

Material Guide - Resistance of material to floods

For the construction or retrofitting of buildings/houses the use of flood-damage-resistant materials and construction techniques to minimize flood damage to areas below the flood protection level of a structure, which is intentionally allowed to flood, is recommended in order to reduce the risk of flood damages.

The below tables summarize the status of acceptability for building materials in terms of resistance to floods. A difference is made between finishing and structural materials in Table 1 and Table 2, respectively.

In the tables acceptable materials for construction in flood hazard areas must be at least resistant to floodwater damage from wetting and drying, but less durable when exposed to moving water and that these materials should survive wetting and drying and may be successfully cleaned after a flood to render them free of most harmful pollutants. High acceptability is achieved if additionally damages even by moving water will likely not occur. In contrast, materials are unacceptable if potential pollutants from floodwater cannot be cleaned after a flood or cannot survive any wetting and drying process.

Table 1. Resistance of material to floods (finishing materials)

Type of Building Material Finish Materials (floor coverings, wall and ceiling finishes, insulation, cabinets, doors, partitions, windows)	Usage		Acceptability as building material		
	Floors	Walls/ Ceiling	Yes (highly)	Yes	No
Asphalt tile	✓				
Cabinets, built in					
<i>Wood</i>		✓			
<i>Particle board (chipboard)</i>		✓			
<i>Metal</i>		✓			
Carpeting	✓				
Ceramic and porcelain tile					
<i>With mortar set</i>	✓	✓			
<i>With organic adhesives</i>	✓	✓			
Concrete tile, with mortar set	✓				
Corkboard		✓			
Doors					
<i>Wood (hollow, lightweight panel, solid)</i>		✓			
<i>Metal (hollow, wood core, foam filled core)</i>		✓			
<i>Fiberglass, wood core</i>		✓			
Epoxy, formed in place	✓				
Glass (sheets, coloured tiles, panels)		✓			
Glass blocks		✓			
Insulation					
<i>Sprayed polyurethane foam (SPUF) or closed-cell plastic foams</i>	✓	✓			
<i>Inorganic – fiberglass, mineral batts, blankets, or blown</i>	✓	✓			
<i>All other types (cellulose, cotton cell plastic foams, etc.)</i>	✓	✓			
Linoleum	✓				
Magnesite (magnesium oxychloride)	✓				
Mastic felt-base floor covering	✓				
Mastic flooring, formed-in-place	✓				
Metals					
<i>Non-ferrous (aluminum, copper, or zinc tiles)</i>		✓			
<i>Metals, ferrous</i>		✓			

Type of Building Material Finish Materials (floor coverings, wall and ceiling finishes, insulation, cabinets, doors, partitions, windows)	Usage		Acceptability as building material		
	Floors	Walls/ Ceiling	Yes (highly)	Yes	No
Paint					
<i>Polyester-epoxy and other oil-based waterproof types</i>		✓			
<i>Latex</i>		✓			
Partitions, folding					
<i>Wood</i>		✓			
<i>Metal</i>		✓			
<i>Fabric-covered</i>		✓			
Partitions, stationary (free-standing)					
<i>Wood frame</i>		✓			
<i>Metal</i>		✓			
<i>Glass, unreinforced</i>		✓			
<i>Glass, reinforced</i>		✓			
<i>Gypsum, solid or block</i>		✓			
Polyurethane, formed-in-place	✓				
Polyvinyl acetate (PVA) emulsion cement	✓				
Rubber					
<i>Moldings and trim with epoxy polyamide adhesive or latex-hydraulic cement</i>		✓			
<i>All other applications</i>		✓			
Terrazo	✓				
Vinyl asbestos tile (semi-flexible vinyl)					
<i>With asphaltic adhesives</i>	✓				
<i>All other applications</i>	✓				
Vinyl sheets or tiles (coated on cork or wood product backings)	✓				
Vinyl sheets or tiles (homogeneous)					
<i>With chemical-set adhesives</i>	✓				
<i>All other applications</i>	✓				
Wall coverings					
<i>Paper, burlap, cloth types</i>		✓			
<i>Vinyl, plastic, wall paper</i>		✓			
Wood floor coverings					
<i>Wood (solid)</i>	✓				
<i>Engineered wood flooring</i>	✓				
<i>Plastic laminate flooring</i>	✓				
<i>Wood composition blocks, laid in cement mortar</i>	✓				
<i>Wood composition blocks, dipped and laid in hot pitch or bitumen</i>	✓				

Table 1. Resistance of material to floods (structural materials)

Type of Building Material Structural Materials (floor slabs, beams, subfloors, framing, and interior/exterior sheathing)	Usage		Acceptability as building material		
	Floors	Walls/ Ceiling	Yes (highly)	Yes	No
Asbestos-cement board		✓			
Brick					
<i>Face or glazed</i>		✓			
<i>Common (clay)</i>		✓			
Cast stone (in waterproof mortar)		✓			
Cement board/fiber-cement board		✓			
Cement/latex, formed-in-place	✓				
Clay tile, structural glazed		✓			
Concrete, precast or cast-in-place	✓	✓			
Concrete block		✓			
Gypsum products					
<i>Paper-faced gypsum board</i>		✓			
<i>Non-paper-faced gypsum board</i>		✓			
<i>Greenboard</i>		✓			
<i>Keene's cement or plaster</i>		✓			
<i>Plaster, otherwise, including acoustical</i>		✓			
<i>Sheathing panels, exterior grade</i>		✓			
<i>Water-resistant, fiber-reinforced gypsum exterior sheathing</i>		✓			
Hardboard (high-density fiberboard)		✓			
Mineral fiberboard		✓			
Oriented-strand board (OSB)	✓	✓			
Particle board	✓				
Plywood					
<i>Marine grade; Preservative-treated, Borate</i>	✓	✓			
<i>Preservative-treated, alkaline copper quaternary (ACQ) or copper azole (C-A); Exterior grade/Exposure 1 (WBP-weather and boil proof)</i>	✓	✓			
<i>All other types</i>	✓	✓			
Recycled plastic lumber (RPL)					
<i>Commingled, with 80-90% polyethylene (PE); Fiber-reinforced, with glass fiber strands; High-density polyethylene (HDPE), up to 95%</i>	✓				
<i>Wood-filled, with 50% sawdust or wood fiber</i>	✓				
Stone, Natural or artificial non-absorbent solid or veneer, waterproof grout	✓	✓			
Structural Building Components					
<i>Floor trusses, wood, solid (2x4s), decay-resistant or preservative-treated</i>	✓	✓			
<i>Floor trusses, steel</i>	✓				
<i>Headers and beams, solid (2x4s) or plywood, exterior grade or preservative-treated</i>		✓			
<i>Headers and beams, OSB, exterior grade or edge-swell resistant</i>		✓			
<i>Headers and beams, steel</i>		✓			
<i>I-joists</i>	✓				

Type of Building Material Structural Materials (floor slabs, beams, subfloors, framing, and interior/exterior sheathing)	Usage		Acceptability as building material		
	Floors	Walls/ Ceiling	Yes (highly)	Yes	No
<i>Wall panels, plywood, exterior grade or preservative-treated</i>		✓			
<i>Wall panels, OSB, exterior grade or edge- swell resistant</i>		✓			
<i>Wall panels, steel</i>		✓			
Wood					
<i>Solid, decay-resistant</i>	✓	✓			
<i>Solid, standard, structural (2x4s); Solid, preservative-treated, Borate; Solid, pre- servative-treated, ACQ or C-A</i>		✓			
<i>Solid, standard, finish/trim</i>					