PQ Corporation

GASIL MATTING AGENTS FOR WOOD COATINGS

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Coatings are applied to wooden surfaces to enhance and preserve the wood's appearance and resist mechanical, weather, water and chemical damage. Clear and pigmented industrial coatings for furniture, parquet flooring and joinery or decorative coatings for woodcare applications can be effectively matted with Gasil silicas. As well as exhibiting high matting efficiency, Gasil matting agents allow the preparation of films which are smooth to the touch, resistant to scratching and polishing, and have high transparency. Gasil matting agents are carefully engineered to offer the paint formulator the optimal matting efficiency, ease of dispersion and smooth hand-feel with minimal impact on viscosity

Optimal matting efficiency is achieved by using silica with high pore volume (more particles per unit weight) and by fine control of the particle size and particle size distribution. Through investment in the latest micronisation equipment and by using best practice manufacturing techniques and sophisticated process controls, PQ Corporation ensure precise control of properties, including surface area, pore volume, particle size and particle size distribution. Careful design and control of the silica parameters ensure easy dispersion into coatings systems at any stage of the manufacturing process.

The refractive index of silica is comparable to most resin systems. The purity of PQ Corporation feedstocks alongside the finished silicas easy dispersion help to maintain minimum loss of clarity in transparent systems. Careful selection of surface treatments and wax systems help prevent settling and improve re-dispersion. Gasil silicas have minimal effect on the mechanical properties, allowing the development of consistent films with excellent hand-feel, scratch resistance and stain resistance.

BENEFITS OF GASIL SILICAS:

Cost effectiveness:
Optimal matting efficiency is achieved by using silicas with high pore volume (more particles per unit weight) and by fine control of the particle size and particle size distribution.

Consistency:
Using best practice manufacturing techniques, PQ Corporation ensure precise control of properties, including surface area, pore volume, particle size and particle size distribution.

Clarity:
The refractive index of silica is comparable to most resin systems. PQ Corporation use only the finest and purest feedstocks to maintain minimum loss of clarity in transparent systems.

Dispersion:
Careful design and control of the silica parameters ensure easy dispersion into coatings systems at any stage of the manufacturing process.

Anti-settling:
Careful choice of surface treatments and wax systems help prevent settling and improve re-dispersion.

Film quality:
Gasil silicas have minimal effect on the mechanical properties, allowing development of smooth films with excellent hand-feel, scratch resistance and stain resistance.

PRODUCT SELECTION

The understanding of the requirements for clarity and surface smoothness is vital in providing the desired performance of the coating when selecting a matting agent. Satin and matt finishes are obtained by lowering the 60° gloss. This can also help to mask minor imperfections in the wood surfaces. For large surfaces (doors, tables) that are more likely to be observed at a shallow angle, it could be also necessary to decrease the 85° gloss.

The selection of a suitable grade of silica for a formulation is determined by a number of parameters related to its composition, the application method and the dry film thickness. Silicas with larger particle size have high matting efficiency, but will detract from surface smoothness and film clarity. Smaller particle sizes will not affect the surface smoothness, but will be less efficient at matting the coating. However in slow drying high solids coatings large particle size silicas may be the only choice to achieve the desired level of gloss and maintain a manageable application viscosity.

The surface treatment of silica has an important effect on the performance of the matting agent. PQ Corporation carefully selects those treatments not only to provide the best suspension characteristics but also to improve the mechanical and surface properties of the film without affecting the inter-coat adhesion.

The pore volume of silica has a direct influence on its matting efficiency. High pore volume silicas have more particles per unit weight than lower pore volume materials. Since gloss reduction is caused by the scattering of the reflected light from the surface of the coating, silicas with the same particle size, but different pore volumes, exhibit different matting efficiencies.

Dispersion is a critical parameter in any coating system. Gasil silicas are easily dispersed in most systems. Through fine control of surface area, pore volume and particle size PQ Corporation is able to offer a wide range of products to meet the demands of the coatings formulator.

SOLVENT COATINGS

Clear and pigmented systems solvent based formulations for industrial and decorative coating applications can be efficiently matted with Gasil silicas. As well as giving excellent matting efficiency, Gasil silicas give films that are smooth, resistant to scratching and polishing and have high transparency.

The ease of dispersion of Gasil silicas in solvent-based systems depends on the binder, the solvent system, the additives package, the viscosity of the formulation and the method of manufacturing of the formulation. PQ Corporation offers a wide range of Gasil silicas with different surface chemistries, treatments and textures and will assist the formulators in finding the optimum grade for their system.

Gasil HP860 is specifically designed for smooth satin furniture coatings where a pleasant handfeel is required. Gasil HP340M is a high efficiency matting agent with a long track record of usage in solvent based wood finishes. It provides good suspension properties and improved scratch resistance. HP560 is a newly developed matting silica that combines high weight efficiency with excellent dispersibility and transparency (Fig.1 and 2).

The Gasil 800s products (HP860, HP870 and HP880) are treated with a special wax with excellent solvent resistance. They are therefore the products recommended for high solvency vehicles and exempt solvents (USA) formulas. Gasil HP290, Gasil HP39 and Gasil HP610 are the most effective silicas for higher solids formulations.

Fig 1. **Performances of Gasil silicas in 2K-PU Alkyd lacquer at 7.5% addition**

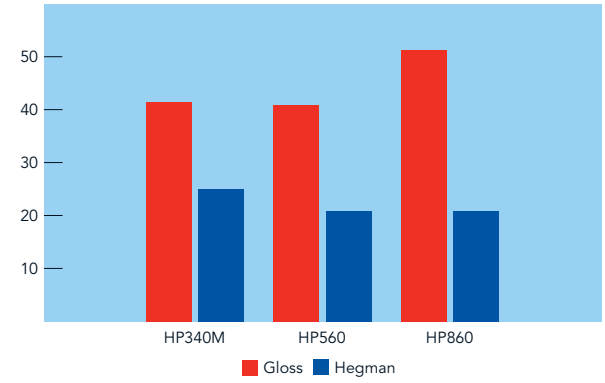
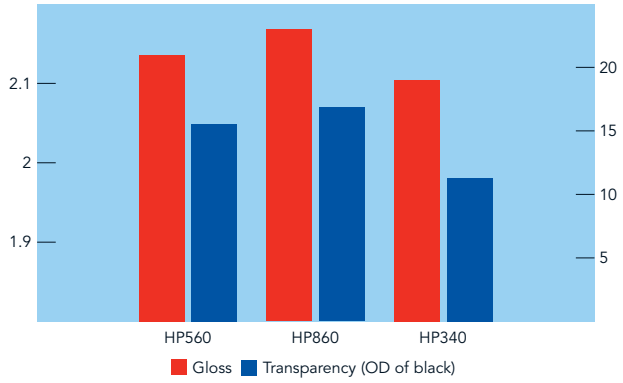


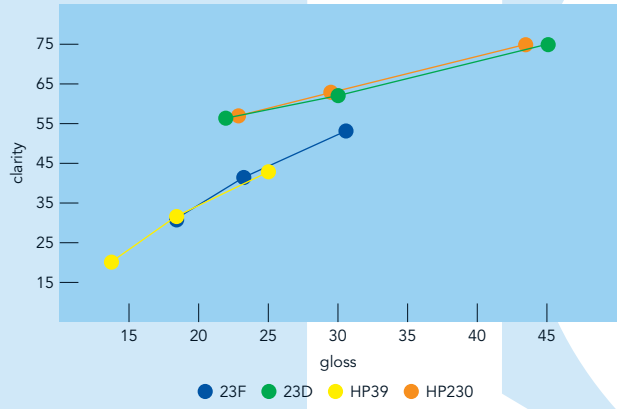
Fig 2. **Performances of Gasil silicas in 2K-PU Acrylic lacquer at 1.6% addition**



AQUEOUS COATINGS

With the introduction of new legislation aimed at decreasing VOC emission, waterborne coatings are increasingly being used in industrial and decorative applications all over the world. Differently from solvent systems, in waterbased finishes matting efficiency and particle size are not necessarily proportional, while the surface chemistry (pH) of the silicas plays an important role.

Fig 3. **Performances of Gasil silicas in Selfcrosslinking Acrylic Waterbased lacquer**



Neutral pH silicas are mostly recommended in waterbased finishes. The Gasil grades for matting of waterbased wood lacquers are HP39, 23F, 23D and HP230. By choosing the most appropriate product for the application different levels of matting efficiency and clarity (Fig.3) can be achieved.

When silica is used in waterbased lacquers it may affect the stability of emulsion binders or/and the effectiveness of polyurethane thickeners. The use of wax coated silicas can help to minimise these effects. Gasil HP240 is one of these products which combine a fine particle size and therefore high dispersibility and transparency with a wax treatment which minimises interactions with other formulation components.

RADIATION CURABLE COATINGS

Radiation curable coatings represent a sizeable portion of industrial wood coatings market. UV and EB coatings are significantly more difficult to matt than solvent and waterbased systems. The development of micro-roughness in conventional systems is a result of film shrinkage during drying. In radiation cured systems film shrinkage is very low, posing special problems for the paint formulator.

PQ Corporation has an extensive experience in radiation curable coatings and has developed a special range of Gasil silicas as a solution to these problems.

A specific brochure on UV curable coatings has been compiled and is available on www.pqcorp.com.

Table giving recommendations for systems

	HP560	HP860	HP870	HP880	HP610	HP210	HP220	HP240	HP340M	UV70C	UV55C	HP230	23D	23F	HP39	HP270	HP280	HP290
Solvent clear	●	●	●	●		●	●	●	●									
Solvent pigmented				●			●									●		
Water clear								●				●	●	●	●			
Water pigmented												●	●	●	●	●		
UV/EB					●					●	●	●			●			●
High solids				●	●												●	●

STORAGE AND HANDLING

It is recommended that pallets of Gasil silicas are not stored on top of each other. Care should be taken when handling the product to minimise dusting.

HEALTH AND SAFETY

Material Safety Data Sheets providing detailed toxicological and handling information on Gasil products are available upon request.

TECHNICAL SERVICE

PQ Corporation offers a high standard of technical and analytical service to ensure optimum performance of its products. For assistance, contact us via e-mail: **techsupport@pqcorp.com**

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February 2009 PQ103-1

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