

Kymene™

Wet-strength Resin Innovations

Bringing the right products and people to your papermaking



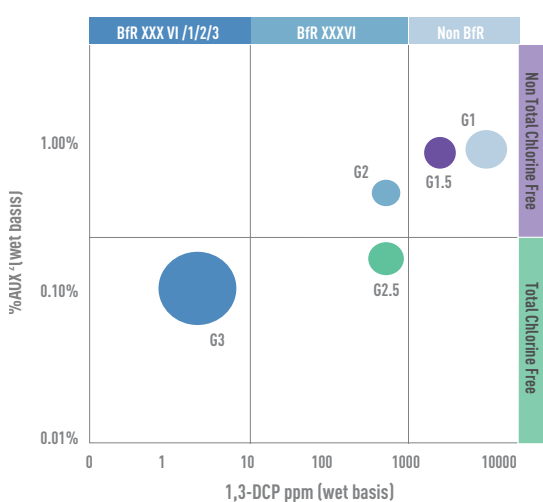
North American Portfolio

- Increased wet strength
- Reduced cost
- Increased efficiency
- Improved functionality
- Improved regulatory compliance

Technology Overview

Kymene™ wet-strength additives, based on polyamide-epichlorohydrin (PAE) resin chemistry, help papermakers improve the wet strength of grades intended primarily for the consumer market. These grades include tissue (facial, kitchen towel, wipers, napkins and tableware), packaging (liquid packaging, aseptic container, carrier board, and other forms of food packaging), and specialty (tea bag, coffee filter, labels, currency, laminating grades, etc.).

Designed to be used at neutral-to-alkaline pH, PAE resins have a high level of wet-strength permanence, help improve machine efficiency and do not adversely affect paper absorbency as do some other chemistries.



NORTH AMERICAN LINE OF KYMENE WET-STRENGTH RESINS

Generation	Base Resin	Total Solids	Efficiency	DCP ¹	MCPD ¹	Total AOX ¹
G1	Kymene 557H	12.5%	Standard	3,000 ppm	400 ppm	High
G1	Kymene 821	21.0%	High	6,500 ppm	750 ppm	High
G1.5	Kymene 1500LV	26.0%	High	5,000 ppm	475 ppm	High
G2	Kymene 925NA	25.0%	High	<999 ppm	<315 ppm	0.65%
G3	Kymene GHP12	12.0%	High	5 ppm	10 ppm	0.10%

¹ values at highest solids option

Solenis has developed methods, including post-synthesis technologies, to modify the basic chemistry of Kymene wet-strength resins to make them stronger-performing while reducing the by-products 1,3-dichloropropanol (1,3-DCP) and 3-monochloropropan-1,2-diol (3-MCPD), as well as aminochlorohydrin (ACH) and polymer-bound CPD (PB-CPD) for our customers' paper and board regulatory compliance needs.

Compliance and Sustainability

Solenis' wet-strength resins can be supplied in a variety of product configurations to accommodate any mill's compliance and regulatory standards. The full wet-strength portfolio has been accepted by Green Seal for use in all paper grades that they register. For customers exporting to European markets, we offer solutions that help them comply with environmental labeling established by Nordic and EU Ecolabels and recommendations issued by the German Federal Institute of Risk Assessment (Bundesinstitut für Risikobewertung, or BfR). Our new G1.5 resins offer decreased volatile organic compound (VOC) levels while maintaining excellent storage stability and efficiency. And our G2 and G3 resins continue to lower the levels of residual DCP and total AOX to help meet global compliance standards.

² Adsorbable organic halogen

FEATURE	BENEFIT
A legacy of innovation	The most complete line of G1, G1.5, G2 and G3 wet-strength resins on the market, making it possible to address a full range of customer compliance needs while balancing cost-in-use
Advanced chemical techniques and manufacturing processes	Introduction of high-solids, high-efficiency resins with ever-increasing levels of azetidinium (AZE) functionality
Biodehalogenation and membrane separation technologies	Stronger-performing resins with reduced levels of 1,3-DCP and 3-MCPD, as well as aminochlorohydrin and polymer-bound CPD
Extensive manufacturing footprint	Ability to provide wet-strength resins—efficiently and cost-effectively—to any mill, anywhere in the world
Dedicated R&D organization and wet-strength resin expertise	Commitment to deliver the next generation of wet-strength resins that increase solids, improve functionality and remain far ahead of all regulatory compliance issues

Supply Chain

Solenis owns and operates four manufacturing facilities for wet-strength resin production in US and one in Mexico. This puts us close to any North American customer, reducing freight distances and, as a result, freight costs. It also gives us the necessary manufacturing backup to ensure that we can serve our customers even if one facility encounters a production problem.

More Information

To learn more, contact your technical sales representative or visit us online.

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