BOWA
Trade Standards

Revised 2/10/23

BOWA
Transforming Houses *into* Homes

Design & Construction ▪ Additions & Renovations
Metro Area: 703.734.9050 ▪ Middleburg: 540.687.6771 ▪ www.bowa.com

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Where BOWA does not have a specific Trade Standard for a trade:

The intent is for a complete job to high standards, and the ultimate finish and performance is the trade contractor's responsibility.

Work must meet current local code, relevant industry standards, manufacturer's instructions, and the plans and specifications for this project.

Any conflicts, omissions, or opportunities for upgrades or cost savings will be brought to BOWA's attention before finalizing agreement. Any work required to meet local code, plans and specifications, industry standards, or manufacturer's instructions, will be completed for no additional charge beyond proposal pricing.

Trade contractor is responsible for the performance and finish of their work. Do not proceed with work over substrates or previous work unless you know it to be acceptable. Once work is commenced, trade contractor is responsible for performance and finish.

Safety

Subcontractor is responsible for following all needed safety measures. Some of these include:

1. Provide personal protective equipment for workers (examples: safety glasses, hearing protection).
2. Electrical cords will be intact including ground pins. All tools will have needed guards.
3. Any material such as sanding dust, rags, applicator pads, etc., which are subject to spontaneous combustion, will be removed from the building at the end of each work day. None shall be stored closer than 100' from the building.
4. OSHA-compliant scaffolding or fall protection equipment will be used when working at height.
5. Fuels will be stored per OSHA standards in metal cans and removed from the structure overnight.

These are the minimum standards for work on this project. The intent is for a complete job to high standards, and the ultimate finish and performance is the trade contractor's responsibility.

Work must meet current local code, relevant industry standards, and the plans and specifications for this project, in addition to specific information below. Any conflicts, omissions, or opportunities for upgrades or cost savings will be brought to BOWA's attention before finalizing agreement. Any work required to meet local code, plans and specifications, industry standards, or terms below will be completed for no additional charge beyond proposal pricing.

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Any exceptions to these terms must be signed off by BOWA Production Manager in writing.

General

1. Subcontractor will participate in Preconstruction Meeting with both management and field supervisor on site.
2. Items/materials to be left in place, removed for reuse, removed for donation, and/or disposed of will be handled by Subcontractor as directed by BOWA staff.
3. Due care will be taken to avoid damage to items/materials to be saved.
4. Subcontractor will keep work areas including access route(s) reasonably clean during work. Cleanup will be done at the end of each day, and at the end of the demolition work.
5. BOWA normally provides & installs protection materials where needed. Subcontractor will work carefully so as not to damage the protection materials or the surfaces/items they protect. Any damage will be reported to BOWA PM immediately so protection can be repaired.
6. For work on pre-1978 structures, Subcontractor is responsible for following all legal requirements of the RRP and other standards, and providing BOWA with copies of all required certificates & records, at or before final invoice.
    - Firm certification certificate
    - Certified Renovator certificate
    - Recordkeeping page per EPA requirements

Work in Pre-1978 buildings: the Renovation, Repair, and Painting Rule

1. BOWA normally performs Information Distribution (Notification & pamphlet) activities and retains records, which can be made available to Subcontractor on request.
2. BOWA normally has a third-party firm test painted surfaces and will provide a report indicating what paint is considered lead-based paint per regulation.
3. Subcontractor's Certified Renovator will attend Preconstruction Meeting and perform all required activities including supervising jobsite (signage, protection of all work areas, removal of protection, and cleaning), On-The-Job Training of non-certified workers, and recordkeeping per legal requirements.
4. Copy of Firm and Renovator certificates will be on site during work.
5. Written documentation of non-Certified workers' names and training will be on site during work.
6. All required work practices will be followed according to current EPA or State regulations:

[EPA version current 2023:]

Prohibited Methods—do not:

- Use open-flame burning or torching.
- Use heat gun above 1,100º F (degrees Fahrenheit).
- Use machines that remove lead-based paint through high-speed operation such as sanding, grinding, planing, needle gun, abrasive blasting, or sandblasting is prohibited unless such machines are used with attached HEPA-filtered local capture ventilation. No dust may escape shroud during use.

For Inside Jobs

- Place signs, barrier tape, and/or cones to keep all non-workers, especially children, out of the work area. Keep pets out of the work area for their safety and to prevent them from tracking dust and debris throughout the home.
- Remove furniture and belongings from the work area. If an item is too large or too heavy to move, cover it with heavy plastic sheeting and tape the sheeting securely in place.
- Use heavy plastic sheeting to cover floors in the work area to a minimum of 6 feet from the area of paint disturbance. Close and seal doors, close windows.
- Close and cover air vents in the work area. This will keep dust from getting into the system and moving through the home.

For Outside Jobs

- Keep non-workers away from the work area by marking it off with signs, tape and/or cones. Have owner keep pets out of the work area.
- Cover the ground and plants with heavy plastic sheeting to catch debris. The covering should extend at least 10 feet out from the building. Secure the covering to the exterior.
- Close windows and doors within 20 feet of the work area to keep dust and debris from going into the home.
- Move (if possible) or cover play areas and equipment within 20 feet of the work area.

For all jobs

- Some jobs create more dust than can be contained by the methods described above. Certified Renovators should exercise their judgment as to whether those methods provide sufficient containment or if additional precautions are necessary. Jobs that typically require additional precautions include:
  - Demolition.
  - Opening up wall cavities.
  - Removing old drop ceilings.
  - Paint scraping/dry hand sanding.
- These jobs call for additional steps to contain dust inside the work area. In addition to the practices reviewed so far, consider the following:
  - Turning off forced-air heating and air-conditioning systems. This will keep dust from circulating through the house.
  - Interior vertical containment to limit the size of the work area.

Leaving the containment area

- When you leave the work site (the area covered by protective sheeting or the work room), take precautions to prevent spreading dust and paint chips on your clothes and shoes to other parts of the residence.
- Every time you leave the plastic sheeting around the surfaces being renovated, remove the disposable shoe covers and wipe or vacuum your shoes before you step off the plastic sheeting. A large disposable tack pad on the floor can help to clean the soles of your shoes.
- Every time you leave containment, HEPA vacuum and remove your disposable coveralls and disposable shoe covers. Clean and/or vacuum your shoes, and wash your hands and face.

Interior Clean Up

- Always begin cleaning activities by picking up visible paint chips and debris with a wet disposable cloth without dispersing any of it, and sealing this material in a heavy-duty bag.
- When the job is complete, mist the sheeting, fold it (dirty side in), and either seal it with tape, or seal it in a heavy-duty bag. Always fold dirty side inwards, and seal with tape or place in a heavy duty plastic bag. If it is placed in a heavy-duty bag, "gooseneck-seal" the bag and dispose of the bag with the rest of your waste. Dispose of all sheeting as waste by using the correct folding and disposal procedure, after it has been vacuumed.
- Start cleaning at the far end of the work area and work back toward the exit.
- Clean walls with a HEPA vacuum or by wiping with a damp disposable cloth: Start with the tops of the walls, tops of doors and door frames and work down to the floor.
- Thoroughly vacuum all remaining surfaces and objects, including furniture and fixtures, in the work area. The HEPA vacuum must be equipped with a beater bar when vacuuming carpeting or rugs.
- Wipe all surfaces and objects that remained in the work area, except carpeted or upholstered surfaces, with a damp cloth.
- Clean floors with a wet mopping system or a two-sided bucket and mop.
- Clean the entire work area and the area within 2 feet of the work area.
- If using the two-bucket mopping system, repeat the process using a new mop head and clean water. Remember, always keep one bucket for cleaning solution and the other bucket for wringing out the cloth or mop head. You must keep wash and rinse water separate. Change the rinse water often.
- Standards for post-renovation cleaning verification--Interiors.
- A certified renovator must perform a visual inspection to determine whether dust, debris or residue is still present. If dust, debris or residue is present, these conditions must be removed by re-cleaning and another visual inspection must be performed.
- After a successful visual inspection, a certified renovator must:

(A) Verify that each windowsill in the work area has been adequately cleaned, using the following procedure.

(1) Wipe the windowsill with a wet disposable cleaning cloth that is damp to the touch. If the cloth matches or is lighter than the cleaning verification card, the windowsill has been adequately cleaned.

(2) If the cloth does not match and is darker than the cleaning verification card, re-clean the windowsill then either use a new cloth or fold the used cloth in such a way that an unused surface is exposed, and wipe the surface again. If the cloth matches or is lighter than the cleaning verification card, that windowsill has been adequately cleaned.

(3) If the cloth does not match and is darker than the cleaning verification card, wait for 1 hour or until the surface has dried completely, whichever is longer.

(4)After waiting for the windowsill to dry, wipe the windowsill with a dry disposable cleaning cloth. After this wipe, the windowsill has been adequately cleaned.

(B) Wipe uncarpeted floors and countertops within the work area with a wet disposable cleaning cloth. Floors must be wiped using an application device with a long handle and a head to which the cloth is attached. The cloth must remain damp at all times while it is being used to wipe the surface for post-renovation cleaning verification. If the surface within the work area is greater than 40 square feet, the surface within the work area must be divided into roughly equal sections that are each less than 40 square feet. Wipe each such section separately with a new wet disposable cleaning cloth. If the cloth used to wipe each section of the surface within the work area matches the cleaning verification card, the surface has been adequately cleaned.

(1) If the cloth used to wipe a particular surface section does not match the cleaning verification card, re-clean that section of the surface then use a new wet disposable cleaning cloth to wipe that section again. If the cloth matches the cleaning verification card, that section of the surface has been adequately cleaned.
(2) If the cloth used to wipe a particular surface section does not match the cleaning verification card after the surface has been re-cleaned, wait for 1 hour or until the entire surface within the work area has dried completely, whichever is longer.
(3) After waiting for the entire surface within the work area to dry, wipe each section of the surface that has not yet achieved post-renovation cleaning verification with a dry disposable cleaning cloth. After this wipe, that section of the surface has been adequately cleaned. When the work area passes the post-renovation cleaning verification, remove the warning signs.

Exterior Clean Up:

- Collect all dust and debris on the sheeting and place in plastic bags.
- Mist sheeting, fold dirty side inward, and dispose of as waste. This is especially important since you will not be cleaning the ground afterward. You are responsible to make sure you do not leave dust and debris behind.
- The Certified Renovator should visually inspect the plastic after cleaning for dust and debris. Remember the Certified Renovator is required to certify that the work area was cleaned properly at the end of the job.
- Protective sheeting is to be disposed of as waste.
- If work takes place on an exterior porch or stairwell, HEPA vacuuming, wet cleaning and mopping, in addition to a thorough visual inspection, should be used to clean the work area. For such jobs, the cleanup can be similar to cleanup after interior jobs. Collect and dispose of any dust and debris with the rest of your waste.
- A thorough visual inspection of the work area should be conducted after any exterior job. Any visible paint chips, wood chips and other debris from the work area should be collected and disposed of with the rest of your waste.
- A certified renovator must perform a visual inspection to determine whether dust, debris or residue is still present on surfaces in and below the work area, including windowsills and the ground. If dust, debris or residue is present, these conditions must be eliminated and another visual inspection must be performed. When the area passes the visual inspection, remove the warning signs.

7. This contract requires that at completion of work and cleanup, a third party testing firm will perform dust-wipe “Clearance Testing” collected by a certified inspector, risk assessor, or dust sampling technician. The Subcontractor is required to re-clean the work area until the dust clearance sample results are below the clearance standards in 40 CFR 745.227(e)(8) or any applicable State, Territorial, Tribal, or local standard. Clearance must be performed following the procedures in 40 CFR 745.227(e)(8), which allow the use of composite sampling. Not all laboratories will analyze composite samples, so check with your laboratory before collecting them.
    - Normally this firm is hired by BOWA.
    - Subcontractor will accurately notify BOWA 48 hours in advance of completion so testing can be scheduled.
    - Any required recleaning will be performed by Subcontractor.
    - If clearance testing fails, retesting will be paid for by Subcontractor.
8. Record Keeping: The Certified Renovator must prepare a renovation report. The report should name the Certified Renovator designated by the Certified Firm as responsible for lead-safe work practices on that

project, and it should include a copy of the Certified Renovator's certification and the Firm's certification.

- The report must also have a signed record from the Certified Renovator that includes the following:
  - A statement that other workers received on-the-job training from the Certified Renovator and a list of the tasks covered in the training.
  - A statement that warning signs were posted.
  - A brief description of the test kits used, if any, the locations where they were used, and the results.
  - A statement that the work area was contained as required by the rule.
  - A statement that waste was properly contained when stored on-site and when transported off-site.
  - A statement that the work site was properly cleaned after the renovation.

Safety

Subcontractor is responsible for following all needed safety measures. Some of these include:

1. Provide personal protective equipment for workers (examples: safety glasses, hearing protection).
2. OSHA rules for lead paint will be followed on such work, including signage and PPE.
3. Electrical cords will be intact including ground pins. All tools will have needed guards.
4. Any material such as sanding dust, rags, applicator pads, etc., which are subject to spontaneous combustion, will be removed from the building at the end of each work day. None shall be stored closer than 100' from the building.
5. OSHA-compliant scaffolding or fall protection equipment will be provided by Subcontractor and used when working at height.
6. Fuels will be stored per OSHA standards in metal cans and removed from the structure overnight.

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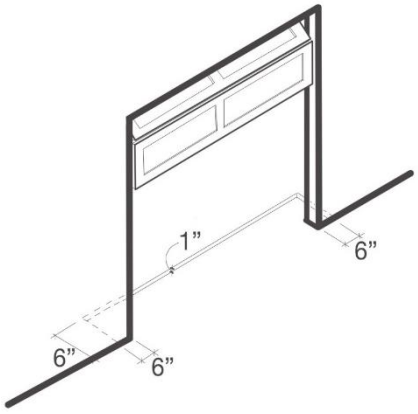
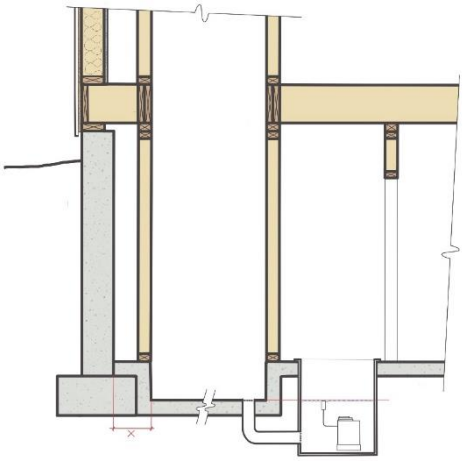
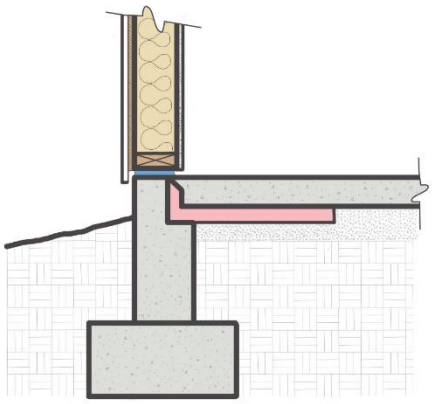
Any exceptions to these terms must be signed off by BOWA Production Manager in writing.

1. Change orders must be approved in writing by BOWA Production Manager prior to work being performed.
2. Meet industry standards such as ACI 332 or ACI 318 (specify in proposal).
3. Minimum PSI (unless noted otherwise by BOWA PDM):
    a. Footings, Interior Slabs 3000 PSI
    b. Walls 3500 PSI
    c. Exterior Slabs 3500 PSI air-entrained
4. Concrete should be placed within 90 minutes of departure time on ticket. Past 90 minutes, if the measured temperature of the concrete is below 100 degrees and slump is adequate, the time may be exceeded. Do not add any water to (retemper) a load past 90 minutes.
5. Water can be added up to the amount on the ticket (the mix design), plus up to TWO gallons per yard, BUT NO MORE. If more slump is needed, the subcontractor must pay for plasticizing additive. (The additional two gallons per yard is already more than the concrete company recommends, but is based on our field experience, and assumes an overdesign in the concrete mix.) This applies only to regular pours, not "Critical Structures" or engineered structures.
6. "Critical Structures" and any engineered structure—follow mix design, no extra water. If site adjustment is desired, have water withheld at the mix plant. High-range water reducer may be used.
7. Calcium chloride admix: Do not exceed 2%. Two, 50 pound bags per 10-yard truckload is about .06% ratio of chloride to the cement. Use non-chloride admix, or maximum 1 bag calcium chloride (0.3%) in structurally-reinforced pours such as retaining walls. WWM and rebar used for crack control is not considered structural. None in outdoor flatwork.
8. Mix design and specifications should be agreed on well ahead of day of pour, so pour can proceed quickly (typically a Pre-Pour meeting will take place between contractor and BOWA). Concrete contractor is responsible for meeting standards. Concrete contractor will alert BOWA PM at time of truck arrival. BOWA Project Manager will promptly verify time from plant, mix, water content, admixes, and temperature on each load of concrete before placement.
9. Wash Out area will be specified by the BOWA Project Manager.
10. Place control joints per plans. Control joints are required on exterior slabs, if not specified in plans must be discussed with BOWA Project Manager. Place 30' on center on interior slabs or per plans.
11. Include structural slab in garage area unless noted otherwise.
12. Fibers are acceptable in lieu of 6x6 mesh, in interior non-structural slabs, if approved by local code. Rebar is acceptable in lieu of 6 x 6 mesh in garage slabs.

13. Water Stop material (ribbed, cast in place gasket) will be installed at cold joints. Bentonite rope, compressible foam waterstop, or equivalent will be installed where new concrete walls connect to existing foundations.
14. Sump crocks to be sealed "radon" type with split top (pipes located in one side, service access panel separate). Examples: Topp Industries C18TS (Ferguson), Jackel SF115 (Ferguson, Milby)
15. In each interior slab, place 3" tee PVC fitting for radon vent, at location specified by BOWA Project Manager. Radon pipe penetration will be separate from sump lid.
16. 6 mil polyethylene (or other code-approved impermeable material) will be placed under interior slabs. Overlap 12" minimum, fit closely around any pipes, piers, other penetrations. Repair or cover punctures/tears before placing concrete.
17. Provide recess at garage door area. Extend 6” in from interior face of wall, and 6” to each side of rough opening.
18. Install anchor bolts for plates per plan and code, normally 1/2" bolts 6’ on center. Note bolts are required within 12” of the end of each wood sill plate. BOWA PM to coordinate layout on site. Provide two bolts at anticipated joint locations (every 16’ unless noted). Review manufacturer’s literature for placement of strap ties and other non-bolt connectors—many require closer spacing, such as 3’ on center. Check plans, galvanized bolts may be required.
19. Elevator pit: verify required depth with elevator provider. Provide and install deep sump crock in elevator mechanical room (or other location per BOWA PM), not in elevator pit. Install drain from elevator pit to sump crock.
20. Areaways: set top step minimum 1” above surrounding grade. At bottom, use 24” x 3” or larger linear drain, instead of round drain. Set bottom landing minimum 4” below door. Per code, all treads and risers same dimensions within 3/8” of each other.







21. Install slab edge insulation per plans and code. Normally R-10 for 2’ down or in from top of slab where slab is near/above grade. Top of insulation can be beveled. Coordinate with BOWA PM.

22. When Concrete contractor hires third-party inspectors, provide copy of documentation to BOWA as well as building code authority.
23. If concrete pump is required, include in your bid price.

Safety

Subcontractor is responsible for following all needed safety measures, including:

1. OSHA-approved rebar caps installed as work progresses.
2. Personal protective equipment for workers (safety glasses, hearing protection)
3. Electrical cords will be intact including ground pins. All tools will have needed guards.
4. OSHA-compliant scaffolding or fall protection equipment will be used when working at height.

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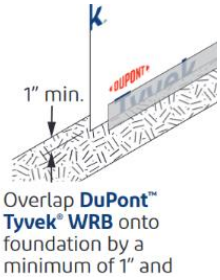
1. Framing will meet local code, American Wood Council National Design Specification for Wood Construction, Truss Plate Institute setting and bracing instructions, and manufacturer's directions for manufactured components, as a minimum.
2. Structure will be built per plans and specifications, which may be more stringent than these listed standards. Any deviation must be approved in writing by BOWA Production Manager.
3. Cuts in treated lumber will have preservative applied per code & manufacturer's instructions.
4. WRB (housewrap) will be installed per manufacturer's instructions.
    a. Install wrap lapped 1-2" below framing onto foundation, and skip-tape or skip-caulk to foundation.

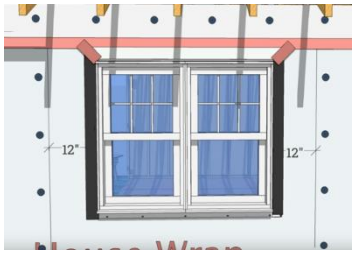


Overlap **DuPont™ Tyvek® WRB** onto foundation by a minimum of 1" and

    b. Button-cap fasteners required. Staples without caps prohibited. Space fasteners 24-48" OC per "Temporary Fastening" instructions unless long exposure or high winds expected.
    c. Fully tape all seams. All tapes will be firmly applied with a roller tool. Any gaps or adhesion issues will be repaired by carpentry contractor.
    d. Caulk wrap to tops of walls.

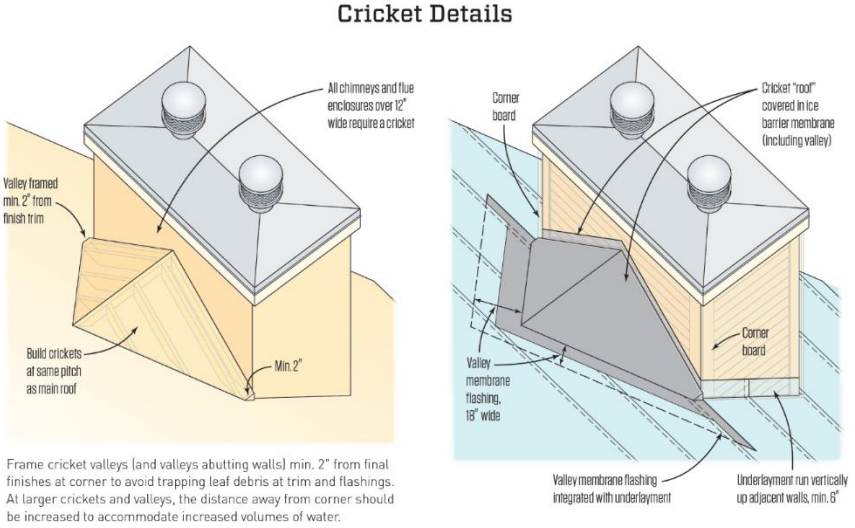
    e. Install shingle-style, with upper pieces lapping over lower pieces to shed water to outside. Follow manufacturer's instructions for laps, usually 6" for horizontal and 12" on vertical. Lap wrap over roof underlayment & flashings to direct water out.

    f. Install to tops of all walls including gables/attic areas. Install before cornice/trim so weather protection is behind trim.
    g. Keep fasteners 8-12" away from window & door openings to make room for tapes & trim.
    h. BOWA standard is DuPont Tyvek Homewrap but this varies by job and must be verified. Any other wrap must be approved in advance.



5. Verify window rough openings with unit size specifications from manufacturer. Carpentry contractor must allow adequate space for drainage at sill, normally ~½" larger than spec, and adequate space on sides for insulation/sealants. TBD in discussion with BOWA production team.

6. Windows will be installed per the minimum requirements of the following codes & standards. Differences will be sorted in site meeting with BOWA Production personnel. We aim to exceed requirements for all of the above standards and proposal should include materials, labor, and tools to meet these standards.
    a. Attached BOWA Window Installation document.
    b. Exterior finish material requirements (for example, through-flashing for brick installed before window sill pan).
    c. Window manufacturer's installation instructions.
    d. AAMA installation standards.
    e. WRB (housewrap) and window flashing tape manufacturer's instructions.
7. Subfloors and low-slope roof sheathing nailed with ringshank nails and/or screwed. Advantech subfloor requires Advantech glue or Polyurethane Subfloor Adhesive, do not use regular subfloor adhesive.
8. Framing connectors will be installed with the correct fasteners per the manufacturer. (Many joist hangers require larger nails than 8d or 10d x 1-1/2" "Hanger Nails".) Carpentry contractor to verify size and number of nails/screws/bolts to meet the loads at the connector.
9. Structure will be plumb, square, and level within 1/8". Install plates and first floor system square and level. Do not follow out-of-square foundation.
10. Crickets and overframe roofs: consult with BOWA Project Manager before framing. Normally should be at least as steep pitch as main roof. Normally valley should not end at corner of chimney or building, maintain 2-6" space away from corner for debris to wash out of valley.



11. Dormers and other rooflines that end on another roof, install subfascia or blocking for roofing underlayment at intersection.
12. Attic catwalks and platforms will be framed to allow full insulation. Include 3/4 nominal material for decking including min. 4 x 8 platform for HVAC as directed by BOWA. Include skirt around accesses to hold insulation from falling down opening.
13. Framing contractor to install blocking at bath accessory, cabinetry locations.
14. Wood exterior trim & cornice work:
    a. Install housewrap to tops of all walls including gables/attic areas, before cornice trim.
    b. All cut ends and/or unprimed end material will be primed before installation with an approved primer (solvent based for wood trim).
    c. Do not use fingerjoint material for exterior—possible exception for porch ceilings where no rain will hit.

d. Synthetic materials—follow manufacturer's directions; use adhesives and fasteners per instructions.
e. See BOWA Siding Trade Standard for additional requirements for panel and other siding installations.

15. If job site conditions prevent full compliance with plans, instructions, code, or any safety requirement, notify BOWA Production Manager in writing before proceeding.
16. Provide written fall protection program per OSHA requirements.

Safety

Subcontractor is responsible for following all needed safety measures. Some of these include:

1. Provide personal protective equipment for workers (examples: safety glasses, hearing protection).
2. Electrical cords will be intact including ground pins. All tools will have needed guards.
3. Any material such as sanding dust, rags, applicator pads, etc., which are subject to spontaneous combustion, will be removed from the building at the end of each work day. None shall be stored closer than 100' from the building.
4. OSHA-compliant scaffolding or fall protection equipment will be used when working at height.
5. Fuels will be stored per OSHA standards in metal cans and removed from the structure overnight.
6. Should fall protection equipment or compliant scaffolding be impossible (at leading edge work for example) then a written fall protection plan will be in place to meet OSHA requirements.

BOWA Standard Window Installation rev. 2/10/23

Contents:

- Materials
- Key Principles
- Step by step instructions:

1. Tyvek cutout at rough opening
2. Sill pan
    a. Slope sill
    b. Prep for cladding
    c. FlexWrap pan
    d. Shim space
    e. Seal to back of unit
3. Side jambs
4. Caulk and set unit
5. Apply optional pressure skirt
6. Complete sides
7. Flash window head
8. Foam rough opening

Materials:

Sill Flashing "Pan" Materials:

Sill tape—use a flexible tape, butyl or acrylic.

- DuPont FlexWrap NF, 9" (2x6 wall), 6" (2x4 wall)
- Zip Stretch Tape or Typar Flashing Flex
- Do not use aluminum flashing by itself, use over tape if desired. Corners leak even when caulked.
- Copper or stainless pans OK (with soldered corners) but not recommended. Expensive and create thermal bridging.
- Plastic pans (Jamsill) OK but not recommended. Expensive and glue joints have leaked.
- Liquid-applied pans: OK but expensive. Prosoco Fast-Flash or Zip Liquid Flash OK.

Shims at sills: plastic or plastic composite shims. Do not use wood shims at sills of wood windows, can soak up water into unit. Wood shims OK for non-wood windows, or for sides of wood windows.

Side Jamb Materials:

Side RO-wrap, use a butyl or acrylic tape. Tape should extend 1" past any window trim out onto wall. Tape should extend into RO at least 2" or at least as far as window unit less extension jambs.

•6-9-12" DuPont Flashing Tape or Straight Flash

- or 6-9-12" Zip Tape,

Henry Fortiflex Butyl, OSI Butyl

• Flange tape (for flanged units): 2-3" Tyvek Tape

Sealants:

- **Acceptable:**

○ OSI Quad **Max** only (Not original Quad)
○ Polyurethane: PL SL40 Window & Door, Sika Pro Construction Sealant, Vulkem, NP1
○ STPs: Tremco Dymonic or Prosoco FastFlash, Zip Liquid Flash
○ Silicone: Dow 780, 790, 791, 795 commercial silicone
○ Dap Dynaflex 230 & Ultra

- **Do not use for windows:**

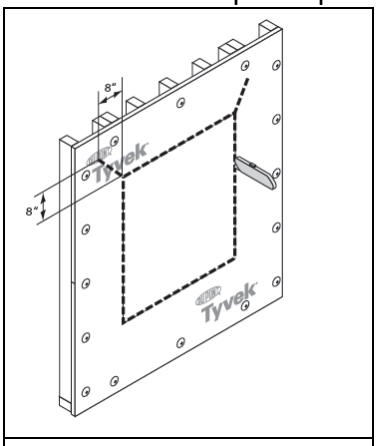
○ Original OSI Quad (only use Quad Max)
○ Home center silicone
○ Dap Alex Plus or other latex caulks

Head Jamb Materials:

- Aluminum head flashing (any wood window or wood trim, any unit when instructions call for it)
- Butyl or acrylic tape: 4-9" DuPont Flashing Tape or Zip Tape
- FlexWrap NF or Zip Flex: curved top units, and jamb corners of no-trim window units

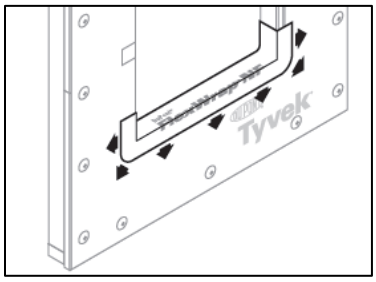
One-Page Simplified Directions:

1. Cut Tyvek:
    a. 1” outside Rough Opening at bottom & sides
    b. Flap at top

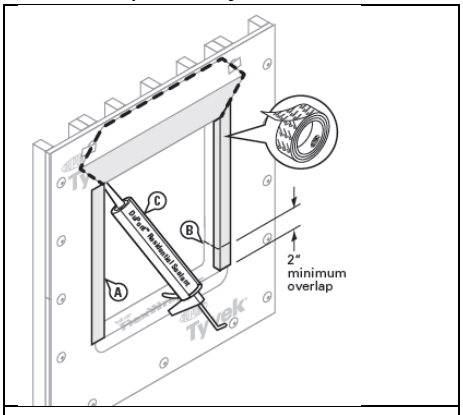


Cut sides & bottom 1” past RO, exposing 1” of sheathing.

2. Slope & tape sill

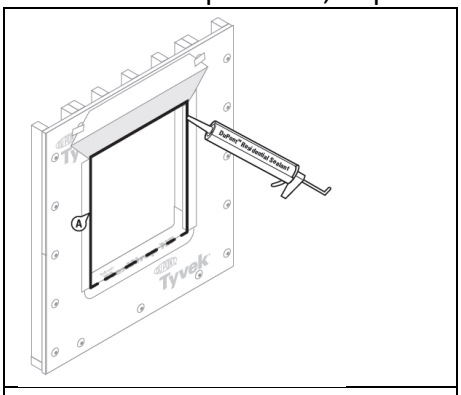


3. Tape side jambs



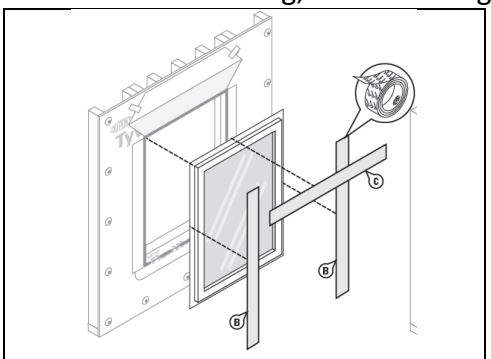
4-12” tape applied to side jambs. Extend 1” beyond window trim on wall, extend 2” minimum into RO, or to depth of unit without any extension jambs.

4. Caulk top & sides, skip-caulk bottom

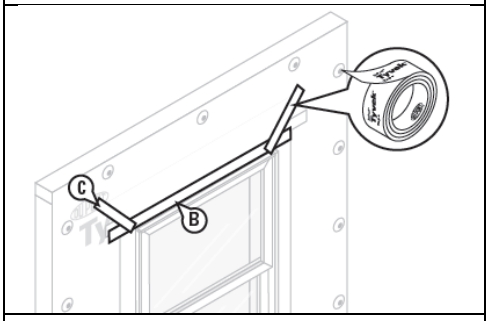


Fully caulk sides and top. Skip caulk sill area (2” gaps).

5. Install window, tape
    a. Flanged units: tape sides with Tyvek tape, tape head with 4-12” flashing tape, aluminum flashing if manufacturer requires.
    b. Wood units, apply aluminum head flashing, 4-12” flashing tape.



Install window unit.



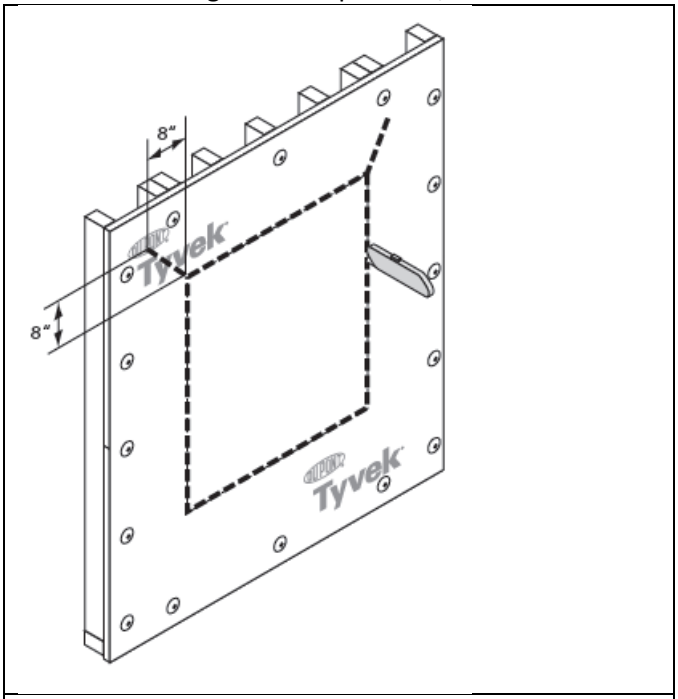
Fold down flap and tape with Tyvek tape.

Step by step instructions:

1. Cut Tyvek at Rough Opening

a. Cut Tyvek 1” back from RO on sides and bottom. Expose 1” of sheathing for tape to adhere.

b. Cut at angle from top of unit, about 8”.



Cut sides & bottom 1” past RO, exposing 1” of sheathing.

2. Pan installation

Key principles:

- Slope to outside for drainage.
- Water and air stop at back (seal to window).
- For wood windows, 1/8” minimum shim space, use plastic shims so water won’t wick up.

A **sill pan** made with FlexWrap, on a sloped sill with plastic shims.

a. **Slope the rough sill**:

- Pry up the back edge about 1/4", and shim.

Lift the inner edge of the rough sill about 1/4", and shim to slope it outward.

b. Prepare for the cladding:

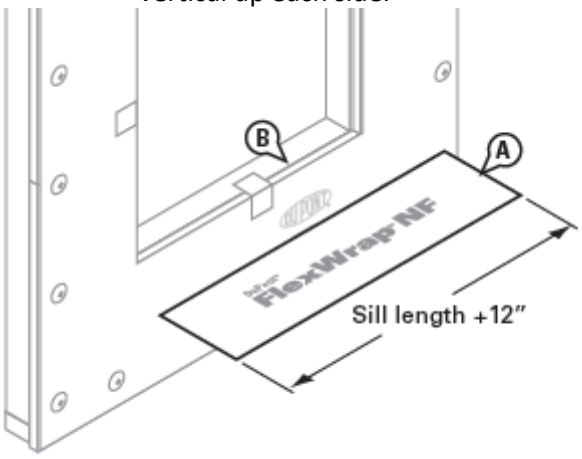
- Masonry: always install through-flashing about 1” below rough opening, sill pan will lap over
- Stucco: varies with window trim detail, often will install a through-flashing similar to masonry
- Siding: optional strip of Tyvek applied where sill pan will lap onto it, strip will lap onto top of siding piece

Masonry through-flashing attached at top edge only, about 1” below rough opening. Sill pan laps onto it.

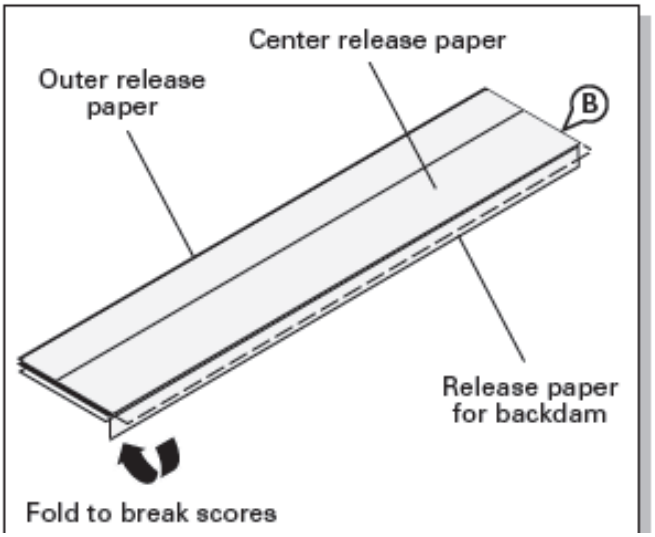
Siding skirt of Tyvek applied below rough opening, fastened at top edge only, will be lapped over siding.

c. **Apply FlexWrap** per DuPont instructions.

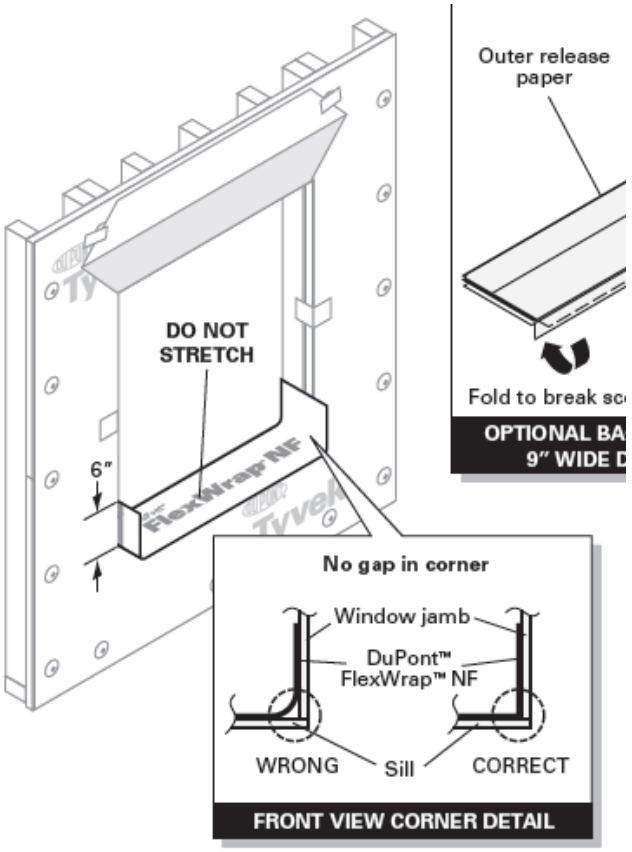
- Use 9” FlexWrap for 2x6 walls, 6” for 2x4.
- Cut 12” longer than RO (minimum), for 6” vertical up each side.



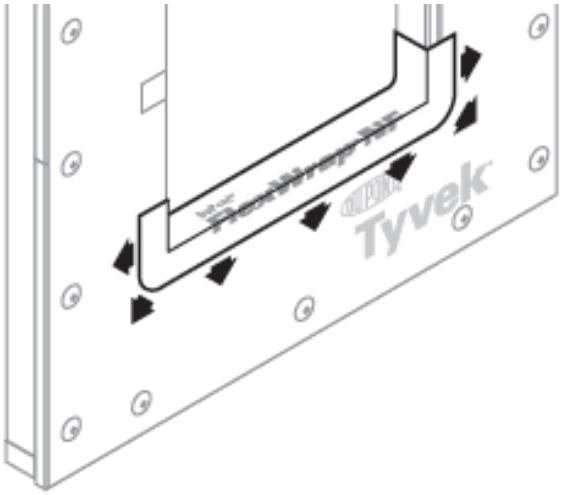
- Remove only center strip of release paper. Leave others on to avoid inadvertent stretching.



- Center on RO and smooth onto sill.
- Align inner edge of FlexWrap with framing, or for doors, 1/2”-3/4” inside of framing line.
- Do not stretch. Tuck all the way into corner using a straight edge like a shim or speed square.



- Remove outer release paper. Starting in middle, adhere down onto face of wall. Stretch corners.
- Fasten lower corners to help hold in place while adhesive sets.
- Roll ALL tapes with a hand-held roller to smooth and activate adhesive.



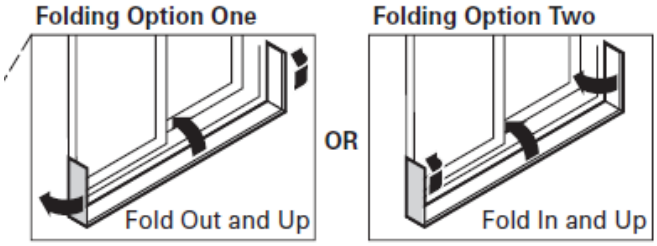
d. For wood windows, create 1/8” minimum gap at sill, with plastic shims. No wood shims.

- Doors do not require a shim space, but it’s a good idea with wood threshold or jambs.

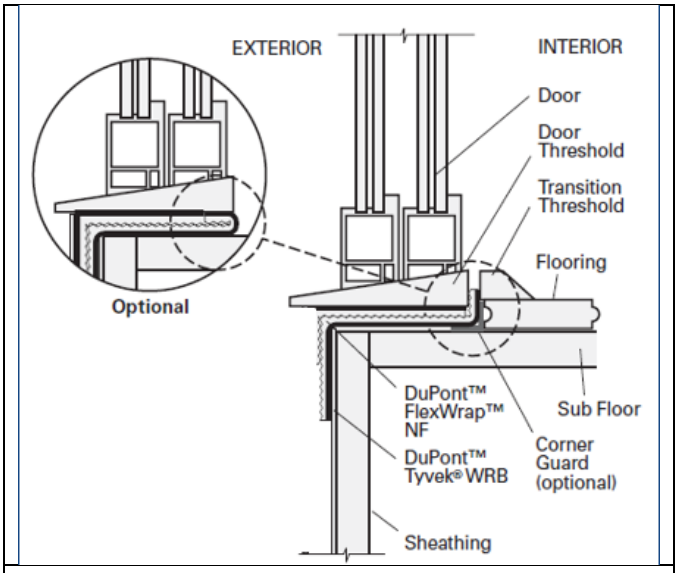
- Non-wood windows, follow manufacturer's instructions.

e. Turn pan up and seal to unit.

Inner strip of FlexWrap release paper makes it easy to fold up inner edge after unit is set.



Fold FlexWrap and seal to window sill/door threshold.

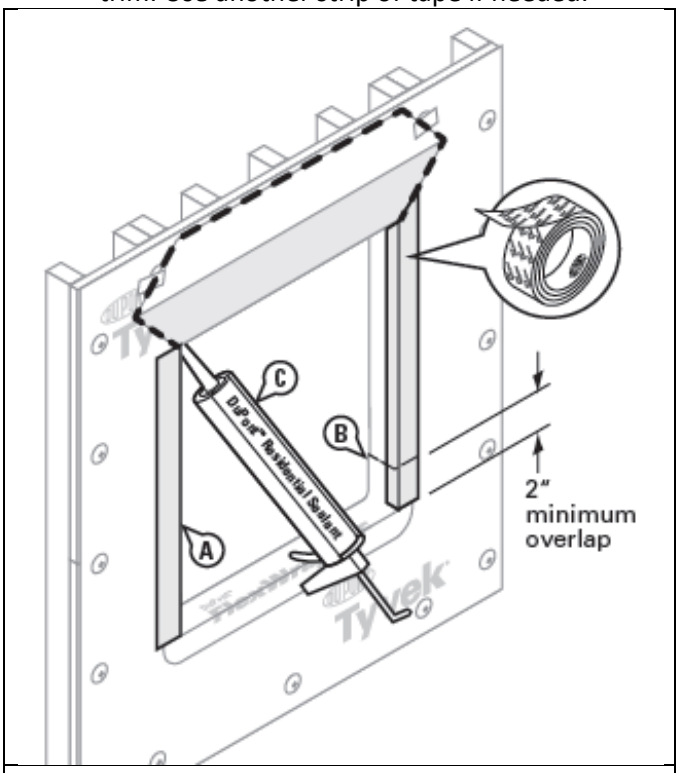


Optional: Fold back edge of FlexWrap all the way over and set unit directly on top of it (upper left of drawing)

3. Side Jambs

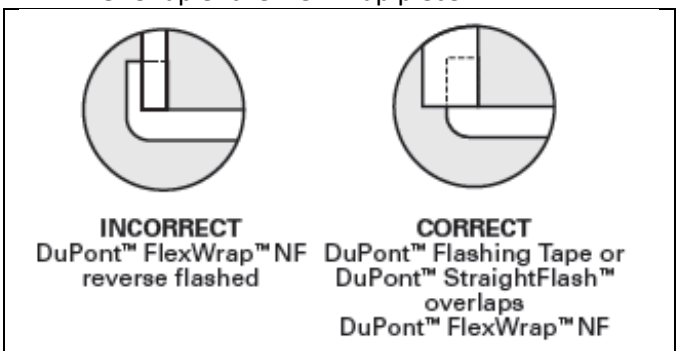
a. Apply 9" Tyvek Flashing Tape or Tyvek Straight Wrap per Tyvek instructions.

- 2" minimum into jamb area, best if inner edge is visible at or past unit.
- Outer edge should be minimum 2" past exterior trim. Use another strip of tape if needed.



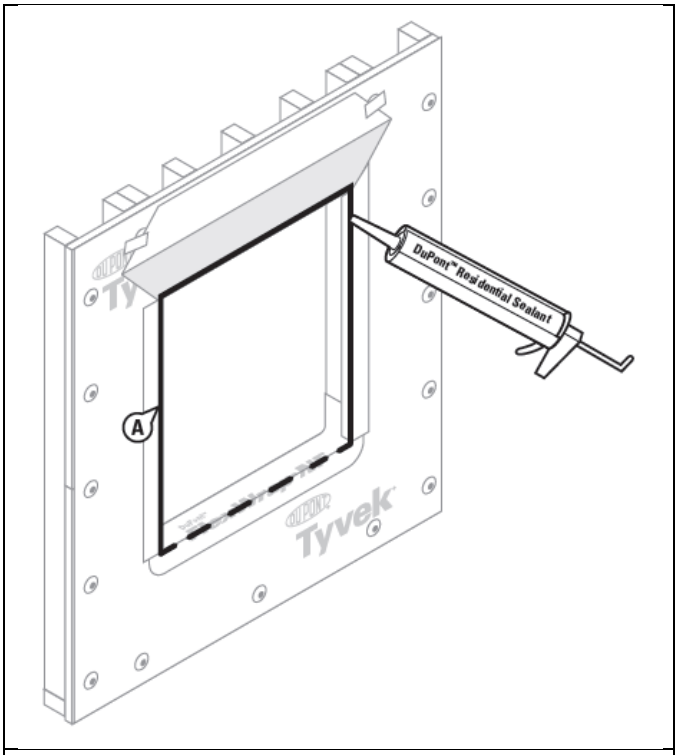
9" tape applied to side jambs.

- Overlap entire FlexWrap piece.

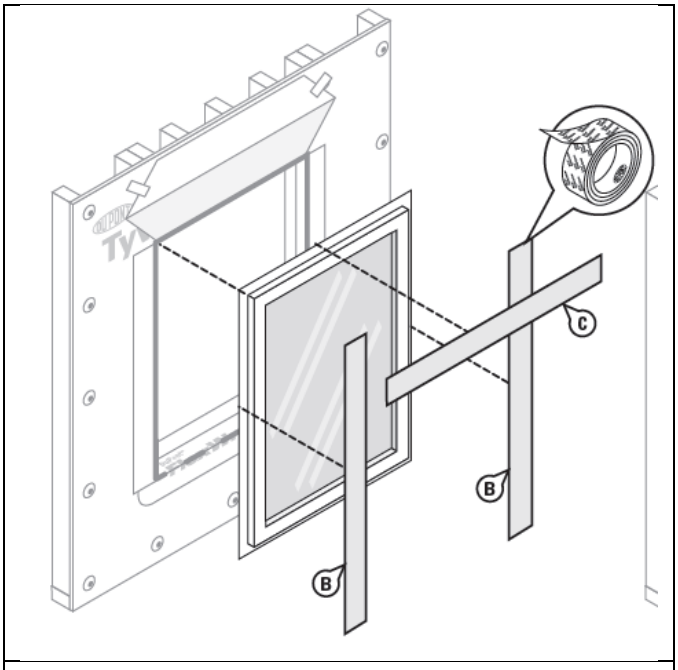


Side tape must cover end of Flex Wrap.

4. Caulk and set unit



Fully caulk sides and top. Skip caulk sill area (2” gaps). (Note that applying sealant to unit is usually easier than applying it to the building.)



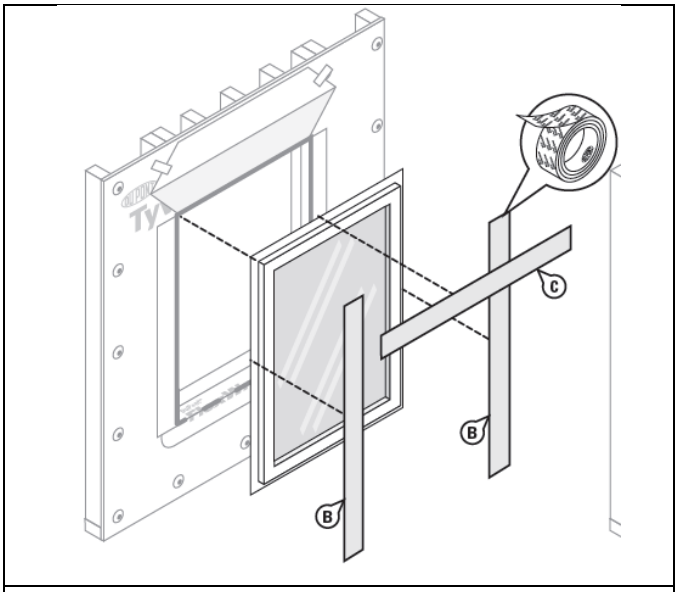
Install window unit.
Fasten per manufacturer’s instructions.
Side and head tape (after pressure skirt, next step, if required).

5. Apply optional pressure skirt

- A Pressure Skirt is required by some window manufacturers.
- Cut a strip of Tyvek 12” tall, and 12” wider than window on each side (24” total)
- Tape to bottom of window or face of bottom flange. Be sure not to cover weep space between unit and sill flashing.

Optional **pressure skirt** is taped to bottom of frame before side tapes are applied. Do not block weep openings between unit and sill pan.

6. Complete sides



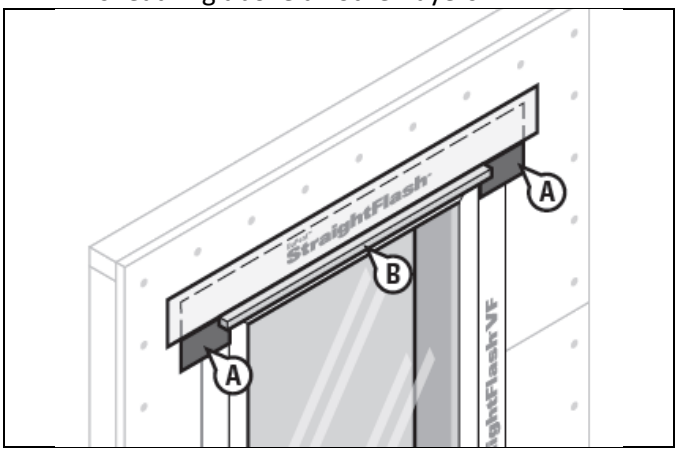
For flanged units, tape over flanges on sides.

7. Complete window head

a. For units with no flange or trim, apply Flex Wrap to rough opening, across head area, before installing unit.
b. For units with trim or flange, use sealant on sheathing and attach unit directly to bare sheathing.
c. Always use metal head flashing for any unit, other than flanged units where manufacturer does not require head flashing.

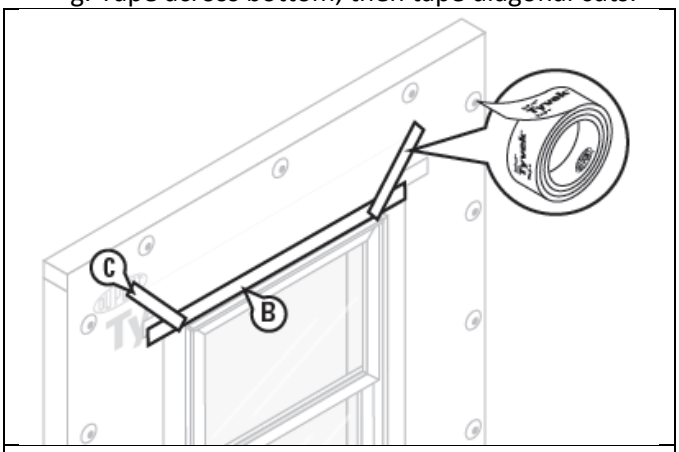
- Many manufacturers require a metal head flashing even on flanged units. Follow instructions.

d. Apply heavy bead of sealant across top of unit before installing metal head flashing.
e. Apply flashing tape over head flashing. Use wide enough piece to adhere directly to sheathing above all other layers.



Metal head flashing is required on all wood units and many flanged units. Caulk behind it, and tape over top. Tape must be wide enough to seal to sheathing.

f. Fold Tyvek flap down over head.
g. Tape across bottom, then tape diagonal cuts.

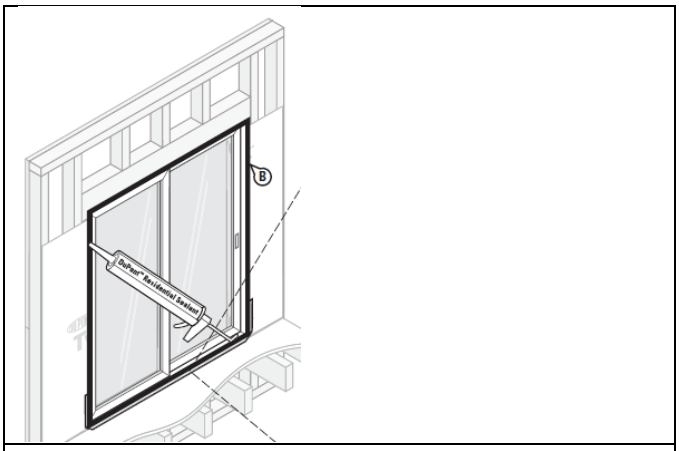


Fold down flap and tape with Tyvek tape.

8. Foam/Caulk rough opening

a. Use can foam to seal top and sides.
b. Caulk is adequate for bottom, unless gap is large.

- Optional, position shims so foam bead can be continuous and shims don't block the foam. Plastic U-shims don't cross entire depth of jamb and allow foam to completely seal all the way up and down with no interruption.
- Optional, use backer rod and sealant between tapes and unit.



Seal bottom of unit with caulk, sides and top with foam.
Optional, use backer rod and sealant to seal sides and top.
Sealant/foam should adhere to tapes used on side and top of rough opening, so the tapes must come far enough in to the RO.

These are the minimum standards for work on this project. The intent is for a complete job to high standards, and the ultimate finish and performance is the trade contractor's responsibility.

Work must meet current local code, relevant industry standards, and the plans and specifications for this project, in addition to specific information below. Any conflicts, omissions, or opportunities for upgrades or cost savings will be brought to BOWA's attention before finalizing agreement. Any work required to meet local code, plans and specifications, industry standards, or terms below will be completed for no additional charge beyond proposal pricing.

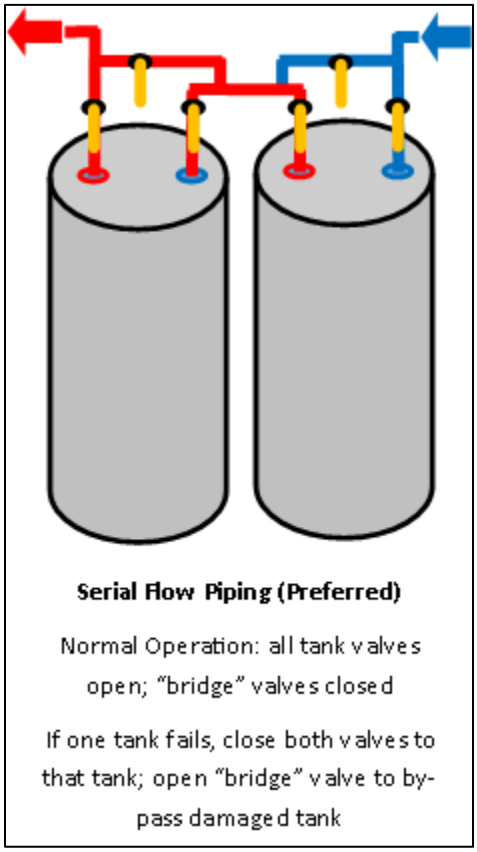
Trade contractor is responsible for the performance and finish of their work. Do not proceed with work over substrates or previous work unless you know it to be acceptable. Once work is commenced, trade contractor is responsible for performance and finish.

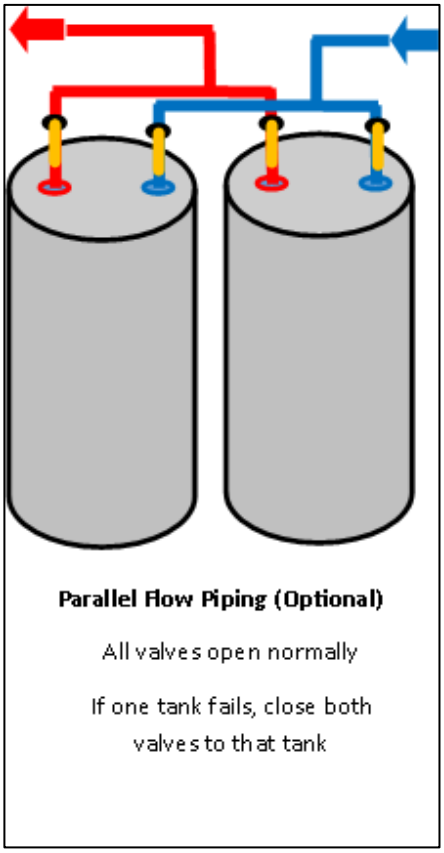
Any exceptions to these terms must be signed off by BOWA Production Manager in writing.

1. Subcontractor agrees to perform warranty diagnosis and repair on fixtures provided by BOWA/ others on this project, on the same terms as if they had been provided by Subcontractor.
    - Labor for diagnosis, ordering parts, and typical minor repairs such as swapping defective parts (provided by supplier/BOWA) are included in this contract no matter who provided the fixtures.
    - Manufacturer/supplier will supply needed parts or fixtures.
    - Extensive labor that would not be included in typical warranty situations will be handled on a case-by-case basis, and BOWA will support Subcontractor in any needed negotiations with suppliers.
    - BOWA expects that there will be a cost added to original contract for these services, but that no charges will be made during warranty period.
2. Check municipal water pressure on every project. Provide optional price for pressure reducing valve and other needed components to reduce water pressure if needed.
3. BOWA standard is copper pipe, Type L.
4. Alternative materials will be considered, must be approved by BOWA Production Manager.
5. When PEX is approved, use tubing, fittings, and manifolds from one company: Uponor, Rehau, Viega, or Vanguard. Do not mix brands. Do not use other brands.
6. Use CPVC only on homes with existing CPVC and with approval of BOWA Production Manager.
    - CPVC hot water lines over 40' must have expansion/movement loops installed per industry standards.
7. Size pipes per industry standard guidelines. Always run 3/4" or larger lines to master shower and tub.
8. Group hose bib cutoffs together, into "manifold" type arrangement, except where not practical—must be approved by Project Manager. PEX tubing is acceptable for hose bibs. Provide "frostproof" hose bibs for all locations.
9. Tag all valves with durable, printed labels.
10. Shower pans will be installed per manufacturer's directions, including special glue for drain connection and seams, and preformed corner patches ("dams"). CPE shower liner material preferred. Provide optional price for PVC liner.
11. Vents painted black above roof line, installed minimum 12" above roof plane, and fully supported immediately below roof penetration.
12. Test all fixtures by filling to overflow and verifying no leaks.
13. Recirculating hot water lines: To reduce wear and energy use, our goal is to reduce run time and flow rate.
    a. Provide valves on each side of pump.

b. Base price for convective loop with check valve, but no pump. Optional price for pump.
c. Use minimal size pump for given length and head of recirc line.
d. Provide and install code-compliant 'demand control' system, or provide and install an aquastat (Honeywell 4008 or approved alternative aquastat) to control pump (BOWA to hire electrician for electrical connection if line voltage). Give optional price for timer on any recirc pump.
e. Provide optional pricing for pre-insulated piping for recirc and return lines.

14. Hot water system expansion tanks will be provided & installed where required.
    - Securely mount tank so it will not stress plumbing pipes when bladder fails and tank fills completely.
    - Follow manufacturer's instructions.
15. If dual water heaters, provide valves & piping to allow either to be bypassed:





16. Base price for power vent or sealed combustion ENERGY STAR labeled hot water heater or heat pump electric water heater. Provide optional pricing for other choices.
17. Provide and install 3" PVC radon pipe through roof to tee below slab (preferred), or to sump crock (NOT preferred, requires flexible connectors to allow sump lid removal), or per local code requirements. Label at every level. No turns greater than 45 degrees.
18. Provide & install shutoff valves for humidifiers, refrigerators, and icemakers in accessible location, not behind unit.
19. Shutoffs for kitchen accessories (pot fillers, ice makers, refrigerators, dishwashers, etc.) to be in sink base (so normal homeowners can find them). Not behind refrigerators, icemakers, etc.
20. Washing machine shutoff valves shall be accessible. When cabinetry, etc. blocks access, add additional shutoffs in sink base or similar accessible location, discuss with BOWA PM.
21. Provide individual shutoff valves at any gas manifolds.
22. Optional price for gas line to each fireplace. Coordinate accessible shutoff on site.

23. Optional price for gas line(s) to furnaces & hot water heaters, barbecue grills.
24. 2psi gas line to manifolds preferred.
25. Optional price for cast iron: any vertical 3” pipe in living spaces, horizontal 3” pipe in living spaces, or washing machine drain(s) above basement level.
26. Optional price for drain pan for washer(s), steam shower generator, steam or condensing dryers, and steam ovens. Include drain piping in base price.
27. Provide bypass valves and loop for any water treatment equipment.

Safety

Subcontractor is responsible for following all needed safety measures. Some of these include:

1. Provide personal protective equipment for workers (examples: safety glasses, hearing protection)
2. Electrical cords will be intact including ground pins. All tools will have needed guards.
3. Any material such as sanding dust, rags, applicator pads, etc., which are subject to spontaneous combustion, will be removed from the building at the end of each work day. None shall be stored closer than 100' from the building.
4. OSHA-compliant scaffolding or fall protection equipment will be used when working at height.
5. Fuels will be stored per OSHA standards in metal cans and removed from the structure overnight.

These are the minimum standards for work on this project. The intent is for a complete job to high standards, and the ultimate finish and performance is the trade contractor's responsibility.

Work must meet current local code, relevant industry standards, and the plans and specifications for this project, in addition to specific information below. Any conflicts, omissions, or opportunities for upgrades or cost savings will be brought to BOWA's attention before finalizing agreement. Any work required to meet local code, plans and specifications, industry standards, or terms below will be completed for no additional charge beyond proposal pricing.

Trade contractor is responsible for the performance and finish of their work. Do not proceed with work over substrates or previous work unless you know it to be acceptable. Once work is commenced, trade contractor is responsible for performance and finish.

Any exceptions to these terms must be signed off by BOWA Production Manager in writing.

1. Temporary electric power shall be provided, and will conform to safety guidelines including GFI protection and cover plates.
2. Panel covers and switch/plug plates must be in place at all times, except when actively working on device.
3. Electrical Contractor agrees to perform warranty diagnosis and repair on fixtures provided by BOWA/others on this project, on the same terms as if they had been provided by the Electrical Contractor.
    - Labor for diagnosis, ordering parts, and typical minor repairs such as swapping defective parts (provided by supplier/BOWA) are included in this contract no matter who provided the fixtures.
    - Manufacturer/supplier will supply needed parts or fixtures.
    - Extensive labor that would not be included in typical warranty situations will be handled on a case-by-case basis and BOWA will support Subcontractor in any needed negotiations with suppliers.
    - BOWA expects that there will be a cost added to original contract for these services, but that no charges will be made during warranty period.
4. GFIs: Arrange GFI outlets so that reset button is in the same room/location as all protected outlets. Confirm locations with BOWA PM.
    - Each bathroom will have its own GFI outlet with reset, rather than one GFI protecting several baths.
    - Each outdoor outlet shall be a separate GFI (possible exception a small number of outlets in the same immediate area such as a screen porch or patio, reset should still be in that immediate area).
    - For kitchens/bars with decorative plug types (plug mold, etc,) locate GFI resets in room per discussion with BOWA PM (in sink base, nearby wall, or other easily accessible location in the room).
    - GFI breakers in panels are not acceptable for plug outlets, except when all outlets are in the room with the panel. (Exceptional circumstances, discuss with BOWA PM. GFI breakers OK for dishwashers, landscape lighting.)
5. For all new panels, use "full-height breaker" style panels which do fit double (twin) breakers, not "half-height breaker" type panels, which only accept single type breakers. We assume we will need to use double /twin breakers to provide code-required circuits.
6. Provide and install ENT ("smurf tube") or conduit between all mechanical rooms and attics. Install two, 2" when possible, discuss with BOWA before bidding.

7. Three conductors between ceiling fans and switch box. Verify single or double switch box with Project Manager.
8. Install no more than two NM-B ("Romex") wires in any single hole through top/bottom plates or where firestopping will be used.
9. Label any new circuits (or all circuits in new panels) with room name (and/or device name). Consult with BOWA Project Manager for names. "Lights and plugs" is not specific enough. Provide typewritten panel label.
10. Bring dishwasher feed into sink base to facilitate plug-in type dishwashers. Junction box on side wall of cabinet to traditional hardwire feed if normal style dishwasher.
11. For range vent >400CFM capacity, run fan motor feed as home run to mechanical space where current sensor can be installed (for makeup air system).
12. Verify compatibility of controls with lighting before installation. Do not proceed with installation of dimmers, lighting, ballasts, etc. if there is any question whether they will work together.
13. Include connection to hot water recirculation pump and aquastat, provided by others.
14. Include bonding of gas piping.
15. For home runs over 100 feet of wire, upsize wire by one size.
16. For exterior lighting in exterior masonry hardscaping (steps, landscaping walls, etc.): provide & install "liquid tight" plastic fixture mounting boxes and conduit. Boxes should be mounted slightly proud of masonry so fixture gasket seals box. Follow waterproofing instructions. Do not "direct bury" UF cable in masonry. Note: wall-mounted light boxes in masonry side walls of house, use metal 8-B boxes to support heavy fixtures; plastic liquid-tight boxes are intended for wet areas not sheltered by the house.
17. Provide optional prices for car charger rough-ins, 32, 48, 80A. Note that per code, wire size must be oversize due to long duration high load draws.
18. Provide optional price for surge protection on each panel. Surge protectors should provide visual confirmation of operational status (for example, green lights for OK, red lights for REPLACE).

Safety

Subcontractor is responsible for following all needed safety measures. Some of these include:

1. Temporary electric power will conform to safety guidelines including GFI protection and cover plates.
2. Panel covers and switch/plug plates must be in place at all times, except when actively working on device.
3. Provide personal protective equipment for workers (examples: safety glasses, hearing protection).
4. Electrical cords will be intact including ground pins. All tools will have needed guards.
5. Any material such as sanding dust, rags, applicator pads, etc., which are subject to spontaneous combustion, will be removed from the building at the end of each work day. None shall be stored closer than 100' from the building.
6. OSHA-compliant scaffolding or fall protection equipment will be used when working at height.
7. Fuels will be stored per OSHA standards in metal cans and removed from the structure overnight.

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Installation will meet ACCA quality standards:

1. Perform ventilation calculations for HVAC system installations/replacements.
2. Perform heat loss and heat gain load calculations for HVAC system installations/replacements.
3. Ensure that equipment is properly sized and selected prior to being installed
4. Geothermal: observe industry-recognized design practices for the proper design of the exterior ground heat exchanger.
5. Ensure that heating and cooling equipment are properly matched systems as identified by industry-recognized certification programs
6. Verify that the airflow through the indoor blower unit, (e.g. furnace, fan coil, air handler) is within acceptable CFM ranges.
7. Verify that the water flow through the refrigerant-to-water, water-to-water, or water-to-air heat exchanger is within acceptable ranges.
8. Ensure that the HVAC system has the proper refrigerant charge.
9. Electrical requirements are met as related to the installed equipment.
10. Ensure the equipment combustion is "on-rate", for gas-fired or oil-fired equipment, and is at the equipment nameplate value.
11. Ensure proper sizing, design, material selection and assembly of the combustion gas venting system.
12. Ensure proper selection and functioning of system operational and safety controls.
13. Ensure the ducts are sealed and that air leakage (CFM) is minimized.
14. Ensure room and ventilation airflows meet the design/application requirements.
15. Provide records pertaining to the HVAC system installation as well as the operation and maintenance to be performed.
16. Inform the customer on how to both operate and maintain the installed equipment, and promote system maintenance to aid in the continuing performance of the installed equipment.

Additionally:

1. All joints in new ductwork (not fully within the building envelope) will be sealed with factory sealant or mastic. Ductwork will pass testing required by 2012 IECC (or local code if stricter).
    a. Per code, 40 feet or less of added ductwork does not require testing.
    b. If tested by contractor, provide 24 hour notice of testing time & date, permit BOWA supervisor to photograph test instruments, and provide calculations showing completed testing.
2. Provide optional price for sealing existing ductwork.

3. Provide and install digital thermostats – non-programmable where permitted by code. Include temporary construction thermostats. Calibrate temperature and humidity on new thermostats.
4. Clean coils & furnaces at completion of construction. For new construction, cover duct openings during construction.
5. Install accessible dampers on each takeoff and each trunk line.
6. Provide drain pans, with automatic shut off.
    a. Extend at least 12" past air handler, coil and humidifier on all sides and under condensate trap or pump, or to rough-framed walls of closet area if closer than 12".
    b. Include pan on all units, including in basements.
    c. Secondary drain to daylight, or floor drain. HVAC contractor to water test pan for leaks.
7. Include balance of system for even heat & AC, twice in first year.
8. Install flues so not visible from front of house, painted black, and fully supported immediately below the roof line.
9. Any condensate/drain lines that are active in winter run to interior drains per direction of BOWA Project Manager and in accordance with local codes. Provide and install a neutralizer on condensate from gas/propane burning appliances per code.
10. Install venting for all kitchen range hoods in solid metal with backdraft damper cap.
11. Install venting for bath fans to exterior, flexible 100% metal acceptable, but not plastic or metalized plastic.
    a. Preference is for individual venting. If bath fan vents are combined, install a backdraft damper on each line just before they join, example Fantech RSK-4 butterfly damper.
12. Dryer venting to be solid metal. Provide & install "dryer box" style recessed area for connection.
    a. Avoid roof outlet wherever possible. Install ductwork to be openable for cleaning from attic if roof vented.
    b. Use single-flap, full flow, metal hood. No louvered or screened hoods on dryer vents.
    c. Slope for condensate management if >10' length. Label with length of vent if over 35 effective feet, per code.
13. Install 2+" media filter cabinet for minimum MERV 11 filter where access is possible. Include filter loss in system static pressure calculations.
14. Temperature differences between rooms less than 2 degrees from thermostat in winter or with multi-zone systems; 3 degrees in summer on single zone systems, per ACCA Manual RS 2005.
15. Basement units: Gas high efficiency unit – 90% or better – gas. Humidifier – Aprilaire pad type or equal.
16. Upper units: Gas high efficiency unit 90% or better, if conditioned space available. Otherwise 80% unit. Humidifier – Aprilaire pad-type or equal – if unit in conditioned space, and drain pan extends 12" past humidifier in every direction. Otherwise no humidifier.
17. Heat Pump systems: Standard two speed compressor with variable speed blower. Optional multi or variable speed outdoor unit. Option for enhanced dehumidification mode(s).
18. Geothermal units:
    a. Provide and install pressure/temperature taps on inlet & outlet piping at unit for system checks.
    b. Provide documentation of field size calculations
    c. Complete startup check per manufacturer's directions, record information and provide to BOWA.
19. Humidifiers: provide optional pricing.
    a. Install pad-type humidifiers only above oversized drain pan (or basement floor if well sloped to drain)
    b. Provide & install airflow proving switch with any steam humidifier, verify humidifier won't operate without system fan. Optional high humidity cutoff as well. Install steam humidifiers per manufacturer's instructions with high-temperature drain lines if required.

    c. Do not install reservoir type humidifiers such as EWC or Skuttle.
20. Zone damper systems:
    a. Zones should be in areas of similar conditions—same level, same set points, similar usage.
    b. Special load areas such as sun rooms, gym rooms and theater rooms should be on their own system, not a zone of a larger system.
    c. Two zones per air handler at most, no small zones. BOWA can make exception for up to four.
    d. Oversize ductwork to each zone.
    e. Use variable speed air handlers and zone controls which control fan speed, avoid bypass dampers.
21. Makeup Air Systems: when required by code include makeup air system.
    a. Include sensor for range hood, automatic damper, exterior inlet hood, and ductwork.
    b. Calculate required size per local code, note Virginia code has unique rules.
    c. Deliver makeup air to an unobjectionable location. Discuss with BOWA PM.
        i. Do not install to toekick or under/behind range.
        ii. Acceptable options: ceiling register; return duct (multiple duct diameters ahead of furnace/air handler for adequate mixing); mechanical, unfinished, or storage space..

Optional items: Please price on each job

1. Three-year service plan
2. HRV and/or ERV devices. List CFM, sensible & latent recovery at standard conditions, and CFM/Watt.
3. UV light in coil area
4. Upgrade WiFi or Programmable thermostats. Include client education session prior to installation, to verify clients accept particular unit.
5. Variable speed furnaces and variable or multi-stage condensing units
6. Higher SEER A/C systems
7. Cartridge steam humidifiers. Note: no EWC, Skuttle, or similar reservoir humidifiers.
8. Condensate pumps
9. Automatic zoning dampers. Honeywell, Water Furnace, or Carrier brand central control only.
10. Testing and air balancing.
11. Hourly rate for extras

Safety

Subcontractor is responsible for following all needed safety measures. Some of these include:

1. Provide personal protective equipment for workers (examples: safety glasses, hearing protection)
2. Electrical cords will be intact including ground pins. All tools will have needed guards.
3. Any material such as sanding dust, rags, applicator pads, etc., which are subject to spontaneous combustion, will be removed from the building at the end of each work day. None shall be stored closer than 100' from the building.
4. OSHA-compliant scaffolding or fall protection equipment will be used when working at height.
5. Fuels will be stored per OSHA standards in metal cans and removed from the structure overnight.

BOWA Manufactured Fireplace Trade Standard rev. 2/10/23

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Note BOWA requires a written "warranty exception" by clients for any vent-free equipment. Please do not show/discuss vent-free fireplaces before discussing with BOWA.

1. It is the subcontractor's responsibility to understand and follow the requirements of the local jurisdiction, the manufacturer, and any requirements for safety or UL rating compliance.
2. Include any required design elements, materials, and labor to complete the job per the plans and any code requirements of the local jurisdiction.
3. Installations must follow manufacturer's instructions in every aspect.
4. If job site conditions prevent full compliance with instructions, code, or any safety requirement, notify BOWA Production Manager in writing before proceeding.
5. Include shield plates, insulation, gaskets, fresh air inlet ducting, plinths, brackets, termination caps, doors, and any other parts required to meet code and manufacturer's directions.
6. Include setup of gas log and any accessories, along with testing and adjustment.
7. Coordinate any penetrations and flue terminations with BOWA Project Manager.
8. Flue termination will be fully supported and attached to the structure (per instructions) to resist wind and snow loads.
9. Flue cap for wood-framed chimney chases must turn down minimum 3" vertical with 1/2" drip projection. Include flue cap in contract.
10. Include startup & operation training for clients at end of project.

Optional items: Please price on each job if not included in plans

1. Two-year service plan
2. Insulation and air sealing in wood-framed chase before installation of fireplace

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1. Provide design, engineering, and permitting services. Note plan version in proposal and verify with BOWA PDM that permit is based on latest plans.
2. Include costs for any permits & inspections.
3. It is the subcontractor's responsibility to understand the requirements of the local jurisdiction. Include any required design elements, materials, and labor to complete the job per the plans and any code requirements of the local jurisdiction.
4. Note any assumptions made about water supply. Where possible, include optional pricing for booster pumps, storage tanks, larger piping, etc. that could reduce costs of new well, new water service line, new water meter, or similar work by others.
5. Provide copies of pipe "material compatibility" lists to BOWA crew on site so foams, caulks, etc. can be properly used by others.
6. Flat plate covered heads in standard colors are the base option unless noted otherwise.

Optional items: Please price on each job if not included in plans

1. Two year warranty/service plan
2. Price to replace backflow prevention device, and other required maintenance services
3. Custom color flat plate covers
4. Sidewall heads for rooms below unconditioned space

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1. Base price, Vacuflo dual-exhaust commercial power plant. Option for standard residential unit.
2. Optional price for additional tool set(s) for each level of home.
3. Install power plant in garage with inlet for car cleaning.
4. Consult BOWA PM before cutting or drilling any structural members, other than solid-wood joists 2x8 or larger, and bottom and top plates of interior walls.
5. All central vacuums will be installed to vent to the outdoors.
6. When "in wall hose" system is used, test hoses on rough-in to verify proper operation.

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1. Provide personal protective equipment for workers (examples: safety glasses, hearing protection, dust masks).
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Illustrations courtesy of JLConline.com, ProTradeCraft.com, Firestone, Certainteed, James Hardie.

Manufacturer's instructions and/or industry guidelines will be provided by contractor to BOWA and installation crews, and followed on this project.

1. If architectural design conflicts with industry standards, code, or manufacturer's directions, provide written notice to BOWA Production Manager before proceeding.
2. Connections between roofing and adjacent materials will vary depending on the requirements for different materials. Roofing and accessories will be provided and installed by roofing contractor to meet necessary requirements for adjacent materials.

Contents:

1. **Steep Slope Roofing**
    a. **General Details …page 1**
    b. **Material-Specific Standards …page 9**
2. **Low Slope Roofing**
    a. **General Details …page 14**
    b. **Material-Specific Standards …page 16**

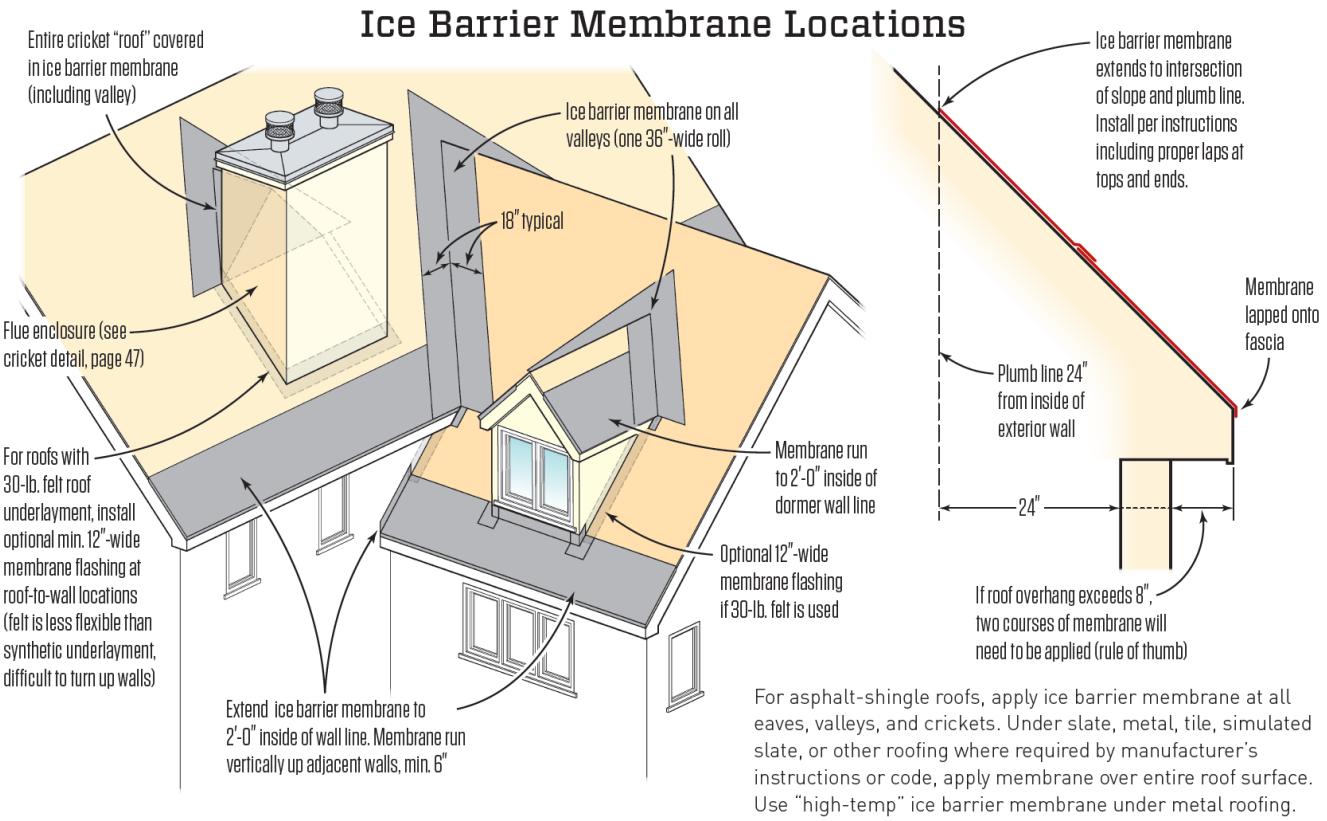
Section I: Steep Slope Roofing (pitch > 3/12)

Section 1A: General Details for Steep Slope Roofing

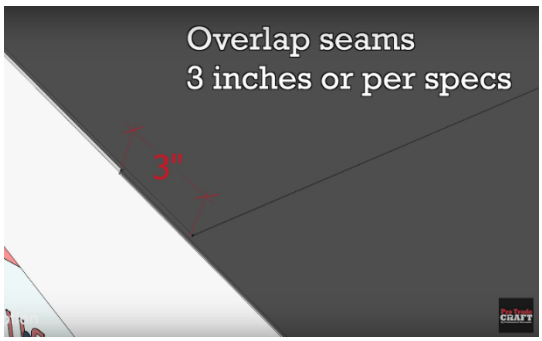
Underlayment & Drip Edge

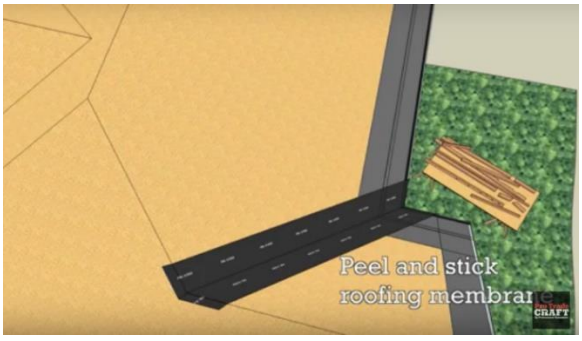
1. BOWA Standards:
    a. Eaves membrane (peel and stick ice dam membrane) at all eaves & valleys.
    b. Under slate, metal, tile, simulated slate (or other roofing where required by manufacturer's instructions or code): Eaves membrane over entire roof surface. Smooth plastic-faced membrane is preferred for full coverage or complex shapes; granulated-face material does not seal as well.
    c. Use synthetic underlayment (Titanium, Shark Skin, etc.) when exposure will be more than 60 days.
    d. #30 felt acceptable other than above situations.

e. Underlayment and fasteners compatible with final roof: “high temp” eaves membrane for metal roofing, copper nails (never galvanized steel) for copper roofing, etc.

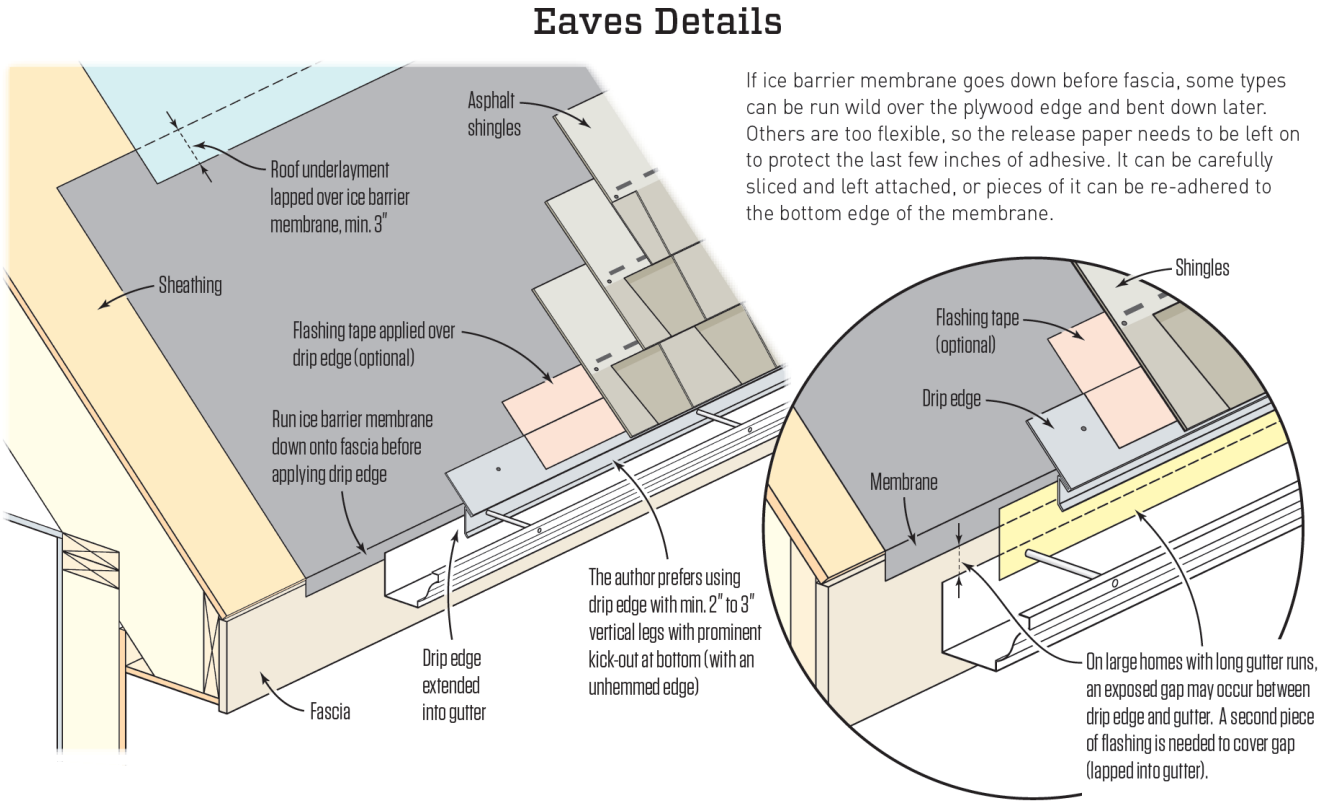


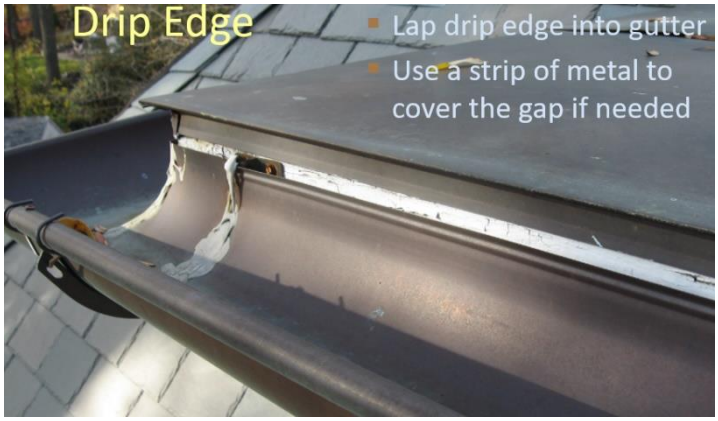
2. Use eaves membrane (peel and stick ice dam membrane) on eaves. Extend to 2’ inside of wall line, may be more than one row. Install per instructions including proper laps at tops & ends. Use on all valleys as well.





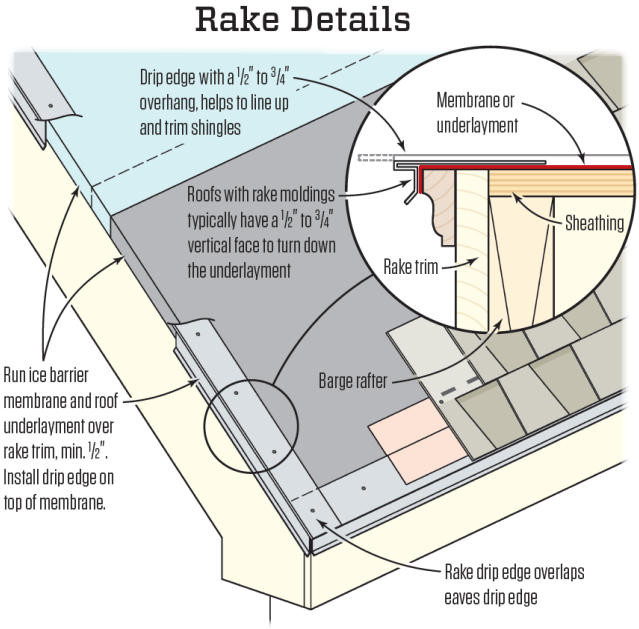
3. Adhere ice guard membrane to fascia board, and attach drip edge on top.



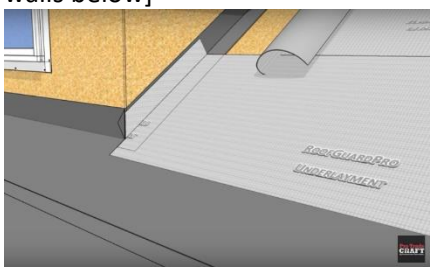


   a. Note if cornice work will be done after papering in, two suggested methods are:
      i. Run eaves membrane 2” past the bottom edge of the plywood. After cornice installed, stick membrane down to fascia board, run drip edge on top of membrane.
      ii. Carefully slice release paper and leave 4” strip stuck to bottom edge of eaves membrane. Don’t nail the bottom edge. After cornice installed, stick membrane down to fascia board.

4. Eave membrane and roof underlayment run over rake (side) edges by minimum 1/2" and covered by drip edge.

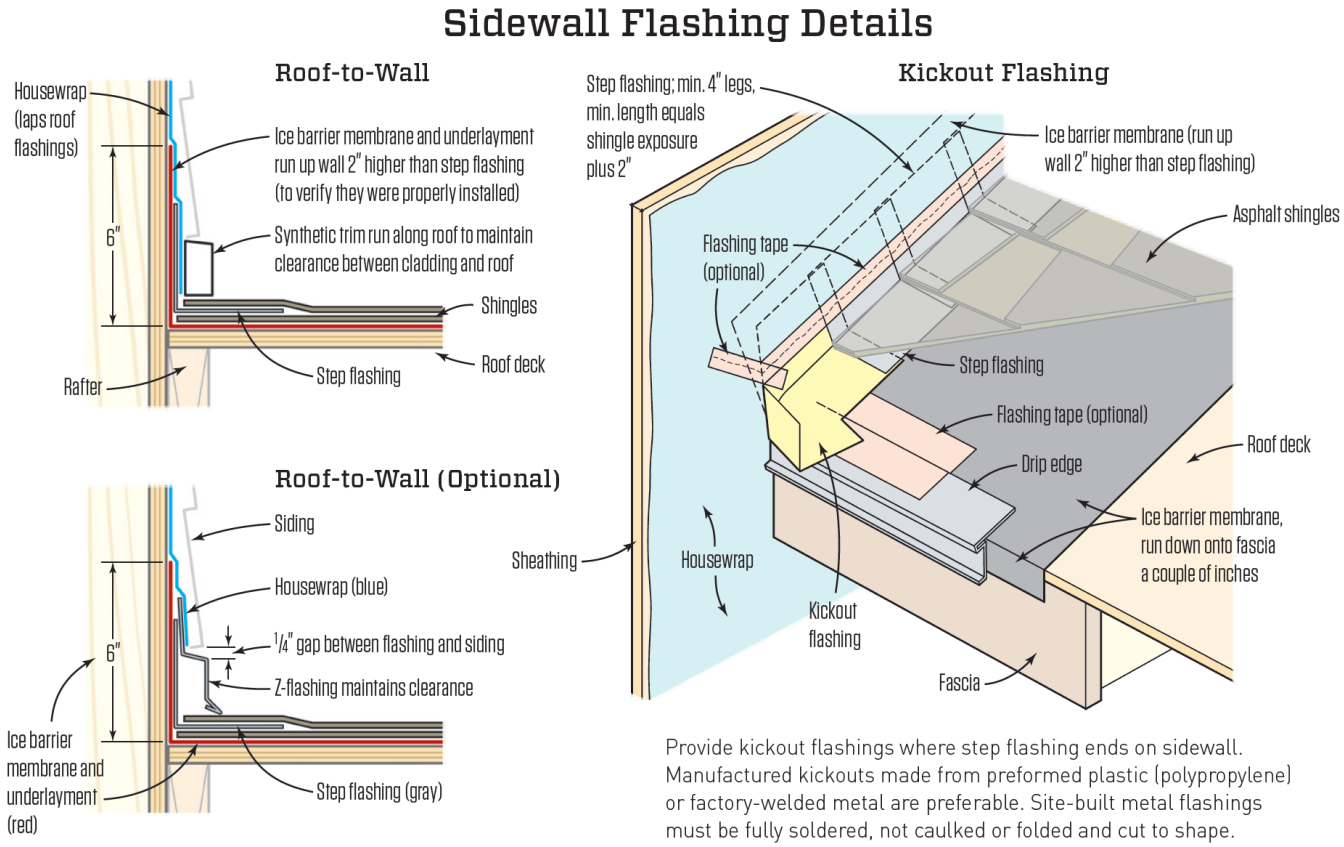


5. Install drip edge all sides of roof, in standard color to match the building details and/or roofing material (consult with BOWA Project Manager); use metal compatible with roof material & of comparable lifespan.
6. On long runs (where gutter slope is more than drip edge height), use oversized drip edge, or add extra strip of metal. Roofer's responsibility to provide & install—BOWA's responsibility to coordinate (find out from gutter subcontractor where extra metal will be needed.)
7. Eave membrane and roof underlayment run vertically up adjacent walls minimum 6". [more on side walls below]

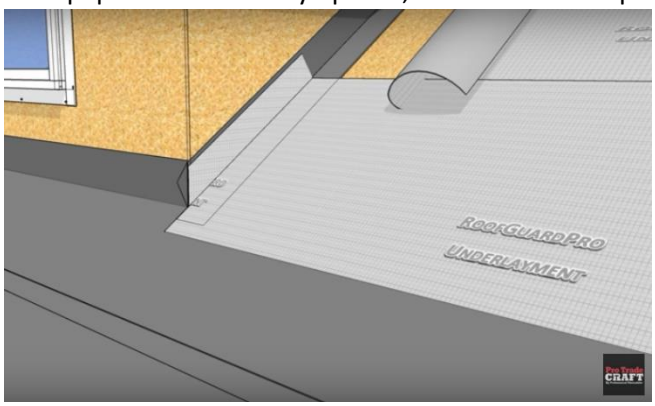


8. Best Practices:
    a. Cover granulated-top eaves membrane with layer of felt or synthetic underlayment, to make future shingle removal easier. Plastic-faced eaves membrane (such as Carlisle WIP 200HT or Grace Ice & Water) does not need this additional layer.

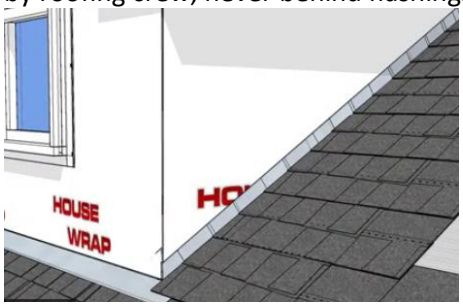
Sidewall connections



1. BOWA Standards:
    a. Roof paper runs vertically up wall, minimum 6". Strip of eaves membrane preferred.



b. Weather-Resistive Barrier (Tyvek, building paper, felt, etc.) brought out in front of roof flashings by roofing crew, never behind flashings.



c. Step flashing size: minimum 4" vertical, minimum length = shingle exposure +2".
d. Provide & install kickout flashings where steps end on side wall.
    i. Polypropylene preformed, or soldered/welded copper/aluminum OK. Metal flashings must be fully soldered or welded, not caulked or folded/cut to shape.
    ii. BOWA PM may decide to allow no special kickout piece for lap siding; if so, last piece of stepflashing must be installed loose at lower end, with clearance at shingles, so it can be brought out to face of siding. Not recommended.

e. Dormers:
    i. Coordinate sidewall/corner flashings with BOWA PM based on finishes. Normally, outside corners must be soldered or manufactured outside corner pieces.
    ii. If window rough sill is less than 3" from roof plane, roofer to provide & install soldered metal window pan integrated with roofing flashing.

Fasteners, flashing materials

1. Use fasteners and flashings which are compatible with other materials. No galvanized with copper & aluminum roofing; no copper with aluminum roofing; etc.
2. Expected life similar to roofing material. For example, slate roof (expected life 75+ years): use 20 oz copper valleys (not aluminum or galvanized); use copper or stainless nails and flashings (not galvanized, plastic, or aluminum).
3. Exposed metal valleys shall be 24" wide minimum (per code) and securely fastened with clips.

Accessories

1. For asphalt roofs, standard is any typical accessory vents and collars.
2. Provide optional upgrade pricing for better collars.
3. For metal, slate, simulated slate roofs, provide and install accessories of comparable lifespan: copper or stainless plumbing vent covers (or matching metal), copper (or matching metal) air vent jacks, etc.

Ridge Vent

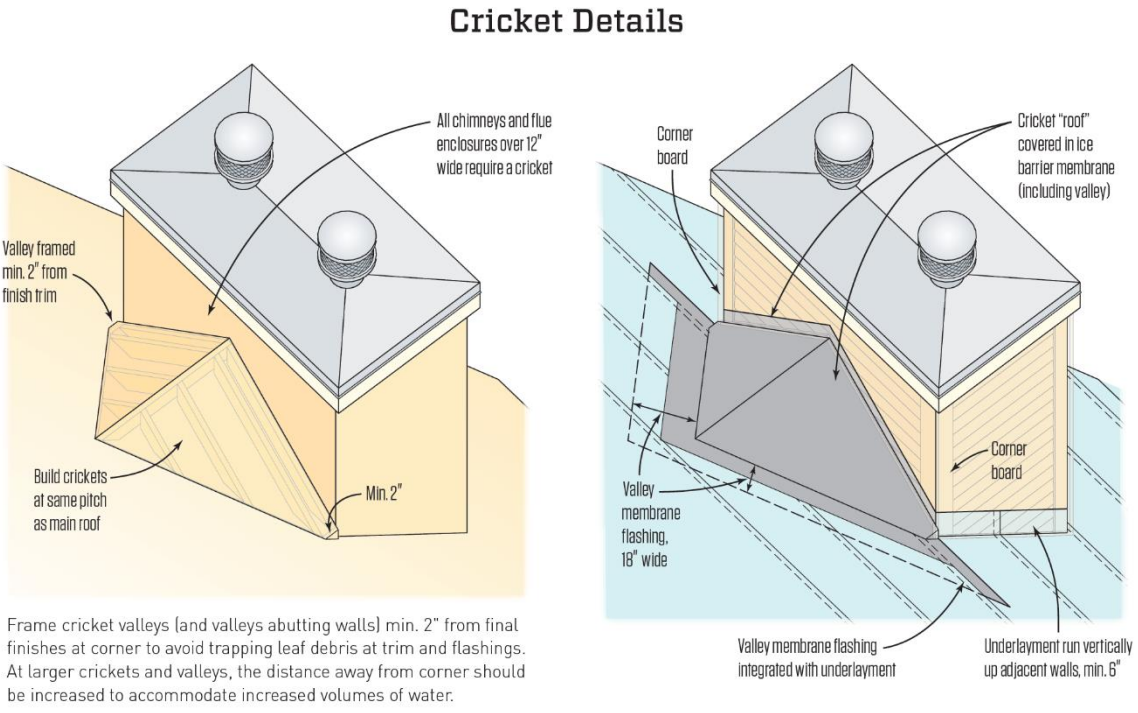
1. Standard, use "shingle-over" ridge vent, with internal filter and external baffles such as:
    a. Lomanco Omni-Ridge OR-4, PRO-4, or LOR-30

b. Certainteed Ridge Vent 4’ rigid plastic vent
c. Air Vent ShingleVent II
d. GAF Cobra non-roll 4’ rigid plastic vent
e. Owens Corning VentSure 4-foot Strip

Skylights

1. BOWA Standards:
    a. Only use manufacturer’s step-flashed flashing kit on shingled roofs. No field-fabricated flashings, no ‘glue down’ or other type flashings without step flashings.
    b. Only use glass units, with internal moisture management (condensate gutters & weeps).
    c. Strictly follow manufacturer’s instructions, including wrapping underlayment up frame, etc. Should instructions not be followed, roofing contractor responsible for replacing missing or damaged materials and installing correctly.
    d. Do not install at lower pitch than manufacturer specifies.
    e. Do not nail lower corners of flashings unless manufacturer instructions say to.
2. Best Practices:
    a. Velux is our preferred brand. “Deck Mounted” preferred for steep-slope roofs.
    b. Large lights—prefer multiple Velux glass units ganged together w/factory kits.

Crickets



Frame cricket valleys (and valleys abutting walls) min. 2" from final finishes at corner to avoid trapping leaf debris at trim and flashings. At larger crickets and valleys, the distance away from corner should be increased to accommodate increased volumes of water.

1. BOWA Standards:
    a. All chimneys over 12” wide require a cricket.
    b. Build crickets at same pitch as roof.
    c. valley minimum 1-2” away from final finishes at corner, so trim/flashings won’t trap leaves.
    d. soldered or preformed corners to prevent leaks when clogged.

Obstructed valleys (lower end is narrower, due to building design)

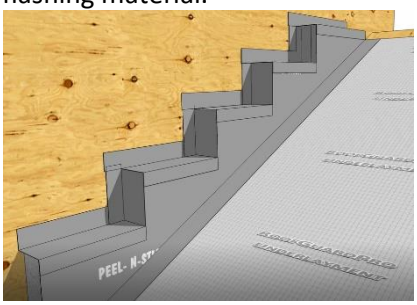
1. BOWA Standards:

a. Design to maintain pitch to end of valley area.
b. Opening of valley 6-12” wide, so trim/flashings won’t trap leaves.

c. Apply ice dam membrane under entire area to 8” above valley level.

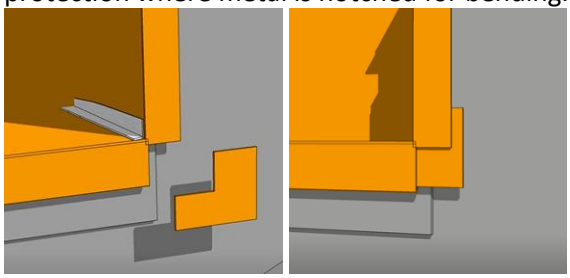
New Masonry Wall Connection to Roof

1. BOWA Standard:
    a. Masons to provide evenly-spaced stepped support masonry minimum 3-1/2” above roof line, covered with flexible masonry through-flashing material.



    b. Roofing subcontractor to provide & install metal through-flashing on masonry steps. Follow industry guidelines.

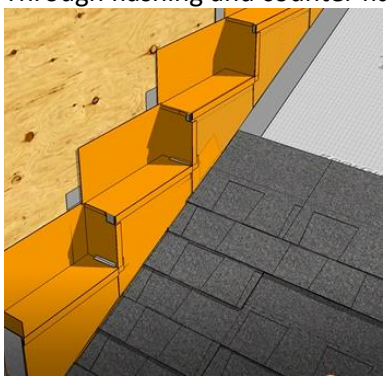
All joints in pans to be soldered; outside corners require extra metal pieces to complete protection where metal is notched for bending.

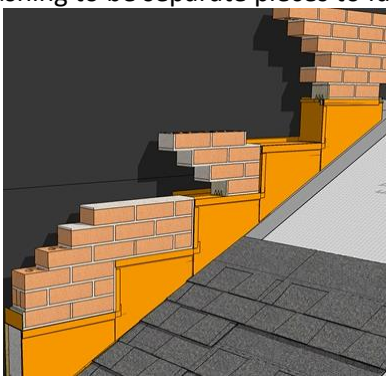


See ProTradeCraft “Step Flashing a Roof to a Brick Wall” document: https://protradecraft.s3.amazonaws.com/s3fs-public/Step-Flashing-Brick%20%281%29.pdf

    c. Masons to complete wall above through-flashing.

d. Through flashing and counter flashing to be separate pieces to facilitate re-roofing later.





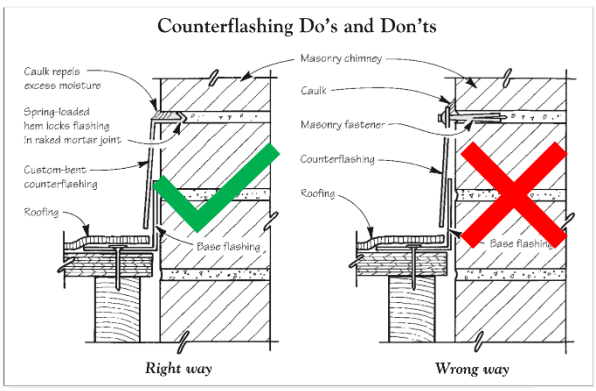
e. Recommended step height 4-6” for stone, two bricks for brick.

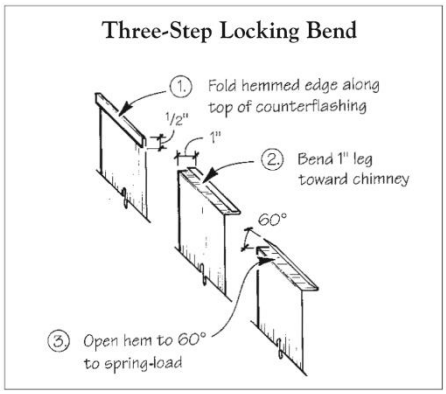
New Chimney

1. BOWA Standards:
    a. Similar construction to “New Masonry Wall Connection to Roof” (see details above).
    b. Install flashing through veneer layer, just above roof level, and into core block. Peel-and-stick flexible material applied first to dry in and provide secondary protection. Copper, stainless steel, or BOWA approved material for flashing, no steel or aluminum.
    c. Flashing will be run through block all the way into the flues. OR, drainage plane on face of block (Thoroseal or similar waterproofing, applied by others).
    d. Metal cap is standard for chimneys of stucco, EIFS, cultured/thin stone, or siding; and for any wood-framed chimney. **Minimum** 3” turndown and ½” extended drip.
2. Best Practices:
    a. Provide optional price for metal cap on masonry chimney crown instead of mortar.

Existing masonry walls & chimneys

2. BOWA Standard:
    a. Cut flashing into masonry. Minimum 3/4” flashing into wall. Bend back edge of flashing up, to wedge into cut.





    b. Apply color-matched urethane sealant to joint.

Bay window in masonry wall

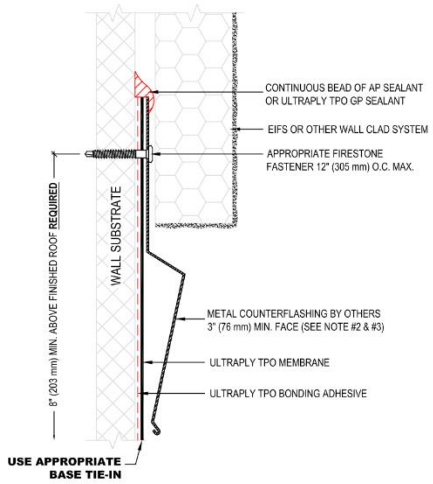
1. BOWA Standard:

a. New construction, roofer to install through flashing through masonry, above roof level (same details as “New Masonry Wall Connection to Roof” above). Coordinate with BOWA PM for roof shape.
b. Existing construction: flashing cut into masonry, ¾” minimum. Bend back edge of flashing up to wedge into cut. Apply color-matched urethane sealant to joint. (Same detail as “Existing Masonry Walls and Chimneys” above.)

Connections to Stucco

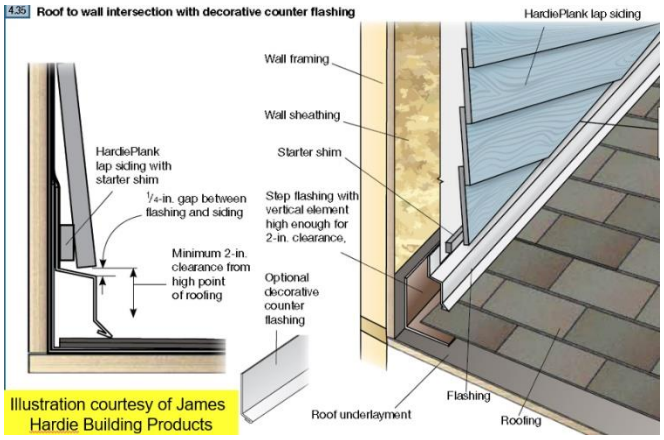
BOWA Standards:

1. Provide & install “Z” flashing at base of stucco walls above roof. Flashing to be minimum 2” from roof to wall cladding, and minimum 2” behind cladding. Consult plans and BOWA PM, if possible, best practice is 4-6” from roof to cladding, to allow roof replacement without needing to damage stucco. Where flashings overhang top of stucco, minimum 3” vertical, and 1/2" projection of drip flange at bottom.



Connection to Siding and Shingles (Wood or Fiber Cement)

1. BOWA Standards:
    a. Include Z flashing to make 2”+ clearance from roofing to siding. Note per discussion with BOWA PM, siding contractor may install synthetic trim instead.



Section 1B: Standards for Steep Slope Materials

Simulated slate/Ecostar

1. BOWA Standards:
    a. Follow manufacturer's instructions for underlayment and fasteners.
    b. Specifically follow instructions for mixing tiles.
    c. Include snowguards per manufacturer's instructions, unless written exception signed by BOWA Production Manager.
    d. Use only Majestic Ecostar brand unless written exception signed by BOWA Production Manager.
    e. Do not use fiber-cement shingles.

Cedar

1. BOWA Standards:
    a. Include "cedar breather" or similar ventilation material (unless roof is skip sheathed).

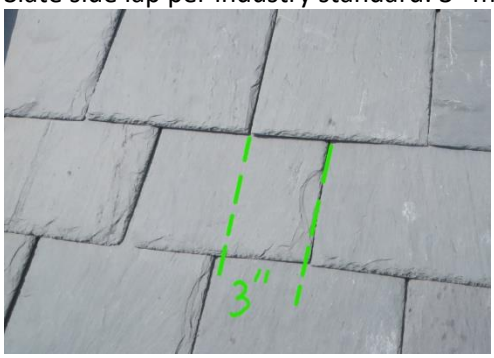
    b. Follow Cedar Bureau installation guidelines.
    c. Offset joints 1-1/2" minimum in adjacent courses, including 1-1/2" from knots, defects.
    d. Space 3/8-5/8" between shakes; 1/4-3/8" for shingles.
    e. Fasteners must be flush with face of shingle, never driven below surface. Two fasteners per piece, 3/4" from edge, 1-1/2" above exposure line. Hot-dipped galvanized for regular material; stainless for pressure-treated.
    f. Extend cedar 1-1/2" past fascia and 1" past rake.
    g. Valley metal shall extend 12" each side min., and have 4-8" clear space in center.

Slate

1. BOWA Standards:
    a. Follow "Slater's Bible" by Joseph Jenkins for general details, except for underlayment.
    b. Underlayment: use full ice membrane coverage on entire roof. Add second layer of underlayment (synthetic or felt OK) to protect eave membrane, if slate installation will take longer than eave membrane exposure limit.

c. Fasteners & flashings copper or stainless. For copper valleys, use 20 oz copper, minimum 15" wide.
d. Vents, pipe flashings, other accessories: use copper, stainless, or similarly durable material of comparable lifespan to slate roof. No plastic, galvanized.
e. Slate "head lap" per code: 4" min for slopes from 4/12 to 8/12; 3" min. for slopes 8/12 to 20/12.

f. Slate side lap per industry standard: 3" minimum offset between joints in adjacent layers.



g. Snowguards installed per manufacturer's specification. Calculate required number and install per requirements unless signed warranty exclusion from client is present. Consult BOWA PM for requested pattern.
h. Repairs: use wire slate hooks or nail/flashing pan. Don't use strip of sheet copper as hook.
i. Mix slates on the ground from each bundle and pallet. Subcontractor will remove and reinstall slates if poorly mixed pattern becomes visible. In photo, area below red line is OK, area above is not mixed properly.

Copper, coated copper

1. BOWA Standards:
    a. Use details in Revere, SMACNA, or CDA Design Handbook.
    b. Solder where needed with metal solder; NO GUTTER SEAL to be used anywhere on any copper roof. If it needs solder, use solder.
    c. Compatible metals only for fasteners and accessories (including fasteners for underlayments; pop rivets; nails; screws; etc.).
        i. Yes: copper, brass, lead, stainless.
        ii. No: steel, zinc, galvanized, aluminum.
    d. Underlayment installed w/copper compatible nails only, use metal-compatible high-temperature underlayment.
    e. Standing seam, 3/12 or greater pitch.
    f. Less than 3/12 pitch, must use full soldered (see Section II: Low Slope Roofs), except with written exception from BOWA Production Manager.
    a. Expansion joints must be installed per Revere, SMACNA, or CDA design handbook for spacing and design.
    b. Coordinate mechanical penetrations (plumbing vents, flues, fan outlets, etc.) with seams. Roofers to provide approximate layout for trades to work to.
    g. Snowguards installed per manufacturer's specification. Calculate required number and install per requirements unless signed warranty exclusion from client is present. Consult BOWA PM for requested pattern.

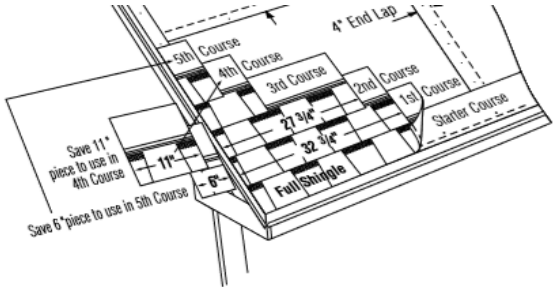
Aluminum, Steel, Stainless

1. BOWA Standards:
    c. Follow manufacturer's specifications and instructions.
    d. Provide full instructions and details for all materials, fasteners, accessories, and connections for the project. Provide a copy on site for BOWA and installers to use during construction.
    e. Use recommended fasteners for roofing & substrate.
    f. Coordinate mechanical penetrations (plumbing vents, flues, fan outlets, etc.) with seams. Roofers to provide approximate layout for trades to work to.
    g. At lower than 4/12 slope, cover roof with two layers "high temp" ice dam material. Install below 3/12 only after full review with BOWA of manufacturer's specific instructions for this application. Do not install below 2/12 slope.
    h. Snowguards installed per manufacturer's specification. Calculate required number and install per requirements unless signed warranty exclusion from client is present. Consult BOWA PM for requested pattern.

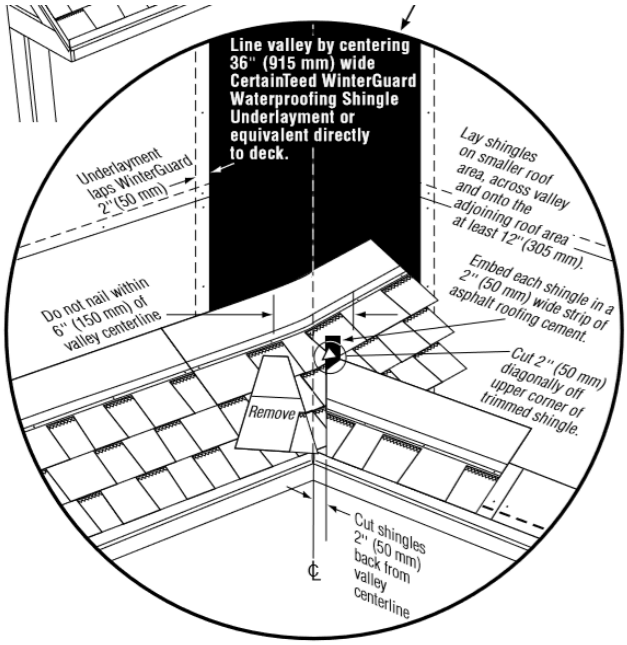
Asphalt shingles

1. BOWA Standards:
    a. Follow manufacturer's specifications and instructions
    b. Provide full instructions and details for all materials, fasteners, accessories, and connections for the project. Provide a copy on site for BOWA and installers to use during construction.
    c. Verify all shingles are from same lot and color before beginning installation. Roofing contractor responsible for replacement of any objectionable color difference.

d. Follow manufacturer's directions for layout of pattern. If disagreeable pattern in finished roof and directions were not followed, roofing contractor will remove and replace roofing. Note each brand and type of shingle has its own pattern.



e. Follow directions for valley construction. Note each brand is different.



Trim top corners of overlaying shingles per instructions. Note: most manufacturers require cut valleys to be trimmed 2" out of valley, not in center.

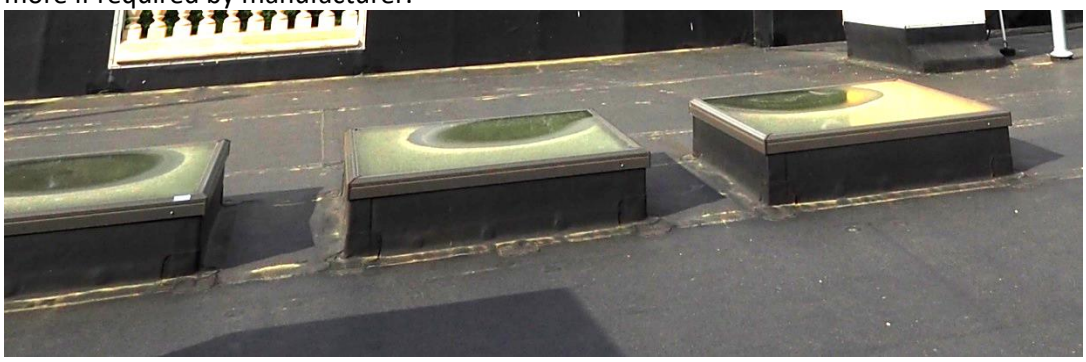
Section 2: Low Slope Roofing (pitch less than 3/12)

Section 2A: General Details for Low Slope Roofing

1. **BOWA Standards**:
    a. Follow manufacturer's specs at minimum.
    b. Provide instructions and detail manual to BOWA and to installation crew.
    c. Minimum 1/4" per foot slope on entire waterproofing surface including edges, drains, gutters, and scuppers. OK to use sloped insulation.
    d. Safety overflow: minimum one 24" wide x 8" high free opening for each 500sf.
    e. Any penetrations within parapets fully watertight to flood rim.
    f. 6" minimum vertical clearance to window or door rough openings. With BOWA PM approval, 4" acceptable.

2. Skylights:

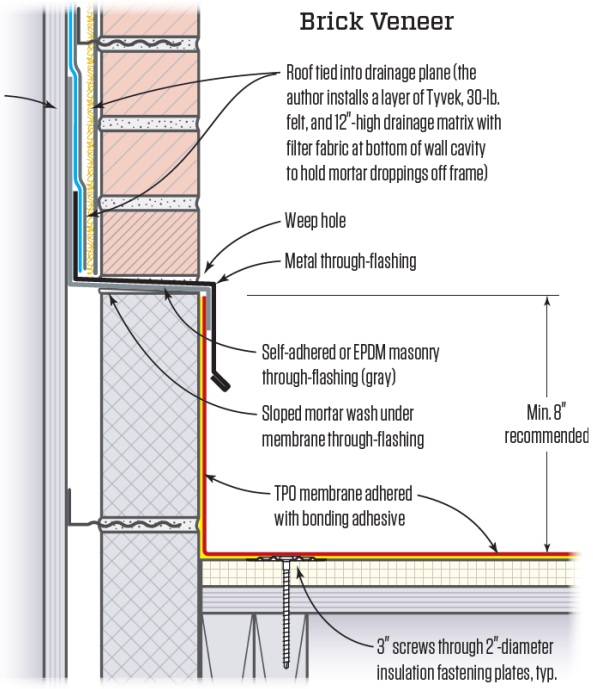
a. Provide & install flexible gasket material (foam weatherstrip or similar) to fully seal skylights, hatches, etc. to roof membrane on top of curb, with no water or air leaks.
b. Wherever possible, install skylights at a slope to prevent debris buildup. Minimum slope 1/12, or more if required by manufacturer.



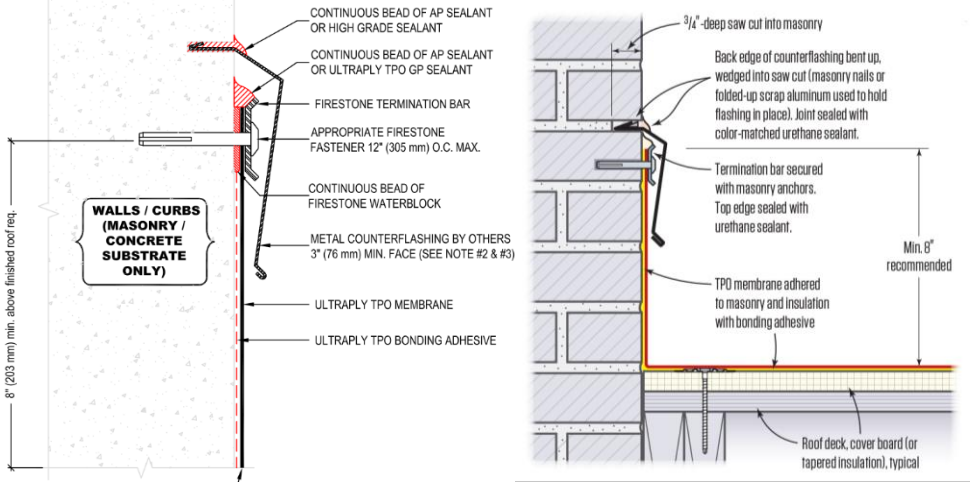
3. BOWA Standard for low-slope connections at New Masonry Walls:

c. See ProTradeCraft "Step Flashing a Roof to a Brick Wall" document and illustrations, in steep-slope roof section of this document.
d. Masons to provide evenly-spaced stepped support masonry minimum 3-1/2" above roof line.
e. Roofer to apply either membrane roofing material (for membrane roofs) or appropriate high-temperature underlayment (for metal roofing) from roof over steps to wall behind.
f. Roofing subcontractor to provide & install metal through-flashing on steps. Follow industry guidelines. All joints in pans to be soldered; outside corners require extra metal pieces to complete protection where metal is notched for bending. See ProTradeCraft "Step Flashing a Roof to a Brick Wall" document and illustrations in steep-slope roof section.
g. Masons to complete wall above through-flashing.

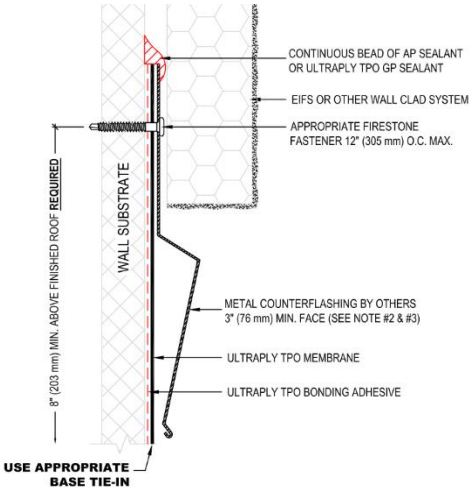
h. Through flashing and counter flashing to be separate pieces to facilitate re-roofing later.

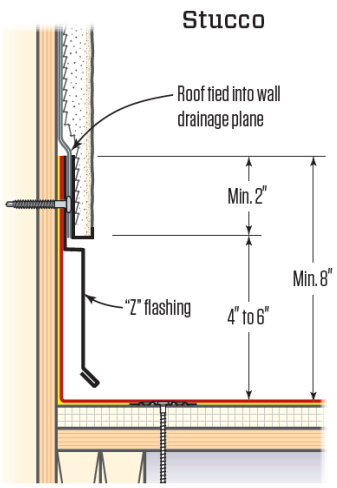


4. **<u>BOWA Standard for low-slope connection at Existing Masonry Walls & Chimneys:</u>**
    a. Use termination bar per manufacturer/industry standard, for membrane roofs.
    b. Cut counter flashing into masonry. Minimum 3/4" flashing into wall.
    c. Bend back edge of flashing up to wedge into cut.
    d. Apply color-matched urethane sealant to joint.



5. **<u>BOWA Standards for low-slope connections to siding, stucco, EIFS, and adhered stone veneer ("thin stone"):</u>**
    a. Provide & install "Z" flashing at base of wall finishes above roof. Flashing to be minimum 2" from roof to wall cladding, and minimum 2" behind cladding. Best practice is 4-6" from roof to cladding, to facilitate roof replacement without needing to damage stucco; consult plans and BOWA PM. Where flashings overhang top of stucco/siding, minimum 3" vertical, and 1/2" projection of drip flange at bottom.





6. **Snowguards**
    i. Snowguards installed per manufacturer's specification. Calculate required number and install per requirements unless signed warranty exclusion from client is present. Consult BOWA PM for requested pattern.
7. **Planters.** If roofing contractor is waterproofing planter boxes:
    j. Install adequate, redundant drainage; detailed so overflow condition will cause no damage. A large overflow sleeve may be acceptable.
    k. Use clamp-ring drains per details below.
    l. Normally, extend roofing/waterproofing material up over perimeter walls and down on other side. See details for parapet walls above.
8. **Details.** Follow industry standards and/or manufacturer's requirements for roof details. See below for BOWA standard choices.

Section 2B: Standards for Low Slope Materials

Copper, coated copper, Coated Stainless Steel

Use details in Revere, SMACNA, or Copper Design Association Design Handbook. Key points:

i. Fully soldered flat seams for any areas below 3/12. Pre-tin all edges. Examine sample joints to verify.

ii. Maximum panel size 18” x 24”.

iii. Apply full coverage “high temperature” ice dam underlayment, with compatible fasteners.

iv. Install proper movement joints to manage expansion, per industry guidelines.

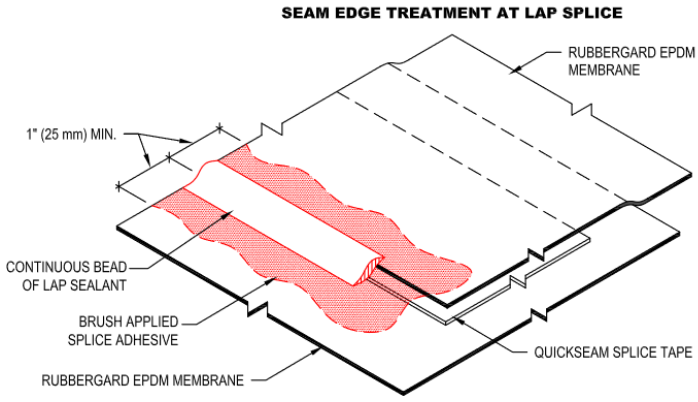
v. Note that built-in gutters require movement joints within 16’ from drains or corners, and gutters require a drain or a movement joint in any corner.

EPDM, TPO, and other “single ply” membranes

Use “Factory Mutual” or manufacturer’s details. Key points:

1. **<u>Check all seams, per manufacturer.</u>** Use seam testing tool on heat-welded roofing.

2. **<u>Seal cut edges and seams</u>** per manufacturer's instructions (example Firestone LS-9). Typically only on EPDM, check manual for other materials.

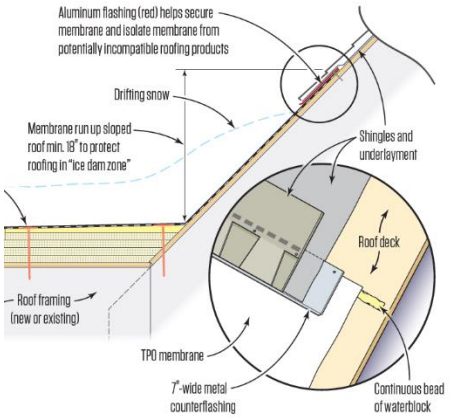


NOTES:
1. REFER TO FIRESTONE WEBSITE FOR THE MOST CURRENT INFORMATION.
2. ALLOW SPLICE ADHESIVE TO FLASH OFF BEFORE APPLYING LAP SEALANT.
3. USE QUICKPRIME PLUS TO CLEAN AND PRIME EPDM MATING SURFACE PRIOR TO INSTALLATION OF QUICKSEAM PRODUCTS.
4. EXTRA CLEANING IS REQUIRED AT FACTORY SPLICE AREAS AND OTHER AREAS WHERE EXCESS DUSTING AGENTS MAY HAVE ACCUMULATED.

WHEN SCRIM OF REINFORCED EPDM IS EXPOSED, APPLY SEAM EDGE TREATMENT TO ENTIRE EXPOSED EDGE.

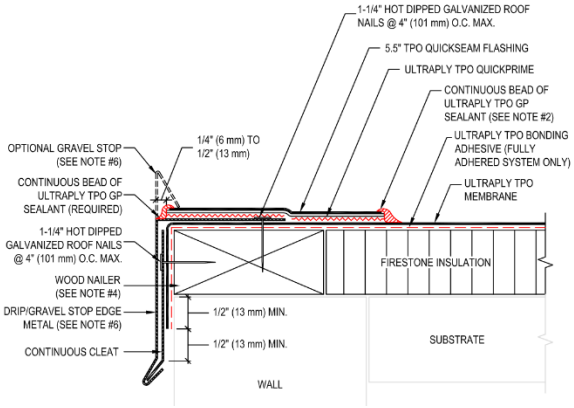
SEAM EDGE TREATMENT FOR QUICKSEAM PRODUCTS

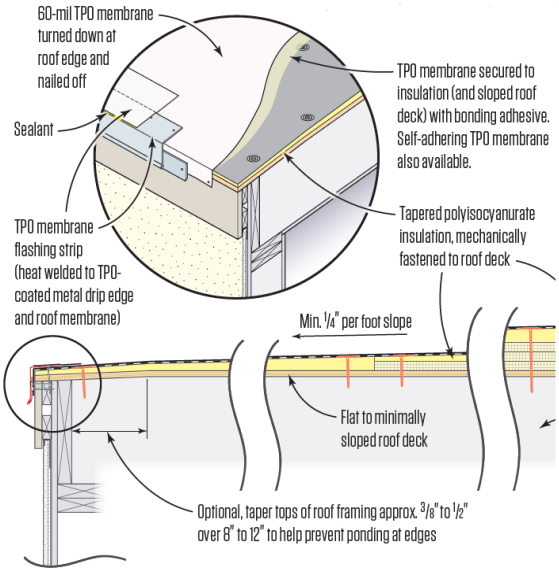
3. **<u>BOWA standard for connection to adjacent steep-slope roofs:</u>**
    a. Run membrane well up onto steep slope roof, in place of ice dam membrane. General rule 18" vertical minimum, 8" is not adequate. 24" horizontal minimum.
    b. Use ice dam membrane, minimum one 36" row, to separate shingles from membrane and provide extra protection. Note must be compatible, recommend "Grace Ultra" butyl-based ice guard for EPDM/TPO membrane roofs, consult manufacturer.



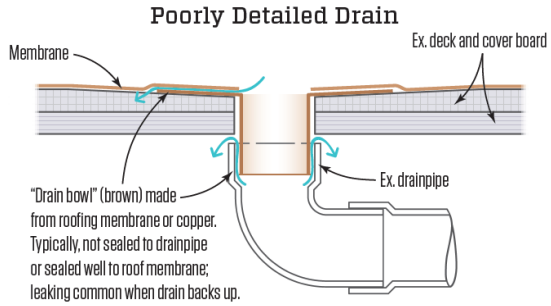
4. **<u>BOWA Standard for Edges:</u>** Use edge details such as Firestone UT-RE-20 or -21, where membrane sheets wrap down over edges, and are covered by metal drip edge. Do not use details where membrane ends on top of metal edge such as UT-RE-22. Note, standard one-part drip edge metal is sufficient; two-piece

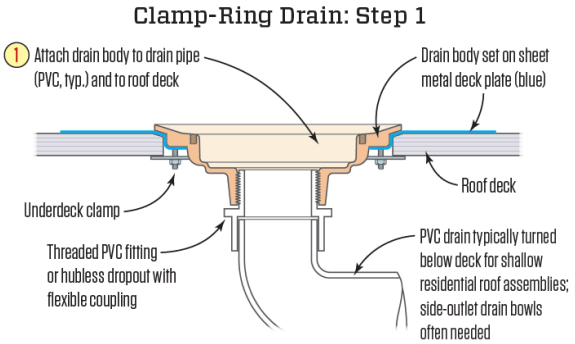
cleat type edges as shown in this illustration are optional.

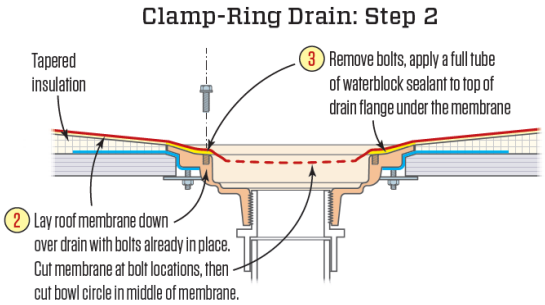


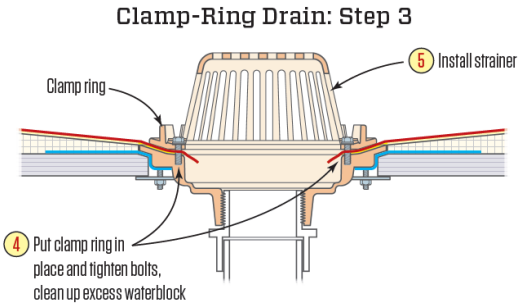


5. **BOWA Standard for Drains:** Provide and install factory made, metal clamp-ring drains, compatible with the roofing material. Install per roofing manufacturer detail, including waterblock sealant. Use 100% watertight plumbing pipe connections.

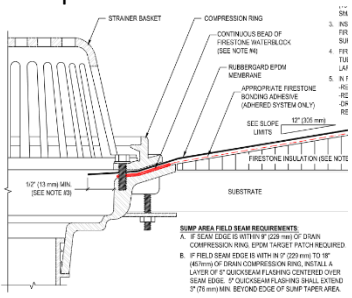




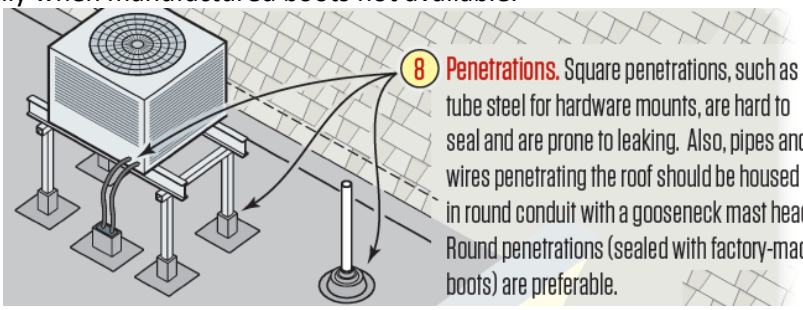




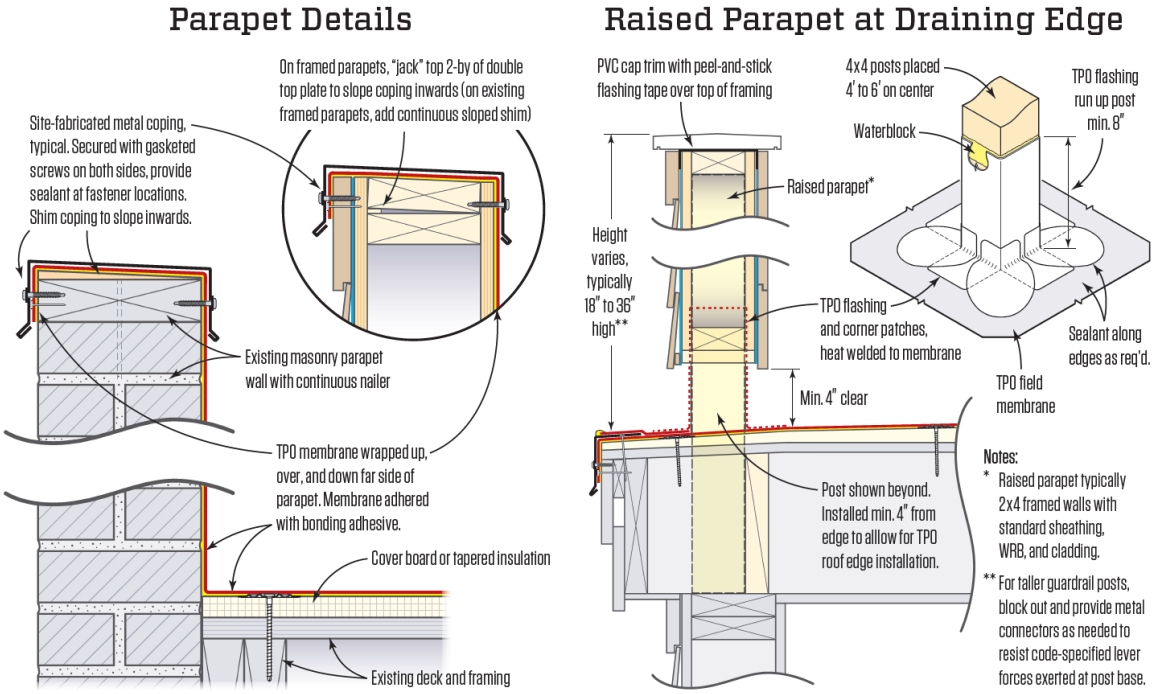
Example Firestone D-1:



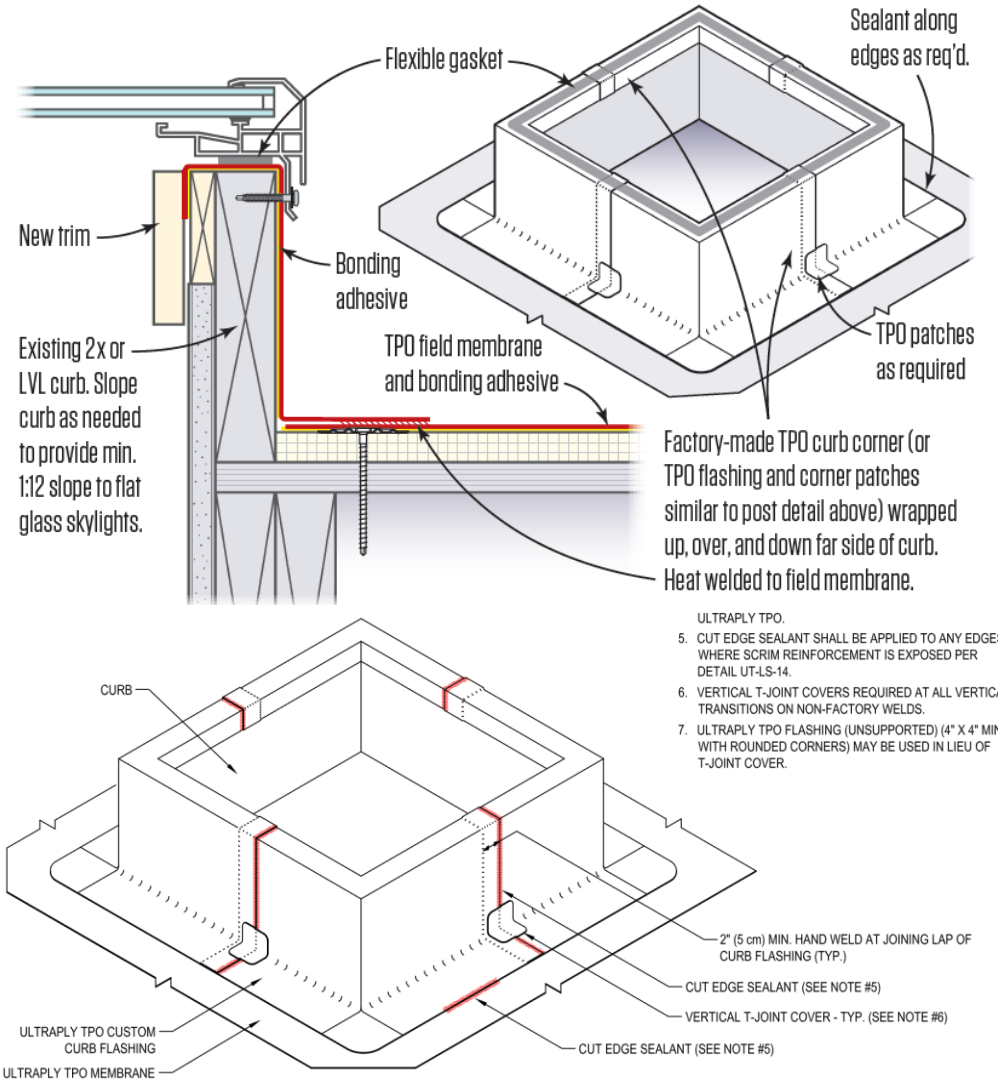
6. **<u>BOWA Standard for penetrations, pipes, etc.:</u>**
    a. Use manufactured pipe boots whenever available for penetrations. “Pitch pockets” or field-fabricated connections only when manufactured boots not available.



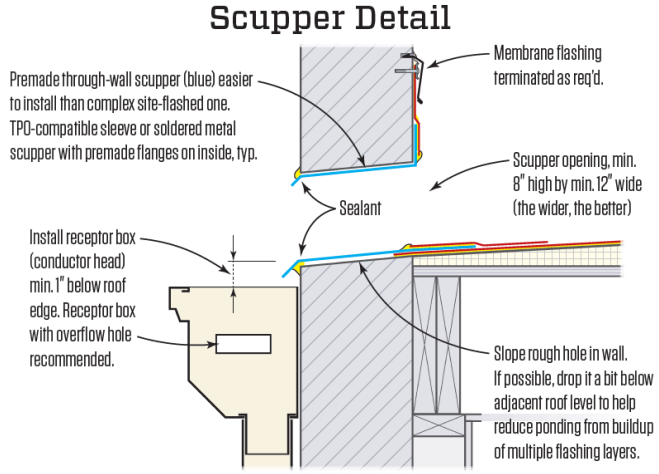
7. **BOWA Standards for Curbs and parapets:**
    a. Membrane wraps up, over, and down far side of parapet. Metal cover over membrane. Use sealant at fasteners. Slope parapet toward roof to keep dirt runoff off façade.
    b. Avoid parapets on all sides of roof. Better to have no parapet on draining edge. If desired for looks, use “raised parapet” design to maximize drainage.



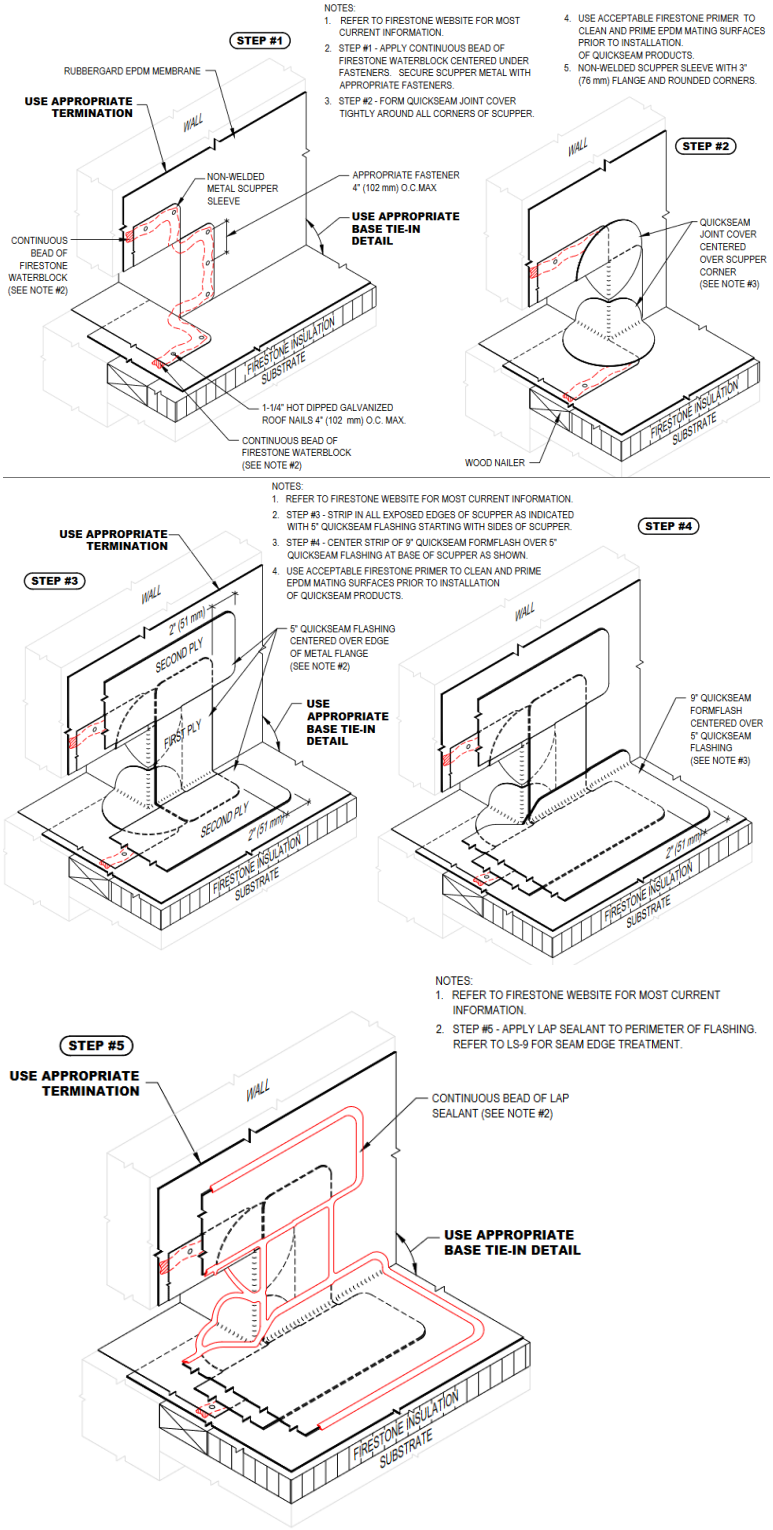
8. **<u>BOWA standard for skylight curbs:</u>**
    a. Membrane up, over, and down. Determine interior termination in conjunction with BOWA PM, based on finishes.
    b. Use weatherstripping, foam gasket, etc. to seal unit to curb.



9. **<u>BOWA standard for scuppers: Use factory details for "scuppers" (metal sleeves</u>**).
    a. Recommend factory-made TPO compatible sleeves (from GAF for example).



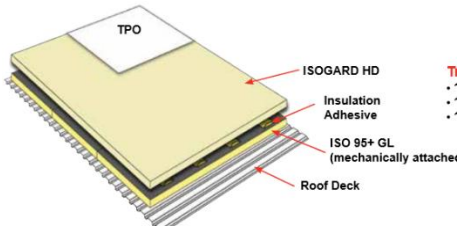
b. Firestone detail S-3 Non-Welded Scupper (or equiv.) is required unless factory welded or soldered copper metal are provided.



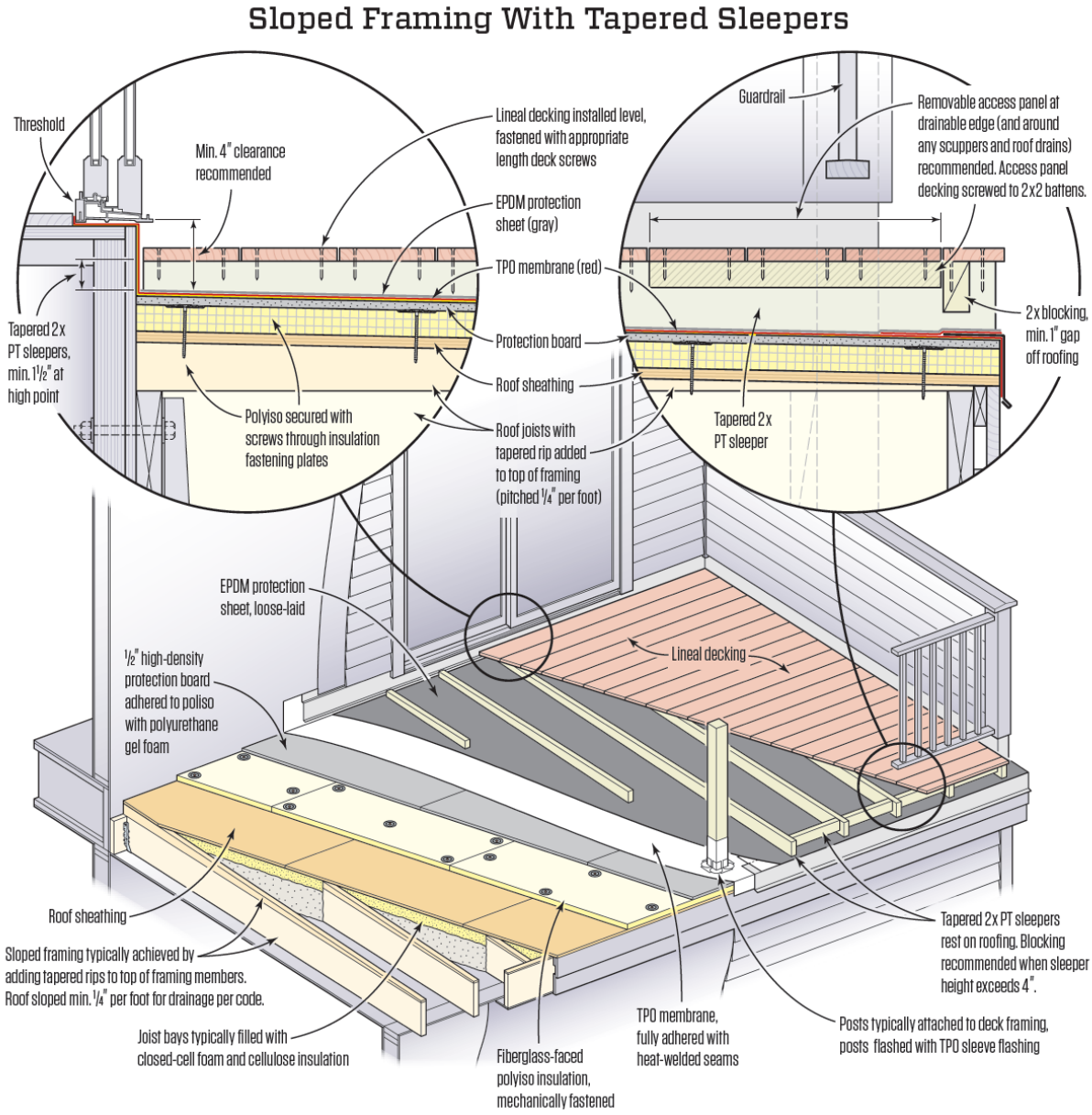
10. <u>Decking over membrane roof:</u>

a. Use TPO or other heat-seamed, no-maintenance membrane under decking, not EPDM or other glued material with required seam maintenance.

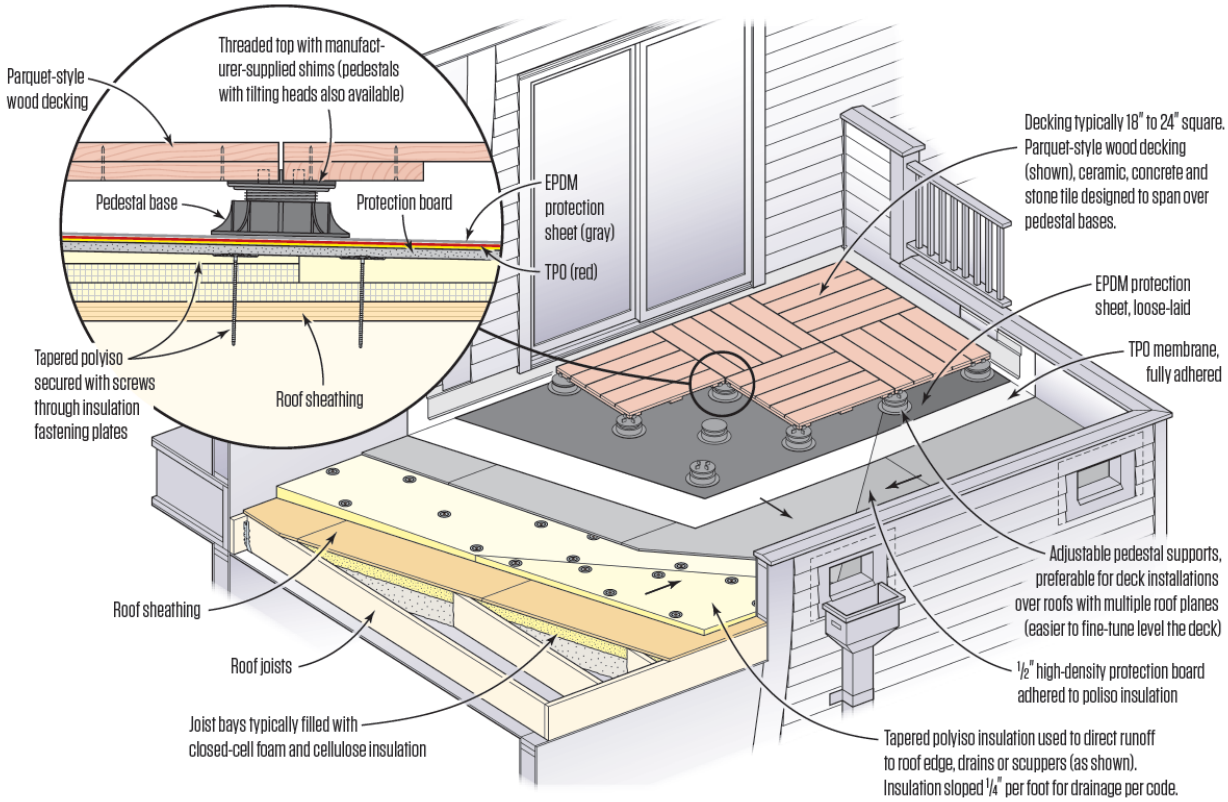
b. Provide extra layer of sheet material as protection below sleepers/pedestals. (Normally black EPDM sheet to help conceal light colored membrane.)



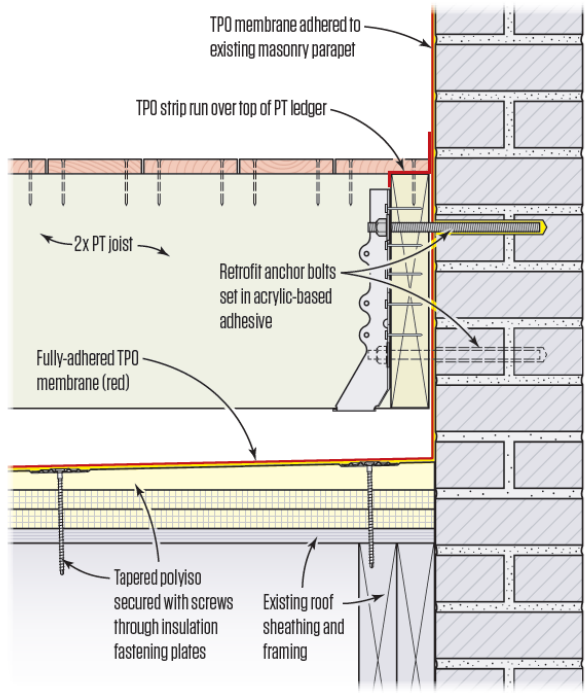
c. Where insulation is used between roofing and structure under a deck, use GAF EnergyGuard HD, Carlisle SecurShield HD, Firestone ISOGARD HD Cover Board or similar high density cover board approved for roof decks. Mechanically fasten insulation below ISOGARD and use adhesive to attach ISOGARD to insulation, so no fastener caps on top of upper layer.



Tapered Insulation With Pedestal Supports



Suspended Deck Detail



Other roofing materials

Follow Manufacturer's guidelines or published industry standards for other materials. Consult with BOWA regarding details before installation.

Safety

Subcontractor is responsible for following all needed safety measures. Some of these include:

1. Provide personal protective equipment for workers (examples: safety glasses, hearing protection).
2. Fall Protection systems will be used where required and installed/used per instructions.
3. Required fire extinguishers must be in place near any hot work.
4. Electrical cords will be intact including ground pins. All tools will have needed guards.
5. Any material such as sanding dust, rags, applicator pads, etc., which are subject to spontaneous combustion, will be removed from the building at the end of each work day. None shall be stored closer than 100' from the building.
6. OSHA-compliant scaffolding or fall protection equipment will be used when working at height. Should crews arrive without safety equipment, BOWA may purchase it and charge the subcontractor.
7. Fuels will be stored per OSHA standards in metal cans and removed from the structure overnight.

BOWA GUTTER AND DOWNSPOUT TRADE STANDARD REV. 11/1/18

These are the minimum standards for work on this project. The intent is for a complete job to high standards, and the ultimate finish and performance is the trade contractor's responsibility.

Work must meet current local code, relevant industry standards, and the plans and specifications for this project, in addition to specific information below. Any conflicts, omissions, or opportunities for upgrades or cost savings will be brought to BOWA's attention before finalizing agreement. Any work required to meet local code, plans and specifications, industry standards, or terms below will be completed for no additional charge beyond proposal pricing.

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Any exceptions to these terms must be signed off by BOWA Production Manager in writing.

1. Follow industry guidelines for sizing of gutters and downspouts.
2. Fasteners will be placed per industry guidelines and must attach to structural framing (structural sub-fascia or ends of rafters/trusses). Do not fasten to trim boards only, must go through to structure. Do not fasten through roof covering (shingles or membrane).
3. Gutters shall extend up behind roof drip edge trim. Where this would prevent adequate slope, consult with BOWA PM for options, normally we will add another segment of metal flashing from behind drip edge down into gutter.
4. Apply 'splash guards' to extend gutter height, at all valleys, and other concentrated flows such as below upper-roof downspouts.
5. Consult BOWA PM for locations of downspouts.
6. Install downspouts so they may be removed from underground drain connections for maintenance. Use screws rather than rivets for lowest connections.
7. Copper gutters will be riveted and soldered. Aluminum to be securely sealed with top-quality product.
8. Provide optional price for gutter leaf protection and for ground-level debris filters.

Subcontractor is responsible for following all needed safety measures. Some of these include:

1. Provide personal protective equipment for workers (examples: safety glasses, hearing protection, dust masks).
2. Electrical cords will be intact including ground pins. All tools will have needed guards.
3. Any material such as sanding dust, rags, applicator pads, etc., which are subject to spontaneous combustion, will be removed from the building at the end of each work day. None shall be stored closer than 100' from the building.
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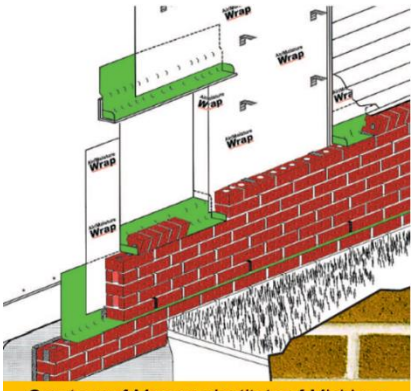
1. Masonry contractor will install building paper, lapped shingle-style with higher layers on top of lower layers, overlap 3". Use #30 felt. Total of two layers of building paper are required. One is Tyvek or Zip installed by framing carpenters, second is felt installed by masons. Felt will be installed shingle-fashion and integrated with other flashings at windows, rowlocks, etc.
    a. Consult with BOWA PM when exterior insulation is being used.
2. Install through-wall flashings and weeps per code:
    a. close to grade.
    b. at top & bottom of windows & doors.
    c. at angles and beams.
    d. at other discontinuities in the cavity.
    e. at rowlocks, caps, & copings.
    f. Through-flashing material will be installed per instructions, fully supported (for flexible flashings), run all the way through the masonry and exposed at the outside (cut off after mortar hardens), and end-dammed at all joints and ends.
    g. Weeps minimum 3/16" diameter every 24". Ropes, if used, must be removed from holes. Color match weep material to masonry. Weeps must be directly on top of through-flashing.

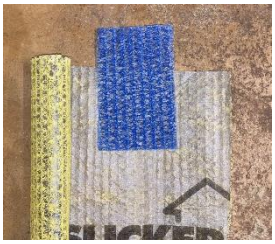


Courtesy of Masonry Institute of Michigan

3. Through-wall flashing material to be one of the following. Any other material must be approved in advance by BOWA. Do not use York Wascoseal, or plastic sheeting.
    a. Carlisle CCW 705 TWF
    b. Grace Perma-Barrier
    c. Henry Butyl-Flash
    d. Hohman & Bernard TeXtroFlash
    e. Fiberweb AquaFlash
    f. 16 oz copper including coated copper;
    g. Stainless steel

4. Air/drainage space must be maintained.

a. For natural stone, use full coverage of entire wall with Obdyke Home Slicker Max or similar:



Keene Dri-Wall, Advanced Mort-Air-Net, or Cav-Clear with scrim on face.

b. For brick, use 16” row of Home Slicker Max (or similar), or Mortar Net or similar bottom-of-cavity material at all through-flashings, or similar products approved in advance by BOWA.

5. Install masonry ties to meet industry standards for material, design, spacing, and installation.
    a. Ties will be fastened to structural studs with stainless or hot-dipped galvanized fasteners, long enough to penetrate studs by 1” minimum.
    b. Spacing 16” x 24” (max 2.67 sf per tie) with additional ties at 12” OC around openings.
    c. Nail within 1/2" of bend in tie. Minimum 5/8 back from exposure at outer face of masonry.
    d. 22 ga corrugated hot-dipped galvanized steel, provide optional price for stainless steel ties.
6. Install rowlocks and sills with clearance space below doors, windows, siding, etc. to allow for wood frame shrinkage. Consult with BOWA PM. Minimum 1/4" at first level, up to 1/2” at upper levels.
7. Cut course below rowlock as needed to allow proper slope (min 15 degree) on sills/rowlocks.
8. Coordinate with roofing contractor to install through-flashings at chimneys and side walls. Flashings must go through block to flue liners, or provide & install water resistive layer (Thoroseal or asphalt dampproofing) over block core including over top to flue liners.
9. Provide optional price to seal outside of chimneys above roof lines with breathable, siloxane sealer: BSM-400 by Chem-Trete Industries or equal.
10. Chimney cap, use concrete with waterproofing below, minimum 2” thick at thinnest point. Preferred option: metal cap instead of mortar.
11. No anti-freeze may be used in mortar or concrete, except for blockwork that will be hidden. Do not work when temperature will be below 32 within 24 hours. Tent & heat areas to work in cold weather. Masonry contractor is responsible for repairs to frost-damaged mortar.
12. Install through-flashing immediately below stone & masonry caps on retaining walls to reduce water entry. Retain top caps with fiberglass pins, stainless clips, or similar.
13. Install anchor bolts for sill plates per plan and code, normally 1/2" bolts 6’ on center. Check plans, galvanized bolts may be required.Bolts are required within 12” of the end of each wood sill plate. BOWA PM to coordinate layout on site. Provide two bolts at anticipated joint locations (every 16’ unless noted). Review manufacturer’s literature for placement of strap ties and other non-bolt connectors—many require closer spacing such as 3’ on center.
14. For concrete work, follow Concrete Trade Standard. For stucco work, follow Stucco Trade Standard.

Safety:

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2. Electrical cords will be intact including ground pins. All tools will have needed guards.
3. Any material such as sanding dust, rags, applicator pads, etc., which are subject to spontaneous combustion, will be removed from the building at the end of each work day. None shall be stored closer than 100' from the building.
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5. Fuels will be stored per OSHA standards in metal cans and removed from the structure overnight.

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General

1. When siding is provided by Subcontractor, it will be delivered, stored, and protected per manufacturer or industry standards. Fiber Cement must be stored flat and kept dry. Subcontractor to provide any materials and labor required for proper storage including supports, tarps, etc.
2. Wood siding must be fully primed on all sides and cut ends. When unfinished siding is provided by Subcontractor, coordinate with BOWA to deliver for painters to prime material before installation.
3. Flashings will be installed on any horizontal projection 1" or more, and at all roofs, decks, penetrations, etc. Do not install siding if flashings are not present. Purchase flashings for curved or other unusual construction ahead of time.
4. Where housewrap/WRB is installed by siding contractor, follow manufacturer's instructions and BOWA Carpentry Standard.
5. Use only Hardie brand fiber-cement without written authorization by BOWA PDM. No Allura brand.

Notes:

1. Most siding materials must be nailed to studs. Follow directions.
2. When drain space materials are used, ensure fasteners meet manufacturer's specifications for length.
3. For SIPS construction, or exterior insulation thicker than 1", wood nailer strips ¾" to 1-1/4" thick are required for most siding options. Verify with industry/manufacturer's specs.
4. Synthetic roofing underlayment (such as "Titanium"): do not use unless approved in writing by BOWA Production Manager. Many of these materials are not vapor permeable and can trap moisture.
5. When working over existing roofs, siding contractor to provide & install kickout flashings, extended counterflashings to achieve 2" clearance, and other materials needed for proper connections to existing roof.
6. Include "Z" flashing above windows and any trim elements over 1" thick. For curved top windows, include custom metal without cuts, or order bendable "Z" flashing such as Astro-Flash, Sure-Seal, or BH Davis brands. Do not use metal with cuts—order flashing ahead of time.

WRB/Drain Space Required

Siding type:	Minimum requirement:

• Wood beveled siding (with triangle spaces behind pieces)
• Horizontal Hardie Plank or SmartSide siding (with triangle spaces behind pieces)
• Vinyl or metal siding with spaces behind each piece (no foam inserts)
	Level 1:
	• One layer of flat WRB:
	  ○ Housewrap (Tyvek, Typar, Dow, or other non-perforated wrap)
	  ○ #30 Felt
	• Or any of the below

• Horizontal wood siding with flat back (no triangle space behind, for example German lap or Dutch lap profiles)
• Vertical or diagonal wood siding, or Hardie Panel siding, protected by overhang above (12" overhang per 18' vertical)
	Level 2:
	• One layer of "draining" housewrap:
	  ○ Obdike DrainWrap
	  ○ Tamlyn Wrap
	  ○ Valeron Vortex
	• One layer of flat housewrap, plus one layer of "draining" housewrap on top.
	• Or any of the below

• Vertical or diagonal wood siding, or Hardie Panel siding (not protected by overhang)
• Synthetic siding made of non-permeable material (PVC, Poly-Ash, Acre)
• "Panel" design areas
• Impermeable sidings without space behind: PVC sheet, standing seam or other metal panel design, synthetic stone/fiber cement materials without space behind them
	Level 3:
	• One layer of flat WRB:
	  ○ Housewrap (Tyvek, Typar, Dow, or other non-perforated wrap)
	  ○ #30 Felt
	• AND a drainage & drying space behind cladding, minimum 3/16":
	  ○ Drain mesh (Obdyke Slicker, Cedar Breather, or similar)
	  ○ Vertical strips of sill seal or 1/4" fanfold foam
	  ○ Strips of wood, fiber-cement, synthetic trim, or corrugated plastic
	Note: insect screening required.

1. There are three "levels" of weather protection, in ascending order. Level 2 is better than Level 1 and so on. We can always use a higher level than the minimum listed.
    - Level 1:
        - One layer of housewrap (Tyvek HomeWrap minimum) or #30 felt
    - Level 2:
        - Draining-type housewrap such as Obdyke HydroGap, TamlynWrap Drainable Housewrap, or Valeron Vortec. (Normally added over Tyvek/felt, or may be used as single layer if approved by BOWA Production Manager.)
    - Level 3:
        - One layer of housewrap (Tyvek HomeWrap minimum) or #30 felt

        PLUS:
        - air space (3/16" minimum) created by:
            - Drainage mesh material (Home Slicker Classic/Cedar Breather or similar)
            - ¼" foamboard ("Fanfold"), in vertical strips covering less than 25% of wall area

- Strips of wood, fiber cement, PVC/Boral trim material, or foam “sill sealer”
- Corrugated plastic strips, with channels vertical for drainage (Cor-A-Vent, DuPont RainVent, or sheet coroplast cut on site)

▪ Air space must have insect screening at openings (bottom of wall, window heads, etc.). Use manufactured product such as Cor-A-Vent Sturdi-Starter, or use 6” +/- wide strip of fiberglass screening wrapped under spacer materials.

2. Requirements by siding type:
    - Standard vinyl or aluminum siding with substantial air space behind each piece and substantial vent/drain openings: Level 1 minimum.
    - Horizontal profiles with spaces behind each piece (beveled siding for example) of wood, fiber cement, or other “permeable” materials: Level 1 minimum.
    - Horizontal siding with flat back profiles (German/Dutch lap, or T & G, for example) of wood, fiber cement, or other “permeable” materials: Level 2 minimum.
    - Vertical or diagonal profiles of wood, fiber cement, or other “permeable” materials: Level 2 when protected by overhangs, otherwise Level 3 minimum.
    - “Panel” designs: Level 3 minimum
    - Impermeable solid siding materials such as Boral, Versatex, Royal, Acre and other plastic or composite siding, including “panel” designs: Level 3 minimum.

Cement Board/Panel Siding

1. Hardie HZ5 is our standard. Do not substitute other brands without written approval from BOWA.
2. Follow Hardie installation instructions. Any deviations will be repaired at Subcontractor’s expense.
    - Maintain 2" clearance at roofs. Install brake metal Z-flashing per Hardie best practices guide (illustration below), unless directed otherwise by BOWA.
    - Include flashing strips at joints.
    - Fasten per instructions (into studs) with stainless or hot-dipped galvanized siding nails.
    - Maintain spacing at board ends per instructions.
    - Prime all cuts with Hardie touchup paint.
    - Verify required kickout flashings are in place before installing siding. Do not cut or bend kickout flashings; cut siding around vertical leg of flashing.
    - Use drain space behind vertical or Hardie Panel material per requirements above.

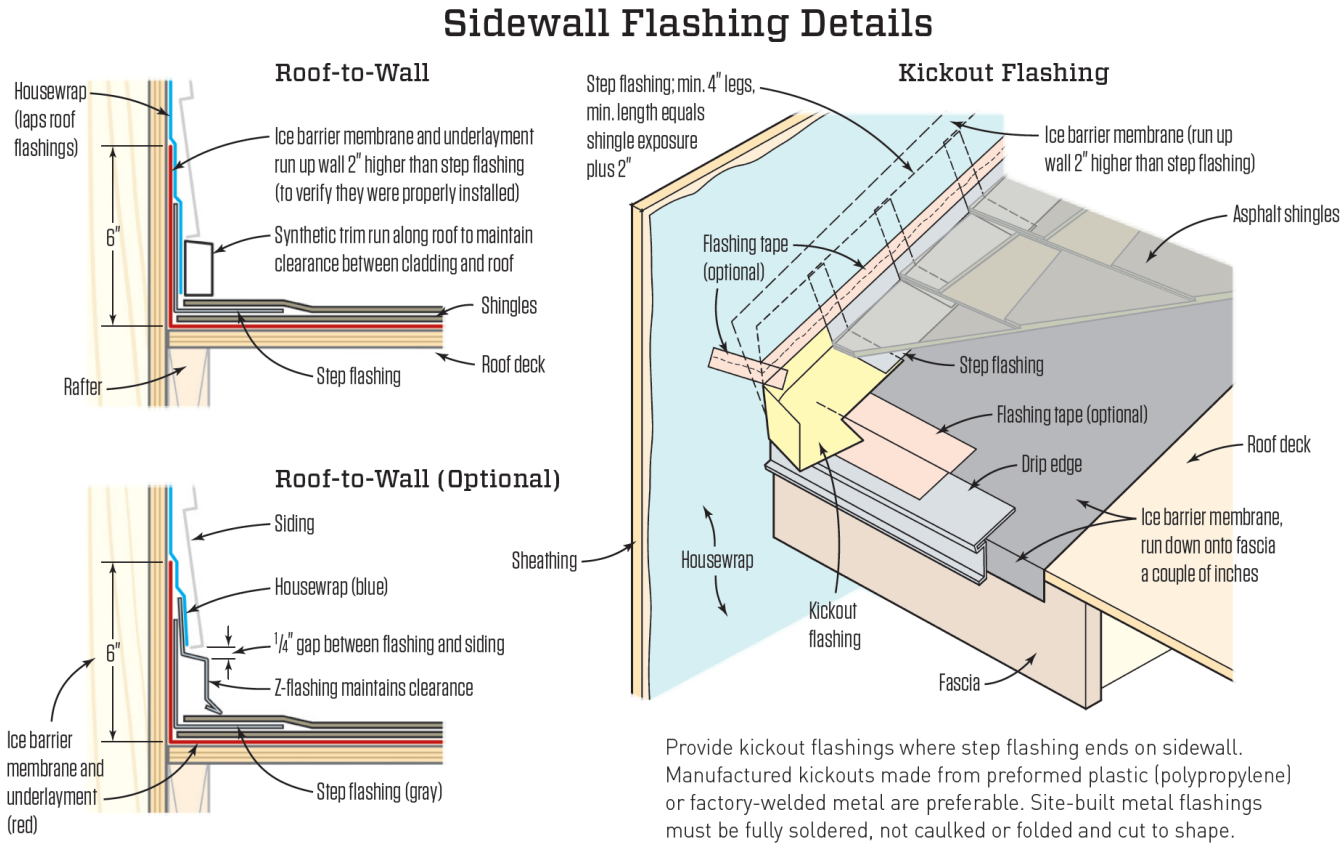
Cedar Siding

1. Follow installation instructions from the Western Red Cedar Lumber Association.
2. Wood siding to be prefinished on all sides. Use alkyd oil stain-blocking primer for painted finishes, or per manufacturer for stains/sealers.
3. Store 6” above ground, covered with watertight cover with air circulating freely below. Subcontractor responsible for materials and labor to store properly on site.
4. Verify cedar averages 12% moisture content by testing 10% of boards and verifying 9-14% MC.
    - Maintain 2" clearance at roofs. Install brake metal Z-flashing similar to Hardie best practices guide, unless directed otherwise by BOWA.
    - Maintain 6” clearance from grade.
    - Include flashing strips at joints.
    - Fasten per instructions with stainless or hot-dipped galvanized siding nails.
5. Vertical joints will be made with a 45 degree miter, angled outward so water is directed away from the building.

6. Horizontal bevel siding shall overlap minimum 1”. Nail above line of piece below so nail only holds one piece of siding. Use spiral or ring shank nails, stainless steel (if painted siding, hot-dipped galvanized is acceptable), long enough to penetrate 1-1/4” into studs.
7. Vertical and diagonal profiles require blocking or nailer strips at 24” OC. Nails must hit 1-1/4” material minimum. Vertical and diagonal siding will be installed over an air space; furring or drain gap products are acceptable.

Composite or vinyl board siding (Boral, Versatex, Royal, Azek, Acre, etc.)

1. Install “Level 3” drain/vent space behind any impermeable siding such as Boral, Versatex, Royal, and other plastic or composite siding.
2. Follow manufacturer’s instructions for fasteners, flashing, priming, etc.



Provide kickout flashings where step flashing ends on sidewall. Manufactured kickouts made from preformed plastic (polypropylene) or factory-welded metal are preferable. Site-built metal flashings must be fully soldered, not caulked or folded and cut to shape.

Safety

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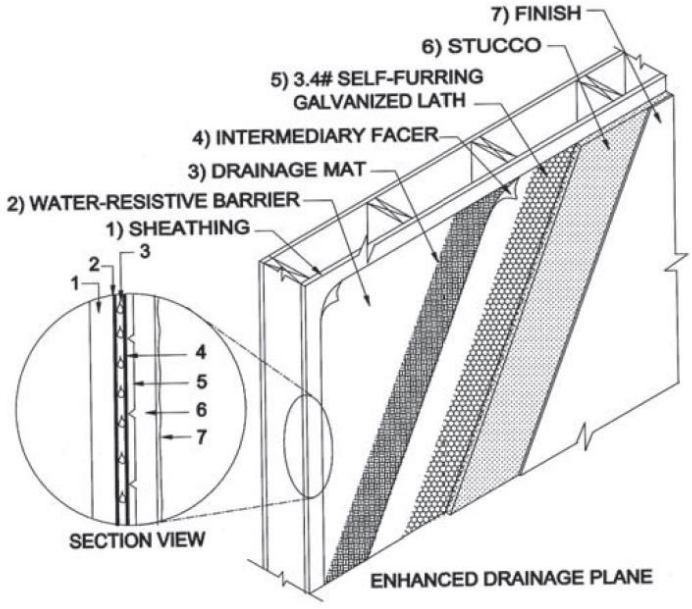
Building paper (note that framing contractor typically installs first layer)

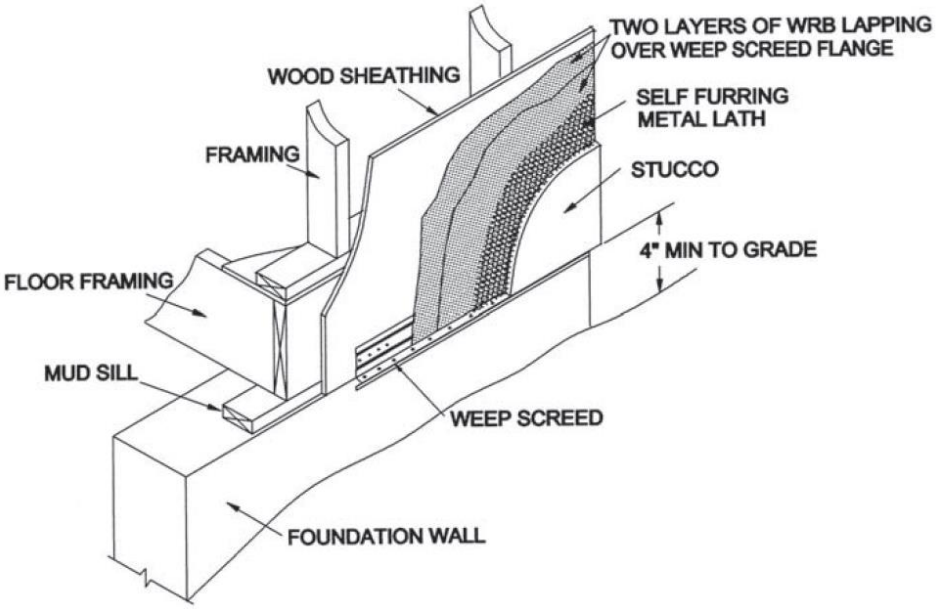
1. Two layers paper are required (or one paper and one foam board).
2. Typically, framing contractor applies Tyvek Home Wrap, fully taped, and stucco contractor applies drainage mat layer and one layer of felt.
3. At least one layer must be low permeability (felt, Valeron WeatherTrek, Delta-Dry, or foam board).
4. Apply one drainage mat layer in addition to two wrap layers. 3/16-3/4" such as Cedar Breather, Home Slicker, Keene Dri-Wall, AirMate, Mort-Air-Net, or MTI materials.
5. At least one layer fully taped. All layers lapped for proper drainage. Bottom should hang 2" below sheathing and be caulked to foundation. Follow manufacturer's directions.
6. All wrap layers should be pulled out to the front of stepflashings, weep screeds, and other bottom terminations.
   This illustration shows Tyvek, unfaced drain mat, and another wrap layer ("Intermediary Facer") in front of drain mat. More typically, we install Tyvek, felt, then a drain mat with built-in facer material. Either is acceptable.

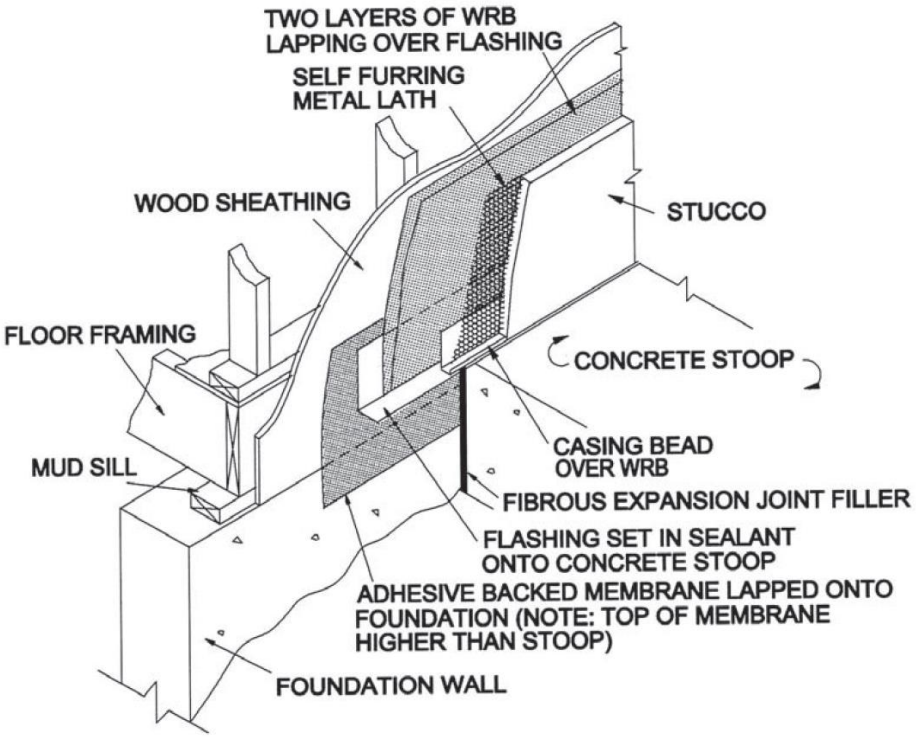


Illustrations courtesy of Minnesota Lath & Plaster Bureau.

Bottom Termination

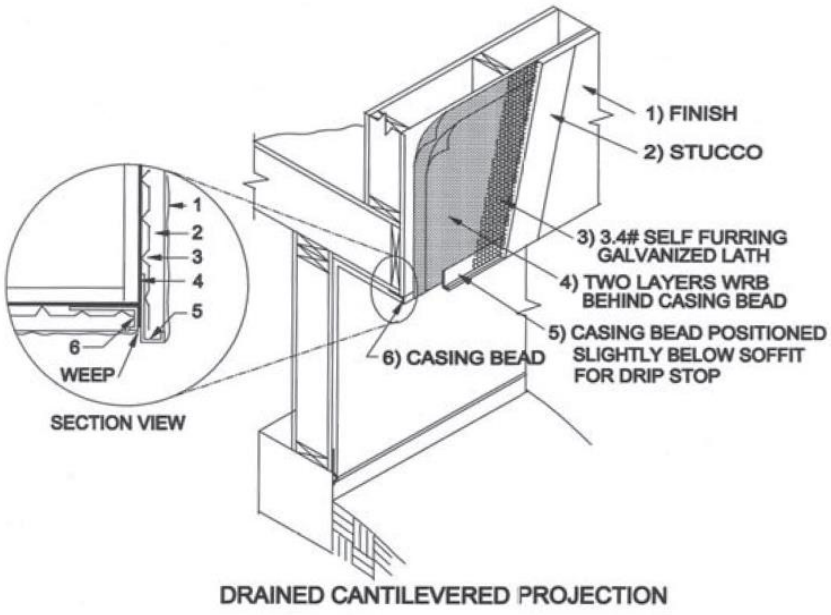
1. Minimum 4" above grade or 2" above slab/driveway condition.
2. Attach termination trim to wood framing, not to foundation wall.
3. Drainage plane behind stucco must terminate above grade at open weeps. Do not run down below grade. Use weep screed, or Z-flashing and casing bead.
   Note illustrations below don't show drain mat installed, which we require on all stucco, as shown above.





Illustrations courtesy of Minnesota Lath & Plaster Bureau.

4. Cantilever/bay condition: create “drained” joint; run stucco down 3/4" past bottom of soffit material.



DRAINED CANTILEVERED PROJECTION

Windows

1. Skirt detail: best practice is to drain the window sill pan to exterior.
2. Windows surrounded by casing bead, 3/8-1/2" space for caulking. Keep finish coat out of joint by caulking first or masking.
3. Head flashing & weeps installed per industry standard drawings approved by BOWA. (May be integral to window or may be omitted when window very well sheltered.)

Stucco lath

1. Self-furring galvanized lath per industry spec.
2. Attach per industry standard: galvanized, roof nails or narrow-crown staples, must be long enough to penetrate ¾” into studs. Fasten 6” o.c. vertically, on each stud.
3. Lath to extend 24" past inside & outside corners—no joints at corners
4. Avoid cutting WRB while installing lath.
5. Plan movement joints at floor lines, and about every 12'. Consult with BOWA PM. Hide behind downspouts, at windows, etc. to minimize visibility of vertical joints.

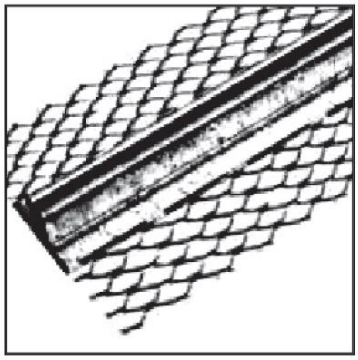


Photo A. A typical one piece “control joint.” Courtesy of Alabama Metal Industries Corp.

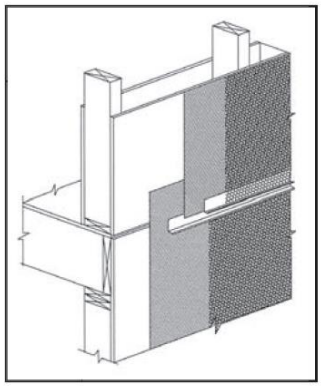
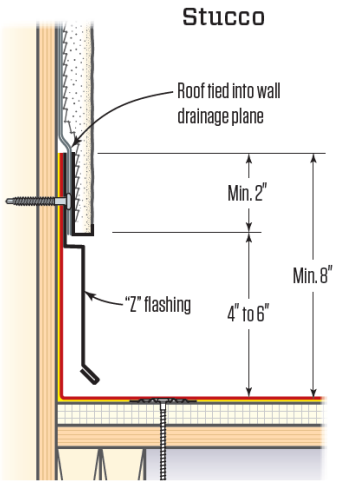


Illustration A. A two piece “weeping expansion joint”

6. Weep screed (or other draining termination detail) at bottom—don't run into ground.
7. Attach to studs not sheathing.



Roof/wall intersection

1. Use 4" tall stepflashing.
2. 2" minimum clearance from roofing material to stucco for steep slope roofing, 4-6” minimum for low-slope roofing.
3. Best practice: install Z-flashing or trim between stucco and roofing material to reduce visual impact of the 2” clearance space.
4. Use polypropylene kickout flashing in approved color to match finishes. Do not cut. Metal kickout flashings must be factory welded or soldered copper; never folded, cut, or sealed with caulking.
5. Best practice on low slope roofs: use trim or flashing material to create 6” min. space between stucco and roof, to reduce splash damage and make roof replacement easier.

Other important factors

1. Temperature needs to be 38 or above for 24 hours after wet products are applied. If quick setting products are used, temperature must be 32 or above for 24 hours. Propane and kerosene heaters can cause a chemical reaction with the base coat which damages stucco; avoid.
2. Base coat materials: provide optional price for brand-name base coat materials for better warranty.
3. Use silicone caulking instead of polyurethane.
4. BOWA recommends traditional stucco on exterior features (retaining walls, stairs, etc.) due to failures of acrylic “one coat” topcoats. If used, stucco contractor warrants performance. Install details to keep water out of stucco systems. Provide complete waterproofing under/through exterior wall caps and horizontal accent details.

Chimneys

1. Stucco chimneys need full metal cap with 3” turn down minimum, ½” projection drip edge

Tudor-style “half timber” trim

1. Apply trim boards to face of drain mat, of base coat, or of complete stucco system; coordinate with BOWA Project Manager. Trim will not be applied directly to wall, due to complexity of flashing details.

Railings, half-walls, planters

1. Ideally, start them 3” away from the wall (free standing) so no integration issues
2. Use SAF (Self-Adhered Flashing, e.g. ice & water membrane) to cover entire connection area, build rail or wall out from there
3. Fully flash including head
4. Half walls should have SAF wrapped over entire top, and housewrap or felt the rest of the way
5. Planters should have SAF wrapped over entire top
6. best to design free drainage below plantings (open spacing between treated supports, free-standing containers for plants)
7. Use flashings or SAF to prevent water entry at tops of hardscape walls (retaining walls, staircase walls and risers, other areas not part of/protected by the house itself). Keep water out of stucco. We prefer hard-coat stucco on exterior walls, stairs, etc. due to failures of acrylic top coats. Stucco contractor warrants performance of acrylic top coats if used.

Use MLPB details from Stucco Resource Guide, 3rd Edition, or NWCB details as outlined in the NWCB Stucco Resource Guide 3rd Edition.
General wall construction: NWCB A13 Drainage Medium Construction p. 70
Window head construction (note use window manufacturer's directions as approved by BOWA for balance): FWB 9, p.82
Termination at bottom: T5, p. 101, and T7, p. 103
General horizontal weep flashing: F1, p. 114
Flashing at roof: F4, page 117; F10, p. 121

Safety

Subcontractor is responsible for following all needed safety measures. Some of these include:

1. Provide personal protective equipment for workers (examples: safety glasses, hearing protection)
2. Electrical cords will be intact including ground pins. All tools will have needed guards.
3. Any material such as sanding dust, rags, applicator pads, etc., which are subject to spontaneous combustion, will be removed from the building at the end of each work day. None shall be stored closer than 100' from the building.
4. OSHA-compliant scaffolding or fall protection equipment will be used when working at height.
5. Fuels will be stored per OSHA standards in metal cans and removed from the structure overnight.

These are the minimum standards for work on this project. The intent is for a complete job to high standards, and the ultimate finish and performance is the trade contractor's responsibility.

Work must meet current local code, relevant industry standards, and the plans and specifications for this project, in addition to specific information below. Any conflicts, omissions, or opportunities for upgrades or cost savings will be brought to BOWA's attention before finalizing agreement. Any work required to meet local code, plans and specifications, industry standards, or terms below will be completed for no additional charge beyond proposal pricing.

Trade contractor is responsible for the performance and finish of their work. Do not proceed with work over substrates or previous work unless you know it to be acceptable. Once work is commenced, trade contractor is responsible for performance and finish.

Any exceptions to these terms must be signed off by BOWA Production Manager in writing.

1. Standard bid spec batts in walls, ceilings, and floors, to meet local code, plans, and/or specs, whichever is more stringent. Blown-in insulation in attics, where possible.
2. Installation of fibrous insulation to meet RESNET Grade 1.
    a. Installed to manufacturers' recommendations and industry standards.
    b. In substantial and permanent contact with the primary air barrier [no gap between drywall and insulation, all batts flush with inside face of framing].
    c. No air spaces between different insulation types or systems.
    d. Installed to the required density and thickness necessary to achieve the required R-value.
    e. Fill around obstructions including framing, blocking, wiring, pipes, etc. without substantial gaps or voids. Closely fit insulation around obstructions like framing, blocking, wiring, pipes, etc. to avoid substantial gaps, voids or compression.
    f. Faced batts must be stapled to the face of the studs or side stapled to the studs with no buckling. The tabs can be left unstapled. Faced batt products without tabs and friction fit products don't need to be stapled in vertical walls. When side stapled, compression is permitted along edges to the depth of the stapling tab.
    g. No more than 2% of the total insulated area (cavity) can be compressed or contain gaps or voids in the insulation.
    h. These areas shall not be missing or compressed more than ¾ inch of the nominal insulation thickness in any given location.
    i. Voids can't extend from the interior to the exterior.
    j. Framed floor assemblies – Insulation must be in substantial and permanent contact with the subfloor.
3. Include separate trip for firestopping/air sealing before rough-in inspection.
4. All batts to be UNFACED OR KRAFT FACED. No foil or plastic facings.
5. Fiberglass insulation to be formaldehyde-free or "no added urea formaldehyde" as made by Owens-Corning, Knauf, or Johns Manville. Cellulose to be borate-only, no ammonium.
6. Full vent channel installation in cathedral ceiling areas, unless noted otherwise.
7. Apply continuous bead of minimal-expanding foam at all window and door perimeters.
8. Provide and install minimum R-3 of neatly installed insulation on hot water piping including entire recirculation loop and line to kitchen faucet.
9. Spray foam: When foam is used, the intent is for a complete air seal and insulation package.

a. Use only equipment which automatically monitors mix ratio. Do not spray foam off ratio. Any foam which exhibits quality issues will be removed and replaced at insulation contractor's expense.
b. Test rig using SPFA recommended technique before spraying each day:
    i. Spray "coupon" 4" thick by 36" long. Wait for first cure. Cut along length and verify foam is uniform throughout with no larger bubbles, discolored areas, etc.
c. Spray foam must be extended to air seal adjacent materials and assemblies. Do not leave gaps near spray foamed areas.
d. Fully enclose exposed rafters/framing to air seal and reduce thermal bridging, except with deep rafters >9", consult with BOWA PM.
e. Spray foam will be installed per manufacturer's instructions. Closed cell must be installed in thin lifts to avoid overheating.
f. Insulation contractor will repair gaps, shrinkage, air leaks etc.; infrared camera review and repairs will be scheduled with BOWA for next day after install.
g. Provide code approval documents for the product and application on this project.
h. Only closed-cell foam will be sprayed on ductwork, or below unvented, low permeability roofs (such as membrane, metal, or roofs completely covered with synthetic underlayment or ice guard membrane). Do not use open-cell insulation in these areas.
i. Flash-and-batt type wall insulation: Minimum 1.5" closed cell foam in walls, note: not average thickness of 1.5", minimum thickness 1.5".
j. Flash-and-batt roof installations: Follow code requirements for minimum thickness of air-impermeable insulation, R-15 in 2015-2021 IRC (R806.5).
k. Install vent channels above foam in sloped roof assemblies. Consult with BOWA project manager.
l. Do not apply foam directly to recessed light fixtures; include 2" layer of fibrous insulation around each fixture.
m. Ensure complete air barrier above recessed lights, ducts, and other obstacles by spraying first, using XPS foam board above lights, or similar techniques. Only install foam or other insulation in contact with lights in accordance with their listings.
n. Provide code-required installation certificate. Use template SPFA-148 or similar.

Optional items: Please price on each job

1. Air seal package
2. Firestop package
3. Blown-in, Spyder, damp-spray, or similar Grade 1 fibrous products

Safety:

Subcontractor is responsible for following all needed safety measures. Some of these include:

1. Provide personal protective equipment for workers (examples: safety glasses, hearing protection).
2. Electrical cords will be intact including ground pins. All tools will have needed guards.
3. Any material such as sanding dust, rags, applicator pads, etc., which are subject to spontaneous combustion, will be removed from the building at the end of each work day. None shall be stored closer than 100' from the building.
4. OSHA-compliant scaffolding or fall protection equipment will be used when working at height. Fuels will be stored per OSHA standards in metal cans and removed from the structure overnight.

BOWA Drywall Trade Standard REV. 11/1/18

These are the minimum standards for work on this project. The intent is for a complete job to high standards, and the ultimate finish and performance is the trade contractor's responsibility.

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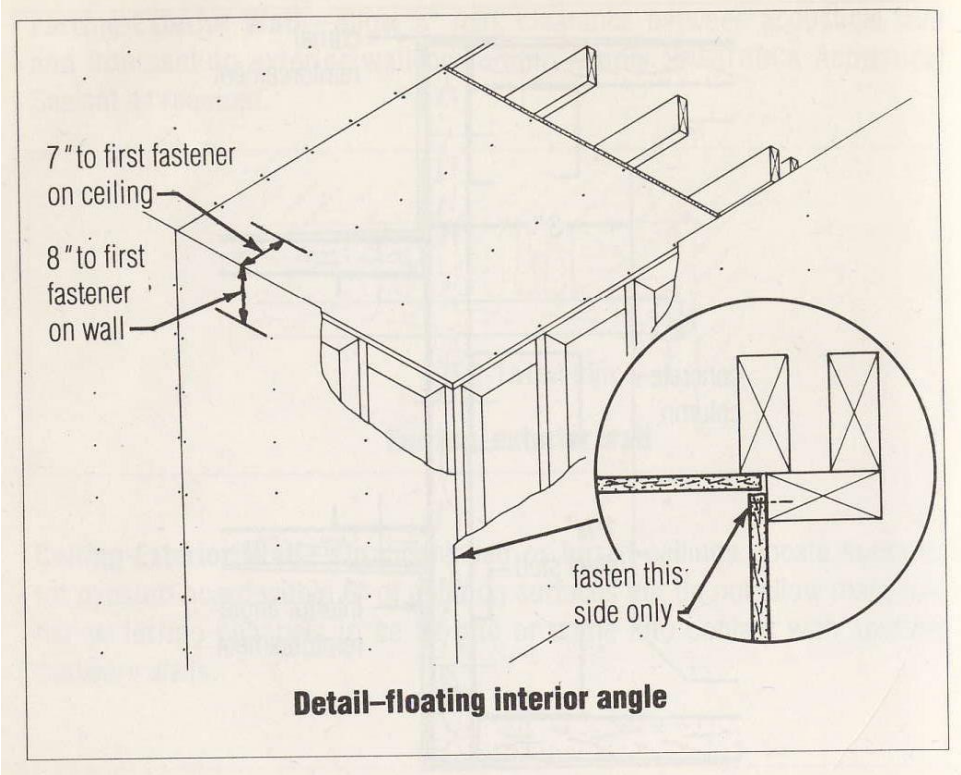
Any exceptions to these terms must be signed off by BOWA Production Manager in writing.

1. All drywall to be SCREWED AND GLUED.
2. Use coarse thread screws on wood framing, fine thread on metal.
3. Subcontractor is responsible for any repairs from stocking process, for example window reinstallation, sill protection/repairs, landscape repairs from truck ruts.
4. Stock drywall perpendicular to floor joists and spread load evenly.
5. Level 4 finish is standard.
6. This contract includes repairs from settlement/shrinkage in the first two years including nail pops and joint repairs.
7. In Montgomery County, include code-required 5/8" Type X on elevator shaft walls & ceiling.
8. Bottom edge of drywall shall be installed at least 1-1/2" above finish basement floor. Bottom edge should be as high as possible such that base trim will cover. Coordinate with BOWA PM.
9. Water resistant board "Greenboard" standard on all surfaces on all baths, except under tile where backer board will be used. Vinyl corner bead at showers and other wet areas.
10. For angled corners, use No-Coat Ultraflex 450 installed per instructions. BOWA PDM may approve equal product.
11. For connections to windows, door jambs, other different materials, always use a bead such as Trim-Tex Flat Tear Away or Caulk Channel Tear Away, EZReveal, etc. Do not "flat tape" or mud directly to windows or other materials.
12. For drywall-to-doorjamb connections with no trim, use beads such as Trim-Tex Fast Cap or Archway; EZJamb Classic, etc. Do not "flat tape" to wood jambs.

13. BOWA recommends use of the 'floating interior angle' technique from the Gypsum Construction Handbook. Drywall contractor is responsible for repairs of cracked corners:



14. Drywall hangers to apply a contiguous bead of drywall adhesive at all top plates on top level rooms (where insulated ceiling/attic above) as an air seal.

Optional items: Please price on each job

1. Georgia Pacific Dens-Armor Plus in lieu of greenboard
2. Georgia Pacific Dens-Armor Plus in basements
3. Provide optional per square foot price for level 5 finish.

Safety

Subcontractor is responsible for following all needed safety measures. Some of these include:

1. Provide personal protective equipment for workers (examples: safety glasses, hearing protection, dust masks).
2. Electrical cords will be intact including ground pins. All tools will have needed guards.
3. Any material such as sanding dust, rags, applicator pads, etc., which are subject to spontaneous combustion, will be removed from the building at the end of each work day. None shall be stored closer than 100' from the building.
4. OSHA-compliant scaffolding or fall protection equipment will be used when working at height.
5. Fuels will be stored per OSHA standards in metal cans and removed from the structure overnight.

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Any exceptions to these terms must be signed off by BOWA Production Manager in writing.

1. Interior finish work to be performed to AWI Architectural Woodwork Standards, Custom Grade.
2. Where rooms are out of level more than 1/2", consult with BOWA PM for how to handle. Different finishes will require different approaches.
3. For synthetic/manufactured trim, provide copy of and follow manufacturer's directions. Note that flexible trim (FlexTrim) and polystyrene trim ("Fypon") must be adhered with correct glue; nails used in these products should be minimal and are only to hold in place until glue sets.

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3. Any material such as sanding dust, rags, applicator pads, etc., which are subject to spontaneous combustion, will be removed from the building at the end of each work day. None shall be stored closer than 100' from the building.
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Any exceptions to these terms must be signed off by BOWA Production Manager in writing.

1. Do not install tile or stone over inadequate floor without written permission from BOWA Production Manager. Note areas of concern in proposal. Do not install stone over a single layer of plywood—always two layers minimum.
2. TCNA, Marble Institute of America, ANSI standards, current local code, and manufacturer's instructions shall be followed at a minimum. Any exceptions must be approved in writing by BOWA Production Manager. Review the current plans and note any areas that may not meet minimum standards before final pricing.
3. Use decoupling/cleavage membrane (Schluter Ditra, Noble, Laticrete Strata Mat, or BOWA approved equal) as underlayment for stone or tile floor installations. Follow TCNA guidelines and manufacturer's specifications for floor construction.
4. Provide & install underlayment where required by TCNA or manufacturer standards. Standard is plywood, thickness shall be based on existing subflooring to make a total of 1-1/4" nominal total thickness. (For 3/4" subfloor use 1/2" underlayment; for 5/8" subfloor use 5/8" underlayment, and so on.) Install per TCNA or Schluter instructions:
    a. Perpendicular to joists
    b. Joints offset by 2' min. from subfloor joints. End joints 1/4 of distance between joists.
    c. 1/8" gaps between sheets
    d. Ringshank nails or screws, not into joists, 4" oc edges and 6" oc field
    e. Glue is not recommended between underlayment and plywood. If glue is used it must cover entire area, combed out with a notched trowel. (Applying individual beads of subfloor adhesive weaken the connection between layers and reduce strength.)
5. Provide optional price for "pre-slope" sloped mortar below plumber's liner.
6. Provide optional price for installation of CPE (preferred) or PVC plumber's shower pan, by tile contractor. Follow manufacturer's installation instructions including correct glue and corner pieces.
7. Showers & baths, include installation of cement board backer. Gypsum products such as Dens-Armor not acceptable. Provide water management layer either on face of wall board (Kerdi, Hydroban, or similar) or behind wall board (#15 felt or plastic).
8. Shower pan waterproofing: either surface-waterproofing or drain-through waterproofing is acceptable.
    a. Surface waterproofing: install sheet membrane (such as Kerdi) or fluid-applied membrane (Laticrete 925 or BOWA-approved substitute—not RedGuard). Use

compatible drain (Schluter for Kerdi, etc.). Follow manufacturer's instructions exactly. Extend waterproofing 2” out onto floor, and 2” past openings onto walls.

b. Draining assembly: use ‘traditional’ plumber’s pan, and add layer of Nobleseal, Kerdi, Hydroban, or similar over curb, knee walls, shampoo niches, benches/tub decks, and any other horizontal areas. Continue down to floor level on inside. Curb waterproofing will extend 2” past door opening on outside (or as far as possible behind finishes—discuss with BOWA PM), and out 2”+ over floor outside.

9. Shower curbs: slope toward drain, or use ‘dam’ at outer edge to keep water in shower area and not allow out onto floor.
10. Thinset mixed on site from powder is the only acceptable setting material in wet areas. No mastic or “pre-mixed thinset”.
11. Sheet waterproofing materials will be applied per instructions.
    a. Use manufacturer’s recommended thinset and sealant
    b. Use pre-formed inside & outside corner pieces at floor, curb, and bench areas. Two preformed corners at each end of curb.
    c. Lap seams per manufacturer, typically 2” minimum.
12. Fluid-applied waterproofing applied per manufacturer's instructions:
    a. Backerboard seams taped with fiberglass tape & thinset, fastener holes filled.
    b. Corner treatments per manufacturer (fabric, flexible sealant, extra coats…).
    c. Apply full coat, checking thickness with wet mil gauge, and additional coats as needed for complete coverage with no pinholes or thin areas.
    d. Allow required drying time between coats and before applying tile.
13. Drains appropriate for waterproofing method. For sheet (Kerdi or similar) waterproofing, use only drains approved by manufacturer for this purpose. Currently only Schluter drains are approved for Kerdi and similar sheet waterproofing.
14. Steam showers, full waterproofing on walls and ceiling with Noblewall, Schluter Kerdi, Laticrete Hydro-Ban Sheet, or similar vapor retarder material.
15. All plumbing and other penetrations in shower walls will be sealed to waterproof layer and/or to tile as appropriate. Provide and install accessory flanges where practical/required by manufacturer instructions. Fabricate drain piece when factory flanges don’t fit:



16. When floor heat is part of contract, all manufacturer’s instructions will be followed.
    a. A copy of the installation instructions will be on site for BOWA PM and tile crew to consult.
    b. Heat wire will cover entire floor, except within 8” of walls, 6” around toilet flange, and below cabinets/fixtures that mount on the floor, per instructions. Do not leave any gaps

at toekicks, doorways, or between mat sections. Verify size of room/square footage with site measurements.

c. Provide layout to BOWA for approval before ordering materials. Use actual measurements of rooms as built, not architectural plans.

d. Install sensors, “cold lead joints”, heat wire in wet areas, etc. per manufacturer’s directions. BOWA PM to note locations of planned furnishings, rugs, mats etc; install sensors in other locations.

17. All tile, stone, and/or grout will be sealed with top quality sealer appropriate to the material.
18. All inside corners caulked with appropriate color caulk. Wide joints with sanded grout may be grouted instead, if acceptable to BOWA PM.
19. Leftover materials (tile, stone, and all grouts & caulks) to be labeled & placed in house per BOWA Project Manager direction.
20. Provided neatly printed grout color list to BOWA.
21. Tile Contractor agrees to perform one grout & caulk “touch-up” during the warranty period, as requested by BOWA and/or the homeowner.

Safety

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1. Provide personal protective equipment for workers (examples: safety glasses, hearing protection)
2. Electrical cords will be intact including ground pins. All tools will have needed guards.
3. Any material such as sanding dust, rags, applicator pads, etc., which are subject to spontaneous combustion, will be removed from the building at the end of each work day. None shall be stored closer than 100' from the building.
4. OSHA-compliant scaffolding or fall protection equipment will be used when working at height.
5. Fuels will be stored per OSHA standards in metal cans and removed from the structure overnight.
6. Should fall protection equipment or compliant scaffolding be impossible (at leading edge work for example) then a written fall protection plan will be in place to meet OSHA requirements.

BOWA HARDWOOD FLOORING TRADE STANDARD REV. 2/10/23

These are the minimum standards for work on this project. The intent is for a complete job to high standards, and the ultimate finish and performance is the trade contractor's responsibility.

Work must meet current local code, relevant industry standards, and the plans and specifications for this project, in addition to specific information below. Any conflicts, omissions, or opportunities for upgrades or cost savings will be brought to BOWA's attention before finalizing agreement. Any work required to meet local code, plans and specifications, industry standards, or terms below will be completed for no additional charge beyond proposal pricing.

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1. Verify subfloor/slab are properly constructed, dry, and in every way ready for installation of flooring before commencement. Provide BOWA with written notes on testing/moisture content.
2. Wood floor moisture testing
    a. Flooring contractor will moisture test subfloor and delivered flooring.
    b. Testing will be documented and provided to BOWA.
    c. Test subflooring in 10 locations per 1000sf (~one per three full 4 x 8 sheets). Write date and MC at tested location on subfloor and also on paper documentation.
    d. Test strip flooring, 20 boards per 1000sf. Follow moisture meter instructions for tests including adjustments for species and depth of reading. Write date and MC on boards and on documentation.
    e. Average moisture content for solid wood and subfloor should be between 7% and 11%. For flooring 3" or narrower, average MC of flooring and subfloor should be within 4%. For wider flooring, MC should be within 2%. If average MC is found to be outside these ranges, notify BOWA PM and do not install until acclimation brings average MC within these ranges.
    f. Per industry experts, 24-48 hour "acclimation" period is sufficient in our climate, provided subfloor and flooring are at proper moisture level.
    g. For prefinished/engineered flooring follow manufacturer's directions for testing and acclimation. Provide copy of instructions on site for BOWA review.
    h. During installation, if boards are noted to be different width, do not proceed with install. Boards of different width indicate manufacturing error of milling or drying.
3. Use correct fasteners for substrate and space properly per industry/manufacturer standards. Typical requirements are:
    a. 8-10" on center, for 1-1/2" to 3" strip
    b. 6-8" maximum for 3"+ plank. Also per NWFA, use glue, screw & plug, or kerfing to assist.
4. Follow manufacturer's directions for finishes. Use "sanding sealer" or other first coat product if recommended by manufacturer to reduce edge bonding.
5. The following are pre-approved floor-finish products when three or more coats are applied per manufacturer's instructions: Bona Traffic, Basic Street Shoe. For other products, submit product information including installation instructions, warranty, etc.; must be approved by BOWA Production Manager.
6. When possible and in consultation with BOWA project manager, install flush thresholds to break up large areas of flooring, which will facilitate partial refinishing in future.

7. Any gaps that remain in a floor at the end of the humid season (in September or October) are "extraordinary gaps" (following NWFA terminology) and flooring contractor will repair as directed by BOWA, including replacing or gluing in wood and refinishing at BOWA discretion, even when NWFA standards only recommend filler.
8. Verify at time of pricing and selection with BOWA the general layout including: material direction, lengths required and any specialty material requirements related to lengths. Confirm grade of material and character. Determine if character knots are to be filled.
9. Finishing – before finishing begins – confirm with BOWA PM stain samples and finish samples. Determine as early as possible the need for custom dye and tinting.
10. Shoe molding will be attached to floor, and any cuts to door jambs, plinth, or casing will be tight to flooring.
11. Verify any materials are suited to the interior climate expected for this project.
12. Include optional price for floor-care kit by manufacturer (or similar, high-quality care system that is compatible with floor finish).

Safety

Subcontractor is responsible for following all needed safety measures. Some of these include:

1. **Any material such as sanding dust, rags, applicator pads, etc., which are subject to spontaneous combustion, will be removed from the building at the end of each work day and disposed of properly in metal containers filled with water. None shall be stored closer than 100' from the building. We have had three fires from staining/floor finishing operations.**
2. Provide personal protective equipment for workers (examples: safety glasses, hearing protection)
3. Electrical cords will be intact including ground pins. All tools will have needed guards.
4. OSHA-compliant scaffolding or fall protection equipment will be used when working at height.
5. Fuels will be stored per OSHA standards in metal cans and removed from the structure overnight.

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General

1. Painter is responsible to follow EPA lead paint rules. [See below for more details.] Never use the following "prohibited methods" on any finished surface unless it is known not to contain lead:
    a. Open flame burning or torching
    b. Sanding, grinding, sandblasting, or any other machine method which abrades or pulverizes
    c. Heat gun over 1100 degrees F
2. This contract includes two "touch up" periods, during which the Subcontractor agrees to make reasonable repairs, as determined by BOWA. The first period is immediately after the spaces are occupied and is intended to repair damage from moving. The second period is after the first heating season and is to repair cracking and caulk failure due to shrinking of wood components.
3. Drywall contractor to provide point-up as required. Coordinate this work so delays are avoided in completion.
4. House to be vacuumed as necessary.
5. Touch-up kits, consisting of minimum 1 qt. of all paint types, labeled by room and dated, for Homeowner use.
6. Printed List of all paint colors & types for Homeowner use. Use BOWA format document.
7. Painter must maintain a clean work space. Protection and drop cloths must be installed to protect over-spray. Any and all paint that is found on finished surfaces is the responsibility of the painter to remove.
8. Cleaning area to be designated by BOWA PM. Do not use sinks unless approved by PM.

Preparation

1. Protection of floors, cabinetry, windows, and other surfaces not to be painted.
2. Removal/replacement or protection of window and door hardware as needed.
3. Seal tops & bottoms of all doors.
4. Coat all sides of garage door panels. Follow manufacturer's written finishing instructions.
5. Filling holes, repair of nicks and blemishes, caulking, and priming all surfaces as needed. This includes sealing all knots with sealer/primer.
6. Sanding and cleaning of surfaces prior to finish coats.

Drywall Surfaces

1. 1 coat of Acrylic Primer
2. 2 finish coats of Flat Latex
3. Baths finished with 2 coats Latex moisture resisting matte or flat paint
4. If eggshell finishes specified: 2 coats Latex Eggshell
5. Final coat to be rolled.

Interior Trim Surfaces

1. 1 coat of primer compatible with finish coats. If material is preprimed, spot prime knots & nailholes with appropriate primer instead of full coat.
2. 2 finish coats of Latex Semi-Gloss.
3. Shelves and windows to be painted with high 'blocking' or 'binding' resistance product.
4. Closet poles to be sealed.
5. Rails to be stained, and sealed with two coats polyurethane.

Exterior Trim, Windows, and Doors

1. Pre-primed Exterior trim: spot prime with Acrylic Exterior Primer.
2. Woods such as Cedar & Redwood: 2 full coats solvent-based primer recommended by manufacturer to reduce extractive bleeding, fully back primed.
3. Any other raw exterior wood to be painted, full back priming. Coordinate with BOWA Project Manager.
4. Two finish coats Acrylic Semi-Gloss.
5. Follow window & door manufacturer's directions for finishing. Notify BOWA of any required changes in specifications based on manufacturer's directions.
6. PVC Trim to be painted with reflective vinyl-specific paint with high LRV per PVC manufacturer's spec.
7. Stain-grade wood doors: stain or color per manufacturer; apply minimum three coats Sikkens Cetol Door & Window polyurethane, or equivalent approved by BOWA Production Manager.

Siding

1. Fully backprime all wood siding. Include mobilization as necessary to complete before siding installation.
2. Cementitious Siding: 1 full coat Acrylic Exterior Primer; manufacturer's directions must be followed.
3. Woods such as Cedar & Redwood: 2 full coats Solvent-Based primer on all sides, use product intended to reduce extractive bleeding
4. Two finish coats Acrylic Satin

Exterior Metal

1. Painted steel: Prime with one coat solvent-based rust proof primer, finish with one coat solvent-based exterior paint
2. Galvanized Metals: clean properly and apply products recommended for galvanized metal

Hardwood Decking

1. Prep (clean and sand as required) and finish with one coat "Penofin for Hardwoods Finish". Messner's is also acceptable. Cabot Australian Timber Oil is not acceptable.
2. Include in your bid the two maintenance coats recommended by the manufacturer (one at three months and one at ten months) as an option

Work in Pre-1978 buildings: the Renovation, Repair, and Painting Rule

1. BOWA normally performs Information Distribution (Notification & pamphlet) activities and retains records, which can be made available to Subcontractor on request.
2. BOWA normally has a third-party firm test painted surfaces and will provide a report indicating what paint is considered lead-based paint per regulation.
3. Subcontractor's Certified Renovator will attend Preconstruction meeting and perform all required activities including supervising jobsite (signage, protection of all work areas, removal of protection, and cleaning), On-The-Job Training of non-certified workers, and recordkeeping per legal requirements.
4. Copy of Firm and Renovator certificates will be on site during work
5. Written documentation of non-Certified workers' names and training will be on site during work
6. All required work practices will be followed:
   [EPA version:]
   Prohibited Methods—do not:
   - Use open-flame burning or torching.
   - Use heat gun above 1,100º F (degrees Fahrenheit).
   - Use machines that remove lead-based paint through high-speed operation such as sanding, grinding, planing, needle gun, abrasive blasting, or sandblasting is prohibited unless such machines are used with attached HEPA-filtered local capture ventilation. No dust may escape shroud during use.

   For Inside Jobs
   - Place signs, barrier tape, and/or cones to keep all non-workers, especially children, out of the work area. Keep pets out of the work area for their safety and to prevent them from tracking dust and debris throughout the home.
   - Remove furniture and belongings from the work area. If an item is too large or too heavy to move, cover it with heavy plastic sheeting and tape the sheeting securely in place.
   - Use heavy plastic sheeting to cover floors in the work area to a minimum of 6 feet from the area of paint disturbance. Close and seal doors, close windows.
   - Close and cover air vents in the work area. This will keep dust from getting into the system and moving through the home.

   For Outside Jobs
   - Keep non-workers away from the work area by marking it off with signs, tape and/or cones. Have owner keep pets out of the work area.
   - Cover the ground and plants with heavy plastic sheeting to catch debris. The covering should extend at least 10 feet out from the building. Secure the covering to the exterior.
   - Close windows and doors within 20 feet of the work area to keep dust and debris from going into the home.
   - Move (if possible) or cover play areas and equipment within 20 feet of the work area.

   For all jobs
   - Some jobs create more dust than can be contained by the methods described above. Certified Renovators should exercise their judgment as to whether those methods provide sufficient containment or if additional precautions are necessary. Jobs that typically require additional precautions include:
     - Demolition.
     - Opening up wall cavities.
     - Removing old drop ceilings.
     - Paint scraping/dry hand sanding.

- These jobs call for additional steps to contain dust inside the work area. In addition to the practices reviewed so far, consider the following:
    - Turning off forced-air heating and air-conditioning systems. This will keep dust from circulating through the house.
    - Interior vertical containment to limit the size of the work area.

Leaving the containment area

- When you leave the work site (the area covered by protective sheeting or the work room), take precautions to prevent spreading dust and paint chips on your clothes and shoes to other parts of the residence.
- Every time you leave the plastic sheeting around the surfaces being renovated, remove the disposable shoe covers and wipe or vacuum your shoes before you step off the plastic sheeting. A large disposable tack pad on the floor can help to clean the soles of your shoes.
- Every time you leave containment, HEPA vacuum and remove your disposable coveralls and disposable shoe covers. Clean and/or vacuum your shoes, and wash your hands and face.

Interior Clean Up

- Always begin cleaning activities by picking up visible paint chips and debris with a wet disposable cloth without dispersing any of it, and sealing this material in a heavy-duty bag.
- When the job is complete, mist the sheeting, fold it (dirty side in), and either seal it with tape, or seal it in a heavy-duty bag. Always fold dirty side inwards, and seal with tape or place in a heavy duty plastic bag. If it is placed in a heavy-duty bag, “gooseneck-seal” the bag and dispose of the bag with the rest of your waste. Dispose of all sheeting as waste by using the correct folding and disposal procedure, after it has been vacuumed.
- Start cleaning at the far end of the work area and work back toward the exit.
- Clean walls with a HEPA vacuum or by wiping with a damp disposable cloth: Start with the tops of the walls, tops of doors and door frames and work down to the floor.
- Thoroughly vacuum all remaining surfaces and objects, including furniture and fixtures, in the work area. The HEPA vacuum must be equipped with a beater bar when vacuuming carpeting or rugs.
- Wipe all surfaces and objects that remained in the work area, except carpeted or upholstered surfaces, with a damp cloth.
- Clean floors with a wet mopping system or a two-sided bucket and mop.
- Clean the entire work area and the area within 2 feet of the work area.
- If using the two-bucket mopping system, repeat the process using a new mop head and clean water. Remember, always keep one bucket for cleaning solution and the other bucket for wringing out the cloth or mop head. You must keep wash and rinse water separate. Change the rinse water often.
- Standards for post-renovation cleaning verification--Interiors.
- A certified renovator must perform a visual inspection to determine whether dust, debris or residue is still present. If dust, debris or residue is present, these conditions must be removed by re-cleaning and another visual inspection must be performed.
- After a successful visual inspection, a certified renovator must:

(A) Verify that each windowsill in the work area has been adequately cleaned, using the following procedure.

(1) Wipe the windowsill with a wet disposable cleaning cloth that is damp to the touch. If the cloth matches or is lighter than the cleaning verification card, the windowsill has been adequately cleaned.

(2) If the cloth does not match and is darker than the cleaning verification card, re-clean the windowsill then either use a new cloth or fold the used cloth in such a way that an unused surface is exposed, and wipe the surface again. If the cloth matches or is lighter than the cleaning verification card, that windowsill has been adequately cleaned.

(3) If the cloth does not match and is darker than the cleaning verification card, wait for 1 hour or until the surface has dried completely, whichever is longer.

(4)After waiting for the windowsill to dry, wipe the windowsill with a dry disposable cleaning cloth. After this wipe, the windowsill has been adequately cleaned.

(B) Wipe uncarpeted floors and countertops within the work area with a wet disposable cleaning cloth. Floors must be wiped using an application device with a long handle and a head to which the cloth is attached. The cloth must remain damp at all times while it is being used to wipe the surface for post-renovation cleaning verification. If the surface within the work area is greater than 40 square feet, the surface within the work area must be divided into roughly equal sections that are each less than 40 square feet. Wipe each such section separately with a new wet disposable cleaning cloth. If the cloth used to wipe each section of the surface within the work area matches the cleaning verification card, the surface has been adequately cleaned.

(1) If the cloth used to wipe a particular surface section does not match the cleaning verification card, re-clean that section of the surface then use a new wet disposable cleaning cloth to wipe that section again. If the cloth matches the cleaning verification card, that section of the surface has been adequately cleaned.

(2) If the cloth used to wipe a particular surface section does not match the cleaning verification card after the surface has been re-cleaned, wait for 1 hour or until the entire surface within the work area has dried completely, whichever is longer.

(3) After waiting for the entire surface within the work area to dry, wipe each section of the surface that has not yet achieved post-renovation cleaning verification with a dry disposable cleaning cloth. After this wipe, that section of the surface has been adequately cleaned. When the work area passes the post-renovation cleaning verification, remove the warning signs.

Exterior Clean Up:

- Collect all dust and debris on the sheeting and place in plastic bags.
- Mist sheeting, fold dirty side inward, and dispose of as waste. This is especially important since you will not be cleaning the ground afterward. You are responsible to make sure you do not leave dust and debris behind.
- The Certified Renovator should visually inspect the plastic after cleaning for dust and debris. Remember the Certified Renovator is required to certify that the work area was cleaned properly at the end of the job.
- Protective sheeting is to be disposed of as waste.
- If work takes place on an exterior porch or stairwell, HEPA vacuuming, wet cleaning and mopping, in addition to a thorough visual inspection, should be used to clean the work area. For such jobs, the cleanup can be similar to cleanup after interior jobs. Collect and dispose of any dust and debris with the rest of your waste.

- A thorough visual inspection of the work area should be conducted after any exterior job. Any visible paint chips, wood chips and other debris from the work area should be collected and disposed of with the rest of your waste.
- A certified renovator must perform a visual inspection to determine whether dust, debris or residue is still present on surfaces in and below the work area, including windowsills and the ground. If dust, debris or residue is present, these conditions must be eliminated and another visual inspection must be performed. When the area passes the visual inspection, remove the warning signs.

7. This contract requires that at completion of work and cleanup, a third party testing firm will perform dust-wipe "Clearance Testing" collected by a certified inspector, risk assessor, or dust sampling technician. The Subcontractor is required to re-clean the work area until the dust clearance sample results are below the clearance standards in 40 CFR 745.227(e)(8) or any applicable State, Territorial, Tribal, or local standard. Clearance must be performed following the procedures in 40 CFR 745.227(e)(8), which allow the use of composite sampling. Not all laboratories will analyze composite samples, so check with your laboratory before collecting them.
   - Normally this firm is hired by BOWA.
   - Subcontractor will accurately notify BOWA 48 hours in advance of completion so testing can be scheduled.
   - Recleaning will be performed by Subcontractor.
   - If clearance testing fails, retesting will be paid for by Subcontractor.
8. Record Keeping: The Certified Renovator must prepare a renovation report. The report should name the Certified Renovator designated by the Certified Firm as responsible for lead-safe work practices on that project, and it should include a copy of the Certified Renovator's certification and the Firm's certification.
   - The report must also have a signed record from the Certified Renovator that includes the following:
     - A statement that other workers received on-the-job training from the Certified Renovator and a list of the tasks covered in the training.
     - A statement that warning signs were posted.
     - A brief description of the test kits used, if any, the locations where they were used, and the results.
     - A statement that the work area was contained as required by the rule.
     - A statement that waste was properly contained when stored on-site and when transported off-site.
     - A statement that the work site was properly cleaned after the renovation.

Safety

Subcontractor is responsible for following all needed safety measures. Some of these include:

1. Provide personal protective equipment for workers (examples: safety glasses, hearing protection)
2. Electrical cords will be intact including ground pins. All tools will have needed guards.
3. **Any material such as sanding dust, rags, applicator pads, etc., which are subject to spontaneous combustion, will be removed from the building at the end of each work day. None shall be stored closer than 100' from the building.**
4. OSHA-compliant scaffolding or fall protection equipment will be used when working at height.

These are the minimum standards for work on this project. The intent is for a complete job to high standards, and the ultimate finish and performance is the trade contractor's responsibility.

Work must meet current local code, relevant industry standards, and the plans and specifications for this project, in addition to specific information below. Any conflicts, omissions, or opportunities for upgrades or cost savings will be brought to BOWA's attention before finalizing agreement. Any work required to meet local code, plans and specifications, industry standards, or terms below will be completed for no additional charge beyond proposal pricing.

Trade contractor is responsible for the performance and finish of their work. Do not proceed with work over substrates or previous work unless you know it to be acceptable. Once work is commenced, trade contractor is responsible for performance and finish.

Any exceptions to these terms must be signed off by BOWA Production Manager in writing.

1. Products and application will meet code for the local jurisdiction. (Note Montgomery County has special requirements.)
2. Foundation walls that enclose usable space will be waterproofed with drain board protection over one of the following, applied per a current Evaluation Report for the product:
    a. Forty-mil polymer-modified asphalt
    b. Sixty-mil flexible polymer cement
    c. One-eighth-inch flexible polymer cement
    d. Sixty-mil solvent-free liquid applied synthetic rubber
3. Dampproofing may be used on other walls per BOWA PM and plans/specs.
4. For retrofits, waterproofing contractor will perform any needed excavation, including temporary placement of dirt as directed by BOWA. Damage to landscaping, patios, decks, etc. will be backcharged unless approved by Production Manager in writing ahead of time.
5. Provide product specifications including manufacturer's installation instructions and Evaluation Report with proposal. Follow written instructions during application.
6. For waterproofing on "flat" surfaces where ponding is expected, use only materials with zero permeability—no polyurethane materials.
7. Wall connections must effectively collect water from wall WRB layer and drain it outside of the building.
8. Provide effective, durable seal for joints between walls, all wall ties, and junction between footing and wall.
9. Include drain board on all waterproofed areas. Follow installation instructions, including termination bar where required by manufacturer.
10. Provide and install perforated drain tile and filter fabric to provide long-lasting protection and drainage.
11. Provide optional price for battery backup pump in any sump proposal.
12. Consult BOWA PM for height of waterproofing on foundation walls.
13. Safety rules for excavations must be followed. Include overdig, shoring and access (ladders) in contract and proposal where appropriate.

Safety

Subcontractor is responsible for following all needed safety measures. Some of these include:

1. Digging and trenching work will follow OSHA requirements including shoring, overdig, access.

2. Provide personal protective equipment for workers (examples: safety glasses, hearing protection, dust masks).
3. Electrical cords will be intact including ground pins. All tools will have needed guards.
4. Any material such as sanding dust, rags, applicator pads, etc., which are subject to spontaneous combustion, will be removed from the building at the end of each work day. None shall be stored closer than 100' from the building.
5. OSHA-compliant scaffolding or fall protection equipment will be used when working at height.
6. Fuels will be stored per OSHA standards in metal cans and removed from the structure overnight.