

**Table S1: Supplementary data of Building materials and their density, flame test temperature, thermal conductivity, material failure time, rate of fire spread and condition of material after heating. The data below were obtained from laboratory experiments for different building materials and their rate of fire spread.**

S/N o.	Building material description with density	Temperature (°C) in Flame test equipment compartment before material was entirely or partially consumed	Heat flux / Thermal Conductivity of Material W/(m <sup>2</sup> K)	Material failure time (in minutes)	Rate at fire spread via linear metre or m <sup>2</sup> of materials per minutes (metre sq. / minute)	Condition of building material after heating
1	<b>Brick/Block</b>					
	i Clay bricks (Density -1,700 kg/m <sup>2</sup> )	500 - 600 °C	0.528	Partial failure after	00:35:00	Material bond substantially weakened in area
	ii sandcrete block - 2,300 kg/m <sup>3</sup>	350 - 400 °C	0.501	Partial failure after	00:47:00	Material bond substantially weakened in area
	iii Concrete (Density - 2,000 kg/m <sup>2</sup> )	500 - 600 °C	0.710	Partial failure after	00:55:00	Material bond substantially weakened in area
2	<b>Insulation materials</b>					Entirely consumed to ashes
	i Celotex insulation (Density - 25 kg/m <sup>2</sup> )	100 - 150 °C	0.211	3 minutes	00:15:13	Entirely consumed to ashes
	ii Fiberglass insulation (Density - kg/m <sup>2</sup> )	350 - 400 °C	0.412	17 minutes	00:25:04	Partially consumed; Melts and Drop formation
	iii Polyurethane Foam (Density - 52 kg/m <sup>2</sup> )	100 - 150 °C	0.222	5 minutes	00:04:05	Entirely consumed to ashes
	iv Polystyrene Insulation (Density - 1060 kg/m <sup>3</sup> )	100 - 150 °C	0.298	7 minutes	00:02:08	Melts, and consumed to ashes
3	<b>Long span Aluminium cladding</b>					
	i Reynobond PE ACM cladding coil-coated aluminium sheets fusion bonded to both sides of a polyethylene core (Density - 10 kg/m <sup>2</sup> up to 35 kg/m <sup>2</sup> )	100 - 200 °C	0	13 Minutes	00:09:10	Soften, Melts and Drop formation
	ii Reynolux aluminium sheets (Density = 2,750 kg/m <sup>2</sup> )	350 - 400 °C		24 Minutes	00:10:08	Soften, Melts and Drop formation
	iii Aluminum (2,739 kg/m <sup>3</sup> )	350 - 400 °C	235	31 Minutes	00:35:10	Soften, Melts and Drop formation
4	<b>Wall and floor tiles</b>					
	i Polymer-Sand Tiles PE-158 (Density	350 - 400 °C	1.455	28 Minutes	00:17:12	Partially consumed
	ii Ceramic tiles (2790 - 3070 kg / m <sup>3</sup> )	350 - 400 °C	1.782	41 Minutes	00:25:10	Partially consumed
	iii 1/2 in ch Plywood (6.93 kg/m <sup>2</sup> )	100 - 200 °C	1.802	9 Minutes	00:07:03	Entirely consumed to ashes
5	<b>Other materials</b>					
	i Wooden skirting (Density - 900 kg/m <sup>2</sup> )	100 - 150 °C	1.452	11 Minutes	00:10:00	Entirely consumed to ashes
	ii Plastic trunking (Density - 930 kg/m <sup>2</sup> )	100 - 150 °C	0.411	3 minutes	00:04:17	Melts; completely deformed
	iii Wooden doors (Density - 420 kg/m <sup>2</sup> )	100 - 150 °C	1.651	11 Minutes	00:12:18	Entirely consumed to ashes
	iv Plastic door (Density - 970 kg/m <sup>2</sup> )	100 - 150 °C	0.621	9 Minutes	00:10:19	Entirely consumed to ashes
	v Glass window (Density - 2579 kg/m <sup>2</sup> )	350 - 400 °C	1.722	23 Minutes	00:11:02	Shattered into pieces
	vi Framing Steel (7,849 kg/m <sup>3</sup> )	100 - 150 °C		No Failure after 45	00:39:21	No visible changes to material