

Roofing Material Comparisons

Housing Fact Sheets

One of the great strengths of our market economy is the number of product choices we are provided with¹. So when it comes time to replace the roof on your home there are several roofing products manufactured from a variety of natural and human-made materials from which you can choose. However, the number of choices can be confusing. This information sheet is meant to provide consumers with basic information about common roofing materials used on residential structures.

The five most common groups of residential roofing materials are:

- Asphalt
- Wood
- Metal
- Tile
- Slate

Table 1 gives cost and life expectancy estimates for each material group. A brief description of these five roofing materials and information about product types available within each group is also included in this information sheet.

Table 1: Roofing Material Comparisons

Material	Asphalt	Wood	Metal	Tile	Slate
material cost*	\$20-\$140	\$95-\$170	\$155-\$310	\$140-\$850	\$320-\$1200
weight* (Lb.)	195-430	300-400	50-270	900±	900±
Estimated life expectancy	15-30 years	15-30	20-50	50	50-100+

*Cost and weight figures are per 100 square feet of roof area covered

Source: Consumer Reports: August, 1997

ASPHALT ROOFING SHINGLES

Asphalt shingles are the most commonly used material on residential roofs in the United States, and for good reason. This type roofing material is durable, easy to install, and is moderately priced.

Asphalt roof shingles are composed of a mat core that is coated with multiple layers of asphalt (Figure 1). Pulverized minerals are embedded into the final layer of asphalt on the top side of the shingle. The granules protect the asphalt and mat from the sun's damaging ultraviolet rays.

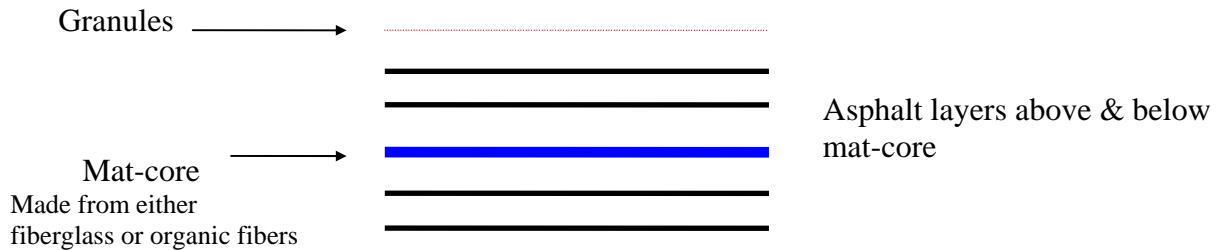


Figure 1

Asphalt shingles are manufactured with either a fiberglass mat-core or an organic mat-core.

1) **Fiberglass Mat-Core Asphalt Shingles:**

The central core is made from lightweight fiber-glass. The durability and quality of fiberglass shingles has been an issue in the roofing industry in the past.

Although these problems have reportedly been addressed by fiberglass shingle manufacturers, The National Roofing Contractors Association recommends using only fiberglass shingles that meet ASTM¹ standard D6432. This standard is a measure of the tear resistance of fiberglass shingles, which is considered to be an indication of durability for fiberglass shingles. However, *Consumer Reports* (vol. n. 8 p.26-29) recently tested fourteen types of fiberglass shingles, although the manufacturers of each of these type shingles claimed they met ASTM D6432, only 50% of the fiberglass shingles tested by *Consumer Reports* actually passed the test.

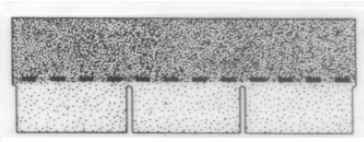
2) **Organic Mat-Core Asphalt Shingles:**

The central core is made from cellulose fibers. Organic shingles are recommended for extremely cold or windy areas.

Most asphalt shingles used in residential work are known as three-tab shingles (Figure 2). Three-tab shingles weigh about 240 pounds per 100 square feet of area and they are typically available with a 15 or 20 year warranty. Heavier, more durable asphalt shingles are also available. But if you want to purchase an asphalt shingle product with a 30 or 40 year warranty you will have to buy laminated shingles, also called *architectural shingles* (Figure 3). These type shingles are solid across their entire length and width. They consist of multiple mats laminated together within each shingle. They are installed so that three to

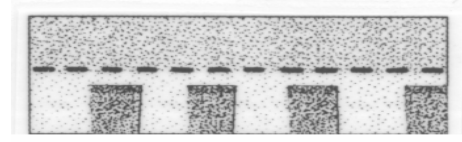
¹ ASTM is an acronym for the American Society for Testing & Materials. It is an international organization made up of engineers, scientists, educators, manufacturers, government agencies, etc. The society determines methodologies for materials testing and sets standards that materials should meet in areas such as strength and durability. ASTM standard D6432 was developed by groups of engineers and scientists who are members of this organization. So when you see "Meets ASTM Standard D6432" stamped on a bundle of shingles, it is your assurance that this product has met durability criteria as determined by a group of neutral scientists and engineers.

four layers of shingles overlap, providing multiple layers of protection from the weather. Architectural shingles are significantly more expensive than 3-tab shingles.



3-Tab Shingle

Figure 2



Laminated Shingle

Figure 3

It is important to note that weight is not a reliable indicator of the quality and durability of asphalt shingles. Jefferson Kolle (1995) quotes a report written by W. Kent Blanchard for the National Roofing Contractors Association. According to this report...”shingle testing and observation from field performance have frequently shown that weight alone is not a sufficient indicator of shingle quality”. Better predictors of a shingle products quality are...”the quality of the individual components of the composite structure, the asphalt, the mat-core and the manufacturing controls” (p.46). Unfortunately there is no way a consumer can determine this. Talk to building suppliers and roofing contractors as a method to determine which asphalt shingle products to purchase. They may know which manufacturers reliably produce good quality shingles and which do not.

WOOD:

Wood roofing products are available in two basic forms: 1), wood shakes and 2), wood shingles. Shingles are produced by *sawing* wood into long tapered shapes; Shakes are produced by *splitting* wood into long tapered shapes. Sawing produces a more uniformly shaped and relatively smooth surface. Splitting produces a rough, highly textured appearance.

Wood shingles and shakes tend to be expensive to purchase and install. In addition wood is ignited relatively easily, so wood roofing products must be treated with fire retardant chemicals. Even then, wood roofs usually do not qualify for a Class A fire rating, the most fire resistant. This is the reason that building codes in some communities will not permit wood roofs. Check with your local building department before buying and installing wood shingles or shakes.

The aesthetic beauty of a wood roof is perhaps its greatest advantage. Wood roofs typically provide an interesting and attractive texture and the wood weathers to a beautiful silver-gray color.

METAL:

Metallic coated steel, copper, aluminum, and stainless steel are some metals commonly used for roofing. Galvanized (zinc coated) steel is the most common metallic coating used on steel roofing. Metal roofs are relatively lightweight and vary greatly in price depending upon which type metal is used.

Metal roofing comes in two different forms:

- 1) agricultural panels and
- 2) standing seam panels.

What follows is a description of each form and advantages and disadvantages of each.

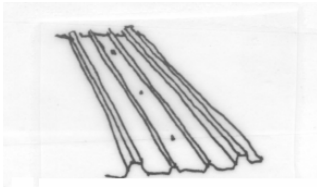
- **Agricultural Panels:**

Agricultural panels have ribbed shapes pressed into them (Figure 4). Exposed fasteners with rubber gaskets are used to attach the panels to the roof deck. Applying this form of metal panel directly to a plywood roof deck usually results in early failure of the roof. The expansion and contraction factor of metal roof panels is so great that the fasteners can become loosened causing panels to blow off.

Expansion and contraction can also cause the holes around fasteners to become enlarged, causing leakage. This is the reason that manufacturers of agricultural panels usually do not recommend their use on residential structures.

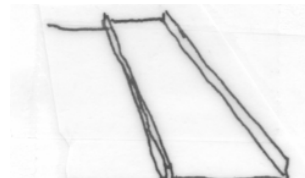
- **Standing Seam Metal Roofing:**

Standing seam metal roofing has folded seams and all fasteners are covered by the seam folds (Figure 5). Copper, easily shaped and highly durable is often used for standing seam roofs. When highly durable metal is used, coupled with proper installation, standing seam roofs are extremely long lived. Installation of this type roof is labor intensive and requires skilled installers. Therefore it is best to leave installation



Agricultural Panel

Figure 4:



Standing Seam Panel

Figure 5:

TILE:

Clay, concrete, and fiber cement are the three most common materials used for roof tiles. Of the three, clay tiles are the most expensive. Tile roofs have a class A fire rating and create a pleasing textured look on a roof. Tile roofs are difficult and time consuming to install.

SLATE:

Slate is probably the most durable roofing material. In fact, the slate will last forever. It is the fasteners that hold the slates to the roof and the flashing's which limit the life of a slate roof. But, if proper fasteners and flashing are used, along with careful installation, a slate roof has a life span of at least 100 years.

References:

Kolle, J. (1994, January). Choosing roofing. *Fine Homebuilding*, pp.46-51.

Haddock, R. (1992, June). Low cost metal roofing. *Journal of Light Construction*, pp. 19-22.

Shingles and siding how to know when you need them, costs, product tests. (1997, August). *Consumer Reports*, pp. 26-29.

¹ Written by Mark Pierce, Extension Associate (1998)