

MA Energy Code – Commercial Air Barrier Checklist

MA 780 CMR 9th Edition – C402.5



Guide to Enforcement of Commercial Air Barrier Provisions

Design to minimize air leakage through the envelope has proven to contribute significant energy savings, as well as comfort and indoor air quality improvements for Commercial buildings. This checklist will serve to provide guidance to Code Enforcement Officials (CEOs) for the enforcement of those requirements in the MA Energy Code, or to Project Managers for compliance support.

1 Confirm Compliance Approach

Approach	Select one	Go To...
Thermal envelope test according to ASTM E 779 or equivalent		Part 2 a. and Table 4 as applicable.
Materials-based envelope compliance C402.5.1.2.1		Part 2 b. and Tables 4 and 5 as applicable.
Assemblies-based envelope compliance C402.5.1.2.2		Part 2 c. and Tables 4 and 5 as applicable.

Documents to support one of the three compliance methodologies must be submitted with permit applications.

- A whole building cross section indicating location and continuity of the air barrier should be included (see Exhibit 1).

2 Confirm Air Barrier Compliance Details

a Thermal Envelope Test Approach

Intent to test thermal envelope air leakage in accordance with C402.5 should be documented in permit application and test results provided prior to final inspection. Also comply with C402.5.5, 402.5.6, and 402.5.7.

Table 1. Envelope Test Compliance Verification (C402.5)

Compliance Specification	Verified in Plan Review? (Y/N)	Verified in Site Inspection? (Y/N)
Target air leakage rate <= 0.4 cfm/sq.ft met		
Responsible testing agent listed		
Proposed remediation if test failed		
Final documentation provided*		
Class I motorized dampers installed on outdoor air intakes and exhaust openings per C403.7.7 (C402.5.5)		
Weatherseals on loading docks (C402.5.6)		
Enclosed vestibules installed if applicable (C402.5.7)		

*As an option, ABAA Site Quality Assurance Program establishes a rigorous installation and testing protocol for air barriers by ABAA-accredited installers and may provide the requisite methodology and documentation for compliance.

b Assemblies Approach

The Air Barrier system that is being proposed must be detailed in the construction documents, and specification provided to show that system complies with C402.5.1.2.2, Assemblies air leakage not greater than 0.04 cfm/sq ft in accordance with ASTM E2357, E1677, or E283.

Table 2. Assembly-based Envelope Compliance Verification (C402.5.1.2.2)

Assembly	Verified in Plan Review? (Y/N)	Verified in Site Inspection? (Y/N)
Coated concrete masonry walls		
½ inch minimum Portland cement/stucco/plaster		
Other assemblies e.g. system with liquid applied and appropriate transition materials	Assembly should be tested or certified to meet average air leakage not greater than 0.04 cfm/sq ft. ABAA-evaluated air barrier assemblies at airbarrier.org/technical-information/evaluated-assemblies-2/ *	

*Assembly listed on airbarrier.org/technical-information/evaluated-assemblies-2/ has demonstrated air leakage rate not greater than 0.04 CFM/sq.ft. in accordance with ASTM E 2357 Standard Test Method.

c Materials Approach

The installed location and type of each of the materials that form the air barrier must be included in the construction documents (C103.2), and air barrier materials are found in Table 2 or are shown to meet maximum material leakage rates (0.004 cfm/sq ft.) per ASTM E2178.

Table 3. Materials-based Compliance Verification (C402.5.1.2.1)

Material	On Product Sheets or Plans? (Y/N)	Verified in Site Inspection? (Y/N)
3/8" plywood		
3/8" oriented strand board		
1/2" polystyrene board		
1/2" polyisocyanurate board		
1.5 inch closed cell spray foam 1.5 pcf		
1/2" gypsum board		
1/2" cement board		
Built-up roof membrane		
Modified bituminous roof membrane		
Fully adhered single ply roof membrane		
5/8" Portland cement/sand parge or gypsum plaster		
Cast in-place or precast concrete		
Fully grouted concrete block masonry		
Sheet steel or aluminum		
Other – tested not greater than 0.004 cfm/sq ft. per ASTM E2178		

3 Confirm Other Construction Details

Table 4. Other Air Barrier Construction Details. Numbering corresponds to graphics in Appendix.

Detail Number	System	Verified in Plan Review? (Y/N/NA)	Verified in Inspection? (Y/N/NA)
2	Wall assembly continuity		
3	Windows and doors sealed/flashed		
4	Utility and other penetrations sealed – pipe, shaft, conduit, recessed lighting		
5	Wall-roof transition is continuous (e.g. parapets, roof curbs)		
6	Wall-ceiling (with attic) transition continuous		
7	Wall-floor transition continuous (rim/band joist, wall to foundation/footing)		
8	Structural elements (beams/posts) sealed		
	Dampers on air intakes, exhaust, stairways, elevator shafts (C402.5.5)		
	Loading dock weatherseals (C402.5.6)		
	Vestibules on public doors or revolving doors or air curtain (C402.5.7)		
	Recessed lighting IC rated and labeled not more than 2.0 cfm leakage (0.944 L/s) in accordance with ASTM E283 (C402.5.8)		

Check that fenestration meets the requirements of Table C402.5.2

Table 5. Maximum Air Leakage Rate for Fenestration Assemblies Checklist (C402.5.2)

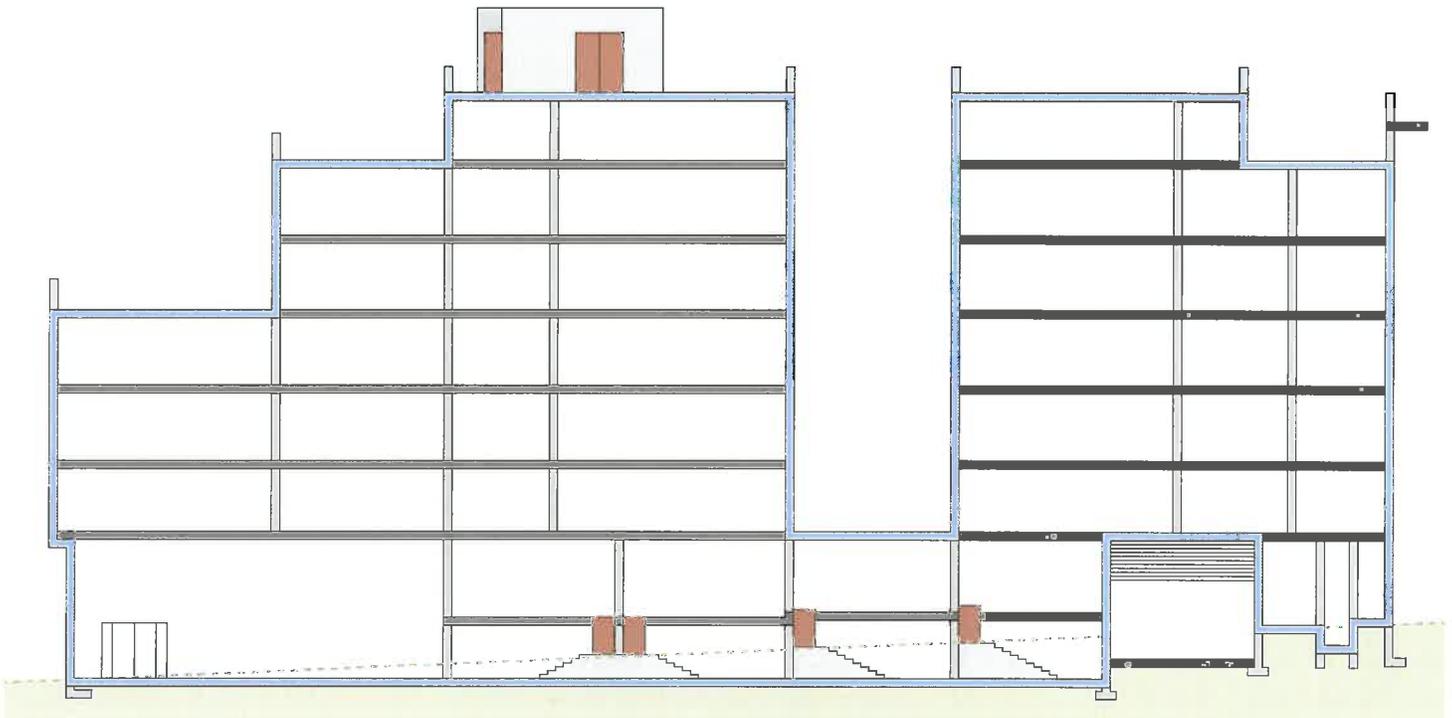
Fenestration Assembly and Maximum Rate CFM/sq.ft.	Identified in Plan Review? (Y/N)	Inspection (Y/N)
Windows ≤ 0.20		
Sliding doors ≤ 0.20		
Swinging doors ≤ 0.20		
Skylights with condensation weepage openings ≤ 0.30		
Skylights – all other ≤ 0.20		
Curtain walls ≤ 0.06		
Storefront glazing ≤ 0.06		
Commercial glazed swinging entrance doors ≤ 1.00		
Power-operated sliding doors and power-operated folding doors ≤ 1.00		
Revolving doors ≤ 1.00		
Garage doors ≤ 0.40		
Rolling doors ≤ 1.00		
High-speed doors ≤ 1.30		

Leakage table recreated from 2018 International Energy Conservation Code Table C402.5.2. Test procedures should be administered per AAMA, WDMA, CSA, NFRC, ASTM, ANSI/DASMA as noted.

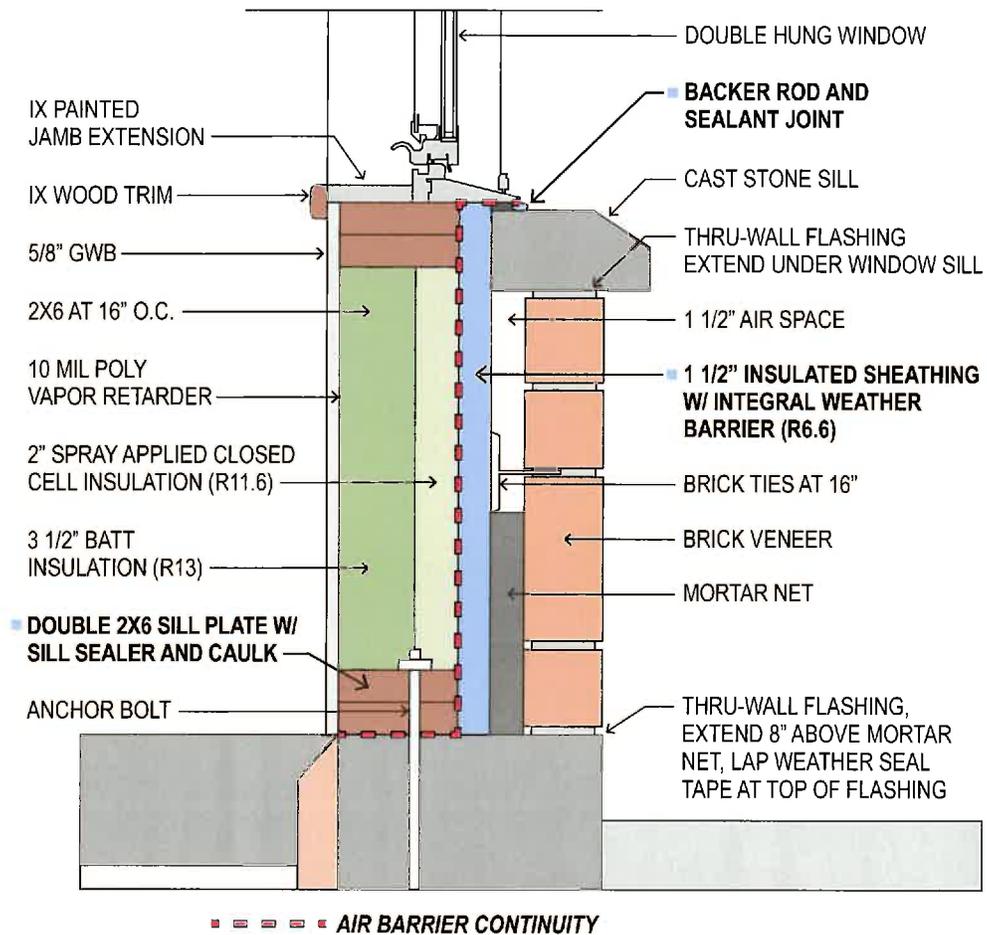
Air leakage of all fenestration is listed in the Window Schedules and comply with the Table, or Documentation that site-built fenestration assemblies will be tested to meet these requirements (table above) and are listed in the specifications, and are sealed according to C402.5.1

Appendix - Air Barrier Construction Details

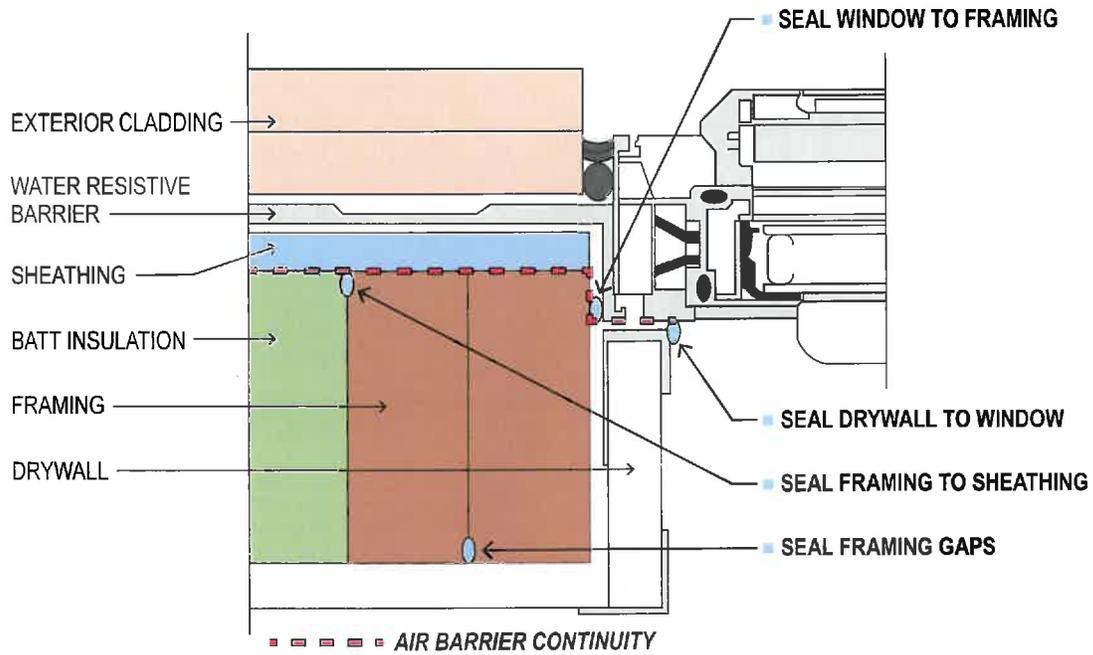
Detail 1. Air Barrier in Building Cross-Section



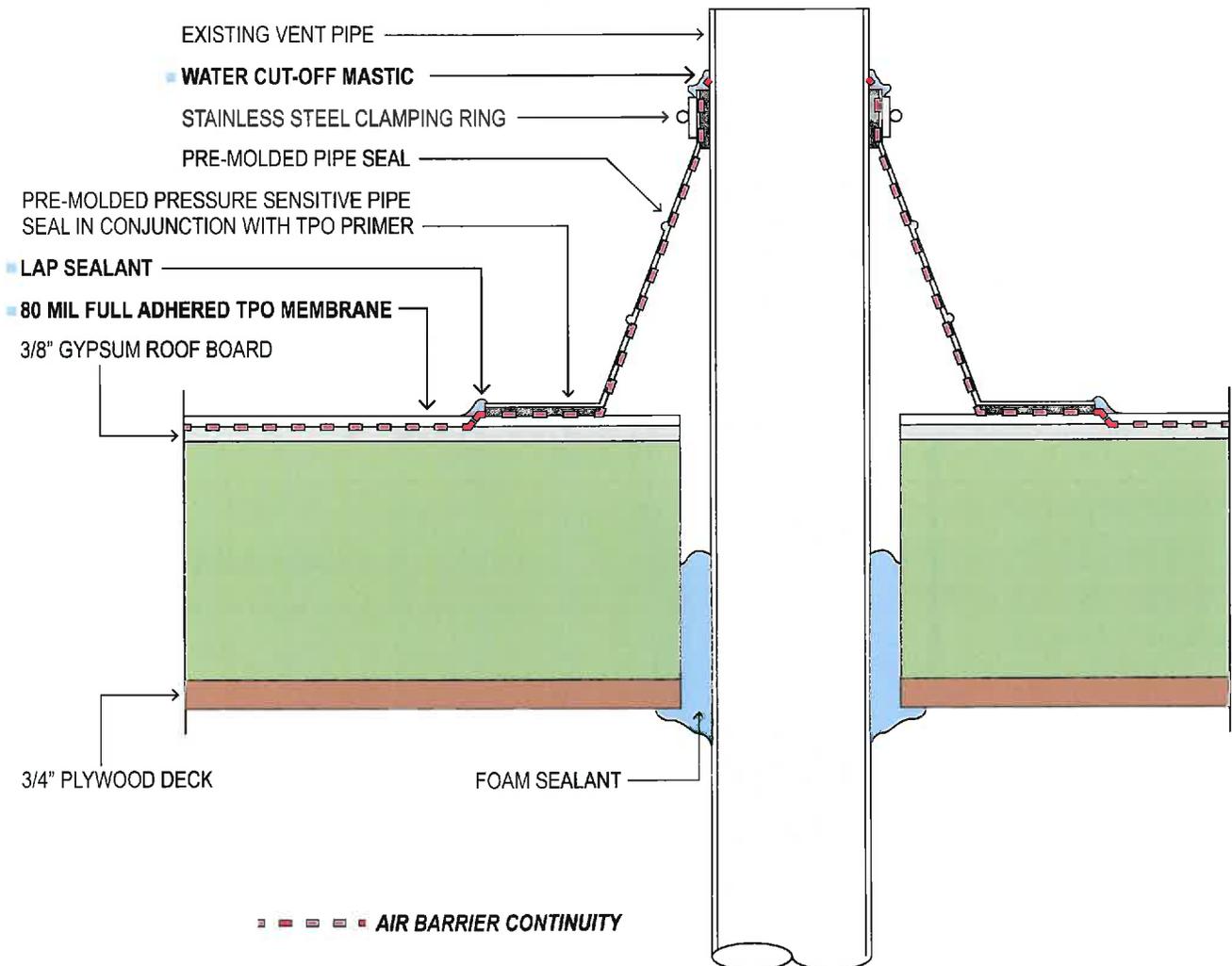
Detail 2. Wall Assembly Continuity



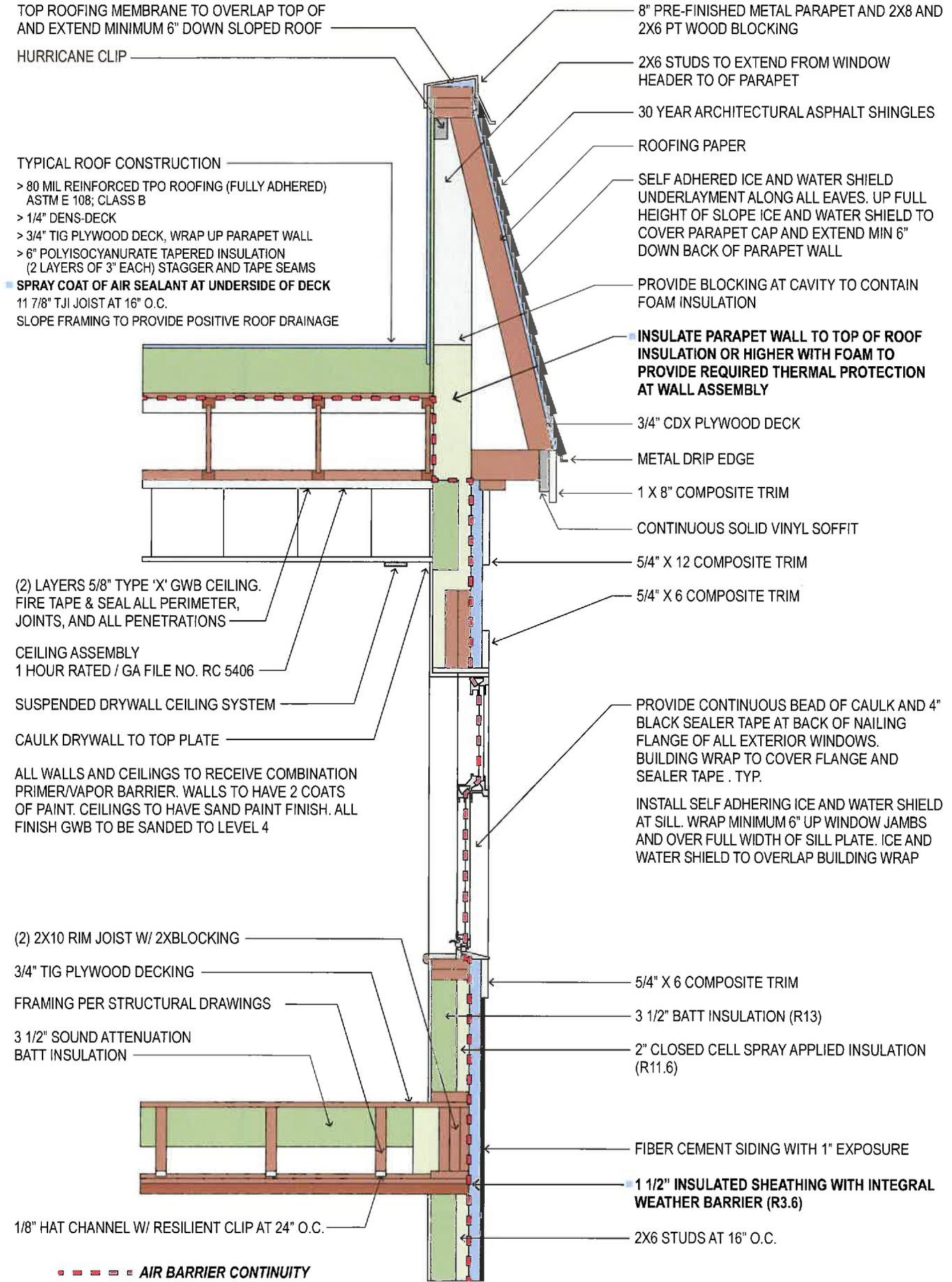
Detail 3. Air Barrier at Window (Top-down View)



Detail 4. Penetration Sealing



Detail 5. Wall-Roof Transition



TOP ROOFING MEMBRANE TO OVERLAP TOP OF AND EXTEND MINIMUM 6" DOWN SLOPED ROOF

HURRICANE CLIP

TYPICAL ROOF CONSTRUCTION

- > 80 MIL REINFORCED TPO ROOFING (FULLY ADHERED) ASTM E 108; CLASS B
- > 1/4" DENS-DECK
- > 3/4" TIG PLYWOOD DECK, WRAP UP PARAPET WALL
- > 6" POLYISOCYANURATE TAPERED INSULATION (2 LAYERS OF 3" EACH) STAGGER AND TAPE SEAMS
- SPRAY COAT OF AIR SEALANT AT UNDERSIDE OF DECK
- 11 7/8" TJI JOIST AT 16" O.C.
- SLOPE FRAMING TO PROVIDE POSITIVE ROOF DRAINAGE

8" PRE-FINISHED METAL PARAPET AND 2X8 AND 2X6 PT WOOD BLOCKING

2X6 STUDS TO EXTEND FROM WINDOW HEADER TO OF PARAPET

30 YEAR ARCHITECTURAL ASPHALT SHINGLES

ROOFING PAPER

SELF ADHERED ICE AND WATER SHIELD UNDERLAYMENT ALONG ALL EAVES. UP FULL HEIGHT OF SLOPE ICE AND WATER SHIELD TO COVER PARAPET CAP AND EXTEND MIN 6" DOWN BACK OF PARAPET WALL

PROVIDE BLOCKING AT CAVITY TO CONTAIN FOAM INSULATION

■ INSULATE PARAPET WALL TO TOP OF ROOF INSULATION OR HIGHER WITH FOAM TO PROVIDE REQUIRED THERMAL PROTECTION AT WALL ASSEMBLY

3/4" CDX PLYWOOD DECK

METAL DRIP EDGE

1 X 8" COMPOSITE TRIM

CONTINUOUS SOLID VINYL SOFFIT

5/4" X 12 COMPOSITE TRIM

5/4" X 6 COMPOSITE TRIM

(2) LAYERS 5/8" TYPE 'X' GWB CEILING. FIRE TAPE & SEAL ALL PERIMETER, JOINTS, AND ALL PENETRATIONS

CEILING ASSEMBLY
1 HOUR RATED / GA FILE NO. RC 5406

SUSPENDED DRYWALL CEILING SYSTEM

CAULK DRYWALL TO TOP PLATE

ALL WALLS AND CEILINGS TO RECEIVE COMBINATION PRIMER/VAPOR BARRIER. WALLS TO HAVE 2 COATS OF PAINT. CEILINGS TO HAVE SAND PAINT FINISH. ALL FINISH GWB TO BE SANDED TO LEVEL 4

PROVIDE CONTINUOUS BEAD OF CAULK AND 4" BLACK SEALER TAPE AT BACK OF NAILING FLANGE OF ALL EXTERIOR WINDOWS. BUILDING WRAP TO COVER FLANGE AND SEALER TAPE. TYP.

INSTALL SELF ADHERING ICE AND WATER SHIELD AT SILL. WRAP MINIMUM 6" UP WINDOW JAMBS AND OVER FULL WIDTH OF SILL PLATE. ICE AND WATER SHIELD TO OVERLAP BUILDING WRAP

(2) 2X10 RIM JOIST W/ 2XBLOCKING

3/4" TIG PLYWOOD DECKING

FRAMING PER STRUCTURAL DRAWINGS

3 1/2" SOUND ATTENUATION BATT INSULATION

5/4" X 6 COMPOSITE TRIM

3 1/2" BATT INSULATION (R13)

2" CLOSED CELL SPRAY APPLIED INSULATION (R11.6)

FIBER CEMENT SIDING WITH 1" EXPOSURE

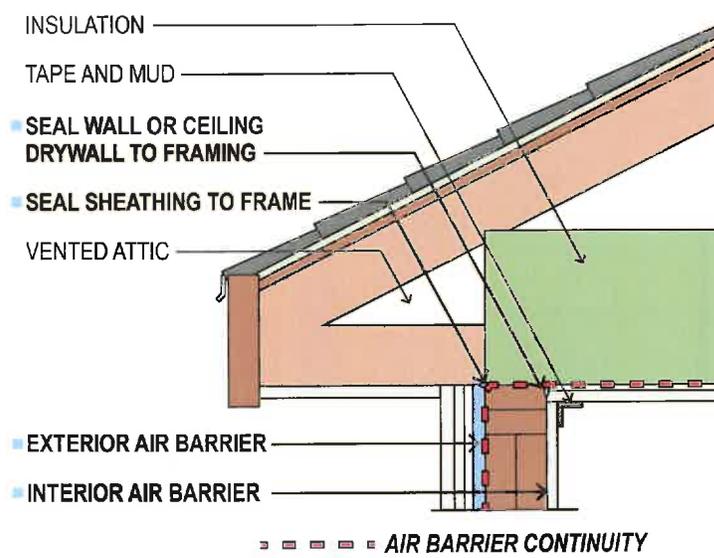
■ 1 1/2" INSULATED SHEATHING WITH INTEGRAL WEATHER BARRIER (R3.6)

1/8" HAT CHANNEL W/ RESILIENT CLIP AT 24" O.C.

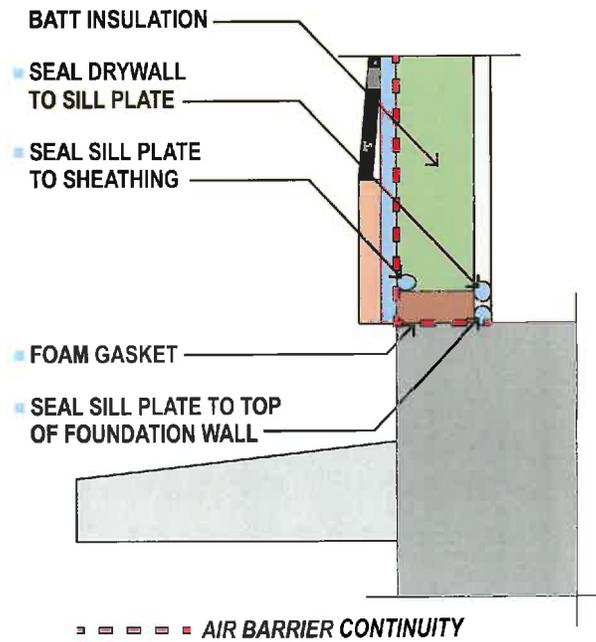
2X6 STUDS AT 16" O.C.

■ ■ ■ ■ ■ AIR BARRIER CONTINUITY

Detail 6. Wall-Ceiling Transition with Attic



Detail 7. Wall-Floor Transition



Detail 8. Structural Element Sealed (Overhang)

