



SECTION 07 31 13

ASPHALT SHINGLES



Specifier note:

This document is based on more than 30 years of experience of TECHNONICOL Corporation in the field of production and application of bitumen materials for roofing.

References have been made within the text of the specification to MasterFormat 2004 Section numbers and titles, specifier needs to coordinate these numbers and titles with sections included for the specific project.

The purpose of this guide specification is to assist the specifier in correctly designating fiberglass-reinforced asphalt shingles with basalt granules on pitched residential and commercial roofing applications. The specifier needs to edit these guide specifications to fit the needs of each particular project. Contact a representative of TECHNONICOL Asia to assist in appropriate product selections.

Considering these recommendations, one would reduce the probability of roof leaking and therefore increase the inter-repair lifetime of the entire roofing system.



PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Fiberglass-reinforced asphalt shingles installation over underlayment with mechanical fastening to the timber roof sheathing.

1.2 REFERENCES

- A. Construction Product Regulation (EU) No. 305/2011:
 - 1. EN 544:2011 – Bitumen shingles with mineral and/or synthetic reinforcements – Product specification and test methods;
 - 2. EN 1110 – Roofing and hydraulic-insulating flexible bitumen-based materials. Method for determination of heat resistance;
 - 3. ENV 1187 – Test methods for external fire exposure to roofs;
 - 4. EN 13501-1 – Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests;
 - 5. EN 13707:2004+A2:2009 – Flexible sheets for waterproofing – Reinforced bitumen sheets for roof waterproofing – Definitions and characteristics;
 - 6. EN 13859-1:2010 – Flexible sheets for waterproofing – Definitions and characteristics of underlays – Part 1: Underlays for discontinuous roofing;
 - 7. EN 12310-1 – Roofing and hydraulic-insulating flexible bitumen-based materials. Method for determination of resistance to tearing by nail shank.
- B. EPD by EWA (European Waterproofing Association, Brussels BELGIUM) Shingles For Pitched-roof Covering, 2019. EPD (Environmental Product Declaration) for the bitumen shingles is considered an important tool to support manufacturers in the environmental marketing activities from a scientific and holistic perspective. It contains key information to help any expert involved in construction deal with the assessment of the environmental impact of the building, building materials and systems used.

1.3 SUBMITTALS

- A. Manufacturer's literature and data:
 - 1. Description of each product: technical data sheets;
 - 2. Roofing shingles installation instructions – [download link](#);
 - 3. Warranty.
- B. Regulatory requirements and certifications:
 - 1. Quality Management System Certificate per ISO 9001:2015;
 - 2. GTC Fire and Rescue Department under the Ministry of the Interior of the Republic of Lithuania.
- C. Shop drawings, depending on the chosen system solution:
 - 1. TN SHINGLES MANSARD – Solution for a pitched roof with thermal insulation of stone wool;
 - 2. TN SHINGLES MANSARD PIR – Solution for a pitched roof with thermal insulation of PIR boards;
 - 3. TN SHINGLES CLASSIC – Solution for a pitched roof without thermal insulation.
- D. Samples: shingles, full size each type, color and texture.

1.4 DELIVERY

- A. Deliver products in manufacturer's original sealed packaging.
- B. Indicate the manufacturer's name or brand, type, color, production batch number and manufacture date.
- C. Before installation, check the product's condition and, if necessary, return or dispose of products within distorted, damaged or opened packaging.
- D. Do not use bundles from different production batches on the same roof as it may lead to color disbalance.

1.5 STORAGE AND HANDLING

- A. The shingles are placed in bundles, wrapped in plastic film and palletized. To avoid sticking shingles inside the bundle do not expose them to direct sunlight. It is unacceptable to stack pallets in two or more layers.



- B.** Roll materials should be stored vertically on pallets in one row heightwise, protected from humidity and direct sunlight (under sheds). Storage of rolls in a horizontal position is prohibited.
- C.** While stored, bitumen materials should not directly contact with heat sources (heaters) with a constant surface temperature of more than 45°C. The distance from heat sources should be more than 1 m.
- D.** Protect products from damage during handling and construction operations.
- E.** Keep materials dry, covered completely and protected from the weather.
- F.** When taken to the roof, do not bend the bundles over the ridge but lay them flat.

1.6 QUALITY ASSURANCE

- A.** Qualifications:
 1. Roofing works are classified as highly dangerous works that may only be performed by persons at least 18 years old who are trained in safe work practices and have successfully passed exams and received relevant certificates.
 2. The roofer shall have a successful installation experience according to the project requirements.
 3. The manufacturer strongly recommends dealing with reliable and experienced roofing contractors who can both install materials properly and provide an appropriate warranty to cover their work for at least 1 year period.
 4. Installation shall be in accordance with asphalt shingle manufacturer's guidelines as well as all state and local building codes and regulations valid in the location where TECHNONICOL products are installed. For full installation guides please visit www.technonicol.asia.
 5. Provide installers with printed instructions for a particular type of asphalt shingles' cutting pattern.
- B.** Mock-up:
 1. Provide a mock-up for evaluation of construction materials and application workmanship.
 2. Choose the color and pattern of asphalt shingles. For each color of asphalt shingle, there should be indicated corresponding hip & ridge shingles as well as metal flashings and accessories involving color selection.
- C.** Provisions must be made in the roof design and installation to provide proper ventilation to avoid high humidity, condensation and mold growth problems.

1.7 PROJECT CONDITIONS

- A.** Anticipate and observe environmental conditions (temperature and humidity) within limits recommended by the manufacturer for the best result. Do not install products under environmental conditions outside the manufacturer's absolute limits.
- B.** Under an outside temperature of +5°C or colder, store roofing shingles in a warm, dry place and take them out in batches of 5 or 6 bundles prior to installation. Use a hand-held hot air welding gun to warm the adhesive strip on a shingle in order to improve adhesion.
- C.** Do not allow works under rain or use special tents to cover the project site to avoid moisture on the roof deck.
- D.** In order to avoid the appearance of stains and shoe marks, it is not recommended to walk on the roof in sunny or cold and moist weather. Special tracks shall be used to move at the roof slope.

1.8 PRE-INSTALLATION MEETING

- A.** Attendees shall include contractor, architect, installer, owner's representative and asphalt shingle manufacturer's designated representative.
- B.** Hold a pre-installation meeting at the project site to review all related project requirements and submittals, check the status of substrate preparation, areas of potential conflict and interface, availability of asphalt shingle assembly materials and components, installer's training requirements, equipment, facilities and scaffolding, coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection.



- C. Coordinate shingles installation with other works. Make sure that the roof is being installed after all works on the floors/walls are done or protect the roof with tarps. That will help to avoid damages such as paint or cement drops on installed shingles.
- D. Conduct a job site visit of the asphalt shingle manufacturer's designated representative or a photo/video exchange to make sure that installation is going in accordance with the manufacturer's guidelines.

1.9 WARRANTY

- A. TECHNONICOL Corporation manufactures roofing shingles since 2002. Export plants of TECHNONICOL have passed UNI EN ISO 9001 certification and strictly comply with the quality requirements determined by this international standard. Plants producing roofing shingles:
 - 1. MIDA plant (Lithuania) – since 2002;
 - 2. Shinglas plant (Russia) – since 2005;
 - 3. Shinglas plant 2 (Russia) – since 2013.
- B. TECHNONICOL Corporation provides a warranty for a period of 30 to 60 years, depending on the collection.
- C. Manufacturer's warranty: TECHNONICOL warrants asphalt shingles against material and manufacturing defects.
- D. Wind resistance warranty for 5 years: resist wind blow-off damage up to the maximum 145 km/h wind speed only with proper nailing application in accordance with corresponding installation instructions.
- E. Algae resistance is officially guaranteed for some collections. Ten (10) years for AR shingles installed in Non-Tropical Zone and five (5) years for AR shingles installed in Tropical Zone.



PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturer: TechnoNICOL-Construction Systems LLC, 47-5 Gilyarovskogo st., Moscow, Russia 129110. Production facility: Zavod Shinglas LLC, 21-58 Vostochny Promuzel, Ryazan, Russia 390000. Tel: +7 495 660 05 65. Email: info@technonicol.asia. Web: www.technonicol.asia.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 – Product Requirements.

2.2 ASPHALT SHINGLES

- A. Applicable collections of roofing shingles by TECHNOMICOL:
 1. Architectural multilayer roofing shingles:
 - a) COUNTRY AR collection:
 - 1) Fully comply with EN 544:2011, ENV 1187 (B_{ROOF}), EN 13501-1 (Euroclass E);
 - 2) Manufacturer's warranty: 50 years;
 - 3) Dimensions: 1000×335 mm;
 - 4) Type of bitumen: oxidized;
 - 5) Heat resistance (EN 1110): 110 °C;
 - 6) Thickness per layer: 2.7±0.2 mm;
 - 7) Weight per sqm: 12.0 kg;
 - 8) Coverage per bundle: 2.6 sqm;
 - 9) Color choice is based on the manufacturer's standard colors;
 - 10) Copper-containing colored basalt granules prevent algae growth on the roof.
 - b) JAZZ collection:
 - 1) Fully comply with EN 544:2011, ENV 1187 (B_{ROOF}), EN 13501-1 (Euroclass E);
 - 2) Manufacturer's warranty: 60 years;
 - 3) Dimensions: 1000×335 mm;
 - 4) Type of bitumen: oxidized;
 - 5) Heat resistance (EN 1110): 110 °C;
 - 6) Thickness per layer: 3.0±0.2 mm;
 - 7) Weight per sqm: 13.5 kg;
 - 8) Coverage per bundle: 2.0 sqm;
 - 9) Color choice is based on the manufacturer's standard colors;
 - 10) The nailing area is additionally reinforced with glass threads.
 - c) CONTINENT collection:
 - 1) Fully comply with EN 544:2011, ENV 1187 (F_{ROOF}), EN 13501-1 (Euroclass E);
 - 2) Manufacturer's warranty: 60 years;
 - 3) Dimensions: 1000×349 mm;
 - 4) Type of bitumen: oxidized;
 - 5) Heat resistance (EN 1110): 110 °C;
 - 6) Thickness per layer: 3.2±0.2 mm;
 - 7) Weight per sqm: 25.4 kg;
 - 8) Coverage per bundle: 1.5 sqm;
 - 9) Color choice is based on the manufacturer's standard colors.
 - d) WESTERN collection:
 - 1) Fully comply with EN 544:2011, ENV 1187 (B_{ROOF}), EN 13501-1 (Euroclass E);
 - 2) Manufacturer's warranty: 55 years;
 - 3) Dimensions: 1000×318 mm;
 - 4) Type of bitumen: oxidized;
 - 5) Heat resistance (EN 1110): 110 °C;



- 6) Thickness per layer: 3.0±0.2 mm;
 - 7) Weight per sqm: 17.6 kg;
 - 8) Coverage per bundle: 1.5 sqm;
 - 9) Color choice is based on the manufacturer's standard colors.
2. Single-layer roofing shingles:
- a) CLASSIC series, RUMBA collection:
 - 1) Fully comply with EN 544:2011, ENV 1187 (B_{ROOF}), EN 13501-1 (Euroclass E);
 - 2) Manufacturer's warranty: 30 years;
 - 3) Dimensions: 1000×317 mm;
 - 4) Type of bitumen: oxidized;
 - 5) Heat resistance (EN 1110): 110 °C;
 - 6) Thickness per layer: 3.0±0.2 mm;
 - 7) Weight per sqm: 8.1 kg;
 - 8) Coverage per bundle: 3.0 sqm;
 - 9) Color choice is based on the manufacturer's standard colors.
 - b) CLASSIC series, TANGO collection:
 - 1) Fully comply with EN 544:2011, ENV 1187 (B_{ROOF}), EN 13501-1 (Euroclass E);
 - 2) Manufacturer's warranty: 30 years;
 - 3) Dimensions: 1000×333 mm;
 - 4) Type of bitumen: oxidized;
 - 5) Heat resistance (EN 1110): 110 °C;
 - 6) Thickness per layer: 3.0±0.2 mm;
 - 7) Weight per sqm: 10.3 kg;
 - 8) Coverage per bundle: 3.0 sqm;
 - 9) Color choice is based on the manufacturer's standard colors.
 - c) CLASSIC series, FLAMENCO collection:
 - 1) Fully comply with EN 544:2011, ENV 1187 (B_{ROOF}), EN 13501-1 (Euroclass E);
 - 2) Manufacturer's warranty: 30 years;
 - 3) Dimensions: 1000×333 mm;
 - 4) Type of bitumen: oxidized;
 - 5) Heat resistance (EN 1110): 110 °C;
 - 6) Thickness per layer: 3.0±0.2 mm;
 - 7) Weight per sqm: 10.9 kg;
 - 8) Coverage per bundle: 3.0 sqm;
 - 9) Color choice is based on the manufacturer's standard colors.
 - d) CLASSIC series, QUADRILLE collection:
 - 1) Fully comply with EN 544:2011, ENV 1187 (B_{ROOF}), EN 13501-1 (Euroclass E);
 - 2) Manufacturer's warranty: 30 years;
 - 3) Dimensions: 1000×317 mm;
 - 4) Type of bitumen: oxidized;
 - 5) Heat resistance (EN 1110): 110 °C;
 - 6) Thickness per layer: 3.0±0.2 mm;
 - 7) Weight per sqm: 8.1 kg;
 - 8) Coverage per bundle: 3.0 sqm;
 - 9) Color choice is based on the manufacturer's standard colors.
 - e) CLASSIC series, MODERN collection:
 - 1) Fully comply with EN 544:2011, ENV 1187 (B_{ROOF}), EN 13501-1 (Euroclass E);
 - 2) Manufacturer's warranty: 30 years;
 - 3) Dimensions: 1000×333 mm;
 - 4) Type of bitumen: oxidized;
 - 5) Heat resistance (EN 1110): 110 °C;



- 6) Thickness per layer: 3.0±0.2 mm;
 - 7) Weight per sqm: 10.5 kg;
 - 8) Coverage per bundle: 3.0 sqm;
 - 9) Color choice is based on the manufacturer's standard colors.
3. Hip and ridge shingles:
- a) Hip & ridge & starter shingles by TECHNONICOL:
 - 1) Fully comply with EN 544:2011, ENV 1187 (F_{ROOF}), EN 13501-1 (Euroclass E);
 - 2) Dimensions: 1000×250 mm;
 - 3) Type of bitumen: SBS-modified;
 - 4) Heat resistance (EN 1110): 100 °C;
 - 5) Thickness per layer: 3.4±0.2 mm;
 - 6) Weight per sqm: 5.5 kg;
 - 7) Coverage per bundle: 5.0 sqm, i.e., 12 lin. m (hip & ridge) or 20 lin. m (starter strip);
 - 8) Color choice is based on the manufacturer's standard colors and should complement the color of the regular shingles.
 - B. The high-strength fiberglass mat reinforcement is coated with a mixture of premium-quality oxidized/SBS-modified bitumen and mineral fillers. The shingle is covered on the upper side (i.e., the side of the shingle which is exposed to the weather) with colored mineral granules and on the underside with sand. The bottom side can be additionally protected with PP or PET film to prevent the adhesive layer from sticking.
 - C. Roofing shingles fully comply with EN 544. This European standard for bitumen shingles is known for its strict requirements for the minimum mass of bitumen in products (1300 g/m² – for single-layer roofing shingles and 1500 g/m² – for multilayer ones).
 - D. Roofing shingles pass a heat resistance test at 110 °C, which allows application even in an extremely hot climate.
 - E. Hip and ridge shingles are manufactured with SBS-modified bitumen to provide flexibility on the roof's hips and ridges.

2.3 ROOFING UNDERLAYMENT

- A. Underlayment application for the whole surface of the roof decking is mandatory for reliable waterproofing.
- B. Applicable polymer-bitumen underlayment membranes by TECHNONICOL:
 1. Self-adhesive polymer-bitumen membranes:
 - a) UNDERLAY NEXT SELF:
 - 1) Fully comply with EN 13707:2004+A2:2009, EN 13859-1:2010;
 - 2) Dimensions: 25×1 m;
 - 3) Type of bitumen: SBS-modified;
 - 4) Heat resistance (EN 1110): 90 °C;
 - 5) Weight per sqm: 1.0±0.1 kg;
 - 6) Tear resistance (EN 12310-1): ≥ 400 N;
 - 7) Type of carrier: non-reinforced;
 - 8) Protective covering type on the top: non-slippery multilayer polypropylene fabric.
 - b) ULTRAFLEX SA 1.5 mm Sanded:
 - 1) Fully comply with EN 13707:2004+A2:2009;
 - 2) Dimensions: 20×1 m;
 - 3) Type of bitumen: SBS-modified;
 - 4) Heat resistance (EN 1110): 90 °C;
 - 5) Weight per sqm: 1.8±0.2 kg;
 - 6) Tear resistance (EN 12310-1): ≥ 100 N;
 - 7) Type of carrier: polyester;
 - 8) Protective covering type on the top: fine-grained sand.



2. Mechanically fixed polymer-bitumen membranes:

- a) UNDERLAY PRO (S) 500:
 - 1) Fully comply with EN 13707:2004+A2:2009, EN 13859-1:2010;
 - 2) Dimensions: 25×1 m;
 - 3) Type of bitumen: SBS-modified;
 - 4) Heat resistance (EN 1110): 120 °C;
 - 5) Weight per sqm: 0.5±0.1 kg;
 - 6) Tear resistance (EN 12310-1): ≥ 130 N;
 - 7) Type of carrier: polyester;
 - 8) Protective covering type on the top: spunbond.
- b) UNDERLAY BASE 1500:
 - 1) Fully comply with EN 13707:2004+A2:2009, EN 13859-1:2010;
 - 2) Dimensions: 15×1 m;
 - 3) Type of bitumen: SBS-modified;
 - 4) Heat resistance (EN 1110): 95 °C;
 - 5) Weight per sqm: 1.5±0.1 kg;
 - 6) Tear resistance (EN 12310-1): ≥ 50 N;
 - 7) Type of carrier: fiberglass;
 - 8) Protective covering type on the top: fine-grained sand.
- c) UNDERLAY BASE 900:
 - 1) Fully comply with EN 13707:2004+A2:2009, EN 13859-1:2010;
 - 2) Dimensions: 20×1 m;
 - 3) Type of bitumen: SBS-modified;
 - 4) Heat resistance (EN 1110): 95 °C;
 - 5) Weight per sqm: 0.9±0.1 kg;
 - 6) Tear resistance (EN 12310-1): ≥ 50 N;
 - 7) Type of carrier: fiberglass;
 - 8) Protective covering type on the top: fine-grained sand.

2.4 FASTENERS

- A. Fasteners should be long enough to penetrate at least 3/4" (19 mm) into the wood deck or go through plywood or OSB-3 decks.
- B. Fasteners should be made from low-carbon galvanized steel. The minimum nailhead diameter is 9 mm. The minimum nail rod diameter is 3 mm.

2.5 ACCESSORIES

- A. Provide metal roof flashings, including drip edges, apron flashings and step flashings specified in installation manuals by TECHNONICOL.
- B. Use non-corroding metal flashings from aluminum or galvanized steel, with or without colored mineral granules coating.
- C. For the arrangement of penetration element on the roof, install the pass-through PVC component by TECHNONICOL, which serves as the base for the final roofing outlet selected depending on the functionality.
- D. In order to arrange an exhaust opening in the roof's ridge, use TECHNONICOL continuous ridge vent element.



PART 3 – EXECUTION

3.1 INSTALLATION – GENERAL

- A. Install products according to manufacturer's instructions and approved submittal drawings.
- B. When manufacturer's instructions deviate from specifications, contact a representative of TECHNONICOL Asia to assist in specific solution development.

3.2 ROOF DECK PREPARATION

- A. Appropriate materials for the roof deck are:
 - 1. Oriented strand boards with increased moisture resistance (OSB-3) or exterior plywood;
 - 2. Tongue-and-groove or straight-edged boards with relative humidity not exceeding 20%.
- B. Standard roofing solutions assume the installation of asphalt shingles on slopes of 1/5 ($\approx 12^\circ$) or greater. In the case of roof slope less than 1/5 ($\approx 12^\circ$), contact a representative of TECHNONICOL Asia to assist in specific solution development.
- C. The base for roofing shingles must be solid, rigid, and flat. The deck must be dry to avoid its buckling, which can result in deck movement and damage the primary roof covering. Elevation drops shall not exceed 1-2 mm.
- D. Separation of 1/8" (3 mm) in plywood or OSB-3 seams will allow for expansion and contraction.
- E. Solid base thickness depends on rafter spacing, cross-section and spacing of lathing. Selection of the roof construction must be performed based on the calculation of permanent and temporary loads, as well as on the roof shape and materials weight.

3.3 VENTILATION

- A. Ventilation is a system of intake and exhaust that creates airflow to remove extra heat and moisture from under the roof. An overheated attic combined with moisture can cause several problems, including damage to roof decking and shingles, as well as moisture accumulation in the deck and/or thermal insulation. This can lead to deck and shingles distortion and significantly shorten the life of a roof structure in general.
- B. The system of roof ventilation includes three main elements: openings for fresh air inflow (at or near soffits, under eave or fascia areas), a ventilated gap (duct over thermal insulation layer) for air circulation and exhaust openings at or near the ridge (ridge vents/other exhaust vents).

3.4 FLASHINGS, ROOF PENETRATIONS

- A. Reinforce eave and rake edges with metal flashings.
- B. Fix the flashings every 15-20 cm in staggered order with roofing nails. The flashings should overlap for 3-5 cm.
- C. Eaves: install metal drip edge before underlayment.
- D. Rakes: install metal drip edge after underlayment.
- E. For sidewalls, make a shield using metal flashings or TECHNONICOL polymer-bitumen valley roll material with basalt granules coating after roofing shingles installation. Mechanically fix and then seal the shield with silicone, thiokol, or polyurethane sealant.
- F. For arranging roof penetrations, use pass-through PVC elements by TECHNONICOL. Seal the elements with adhesive polymer-bitumen mastic TECHNONICOL FIXER and fix them mechanically. Cover the base of the elements with roofing shingles.

3.5 UNDERLAYMENT INSTALLATION

- A. The use of self-adhesive underlay membranes UNDERLAY NEXT SELF or ULTRAFLEX SA 1.5 mm Sanded is mandatory in zones of valleys and eaves as these areas are most prone to leakages. The remaining roof area can be covered with underlay membranes for pitched roofs with mechanical fixation; all overlaps are to be sealed with TECHNONICOL FIXER mastic.



- B. Position membrane without blisters or wrinkling. Firmly roll self-adhesive underlayment to ensure adhesion to the roof deck and metal flashings.
- C. Do not leave the membrane exposed to UV and weather for longer than is required to install roofing shingles.
- D. Install underlayment from eaves to ridges perpendicular to the slope (i.e., parallel to the eave). Lap sides are 100 mm minimum; lap ends are 150 mm minimum.

3.6 VALLEY PROTECTION

- A. Two options are available for valley arrangement:
 - 1. Open valley (with the use of special polymer-bitumen valley roll material from TECHNONICOL);
 - 2. Closed valley.
- B. Always place underlayment membrane centered over valleys.
- C. Do not drive any fasteners at a distance of 300 mm from the valley centerline. Use adhesive polymer-bitumen mastic TECHNONICOL FIXER to fix shingles in this area.

3.7 ASPHALT SHINGLES INSTALLATION

- A. Install shingles following the manufacturer's instructions.
- B. In order to ensure unobstructed separation of roofing shingles from one another, it is recommended to slightly bend and shake the bundle before opening.
- C. Use a straight blade knife, tin snips or sharp hook blade knife for shingles cutting.
- D. Correct nailing is critical. Nails must be driven so as to make sure that the head is in the same plane with the roofing shingles surface and does not cut through it. All nails must be covered with the following courses of roofing shingles.
- E. In the case of COUNTRY AR or JAZZ collections, place roofing nails exactly at the painted guide line to ensure fastening through a shingle's double layer area. The manufacturer applies the special marking line to the front surface of multilayer shingles for reference.
- F. In the case of steep slope application ($>45^\circ$) or high wind areas, extra nails are required. Check the manufacturer's manuals for the correct scheme of nailing for each cutting pattern.

3.8 HIP AND RIDGE SHINGLES INSTALLATION

- A. Two methods are available for the arrangement of hips and ridges:
 - 1. Method 1 is based on the use of hip & ridge & starter shingles by TECHNONICOL;
 - 2. Method 2 is based on the use of the cutouts of regular shingles (applicable for some single-layer collections).
- B. Remove anti-adhesion film from the rear side of the hip & ridge & starter shingles before installation.
- C. Install hip & ridge & starter shingles from the bottom upward after marking the dimensions of the future rib (two strips along the rib) using a chalk line. Fix each shingle with four roofing nails, two on each side.

3.9 PROTECTION OF FINISHED WORK

- A. Do not permit traffic over the finished roof surface or use special ladders.
- B. If there is a threat of the growth of moss, fungus or algae on the surface of roofing materials, it is recommended to apply the roof care concentrated solution or any other special treatment advisable for roofing shingles.

END OF SECTION