

## **Quality Assurance In Drawings And Specifications Check List:**

### **Redi-Check**

1. Add requirement for window and light fixture submittals in general notes
2. Check to make sure that specifications divisions are appropriate and conform to a standard industry format.
3. Make sure that procedures for contractor material substitutions are clear.
4. Check that appropriate material and equipment standards are specified.
5. Eliminate or minimize specifying sole source or brand name materials or equipment.
6. Check to make sure that technologies and systems are consistent.
7. Check to make sure that plans and specifications allow the selection of appropriate construction means, methods and techniques.
8. Check all cross-referencing drawings and specifications to make sure that terms are the same.
9. Check that there is a complete description of owner-furnished items.
10. Check to make sure that definitions of items of work provided by each contractor for multiple contracts are clear.
11. Check to make sure that quality control responsibilities of the contractor and owner are defined, with clear statement of tests and access requirements.
12. Check that submittal requirements are clear.
13. Check to make sure the review period for submittals is identified and appropriate.
14. The construction schedule is feasible and clearly defined with schedule interface points
15. Emphasize change order procedure at start of construction
16. Discuss responsibility for inspections at start of construction

### **Code**

1. Exterior receptacles must have in-use protected covers
2. Receptacles must be grounded
3. [AFCI](#) (Arc Fault Circuit Interrupter) required in bedroom outlets
4. Ground wire required to appliances using a flexible raceway.
5. 2003 International Building Code "Formal Interpretations":
  - Fire separation distances can be measured from the center of the street
  - A penthouse does not count as a story but must be included in the allowable maximum height
  - A mezzanine does not count as a story but does contribute to the fire area
  - Outpatient clinics are use group B
  - Use group R2 can be counted as R3 if it has independent exit (not a common corridor or hallway)

- Unlimited area buildings cannot have basements
  - Combustible nailers and blocking are permitted in Types 1 and 2 construction
  - Area increase for open perimeter and fire sprinklers apply to both height and area
  - The posted 20 foot fire lane required for perimeter increase does not have to be paved but must be fire dept accessible
  - Rated fire dampers cannot be installed at floor levels in lieu of fire rated shaft enclosures
  - Unfaced fiberglass insulation can be used as a fireblocking material for wall cavities in combustible construction only
  - When two exits are required, one cannot pass through a stairway for a continuous corridor beyond the stairway leading to the second exit
6. Calculate area of building and area of sidewalks for permit cost calculation
7. If exterior wall is less than 3' from property line, it must be 1 HR rated – 5/8" type "X" gypsum board on each side of wall. No penetrations, even conduit, are allowed through this wall.
8. Soffits:
- If soffits are less than 3' from property line, bottom of soffit must be clad with 5/8" type "X" gypsum board.
  - Overhangs cannot be less than 24" from property line. If they are, Head of department may allow fire treatment of roof sheathing and wood fascia.
9. Railings and guard rails:
- Show railing height along stairs and at landings
  - Show stair and riser sizes
  - Show spacing of balusters
  - Must have "graspable" handrail on one side of stairs (1 ½" round rail)
10. Residential egress:
- Front or back door must be 3' wide to qualify as an egress door
  - Cannot use sliding door for egress
  - Cannot open a door out over a step.
  - Must have 3' long landing at top and bottom of stairs
11. If you're involved in construction or installation in homes or other child-occupied facilities built before 1978, you'll need to know about the EPA's new

Lead: Renovation, Repair and Painting rule, which will become mandatory in April 2010.

- In short, the Lead: Renovation, Repair and Painting rule requires:
- An eight-hour training session
- New work practices, including cleaning verification
- Keeping records for three years

### **Planning**

1. Check height of window sill above floor for readers.
2. Locate telephone, cable, and network wiring risers and jacks in all buildings.
3. Provide access panels for motors, thermostats, and P-traps.
4. Provide sound batts between rooms especially around toilet rooms.

### **Site work**

1. Always note grading to drain away from building.
2. Note architect to verify top of footings and foundations prior to pouring.
3. Note that all borrow and fill to be provided in contract.
4. Underground water piping min 3'-6" deep.
5. 4" min soil pipe outside building.
6. Use 6" diameter ASTM D3034 SDR green PVC pipe for storm drains.
7. Use sand fill around pipes.
8. Use rigid perforated PVC with filter fabric for sub-soil drains.
9. Field verify compaction of all soil after excavation.
10. Check level at every door at grade.

### **Decks & Porches**

1. Use stainless steel nails on exterior decks.
2. Ease edges of stairs.
3. Redwood thickness min. 1 1/4" for spanning 16" joist spacing.

### **Additions & Remodeling**

1. Must have photographs for rehab jobs in drawings so nothing is missed.
2. Assume that ceiling heights in adjacent rooms are slightly out of level.
3. Specify floor levelness for rehab; specify that all floors must be filled & leveled.
4. Check that all existing items, including hardware shall be stripped of paint.

5. Note on drawings that all surfaces should be painted in area of remodeling.

## **Masonry**

1. New masonry horizontal joints must line up with exist masonry.
2. Expansion joints in lintels or shelf angles supporting masonry where masonry expansion joints occur.
3. Always use hot dipped galvanized wire ties in exterior walls.
4. Do drawings indicate the proper location of expansion and control joints on all of the elevations?
5. Do drawings contain proper details of expansion and control joints?
6. Do drawings indicate compressible fillers, flexible anchor, etc., to compensate for various structural movements?
7. Has flashing been properly detailed and located in the appropriate areas?
8. Do drawings indicate the type of flashing to be used?
9. Specify the required fire rating, if so required?
10. Are weepholes properly indicated on drawings?
11. Do drawings indicate the proper number of wall ties as required by code?
12. Do drawings indicate the proper location of wall ties and anchors?
13. Do drawings notate the type of insulation that is to be used?
14. Do drawings indicate a 1" or greater air space, with rigid insulation for the cavity wall detail?
15. Do drawings indicate locations of all sealants?
16. Do drawings indicate "grade" at a minimum of 2" below foundation base flashing?
17. Are intricate masonry patterns or ornamental details properly worked out on the drawings?
18. Do drawings indicate a vapor barrier in walls having an exterior wythe of glazed brick?
19. Do drawings indicate proper ventilation of the cavity when an exterior wythe of glazed brick is used?
20. Do drawings indicate a stain and/or waterproof coating on exterior concrete masonry walls?
21. Are all dimensions of masonry based on 4", 8" or 12" increments?
22. Do drawings indicate realistic dimensions and tolerances in details for plumbing and chase walls?
23. Did you specify the proper brick type, which is conducive to its proposed function?
24. Did you specify and indicate on the drawings and the specifications the required fire rating, if so required?
25. For economy, did you specify the largest modular size brick (not a quad-sized brick) available?
26. Did you specify the proper strength of the masonry unit to be used?

27. Did you specify all special shapes that might be used?
28. Did you specify special cold weather masonry construction and protection recommendation when weather conditions are near freezing?
29. Did you specify the type of mortar and grout that is to be used?
30. Did you specify the proper mixing and procedure for mortar and grout?
31. Did you specify properly tooled mortar joints?
32. Did you specify for all head, bed, and collar joints to be filled as solidly as possible?
33. Did you specify the proper amount of galvanizing on all metals used in conjunction with masonry wall systems?
34. Did you specify that cavity wall ties and veneer ties have adequate thickness to fully transfer lateral loads?
35. Did you specify that all shelf angles be properly designed to limit deflection to 1/600, and properly shimmed to avoid rotation?
36. Did you specify all the types of accessories to be used, such as inserts, regrets, etc. and by whom they are to be supplied?
37. Did you specify that necessary masonry samples be submitted?
38. Did you specify that a mock-up masonry panel (with flashing, expansion joint and corner conditions) be built prior to start of construction?
39. Did you specify that all copings, sills and cornices are to be pitched and have a drip?
40. Did you specify all proper and realistic construction tolerances for structural frames and for masonry walls supported on frames?
41. In general, do not specify brick masonry for copings or low slope sills.
42. Do not specify the use of chloride admixtures in mortar.
43. Do not specify parging in cavity walls.
44. Do not specify a vapor barrier in a conventional cavity wall.
45. Do not specify the use of oil-base or alkyd paints on exterior brick masonry.
46. Do not specify plastic tubes to be used as weepholes.

## **Windows**

1. Windows with sills below 24" require a guard.
2. Specify tempered glass in bathroom and showers in notes
3. Seal all windows and doors inside and out.
4. Bedroom Egress Windows:
  - a. **1009.2 Minimum size:** Emergency escape and rescue openings shall have a minimum net clear opening of 5.7 square feet. Exception: The minimum net clear opening for emergency escape and rescue openings on the ground level at grade is 5.0 square feet.
  - b. **1009.2.1 Minimum dimensions:** The minimum net clear opening height dimension shall be 24 inches. The net clear opening width

dimension shall be 20 inches. The net clear opening dimensions shall be the result of normal operation of the opening.

- c. **1009.3 Maximum height from the floor:** Emergency escape and rescue opening shall have the bottom of the clear opening not greater than 44 inches (1118 mm) measured from the floor.

5. Basement Egress Windows:

- a. Sill height of window above floor: Not to exceed 44"  
Minimum opening area:  $\geq 5.7$  sq. ft.  
Minimum opening height  $\geq 24$ "  
Minimum opening width:  $\geq 20$ "
- b. Window Wells/Area Wells:  
Required where window opening sill height is below ground elevation.  
Horizontal dimensions:  $\geq 9$  sq.ft. (width x projection)  
Horizontal projection:  $\geq 36$  "
- c. Ladders:  
Required on window wells deeper than 44" and must be permanently attached.  
Ladder may encroach into well up to 6".  
Step distance between rungs:  $\leq 18$ "  
Rungs: 12" wide or greater and must project a minimum of 3" away from wall but maximum of 6".
- d. Grates:  
Shall be removable without special tools.

6. Safety Glazing

- a. **Safety Glazing Requirements from IBC 2003:**
- b. **2406.3 Hazardous locations.** The following shall be considered specific hazardous locations requiring safety glazing materials:
- c. Glazing in swinging doors except jalousies
- d. Glazing in fixed and sliding panels of sliding door assemblies and panels in sliding and bifold closet door assemblies.
- e. Glazing in storm doors.
- f. Glazing in unframed swinging doors.
- g. Glazing in doors and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers. Glazing in any portion of a building wall enclosing these compartments where the bottom exposed edge of the glazing is less than 60 inches above a standing surface.
- h. Glazing in an individual fixed or operable panel adjacent to a door where the nearest exposed edge of the glazing is within a 24-inch arc of either vertical edge of the door in a closed position and where the bottom exposed edge of the glazing is less than 60 inches above the walking surface.
  - i. **Exceptions:**

- i. Panels where there is an intervening wall or other permanent barrier between the door and glazing.
  - j. Where access through the door is to a closet or storage area 3 feet or less in depth.
  - k. Glazing in walls perpendicular to the plane of the door in a closed position, other than the wall towards which the door swings when opened, in one- and two-family dwellings or within dwelling units in Group R-2.
7. Glazing in an individual fixed or operable panel, other than in those locations described in preceding Items 5 and 6, which meets all of the following conditions:
- i. 7.1. Exposed area of an individual pane greater than 9 square feet;
  - ii. 7.2. Exposed bottom edge less than 18 inches above the floor;
  - iii. 7.3. Exposed top edge greater than 36 inches above the floor; and
  - iv. 7.4. One or more walking surface(s) within 36 inches horizontally of the plane of the glazing.
    - 1. **Exception:** Safety glazing for Item 7 is not required for the following installations:
      - v. A protective bar 1 1/2 inches or more in height, capable of withstanding a horizontal load of 50 pounds plf without contacting the glass, is installed on the accessible sides of the glazing 34 inches to 38 inches above the floor.
      - vi. The outboard pane in insulating glass units or multiple glazing where the bottom exposed edge of the glass is 25 feet or more above any grade, roof, walking surface or other horizontal or sloped (within 45 degrees of horizontal) surface adjacent to the glass exterior.
8. Glazing in guards and railings, including structural baluster panels and nonstructural in-fill panels, regardless of area or height above a walking surface.
9. Glazing in walls and fences enclosing indoor and outdoor swimming pools, hot tubs and spas where all of the following conditions are present:
- a. The bottom edge of the glazing on the pool or spa side is less than 60 inches above a walking surface on the pool or spa side of the glazing; and
  - b. The glazing is within 60 inches horizontally of the water's edge of a swimming pool or spa.
10. Glazing adjacent to stairways, landings and ramps within 36 inches horizontally of a walking surface; when the exposed surface of the glass is less than 60 inches above the plane of the adjacent walking surface.

11. Glazing adjacent to stairways within 60 inches horizontally of the bottom tread of a stairway in any direction when the exposed surface of the glass is less than 60 inches above the nose of the tread.
  - i. **Exception:** Safety glazing for Item 10 or 11 is not required for the following installations where:
    1. The side of a stairway, landing or ramp which has a guardrail or handrail, including balusters or in-fill panels, complying with the provisions of Sections 1012 and 1607.7; and
    2. The plane of the glass is greater than 18 inches from the railing.
  - b. **2406.3.1 Exceptions:** The following products, materials and uses shall not be considered specific hazardous locations:
    1. Openings in doors through which a 3-inch sphere is unable to pass.
    2. Decorative glass
    3. Glazing materials used as curved glazed panels in revolving doors.
    4. Commercial refrigerated cabinet glazed doors.
    5. Glass-block panels
    6. Louvered windows and jalousies
    7. Mirrors and other glass panels mounted or hung on a surface that provides a continuous backing support.

### **Doors**

1. Specify dark bronze anodized aluminum for thresholds.
2. Check to make sure that Baldwin hardware fits within door stile.

### **Walls**

1. Inspection of drywall finishing - use long straightedge to test straightness of finish (can't see quality without straightedge)

### **Floors**

2. Use dark grout color for floors; use white grout for light wall tile.
3. Do not stain maple flooring -- sanding by hand at edges will take stain differently.
4. Inspect all wood for floors to make sure it meets quality standard.
5. Beware of using strip flooring near toe-space heaters - the boards will dry out and separate.

### **Stairs**

1. Use skirt boards on stairs.
2. Watch out for stair railing support.



## **Energy & Insulation**

1. Make sure steel beams are insulated to prevent excessive expansion and contraction.
2. Foil-faced fiberglass insulation is available from Bone Roofing Supply in Chicago (773) 237-9740, and ABC Supply, Cicero 222-8222.
3. Provide weep holes at bottom of steel tubes or pipe columns subject to weather, temperature changes and condensation.

## **Accessibility**

1. Truncated domes are required at curb ramps under the ADA - temporary suspension expired July 26, 2001.

## **Structure**

2. Stresses
3. Paralam PSL: 45 pcf; 3 ½" 5 ¼" and 7" wide x 9 ½" 11 7/8" 14" 16" 18" deep; Fb = 2900 psi; E=2x10<sup>6</sup> psi
4. Microlam LVL: 42 pcf; 1.75" wide; 5 ½" 7 ¼" 9 ¼" 9 ½" 11 ¼" 11 7/8" 14" 16" 18" 20" Fb = 2600 psi; E = 1.9 x 10<sup>6</sup> psi
5. Brace tops of all exterior walls.
6. Spike sister joists with two 10d nails @ 12" o.c.
7. Use 20 gage studs to support cement backer board for ceramic tile.
8. Calculate stress on beams and slabs for snow drifting.
9. Tops of beams must be braced to qualify for compact section F<sub>b</sub> allowable.
10. Concrete stairs must have #4 bars @ 12" o.c. at bottom and #4 nosing bars.
11. Minimum length of shear wall adjacent to garage door is 28"
12. Light gage metal thicknesses:
13. 54 mil = 16 ga
14. 43 mil = 18 ga
15. 33 mil = 20 ga
16. 18 mil = 25 ga
17. Stud designation "362S 137-43" means a metal stud 3.62" deep (3 5/8") x 1.37" wide and 43 mills thick (18 ga), the S is for "stud". From Steel Stud Manufacturers Association (SSMA)  
<http://www.ssma.com/ssmatechcatalog.pdf>

## **Painting**

1. Back prime all trim.
2. Call for painting of edges of exterior window and door casings to match face at clapboard siding.

3. Paint projecting PVC vent pipes black
4. Painting general notes:
  - a. Paint all exposed surfaces, except where the drawings indicate that a surface or material is not to be painted or is to remain natural. If the drawings do not specifically mention an item or a surface, paint the item or surface the same color as similar adjacent materials or surfaces. Also paint the following items: uninsulated metal piping, uninsulated plastic piping, pipe hangers and supports, tanks that do not have factory-applied final finishes, visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets, duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material, mechanical equipment that is indicated to have a factory-primed finish for field painting, switchgear, panelboards, and electrical equipment that is indicated to have a factory-primed finish for field painting, surfaces behind movable equipment and furniture. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  - b. Do not paint prefinished items such as architectural woodwork and casework, acoustical wall panels, metal toilet enclosures, metal lockers, unit kitchens, elevator entrance doors and frames, elevator equipment, finished mechanical and electrical equipment, light fixtures, distribution cabinets; concealed surfaces such as foundation spaces, furred areas, ceiling plenums, utility tunnels, pipe spaces, duct shafts, elevator shafts; finished metal surfaces such as anodized aluminum, stainless steel, chromium plate, copper, bronze and brass; and operating parts and labels.
  - c. Painting Preparation:
  - d. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - e. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants. Coordination of shop-applied prime coats with topcoats is critical. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
  - f. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content

or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

- g. Clay Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content of surfaces or alkalinity of mortar joints to be painted exceed that permitted in manufacturer's written instructions.
- h. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- i. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer. Galvanized-metal substrates should not be chromate passivated (commercially known as "bonderized") if primers are field applied. If galvanized metal is chromate passivated, consult manufacturers for appropriate surface preparation and primers.
- j. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- k. Aluminum Substrates: Remove surface oxidation.
- l. Wood Substrates: scrape and clean knots, and apply coat of knot sealer before applying primer; sand surfaces that will be exposed to view, and dust off; prime edges, ends, faces, undersides, and backsides of wood, after priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler, sand smooth when dried.
- m. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.
- n. Plaster Substrates: Do not begin paint application until plaster is fully cured and dry.
- o. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

## **Fireplaces**

1. Direct vent flues min 2' from windows and 1' from ground (from American Heritage Fireplace Co.)
2. International Fuel Gas Code, 2003, section 508.3 3: The vent terminal of a direct-vent appliance with an input of 10,000 Btu per hour (3 kW) or less shall be located at least 6 inches (152 mm) from any air opening into a building, and such an appliance with an input over 10,000 Btu per hour (3 kW) but not over 50,000 Btu per hour (14.7 kW) shall be installed with a 9-inch (230 mm) vent termination clearance, and an appliance with an input over 50,000 Btu/h (14.7 kw) shall have at least a 12-inch (305 mm) vent termination clearance. The bottom of the vent terminal and the air intake shall be located at least 12 inches (305 mm) above grade.

### **Mechanical**

1. Service heating boiler and or furnace after installation; change filters.
2. Show supply and return registers on drawings
3. Make sure that ceiling diffusers are compatible with ceiling material, such as wood grills on a wood ceiling.

### **Plumbing**

1. When specifying a whirlpool or bathtub with hand-held shower, specify a vacuum breaker in the water lines.
2. Oak Park requires a 1 ½" deep safety pan or floor drain in a room with a 1 ½" threshold and waterproofing under flooring material in rooms where washing machines and hot water heaters are located above basement level. Safety pan shall be connected to 1 ½" vertical pipe discharging indirectly to a drain at the lowest level of the building. Vertical stack cannot be more than 24" away from the safety pan unless the size of the pipe increases. Piping from the safety pan to the vertical line should be a tee for venting the vertical pipe.
3. Oak Park requires new basement bathrooms or relocated basement bathrooms to connect to an ejector system.
4. Provide battery backup for sump pumps and ejectors.
5. Oak Park requires basement floor drains as follows:
  - a. Existing floor drains discharge into an existing or new sump pump or ejector pump to the sewer, or a taped floor drain with a 48" tall stand pipe.
  - b. All new floor drains connect to an ejector system.
6. Provide area drains for courtyards.
7. Provide drains for all small roofs.
8. Always look for plumbing stacks and vents to relocate
9. Specify that all pipes are parallel with walls.
10. Use cast iron drain stack to reduce noise problems.
11. Provide gravity loop for hot water stacks.
12. Provide temperature control at faucets for commercial toilet rooms.

13. Wrap plastic underground gas lines with signal cable to enable it to be detected.
14. Water service and meter sizing – follow state minimum sizes and show on drawings.
15. Show riser diagram
16. Minimum 3" pipe to WC – show
17. Show that shower is 6'-8" above top of shower basin
18. Ceiling height min 6'-8" above toilet

## **Electrical**

1. Specify steel conduit in basement (not aluminum EMT)
2. Check location of wall switches near a tub – keep far away.
3. Use quartz lighting for terrace lights for quick on & off.
4. Get owner to approve light fixtures and get samples prior to specifying.
5. Minimize outlets on exterior walls.
6. Specify basement receptacles 2'-0" AFF if basement walls are to be finished in the future.
7. Smoke detectors:
  - a. basement and first floor and top of all stairs
  - b. hardwired and interconnected
8. CO detectors:
  - a. Basement and near furnaces
  - b. First floor
  - c. Within 15 feet of any bedroom
9. Electrical panelboards need to be installed vertically but may be installed horizontally if breakers are installed so that "on" is in the up position – this would effectively limit you to using only half of the number of breakers in a panel (NEC Sec. 240.33 and 240.81)