

derypol

HIMOLOC

TECHNOLOGY

PROTECTING THE ENVIRONMENT, ENSURING
A BETTER FUTURE





WHAT IS HIMOLOC?

HIMOLOC is a unique and different technology that makes possible to obtain high molecular weight flocculants in aqueous dispersion.

HIMOLOC cares for the environment and people.

“There is no new water. All we have is here.”
National Geographic



HIMOLOC IN 5 WORDS

HIMOLOC products are a revolution in the chemical industry and can be defined in these 5 words.

GREEN

HIMOLOC polymers are free of solvents, mineral oils and surfactants.

BLUE

This technology reduces the emission of VOC's into the atmosphere.

EASY

HIMOLOC products dissolve easily in all types of water.

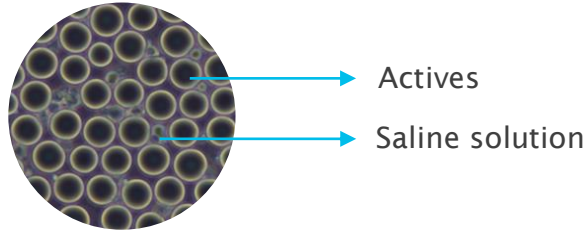
VERSATILE

It can be applied in different sectors: water treatment, cosmetics, textile, pulp & paper, oil & gas, mining and dust control.

INNOVATIVE

HIMOLOC is a new, exclusive and leading technology in its sector that allows different and more beneficial solutions to be obtained.

WHAT IS HIMOLOC?

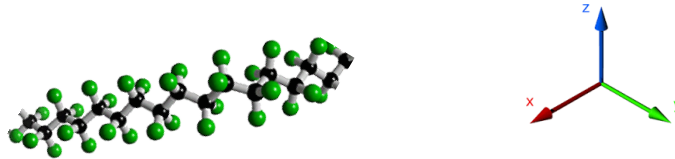


Soluble polymer in **aqueous matrix**

Pure vs. dissolved aspect

Ionic charge: Cationic, Anionic, Non-ionic and Amphoteric

Estructure: Cross-Linked and linear



Micropolymers with 3D structure (greater charge accessibility → Increases Reactivity)



Pure product

Solution at 1%

HIMOLOC ENVIRONMENTAL ADVANTAGES



Allows **saving water**



No VOC's emission to the atmosphere



Reduction of mineral oils in sludges



Promote **circular economy**



3 times lower carbon footprint than emulsion flocculants



Availability of **acrylamide-free** flocculants

HIMOLOC ECONOMIC ADVANTAGES



EASY

Can be dissolved in any type of water with a simple static mixer



AD HOC POLYMERS

Designed for innovative and more efficient applications



MORE THAN EASY

Direct dosing of the product under optimum conditions



OPTIMAL

Increased exploitation of polymer actives

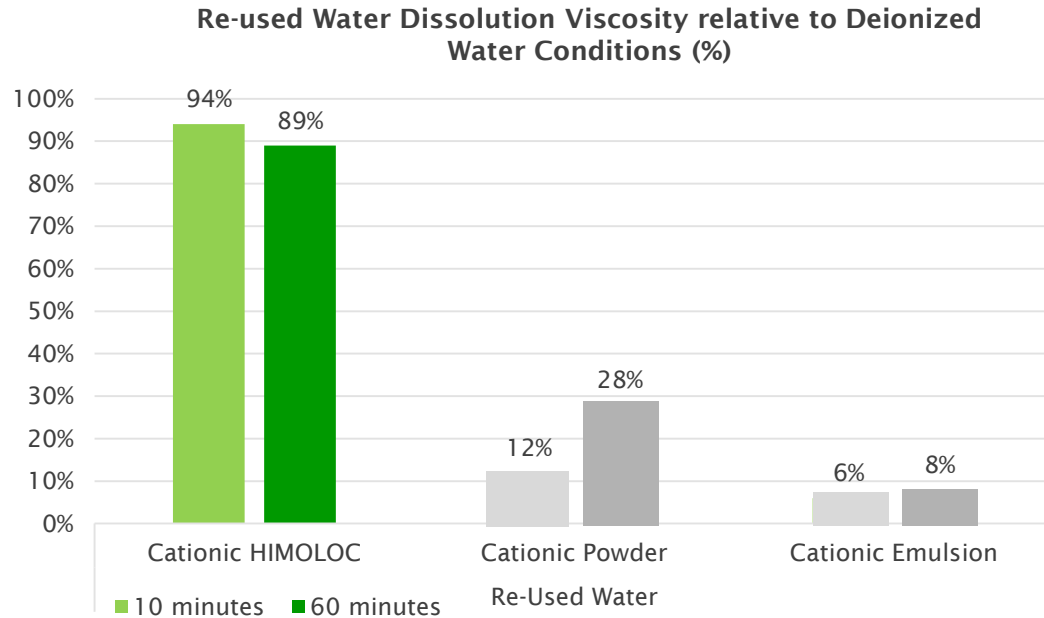


TECHNOLOGY COMPARISON

	HIMOLOC Technology	Emulsions	Powder
Application	Very cheap equipment	Expensive equipment	Very expensive equipment
Prior to use	No need to stir	Stir recommended	Hygroscopic products can clog
Solubility	Complete between 0,1% - 5%	They need to be prepared at certain concentrations	Very difficult, implies poor polymer utilisation
Dissolution time	< 10 min Instant with a Static Mixer	> 25 min	> 60 min
Freezing temperature	Very low	Low	N/A
VOC's emission	NO	YES	NO
Increase in COD and BOD	NO	YES	NO
Effect of water quality on dissolution	NO	YES	YES
Direct application	YES	NO	NO
Shelf life	9 months	6 months	12 months

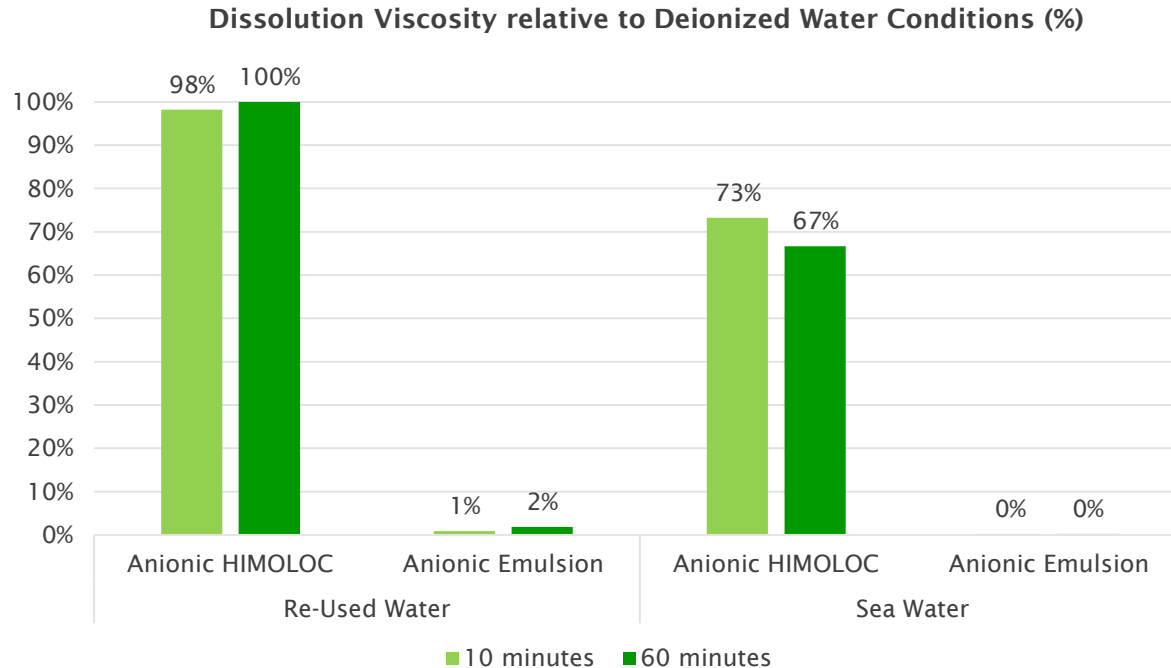
POLYMER DISSOLUTION

- The **exploitation of polymer actives** is highly dependent on the dissolution process.
- The **dissolution equipment** and the **water used** are key factors.
- The **quality of the dilution water** significantly affects the performance and viscosity of powder and emulsion flocculants.

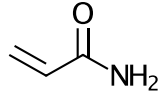


POLYMER DISSOLUTION

- The results are better and in applications where seawater is used, anionics are most often used (especially in Oil & Gas).



HIMOLOC FORMULATION



AAM: Acrylamide
 C_3H_5NO
 71.08 g/mol



Base monomer for the
 formulation of PAM's
 (Polyacrylamides)

CATIONIC MONOMERS							ANIONIC MONOMERS	
Name	DADMAC	APTAC	MAPTAC	MADAMQUAT	ADAMQUAT (MCQ)	BZQUAT (BZQ)	AA	AMPS
Chemical structure	<p>DADMAC $C_8H_{16}ClN$ 161.67 g/mol</p>	<p>APTAC $C_9H_{19}ClN_2O$ 206.9 g/mol</p>	<p>MAPTAC $C_{10}H_{21}ClN_2O$ 220.74 g/mol</p>	<p>Madamquat or MC75 $C_9H_{18}ClNO_2$ 207.7 g/mol</p>	<p>Adamquat or MC80 $C_8H_{16}ClNO_2$ 193.45 g/mol</p>	<p>Benzoquat $C_{14}H_{20}ClNO_2$ 269.77 g/mol</p>	<p>Acrylic Acid $C_3H_4O_2$ 72.06 g/mol</p>	<p>NaAMPS $C_7H_{12}NNaO_4S$ 229.23 g/mol</p>
Benefits	Helps neutralise the negative surface charge of colloids	High resistance to hydrolysis	High resistance to hydrolysis	Very high molecular weights can be obtained	Allows high molecular weights to be obtained at reasonable cost	Unique DERYPOL monomer with hydrophobic part for systems with grease and/or high conductivity	Very high molecular weights can be obtained	High resistance to hydrolysis. For systems with acid pH and/or high temperatures and pressures

HIMOLOC SERIES: A SOLUTION FOR EVERY APPLICATION

HIMOLOC technology products include a wide range of polymers to suit every need in the chemical industry.

HIMOLOC
DR

HIMOLOC
TG / HB

HIMOLOC
TX

HIMOLOC
GO/GA

HIMOLOC
ZW

HIMOLOC
DW

HIMOLOC
AAM FREE

HIMOLOC
MJ&AD500

NEW
POLYMERS

HIMOLOC DR

- High molecular weight **CATIONIC** polyacrylamide with the special Derypol monomer (BZQ) for the separation of fats and oils, especially in flotation processes.
- The most effective polymer in high conductivity media.
- For all water treatment (flocculant) and paper processes (retention and drainage / fibre recovery).

Product	Cationicity (molar %)	Composition	Molecular weight (UL)	Viscosity	Actives
DR2200	4%	AAM/BZQ	3.3	<1000 cp	20%
DR2500	10%	AAM/BZQ	3.4	<400 cp	15%
DR1020	10%	AAM/BZQ	3.6	<700 cp	20%
DR525	10%	AAM/BZQ	3.6	<1500cp	25%
DR3000	35%	AAM/BZQ/MCQ	2.7	<400 cp	20%
DR523	35%	AAM/BZQ/MCQ	2.8	<1500 cp	25%
DR35	35%	AMM/BZQ/MCQ	1.7	<400 cp	20%
DR6020	60%	AAM/BCQ/MCQ	2.4	<400 cp	20%
DR4000	80%	AAM/BZQ/MCQ	2.1	<500 cp	20%
DR524	80%	AAM/BZQ/MCQ	2.7	<2500 cp	28%

HIMOLOC TG / HB

- Very high molecular weight **CATIONIC** polyacrylamides.
- **Improves dryness** in sludge dewatering processes, especially in centrifuges and screw presses.
- **Retention and Drainage Programmes:** TG992SIM, TG325, TG22, TG224, TG971 and HB3522.

Product	Cationicity (molar %)	Composition	Molecular weight (UL)	Viscosity	Actives
TG224	4%	AAM/BZQ/MCQ	4.0	<2000 cp	20%
TG325	10%	AAM/MCQ	4.3	<1500 cp	20%
TG971	14%	AAM/MCQ	4.5	<1500 cp	20%
HB3522	15%	AAM/MCQ	3.7	<1500 cp	23%
TG22	20%	AAM/MCQ	3.2	<5000 cp	25%
TG992SIM	20%	AAM/MCQ	5.0	<3000 cp	20%
TG30	35%	AAM/MCQ/BZQ	3.6	<1000 cp	22%
TG823	35%	AAM/MCQ/BZQ	3.6	<2500 cp	28%
TG995	50%	AAM/MCQ/BZQ	5.0	<2000 cp	20%
TG60	64%	AAM/MCQ/BZQ	3.8	<2000 cp	20%
TG998	80%	AAM/MCQ/BZQ	5.0	<2000 cp	20%

HIMOLOC TX

- High molecular weight, cross-linked **CATIONIC** polyacrylamides to **increase sludge dryness** in sludge dewatering systems, especially high speed centrifuges.
- Solvent and surfactant free sludge (Green Technology).
- Drastically reduces the emission of volatiles (VOCs) into the air in Thermal Dryers (Blue Technology).
- Complies with regulations to use the final sludge for agricultural purposes or land filling.
- **Innovative Sludge Dewatering Programmes to improve Performance and the Environment.**

Product	Cationicity (molar %)	Composition	Molecular weight (UL)	Cross-linking degree	Viscosity	Actives
TX7392	30%	AAM/MCQ /BZQ	4.1	Medium	<2500	20%
TX950	50%	AAM/MCQ /BZQ	2.0	Very high	<2500	20%
TX9550	50%	AAM/MCQ /BZQ	3.5	Medium-High	<2500	20%
TX7360	64%	AAM/MCQ /BZQ	3.7	Medium	<2500	20%
TX980	80%	AAM/MCQ /BZQ	2.5	Very high	<2000	20%
TX9880	80%	AAM/MCQ /BZQ	3.8	Medium	< 2500	20%

HIMOLOC GO / GA

- High molecular weight **ANIONIC** polyacrylamides.
- Universal flocculants with high affinity for the separation of suspended solids.
- Polymers with AMPS can act over a wide pH range.

Product	Anionicity (molar %)	Composition	Molecular weight (UL)	Viscosity	Actives
GO2000	0%	AAM	3.9	<2000 cp	20%
GO2010	10%	AAM/AAC	5.1	<3000 cp	25%
GA8713	13%	AAM/AMPS	3.8	<400 cp	20%
GAS100L	25%	AAM/AMPS/AcNa	4.6	<3500 cp	20%
GO2030	30%	AAM/AAC	5.6	<2000 cp	25%
GO115	30%	AAM/AAC	7.3	<1000 cp	13%
GO7130	30%	AAM/AAC/AMPS	6.2	<500 cp	15%
GO8230	30%	AAM/AAC/AMPS	6.1	<1000 cp	20%
GO5077	50%	AAM/AAC/AMPS	5.3	<1000 cp	20%

HIMOLOC ZW

- High molecular weight **AMPHOTHERIC** polyacrylamides.
- Water Treatment (P-C) → High performance in systems with lack of homogenisation or where water quality changes frequently.
- Special synergy with the HYGREEN coagulant series (tannin-based vegetable coagulants).
- Sludge treatment → High performance in filter presses (avoids clogging of the screens).

Product	Cationic/ Anionic	Composition	Molecular weight (UL)	Viscosity	Actives
ZW111	30% / 15%	AAM/BZQ/ AAC/MCQ	2.9	<1500 cp	20%
ZW322	50% / 20%	AAM/BZQ/ AAC/MCQ	3.0	<1500 cp	20%

HIMOLOC DW

- High molecular weight **CATIONIC** and **ANIONIC** polyacrylamides.
- Very low residual monomer values (RMA): **DW1032 (<10 ppm)** and **DW7135 (<5ppm)**.
- Suitable for **DRINKING WATER** → They comply with European regulations (Directive 2015/1787) regarding Acrylamide residual monomer (AAM) content.

Product	Cationicity (molar %)	Composition	Molecular weight (UL)	Viscosity	Actives
DW1032	10%	AAM/MCQ	4.3	<1500 cp	20%

Product	Anionicity (molar %)	Composition	Molecular weight (UL)	Viscosity	Actives
DW7135	30%	AAM/AAC/AMPS	6.2	<1000 cp	15%

HIMOLOC DF & AF (Acrylamide free)

- High molecular weight NON ACRYLAMIDE based flocculants.
- Treatments or processes where a strong cationic demand is required or where acrylamide-free processes are necessary.

Product	Ionicity (molar %)	Composition	Molecular weight (UL)	Viscosity	Actives
DF100	100% Cationic	MADAMQ	3.7	<3000 cp	20%
AFC80	80% Cationic	MAAm/MCQ/BZQ	3.5	<3000 cp	25%
AFA40	40% Anionic	DMA /AAC/AMPS	4.0	<2500 cp	23%

HIMOLOC MJ (Pulp & Paper)

- **ANIONIC** polyacrylamides that improve the adhesion between layers (**Ply Bond agent**), improving the mechanical properties of the paper.
- **Partially replaces native starch**, providing considerable economic savings and overall system improvement (reducing COD in water, improving energy efficiency, etc.).

Product	Anionicity (molar %)	Composition	Molecular weight (UL)	Viscosity	Actives
MJ480	45%	AAM/AAC	NA	<1500 cp	25%

HIMOLOC AD500

- **ANIONIC** polyacrylamide of easy application, which provides a protective film on the applied material without affecting its properties.
- AD500 suitable for **Dust Control** applications (Mining, Civil Works, etc.).
- AD500AB20 indicated for **Agriculture** applications (water saving and soil fixation).

Product	Anionicity (molar %)	Composition	Molecular weight (UL)	Viscosity	Actives
AD500	45%	AAM/AAC	NA	<1500 cp	25%
AD500AB20	45%	AAM/AAC	NA	<1500 cp	25%

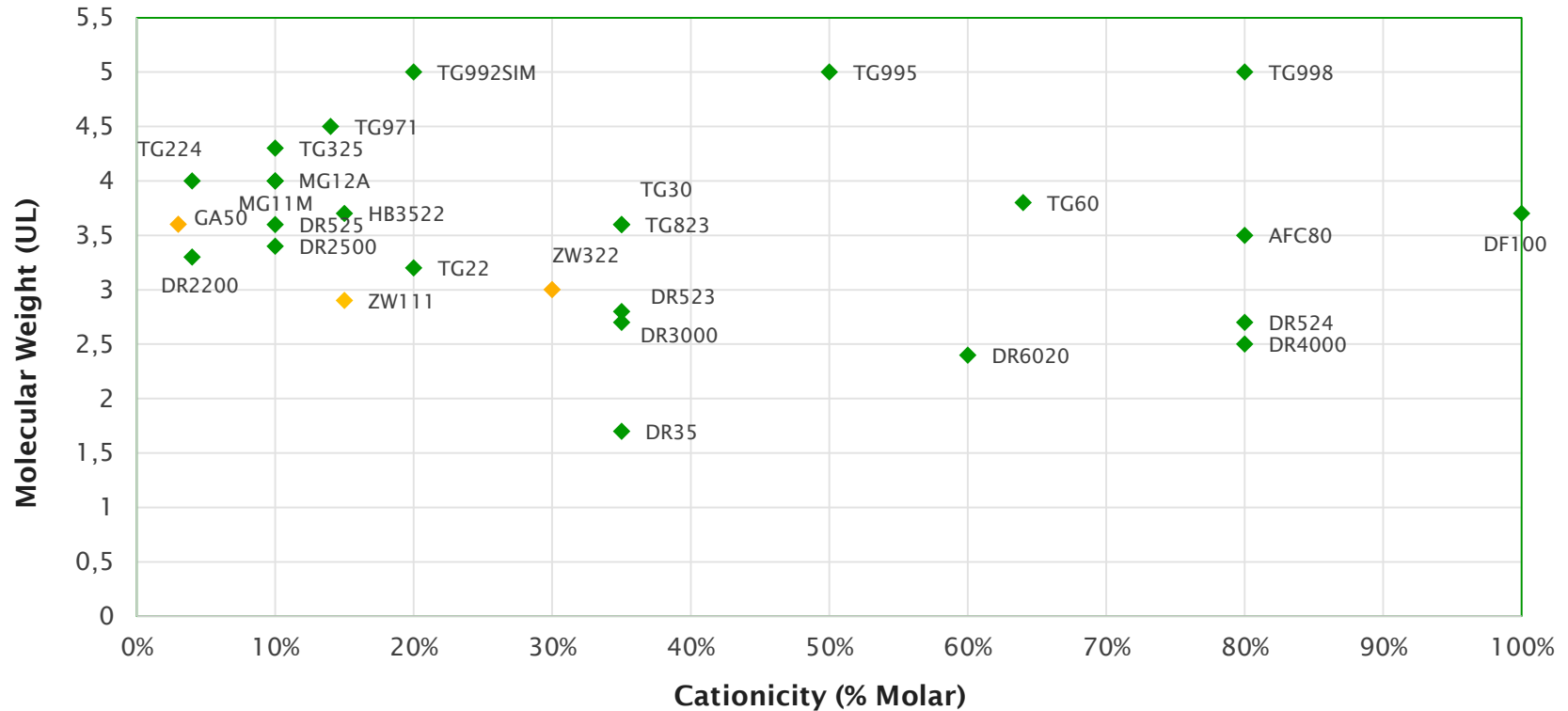
NEW HIMOLOC POLYMERS

- High molecular weight **CATIONIC** and **AMPHOTERIC** polyacrylamides with special monomers such as APTAC / MAPTAC.
- High Hydrolysis Resistance Polymers.
- Special applications such as SAGD (Steam Assisted Gravity Drainage) in Oil&Gas.

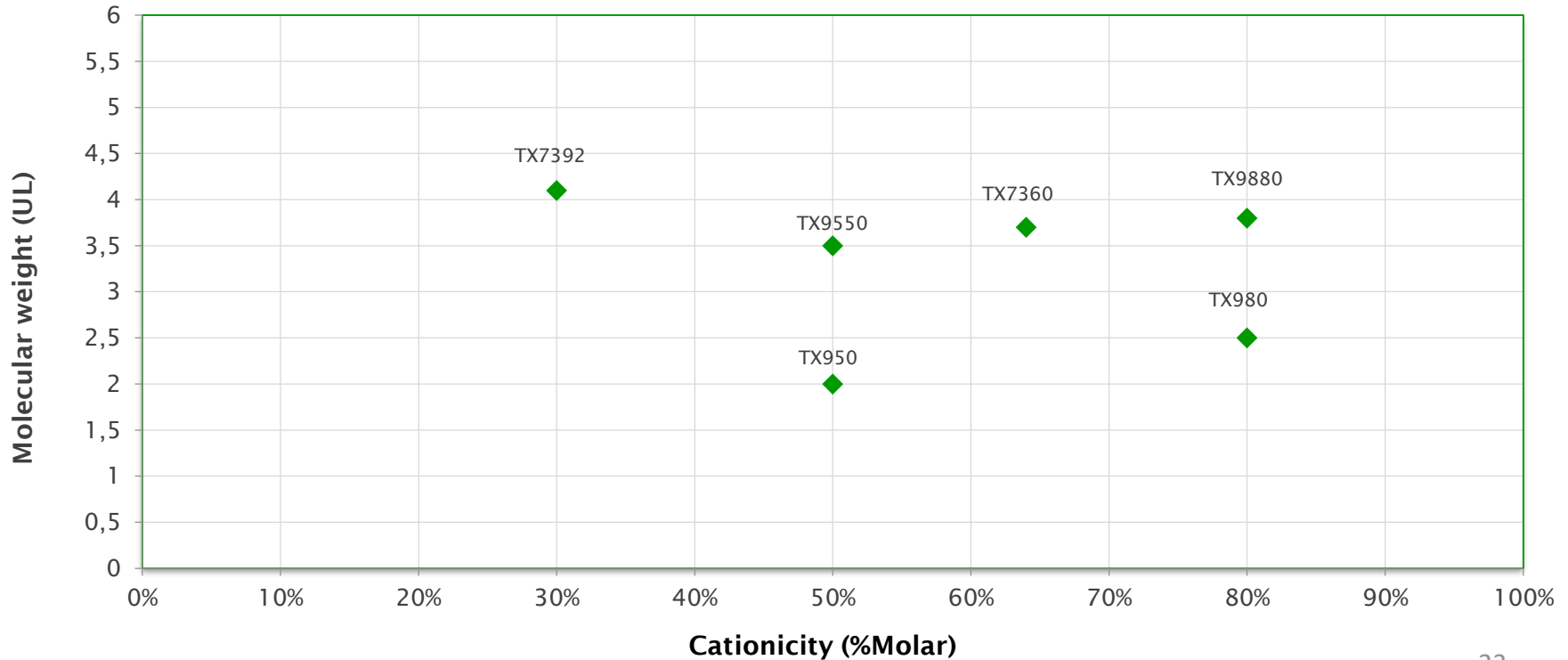
Product	Ionicity (molar %)	Composition	Molecular weight (UL)	Viscosity	Actives
MG12A	10% Cationic	AAM/APTAC	4.0	<3000 cp	20%
MG11M	10% Cationic	AAM/MAPTAC	4.0	<3000 cp	20%

Product	Ionicity (molar %)	Composition	Molecular weight (UL)	Viscosity	Actives
GA50	Amphoteric	AAM/APTAC/AMPS	3.6	<2000 cp	20%

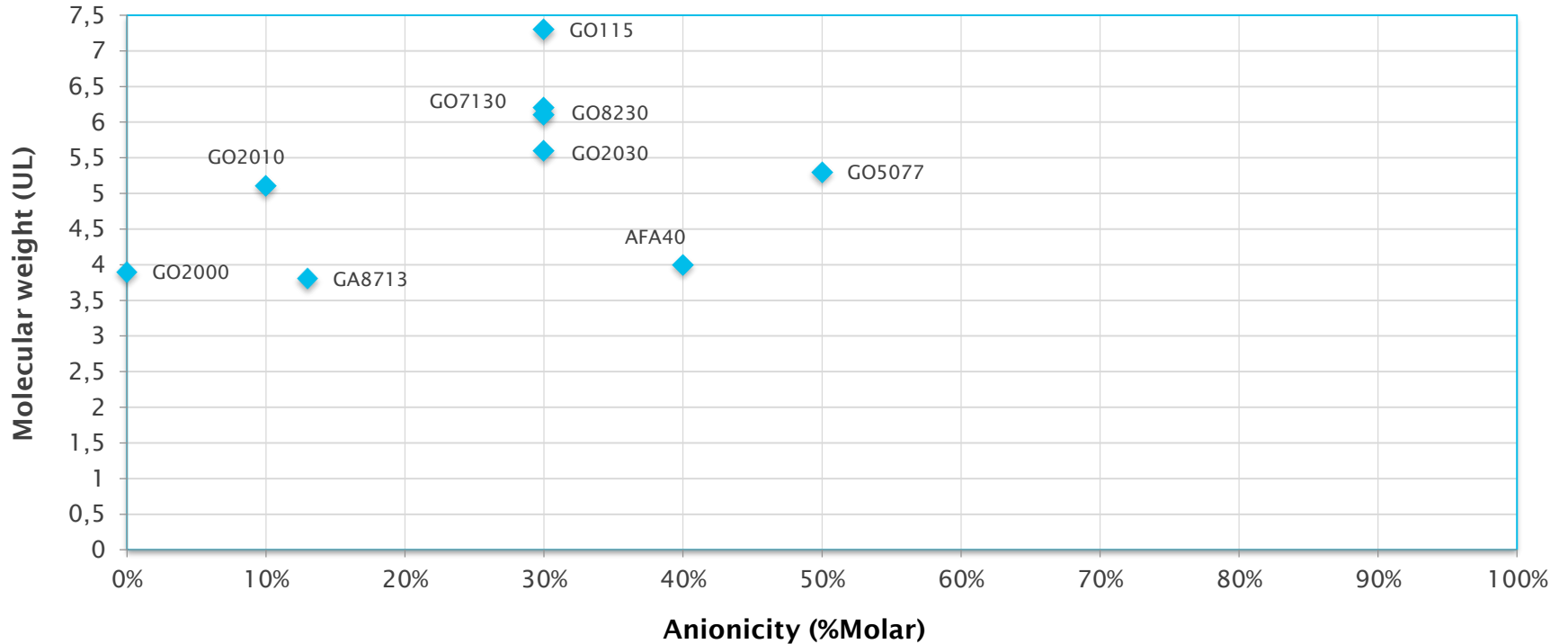
MW vs IONICITY: **CATIONIC** and **AMPHOTERIC** HIMOLOCS



MW vs IONICITY: **CATIONIC** CROSS-LINKED HIMOLOCS



MW vs IONICITY: ANIONIC HIMOLOCS



STANDARDS AND REGULATIONS

Depending on the requirements, HIMOLOC polymers can comply with the following regulations:

- **HIMOLOC standard:** All HIMOLOCs have less than 250 ppm residual Acrylamide.
- **GRAS series:** They can meet the established requirements.
- **AB series:** We can supply any HIMOLOC with residual Acrylamide value according to our customers demand.
- **FDA:** 21CFR 176.170 and 21CFR 176.180 for food contact paper and board manufacturing.
- **BfR:** Recommendation XXXVI: Food contact paper and board.
- **GB9685:** Hygienic Standards for the Use of Additives in Food Containers and Packaging Materials.
- **Ecolabel / Nordic Ecolabel:** May meet the requirements.
- **DW Series:** For use in drinking water, according to national regulations.
- **Microplastic-free** polymers.
- Depending on the customer's needs, **we can reduce the residual Acrylamide**, as we have the analytical capacity to make this possible.

Please contact our Sales Department for more information

MAIN COMMERCIAL APPLICATIONS (1/5)

Industry	Process	HIMOLOC	Main benefits
Pulp & Paper Retention & In-Process Dewatering Water recovery Sludge Ply Bond Agent	Machine Decantation / Flotation Sludge dewatering	TG325	Top Selling Retention and Drainage Polymers.
		TG992SIM	SIM: NEW Retention and Drainage Technology.
		DR525	Contains "Benzoquat", the best choice for high conductivity closed systems and fibre recuperators.
		GO5077	High performance for the treatment of "green liquors" from pulp mills.
		MJ480	Ply Bond agents that improve mechanical properties such as Scott Bond and CMT. Reduces starch consumption, helping to lower the COD of the system.
Municipal WWT P-C treatment Primary and secondary effluents Sludge treatment Drinking water	Decantation / Flotation Sludge dewatering	TX Series	Cross-linked. Suitable for increasing dryness in centrifugal sludge dewatering.
		TG30 / TG60 / TG995 / TG998	High molecular weight. Solid-liquid separation with high solids content either P-C or Sludge Dewatering Treatment.
		DW7135 DW1032	Suitable for Drinking Water Treatment.
Chemical Industry Brines, Magnesium Hydroxide, Titanium Dioxide, Latex & Plastics	Decantation / Flotation Sludge dewatering	DR4000	High "Benzoquat" content, very efficient in high conductivity media.
		GA8713	Due to the AMPSA monomer, they have high efficiency in conditions of high conductivity and/or low pHs.
		GO7130	High affinity for the separation of suspended solids over a wide pH range also due to the AMPS monomer.
		ZW322	Provides versatility in industries where wastewater quality changes frequently.
Glass/ Inks/ Paints Adhesives, Paints, Dyes	Flotation Sludge dewatering	GO7130 GO2030 GA8713	Universal flocculants with a high affinity for the separation of suspended solids over a wide pH range.

MAIN COMMERCIAL APPLICATIONS (2/5)

Industry	Process	HIMOLOC	Main benefits
Oils & Fats High fat food industry Edible oil production	Flotación Deshidratación de fangos	DR3000 / DR4000 TG30 / TG60 TG995 / TG998 ZW322	DR/TG series have a high content of "Benzoquat" monomer: <ul style="list-style-type: none"> • Most efficient monomer in high conductivity media. • Works especially well in the separation of oils & fats in flotation units due to its hydrophobic nature ZW: Amphoteric polymers that work very well in processes where wastewater quality changes frequently.
		GO7130AB10	Suitable for sugar production processes.
Food industry Juices, Food processing, Sludge, Sugar	Decantación/ Flotación Deshidratación de fangos	TX7360 / TX9550	Cross-linked. Increasing dryness in sludge dewatering by centrifuge.
		DR3000 / DR4000 TG30 / TG995	DR/TG series have a high content of "Benzoquat" monomer: <ul style="list-style-type: none"> • Most efficient monomer in high conductivity media. • Works especially well in the separation of oils & fats in flotation units due to its hydrophobic nature
Brewery, Winery & Distillery Beer and wine production, Alcoholic beverages	Decantación/ Flotación Deshidratación de fangos	DR3000 / DR4000 TG30 / TG995	DR/TG series have a high content of "Benzoquat" monomer: <ul style="list-style-type: none"> • Most efficient monomer in high conductivity media. • Works especially well in the separation of oils & fats in flotation units due to its hydrophobic nature
		TX Series	Cross-linked. Increasing dryness in sludge dewatering by centrifuge.
Dairy products Cheese & Cheese products	Flotation Sludge dewatering	GO7130 / GA8713	Anionic flocculants that work at low pHs.
		TG30 / TG60 TG995	They work especially well in the separation of oils & fats in flotation units due to their hydrophobic nature.
Slaughterhouse Meat processing Meat by-products	Flotation Sludge dewatering	TX Series	Cross-linked. Increasing dryness in centrifugal sludge dewatering.

MAIN COMMERCIAL APPLICATIONS (3/5)

Industry	Process	HIMOLOC	Main benefits
Oil & Gas Liquid-liquid separation phase Solid-liquid separation phase Enhanced oil recovery Fracking and SAGD operations Produced water reinjection Petroleum coke dust suppressant Drilling mud formulations Solids Control in Drilling Operations Well stimulation operations Water flooding operations	Deoilers Water clarifiers Sludge dewatering Sludge dewatering Drag Reducer EOR / Polymers Fluid Loss Control and Viscosifiers Clay Stabilizers Gelling polymers Saline solution and fresh drilling fluids.	AD500	Dust control. Prevents the emission of petroleum coke particles stored in piles into the air.
		GA8713	High resistance to hydrolysis.
		GO7130	Fluid Friction Reducer, achieving between 50 and 80%. High tolerance to High Pressure and High Temperature conditions. Increase viscosity at low shear rates (Low Shear Rates).
		DR3000 / DR4000	Excellent phase separation for O/W emulsion systems treated in flotation units.
		HYD151 / HYD252	Excellent liquid-liquid and liquid-solid separation for the treatment of production water, very low dosages.
		MG12A	Excellent performance in applications for water-based drilling fluids, viscosifiers, diluents, shale inhibitors, bentonite extenders and also as a drag reducer and for hydraulic fracturing.
		TG30 / TG60 TG995 / TG998	Improves EHS conditions, avoiding chemical loss. Increases production speed, optimizing costs, used in sludge dewatering operations in filters and decanters.
		GA50	Fracture gel formulation.
		ZW322LMW	Fluid loss control, increases viscosity at low shear rates, excellent for clay stabilization.

MAIN COMMERCIAL APPLICATIONS (4/5)

Industry	Process	HIMOLOC	Main benefits
Mining Carbon, Refined Copper and Zinc Uranium, Coal, Nickel Refined Aluminum	Decantation Sludge dewatering	GO7130 / GO2030 GA8713	Universal flocculants with high affinity for the separation of suspended solids over a wide pH range.
		DR2200 / DR525	When a low cationicity polymer is required.
		DF100	Recommended for Titanium Dioxide process.
Dust control	Sealing of stock piles	AD500 / AD500AB20	Dust Control: prevents the emission of dust into the atmosphere by forming a film on the material to be protected. Applicable in the transport of mineral wagons as dust suppressant.
Metallurgical industry Smelting furnaces, Scrubber Powder Lamination Aluminum liquor	Decantation/ Flotation Sludge dewatering	GO7130 / GO2030 GA8713	Universal flocculants with high affinity for the separation of suspended solids over a wide pH range. GA8713 is very efficient at any pH.
		DR3000 / DR4000	High content of "Benzoquat" monomer: <ul style="list-style-type: none"> • Most efficient monomer in high conductivity media. • Works especially well in the separation of oils & fats in flotation units due to its hydrophobic nature
Automotive industry Paints Water with cutting oils	Decantation/ Flotation Sludge dewatering	DR3000 / DR4000	
		GO7130	Universal anionic flocculant with high affinity for the separation of suspended solids in a wide pH range.

MAIN COMMERCIAL APPLICATIONS (5/5)

Industry	Process	HIMOLOC	Main benefits
Textile Dyeing, Wool washing Process water, sludge	Decantation/ Flotation Sludge dewatering	GO7130 / GO2030 GA8713	Universal flocculants with high affinity for the separation of suspended solids in a wide pH range.
Tanneries Leather products Footwear industry	Decantation/ Flotation Sludge dewatering	DR2200 / DR525 TG325	Recommended when a very low cationicity flocculant is needed.
		GO7130 GO2030	Universal flocculants with high affinity for the separation of suspended solids in a wide pH range.
Leachate Waste processing Landfills	Decantation/ Flotation Sludge dewatering	DR2200 / DR2500	Recommended for phase separation in wastewater with both mineral and organic content.
		GA8713	Efficient flocculant at any pH.
Ceramics Wastewater processing	Decantation/ Flotation Sludge dewatering	GO7130 GA8713	High efficiency in high conductivity media at any pH.
		ZW322	Provides versatility.



5 KEY IDEAS TO REMEMBER

HIMOLOC products take care of the environment and people.

GREEN AND BLUE

HIMOLOC polymers are free of solvents, mineral oils and surfactants. They do not emit VOC's into the atmosphere.

COMPLEMENTS THE PORTFOLIO

HIMOLOC products allow to expand the portfolio of products used in the industry.

EASY

It is a very easy-to-use technology that does not require a large equipment investment.

VERSATILE

HIMOLOC technology can be applied in different sectors.

INNOVATIVE

HIMOLOC is a new, exclusive and leading technology in its sector that allows different and more beneficial solutions to be obtained.

**Thank you for
your attention!**

derypol

