

Building Systems... & *everything* else:

Doors and Windows

Interior Walls and Partitions

Finish Ceilings and Floors

Interior Finishes

- > These are the systems which change most quickly over time;
- > These are the systems to which most building occupants are most sensitive;
- > These are the systems which, in most commercial buildings, define the spatial characteristics of our environment;
- > These are the non-mechanical systems into which most of our clients' money gets poured.

Doors and Windows... *Windows*

> Types of Windows

Fixed

Single-panel; Multiple-panel; Skylight.

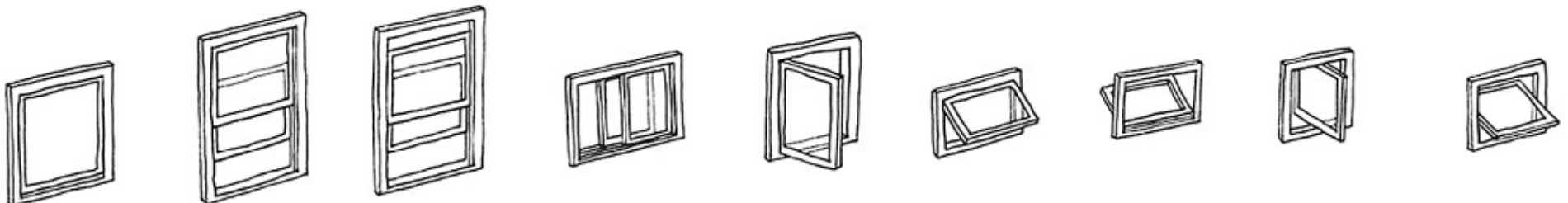
Operable

Single-Hung, Double-Hung, Sliding, Casement, Awning, Hopper, Roof Window;

Top-Hinged / Inswinging, Side-Hinged / Inswinging, Pivot;

“Drei-Kip” Casement/Hopper Combination;

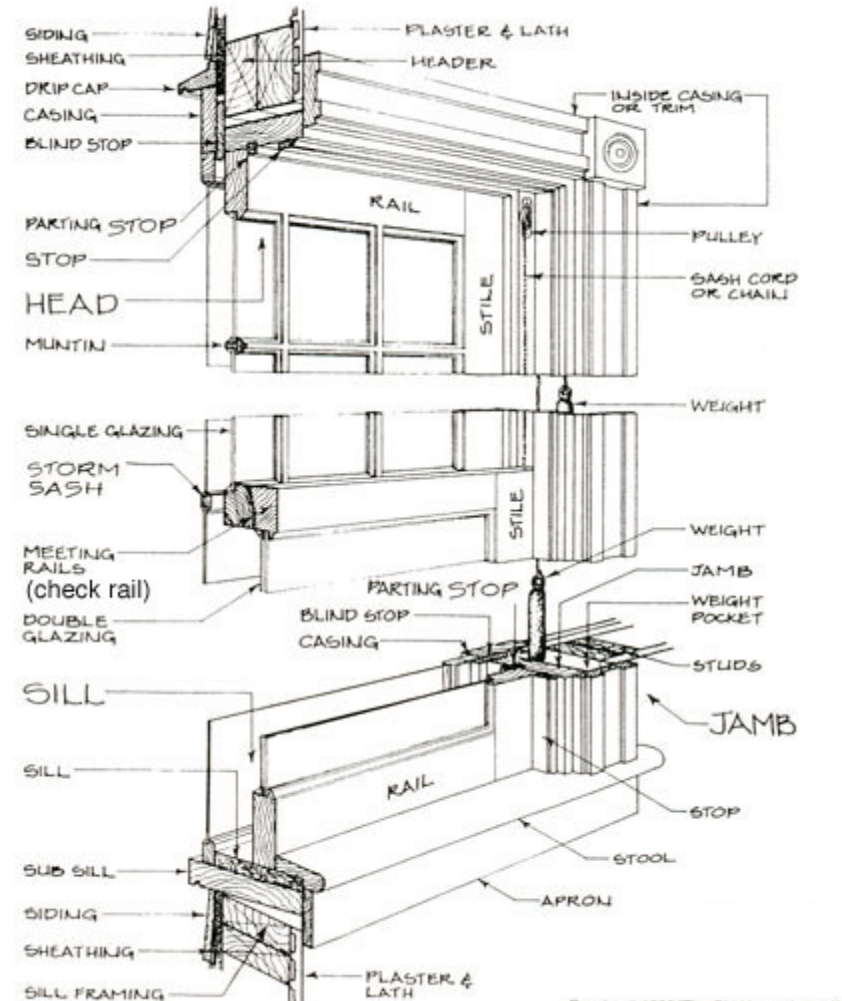
Terrace Door, French Door, Sliding Door.



Windows...

> Windows Nomenclature

Sill, Jamb, Head; Sash;
Casing, Stool, Apron.



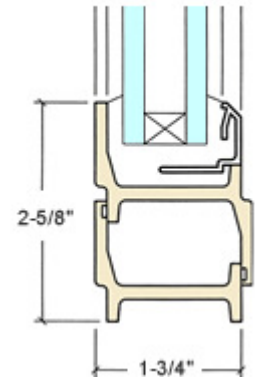
> Window Considerations

Insect Screens (sash-mounted, hinged, fixed, or roll-up);
Hinged for cleaning: Casement, Double-hung, Drei-kip.

Windows...

> Window Frames

Wood, Aluminum, Plastic, Clad Wood, Steel 



> Window Glazing

Single-glazed,

Double-glazed,

Triple-Glazed (w/film)

R-Value

0.90

2.00

5.88

Windows...

> **Safety Considerations**

Safety Glass (Tempered Glass); Laminated Glass;
Rescue Access (5.7sf clear area, min. dimensions 20");
Sill-height for in-room barrier safety;
Bumping-hazard with swing-out windows at head-height.

> **Testing and Standards** (AAMA - metal & plastic / NWWDA - wood & clad)

Performance Grades, categorized by Wind Pressure:
(15, 20, 25, 30, 35, 40 psf)

Performance tests:

Resist Failure after Pressure/Suction cycling;
Resist water penetration when subjected to wind/drenching;
Resist entry when locked;

Missile Test in high-wind locales.

Windows...

> Installation and Nomenclature

Rough Opening; Masonry Opening; Frame Dimension; Clear Dim.

Table of Basic Unit Sizes Scale 1/8" = 1'-0" (1:96)

Unit Dimension	1'-9 5/8"	2'-1 5/8"	2'-5 5/8"	2'-7 5/8"	2'-9 5/8"	2'-11 5/8"	3'-1 5/8"	3'-5 5/8"	3'-9 5/8"
Minimum Rough Opening	1'-10 1/8" (562)	2'-2 1/8" (664)	2'-6 1/8" (765)	2'-8 1/8" (816)	2'-10 1/8" (867)	3'-0 1/8" (917)	3'-2 1/8" (968)	3'-6 1/8" (1070)	3'-10 1/8" (1172)
Unobstructed Glass*	15" (381)	19" (483)	23" (584)	25" (635)	27" (686)	29" (737)	31" (787)	35" (889)	39" (991)
3'-0 7/8" (937)									
3'-4 7/8" (1038)									
3'-8 7/8" (1140)									
4'-0 7/8" (1241)									

> Technical Considerations

Flashing & Sealing to prevent air/moisture infiltration.

Anchorage; Continuous Flange in Clad Window products.

Manufacturer's Recommendations.

Doors and Windows... *Doors*

> Types of Doors

Exposure

Exterior or Interior

Operation

Swinging, Bifold, Accordion;

Sliding (Pocket), Sliding (Bypass), Sliding (Surface);

Overhead, Coiling, Sectional.

> Direction of Swing

Direction of Egress (Usually Out); Residential (Usually In)

> Handedness (RH, LH -- Facing Door, from the outside)

Doors...

> Door Materials

Wood

Stile-and-rail (panel), Flush, Louver;
Solid-Core, Hollow-Core

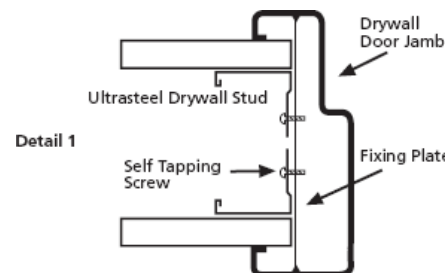
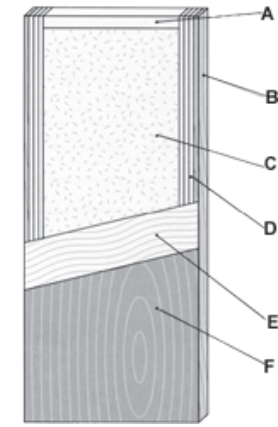
Metal

Hollow-Core, Insulated

Glass

> Fire-Rated Doors (Metal and Wood)

> Door Frames & Anchors



Doors...

> Door Vocabulary

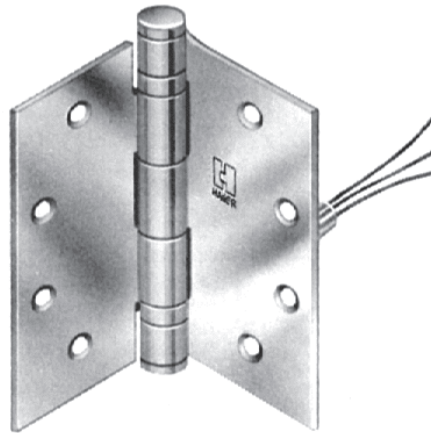
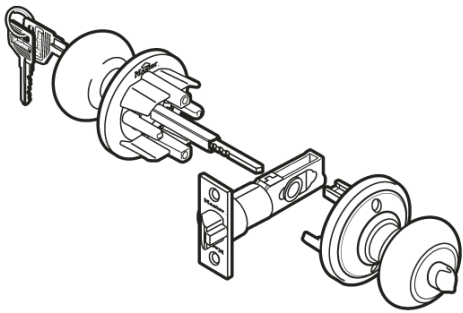
Buck, Jamb, Head, Threshold;

Hardware: Hinges, Closers, Latches, Strikes, Pulls, Locks (Mortise);

Panic Hardware (Exposed, Hidden); Hold-opens.

Weatherstripping, Eyepiece, Kicks, Undercut, Louver;

Vision Panel...



> Door Hardware Design and Specification (Hardware Consultant)

Doors... Specialty Doors



Interior Walls and Partitions

> Types of Walls... (Well, they're not "walls" but "partitions"...)

Fire Walls: *Restrict the Spread of Fire by
 Dividing Structure into Separate Buildings*

Shaft Partitions: *Enclose multi-story openings or shafts*

Fire Barriers: *Restrict the Spread of Fire by Separating Areas
 Within a Single Building*

Smoke Barriers: *Restrict the Propagation of Smoke*

...and Other Non-bearing Partitions.

Interior Walls and Partitions

> Framing Systems

Light-gage framing: Wood or Metal Studs; Plaster or Gyp. Board.

Gypsum Board Products and Related Elements:

Size: 4'x8' up to 14'...

Thickness: 1/4", 5/16", 3/8", 1/2", 5/8", 3/4", 1"

Types: Regular, moisture-resistant, fire-resistant (Type X or C), foil-faced, pre-finished, shaft-liner/coreboard.

Profile: Tapered Edge; Rounded/Beveled Edges; T&G

Joint Finishes: Tape, Spackle, Corner Beads

Joint Treatment: Sanding, Re-spackle.

Additional System Components: Acoustic Insulation; Conduit; Sealant, Resilient Channels, Special Framing

Interior Walls and Partitions

> Masonry Systems

Old buildings: Clay Tile, Plaster Finish.

Contemporary Buildings: CMU, furred-drywall Finish.

Other Contemporary Masonry Systems:

Glazed CMU; Applied-Ceramic Tile on CMU;
Polished-faced CMU; “Thin-Brick” Finishes.

Fire-resistance performance of Masonry Systems:

2 hr (easy) or more;

Attractive for use as stair-well enclosures or elevator shafts.

Finish Ceilings and Floors

> Finish Ceilings: Why? Modern Shelter is defined by its *Environmental Controls!*

> Types of Ceilings

Exposed Structure, Exposed Mechanical Equipment;

Tightly-Attached Ceilings;

Suspended Ceilings:

Acoustical Ceilings (Lay-in Tile, Metal Grid)

Hard-board Ceilings (Drywall or Plaster)

Metal Panel/Metal Slats

Interstitial Ceilings/Floors: *An entire, accessible level for the distribution of mechanical, electrical, and communication services.*

Finish Floors

- > Finish Floors: Duh!
- > Underfloor delivery of Services
 - Raised Floors; Poke-through Fittings.
(Electrical *and* Mechanical Delivery)
- > Noise Transmission at Floors:
 - Resilient Flooring;
 - Floor Finish Underlayment;
 - Under-floor resilient ceiling;
 - Increased Floor Mass/Inertia.
 - STC (Sound Transmission Class)
 - IIC (Impact Insulation Class)



Finish Floors

- > Skid Resistance and Fire Resistance
 - SCOF (Static Coefficient of Friction)
 - Class I, Class II Flame Resistance (NFPA 253)
- > Hard Floor Materials:
 - Concrete, Stone, Bricks & Pavers, Quarry (Clay) Tile, Terrazzo, Ceramic Tile (including Granite Porcelain).
 - Requirements for setting beds and subfloor preparation.
- > Membrane/Fluid-Applied Flooring: Epoxy Paint & Misc. Toppings.
- > Wood Flooring (Strip Flooring: Nailed, Floated; Board/Veneer)
- > Resilient Flooring: VCT, Sheet Vinyl, Linoleum, Cork
- > Carpet: Sheet or Tile; Glued or Stretched; Types of Pile & Cut; Synthetics and Natural Fibers.

Selecting Interior Finishes

- > Interior build-out must accommodate *Systems* as well as *People*.
Nevertheless, books about technology sometimes forget the latter.
- > Systems include:
 - Mechanical (Air, Heating, and supply Piping);
 - Plumbing (Supply, Sanitary, Rainwater, Condensation);
 - Electrical (Conduit, Wiring, Lighting, Communication);
- > Accommodation for those systems include:
 - Ceilings, Floors, Chases, & Wall Cavities.
 - (Systems may also be exposed.)
- > The sequence of Interior Fit-out must account for the installation of both *material* infrastructure and *systems* infrastructure (rough-in).

Selecting Interior Finishes

> Typical Sequence of Interior Build-Out:

Hanger-wire for ceilings;

Full-height partition framing, including those required fire-rating;

Fire-stopping around penetrations through rated-walls;

Electrical Conduit; Plumbing Runs;

Mechanical Runs, including Ductwork;

Ceiling Grid; lay-in Lighting and Mechanical Fittings; Ceiling Finishes;

Up-to-Ceiling Partition Framing;

Additional Electrical Runs and Plumbing Rough-ins;

Wall Finishes; Addtional Ceiling Finishes; Flooring; Fixtures.

Furnishings & **Occupants!**

Selecting Interior Finishes

- > Criteria to consider in selecting finishes and finish systems:
 - Appearance;
 - Durability and Maintenance;
 - Acoustic Performance;
 - Fire Rating and Requirements: Combustibility / Fire-resistance Rating;
 - Relationship to Mechanical and Electrical Services;
 - Changeability / Flexibility;
 - Emissivity and Toxicity
 - Cost!**

Trends in Interior Finishes

- > From “single-piece” systems to component systems.
- > The use of heavy materials replaced with lighter materials.
- > “Wet” systems replaced by “Dry” Systems;
On-site manufacture replaced by prefabricated manufacture.
- > Greater consideration of environmental impact (toxicity) and upon
“Sustainability” categories: Distance from Manufacture, Renewable Resources)

Typical benefits of these trends:

Greater flexibility, lower cost, faster installation

Typical drawbacks of these trends:

Decreased durability, less detail-oriented craft,
lower acoustic performance.

Additional Considerations for Architectural Finishes

- > Decorative Philosophy and Concept
- > Furnishings (Material Palette, Maintenance, Flexibility)
- > Fittings (Function, Location, and Use)
- > Signage (Color Palette, Legibility)

and of course... Occupancy!