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**UCARFLOC™ AND POLYOX™
WATER-SOLUBLE RESINS
IN FLOCCULATION
APPLICATIONS**

UCARFLOC™ and POLYOX™ Water-Soluble Resins, used alone or in combination with other commercial flocculants, can significantly improve flocculation and particle retention performance in a wide variety of applications:

- paper pulps, lignins
- mining and drilling: silica, kaolin clays, phosphates, ores, oil field reserve pits
- food waste treatment

UCARFLOC™ and POLYOX™ - Superior Flocculants in Paper Applications

With increasing pulp costs and formulations and process limitations, paper mills need to rely on additional tools to overcome the many technical and economic challenges they face. Paper pulp manufacturers can use UCARFLOC™ and POLYOX™ (Poly)Ethylene Oxide (PEO) Water-Soluble Resins to improve a wide variety of formulation and process parameters.

UCARFLOC™ and POLYOX™ product features	Functional benefits
Water-soluble polymers with high-molecular weight	Versatile and functional at low-use levels
High-affinity with fillers, fibers, pitch, fines and additives	Superior flocculant for fine particles Improves first pass retention and yields Extends wood pulps and enables cost reduction Improves formation, floc strength and quality Improves filler retention Promotes effective drainage Enables formulation and process changes Improves quality and consistency - Smoother potential fiber or color variations - Improves strength consistency
Nonionic and less pH sensitive	Wide range of applications and processes Formulation and process robustness More effective than cationic retention aids such as polyacrylamides, polyethylenimines

Application	Recommended product	Molecular Weight *	Viscosity mPa.s **	Usage level ppm (Kg / KMT)
Flocculants	POLYOX™ WSR Coagulant	5,000,000	5,500 - 7,500	25 - 100
	POLYOX™ WSR-308	8,000,000	10,000 - 15,000	5 - 50
	UCARFLOC™ 309CP***	8,500,000	>13,000	5 - 40

* Calculated: approximation using rheological measurements

** Measured 1% solution at 25°C

*** CP = Coarse Particle

General consumption of UCARFLOC™ Polymers in household papers

Paper	Paper weight (g/m ²)	Molecular Weight * (Kg/MT)
Tissue paper	10-11	0.8-1.8
Toilet paper	18-20	0.3-0.8

The typical addition level for UCARFLOC™ Polymers is 0.3 to 2 kg per ton of paper. For very high-speed paper machines (1,300 – 1,500 m/min), a higher dose (1.5 – 2.0 Kg/Ton of paper) of UCARFLOC™ Polymer is required to achieve the necessary level of pulp dispersion. The table below provides recommended use levels for various types of paper. Also it is not practical to use more than 500ppm of UCARFLOC™ (dissolution).

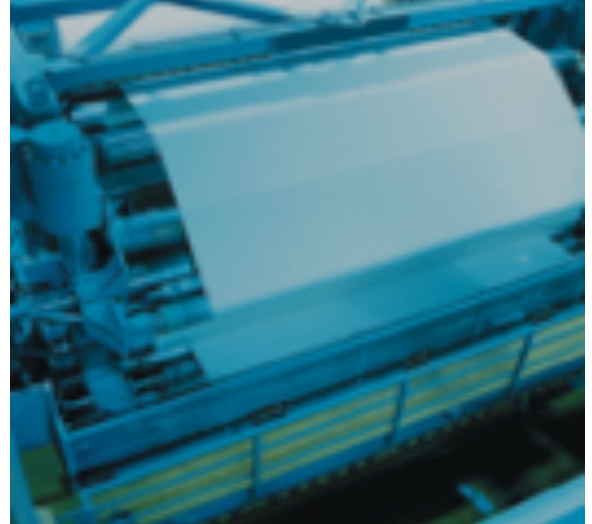
UCARFLOC™ 309CP

Efficacy of UCARFLOC™ 309CP in Pitch Removal Measured in g/L

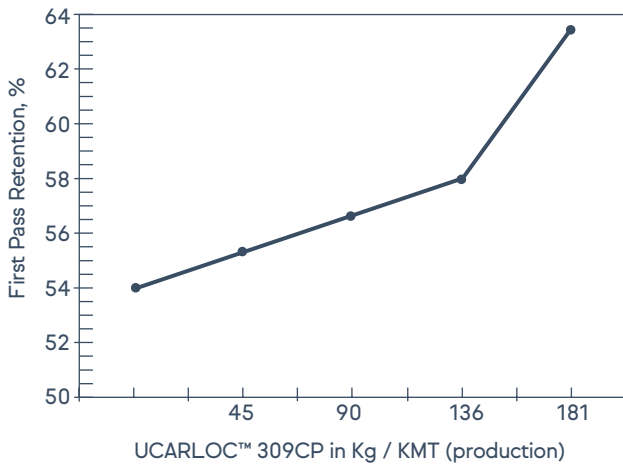
	Untreated	5ppm	10ppm	15ppm
SAMPLE SET "A"	0.32	ND	ND	ND
SAMPLE SET "B"	0.34	0.15	ND	ND

ND = Non detected (<0.02g/L)

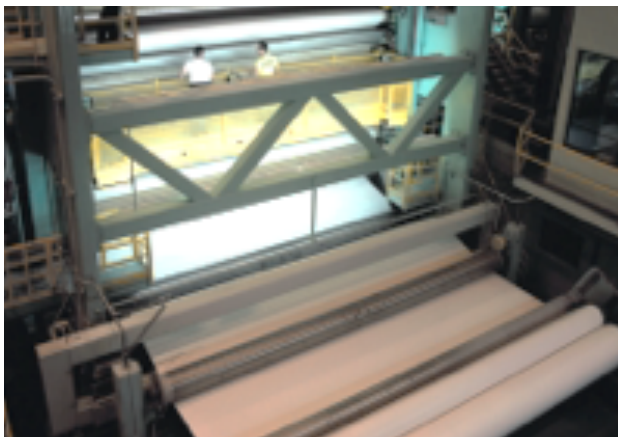
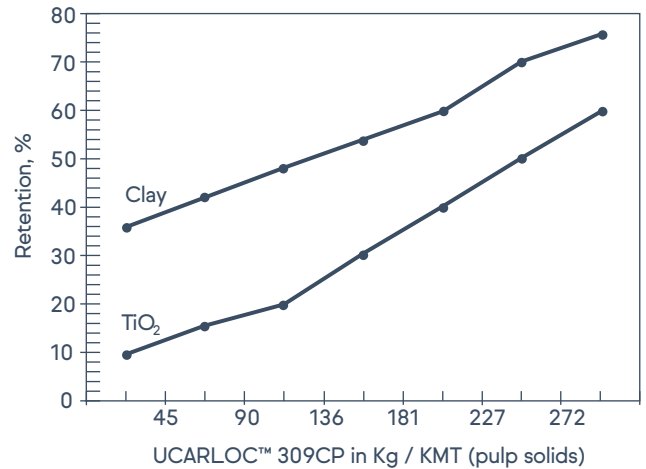
- Reduces effluent treatment and sludge
- Improves yields, reduces costs
- Increases floc strength



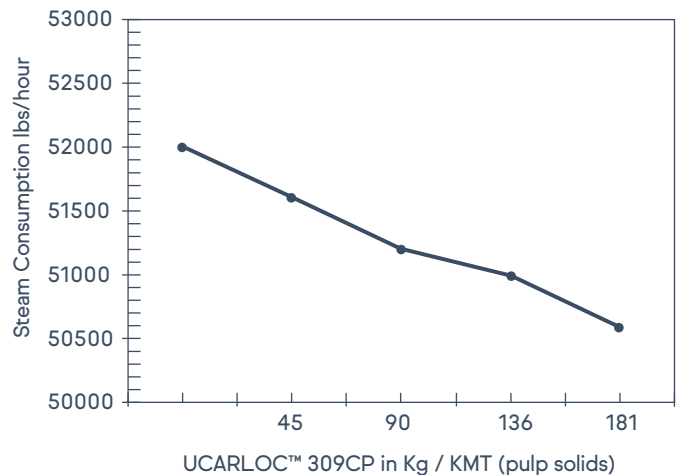
Improved pulp First Pass Retention with UCARFLOC™ 309CP



Improved filler retention with UCARFLOC™ 309CP



Energy savings with UCARFLOC™ 309CP



UCARFLOC™ and POLYOX™ - Superior Flocculants in Other Applications

The use of UCARFLOC™ and POLYOX™ Water-Soluble Resins is common in mining operations. It is more prevalent in silica-based applications where UCARFLOC™ and POLYOX™ Water-Soluble Resins offer superior functionality.

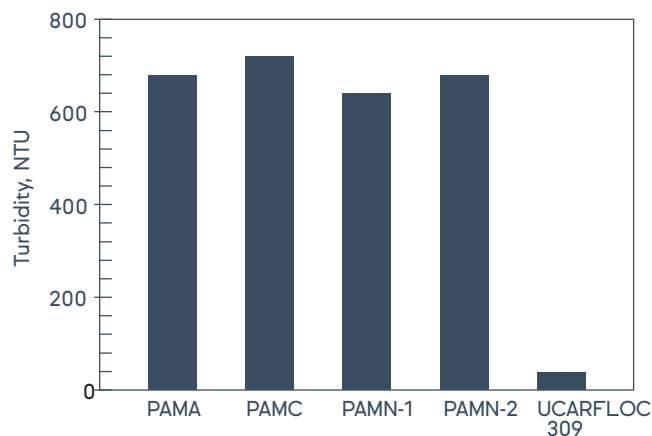
Flocculation Mechanism

Adsorption of UCARFLOC™ and POLYOX™ Water-Soluble Resins on silica-based substrates occurs because of hydrogen bonding between the ether oxygen and the hydroxyl groups on hydrated silica. The unique hydrophilicity of UCARFLOC™ and POLYOX™ Water-Soluble Resins leads to a competition between hydrogen bonding with the water in bulk and the surface hydrated layer of the oxide minerals. These competing forces promote the formation of tails and loops on the surface of the fine particles - the longer the tails and loops the better the flocculation. Flocculation of oxide minerals using UCARFLOC™ polymers has been discussed extensively in literature.

UCARFLOC™ and POLYOX™ product features	Functional benefits
Water-soluble polymers with high-molecular weight	Versatile and functional at low-use levels Formulation and process robustness
Nonionic and less pH sensitive	Wide range of applications and processes Formulation and process robustness
Superior affinity for silicas and mineral slurries	Superior flocculant - Improves yields - Reduces wastes Better performance than PAMS* Reduces effluent treatment and sludge

* Cationic, anionic, and nonionic polyacrylamides (PAMS)

Flocculation Performance of UCARFLOC™ 309CP (2 ppm) and Polyacrylamides (10 ppm) for Silica



A wide range of fillers and substrates can benefit from UCARFLOC™ 309CP

UCARFLOC™ and POLYOX™ Water-Soluble Resins with various enhancers are successful in retaining many filler types, including:

- kaolin clays
- titanium dioxide
- sodium aluminum silicate
- calcined clays, etc.

Connect with us

Our enthusiastic sales team, wide network of distributors, and technical experts stand ready to support you in your development projects.

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