GREAT PAINTS
WITH GINSHICEL MH CELLULOSIC THICKENER

1

INTRODUCTION

GINSHICEL MH FOR WATER-BASED PAINTS & COATINGS

In the very vibrant world of water based latex paints, one very important additive is GINSHICEL MH cellulosic thickener. Beside being a highly efficient thickener, this type of additive also provide a host of other beneficial properties, such as brush-ability, sag resistance, emulsification, suspension power, etc, while providing very good color compatibility, making this type of thickener highly popular with many paint manufacturers in the world.

PROPERTIES AND ADVANTAGES

GINSHICEL MH cellulosic thickener is manufactured in a variety of viscosity grades. These versions differ primarily in their aqueous solution viscosities and swelling time to optimize performance in specific applications.

The viscosity number of each GINSHICEL MH cellulosic thickener grade corresponds to its average two-percent aqueous solution viscosity. Your local technical sales representative or distributor will be glad to help you in selecting the most appropriate type for your specific applications.

Reliable Thickening Action

The narrow viscosity range for each grade of GINSHICEL MH cellulosic thickeners provide batch-to-batch reproducibility of thickening action in the paint manufacturing process.

Ease of Dispersion

GINSHICEL MH cellulosic thickeners are readily added to the paint batch. Solutions can also be quickly prepared with simple

mixing equipment using either hot or cold water.

Extended Shelf Life

Pigment dispersion and suspension are maintained in the paint can during prolonged storage. Breaking of emulsion due to syneresis and enzymatic degradation is minimized or eliminated, as is color floating. Viscosity is stable to wide temperature fluctuations.

Versatility in Formulating

GINSHICEL MH cellulosic thickeners are nonionic and may be used over a pH range of 2 to 12. It is compatible with various commercial latexes and with most other ingredients commonly used in paint, including many reactive pigments, additives, and components with high levels of soluble salts or electrolytes.

Excellent Application Properties

Paints thickened with GINSHICEL MH cellulosic thickeners are pseudo-plastic and can be applied efficiently by brush, roller, pad, or spray with minimal dripping, spattering, or running. Excellent flow and leveling can be achieved, plus superb wet scrub resistance once dried.

Enzyme Resistance

GINSHICEL MH cellulosic thickener is highly enzyme resistant, even more so than many biostable hydroxyethyl cellulose (HEC), thus offering the best-in-class storage stability of all similar cellulose ethers.

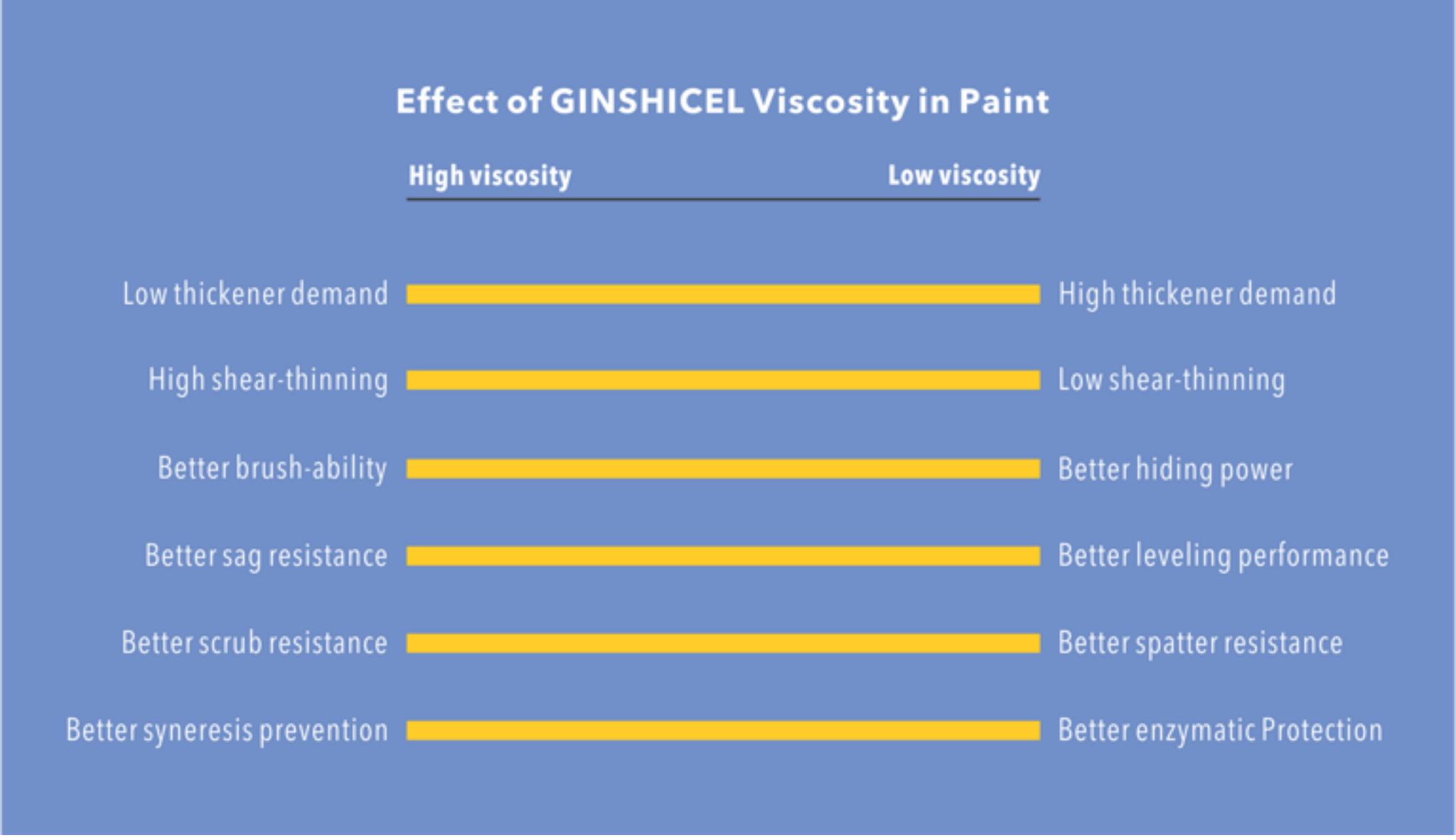
EFFECTS OF GINSHICEL ON PAINT

GINSHICEL MH cellulosic thickeners are not only used as thickeners, but also as rheology modifiers and stabilizers in the coatings industry and contributes significantly to the properties such as hiding power, brushability, leveling, sag resistance, open time, scrub resistance, storage stability, and spatter resistance. It is the chief function as a shear-thinning rheology modifier that GINSHICEL is able to affect so many properties.

Hiding Power vs. Brushability

Being shear-thinning, GINSHICEL MH cellulosic thickeners contribute greatly to the brushability. Higher viscosity types imparts a greater shear thinning behavior than lower viscosity types, meaning that the effort spent on applying the paint will be less for those made with higher viscosity GINSHICEL, if final paint viscosity is the same.

But at the same time, this shear-thinning could lead to over-thinning during brushing, reducing wet film build thickness in a single pass and so reduces hiding power.



Leveling vs. Sag Resistance

Paint made with lower viscosity GINSHICEL MH cellulosic thickeners requires more brushing as explained previously, but less shear thinning also means better leveling performance - at a cost of lowering sag resistance. Higher viscosity leads to better sag resistance, but lower leveling performance.

Scrub resistance vs. Spatter resistance

Low viscosity GINSHICEL MH cellulosic thickeners, being less shear thinning, can help the paint to be more spatter resistant, leading to less clean up efforts, but will require more dosage to reach same paint viscosity. In general, all water soluble cellulosic thickeners are re-dissolvable in water, thus higher concentration tends to weaken the scrub resistance. Also, GINSHICEL MH grades are less hydrophilic than any HEC grades, and is much more scrub resistant than HEC.

Storage stability: syneresis prevention vs. enzymatic protection

Storage stability is one of the most important criteria for judging paint quality. Syneresis is a chief complaint among customers. High viscosity GINSHICEL products overcomes syneresis by providing adequate suspension power due to its excellent thickening efficiency.

All cellulosic thickeners are subject to viscosity loss due to enzymatic action . Though GINSHICEL MH is more resistant, already low viscosity types of GINSHICEL MH tend to suffer less viscosity loss than higher viscosity types.

2

APPLICATION GUIDE

GINSHICEL MH cellulosic thickeners have been widely adopted by many paint manufacturers in the world in replacing or in conjunction with other thickeners, such as HEC or associative thickeners.

Even though GINSHICEL MH is easier to disperse and dissolve than many other types of thickeners, like all ingredients in the water-based paint, the process and conditions of addition must be followed in order to reach optimum performance.

DISPERSION, DISSOLUTION, AND FOAM CONTROL

Dispersion and Dissolution of GINSHICEL MH

GINSHICEL MH cellulosic thickeners with -SD (surface treated, delayed hydration) modification is very easy to disperse -- just add to cold water and stir. The start of viscosity development can be retarded up to 30 minutes to aid dispersion and even mixing of other ingredients. pH buffer such as ammonium hydroxide can be added to adjust the pH of the solution to 8.5 to 9 in order to kickstart the viscosity development process.

Organic solvent and water also may be used to disperse GINSHICEL MH in a slurry at a high concentration. Such concentrated slurry usually have a shelf life about 35 minutes.

Foam Control

GINSHICEL MH cellulosic thickeners may introduce foaming in aqueous solutions, and foaming can be controlled very effectively by a number of commercially available defoamers such as polypropylene glycol.

STABILITY AND COMPATIBILITY

Stabilizing Viscosity

Water based paint provides micro-organisms an ideal place to thrive, due to is often ideal temperatures of storage, abundance of nutrition, and a slightly alkaline solution medium. Such micro-organisms can lead to fouling of paint, reduction of viscosity, and breakage of emulsion.

Even though the excellent enzyme resistance of GINSHICEL MH cellulosic thickeners does lead to better storage stability, it is still a good idea to inhibit micro-organism growth by the adding of biocides or bio-inhibitors (*except phenol-containing preservatives*) at the beginning of paint production cycle.

Color Compatibility

GINSHICEL MH cellulosic thickener in general has very good color compatibility with several universal colorant systems.

In very few pigment systems the dispersant migrates away from pigment onto GINSHICEL MH cellulosic thickener, causing pigment agglomeration, making the paint seem lighter in color than it really is until brushing. The two pigments that are obvious offenders are: Organic orange, and Carbazole Violet (Dioxazine Violet). Instead, Pyrazolone Orange, Dinitraniline Orange, and Monastral violet (Quinacridone Violet) can be used with full compatibility.

3

APPLICATIONS AND GRADES

GINSHICEL Grade	Broofield LV Viscosity (cps)	Natrosol* Equivalent	Cellosize** Equivalent
MH 592-SD	7000	-	QP100M-V
MH 336-SD	6000	HHR	QP100MH
MH 256-SD	4400	HHR	QP100MH
MH 133-SD	3300	H4R	
MH 96-SD	2500	HR	QP52000H
MH 64-SD	2200	HR	QP40000H
MH 53-SD	1100	MHR	QP15000H
MH 37-SD	6500***	MR	QP4400H

***: Tested at 2%

APPLICATIONS

One size does not fit all, nor does one kind of water-based coating fit all circumstances. That's why we need interior, exterior, flat roof reflective (also known as "elastomeric coating") types of coatings of varying binders, textures, and fillers.

Each of these types of coating have distinct needs in thickening and rheological properties, all of which are served by different grades of GINSHICEL MH cellulosic thickeners. For example: factory made premium colored paints should use lower viscosity grades of GINSHICEL MH cellulosic thickeners such as MH 37-SD for its good spatter resistance, leveling performance, and good one-coat film thickness; white primers can use high viscosity grades such as MH 336-SD to efficiently thicken; white industrial, flat roof reflective waterproofing coating, or sprayable paints can use ultra high viscosity grades such as MH 592-SD for its extremely high thickening efficiency, application temperature stability, and highly shear-thinning rheological behavior.

The below table lists the suitable products in each application, as well as recommended dosage.

Recomended GINSHICEL MH Grade	Interior Paint and Primers	Premium Interior Paint	High Solids Exterior Paint	Flat Roof Reflective Coating	Sprayable Paint	Dosage (KG / M^3)	Stormer Viscosity (KU)
MH 37-SD		x				5.76	98
MH 53-SD		x				5.10	98
MH 96-SD	x	x				4.56	98
MH 133-SD	x		x			4.07	98
MH 256-SD	x		x	x		3.84	97
MH 336-SD	x		x	x	x		
MH 592-SD	x		x	x	x		

4

PACKAGING, HANDLING, AND SAFETY

Packaging

All grades of GINSHICEL MH cellulosic thickeners are packaged in 25-kilogram multi-ply valve paper bags with PE lining and heat-sealed valve opening. When you make an order of 1200 kilograms of a single product, PE stretch-wrap palletizing is available.

Ten pallets, total of 12 metric nets (net weight) can fit into each 20 foot General Purpose container. For 40 foot General Purpose Container, 24 metric tons (net weight) can be fitted.

Storage

GINSHICEL MH cellulosic thickeners can be stored for a period of one year in original, unbroken packaging without any adverse effect on performance. Tests done on two year undisturbed storage in non-condensing humidity environment shows less than 20% reduction in apparent viscosity.

For extended storage stability, we recommend storing in original palletized configuration, in storage condition of no more than 35 degrees Celsius, and non-condensing relative humidity of no more than 80%.

As with any other organic material GINSHICEL MH cellulosic thickeners should not be stored next to peroxides or other oxidizing agents.

Disposal

Despite the very slow rate of biodegradation, GINSHICEL MH cellulosic thickeners should not present any hazard in the waste/soil. Their breakdown behavior and environmental impact are similar to wheat flour or sawdust. Although 5-day, 10-day, and 20-day BOD tests yielded no value, activated sludge in actual wastewater treatment facility shows greater than 90% breakdown and removal within 20 days.

Furthermore, in tests conducted according to U.S. EPA and ASTM guidelines for GINSHICEL MH cellulosic thickener toxicity to aquatic life, at the highest test concentrations used, no toxic effects were observed for Daphnia magna or for fathead minnows.

Health and Handling & Safety

Prior to using or handling of any GINSHICEL products, you should review, understand, and make sure you can implement safety measures prescribed by our latest Safety Data Sheets, which can be found on our website.

Worldwide Contacts:

info@haishenchem.com

Website:

www.ginshicel.com

www.haishenchem.com

GINSHICEL® is a registered trademark of: Zhejiang Haishen Chemical Co. Ltd.

GINSHICEL cellulosic thickeners are manufactured and marketed by

Zhejiang Haishen Chem. Co. Ltd.

*Natrosol is a trademark of Ashland Specialty Ingredients

**Cellosize is a trademark of Dow Chemicals