

THE GASIL RANGE FOR SURFACE COATING APPLICATIONS



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Surface coatings is a common term used to identify applications within the coatings (paint and lacquer), plastics and paper industries. These market segments require tightly-controlled, consistent additives which will enhance the end product performance. PQ Corporation meets these requirements with its wide range of Gasil silica products and over 70 years of experience. Our goal is to offer world-class silica products supported globally by expert technical and analytical services, to ensure maximum customer satisfaction.

BENEFITS OF GASIL SILICAS:

Cost effectiveness:

Accurately controlled particle size and distribution in the micron range for maximum matting efficiency.

Consistency:

Precisely controlled physical properties including surface area and pore volume for consistent performance.

Clarity:

Refractive index of silica and its organic coating comparable to that of most resins, thus reducing loss of clarity in clear systems.

Dispersibility:

Easily dispersible at any stage of the manufacturing process using high speed stirring equipment.

Film quality:

Minimal effect on mechanical film properties, allowing smooth films with excellent scratch and stain resistance, to be developed.

Colour:

High degree of whiteness due to high purity for minimal influence on film colour.

PRODUCT SELECTION

The selection of the optimum grade for a particular application will depend primarily on the product characteristics of porosity, particle size and surface treatment.

POROSITY

Gasil silicas are not solid particles. They can be considered as sponge-like structures with a well defined porosity which can be varied depending on the route of manufacture. Low porosity silicas adsorb moisture vapour, but have poor carrying capacity for liquid systems. Because of their dense structure they are used in applications where the strength of the particle is important. High porosity silicas are usually more efficient as matting agents because they offer more particles per unit weight. They also tend to be lower in bulk density and exhibit a greater thickening effect on the medium in which they are incorporated.

When used in ink-jet coatings, high pore volume silicas improve both print definition and colour to colour bleed. Medium pore volume products are recommended where a higher solids content or lower coatings viscosity is needed.

PARTICLE SIZE

In many applications the choice of silica depends upon the thickness of the polymer film. Generally products having an average particle size of 4-6 microns are used in thin synthetic leather coatings and printing inks. Particles in the 6-8 micron range are used in wood and metal coatings and those in the 8-14 micron range for special finishes where a full matt effect is required. The large particle sized silicas generally disperse more easily and have minimal effect on the viscosity of the system.

Selection of the correct silica particle size is also important for print definition, colour density and gamut in ink-jet coatings. In applications such as photographic paper, where high optical density is required, silicas with a larger particle size are preferred. In coated paper, where text reproduction is important, a smaller particle size silica would be chosen.

SURFACE CHARACTERISTICS

Gasil silicas, because of their large internal structure, have surface areas ranging from 180 to 850m²g⁻¹. For specific end users, the silicas are treated with an organic coating to improve mar resistance and prevent hard sediment. These products offer superior initial dispersion, improved redispersion characteristics and minimal effect on viscosity, combined with high matting efficiency.

Coated silicas are not normally recommended for ink-jet coatings as the organic treatment can affect the way in which the silica interacts with the deposited inks.

DISPERSION

Gasil matting agents are easily dispersible and may be incorporated into coatings at any stage during the manufacturing process, separately or with pigments and other additives. This flexibility enables final gloss adjustments and even post-production corrections to be made. For best results high speed stirring equipment should be used to disperse Gasil silicas. Optimum dispersion depends on the shear rate of the stirrer blade and the viscosity of the coating itself. When the required amount of silica is added to the batch, the stirrer should be started gently and then slowly brought up to optimum speed (between 10 and 20ms⁻¹ peripheral speed depending on system viscosity) for 15-20 minutes in order to obtain a uniform grit-free dispersion.

For ink-jet coatings it is recommended that Gasil silicas are thoroughly pre-dispersed in water (typically 15% silica slurry) before addition to the main coating mix as this can help to minimise air entrapment.

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.

The Gasil Range - Typical Properties

Gasil Grades	Properties	APS (Malvern 100mm lens), microns	Pore volume, mlg ⁻¹	pH (5% aqueous suspension)	Loss at 105°C, %	Loss at 1000°C, %*	Oil absorption (linseed), g/100g	Surface treatment
HP240		5.9	1.8*	7	2	12	250	Wax
HP210		6.4	1.8*	3.5	2	11	250	Wax
HP560		6.0	1.8*	3.5	2	10	250	Wax
HP340M		6.5	1.8*	3.5	2	12	250	Wax
HP220		8.0	1.8*	3.5	2	11	250	Wax
HP860		5.1	1.8*	3.5	2	12	250	Wax
HP870		6.5	1.8*	3.5	2	12	250	Wax
HP880		8.0	1.8*	3.5	2	12	250	Wax
HP255		5.5	1.8	3.5	2	3	280	None
HP260		6.6	1.8	3.5	2	3	280	None
HP270		8.7	1.8	3.5	2	3	280	None
HP280		10.4	1.8	3.5	2	3	280	None
HP290		12.0	1.8	3.5	2	3	2.80	None
HP230		3.6	1.6	7	2	3	280	None
23D		4.4	1.8	7	3	3	290	None
23F		5.9	1.8	7	3	3	290	None
HP39		10.3	1.8	7	2	3	280	None
HP395		14.5	1.8	7	2	3	280	None
200DF		4.3	0.4	4.2	2	6	80	None
GM2		7.8	0.4	4.2	2	6	80	None
937		5.7	1.2*	7	2	11	170	Wax
35M		4.0	1.2	7	1	3	200	None
114		6.5	1.2	7	1	3	200	None
EBN		8.3	1.2	7	1	3	200	None
UV55C		5.5	1.2*	7	2	12	170	Wax
UV70C		7.5	1.8*	3.5	2	14	250	Wax

* of moisture free product * of silica prior to treatment

Gasil Applications Summary

Applications	HP240	HP210	HP560	HP340M	HP220	HP860	HP870	HP880	HP255	HP260	HP270	HP280	HP290	HP230	23D	23F	HP39	HP395	200DF	GM2	937	35M	114	EBN	UV55C	UV70C
Deco-Wood	•	•	•	•	•	•	•	•		•	•			•			•				•					
Deco-Masonry											•	•														
Industrial Wood	•	•	•	•	•	•	•	•		•	•			•			•							•	•	•
Industrial OEM		•	•		•				•	•	•	•	•				•	•								
Ink Jet Paper									•	•	•	•	•	•	•	•		•								
Other Paper												•			•	•			•			•				
Leather		•								•				•	•	•					•	•	•			
Inks		•							•					•	•							•			•	
System																										
Solvent-Clear	•	•	•	•	•	•	•	•					•								•					
Solvent-Pigmented	•	•		•	•	•	•	•	•	•	•	•									•					
Water-Clear	•					•					•			•		•										
Water-Pigmented										•	•	•				•										
Electrocoat	•															•										
High Solids								•				•					•	•						•		
Powder							•												•							
UV/EB	•				•		•	•				•		•		•	•	•			•			•	•	•

TECHNICAL SERVICE

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