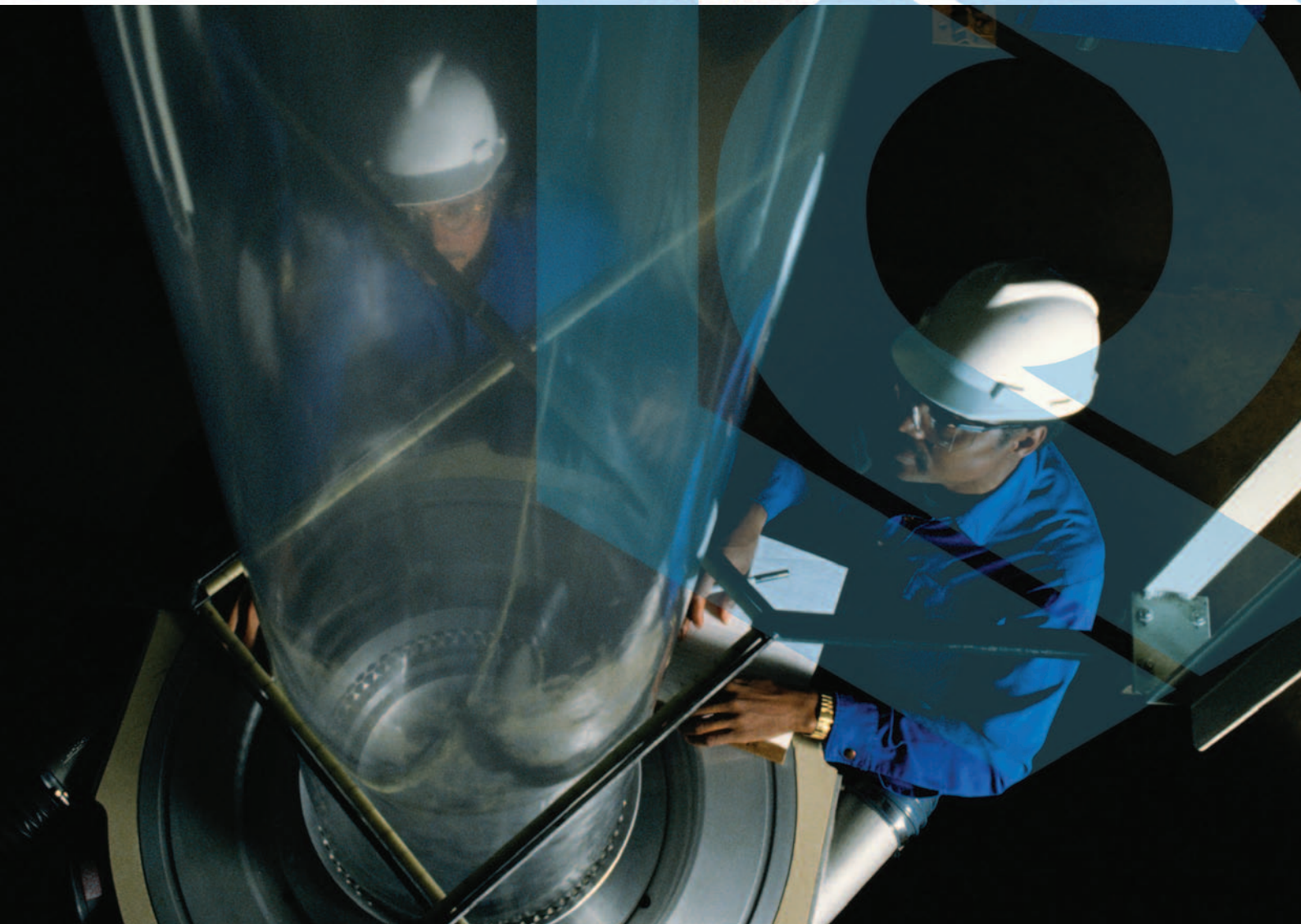


# **DON'T COMPROMISE GASIL ANTIBLOCKING SILICAS**



# DON'T COMPROMISE GASIL ANTIBLOCKING SILICAS

High clarity and thin polyolefin and polyester films are inherently prone to "blocking". Blocking is the tendency of opposite film faces to adhere to each other and is most prevalent during film winding operations. Unless remedied, blocking causes severe handling problems during film fabrication and final conversion/packaging applications.

Incorporation of small quantities of an PQ Corporation Gasil antiblocking silica into a film formulation confers a micro-rough surface to the film. This reduces or eliminates blocking without compromising the balance of physical and optical properties of the film.

## BENEFITS OF GASIL ANTIBLOCKING SILICAS:

### High efficiency:

Accurately controlled particle size and bulk density provide for maximum efficiency with excellent optical properties.

### Excellent dispersibility:

Optimal balance of pore volume and surface area ensures excellent dispersibility.

### Clarity:

The refractive index of silica is comparable to polyolefin and polyester resins.

### Colour generation:

Gasil antiblocking silicas are synthetic materials manufactured from high quality feedstocks – this ensures that the products contain low levels of trace metal contaminants and provides for excellent yellowing performance.

### Film quality:

Minimum effect on mechanical properties, allowing smooth films with excellent scratch resistance.

### Low abrasivity:

Gasil antiblocking silicas are soft honeycomb structures that are sufficiently strong to resist mechanical attrition during processing but soft enough to minimise wear on processing equipment.

### Special approvals:

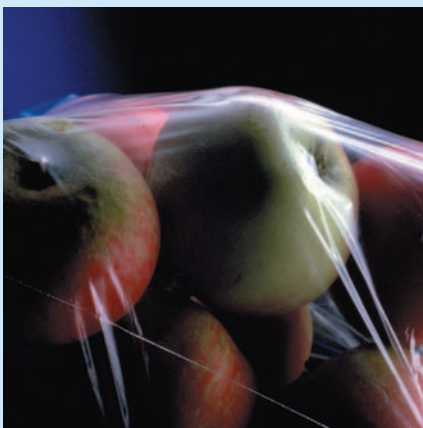
Gasil antiblocking silicas have FDA and BGA Food Contract Approval and are Halal and Kosher certified.

### Non-toxic/odourless/non-tainting:

Gasil antiblocking silicas are inorganic and do not affect taint, odour or toxicity.

### Consistently reproducible product quality:

Precisely controlled particle size, surface area and pore volume offer consistent performance.



Photograph courtesy of BP

## FINDING THE OPTIMAL GASIL ANTIBLOCKING SILICA FOR YOUR APPLICATION

High clarity polymer films produced from vldPE, ldPE, lldPE, mlldPE, PP, PVC and PET resins are inherently prone to blocking. Blocking is particularly common in films produced by the following techniques:

- Casting
- Blown Film Extrusion
- Biaxial Orientation
- Tubular Water Quench (Dow-Taga Type)
- Calendering

Selection of the optimal Gasil antiblocking silica will depend upon the magnitude of the blocking problem, base resin type, target film thickness and method/process of film manufacture. PQ Corporation produces a range of Gasil antiblocking silicas that are differentiated by particle size and bulk density. These attributes form the basis for the superior dispersibility and high efficiency of Gasil antiblocking silicas in polymer film applications.

### ANTIBLOCKING EFFICIENCY

Antiblocking agents work by conferring a micro-roughness to the surfaces of polymer films. This reduces the contact area between the film layers and allows for penetration of air between them thereby reducing adhesion.

The choice of antiblocking silica depends upon resin type, target film thickness and method of incorporation of the antiblock. The customer will find that PQ Corporation's Gasil antiblocking silica products are ideally suited for use in all high clarity and thin film applications and our technical experts can help you to find the optimal product for your application.

### ABSORPTION OF ADDITIVES

Most packaging films require good slip properties. The micro-rough film surface imparted by Gasil antiblocking silicas combined with slip additives reduces film friction.

Synthetic silicas are manufactured with a wide range of surface area and pore volume characteristics. Using our patented technology PQ Corporation's range of Gasil antiblocking silicas has been tailored to offer the greatest antiblocking efficiency with low absorption of the other polymer additives.

Chart 1. Blocking force vs haze: 25µm LLDPE

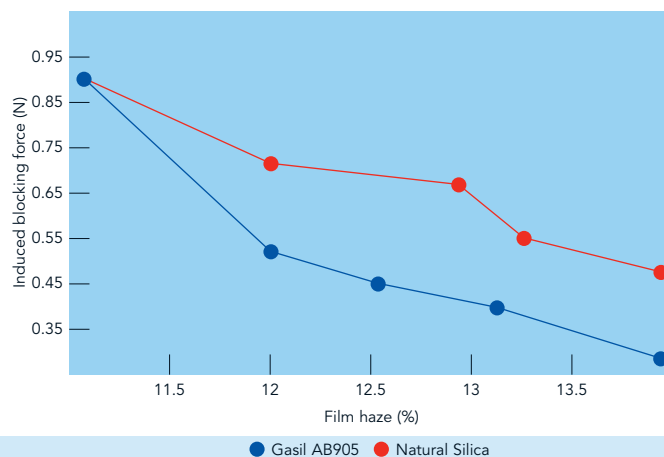


Chart 2. Blocking force vs antiblock content: 25µm LDPE

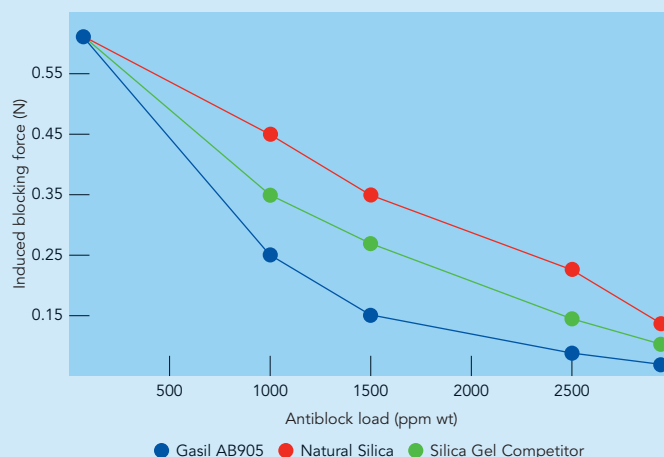
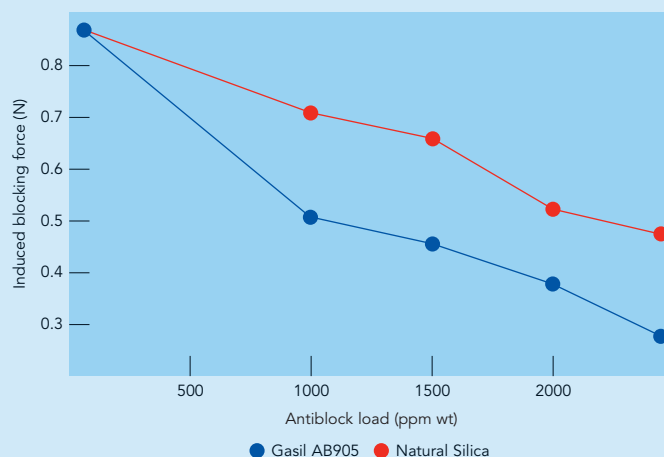


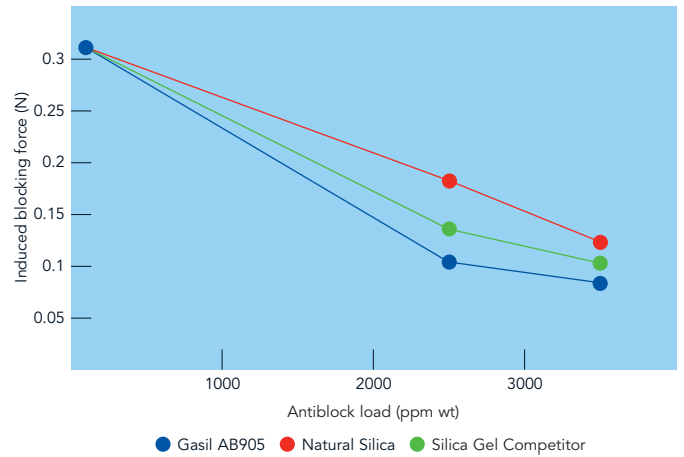
Chart 3. Blocking force vs antiblock content: 25µm LLDPE



## OPTICAL PROPERTIES

Gasil antiblocking silicas are particularly suitable for polyolefin and polyester film grades where film optical properties, for example clarity, are of prime importance. In such applications Gasil antiblocking silicas provide the most effective combination of high antiblocking efficiency and excellent optical properties – a performance combination not possible with other antiblocking systems.

Chart 4. **Blocking force vs antiblock content: 25µm PP**



## Application summary - Gasil antiblocking silicas

	AB705	AB710	AB720	AB725	AB905	23D	200DF	114	EBN
PP Blown		•	•	•		•	•		
PP Cast		•	•	•		•	•	•	
BOPP			•	•		•	•		
TWQ PP			•	•		•	•	•	
lIdPE	•	•	•	•	•			•	
ldPE<100µm	•	•		•	•		•	•	
ldPE>100µm	•				•				•
PET			•						
Antislip									•

## LOW ABRASIVITY

Gasil antiblocking silicas are porous, non-crystalline, honeycomb structures of low hardness. This minimises wear on processing machinery and makes them an ideal antiblocking additive in metallized films where minimising scratching of the surface is important.

## EASE OF DISPERSION

Incorporation of antiblocking additives into the polymer resin is a critical operation because poor dispersion will result in poor efficiency and inclusion of optical defects in the final polymer film. The degree of dispersion generally depends upon the type of equipment used. High shear mixing normally has to be applied in order to obtain a homogeneous distribution of antiblock in the final film.

Gasil antiblocking silicas have been specifically tailored to provide optimal dispersion characteristics with batch/internal (Banbury-type) mixers, twin and single screw, low and high shear extrusion systems. Gasil antiblocking silicas can be mixed with the resin by adding the final concentration necessary to obtain the desired effects either via direct addition or via a compacted blend with other polymer additives. Alternatively they can be used to prepare masterbatch concentrates that can subsequently be let down during film manufacture to give the desired properties.

## STORAGE AND HANDLING

Gasil antiblocking silicas should be stored in unopened bags in a dry cool place. Storage temperatures should be less than 30°C/86°F. Material older than 1 year after manufacture, should be discarded.

## HEALTH AND SAFETY

Gasil antiblocking silicas are fine, light powders which are non-silicotic. Material Safety Data Sheets providing detailed toxicological and handling information on all Gasil antiblocking silica products are available on request.

## FURTHER ADVANTAGES OF GASIL ANTIBLOCKING SILICAS

- High film gloss maintained
- Films containing Gasil antiblocking silicas are not subject to scuffing when rubbed together
- Antiblocking effect is instantaneous after polymer resin solidification
- Finished film has excellent printability and ink adhesion
- Good film handleability, does not feel greasy to the touch
- Use of Gasil antiblocking silicas in polymer films does not lead to taint and odour problems in packaging applications
- Gasil antiblocking silicas are amorphous to X-rays and are non-silicotic

### Gasil antiblocking silica products

	AB705	AB710	AB720	AB725	AB905	23D	200DF	114	EBN
Pore volume, mlg <sup>-1</sup>	0.7	0.7	0.7	1.0	-	1.6	0.4	1.2	1.2
Average particle size (µm)	6.5	5.4	3.2	5.3	6.8	4.6	4.3	6.5	8.3
Surface area, m <sup>2</sup> g <sup>-1</sup>	500	500	500	400	-	290	750	320	320
pH	6.5	6.5	6.5	7.0	8.0	6.5	4.2	7.0	7.0
Loss at 105C, %	1.5	1.5	1.5	1.0	3.0	3.0	2.0	1.0	1.0
Loss at 1000C, %	7.0	7.0	7.0	5.0	7.0	3.0	6.0	3.0	3.0
Oil absorption, linseed, g100g <sup>-1</sup>	90	90	90	160	-	290	80	200	200
Iron content as Fe*, ppm	40	40	40	60	-	50	40	60	60
Surface treatment	none	none	none	none	none	none	none	none	none
SiO <sub>2</sub> content, %	99.5	99.5	99.5	99.5	99.5	99.5	99.5	99.5	99.5
Bulk density	360	350	330	220	320	105	400	150	160

All parameters are typical values

## 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](mailto:techsupport@pqcorp.com)

For further information please contact:

### **PQ Corporation**

Warrington, England, WA5 1AB  
T: +44 (0)1925 416100 F: +44 (0)1925 416116

### **PQ Corporation**

280 Cedar Grove Road, Conshohocken, PA 19428-2240 USA  
T: +1 610 651 4600 F: +1 610 825 1421

### **PQ Corporation**

435 Orchard Road, #19-05 Wisma Atria, Singapore 238877  
T: +65 6838 7290 F: +65 6736 1650

### **PQ Corporation**

Av. Marques de São Vicente, 121, 6° andar sala 60101139-001 - São Paulo, SP Brazil  
T: +55 (0)11 3613 9900 F: +55 (0)11 3613 9919

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