

PRO-RAILING® PROTECT EXPLAINED

Q & A

Question: What is Pro-Railing® Protect?

Answer: Put in its simplest form Pro-Railing Protect is just glass as we all know it but suspended in liquid form at a molecular level. In order to keep this glass in liquid form it needs to be carried in either water or ethanol.

Question: Where does it come from?

Answer: Pro-Railing Protect, in the scientific world, is better known as Silicon Dioxide (SiO₂). SiO₂ is a chemical found in quartz, sand and even inside our human bodies. If you believe it or not, the truth is that humans need SiO₂ to survive. It is also used in food manufacturing amongst other things too.

Question: Is this chemical harmful for us?

Answer: No, Pro-Railing Protect comes from a natural source and it is 100% organic and eco-friendly.

Question: It uses alcohol. Is this dangerous?

Answer: It does as Pro-Railing Protect needs to be carried (or if you prefer kept) in either alcohol or water, and our alcohol is organic. Once applied the carrier evaporates leaving a pure nano-layer of glass. We believe in only using eco-friendly and organic technology in our products.

Question: Where can you use Pro-Railing Protect?

Answer: The most incredible thing about this technology is that there is not a single surface which cannot be coated in Pro-Railing Protect.

Question: Why would you want to coat glass with Pro-Railing Protect?

Answer: One of the main characteristics of Pro-Railing Protect is that it creates an easy clean surface helping us reduce the amount of time and money spent on cleaning products, keeping the things you love looking newer for longer.

Question: What are the main characteristics of Pro-Railing Protect?

Answer: It is; 100% invisible, anti-abrasion, anti-bacterial and superphobic.

Question: What does "Superphobic" mean?

Answer: Superphobic means that it is oleophobic (repels grease) and hydrophobic (repels water). Watch what happens when you coat a shirt in our Pro-Railing Protect.

Question: How long does the coating last?

Answer: There is no glue or adhesive agent in our coatings as these bond (or stick) to the substrate (or surface) using what is known in physics as the Van der Waals effect. Therefore, it can only be removed with abrasion and usage over time.

Question: Does that mean that once applied Pro-Railing Protect is permanent?

Answer: No, it is not permanent but 99% of our coatings will last between 9 months and 2 years depending on where they are applied and how much abrasion the surface is exposed to. This includes human abrasion through touch, wear and tear as well as environmental abrasion such as wind, dirt, rain etc....

General Technical Details

Silicon based coatings or Pro-Railing Protect as it is more conventionally known has been developed through extensive testing and research to offer one of the most advanced nano-coatings available today. Apart from a select group of professionals, very few people globally are even aware of this incredible “ultra thin layering” technology. Pro-Railing Protect is most commonly found in natural resources such as sand or quartz, as well as in the cell walls of diatoms (frustules). Silica is used primarily in the production of glass for windows, drinking glasses, beverage bottles, amongst many others. The majority of optical fibres for telecommunications are also made from silica, which is also the primary raw material for many ceramics.

Pro-Railing Protect offers protection from oil, moisture, dirt, bacteria and gave the surface unequalled abrasion resistance. The flexible and breathable Pro-Railing Protect coating is approximately 100 nanometres thick, which is 500 times thinner than a human hair, and as a result is completely invisible to the naked eye whilst offering extremely tangible benefits.

As the coating is based on pristine glass, it offers many characteristics which in effect provide huge benefits:

- 1. There is an extremely low surface tension on areas coated with Pro-Railing Protect.**
- 2. The technology creates a hydrophobic and simultaneously an oleophobic layer where water or any oil-based substance is unable to penetrate and adhere to the protected surface. (hydrophobic + oleophobic = superphobic)**
- 3. The Pro-Railing Protect layer is 200% flexible making it suitable for both hard and soft surfaces. Moreover, this flexibility ensures that the surface retains its original properties preventing any alteration to its look and feel.**
- 4. Pro-Railing Protect Nanotech layers are acid and alkaline resistant.**
- 5. Pro-Railing Protect Nanotech layers can withstand extreme temperature changes. Standard coatings can operate efficiently between -30°C up to 300°C. Specialist advanced coatings offer even greater temperature tolerance ranging from -90°C up to 700°C.**

When applied it is imperative that the polymerisation process takes place allowing for the ultra thin layer of Pro-Railing Protect to set correctly on the surface. What is amazing is that there are no glues or resins within the matrix of the structure of the coating. The Pro-Railing Protect layer adheres to a surface through the Van Der Waals effect. This means that quantum forces draw the molecules to the substrate layer it is coating.

As a result, any surface that is coated with Pro-Railing Protect Protection becomes easy to clean and gives anti-microbial protection. Once coated, surfaces like screens, cases on your mobile devices, windows, glasses, car windscreens and other hard and soft surfaces, become stain resistant and can be easily cleaned with water and without the need of harsh cleaning chemicals.

Hydrophobic Coatings

Our Pro-Railing Protect coatings are also known as hydrophobic coatings, since one of the primary characteristics of the technology is that it makes all substrates it is applied to resistant to water, oil and other liquids. The hydrophobic effect of our coatings can be observed by watching how liquid substances are repelled by a treated surface and fall off.

Hydrophobic Coatings For Absorbent Surfaces

Absorbent surfaces such as textiles made of interlacing fibres, or wood and stone can be very porous. Moreover, these surfaces allow water and other liquid substances to easily penetrate and, in many instances, cause unwanted staining and damage leading to mold. Our Pro-Railing Protect coatings make these surfaces hydrophobic ensuring that these unwanted substances are unable to penetrate them.

How To Test The Performance Of Hydrophobic Coatings On Absorbent Surfaces

Hydrophobicity tests with absorbent surfaces are the most visible. In order to test the performance of the hydrophobic coating on absorbent surfaces such as textile, simply pour a few drops of water on the material and if the liquid is unable to penetrate the surface, this implies that it is hydrophobic. The contact angle of liquid droplet and the surface is also an indicator that tells us exactly how hydrophobic a surface is. A coating is more hydrophobic when there is less contact between the droplet and the surface, and typically these are referred to as being superphobic.

Hydrophobic Coatings For Non-absorbent, Hard Surfaces

Different glass surfaces are composed of different substances and finishes requiring different methods of care. Many glass surfaces found in most homes such as windows, shower doors, and auto glass are made up of porous glass surfaces. The voids in porous glass can easily become filled with contaminants such as minerals found in hard water. These contaminants can adhere to the porous surfaces of glass causing obscured clarity and staining. However, to the naked eye hard surfaces such as glass and metals are naturally hydrophobic. Coating these surfaces with Pro-Railing Protect ensures that the pores prone to staining are covered and protected. Additional characteristics of the hydrophobic coating are creating an easy to clean layer, reducing various forms of corrosion caused by factors like salt and harsh chemicals, creating a cationic surface preventing bacteria growth, improving smoothness and aerodynamics of a surface helping reduce drag.

How To Test The Performance Of Hydrophobic Coatings On Non-absorbent, Hard Surfaces?

Speed test: The speed at which a liquid rolls off a surface will alter depending on the hydrophobicity of the substrate. After coating a surface in Pro-Railing Protect, water and other substances will roll off the substrate a lot quicker. An easy way to test this is by simply throwing water on a treated and untreated surface and compare the difference. There will also be less residue left on the treated surface.

Beading test: When most surfaces are exposed to water or other liquids, the liquid tends to shear across the entire surface. After being coated in Pro-Railing Protect the liquid will bead on the surface and beads pull together as the treated surface is trying to repel them.

Understanding Nanotechnology

Nanotechnology (“nanotech”) is known as the manipulation of matter on an atomic, molecular, and supra-molecular scale. More recently nanotechnology has been established by the National Nanotechnology Initiative, as the manipulation of matter with at least one dimension sized from 1 to 100 nanometers, and so the definition shifted from a particular technological goal to a research category inclusive of all types of research and technologies that deal with the special properties of matter that occur below the given size threshold. Nanotechnology is naturally a very broad subject matter, including fields of science as diverse as surface science, organic chemistry, molecular biology, semiconductor physics, micro-fabrication, etc. The associated research and applications are equally diverse, ranging from extensions of conventional device physics to completely new approaches based upon molecular self-assembly, from developing new materials with dimensions on the nanoscale to direct control of matter on the atomic scale.

Understanding Liquid Nanotechnology

At Pro-Railing we specialise in liquid nanotechnology and more precisely with silicon dioxide, better known as Pro-Railing Protect. Whilst nanotechnology today is studied and utilised to produce many products, we focus on SiO₂ protection also known as nano-coatings. As defined by the National Nanotechnology Initiative, nanotechnology includes matter sized up to 100 nanometers, and our liquid nanotechnology once applied to a substrate creates a protective layer ranging between 100 nanometers with our most advanced coatings reaching up to 5 microns in thickness. Silicon is the eighth most common element in the universe by mass and whilst most silicon is used commercially without being separated, in stone, sand, however by specialising in liquid nanotechnology our labs separate the elements and utilise the nano-particles to develop what is rapidly becoming one of the most advanced technologies available today. By suspending the nano-particles in a liquid, the technology becomes easy to manipulate and distribute. The liquid the nano-particles are suspended in acts as a propellant for the technology and once vaporised the end result is an invisible nano-layer of protection.