



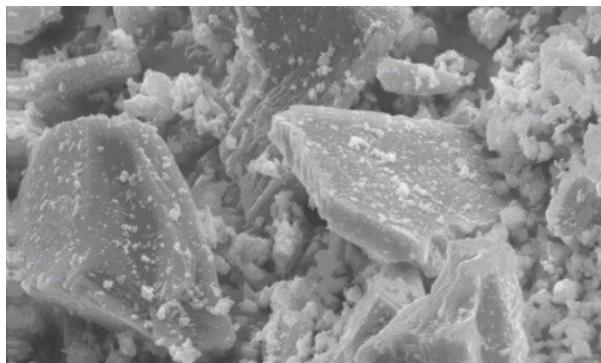
HIFILL® N

Nepheline Syenite Filler

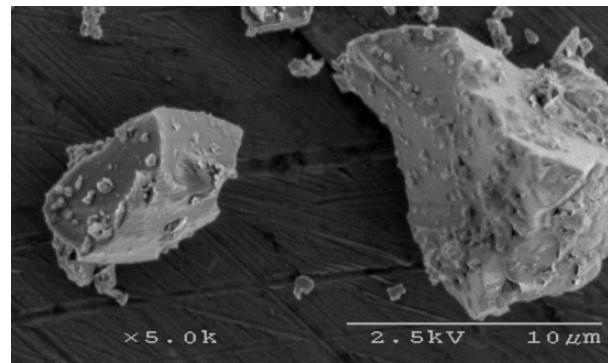
HIFILL® N uniquely combines superior performance in silicone elastomers and compliance with OSHA's respiratory crystalline silica (RCS) regulations

COVIA's HIFILL N (nepheline syenite) is the crystalline silica-free alternative to ground or microcrystalline silica mineral fillers typically used in silicone elastomeric applications. Formulators have been adopting low crystalline silica HIFILL N due to stricter OSHA regulations on RCS, and due to HIFILL N's similar high dielectric resistance, thermal conductivity, compressive strength and UV resistance properties.

This independent study shows how HIFILL N delivers superior performance relative to Min-U-Sil® (ground silica) in silicone elastomer applications, which is yet another reason why formulators have been adopting it.



SEM Photomicrograph-HIFILL N 800



SEM Photomicrograph-Min-U-Sil 30

For more information about HIFILL N mineral fillers,
please call: 800.243.9004 or email: Sales@CoviaCorp.com.

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Comparing attributes:

Morphology	Oil Absorption	Hardness	GE Brightness	pH
HIFILL N's angular morphology is similar to that of Min-U-Sil. HIFILL N is a silica-deficient sodium-potassium aluminosilicate and also exhibits high compressive strength. Reinforcement, compression set, tensile and elongation are similar for grades with similar particle size distribution based on similar particle shape characteristics.	Oil absorption ranges from 20% to 35% for HIFILL N grades with varying particle size distributions. HIFILL N rheology and viscosity are similar to Min-U-Sil at equal loadings potentially enabling higher loadings. The low oil absorption and smooth surface allows for higher filler loadings.	HIFILL N is 6.0 to 6.5 while Min-U-Sil is 7 on the 1-10 Mohs hardness scale. Silicone rubber and elastomers that are highly filled with either HIFILL N or Min-U-Sil will exhibit similar hardness, however NS is less abrasive than GCS which translates into longer equipment service life, reduced maintenance cost and higher productivity.	HIFILL N dry brightness is typically superior ranging from 89-94 in GE Brightness while Min-U-Sil brightness values range from 88-91. HIFILL N offers brighter and less yellowness overtones in pigmented silicone elastomer application. It will enhance the colors more effectively than crystalline silica in all white and pigmented applications.	HIFILL N and Min-U-Sil both have excellent chemical resistance. pH of GCS in 6.5 while HIFILL N is typically in 9-10 range. Curing behaviors are similar or when silane treated.

HiFILL N and Min-U-Sil product portfolios and properties:

Grade	*mean, µm	+325 mesh	pH	GEB	% Oil Absorption
Min-U-Sil 30	5.5	0.1	6.5	88	29
HIFILL N 800	6.8	0.1	10.1	88	26
Min-U-Sil 15	3.0	trace	6.5	88	39
HIFILL N 400	3.6	0	10.1	89	31
Min-U-Sil 10	2.0	0	6.5	91	39
HIFILL N 300	2.1	0	10.2	91	33
Min-U-Sil 5	1.0	0	6.5	88	40
HIFILL N 200	1.5	0.0	10	90+	35

*Sedigraph mean P.S. in microns



Comparison of physical properties in 60 Durometer hardness silicone elastomer sheet molding compound

HiFill N 400 outperforms Min-U-Sil 15 in several key physical tests and is the suitable and proven safer alternative to ground crystalline silica. The superior physical properties performance of compounds formulated with HIFILL N 400 allow for higher loadings leading to cost savings while meeting the specification.

60 Durometer sheet molding compound test formula

Ingredient parts	Base
60 Durometer silicone base	100.0
DBPH-50 molding catalyst	1.0
Extender	50.0

		Min-U-Sil 15 60 CG LOT 16258	HIFILL N 400 60 CG LOT 162608	
ASTM Method	Test			Limits
	Appearance	pass	pass	pass/fail
D792	S.G. (g/cc)	1.427	1.429	report
2240	Durometer (Shore A)	51 fail	56	55 to 65
D412	Tensile (PSI)	801	850	650 min
D412	Elongation (%)	343	294	100 min
D412	Modulus 100%	342	394	report
D624	Tear strength, PPI DIE B	93	90	report
D395 meth B, 70hrs at 150C	Compression set (%)	11.70	13.8	25 max
D573, 70 hrs at 225 D573, 70 hrs at 225	Dry heat resistance change in hardness (points) change in tensile (%) Change in elongation (%)	+ 6.4 + 3.1 - 40.9 fail	+2.7 +1.2 - 26.5	+ 10 max - 20 max - 40 max
D2137 at -62.2°C	Low temp resistance brittleness	pass	pass	pass/fail
D471 70 hrs at 100C	Water immersion Volume change	- 0.75	- 0.41	+ 5 max

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