

Building Enclosure Material/System Options

Dr John Straube, P.Eng.
University of Waterloo
Building Science Labs

All Enclosure need to fulfill the functions of

Support Control

Rain
Air
Heat
Vapor

... and others, such as Fire, Sound, Insects, Access

Finish

Inside
Outside

These functions are met by a range of different materials / sub-assemblies (numerous distinct materials non-chemically combined) in different formats. Common choices for the design of modern buildings in the Western world are listed below. While not comprehensive, the materials/systems listed probably comprise 90-95% of all buildings.

Support (sometimes called structure, but building structure can be distinct from enclosure)

- Brick, concrete (CMU), & Stone (limestone, granite, marble) masonry
- Concrete (precast, sitecast, tiltup) panels
- Wood (stud framing, logs, heavy timber, CLT)
- Steel (stud framing, hot-rolled angles & tubes)
- Aluminum extrusions (custom formed tubes, C-sections, etc.)
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Outside Finish (the component called Cladding, which may have other functions as well)

- Brick, concrete, & Stone (limestone, granite, marble) masonry
- Concrete (precast, sitecast tiltup) panels
- Ceramic / porcelain / terra-cotta
- Metal (steel, aluminum, zinc, copper, titanium) panels or siding
- Glass
- Fiber-cement
- Stucco (cement, lime, earth)
- Synthetic stucco (polymer)
- Adhered veneers (stone, brick, concrete)
- Vinyl Siding
- Wood siding or panels
- High Pressure Laminates / Phenolic
- Paint or elastomeric over substrate (concrete, metal, wood, etc)
- Polymers / Fiberglass / Acrylic (e.g. Corian)

Inside Finish

- Paint or elastomeric (over gypsum wall board, wood, concrete)
- Wallpaper (vinyl or cellulose based)
- Plaster (gypsum, lime, cement)
- Concrete
- Wood and wood veneers
- Ceramics
- Stone
- Glass
- Metals
- Laminates / High Pressure Laminates
- Carpet
- Vinyl (sheet, tile)
- Linoleum
- Cork

Control- Heat (“Insulation”)

- Fiberglass (rigid , batt, blown loose)
- Stonewool (rigid , batt, blown loose)
- Cellulose fiber (fiberboard, blown loose)
- Spray foam (open-cell low-medium density and closed-cell medium-high density)
- Extruded polystyrene boards
- Polyisocyanurate boards (faced with numerous materials)
- Expanded polystyrene
- Foamglass
- Low-e coatings / radiant barriers (when in conjunction with an airspace)
- Gas-filled or vacuum gaps

Control- Water (not at joints)

- Asphalt-impregnated felt
- Asphalt-coated paper
- Polymeric housewraps
- Faced (plastic,aluminum) SBS bitumen and butyl sheets
- Fluid-applied asphalts, urethanes, acrylics, silicones
- Thick layers of monolithic masonry
- 3-6” or more of high-quality reinforced concrete
- EPDM, TPO, fabric reinforced modified SBS, reinforced PVC, fabric reinforced asphalt
- Glass sheets
- Metal (aluminum, steel, zinc, copper) sheets
- Closed-cell plastic foams (spray or board)

Control- Air (not at joints)

- Polymeric housewraps
- Faced (plastic,aluminum) SBS bitumen and butyl sheets
- Fluid-applied asphalts, urethanes, acrylics, silicones
- Thick layers of monolithic masonry
- 3-6” or more of high-quality reinforced concrete
- EPDM, TPO, fabric reinforced modified SBS, reinforced PVC, fabric reinforced asphalt
- Glass sheets
- Metal (aluminum, steel, zinc, copper) sheets
- Closed-cell plastic foams (spray or board)
- Gypsum board
- Wood panel boards (OSB, plywood)

Control-Fire

- Gypsum board
- Cement-bonded cellulose spray
- Concrete / mortar
- Thick layers of solid wood
- Specialty polymeric coatings (intumescent)