

CITY OF WILLITS Roofing Guidelines

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Wildland Urban Interface

Note: Chapter 7A “Materials and Construction Methods for Exterior Wildfire Exposure” in the 2016 CBC became effective January 1, 2017. This chapter incorporates requirements for the Wildland Urban Interface and areas within designated Fire Severity Zones. In unincorporated areas of the county, these FSZ’s occur in what is referenced as the State Responsibility Area (SRA). In the incorporated cities, these FSZ’s occur in what is referenced as the Local Responsibility Areas (LRA). These regulations are valid for new construction only and are not applicable to the requirements of re-roofing and the guidelines incorporated herein. For more information regarding these requirements for new construction, contact the appropriate building department with jurisdiction over the proposed new construction project site. Additional information can be obtained from the State Fire Marshal’s website at: <http://www.fire.ca.gov/wildland.php>

Introduction

These recommended guidelines for re-roofing are the product of a cooperative effort between the County of Sonoma and all of the City Building Departments in Sonoma County and representative members of the Independent Roofing Contractors of California, Inc., Northbay Chapter. The goal of this effort, which was launched in June of 2000, and revised in July of 2008, has been to develop a working outline of the California roofing industry's generally accepted standards for the application of roof decking, repairs, and roof system applications. The information contained in the *Re-roofing Guidelines* ranges from ply-wood deck nailing requirements to the installation of built-up roofing, composition asphalt shingles, metal, concrete & clay tiles, modified bitumen, and single-ply applications.

The *Re-roofing Guidelines* are meant to assist roofing contractors, members of building department, and consumers in understanding the specifics of reroofing.

Hopefully, the document is both useful and informative to all users. It should be noted that, though emphasis has been placed on roofing practices that are relevant to Sonoma County, much of the material within the *Guidelines* is most probably relevant to those other areas of California which share a climate similar to Sonoma County's.

As a greater aid to the community of roofing contractors and consumers, this document includes a number of appendices which provide jurisdictional specific information, as well as sections from the 2001 Edition of California Building Code which are relevant to re-roofing. Although the new CBC is based on the International Building Code, references from the 2001 CBC have been retained as a guideline as many of the tables and sections are no longer housed in the current code and are still valuable tools.

The information contained in this document was current at the time of publication. It should be noted, however, that building code requirements change from time to time, as do local ordinances and policies. Consequently, the *Re-roofing Guidelines* Drafting Committee advises contractors and consumers to verify re-roofing requirements of the jurisdiction in which they are working prior to commencing the work.

Notes: (1) These guidelines are recommendations that are based on generally accepted roofing techniques, which have evolved over time. The techniques have been time-tested and found to be effective by the Independent Roofing Contractors of California. (2) Where Guideline recommendations conflict with California Building Code (CBC) requirements, local amendments or local re-roofing policies, CBC Code provisions, local amendments or policies shall prevail.

Roof Deck Applications

Roof Deck Applications

A. Existing Deck Repairs:

1. If replacing defective decking, then new decking should match existing and be nailed in the same manner.

B. Spaced Sheathing Boards:

1. Fill-in between existing spaced sheathing boards is not allowed for composition shingle re-roofing.

2. Fill-in is allowed for other types of roofing.¹

3. All fill-in boards should end on rafters and be attached with two fasteners per rafter location.

C. Plywood over Spaced Sheathing:

This section is applicable to plywood or oriented strand board (OSB) sheathing installed to

provide a smooth surface on which to apply roofing materials and not for structural support and/or diaphragm purposes. IRCC recommends the following guidelines for such sheathing applications when installed over pre-existing spaced sheathing:

1. Sheathing shall comply with the California Building Code (CBC) and the roofing material manufacturer's installation instructions.²
2. Plywood vertical seams do not need to end on rafters.
3. Horizontal seams shall be fully blocked by spaced sheathing boards or by fill-in boards.
4. All fasteners shall be at least 1 1/2" in length. Staples or nails are acceptable, providing that staples have at least a 7/16th inch crown. (**Shorter fasteners are acceptable for use at overhangs to minimize penetration of visible underside**)
5. Fasteners should be placed approximately 6" apart along the horizontal edges.

¹Verify with local jurisdiction.

²While 3/8" panel thickness is allowed by 2007 CBC Table 2304.7(3) under limited circumstances, roofing material manufacturers require a minimum nail/staple penetration through the substrate of at least 1/2". Consequently, the use of 3/8" panel thickness for roof sheathing is not allowable without voiding the manufacturer's installation instructions.

Roof Deck Applications

6. All vertical ends shall be fastened with at least one fastener on every spaced sheathing board.
7. All field nailing shall be placed at a **maximum of 12"** apart and roughly equidistant from top and bottom edges.
8. All exposed edges of plywood shall be covered.

Diagram of Nailing Plywood Over Spaced Sheathing

D. Sheathing for Fire Rating:

In some cases a specific type and size of plywood may be required to meet the fire rating for the combined deck and roof application. Please refer to local building codes, manufacturer's specifications, ICC-ES reports or to other design professionals for specific application requirements.

Roof Deck Applications

E. Building Inspection Requirements:

1. All new roof sheathing will require a nailing inspection, unless approved by local jurisdictions.
2. A ladder shall be provided by the contractor on the job site for all inspections.
3. The inspector will inspect the sheathing for compliance to these requirements.

Composition Shingle Roofing

Composition Shingle Roofing

A. Roof Deck:

1. Roof deck shall be solid sheathing, which meets California Building Code (CBC) and those of the roofing material manufacturer's installation requirements (refer to footnote 2, page 5)

2. Original solid plank board construction is acceptable provided large voids such as knot holes are replaced or covered with metal.
3. Fill-in between existing spaced sheathing boards is not allowed for composition shingle re-roofing.
4. Also see section on Roof Deck Application if needed. (refer to page 5)

B. Underlayment:

1. A minimum Type 15 (ASTM) felt underlayment is required over solid sheathing.
2. No underlayment is required when roofing over existing shingles when the pitch is at least 4/12 or more, it is recommended that a Type 30 felt be used.
3. A minimum Type 30 felt underlayment should be used when roofing over wood shingles.
4. A 72 lb. capsheet, or two layers of 30 lb., or three layers of 15 lb. felt underlayment shall be applied to all valleys where shingles are used over the valley in lieu of sheet metal (as in a "California" or woven valley.)
5. Slopes less than 4/12 pitch and greater than 2/12 should have a minimum double layer of 15 lb. felt underlayment installed in shingle fashion.
6. Application of composition shingles on slopes less than 2/12 is not recommended.
7. All sheet metal valleys shall receive a felt underlayment at least equal to the roofing underlayment.

Composition Shingle Roofing

C. Fasteners:

1. Nails should be EG type, 7/16 head, long enough to penetrate 3/4" into or through the sheathing.
2. Staples should be galvanized type, at least 7/8" crown, and long enough to penetrate 3/4" into or through the sheathing.
3. Shorter fasteners are acceptable for use at overhangs to minimize penetration of visible underside.
4. Fasteners shall be located so that they penetrate through all laminations and the selvage top of the underlying shingle.

Composition Shingle Roofing

D. Ridge:

1. Ridge should be installed with one nail minimum on each side. All nails must be galvanized.
2. Blind nailing is recommended.
3. Supplemental surface nailing is acceptable in addition to blind nailing and is desirable for high wind areas.
4. Spacing of ridge shingles shall match that of the field shingles unless otherwise specified by manufacturer.

E. Starter Coursing:

1. Can be made of shingles or rolled roofing.
2. Starter can be fastened separately or be fastened along with the first course of field shingles.

3. Low nailing of starter shingles is not recommended.
4. Supplemental spot sealing of first course of shingles is not recommended.

F. Valleys:

1. A minimum 28 gauge, 18" wide, W type valley shall be used. The shingles should overlap a minimum of 6" on each flange, or:
2. A "California Valley" consisting of shingles lapped a minimum of 12" past center of valley and covered with a shingle (bleeder strip) parallel with the center of the valley is also acceptable, or:
3. Woven shingles from each side 12" minimum onto the opposite side.

Composition Shingle Roofing

G. Chimney Flashing:

1. May be re-used, if in serviceable condition. When the roofing is over an existing roof, the base flange should be lifted and installed into the new roof.
2. If counter flashing is replaced, it may be fastened to the chimney using concrete nails and sealed with a good exterior caulking or mortared.

H. Roof Jacks and Plumbing Vents:

1. All standard roof jacks and flashings must be replaced; however, certain resizable custom fabricated roof flashings may be used if in serviceable condition.
2. When roofing over an existing roof, the flashings can be lifted and reinstalled with the new roof if in serviceable condition. Any flashings or metal edgings (etc.) which are missing, rusted or damaged must be replaced.
3. All plumbing vents may be sealed to the flashing with flashing tape or by installation of a rubber storm collar or plastic cement.

I. Miscellaneous Flashings:

1. Flashings do not need to be painted.
2. Drip edge flashing is required only when needed to cover exposed edges of plywood.
3. Drip edge flashing is not required but is desirable to cover exposed shingles when overlaying existing roofs.
4. When flashing against a vertical side wall:
 - a. The old flashings may be re-used if they are in serviceable condition.
 - b. New flashings may be installed behind the wall if feasible.
 - c. When roofing over composition, the old flashings may remain in the old roof. Embed the last 3" of the new shingles in asphalt plastic cement. Apply a bead of cement on top of the shingles, between the shingles, and the vertical wall.
 - d. When roofing over wood shingles, the old flashings may remain in the old roof. Install 6" wide strip of mineral surfaced roofing upside down next to wall. Cover the strip with plastic cement and install the new shingles. Apply a bead of cement on top of the shingles between the shingles and the vertical wall. (As per NRCA specs.)
 - e. Installation of new roof flashings and a surface mounted counter flashing caulked to the wall is also acceptable.

J. Re-cover Application:

1. Shingle re-covers over shakes, slate, clay, cement or asbestos-cement tile are not permitted.
2. No more than two overlays of composition shingles are allowed over original composition

or wood shingles. No more than one overlay of architectural shingles is recommended; and, in certain jurisdictions may be prohibited.

3. All rusted or damaged sheet metal vents or flashings should be replaced.

H. Building Inspection Requirements

1. All new roof sheathing will require a nailing inspection.

2. A ladder shall be provided by the contractor on the job site for all inspections.

3. The inspector will inspect the sheathing for compliance to these requirements.

Cement Fiber Shake Roofing

Cement Fiber Roofing

Note: (1) The general application of cement fiber shakes shall be the same as for wood shakes except as noted and as required in the manufacturer's instructions. (2) The IRCC requires an in progress inspection and requests that any final inspections be performed from the ground or from a ladder to avoid walking damage to the cement shakes.

A. Decking:

1. Can be solid or spaced sheathing with the approval of the local jurisdiction.

2. If over spaced sheathing, sheathing shall be filled in as needed to meet nailing zone for material.

3. The IRCC *requires* complete fill-in of spaced sheathing.

4. Refer to section on roof deck applications when installing new sheathing over existing spaced sheathing.

B. Underlayment/ Interlayment:

1. All sheet metal valleys shall have a 36" wide ASTM 30 lb. felt underlayment.

2. Low slope applications may require additional underlayment. The IRCC *requires* a mineral surfaced capsheet underlayment on slopes of 2/12 to below 4/12.

3. All field felt shall be a minimum of 18" wide ASTM 30 lb. felt interlayment installed to the desired shake exposure not to exceed a nominal 10" maximum.

C. Field Shakes:

1. All shakes shall be installed with a nominal maximum 10" exposure.

2. A total of 102" over 10 courses shall be an acceptable maximum exposure.

3. No felt shall be exposed between the open keyways between the shakes.

4. Keyway spacing between shakes shall be a maximum of 5/8".

D. Hip and Ridge Shakes:

1. Shall be installed with the same 10" maximum exposure as the field.

Cement Fiber Roofing

E. Fasteners:

1. All fasteners shall be galvanized nails or staples long enough to penetrate 3/4" into or through the sheathing.

2. All shakes shall be fastened with 2 nails or staples.

F. Flashings:

1. Flashings do not need to be painted.

2. Drip edge flashing is required only when needed to cover exposed edges of plywood.

3. The old flashings may be re-used if they are in serviceable condition.

4. New flashings may be installed behind the wall if feasible.

5. Installation of new roof flashings and a surface mounted counter flashing caulked to

the wall is also acceptable for vertical side walls.

6. A minimum 28 gauge 24" wide, W type valley shall be used. The shakes should overlap a minimum of 6" on each flange.

G. Re-cover Application:

1. Roofing over any existing roof is not recommended, and may be prohibited per local ordinance, respectively.

H. Building Inspection Requirements:

1. An In-Progress inspection will be required.
7. A Final Inspection will be required.
8. A ladder will be provided for the in-progress inspection.

Tile Roofing

Tile Roofing

Note: The IRCC recommends an in progress inspection and requests that any final inspections be performed from the ground or from a ladder to avoid walking damage to the tile roofing.

A. Decking:

1. Shall be 1/2" plywood sheathing, OSB, or complete fill-in of spaced sheathing.
2. Refer to section on roof deck applications when installing new sheathing over existing spaced sheathing.

B. Underlayment:

1. The minimum standard for tile underlayment is an ASTM type 30 felt.
2. One layer of an ASTM coated base sheet or mineral surfaced roofing may be substituted for ASTM Type 30 felt.

C. Battens:

1. Battens shall be nominal 1" x 2" boards and are required on all solid sheathed roofs where pitches exceed 7:12.
2. Battens shall be nailed or stapled at 24 inches on center over felt and deck.
3. Batten installation on roof slopes 3:12 and greater shall have provision for drainage by providing a minimum 1/2 inch break in battens every 4 feet or by shimming with moisture resistant 3/8 inch nominal lath or strips of decay resistant material such as asphalt cap sheet or asphalt shingle.
4. It is important that all tile be nailed on non-batten applications.

D. Fasteners:

1. All tile fasteners shall be galvanized nails.
2. Fasteners must extend through substrate.
3. Where field tile nailing is specified, one galvanized nail per tile is used and must be of sufficient length to penetrate 3/4 inch into or through the thickness of the sheathing, whichever is less.

E. Hips, Ridges and Rakes:

1. The use of mortar, pressure-sensitive adhesive material, or special fabricated flashings supplied by the tile manufacturer is mandatory.
2. Each hip and ridge tile is to be nailed to the supporting member using one corrosion resistant nail.
3. Nose ends are to be set in a bead of roofer's mastic which also covers the nail head.

4. The underlayment at gable ends must be wrapped over and turned down over the rake edge.

5. All rake tiles shall be fastened with two galvanized nails.

F. Eaves:

1. Raised fascia shall require anti-ponding by either:

a. Metal flashing that is installed beneath the underlayment, or 3 courses to the underlayment.

b. A tapered cant installed beneath the underlayment.

2. A metal bird stop can be used on flush deck applications.

G. Rake Wall Flashings:

1. The underlayment must be turned up the wall a minimum of 4 inches.

2. The galvanized pan flashing is to be 4 inches by 6 inches with 3/4 inch hem, installed with a minimum of 6 inches on the deck.

3. A portion of the tile head lug where the tile rests on the metal flashing shall be removed to prevent water damming.

4. At no time are nails to be driven through the pan flashing.

5. Where tiles cannot be nailed, a wire tie or approved adhesive shall be used for securing.

6. All pan flashings will either extend to the eave line, or be tailed-out atop lower tile courses with a flexible metal skirt, preferably lead.

H. Roof to Wall Flashing:

1. The underlayment must be turned up the wall a minimum of 4 inches.

2. Roof-to-wall flashing must be set atop the tile and counter flashed in an acceptable manner.

3. If an 'S' tile or similar high profile tile is used, a weather block must be installed. This Weather block may consist of a prefabricated flashing supplied by the tile manufacturer, or the same roof-to-wall flashing used with the low profile tile may be used with a weather block. A third option would be the use of a sheet lead flashing molded to the tiles.

I. Plumbing and Mechanical Flashings:

1. Galvanized metal flashings can be used with flat and low profile type tiles.

2. High profile tile flashings shall be fabricated of aluminum or lead and molded over tiles to ensure water sheds atop lower course of tile.

J. Valley Flashings:

1. All valley shall be minimum 28 gauge galvanized metal, 24 inch wide "W" type with hemmed edges and a raised diverter down the center.

2. All valley metal shall be installed over at least one layer of 36-inch wide, 30-pound felt.

K. Chimneys, Dormers and Skylights:

1. The front, or bottom side, shall be treated as a roof-to-wall, and the sides as rake walls.

2. Saddle flashings shall be installed around the tops where applicable.

L. Building Inspection Requirements

1. An In-Progress Inspection is required.

2. A Final Inspection will be required.

3. A ladder will be provided by the contractor for the in-progress inspection.

Metal Tile Roofing

Metal Tile Roofing

Note: Metal tile roofing shall be installed as noted below and as required by the specific manufacturer's instructions. In progress inspections are required for the verification of conformance to California Building Code requirements and ICC-ES Reports, relative to fill material within gaps between battens. Installers should contact the individual jurisdiction for approved materials and inspection requirements.

A. Existing Roof Preparation:

1. Cut back existing roofing at all perimeter edges, and remove hip and ridge material.
2. Install new lumber along perimeter edges to match height of adjacent roofing.

B. Batten Installation:

1. Install 1" x 4" vertical battens over existing roof and rafters.
2. Battens to be fastened with nails of sufficient length to penetrate through batten, old roof and at least $\frac{3}{4}$ " into rafters.
3. When the application of new roofing over existing wood shingle or wood shake roofs creates a combustible concealed space, the entire existing surface shall be covered with gypsum board, mineral fiber, glass fiber or other approved materials securely fastened in place, as required in Appendix CBC Section No. 1516.3. For approved materials or methods, contact the individual jurisdiction.

C. Counter Batten Installation:

1. Install 2" x 2" horizontal counter battens over 1 x 4 vertical battens.
2. Counter battens to be spaced to set exposure for tiles.
3. Counter batten 2 x 2's to be fastened to 1 x 4's with nails of sufficient length to penetrate the 1 x 4 battens.

D. Perimeter Flashing:

1. Nosing to be installed over perimeter edge to cover existing roof and batten structure.

E. Vent Flashing:

1. All roof penetration vents shall be double flashed.
2. All vents to be caulked at tiles.

F. Tile Application:

1. All tile to be installed and fastened with 8-d galvanized nails.

G. Building Inspection Requirements

1. An In-Progress Inspection will be required.
2. A Final Inspection will be required; however, these should be performed from the ground or from a ladder to prevent damage to the roofing materials.
3. A ladder will be provided by the contractor for the in-progress inspection.

Built-up Roofing

Built-up Roofing

A. Roof Decks:

1. Roof deck shall be solid sheathing and shall comply with CBC requirements and manufacturers' installations instructions. (Please note footnote No. 2 on page 5.)
2. Original solid plank board construction is acceptable provided large voids such as knot holes are replaced or covered with metal.

B. Field Application:

1. Dry nail one layer of base sheet over entire roof surface. Nailing pattern shall be conventional pattern using cap nails; roughly 9" along edges and 2 rows staggered, 18" apart, equidistant, from outside edges of each sheet.
2. Solid mop successive layers of ply sheet in shingle fashion.
3. Surfacing shall generally be one of the following:
 - a. Mineral surfaced cap sheet set in a solid mopping of hot asphalt.
 - b. Gravel surfacing embedded in a flood coat of asphalt adequate to cover underlying plies.
4. Plies may also be surfaced with a coat of asphalt, emulsion, aluminum or a host of other elastomeric coatings.
5. Perimeter edges shall be finished with metal flashing or three-coursed with plastic cement and webbing where applicable.

C. Base Flashing:

1. All vertical angles should receive cant strip where curb is 2 or more inches.
2. Angles should receive a finish layer of mineral surfaced cap sheet.
3. Top of base flashing shall be nailed securely to prevent slipping.

D. Sheet Metal Installation:

1. All sheet metal penetration flashings shall be set in plastic cement, nailed securely, primed, and strip mopped into roof assembly.
2. Existing flashings can be re-used if in good condition.
3. Flashings do not need to be painted.

E. Vertical Wall Flashing:

Roof-to-wall locations can vary greatly based on existing conditions; the following are the more common methods of treatment:

1. Turn up roofing under counter flashing.
2. Remove and replace siding or stucco after turning plies up wall.
3. Three course roofing to wall using plastic cement and webbing.

F. Re-cover Application:

1. Re-cover/overlay roofing should only be done if existing roof and deck are sound and adequate to support the additional weight.
2. Overlay of one existing built-up roof is acceptable.
3. If overlaying mineral surfaced capsheet or other smooth surface then basic application shall be the same as new construction.
4. If over gravel, then surface shall be cleaned and a layer of insulation board be installed prior to application of roof membrane.

G. Equipment Supports and Blocking:

1. All large equipment blocks and/or sleepers shall be securely mounted to the roof deck. When the equipment is removed as part of the re-roofing process, and if it weighs over 400 pounds and is supported directly on the roof, it shall be supported in a manner compatible with CBC Section 1613 (Earthquake Loads) and ASCE 7-05 Chapter 13 (Seismic Design Requirements for Non structural components) or in a manner acceptable to the jurisdictional authority.
2. All minor conduit or pipe blocking should be fastened to piping but not to roof membrane.

H. Building Inspection Requirements

1. An In-Progress Inspection will be required.
2. A Final Inspection will be required.
3. The contractor will provide a ladder for the in-progress inspection.

Modified Bitumen Roofing

Modified Bitumen Roofing

A. Field Applications:

1. Dry nail one layer of fiberglass base sheet over entire roof surface. Nailing pattern shall be conventional pattern using cap nails; roughly 9" along edges and 2 rows staggered, 18" apart, equidistant from outside edges of each sheet.
2. Apply modified bitumen by use of torch, hot mopping or cold process adhesive as required for specific type of membrane.
3. The entire roll shall be torched, mopped, or glued.
4. All seams shall be fully sealed.

B. Base Flashings:

1. All vertical intersections, such as at walls or curbs, should receive a minimum of two layers of modified bitumen.
2. Cant strip not necessarily required at such areas.
3. Top of base flashing shall be nailed securely to prevent slipping.

C. Sheet Metal Installation:

1. All sheet metal penetration flashings shall be sandwiched between two layers of modified bitumen.
2. All sheet metal shall be primed and allowed to dry before applying roof membrane.
3. Flashing flange shall be nailed securely over first membrane layer.

D. Vertical Wall Flashings:

1. When flashing against a vertical side wall:
 - a. The old flashing may be re-used if they are in serviceable condition.
 - b. New flashing may be installed behind the wall if feasible.
 - c. It is acceptable to turn up wall and three course membrane to wall.
1 Portable fire extinguishers shall be placed in locations and in a quantity as described in industry standards.
 - d. Installation of new roof flashings and a surface mounted counter flashing caulked to the wall is also acceptable.

E. Re-cover Application:

Re-cover/Overlay roofing should be done only if existing roof and deck are sound and adequate to support the additional weight.

1. Overlay of 1 existing built-up roof is acceptable.
2. If overlaying mineral surfaced cap sheet or other smooth surface then basic application shall be the same as new construction.
3. If over gravel, then surface shall be cleaned and a layer of insulation board shall be installed prior to application of roof membrane.

F. Building Inspection Requirements.

1. An In-Progress inspection will be required.
2. A Final Inspection will be required.
3. The Contractor will provide a ladder for the in-progress inspection.