

DESIGN AND CONSTRUCTION GUIDELINES AND STANDARDS

DIVISION 7 • THERMAL & MOISTURE PROTECTION

07 30 00 • ASPHALT ROOF SHINGLES

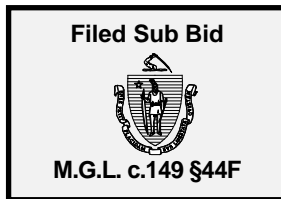
SECTION INCLUDES

Roof Shingles
Underlayment
Rubberized Membrane
Fasteners
Flashing
Attic Ventilation

RELATED SECTIONS

01 74 19 Waste Management
02 41 00 Demolition
02 82 00 Asbestos Remediation
06 10 00 Rough Carpentry
07 07 00 Solar Photovoltaic Systems
07 20 00 Building Insulation and Moisture Protection
07 45 00 Gutters and Downspouts
07 62 00 Sheet Metal Trim and Flashing

For Contracts estimated over \$100,000 that are predominately Roofing Work, the DCAM category for the General Contractor should be Roofing. An alternative is to have the DCAM category as General Building Construction but will require filed sub-bids for the roofing. This requirement needs to be clearly spelled out in the Advertisement.



When replacing shingle roofs are part of a larger General Contract, Roofing is a stipulated filed sub-bid category under M.G.L. Chapter 149, §44F. While different types of roofing are typically specified in different specification sections, if the project's total cost is over \$100,000 and the cumulative estimated value of all roofing work exceeds \$20,000, it triggers the filed sub-bid requirement. It is then better to specify all roofing work in a single section to avoid confusion.

INVESTIGATION AND RESEARCH

Check for rotted and delaminated sheathing. This may be especially apparent in areas where leaks and water stains are visible, as well as around chimneys and other roof penetrations. It will be necessary to verify the actual thickness of the existing sheathing. The size specified on the original plans may not be a guarantee of the actual size.

Our experience has shown that fire rated, plywood roof sheathing has failed when exposed to high temperatures between the asphalt roof shingles and the roof sheathing. This can be exacerbated by poorly vented attics. The designer should find alternative fire separation methods to using fire rated roof sheathing.

Field verify the condition and existence of existing step flashing; in many instances it may be missing or it might be the original deteriorated step flashing, even if the original roof may have been replaced.



Complete stripping and recycling of existing shingles is required. When re-roofing multiple buildings, check every building for the number of existing layers of shingles.

DESIGN AND CONSTRUCTION GUIDELINES AND STANDARDS

DIVISION 7 • THERMAL & MOISTURE PROTECTION

07 30 00 • ASPHALT ROOF SHINGLES



Calculate the amount of existing attic ventilation. If more ventilation is required per state energy code, ridge and soffit venting is preferred.

Verify that the existing roofs have adequate attic insulation to meet the current building energy code. Funding may be available from the local utility companies to add attic insulation.

Care should be taken not to cover soffit vents with new attic insulation. Verify that existing insulation does not covering the soffit vents as well.

Determine if there are wind conditions that require special attention such as proximity to the coast or other circumstances needing attention. In these cases, materials designed for these applications and or special installation provisions should be included in the contract specifications. Check the table in the state building code for design wind speeds for project site.

Design wall to roof/attic detail to coordinate and connect thermal, moisture, air and water barriers.

Perform evaluation to determine if solar thermal or photovoltaic installations are feasible. Technical criteria for selecting potential PV sites should include condition of the roof, structural strength of roof for additional weight, orientation of roof, roof pitch, shading and electrical installation requirements. See Section 07 07 00 Photovoltaic Systems & Solar Thermal for more information.

TECHNICAL STANDARDS

SHINGLES

MATERIALS

Class "A" label fiberglass shingles that meet ASTM 3462 are preferred.

Shingles must carry a 50 year minimum warranty.

Architectural Shingles are preferred because installation is usually less labor intensive and worth the investment in the total cost of installation.

DESIGN

Carefully detail flashing and connections where the roof pitch changes slope, especially from a steeper to a shallower pitch, or where a roof meets a wall.

Woven valleys or closed cut valleys should always be used – run a full 36" width of rubberized membrane up the entire length of all valleys. Open valleys are not acceptable.

Minimize the number of penetrations. Develop details, or refer to the manufacturer's details, for each type of penetration including: skylights, hatches, and exhaust and plumbing vents.

DESIGN AND CONSTRUCTION GUIDELINES AND STANDARDS

DIVISION 7 • THERMAL & MOISTURE PROTECTION

07 30 00 • ASPHALT ROOF SHINGLES



Avoid dark brown and black shingles because they tend to build up and retain heat, and therefore have a shorter lifespan. In urban areas or where air conditioning is used in the building, consider using light colored shingles to reduce the heat island effect outside the building and heat transmission into the building.

EXECUTION

Always strip existing shingles and re-nail sheathing before re-shingling. Remove existing underlayment (including rubberized membranes) before installation of new underlayment.

Follow manufacturer's recommendations to ensure proper installation and not void the warranty.

For asphalt roof shingles, follow the installation requirements of the Asphalt Roofing Manufacturing Association. www.asphaltroofing.org

SHINGLE UNDERLAYMENT

MATERIALS

Follow the recommendations of the shingle manufacturer for asphalt impregnated 15lb felt underlayment. Use double layer of roofing felt on roofs with a pitch of 3 in 12 or lower.

Use rubberized membrane (such as one of the Ice and Water products made by W.R. Grace) at 36" wide valleys and at eave flashing to three feet inside of the heated wall perimeter line of the building.

Use at the ridge and along rake is not necessary unless specific job conditions warrant.

Most manufacturers make a variety of similar products; select the appropriate product for the project.

Run underlayment beneath the drip edge along the rake.

EXECUTION

Install only as much of the felt underlayment that will be covered by shingles on the same day. Prolonged exposure to the weather creates wrinkles in the felt underlayment and leads to poor installation. When temperatures are below freezing, the contractor must wait to install shingles until roofs are dry and free of frost and moisture.

FASTENERS

MATERIALS

Use hot-dipped galvanized roofing nails to fasten shingles because of their strong holding power.

Staples are not acceptable because they tend to punch through shingles.

Power nailing needs to be monitored closely.

DESIGN AND CONSTRUCTION GUIDELINES AND STANDARDS

DIVISION 7 • THERMAL & MOISTURE PROTECTION

07 30 00 • ASPHALT ROOF SHINGLES

EXECUTION

Always specify that the existing sheathing is to be railed after stripping off existing shingles.

Use of nail guns needs to be monitored closely. There is power nailing equipment that does an acceptable job. Some of the common problems include having the nail heads punch through the shingles, leaving the heads up too high, having the nail heads pop off, or having the nail driven in at an angle leaving a sharp edge that cuts through the top shingle. The latter is usually caused by a roofer trying to reach too far with a nail gun. Staples are not acceptable even for fastening underlayment.

Determine if there is a need for additional nailing or adhesive in addition to nailing for high wind applications such as properties near the ocean. See shingle manufacturer's installation guidelines for high wind applications.

FLASHING

MATERIALS

Flashing materials must be compatible with the specifications of the roofing system's manufacturer.

For masonry chimneys, use lead coated copper flashing only.

For step flashing at side walls use aluminum or lead coated copper; avoid galvanized steel.

Always use an aluminum drip edge with a minimum 8" upturn leg. Aluminum drip edge must be a minimum of .024 gauge. Aluminum drip edge is recommended along the rakes, eaves and other special conditions.

EXECUTION

Refer to the Sheet Metal and Air Conditioning Contractors National Association design manual for details and installation standards.

www.smacna.org

ATTIC VENTILATION

DESIGN

Always calculate the existing ventilation to determine if additional ventilation may be necessary. Lack of proper attic ventilation can lead to a host of moisture related problems in the building.

Ridge vents with soffit vents is the preferred approach to venting attics.

If there are existing gable vents do not add ridge vents. If necessary block off existing gable vents and add new ridge and soffit venting.

DESIGN AND CONSTRUCTION GUIDELINES AND STANDARDS

DIVISION 7 • THERMAL & MOISTURE PROTECTION

07 30 00 • ASPHALT ROOF SHINGLES

MATERIALS

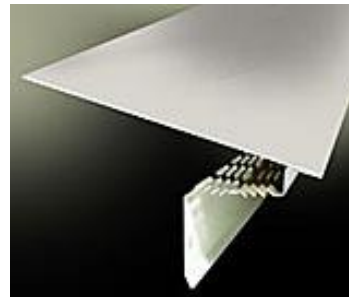
Use heavy PVC ridge vents (such as Shingle Vent II by Air Vent Inc.).

Always specify a ridge vent with baffles. Roll type ventilation tends to get crushed and may not create the correct dynamic for good ventilation.

The goal is to allow proper ventilating air out without letting in rain and snow.

Use perforated vinyl soffits, or fabricated continuous aluminum soffit vents, 1 to 2 inches wide with insect screens or fine holes.

In retrofit situations where there is no overhang and no soffit ventilation consider a vented drip edge similar to Air Vent Pro Flow or Bendtek.



Coordinate location of ventilation with location of piping and other items in ventilated spaces. These items may be susceptible to cold and freezing temperatures which may be intensified by the ventilation.

Also check the building insulation to ensure that adding soffit venting does not create a heating leak at the wall/roof intersection which will create ice damming issues as well as increase the costs of heating the dwelling units.

Also check to make certain that soffit vents are not covered by new insulation.