SPF Europe BV
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YOUR PARTNER IN ELECTROPLATING AND CORROSION RESISTANT MATERIALS

TANTALUM, NIOBium, TITANIUM, ZIRCONIUM AND NICKEL ALLOYS

BUS BARS, CURRENT FEEDERS

SPF Europe BV develops and produces vacuum evaporators, electrolysis cells and systems for process water treatment to customer specification. Our modular range of vacuum evaporators is capable of treating volumes ranging from 25 l/h to 500 l/h. The use of corrosion resistant materials such as titanium, tantalum, zirconium and niobium allows the treatment of extremely aggressive media. We supply our systems completely assembled and including support during start-up.

For metal recovery (Au, Ag, Ni etc.) or process water treatment we design and manufacture divided (membrane) and undivided electrolysis cells. Our own construction department optimises the mechanical, electrical and electrochemical design of the system for highest efficiency and safety of operation. If desired we can supply our systems completely assembled with rectifier, pumps, filters and other auxiliary equipment.
SPF Europe was founded in Hoensbroek, the Netherlands in 1989 and is specialised in processing refractory metals i.e. tantalum, niobium, titanium, zirconium and nickel alloys for use in aggressive and highly corrosive environments.

**Baskets**
Titanium and zirconium baskets are widely used for copper, nickel or zinc plating applications. Baskets can be manufactured from a wide range of mesh types and dimensions and may include hooks, current distributors and pellet feeder systems. SPF Europe designs and manufactures according to customer specification. The typical delivery time for anode baskets is 10 days after order receipt.

**Heating elements and coolers**
SPF Europe manufactures heating elements and coolers from titanium, niobium, zirconium and tantalum for application in plating tanks. Our know-how and experience guarantees that the material selection as well as the design and construction meet the highest standards. Heating elements and coolers manufactured from corrosion resistant materials are reliable and durable. The large surface area achieves a very high heat transfer efficiency.

**Tank linings**
For applications in aggressive and highly corrosive environments SPF Europe designs and manufactures tank linings from titanium, zirconium or tantalum. These metallic linings can be electrically polarised to further enhance their already outstanding corrosion resistance properties. Over time the functionality of conventional rubber or enamel coatings degrades due to mechanical damages or ageing. When this happens the tank wall will be in direct contact with the electrolyte and may corrode. A metallic lining will shield the tank wall from the electrolyte. Equipped with a leakage monitoring system metallic linings provide optimal environmental protection and will allow for quick corrective actions in case of leakage.

**Sun-Z-R cladding technology**
With SPF Showa Entetsu’s patented Sun-Z-R cladding technology a steel, copper or aluminium support structure can be clad with a thin but extremely corrosion resistant lining of Ta, Ti, Nb or Zr. The corrosion resistant metal, which can be from 0.6 to 1.5 mm in thickness, is bonded to the support construction by resistance welding. This makes it possible to use materials with poor corrosion resistance but excellent electrical conductivity like steel or copper as current feeder and distributor in the aggressive environments encountered in the plating industry.

A further improvement of the Sun-Z-R clad technology is found in the patented submerged bus bars. With the use of submerged bus bars everyday problems such as contact corrosion, heat generation due to electrical contact resistance and plating defects due to contamination of the electrolyte with corrosion products can be solved. If used as current feeder and hanging bar for anode baskets, submerged bus bars greatly simplify filling and refilling of nuggets and pellets.

**Your partner in electroplating and corrosion resistant materials**
**LEAD ANODES**
The main application for lead anodes is in hard chromium plating. SPF Europe is specialised in optimising the design and construction of lead anodes in order to meet the increasing demands with respect to current distribution, anode stability and service life. The delivery program includes the manufacturing of lead anodes with copper current feeder hooks and current distributors. Lead alloys are available in a wide variety of shapes and sizes.

**LEAD CLAD TITANIUM ANODES**
Lead clad titanium anodes combine the best of titanium and lead alloys for practically maintenance free anodes. On a solid titanium substrate a layer of lead alloy is applied by means of a highly developed proprietary technology. The lead face has a uniform current distribution and the lowest possible wear rate. The excellent corrosion resistance of titanium is related to the formation of a dense, passive and thus electrically nonconductive titanium oxide layer. The titanium support structure provides the mechanical rigidity, but will not pass any current. After end of service life the lead alloy coating can be renewed. This type of anode construction is typically used in processes, where high emphasis is put on the reduction of both lead sludge and maintenance costs in combination with long service life and high mechanical stability. This includes hard chromium plating and continuous strip electrogalvanising processes.

**PLATINISED TITANIUM ANODES**
The classical anode material used in the electroplating industry is platinum coated titanium. This material is available in a wide variety of shapes and sizes. The standard platinum thickness is 2,5 µm or 5,0 µm coated on titanium mesh with diamond size 5 mm x 10 mm. Titanium is not stable in the presence of fluorides. In this case the use of tantalum and niobium as substratematerial is strongly recommended. Besides for chromium and precious metal plating, platinised anodes are also widely used for electrodialysis and cathodic protection. SPF Europe provides technical support for the mechanical and electrical design and construction of anode structures, bus bars and current distributors.

**MIXED OXIDE COATED ANODES**
The invention of the mixed oxide coatings has revolutionised the electrochemical industry. The chlorine industry was amongst the first to recognise the advantages of the superb corrosion resistance of titanium in combination with the excellent electrochemical properties of the mixed oxide coatings. Soon chlorine plants started to convert their amalgam lines from graphite anodes to the far more economical and durable ruthenium oxide coated titanium anodes. Later, mixed oxide coatings on the basis of iridium precious metal were developed for oxygen evolving applications. Today, mixed oxide coated anodes are used in many applications and offer significant advantages in high current density applications, because of their robustness and longevity.

**PLATINUM FOIL CLAD ANODES**
The Sun-Z-R process enables SPF Europe also to manufacture thin but dense platinum foil on titanium, tantalum or niobium substrates. The platinum foil can be clad in thickness of 3 µm minimum. The extreme micro-smoothness of the platinum foil provides high durability, whilst the dense structure minimises the risk of premature failure due to passivation or corrosion of the base material. Platinum foil clad anodes can be manufactured as sheet or mesh material, with foil clad to one side only or to both sides of the substrate.
**Bus bars, current feeders**
The Sun-Z-R technology is used for the manufacturing of bus bars and current feeders. It offers significant advantages over other cladding technologies, such as explosion- and rollcladding.

- Considerable cost savings
- Shorter delivery times
- Increased design flexibility

Compared to conventional loose linings, bus bars clad with Sun-Z-R offer the following additional advantages:

- Heat transfer comparable with explosion clad material
- Excellent electrical conductivity (low voltage drop)

**Vacuum evaporators and electrolysis cells for process water treatment**
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