

# Hymod<sup>®</sup> M9400 SP

## Surface-Treated Aluminum Hydroxide (ATH) for High Voltage Silicone Rubber Insulators

**Overall Benefits:**

Huber Engineered Materials' Hymod<sup>®</sup> M9400 SP aluminum hydroxide (ATH) is a vinyl-functionalized, precipitated grade developed for peroxide-cured silicone rubber. Everything about this product has been optimized for maximum performance in high-voltage, silicone rubber insulator compositions. The resulting product performs well on the job. Silicone rubber compound containing Hymod<sup>®</sup> M9400 SP does not stick in the mold. This increases the value of your compound to your customers. They will save money by reducing the number of rejected parts.

**Product Advantages:**

The Hymod<sup>®</sup>M9400 SP product has a narrow particle size distribution for optimum particle spacing in silicone. Optimum particle spacing in turn provides for maximum resistance to carbon tracking.

Aluminum hydroxide has a polar surface, making it difficult to fully disperse in non-polar resins such as silicone rubber. The SP surface treatment reduces surface tension between the ATH and silicone, permitting optimum wet-out and dispersion.

Mold fouling can happen if the surface treatment is not optimized for proper level and attachment to the ATH surface. Hymod<sup>®</sup> M9400 SP ATH will not contribute to mold fouling. Extensive testing has been conducted to ensure that Huber's production protocol:

- Delivers precisely the right amount of surface treatment.
- Yields a superior, treated ATH product free from residual silanols.

**Performance:**

Long-term outdoor performance of silicone rubber in applications such as line post insulators, dead-end insulators, suspension insulators and surge arrestors requires hydrophobicity. With the highly consistent surface treatment on Hymod<sup>®</sup> M9400 SP aluminum hydroxide, the surface is extremely hydrophobic for optimum resistance to environmental water pick-up. A complete product specification is available upon request.

**Processability:**

This precipitated Hymod<sup>®</sup> M9400 SP aluminum hydroxide product is easy to use as long as processing temperatures stay below the ATH decomposition temperature of 200°C.

**Compatibility:**

Aluminum hydroxide is soluble in strong acids and alkalis.

**Research & Development:**

Our applications laboratory, located in Fairmount, Georgia, is available to assist you with your application. Basic research and development leading to our next generation of products is under way.

## Hymod® M9400 SP Aluminum Hydroxide (ATH) *General, Chemical and Physical Property Data*

<b>Constant Physical Properties</b>		
<b>Parameter</b>	<b>Method</b>	<b>Value</b>
PH	ASTM D-1208	9 - 10
Hardness, Mohs	Handbook of Chem. & Physics	2.5 – 3.5
Solubility, g/100g	Handbook of Chem. & Physics	Insoluble
Particle Shape	Microscopy	Hexagonal Platelet
Specific Gravity	Handbook of Fillers and Reinforcement for Plastics	2.42
Refractive Index	Handbook of Fillers and Reinforcement for Plastics	1.57
Linear Expansion Coefficient, 10 <sup>-6</sup> /°C	Handbook of Fillers and Reinforcement for Plastics	4 - 5
Thermal Conductivity, W/(m·K)	Handbook of Fillers and Reinforcement for Plastics	0.84
Specific Heat, cal/(g·°C)	Handbook of Fillers and Reinforcement for Plastics	0.19
Dielectric Constant, $\epsilon = D/E$	Handbook of Fillers and Reinforcement for Plastics	7
Loss on Ignition (1000°C), %	Calculated	34.6%

<b>Typical Physical Properties</b>		
<b>Parameter</b>	<b>Method</b>	<b>Hymod® M9400 SP</b>
<b>MEASURED ON BASE ATH</b>		
Average Particle Size, $\mu\text{m}$	FQA 3065	1.2
Conductivity, micromohs	ASTM D-2448	80
BET Surface Area, m <sup>2</sup> /2g	BET	4.0
<b>MEASURED ON TREATED ATH</b>		
325 Mesh Residue, typical %	FQA 3015	0.01
Carbon Content, % (treatment level)	FQA 3069	0.17
Volatiles Content @105° C, %	ASTM D-280	0.16
Dry Brightness, (MgO = 100)	ASTM C-110	96

<b>Typical Chemical Analysis</b>	
<b>Parameter</b>	<b>Hymod® M9400 SP</b>
Al(OH) <sub>3</sub> , %	99.6
Crystalline Silica (Quartz), %	0.005
Fe <sub>2</sub> O <sub>3</sub> , %	0.006
Na <sub>2</sub> O, % soluble	0.025

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