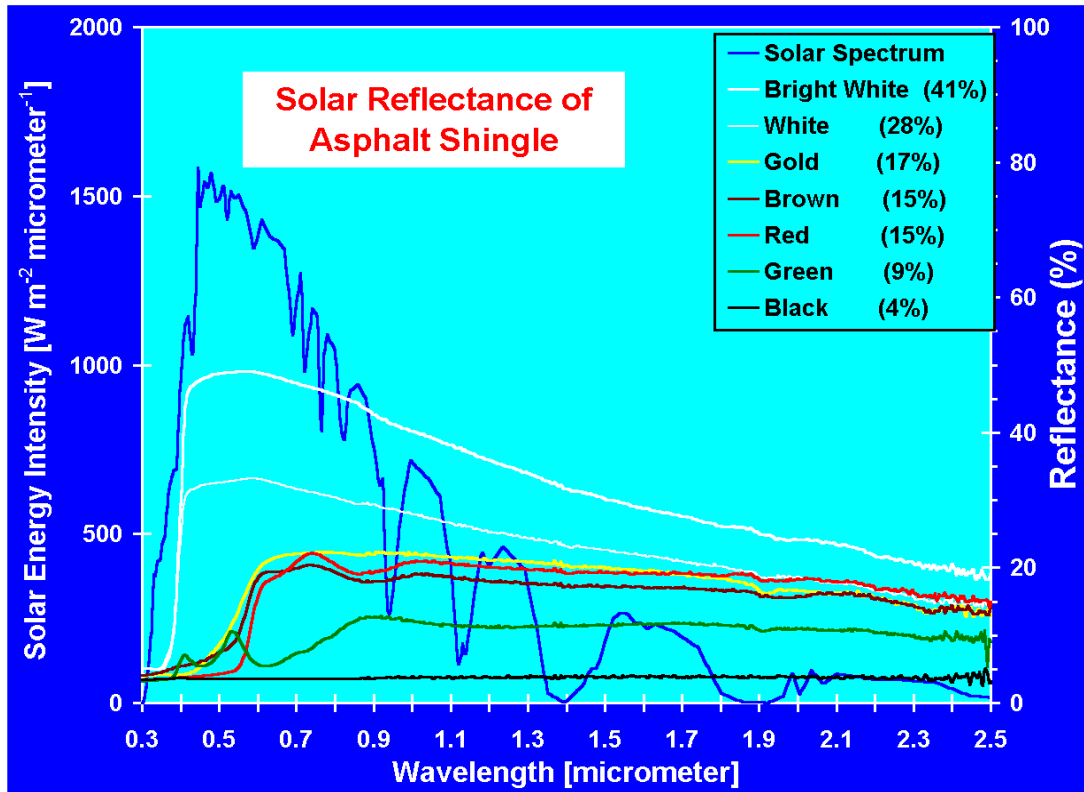


Asphalt Shingles

General Description

Asphalt shingles are a very economic roofing choice, which have a large share of the market, including most houses with sloping roofs. From a reflectance point of view, they are very similar to rolled asphalt roofing, which is often used as the top layer of low slope roofing. These materials are composed of asphalt saturated mats made from organic felts or fiberglass. The asphalt is protected from the sun's uv light by roofing granules pressed into the shingle while it is hot (and soft). The roofing granules are 1 millimeter-sized stones (e.g., of crushed granite), which are coated with an inorganic silicate material. The coating contains microscopic pigment particles, similar to those used in paint, to provide color.



The solar reflectance of all commercial asphalt shingles is rather low (see table). Premium white shingles are only about 30% reflective, and other colors reflect less. (Incidentally, white roofing materials usually contain additive to inhibit biological growth, to avoid roof discoloration.) The low solar reflectance can be attributed to several factors. First, there is a limited amount of pigment in the granule coating. Also, the roughness of the shingle contributes to multiple scattering of light and thus to increased absorption. Finally, the black asphalt substrate is not 100% covered, and reflects only about 5% of the light which strikes it. ISP Minerals of Hagerstown, MD has developed a whiter white roofing granule which can be fabricated into shingles with reflectance exceeding 50%. It is hoped that this granule will become available commercially.

Table 1. Solar Reflectance and Thermal Performance of Asphalt Shingles

Product	Solar Reflectance	Infrared Emittance	Temperature Rise	Solar Reflectance Index	Reference
White	0.21	0.91	68 F	21	LBNL 1
ISP K-711 White	0.36	0.91	55 F	40	LBNL 2
ISP K-711 White	0.31	0.91	59 F	34	FSEC 1

Shasta White	0.26	0.91	64 F	27	FSEC 1
Generic White	0.25	0.91	64 F	26	FSEC 1
Generic Grey	0.22	0.91	67 F	22	FSEC 1
Antique Silver	0.20	0.91	69 F	19	LBNL 1
Aspen Gray	0.18	0.91	71 F	17	FSEC 1
Ocean Gray	0.12	0.91	76 F	9	FSEC 1
Gray	0.08	0.91	79 F	4	LBNL 1
Beachwood Sand	0.20	0.91	69 F	19	FSEC 1
Light Brown	0.19	0.91	70 F	18	LBNL 1
Medium Lt. Brown	0.10	0.91	77 F	7	LBNL 1
Medium Brown	0.12	0.91	76 F	9	LBNL 1
Autumn Brown	0.10	0.91	77 F	7	FSEC 1
Dark Brown	0.08	0.91	79 F	4	LBNL 1
Green	0.19	0.91	70 F	18	LBNL 1
Surf Green	0.16	0.91	72 F	14	FSEC 1
Onyx Black	0.03	0.91	83 F	-2	FSEC 1
Island Brown	0.09	0.91	78 F	6	FSEC 1
Weathered Wood	0.08	0.91	79 F	4	FSEC 1
Coral	0.16	0.91	72 F	14	LBNL 1
Saddle Tan	0.16	0.91	72 F	14	LBNL 1
Desert Tan	0.12	0.91	76 F	9	FSEC 1
Generic Black	0.05	0.91	82 F	1	FSEC 1
Black	0.05	0.91	82 F	1	LBNL 1

[List of Suppliers](#)