WELCOME TO THE BASIS OF DESIGN

THE RIGHT CHOICES MATTER:

The Basis of Design (BOD) specifies products and performance criteria based on durability + maintenance requirements, availability, and energy + water efficiency. By standardizing building performance across the portfolio, we can ensure quality-built homes for our residents.

The products in the BOD have been vetted by POAH and are shown as examples that meet our standards. Alternates are welcome, however they must be brought to POAH’s attention and approved by POAH if they are to be used in the project.

The Basis of design is a product selection resource, not a product purchasing platform.

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AIR CONDITIONER COVERS

PRODUCT DEFINITION:
In locations with permanently installed window or through wall air conditioners, a plastic hard cover should be installed on the interior of the air conditioner unit during the winter months. Air conditioner covers reduce cold air infiltration into the units/building, save on heating costs, and make units more comfortable. For use on the interior of the unit only.

PRODUCT ORDERING INFORMATION:
Record the size of your existing air conditioners in the diagram:
The following dimensions are required:
- Depth of air conditioner and sleeve (A)
- Width of air conditioner (B)
- Height of air conditioner (C)
- Depth of sleeve (D)

This information can then be used by the architect, contractor, product representative, or Project Manager coordinating the installation. Contact manufacturer directly for specific measurements required.

RECOMMENDED PRODUCTS:
AM Conservation Group, Inc. / Chill Stopper Air Conditioner Cover
- Cover Depth: 4” to 8”
- Cover Width: 26 3/4” to 27 3/4”
- Cover Height: 16 1/4” to 18 1/4”
- High impact hard cover
- Minimum R-Value R7

LOOKING FOR INFORMATION ON AC UNITS?
Take a look at the AC Unit Spec:

CLICK HERE FOR AC UNIT SPEC

https://www.poahbod.org/appliances#appliances-index-range-ac-unit

ADDITIONAL INFORMATION:
REQUIRED DETAILS:

• At sites where residents provide their own air conditioner, the depth of the cover may vary. If possible, select one depth that will fit all existing depths.
• Some minor modifications to the existing wall or the installation of trim may be required to accommodate the air conditioner cover. If recommended product is not conducive to existing conditions, please contact Design + Building Performance Dept. for assistance.

CONTACT DESIGN + BUILDING PERFORMANCE DEPT.

https://www.poahbod.org/contact
APPLIANCES

REFRIGERATOR

GENERAL INFORMATION & REQUIRED DETAILS:

• Finish: White or Black; Color to be determined by architect, POAH Design + Building Performance Dept., or match existing. All appliances must match.
• Volume:
  • Non-family Units: 17.5 cubic feet minimum or match existing.
  • Family Units: 21 cubic feet or match existing.
• Width: 30” minimum width or match existing.
• Energy Star Rated: Required.
• Self-Defrosting: Required.
• No water/ice dispensers.
• No ice makers.
• No side-by-side doors.
• Reversible hinges required.
• Refrigerators in ADA units must be ADA approved.
• 100% of the fresh food space below 54 inches
• 50% of the freezer space below 54 inches
• Controls must be below 54 inches

SAMPLE PRODUCTS:

Whirlpool
30-inch Wide
18.2 cu. ft.
Top Freezer
Manufacturer Number:
WRT138FZDW

• ADA Compliant
**RANGE**

**GENERAL INFORMATION & REQUIRED DETAILS:**
- Finish: White or Black; Color to be determined by architect, POAH Design + Building Performance Dept., or match existing. All appliances must match.
- Volume: 4.5 cubic feet minimum or match existing.
- Width: 30” minimum width or match existing.
- Knobs on front face of range for ease of use.
- Electric ranges preferred.
  - Gas ranges are a fire hazard and introduce harmful fumes into the dwelling unit.
- When replacing gas ranges, confirm possibility of converting to electric.
- Do not use "self-cleaning" ranges.

**SAMPLE ELECTRIC RANGES (PREFERRED):**

- **Frigidaire**
  - 30-inch
  - Manufacturer Number: FFEF3009LW
  - ADA approve

**SAMPLE GAS RANGES:**

- **Whirlpool**
  - 30-inch Gas Range
  - Manufacturer Number: WFG320M0AW
  - ADA approved

**SPASH PLATE TO BE INSTALLED ON WALL BEHIND RANGE:**

- **Broan**
  - Reversible Backsplash
  - Almond
  - EP300108
  - (Install with Almond finish facing out)
COOKTOP

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: White or Black; Color to be determined by architect, POAH Design + Building Performance Dept., or match existing. All appliances must match.
- Width: 30” minimum width or match existing.
- Coordinate cabinetry shop drawings with product choice.
- Product to meet ADA standards; Architect to verify mounting height/ location meets ADA standards.
- Electric cooktops preferred.

SAMPLE ELECTRIC COOKTOP (PREFERRED):

**GE**
30-inch
Built-in Electric Cooktop
Manufacturer Number:
JP328WKWW

- ADA compliant if installed per ADA guidelines.

SAMPLE GAS COOKTOPS:

**Whirlpool**
30-inch
Gas Cooktop
Manufacturer Number:
W3CG3014XW

- ADA compliant if installed per ADA guidelines.
RANGE HOOD

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: White or Black; Color to be determined by architect, POAH Design + Building Performance Dept., or match existing. All appliances must match.
- If at all possible, range hood should vent to exterior:
  - In new construction, drawings should show the range hood exhausting to the exterior.
  - In rehabs, this should be designed and bid as an add alternate.
- Width: 30" minimum or match existing.
- All range hoods must receive StoveTop FireStop® Rangehood Fire Extinguishers.
- Extinguishers must fit within the depth of rangehood without being noticeably visible.

SAMPLE VENTED RANGE HOOD (PREFERRED):

Broan
30" Vented Range Hood
7" Round Vent
190 CFM
Manufacturer Number: 423001

Broan
30" Vented Range Hood
3-1/4" x 10" Vent
160 CFM
Manufacturer Number: 403001

SAMPLE NON-VENTED RANGE HOOD:

Broan
Non-Vented Range Hood
Manufacturer Number: 413001
RANGE HOOD

SAMPLE FIRE EXTINGUISHERS (MANDATORY):

**StoveTop**
FireStop Rangehood
Height: 3.5"
Diameter: 3.4"
Manufacturer Number: 675-3

- Attaches under range hoods.

**StoveTop**
FireStop Microhood
Height: 2.2"
Width: 3.9"
Length: 13.9"
Manufacturer Number: 677-1 (Black), 677-2 (White)

- Attaches under microwave.

EXAMPLE OF NON-CONFORMING FIRESTOP INSTALLATION:

Firestops should be concealed within depth of range hood and be hidden in plain sight.
MICROWAVE (OVER-THE-RANGE)

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: White or Black; Color to be determined by architect, POAH Design + Building Performance Dept., or match existing. All appliances must match.
- If at all possible, microwave should vent to exterior:
  - In new construction, drawings should show the microwave exhausting to the exterior.
  - In rehabs, this should be designed and bid as an add alternate.
- Width: 30" minimum or match existing.
- All over-the-range microwaves must be able to receive StoveTop FireStop® Microhood Fire Extinguishers without the unit being noticeably visible.

SAMPLE OVER-THE-RANGE MICROWAVES:

**Whirlpool**
30" Vented Microwave
1.7 Cubic Feet
220 CFM
Exhaust vented to exterior (preferred) or recirculated
Manufacturer Number:
WMH31017FW

**Frigidaire**
30" Vented Microwave
1.5 Cubic Feet
300 or 170 CFM
Exhaust vented to exterior (preferred) or recirculated
Manufacturer Number:
MWV150KW

SAMPLE OVER-THE-RANGE MICROWAVES:

**StoveTop**
FireStop Microhood
Height: 2.2"
Width: 3.9"
Length: 13.9"
Manufacturer Number:
677-1 (Black), 677-2 (White)
- Attaches under microwave.
WALL OVEN

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: White or Black; Color to be determined by architect, POAH Design + Building Performance Dept., or match existing. All appliances must match.
- Volume: Minimum 4 cubic feet or match existing.
- Coordinate cabinetry shop drawings with product choice.
- Product to meet ADA standards; Architect to verify mounting height/ location meets ADA standards.
- Electric wall oven preferred.

SAMPLE ELECTRIC WALL OVEN (PREFERRED):

GE
27-inch width
Electric Single Standard Wall
Manufacturer Number: JK3000DFWW

SAMPLE GAS WALL OVEN:

Whirlpool
27-inch width
Single Wall Oven
Manufacturer Number: WOS51EC7AW
DISHWASHER

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: White or Black; Color to be determined by architect, POAH Design + Building Performance Dept., or match existing. All appliances must match.
- Width: 24” minimum width or match existing.
- Energy Star Rated: Required.
- All dishwashers to be built-in to cabinetry/counter assembly.
- Coordinate cabinetry shop drawings with product choice.

SAMPLE ELECTRIC WALL OVEN (PREFERRED):

**Whirlpool**
24-inch
Built-in Dishwasher
Manufacturer Number: WDF110PABW

**GE**
24-inch
Built-in Dishwasher
Manufacturer Number: GSD3300DWW
AIR CONDITIONING UNIT

(WINDOW OR THROUGH-WALL)

GENERAL INFORMATION & REQUIRED DETAILS:

- Confirm electrical supply can accommodate new air conditioning unit.
- Energy Star: Required.
- AC unit must fit through-wall sleeve.
- Through-wall sleeve to slope to exterior.
- All through-wall AC Units should be covered in Winter w/ interior plastic cover. See AC Cover Spec for more information:
- AC Unit should be sized appropriately per energy star’s guidelines:

<table>
<thead>
<tr>
<th>Area To Be Cooled (square feet)</th>
<th>Capacity Needed (BTUs per hour)</th>
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<tbody>
<tr>
<td>100 up to 150</td>
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<tr>
<td>150 up to 250</td>
<td>6,000</td>
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<td>30,000</td>
</tr>
<tr>
<td>2,000 up to 2,500</td>
<td>34,000</td>
</tr>
</tbody>
</table>

SAMPLE PRODUCT:
LG
12,000 BTU, 115 Volt
Window Air Conditioner
Energy Star
Manufacturer Number:
LW1216ER

WASHER

GENERAL INFORMATION & REQUIRED DETAILS:

- Front loaded for easy ADA accessibility.
- Energy Star Rated: Required.

SAMPLE PRODUCT:

Frigidaire
3.9 Cu Ft
Full Size Front Load Washer
ENERGY STAR
Manufacturer Number:
FFFW5000QW

DRYER

GENERAL INFORMATION & REQUIRED DETAILS:

- Front loaded for easy ADA accessibility.
- High Efficiency: Required.

SAMPLE PRODUCTS:

Whirlpool
7.0 Cubic Foot Cabrio
High-Efficiency Electric Dryer
Manufacturer Number:
WED7000DW
Whirlpool
7.0 Cubic Foot Cabrio
High-Efficiency **Gas** Dryer
Manufacturer Number:
WGD7000DW
BATH ACCESSORIES (UNIT)

GENERAL INFORMATION & REQUIRED DETAILS:

DO NOT INSTALL:

- Toothbrush holders.
- Soap dishes at bathroom sinks.

MEDICINE CABINETS

GENERAL INFORMATION & REQUIRED DETAILS:

- If possible, all medicine cabinets should:
  - be recessed into wall (eliminates shadow from vanity light).
  - have beveled edge mirror. No metal frames.
- Rust-resistant steel body.
- Adjustable steel shelves (No Glass Shelves).
- In ADA units, install medicine cabinet on side wall and mirror over sink. Confirm heights with architect or building code for ADA compliance.
- Installation:
  - Install per manufacturer's instructions.
  - Install on wood stud or add blocking; do not install directly to sheetrock.

SAMPLE RECESSED MEDICINE CABINET (PREFERRED):

HD Supply
16W x 26”H Recessed Beveled Edge Mirrored Medicine Cabinet
Steel Body
Metal Shelves
Manufacturer Number:
189813

SAMPLE SURFACE MOUNTED MEDICINE CABINET:

HD Supply
16W x 26”H Surface Mount Mirror Medicine Cabinet
Steel Body
Metal Shelves
Manufacturer Number:
404469
MIRRORS

GENERAL INFORMATION & REQUIRED DETAILS:

- In ADA units, install mirror over sink, and medicine cabinet on side wall. Confirm heights with architect or building code for ADA compliance.
- Wall-mounted Mirror.
- 24” x 36” Stainless Steel Channel Frame Mirror.
- Frame: Stainless Steel, roll-formed one-piece construction.
- Glass: ¼” thick, No. 1 quality, plate/float glass, silver coated and hermetically sealed with a uniform copper plating.
- Installation:
  - Install per manufacturer's instructions.
  - Install on wood stud or add blocking; do not install directly to sheetrock.

SAMPLE PRODUCTS:

Bobrick
Framed Mirror 24 x 36” Stainless Steel
Manufacturer Number: 165 2436

TOILET TISSUE HOLDERS

GENERAL INFORMATION & REQUIRED DETAILS:

- Surface mounted holder for standard core roll tissue.
- Unit to be fabricated stainless steel.
- Finish: Satin Stainless Steel, roller to be chrome-plated high impact resistant ABS plastic.
- Installation:
  - Install per manufacturer's instructions.
  - Install on wood stud or add blocking; do not install directly to sheetrock.

SAMPLE PRODUCTS:

Franklin Brass
Stainless Steel Toilet Paper Holder Concealed Mount
Manufacturer Number: 819400
TOWEL BARS

GENERAL INFORMATION & REQUIRED DETAILS:

• Square Towel Bar to be fabricated of stainless steel.
• Bar shall be square tubing and shall be held in receiver holes in support posts.
• Installation:
  o Install per manufacturer's instructions.
  o Install on wood stud or add blocking; do not install directly to sheetrock.

SAMPLE PRODUCTS:

**Franklin Brass**
Futura 3/4 x 18" Chrome Towel Bar Set
Manufacturer Number: 818725

**Franklin Brass**
Futura 3/4 x 24" Chrome Towel Bar Set
Manufacturer Number: 818740

**Franklin Brass**
Futura 3/4 x 24" Century Towel Bar Set
Manufacturer Number: 819350
ROBE HOOKS

GENERAL INFORMATION & REQUIRED DETAILS:

- Fabricated of stainless steel.
- Install in solid wood or use appropriate anchors to support weight.
- Installation:
  - Install per manufacturer's instructions.
  - Wall: install on wood stud or add blocking; do not install directly to sheetrock.
  - Door: install in solid wood, not to hollow core.

SAMPLE PRODUCTS:

Symmons
Dia Chrome Robe Hook
Manufacturer Number: 459079

SHOWER CURTAIN RODS

GENERAL INFORMATION & REQUIRED DETAILS:

- Heavy Duty with flanges fabricated from alloy stainless steel.
- Tubing shall be 1” diameter.
- Flanges shall be provided and have dimpled holes for exposed fasteners.
- Installation:
  - Install per manufacturer's instructions.
  - Install on wood stud or add blocking; do not install directly to sheetrock.

SAMPLE PRODUCTS:

HD Supply
60” Chrome Shower Rod Set
Manufacturer Number: 822450
GRAB BARS

GENERAL INFORMATION & REQUIRED DETAILS:

- Grab Bars with Snap-on flange covers for concealed mounting shall be fabricated of stainless steel.
- Tubing shall be 1 ½” O.D. (outside diameter).
- End flanges shall have two 3/8” diameter mounting holes, center/intermediate supports shall have 2 keyhole slots for easy access.
- All exposed surfaces to be satin stainless-steel finish.
- All grab bar tubing to have **peened, non-slip finish**.
- Provide in configurations and mounting heights as required by Federal, State and Local Accessibility Codes and Fair Housing Guidelines.
- **Installation:**
  - Install per manufacturer's instructions.
  - Install on wood stud or add blocking; do not install directly to sheetrock.

SAMPLE PRODUCTS:

**Bobrick**
Concealed Mount Grab Bar
Non-slip Gripping
1-1/2" Diameter, 18” Length
Manufacturer Number:
B6806.99x18

**Bobrick**
Concealed Mount Grab Bar
Non-slip Gripping
1-1/2" Diameter, 24” Length
Manufacturer Number:
B6806.99x24
SHOWER SEATS

GENERAL INFORMATION & REQUIRED DETAILS:

- “L-shaped” fold-up padded shower seat. To meet or exceed ADAAG requirements.
- Shall be of adequate strength to support a load of 250 pounds and shall conform to the size and edge clearances as diagrammed in ADAAG.
- Tube: 18 gauge (0.48 in thick) type 304 stainless steel, 1” diameter and 1 ¼” square. Unitized all welded construction. Exposed surfaces are satin finish. Edges and Corners are radius-ed and burr free.
- Flange: 3/16” type 304 stainless steel. Exposed surfaces have satin finish. Edges and Corners are radius-ed and burr free.
- Bracket: 16 gauge (0.06 in thick) type 304 stainless steel. Exposed surfaces to have satin finish. Edges and corners are radius-ed and burr free.
- Bracket: 16 gauge (0.06 in thick) type 304 stainless steel. Exposed surfaces to have satin finish. Edges and corners are radius-ed and burr free.
- Spring: Stainless steel type 304, O.D. 27/32” coils x 2 ¼” body length x 0.085” wire diameter.
- **Installation:**
  - Install per manufacturer’s instructions.
  - Install on wood stud or add blocking; do not install directly to sheetrock.

SAMPLE PRODUCTS:

Bobrick
Shower Seat 32” Ivory
Manufacturer Number: 5181
BATH ACCESSORIES (COMMON)

GENERAL INFORMATION & REQUIRED DETAILS:

DO NOT INSTALL:
- Soap dishes at bathroom sinks.

MIRRORS

GENERAL INFORMATION & REQUIRED DETAILS:
- Wall-mounted Mirror.
- 24” x 36” Stainless Steel Channel Frame Mirror.
- Frame: Stainless Steel, roll-formed one-piece construction.
- Glass: ¼” thick, No. 1 quality, plate/float glass, silver coated and hermetically sealed with a uniform copper plating.
- Installation:
  - Install per manufacturer’s instructions.
  - Install on wood stud or add blocking; do not install directly to sheetrock.

SAMPLE PRODUCTS:

Bobrick
Framed Mirror 24 x 36” Stainless Steel
Manufacturer Number:
165 2436
TOILET TISSUE HOLDERS

GENERAL INFORMATION & REQUIRED DETAILS:

- Surface mounted holder for standard core roll tissue.
- Unit to be fabricated stainless steel.
- Finish: Satin Stainless Steel, roller to be chrome-plated high impact resistant ABS plastic.
- Installation:
  - Install per manufacturer’s instructions.
  - Install on wood stud or add blocking; do not install directly to sheetrock.

SAMPLE PRODUCTS:

Franklin Brass
Stainless Steel Twin Toilet Paper Holder Concealed Mount
Manufacturer Number: 819425
GRAB BARS

GENERAL INFORMATION & REQUIRED DETAILS:

- Grab Bars with Snap-on flange covers for concealed mounting shall be fabricated of stainless steel.
- Tubing shall be 1 ½” O.D. (outside diameter).
- End flanges shall have two 3/8” diameter mounting holes, center/intermediate supports shall have 2 keyhole slots for easy access.
- All exposed surfaces to be satin stainless-steel finish.
- All grab bar tubing to have peened, non-slip finish.
- Provide in configurations and mounting heights as required by Federal, State and Local Accessibility Codes and Fair Housing Guidelines.

  Installation:
  - Install per manufacturer's instructions.
  - Install on wood stud or add blocking; do not install directly to sheetrock.

SAMPLE PRODUCTS:

Bobrick
Concealed Mount Grab Bar
Nonslip Griping
1-1/2” Diameter, 18” Length
Manufacturer Number: B6806.99x18

Bobrick
Concealed Mount Grab Bar
Nonslip Griping
1-1/2” Diameter, 24” Length
Manufacturer Number: B6806.99x24
SOAP DISPENSORS

GENERAL INFORMATION & REQUIRED DETAILS:

- To be installed in Common Bathrooms only.
- Stainless steel construction.
- Satin finish.
- ADA compliant.
- Installation:
  - Install per manufacturer’s instructions.
  - Install on wood stud or add blocking; do not install directly to sheetrock.

SAMPLE PRODUCTS:

Bobrick
Soap Dispenser Vertical
Mount Tall Stainless Steel
Manufacturer Number:
2111

HAND DRYERS

GENERAL INFORMATION & REQUIRED DETAILS:

- Stainless steel cover.
- Installation:
  - Install per manufacturer’s instructions.
  - Install on wood stud or add blocking; do not install directly to sheetrock.

SAMPLE PRODUCTS:

XLERATOR
No Heat Hand Dryer
With Noise Reduction, Brushed Stainless
Manufacturer Number:
XL-SB-ECO-1.1N
WHEN TO USE THIS BASIS OF DESIGN SECTION:

This BOD section should be used for new construction projects and for any projects involving work on the building enclosure, e.g., re-cladding, attic insulation, window replacement, re-roofing. Constructing a good building enclosure will have more impact on saving energy than most if not all other energy conservation measures in new building construction. Modifications to existing building enclosures present significant and uncommon opportunities to move the building in the direction of high performance. A good building enclosure can insure durability and have a positive impact on health and comfort of residents. This section is intended to outline criteria for high performance building enclosure in rehab and new construction projects.

GENERAL REQUIREMENTS:

DESIGN REVIEW

Building enclosure designs shall be submitted to Design + Building Performance Department and/or the energy consultant for review. In new construction projects, include details for all building enclosure components. For renovation projects, include details for all building enclosure components impacted by the project.

- The building enclosure includes all walls, windows, doors, and roofs that are exposed to the exterior, as well as slabs, and basement walls.
- Details must clearly indicate materials or components providing critical control functions. For Description of control functions, see below.
- Architects should provide a thermal boundary drawing showing continuous Insulation for review by Design + Building Performance Department.

QUANTITATIVE PERFORMANCE TARGETS:

The new construction or renovation project shall meet quantitative performance targets for:

- Whole-building enclosure air tightness
- Apartment unit air tightness
- Insulation levels

**Note:** in cases where applicable local codes or funding requirements indicate more stringent performance targets, these local code or funding requirements shall govern.
BUILDING ENCLOSURE CONTROL FUNCTIONS:

A fundamental purpose of the building enclosure is to separate the interior environment from the exterior environment. Yes, it’s that simple. Most of the time, we want the interior environment to be something different from the exterior environment. In many situations – such as in cold winter weather, rainy weather or during a heat wave – we want the interior environment to be quite different from the exterior environment.

In order to support this environmental separation – where the environment on one side of the enclosure is different from the environment on the other side of the enclosure – the building enclosure must provide the follow 5 critical control functions:

- Water Control
- Air Control
- Vapor Control
- Thermal Control
- Critter Control

These first four Building Enclosure Control Functions are hierarchical. Air Control really doesn’t matter if the roof can’t keep the rain out. Thick layers of insulation and sophisticated vapor diffusion control membranes are a waste of effort if there are huge air leaks that allow for bypass of the vapor and thermal control. And so on.

Critter Control is probably closely related to Air Control. Generally, if air can’t leak into a building, then it would be hard for pests to gain access to the building. Air control within and between spaces in a building – something often referred to as compartmentalization – goes hand in hand both with effective smoke control and with effective pest control. Water Control and Vapor Control relate to Critter Control as well because preventing moisture problems is essential to making the building unappealing for most typical building pests.

In Building Enclosure design, whether for new construction of renovation projects, the control layers, i.e., the elements providing each control function, should be clearly indicated and called out in design documents.

The critical control functions are each described in more detail below.
WATER CONTROL

For the purposes of the building enclosures, liquid water is moved by gravity, by air pressures (e.g., induced by wind, stack effect or mechanical systems) or by capillarity (i.e. wicking). Flashings, drainage planes and claddings use gravity to shed water away from the building and to get water out of assemblies should it get in. Seals and air barriers are used to control air pressures that push water through cracks, holes and openings in a building enclosure. Capillary breaks are used to control the water that wicks through a concrete foundation. Capillary breaks are also used to separate slabs on grade from water that wicks through soil.

Of course, water is also conveyed by plumbing and sometimes carried around by people. But managing this potential water load is outside of the scope of the building enclosure.

KEY TERMS:

DRAINAGE PLANE:

The drainage plane is the component or material that prevents further penetration of water into the assembly and on which water can be safely managed. Drainage planes are impervious to water.

- Examples:
  - At a sloped roof: underlayment, ice and water membrane
  - At a wall: single-lapped building wrap, shingle-lapped tar paper or building felt, a fully-adhered sheet membrane, a fluid-applied membrane, rigid insulation with taped seams, structural sheathing panels with integral water control membrane and taped seams
FLASHING:
Flashing is a water impervious component that 1) diverts water away from openings in- or vulnerable areas of- the enclosure, and/or 2) directs water inside an assembly to the exterior.

- Examples:
  - Diversion flashing: kick-out flashing at roof-wall interface, step flashing at a roof-wall interface, cap flashing (if sloped to the exterior) above a window, roof edging with a drip leg, saddle flashing over a joist or other structural element that penetrates a wall.
  - Flashing to direct water to exterior: sill pan flashing in a window opening, through-wall flashing for a brick cavity wall.

CLadding:
A durable component/material that provides rain shedding and that protects the drainage plane from UV and direct weather exposure. Cladding provides aesthetic finish at the building exterior.

- Examples:
  - At a sloped roof: asphalt shingles, metal roofing, clay tiles
  - At a wall: fiber cement lapped siding, metal panels, EIFS, brick masonry, vinyl siding

CAPILLARY BREAK:
A non-water porous, water impervious material placed between two capillary active (water wicking) materials to prevent the capillary transfer (wicking) of water to moisture sensitive materials.

- Examples:
  - Foam gasket, bituminous membrane or sheet metal placed between concrete and wood framing (not that this application is not limited to the framing sill at the top of a foundation wall, it applies to all wood-concrete interfaces), free-draining gravel beneath a concrete slab, 10 mil polyethylene sheet placed between a concrete slab and ground/insulation, damp-proofing applied to a foundation wall, bituminous membrane placed on top of a footing before casting the foundation wall.

DESIGN DOCUMENT REQUIREMENTS:
Clearly indicate the materials or components performing the water control function in an assembly or detail.

APPLICATIONS:

ROOF:
In a pitched roof configuration, it is the shingles, metal roofing, clay tiles, etc. serve as the primary rain shedding layer or cladding while the roof underlayment (e.g., 30# building felt, ice and water membrane) serves as the drainage plane. One of the functions of cladding is to protect the drainage plane.

On a low-sloped roof, the roof membrane often serves as both the rain shedding layer and the water control layer. In some configurations pavers and insulation, ballast, or even a green roof is placed on top of the roof membrane and provides a degree of protection for the drainage plane.
Wall:
At walls, the cladding that provides the primary rain shedding and protection for the drainage plane may be fiber cement lapped siding, metal panels, EIFS, brick masonry, vinyl siding, etc... The drainage plane of the wall could be single-lapped building wrap, shingle-lapped tar paper or building felt, a fully-adhered sheet membrane, a fluid-applied membrane, rigid insulation with tapered seams, structural panels with integral water control membrane and taped seams.

Foundation/Slab:
Foundations use the slope of grade to divert surface water away from the foundation. Drain tile and sump pumps may be used to intercept ground water and keep it from the foundation or slab.

Openings and Penetrations:
Flashings are required at:
- openings in the enclosure, such as window and door openings,
- penetrations through the water control layer, such as for pipes, conduits or structural members.

The flashing must be configured so that it:
- diverts water away from the hole or opening, and
- directs water that gets into the opening safely to the OUTSIDE over the drainage plane or cladding.

Air Control
Air control is about keeping the inside air in and the outside air out. In order to control the condition (i.e. the temperature, humidity) of the air within a building, one first needs to contain it.

Air control is achieved by connecting air tight materials to form a continuous, unbroken (unless doors or windows are open) 3-dimensional wrap around the building interior. Think of a balloon with no holes. Materials must be joined in an airtight and durable manner that allows for building movement as well as thermal expansion and contraction of materials. Transitions between building assemblies, for example between walls and the ceiling/roof, require particular attention to maintain continuity of the air control. Openings in assemblies, such as windows and doors, are places where careful detailing and installation is needed to achieve airtight and durable seals to connect the various materials coming together at these locations. Attached elements such as porch roofs, decks and entry canopies present challenges to airtightness.
It is also important to have good air control between various spaces within the building. This is referred to as compartmentalization – a complicated word for a relatively simple idea. An air tight enclosure around an apartment unit is needed to prevent airborne contaminants, smoke and odors in one apartment from spreading to neighboring apartments. Robust compartmentalization also diminishes the forces acting on a building that move air into or through the building. For example, the ground floor of a multi-story building would be less subject to drafts, and out-swinging doors would be easier to open in cold weather, if a building is well compartmentalized.

Airtight enclosures also support the operation of conditioning and ventilation systems by making it easier to control the pressures and direction of air flow between spaces. For example, if we want a corridor to be slightly pressurized relative to apartments so that odors from apartments do not migrate into the corridor, then it helps to have an airtight enclosure of that corridor space. The more airtight an enclosure the less airflow is needed to pressurize or depressurize the space with the enclosure. Therefore, with better airtightness it is possible to maintain the desired pressure relationships while using less energy and installing smaller ducts and equipment.

Airtightness is sometimes regarded as a proxy for overall construction quality. The airtightness of a building and of apartments within buildings are properties that can be measured.

The common method for testing and verifying the airtightness is through the use of a calibrated fan and pressure measuring gauges. In the construction industry the common term for this testing apparatus is “blower door” equipment and qualified technicians allows for quantitative airtightness targets to be established for new construction and renovation projects.

Don’t buildings need to breathe?
This is a very common misconception. It’s close, but not correct. People need to breathe; buildings need to be able to dry. Moisture sensitive building materials need to be able to dry out should they get wet. It is a good practice to deliberately allow for this in design. But it is important to understand the difference between air movement and drying by diffusion. Air leakage can certainly move moisture – but not always in a direction or to a location that is helpful! Diffusion drying can be thought of as evaporation through solid materials. There is more on diffusion in the Vapor Control section of this document. For more on the people needing to breathe thing, consult the Ventilation Basis of Design section.

https://www.poahbod.org/ventilation
REQUIREMENTS:

DESIGN DOCUMENT REQUIREMENTS:

Clearly indicate the materials or components performing the air control function in an assembly or detail. In the design documents it should be evident how the air control function is transitioned from one component or assembly to another.

PERFORMANCE TARGETS:

- Project managers should budget for blower door testing at the following times:
  - Before construction (Rehab) in order to establish baseline.
  - During construction (Rehab), based on scope of work, test when sufficient work is complete to identify leaks in new work.
  - During construction (New), test after insulation but before sheetrock is installed.
  - After construction (Both) is finished, to verify performance.

- Architects should include performance targets in specifications and drawings.

NEW CONSTRUCTION:

Measured air leakage shall not exceed the following thresholds:

- Whole building enclosure: 0.4 cfm / ft² enclosure at a pressure difference of 75 Pascals (0.3 inch water gauge).
- Individual apartments: 3 ACH 50 (3 air changes per hour at a pressure difference of 50 Pascals).

New construction whole building enclosure airtightness shall be measured in accordance with ASTM E 779:

- Test airtightness at a pressure differential of 0.3 inch water gauge (75 pascals).
- Result of test should shall calculate air leakage rate of building thermal envelope at or less than 0.4 cfm/ft² (0.2 L/s * m²)

New construction apartment airtightness shall be measured in accordance with RESNET testing and sampling protocols.

REHAB:

Retrofit and renovation projects should target reductions in the measured air leakage. For retrofit and renovation the appropriate airtightness improvement target will depend upon the scope of the project. Suggestions for air leakage reduction targets associated with various scopes are provided below:

<table>
<thead>
<tr>
<th>Scope</th>
<th>Reduction Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall re-cladding</td>
<td>30-40%</td>
</tr>
<tr>
<td>Attic air sealing</td>
<td>15-30%</td>
</tr>
<tr>
<td>Converting from vented to conditioned attic</td>
<td>30-50% (low-rise construction)</td>
</tr>
<tr>
<td>Window replacement</td>
<td>10-30%</td>
</tr>
</tbody>
</table>
RENOVATION, MAINTENANCE, AND COMPARTMENTALIZATION:

Measures to improve compartmentalization should also be incorporated into any interior renovation scope. This is particularly important in occupied buildings as the opportunities to make improvements within occupied spaces is rare. Even regular maintenance activities can be leveraged to improve compartmentalization of apartments. Examples of typical renovation or maintenance scopes and associated opportunities for airtightness improvement are lists below:

- **Flooring replacement:**
  - Seal the wallboard to the floor at the base of the wall (full perimeter of the floor).

- **Painting:**
  - Slide escutcheons away from the wall and seal around pipe penetrations.
  - Remove ventilation and heating/cooling register grilles. Extend and seal the register boot ductwork to the wallboard or ceiling.
  - Seal the wallboard to the ceiling at the top of the wall (full perimeter of the ceiling).
  - If using a dropped ceiling, ensure the demising walls are continuous and seal to the underside of the floor deck above.
  - Temporarily remove switch plate and outlet covers, caulk between electric box and wallboard.

- **Plumbing repairs and maintenance:**
  - Use elastomeric sealant and, where necessary, backing, to seal pipe penetrations behind toilets, shower heads, hot water heaters and under bathroom vanities and kitchen sinks.
  - Slide escutcheons away from the wall and seal around pipe penetrations.

- **Electrical renovations and repairs:**
  - Seal electrical penetrations at all walls and ceilings: electrical panel box, data boxes (i.e. phone), outlets, and switches, behind oven/fridge, telephone box, intercom, in closet ceilings/floors with caulk, foam or with a gasket.
  - Foam penetrations made by electrical fixtures and wiring in attic.
  - Seal ceiling penetrations at light fixtures with foam. When possible switch to surface mounted LED fixtures.
  - When replacing ceiling-recessed fixtures use only Insulation Contact (IC) and Airtight (AT) rated fixtures.

- **Duct cleaning and HVAC maintenance:**
  - Seal exhaust fan housing to ceiling. Remove grilles and seal fan housing to gypsum wallboard with foilmastic tape with UL 181 label.
  - Seal heating and cooling duct boots/register boxes to ceiling/wallboard. Remove register grilles. Install sleeve to extend duct boot to back of wallboard if needed. Tape duct boot (to sleeve and) to wallboard or ceiling with a foil mastic tape carrying UL 181 label.

- **Bathroom renovation:**
  - Tub replacement: ensure that the drywall surrounding the tub is continuous to the floor behind the tub.
  - Use elastomeric sealant and, where necessary, backing, to seal pipe penetrations behind toilets, shower heads, and under bathroom vanities.
  - Use surface mounted medicine cabinets or mount recessed cabinets in an airtight enclosure.
  - Seal at base of bathtubs, toilets and top of shower tile with caulk.

- **Unite entry door maintenance, painting or replacement:**
Buildings Enclosure

- Replace entry door weather stripping if necessary; use V-seal if possible.
- Caulk door frame to wall and floor.
- Foam inside door latches making sure foam fills cavity above, below, and sides of latch opening. Cut any foam that interferes with latch operation.

- **Stair tread replacement or stair renovation:**
  - Caulk gaps around risers, treads, and stringers.
  - Caulk between stringers and walls.

- **Attic hatch installation:**
  - Glue 2 layers of 2 inch rigid foam to back of hatch and use gasket or weather stripping to seal hatch to opening.
  - Ensure the hatch engages gasket or weather stripping when placed in opening.

- **Kitchen renovation:**
  - Repair drywall (ensure it is continuous) and seal all holes and cracks in the drywall behind cabinets and appliances.
  - Seal the wallboard to the floor.
  - Seal all penetrations through the wallboard and use a metal mesh backer for openings wider than 3/8”.
  - If the kitchen includes a dropped soffit, ensure that wallboard at the back of the soffit is continuous to the underside of the floor above.
  - Seal around the range hood exhaust duct penetration through the ceiling/wallboard with appropriate sealant.

---

**VAPOR CONTROL**

Vapor Control is about preventing condensation within walls, roof assemblies, finished basement walls, carpets, the backs of cabinets or wherever moisture can cause problems in a building.

Generally, water vapor moves from warm to cold: Think of a cold can on a warm day or the fog that develops of glasses when one comes out of the cold into a warm coffee shop. Water vapor also moves from more to less, that is from a higher concentration to a lower concentration: Think of how the steam from a hot shower dissipates when the bathroom door is left open.

For the building enclosure it is useful to think of airborne moisture this way:

- The **interior** airborne moisture tends to move from the **inside** to the **outside** in **cold weather**.
- The **exterior** airborne moisture tends to move from the **outside** to the **inside** in **warm weather**.

The strength of water vapor movement in or out increases with the difference in temperature and humidity between the inside and the outside.

In heated and occupied buildings, airborne moisture tends to move through building assemblies toward the outside **unless** and **until** it encounters something vapor impermeable (metal, glass) or a material that resists the diffusion of moisture (OSB, plywood).

In an air-conditioned building, airborne moisture from the exterior tends to move inward through the building assemblies **unless** and **until** it encounters something vapor impermeable such as polyethylene, foil
faced gypsum, glazed tiles or something that offers significant resistance to vapor diffusion such as the back of pressed board cabinets.

For buildings that are in very cold climates and that do not have air conditioning, the inside-to-outside vapor drive is the greater concern. The appropriate vapor control strategy for these situations is to either

- Maintain moisture sensitive materials above the dew point of interior air (e.g., through the use of insulation exterior to those materials), or
- Promote drying to the exterior by using vapor permeable materials in the enclosure assembly and providing ventilation of sheathing (e.g., through the use of a vented cladding).

For any air-conditioned building and for buildings in hot humid climates the outside-to-inside vapor drive is the greater concern. The appropriate vapor control strategy for these buildings is to avoid the use of significant vapor retarders to the interior side of the enclosure and one or both of the following:

- Prevent circulation of exterior air into the enclosure assemblies (e.g., with an airtight enclosure and positive pressurization of the building)
- Use a vapor control material (vapor retarder) to the exterior side of the enclosure.

Most climates in the US present both periods of interior-to-exterior and exterior-to-interior vapor drive.

Water vapor can move through some materials in the direction of drying (toward drier air). Such materials are considered vapor permeable. Examples of vapor permeable materials include uncoated wood boards, uncoated gypsum wallboard, brick, cellulose, air. Water vapor cannot move through vapor impermeable materials. Such materials may be referred to as vapor barriers and include 6 mil or thicker polyethylene, metal, foil facings, glass. Then there are materials that restrict water vapor diffusion but still have some permeability. Vapor semi-impermeable materials include asphalt impregnated kraft facing (e.g., kraft-faced batts), most building felts*, OSB*. Vapor semi-permeable materials include plywood, gypsum wallboard with latex paint. (**What makes things a little more complicated/interesting, is that many common building materials change their vapor permeability with relative humidity.)

Designers must be aware of the vapor permeability of materials used in design or in an existing assembly. Caution and care is required regarding vapor impermeable materials in a building assembly.

For more information see BSC documents Info-312: Vapor Permeance of Some Building Materials, and BSD-106: Understanding Vapor Barriers

**Vapor Control for Slabs and Foundation Walls**

A slab on grade or foundation wall (applies to finished basement) is something of a special case for vapor control. These ground-coupled elements tend to be below the dew point of ambient air in warm weather. Insulating the slab or foundation wall from the ground (e.g., with insulation) will thermally decouple the slab from the ground and reduce the risk of condensation.

The risk of condensation on ground-coupled slabs and foundations is increased when these are insulated on the interior side with an air permeable insulation. Using fiberglass insulation to the interior of a foundation wall should be avoided. But who would ever insulate the top side of a slab on grade? Actually, carpet on a concrete floor acts as insulation and increases the risk of condensation and elevated humidity (i.e. increased risk of biological growth and support of dust mites) at the floor slab. Carpet should not be installed – or allowed to remain – on uninsulated slabs on grade.
O.K. strictly speaking, all materials have some degree of permeability. But for practical purposes, it is helpful to think of relative vapor permeability and to regard some materials as non-vapor-permeable.

The IBC and IRC define vapor permeability of vapor retarders this as follows:

- **Class I**: 0.1 perm or less
- **Class II**: greater than 0.1 perm, less than or equal to 1.0 perm
- **Class III**: greater than 1.0 perm, less than 10 perm.

---

**THERMAL CONTROL**

Once design has established robust water control, air control and vapor control, then it is appropriate to determine how to provide thermal control. Thermal control, like air control, will have a direct impact on resident comfort and on energy bills. Maximizing thermal control will generally allow for heating loads to be met with smaller equipment. High levels of insulation may provide greater flexibility in mechanical system design by making feasible certain heating and cooling strategies that are not appropriate for conventionally insulated buildings. Insulation can also serve as a vapor control strategy where insulation is used to decrease condensation risk and promote drying.

For opaque building enclosure components and assemblies, the insulation value or *resistance to heat flow* is typically expressed as R-value. For windows and glazing the pertinent thermal control is both in terms of heat conduction, or U-factor, and radiant transfer of heat. With windows the solar heat gain coefficient (SHGC) and U-factor are important criteria of window selection. See the Windows BOD section for window requirements and further guidance.

Target opaque element R-values for POAH projects are provided by the International Energy Conservation Code (IECC).
Control heat flow by using the following minimum R-value requirements.

### THERMAL ENVELOPE MINIMUM R-VALUE REQUIREMENTS
(New Construction)

*ci = continuous insulation | *NR = no requirement | *LS = liner system

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 Except Marine</th>
<th>5 and Marine</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attic and other</td>
<td>R-38</td>
<td>R-38</td>
<td>R-38</td>
<td>R-38</td>
<td>R-49</td>
<td>R-49</td>
<td>R-49</td>
<td>R-49</td>
</tr>
</tbody>
</table>

### Walls Above Grade

<table>
<thead>
<tr>
<th>Type</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 Except Marine</th>
<th>5 and Marine</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal framed</td>
<td>R-13 + R-5ci</td>
<td>R-13 + R-7.5ci</td>
<td>R-13 + R-7.5ci</td>
<td>R-13 + R-7.5ci</td>
<td>R-13 + R-7.5ci</td>
<td>R-13 + R-7.5ci</td>
<td>R-13 + R-15.6ci</td>
<td>R-13 + R-17.5ci</td>
</tr>
<tr>
<td>Wood framed and other</td>
<td>R-13 + R-3.8ci or R-20</td>
<td>R-13 + R-3.8ci or R-20</td>
<td>R-13 + R-3.8ci or R-20</td>
<td>R-13 + R-7.5ci or R-20</td>
<td>R-13 + R-7.5ci or R-20</td>
<td>R-13 + R-7.5ci or R-20</td>
<td>R-13 + R-7.5ci or R-20</td>
<td>R-13 + R-7.5ci or R-20</td>
</tr>
</tbody>
</table>

### Walls Below Grade

<table>
<thead>
<tr>
<th>Type</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 Except Marine</th>
<th>5 and Marine</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below grade wall</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>R-7.5ci</td>
<td>R-7.5ci</td>
<td>R-7.5ci</td>
<td>R-10ci</td>
<td>R-12.5ci</td>
</tr>
<tr>
<td>Floor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>NR</td>
<td>R-8.3ci</td>
<td>R-10ci</td>
<td>R-10.4ci</td>
<td>R-12.5ci</td>
<td>R-12.5ci</td>
<td>R-16.7ci</td>
<td>R-16.7ci</td>
</tr>
<tr>
<td>Joist/framing</td>
<td>NR</td>
<td>R-30</td>
<td>R-30</td>
<td>R-30</td>
<td>R-30</td>
<td>R-30</td>
<td>R-30</td>
<td>R-30</td>
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</tbody>
</table>

### Slab On Grade Floor

<table>
<thead>
<tr>
<th>Type</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 Except Marine</th>
<th>5 and Marine</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unheated slabs</td>
<td>NR</td>
<td>R-7.5 for 12&quot; below</td>
<td>R-7.5 for 12&quot; below</td>
<td>R-10 for 24&quot; below</td>
<td>R-10 for 24&quot; below</td>
<td>R-15 for 24&quot; below</td>
<td>R-15 for 24&quot; below</td>
<td>R-20 for 24&quot; below</td>
</tr>
<tr>
<td>Heated slabs</td>
<td>NR</td>
<td>R-7.5 for 12&quot; below</td>
<td>R-10 for 24&quot; below</td>
<td>R-15 for 36&quot; below</td>
<td>R-20 for 48&quot; below</td>
<td>R-20 for 48&quot; below</td>
<td>R-20 for 48&quot; below</td>
<td>R-20 for 48&quot; below</td>
</tr>
</tbody>
</table>

### Opaque Doors

<table>
<thead>
<tr>
<th>Type</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4 Except Marine</th>
<th>5 and Marine</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonswinging</td>
<td>R-4.75</td>
<td>R-4.75</td>
<td>R-4.75</td>
<td>R-4.75</td>
<td>R-4.75</td>
<td>R-4.75</td>
<td>R-4.75</td>
<td>R-4.75</td>
</tr>
</tbody>
</table>

For thermal requirements for windows and doors, see their corresponding BOD sections:

**BOD DOOR SECTION**  [https://www.poahbod.org/doors](https://www.poahbod.org/doors)

**BOD WINDOW SECTION**  [https://www.poahbod.org/windows](https://www.poahbod.org/windows)
One factor that can have a large impact on thermal control is **thermal bridging**. Thermal bridging is the term used for a conductive element that conducts heat energy through or around the insulation. Common examples include steel framing in an insulated assembly, the metal spaces at the perimeter of an insulated glazing unit (IGU), the bare wood panel attic hatch to an otherwise insulated attic... Thermal bridging can significantly degrade the overall thermal resistance of an assembly. The IECC (in Table C402.1.4.1) provides values for Effective R-value for walls with steel studs. For example, a wall with R13 insulation between nominal 3 ½” studs at 16” o.c. would have an effective R-value of less than R6 and a wall with R19 insulation between nominal 6” studs at 16” o.c. would have an effective R-value of about R7. In both cases, this is assuming the insulation is properly installed.

Note that continuous insulation – as required by code in some circumstances – precludes the use of framing through the insulation layer. Where rigid insulation on the outside of a building is interrupted by Z furring, the insulation is not continuous. There are numerous approved methods to attach and support cladding over continuous insulation. It is important that POAH project managers do not allow designers to take the lazy way out by trying to pass off interrupted exterior insulation as continuous insulation.

**Architects should include a thermal boundary drawing showing continuous Insulation for review by Design + Building Performance Department.**
COMPONENTS OF ENCLOSURE

- CRAWLSPACES + BASEMENTS
- DOORS [https://www.poahbod.org/doors](https://www.poahbod.org/doors)
- ROOF/ATTIC [https://www.poahbod.org/roofing](https://www.poahbod.org/roofing)
- SLAB ON GRADE
- WALLS
- WINDOWS [https://www.poahbod.org-windows](https://www.poahbod.org-windows)
CABINETRY

GENERAL INFORMATION & REQUIRED DETAILS:

- All cabinetry to be plywood construction (no particleboard).
- 180 degree hinges, wrap hinge.
- No blind corners.
- All space below the corner of a kitchen countertop must be accessible from either of the adjacent cabinets, or by a special corner cabinet door.
- No Lazy Susans.
- No drawers larger than 18”.
- KCMA certification preferred.
- Hardware (pull) to be included in all cabinetry.
- The cabinetry products in this section are shown as reference. Other cabinetry products that meet the requirements of the spec may be used.
- Seal with foam all plumbing and electrical penetrations behind cabinetry.

BOX CONSTRUCTION REQUIRED DETAILS:

A) FRONT FRAME: 3/4” solid hardwood or thermo-foil vinyl wrapped solid finger jointed lumber or LVL linear veneer lumber Bore and dowel/pocket screw construction frame joinery reinforced with glue/nails. Stiles 1 1/2” wide. Mulls 3” wide. Rails 1 3/4” wide. Stile and top and bottom rails dadoed to receive ends, tops, and bottoms.

B) END PANELS: Standard: Nominal 1/2” thick multi-ply birch veneer plywood dadoed to receive tops and bottoms, with wood grained or laminate on interior/exterior surfaces. All end panels are inserted into dado in face frame and recessed 3/16”.

C) TOP/BOTTOM PANELS: 1/2” thick multi-ply hardwood plywood. Tops and bottoms are set into grooved end panels and front rails glued and stapled. Bottoms are supported by 1/2” thick wood base composite panel.

D) HANGING RAILS: Wall cabinets have 1/2” thick x 2 7/8” multi-ply plywood hanging rail, running full cabinet width at top and bottom. Base cabinets have 1/2” thick x 2 7/8” wood based composite panel hanging rail running full cabinet width at top. Hanging rails are captured between end panels recessed behind.
E) BACK PANEL: 1/8” thick hardwood plywood Securely glued/stapled to end panels and hang rails. Back panels are fully captured on wall cabinets.

F) SHELVES: 5/8” thick multi-ply hardwood plywood, with hardwood veneer banded front edge. Shelves are adjustable in all standard wall and base cabinets.

G) TOE KICK: 4” high and recessed 3 3/8”. 1/2” thick unfinished wood based composite panel captured between end panels. Finish should be covered with infill panel to match finish.

H) BASE CORNER BRACES: High impact, injection molded plastic.

I) DRAWERS: Nominal 1/2” thick multi-ply hardwood front, back, and sides. Drawer bottoms are nominal 1/4” thick multi-ply hardwood inserted into dado in front back and sides. All drawer parts glued and stapled together.


COUNTERTOP REQUIRED DETAILS:

PLASTIC LAMINATE (KITCHEN ONLY):

- Suggested Laminate Manufacturers: Wilsonart or Formica.
- NEMA LD 3 compliant, HGP Grade, and minimum 1.0mm thickness.
- Countertop Construction:
  - Post form (continuous, no visible joints).
  - Front Edge - Continuous, Double Round Over, 1 3/8" high (See Section Below).
  - Backsplash - Continuous one piece raises up wall with 1 1/8" return to wall (See Section Below).
  - Side splash - square edged loose, installed between wall and counter, height to match back splash height.
  - Substrate: Comply with ASTM D 1037.
    - At Sink: Exterior grade plywood or phenolic resin.
    - Particleboard: Compliance with ANSI A208.1 (Grade M-2 exterior glue), 45-lb density and minimum 3/4” thick.
    - MDF: Compliance with ANSI A208.2 and minimum 3/4” thick.
  - Provide BK-20 Backer Sheet if unsupported countertop area.

GRAPHIC OF POST FORM COUNTERTOP:
SOLID SURFACE/ VANITY TOP WITH INTEGRAL SINK (BATHROOMS ONLY):

- Suggested Manufacturers: Swanstone.
- Coordinate size with cabinetry manufacturer.
- Coordinate product with faucet. No open holes or plugs to be used.
- 2 gallon bowl capacity.

DOOR REQUIREMENTS:

- Family properties: 3/4” thick solid wood door frames and drawer fronts.
- Senior Properties: MDF center panels acceptable.
- Standard reveal doors and drawer fronts.

SAMPLE DOOR PRODUCTS:

The cabinetry products in this section are shown as reference. Other cabinetry products that meet the requirements of the spec may be used.

Advanta / Vista / Allwood Series Construction

- 3/4” Thick solid birch door frames and drawer fronts.
- Veneered MDF recessed flat center panel.
- Assembled with five-piece mortise and tenon joinery.
- Square design for all cabinets; offered with slab drawer heads.
- Standard reveal doors and drawer fronts.
- Eased edge profile on outside door frame.

Advanta / Coronet / Allwood Series Construction

- 3/4” Thick plantation hardwood door frames and drawer fronts.
- Solid routed raised panel.
- Square design for all cabinets; offered with slab drawer heads.
- Standard reveal doors and drawer fronts.
- Double rolled edge on outer and inner door profile.

Advanta / Siena SLAB / Allwood Series Construction

- 3/4” thick solid birch door frames and drawer fronts.
- Genuine birch wood veneer flat center panel.
- Square design for all cabinets; offered with slab drawer heads.
- Assembled with five-piece mortise and tenon joinery.
- Standard reveal doors and drawer fronts.
- Double rolled edge on outer and inner door profile.
ADDITIONAL INFORMATION

VOCAB

- PLASTIC LAMINATE COUNTERTOP (POST FORM)
- CABINETRY CONSTRUCTION (BOX)
- CABINET HARDWARE
- CABINET DOORS
DOORS

EXTERIOR DOORS:

LOCATIONS INCLUDE:
Lobby entries, corridors, town homes units, community rooms, mechanical closets, and management offices.

ALL EXTERIOR DOORS SHOULD INCLUDE:
- Install thresholds on silicone type water repellent proper to installation.
- Pan flashing.
- Doors must have VYCOR brand or equal, self adhered flashing installed to all perimeters and sills for protection against air, water and moisture.
- Weather-stripping: vinyl foam compression type or equal around perimeter; vinyl sweep at door bottoms; and aluminum with vinyl seal strip threshold with thermal brake at all exterior doors.
- Preferred: Aluminum Storefront with sidelight and power door operator preferred.

PERFORMANCE REQUIREMENTS OF ALL EXTERIOR DOORS:
- Minimum STC rating of 35
- Exterior doors must be energy star rated, and comply with the following:

<table>
<thead>
<tr>
<th>GLAZING LEVEL</th>
<th>U-FACTOR</th>
<th>SHGC²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opaque</td>
<td>≤ 0.17</td>
<td>No Rating</td>
</tr>
<tr>
<td>≤ ½-Lite</td>
<td>≤ 0.25</td>
<td>≤ 0.25</td>
</tr>
</tbody>
</table>
| > ½-Lite      | ≤ 0.30   | Northern North-Central: ≤ 0.40  
                              Southern South-Central: ≤ 0.25 |

Air Leakage for Sliding Doors ≤ 0.3 cfm/ft²
Air Leakage for Swinging Doors ≤ 0.5 cfm/ft²
STOREFRONT SYSTEMS:
FOR USE AT LOBBY ENTRIES

• May have an automatic opener/closer.
• Insulated glazing.
• Thermally broken framing system and door.

SAMPLE PRODUCT:

Kawneer
Storefront System 451T
2 3/4” x 5” Thermal Exterior Frame System
Field Glazed.

UNIT EXTERIOR DOORS:
FOR USE AT TOWNHOUSES & UNITS WITH DIRECT ACCESS TO EXTERIOR

• Door unit may include sidelight, transom, or lite integral to the door itself.
• Minimum 1-3/4”, 20-gauge six-raised panel steel insulated doors with 26 gauge steel frame.
• Use vinyl exterior jambs instead of wood jambs to prevent rot.
• Preferred: Endura PVC door jambs
• All doors to have peephole. See Door Hardware section below.

SAMPLE PRODUCT:

Jeld-Wen
6-Panel
Pre-Hung Door
Insulated Core
Energy Star
Manufacturer Number:
957077
INTERIOR DOORS:

LOCATIONS INCLUDE:
Unit entries, closets, bedroom, bathroom, mechanical closets, etc.

GENERAL INFORMATION AND REQUIRED DETAILS:

- Minimum 1-3/8" wood or solid/semi-solid core high-density fiberboard (HDF).
- Use flush thresholds for ease of tenants.
- Do not silicone/caulk metal frames to wall board because it affects future shimming as building settles.

**New Construction:**
  - Solid doors should be used at family properties.
  - Hollow core doors are acceptable at senior properties.

**Rehab:**
  - Replace doors in-kind (hollow or solid core depending on tenancy type), unless resident damage warrants upgrade to solid core.

UNIT ENTRY DOOR FROM CORRIDOR:

- Preferred: Jeld-Wen or Mohawk smooth core wood door.
  - Alternate: Six panel solid core wood door with paint finish. If replacing individual units, finish TBD by Property Manager.
- Corridor doors must have adjustable (knock down) frames for future adjustments.
- Doors must comply with fire rating required by code.
  - Fire rating information should be included in door label. Contact basisofdesign@poah.org with questions.
- All doors to have peephole. See Door Hardware section below.
- Clear width of a door opening must be 32 inches minimum to satisfy Fair Housing Act Regulations.
  - 32 inch clear width is achieved with a 36 inch wide door.
- Weatherstrip all unit entrance doors using:

**Q-Lon**
Door Weatherstripping at Head and Jamb
Polyethylene-clad urethane foam secured to a PVC carrier.
Available at:
Conservation Mart
**Pemko**
Door Weatherstripping at Sill
36" Fire-Rated Door Sweep Aluminum
Manufacturer Number: 307AV36

**SAMPLE PRODUCT:**

**Jeld-Wen**
1-3/4" Thick Flush
Legacy Tru-Oak
Solid Core Slab Door
Manufacturer Number: 984124

---

**UNIT INTERIOR DOORS:**

**BEDROOM:**
- Preferred: Jeld-Wen or Mohawk 1-3/4" hinged solid core doors
- Clear width of a door opening must be 32 inches minimum to satisfy Fair Housing Act Regulations
  - 32 inch clear width is achieved with a 36 inch wide door

**SAMPLE PRODUCT:**

**Jeld-Wen**
1-3/4" Thick Flush
Legacy Tru-Oak
Solid Core Slab Door
Manufacturer Number: 984124
BATHROOM:

- Clear width of a door opening must be 32 inches minimum to satisfy Fair Housing Act Regulations
  - 32 inch clear width is achieved with a 36 inch wide door
- No raised threshold at bathroom doors. If possible, create a flush transition from hallway floor to bathroom floor.

SAMPLE PRODUCT:

**Jeld-Wen**
1-3/4" Thick Flush
Legacy Tru-Oak
Solid Core Slab Door
Manufacturer Number: 984124

CLOSET:

- MAGIGLIDE Bifold Closet Door System.
  - MAGIGLIDE Bi-Fold Closet Door is the ONLY bi-fold closet door available today that meets the HUD Specification for “Heavy Duty Bi-Fold Closet Doors.”

**MAGIGLIDE**
Bi-folding closet door
Flat Panel
Solid Core
DOOR ACCESSORIES

PEEP HOLES:

- To be provided at building entry doors and unit doors. Handicapped units shall be provided with two (2) peep holes, one at the regular height and one in accordance with the ADA standards.

SAMPLE PRODUCT:

HD Supply
190 Diameter
Fire Rated Door Viewer
Satin Chrome
Manufacturer Number: 874140

HARDWARE:

GENERAL INFORMATION AND REQUIRED DETAILS:

- All public, common area and handicap unit doors shall be equipped with lever type hardware or hardware that meets ADA/UFAS design standards.
- Floor mounted door stops to be installed at all doors
- Finish: all hardware to be brushed aluminum, or satin chrome.
- Anti-pick latches with single action lever.
- Keying for common spaces and unit entries:
- Key tree to be reviewed by POAHC.
- No grand master key for dwelling units.
- Include 4-5 cores as additional stock for unit entry doors to accommodate unit turns.
- Site staff to use HandyTrac key control system.
- Main building entries to be equipped with Knox Box rapid entry system for local fire department.

UNIT ENTRANCE (FROM EXTERIOR + FROM CORRIDOR):

- Doors shall be equipped with interlocking mortise lock sets. Operation of the lock set shall include to following features:
  - From exterior of unit entrance, key unlocks both dead latch and deadbolt.
  - From interior of unit entrance, turning knob disengages both dead latch and deadbolt at the same time.
SAMPLE PRODUCT:

Schlage
Mortise Storeroom Lockset
06 Lever
Interconnected Lock
Manufacturer Number:
L9080L 07A 626

UNIT BEDROOMS, CLOSETS & PASSAGE DOORS:

- Use levered handles; no knobs.
- No locks.

SAMPLE PRODUCT:

Schlage
Manhattan Passage Lever
Satin Chrome
Manufacturer Number:
F10MNH

UNIT BATHROOM DOORS:

- Use levered handles; no knobs.
- Required: lock with "pin-hole" reset.

SAMPLE PRODUCT:

Schlage
Manhattan Privacy Lever
Satin Chrome
Manufacturer Number:
F40MNH
UNIT MECHANICAL CLOSETS:

- Use levered handles; no knobs.
- Required: lock with key for site personnel only.
- **Need to be secured and accessed by site personnel only.**

**SAMPLE PRODUCT:**

Schlage
Manhattan Entry Lever
Satin Chrome
Manufacturer Number:
F51MNH

ATTIC HATCHES:

- Access to attic areas for maintenance and/or inspection shall be outside of the dwelling unit, where possible.
  - If inside, access doors will be insulated and furnished with key locks and fire rated where required.

STORM DOORS:

- Unit entrance doors, which open directly to the exterior of the building, shall be equipped with storm doors with screens.
  - Storms and screens must be stored within the door and require no storage of panels during winter or summer.
  - Preferred: Larson Duratech surface - window and screen.

**SAMPLE PRODUCT:**

Larson
Life Core
Storm Door White
DuraTech® Surface
Manufacturer Number:
37050032
UNIT FLOORING

REQUIRED DETAILS FOR ALL FLOORING TYPES:

- UNIT TURNS:
  - To achieve unit compartmentalization, seal joint from new flooring to existing wall with manufacturer approved joint sealant.
  - All new flooring requires a level subfloor free from cracks, bumps and excessive adhesive residue from former floors.
    - Subcontractor must evaluate existing subfloor condition and include associated costs for necessary repairs in their bid.

- REHABS:
  - Moisture testing is required in basement or slab on grade units.
  - To achieve unit compartmentalization, seal joint from new flooring to existing wall with manufacturer approved joint sealant.
  - All new flooring requires a level subfloor free from cracks, bumps and excessive adhesive residue from former floors.
    - Subcontractor must evaluate existing subfloor condition and include associated costs for necessary repairs in their bid.

- NEW CONSTRUCTION:
  - Follow compartmentalization/ air sealing per architect’s details. If not included in details, highlight for architect.
VINYL PLANK OPTIONS:

**Location:** Kitchen, Bath, Living, Bedroom, Entry/Corridor.

**Wear Layer:** 12 mil

GLUE DOWN OPTIONS:

Subfloor condition: even, smooth, and free of cracks.
Size: 8” x 48” planks, 2.0mm thickness.

- Mohawk
- Rexford
- Merino
- Glue-down

- Mohawk
- Rexford
- Ashen Tan
- Glue-down

- Mohawk
- Rexford
- Sequoia
- Glue-down

FLOATING/CLICK OPTIONS:

Subfloor condition: uneven or has large cracks.
Size: 6” x 48” planks, 3.2mm thickness.

- Mohawk
- Empress
- Butterscotch
- Floating/click

- Mohawk
- Empress
- Butterscotch
- Floating/click

CARE & MAINTENANCE

SHEET VINYL OPTIONS:

- **Location:** Bath.
- **Size:** 12'-0” wide rolls, 65 gauge thickness

![Mohawk Divinity Almond Spice](image1)

![Mohawk Divinity Silver Screen](image2)

REQUIRED DETAILS:
All seams must be **chemically welded.**

[ CARE & MAINTENANCE ]


STAIRS:

- **Johnsonite Vinyl Stair Treads**
  - Service Weight
  - 22 Pearl CB

Based on the amount of stair traffic, pick one of the following solutions:
LIGHT TRAFFIC

NOSING
Nosing: Vinyl
Tread: Flooring Material
Riser: Painted

MEDIUM TRAFFIC

TREAD
Nosing/Tread: Vinyl
Riser: Painted

HEAVY TRAFFIC

TREAD + INTEGRATED RISER
All vinyl

RUBBER BASE

- Suggested Manufacturers: Armstrong, Mannington, Johnsonite
- Type TV (vinyl thermoplastic); Group I (solid, homogeneous)
- Length: **Coil stock ONLY**, in manufacturer’s standard length
- Size: 4 inches in height, 0.125” min. thickness, and Cove style

**Johnsonite**
Baseworks
Toe 4"
34 Almond

**Johnsonite**
Baseworks
Toe 4"
09 Clay

**Johnsonite**
Baseworks
Toe 4"
280 Shoreline

CORNER INSTALLATION:

**Factory Made Outside Corners:**
Install factory made outside corners before installing wall base.

**Field-Made Inside Corners:**
Use a utility knife to score the back and notch out the base for inside corners.
COMMON FLOORING

NEW CONSTRUCTION:

- Architect to provide common area floor design for all spaces in building.
- Follow compartmentalization/air sealing per architect’s details. If not included in details, highlight for architect.

REHABS:

- Architect to provide common area floor design for all spaces in building.
- Moisture testing is required in basement or slab on grade units.
- All new flooring requires a level subfloor free from cracks, bumps and excessive adhesive residue from former floors.
  - Subcontractor must evaluate existing subfloor condition and include associated costs for necessary repairs in their bid.

PROPERTY MANAGEMENT:

- Contact Design + Building Performance Dept. for design support.

VINYL PLANK & VINYL TILE OPTIONS:

- **Locations**: corridor, offices, community spaces, elevator lobbies
- **Size**: Size: 4” x 36”, 6” x 36”, 6” x 48” planks, 1/8” thickness.

GLUE DOWN PLANK OPTIONS:

Subfloor condition: even, smooth, and free of cracks.
Size: 8” x 48” planks, 2.0mm thickness.
GLUE DOWN TILE OPTIONS:
Subfloor condition: even, smooth, and free of cracks.
Size: 12” x 24” planks, 2.0mm thickness.

FLOATING / CLICK OPTIONS:
Subfloor condition: uneven or has large cracks.
Size: 6” x 48” planks, 3.2mm thickness.
STAIRS

RUBBER OR VINYL

BASED ON STAIR TRAFFIC, PICK FROM THE SOLUTIONS BELOW.

1. LIGHT TRAFFIC
   NOSING
   Nosing: Rubber or Vinyl
   Tread: Flooring Material
   Riser: Painted

2. MEDIUM TRAFFIC
   TREAD
   Nosing/Tread: Rubber or Vinyl
   Riser: Painted

3. HEAVY TRAFFIC
   TREAD + INTEGRATED RISER
   All rubber or All Vinyl

APPROVED PRODUCT:

ARMSTRONG
Rubber Stair Solutions
Square Pattern
1/8" Thickness
WALK-OFF MAT

APPROVED LOCATIONS:

- Main entry vestibules.
- Area just inside door if no vestibule.
- Inside elevator cabs if elevator is near main entry.
- **New construction:**
  - Work with architect to provide recessed floor to accommodate thickness of mat.
- **Rehab:**
  - It is likely the existing flooring will need to be removed to install new walk-off mat.
  - Confirm any anticipated threshold changes or issues caused by new walk-off mat.

APPROVED PRODUCTS:

- **Shaw Succession II**
  - Size: 24” x 24” tiles or 12'-0” wide roll;
  - .373” thickness
  - Backing: Rubber

- **Mannington Ruffian II**
  - Size: 24” x 24” tiles;
  - 5/32” thickness
  - Backing: Vinyl

- **Mats Inc Cocoa Mat**
  - Size: 6’-7” x 39’-4” roll;
  - 5/8” thickness
  - Backing: Vinyl
CARPET

APPROVED LOCATIONS:

- Carpet only to be installed if approved by POAHC Director of Maintenance.
- Carpet may be installed in certain instances but after pricing is secured for all flooring options.

APPROVED PRODUCTS:

- Shaw Capital III
  - Size: 12’-0” roll, 0.315” thickness

CARPET SPECS

Tile or Broadloom Carpet:

- Construction: Textured graphic loop, Fiber: Branded Nylon 6,6 or Solution Dyed Nylon
- Protective treatment: Soil Protection
- Stitched per inch: 10-13, Gauge: 1/10 - 1/12, Tufted weight: 28.0 to 32 oz
- Secondary backing: Moisture barrier backing
- Environmental: Green Label Plus
- Warrantee: Lifetime warrantee against edge ravel and delamination
- Methane Pill Test (ASTM-D-2859): Passes
- Flooring Radiant Panel Test (ASTM-E-648): Class I
- NBS Smoke Chamber Test (ASTM-E-662): <450
- Electrostatic Propensity test (AATCC): <3.5 KV

RUBBER BASE

APPROVED LOCATIONS

- Corridor, Offices, Community spaces, Elevator lobby

APPROVED RUBBER BASE PRODUCTS:

- Suggested Manufacturers: Armstrong, Mannington, Johnsonite
- Type TV (vinyl thermoplastic); Group I (solid, homogeneous)
- Length: **Coil stock ONLY**, in manufacturer’s standard length
- Size: 4 inches in height, 0.125” min. thickness, and Cove style

CORNER INSTALLATION:

Factory Made Outside Corners:

Install factory made outside corners before installing wall base.

Field-Made Inside Corners:

Use a utility knife to score the back and notch out the base for inside corners.
LIGHTING

GENERAL INFORMATION & REQUIRED DETAILS:

- All fixtures can be purchased through HD Supply, unless noted.
- All lenses must be acrylic; No glass.
- If replacing fixture in same location use LED w/ same lumens or higher to provide effective lighting.
- Energy Star rating Required unless LED fixture.
  - (Note: some LED fixtures are not Energy Star rated).
- Confirm if Energy Star rated fixtures are a requirement by lender or local building code (ex: Chicago properties require task lighting at kitchen sink).
- The project parameters (i.e. size of kitchen, integrated bathroom light and fan, etc.) should be established and architect/ engineer must confirm required light levels will be met with approved fixtures provided and required power will be provided.
- Bulbs should be available at local stores and can be affordably purchased by residents.
- Check with local utility for lighting rebates.
- Do not install exterior fixtures that shine light upwards or into residential unit windows.
- All exterior lighting should be controlled by photocell, not timers.
- All LED fixtures in units to be within 2700-3000 Kelvin color temperature.
  - Fixtures greater than 3000 Kelvin color temperature are acceptable in common areas only.

![Color Temperature Chart](chart.png)
SURFACE MOUNTED ROUND

APPROVED LOCATIONS:

- Use in locations with hard (non-dropped) ceiling.
- **In-Unit**: All rooms.
- **Common Areas**: Offices, Corridors, Community Rooms, and Lobbies.

SAMPLE PRODUCTS:

<table>
<thead>
<tr>
<th>HD Supply / LED Saturn Carlisle</th>
<th>HD Supply / LED Ceiling Fixture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wattage/Voltage: 27 watt - 120/277 Volt</td>
<td>Wattage/Voltage: 17 watt - 120 Volt</td>
</tr>
<tr>
<td>Finish: Satin Nickel</td>
<td>Finish: Satin Nickel</td>
</tr>
<tr>
<td>Bulb Type: Integrated LED</td>
<td>Bulb Type: Integrated LED</td>
</tr>
<tr>
<td>Kelvin: 3000</td>
<td>Kelvin: 2700</td>
</tr>
<tr>
<td>Diameter: 14.5&quot;</td>
<td>Diameter: 13.5&quot;</td>
</tr>
<tr>
<td>Manufacturer Number: CAF142400L30 ENSNDB-50</td>
<td>Manufacturer Number: LED1102A-35-ACR</td>
</tr>
</tbody>
</table>

SURFACE MOUNTED – LINEAR

APPROVED LOCATIONS:

- Use in locations with hard (non-dropped) ceiling.
- **Units**: Avoid using in units unless replacing in kind.
  - Linear lights typically are above 3000 Kelvin, and have a very blue/white color.
- **Common Areas**: Offices, Corridors, Community Rooms, and Lobbies.

SAMPLE PRODUCTS:

<table>
<thead>
<tr>
<th>Lithonia Lighting / Futra LED</th>
<th>2'-0&quot; Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wattage/Voltage: 24 / 42 watt - 120 Volt</td>
<td>Manufacturer Number: FMLFUTL 24 840 BN</td>
</tr>
<tr>
<td>Finish: Brushed Nickel</td>
<td></td>
</tr>
<tr>
<td>Bulb Type: Integrated LED</td>
<td></td>
</tr>
<tr>
<td>Kelvin: 4100</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4'-0&quot; Length</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer Number: FMLFUTL 48 840 BN</td>
<td></td>
</tr>
</tbody>
</table>
RECESSED CAN

APPROVED LOCATIONS:

- Use in locations with hard (non-dropped) ceiling.
- **In-Unit:** All rooms.
- **Common Areas:** Offices, Corridors, Community Rooms, and Lobbies.
- Must use airtight product or sealant if installed in top floor ceiling or in ceilings between units.

SAMPLE PRODUCTS:

<table>
<thead>
<tr>
<th>Cordelia / Retrofit Trim</th>
<th>4&quot; Diameter Retrofit</th>
<th>5&quot; or 6&quot; Diameter Retrofit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wattage/Voltage: 9 / 11 watt - 120 Volt</td>
<td>Manufacturer Number: EVL4730MWH27</td>
<td>Manufacturer Number: EVL6730MWH27</td>
</tr>
<tr>
<td>Finish: Plastic</td>
<td>Kelvin: 2700</td>
<td></td>
</tr>
<tr>
<td>Bulb Type: Integrated LED</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PENDANT

If pendant lighting is requested, please contact Design + Building Performance Dept. with the following information:

- Location of proposed pendant.
- If proposed pendant is replacing an existing pendant fixture.

BATH VANITY

APPROVED LOCATIONS:

- **In-Unit:** Bathroom Vanity, above medicine cabinet or mirror.

SAMPLE PRODUCTS:
HD Supply / LED Vanity
Wattage/Voltage: 17 watt - 120/277 Volt
Finish: Brushed Nickel
Bulb Type: Integrated LED
Kelvin: 3000
Length: 2'-0"
Manufacturer Number:
HDS#326710

WALL SCONCE

APPROVED LOCATIONS:
• In-Unit: Hallways.
• Common Areas: Offices, Corridors, Community Rooms, and Lobbies.

SAMPLE PRODUCTS:

HD Supply / LED Saturn Wall Sconce
Wattage/Voltage: 10 watt - 120 Volt
Finish: Brushed Nickel
Bulb Type: Integrated LED
Kelvin: 3000
Width: 7"
Manufacturer Number:
HDS#326740

CEILING FANS

APPROVED LOCATIONS:
• In-Unit: Living Room, Bedrooms.
• Common Areas: Offices, Corridors, Community Rooms, and Lobbies.
SAMPLE PRODUCTS:

**Craftmade / Tempo**
44-in. Hugger Ceiling Fan, LED Light Kit
Wattage/Voltage: 16 watt
Finish: Brushed Polished Nickel
Bulb Type: Integrated LED
Dimensions: 44”D
Manufacturer Number:
TMPH44BNK5

---

CLOSET LIGHTING

APPROVED LOCATIONS:

- **Units**: Closets.
- **Common Areas**: Closets.
- **Do not use products that protrude far off ceiling down into the closet. Such products are prone to damage while storing items in high areas of closet.**

SAMPLE PRODUCTS:

**Philips Lightolier/ Slimsurface**
Wattage/Voltage: 14 watt
Finish: White Trim
Glare-Free Acrylic Diffuser
Bulb Type: Integrated LED
Kelvin: 2700
Dimensions: 7” Round x 5/8” Profile
Manufacturer Number:
S7R827K10WZ10U

---

DROPPED CEILING LIGHTING

(CEILINGS WITH GRIDS AND CEILING TILES)

APPROVED LOCATIONS:

- **Common Areas**: Offices, Corridors, Community Rooms, Lobbies, Mechanical Rooms.
SAMPLE PRODUCTS:

**Lithonia Lighting / LED**
2x2’ Recessed
Wattage/Voltage: 39 watt
- 120/277 Volt
Finish: White Enameled
Steel Base
Prismatic Acrylic Diffuser
Bulb Type: Integrated LED
Kelvin: 3500
Dimensions: 24L x 24W x 3.25”D
Manufacturer Number: 2GTL2 LP835

**Lithonia Lighting / LED**
2x4’ Recessed
Wattage/Voltage: 39 watt
- 120/277 Volt
Finish: White Enamel Steel Base
Prismatic Acrylic Diffuser
Bulb Type: Integrated LED
Kelvin: 3500
Dimensions: 48L x 24W x 3.25”D
Manufacturer Number: 2GTL4 LP835

UTILITY LIGHTING

APPROVED LOCATIONS:

- **Common Areas:** Mechanical Rooms, Maintenance Shops, & Other Back-Of-House Spaces.
- **SAMPLE PRODUCTS:**

**Lithonia Lighting / LED Wrap Fixture**
Wattage/Voltage: 50 watt - 120/277 Volt
Finish: White Enamel Steel Base
Acrylic Prismatic Diffuser
Bulb Type: Integrated LED
Kelvin: 3500
Dimensions: 48L x 10W x 3”D
Manufacturer Number: LBL4 LP835

EMERGENCY LIGHTING

GENERAL INFORMATION & REQUIRED DETAILS:

- **Emergency lighting to comply with local Building, Fire, & Egress codes**
- The fixture must include a back-up battery within the fixture or be powered by the building's back-up system.
- If replacing in-kind, the fixture has to be located in same location or reviewed by the Fire Department.
SAMPLE PRODUCTS:

**Lithonia Lighting** / Green LED Exit
Wattage/Voltage: 120/277 Volt
Finish: White
Thermoplastic Housing
Bulb Type: Integrated LED
Dimensions: 7-3/16”H x 11-5/8”W x 1-5/8”D
Battery Back Up: 6 Volt
Sealed Lead Calcium Battery
Manufacturer Number: EXG LED EL M6

**Lithonia Lighting** / Two-Light Emergency Unit
Wattage/Voltage: 120/277 Volt
Finish: White
Thermoplastic Housing
Bulb Type: Integrated LED
Dimensions: 4-1/4”H x 10-1/4”W x 3-5/8”D
Battery Backup: NiCad Battery
Manufacturer Number: ELM2 LED M12
  - Use in stairways & corridors.

**HD Supply** / Photocell Wall Pack
Wattage/Voltage: 27 watt - 120 Volt
Finish: Bronze
Polycarbonate Housing

LIGHTING CONTROLS

APPROVED LOCATIONS:
  - **Common Areas**: corridors, public bathrooms, offices, community rooms.

RECOMMENDATIONS:
  - Use occupancy or daylight sensors.
  - Emergency lighting **cannot** be controlled with daylight or occupancy sensors.
  - All exterior lighting should operate on photocells, no timers.

SAMPLE PRODUCTS:

**Lithonia**
Passive Infrared Switch Wall Occupancy Sensor
White
Manufacturer Number: 184LCT

**Lithonia**
Passive Infrared Switch Wall Occupancy Sensor
White
Manufacturer Number: 184LCT
Frosted Prismatic Acrylic Lens
Bulb Type: Integrated

LED  
Kelvin: 4100  
Dimensions: 10-3/4H x 6-1/4W x 5-1/2"D
Manufacturer Number: HDS 326111

EXTERIOR WALL MOUNTED

APPROVED LOCATIONS:

- **Exterior:** at unit and building entry.

SAMPLE PRODUCTS:

HD Supply / Mission LED Wall Fixture w/ Photocell  
Wattage/Voltage: 9 watt - 120 Volt  
Finish: Black Aluminum Housing  
White Acrylic Diffuser  
Bulb Type: Integrated LED  
Kelvin: 5000  
Dimensions: 9-1/2H x 7-3/4W x 4-1/2"D  
Manufacturer Number: BSSW8700L30BK

---

EXTERIOR CEILING MOUNTED

APPROVED LOCATIONS:

- **Exterior:** at unit and building entry.
SAMPLE PRODUCTS:

**Lithonia / LED Versi Lite**
- Wattage/Voltage: 28 watt - 120 Volt
- Finish: Textured Bronze w/ White Acrylic Diffuser
- Bulb Type: Integrated LED
- Kelvin: 3000k
- Dimensions: 13" Diameter
- Manufacturer Number: FMML 13 830 WL DDBT

**EXTERIOR POLE**

GENERAL INFORMATION & REQUIRED DETAILS:
- If replacing in-kind, use at least the same watt bulb.
- For new construction electrical engineer should provide lighting plan that provides the appropriate lumens for design.

APPROVED LOCATIONS:
- **Exterior:** at unit and building entry.

SAMPLE PRODUCTS:

**HD Supply / LED Post-Top Lanterns**
- Wattage/Voltage: 22 watt - 120 Volt
- Finish: Compression Molded Noncorrosive Resin
- Bulb Type: Integrated LED
- Kelvin: 4000k
- Dimensions: 13”H x 22-3/8”W x 10-1/16”D
- Manufacturer Number: 504439
EXTERIOR FLOOD LIGHTS (WALL PACKS)

GENERAL INFORMATION & REQUIRED DETAILS:
• If replacing in-kind, use at least the same watt bulb.

APPROVED LOCATIONS:
• Exterior: typically building mounted.

SAMPLE PRODUCTS:

**HD Supply / Photocell Wall Pack**
- Wattage/Voltage: 27 watt - 120 Volt
- Finish: Bronze
- Polycarbonate Housing
- Frosted Prismatic Acrylic Lens
- Bulb Type: Integrated LED
- Kelvin: 4100
- Dimensions: 10-3/4H x 6-1/4W x 5-1/2"D

Manufacturer Number: HDS 326111
<table>
<thead>
<tr>
<th><strong>Lithonia</strong> / LED Wall Pack</th>
<th>Aluminum</th>
<th>16-1/4&quot;W x 8&quot;D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wattage/Voltage: 39 watt - 120/277 Volt</td>
<td>Bulb Type: Integrated LED</td>
<td>Manufacturer Number: 223859</td>
</tr>
<tr>
<td>Finish: Bronze Cast</td>
<td>Dimensions: 15-3/4”H x 16-1/4”W x 8”D</td>
<td></td>
</tr>
</tbody>
</table>
PAINT

PRODUCTS + APPLICATION

PRIME COAT

- **Sheetrock substrate**: Sherwin Williams- ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 mils wet, 1.5 mils dry.
- **Concrete/ concrete block substrate**: Sherwin Williams- S-W PrepRite Block Filler, B25W25, at 100 to 200 sq. ft. per gal (2.4 to 4.9 sq. m per l).
- **Wood substrate**: Sherwin Williams- PrepRite ProBlock Primer Sealer, B51-620 Series, at 4.0 mils wet, 1.4 mils dry
- **Metal substrate**: Sherwin Williams- S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry

TOP COAT

- **Units + Low Traffic Common Areas**:  
  - All Substrates, except metal:  
    - Sherwin Williams- ProMar 200 Zero VOC Latex, B31-2600 Series, at 4.0 mils wet, 1.6 mils dry, per coat.
- **High Traffic Common Areas + Metal Substrates**:  
  - All elevator walls, handrails, and doors in common areas.  
    - Sherwin Williams- Pro Industrial Waterbased Alkyd Urethane Enamel, B53-115- Series, at 1.4-1.7 dry, per coat.

PREPARATION:

- Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted.
- Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulates.
- Using a damp sponge or cloth, wipe to remove the surface dirt and marks and any excess cleaner. For difficult stains, some scrubbing may be necessary.
- Do not allow the cleaner to dry on the surface.
- **Review hazardous material O&M for locations of lead paint or asbestos-containing substrate. Any work on these surfaces must follow directions in O&M.**
APPLICATION:

- Apply paint in accordance with manufacturer’s directions. Use applicators and techniques best suited for substrate and type of material being applied.
- Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F
- **Brush:** Use a nylon/polyester brush.
- **Roller:** Use a 3/8” - 3/4” nap synthetic cover.
- **Spray—Airless:**
  - Pressure: 2000 psi
  - Tip: 017”-.021”

UNIT PAINT COLORS

**WALLS:**

Sherwin Williams
6378
Crisp Linen
Eggshell

**CEILINGS:**

Sherwin Williams
7002
Downy
Flat

**TRIM:**

Sherwin Williams
7102
White Flour
Semi-Gloss

**DOORS:**

Sherwin Williams
7102
White Flour
Semi-Gloss

COMMON AREA PAINT

NEW CONSTRUCTION + REHAB:

- Architect to provide paint design for all interior common areas.
  - Paint design should include colored floor plan.

PROPERTY MANAGEMENT:

- Contact Design + Building Performance Dept. for design support.
PLUMBING

GENERAL INFORMATION & REQUIRED DETAILS:

• These products are chosen based on their ability to conserve water, and their availability at HD Supply Solutions.

AERATORS

GENERAL INFORMATION & REQUIRED DETAILS:

• Finish: Chrome or Stainless.
• Water Flow:
  o Bathroom Faucets: 0.5 gpm maximum.
  o Kitchen Faucets: 1.5 gpm maximum.
• Aerator to be flushed yearly or if resident complains of weak flow.
  o Aerators help control water usage, so it is important they are maintained.
  o Removal of aerator will result in higher water bills.

BATHROOM FAUCET AERATOR:

Neoperl
Low Flow Dual Thread Chrome Aerator 0.5 GPM 6Pk

• 0.5 GPM
• Chrome
• Manufacturer Number: 50 0420 3

If residents are removing aerators, use the following vandal-proof aerator and key:

Neoperl
Dual Thread Aerator 0.5 GPM 6Pk Vandalproof

• 0.5 GPM
• Chrome
• Manufacturer Number: 50 0020 2

Neoperl
Vandal Proof Aerator Removal Tool

• Manufacturer Number: 50 0030 5
KITCHEN FAUCET AERATOR:

Neoperl
Dual Thread Aerator 1.5 GPM 6Pk

- 1.5 GPM
- Chrome
- Manufacturer Number: 50 0310 3

BATHROOM FAUCETS

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: Chrome or Stainless.
- Water Flow: Maximum of 0.5 gpm.
- Aerator to be flushed yearly or if resident complains of weak flow.
  - Aerators help control water usage, so it is important they are maintained.
  - Removal of aerator will result in higher water bills.
- Single tap/lever is preferred.
- Coordinate faucet selection with sink holes (No holes can be empty).
- Required: pop-up drain.
- Faucets in ADA units must be ADA compliant.
- Faucets in common bathrooms must be ADA compliant.

SAMPLE PRODUCTS (UNIT):

American Standard
Reliant 3 Lavatory Faucet

- 0.5 GPM @ 60 PSI
- Chrome
- Single Handle
- ADA compliant
- Manufacturer Number: 7385050.002

Seasons
Anchor Point Two-Handle Bath Faucet

***0.5 aerator must be installed separately. ***

- 1.2 GPM @ 60 PSI
- Chrome
- Two Handle
- ADA compliant
- Manufacturer Number: 412395.00
SAMPLE PRODUCTS (COMMON):

**Delta**

Metering Faucet

- 0.5 GPM @ 60 PSI
- Chrome
- Single Handle
- ADA compliant
- Manufacturer Number: 87T105

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**KITCHEN FAUCETS**

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: Chrome or Stainless.
- Water Flow: Maximum of 1.5 gpm.
- Aerator to be flushed yearly or if resident complains of weak flow.
  - Aerators help control water usage, so it is important they are maintained.
  - Removal of aerator will result in higher water bills.
- Single tap/lever is preferred.
- Coordinate faucet selection with sink holes.
- Sprayers: Not permitted.
- Faucets in ADA units must be ADA compliant.
- Faucets in common bathrooms must be ADA compliant.

SAMPLE PRODUCTS (UNIT + COMMON):

**American Standard**

Colony Choice Kitchen Faucet

- 1.5 GPM @ 60 PSI
- Chrome
- Single Handle
- ADA compliant
- Manufacturer Number: 415.700.F15.002

**CFG**

Cornerstone Kitchen Faucet

- 1.5 GPM @ 60 PSI
- Chrome
- Single Handle
- ADA compliant
- Manufacturer Number: CA40512
TUB/SHOWER FIXTURES

GENERAL INFORMATION & REQUIRED DETAILS:

- Water Flow: Maximum of 1.5 gpm and Water Sense Certified.
- Finish: Chrome coating over brass.
- Diverter integral to shower valve.

SAMPLE PRODUCTS

**Niagara**
- Earth Showerhead
- 1.5 GPM @ 80 PSI
- Chrome
- Manufacturer Number: N2915CH

**Niagara**
- Earth Massage Showerhead
- 1.5 GPM @ 80 PSI
- Chrome
- Manufacturer Number: N2945CH
  - Use in ADA Units
  - Use for reasonable accommodations

**Symmons**
- Temptrol Tub-Shower Trim With Valve
- Chrome
- Manufacturer Number: S-86-2-X

**HD Supply**
- Tub Spout
- Chrome
- Manufacturer Number: 424800
SAMPLE SHOWER VALVE REMODEL PLATES:

**CFG**
Tub-Shower Chrome Remodel Cover Plate
Chrome Finish
Converts 2 & 3 handle applications into Single handle
13-1/4" Long x 7-3/16" OD
Manufacturer Number: 40913

SAMPLE SHOWER TRIM REPLACEMENTS:

**Symmons**
Replacement Temptrol Trim
Chrome
Manufacturer Number:
GSYM-100

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TOILETS

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: White.
- Water Flow: Maximum of 0.86 GPF required.
- Comfort Height Toilets: Required.
- Two-Piece Toilets: Preferred.
- Bowl Type: Elongated Bowl Required.
  - For rehabs: Verify elongated bowl can fit within existing bathroom and maneuverability is not compromised.
- Note Rough-In Size and if **Rear/ Wall Discharge** vs. **Floor-Mounted** (Rehab only).
SAMPLE PRODUCTS:

**Niagara Stealth Back Outlet**
- Elongated Toilet Bowl
- ADA compliant
- Manufacturer Number: N7799

**Niagara Stealth Floor Outlet**
- Elongated Toilet Bowl
- ADA compliant
- Manufacturer Number: N7717

**Niagara Stealth 0.8 GPF Toilet Tank**
- 12” Rough-In
- Floor Or Back Outlet
- Manufacturer Number: N7714T

**Niagara (ADA) Stealth ADA Button**
- Manufacturer Number: C7715-ADA
- Use in ADA units.
URINALS

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: White Porcelain.
- Water Flow: Maximum of 0.5 GPF required.

SAMPLE PRODUCTS:

TOTO
Modern Urinal

- 0.125 GPF
- Manufacturer Number: UT105U

American Standard
Flushometer Valve
Manual Urinal

- 0.125 GPF
- Manufacturer Number: 6045013.002

KITCHEN SINKS

GENERAL INFORMATION & REQUIRED DETAILS:

- Finish: Type 302, 18 gauge Stainless Steel.
- Bowl Number: Double Bowl Preferred.
- Depth: 8” for standard unit; Maximum of 6.5” in ADA units.
- Drain Size: 3.5” Minimum.
- Holes: 3 holes or less, no plugs permitted.
- Sprayers: Not permitted.
- Required Mounting Details: Self-rimming.

SAMPLE PRODUCTS:

Moen
33 x 22” Double Bowl Kitchen Sink

- Stainless Steel
- 3-Hole
- 8" Depth
- Manufacturer Number: G202133

Aspen
33 x 22” Double Bowl Kitchen Sink

- Stainless Steel
- 3-Hole
- 8” Depth
- Manufacturer Number: 500872
Dayton
25" x 22" Single Bowl Kitchen Sink

- Stainless Steel
- 3 Hole
- 8" Depth
- Manufacturer Number: DSE125223

*If counter space is limited, consider single bowl sink.

GARBAGE DISPOSALS

GENERAL INFORMATION & REQUIRED DETAILS:

- **New Construction + Rehab**: garbage disposals are not permitted.
- **Property Management**: remove garbage disposals when they warrant repair or replacement.

WALL HUNG SINKS

GENERAL INFORMATION & REQUIRED DETAILS:

- Must be ADA compliant.
- Finish: White Porcelain.
- Size: 2 gallon min. capacity.
- Holes: 3 holes or less, no plugs permitted.
- Integral Wall Bracket Supports required with assembly.
- Insulation/padding required for exposed pipes.
- Pop-up drain required at unit bathroom sinks, but not in common area sinks.
- All sinks to have overflow drain.
SAMPLE PRODUCTS (UNIT + COMMON):

American Standard
Declyn Wall Hung Lavatory Sink
- White China
- Manufacturer Number: 0321.026

Gerber
Monticello II Wall Hung Lavatory Sink
- White China
- Manufacturer Number: G0012654

VANITY SINKS

GENERAL INFORMATION & REQUIRED DETAILS:
- Use solid surface vanity tops (sink integral with countertop).
- Width: 37" min or match existing.
- Holes: 3 holes or less, no plugs permitted.
- Pop-up drain required at bathroom sink.

PREFERRED PRODUCTS (UNIT):

Modular Vanity Tops
Solid White Cultured Marble Vanity Top And Bowl
- 37W x 22"D
- 4" Faucet Centers
- Integrated Backsplash
- Fits 36W x 21"D Bathroom Vanities
- Part Number: 404384

Swanstone
Solid Surface Lavatory with Integral Sink
- Color: Bisque (018), or match existing
EXAMPLE VANITY BASE CABINET:

Seasons
36W x 32-1/2H x 21"D White Bath Vanity Base Cabinet

- 3/4 Solid Wood Face Frame
- 1/2 Plywood Construction
- Part Number: 283759

BATHHTUBS

GENERAL INFORMATION & REQUIRED DETAILS:

- Materials: White porcelain enameled steel tub.
- Size: 60” minimum length or match existing.

SAMPLE PRODUCTS:

Bootz
Aloha Bathtub

- Right Hand Drain
- Enameled Steel
- Manufacturer Number: 011-2364

Bootz
Maui Bathtub

- Right Hand Drain
- Enameled Steel
- Deep Soaker
- Manufacturer Number: 011-2340-00

APPROVED TUB RETROFIT PRODUCTS:

To be installed upon resident reasonable request.

Cleancut
Step-In Kit

- Converts Bathtub To Step-In Shower
- White
- Medium Width
- Manufacturer #: S-W-M
ROLL-IN SHOWERS

GENERAL INFORMATION & REQUIRED DETAILS:

- Accessories: Folding shower seat and hand-held shower head.
- Trench Drain: Required at shower threshold.
- At senior properties where ADA units are being built (new construction) or rehabbed, as many bathrooms as possible should be converted to roll-in showers.

APPROVED PRODUCTS:

- Swanstone in Bisque (018).
- Porcelain 12”x12” tiles in natural or light color.

TRENCH DRAIN DETAIL:
SAMPLE WATER MANAGEMENT PRODUCTS:
At locations where a trench drain installation is not feasible, the follow products are recommended to keep water inside the shower. These collapsible water retainers keep water within the shower, but compress under a wheelchair or foot:

- **Swan**
  - Collapsible Shower Floor Water Barrier

- **Best Bath Systems**
  - Rubber WaterStopper Kit

TUB/SHOWER SURROUNDS

GENERAL INFORMATION & REQUIRED DETAILS:

- Wall Surround: Solid surface or tiled tub surround.
  - Acceptable manufacturers and finishes:
    - Swanstone in Bisque (018).
    - Porcelain Tile - white 12”x12” tiles.
- Required Details: One of the following details must be incorporated into the shower design to accommodate the introduction of grab bars or other reasonable accommodation requests in the future.
  - Install 3/4” plywood continuously on all shower walls between studs and waterproof backerboard.
  - According to the Fair Housing Act Design Manual, install blocking in the following locations:
Foot (Control Wall)

- Some people benefit from a vertical bar here; this is a recommended additional reinforced area.

- Additional recommended reinforced area.

Head

- Additional reinforced area recommended.

Back Wall

- 6" max.

- 48" min.

- 38" min.
SAMPLE PRODUCTS:

**Swanstone**
3-piece tub surround.

- Color: Bisque (018), or match existing

SAMPLE SHOWER KIT SIZES:
ROOFING

POAH's Portfolio includes sloped and flat roofs. Some, but very few, details overlap between these two roof types. This section relates to sloped roofs.

ROOF SYSTEM COMPONENTS (SLOPED ROOFS)

All steep-slope roof systems (i.e., roofs with slopes of 25 percent or more) have the following basic components:

- **Roof structure**: rafters and trusses constructed to support the sheathing.
- **Sheathing**: boards or sheet material that are fastened to roof rafters to cover a house or building.
- **Roof underlayment**: typically asphalt felt applied in rolls directly on top of the roof sheathing. The underlayment is a second line of weather resistance and helps shed water.
- **Flashing**: a water impervious component used to 1) diverts water away from openings in- or vulnerable areas of- the enclosure, and/or 2) directs water from behind cladding in an assembly to the exterior. In a roof assembly, flashing is often sheet metal or rubberized membrane material. Flashing occurs in a roof system at valleys, in locations that the roof abuts a wall (step flashing), and at chimneys.
- **Roof covering**: asphalt shingles, tile, slate or metal that protect the underlayment and sheathing from weather.
- **Drainage**: a roof system's design features, such as shape, slope and layout that affect its ability to shed water.
- **Insulation**: Insulation in attics to meet the following minimum R-values, and to be installed evenly while not blocking soffit vents:
  - R-30 in climate zones 1, 2, and 3
  - R-38 in climate zones 4 and 5
  - R-49 in climate zones 6, 7, and 8
- **Ventilation**: ridge vents, eave vents, and gable-end vents move air through an attic, reducing the amount of heat and moisture that contributes to mold issues. Baffles should to be used along eaves to promote air movement. Roofs for a vented attic or vented roof configuration include provisions for ventilation. A roof that meets the requirements for an unvented roof does not need ventilation.
- **Airsealing**: Ideally all attic penetrations (light fixtures, plumbing vents, etc) are sealed to isolate attic from space below.
REQUIREMENTS:

ROOF STRUCTURE:
All new roofs need to be engineered to support a future PV or Solar Thermal system.

ROOF PENETRATIONS:
All new roof design and construction must coordinate with plumbing and mechanical design/trades to locate vents on the North slope. Roof surfaces that face South or within 90 degrees of South should be maintained clear of obstructions.

REQUIRED DETAILS:

- **Roof cricket:** provide a roof cricket for each chimney, skylight curb or other such penetrations or obstruction with a face perpendicular to the roof slope. The cricket shall extend at least 4” past the sides pf the obstruction.
- **Kick-out flashing:** a flashing shall be installed to divert water away from where the eave of a sloped roof intersects a vertical sidewall. A kick-out/diverter flashing should also be installed at the end of eaves where a gutter is installed at the eave and the gutter does not extend past the end of the eave.
- **Ice barrier:** a self-adhering polymer-modified bitumen sheet shall be installed at the roof edge and extend from the edge of the roof deck to a point not less than 24 inches to the inside of the exterior wall line of the building.
- **Step flashing:** flashings shall be installed at wall and roof intersections. A self-adhering polymer-modified bitumen sheet shall be installed at roof-wall intersections behind step flashing and extending at least 12” up the vertical face of the wall sheathing.
- **Drip edge:** the entire roof perimeter shall be provided with a metal drip edge that has a drip leg extending at least ½” from adjacent fascia or rake trim.
- **Zinc Roof Strips:** use zinc strips to kill moss, algae, and lichen growth on the roof. These vegetation with shorten the life of the roof covering. Strips are typically installed at the peaks of sloped roofs.

GUTTER INSTALLATION:

- Remove existing gutters carefully if they are to be reused.
- Remove any/all screw fasteners at the roof edge.
- Install a metal drip edge between the roof panel and the fascia using a polyurethane sealant and screw fasteners. The drip edge or gutter apron will be inserted at least four (4) inches inside the roof and into the gutter at least two (2) inches. Please specify sealant in bid. The sealant should be Sikaflex-221 Non-Sag Polyurethane Sealant or equal in performance.
- Install 12” flashing termination of ice+water shield on upper edge of drip edge.
- Gutters, existing and new will be installed with the appropriate hangers and spacing to effectively secure them to the building. Hangers should be no greater than 2 feet apart. Please specify hanger in bid.
- Downspouts will be installed effectively to collect and transport water to grade and away from building. Connect gutter to underground storm water system. If using splash-blocks, slope them so water drains away from building. The downspouts should be 4 inc Schedule 40 PVC, painted to
match the direct adjacent building color. Exterior Acrylic Paint specified for plastics should be used. Provide product information with bid.

- Do not install gutter/leaf guard unless approved by POAH Communities Director of Maintenance. If approved, gutter guard should be installed without damaging existing roof or gutter.
- Provide an allowance for any work that is required to ensure that the gutter operates correctly once the guard is removed. Include a scope of work with the allowance. Items that should be reviewed and confirmed include (but are not limited to) verifying that:
  - The metal roof overhang and drip edge forces rain water to enter gutter and not back into building.
  - There are sufficient hangers to support the gutter
  - The gutters are installed with the correct slope to downspouts.
  - The gutter is installed at an effective distance below the roof edge to allow rain water to enter and not back up into building.

**ROOF DETAIL AT GUTTER**

- **ROOF UNDERLAYMENT**
- **12" STRIP OF ICE+WATER SHIELD**
- **DRIP EDGE EXTENDS 4" INTO ROOF AND 2" INTO GUTTER**
- **ICE+WATER SHIELD TO EXTEND DOWN THE FACE OF THE FACIA**
VENTED / UNVENTED ROOFS:  
Where interior finish is installed directly to the underside of roof framing (or to furring or framing installed to the bottom of roof framing) as a vaulted or cathedral ceiling, an unvented roof configuration shall be used.

Unvented Roof Requirements:  
- The roof shall be designed and constructed with an airtight connection from the roof air barrier to the wall air barrier  
- The unvented roof shall meet the provisions of IRC 806.5 regardless of whether the IRC is applicable to the building

Vented Roof Requirements:  
- Ventilation shall be provided at a ratio of 1 square foot of free vent area for each 150 square feet of attic floor—with vents placed proportionately at the eaves (e.g., soffits) and at or near the ridge.  
- Vented roofs shall have continuous vent openings at eaves and at the ridge.  
- Where permitted by the roof configuration, a ventilation channel at least 2” deep shall be maintained clear from eave to ridge at each roof framing bay.  
  - Where a skylight, dormer or other obstruction precludes a continuous eave-to-ridge ventilation channel, provision shall be made for venting framing cavities above and below the obstruction.  
  - In hipped roof or valley configurations where framing bays do not connect to a bay (valley) or ridge (hipped roof), ventilation openings shall be provided to achieve similar ridge and eave ventilation opening area
- Wind blocking shall be installed at the perimeter of the attic to prevent roof ventilation from moving through or bypassing insulation. The wind blocking must be a solid material that is sealed to the wall top plate and to roof rafters. The blocking should extend to within 2” of the roof sheathing and seal to a vent baffle  
- A vent baffle shall be installed to extend along the roof slope to a point 12” above the top of the attic insulation. Vent baffles should be installed with fasteners to attach them to the rafter.

ROOF/ATTIC CONFIGURATION:  
The roof/attic configuration may be vented or unvented.

Vented attic  
A vented attic is appropriate for situations where the roof is relatively simple in form and where there are not conditioned spaces or mechanical distribution located in the roof space. With a vented attic, access to the attic should be restricted. Consider providing access through an exterior gable entry.

Unvented attic  
An unvented roof/attic is appropriate for situations where there is living space or mechanical systems/distribution in the space enclosed by the roof rafters. There are two general approaches for an unvented roof/attic: 1) closed-cell spray foam applied to the underside of the roof sheathing, or 2) rigid insulation and a nail base for the roof covering installed to the top side of the roof sheathing (often with supplemental fibrous insulation immediately below
the roof sheathing). The later approach will readily accommodate a vented roof covering (by providing a ventilation space between the rigid insulation and the nailbase). The unvented roof/attic approach can provide better thermal performance and better resistance to ice dams than a conventional vented attic approach.

PRODUCTS:

- **Architectural Shingles** are preferred over 3-tab shingles, as they have a longer lifespan.

WARRANTY:

- **Labor Warranty:** a separate 10-year labor warranty should be provided by the roofing installer. Most roofs that fail during the roof product warranty do so because they were installed incorrectly and in conflict with the manufacturer’s recommended installation.

VENTILATION & ICE DAMS:

EXISTING ROOFS:

Ventilation is critical to a roof system’s durability and longevity. Never block off sources of roof ventilation, such as louvers, ridge vents or soffit vents, even in winter, or allow bath and kitchen exhaust to terminate in an attic. Without proper air movement and ventilation in an attic, heat and moisture build up and can cause rafters and sheathing to rot, and insulation to become less effective.

Ice dams are a symptom of poor thermal and air leakage control for roofs in cold winter climates. For more information on ice dams and how to avoid them, please view Fine Home Building’s article referenced below.

**Note:** ice dams are essentially impossible in new buildings built to code. Incidents of ice damming in newer buildings may be reason to seek remedy from the designer, the contractor or both.

[HOW TO FIX ICE DAMS](https://static1.squarespace.com/static/57add27ac534a5d1b9a205a7/t/589b67602994ca99ff706c6d/1486579555190/Ice+Dams.pdf)
PROPERTY SIGNAGE

When considering new property signage, POAH’s properties will receive either monument signage, or urban signage. The installation of signage helps identify and brand each property as a POAH Community. The signs also provide information about fair housing, ADA offerings, and leasing websites. All properties need to abide by their local signage zoning ordinances and must receive a permit before any signage is installed.

- Monument Signage: the sign shall be purchased from Creative Sign Design and permitted + installed by a local sign company.
- Urban signs: a local sign installer shall permit, manufacture, and install the new signs.

MONUMENT SIGNAGE

Where: At non-urban properties, monument signs (freestanding signs) are typically installed at the property entrance, or in a significant location to brand the property as a POAH Community.

How: POAH has negotiated pricing with Creative Sign Design (CSD) of Florida to manufacture all new property signs. The project manager at each property is responsible for hiring a local sign installer to permit and install the sign. The following steps should be followed when purchasing and installing a new property sign.

1. Download + review Monument Signage PDF (see button below).
2. Select desired sign type and position it on property.
3. Review selection and placement with Design + Building Performance Department.
4. Contact CSD, and contract with them for new sign(s).
   - http://www.creativesigndesigns.com
   - 830 S. Ronald Reagan Blvd.
     Suite 232
     Longwood, FL 32750
     - (800) 804-4809
5. CSD will produce a shop drawing to be used during permitting.
6. Send Request For Proposals to local sign companies for permitting and installation of new sign.
   Demolition of existing sign may need to be included in scope. Pricing will vary. Contract with selected local sign company.
7. Local sign company to submit CSD’s shop drawing for permit at local zoning/planning department.
8. Local sign company to receive permit from municipality.
9. CSD to manufacture and ship new sign to local sign company.
10. Local Sign company to install new sign.
DOWNLOAD THE MONUMENT SIGNAGE PDF HERE


Monument signage.

DOWNLOAD THE MONUMENT SIGNAGE PDF HERE

A1

A1: Rectangular - 1 sided
Product only: $2,133.20

A2

A2: Rectangular - 2 sided
Product only: $2,616.50

B1

B1: Cutout - 1 sided
Product only: $2,533.62

B2

B2: Cutout - 2 sided
Product only: $3,117.02
C1: Cutout - 1 sided with base
Product only: $2,933.62

C2: Cutout - 2 sided with base
Product only: $3,533.62

D1: Rectangular - 1 sided with base
Product only: $2,733.20

D2: Rectangular - 2 sided with base
Product only: $3,216.50
URBAN SIGNAGE

Not all properties are able to receive a new monument sign. Urban properties typically do not have space for a free-standing sign, or when they do have space, zoning regulations may not allow one to be installed. For these types of properties, a local sign company should provide a wall mounted sign.

1. Review potential urban sign locations and designs with Design + Building Performance Dept.
2. Send a Request For Proposal to local sign companies.
3. Select a local sign company and work with them to finalize a sign design.
   - All designs should incorporate the POAH logo, the property name, property address, ADA logo, www.poahcommunities.com, and the fair housing logo.
4. Local company should then submit design for permit.
5. Once the permit is received, the sign company will manufacture and install the new sign.
6. Local sign companies can also provide exterior wayfinding signage. POAH/POAHC fonts and colors should be used.
INTERIOR WAYFINDING

INCLUDES UNIT, MANAGEMENT, CODE REQUIRED, AND DIRECTIONAL SIGNAGE

Architect to identify all required signs, including those required by code, and provide a sign schedule. Using the Interior Wayfinding Template as a starting point, signage shall be tailored to the specifics of the property. The project manager should pick an accent color for the background of interior wayfinding signs.

INTERIOR WAYFINDING TEMPLATE

https://static1.squarespace.com/static/57add27ac534a5d1b9a205a7/t/58b587269de4bbb8c784215f/1488291627275/BOD-Signage-InteriorWayfinding-170227.pdf
UNIT FINISHES

KITCHEN

HONEY COLOR SCHEME
CABINET: Wilsonart Kalahri Topaz 4588K-07
COUNTERTOP OPTIONS:
- Wilsonart Tungsten EV 4814-60
- Wilsonart Western Suede 4871-60
- Wilsonart Vila Roca 4836-38

TOFFEE COLOR SCHEME
CABINET: Wilsonart Kalahri Topaz 4588K-07
COUNTERTOP OPTIONS:
- Wilsonart Silicon Ev 4811-60
- Wilsonart Golden Travertine 1859K-55
- Wilsonart Vila Roca 4836-38

CAFE COLOR SCHEME
CABINET: Wilsonart Kalahri Topaz 4588K-07
COUNTERTOP OPTIONS:
- Wilsonart Silicon Ev 4811-60
- Wilsonart Western Suede 4871-60
- Wilsonart Vila Roca 4836-38
PULLS AND SPLASH PLATE

PULLS:

Amerock
Allison Curved 96MM Pull
Satin Nickel
BP53003G10

SPLASH PLATE:

Broan
Reversible Backsplash
Almond
EP300108
(To be installed on wall behind stove - install with Almond finish facing out)

BATH:

SHOWER/ TUB SURROUND:

Swanstone
Bisque
(018)

Tub surround Spec:
https://www.poahbod.org/plumbing#plumbing-index-tub-shower-surround

VANITY:

Swanstone
Bisque
(018)

Vanity Spec:
https://www.poahbod.org/plumbing#plumbing-index-vanity-sink
PAINT:

WALLS:
- Sherwin Williams
- 6378 Crisp Linen Eggshell

CEILINGS:
- Sherwin Williams
- 7002 Downy Flat

TRIM:
- Sherwin Williams
- 7102 White Flour Semi-gloss

DOORS:
- Sherwin Williams
- 7102 White Flour Semi-gloss

For Sheetrock walls use:
- **Prime coat**: Sherwin Williams- ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 mils wet, 1.5 mils dry.
- **Top coat**: Sherwin Williams- ProMar 200 Zero VOC Latex Semi-Gloss, B31-2600 Series, at 4.0 mils wet, 1.6 mils dry, per coat.

For all other wall types, see the Paint Spec.
[https://www.poahbod.org/paint](https://www.poahbod.org/paint)
UNIT FLOORING

REQUIRED DETAILS FOR ALL FLOORING TYPES:

- **UNIT TURNS:**
  - To achieve unit compartmentalization, seal joint from new flooring to existing wall with manufacturer approved joint sealant.
  - All new flooring requires a level subfloor free from cracks, bumps and excessive adhesive residue from former floors.
    - Subcontractor must evaluate existing subfloor condition and include associated costs for necessary repairs in their bid.

- **REHABS:**
  - Moisture testing is required in basement or slab on grade units.
  - To achieve unit compartmentalization, seal joint from new flooring to existing wall with manufacturer approved joint sealant.
  - All new flooring requires a level subfloor free from cracks, bumps and excessive adhesive residue from former floors.
    - Subcontractor must evaluate existing subfloor condition and include associated costs for necessary repairs in their bid.

- **NEW CONSTRUCTION:**
  - Follow compartmentalization/air sealing per architect’s details. If not included in details, highlight for architect.
VINYL PLANK OPTIONS:

Location: Kitchen, Bath, Living, Bedroom, Entry/Corridor.

Wear Layer: 12 mil

GLUE DOWN OPTIONS:

Subfloor condition: even, smooth, and free of cracks.
Size: 8” x 48” planks, 2.0mm thickness.

FLOATING/CCLICK OPTIONS:

Subfloor condition: uneven or has large cracks.
Size: 6” x 48” planks, 3.2mm thickness.

CARE & MAINTENANCE

SHEET VINYL OPTIONS:

**Location:** Bath.
**Size:** 12'-0” wide rolls, 65 gauge thickness

- Mohawk Divinity
- Almond Spice

- Mohawk Divinity
- Silver Screen

REQUIRED DETAILS:

All seams must be **chemically welded.**


STAIRS:

- **Johnsonite Vinyl Stair Treads**
  - Service Weight
  - 22 Pearl CB

Based on the amount of stair traffic, pick one of the following solutions:
LIGHT TRAFFIC

NOSING

Nosing: Vinyl
Tread: Flooring Material
Riser: Painted

MEDIUM TRAFFIC

TREAD

Nosing/Tread: Vinyl
Riser: Painted

HEAVY TRAFFIC

TREAD + INTEGRATED RISER

All vinyl

RUBBER BASE

- Suggested Manufacturers: Armstrong, Mannington, Johnsonite
- Type TV (vinyl thermoplastic); Group I (solid, homogeneous)
- Length: Coil stock ONLY, in manufacturer’s standard length
- Size: 4 inches in height, 0.125” min. thickness, and Cove style

- Johnsonite Baseworks Toe 4"
  - 34 Almond

- Johnsonite Baseworks Toe 4"
  - 09 Clay

- Johnsonite Baseworks Toe 4"
  - 280 Shoreline

CORNER INSTALLATION:

Factory Made Outside Corners:
Install factory made outside corners before installing wall base.

Field-Made Inside Corners:
Use a utility knife to score the back and notch out the base for inside corners.
WHEN TO USE THIS BASIS OF DESIGN SECTION:

This BOD section should be referenced and applied in all new construction projects as well as any projects involving work on ventilation components or systems in POAH developments. This section should also be referenced during planning activities to guide the scope of pending renovation to existing buildings.

Ventilation has significant impact on resident health, resident satisfaction with the living environment and on building energy use. Historical building ventilation approaches are unlikely to provide appropriate ventilation in modern buildings or for modern expectations. It should not be assumed that new systems designed to meet current code standards will deliver effective and efficient ventilation in multifamily buildings.

WHY VENTILATE - GENERAL INFORMATION:

The purpose of ventilation is threefold:

1. to remove airborne contaminants,
2. to dilute airborne contaminants that cannot be effectively removed, and
3. to provide fresh air.

Removing airborne contaminants is the work of source control ventilation (ie range hood and bath exhaust fan). Diluting distributed airborne contaminants and providing fresh air is the work of general background ventilation.

Historically, buildings relied upon leaks in the building enclosure and open windows to provide ventilation. Source control ventilation is often ineffective in this approach. General background ventilation rates are neither controlled nor reliable. The random leaks of this approach bring severe detriment to comfort, energy costs and pest control.

More recently, the need for mechanical ventilation was recognized and exhaust fans were used to move air in and out of buildings. While providing more reliable source control ventilation and some control of general background ventilation rates, these systems still relied on a leaky building enclosure. The air exhausted from the building was replaced by air "leaking" back into the building. The "exhaust-only" approach affords no control of where the make-up air comes from. Instead of being fresh air, the make-up air for apartment exhaust may be drawn through building cavities and from neighboring apartments.

Today, our goal is to make our building enclosures air-tight and avoid reliance on random leaks. Therefore, ventilation systems need to include supply air. Balancing supply and exhaust air in a building supports good indoor air quality (IAQ) which is key to providing healthy homes. By removing carbon dioxide, contaminants produced in cooking activities, VOCs and excess moisture/humidity, the ventilation system
improves indoor air quality and increases the long-term durability of the building by limiting the opportunity for mold/mildew growth.

In substantial rehab or new construction, building codes will dictate the amount of fresh air to be supplied to buildings and units (general background ventilation). They also establish the amount of air that needs to be exhausted (source control ventilation) from building spaces where airborne contaminants are often generated such as laundry and trash room, as well as kitchens and bathrooms within apartments. While codes dictate the volume rate of ventilation, the codes do not provide for ventilation effectiveness. For example, the code provisions do not ensure that intended fresh air actually reaches apartments nor that source control ventilation actually captures or contains airborne contaminants. The codes also do not require ventilation systems to be optimized for operation expense and energy use.

Because of this, POAH needs engineers for substantial rehab or new construction projects to design a ventilation system that is not only code compliant but also effective and energy efficient. The ventilation design will be reviewed by Design & Building Performance and the energy consultant (if applicable). The engineer will also be asked to provide data on ventilation system energy use, flow rates and other system parameters as means to demonstrate the energy efficiency and effectiveness of the design.

For property managers and maintenance staff replacing fans or roof top units, please use the preferred products highlighted below. If new equipment is being installed contact POAH for guidance.

**REQUIREMENTS**

***DESIGN METRICS WILL BE MEASURED DURING AND POST CONSTRUCTION***

- **DESIGN PROCESS:** As part of the design work, the mechanical engineer must provide projected energy consumption impact for any modification or new system to be installed. Energy consumption will be verified with energy data post construction.

- **DUCT TIGHTNESS:** When new ductwork is installed the duct leakage shall not exceed the sum of 2.5 CFM50 per register per shaft, and 2.5 CFM50 per floor per shaft during testing. Duct tightness will be measured during construction.

- **FAN EFFICIENCY:** Engineer to provide CFM/watt per specified equipment as well as for the ventilation system in aggregate. Fan efficiency will be measured during building commissioning.

- **AIR CHANGES:** Engineer to provide CFM/bedroom in terms of design ventilation flow to/from apartments as well as for the building ventilation in aggregate. Air flow will be measured during building commissioning.

- **VENTILATION SYSTEM LEAKAGE CONTROL:** For fans installed directly through wall or ceiling finishes (e.g. ceiling bath fan), the fan housing shall be sealed to the interior finish.

- **MOCK UP:** A mock-up must be completed to measure some level of new fans + existing ductwork.
PREFERRED STRATEGIES

***ALL VENTILATION SYSTEM DESIGNS SHOULD BE REVIEWED BY THE DESIGN & BUILDING PERFORMANCE DEPT. USE OF STRATEGIES OTHER THAN THE PREFERRED STRATEGIES REQUIRE APPROVAL FROM THE DESIGN & BUILDING PERFORMANCE DEPT.***

The sections below outline preferred and acceptable ventilation strategies. The strategies are arranged as follows:

APARTMENT OR IN-UNIT VENTILATION STRATEGIES:
- Apartment Source Control Ventilation
- Apartment Background Ventilation

COMMON AREA VENTILATION STRATEGIES:
- Common Area Source Control Ventilation
- Common Area Background Ventilation

EXISTING CONDITION STRATEGIES:
- Existing Conditions Ventilation

APARTMENT SOURCE CONTROL VENTILATION

BATHROOM EXHAUST:
- Every bathroom must exhaust to exterior by using one of the following systems:
  - exhaust fan in the ceiling vented to exterior
  - or, exhaust grill connected to a roof top fan that exhausts to exterior
- Fans should be low noise. **Sone (measurement of sound) should be 0.9 maximum.**
  - Please evaluate ductwork. The low sone cannot be achieved if ductwork is loose, or uninsulated. Exhaust ductwork should also be as short and straight as possible, minimizing the number of bends and angles. If flexible duct is used, the flexible duct shall be pulled taught and excess duct length shall be eliminate.
  - A mock-up must be completed to measure sone level of new fans + existing ductwork.
Ventilation

- Bathroom exhaust fans should **run continuously at a low CFM (~30) and be capable of boosting to higher CFM** when switched on. The low speed setting is typically set at the fan. By running the fan at a low speed continuously the humidity can be controlled in the space without resident intervention. Excessive humidity leads to mold.
  - The boost capability shall include a “delay-off” operation whereby the fan continues to operate for an additional ~15 minutes after the boost is turned off.
  - In order to provide separate background and boost capabilities, there must be two wires to the fan. If the project is a simple fan replacement with no re-wiring, the separate boost capability may be achieved through a special wall switch or controller at the switch box.
  - Contact POAH Design + Building Performance for other options.
- The cost to run a bath fan continuously cost less than $3 dollars a month at ø10 cents a kWh.
- There are add-on modules for the Panasonic fan that can be used instead of continuously running. Occupancy sensors and timers can be programmed to help manage humidity and insure long term durability and good IAQ.
- Airtightness measures:
  - Use mastic or tape to seal any gaps between the ductwork and/or fan housing before installing fan or grill.
  - Seal between ductboot and sheetrock.
- After installation the fan should be measured to confirm appropriate draw.

Bathroom Exhaust Through Shared Exhaust Riser and Roof-Top Fan:

This approach generally employs continuous exhaust flow to achieve source control of excess humidity and odors. Where a shared exhaust riser and roof-top fan are used to provide continuous exhaust from apartment bathrooms, POAH prefers the following measures:

- Seal the shaft to 5cfm at 50 Pascals per floor or less
- Install constant air flow regulators (CARs) for each exhaust intake grille to control exhaust flow rate provided
- Install direct drive exhaust riser fan with barometric control to maintain duct pressure within parameters for CAR operation.

Sample Products:

Panasonic WhisperGreen Select
- CFM: 30 - 110
- Sone: 0.3 - 0.8
- CFM/Watt: 11.5 - 15.1
- Manufacturer Number: FV-05-11VKS1

Panasonic WhisperSense
- Motion/Humidity Sensor
- CFM: 80
- Sone: 0.3
- CFM/Watt: 5.1
- Manufacturer Number: FV-08VQC5
MAINTENANCE:

- Fan should be cleaned every year at minimum:
  - Grill only: Remove register and clean. Clean inside reachable ductwork.
  - Fan: Remove dust and dirt from the fan body using a vacuum, a dirty fan can cause noise issues and loss of efficiency.

KITCHEN EXHAUST:

Building codes allow for kitchen exhaust ventilation to be either 1) intermittent or 2) continuous. Intermittent kitchen exhaust is preferred as it 1) provides for more effective source control (capture efficacy) and 2) results in less aggregate ventilation load.

Codes also allow for kitchen exhaust through either a capture hood over the cooking appliance or through a general area exhaust grille located in the cooking area. The capture hood is preferred as this approach has the potential for reasonably effective capture efficacy of cooking effluent. The general area exhaust is not effective.

- Every kitchen must exhaust to exterior by using one of the following systems:
  - Range hood with integral fan exhausted directly to exterior
  - or, range hood connected to a shared exhaust riser served by a rooftop fan exhausted to exterior
- Sone sound should be maximum 7.
- Kitchen exhaust fan ductwork should never terminate into attic space.
- Kitchen exhaust fan should include back draft damper.
- CFM rating should be minimum 100.
- Assist capacity required for buildings 3 stories and above. May be accomplished using an In-line fan or a roof top unit (RTU).
- Range hood should be deep enough that Range Queen, when installed, is not visible. Range Queen Product information is found within the Rangehood BOD section. See link below.

SAMPLE PRODUCTS:

Sample products are located in the RANGEHOOD page of the APPLIANCES section:

SEE SAMPLE RANGEHOODS HERE

https://www.poahbod.org/appliances#appliances-index-range-hood

MAINTENANCE:

- Range hood should be cleaned every year at minimum:
  - Clean grille.
  - Clean filter.
APARTMENT BACKGROUND VENTILATION

BALANCED VENTILATION WITH RECOVERY:

Balanced energy recovery ventilation (ERV) or heat recovery ventilation (HRV) is preferred in all climates excepting Climate Zone 2a. There are three different general approaches to providing this kind of background ventilation to apartments:

- Individual apartment ERV or HRV
- Floor-by-floor (or other sub-section of the building) ventilation with direct ventilation supply to each apartment
- Central ERV or HRV system with direct supply to apartments

INDIVIDUAL APARTMENT ERV OR HRV

Individual apartment ERV/HRV offers the advantage of apartment-level control, off-the-shelf products and minimized risk of cross-contamination between apartments. It brings the challenges of distributed in-unit equipment that requires periodic maintenance. Ventilation using a separate ERV/HRV for each apartment will require at least one through-wall penetration per apartment for the fresh air intake and stale air vent. However, this approach supports compartmentalization as vertical shafts between floors and penetrations through interior separations are not needed for general apartment ventilation.

SAMPLE PRODUCTS:

DUCTED ERV/HRV WITH CROSS-FLOW OR COUNTER-FLOW ENTHALPY/HEAT EXCHANGE CORE:

These systems will require one or more exterior wall penetrations per apartment. The ducting allows for distribution of ventilation air and can provide a degree of air mixing (to prevent stagnation) within the apartment. (The ventilation may also be integrated with heating and cooling ductwork, provided 1) proper design and controls are implemented to minimize air handler fan energy 2) allow ventilation distribution and 3) prevent short-circuiting of the ventilation supply to the stale air exhaust) If sized properly, these systems can provide bathroom source control ventilation. Typically installation of these systems will occur in soffits or a ceiling plenum in which to run ductwork as well as an area (e.g. upper part of closet) where the equipment could be located. The product shown is RenewAire.
ON THE HORIZON:
As of Spring 2017, two manufacturers are beginning to offer heat pump heat recovery units to the US market. These units offer ventilation and dehumidification with the ability to provide a modest amount of heating and cooling. Once these products achieve a successful track record, they will offer an interesting solution for complete apartment-side conditioning and ventilation for low load buildings.

FLOOR-BY-FLOOR ERV/HRV
This approach can reduce or eliminate the need for vertical ventilation ducts in a building. Economies of scale can be achieved by sharing ventilation equipment among several apartments. These economies may afford the installation of high quality and highly efficient equipment. Some ventilation equipment may offer economizer capabilities to provide free cooling. This approach may present challenges in balancing the ventilation airflows to each apartment. If sized properly, these systems can provide bathroom source control ventilation. Maintenance requirements of the ventilation system are met without the need for access to apartments. This approach entails a challenge of routing ductwork horizontally through corridors (above the ceiling) and of crossing fire separation assemblies with ductwork. In existing buildings, the deck-to-deck height may not be able to accommodate horizontal ductwork along corridors.

CENTRAL ERV/HRV
This approach may be most suitable for existing buildings with existing exhaust and ventilation supply risers through the building. This approach allows for minimizing the number of penetrations through the exterior enclosure but will require many penetrations through assemblies within the enclosure. Economies of scale can be achieved by sharing ventilation equipment among several apartments. Larger and more sophisticated equipment may offer useful functionality such as enthalpy economizer functionality, variable speed demand control, etc. Typically, commercial-sized ERV/HRV equipment offers only modest recovery efficiency (note the exception of Ventacity with its exceptional performance). Maintenance and controls may require specialized skills. A central ERV/HRV will require vertical shafts through the building. This approach will present challenges in balancing the ventilation airflows to each apartment. In existing buildings, the deck-to-deck height may not be able to accommodate horizontal ductwork along corridors.

- Bathroom exhaust risers should be connected to the ERV/HRV.
- Rangehood kitchen exhaust risers should NOT be connected to the ERV/HRV due to grease buildup.
COMMON AREA SOURCE CONTROL VENTILATION

The following preferred strategies apply to trash rooms, janitor closets, elevator machine rooms and other areas outside of apartments where airborne contaminants are generated.

- Seal the shaft to 5cfm per floor or less (measured at 50 Pascals)
- Install constant air flow regulators (CARs) for each exhaust intake grille to control exhaust flow rate provided
- Install direct drive exhaust riser fan with barometric control to maintain duct pressure within parameters for CAR operation.

COMMON AREA/CORRIDOR BACKGROUND VENTILATION

Preferred strategies will ventilate corridors as per the requirements of that space plus additional supply airflow commensurate with common area exhaust of spaces such as trash rooms, janitor closets, elevator machine rooms that are directly attached to the corridor. The ventilation design for new and renovation projects shall not employ the corridor as a make-up air plenum for apartment exhaust (unless the project is over 54 ft in height and is in Chicago where physics of air are different – hence “Windy City”).

HALLWAY VENTILATION BY ERV/HRV:

Providing hallway ventilation by ERV or HRV will significantly reduce the thermal load of the hallway ventilation air. It will bring a slight increase in fan energy however this may be mitigated by high efficiency equipment.

- **NEW CONSTRUCTION:** do not install combustion equipment with an efficiency rating below 83%
- **REHAB:** do not install a new piece of equipment with an efficiency rating equal to or less than the efficiency rating of the unit it is replacing.

MAINTENANCE:

- The manufactures’ guide should be followed for ongoing maintenance. Perform the following at least once a year:
  - Clean/replace filters regularly - typically 3 to 6 times a year depending on equipment.
  - Check belt drives for wear, tension, alignment, debris
  - Tension belt drives per manufacturer’s directions
  - Clean motor and lubricate if necessary
  - Clean heating / cooling coils
  - Clear burner orifices
HALLWAY SUPPLY:

- Applies to buildings with corridors
- Across the portfolio the fresh air systems simply supply air into corridors with the expectation that the air will move through the gap below the door. This is against the code in most locations for fire and smoke reasons. It is also ineffective in making up air lost in kitchen and bathroom exhaust systems.
  - If replacing a make-up air unit, size only for the corridor ventilation and make-up of exhaust in directly attached building services such as laundry, trash rooms, elevator machine rooms, etc. This right sizing typically results in a significant reduction in capacity. Do not simply replace the MAU with an in-kind product.
  - Weather-strip all apartment doors.
- The air provided to common spaces is should be tempered or pre-conditioned.
  - The hallway supply may be tempered or “pre-conditioned” by energy recovery from other common area or apartment exhaust
  - Cooling and dehumidification capacity should be provided for hallway supply ventilation systems in climate zones 5 or lower.
- Ideally ventilation system replacement work would not be completed on a component by component basis. In most of our properties it is preferred that the following occurs to update and drastically improve the performance, both from an indoor air quality and energy efficiency perspective, at one time
  - Air seal the existing ductwork
  - Right size the roof top exhaust fans with direct drive, ECM fans
  - Install CAR dampers at register locations or branch take-offs (only after ductwork is sealed. Applies to buildings 3 stories and above).
  - Right size the corridor MAU to the required hallway ventilation
  - Individual apartments shall be air sealed and compartmentalized (See Building Enclosure section).

MAINTENANCE:

- The manufactures’ guide should be followed for ongoing maintenance. Perform the following at least once a year:
  - Clean/replace filters regularly – typically 3 to 6 times a year depending on equipment
  - Check belt drives for wear, tension, alignment, debris
  - Tension belt drives per manufacturer’s directions
  - Clean motor and lubricate if necessary
  - Clean heating / cooling coils
  - Clear burner orifices
WEATHER-STRIP ALL UNIT ENTRANCE DOORS:

Independent of which common are ventilation strategy is used, all unit entrance doors need to be weatherstripped to maintain unit compartmentalization.

SAMPLE PRODUCT:

**Q-Lon**
Door Weatherstripping at Head and Jamb
Polyethylene-clad urethane foam secured to a PVC carrier.

**Pemko**
Door Weatherstripping at Sill
36" Fire-Rated Door Sweep Aluminum Manufacturer Number: 307AV36

EXISTING CONDITIONS

LAST AND LEAST FAVORABLE OPTION

If there is no feasible way to vent directly into units (i.e., because hallway ceiling height is too low), the following configuration may be allowed. If air is supplied to the corridor in equal (or more) volume to the volume of air exhausted from the apartment units, this is NOT a balanced system. Instead, it creates an unbalanced supply ventilation system for the corridors and an unbalanced exhaust ventilation system for the apartments. Supplying pre-conditioned, filtered outdoor air to the corridors only marginally improves the situation for the adjacent apartments with the unbalanced exhaust ventilation systems. In very few locations it is permissible to assume air supplied to corridors will enter units though an undercut door. Most fire codes don’t allow this. This also eliminates any compartmentalization from unit to hallway.

The steps below are suggested for situations where direct ducted supply air to units or individual/HRV/ERV are not possible.

EXHAUST SYSTEM IMPROVEMENTS:

- Aero seal (or equivalent) all ducts. A big portion of what exhaust fans are pulling from the building is duct leakage. If you can substantially eliminate that, then you could meet the ventilation requirement with smaller equipment and have less air to “balance” on the other side.
- Bathroom exhaust: this can be continuous. This can be the background ventilation for the apartment as well as the source control for the moisture and odor generation in the bathroom. Typically, for anything larger than a studio, the background ventilation rate for the apartment will be larger than the required continuous duty source control needed for a bathroom. Use a constant airflow regulator, sized to the apartment, behind the bath exhaust grille.
- Kitchen exhaust changes from continuous to intermittent through a range hood. This requires fan powered range hoods. 150-200 cfm of exhaust at a range hood with good capture efficacy can remove odors and contaminants (moisture, heat, fine particles, NOx, SOx, etc) reasonably well. Kitchen exhaust through a grille on the wall of a kitchen is really not much better than cracking a window in the living room. The intermittent exhaust will yield a MUCH lower 24/7 average exhaust rate, (more effective contaminant capture and much less energy use). If an engineer insists on making up this intermittent range hood exhaust flow (150-200 cfm per range hood) make sure a realistic diversity factor is used and that the supply is either averaged over 24hr period or the supply ventilation can ramp up during periods of peak range hood use and then back down. The riser fan should be variable speed and controlled by a barometric sensor in the exhaust riser. Maintain a slight negative in the exhaust riser so that exhaust goes up the riser and not back-flow into another apartment. Not too negative because we don’t want range hoods to continually suck at each kitchen. This approach will not work unless ducts are sealed between units and between unit and corridors.

- Compartmentalize between units and between unit and corridors. This will reduce the incidence of airborne stuff being exchanged between units and will make the air in the units and the source of make-up air more likely to be controlled.

With all of these improvements, there is now much less air being sucked out of the building. There would be less fan energy, better contaminant control, less thermal energy to heat the air drawn in by the exhaust, and smaller equipment on the roof.
SUPPLY SYSTEM IMPROVEMENTS:

Supply fresh air to the corridors based on square feet and CFM exhausted from corridor ventilation (something like 6 cfm per 100 sf), trash rooms, janitor closets and elevator machine rooms (if the ventilation supply rate to the corridor is more than the exhaust from connected trash rooms and such, then you shouldn’t need to bump up the supply). The design supply ventilation rate drops to about 1/5 or less of what it previously was.

More likely, you’re to have a situation (especially in Chicago if the building is over 53ft high) where engineers insist on supplying to the corridors an equal volume to the exhaust from the apartments. This is far from optimal and in no way represents a balanced system.

1. Aero seal (or equivalent) all supply ventilation shafts. A big portion of what supply fans are pushing into the building is not making it to the supply diffusers/grilles. If you can substantially eliminate the leakage, then you could meet ventilation requirement with smaller equipment and have less air to precondition at the building owner’s expense.

2. Gather the apartment bathroom exhausts to an ERV that will pre-condition the supply ventilation air. Use a high efficiency ERV (ex: Ventacity) so that the ventilation air is delivered at close to neutral temperature.

3. Carefully balance the supply rates at each grille and periodically re-balance or use CAR devices.

4. Separate heating and cooling from the ventilation air. There is no need for a furnace/DX RTU. Use an ERV that can be carried through a roof hatch or the roof access door.
   - Use fan coils or other heating or cooling in corridors. Source in each corridor making each corridor its own zone (or pair of zones).
   - Dehumidification should be provided. It could be provided either through the central ventilation unit or with the corridor heating and cooling units.

Again, the unit entry doors should be gasketed and weather stripped. And so should doors to stairs, doors to trash rooms, doors to elevator lobbies...
GENERAL INFORMATION:

- Selecting the right windows can save energy and affect resident comfort.
- Window installation will have an impact on building durability (water control) as well as energy use and resident comfort.
- There are three main components of windows that affect performance: the glazing, the frame, and the spacer (material or system that separates the glass panes).
  - Window frames are available in a wide range of materials. Common materials for windows include wood, vinyl, aluminum, and fiberglass.
  - Glazing choices affect how much light the window will transmit and how much of the sun’s heat they allow into interior spaces, and how well they prevent the flow of heat.
  - The spacer is the component that separates two panes of glass from one another and holds them at a fixed separation. Older double-pane glazing units typically have metal spacer that are highly conductive. This can increase the risk of condensation on the glass near the window frame. Newer high performance windows have thermal spaces that help maintain resistance to heat flow at the perimeter of the glazing unit.
- Window rating are based on three primary classifications:
  - U-factor, the amount of heat that a material conducts.
  - Solar Heat Gain Coefficient (SHGC), a measure of how much of the sun’s heat energy is transmitted through the glass.
  - Visual Transmittance (VT), is the percentage of visible light transmitted through the glass.
- Two other voluntary criteria (not required to be included on NFRC labels) are also important to window performance:
  - Air leakage
  - Condensation resistance

Considerations for historic buildings:

- Historic buildings may have restrictions on the type (operation) of window, the frame material, and certain panning details.
- For projects using historic tax credits, all window details will have to be reviewed by local governing authorities.
REQUIREMENTS

SAFETY REQUIREMENTS:

- POAH and POAH Communities Window Limiter Policy: Windows should be limited to opening 4” maximum.

CLICK HERE FOR THE WINDOW LIMITER POLICY

https://static1.squarespace.com/static/57add27ac534a5d1b9a205a7/t/58dd5adfa5790a2b20301b21/1490901728393/Window+Limiting+Device+Policy+and+Implementation+11-12-2014.pdf

REQUIRED DETAILS:

- For each unique window type or wall assembly provide details for the head, sill and jamb conditions.
- The details must clearly demonstrate the water control for the window opening (flashing and drainage).
- The details must also clearly demonstrate how the air barrier of surrounding assemblies will be transferred to the window.

INSTALLATION REQUIREMENTS:

- Window openings shall be fully flashed with flashing at the sill and jambs of the window opening
- The window opening shall have provision to drain any incidental water on the flashing in the window opening. The sill flashing shall drain over the drainage plane of the wall or over the wall cladding.
- The window shall be fully air sealed to the window opening at the entire interior perimeter of the window frame
- For mulled window units, the junction of windows shall include:
  - Provision for drainage from the joint
  - Continuous air barrier across the interior side of the joint
WINDOW FLASHING DIAGRAM
INSTALLED FLASHING FROM BOTTOM UP

STEP 5
FLASHING TERMINATION
Terminate the top edge of flashing with sheathing tape (typical for all but bituminous or butyl self-adhered flashing membranes)

STEP 4
HEAD FLASHING
Head flashing laps over jamb flashing and over window head flange

STEP 3
WINDOW UNIT
Install window unit in opening

STEP 2
JAMB FLASHING
Jamb flashing laps over sill flashing

STEP 1
SILL FLASHING
Sill flashing turns up at jambs
**WINDOW FLASHING AT SILL**

- **SILL FLANGE OF WINDOW** NOT TAPED. ALLOW DRAINAGE
- **SILL FLASHING** LAP OVER DRAINAGE PLANE
- **DRAINAGE PLANE OF WALL ASSEMBLY**
- **INTERIOR SEAL AT ENTIRE INTERIOR PERIMETER OF WINDOW**
- **SILL FLASHING TURNED UP AT INTERIOR SIDE OF WINDOW TO PROVIDE A BACK-DAM**
- **PIECE OF BEVELED SIDING PROVIDES SLOPED SUBSTRATE FOR SILL FLASHING**

**WINDOW FLASHING AT JAMB**

- **JAMB FLASHING EXTENDS PAST INTERIOR FACE OF WINDOW**
- **INTERIOR SEAL AT ENTIRE INTERIOR PERIMETER OF WINDOW**
- **JAMB FLASHING LAP OVER DRAINAGE PLANE OF WALL (AND SILL FLASHING)**
- **DRAINAGE PLANE OF WALL ASSEMBLY**
- **FLANGE TAPED TO JAMB FLASHING OR DRAINAGE PLANE**
PERFORMANCE REQUIREMENTS:

- Windows must comply with local energy code.
- To verify if specific window energy properties comply with the local code requirements, look for the NFRC label.
- The National Fenestration Rating Council (NFRC) label is needed for verification of energy code compliance. The NFRC label displays whole-window energy properties and appears on all fenestration products which are part of the ENERGY STAR program (www.nfrc.org).
- Windows must be ENERGY STAR certified. Often energy star certified windows meet or exceed energy code requirements.
- Proper window installation is necessary for optimal performance, to avoid air and water leakage. Always follow manufacturers’ installation guidelines and use trained professionals for window and skylight installation.
- Window performance is based on location and climate. See below for climate zone requirements. To find your climate zone, click here https://www.energystar.gov/index.cfm?fuseaction=windows_doors.search_climate
- Windows must meet the following U-Factor and Solar Heat Gain Coefficient (SHGC) requirements.
### WINDOW TYPES:

#### SLIDER

#### CASEMENT

#### AWNING

#### HOPPER

#### FIXED

#### SINGLE HUNG

#### DOUBLE HUNG
**TERMS & VOCABULARY:**

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**U-Factor**
The rate of heat loss is indicated in terms of the U-factor (U-value). This rate of non-solar heat loss or gain through a whole window assembly is measured in Btu/hr-sf-°F. The lower the U-factor, the greater a window’s resistance to heat flow and the better its insulating value.

**Solar Heat Gain Coefficient (SHGC)**
The SHGC is the fraction of incident solar radiation admitted through a window. SHGC is expressed as a number between 0 and 1. The lower a window’s solar heat gain coefficient, the less solar heat it transmits. Whether a higher or lower SHGC is desirable depends on the climate, orientation, shading conditions, and other factors.

**Visible Transmittance (VT)**
The VT is an optical property that indicates the amount of visible light transmitted. VT is a whole window rating and includes the impact of the frame which does not transmit any visible light. While VT theoretically varies between 0 and 1, most values are between 0.3 and 0.7. The higher the VT, the more light is transmitted.
**BASIS OF DESIGN**

**Air Leakage (AL)**
AL is expressed in cubic feet of air passing through a square foot of window area (cfm/sf). The lower the AL, the less air will pass through cracks in the assembly. AL is very important, but not as important as U-factor and SHGC.

**Condensation Resistance (CR)**
CR measures how well a window resists the formation of condensation on the inside surface. CR is expressed as a number between 1 and 100. The higher the number, the better a product is able to resist condensation. CR is meant to compare products and their potential for condensation formation. CR is an optional rating on the NFRC label.

**Further Resources:**
- [Efficient Windows Collaborative](http://www.efficientwindows.org/)
- [The National Fenestration Research Council](http://www.nfrc.org/)

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