central fiber

Dependable, Smart. Naturally.

Technical Data Sheet 2.1.1

BUILDING VISCOSITY WITH CELLULOSE FIBER

In paint, coating, sealant and adhesive applications, cellulose fiber is often incorporated as a cost-effective formulation component to build viscosity in accordance with specific application needs. Typically use level ranges from 1 – 5 wt. % and is dependent on a number of factors including other formulation components, application needs and end-use performance requirements. **Table 1** can be used as a general guide for selecting the appropriate cellulose fiber and use level for **non-aqueous applications**, such as high solids coatings and sealants.

Table 1: Viscosity as a Function of Fiber Type and Concentration in 30W Oil

Concentration (wt. %)	CF725	CF525	CF425	CFS40605	CF335	CF325	CF315	CF220	CF100	Drill Paper
0.5	2,200	2,700	2,200	1,700	5,600	3,600	4,400	3,600	5,300	5,600
1	3,200	4,100	3,400	2,800	10,700	7,700	8,800	7,200	15,800	15,000
1.5	4,700	6,300	5,300	4,500	20,200	16,600	17,600	14,600	47,100	40,700
2	6,700	9,800	8,200	7,400	38,300	35,700	35,500	29,500	140,200	110,300
2.5	9,700	15,100	12,700	12,100	72,700	76,900	71,500	59,700	*>320,000*	298,800
3	13,900	23,400	19,600	19,800	137,800	165,300	14,400	120,700	*>320,000*	*>320,000*
4	28,900	55,800	46,900	52,600	*>320,000*	*>320,000*	*>320,000*	*>320,000*	*>320,000*	*>320,000*
5	6,000	133,200	112,200	140,200	*>320,000*	*>320,000*	*>320,000*	*>320,000*	*>320,000*	*>320,000*
6	124,400	31,800	268,300	*>320,000*	*>320,000*	*>320,000*	*>320,000*	*>320,000*	*>320,000*	*>320,000*
7	258,000	*>320,000*	*>320,000*	*>320,000*	*>320,000*	*>320,000*	*>320,000*	*>320,000*	*>320,000*	*>320,000*

*__Note__: Brookfield viscosity measured using HAT model, #2H spindle @ 5 rpm shear rate. Measured values rounded to the nearest 100cp. Values >320,000cp are outside the range of the viscometer.

1525 WAYNESBURG DR, SE
CANTON, OH 44707
PHONE: (888) 452-2630
FAX: (330) 452-2644

4814 FIBER LANE
WELLSVILLE, KS 66092
PHONE: (800) 654-6117
FAX: (785) 883-4429

2400 E ERWIN
TYLER, TX 75702
PHONE: (903) 531-2211
FAX: (903) 531-2312

www.centralfiber.com

For **aqueous applications**, such as emulsion paints and asphalt sealers, **Table 2** can be used as a general guide.

Table 2: Viscosity as a Function of Fiber Type and Concentration in Deionized Water

Concentration (wt. %)	CF725	CF525	CF425	CFS40605	CF335	CF325	CF315	CF220	CF100	Drill Paper
1	240	230	150	150	880	380	1,230	430	2,680	800
2	530	500	360	340	1,790	1,050	3,360	1,160	4,930	2,030
3	1,160	1,090	880	780	3,640	2,880	9,170	3,110	9,070	5,170
4	2,550	2,360	2,150	1,750	7,400	7,920	25,010	8,380	16,670	13,170
5	5,620	5,120	5,260	3,940	15,060	21,800	68,230	22,550	30,650	33,560
6	12,380	11,080	12,870	8,870	30,640	60,010	186,170	60,700	56,360	85,530
7	27,250	24,010	31,500	19,970	62,320	165,180	*>320,000*	163,410	103,630	217,970

***Note**: To aid in fiber dispersion, Tergitol 15-S-5 surfactant was added prior to addition of fiber. Brookfield viscosity measured using HAT model, #2H spindle @ 5 rpm shear rate. Measured values rounded to the nearest 10cp. Values >320,000cp are outside the range of the viscometer.

Thickening Efficiency

Cellulose fiber's thickening effect is dependent on several factors: the concentration of added fiber, fiber length and the shear created during finished product application. As average fiber length increases, the more effective the fiber is at increasing viscosity at a given concentration. **Table 3** shows the fiber efficiency factor for Central Fiber's Cellulose Fiber products in both organic (oil) and aqueous media.

Table 3: Thickening Efficiency Factors

Concentration (wt. %)	CF725	CF525	CF425	CFS40605	CF335	CF325	CF315	CF220	CF100	Drill Paper
1	2,200	2,700	2,200	1,700	5,600	3,600	4,400	3,600	5,300	5,600
2	3,200	4,100	3,400	2,800	10,700	7,700	8,800	7,200	15,800	15,000

It should be noted that the most efficient fibers are not necessarily the best choice for a given application. Long fiber length products may impart undesired end-use characteristics, such as an undesirable degree of texture in a coating or sealant application.

Shear Behavior

Fluids containing cellulose fibers exhibit shear thinning behavior. In other words, as the rate of shear increases, viscosity decreases. **Figures 1 and 2** show typical shear thinning behavior for a short average fiber length fiber in organic (30W Oil) and aqueous media.

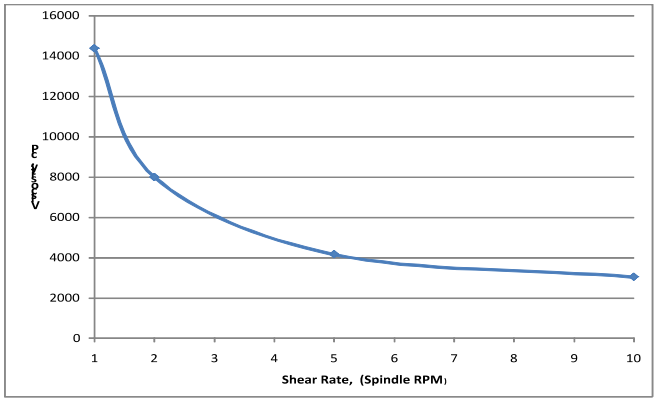

Figure 1: CF325 dispersed in 30W Oil at a concentration of 1.5 wt%.

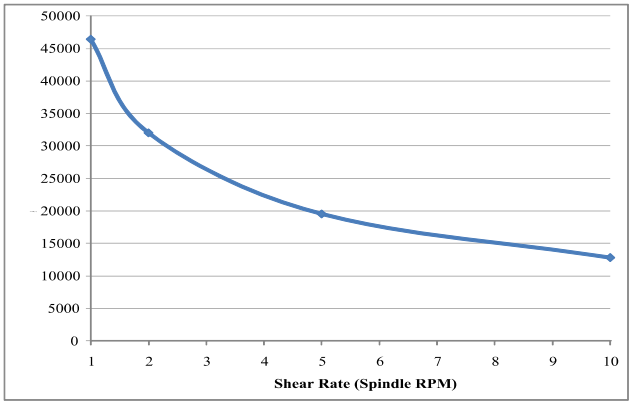

Figure 2: CF325 dispersed in DI water at a concentration of 3 wt%.

For application reference, a shear rate represented by 1 or less on the above graph would be a few times greater the shear imparted by sagging wet paint. A shear rate of 10 would be about equivalent to the shear imparted during trowel application of a mastic sealant. To ensure fibers were fully dispersed, the fiber/fluid mixture was allowed to mix at high shear for 10 minutes prior to measuring viscosity.

Contact Us

For specific recommendations selecting the right fiber for your application, or to request samples, please contact Central Fiber:

Debra Light
VP Sales, Industrial Fibers
dlight@centralfiber.com
Office: 888-452-2630
Cell: 216-346-6452

Gordon Fischer, PhD.
Sr. VP & General Business Manager
gfischer@centralfiber.com
Office: 800-654-6117
Cell: 949-993-6993