

**Afwillite****Ca<sub>3</sub>(SiO<sub>3</sub>OH)<sub>2</sub>·2H<sub>2</sub>O**

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**Crystal Data:** Monoclinic. *Point Group:* *m*. Crystals prismatic, elongated and striated || [010], to 11 cm, many tabular on {100} and {201}; in radial fibrous spherulites; massive.

**Physical Properties:** *Cleavage:* Perfect on {10 $\bar{1}$ }; good on {100}. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 3–4 D(meas.) = 2.630 D(calc.) = 2.643(5) Piezoelectric.

**Optical Properties:** Transparent. *Color:* Colorless or white. *Streak:* White.

*Luster:* Vitreous.

*Optical Class:* Biaxial (+). *Orientation:*  $Y = b$ ;  $X \wedge c = 31.2^\circ$  *Dispersion:*  $r < v$ .

$\alpha = 1.616\text{--}1.618$   $\beta = 1.619\text{--}1.621$   $\gamma = 1.631\text{--}1.634$   $2V(\text{meas.}) = 50^\circ\text{--}56^\circ$

**Cell Data:** *Space Group:* *Cc*.  $a = 16.278(1)$   $b = 5.6321(4)$   $c = 13.236(1)$   $\beta = 134.898^\circ$   
Z = 4

**X-ray Powder Pattern:** Kimberley, South Africa.

2.83 (100), 6.61 (90), 3.18 (90), 2.73 (90), 3.28 (70), 2.15 (70), 2.34 (60)

**Chemistry:**

	(1)	(2)	(3)
SiO <sub>2</sub>	33.96	34.65	35.09
Al <sub>2</sub> O <sub>3</sub> , Fe <sub>2</sub> O <sub>3</sub>	0.60		
MgO		trace	
CaO	49.28	48.94	49.13
F		0.18	
H <sub>2</sub> O <sup>+</sup>	15.89	16.08	15.78
H <sub>2</sub> O <sup>-</sup>	0.12	0.01	
-O = F <sub>2</sub>		0.10	
Total	99.85	99.76	100.00

(1) Kimberley, South Africa. (2) Crestmore, California, USA. (3) Ca<sub>3</sub>(SiO<sub>3</sub>OH)<sub>2</sub>·2H<sub>2</sub>O.

**Occurrence:** A product of contact metamorphism of limestones.

**Association:** Apophyllite, natrolite, thaumasite, merwinite, spurrite, gehlenite, ettringite, portlandite, hillebrandite, foshagite, brucite, calcite.

**Distribution:** From the Dutoitspan diamond mine, Kimberley, and the Wessels mine, near Kuruman, Cape Province, South Africa. In Ireland, at Scawt Hill, near Larne, Co. Antrim. From the Schellkopf, near Brenk, Eifel district, and on the Zeilberg, near Maroldsweisach, Bavaria, Germany. At Campomorto, Montalto di Castro, Lazio, Italy. From Nahal Ayalon, Israel. In the USA, at Crestmore, Riverside Co., California. In the Mihara mine and at Fuka, near Bicchu, Okayama Prefecture, Japan.

**Name:** Honoring Alpheus Fuller Williams (1874–1953), General Manager, DeBeers Consolidated Mines, Kimberley, South Africa.

**Type Material:** The Natural History Museum, London, England, 1925,80; National Museum of Natural History, Washington, D.C., USA, 95237.

**References:** (1) Parry, J. and F.E. Wright (1925) Afwillite, a new hydrous calcium silicate, from Dutoitspan Mine, Kimberley, South Africa. *Mineral. Mag.*, 20, 277–285. (2) (1925) *Amer. Mineral.*, 10, 447 (abs. ref. 1). (3) Switzer, G. and E.H. Bailey (1953) Afwillite from Crestmore, California. *Amer. Mineral.*, 38, 629–633. (4) Heller, L. and H.F.W. Taylor (1956) Crystallographic data for the calcium silicates. H.M. Stationary Office, London, 50–53. (5) Malik, K.M.A. and J.W. Jeffrey (1976) A re-investigation of the structure of afwillite. *Acta Cryst.*, 32, 475–480. (6) Kusachi, I., C. Henmi, and K. Henmi (1989) Afwillite and jennite from Fuka, Okayama Prefecture, Japan. *Mineral. J. (Japan)*, 14, 279–292.

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