

Painting Solutions for Wind Turbines



Teknos in Brief

Founded in 1948, Teknos has operated for over 60 years, evolving into one of Europe's leading suppliers of industrial paints and coatings with a strong position in retail and architectural coatings.

Teknos has production in seven countries: Finland, Sweden, Denmark, Germany, Poland, Russia and China. In addition, Teknos has sales companies in fourteen countries and exports to over twenty countries via a well-established network of dealers.

Teknos is a family business, which allows the Company to take a long-term business view and facilitates flexibility and quick decision making. The family ownership is reflected in Teknos' values and corporate culture.

Teknos is known as an innovative, technology oriented, Customer focused company. We are proud of our reputation, our heritage and especially our professional, committed personnel – the key players in Teknos' success story.

Teknos Way

The "Teknos Way" defines the principles underlying our day to day operations, company vision, values and objectives. Teknos vision is to be the leading supplier of technically advanced paint and coating solutions. At the heart of the Teknos Way is our belief in profitable growth and that it should be achieved through creative, persistent and fair dealings with all our stakeholders.

THREE CORE ELEMENTS LIE AT THE HEART OF THE TEKNOS WAY:



INNOVATION

Creativity and innovation are the basis of our success. We respond to intensifying market requirements through major investment in research and product development.



ADDED VALUE

Teknos does not merely sell paints and coatings but offers solutions to clients' problems. We stand out by making a difference: we provide coating solutions offering the optimum balance between price, quality and service. Our service adds true Customer value, by offering a competitive advantage for those in a longterm partnership with Teknos.



RELIABILITY

Teknos' supply chain incorporates modern production facilities and highly advanced tinting systems combining high and consistent paint quality with rapid and reliable deliveries.



Quality and Environment

Comprehensive attention to environmental issues is one of the cornerstones of Teknos' business. We continuously seek to develop our products to make them more environmentally friendly and take environmental impacts into account in all our endeavours.

Teknos' production facilities comply with quality and environmental management systems according to the standards of ISO 9001 and ISO 14001.

Teknos' core products are waterborne, low solvent or totally solvent-free, developed with attention to the environmental aspects so as to minimize the impacts on the natural surroundings. Compliance with the REACH chemicals legislation, to ensure the safety of both humans and the environment, is integral to Teknos' product development activities.

In a world of Colours

Colours play an essential part in our activities and our success. We strive, in every possible way, to help our customers find the best option for their particular purposes.

Teknos pioneered automatic universal tinting systems and its latest generation of TEKNOMIX tinting systems represent state of art technology in the industry. TEKNOMIX supports thousands of satisfied users, in hardware stores and paint retailers around the world.

Our paints can be tinted to meet Customers' wishes, making colours from opaque to translucent. For powder coatings, we have developed the Teknos Design tinting concept, which provides an almost unrestricted range of tones and effects.

Customers throughout the Nordic countries now have access to the Natural Colour System (NCS) tinting system for all interior paints. NCS is a logical colour system based on how humans perceive and experience colour. Using the NCS system, each and every conceivable colour shade can be given a unique NCS colour code.

Teknos' Paint Systems for Wind Turbine Towers

Teknos has strong evidence of its expertise in the surface treatment of wind turbine towers. Alongside traditional solvent-based products, Teknos has developed alternative water-based and high solids solvent-based paints for tower surfaces. The adoption of the EU's VOC directive on the restriction on solvent emissions has fostered this development.

combination of paints to be used. We have developed our paint systems to meet EN ISO 12944, EN ISO 20340 and NORSOK M-501.

Teknos has an extensive product range and we can provide the correct paint systems for the towers in different environments, including onshore and offshore wind turbine towers.

A successful surface treatment requires that the work must have been systematically planned when the time comes to select the

Traditional paint systems for wind turbine towers

OUTER SURFACE OF TOWER

TEKNOZINC Series	Epoxy Zinc
TEKNOPLAST PRIMER Series	Epoxy
TEKNODUR Series	Polyurethane

INNER SURFACE OF TOWER

TEKNOZINC Series	Epoxy Zinc
TEKNOPLAST PRIMER Series	Epoxy

SPLASH ZONE, TIDE ZONE AND IMMERSION AREAS OF OFFSHORE TOWER

INERTA Series	Solvent-free Epoxy
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Environmentally friendly water-based paint systems for wind turbine towers

OUTER SURFACE OF TOWER

TEKNOZINC AQUA 90 SE	Water-borne zinc rich epoxy paint	VOC 180 g/l
TEKNOPOX AQUA series	Water-borne epoxy paint	VOC 20-40 g/l
TEKNODUR AQUA series	Water-borne polyurethane	VOC 90 g/l

INNER SURFACE OF TOWER

TEKNOZINC AQUA 90 SE	Water-borne zinc rich epoxy paint	VOC 180 g/l
TEKNOPOX AQUA series	Water-borne epoxy paint	VOC 20-40 g/l

TEKNODUR COMBI 3560

Innovative high solids paint systems for outer surfaces of wind turbine towers

Low VOC emissions

Thanks to its high solids content, which can even be adjusted to a full 100%, the TEKNODUR COMBI 3560 series emits a notably smaller quantity of VOC emissions than water-borne polyurethane paints do.

Fast throughput

The drying profiles of the TEKNODUR COMBI 3560 series variants vary. The actual drying times at room temperature are adjustable between less than one hour and several hours. Immediately after drying, the work pieces are ready for the next step in the process. This significantly shortens the throughput time in the paint shop, saving time and money. Additional savings are provided by lower energy costs, as the short drying process does not require the elevated temperatures of conventional methods.

Less layers needed

In pursuit of higher efficiency, more and more paint shops are exploring the possibilities of one-layer solutions. The TEKNODUR COMBI 3560 product family contains anti-corrosion pigments and fulfils the ISO 12944 requirements for one-layer paints. As an example, its corrosivity category is C4-M at a dry film thickness of 120 µm. For outer surfaces of wind turbine towers two-

layer systems are available up to corrosivity category C5-M/High. With a three-layer system it is possible to reach NORSOK M-501 requirements.

Appealing looks that last

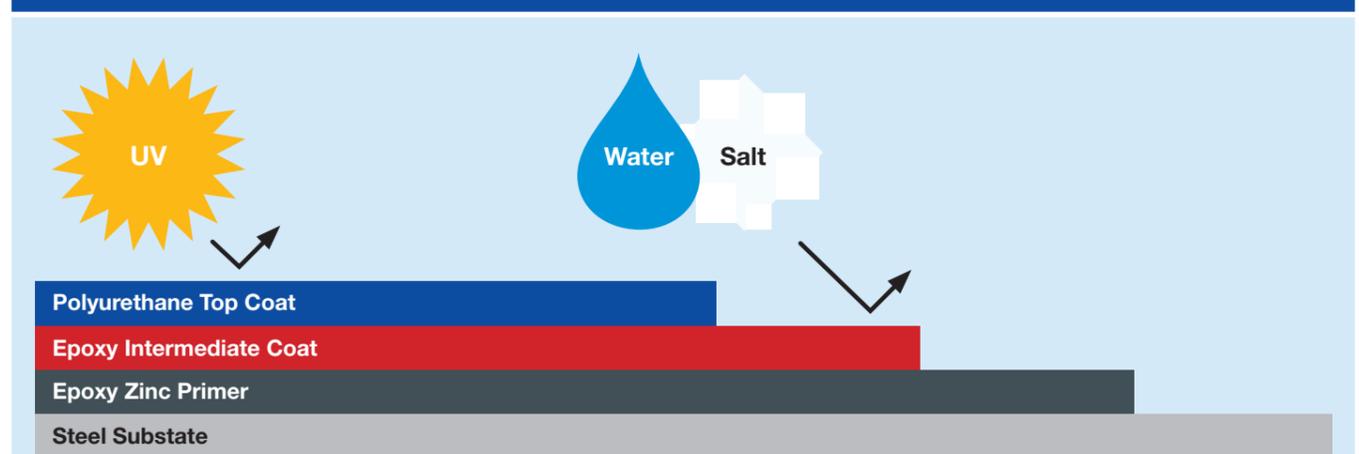
The TEKNODUR COMBI 3560 coats are tough and impact resistant, effectively reducing the need for touch-up paint jobs. The finished coat is weatherproof and resistant against many chemicals. Characterized by the good looks and high UV resistance common to polyurethane coats, its colour and gloss can be further enhanced by a clear coat.

The various products in the new series are suited to a wide range of applications, either as a one-layer alternative or in combination with a compatible primer. Certain variants of TEKNODUR COMBI 3560 can be applied directly to shot-blasted steel, aluminium, zinc and even to concrete surfaces.

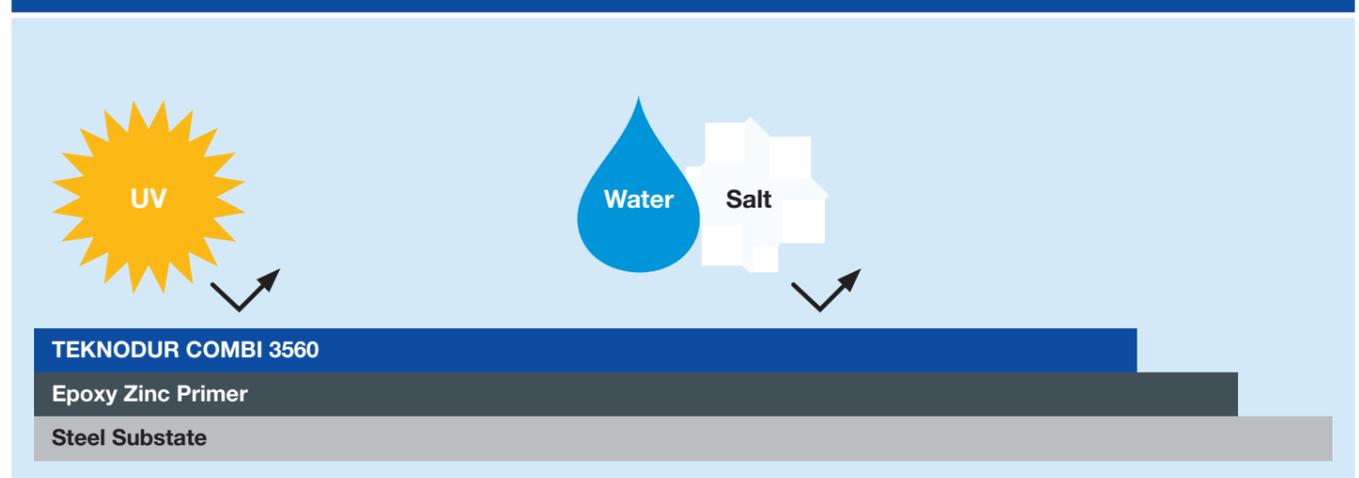
TEKNODUR COMBI 3560 product family is the perfect alternative for paint shops striving to reduce their VOC emissions, improve their profitability and interested in additional benefits not offered by conventional paints. All this without sacrificing quality.



TRADITIONAL THREE-LAYER PAINT SYSTEM



INNOVATIVE TWO-LAYER PAINT SYSTEM



Innovative TEKNODUR COMBI 3560 high solids paint systems compared to traditional systems

CORROSIVITY CLASS	TEKNODUR COMBI 3560 SYSTEM	EXAMPLES OF TRADITIONAL SYSTEMS ACCORDING TO EN ISO 12944 STANDARD
C4-M	PUR 120/1	EPZn(R) EPPUR 200/4
C4-H	EPZn(R)PUR 160/2	EPZn(R) EPPUR 240/4
C5-M/H	EPZn(R)PUR 200/2	EPZn(R) EPPUR 320/5
NORSOK M-501	EPZn(R)PUR 240/3	EPZn(R) EPPUR 320/5

Teknos' Paint Systems for Wind Turbine Blades

Teknos is an expert in producing paints and coatings for metal surfaces, and also for fiber glass surfaces. One of the best examples of Teknos' recent product development is the paints and coatings specially developed for wind turbine blades.

The Teknos product family for wind blades consists of a full range of products, from priming to finishing paints, and putties. Teknos' advanced coatings technologies enhance the efficiency, performance and longevity of wind turbine blades. These paint systems for wind turbine blades have been proven in different environment to perform in atmospheres ranging from challenging to harsh.



TEKNODUR 3572

High-performance paint system for wind turbine blades

Applications

Surface of wind turbine blades or other fiber glass components.

Application Conditions

Humidity must be below 70% RH at ambient temperature (15– 30°C) or at elevated temperatures.

Products

- TEKNOPOX 2118 Putty
- TEKNODUR 3572-09 Primer
- TEKNODUR 3574 Pinhole Filler
- TEKNODUR 3572-02 Topcoat
- TEKNOSOLV 9521/9526 Thinners
- TEKNOCLEAN 6496 for 2K-equipment cleaning

Features

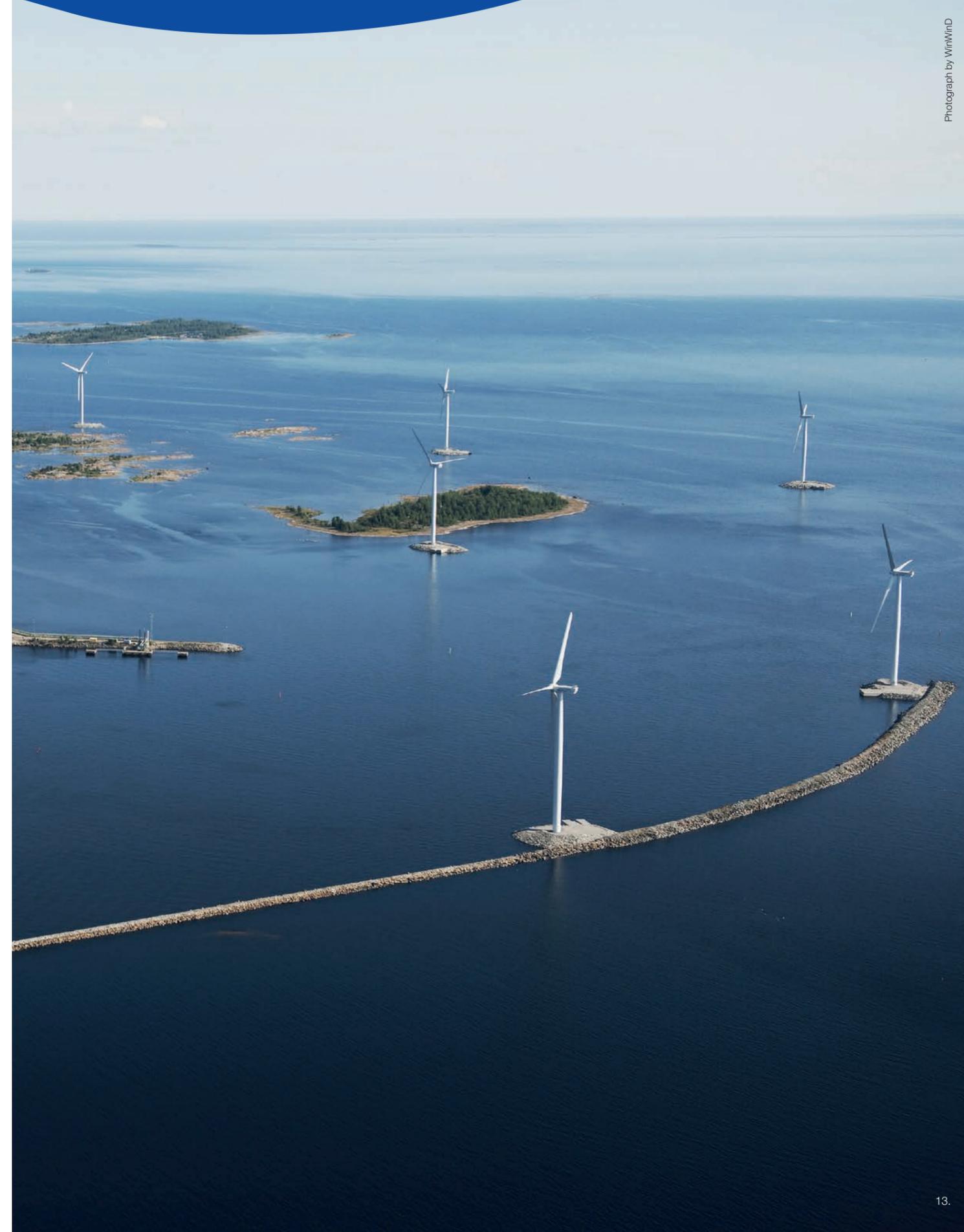
- Excellent adhesion and pull-off strength
- High solid content and low VOC emissions
- Designed for fast application with 2K-equipment
- Smooth surface with desired gloss level
- Excellent weather and abrasion resistance

Benefits

- Significantly improved application efficiency
- No need for elevated curing temperature
- Fast drying in normal room temperature
- Extended blade and film life cycle
- Suitable for different environments

Properties of TEKNODUR 3572-02 Topcoat

TEST	TEST METHOD	RESULT
Color		As required
Gloss	ISO 2813	15-30
Dry time (+23°C)	To Touch To Handle To Service	1 hour 2 hours 4 hours
Heating (+40°C)	To Handle	No need
Dry Film Thickness area		70-150 µm
Density	EN ISO 2811-1	1.45 g/ml
Adhesion	Pull-off	≥ 8 Mpa



Photograph by WinWind

Teknos' Paint Systems for Wind Turbine Components

OUTER SURFACE OF COMPONENTS, SUCH AS MAIN SHAFT, HUB, GENERATOR, AND CASTED IRON COMPONENTS

TEKNOZINC Series	Epoxy Zinc
TEKNOPLAST PRIMER Series	Epoxy
TEKNODUR Series	Polyurethane

INNER SURFACE OF COMPONENTS, SUCH AS GEARBOX

TEKNOPLAST PRIMER Series	Epoxy
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OUTER SURFACE OF STEEL COMPONENTS, SUCH AS FLANGE JOINTS

TEKNOZINC SS Series	Zinc Silicate
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OUTER SURFACE OF GLASS FIBER COMPONENTS, SUCH AS NACELLE

TEKNODUR PRIMER Series	Polyurethane
TEKNODUR Series	Polyurethane



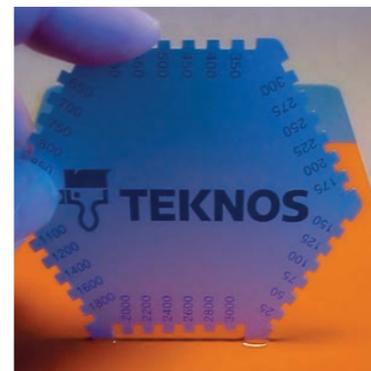
Courtesy of ABB

Teknos' Technical Service

According to the independent research, up to 95% of the painting problems are caused by improper surface preparation and coating application. That is why good surface preparation and proper application methods play a crucial role, when our customers are looking for long-lasting protective paint systems.

Teknos' manual, the "Handbook for Corrosion Protection of Steel Surfaces by Painting" provides comprehensive information on corrosion protection by painting for buyers, planners, and implementers of corrosion protection painting work.

Teknos' technical service engineers have a wide experience in the industrial painting field, and they are happy to help you to reach the desired level of protection for your products.



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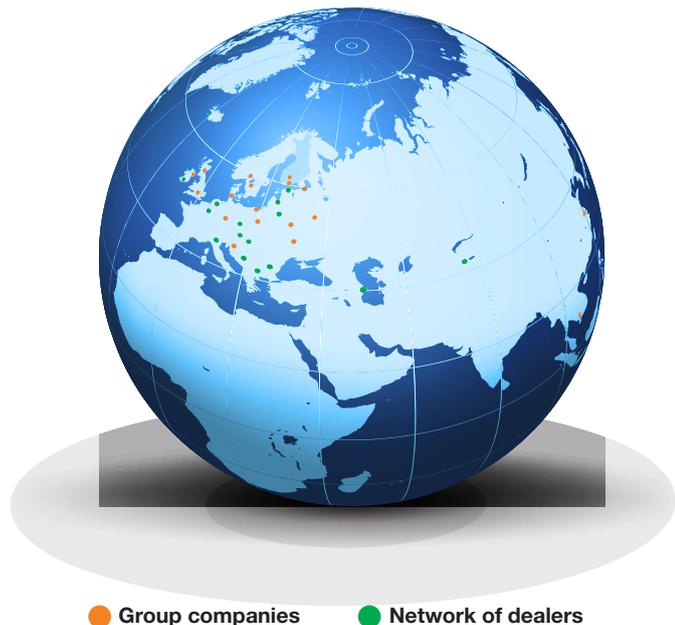
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Teknos was established in 1948 and is one of Finland's largest family-owned businesses.

OFFICIAL DEALER OF TEKNOS PAINTS AND COATINGS:



www.teknos.com