

TABLE 2-2. OPTICAL PROPERTIES OF ASBESTOS FIBERS

Mineral	Morphology and Color ¹	Refractive Indices ² α γ^s	Birefringence ⁶	Extinction	Sign of Elongation
Chrysotile (asbestiform serpentine)	Wavy fibers. Fiber bundles have splayed ends and "kinks". Aspect ratio typically >10:1. Colorless ³	1.493-1.546 1.517-1.557 1.532-1.549 1.545-1.556 1.529-1.559 1.537-1.567 1.544-1.553 1.552-1.561	0.004-0.017	Parallel	+
Amosite (asbestiform grunerite)	Straight to curved, rigid fibers. Aspect ratio typically >10:1. Colorless to brown, nonpleochroic or weakly so. ⁴ Opaque inclusions may be present	1.657-1.663 1.699-1.717 1.663-1.686 1.696-1.729 1.663-1.686 1.696-1.729 1.676-1.683 1.697-1.704	0.021-0.054	Usually parallel	+
Crocidolite (asbestiform riebeckite)	Straight to curved, rigid fibers. Aspect ratio typically > 10:1. Thick fibers and bundles common, blue to dark-blue in color. Pleochroic.	1.693 1.697 1.654-1.701 1.668-1.717 1.680-1.698 1.685-1.706	0.003-0.022	Usually parallel	-
Anthophyllite- asbestos	Straight to curved fibers and bundles. Aspect ratio typically > 10:1. Anthophyllite cleavage fragments may be present with aspect ratios <10:1. Colorless to light brown.	1.598-1.652 1.623-1.676 1.596-1.694 1.615-1.722 1.598-1.674 1.615-1.697 1.6148 ⁷ 1.6362 ⁷	0.013-0.028	Parallel	+
Tremolite- Actinolite- asbestos	Straight to curved fibers and bundles. Aspect ratio typically > 10:1. Cleavage fragments may be present with aspect ratios <10:1. Colorless to pale green	Tremolite 1.600-1.628 1.625-1.655 1.604-1.612 1.627-1.635 1.599-1.612 1.625-1.637 1.6063 ⁷ 1.6343 ⁷ Actinolite 1.600-1.628 1.625-1.655 1.612-1.668 1.635-1.688 1.613-1.628 1.638-1.655 1.6126 ⁷ 1.6393 ⁷	0.017-0.028 0.017-0.028	Parallel and oblique (up to 21°); Composite fibers show parallel extinction.	+

¹Colors cited are seen by observation with plane polarized light.

⁵ \perp to fiber length, except \perp to fiber length for crocidolite only.

²From references 2, 11, 12, and 18, respectively. Refractive indices for n_x at 589.3nm.

⁶Maximum and minimum values from references 2, 11, 12, and 18 given.

³Fibers subjected to heating may be brownish. (references 13, 14, and 15)

⁷ \pm 0.0007

⁴Fibers subjected to heating may be dark brown and pleochroic. (references 13, 14, and 15)