



Product information: Tecnadis METALCOAT EASY TO CLEAN
Protective coating with hydrophobic and oleophobic properties

DESCRIPTION

Tecnadis METALCOAT EASY TO CLEAN coating includes the following features:

- It is a **bi-product coating** consisting on the followings (See “How To Use” sheet for more information):
 - Tecnadis METALCOAT BASE: Primer that provides adhesion to the surface and the durability to the final product.
 - Tecnadis METALCOAT ENHANCER: Surface layer that enhances hydrophobic and oleophobic properties, as well as anti-adherent capacity (easy to clean effect).
- It is a highly durable coating that protects the surface on which it is applied, provides improved hardness and anti-corrosion properties, while providing hydrophobic and oleophobic properties.
- It is based on a ceramic nanoparticles dispersion, which transforms the surface where it is applied into an **anti-adherence surface** with easy to clean properties.
- The coating protects the surface from **external agents** such as weathering or other corrosive agents.
- The transparent coating maintains the natural color and appearance of the base metal, although color versions are also available.
- The final thickness of the standard coating is around **6-20 microns**, this thickness can vary depending on the desired properties.

BENEFITS

Tecnadis METALCOAT EASY TO CLEAN coating provides the following benefits:

- It is **directly applicable over a wide variety of surfaces** such as iron, steel, aluminium, copper, bronze, brass, enamelled metals, etc., as well as ceramics materials.
- The transparent coating does **not modify at all the natural aspect, colour, brightness and structure** of the surface onto it is applied.
- It **acts as a barrier**, preventing the sticking of stain to the surface onto where it has been applied, as well as it protects against corrosion and aggressive agents that might make serious damages on the surface. Its composition with hydrophobic and oleophobic properties facilitates the easy removal of aqueous or organic materials from the treated surface.
- **High heat shock resistance** even at temperatures higher than 350°C.
- It presents **good resistance to acids, basics, solvents and common cleaning products**.
- **There is not migration risk**. It fulfils current legislation on materials and objects to be in contact with food in agreement with Directive 2005/31/CE and Regulation 1935/2004. In addition, based on FDA regulation, the coating is safe for the intended end use in contact with all food types under long term storage conditions which include from freezing to heating processes of more than 250°C and can be safely marketed in the United States. Finally, the English company InS Services have certified Tecnadis METALCOAT “Easy To Clean”, as R1 with No. 1805038, as a coating intended for food contact.
- **Easy to apply**. Its application can be performed through common coating or painting techniques such as spraying with a commercial gun or by dip-coating.
- It is a **permanent film**, maintaining its easy to clean properties for more than 30 temperature cycles of heat shocks at 350°C and 30.000 abrasion cycles. The active components do not react with the treated surface, thereof avoiding possible degradations.
- Its final **thickness (6 - 20 microns**, it can vary depending on application method and desired properties) is negligible when comparing to usual mechanical tolerances in manufacturing and/or transforming.

- **It is possible to repair the coating in damaged areas and even a complete reapplication** of the Tecnadis METALCOAT ENHANCER without removing the remains of the previous coating. If necessary, it can be removed polishing the treated surface.
- In industrial environments, it provides **non-stick properties** that make easy the surfaces cleaning avoiding deposits and incrustations, as well as it facilitates the transport of fluids through pipes and pipelines reducing pumping's energy consumption. It also **protects from external agents** that could damage the structure of the treated material. Thanks to its non-stick properties, **simplifies the cleaning process** by reducing the amount of resources (water, energy and cleaning products), and even avoiding the use of abrasives and descaling that may damage the surface.

COMPOSITION

- Tecnadis METALCOAT EASY TO CLEAN is based on a dispersion of ceramic nanoparticles.
- Other active agents are added in a concentration ranging from 35 to 50% wt. approx.
- This product is in an alcoholic base (ethanol).

APPLICATIONS

Tecnadis METALCOAT EASY TO CLEAN coating may be directly applied onto any metallic surface such as steel, iron, aluminum, copper, bronze, brass and enameled steels, among others, and also onto ceramic materials.

PHYSICO-CHEMICAL PROPERTIES

	<u>BASE</u>	<u>ENHANCER</u>
• Colour	Colourless	Colourless
• Active Components	35 - 45% wt.	<5%
• Solvent	Ethanol	Ethanol
• Density	0,958 g/ml	0,79 g/ml
• Boiling point	78 °C	78°C
• Flashpoint	9 °C	9°C
• pH value	2 - 2,5	-

HOW TO USE

Steps to follow for a complete application of Tecnadis METALCOAT EASY TO CLEAN:

1. **PREPARING THE SURFACE:** The surface must be clean and dry before the application. Avoid presence of dust or any other solid particles on the surface. It is recommended to clean the surface with an alcoholic solvent before the application of the Tecnadis METALCOAT BASE to remove any dirt, fats, oil, water, cleaners or cleaning products.
2. **PREPARATION OF TECNADIS METALCOAT BASE.** It is recommended to shake the product before use to guarantee the homogeneity of the product. Shearing forces are not required.
3. **TECNADIS METALCOAT BASE APPLICATION:** Apply the product homogeneously over the surface in a single layer, avoiding possible excesses and product's sags. Approximated performance: 60-90 ml/m² depending on surface's nature, porosity and roughness.

It is better to apply less amount than an excess, since that could end in a brittle white-colour-coating after drying which will be easily detached from the surface as flakes. If the product drains after its application, use the air of the gun or a cloth to spread it out uniformly along the surface before it dries (with one pass is enough).

The application of the product can be performed by different techniques taking into account morphology, dimensions and end-use of the pieces to be treated. For small pieces, the dip-coating method is recommended, which consists in immersing the piece into the liquid and then draining excess. For larger pieces with good accessibility, application by a compressed-air-powered-spray-gun like the type of "TransTech" or by an electric airless painting gun is advisable. For applications in industrial series is better to use a robotic arm system to spray the product.

4. **DRYING AND SINTERIZATION OF THE TECNADIS METALCOAT BASE:** The curing process of Tecnadis METALCOAT BASE can be adapted according to the requirements/properties sought and the possibilities of temperature application. This curing process, necessary to achieve the fixation of the product on the substrate, can be carried out from a temperature of 170°C to 300°C. For the application of temperature for curing, various thermal devices can be used depending on the size, shape and accessibility of the piece. **The ovens** are recommended for small parts and industrial series production, while for in-situ applications in existing installations, **portable systems such as guns or thermal cannons** may be considered, among others.

For curing it is recommended to carry out a progressive heating of the material and to keep the heating as long as possible, bearing in mind that the longer the thermal curing time, the better the fixation and the structure/matrix of the coating. The estimated time for thermal curing can vary between 30 and 60 minutes depending on the dimensions of the piece to cure and the thermal system used

Important: Direct contact with the heat focus and hot supports must be avoided since a strong thermal shock at this point may cause a too fast drying, ending in a whitish and brittle coating.

5. **COOLING THE SURFACE:** Wait to cool the surface during 2-5 minutes before to apply the Tecnadis METALCOAT ENHANCER. It is not recommendable to apply this second layer with the surface very hot because the product can evaporate and it cannot stick it on the surface, although it is not essential that the surface is completely cold.
6. **TECNADIS METALCOAT ENHANCER APPLICATION:** This product is applied by dip-coating or spraying with a compressed-air-gun "TransTech" type, an electric airless painting or by a robotic arm system as in the case before. If the same air-gun is used for the two products, it is recommendable to clean it with a solvent in order to not contaminate the liquids. The approximated performance is 60-90 ml/m².

The aspect of the coating should not be altered by the deposition of this top layer. For this reason, a fast spraying will be used for the deposition preferably. Although it seems that nothing has been applied, the enhancer product has been already deposited. Avoid excess product. If this occurs, use a cloth to spread it uniformly along the surface.

7. **CURING OF THE TECNADIS METALCOAT ENHANCER:** The Tecnadis METALCOAT ENHANCER needs a curing to ensure a proper fixation of the product over the previous product, Tecnadis METALCOAT BASE, which can be adapted according to the requirements/properties desired and the possibility of applying temperature for drying.

The curing process with temperature for fixing the ENHANCER layer over the previous one can be carried out at a temperature of between 170°C and 200°C. For the application of temperature for curing can be used a thermal gun or other thermal systems like ovens. The estimated time for thermal curing can vary between 15 and 30 minutes depending on the dimensions of the piece to cure and the thermal system used.

Curing at room temperature is also possible. In this case, after the application of Tecnadis METALCOAT ENHANCER, the product presents an appreciable effect of repellence to water and others after 2 hours, achieving its maximum properties after 24-48 hours. This curing time may vary depending on environmental conditions.

HANDLING PRECAUTIONS

Product safety information required for safe use is not included in this document. Before handling, read material safety data sheets and container labels for safe use, physical, and health hazard information. Material safety data sheet (MSDS) is available from Tecnan S. L.

USAGE LIFE AN STORAGE

Storage well closed in the original hermetic container between 5°C y 30°C of temperature.

Avoid direct sunlight and keep away from heat and open flames and avoid freezing.

The material contained may settle slowly, so it is recommended an adequate agitation before use.

Each of the products that make up the solution Tecnadis METALCAOAT EASY TO CLEAN has a shelf life of 12 months since the manufacture's date.

LIMITATIONS

It is recommended to make an initial test of the application on a small area of the material to be treated in order to verify the correct application of the product.

Apply in temperatures between 5°C and 30°C (recommended).

This product is not suitable for medical or pharmaceutical uses.

Limited warranty information – Please read carefully

The information contained herein is offered in good faith and is believed to be accurate. However, because conditions and methods of use of our products are beyond our control, this information should not be used in substitution for customer's tests to ensure that Tecnan's products are safe, effective, and fully satisfactory for the intended end use. Suggestions of use shall not be taken as inducements to infringe any patent. Tecnan's sole warranty is that the product will meet the Tecnan specifications in effect at the time of shipment. Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted.

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