

## CAB-O-SPERSE® DISPERSIONS FOR PRESSURE SENSITIVE ADHESIVES

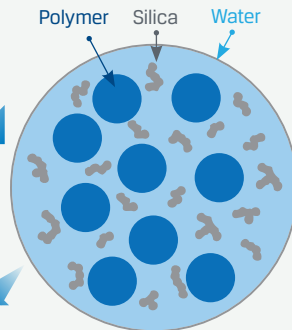
### WHY CAB-O-SPERSE DISPERSIONS IN PSAs?

CAB-O-SPERSE dispersions provide the following benefits to waterborne pressure sensitive adhesives (PSAs):

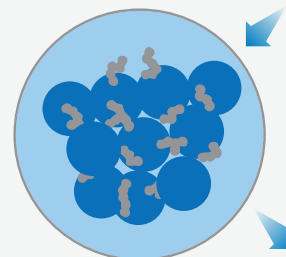
1. Ease of processing
2. PSA Performance Enhancement
  - ◆ Increased cohesive shear strength
  - ◆ Preserved adhesive peel strength
  - ◆ Improved thermal stability
  - ◆ Tunable optical properties (clarity/haze)
3. Ultra-high Purity

### The advantage of CAB-O-SPERSE dispersions

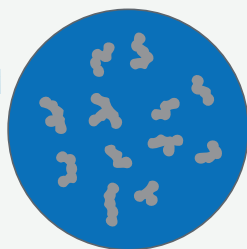
Adding CAB-O-SPERSE dispersions to polymer latex yields stable dispersions with very low energy input



Application to substrate



Silica particle distribution is maintained during drying and film formation

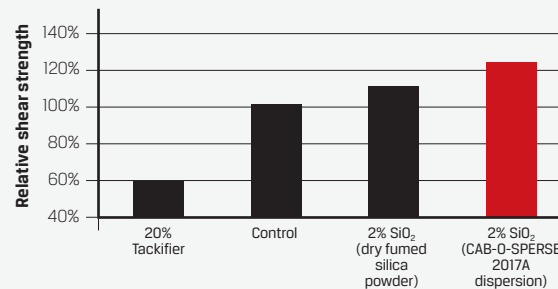


### IMPROVING STRENGTH IN ACRYLIC SYSTEMS

#### Cohesive shear strength

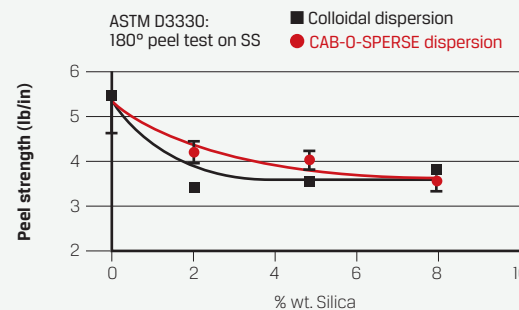
CAB-O-SPERSE dispersions:

- ◆ Increase shear strength vs. dry powder alternatives at equivalent loading
- ◆ Offset reductions in shear strength caused by organic tackifiers typically used to increase adhesion
- ◆ Deliver >20% improvement in shear strength at ≥2% wt. silica vs control



#### Greater adhesive strength retention

CAB-O-SPERSE dispersions deliver greater peel strength retention than comparable colloidal silica dispersions

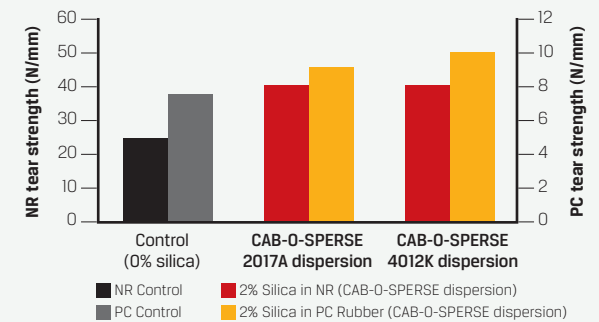


### VERSATILITY IN OTHER POLYMER SYSTEMS

#### Use in other adhesive systems

CAB-O-SPERSE dispersions can improve the mechanical properties of many other waterborne polymers in addition to acrylics

CAB-O-SPERSE dispersions increase tear strength of natural rubber (NR) and polychloroprene (PC) rubber films by up to 65%.



Polymers capable of hydrogen bonding can interact favorably with CAB-O-SPERSE silica and alumina dispersions and gain even more strength.



RELATIVE PERFORMANCE IN ADHESIVES

Suggested products:

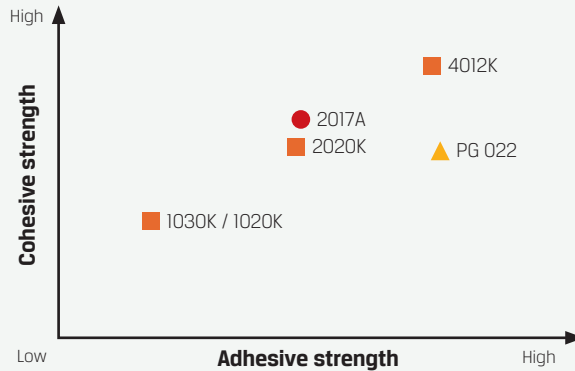
CAB-O-SPERSE 2017A, 2020K, 4012K, 1020K, 1030K, PG022, 1015E dispersions

General guidelines:

- Large particles facilitate formulation stability and yield greater surface roughness
- In anionic systems, cationic CAB-O-SPERSE products promote the best adhesion performance, and anionic CAB-O-SPERSE products promote the best balance of performance and formulation stability

Legend:

Material	Stabilizer chemistry	Particle charge
● Silica	NH <sub>3</sub>	Anionic
■ Silica	KOH	Anionic
▲ Silica	Proprietary	Cationic



Note: Data are for constant solids loading

FORMULATION INFORMATION

Waterborne PSA formulation in %wt.:

- Water (25-35%)
- Polymer (40-55%)
- Tackifier or plasticizer (5-15%)
- Viscosifier (0-15%, optional)
- CAB-O-SPERSE metal oxide (2-10%, dry particle wt.)

For waterborne organic tackifiers consider rosin ester dispersions or resin dispersions, such as:

- Tacolyn™ 3179 H
- Tacolyn 5193

For removable PSAs, consider less tacky acrylics, such as:

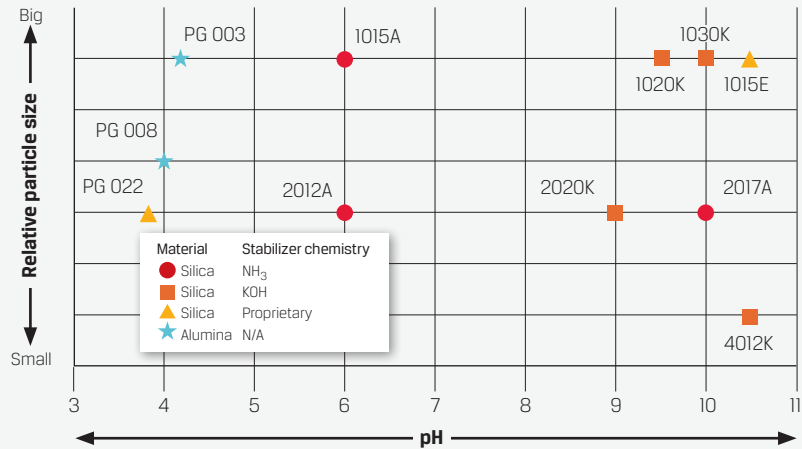
- ROBOND™ PS-8120 HV

For more permanent waterborne acrylic systems consider:

- ROBOND PS-90
- Acronol® 220

CAB-O-SPERSE PRODUCTS AND PROPERTIES

CAB-O-SPERSE product	Loading	Charge
1015A	15%	Anionic
1020K	20%	Anionic
1030K	30%	Anionic
2012A	12%	Anionic
2017A	17%	Anionic
2020K	20%	Anionic
4012K	12%	Anionic
PG 003	40%	Cationic
PG 008	40%	Cationic
PG 022	20%	Cationic



Technical Support

North America: +1 800 462 2313  
South America: +55 11 2144 6400  
Europe: +371 6705 0700  
Asia Pacific: +86 21 5175 8800

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