																																																																																																																																																																																																																																																
145	145	145	3.816	3.938	3.712	4.264	4.089	4.274	4.049																																																																																																																																																																																																																																																																																																																
165	165	165	4.342	4.481	4.224	4.807	4.601	4.817	4.561																																																																																																																																																																																																																																																																																																																
215	215	215	5.658	5.839	5.504	6.165	5.881	6.175	5.841																																																																																																																																																																																																																																																																																																																
265	265	265	6.974	7.197	6.784	7.523	7.161	7.533	7.121																																																																																																																																																																																																																																																																																																																
315	315	315	8.289	8.554	8.064	8.881	8.441	8.891	8.401																																																																																																																																																																																																																																																																																																																

NOTES: Determinations based upon AS/NZS 4859 Parts 1&2:2018, Thermal insulation materials for buildings.
 The results are believed representative at the date of calculation, however the author reserves the right to revise calculations.
 "Nominal Thickness" is the thickness (mm) between containing parallel surfaces that touch the outside of skin profiles.
 "Minimum Thickness" is the thickness (mm) between parallel surfaces that would touch the inside of skin profiles.
Conductivities used: Material R calculated by R=t/k
 steel, k= 45 W/m.K 0.5mm steel sheet (top and bottom skins), R 0.00011
 OSB, k= 0.13 W/m.K 11mm OSB (Oriented Strand Board) (top and bottom skins), R 0.0846
 PU glue, k= 0.14 W/m.K 0.5mm PU glue lines against top and bottom skins, R 0.0036
CORE: Class M Expanded Polystyrene, k (at 23°C) = 0.0380 W/m.K e.g. Material R for 100mm = thickness/conductivity, thus R=t/k = 2.632 m².K/W
 Insulation R adjusted for temperature per Clause 5.2 of AS/NZS 4859.2:2018
Common components:
 WINTER: Air temperature indoors 18°C, outdoors 12°C, mean 15°C. Exterior air film, R0.04. Interior air film, R0.11 (heat flow up).
 SUMMER: Air temperature indoors 24°C, outdoors 36°C, mean 30°C. Exterior air film, R0.04. Interior air film, R0.16 (heat flow down).
 Walls: Interior air film, R0.12 summer and winter (heat flow horizontal).

Calculated by James Fricker, F.AIRAH F.IEAust CPEng NER APEC Engineer IntPE(Aus)

Signed:   **ENGINEERS AUSTRALIA**
 Chartered Professional Engineer
 MEMBER 1179647

JMF Calc Ref
455r01.3
 Calculated 3/08/2020
 455_B.xls

THERMAL INSULATION EVALUATION BY CALCULATION

TRIDEK™ ROOFING SANDWICH PANELS - DECLARED THERMAL RESISTANCE & TOTAL R IN APPLICATION																																																																																																																																																																																																																																																																																																																									
CORE: Class H Expanded Polystyrene, k (at 23°C) = 0.0365 W/m.K assumed conductivity.																																																																																																																																																																																																																																																																																																																									
Nominal Panel Thickness	Minimum Panel Thickness	Insulation Effective Thermal Thickness	Expanded Polystyrene Declared Material R-value*			Total R Rating				Tridek Profile																																																																																																																																																																																																																																																																																																															
			R at 23°C	R at 15°C	R at 30°C	ROOFS		WALLS																																																																																																																																																																																																																																																																																																																	
						R at 15°C	R at 30°C	R at 15°C	R at 30°C																																																																																																																																																																																																																																																																																																																
Classic																																																																																																																																																																																																																																																																																																																									
100	68	82	2.247	2.315	2.188	2.472	2.395	2.482	2.355																																																																																																																																																																																																																																																																																																																
125	93	107	2.932	3.021	2.855	3.178	3.063	3.188	3.023																																																																																																																																																																																																																																																																																																																
140	108	122	3.342	3.444	3.256	3.602	3.463	3.612	3.423																																																																																																																																																																																																																																																																																																																
165	133	147	4.027	4.150	3.923	4.307	4.130	4.317	4.090																																																																																																																																																																																																																																																																																																																
200	168	182	4.986	5.138	4.857	5.296	5.064	5.306	5.024																																																																																																																																																																																																																																																																																																																
250	218	232	6.356	6.550	6.191	6.707	6.398	6.717	6.358																																																																																																																																																																																																																																																																																																																
300	268	282	7.726	7.962	7.526	8.119	7.733	8.129	7.693	Smart										100	52	74	2.027	2.089	1.975	2.246	2.182	2.256	2.142		125	77	99	2.712	2.795	2.642	2.952	2.849	2.962	2.809	140	92	114	3.123	3.219	3.042	3.376	3.249	3.386	3.209	165	117	139	3.808	3.924	3.709	4.082	3.917	4.092	3.877	200	152	174	4.767	4.913	4.643	5.070	4.851	5.080	4.811	250	202	224	6.137	6.324	5.978	6.481	6.185	6.491	6.145	300	252	274	7.507	7.736	7.312	7.893	7.519	7.903	7.479	Pro Series										100	56	63	1.726	1.779	1.681	1.936	1.888	1.946	1.848		125	81	88	2.411	2.485	2.348	2.642	2.556	2.652	2.516	140	96	103	2.822	2.908	2.749	3.065	2.956	3.075	2.916	165	121	128	3.507	3.614	3.416	3.771	3.623	3.781	3.583	200	156	163	4.466	4.602	4.350	4.759	4.557	4.769	4.517	250	206	213	5.836	6.014	5.684	6.171	5.891	6.181	5.851	300	256	263	7.205	7.425	7.018	7.582	7.226	7.592	7.186	Icon										125	58	69	1.890	1.948	1.841	2.105	2.049	2.115	2.009		140	73	84	2.301	2.372	2.242	2.529	2.449	2.539	2.409	165	98	109	2.986	3.077	2.909	3.235	3.116	3.245	3.076	200	133	144	3.945	4.066	3.843	4.223	4.050	4.233	4.010	250	183	194	5.315	5.477	5.177	5.634	5.384	5.644	5.344	300	233	244	6.685	6.889	6.511	7.046	6.719	7.056	6.679	11mm OSB										115	115	115	3.151	3.247	3.069	3.573	3.445	3.583	3.405		145	145	145	3.973	4.094	3.870	4.420	4.246	4.430	4.206	165	165	165	4.521	4.658	4.403	4.985	4.780	4.995	4.740	215	215	215	5.890	6.070	5.738	6.396	6.114	6.406	6.074	265	265	265	7.260	7.482	7.072	7.808	7.448	7.818	7.408	315	315	315	8.630	8.893	8.406	9.220	8.783	9.230	8.743
Smart																																																																																																																																																																																																																																																																																																																									
100	52	74	2.027	2.089	1.975	2.246	2.182	2.256	2.142																																																																																																																																																																																																																																																																																																																
125	77	99	2.712	2.795	2.642	2.952	2.849	2.962	2.809																																																																																																																																																																																																																																																																																																																
140	92	114	3.123	3.219	3.042	3.376	3.249	3.386	3.209																																																																																																																																																																																																																																																																																																																
165	117	139	3.808	3.924	3.709	4.082	3.917	4.092	3.877																																																																																																																																																																																																																																																																																																																
200	152	174	4.767	4.913	4.643	5.070	4.851	5.080	4.811																																																																																																																																																																																																																																																																																																																
250	202	224	6.137	6.324	5.978	6.481	6.185	6.491	6.145																																																																																																																																																																																																																																																																																																																
300	252	274	7.507	7.736	7.312	7.893	7.519	7.903	7.479	Pro Series										100	56	63	1.726	1.779	1.681	1.936	1.888	1.946	1.848		125	81	88	2.411	2.485	2.348	2.642	2.556	2.652	2.516	140	96	103	2.822	2.908	2.749	3.065	2.956	3.075	2.916	165	121	128	3.507	3.614	3.416	3.771	3.623	3.781	3.583	200	156	163	4.466	4.602	4.350	4.759	4.557	4.769	4.517	250	206	213	5.836	6.014	5.684	6.171	5.891	6.181	5.851	300	256	263	7.205	7.425	7.018	7.582	7.226	7.592	7.186	Icon										125	58	69	1.890	1.948	1.841	2.105	2.049	2.115	2.009		140	73	84	2.301	2.372	2.242	2.529	2.449	2.539	2.409	165	98	109	2.986	3.077	2.909	3.235	3.116	3.245	3.076	200	133	144	3.945	4.066	3.843	4.223	4.050	4.233	4.010	250	183	194	5.315	5.477	5.177	5.634	5.384	5.644	5.344	300	233	244	6.685	6.889	6.511	7.046	6.719	7.056	6.679	11mm OSB										115	115	115	3.151	3.247	3.069	3.573	3.445	3.583	3.405		145	145	145	3.973	4.094	3.870	4.420	4.246	4.430	4.206	165	165	165	4.521	4.658	4.403	4.985	4.780	4.995	4.740	215	215	215	5.890	6.070	5.738	6.396	6.114	6.406	6.074	265	265	265	7.260	7.482	7.072	7.808	7.448	7.818	7.408	315	315	315	8.630	8.893	8.406	9.220	8.783	9.230	8.743																																																																																	
Pro Series																																																																																																																																																																																																																																																																																																																									
100	56	63	1.726	1.779	1.681	1.936	1.888	1.946	1.848																																																																																																																																																																																																																																																																																																																
125	81	88	2.411	2.485	2.348	2.642	2.556	2.652	2.516																																																																																																																																																																																																																																																																																																																
140	96	103	2.822	2.908	2.749	3.065	2.956	3.075	2.916																																																																																																																																																																																																																																																																																																																
165	121	128	3.507	3.614	3.416	3.771	3.623	3.781	3.583																																																																																																																																																																																																																																																																																																																
200	156	163	4.466	4.602	4.350	4.759	4.557	4.769	4.517																																																																																																																																																																																																																																																																																																																
250	206	213	5.836	6.014	5.684	6.171	5.891	6.181	5.851																																																																																																																																																																																																																																																																																																																
300	256	263	7.205	7.425	7.018	7.582	7.226	7.592	7.186	Icon										125	58	69	1.890	1.948	1.841	2.105	2.049	2.115	2.009		140	73	84	2.301	2.372	2.242	2.529	2.449	2.539	2.409	165	98	109	2.986	3.077	2.909	3.235	3.116	3.245	3.076	200	133	144	3.945	4.066	3.843	4.223	4.050	4.233	4.010	250	183	194	5.315	5.477	5.177	5.634	5.384	5.644	5.344	300	233	244	6.685	6.889	6.511	7.046	6.719	7.056	6.679	11mm OSB										115	115	115	3.151	3.247	3.069	3.573	3.445	3.583	3.405		145	145	145	3.973	4.094	3.870	4.420	4.246	4.430	4.206	165	165	165	4.521	4.658	4.403	4.985	4.780	4.995	4.740	215	215	215	5.890	6.070	5.738	6.396	6.114	6.406	6.074	265	265	265	7.260	7.482	7.072	7.808	7.448	7.818	7.408	315	315	315	8.630	8.893	8.406	9.220	8.783	9.230	8.743																																																																																																																																																																		
Icon																																																																																																																																																																																																																																																																																																																									
125	58	69	1.890	1.948	1.841	2.105	2.049	2.115	2.009																																																																																																																																																																																																																																																																																																																
140	73	84	2.301	2.372	2.242	2.529	2.449	2.539	2.409																																																																																																																																																																																																																																																																																																																
165	98	109	2.986	3.077	2.909	3.235	3.116	3.245	3.076																																																																																																																																																																																																																																																																																																																
200	133	144	3.945	4.066	3.843	4.223	4.050	4.233	4.010																																																																																																																																																																																																																																																																																																																
250	183	194	5.315	5.477	5.177	5.634	5.384	5.644	5.344																																																																																																																																																																																																																																																																																																																
300	233	244	6.685	6.889	6.511	7.046	6.719	7.056	6.679		11mm OSB										115	115	115	3.151	3.247	3.069	3.573	3.445	3.583	3.405		145	145	145	3.973	4.094	3.870	4.420	4.246	4.430	4.206	165	165	165	4.521	4.658	4.403	4.985	4.780	4.995	4.740	215	215	215	5.890	6.070	5.738	6.396	6.114	6.406	6.074	265	265	265	7.260	7.482	7.072	7.808	7.448	7.818	7.408	315	315	315	8.630	8.893	8.406	9.220	8.783	9.230	8.743																																																																																																																																																																																																																																								
11mm OSB																																																																																																																																																																																																																																																																																																																									
115	115	115	3.151	3.247	3.069	3.573	3.445	3.583	3.405																																																																																																																																																																																																																																																																																																																
145	145	145	3.973	4.094	3.870	4.420	4.246	4.430	4.206																																																																																																																																																																																																																																																																																																																
165	165	165	4.521	4.658	4.403	4.985	4.780	4.995	4.740																																																																																																																																																																																																																																																																																																																
215	215	215	5.890	6.070	5.738	6.396	6.114	6.406	6.074																																																																																																																																																																																																																																																																																																																
265	265	265	7.260	7.482	7.072	7.808	7.448	7.818	7.408																																																																																																																																																																																																																																																																																																																
315	315	315	8.630	8.893	8.406	9.220	8.783	9.230	8.743																																																																																																																																																																																																																																																																																																																

NOTES: Determinations based upon AS/NZS 4859 Parts 1&2:2018, Thermal insulation materials for buildings.
 The results are believed representative at the date of calculation, however the author reserves the right to revise calculations.
 *Nominal Thickness" is the thickness (mm) between containing parallel surfaces that touch the outside of skin profiles.
 *Minimum Thickness" is the thickness (mm) between parallel surfaces that would touch the inside of skin profiles.
Conductivities used: Material R calculated by R=t/k
 steel, k= 45 W/m.K 0.5mm steel sheet (top and bottom skins), R 0.000011
 OSB, k= 0.13 W/m.K 11mm OSB (Oriented Strand Board) (top and bottom skins), R 0.0846
 PU glue, k= 0.14 W/m.K 0.5mm PU glue lines against top and bottom skins, R 0.0036
CORE: Class H Expanded Polystyrene, k (at 23°C) = 0.0365 W/m.K e.g. Material R for 100mm = thickness/conductivity, thus R=t/k = 2.740 m².K/W
 Insulation R adjusted for temperature per Clause 5.2 of AS/NZS 4859.2:2018
Common components:
 WINTER: Air temperature indoors 18°C, outdoors 12°C, mean 15°C. Exterior air film, R0.04. Interior air film, R0.11 (heat flow up).
 SUMMER: Air temperature indoors 24°C, outdoors 36°C, mean 30°C. Exterior air film, R0.04. Interior air film, R0.16 (heat flow down).
 Walls: Interior air film, R0.12 summer and winter (heat flow horizontal).

Calculated by James Fricker, F.AIRAH F.IEAust CPEng NER APEC Engineer IntPE(Aus)

Signed:   **ENGINEERS AUSTRALIA**
 Chartered Professional Engineer
 MEMBER 1179647

JMF Calc Ref
455r01.4
 Calculated 3/08/2020
 455_B.xls

THERMAL INSULATION EVALUATION BY CALCULATION

TRIDEK™ ROOFING SANDWICH PANELS - DECLARED THERMAL RESISTANCE & TOTAL R IN APPLICATION										
CORE: Class VH Expanded Polystyrene, k (at 23°C) = 0.0349 W/m.K assumed conductivity.										
Nominal Panel Thickness	Minimum Panel Thickness	Insulation Effective Thermal Thickness	Expanded Polystyrene Declared Material R-value* (m².K/W)			Total R Rating				Tridek Profile
						ROOFS		WALLS		
			R at 23°C	R at 15°C	R at 30°C	WINTER R at 15°C	SUMMER R at 30°C	WINTER R at 15°C	SUMMER R at 30°C	
Classic										
100	68	82	2.350	2.417	2.292	2.574	2.499	2.584	2.459	
125	93	107	3.066	3.154	2.991	3.311	3.198	3.321	3.158	
140	108	122	3.496	3.596	3.410	3.754	3.617	3.764	3.577	
165	133	147	4.212	4.333	4.109	4.490	4.316	4.500	4.276	
200	168	182	5.215	5.365	5.087	5.522	5.294	5.532	5.254	
250	218	232	6.648	6.839	6.484	6.996	6.692	7.006	6.652	
300	268	282	8.080	8.313	7.882	8.470	8.089	8.480	8.049	
Smart										
100	52	74	2.120	2.181	2.068	2.339	2.275	2.349	2.235	
125	77	99	2.837	2.918	2.767	3.076	2.974	3.086	2.934	
140	92	114	3.266	3.361	3.186	3.518	3.394	3.528	3.354	
165	117	139	3.668	3.773	3.578	4.255	4.092	4.265	4.052	
200	152	174	4.986	5.129	4.863	5.286	5.071	5.296	5.031	
250	202	224	6.418	6.603	6.261	6.760	6.468	6.770	6.428	
300	252	274	7.851	8.077	7.658	8.234	7.866	8.244	7.826	
Pro Series										
100	56	63	1.805	1.857	1.761	2.014	1.968	2.024	1.928	
125	81	88	2.521	2.594	2.460	2.751	2.667	2.761	2.627	
140	96	103	2.951	3.036	2.879	3.193	3.086	3.203	3.046	
165	121	128	3.668	3.773	3.578	3.930	3.785	3.940	3.745	
200	156	163	4.670	4.805	4.556	4.962	4.763	4.972	4.723	
250	206	213	6.103	6.279	5.953	6.436	6.161	6.446	6.121	
300	256	263	7.536	7.753	7.351	7.910	7.558	7.920	7.518	
Icon										
125	58	69	1.977	2.034	1.929	2.191	2.136	2.201	2.096	
140	73	84	2.407	2.476	2.348	2.633	2.555	2.643	2.515	
165	98	109	3.123	3.213	3.047	3.370	3.254	3.380	3.214	
200	133	144	4.126	4.245	4.025	4.402	4.232	4.412	4.192	
250	183	194	5.559	5.719	5.422	5.876	5.630	5.886	5.590	
300	233	244	6.991	7.193	6.820	7.350	7.027	7.360	6.987	
11mm OSB										
115	115	115	3.295	3.390	3.214	3.716	3.591	3.726	3.551	
145	145	145	4.155	4.274	4.053	4.601	4.429	4.611	4.389	
165	165	165	4.728	4.864	4.612	5.190	4.988	5.200	4.948	
215	215	215	6.160	6.338	6.009	6.664	6.386	6.674	6.346	
265	265	265	7.593	7.812	7.407	8.138	7.783	8.148	7.743	
315	315	315	9.026	9.286	8.804	9.612	9.181	9.622	9.141	

NOTES: Determinations based upon AS/NZS 4859 Parts 1&2:2018, Thermal insulation materials for buildings.
 The results are believed representative at the date of calculation, however the author reserves the right to revise calculations.
 "Nominal Thickness" is the thickness (mm) between containing parallel surfaces that touch the outside of skin profiles.
 "Minimum Thickness" is the thickness (mm) between parallel surfaces that would touch the inside of skin profiles.
Conductivities used: Material R calculated by R=t/k
 steel, k= 45 W/m.K 0.5mm steel sheet (top and bottom skins), R 0.00011
 OSB, k= 0.13 W/m.K 11mm OSB (Oriented Strand Board) (top and bottom skins), R 0.0846
 PU glue, k= 0.14 W/m.K 0.5mm PU glue lines against top and bottom skins, R 0.0036
CORE: Class VH Expanded Polystyrene, k (at 23°C) = 0.0349 W/m.K e.g. Material R for 100mm = thickness/conductivity, thus R=t/k = 2.865 m².K/W
 Insulation R adjusted for temperature per Clause 5.2 of AS/NZS 4859.2:2018
Common components:
 WINTER: Air temperature indoors 18°C, outdoors 12°C, mean 15°C. Exterior air film, R0.04. Interior air film, R0.11 (heat flow up).
 SUMMER: Air temperature indoors 24°C, outdoors 36°C, mean 30°C. Exterior air film, R0.04. Interior air film, R0.16 (heat flow down).
 Walls: Interior air film, R0.12 summer and winter (heat flow horizontal).

Calculated by James Fricker, F.AIRAH F.IEAust CPEng NER APEC Engineer IntPE(Aus)

Signed:   **ENGINEERS AUSTRALIA**
 Chartered Professional Engineer
 MEMBER 1179647

JMF Calc Ref
455r01.5
 Calculated 3/08/2020
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THERMAL INSULATION EVALUATION BY CALCULATION

TRIDEK™ ROOFING SANDWICH PANELS - DECLARED THERMAL RESISTANCE & TOTAL R IN APPLICATION																																																																																																																																																																																																																																																																																																																									
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Nominal Panel Thickness	Minimum Panel Thickness	Insulation Effective Thermal Thickness	Expanded Polyurethane Declared Material R-value* (m².K/W)			Total R Rating				Tridek Profile																																																																																																																																																																																																																																																																																																															
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Classic																																																																																																																																																																																																																																																																																																																									
100	68	82	4.100	4.119	4.083	4.276	4.290	4.286	4.250																																																																																																																																																																																																																																																																																																																
125	93	107	5.350	5.375	5.328	5.532	5.535	5.542	5.495																																																																																																																																																																																																																																																																																																																
140	108	122	6.100	6.129	6.075	6.286	6.282	6.296	6.242																																																																																																																																																																																																																																																																																																																
165	133	147	7.350	7.384	7.320	7.542	7.527	7.552	7.487																																																																																																																																																																																																																																																																																																																
200	168	182	9.100	9.143	9.063	9.300	9.270	9.310	9.230																																																																																																																																																																																																																																																																																																																
250	218	232	11.600	11.654	11.553	11.812	11.760	11.822	11.720																																																																																																																																																																																																																																																																																																																
300	268	282	14.100	14.166	14.042	14.323	14.250	14.333	14.210	Smart										100	52	74	3.700	3.717	3.685	3.875	3.892	3.885	3.852		125	77	99	4.950	4.973	4.930	5.130	5.137	5.140	5.097	140	92	114	5.700	5.727	5.677	5.884	5.884	5.894	5.844	165	117	139	6.950	6.983	6.922	7.140	7.129	7.150	7.089	200	152	174	8.700	8.741	8.664	8.898	8.872	8.908	8.832	250	202	224	11.200	11.253	11.154	11.410	11.361	11.420	11.321	300	252	274	13.700	13.764	13.644	13.921	13.851	13.931	13.811	Pro Series										100	56	63	3.150	3.165	3.137	3.322	3.344	3.332	3.304		125	81	88	4.400	4.421	4.382	4.578	4.589	4.588	4.549	140	96	103	5.150	5.174	5.129	5.331	5.336	5.341	5.296	165	121	128	6.400	6.430	6.374	6.587	6.581	6.597	6.541	200	156	163	8.150	8.188	8.117	8.345	8.324	8.355	8.284	250	206	213	10.650	10.700	10.606	10.857	10.814	10.867	10.774	300	256	263	13.150	13.212	13.096	13.369	13.303	13.379	13.263	Icon										125	58	69	3.450	3.466	3.436	3.623	3.643	3.633	3.603		140	73	84	4.200	4.220	4.183	4.377	4.390	4.387	4.350	165	98	109	5.450	5.476	5.428	5.633	5.635	5.643	5.595	200	133	144	7.200	7.234	7.171	7.391	7.378	7.401	7.338	250	183	194	9.700	9.746	9.660	9.903	9.868	9.913	9.828	300	233	244	12.200	12.257	12.150	12.414	12.357	12.424	12.317	11mm OSB										115	115	115	5.750	5.777	5.726	6.103	6.103	6.113	6.063		145	145	145	7.250	7.284	7.220	7.610	7.597	7.620	7.557	165	165	165	8.250	8.289	8.216	8.615	8.593	8.625	8.553	215	215	215	10.750	10.800	10.706	11.127	11.082	11.137	11.042	265	265	265	13.250	13.312	13.196	13.639	13.572	13.649	13.532	315	315	315	15.750	15.824	15.686	16.150	16.062	16.160	16.022
Smart																																																																																																																																																																																																																																																																																																																									
100	52	74	3.700	3.717	3.685	3.875	3.892	3.885	3.852																																																																																																																																																																																																																																																																																																																
125	77	99	4.950	4.973	4.930	5.130	5.137	5.140	5.097																																																																																																																																																																																																																																																																																																																
140	92	114	5.700	5.727	5.677	5.884	5.884	5.894	5.844																																																																																																																																																																																																																																																																																																																
165	117	139	6.950	6.983	6.922	7.140	7.129	7.150	7.089																																																																																																																																																																																																																																																																																																																
200	152	174	8.700	8.741	8.664	8.898	8.872	8.908	8.832																																																																																																																																																																																																																																																																																																																
250	202	224	11.200	11.253	11.154	11.410	11.361	11.420	11.321																																																																																																																																																																																																																																																																																																																
300	252	274	13.700	13.764	13.644	13.921	13.851	13.931	13.811	Pro Series										100	56	63	3.150	3.165	3.137	3.322	3.344	3.332	3.304		125	81	88	4.400	4.421	4.382	4.578	4.589	4.588	4.549	140	96	103	5.150	5.174	5.129	5.331	5.336	5.341	5.296	165	121	128	6.400	6.430	6.374	6.587	6.581	6.597	6.541	200	156	163	8.150	8.188	8.117	8.345	8.324	8.355	8.284	250	206	213	10.650	10.700	10.606	10.857	10.814	10.867	10.774	300	256	263	13.150	13.212	13.096	13.369	13.303	13.379	13.263	Icon										125	58	69	3.450	3.466	3.436	3.623	3.643	3.633	3.603		140	73	84	4.200	4.220	4.183	4.377	4.390	4.387	4.350	165	98	109	5.450	5.476	5.428	5.633	5.635	5.643	5.595	200	133	144	7.200	7.234	7.171	7.391	7.378	7.401	7.338	250	183	194	9.700	9.746	9.660	9.903	9.868	9.913	9.828	300	233	244	12.200	12.257	12.150	12.414	12.357	12.424	12.317	11mm OSB										115	115	115	5.750	5.777	5.726	6.103	6.103	6.113	6.063		145	145	145	7.250	7.284	7.220	7.610	7.597	7.620	7.557	165	165	165	8.250	8.289	8.216	8.615	8.593	8.625	8.553	215	215	215	10.750	10.800	10.706	11.127	11.082	11.137	11.042	265	265	265	13.250	13.312	13.196	13.639	13.572	13.649	13.532	315	315	315	15.750	15.824	15.686	16.150	16.062	16.160	16.022																																																																																	
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100	56	63	3.150	3.165	3.137	3.322	3.344	3.332	3.304																																																																																																																																																																																																																																																																																																																
125	81	88	4.400	4.421	4.382	4.578	4.589	4.588	4.549																																																																																																																																																																																																																																																																																																																
140	96	103	5.150	5.174	5.129	5.331	5.336	5.341	5.296																																																																																																																																																																																																																																																																																																																
165	121	128	6.400	6.430	6.374	6.587	6.581	6.597	6.541																																																																																																																																																																																																																																																																																																																
200	156	163	8.150	8.188	8.117	8.345	8.324	8.355	8.284																																																																																																																																																																																																																																																																																																																
250	206	213	10.650	10.700	10.606	10.857	10.814	10.867	10.774																																																																																																																																																																																																																																																																																																																
300	256	263	13.150	13.212	13.096	13.369	13.303	13.379	13.263	Icon										125	58	69	3.450	3.466	3.436	3.623	3.643	3.633	3.603		140	73	84	4.200	4.220	4.183	4.377	4.390	4.387	4.350	165	98	109	5.450	5.476	5.428	5.633	5.635	5.643	5.595	200	133	144	7.200	7.234	7.171	7.391	7.378	7.401	7.338	250	183	194	9.700	9.746	9.660	9.903	9.868	9.913	9.828	300	233	244	12.200	12.257	12.150	12.414	12.357	12.424	12.317	11mm OSB										115	115	115	5.750	5.777	5.726	6.103	6.103	6.113	6.063		145	145	145	7.250	7.284	7.220	7.610	7.597	7.620	7.557	165	165	165	8.250	8.289	8.216	8.615	8.593	8.625	8.553	215	215	215	10.750	10.800	10.706	11.127	11.082	11.137	11.042	265	265	265	13.250	13.312	13.196	13.639	13.572	13.649	13.532	315	315	315	15.750	15.824	15.686	16.150	16.062	16.160	16.022																																																																																																																																																																		
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140	73	84	4.200	4.220	4.183	4.377	4.390	4.387	4.350																																																																																																																																																																																																																																																																																																																
165	98	109	5.450	5.476	5.428	5.633	5.635	5.643	5.595																																																																																																																																																																																																																																																																																																																
200	133	144	7.200	7.234	7.171	7.391	7.378	7.401	7.338																																																																																																																																																																																																																																																																																																																
250	183	194	9.700	9.746	9.660	9.903	9.868	9.913	9.828																																																																																																																																																																																																																																																																																																																
300	233	244	12.200	12.257	12.150	12.414	12.357	12.424	12.317		11mm OSB										115	115	115	5.750	5.777	5.726	6.103	6.103	6.113	6.063		145	145	145	7.250	7.284	7.220	7.610	7.597	7.620	7.557	165	165	165	8.250	8.289	8.216	8.615	8.593	8.625	8.553	215	215	215	10.750	10.800	10.706	11.127	11.082	11.137	11.042	265	265	265	13.250	13.312	13.196	13.639	13.572	13.649	13.532	315	315	315	15.750	15.824	15.686	16.150	16.062	16.160	16.022																																																																																																																																																																																																																																								
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215	215	215	10.750	10.800	10.706	11.127	11.082	11.137	11.042																																																																																																																																																																																																																																																																																																																
265	265	265	13.250	13.312	13.196	13.639	13.572	13.649	13.532																																																																																																																																																																																																																																																																																																																
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 PU glue, k= 0.14 W/m.K 0.5mm PU glue lines against top and bottom skins, R 0.0036
CORE: Expanded Polyurethane (PU), k (at 23°C) = 0.0200 W/m.K e.g. Material R for 100mm = thickness/conductivity, thus R=t/k = 5.000 m².K/W
 Insulation R adjusted for temperature per Clause 5.2 of AS/NZS 4859.2:2018
Common components:
 WINTER: Air temperature indoors 18°C, outdoors 12°C, mean 15°C. Exterior air film, R0.04. Interior air film, R0.11 (heat flow up).
 SUMMER: Air temperature indoors 24°C, outdoors 36°C, mean 30°C. Exterior air film, R0.04. Interior air film, R0.16 (heat flow down).
 Walls: Interior air film, R0.12 summer and winter (heat flow horizontal).

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Signed:   **ENGINEERS AUSTRALIA**
 Chartered Professional Engineer
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JMF Calc Ref
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