

The background of the slide is a photograph of a modern building with vibrant, multi-colored facades in shades of yellow, orange, red, and blue. Several white-framed windows are visible. A large, semi-transparent abstract graphic is overlaid on the right side of the image, featuring swirling patterns in shades of red, pink, and purple, with a prominent diagonal blue stripe cutting through it.

DISPERSING AGENTS FOR WATER- BASED PAINTS

As a leading global chemical manufacturer, ICL's R&D team is continuously developing industrial solutions to manufacture safe, high-quality products for the paints and coatings industry.

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

Impact for a sustainable future

WHY DISPERSING AGENTS?

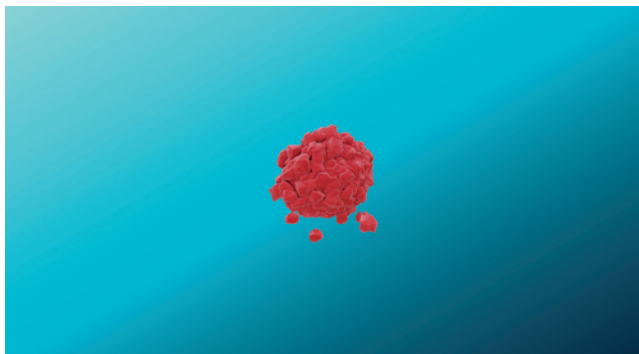
By introducing mechanical forces, pigment agglomerates are broken up into primary particles and smaller aggregates during the dispersion process.

The function of dispersing agents is to stabilize primary particles, preventing reagglomeration.

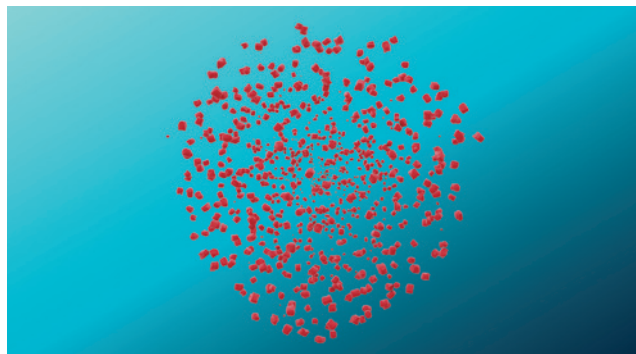
To achieve proper dispersion, molecules of the dispersing agent adsorb onto the surface of the

pigment particles and generate repulsive forces between individual pigment particles.

Pigment particles are kept at a distance through electrostatic and/or steric stabilization.



Agglomerated particles.



Primary particles.

BENEFITS OF DISPERSING AGENTS

Stabilizing a dispersion not only prevents pigment particles from reagglomerating, 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 PVC.



Left: Pigment preparation without dispersing agent; right: Pigment preparation with 0.1 % POLYRON® N.

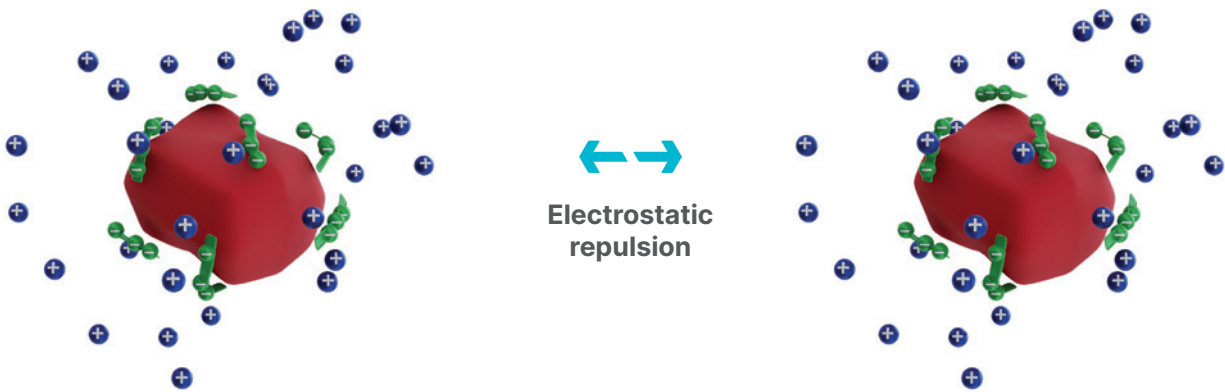
Adding just 0.1 % POLYRON® N, the viscosity can be strongly reduced at the same PVC, thus a flowable paint can be achieved.

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 solution, the repulsive forces due to their identical charge keep them apart.



Steric stabilization

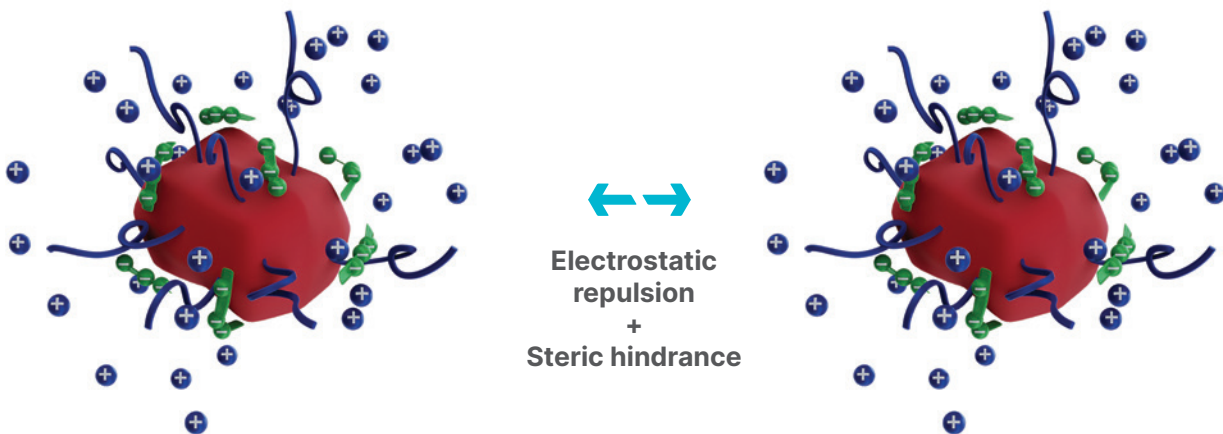
During the dispersion phase the adsorbed dispersing agent forms a polymer shell around each pigment particle. When pigment particles approach each other, the polymeric shells penetrate one another.

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 as well as steric stabilization.

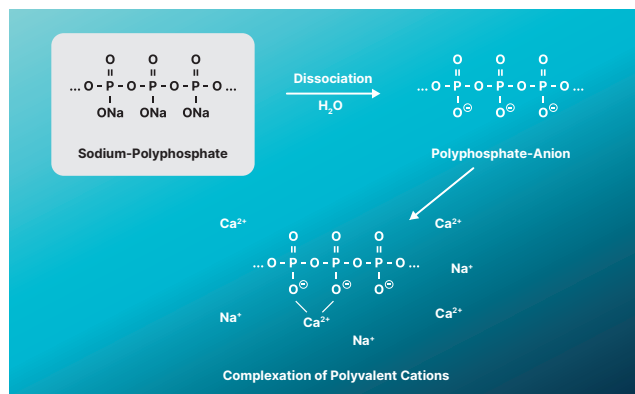


ADDITIONAL BENEFITS OF POLYPHOSPHATES

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

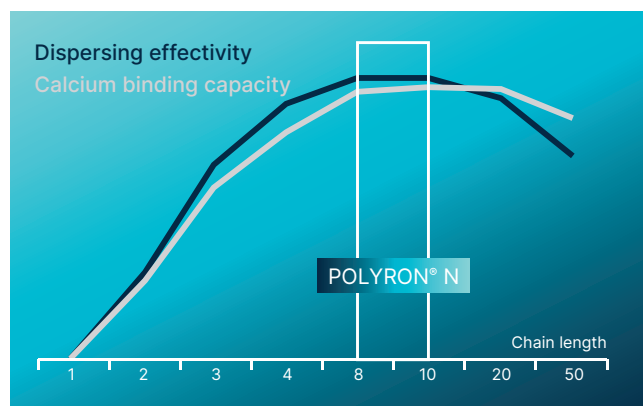
In aqueous systems they dissociate according to the electrostatic stabilization mechanism to form anionic polyions.

These anionically charged macromolecules complex multivalent cations such as Ca^{2+} and therefore also act as water softeners.



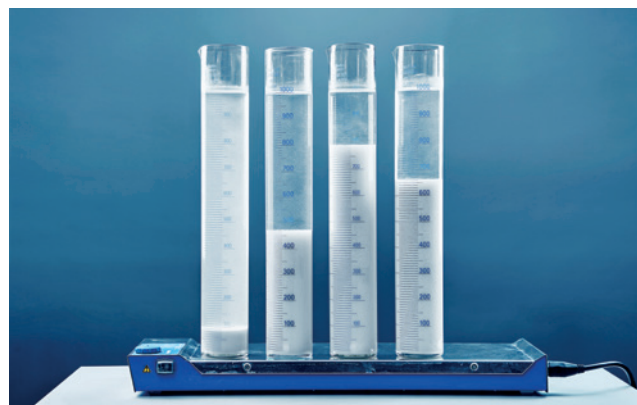
WHY POLYRON® N?

The dispersing and calcium binding capacity of polyphosphates depends on their chain length.



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

Best results are shown by polyphosphates with a chain length between 6 and 10.



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 OF DISPERSING AGENTS

● very suitable ● suitable

Product	Chemical basis	Supplied as	Solid Content [%]	Solvent	pH value	low VOC	Interior paints	Exterior paints & plasters	Emulsion silicate paints	Silicone resin paints	Varnish / Lacquer	Advantages / properties
Inorganic Dispersing Agents												
POLYRON® N	Sodium polyphosphate	powder	100		7.6 (1 %)	✓	●			●		Optimum dispersing and calcium binding properties
POLYRON® N NEW	Sodium polyphosphate	micro agglomerate	100		7.5 (1 %)	✓	●			●		Optimum dispersing and calcium binding properties
POLYRON® 322	Sodium polyphosphate	powder	100		6.6 (1 %)	✓	●			●		Good dispersing and calcium binding properties
POLYRON® 322 NEW	Sodium polyphosphate	micro agglomerate	100		6.6 (1 %)	✓	●			●		Good dispersing and calcium binding properties
Organic Dispersing Agents												
LOPON® P	Amine phosphonate	liquid	38-42	water	7.0			●		●		High calcium binding capacity. Prevention of efflorescence at colored facade paints
LOPON® PL	Amine phosphonate + polyacrylate copolymer	liquid	48-50	water	8.5		●					Good dispersing property, improved color levelling
LOPON® PO	Sodium polycarboxylate	liquid	~24	water	11.0	✓	●	●		●	●	Dispersing agent for glossy paints
LOPON® 890	Sodium polyacrylate - low molecular weight	liquid	44-46	water	8.5		●	●		●	●	Dispersing agent for white and colored wall paints
LOPON® DA 200	Sodium polyacrylate - low molecular weight	liquid	42-45	water	7.8	✓	●	●		●	●	Dispersing agent for white and colored wall paints
LOPON® DA 201	Potassium polyacrylate - low molecular weight	liquid	40-45	water	7.8	✓		●	●	●	●	Dispersing agent for facade paints and mineral paints
LOPON® DA 202	Ammonium polyacrylate - low molecular weight	liquid	38-44	water	7.0	✓	●	●		●	●	Dispersing agent for interior and exterior paints
LOPON® DA 203	Lithium polyacrylate - low molecular weight	liquid	33-37	water	8.5	✓	●		●		●	Dispersing agent for antiallergenic and environmentally friendly paints, free of preservatives
LOPON® DA 204	Organic amino polyacrylate - low molecular weight	liquid	57-61	water	7.5			●		●	●	Dispersing agent for white and colored wall paints
LOPON® DA 400	Sodium polyacrylate - middle molecular weight	liquid	38-42	water	7.8	✓	●	●		●		Dispersing agent for white wall paints
LOPON® DA 401	Potassium polyacrylate - middle molecular weight	liquid	38-43	water	7.8	✓		●	●	●		Dispersing agent for emulsion silicate paints and facade paints
LOPON® DA 402	Ammonium polyacrylate - middle molecular weight	liquid	36-42	water	7.0	✓	●	●		●		Dispersing agent for interior and exterior paints
LOPON® DA 403	Lithium polyacrylate - middle molecular weight	liquid	33-37	water	8.5	✓			●			Dispersing agent for antiallergenic and environmentally friendly paints, free of preservatives
LOPON® DA 404	Organic amino polyacrylate - middle molecular weight	liquid	57-61	water	7.5			●		●	●	Dispersing agent for white and colored wall paints
LOPON® 892	Sodium polyacrylate	powder	100		8.3 (1 %)	✓	●					Dispersing agent for powder systems
LOPON® 826	Preparation	liquid	52-54	water	> 13	✓			●			Dispersing agent for emulsion silicate paints

MAIN APPLICATIONS

All our dispersing agents are specially designed for water-based formulations.

Applications include

- emulsion paints
- silicate emulsion paints
- silicone resin paints
- pigment pastes
- varnishes
- plasters
- adhesives

These products may be used for decorative wall paints in both indoor and outdoor applications.



FURTHER PRODUCTS

In addition to dispersing agents, we also offer **defoamers and stabilizers specially for silicate paints and biocide-free paints.**

We would be glad to advise you here as well.

You can find our versatile additives for the construction industry under the brand name **TARGON®**.

ICL also has an extensive portfolio of organic and inorganic corrosion inhibitors as well as flash rust inhibitors. The **HALOX®** product line is supplemented by tannin stain inhibitors.

For more information please visit our website www.halox.com or contact us directly at coatings@icl-group.com

We look forward to helping you!





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.

BK Giuliani GmbH
Dr.-Albert-Reimann-Strasse 2
68526 Ladenburg, Germany

T +49 6203 77-0
coatings@icl-group.com

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www.icl-group.com

