



INNOVATIVE METAL SURFACE TREATMENT

Electropolishing | Anodising | Specialist Surface Treatments

HIDAYATH
GROUP

www.ep.hidayath.com

Hidayath Heavy Industry (HHI) a subsidiary of prestigious HIDAYATH GROUP, DUBAI, in its endeavor to be at the leading edge of technology has extended its service portfolio to specialist surface treatment processes that include ELECTROPOLISHING and ANODIZING. This modern purpose built facility is one of its kind in GCC and is equipped to carry out a number of innovative processes for metal surface treatment.

Cleaning, Degreasing, Pickling, Electropolishing, Passivating and Sanitizing Stainless Steel form the core of operations at HIDAYATH's Specialist Metal Surface Finishing Division. We develop, manufacture and implement process technologies to remove contamination and repair damage produced in the fabrication and machining operations as well as enhancing and optimizing surface properties. Our personnel, with years of industry hands-on experience, expertise and knowledge, are intensely abreast with SURFACE TREATMENT PROCESSES. This includes partners and associates that strengthen our ability to supply high quality, up to date chemical and electrochemical technology.

As an ISO 9001 and 18001 certified company, maintaining quality standards at all levels of our operation have become a part of our business tradition.

SECTORS

- Oil & Gas
- Biochemical
- Pharmaceutical
- Surgical & Medical
- Semiconductor
- High Vacuum
- Food & Beverage
- Architectural
- Maritime

SERVICES

- Cleaning & Degreasing
- Pickling & Descaling
- Electropolishing
- Passivating & Desmuting
- Sanitising & Disinfecting
- Anodising
- Cleaning Products
- Advise & Consultancy
- Site Operations



WHY TREAT STAINLESS STEEL?

It is well known that Stainless Steel gains its major surface corrosion properties from the presence of CHROMIUM within its formulation which reacts with OXYGEN in the atmosphere to produce an inert surface layer. This layer protects the material from attack and if damaged, will automatically repair itself by deoxidizing. This is true if the surface is not masked by residues, contaminated and the material is undamaged. Typical manipulation techniques employed in the manufacturing process can easily create contamination, damage and result in changes to the surface structure.



SURFACE CONTAMINATION

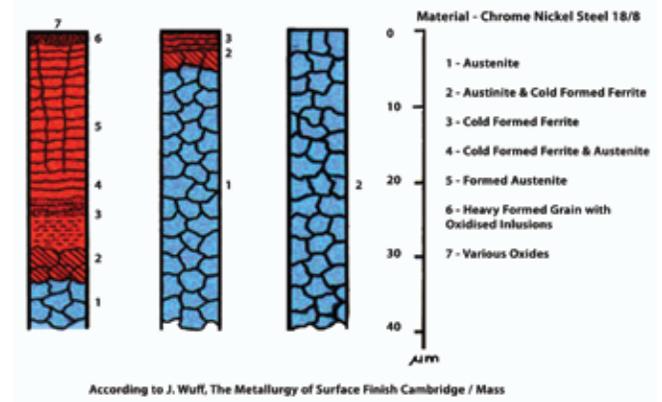
Shop floors in most factories have a variety of consumable products to aid their manufacturing processes including grease and oils for lubrication. Airborne dust particles can easily settle on both the fabrication and manipulation tools and devices used in manufacture.



CHANGES TO THE MATERIAL SURFACE

Materials are produced under controlled temperature conditions and methods to enable a particular structure to form. Inducing heat by thermal treatment, fast machining, grinding and polishing can enter the critical temperature zone which the material is formed leading to changes in the structure which can easily occur as shown in diagram.

Influence of Surface Treatment on Depth of the Mechanical Modified Layer

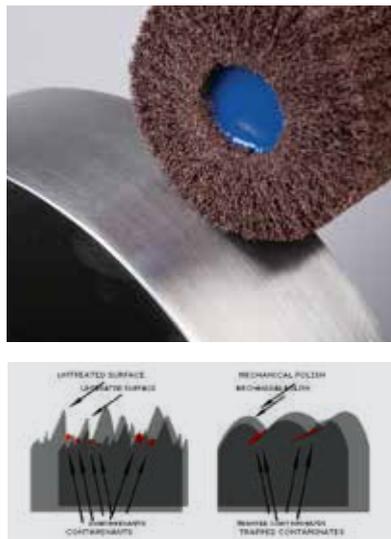


EFFECTS OF MANUFACTURING



CUTTING & SHEERING

When Cutting and Sheering material BURRS are produced, which can both be a hazard and have the potential to contaminate product media and damage other parts in an assembly.



GRINDING & POLISHING

The heat created in these operations change the surface and also smear the surface dragging in undesirable contaminants.



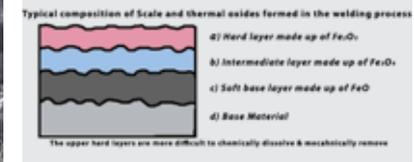
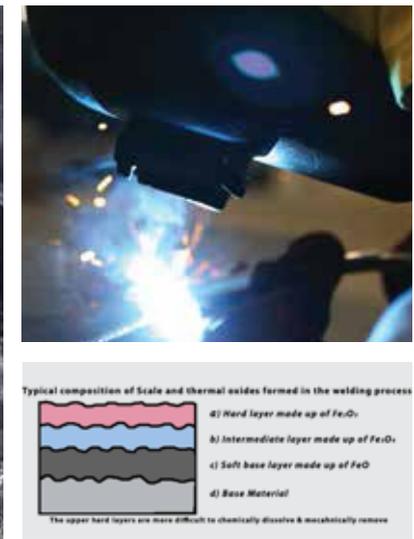
BENDING & MANIPULATION

Most machine shop tools used in this process are carbon steel and create huge surface pressure that can embed contaminant particles from its own base material and atmospheric dust, coolants and general workshop consumables including grease and oils.



TURNING & MILLING

Both these operations use coolants which may contaminate the surface. Fast machining speeds can smear surface layers, especially when using blunt tools. Localized overheating can also change the material structure.

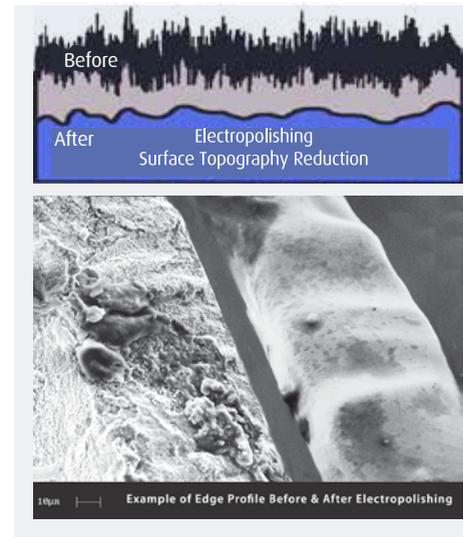


WELDING AND HEAT TREATMENT

Both the processes produce surface oxides which are firmly bonded as part of the surface layer and do not display the same characteristics as the base material. The oxides are hard deposits which are difficult to remove and can easily corrode in the atmosphere.

ELECTROPOLISHING

Electropolishing is the ultimate process in the surface finishing of stainless steel and produces a superior finish with unique properties. The process is carried out by immersion in a tank with an electrolyte and a DC power passed through a rectifier having the opposite effect of electroplating the process removes a layer of material between 5 to 40um (microns). As the process has no impact to the surface and the process solution, temperature is far low the critical structure formation zone. This renders the surface chemically pure, clean and thus, undisturbed crystalline structures are exposed. These surfaces have several features and characteristics unmatched by any other surface finishing treatment.



INCREASED CORROSION RESISTANCE

Selective removal of Iron enriches the surface with Chromium and Nickel. Oxygen is liberated at the anode (Positive) side of the electrolytic process and these gases flow upward reacting and oxidizing recently expose layers thus further improving the corrosion resistance.

ULTRA CLEAN

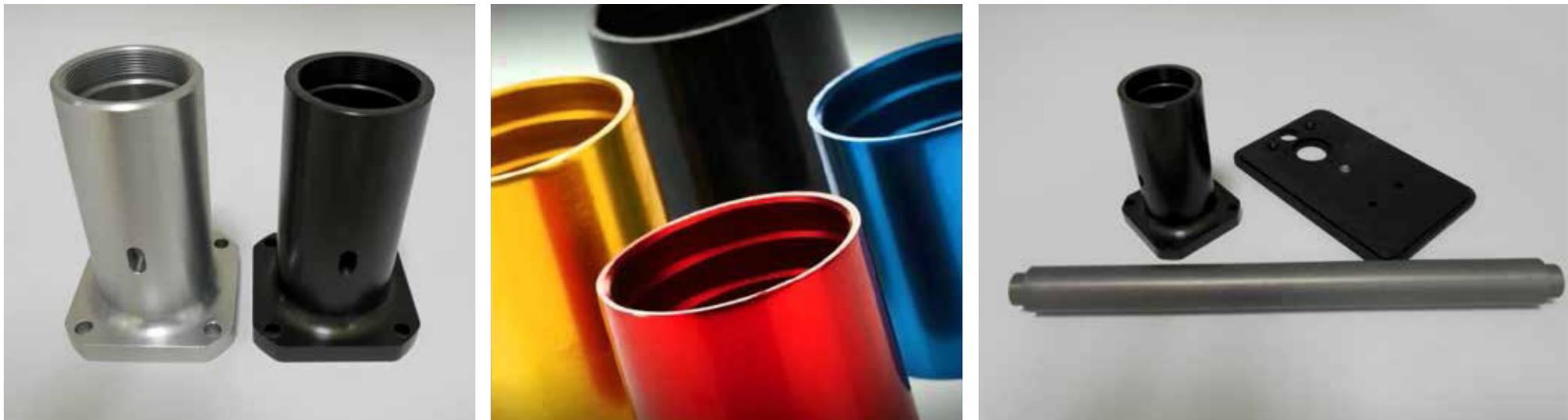
By removing damaged and contaminated surface layers, the process exposes pure crystalline, ultra clean base material. This restores the original properties of the material and makes the surface suitable for ultra clean applications. Furthermore, external surface stresses in the upper layers are relieved. Component sizing may also be undertaken by employing tightly controlled parameters.

MICRO FINISHING

The flow of the current and the natural action is to remove the peaks at a faster rate than in the troughs in the surface topography, leading to the elimination of micro roughness and has a further feature of deburring. Additionally, the surface is super smooth, making it hard for deposits and residues to attach themselves, which makes the surface exceptionally easy to clean.

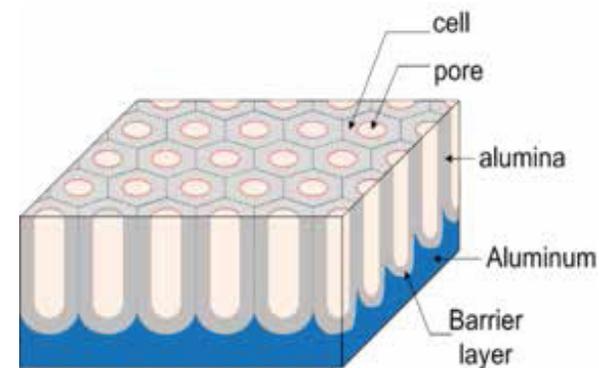
ANODISING

Anodising (Anodic Oxidation) is a process method of electrolysis in which a controlled rate Aluminium Oxide is built on the surface forming a ceramic like parallel film which is very corrosion, wear resistant and non conductive. Processes offered include Conventional, Dyed and Hard Anodising to high level Military Specification MIL-A-8625 Type II, Type III, Class 1 & 2 including PTFE dry film and impregnation.



Anodic films are employed in numerous industrial sectors where application properties are desired and also used for aesthetical, identification purposes where the formed porous film can absorb pigments dyestuffs of an infinite range of colours.

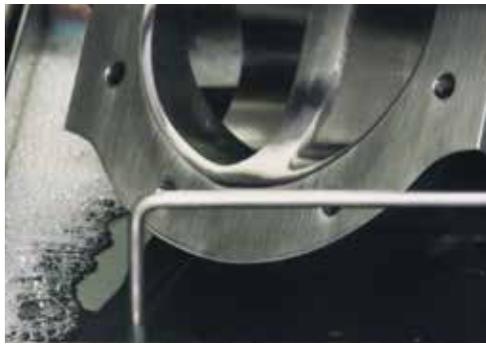
Hard Anodising produces much thicker films with tighter pore structure having exceptional resistance to wear making it ideal for bearing surfaces and moving parts.



OTHER TREATMENTS

CLEANING & DEGREASING

Preparing for another surface finishing process or going for dispatch, all fabrications and components should be thoroughly cleaned after manufacture. Sometimes it is



necessary to clean assemblies in between manufacturing steps to ensure contamination is not an issue. This can often be a problem when leading onto heat treatment or welding operations, as surface contaminants are easily absorbed into the upper surface layers and extremely difficult to remove.

The subsequent masking effect which can occur and insufficient cleaning can both impair the overall appearance as well and reducing its performance.

PICKLING & DESCALING

The thermal oxides from any heat treatment process and welding mainly Iron Oxides of various states, readily corrode and in almost every application, will contaminate product



media in which they are in contact with. It is vital to remove these oxides to maintain the surface properties of stainless steel. Mechanical treatments can remove the bulk of these oxides, although these methods can smear the surface entrapping contaminants which may later release, causing failure to the function of the product. For example, if an abrasive wheel employed to remove the oxides, it can have the dual action of decontaminating and recontaminating the surface.

PASSIVATION

To ensure a fabrication or components corrosion resistance is optimized prior to delivery, it should undergo a passivation stage. Employing high oxidizing agents all



surfaces are either sprayed or immersed in a solution which really oxidizes the Chromium. This rapidly forms the inert layer on the material and creates the critical surface property relied upon in service. Several methods of passivation are employed depending on the Alloy, pre-treatment and type of application. Both ISO 15730 and ASTM A967 Stainless Steel Passivation specification details each process in depth.

SANITATION & DISINFECTING

We are under constant attack from bugs. Hospitals and public areas are well known to be ideal sites for these pathogens to grow and fester. Some bacteria known to be



resistant to common antibiotics make this task of containing epidemics even more harder to control. Ongoing cleaning programmes must be stringently employed wherever to keep the spread of disease to a minimum. Both people and existing equipment should be disinfected as well as new and refurbished equipment should also undergo Sanitation prior to delivery, reducing the threat even further.

HIDAYATH

GROUP

ENQUIRIES

Hidayath Heavy Industry LLC

Dubai Industrial City, UAE

Tel: +971 4 885 7700 | Fax: +971 4 885 7070

Email: ep@hidayath.com | services@hidayath.com

CORPORATE HEADQUARTERS

Hidayath Group

Phase II

Dubai Investment Park,

Dubai, UAE

UAE | Oman | Qatar | Saudi Arabia | India

www.ep.hidayath.com