

# Building Materials at a Glance

Material	Fire Resistance	Rain and Floods	Extreme Temperatures	Wind	Seismic Resilience
Rammed Earth	✔ Naturally fire-resistant.	⚠ Rammed earth is vulnerable to flood/moisture damage, including mold.	✔ Temperature regulation: Good thermal mass aids in maintaining comfortable temperatures. ⚠ Poor insulation.	⚠ Roof is vulnerable to damage in windy conditions.	⚠ Reinforcements are needed to improve seismic resilience, such as bracing or panels.
Straw Bale	✔ Fire-resistant, with a 2-hour fire rating. Plaster further strengthens fire resilience.	⚠ Risk of moisture retention and mold, especially if exposed to rain or water during construction	⚠ Temperature regulation: low density means low thermal mass. ✔ Insulation: Straw bale has higher insulation value than standard walls.	✔ Can withstand substantial dynamic force (i.e., wind) with minimal movement	✔ Straw bale absorbs energy well and straw bale walls have wide footprints.
Cob	✔ Fire-resistant, with a 2-4 hour fire rating.	⚠ Vulnerable to flood damage	✔ Temperature regulation: good due to high thermal mass. ⚠ Insulation: low	? Little information available about wind resistance	⚠ Reinforcements are needed to improve seismic resilience
Hempcrete	✔ Fire-resistant, with a 1-4 hour fire rating.	✔ Hempcrete is naturally vapour-permeable and the presence of lime makes the material more resilient to moisture and mould.	✔ Temperature regulation: good due to high thermal mass. ⚠ Insulation: moderate.	Typically used as infill, so has less influence on wind resilience	✔ Hempcrete is flexible, elastic, and lightweight. This makes it more seismically resilient.
Autoclaved Aerated Concrete (AAC)	✔ High hourly fire rating, which means AAC can withstand fire for a long period before damage.	✔ Moisture does not pull deeply into AAC and it is inorganic, so it will not decay when exposed to moisture	⚠ Temperature regulation: Lower due to low/moderate thermal mass. ✔ Excellent insulation.	⚠ Needs reinforcements for wind resistance	✔ High compressive strength contributes to seismic resilience.
Mass Timber	✔ Fire rating of 3+ hours; surface char forms a protective layer.	⚠ Risk of swelling/decay without protective detailing.	✔ Temperature regulation: good due to high thermal mass. ⚠ Insulation: moderate.	✔ Strong wind resistance due to engineered connections that provide stability.	✔ Flexibility and engineered joints help withstand earthquakes