



## Corrosion Resistant Linear Guides

Linear guide systems operating in high humidity, wet, salt spray or other harsh environments tend to corrode very quickly if not protected in some manner. Several treatments can provide protection beyond that of stainless steel.

- Raydent®
- TDC (Thin Dense Chrome)
- TDNC (Thin Dense Nickel Composite)

These treatments can be applied to any of our standard (size 15 to 65) or miniature (size 3 to 15) linear rail systems.

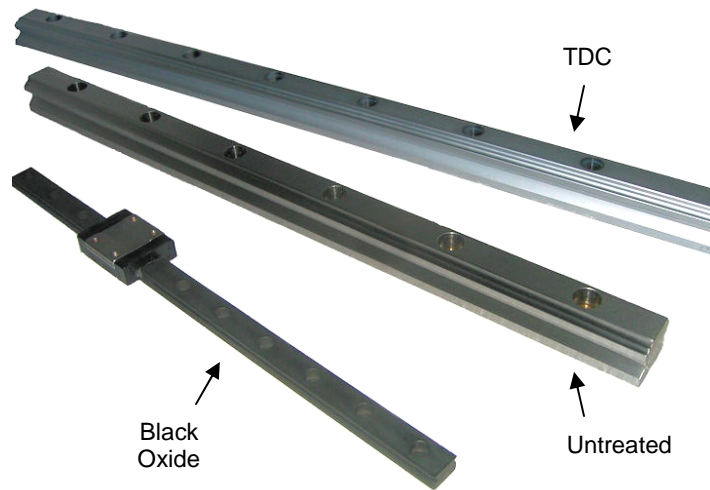
Maximum continuous rail lengths up to 6 meters (20 ft) can be processed. Our most frequently requested treatments are described in more detail below.

### Raydent®

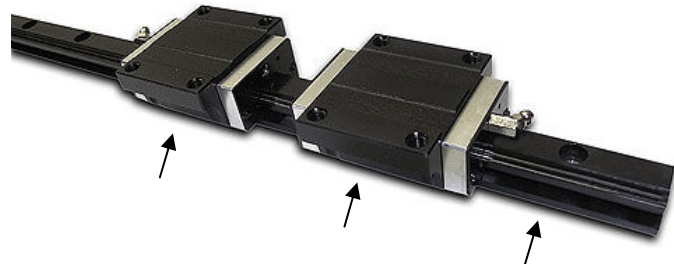
Appearance: black satin color

Raydent® treatment is a proprietary surface treatment technology to form an alloyed surface of metallic materials by means of electroplating. It was developed in Japan in 1964 by Ken Ogawa. The electrochemical process occurs at a temperature below 0° C (-32° F), which is different from ordinary chemical reactions.

Raydent® surface treatment permeates the metal surface. There is minimal surface buildup, about 1.0 – 2.0 µm deposit per side. The resulting surface is highly durable and provides excellent resistance to corrosion. This surface treatment can allow for minimal lubrication. The low lubrication requirements lend to low particle emissions, delivering an ideal solution for clean room, food processing, pharmaceutical and additional applications. Tests have proven this treatment to be effective in concentrated sulphuric acid, sodium hydroxide, and salt water spray environments.



Raydent® Treatment on Ball Screw



Raydent® Treatment on Guide Rail and Blocks



### TDC – Thin Dense Chromium (also referred to as Thin Dense Chrome)

Appearance: satin silver matte

TDC improves the corrosion resistance of standard linear rails in most chemical (except sulfuric and hydrochloric acids) or water environments to be comparable to or exceed that of 440C stainless steel. It also has the added benefit of longer wear life than stainless steel due to its higher surface hardness (Rc 72 -78).

TDC is applied via an electroplating process performed at temperatures below 66 ° C (150° F) which does not change the base metal characteristics. The process deposits an alloy of chromium into the surface.

Finished surface build-up is about 2.5 – 5.0 µm deposit per side. FDA-USDA has approved this process for food or medical processing equipment applications.

### TDNC – Thin Dense Nickel Composite

Appearance: satin silver matte with a hue of yellow color

TDNC improves the corrosion resistance of standard linear rails in most chemical (except sulfuric and hydrochloric acids) or water environments to be comparable to or exceed that of 440C stainless steel. It also has the added benefit of longer wear life than stainless steel due to its higher surface hardness (Rc 58 - 60).

TDNC is applied via an electroplating process performed at temperatures below 66 ° C (150° F) which does not change the base metal characteristics. The process deposits a multi-alloy of chromium and nickel phosphorus into the surface. The nickel alloy increases the corrosion resistance beyond the standard TDC treatment.

Final surface build-up is about 2.5 – 5.0 µm deposit per side. FDA-USDA has approved this process for food or medical processing equipment applications.

## OTHER TREATMENTS

### Black Oxide

Appearance: black matte (non oiled or waxed), glossy black (oiled)

Black oxide is a conversion coating, formed by a chemical reaction, produced when parts are immersed in an alkaline aqueous salt solution operating at approximately 290 degrees F. The reaction between the iron of the ferrous alloy and the hot oxide bath produces a magnetite (Fe<sub>3</sub>O<sub>4</sub>) on the actual surface of the part. It is possible to apply black oxide at room temperature; however it is not possible to achieve all of the benefits available from the "hot" oxide process. The cold black oxide process routinely shows color variation from part to part and the black material frequently rubs off in your hands.

Black oxide without an after-finish has very poor corrosion protection. However, with an oil or wax it is possible to achieve excellent indoor corrosion protection (100+ hrs. in a humidity cabinet). Black oxides on steel are not suitable for severe outdoor applications or corrosive environments, but they can provide superior humidity cabinet results, with proper supplementary coating.

We find our customers using this mostly to meet their non-reflective requirements in optical or other similar applications.



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### Additional Post Processing

To further improve wear or corrosion resistance additional post processing is sometimes done. This usually involves impregnating the surface with a proprietary long chain organic polymer that has a very dense molecular structure to seal off the surface. This technology is being further developed as more applications are being deployed in wet or harsh environments.