

# COVER

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## BUILDING ENVELOPE INSPECTION CHECKLISTS

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## **BUILDING ENVELOPE INSPECTION CHECKLISTS**

The following checklists are intended to serve as a list of items to inspect and verify proper installation of the building envelope components. These checklists focus on the ability of the installation and performance of the building envelope to comply with the construction documents.

The Building Envelope Technical Commissioning Specialist (CxB) must document checklist completion by reviewing completed checklists and by selected site observation. The CxB must also spot-check miscellaneous items on the checklist previously completed by the installer, before the beginning of testing.

## **EXECUTION OF CHECKLISTS**

The checklists contain items for Division 3, 4, 7 and 8 contractors to perform. On each checklist, a column is provided for the responsible entity (BEC, CQC, and CxB) to fill out. The BEC column must be initialed only by individuals that have direct knowledge and witnessed that a line item task on the checklist was actually performed shall initial that item. It is not acceptable for non-witnessing supervisors to fill out the forms.

The checklist questions have been kept short and worded clearly so that the answer is typically yes or no.

Complete inspection of items that will be concealed before concealing the items. Check off all such items in the checklists prior to concealment.

Correct all areas that are deficient or incomplete in the checklists in a timely manner and before the beginning of related testing.

## **PERFORMANCE OBJECTIVES**

Control: Heat Flow, Air Flow, Noise, Fire, Light, Infrared, & Ultraviolet

Eliminate: Rain Penetration and Moisture Build-up

## COMPONENT SPECIFICATION SECTIONS

*Note: List all specification sections containing items that require inspection.*

Components of the Building Envelope include but are not limited to the following specification sections:

Spec ####	SPECIFICATION SECTION NAME
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## COMPONENT AND SYSTEM NOTES

*Note: Provide notes to assist contractor with specification/contract compliance and achieving acceptable performance. Example shown below.*

Notes from Section 07 27 10.00 10 BUILDING AIR BARRIER SYSTEM:

- a) Ventilated attic and crawl spaces are not included as part of the air barrier system boundary.
- b) Rooms with permanent fixed openings to the outdoor environment cannot be included in the air barrier envelope because such openings would represent a break in the system.
- c) The following are examples for air barrier materials: Cast-in-place concrete, Glass, Metal, Spray polyurethane foam, extruded polystyrene, Low permeance building wrap products, Liquid applied one and two component materials.
- d) The following CANNOT serve as air barrier materials: Concrete block, Expanded polystyrene foam, Building paper, Open cell foam, High permeance house wraps, Perlite board, Fiberboard, Glass fiber rigid board, Cellulose insulation, Metal roof decking, and Standing seam roof.

## APPROVALS

The building envelope and components integral to it are complete and ready for testing. The checklist items are complete and have been checked off only by parties having direct knowledge of the event, as marked below, respective to each responsible contractor. This checklist is submitted for approval, subject to an attached list of outstanding items yet to be completed. None of the outstanding items preclude safe and reliable functional tests being performed.

Insulating Concrete Form (ICF) Contractor	Date
Masonry/Cast Stone Contractor	Date
Building Insulation Contractor	Date
Waterproofing/Air Barrier Contractor	Date
Sealant Contractor	Date
Door/Window Contractor	Date
Roof Contractor	Date
Sheet Metal Contractor	Date
General Contractor	Date

This completed checklist has been reviewed and no outstanding major issues discovered.

Commissioning Specialist, CxB	Date
Contractor's Quality Control Representative	Date

## WATERPROOFING CHECKLIST

Item	BEC	CQC	CxB
1. Is subcontractor authorized by manufacturer to apply product?			
2. Are exposed areas masked to protect adjacent work?			
3. Are acceptable weather conditions present for application (above 40 degrees F, not damp or foggy, depending on material used)?			
4. Are substrates free of standing water, dirt and debris, loose material, voids and protrusions or deformations, which may inhibit application or performance of waterproofing?			
5. If waterproofing will be installed on concrete and/or masonry, are substrates free of voids deeper than 3/8" and free of surface protrusions more than 1/4" above the surface.			
6. If waterproofing will be installed on concrete footings, is wood float or better finish provided to surfaces scheduled to receive the vapor-protective waterproofing?			
7. If waterproofing will include bentonite water stop strips, are concrete surfaces provided as required for that installation?			
8. Are laps between membrane sheets consistent with approved details (flashings, changes of plane in membrane showing overlap, etcetera)?			
9. Is joinery between each day's work adequate?			
10. Is interstitial moisture not present?			
11. Are stored materials protected against moisture?			
12. Are proper fasteners and adhesives used?			
13. Is membrane applied smooth without buckles or "fish mouths"?			
14. Are appropriate protective measures taken to ensure that finished work is not penetrated or damaged by other trades?			
15. Are pipes, ducts, conduits, and other items penetrating membrane watertight?			
16. Is there proper coverage and quantities of materials such as mil thickness?			
17. Is a protective covering provided and installed as required? Is backfilling taking place immediately with the covering to remain in place during backfilling?			

## ROOF CHECKLIST

Item	BEC	CQC	CxB
1. Is the roofing subcontractor installing the specified products and installing them in accordance with the manufacturer's instructions?			
2. Is the roofing subcontractor authorized by the manufacturer to install the products?			
3. Are the roofing materials being stored in accordance with the manufacturer's recommendations.			
4. Are nails and fasteners of length, shank, head, and coating provided as required?			
5. Is surface to receive roofing primed or otherwise prepared as required?			
6. Is roof insulation installed and without thermal breaks?			
7. Does the roof insulation have staggered joints?			
8. Is the insulation installed with 1/2 inch clearance at vertical surfaces penetrating and projecting from roof surface?			
9. Is roof covering continuous and complete?			
10. Is roof free and clean of debris and other foreign matter?			
11. Are skylight, roof hatch, and HVAC equipment and curbs complete and flashed?			
12. Are saddles and crickets provided at roof openings for slope to drains?			
13. Are gutters, scuppers, and drains complete?			
14. Are fascias and soffits complete?			
15. Are cants, edge strips, and nailers complete?			
16. Are all base, cap, and counter flashings complete?			
17. Are expansion joint covers complete?			
18. Are roof drains and gutters systems free of debris?			
19. Is there positive drainage to roof drains, outlets, and gutters?			
20. Are vent pipes, vent & fan hoods, ducts, and conduit penetrations in the roof flashed and sealed?			
21. Are there any punctures, cracks, alligatoring, blisters, fishmouths, or ponding?			
22. Is there any staining of roof?			
23. Are roof pad walkways complete?			
24. Are there any deformed edges, buckled or curled roofing?			

25. Is there any corrosion or deterioration of roofing or fasteners?			
26. Is the air barrier installed complete without gaps and damage?			
27. Are air barrier components continuous and sealed?			
28. Are pipe, ducts, and conduit penetrations in the air barrier sealed?			
29. Is air barrier material located on the inside of the insulation and attached to a durable substrate.			
30. Is connection between the roof & wall air barriers sealed?			
31. Is roofing protected from damage by other trades or by general contractor during installation and following completion?			

## FLASHING AND SHEET METAL CHECKLISTS

Item	BEC	CQC	CxB
1. Are the type, shape, gauge, metal, fabrication, priming, and accessories provided as required?			
2. Are isolation provisions made for dissimilar metals. Do not allow copper and aluminum flashings to be in contact with each other or with ferrous metal. Copper or aluminum flashings are to be fastened with non-ferrous nails or screws. Ferrous equipment bases are not to be set on copper flashings. Verify that flanges embedded in plastic cement or asphalt are asphalt primed.			
3. Are expansion joints provided and installed as required or as specified? Note location of joints with respect to drains, downspouts, scuppers, corners, and other outlets.			
4. Are lengths as long as practical or specified?			
5. Is installation coordinated with roofing and/or siding installation?			
6. Is a nailer or cant strip provided for fastening flashing to roof deck and is of proper material, well secured, and allows venting if required or specified?			
7. Is flashing embedded and installed over roof membrane assembly with additional roofing membrane material?			
8. Is method of anchoring lower edge of fascia as required? Observe alignment, and stiffness.			
9. Are gravel stops complete and flush with deck?			
<b>Gutters</b>	<b>BEC</b>	<b>CQC</b>	<b>CxB</b>
10. Are gutters adequately supported and allow for movement? Observe attachment size, type, location, and spacing of hangers and supports.			
11. Are gutters pitched and provide for positive drainage to outlets?			
12. Are gutter joints lapped in direction of flow?			



13. Are expansion joints, concealed or standing, provided midway between outlets or downspouts and/or as required?			
14. Are scuppers installed low enough not to retain dam water on roof?			
15. Are overflow drains and scuppers if indicated or required by code provided, located properly, i.e., low point of roof, of size required and have correct inlet flow elevation?			
16. Are accessories provided if required – basket strainer, bird screens, and covers?			
<b>Downspouts</b>	<b>BEC</b>	<b>CQC</b>	<b>CxB</b>
17. Are lengths as long as practical and in accordance with specifications?			
18. Are slip joints in direction of flow and allowance for movement provided?			
19. Are hangers or straps provided as required? Verify spacing and location are as required or specified, and each section is supported. Connection of hangers does not damage finish wall material.			
20. Is contact not made with wall surfaces except for supports?			
21. Are downspouts installed plumb, without excessive lateral or angled joints, unless indicated or if required to conduct drainage?			
22. Are special items furnished: heads, scuppers, and linings?			
23. Are downspouts indicated to terminate in drainage lines neatly fitted and clean and free of building debris or other materials?			
<b>Base and Cap Flashings</b>	<b>BEC</b>	<b>CQC</b>	<b>CxB</b>
24. Is flashing provided to suit condition - cant, size, gauge, and fabrication?			
25. Does base flashing extend up sufficiently; flange is properly secured and embedded at least 4 inches in roofing membrane and is installed similarly to gravel stops?			
26. Are seams lapped, locked, and soldered as required?			
27. Is secure anchorage provided for size, spacing, and fixing of cleats or other equipment mountings?			
28. Are cap flashings of shapes, sizes, and gauges provided as required and installed to secure anchorage, allow movement, and have sufficient laps and spacing?			
29. Is counter flashing extended sufficiently into masonry walls or into reglets and securely anchored and caulked, if necessary?			
<b>Other Roof Flashing</b>	<b>BEC</b>	<b>CQC</b>	<b>CxB</b>
30. Is hip and ridge flashing and venting provided as required? Check fabrication, size, gauge, anchorage, and lap.			
31. Is valley flashing provided as required: open or closed, width, gauge, anchorage, and lap?			
32. Is stepped flashing provided as required? Check depth of insertion into wall, and length of material attached to deck and lap. Verify plastic cement or approved material is filled into joints between edges of shingles and flashings as required.			

33. Are reglets provided at required areas? Observe the setting in concrete or masonry to assure firm anchorage. Verify reglets are protected to prevent deformation or filling during installation. Observe installation of sheet metal into reglets for tightness, weatherproof ness, caulking, and lap.			
<b>Wall and Through Wall Flashing</b>	<b>BEC</b>	<b>CQC</b>	<b>CxB</b>
34. Are lap, turn up, location in wall, depth in masonry, and length installed as required?			
35. Do sill flashing and pans extend full depth, are turned up and installed for proper drainage?			
<b>Miscellaneous</b>	<b>BEC</b>	<b>CQC</b>	<b>CxB</b>
36. Do louvers and vents have adequate flanges and connections for anchorage and are flashings watertight against driving rains after installation? Verify insect screen, bird screen, and shutters are provided as required.			
37. Are sheet metal termite shields provided as required?			

#### JOINT SEALANT CHECKLISTS

Item	BEC	CQC	CxB
1. Is subcontractor authorized by manufacturer to apply product.			
2. Is product compatible with substrate?			
3. Is surface properly prepared?			
4. Is primer being used when required?			
5. Is the proper sealant installation technique being used including application, bond breakers, field-testing, storage, shelf life, etc?			
6. Is correct size backer rod installed at the specified depth? Is depth consistent?			
7. Is the sealant tooled properly?			
8. Is the sealant properly adhered to the substrate?			
9. Is the sealant clean and free of debris and other foreign matter?			

#### WALL CHECKLIST

Item	BEC	CQC	CxB
1. Is exterior wall insulation installed and without thermal breaks?			
2. Are exterior wall materials continuous and complete?			

3. Is the exterior wall clean and free of debris and other foreign matter?			
4. Are pipes, ducts, and conduit penetrations in the exterior wall flashed and sealed?			
5. Are expansion and control joints sealed?			
6. Is there any staining of exterior wall materials?			
7. Is there any corrosion or deterioration of wall materials or fasteners?			
8. Is the air barrier installed complete without gaps and damage?			
9. Are air barrier components continuous and sealed?			
10. Are pipe, ducts, and conduit penetrations in the air barrier sealed?			
11. Are intake, exhaust, and relief dampers in the exterior wall sealed?			
12. Do dampers seal tight and controls close all ventilation or make-up air intakes and exhausts during inactive or unoccupied periods?			
13. Is air barrier system at expansion and isolation joints sealed?			
14. Is air barrier material continuous under or around all electrical boxes and panels, plumbing fixture boxes, and other items affecting air barrier system continuity?			
15. Is the air barrier material located on the outer side of the insulation?			
16. Is connection between the wall & floor air barriers sealed?			
<b>Masonry</b>	<b>BEC</b>	<b>CQC</b>	<b>CxB</b>
17. Are masonry anchors in good condition and properly installed?			
18. Are masonry control joints 25' or less apart?			
19. Are masonry weep holes open and free of debris?			
20. Is masonry and cavity grouted solid below grade?			

#### OPENING (DOOR, WINDOW, STOREFRONT, & CURTAINWALL) CHECKLIST

Item	BEC	CQC	CxB
1. Are openings installed and include thermal breaks?			
2. Is rough or masonry opening correct size with required clearance for proper installation of opening?			
3. Are openings of type, size, finish, and operation as approved?			
4. Is flashing installed around opening?			
5. Is caulking and sealant applied around opening complete and smooth without air pockets & wrinkles?			

6. Is field-applied sealant of proper type and color and applied where required?			
7. Are sealant joint widths correct?			
8. Are rain drips, weep holes, and drainage systems provided and clean of sealant, mortar and debris?			
9. Is weather stripping provided on doors and operable window sections?			
10. Are all hardware provisions coordinated and installed?			
11. Is hardware of required type, metal, finish, and function?			
12. Are electric or pneumatic outlets and locations provided if required?			
13. Is window/door hardware adjusted to provide smooth operation and weather-tight sealing when doors and operable sections are closed and locked?			
14. Are openings clean and free of mortar, plaster, paint spattering spots, and other foreign matter?			
15. Is there any corrosion or deterioration of materials or fasteners?			
16. Are air barrier components continuous and sealed?			
17. Is connection between openings & wall air barriers sealed?			
18. Do doors open per ABA guidelines?			
19. Are dissimilar metals and materials isolated? For example, aluminum, in contact with other metals and cementitious surfaces, may require nylon, polystyrene or pressure tape, separators or stainless steel bolts.			
20. Are installation tolerances maintained regarding horizontal and vertical alignment and plumbness.			
21. Is anchorage to structure secure for transfer of wind/blast loads and permanently tightened after alignment?			
22. Has a water test (hose test) of the installed assemblies been conducted if required?			

## GLAZING CHECKLIST

Item	BEC	CQC	CxB
1. Are types, thickness, quality, pattern, and finish of glass provided as required?			
2. Is each unit permanently labeled on spacer or pane?			
3. Are type, materials, and methods of glazing provided as required? Verify putty, glazing compound, tape, gasketing, glazier points, screws, shims, separators, beads, and special sections are provided as required.			
4. Is patterned glass set in exterior opening with smooth side to exterior? Verify pattern of adjacent panes is consistent.			

## SKYLIGHT CHECKLIST

Item	BEC	CQC	CxB
1. Are skylights installed and include thermal breaks?			
2. Is rough opening correct size with required clearance for proper installation of skylight?			
3. Are skylights of type, size, finish, and operation as approved?			
4. Is flashing installed around skylights and ends overlap a minimum of 6" – 8" and set in full bed of sealant?			
5. Do flashing details meet the standards of the National Roofing Contractors Association and/or SMACNA?			
6. Are the skylights clean and free of mortar, plaster, paint spattering spots, and other foreign matter?			
7. Is there any corrosion or deterioration of skylight materials or fasteners?			
8. If integral gutter system is utilized, is there positive drainage?			
9. Is weep/gutter clear of caulking and/or debris?			