

CAB-O-SIL® FUMED SILICA FOR GREASE APPLICATIONS

The use of lubricating greases is essential across a wide range of industries. Composed of a base oil, a thickener and other additives, a grease reduces friction and wear of equipment, protects against rust and corrosion and acts as a seal against dirt, water and other contaminants. Our CAB-O-SIL fumed silicas are effective thixotropes that can be used to thicken a range of base oils and improve the performance properties of greases.



CAB-O-SIL fumed silica can enable:

- ◆ Efficient thickening
- ◆ Low oil bleed
- ◆ Good reversibility
- ◆ No dropping point
- ◆ Water resistance

Base oils have different properties, whether they are mineral oils, silicones or synthetic oils. Using the optimal CAB-O-SIL product creates a particle network, enabling more tailored performance. CAB-O-SIL fumed silica performs well in a range of base oils and is widely used in dielectric greases, damping greases, vacuum greases and food grade greases.

CABOT PRODUCT OFFERING FOR GREASE APPLICATIONS

Material Category	CAB-O-SIL® Fumed Silica Product	Typical Surface Area m²/g	Treatment Agent	Fumed Silica Product Characteristics
Hydrophobic Fumed Silica	TS-720	120	PDMS	Our most hydrophobic fumed silica. It provides thickening efficiency even in oils of higher polarity. It provides excellent resistance to moisture and good stability in grease systems.
		120		
	TS-622	195	DiMeDi	Suitable for use in both polar and non-polar oil systems. They provide easier dispersion than other hydrophobic fumed silicas. CAB-O-SIL TS-622 fumed silica will typically enable improved thickening performance relative to CAB-O-SIL TS-610 fumed silica
	TS-610	125		
	TS-382	150	OTMS	Very hydrophobic fumed silica that can offer effective thickening in increasingly polar systems. Typically provides good stability and low oil bleed.
Hydrophilic Fumed Silica	HS-5	320	N/A	Hydrophilic fumed silica that provide their highest thickening efficiency in non-polar systems. They can be used to make non-melting greases. Additionally, CAB-O-SIL M-5F and EH-5F fumed silica are designed for food applications and are suitable for use as an ingredient in the manufacture of incidental food contact greases and lubricants.
	M-5	200		

Surface area measured by BET of product as sold. The data in the table above are typical test values intended as guidance only and are not product specifications. Product specifications are available from your Cabot representative.

Performance examples in a polyalphaolefin (PAO) grease

TABLE 1: WORKED PENETRATION OF CAB-O-SIL® FUMED SILICAS

CAB-O-SIL fumed silica	Unworked penetration (1/10 mm) ASTM D217	Worked 60 penetration (1/10 mm) ASTM D217	Worked 100,000 penetration (1/10 mm) ASTM D217	Thickener loading (mass %)
M-5	271	274	435 (+161)	6.7
TS-720	281	292	326 (+34)	14.5
TS-622	293	290	332 (+42)	10.4
TS-382	283	283	297 (+14)	15

TABLE 2: ROLL STABILITY OF CAB-O-SIL FUMED SILICAS

CAB-O-SIL fumed silica	Worked penetrometer pre roll (1/10 mm)	Roll stability test ASTM D 1831-11 Worked penetrometer post roll (1/10 mm)	Δ Penetration (1/10 mm)
M-5	263	373	110
TS-720	305	333	28
TS-622	309	323	14
TS-382	289	307	18

CAB-O-SIL fumed silica products offer different surface chemistries in order to work well with a wide variety of formulations. Untreated CAB-O-SIL fumed silica will offer the highest thickening efficiency in non-polar oil systems. Due to their hydrophilic nature, however, untreated silicas may not be as stable when worked or where high moisture is present. For these systems, CAB-O-SIL treated fumed silicas can offer the advantage of tailoring thickening and stability attributes.

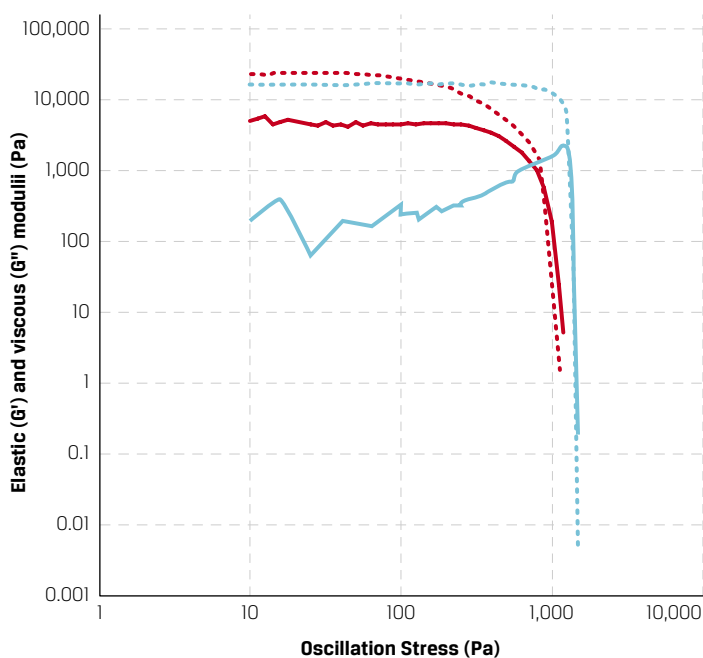
TABLE 3: OIL SEPARATION, DROPPING POINT AND WEAR OF CAB-O-SIL FUMED SILICAS

CAB-O-SIL fumed silica	Oil separation, 24h at 100 °C (mass %) ASTM D6184	Dropping point (°C) ASTM D2265	Four ball wear scar (mm) ASTM D2266
M-5	2.76	>260	0.75
TS-720	1.12	>260	0.9
TS-622	4.71	>260	0.9
TS-382	1.71	>260	0.89
Reference oil	N/A	N/A	0.79

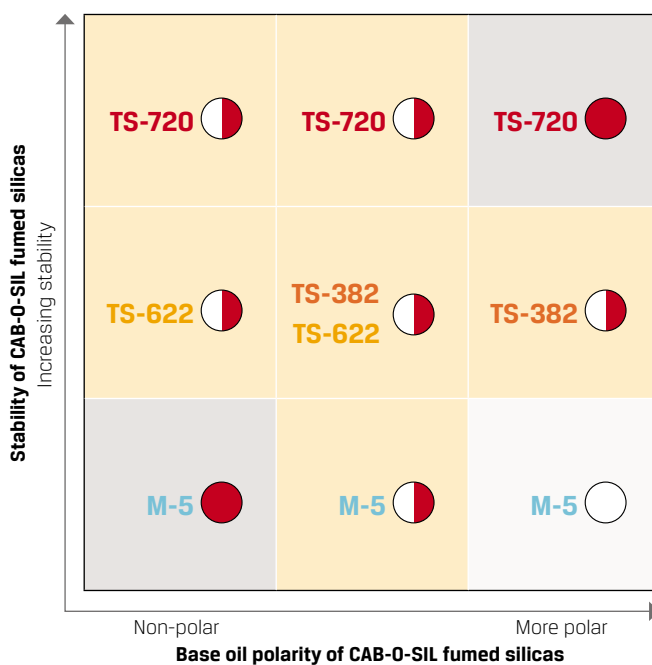
Fumed silica forms a physical network of particles that thicken a base oil. The network formed allows for high levels of thixotropy and reversibility in the base oil. In addition to providing good thickening and stability, and allowing the system to exhibit elasticity to large strains, fumed silica can also be used as a thickening additive in formulated greases. As an additive to formulated greases, fumed silica can provide an additional level of rheological tailoring.



RHEOLOGY COMPARISON



BASE OIL POLARITY



INCREASING THICKENING EFFICIENCY



Greases used in food applications

CAB-O-SIL M-5F and EH-5F fumed silicas are synthetic amorphous silica products used in food applications. These products are suitable for use as an ingredient in the manufacture of incidental food contact greases and lubricants.



For more information about our fumed silicas for grease applications, contact

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