IIBEC
International Institute of
Building Enclosure Consultants

Steep Slope Roofing

Rooftop Quality Assurance

AIA
Continuing
Education
Provider

8 IIBEC Continuing Educational Hours
8 AIA Learning Units and HSW Credit

Version 09.19.07

Steep Roofing

- Prepared Roof Coverings:
  - Factory Produced
  - Application Instructions on Wrapper

Steep Roofing

- Resources:
  - Manufacturers
  - Trade Associations (CRCA, CASMA, NRCA)
  - IIBEC
  - CMHC, CCMC
  - Underwriters Laboratories
  - Building Codes

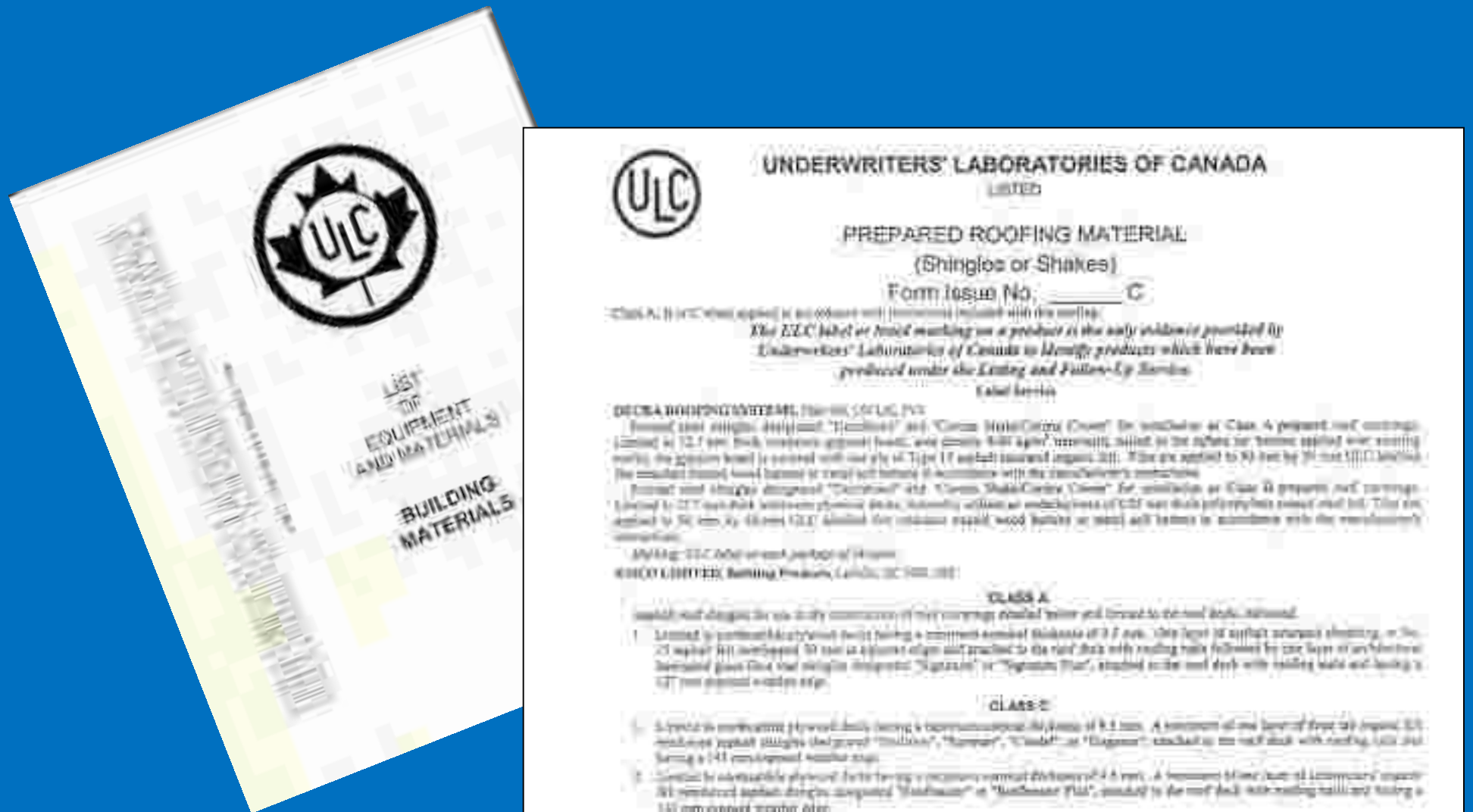
Steep Roofing

- Prepared Roof Coverings (UL®)
  - Asphalt-Organic Shingles
  - Asphalt-Glass Shingles
  - Modified Asphalt Glass Shingles
  - Wind-Resistant Organic, Glass or Modified Shingles
  - Some Roll Roofing Products, e.g., Split sheet mineral surfaced roofing

Other Prepared Roof Coverings (UL®)

- Fiber Cement
- Formed Aluminum, Steel or Copper Shingles
- Molded Reinforced Plastic Shingles
- Steel Tiles or Panels
- Photovoltaic Modules/Shingles
- Reinforced Cast Stone Shingles

Prepared Roof Coverings (ULC)



Roof Coverings - CCMC

- CCMC evaluates innovative products
- Determines their compliance with the requirements of the Code
- Determines if they are suitable for intended use

Other Prepared Roof Coverings

- Wood Shakes and Shingles
- Clay and Concrete Tile
- Slate

Steep Roofing

- Fire Tests of Roof Coverings
  - Class A, B, C rating required in Part 3, NBC
    - Applies to buildings greater than 2 storeys in height
    - Applies to buildings greater than 1000 m² (10,700 ft²)

Steep Roofing

- Building Code Requirements
  - NBC - Part 9, Section 9.26 - Roofing
  - 9.26.2.1. – Material Standards
    - Lists 20 CGSB and/or CSA standards for different roofing materials.
    - If a product is governed by one of these standards, it must meet the standard's requirements.
    - eg - CAN/CSA 123.5 Asphalt Shingles Made of Glass Felt
  - CCMC Approvals exist for products that do not "fit" into one of the listed standards
  - Most standards do not include fire resistance testing

Fire Requirements

Only rated when deck and underlay requirements are followed.

OWENS CORNING R2453

1 OWENS CORNING PKY, TOLEDO OH 43659

Asphalt glass fiber mat sheet roofing, for installation as Class C prepared roof coverings.

Asphalt glass fiber mat and hip and ridge shingles, for installation as Class A prepared roof coverings. Suitable for installation on minimum 3/8 in. thick plywood decks with underlayment such as asphalt saturated felt or shingle underlayment classified by UL as a prepared roofing accessory (underlayment not required for hip and ridge shingles) and on minimum 15/32 in. " thick plywood decks without underlayment. Asphalt glass fiber mat shingles, for installation as Class C prepared roof coverings on minimum 3/8 in." thick plywood decks without underlayment. Asphalt glass fiber mat and hip and ridge shingles for installation as wind resistant roof coverings.

Asphalt glass-mat shingles, Classified in accordance with ASTM D3462, including tear resistance.

Asphalt glass-mat shingles, Classified in accordance with CSA-A 123.5-M90.

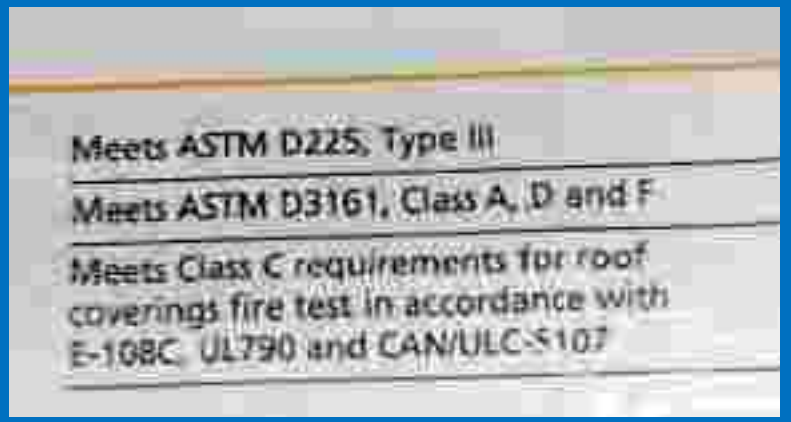
Formed steel or copper shingles, for installation as Class A prepared roof covering when installed in accordance with manufacturer's installation instructions. Suitable for use over 15/32 in. thick plywood decking covered with one ply Type 30 asphalt saturated felt base sheet followed by either 1/2 in. thick Type-X gypsum board or 1/4 in. thick G-P Gypsum Dens-Deck®.

Fire Rating – Shingles

- Fiberglass usually Class A, with specified underlayment
- Organic Shingles usually Class C
- Metal Shingles or Treated Cedar with Gypsum Underlay can achieve Class A rating

Fire Rating – Shingles

- Verify that label is correct per Canadian specifications
- Verify Deck and Underlayment are in compliance with ULC approval
- Put copy of label into roof file



Warranties

IKO

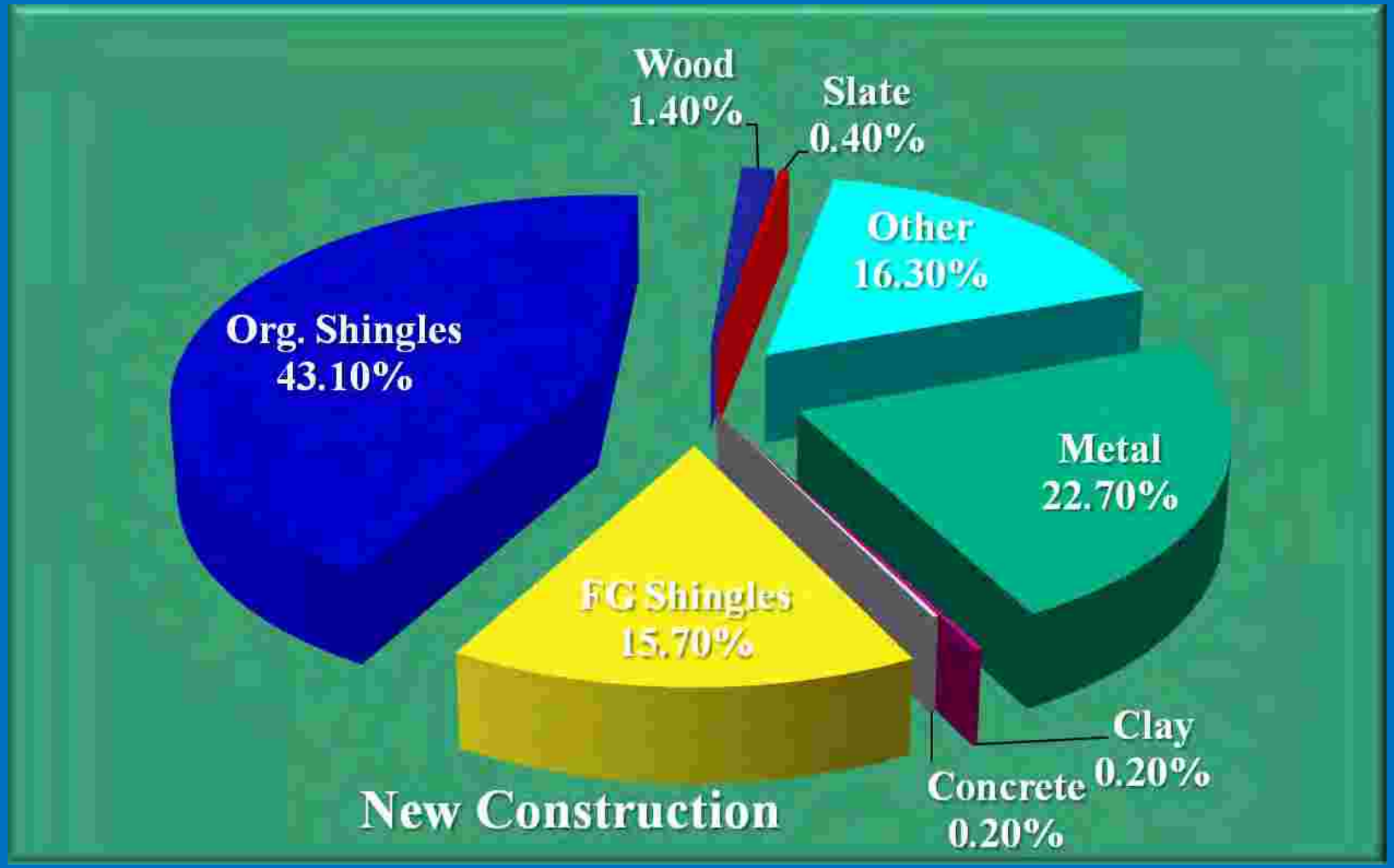
Setting the Standard

IKO Industries Ltd.
Limited Warranty Information
for Asphalt Shingles

IKO IRON-CLAD LIMITED WARRANTY

Steep Roofing

CRCA 2000-2001 Annual Market Survey



Steep Roofing

- Safety
- Codes & Insurance
- Application Procedures
- Decking
- Ventilation

Safety

- Fall Protection

Safety Harnesses
Toe Boards
Ladders and Scaffolding

Pressure Treated Wood

Consumer Safety Information Sheet

INORGANIC ARSENICAL PRESSURE TREATED WOOD (Including: CCA, ACA, and ACZA)

CONSUMER INFORMATION

HANDLING PRECAUTIONS

USE SITE PRECAUTIONS

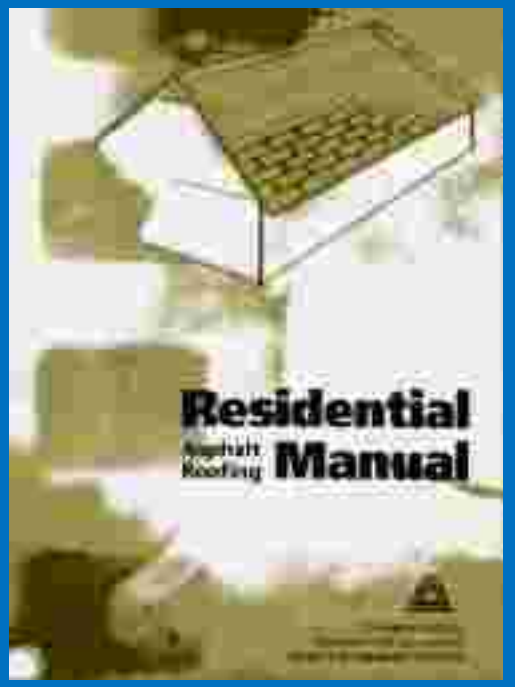
Please see reverse side for WARRANTY info.

CCA (arsenic containing) treated wood no longer available.

Pressure Treated wood now treated with ACQ, which may be more corrosive

Design and Product Information

- Test Methods referenced in material specifications
- Design and Application Information available from Trade Associations and Manufacturers



Compliance

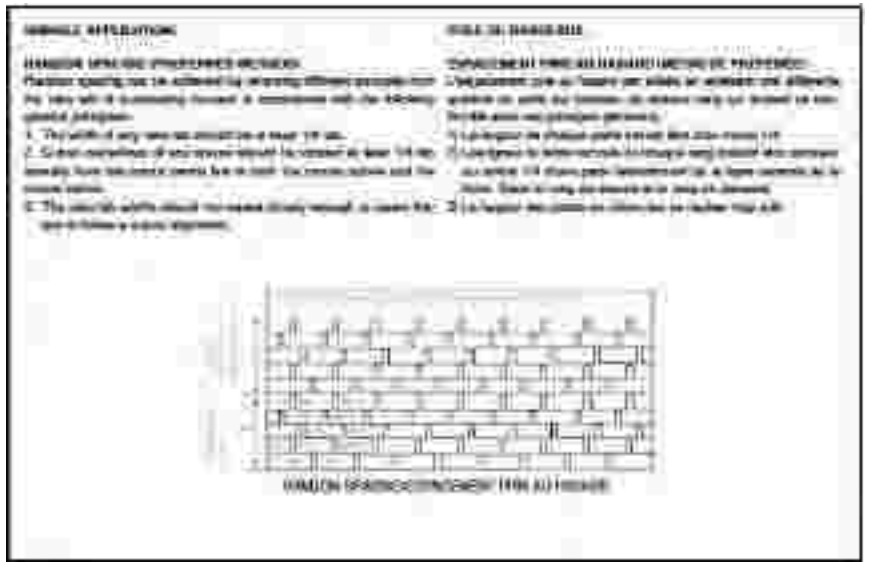
Glass Mat Shingles

Class A Asphalt Shingles

Wind Resistance of Asphalt Shingles

ASTM and Canadian Standards

Installation Instructions



Avoid Color Variation

- Use same batch or lot number on single side of roof

Underlayment Requirements

Underlayment	Roof Slope 2 ½ /12 to 4 /12	Roof Slope 4 in 12 and up
	- minimum Bakor RF 200 Blueskin self seal membrane over entire roof, or full approved low slope roofing system installed under the tile.	– approved ice and water protection in valleys min. 1 ft. into eave heated section. (usually peel & stick)* - main roof underlay: min. #30 felt as per CSA 123.3 or upgrades such as approved: polypropylene, base sheet, peel and stick, etc. - extend underlayment 20mm (3/4") past eaves, 100mm (4") head lap, 150mm (6") side laps, 200mm (8") up abutment walls (on new construction), lap all ridges and hips min. 150mm(6"). - mark location of all trusses on every membrane layer for counter-strapping.

B - Underlayment

The use of underlayment is mandatory under Eclipse and Glass based shingles, as well as under all other shingles if you want to meet fire-resistant ratings. *See Table 3* for underlayment requirements for BP Shingles.

The purpose of shingles is to shed water. Wind will periodically drive rain under shingles. Thus even when an underlayment is optional, its use over entire roof deck is strongly recommended to specification writers.

Underlayment consists of No. 15 Asphalt Felt Plain or BP Standard Asphalt Sheathing (BP Shingle Base Underlayment in the U.S.A.) laid horizontally over the deck and must be applied over the entire roof deck. Where Eave protector ([illegible] or [illegible] Plus) is installed, underlayment should overlap it by 4" (10 cm). Nail sufficiently to hold in place until shingles are applied. Overlap the succeeding courses 2" (5 cm) (see *Diagram 9*). End laps should be a minimum of 4" (10 cm). End laps should be at least 6" (15 cm) from the hips, ridges or valleys.

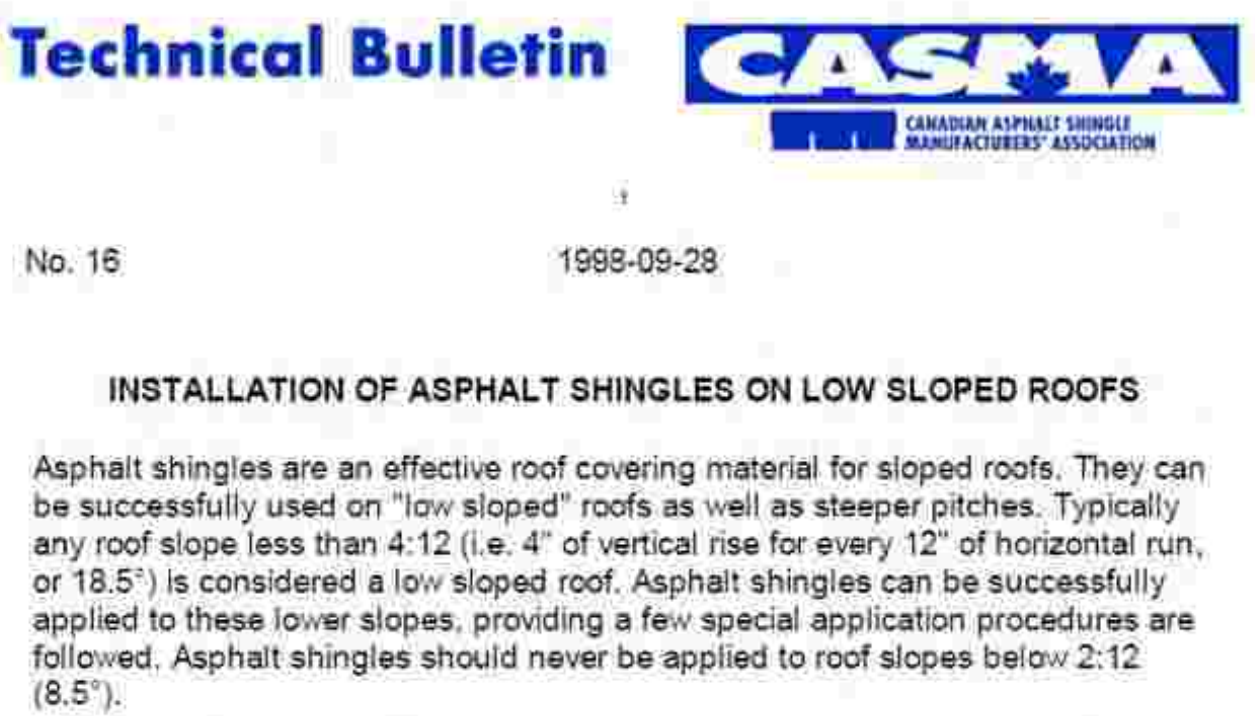
Asphalt Shingle Standards

- Material Standards
  - CSA A123.1, Asphalt Shingles Made from Organic Felt and Surfaced with Mineral Granules
  - CSA A123.5, Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules

Asphalt Shingle Standards

- Application Standards
  - CSA Standard A123.51-M, Asphalt Shingle Application on Roof Slopes 1:3 and Steeper
  - CSA Standard A123.52 , Asphalt Shingle Application on Roof Slopes 1:6 to Less Than 1:3

Low Slope Application



Technical Bulletin

CANADIAN ASPHALT SHINGLE MANUFACTURERS' ASSOCIATION

No. 16 1998-09-28

INSTALLATION OF ASPHALT SHINGLES ON LOW SLOPED ROOFS

Asphalt shingles are an effective roof covering material for sloped roofs. They can be successfully used on "low sloped" roofs as well as steeper pitches. Typically any roof slope less than 4:12 (i.e. 4" of vertical rise for every 12" of horizontal run, or 18.5°) is considered a low sloped roof. Asphalt shingles can be successfully applied to these lower slopes, providing a few special application procedures are followed. Asphalt shingles should never be applied to roof slopes below 2:12 (8.5°).

- **Strip shingles may be used on low slope roofs if applied in accordance with CSA A123.52**

Hail Ratings

- Hail damage to shingle roofs costs insurance companies millions $ each year

Hail Ratings

- Three test methods to determine hail impact resistance
  - UL Standard 2218, Impact Resistance of Prepared Roof Covering Materials
  - ASTM D-3746, Standard Test Method for Impact Resistance of Bituminous Roofing Systems
  - FM 4470 Approval Standard for Class 1 Roof Covers, 5.3 - Hail Resistance

Hail Ratings

- Each test method involves dropping steel missiles (balls) on to the roof cover to simulate hail.

UL 2218	
Level	Impact Energy (Joules)
1	4.6
2	9.8
3	18.3
4	31.2

50 mm (2”) hailstone = 30J)

Hail Ratings

- Each test method involves dropping steel missiles (balls) on to the roof cover to simulate hail.

ASTM D-3746	
	Impact Energy (Joules)
50 mm steel ball	30

FM 4470	
	Impact Energy (Joules)
Class 1 - SH	19
Class 1 - MH	10.8

Reduction in Homeowner Insurance


Texas Department of Insurance

Regulation / Legal

- Discounts on insurance premiums offered in U.S.
  - At least one insurance company offers discounts in Alberta

State Farm web site:
www.statefarm.com/consumer/roofinginfo/roofinginfo.htm#roofprod

Hail Resistance

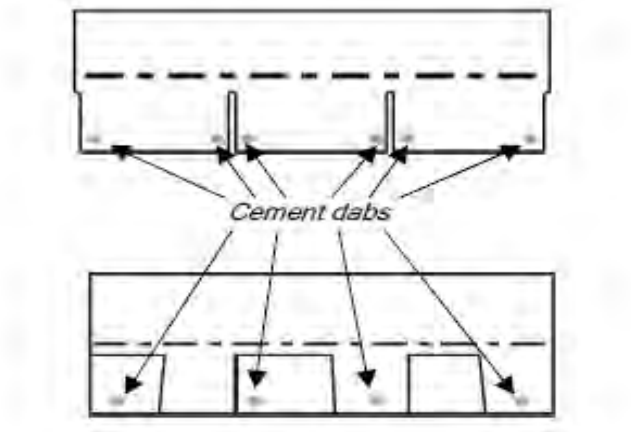
- Some manufacturers of brittle shingles (Cement and Clay Tile) object to the use of a steel ball such as used in the UL tests. They recommend ice spheres instead.
- ASTM joint task force conducting round-robin tests to evaluate different hail (impact) test methods.
- Check with insurance and code officials for hail impact resistance requirements

Wind Resistance

- ASTM D3161, *Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method).*
- Tests are carried out on fully sealed shingles, in a carefully controlled laboratory environment

Wind Resistance

- For high wind areas,
  - Generally requires additional fastening, i.e., 6 nails instead of 4
  - Hand-tabbing of eave and ridge shingles, when roof is installed in autumn or winter
  - Wind velocities available from NBC, WIND RCI



Wind Resistance

- UL 2390, Test Method for Wind Resistant Asphalt Shingles with Sealed Tabs
- UL 997 Wind Resistance of Prepared Roof Covering Materials
- ASTM D7158, Standard Test Method for Wind Resistance of Sealed Asphalt Shingles

Steep Roofing

- Decking
- Underlayments
- Flashing
- Venting

Steep Roofing

- Decking
  - Continuous
  - Spaced Sheathing

Continuous Sheathing

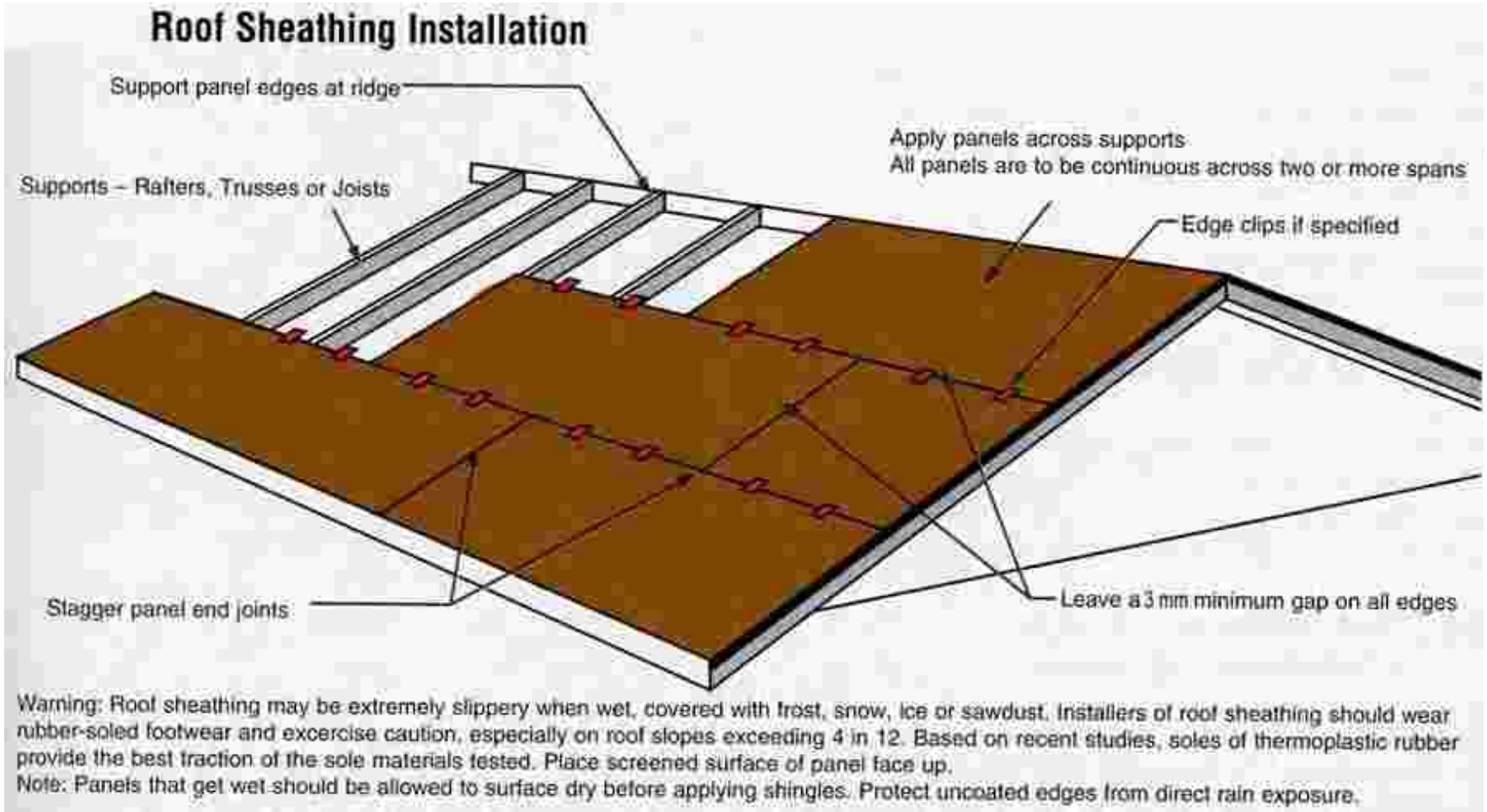
Spaced Sheathing

Steep Roofing

- NBC 9.23.15.7 requirements for sheathing:
  - Table 9.23.14.5A for thickness - flat roofs
  - Table 9.23.15.7A for thickness - sloped roofs
  - Long dimension across supports
  - Fully supported with blocking or H-clips

Steep Roofing

- **Spacing and Support**



Current Recommendations on Fasteners for Treated Wood

As a minimum, nails for ACQ or CA treated wood must be hot-dipped galvanized in accordance with ASTM A153. The zinc coating laid down using mechanical galvanizing may suffer excessive damage during nailing. Stainless steel should be used for maximum service life, for high preservative retentions or severe applications such as salt spray environments. Where appropriate, copper fasteners may also be used. Fasteners used in combination with metal connectors must be the same type of metal to avoid galvanic corrosion caused by dissimilar metals. For example stainless steel fasteners should not be used in combination with galvanized connectors.

Screws for ACQ or CA treated wood must be hot dipped galvanized in accordance with ASTM A153 or, if recommended by the manufacturer and the preservative supplier, high-quality polymer coated. Stainless steel should be used for maximum service life, for high preservative retentions or severe applications such as salt spray environments.

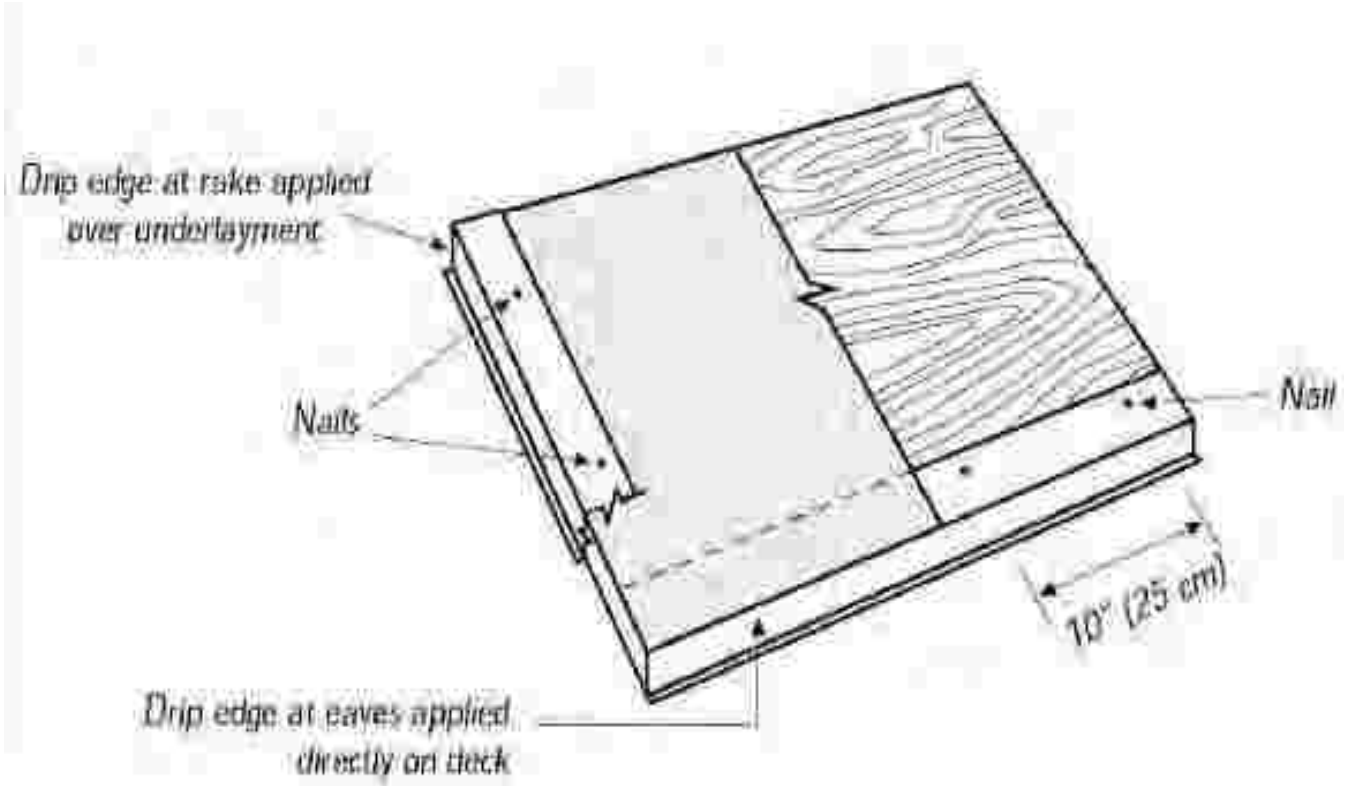
For borate treated wood used inside buildings, the same fasteners can be used as for untreated wood.

Fasteners:

- **ACQ(Alkaline Copper Quaternary)- treated wood much richer in copper salts**
- **Recommended fasteners should be Hot-dipped galvanized or Stainless Steel, *not* electroplated fasteners.**

Steep Roofing

- Underlayment and drip edges



Steep Roofing

- Underlayments
  - NBCC, 9.26.6.

(1) When underlay is used beneath asphalt shingles

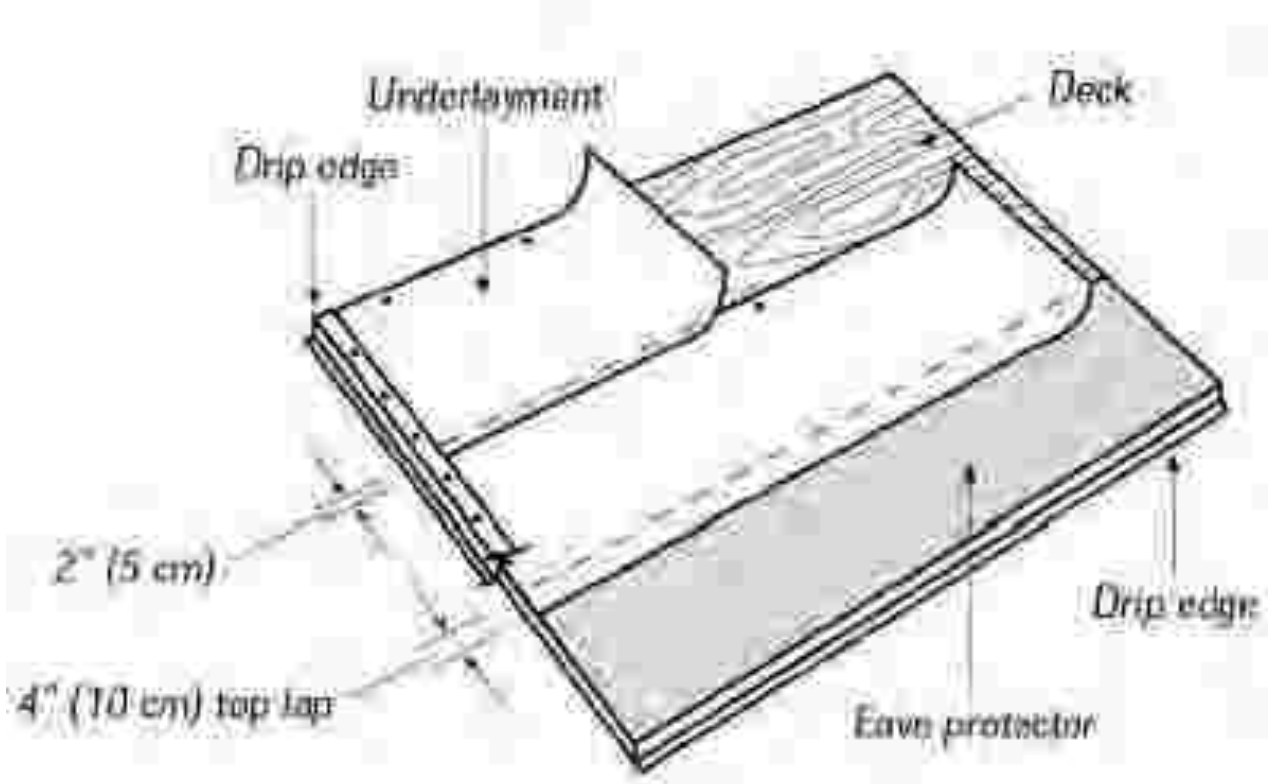
(a) Asphalt-saturated sheathing paper weighing not less than 0.195 kg/m² (0.04 lbs/ft²)

(b) No. 15 plain or perforated asphalt felts

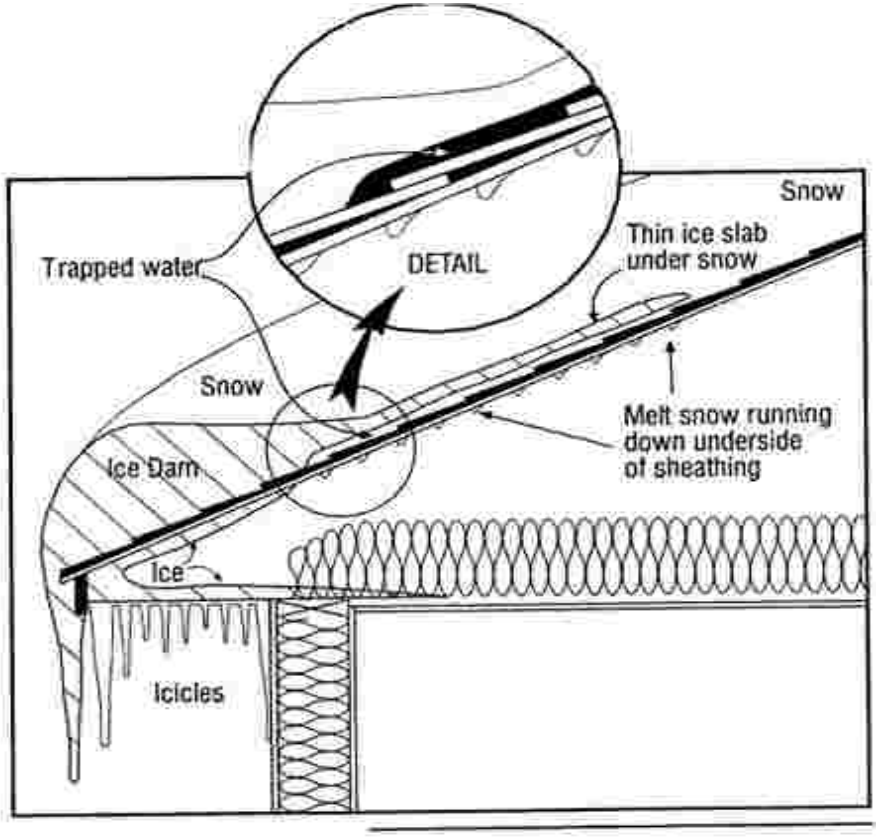
(2) Underlay used beneath wood shingles shall be breather type

Steep Roofing

- Overlapping underlayment



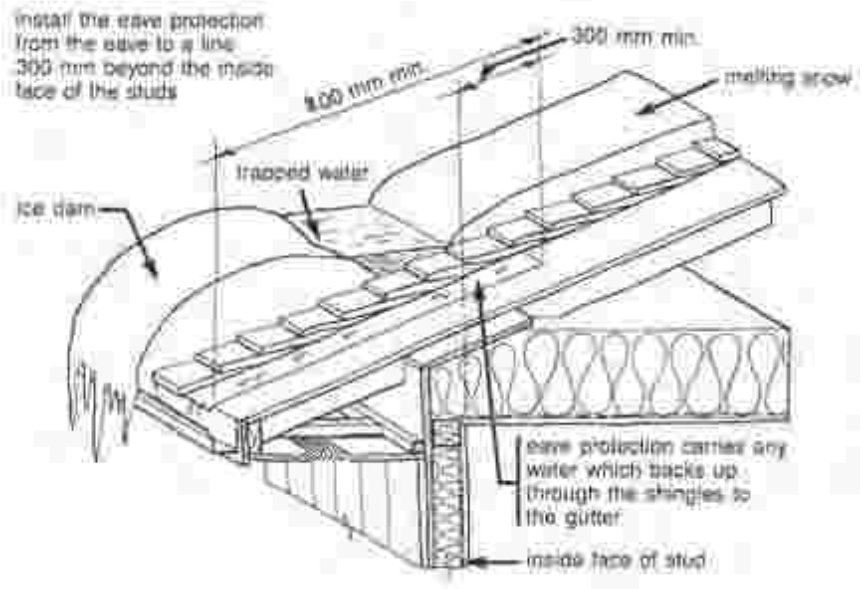
Eave Protection - Ice dams



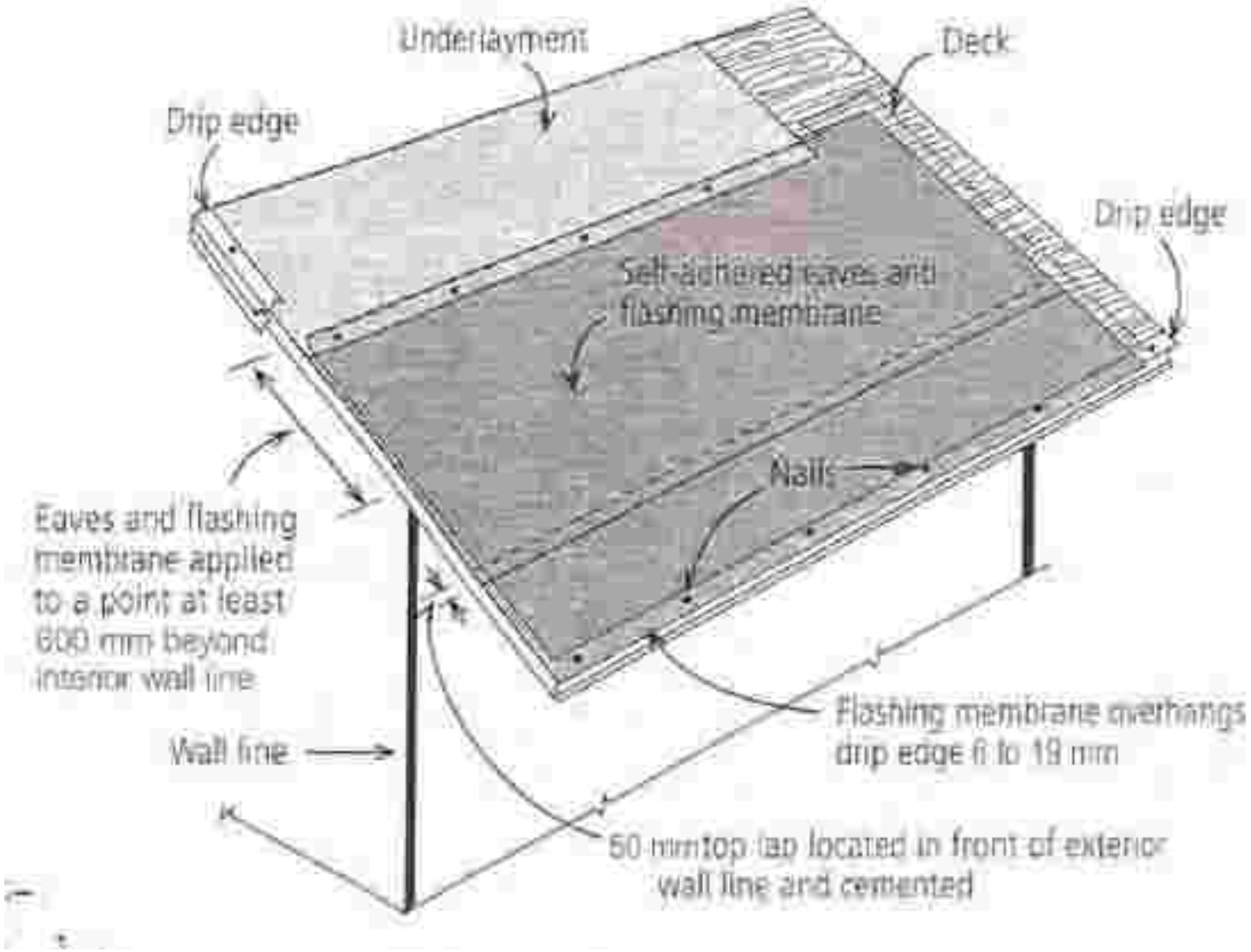
- Caused by heat loss and/or ineffective ventilation
- Managed with eave protection membrane

Eave Protection - Ice dams

- Part 9, NBCC, requires eave protection to extend up the slope a minimum of 900 mm (3 ft.) and no less than 300 mm (12”) horizontally over the inside face of the exterior wall



Eave Protection



Self-Adhesive Eave Protection

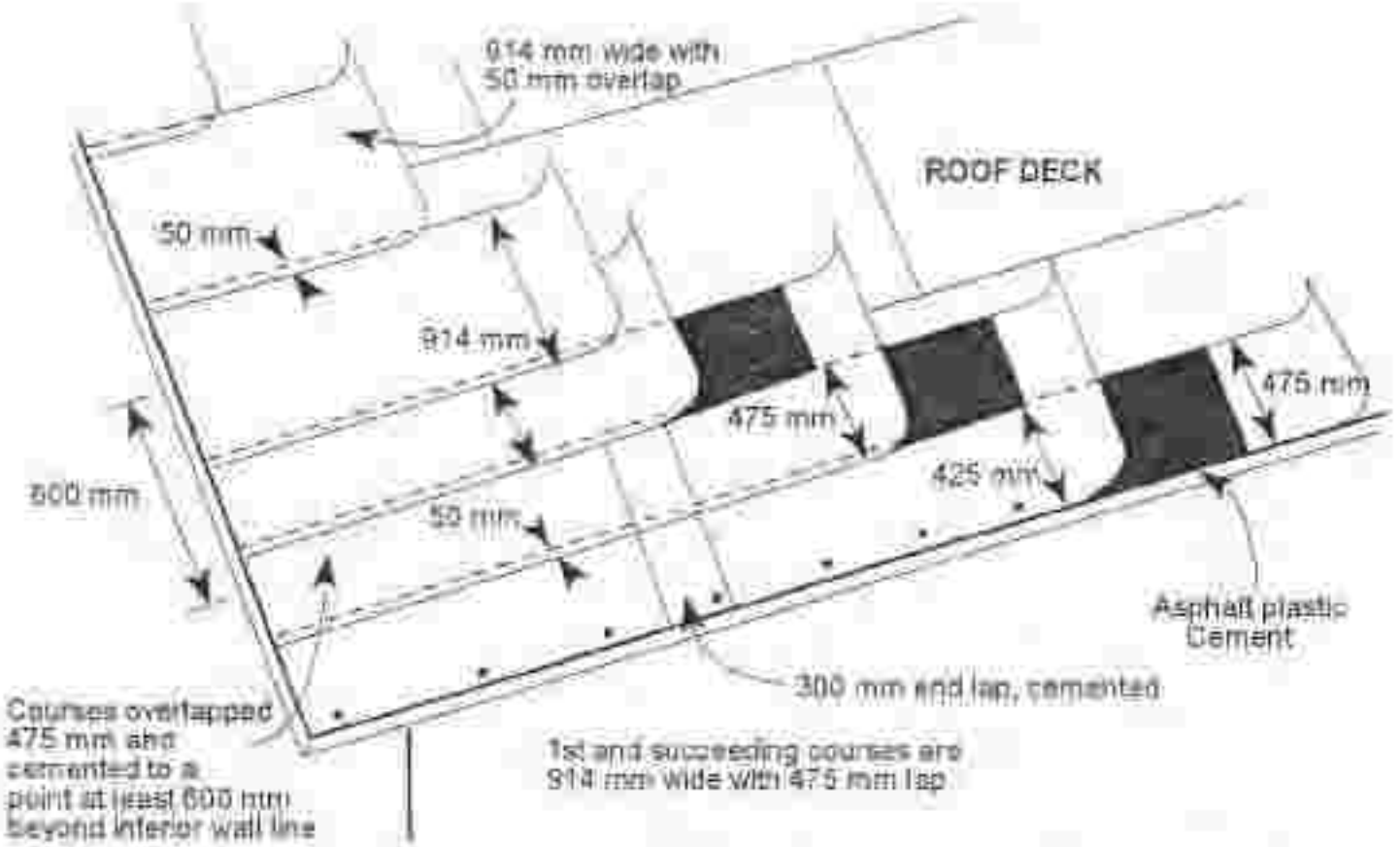
- Conform to CSA A123.22, (adoption of ASTM 1790 with Canadian deviations
- Glass reinforced MB with a coating of self-adhesive bitumen
  - Typically 1.5mm thick, sanded top surface
- Rubberized asphalt and polyethylene film
  - Typically 1mm thick material
- Available in high temperature grade (for use under dark metal roofs)

Eave Protection

- Self-adhering Modified Bituminous Underlay
- Conform to CSA A123.22, ASTM D 1970

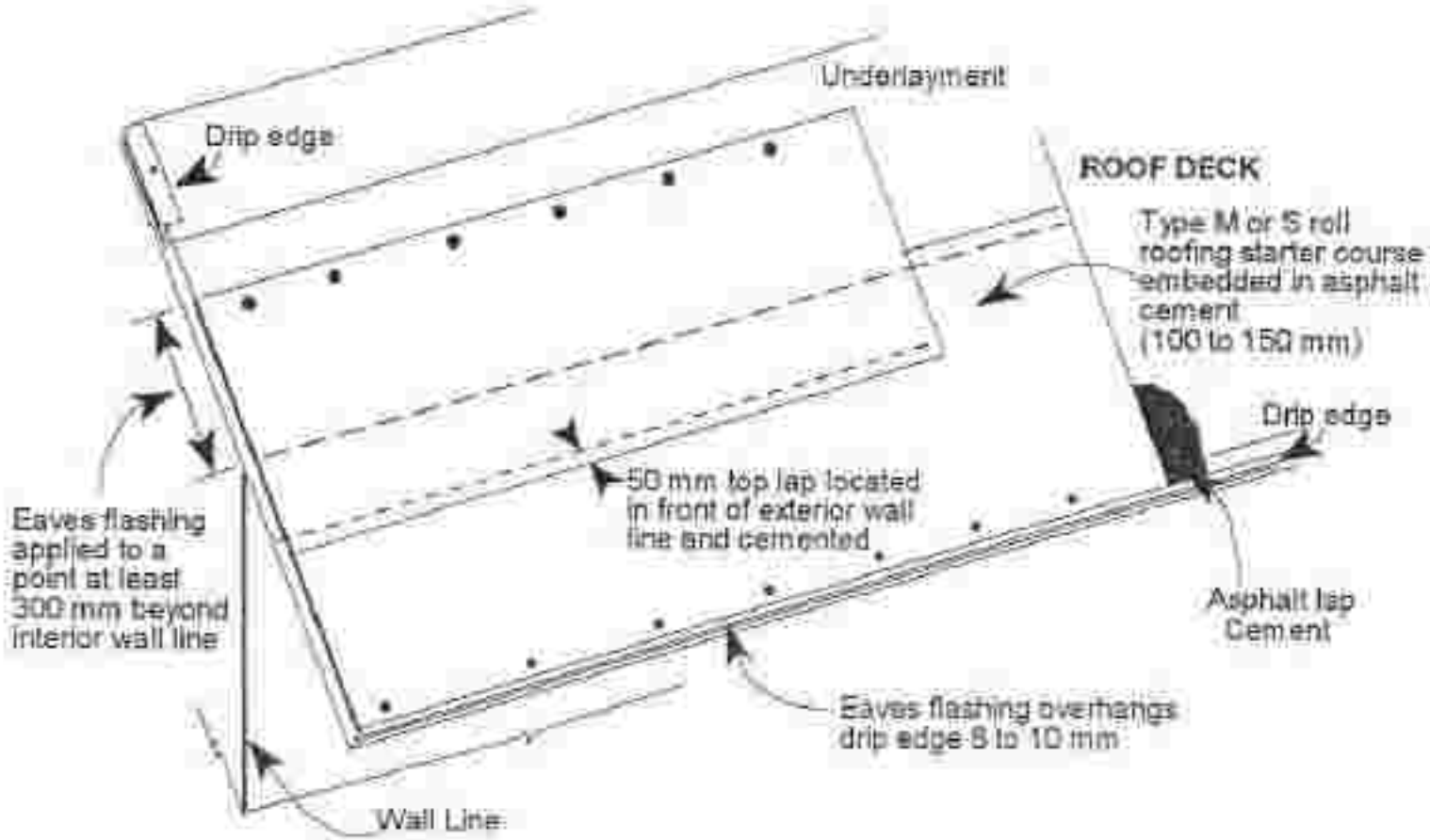
Eave Protection as Underlayment

Eave Protection



Application of No. 15 Asphalt Saturated Felt Underlay as Eave Protection
(For Slopes 1:3 or greater)

Eave Protection



Application of Type M or S Roll Roofing as Eave Protection

Underlayments

- Synthetic underlayments
  - Various Synthetic Fiber Mats
  - No standard specifications referenced in NBCC (2005)
  - ASTM D 6757, Standard Specification for Underlayment Felt Containing Inorganic Fibers Used in Steep-Slope Roofing)
  - May not be ULC?UL classified
  - Ask for CCMC evaluation report

Steep Roofing

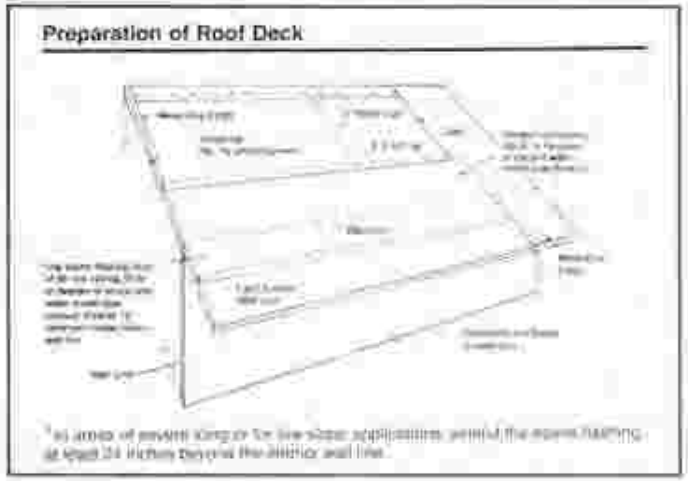
- Decking
- Underlayments
- Flashing

Steep Roofing - Flashing

Proper Eaves Details for Asphalt Shingles

R.L. Corbin

Roy Corbin is Director for the Better Understanding of Roofing Systems Institute (BURSI), a 21-year old national educational program on roofing systems designed for architects, engineers and building owners, which is sponsored by Schuller International, Inc., Manville® Roofing Systems. Mr. Corbin is also a faculty member of BEI, has served as Chairman of the Code Committee for ARMA, and is a member of BOCA, SBCCI, ICBO, ASTM, CSI and RCI. He holds four U.S. Patents for roofing shingle design and application and has published numerous technical articles.



It's obvious that a well-constructed building begins with a good foundation. What may be less obvious is that a well constructed asphalt shingle roof begins with proper application at the eaves. Without it, the finished roof will be far less than satisfactory. It's important, therefore, to pay close attention to the eaves details once the APA rated decking has been installed. Here are some recommendations that should prove helpful.

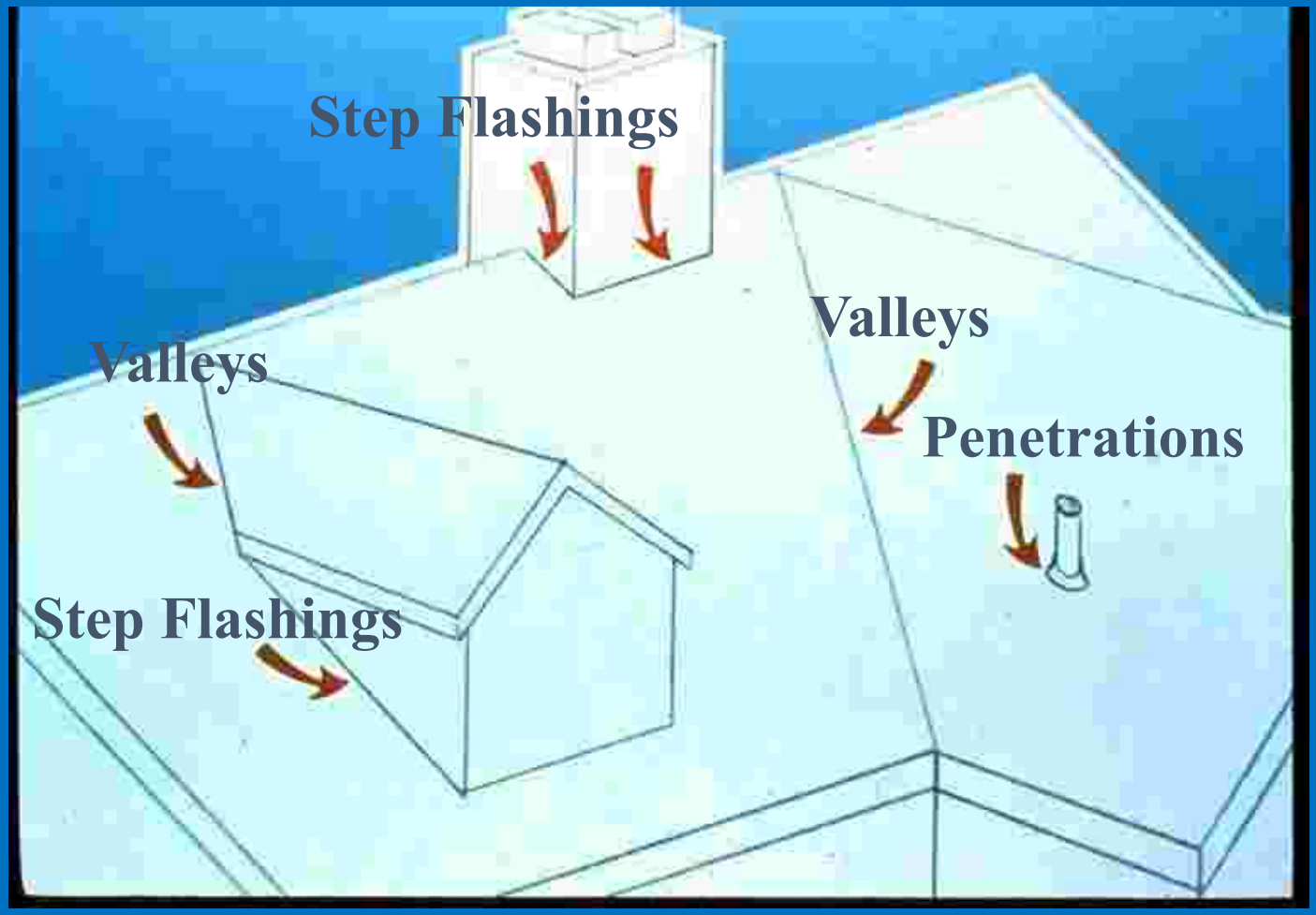
First, install a drip edge along the lower leading edge of the deck. Drip edges come in the basic "L" angle or the "T" shape. Either type will afford the needed protection to the leading

protection is especially important where cold weather conditions exist (January temperatures of 25 degrees Fahrenheit or colder) or in warm, rainy climates where pine needles and other debris accumulate along the eaves, creating a damming action similar to that of ice and snow.

In order to guard against the resultant leaks from the damming effect, install a single ply of an ice-and-water (or pine needle) protection membrane directly over the decking and drip edge. Position the membrane to a point at least 12 inches inside the interior wall line (on slopes of 4" in 12" or greater) and to at least 24 inches inside

See Handouts in your manual for more information

Critical Areas for Steep Roofing Systems



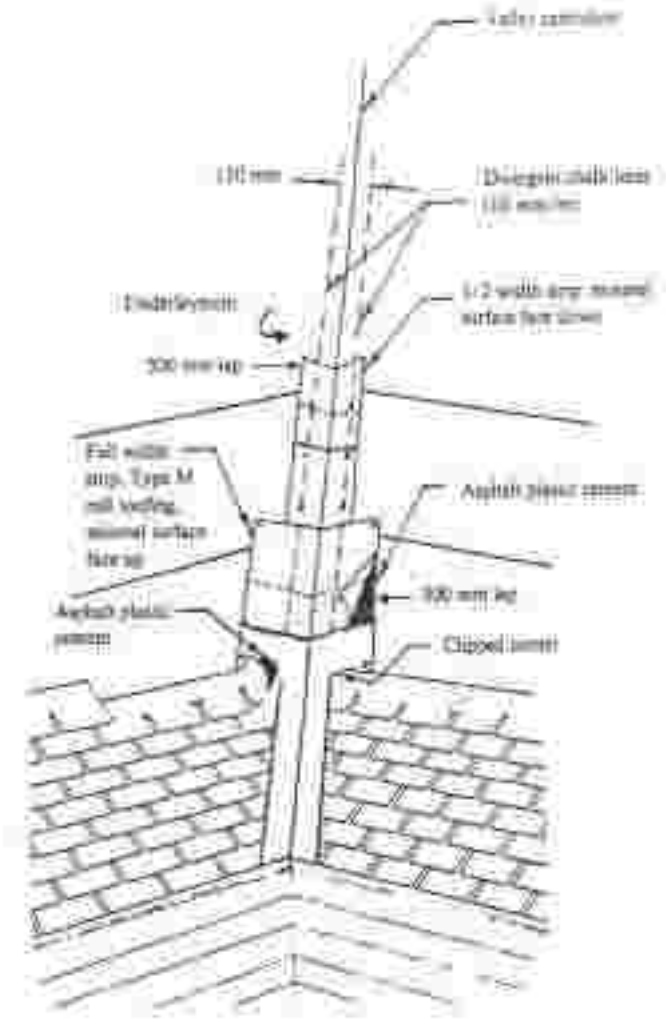
Valleys


Valley will have lower slope than either of the intersecting deck planes

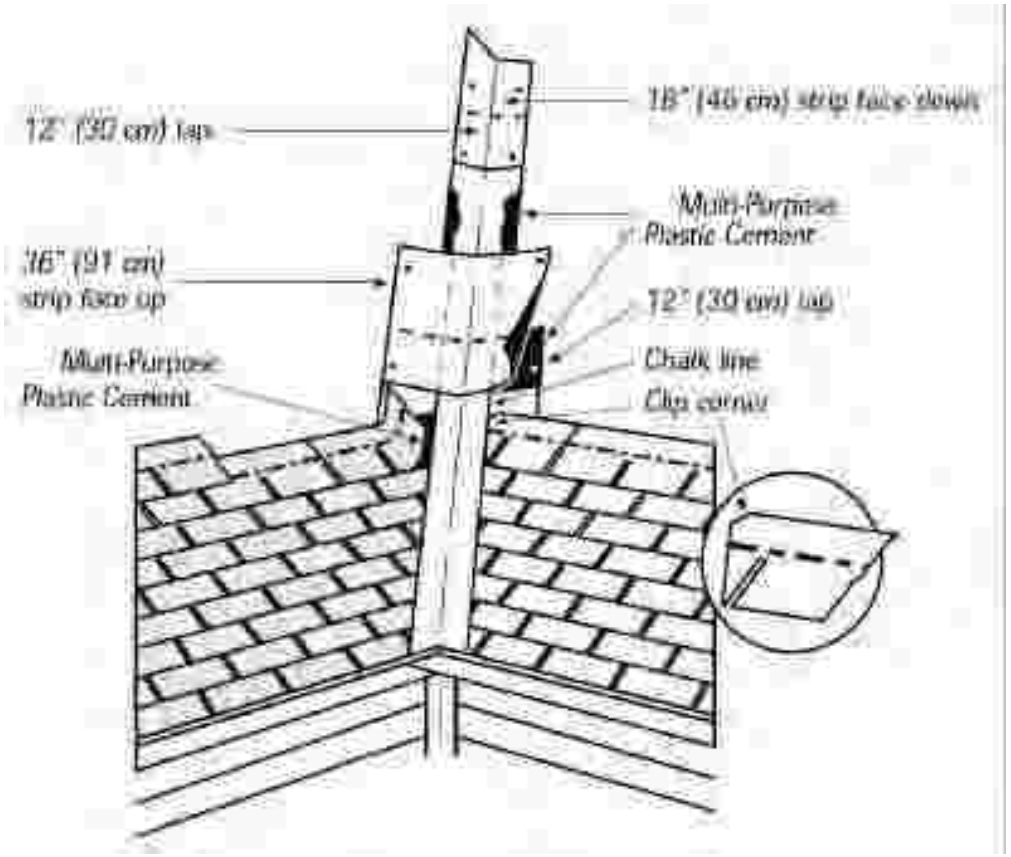
Valley Flashing Types

- Open Valley
  - uses metal or granule-surfaced sheet as the water channel
- Woven Valley
  - Overlaps the shingles from both intersecting planes
- Closed-Cut Valley
  - Carries shingles from one plane at least 12” beyond valley centerline and overlaps them on a cut line with the shingles from the second plane

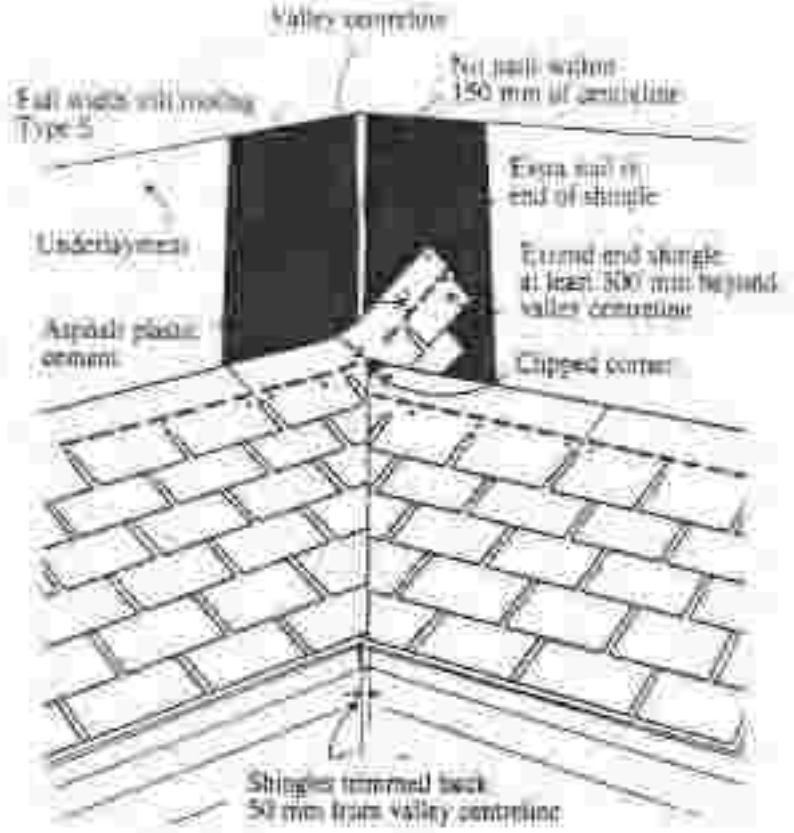
Open Valley - Metal



Open Valley – Roll Roofing

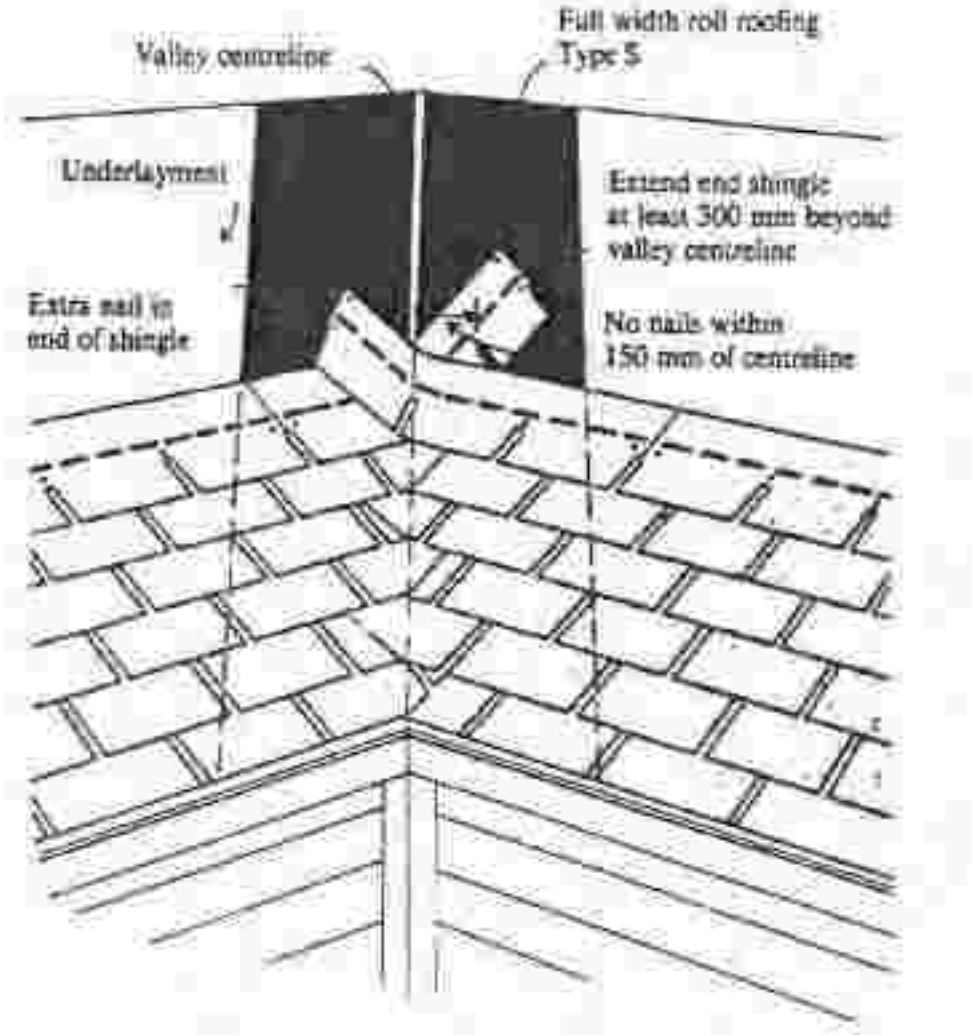


Closed Cut Valley



Closed Cut Valley

WovenValley



Valley Flashings

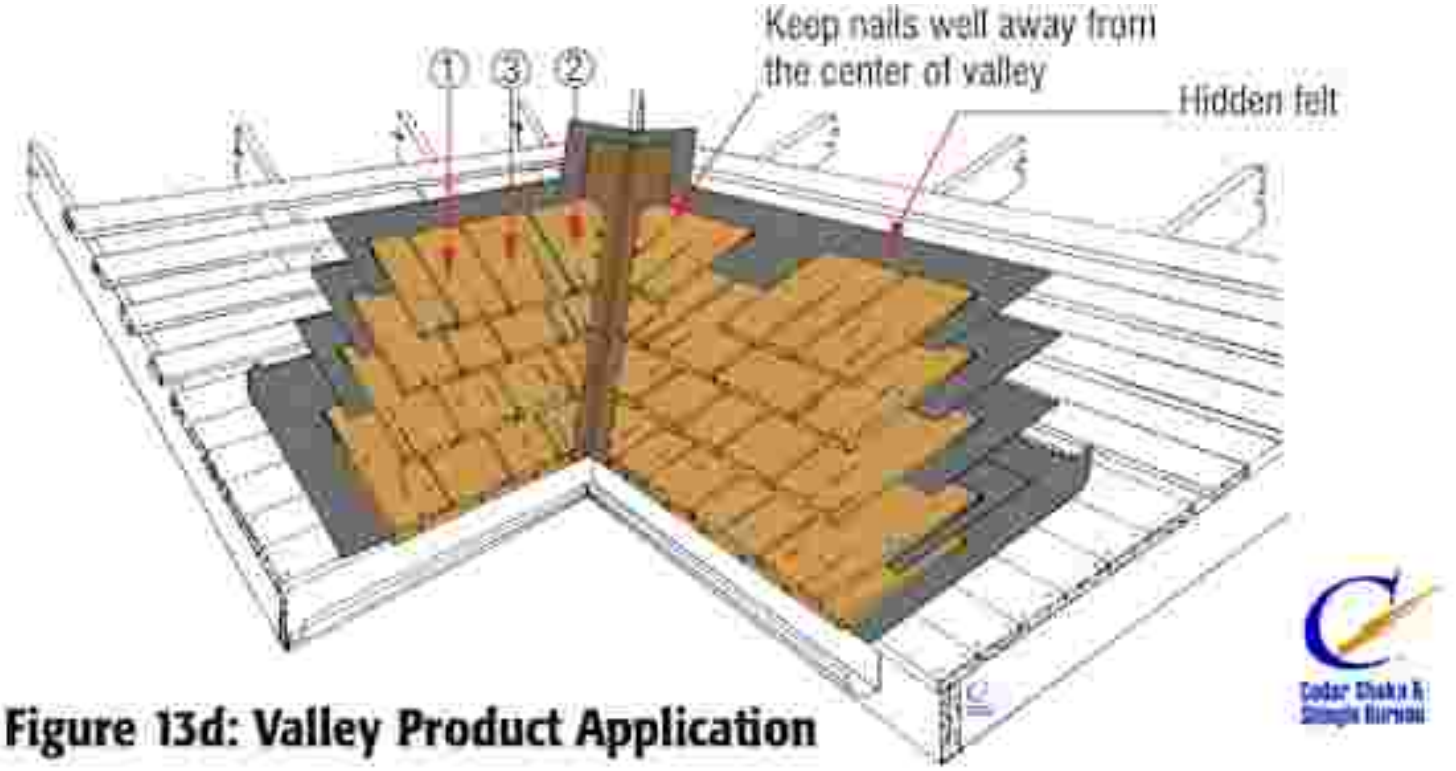


Figure 13d: Valley Product Application

Order of applying Certi-label shakes or shingles at valley:

1. Stop course line here
2. Place pre-cut piece so that cut-angle is positioned on the valley guide chalk line with tip on course line.
3. Select product of the required width to complete the course of Certi-label shakes or shingles.

Metals used in Flashings

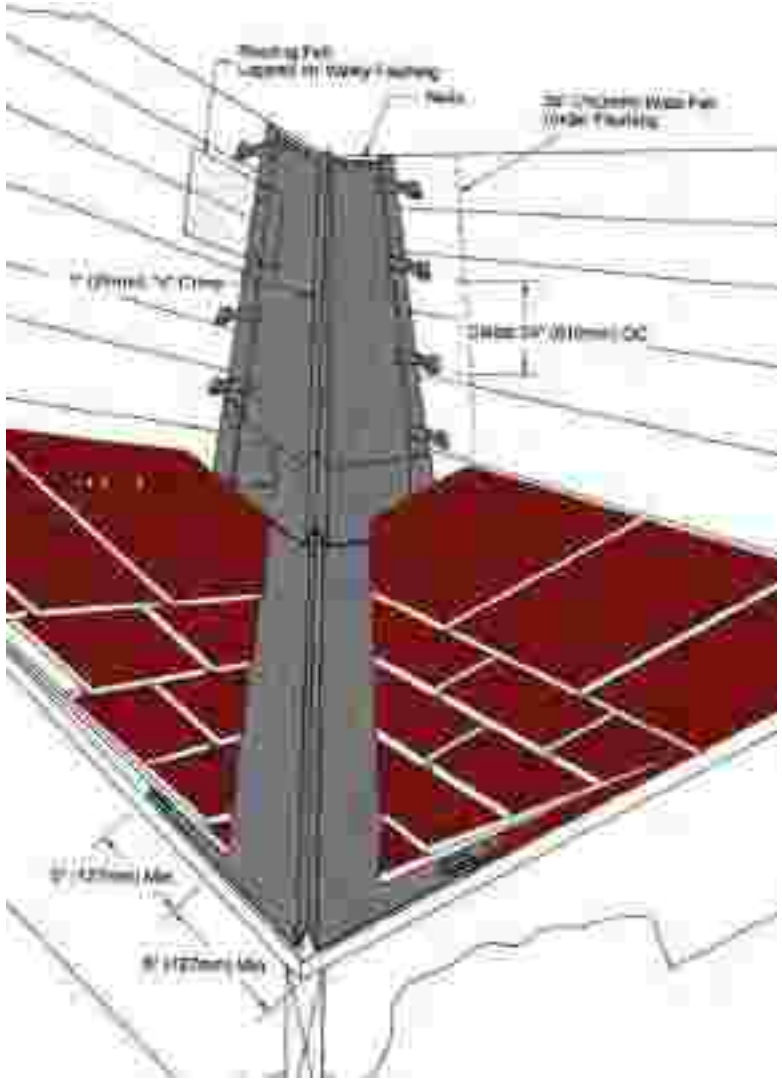
- NBCC, 9.26.4.2, flashing materials

Type	Thickness
Sheet Lead	1.73 mm
Galvanized Steel	0.33 mm
Copper	0.33 mm
Zinc	0.35 mm
Aluminum	0.48 mm

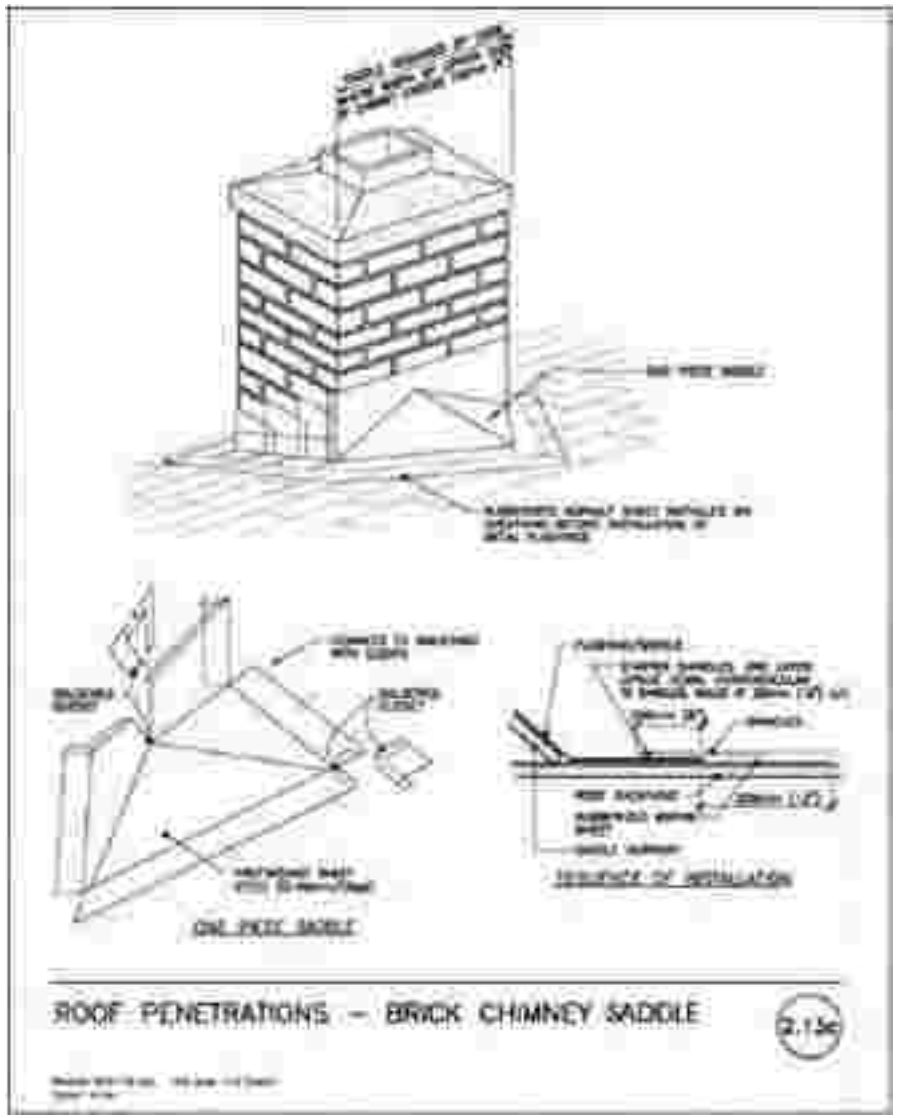
Valley Flashings

Inverted Vee

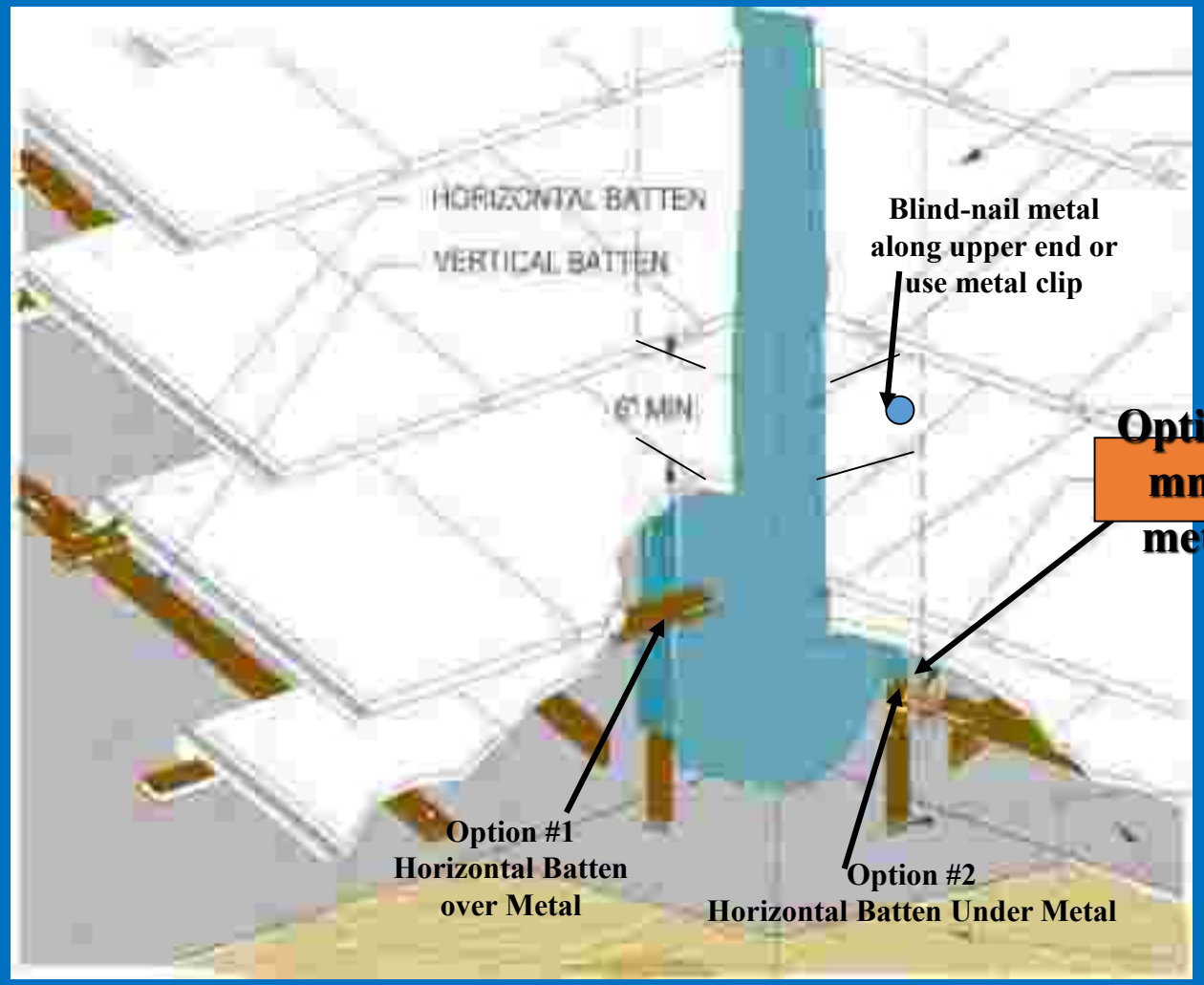
.55mm (24 ga 16 oz.)
Copper or
.45 mm (0.018”)
Stainless recommended.



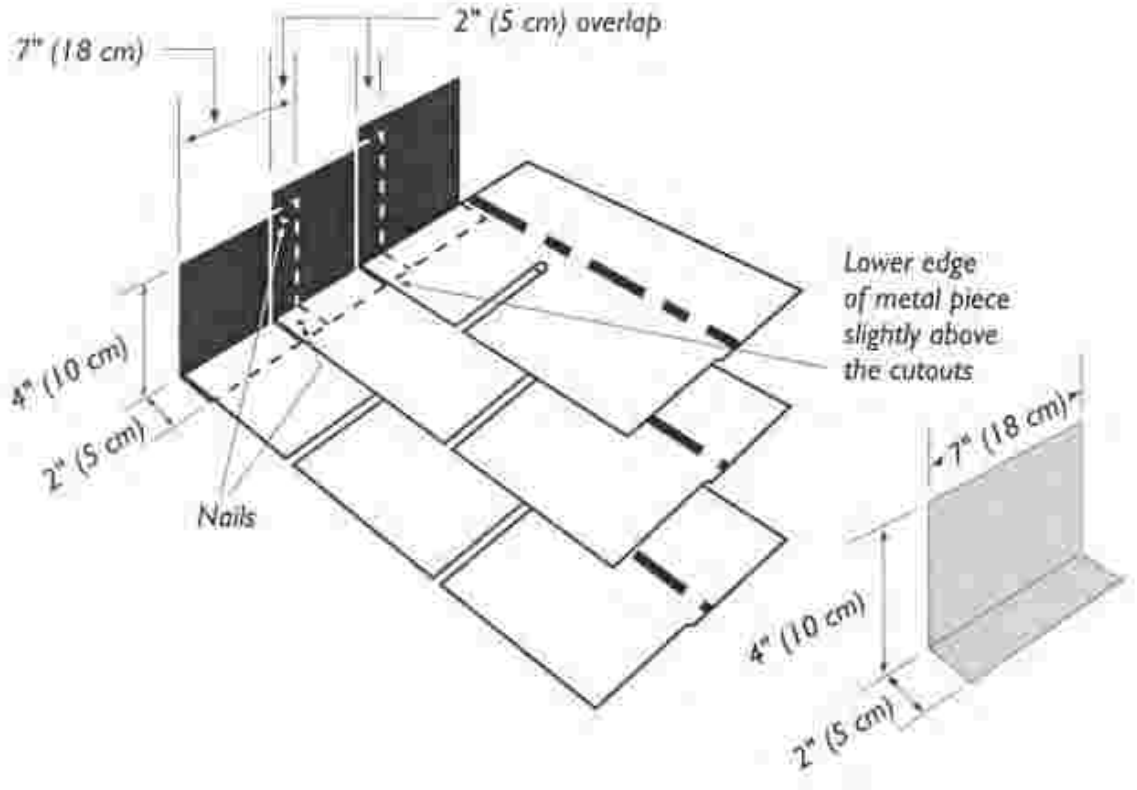
Saddles



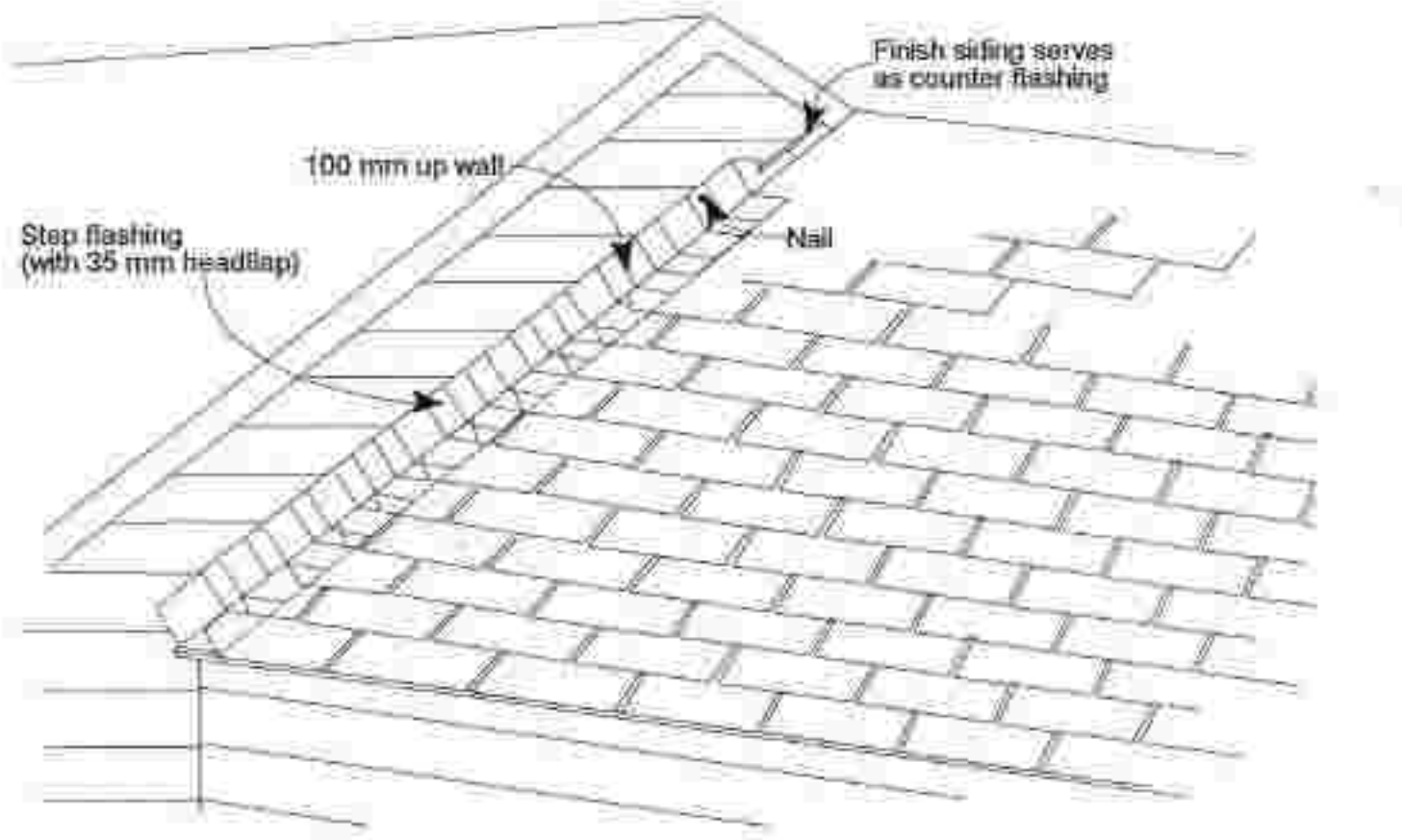
Valley Metal for Cement and Clay Tile



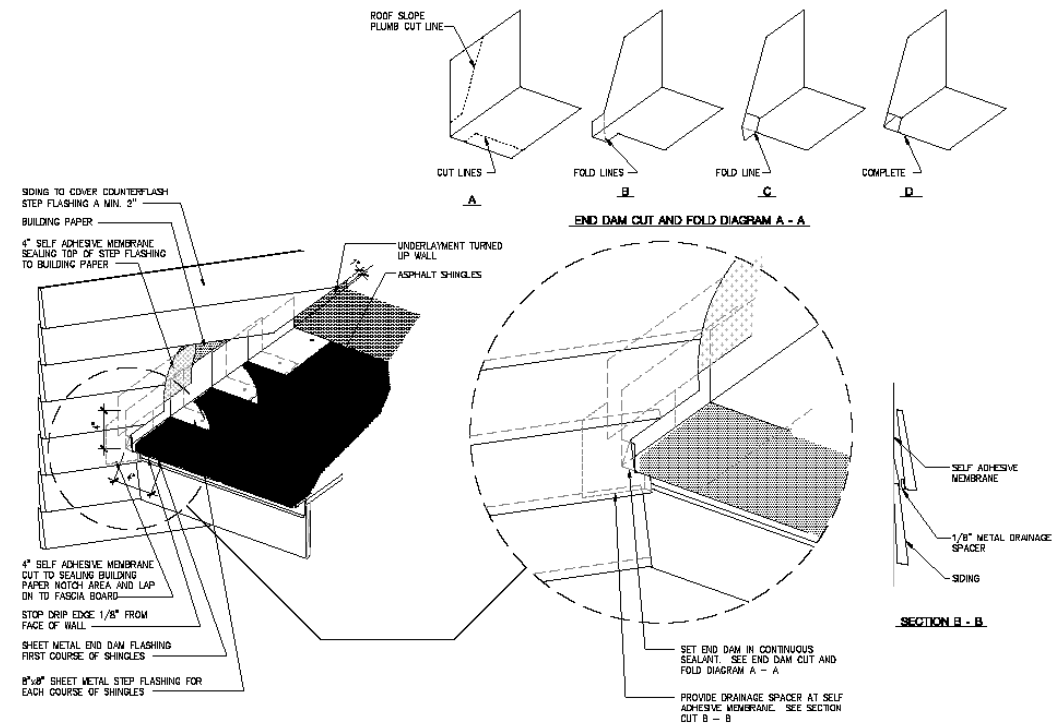
Step Flashings



Step Flashing

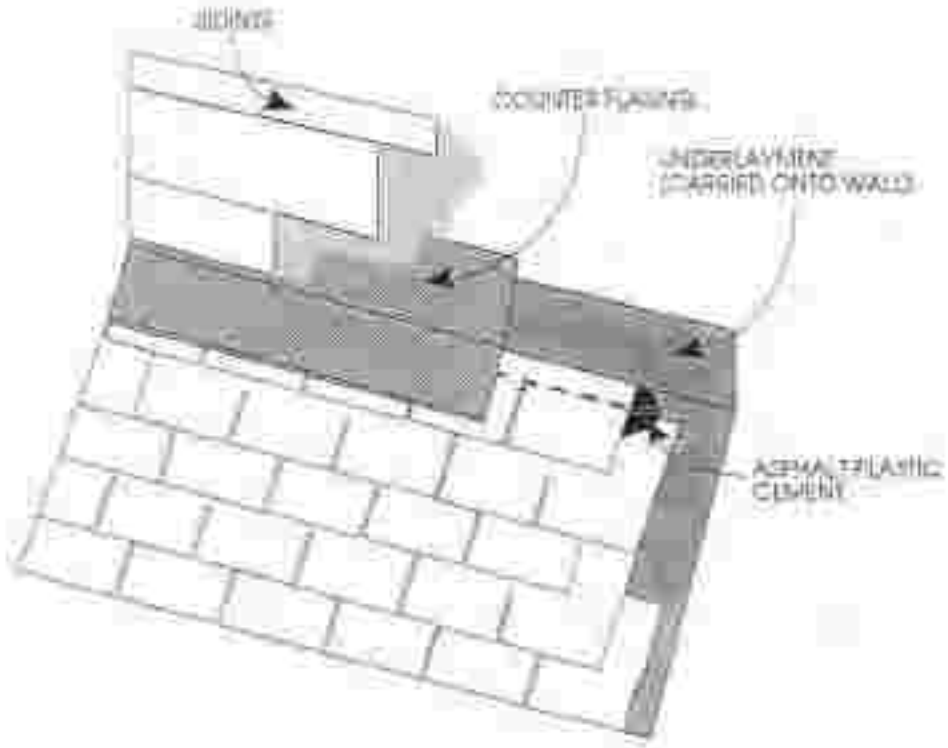


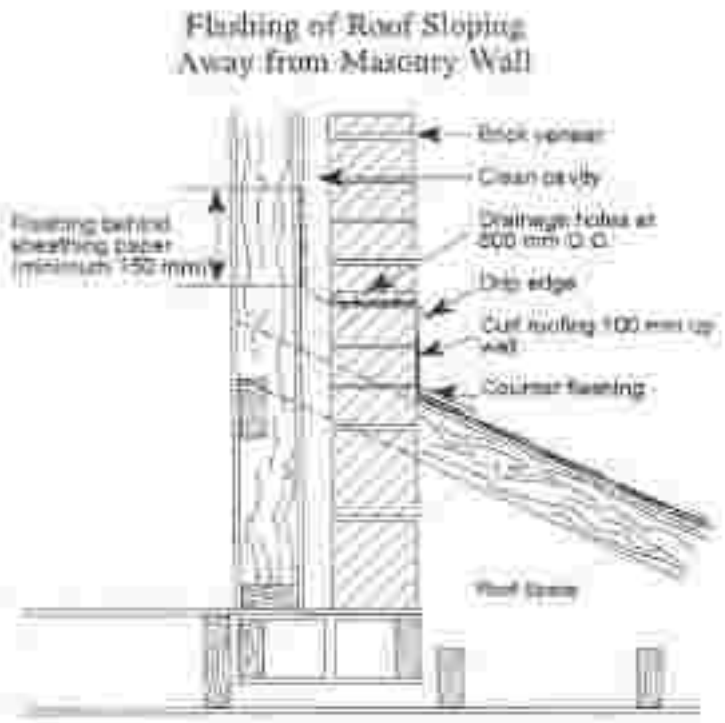
Special Juncture at Base



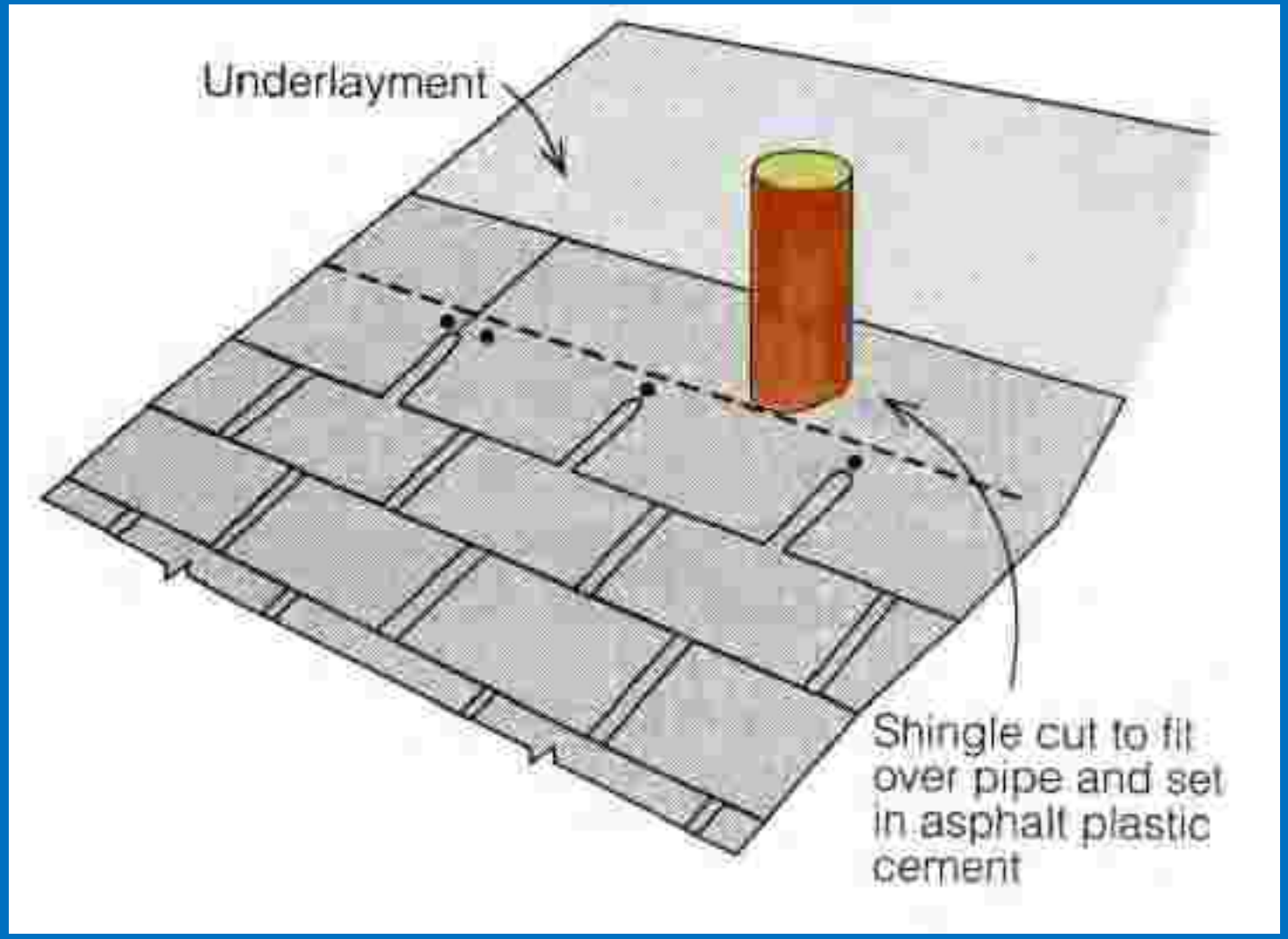
5 **FLASHING DETAIL**
1 1/2"=1'-0"

Flashing at Headwall

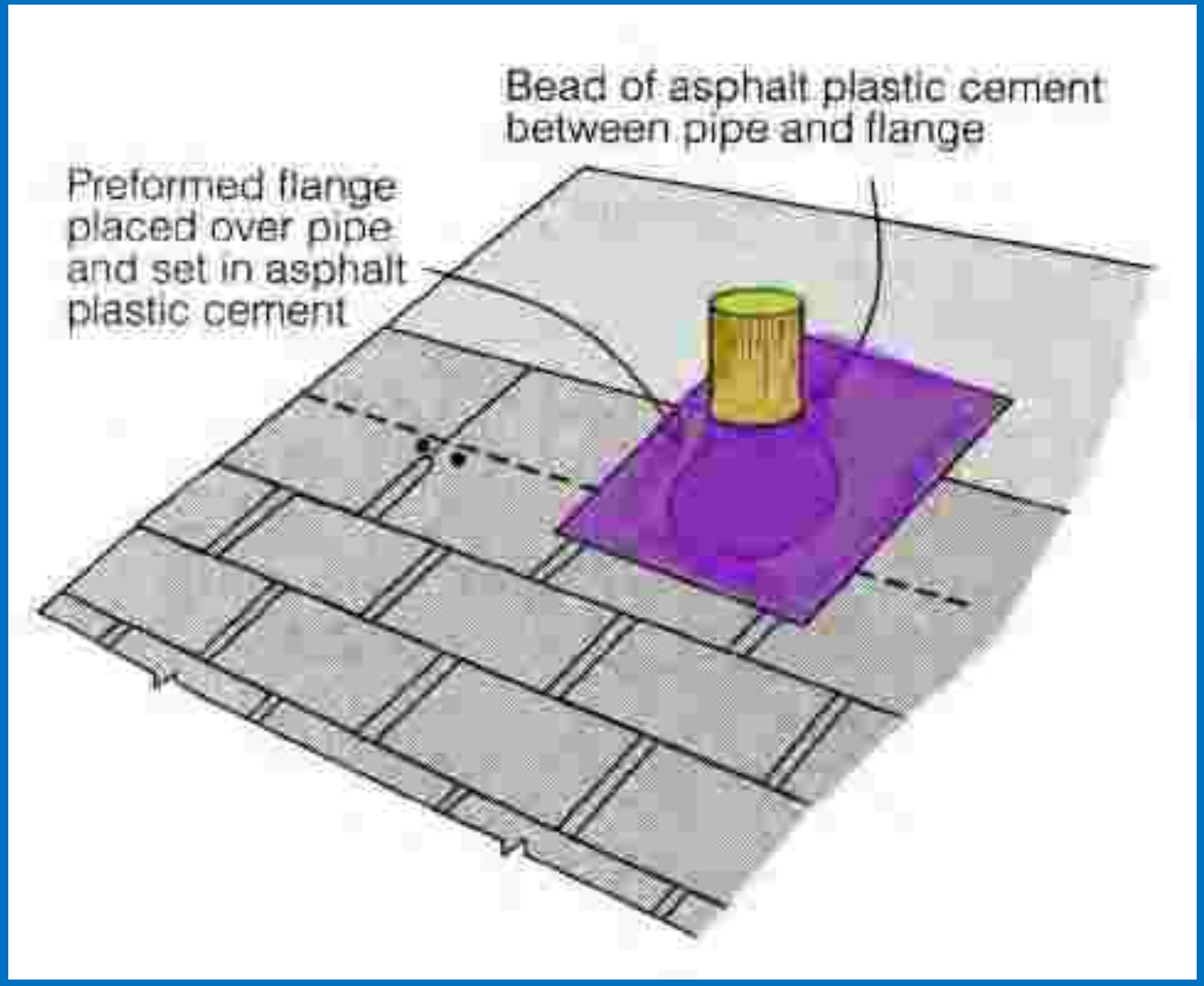




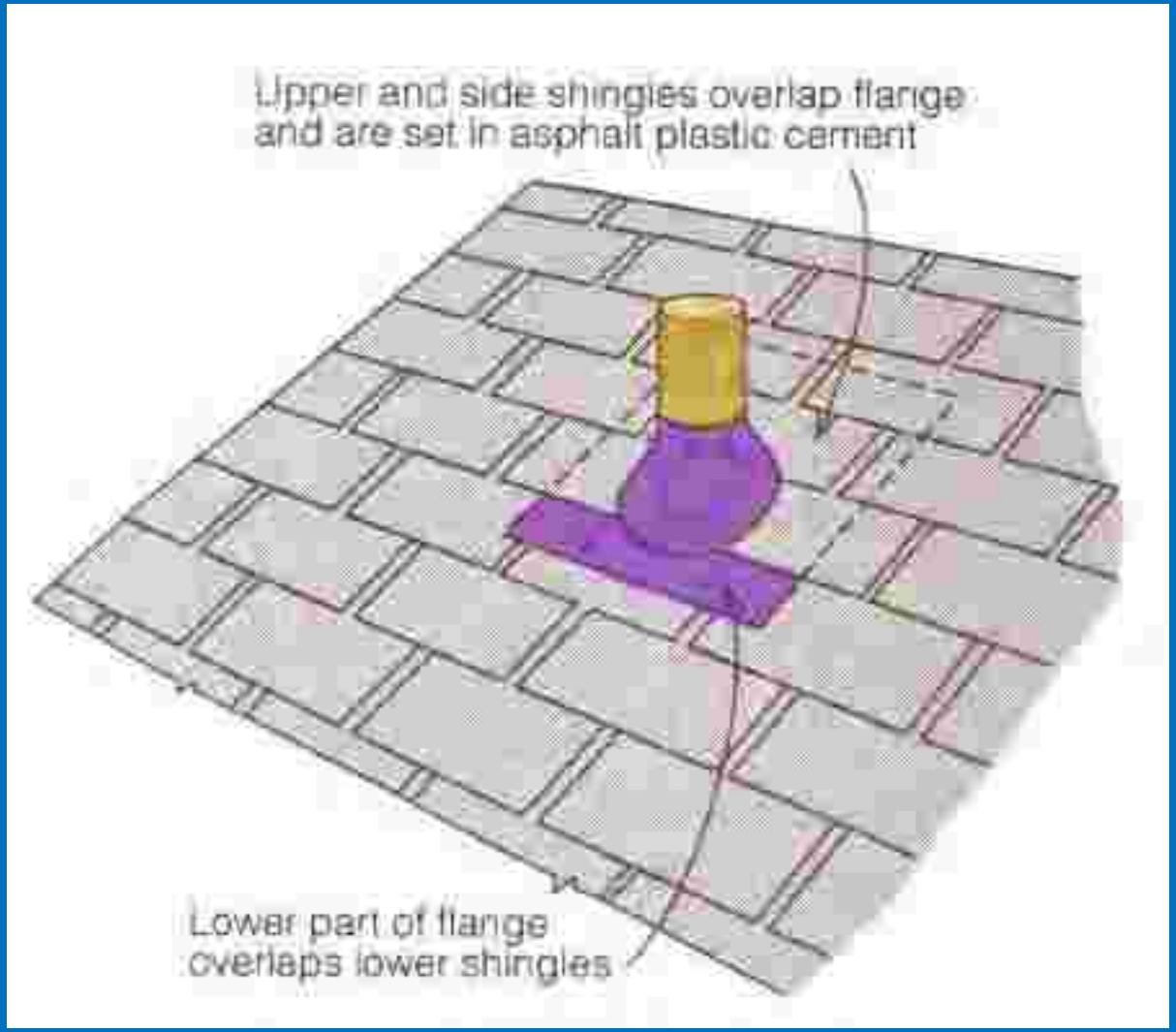
Pipe Flashing-1



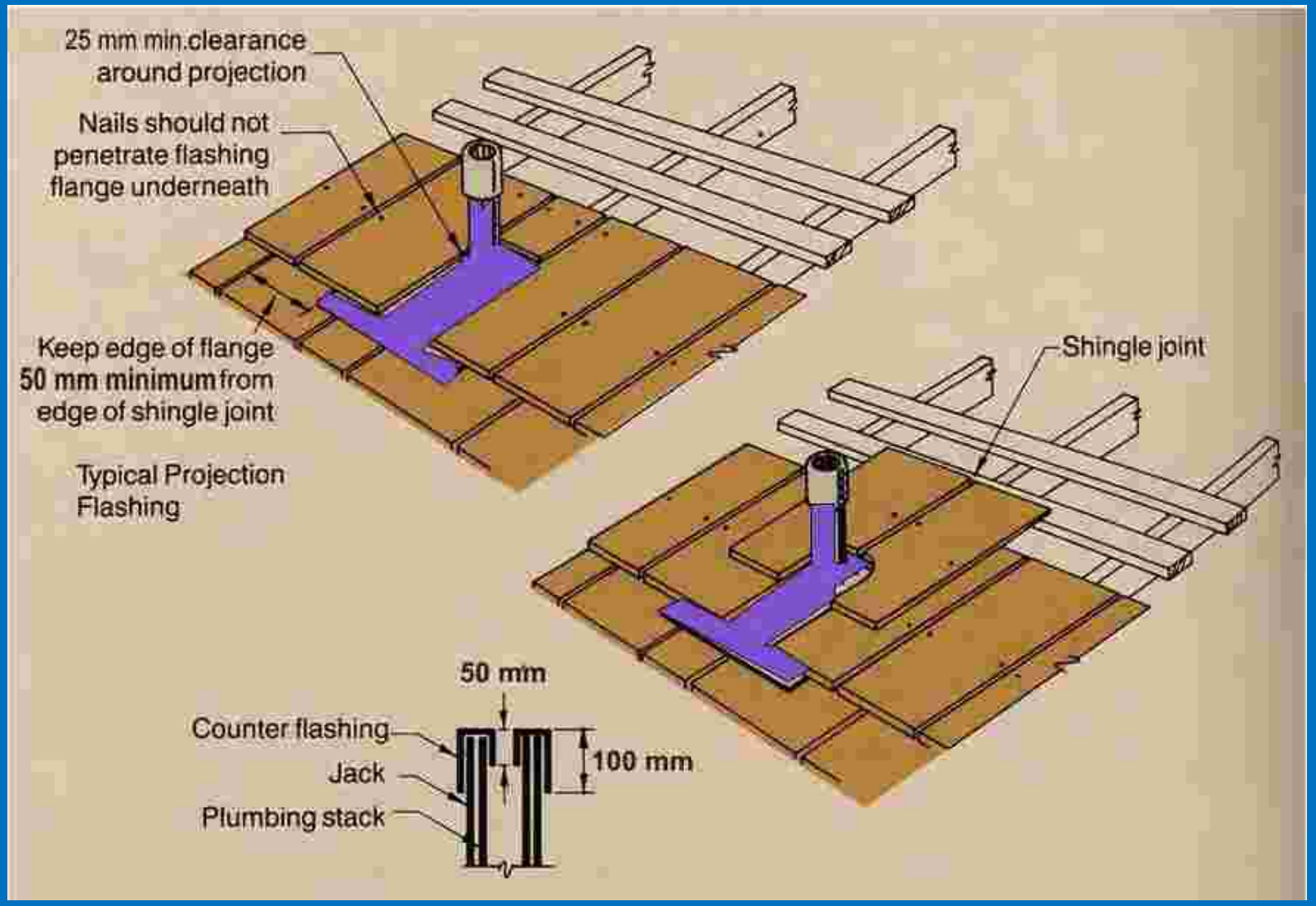
Pipe Flashing-2



Pipe Flashing-3



Pipe Flashing – Wood Shingles

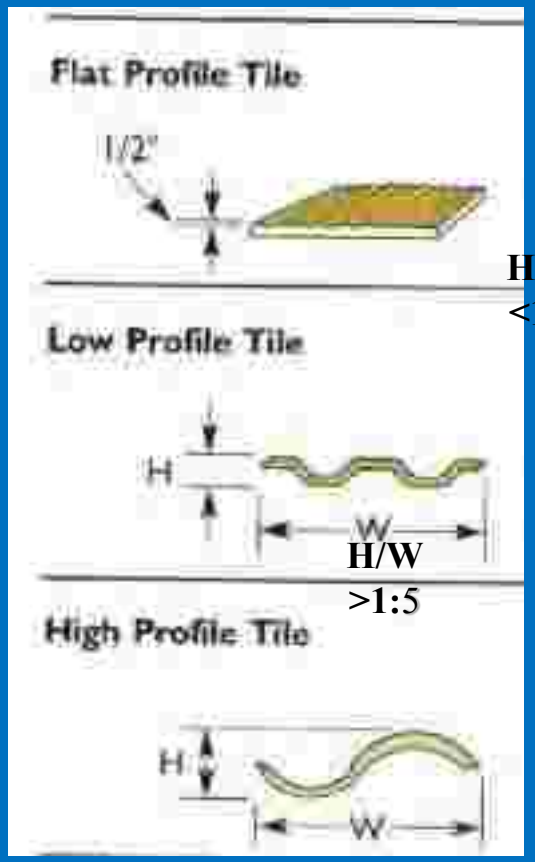


Pipe Flashing-Concrete Tile

Check List
Concrete Tile

- CAN/CSA –A220.0-M91, Performance of Concrete Roof Tiles
- CAN/CSA-A220.1-M91, Installation of Concrete Roof Tiles

Check List
Concrete and Clay Tile



- Decking: 25 mm (1”) nominal lumber or 0.47 mm (15/32”) plywood/OSB
- Underlay: D226 Type II (30 lb) or D 4869 Type IV
- Battens: Nominal 25 mm x 50mm (1” x 2”)
- Eave Treatments: Bird Stop/Eave Riser
- Valley flashing: 26 ga G90, 600 mm (24”) wide
- Wall Trays (Pans) G90, min 150 mm (6”) trough
- Pipe flashing (profile) 2-1/2 lb lead or dead soft aluminum

Check List
Cedar Shakes and Shingles

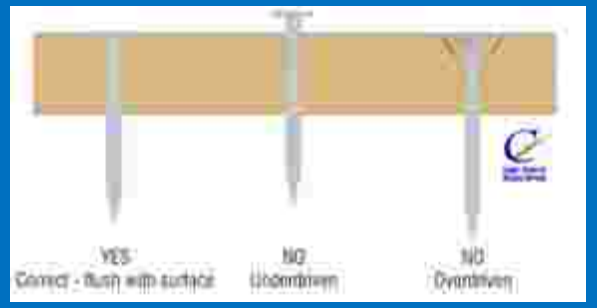
- Spaced Strapping: 25 x 100 mm (1”x4”) or 25 mm x 150 mm (1”x6”) softwood, spaced to match exposure
- Use solid sheathing 300 to 600mm x (12” to 24”) inside wall line
- Solid Sheathing: OSB or Plywood
- Underlay: Shingles—not common, but breathing felt may be used.
- Shakes: Felt Interlay required
- Valley flashing: Center crimped, painted galvanized or aluminum

Cedar Shingles and Shakes

Fasteners for Wood Shingles and Shakes

Fasteners	
Type of Certi-label Shake or Shingle	Nail Type and Minimum Length
Certi-Split & Certi-Sawn Shakes	**Type (in)**
18" Straight-Split	5d Box 1 3/4
18" and 24" Handsplit-and-Resawn	6d Box 2
24" Tapersplit	5d Box 1 3/4
18" and 24" Tapersawn	6d Box 2
Certigrade Shingles	**Type (in)**
16" and 18" Shingles	3d Box 1 1/4
24" Shingles	4d Box 1 1/2

- Nails: 2 corrosion-resistant fasteners per shingle or shake
- (304 or 316 stainless, hot-dipped zinc coated or aluminum nails)
- Staples: aluminum or stainless
- 2 with 11mm (7/16”) min crowns, long enough to penetrate sheathing 12mm (1/2” min)



Wood Shingles and Shakes

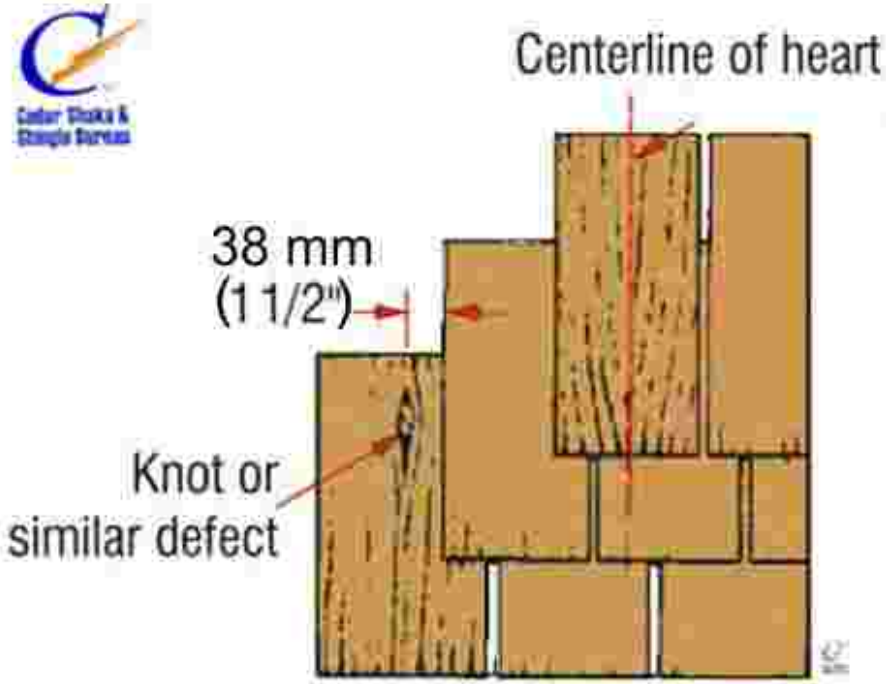


Figure 5a: Course Alignment

Check List: Asphalt Shingles

- Min. thickness of roof sheathing for sloping roofs:

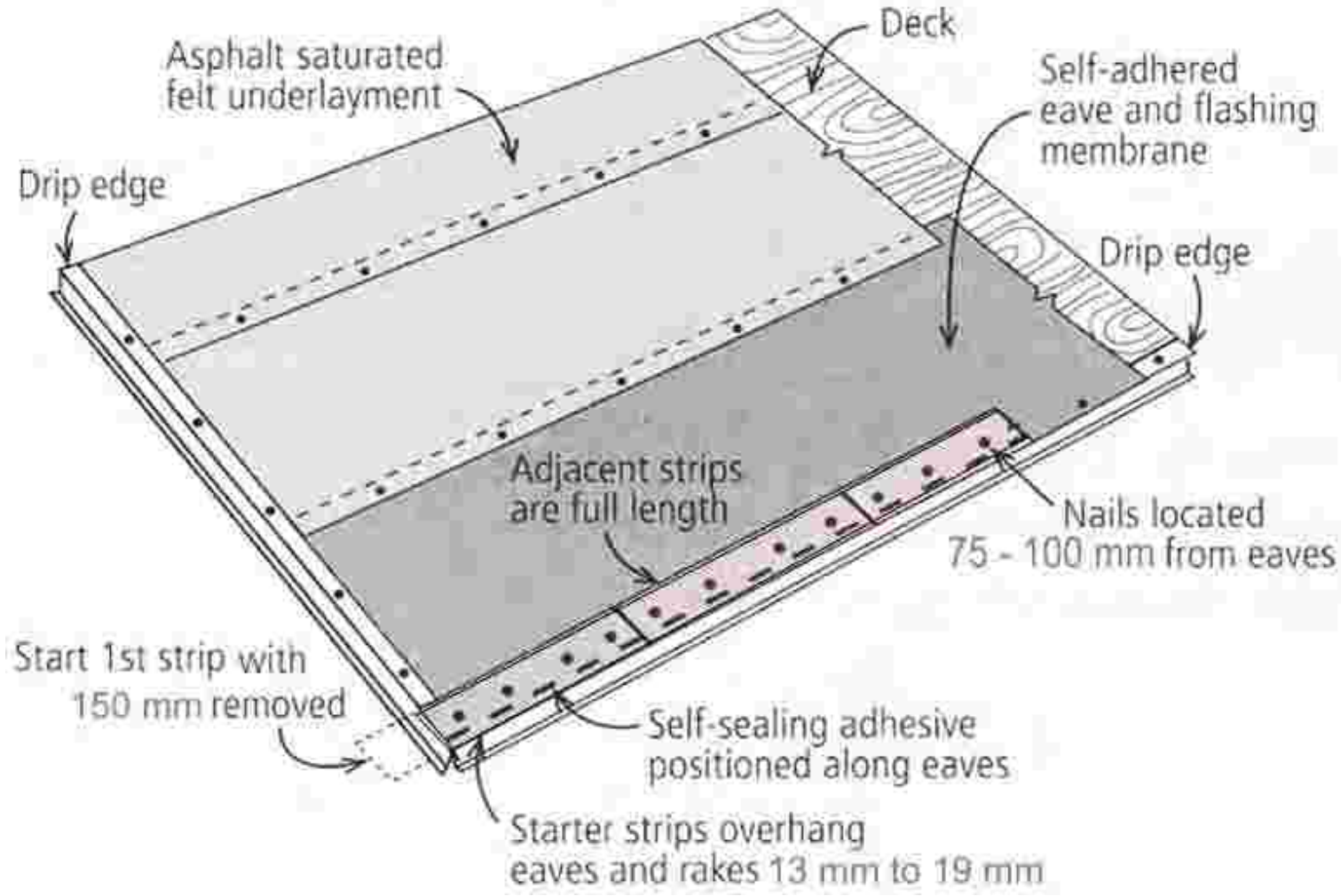
Max. Spacing	Plywood, OSB, 0-2 Grade		OSB, 0-1 Grade, and Waferboard, R-1 Grade	
	E.S.*	E.U.*	E.S.	E.U.
300	7.5 mm	7.5 mm	9.5 mm	9.5 mm
400	7.5 mm	9.5 mm	9.5 mm	11.1 mm
600	9.5 mm	12.5 mm	11.1 mm	12.7 mm

*E.S: Edges Supported, *E.U: Edges Unsupported

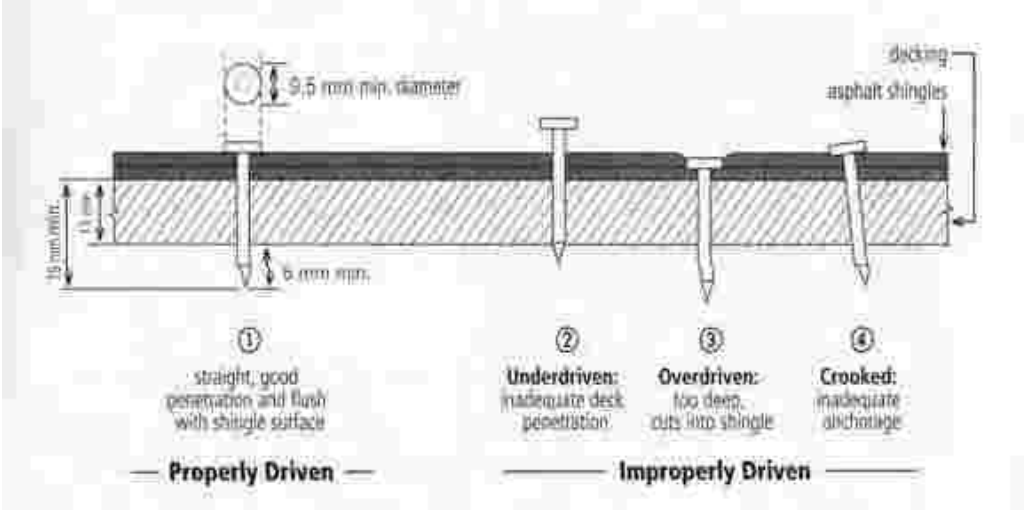
Check List: Asphalt Shingles

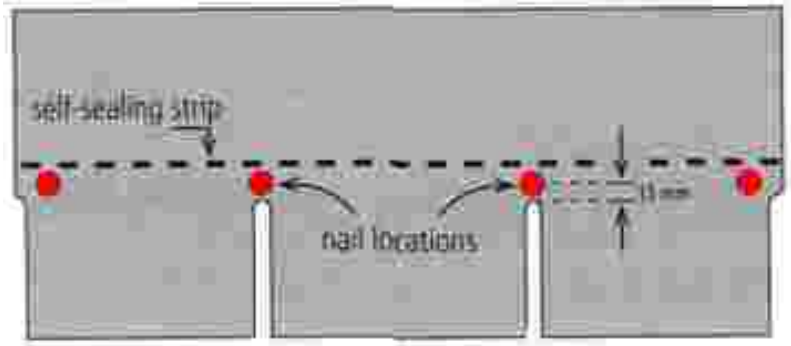
- Underlay: No. 15 asphalt felt
- Nails: shank thickness: 2.95 mm (12 ga), head 9.5 mm (3/8”), galvanized
- Nail Length: 12 mm (½”) through, or into the roof sheathing
- Staples not recommended but allowed by code
- Metal Flashings: 0.33 mm (28 ga)galvanized steel
- Pipe flashing: preformed flashing

Starting Application

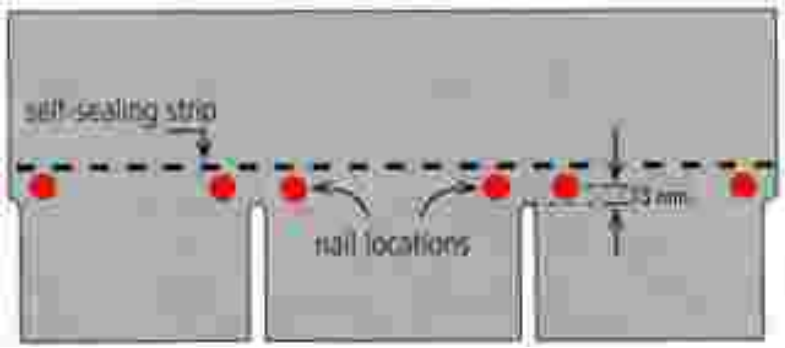


Nailing – Asphalt Shingles



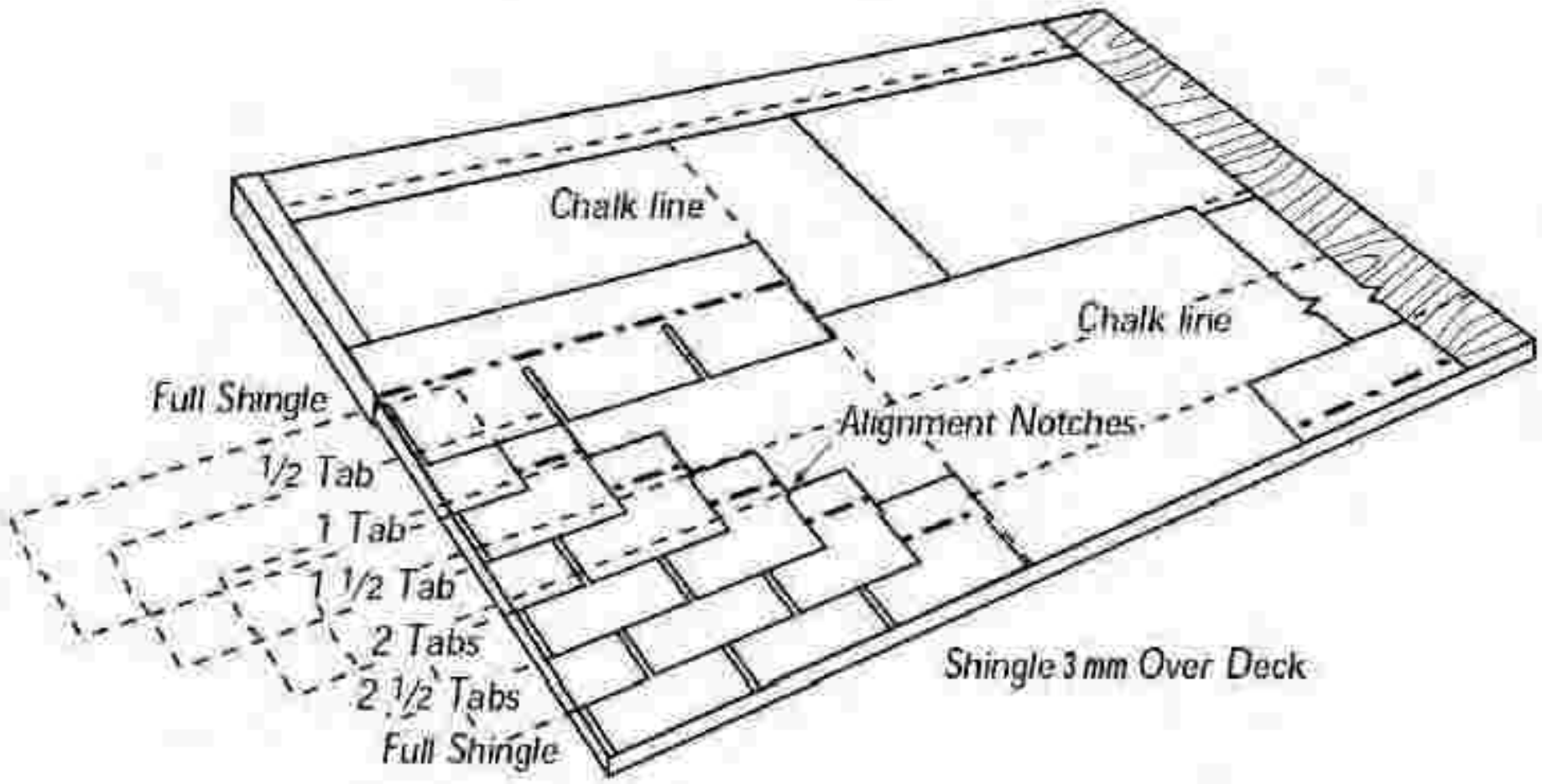


‘normal’ 4-nail pattern

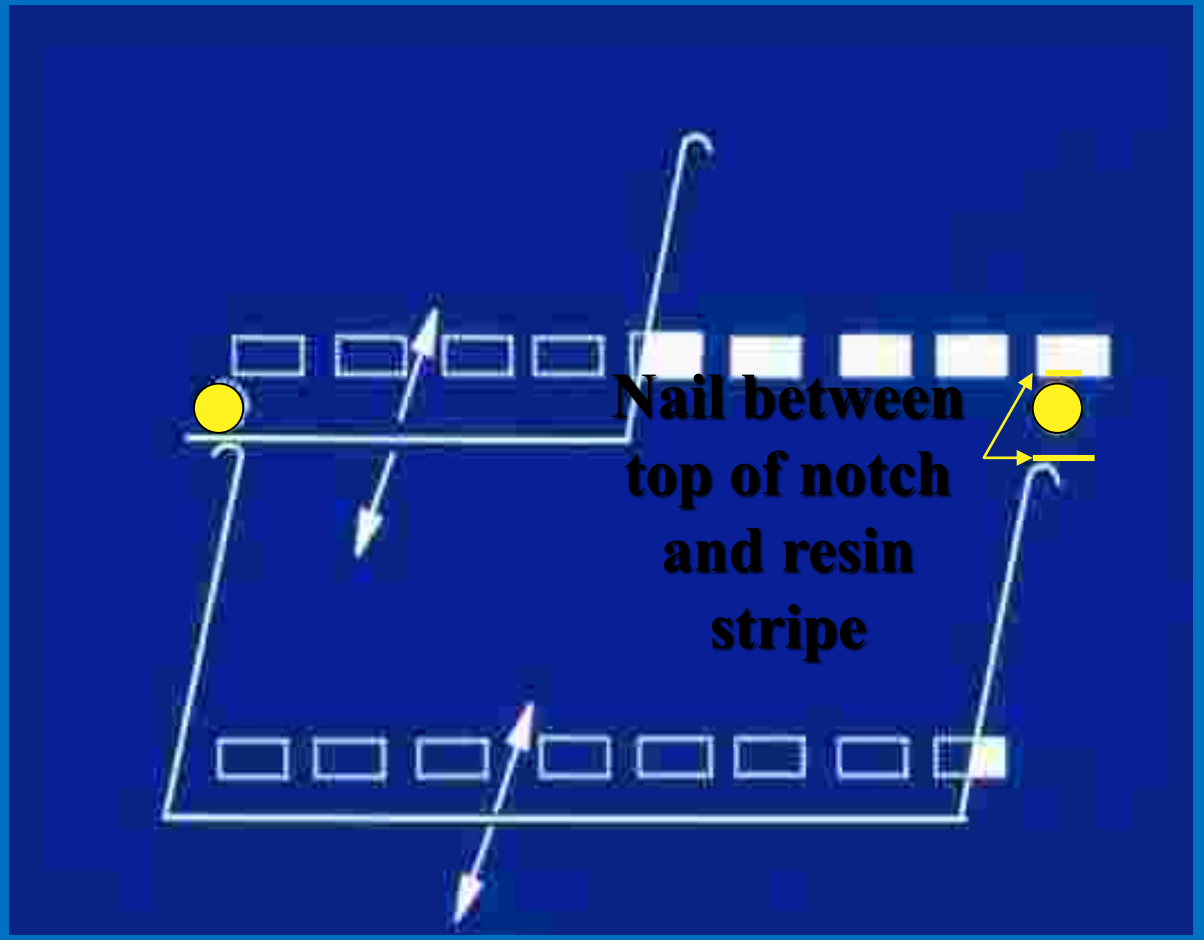


‘high wind’ 6-nail pattern

3-Tab Application

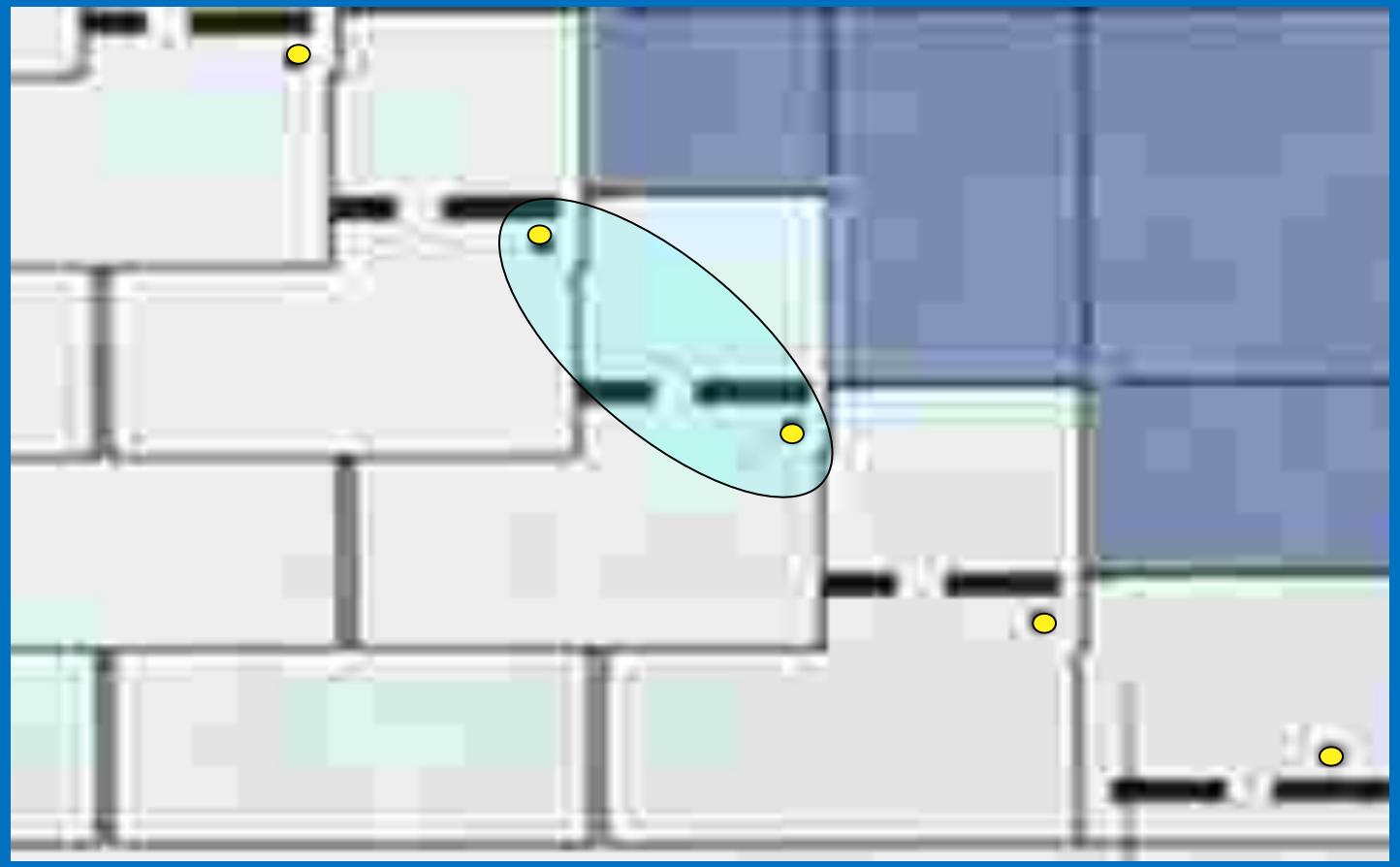


Proper Nail Location

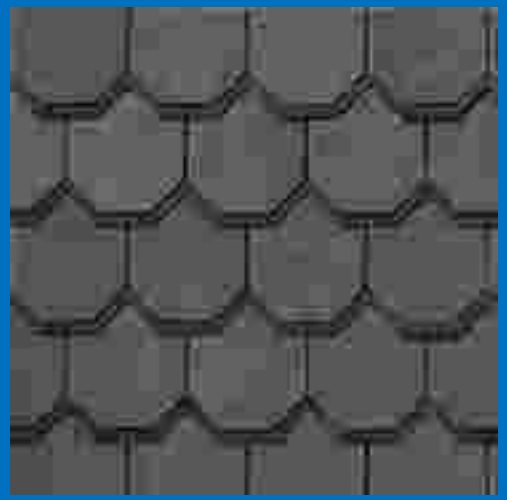


Proper Nail Location

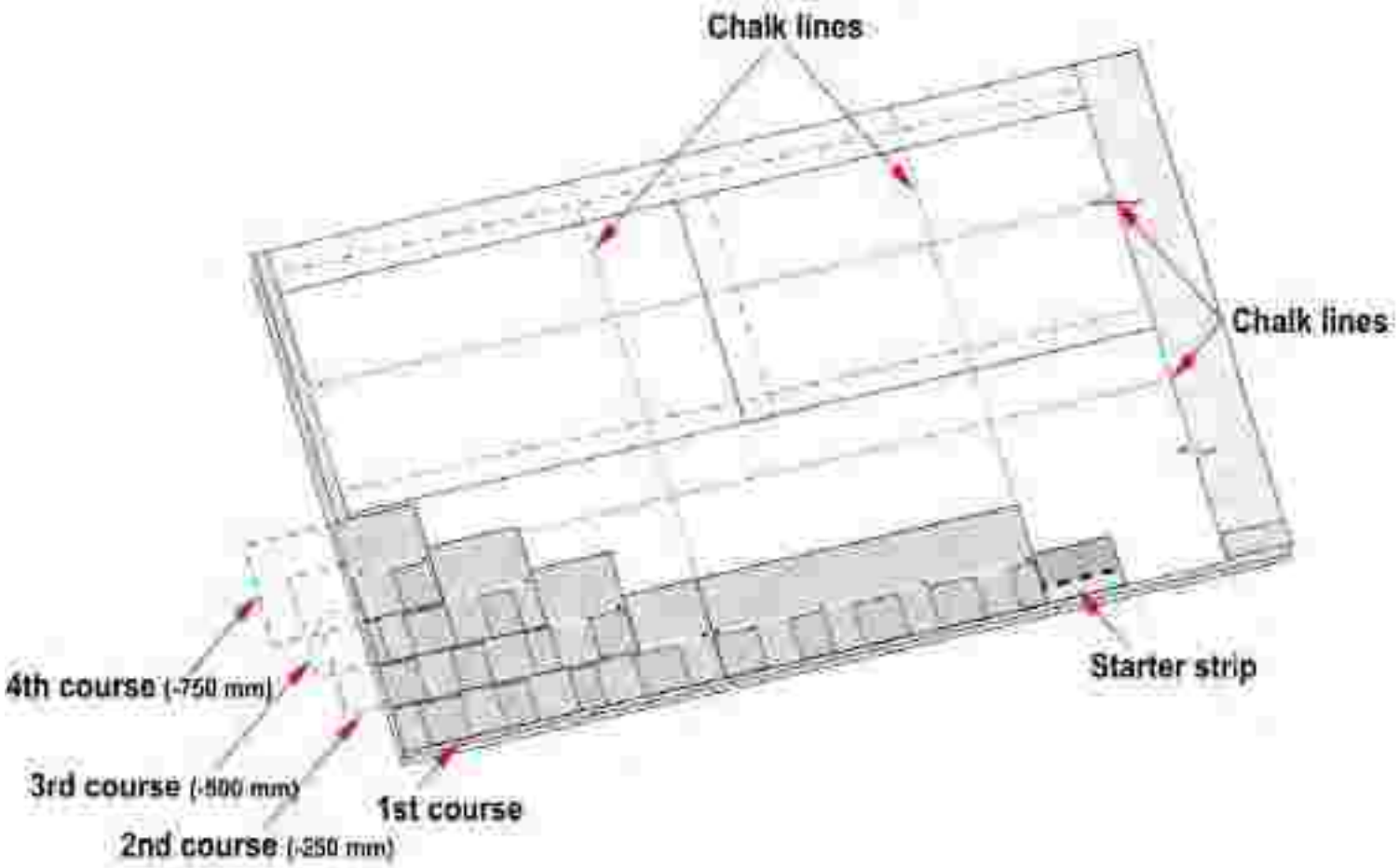
- Each nail catches the underlying shingle
- Results in each shingle having 8 or 12 nails



Additional types and styles



Starting Laminated Shingle Application



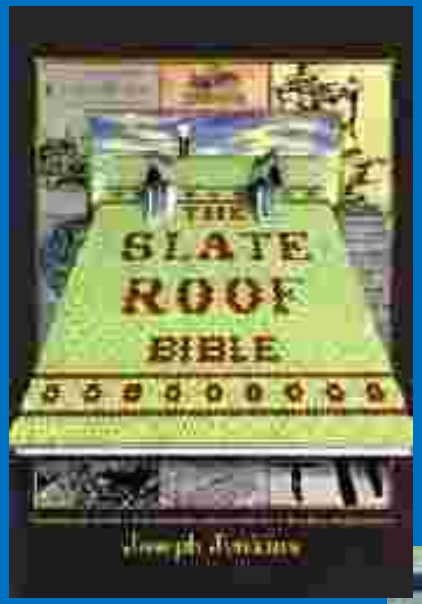
Laminated Shingles

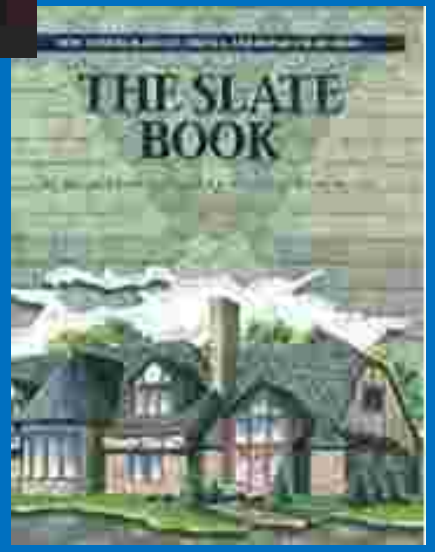
- One of the most critical elements of a successful roofing project is correct installation of the shingle. Market research has shown that most laminated shingles are incorrectly installed due to improper fastener placement.” (Malarkey Roofing Products)

Fasteners - Staples

Fasteners - Staples

Check List - Slate





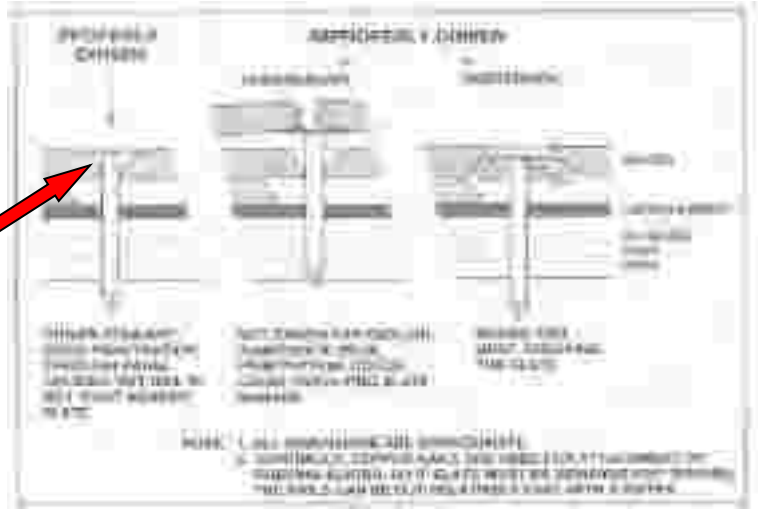
ASTM C 406, *Standard Specification for Roofing Slate*

- **Decking: 19mm (3/4”) min. wood, OSB or plywood (exterior).**
- **Drip edge min. 0.55mm (16 oz.) Copper or equivalent durability.**
- **Underlay: Min two #30 asphalt saturated felts.**

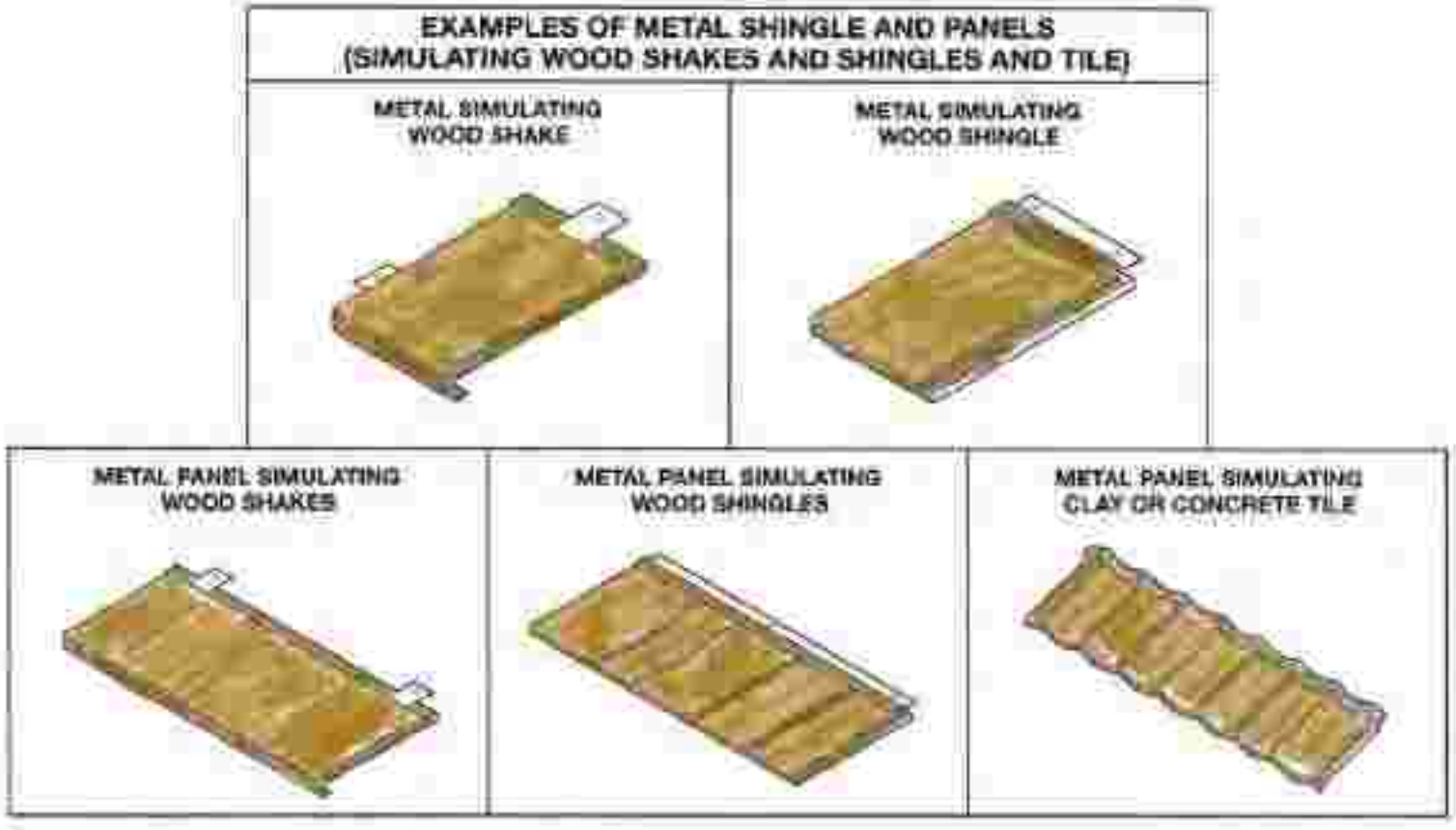
Check List - Slate

- **Fasteners: Place 75mm (3”) min. from edge of overlying edge joint**
- **Copper slating nails, 3mm (1/8”) diameter, long enough to penetrate into deck so as to be visible from the underside. Stainless, bronze or brass nails may also be used.**
- **Slating clips may also be used.**

Note that nail is not tight against slate



Typical Configurations
Metal Shingles



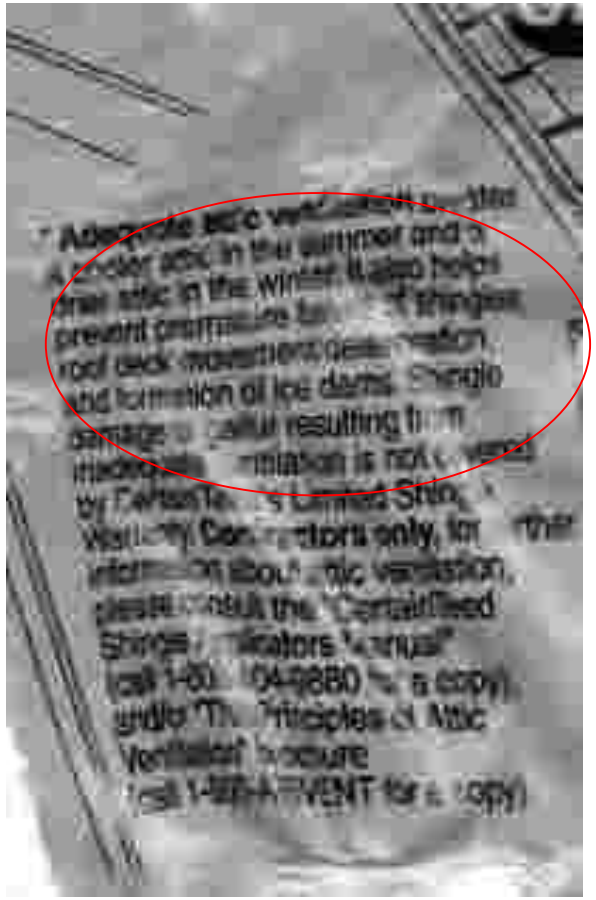
Metal Shingles & Panels

- Application requirements depend upon profile
- Water-shedding
- Rely upon underlay
- Need Manufacturer's specific details
- SMACNA manual helpful

Metal Shingles

Steep Roofing - Ventilation

Steep Roofing - Ventilation



VENTILATION

All roof structures must be provided with through ventilation to prevent entrapment of moisture-laden air beneath the roof sheathing. Ventilation must meet or exceed current National and/or Local Building Code standards.

CEMENT

these shingles on roofs having a slope less than 2" (51 mm) per foot or more than 21" (534 mm) in 12" (305 mm).

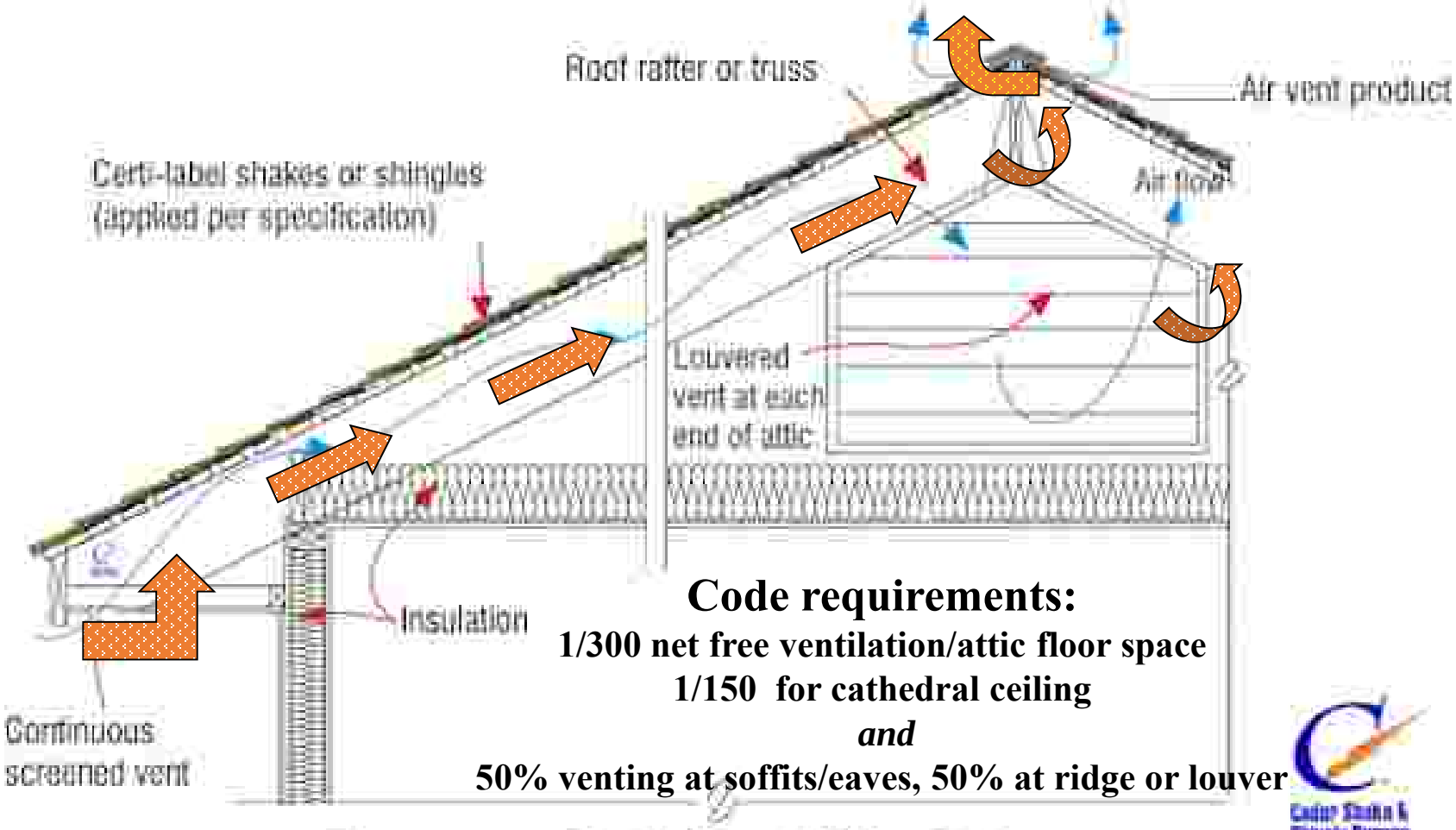
Ventilation– To prevent harmful condensation or heat build-up, air must circulate freely under the roof deck. F.H.A. minimum property standards require that there be a minimum of one square foot (929 cm2) of ventilation for every 300-square feet (28m2) of attic floor space, distributed 50% at the eaves and 50% at the peak. All roof structures must be provided with thorough ventilation to prevent entrapment of moisture laden air behind roof sheathing. Ventilation provisions must meet or exceed current F.H.A. or H.U.D. requirements.

Roof Deck– Roof deck must be constructed of tongue and groove, seasoned dry lumber not over 8" (203 mm) in width and not less than 5/8" (16mm) in thickness. Exterior grade plywood sheathing may be used provided it is at least 15/32" (12 mm) thick and is blocked, supported and nailed according to the specifications of the American Plywood Association. Deck must be dry and free of debris before beginning application of underlayment or shingles. For application over other decks or construction conditions not shown consult the manufacturer before

NBC Ventilation Requirements

- 9.19.1. Venting
  - 1 in 300 rule for normal attics
  - 1 in 150 rule for roofs with slopes of less than 1 in 6, or constructed with roof joists
  - Uniformly on opposite sides of the roof
  - Minimum 25% at or near ridge
  - Minimum 25% at or near the bottom
  - Meet CSA CAN3-A93-M, “Natural Airflow Ventilators for Buildings.”

Steep Roofing - Ventilation



Code requirements:

1/300 net free ventilation/attic floor space

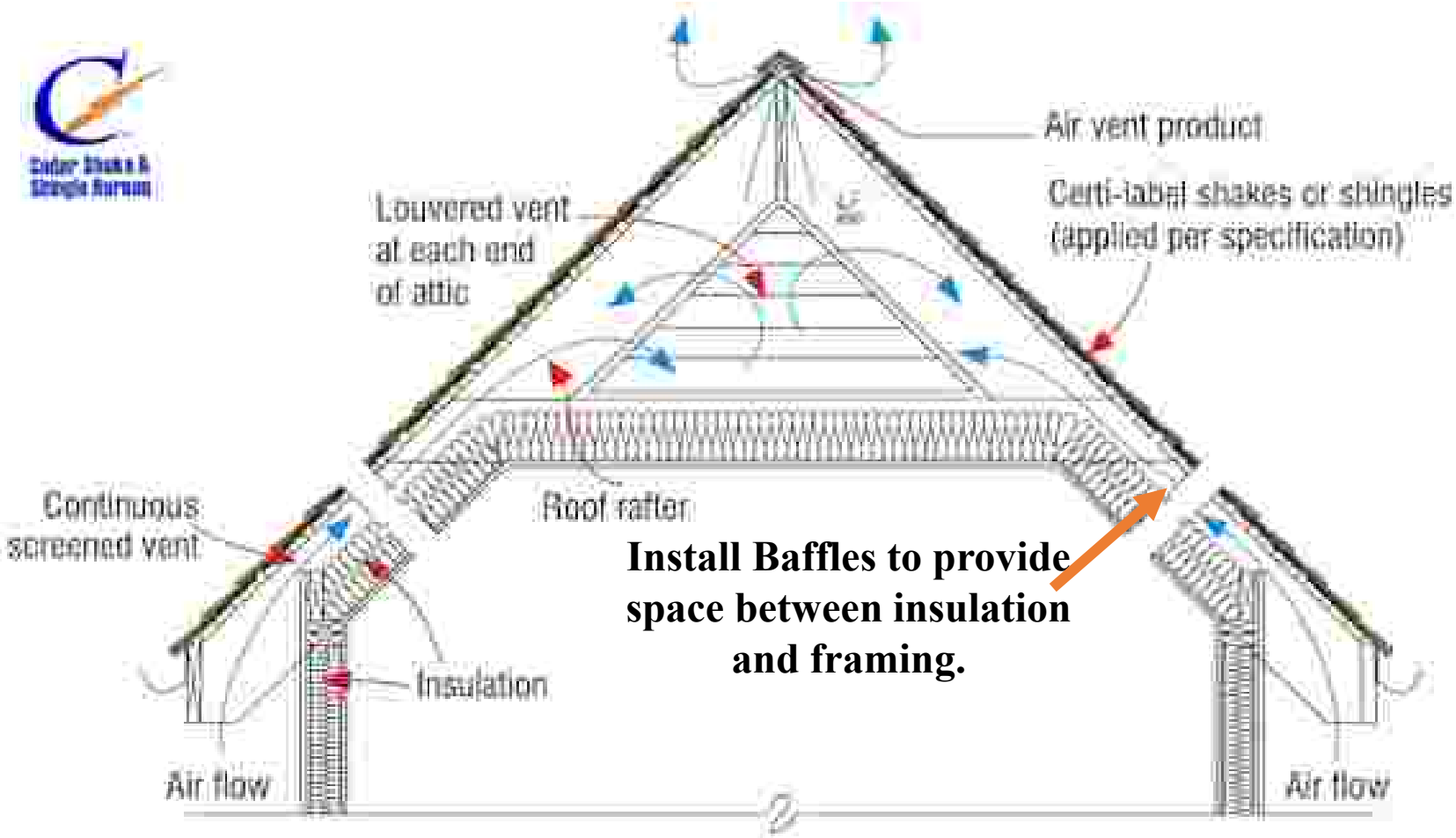
1/150 for cathedral ceiling

and

50% venting at soffits/eaves, 50% at ridge or louver

Figure 15a: Gable Roof With Attic

Steep Roofing - Ventilation



Install Baffles to provide space between insulation and framing.

Figure 15b: Cathedral Ceiling With Partial Attic

Venting - Insulation on Top of Deck

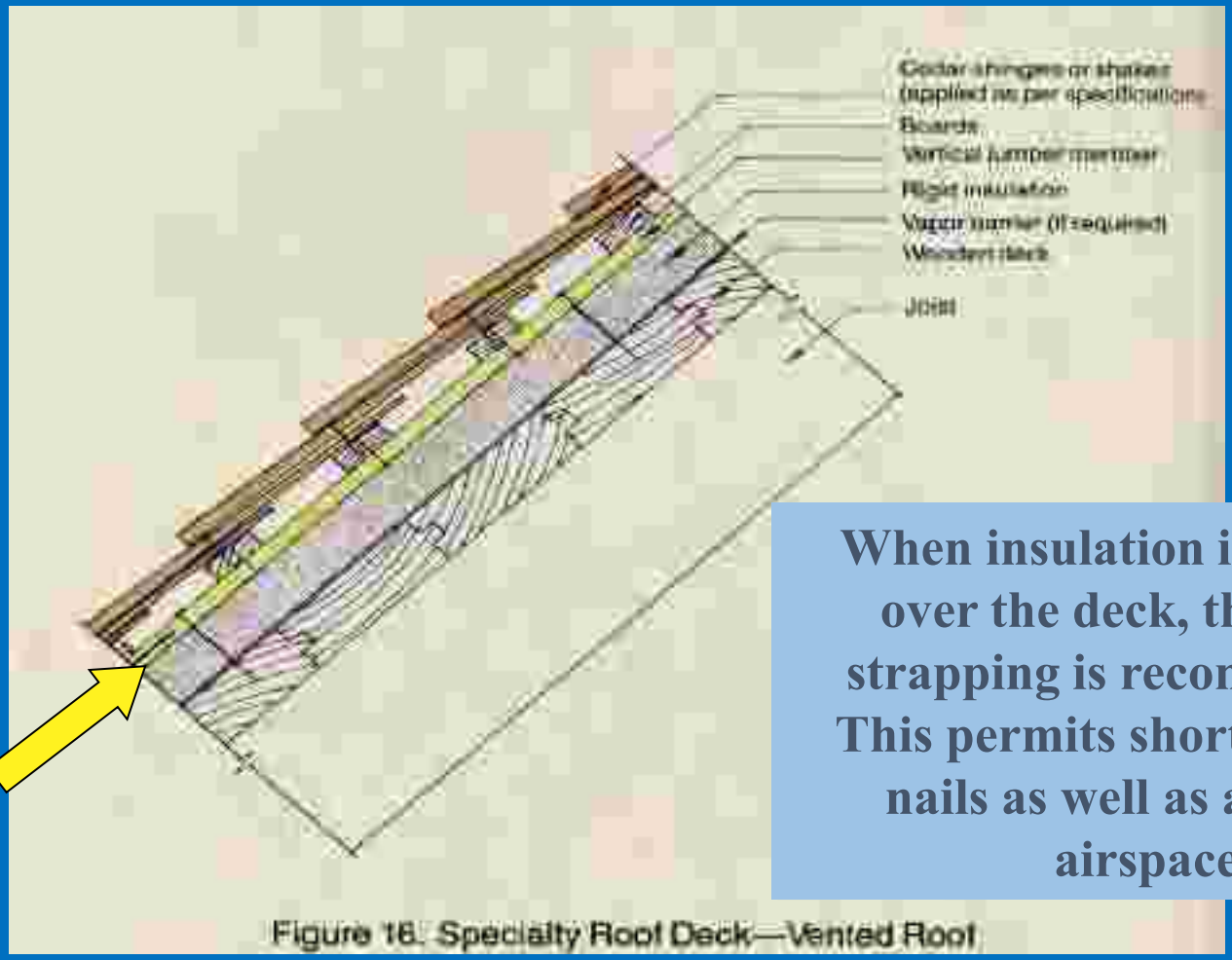


Figure 18. Specialty Roof Deck—Vented Roof

When insulation is installed over the deck, the use of strapping is recommended. This permits shorter shingle nails as well as a vented airspace

ARMA Technical Bulletin

Direct Application of Asphalt Shingles over Insulation or Insulated Decks

- Reasons to Vent:
  - Shingles may be damaged or punctured due to soft substrate
  - Nail-holding may be inadequate
  - Heat build-up may accelerate weathering
  - Fire ratings may be affected
  - Proper ventilation is impossible to accomplish

It is recommended that a flow-through ventilated air space be provided

Ventilation

Ventilation

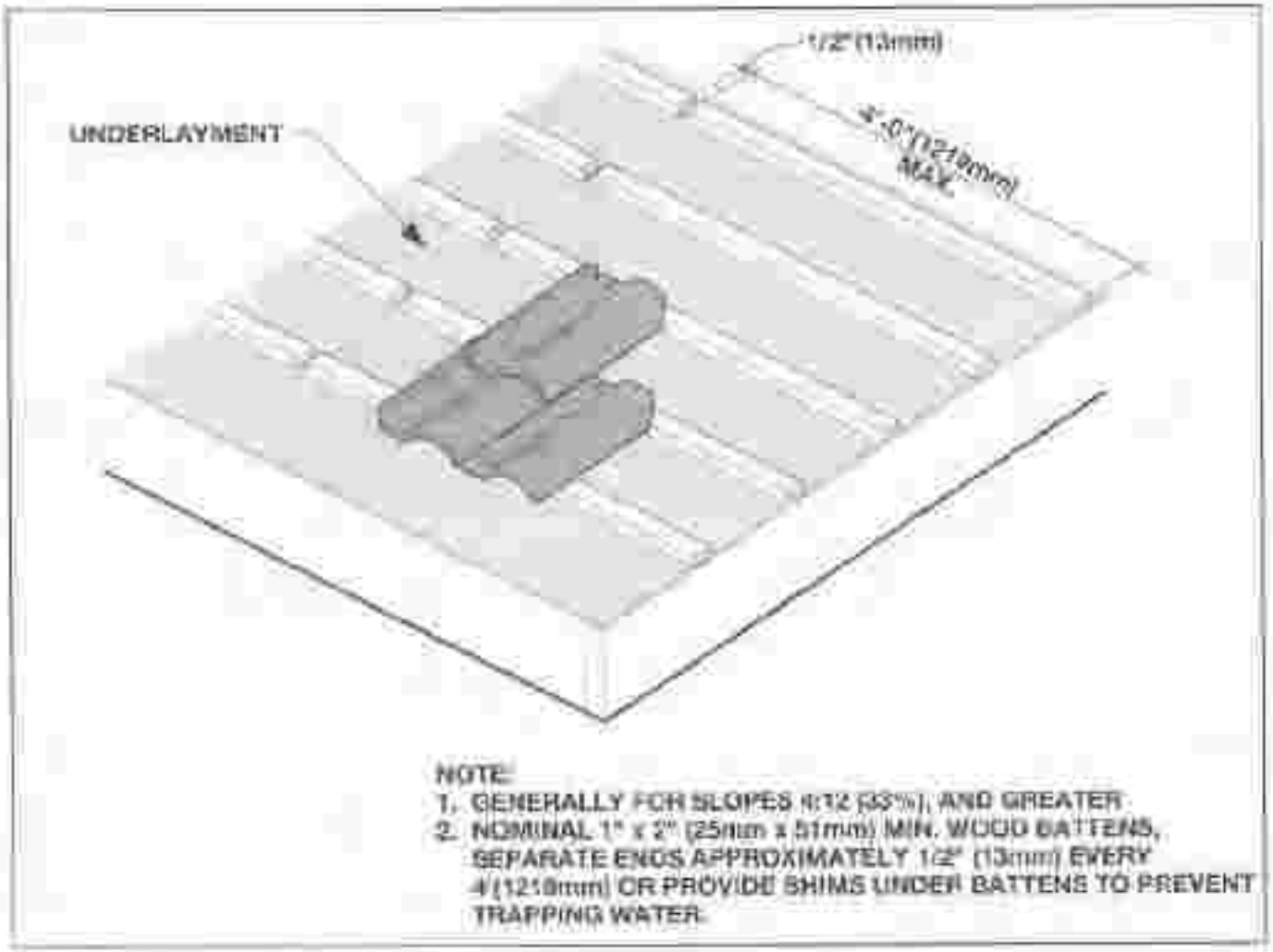
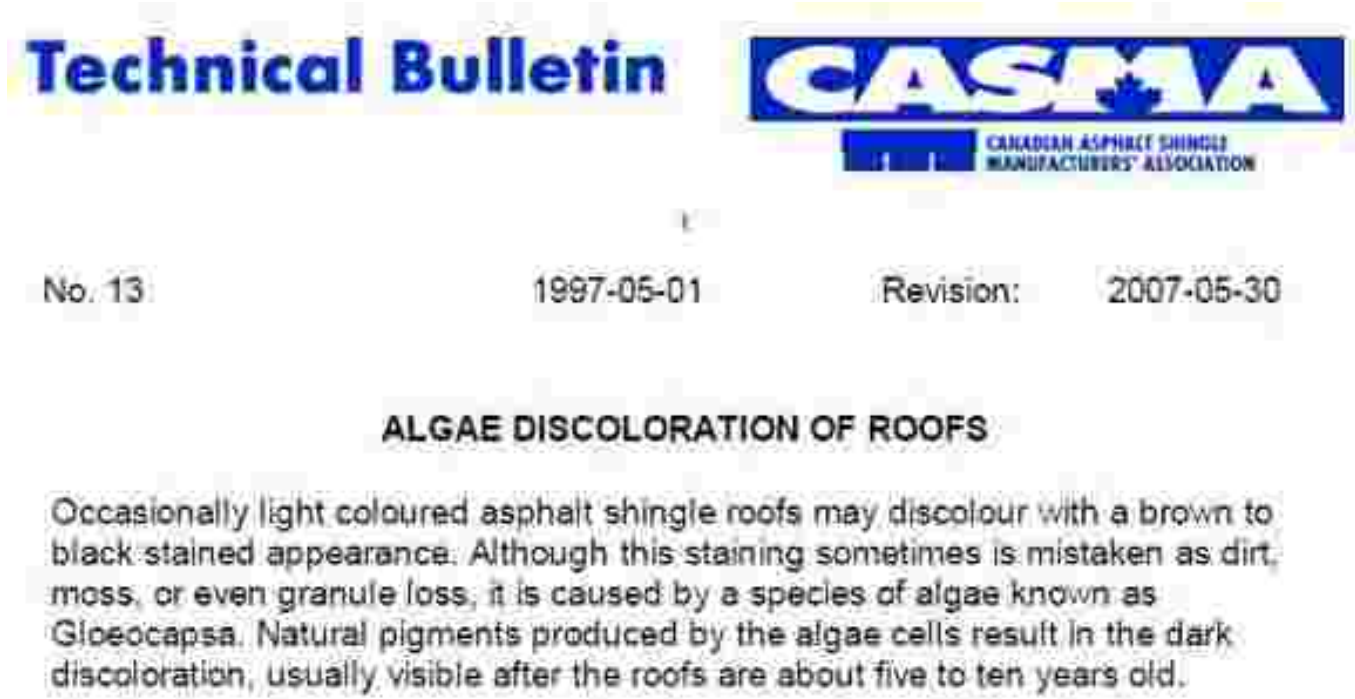


Figure 1 Example of wood batten system.

Steep Slope

- Deck and Underlay
- Valley Treatments
- Flashings
- Ventilation
- Fastening
- Troubleshooting

Mold and Mildew



Technical Bulletin

CASMA
CANADIAN ASPHALT SHINGLE MANUFACTURERS' ASSOCIATION

No. 13 1997-05-01 Revision: 2007-05-30

ALGAE DISCOLORATION OF ROOFS

Occasionally light coloured asphalt shingle roofs may discolour with a brown to black stained appearance. Although this staining sometimes is mistaken as dirt, moss, or even granule loss, it is caused by a species of algae known as Gloeocapsa. Natural pigments produced by the algae cells result in the dark discoloration, usually visible after the roofs are about five to ten years old.

- Bleach, TSP, water
- Apply with soft brush
- Rinse with fresh water
- Verify procedure with manufacture

Color Shading

Technical Bulletin

CASMA
CANADIAN ASPHALT SHINGLE MANUFACTURERS' ASSOCIATION

No. 17 1998-09-28

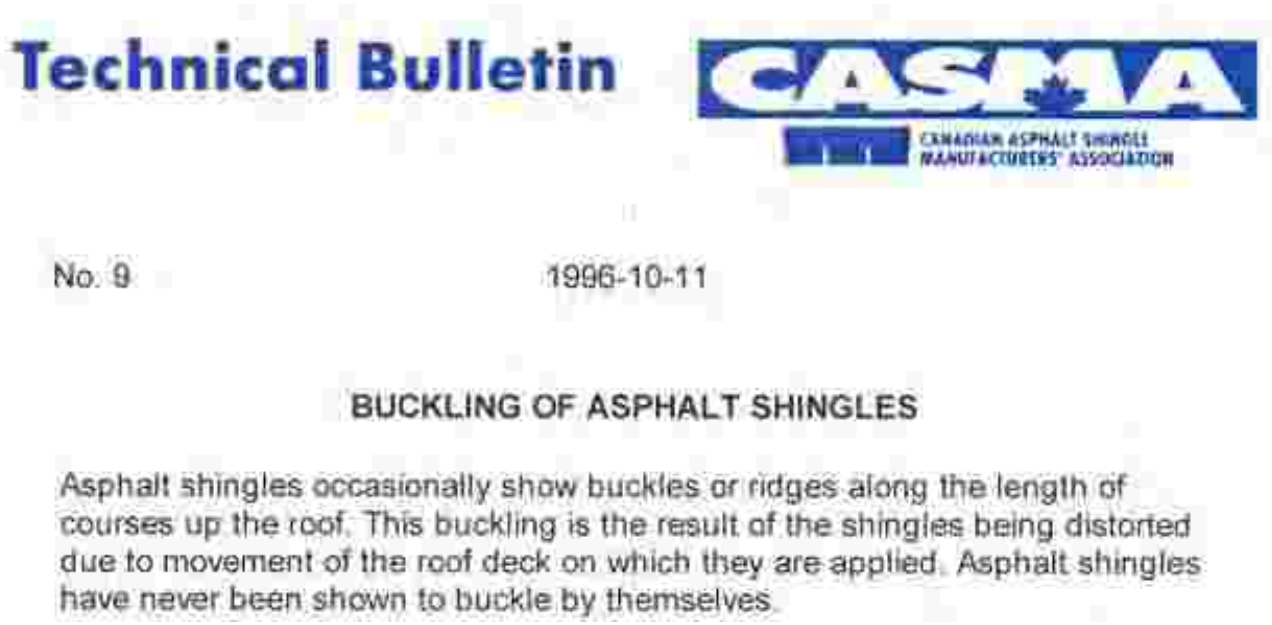
COLOUR SHADING OF ASPHALT SHINGLE ROOFS

As a roof is viewed from different angles, and/or different lighting conditions, certain areas may appear darker or lighter. This inconsistency in colour is commonly called "shading".

Shading usually results from slight variations in texture which normally occur during shingle production. The variations necessary to cause shading are so slight that they cannot be detected during the manufacturing process. When light is reflected from a given roof, its appearance will vary as the viewer walks past the building. The impact will depend on the position of the sun and the overall light intensity. When the sun is directly overhead, the shading may disappear. The perception of shade differences may also vary under cloudy skies or if the shingles are wet.

- Use blends
- Work across and up roof

Buckled Shingles



Technical Bulletin

CASMA
CANADIAN ASPHALT SHINGLE MANUFACTURERS' ASSOCIATION

No. 9 1996-10-11

BUCKLING OF ASPHALT SHINGLES

Asphalt shingles occasionally show buckles or ridges along the length of courses up the roof. This buckling is the result of the shingles being distorted due to movement of the roof deck on which they are applied. Asphalt shingles have never been shown to buckle by themselves.

- Allow decking to come to moisture equilibrium
- Use shingle underlayment
- Ensure adequate attic ventilation

Moss & Algae

- In dry weather, spray with 10% zinc sulfate.
- Caution, don’t use with copper flashings or gutters
- Nailed strips of zinc or copper at ridge retards moss, fungus and mildew
- Trim overhanging branches

Moss & Algae


Algae discoloration


Wash of zinc from galvanized flashings inhibits algae growth

Severe Humidity

Certi-Last (0.4 CCA) treated cedar recommended in moist areas—or— after 12-24 months, apply wood preservative on 5-year cycle

Steep Roofing Resources

- *Steep Roofing Manual* www/nrca.net
- *Concrete and Clay Roof Tile Design Criteria*-Tile Institute www.rooftile.org
- Western States Roofing Contractors Assoc. www.csrca.com
- *Residential Asphalt Roofing Manual* www.arma.org
- Cedar Shake and Shingle Bureau www.cedarbureau.org
- *Sheet Metal Manual* SMACNA www.smacna.org
- *Copper and Common Sense* www.reverecopper.com
- Copper Development Association www.cda.org
- Metal Building Manufacturers Association www.mbma.org
- Metal Roofing Alliance www.metalroofing.com
- Canadian Asphalt Shingle Manufacturers Association www.casma.ca
- Canada Mortgage and Housing Corporation www.cmhc-schl.gc.c
- Building Codes and Individual Materials Manufacturers
  - Don’t forget the RCI-Mercury.com search engine

IBEC
International Institute of
Building Enclosure Consultants

Questions and Discussion