



Tannin Stain Inhibitors for Wood Finishes

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.

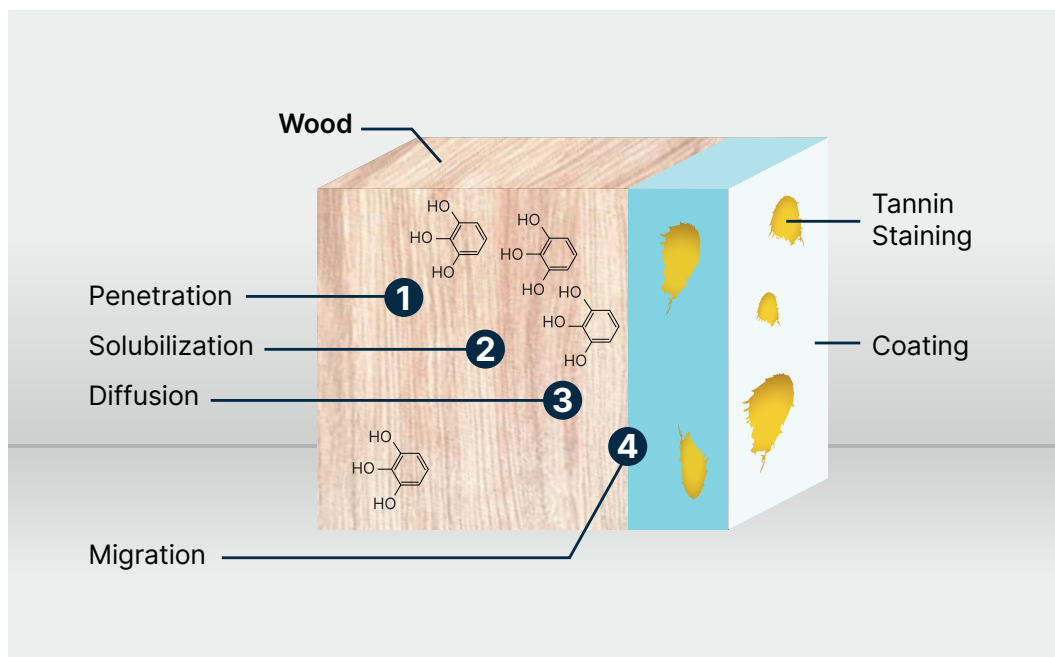


Stop the migration of soluble tannin stains on painted surfaces using our tannin blocking additives in conjunction with resins for superior results.

What are Tannins and How do They Manifest?

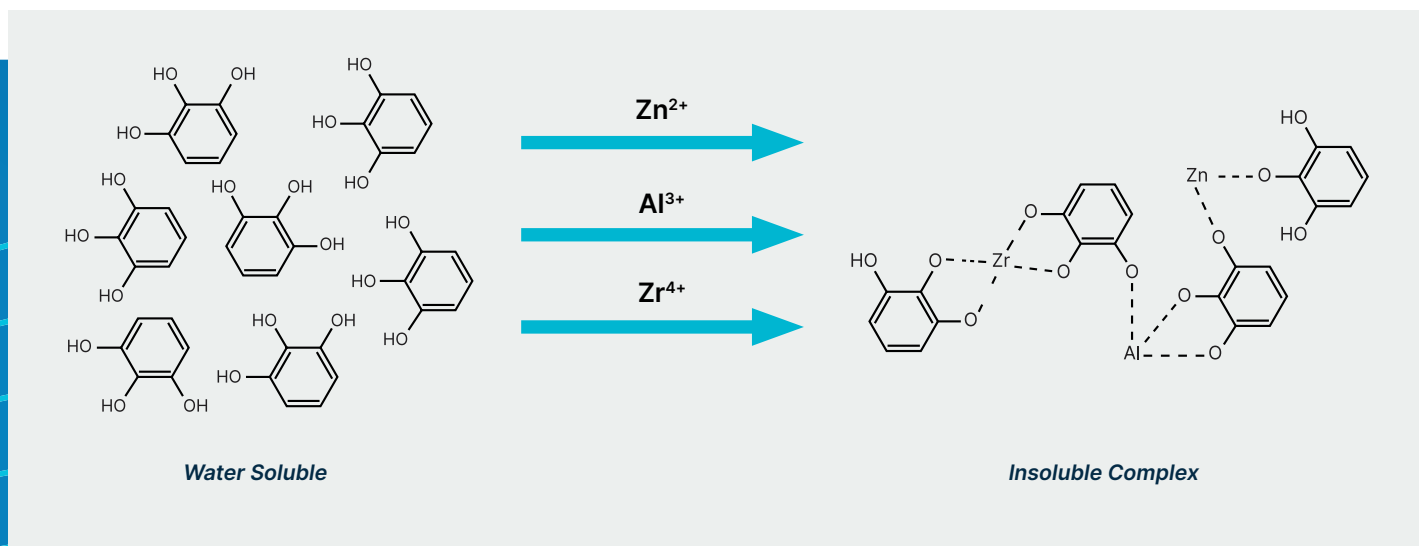
Tannins are high molecular weight, water soluble, poly-phenolic molecules found in many types of wood around the world, including:

- Western Red Cedar
- Redwood
- Oak
- Fir
- Birch
- Willow
- Merbau
- White and Yellow Pine



How do HALOX Tannin Stain Inhibitors Work?

HALOX® has developed several technologies that rely on chelation to combat tannin staining. The chelation process is the reaction of soluble metal cations from tannin stain inhibitive pigments with anionic groups on the phenolic rings present in tannins.



Our Portfolio

Classification	HALOX® BW-100 Calcium Barium Phosphosilicate	HALOX® XTAIN® A Aluminum Zirconium Phosphosilicate	HALOX® XTAIN® L-44 Stabilized Ammonium Zirconium Complex	HALOX® XTAIN® L-47 Stabilized Zirconium Complex	HALOX® CZ-170 Zinc Ortho Phosphate Complex
pH	7.5	10.0	9.0	7.5	8.1
Oil Absorption	37.1	33.1	N/A	N/A	43.5
Water Solubility (%)	0.17	0.12	100	100	0.02
Density (g/ml)	2.8	3.1	1.26	1.45	3.6
Mean Particle Size (Microns)	5.1	5.8	N/A	N/A	4.3
Appearance	White Powder	White Powder	Clear Liquid	Clear Liquid	White Powder
Recommended Loading Levels	5-10% TFW	1-3% TFW	1-3% TFW	1-3% TFW	5-10% TFW
Water-Based	✓	✓	✓	✓	✓
Solvent-Based	✓				✓
Product Benefits	• Effective in high PVC Alkyd primers • Demonstrates excellent performance	• Effective at very low loading levels • Barium and antimony-free • Contains multivalent cations	• Provides superior performance and good compatibility in water-based coatings systems • Barium and antimony-free • Zinc oxide replacement • Easy to post-add to a coating (1:1 with water)	• Similar performance and compatibility to HALOX® XTAIN® L-44 • Zinc-free • Ammonia-free • Low VOC • No labeling • EU Ecolabel compliant • Easy to post-add to a coating (1:1 with water)	• Contains high levels of zinc compounds that provide dual tannin blocking and corrosion resistance • Barium and antimony-free • Zinc oxide replacement



These redwood panels demonstrate how XTAIN® L-47 blocks tannin stains.

Left Panel: (Top) One coat of paint without XTAIN® L-47; (Bottom): Two coats of paint without XTAIN® L-47.

Right Panel (Top): One coat of paint with XTAIN® L-47; (Bottom): Two coats of paint with XTAIN® L-47.



ICL Test Method (Tannin Stain Characterization)

- Post-add or high speed disperse into latex paint
 - 2% TFW liquid tannin stain inhibitor
 - 5% TFW tannin stain reactive pigment
- Apply first coat to board at desired spread rate (ft²/gal or m²/L)
- Air dry for 24 hours
- Apply second coat to half of the board at desired spread rate (ft²/gal or m²/L)
- Air dry for 24 hours
- Colorimetry: Measure CIE L*a*b* values (before testing)
- Expose boards to 90-100% RH, 100°F (38°C) for 16 - 24 hours to accelerate tannin or stain bleeding through the coating
- Air dry for 2 hours
- Colorimetry: Measure CIE L*a*b* values (after testing)
- Quantify degree of staining

Important Formulation Tips

Extender Pigment(s) Used

Certain pigment morphologies can improve the barrier properties of the coating (e.g. platy talc). The alkaline nature of certain pigments can help to buffer the paint (e.g. calcium carbonate).

Coalescent Solvent Used

Ester alcohols and glycols are preferred. Glycol ethers can adversely affect the chelation mechanism.





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.

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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.