

New Life in Creativity

SMN
INDUSTRIES
PVD COATING



S.M.N
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About Us

The wait for eco-friendly stainless steel coupled with cutting edge technology is now over! SMN Industries brings to you this much-awaited blend of niftiness and burliness of stainless-steel products and has set new a yardstick towards delivering customer satisfaction. What sets apart the endeavor of SMN Industries is its endless thirst for making timeless stainless-steel products and the eternal pursuit of committing the best efforts to manufacture magnum opus. SMN Industries has ushered in a new era of other-worldly products which are based on cutting edge vacuum technology to the likes of pipes, colored stainless steel products, among other robust products. SMN Industries's products are known for their functionality, handiness, and sleek design. What's more? All of this is combined with hybrid coating technology.

To an amazing lot of our products, we have now added a high-quality range of designer stainless-steel sheets viz. Super 8K Mirror, Hairline, PVD colored Stainless -steel etc.

We forayed into the industry with our pioneering work of supplying excellent architectural patterns in both domestic and foreign markets. We take pride in producing innovative and high-tech stainless-steel works. Our customers have confided in us for our dedication in completing the projects with a high level of commitment and elegance. Our products are synonymous with originality, reliability, and above anything else, quality.

PVD Coating

Physical Vapor Deposition (PVD) is an environmentally friendly vacuum coating process which results into formation of brilliant and durable decorative finishes on ABC (Architecture & Building Construction) Field, door hardware, household appliances, jewelry, stainless steel sheets, electronic components, automotive trim, and marine fittings. By the use of this method, a wide array of colors is coated on our products. Another advantage of PVD coating is that it gives a decorative finish coupled with wear and corrosion resistance.

PVD coating is one of the best methods for enhancing thin film plating elements. The vacuum deposition method coats the product with a film of hard refractory material 1-2 microns thick.

PVD coating involves deposition of physical vapor of Titanium, Titanium Aluminium and Chromium.

This process is also known as Titanium/ Titanium Aluminium/ Chromium plating.

The principle of Plasma Acceleration is used in the process of PVD coating.

The method involves purely physical processes, such as low-temperature vacuum evaporation with plasma sputter bombardment. There are three main types of PVD and all the three methods are undertaken in a chamber containing a controlled atmosphere at reduced pressure.

The three PVDs are:

THERMAL EVAPORATION

SPUTTERING

ION PLATING

Thermal evaporation: In this method, the material is heated so that its vapor is used in condensing on a substrate to form the coating. Heating is done by various methods such as laser beam, hot filament, electrical resistance, electron, and electric arc.

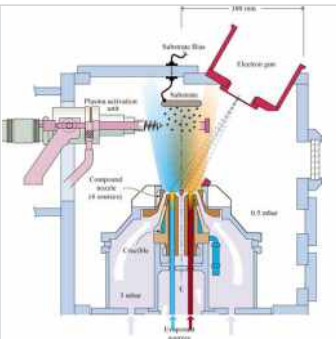
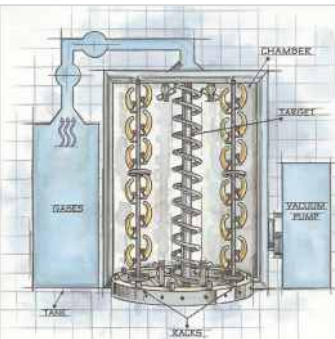
Sputtering: This method involves the electrical generation of a plasma between the coating species and the substrate.

Ion plating: This involves the combination of thermal evaporation and sputtering.

These three methods can be used to directly deposit the material or for 'reactive' use in which chemical reaction occurs in the vapor phase between atoms of the coating material and 'reactive' gases.



The process of PVD coating



The first step is to clean the stainless steel so that the coating will bond in a good fashion. The cleaned steel is then placed in a vacuum chamber where a target metal is situated which is used to create the coating. A high level of vacuum is maintained in the coating chamber and then a small amount of argon gas is passed through it.

In order to enable the stainless steel and target to bond well, a high voltage circuit is used.

This will empower the argon ions to bombard the target and release the atoms of the target metal which will then be deposited on the stainless-steel substrate as a layer of coating.

This PVD process is known as sputtering and results in the deposition of plasma on stainless steel imparting its strength and luster. Different metals such as gold (TiN), rose gold (ZrN), bronze (TiAlN), blue (TiAlN), black (TiAlCN), as well as a dark red (ZrN) can be used for coloring the surface coatings.

This is basically the ceramic coating which is deposited as a very thin layer and thus makes the texture underneath visible.

These PVD colors do not fade over time remain uniform in appearance. They are more abrasion-resistant than coloring which is done by the electrochemical processes.

Uses for PVD coated stainless steel

There are a broad spectrum of applications of PVD coated stainless steel products. The coatings prepared by PVD are put to multiple uses such as aluminum tracks and ceramic resistors for electronic circuitry; decorative coatings on plastics; corrosion resistant coatings on gas turbine blades; and wear prevention coatings for machine and press tools; anti-reflective ceramic coatings for optics.

A number of other important uses are:

Architectural

PVD colored stainless steel is widely used in various industries particularly, architectural and industrial designs. For e.g. railway stations, shopping centers, stainless steel curtain walls, and fit-outs of high-end retail stores, cladding and profiles for hotels and casinos, facades, etc.

Transport

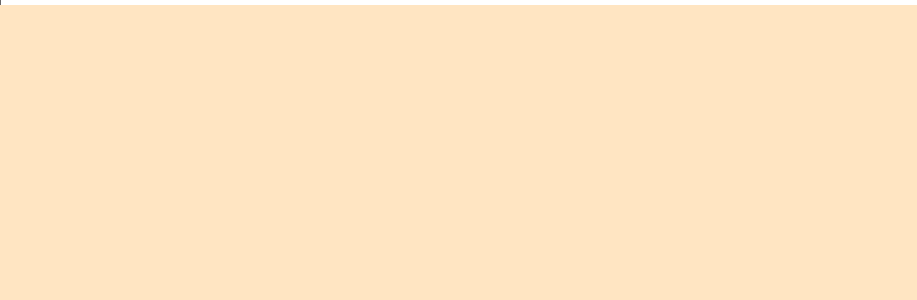
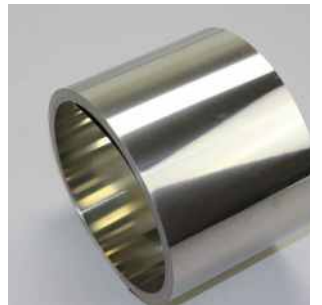
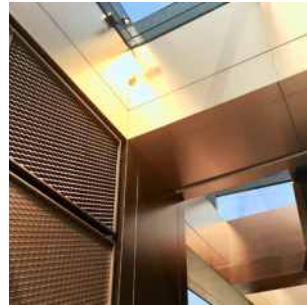
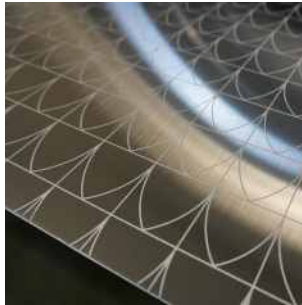
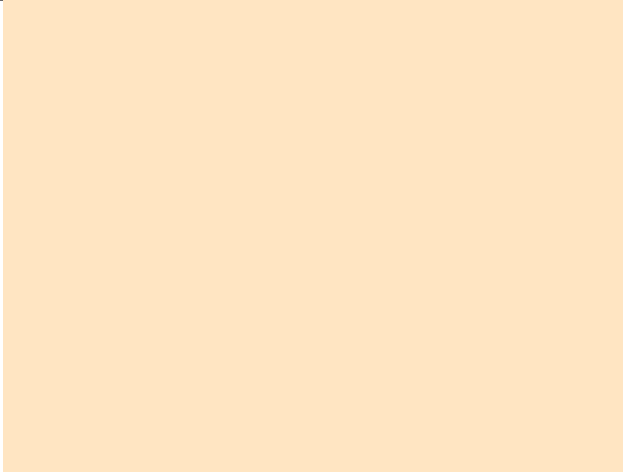
PVD coated stainless steel is used in the transport industry as well such as paneling on the trains, ceiling, skirting on trains, wall cladding to shipping, etc.

Ironmongery

The colored steel can be used for small products such as display cases, furniture, lighting fixtures, to door handles and taps.

Jewellery

The PVD process is heavily used in stainless steel jewelry for the purpose of achieving some beautiful and radiant colors. PVD stable colors used in jewelry are gold, rose gold, coffee, black, dark grey, and blue. These colors are used for their polished, satin or matt finish depending on the product's surface polish finish.





Benefits

Wear and weather resistant: The PVD process does not alter that original structure and texture of the stainless steel. It enhances the durability of the product and cuts down on its maintenance.

A number of applications which involve exposure to wear and weather resistant activities have kept the material pristine in its original form. However, it is to be noted that the color can be damaged if it is attacked very aggressively and, in many cases, may not be repairable.

Appearance: You will get an amazing selection of unique colours on the smooth surface. Consequently, it dispenses with the need for further processing. It keeps the surface shinier than the original materials. A lustrous surface makes the material look plush and luxurious. The product will not suffer from any distortion.

Cost-effective: PVD method is very economical method that works similar to traditional electroplating and effectuates in producing similar results. It dispenses with the need of using abrasive cleaners. You can easily wipe the surface of the material with a soft cloth.

Environmentally friendly process: The biggest advantage of the PVD process is that is completely environmentally friendly than other alternatives like electroplating and painting. There is no residue, no gases, no water waste produced. It is important to note that the colouring process does not put any constraints on the recycling value of stainless steel.

Scratch Hardness: The Kuremence Scratch Tester tested the Load of cracking point by scratching 150mm per minute. The result showed that Ion coating was 3 times harder than a chemical coating on scratch resistant hardness.

Resistance to corrosion and oxidation: PVD coating makes the surface resistant to corrosion and oxidation caused as a result of factors such as peeling, discoloration, tarnishing, cracking or peeling under normal conditions. The coating shields the product from scorching sunlight, salty water, and humidity.

Flexibility: The material coated with PVD imparts a low modulus of elasticity as a result of which it becomes extremely flexible. The PVD process lends a good thermal conductivity. This means there is no peeling or flaking of the coating at the time of bending.

Durability: Since the PDV Coating shields the surface of the product from corrosion, it makes the material durable. It works as an amazing long-lasting alternative for a gold finish. When compared with electroplating it is 15 - 25 times more wear-resistant.

Safety: The coating has been safety tested for surgical devices and food processing.

Thin film hardness: The hardness has been tested via the Vickers hardness test and was it was concluded to be 10 times harder than stainless steel.

Characteristics

What materials are suitable for PVD Coating?

A wide array of materials is applied with PVD Coating such as glass, stainless steel, and porcelain.

When Stainless steel is exposed to environmental factors such as humidity and other factors, over a period of time, it gets oxidised and fades away. But when stainless steel has been PVD coated:

- It will not react with environmental factors and thus will not get tarnished, oxidized or discolored in the presence of sunlight saltwater or humidity.
- It will be available in a wide range of colors, surface patterns, and finishes.
- It will become impervious to UV light and there will be no flaking, cracking or discoloration of the material.

Why choose PVD Coating?

Our products are about strength, perfection, and unparalleled quality. Our PVD coating is an innovative method involved in the creation of colored stainless steel. This process makes the surface much harder and more durable than others.

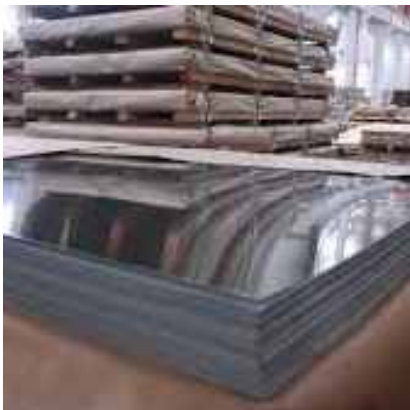
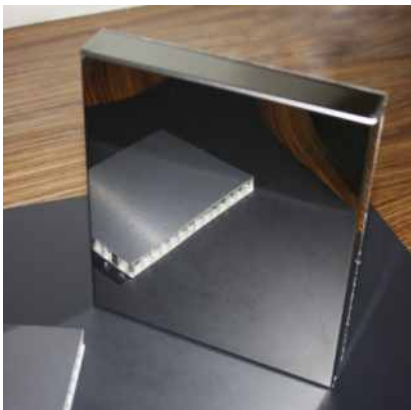
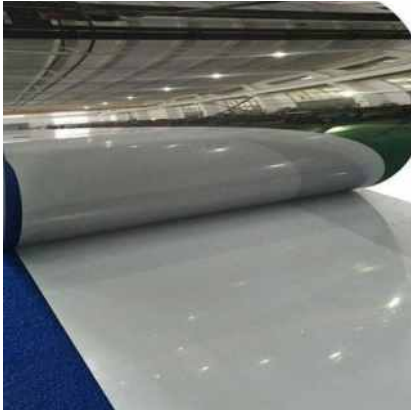
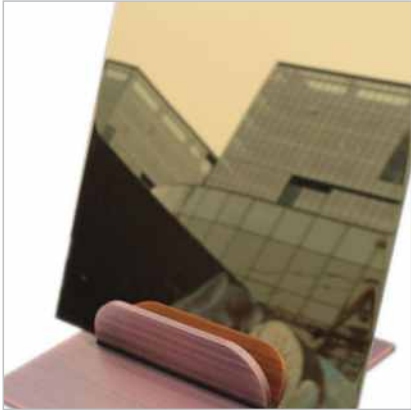
The most common PVD coating is TiN which is widely used to provide wear protection.

When the coating is deposited the product is coated with a film of hard refractory 1-2 microns thick. However, we at SMN Industries make it even thicker for better wear, scratch and corrosion resistance. Thus, our methods enhance the performance of the stainless steel and augment its wear, scratch and corrosion resistance.

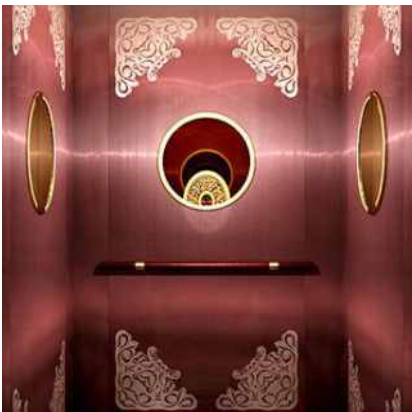
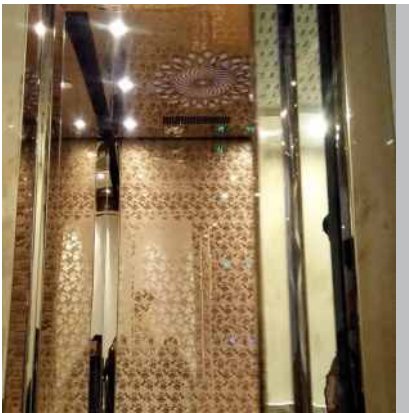
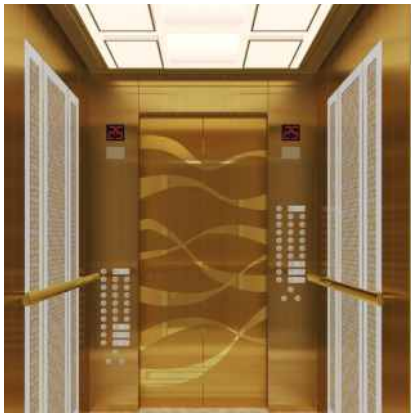
Therefore, our materials have durability far superior to conventional coating methods such as electroplating or other PVD processes.

- Dry and clean process
- Low colour variation
- Perfect binding
- Environmentally friendly
- Perfect coating thickness
- Perfect wear, scratch and corrosion resistance
- zero waste residue

super 8k mirrors



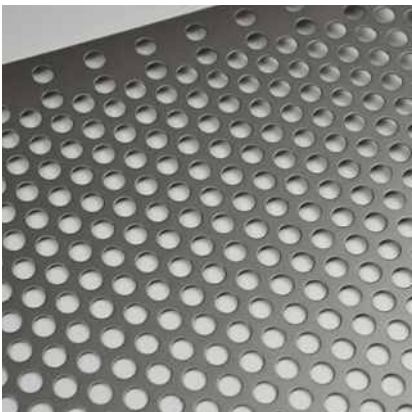
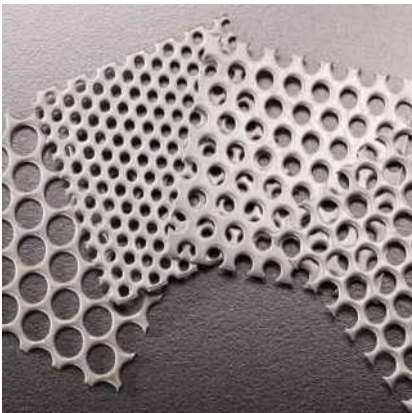
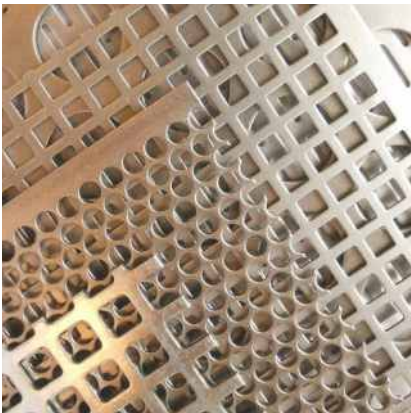
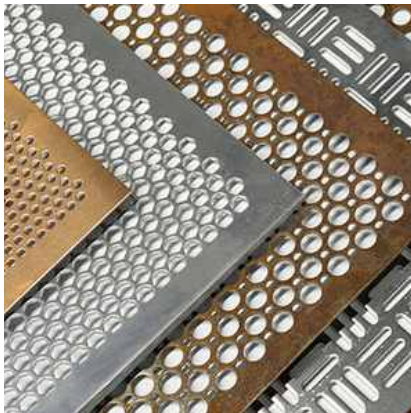
elevatores



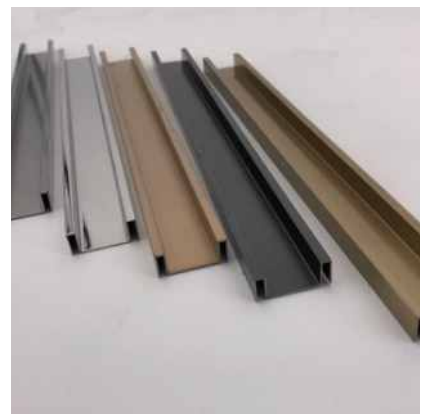
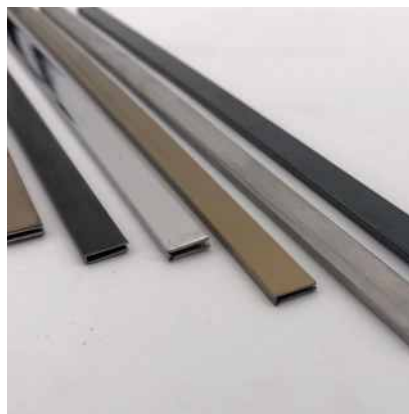
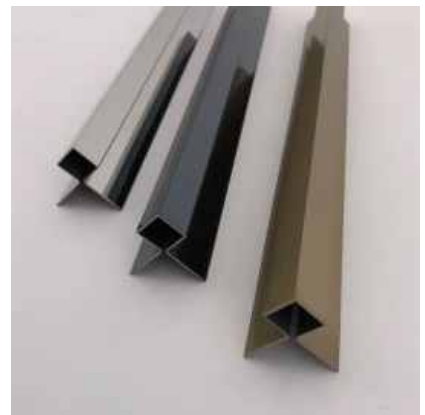
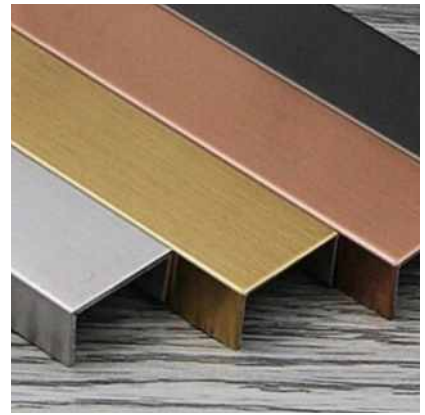
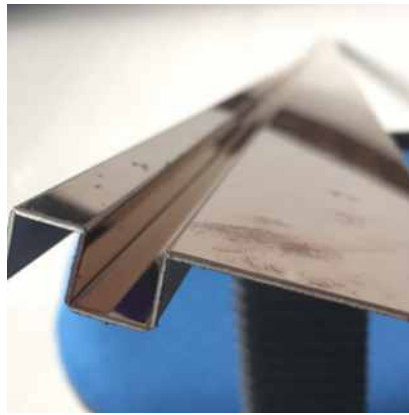
etched patterns



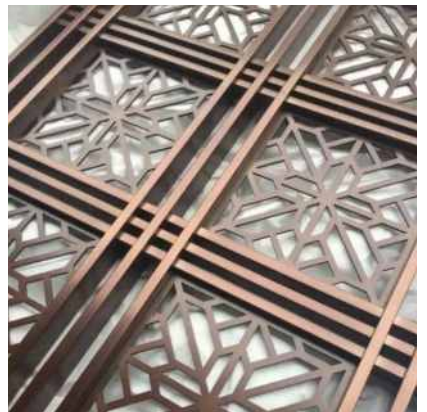
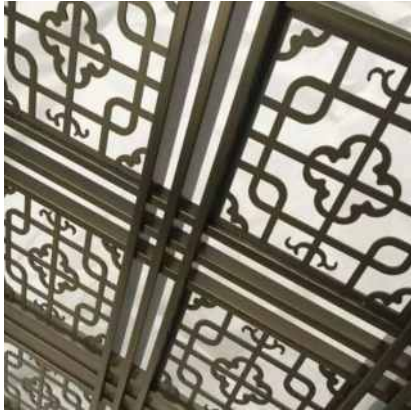
perforated



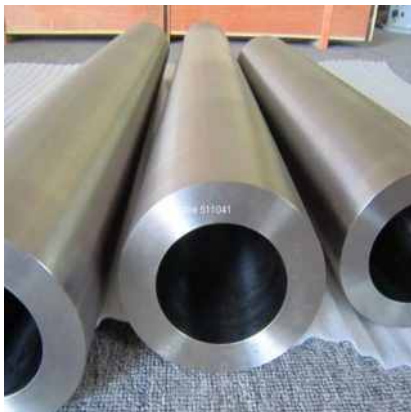
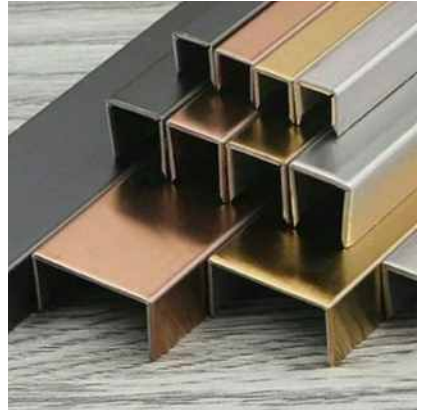
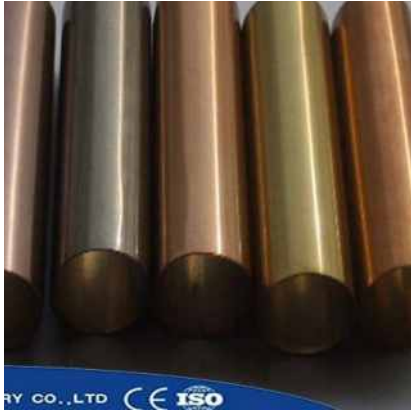
profile



screen



tube



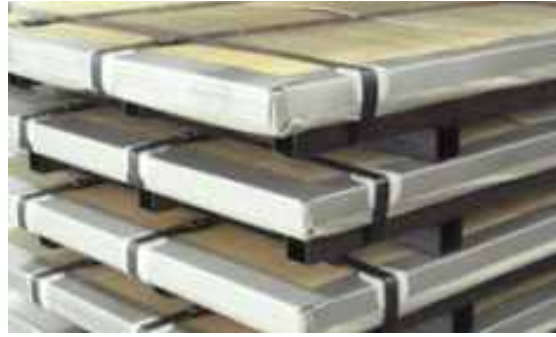
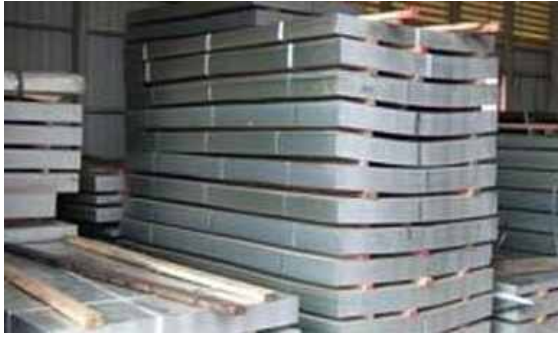
furniture





Manufacturing

We have discussed the most important part of our manufacturing process i.e. PVD coating in detail. We, at SMN Industries, use advanced machinery to produce quality goods. Our production system ensures that our customers get perfection delivered at their doorstep. All the stages of our business process including ordering, to production, delivery and after-sales service are completed by attention to intricate details. All our departmental teams make concerted efforts to update the design range and continuously add latest designs to ensure that our clients have an edge in their products. We procure raw materials under the ASTM and JIS standards. This means the surface of the materials is free from defects and thickness is also under control to be used for different kinds of fabrication. The products will come out as blemish-free, defect-free, sleek, and shiny materials, perfect to be readily put to use.



Packaging

We do not restrict our liability to the process of manufacturing only. Taking a step further, we provide quality in packaging also. All our products are well packed taking into account the usage and delicate nature of the materials. SMN Industries takes the appropriate care in packing our finished products so as to protect them from any sort of damage.

We, at SMN Industries, pack the products in 100% wooden pallets so that it is shielded from all the sides. To strengthen and protect it further, metals strips are tied on it. Our packing has been designed keeping in mind damage-free transportation and shipments. Until the product is delivered at your doorstep pristine in its original form, we do not rest.



New shine in your life....

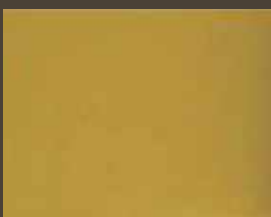
colours available



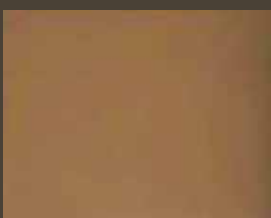
silver



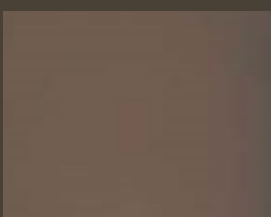
campagne gold



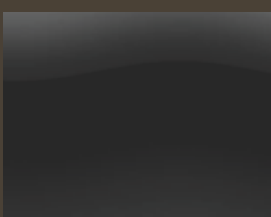
gold



rose gold



bronze



black



blue

SMN
I N D U S T R I E S

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