

Asphalt Shingle Options and Considerations

www.PHIinspect.com

Asphalt Shingle History:

Asphalt shingles have been around for more than a century and account for 80-90% of all residential roofs. Basic shingle construction remained consistent until the mid 1970's when shingle makers began introducing varying innovations such as fiberglass reinforcing mats, self-sealing tabs, laminated construction, and modified asphalt formulas with varying degrees of success.

Basic Components: (see page # 2 for a visual)

All asphalt shingles consist of an inner reinforced fiber mat coated with asphalt. The fiber mat, which gives the shingle most of its strength, is made either from an *organic cellulose material* (derived from wood or recycled paper) or from newer technology *fiberglass material*. On top of the inner reinforcing mat is a coating of asphalt (*thicker for organic mats, thinner for fiberglass mats*), followed by a top surfacing of small granules of rock which are colored with a ceramic coating, to protect/reflect damaging sunlight. On the back is a stabilizing back-surface asphalt layer (organic shingles) and finely ground mineral dust used to retard adhesion while in storage. On the back a stripe of adhesive helps to resistant shingle movement from wind.

Organic Shingles:

- Incorporate two kinds of asphalt, a soft saturating asphalt in the mat, and a harder, filler-modified coating on the top & bottom surfaces.
- Have greater pliability/flexibility to weather extremes so they are often preferred by roofers to fiberglass shingles in cold weather climates.
- Uses more asphalt in the construction process (greater resistance to severe cracking), heavier compared to fiberglass shingles.
- Less resistant to moisture but more susceptible to aesthetic staining issues from *Gloeocapsa* algae spores
- Normal aging includes drying out, washing away of granules/asphalt resulting in cupping, curling, and surface cracks.

Fiberglass Shingles:

- Incorporate one thinner layer of asphalt.
- Bonded together with a phenolic adhesive which is affected less by moisture.
- A less flexible more brittle type of shingle. More susceptible to shingle tear off in windy conditions and severe cracking (through the entire shingle) from thermal expansion/contraction of shingle and roof decking structure and sheathing surfaces.
- A lighter, easier to install, easier to ship shingle which is often less expensive compared to organic shingles.
- Normal aging includes a dullness to shingle surfaces, missing granules, severe brittleness & cracking. Cupping/curling are much less common compared to organic shingles.

Gloeocapsa (blue/green algae staining):

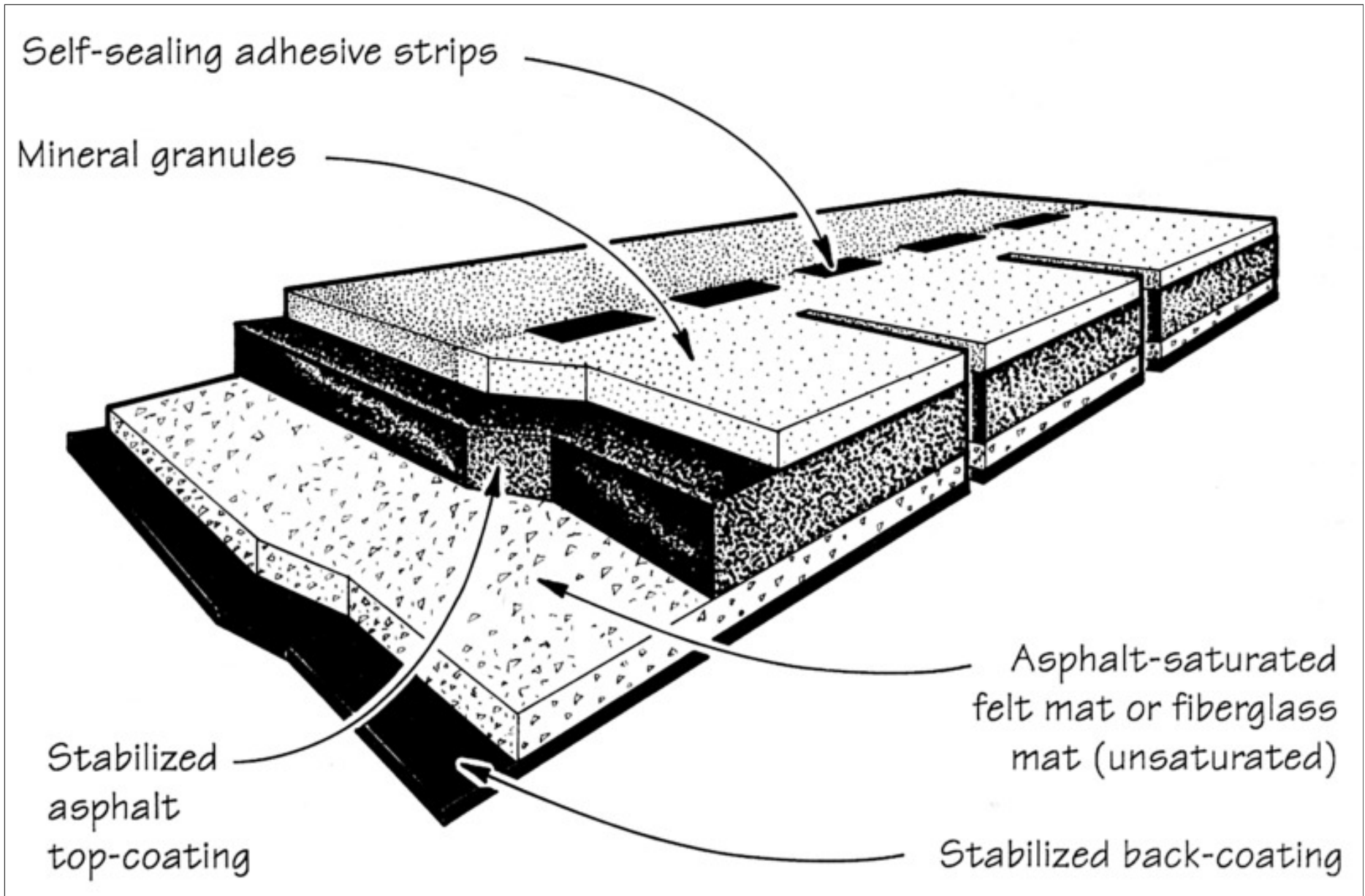
A bacteria capable of photosynthesis and able to tolerate drought, heat and periods of winter cold. Metallic Zinc strips (sufficiently thick) at the peaks of roofs with adequate rain can/will reduce staining. Current technology includes algae resistant granules with inhibiting copper icons. Roof slope, compass heading & color affect algae resistant technologies/materials. *Gloeocapsa* staining, although unsightly, is not considered harmful to shingle performance.

Testing/Quality Standards:

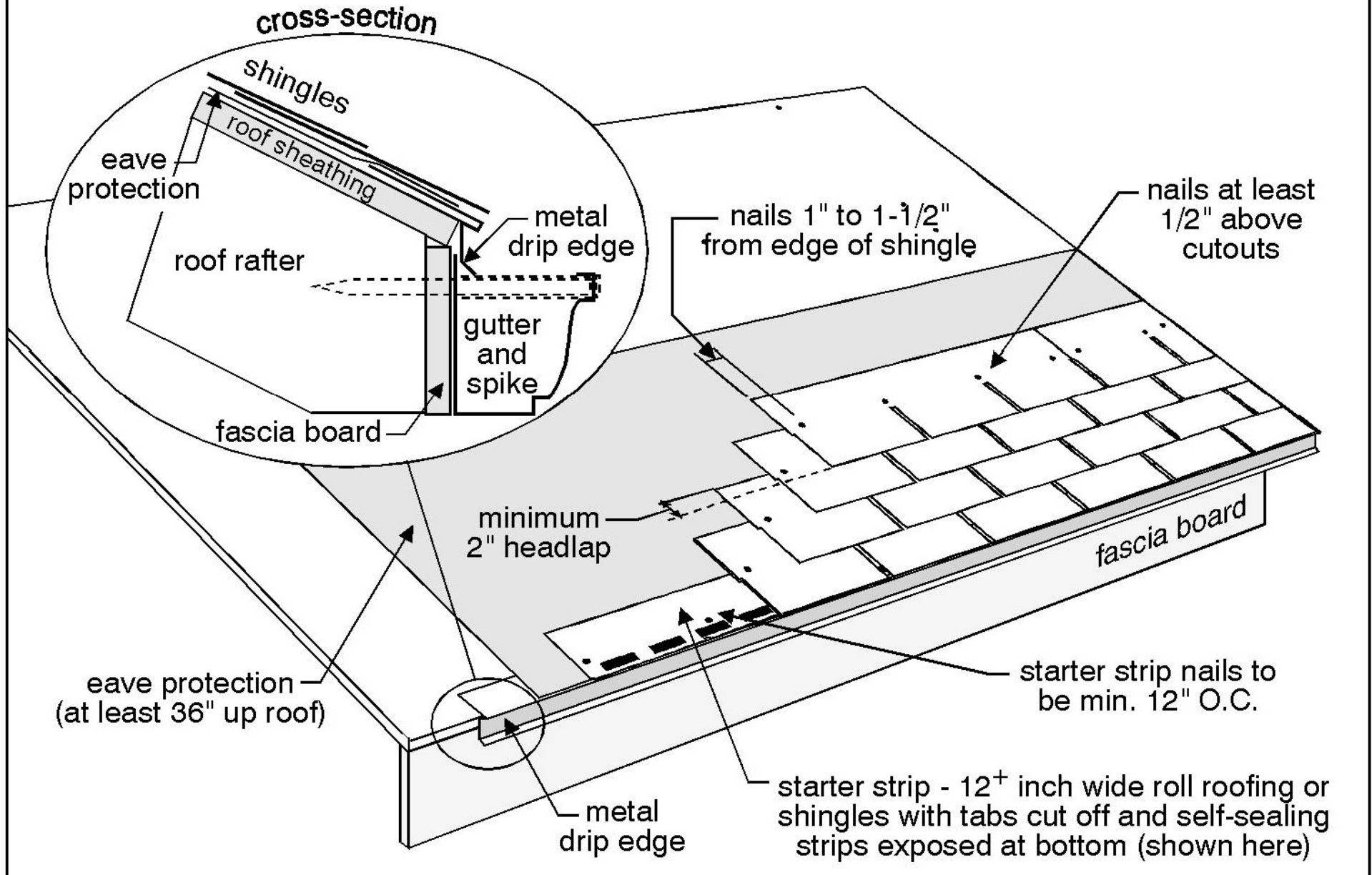
The shingle industry has had limited success establishing standardization/minimum testing protocols. Different stakeholders (companies and/or groups with varying degrees of interest-influence) have slowed and/or stalled any realistic/reliable industry standardization. Current testing methods such as: the "tear test", the "nail pull-through test", and the "pliability test" have made strides to improve industry standards. A "dark oven test" is a newer and not yet implemented test that simulates accelerated heat exposure in the field.

Typical Shingle Components

All asphalt shingles are built around a mat of either organic felt or fiberglass. The organic mats are thicker and are saturated with soft, pliable asphalt. Both types of shingles have a top layer of harder, stabilized asphalt topped with colored stone to protect against UV light. On the bottom, all shingles have a thin coating of asphalt coated with talc, sand, or mica to keep the shingles from sticking together in the package.



Typical asphalt shingle application - showing metal drip edge

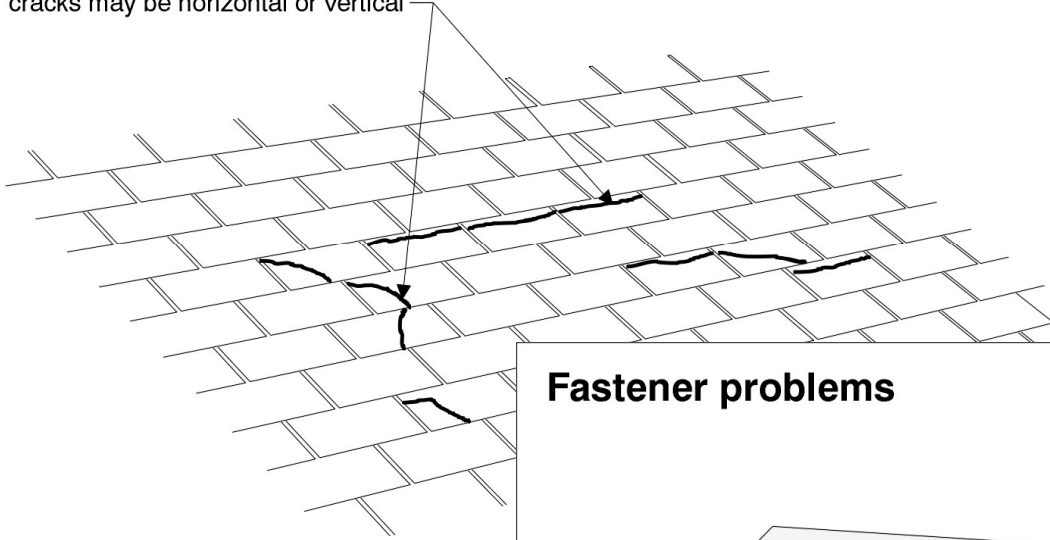


Issues & Concerns

Premature failure of asphalt shingles

premature cracking of shingles can occur even in newer asphalt shingle applications

cracks may be horizontal or vertical



Fastener problems

