



# Dispersing Agents for Water-Based Paints & Plasters

As a leading global chemical manufacturer, ICL's R&D team is continuously developing innovative solutions which enable the manufacturing of sustainable, high-quality paints and coatings.



**We provide condensed phosphates and organic polymers which are extensively used as dispersing agents in pigmented systems – primarily in water-based paints.**

## Main Applications

**All of our dispersing agents are specially designed for water-based formulations. These products may be used for decorative wall paints in both indoor and outdoor applications such as:**

- Emulsion Paints
- Silicate Emulsion Paints
- Silicone Resin Paints
- Pigment Pastes
- Varnishes
- Plasters
- Adhesives

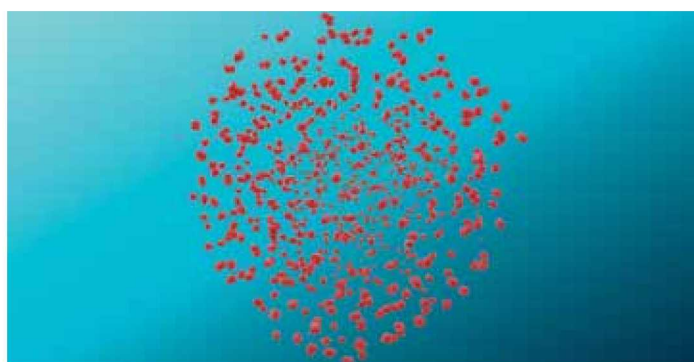
## Why Dispersing Agents?

**By introducing mechanical forces, pigment particle agglomerates are broken up into smaller aggregates during the dispersion process.**

The function of dispersing agents is to stabilize primary particles and prevent re-agglomeration. To achieve proper dispersion, molecules of the dispersing agent adsorb into the surface of the pigment particles and generate repulsive forces. Pigment particles are kept at a distance through electrostatic and/or steric stabilization.



*Agglomerated particles*



*Primary particles*

## What are the Benefits of Dispersing Agents?

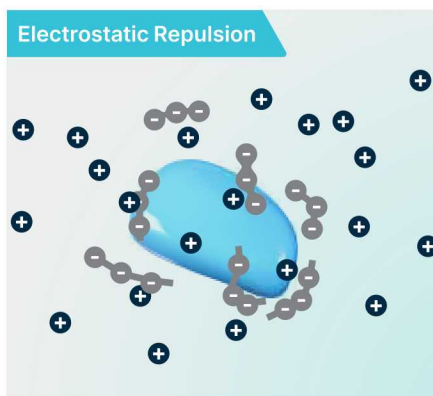
**Stabilizing a dispersion not only prevents pigment particles from re-agglomerating, but also optimizes the distribution of pigments and other fillers.**

Stabilization leads to improvements in hiding power, scrub resistance and storage stability. Properly stabilized dispersions allow for a higher pigment volume concentration (PVC).



*Left: Pigment preparation without dispersing agent. Right: Pigment preparation with 0.1% POLYRON® N. Adding just 0.1% POLYRON® N, the viscosity can be strongly reduced at the same PVC, thus a flowable paint can be achieved.*

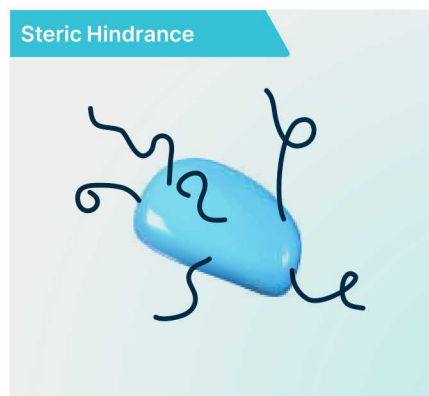
## Stabilization Mechanisms



### Electrostatic Stabilization

In an aqueous medium, the adsorbed dispersing agent dissociates into anionically charged macro molecules and low molecular weight cations.

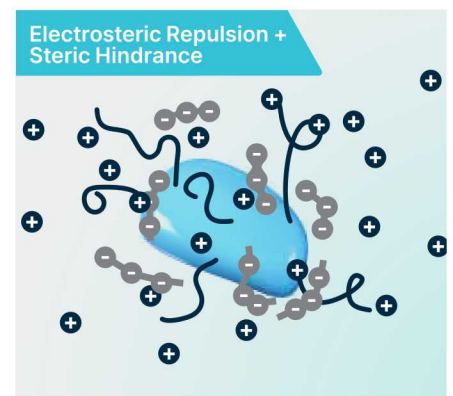
This results in an electrical double layer around each pigment particle. When pigment particles approach each other in the solution, the repulsive forces keep them apart because of their identical charge.



### Steric Stabilization

During the dispersion phase, the adsorbed dispersing agent forms a polymeric shell around each pigment particle. When pigment particles approach each other, the polymeric shells penetrate one another.

This penetration minimizes the mobility of the polymer chains resulting in a reduction of entropy. To compensate for this loss of entropy, the pigment particles must increase their distance from one another.



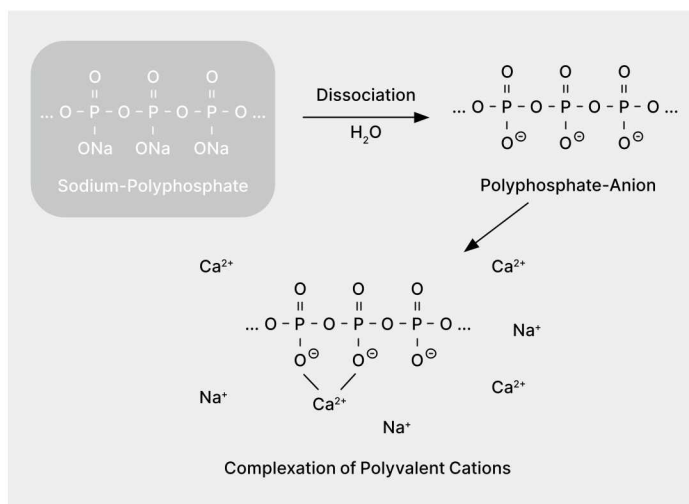
### Electrosteric Stabilization

Electrosteric stabilization combines both mechanisms – electrostatic and steric stabilization.

## What are the Additional Benefits of Polyphosphates?

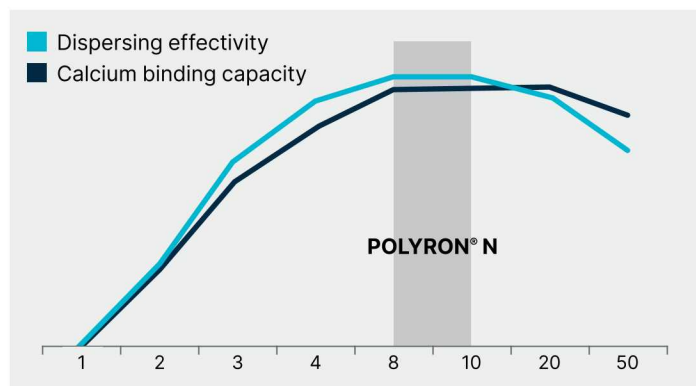
### In addition to their dispersing power, polyphosphates chelate multivalent cations.

In aqueous systems they dissociate according to the electrostatic stabilization mechanism to form anionic polyions. These anionically charged macromolecules complex multivalent cations such as  $\text{Ca}^{2+}$  and therefore also act as water softeners.



## Why POLYRON® N?

### The dispersing and calcium binding capacity of polyphosphates depends on their chain length. Best results are shown by polyphosphates with a chain length between 6 and 10.



*POLYRON® N has an optimized chain length distribution and brings superior effectiveness in terms of both dispersion and water softening.*



*Dispersing effectiveness of various polyphosphates with  $\text{Ca}(\text{OH})_2$  in water. From left to right: no dispersing agent, STPP, POLYRON® N, SHMP.*

## Additional Benefits of Polyacrylates

Compared to polyphosphates, polyacrylates have the advantage of being structurally similar to the binder. Polyacrylate dispersing agents are compatible with many binders, resulting in improved film formation and positive impact to scrub resistance and gloss.

## Combination of Polyphosphates and Polyacrylates

Combining polyphosphates and polyacrylates has a complementary effect. Being highly polar, the polyphosphates cover the surface of the pigment quickly and yield a high charge density. Stabilization is 100% electrostatic. Polyacrylates are comparatively less polar. They cover the surface of the pigment with a lower charge density but serve as buffers and adhere at the interface.

## Our Portfolio

Products	Supplied As / Chemical Basis	Solid Content (%)	Solvent	pH Value	Low VOC	Interior Paints
<b>Inorganic Dispersing Agents</b>						
<b>POLYRON® N</b>	Powder / Sodium polyphosphate	100		7.6 (1%)	✓	•
<b>POLYRON® N NEW</b>	Micro agglomerate / Sodium polyphosphate	100		7.5 (1%)	✓	•
<b>POLYRON® 322</b>	Powder / Sodium polyphosphate	100		6.6% (1%)	✓	•
<b>POLYRON® 322 NEW</b>	Micro agglomerate / Sodium polyphosphate	100		6.6% (1%)	✓	•
<b>Organic Dispersing Agents</b>						
<b>LOPON® P</b>	Liquid / Amine phosphonate	38 - 42	Water	7.0		
<b>LOPON® PL</b>	Liquid / Amine phosphonate + polyacrylate copolymer	48 - 50	Water	8.5		•
<b>LOPON® PO</b>	Liquid / Sodium polycarboxylate	~24	Water	11	✓	•
<b>LOPON® 890</b>	Liquid / Sodium polyacrylate – low molecular weight	44 - 46	Water	8.5		•
<b>LOPON® DA 200</b>	Liquid / Sodium polyacrylate – low molecular weight	42 - 45	Water	7.8	✓	•
<b>LOPON® DA 201</b>	Liquid / Potassium polyacrylate – low molecular weight	40 - 45	Water	7.8	✓	
<b>LOPON® DA 202</b>	Liquid / Ammonium polyacrylate – low molecular weight	38 - 44	Water	7.0	✓	•
<b>LOPON® DA 203</b>	Liquid / Lithium polyacrylate – low molecular weight	33 - 37	Water	8.5	✓	•
<b>LOPON® DA 204</b>	Liquid / Organic amino polyacrylate – low molecular weight	57 - 61	Water	7.5		
<b>LOPON® DA 400</b>	Liquid / Sodium polyacrylate – middle molecular weight	38 - 42	Water	7.8	✓	•
<b>LOPON® DA 401</b>	Liquid / Potassium polyacrylate – middle molecular weight	38 - 43	Water	7.8	✓	
<b>LOPON® DA 402</b>	Liquid / Ammonium polyacrylate – middle molecular weight	36 - 42	Water	7.0	✓	•
<b>LOPON® DA 403</b>	Liquid / Lithium polyacrylate – middle molecular weight	33 - 37	Water	8.5	✓	
<b>LOPON® DA 404</b>	Liquid / Organic amino polyacrylate – middle molecular weight	57 - 61	Water	7.5		
<b>LOPON® 892</b>	Powder / Sodium polyacrylate	100		8.3 (1%)	✓	•
<b>LOPON® 826</b>	Liquid / Preparation	52 - 54	Water	>13	✓	

Exterior Paints & Plasters	Emulsion Silicate Paints	Silicone Resin Paints	Varnish/Lacquer	Advantages/Properties	Products
<b>Inorganic Dispersing Agents</b>					
•	•	•		Optimum dispersing and calcium binding properties	<b>POLYRON® N</b>
•	•	•		Optimum dispersing and calcium binding properties that contain low dust micro particles which are easier to handle and disperse	<b>POLYRON® N NEW</b>
•	•	•		Good dispersing and calcium binding properties	<b>POLYRON® 322</b>
•	•	•	•	Good dispersing and calcium binding properties that contain low dust micro particles which are easier to handle and disperse	<b>POLYRON® 322 NEW</b>
<b>Organic Dispersing Agents</b>					
•		•		High calcium binding capacity; prevention of efflorescence at colored facade paints	<b>LOPON® P</b>
				Good dispersing property, improved color leveling	<b>LOPON® PL</b>
•		•	•	Dispersing for glossy paints	<b>LOPON® PO</b>
•		•	•	Dispersing for white and colored wall paints	<b>LOPON® 890</b>
•		•	•	Dispersing for white and colored wall paints	<b>LOPON® DA 200</b>
•	•	•	•	Dispersing for facade paints and mineral paints	<b>LOPON® DA 201</b>
•		•	•	Dispersing for interior and exterior paints	<b>LOPON® DA 202</b>
	•		•	Dispersing for anti-allergenic and environmentally friendly paints, free of preservatives	<b>LOPON® DA 203</b>
•		•	•	Dispersing for white and colored wall paints	<b>LOPON® DA 204</b>
•		•		Dispersing for white wall paints	<b>LOPON® DA 400</b>
•	•	•		Dispersing for emulsion silicate paints and facade paints	<b>LOPON® DA 401</b>
•		•		Dispersing for interior and exterior paints	<b>LOPON® DA 402</b>
	•			Dispersing for anti-allergenic and environmentally friendly paints, free of preservatives	<b>LOPON® DA 403</b>
•		•	•	Dispersing for white and colored wall paints	<b>LOPON® DA 404</b>
				Dispersing for powder systems	<b>LOPON® 892</b>
	•			Dispersing for emulsion silicate paints	<b>LOPON® 826</b>



REACH



**ICL is one of the world's leading fertilizer and specialty chemicals producers committed to fulfilling humanity's ever-evolving needs. Our major production activities are located in Israel, Europe, the US, South America and China, and are supported by major global marketing and logistics networks.**

**Our Commitment:** Successful relationships begin at the product development planning stage and extend through plant trials and product launch. Customers come to us with challenges, and we are dedicated to providing them with solutions. For manufacturers who rely on quality coatings, ICL offers proven performance, long-term corrosion and tannin stain protection, and protection of the world around us.

**Technical Service:** Our technical support capabilities allow us to help customers achieve better products. We are committed to building our product portfolio and continually exploring and expanding the frontiers of today's coatings technologies. This includes delivering timely assistance on coating formulation questions, aiding formulators in achieving total system compatibility and identifying an optimum inhibitor package to address individual cost and performance targets. We take the problem, analyze the parameters, work jointly with company product experts and create solutions that exceed customer expectations.

**Quality / REACH Statement / Responsible Care:** As a responsible international supplier of specialty chemicals, ICL is committed to advancing the principles of sustainability in the industries in which we operate. We incorporate quality, health, safety and environment management systems into all phases of the chemical life cycle. We pledge continuous improvement to provide the highest quality of products while protecting the safety of our people, our business partners, and the environment.

ICL is ISO 9001, ISO 14001:2004 and RC 14001:2014 certified. We are committed to our Responsible Care® initiatives and are consistent with the Responsible Care® code of Product Stewardship. We remain fully engaged in the implementation of the European Union's Registration, Evaluation, Authorization and Restriction of Chemicals legislation (REACH). The impact it will have on the future availability of chemicals is of vital importance for ICL, our customers and the entire global chemical industry.

To learn more, visit: [www.halox.com](http://www.halox.com)  
[techservice@halox.com](mailto:techservice@halox.com) | +49 6203 77 0 (International) | +1 (219) 933-1560 (US)

This information is based on our present state of knowledge and is intended to provide general notes on our products and their uses. It should not therefore be construed as guaranteeing specific properties of the products described or their suitability for a particular application. No legal liability shall be derived from it. Any existing industrial property rights must be observed. The quality of our products is guaranteed under our terms and conditions. © 2023 ICL Specialty Products Inc. All rights reserved. All information is protected under international copyright conventions. BK Giuliani is a wholly owned subsidiary of ICL Group. **ICL HALOX 0224**

#### Additional Product Lines

**HALOX®:** An extensive portfolio of organic and inorganic corrosion and flash rust inhibitors, supplemented by tannin stain inhibitors.

**LOPON® & POLYRON®:** Dispersing agents and stabilizers specially formulated for silicate and biocide-free paints.

**TARGON®:** Versatile additives for the construction industry.