

Copper anodes for electroplating

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**LUVATA**  
SPECIAL PRODUCTS



# There are some things you can predict

Over the billions of years of their existence, we've come to understand the movements of the earth, sun and moon are fixed and known precisely. As a result, the inherent predictability of high or low tide can also be determined with great accuracy. If only we could gaze into our crystal ball to predict future events with the same accuracy.

With a Luvata Special Products anode – you can.

Similar to the predictability of sunrise and sunset, customers look to Luvata Special Products for consistent, predictable product performance. From the first shipment to the next, Luvata Special Products anodes are distinguished by their consistent, reliable and predictable performance.

## Copper in electroplating

Electroplating is widely used in various industries for coating metal objects with a thin layer of a different metal. Electroplating can change the chemical, physical, and mechanical properties of an item.

The layer of metal deposited has some desired property, which the metal of the object lacks. An example of a mechanical change is a change in tensile strength or surface hardness.

Copper is commonly used in electroplating because it is a good metal to cover substrate defects that can accelerate corrosion. In addition copper has a high plating efficiency while being among the least expensive metals in stable supply. Exceeded only by silver, copper's high electrical conductivity makes an exceptional coating for products such as printed circuit boards.

## Cleanliness

Cleanliness is essential to successful electroplating, as impurities can prevent adhesion of the coating to the intended object. Luvata Special Products' discriminate copper cathode selection and stringent lean manufacturing processes, delivers shiny, clean copper anodes for predictable coating thickness and performance.

Luvata Special Products anodes offer the same predictable performance, just like the rising sun or full moon.

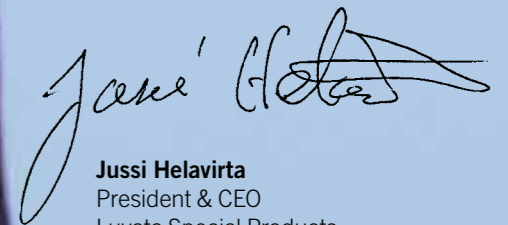


*“When you first glimpse at a small round anode, it doesn't appear all that complicated. But like many things – looks can be deceiving.*

*Luvata Special Products has been manufacturing anodes for nearly five decades. Enclosed we highlight the many key characteristics that distinguish a Luvata Special Products anode from all the others. There is a difference. From high-purity copper to its grain structure and from balls or slugs to plates and profiles, there are many differences.*

*With a Luvata Special Products anode, you receive consistent structural and chemical properties in each anode, delivering predictable and consistent performance from the first anode to the last. This gives Luvata Special Products anode customers electrical conductivity, plating and ductility performance on which they depend.*

*Don't be deceived again – by a simple shiny copper ball. Understand the difference a Luvata Special Products anode makes.”*

  
**Jussi Helavirta**  
President & CEO  
Luvata Special Products

# Superior copper material

At Luvata Special Products, each casting of both oxygen-free copper anodes and phosphorus copper anodes is made under highly controlled and optimum conditions. This leads to the lowest variation in structural and chemical properties and therefore high consistency of the end product. Luvata's manufacturing process guarantees anodes to behave exactly the same way – from plating bath to bath.

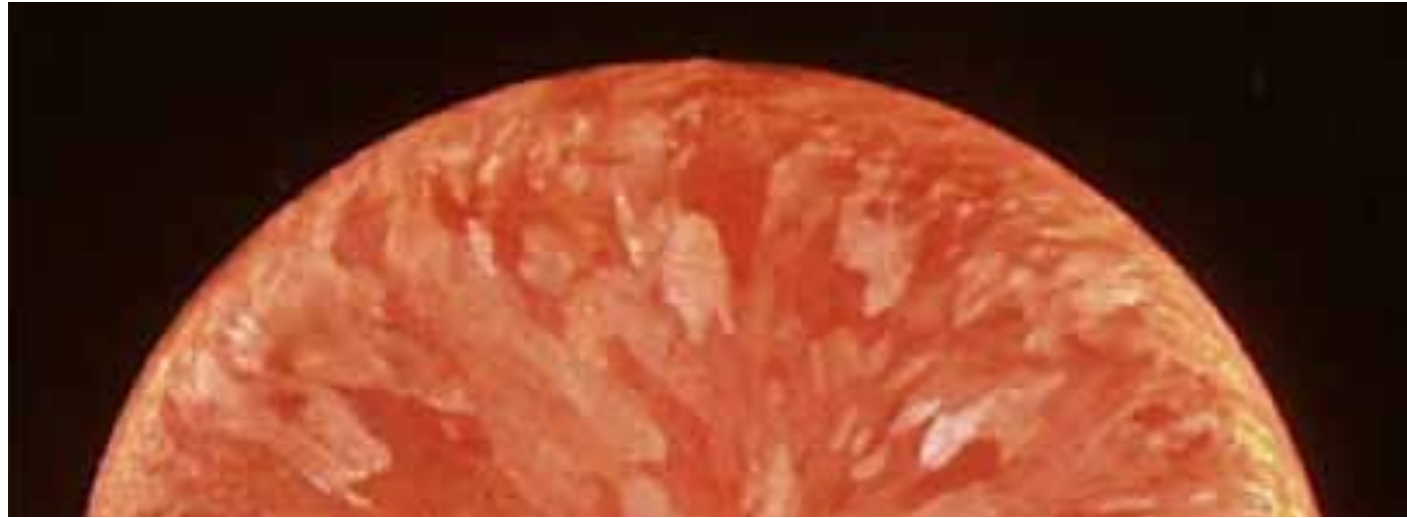


Figure 1. Luvata Special Products' anode balls contain large cast grains.

### Ultimate high purity level

Impurities like iron, nickel, zinc and arsenic tend to dissolve in the plating bath and get enriched as time goes by. If the impurity level is high enough, elements start to interfere with the plating process by precipitating on the coating. This leads to lower electrical conductivity, stresses and changing mechanical properties of the coating. Impurities can reduce the physical properties such as ductility.

Tin, lead and silver form sludge that floats in the bath causing inclusions and a rough finish to the coating. Antimony and bismuth will reduce the mechanical stress capability. Inhomogeneous casting structures with oxides and pores can decrease formability and therefore the quality of the end product.

### The Luvata Special Products advantage

The most important property of a Luvata Special Products anode is purity. Copper purity is essential. Pure copper means greater predictability.

Luvata Special Products anodes have uniform grain structure and phosphorus content. Oxygen-free copper (OF-OK<sup>®</sup>) has no pores in the cast state and no copper oxide inclusions. Both OF-OK and phosphorus deoxidized copper have homogeneous single phase structure that does not form sludge.

In the casting process phosphorus is added to the master alloy which melts very fast. Due to diffusion and continuous movement of the copper melt, the melt is instantly homogeneous (evenly distributed in the melt). This leads to even phosphorus content in the anodes. A rapid and even black-film is evidence of uniform phosphorus distribution in Luvata Special Products anodes.

The copper crystal structure of Luvata Special Products cast balls consists of large grains, see figure 1. As a result of Luvata Special Products' casting process, both grain size and shape are the same in the entire batch of anodes. Large copper grains dissolve evenly and guarantee a stable anode film on the ball surface. Large grain size also ensures better anode film adhesion and thus less anode sludge creation and less consumption of organic plating additives. Large crystals are very good in prevention of porous erosion of the ball and to avoid nodular plating caused by undissolved copper dust in the plating tank.

**By Dr. Terhi Glas,**  
Development Manager Luvata Pori

# Specifications

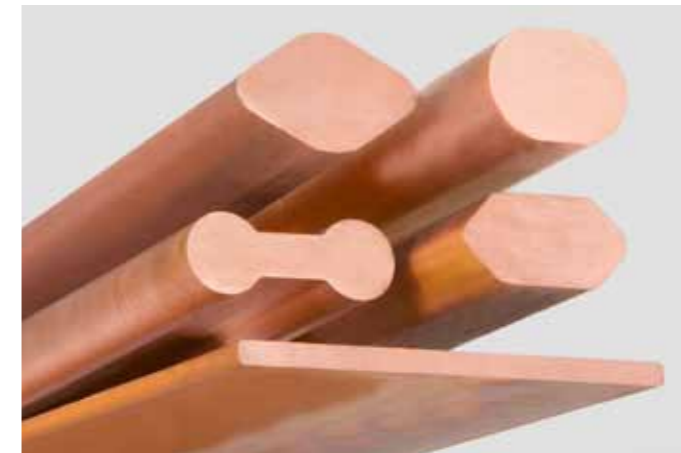


### Phosphorous copper anodes

Luvata Special Products phosphorous copper anodes have high quality plating properties and are widely used for demanding plating applications. The oxygen-free melt in the Luvata Special Products casting process gives the anodes a phosphorous content of P 0.04 – 0.06% that remains consistent from bath to bath. Phosphorous copper anodes are used in acid copper plating baths.

### Oxygen-free copper anodes

Luvata Special Products oxygen-free copper anodes are made specifically for electroplating purposes. They have a high purity level (99.99% minimum) and have a clean surface. Because of their cast crystal structure and even particle size, Luvata Special Products anodes are easily dissolved and their free-flowing material allows ease of handling.



Shapes				
<b>Balls</b> diameter	15	28	42	50
	25	40	45	55
<b>Slugs</b> diameter	8x15	12x8	14x10	25x25
	8x20	12x10	14x20	25x30-40
		12x20		
<b>Plates</b>	25x10xL	100x10xL	152x19xL	175x15xL
	60x12xL	100x15xL	152x15xL	200x10xL
	80x12xL	100x20xL	158x12xL	200x12xL
	80x15xL	130x19xL	170x15xL	200x20xL
<b>Ovals</b>	48x65xL	51x76xL		
<b>Dogbones</b>	94x34xL			
<b>Hexagonals</b>	39x78xL			
all dimensions mm; ask for other shapes and sizes				

Packing	Sizes	Packing type	
<b>Balls and Slugs</b>	40-55 mm	20kg carton boxes on pallets	
	15-25 mm	25kg carton boxes on pallets max 1000kg big bags on pallets	
<b>Plates and Profiles</b>	500/1000kg	Bundles	Wooden cases

# Applications



Coin blanks



Rotogravure printing cylinders



Printed circuit board plating



Decorative plating



Radiators



Printed circuit boards



Automotive parts

# About Luvata Special Products

## What does Luvata Special Products see for the future?

We will use our unique technology know-how to influence the development of a sustainable modern world. We have always aimed to improve our customers' products and processes, and to help them increase the efficiency of their businesses. But our vision is bigger than that. If human society is going to maintain the lifestyle that we all enjoy today AND offer it to emerging societies, we will all need to become much more efficient and to take much less from the planet. We are helping companies to make their products, processes and production more sustainable: do more, waste less, and pollute less.

## What's Luvata Special Products' plan for getting there?

Luvata Special Products looks to build on its distinct strengths, bringing expertise and dedication to high growth regions and adjacent markets around the world. We are stepping into niche and specialist markets with our high-value, engineered solutions, and we

are developing new solutions in partnership with our customers to conquer challenges at the front end of market demand.

## How does Luvata Special Products behave?

In doing all this, we resolve to be the partner of choice for our customers, the employer of choice for our staff, and to be a positive and responsible friend to everyone else. We strive to be open-minded and focused on getting results; and when we promise, we deliver.

## Where in the world are we?

Our global footprint stretches across America, Europe and Asia. Our diversity of locations, cultures and markets gives us access to a wealth of knowledge and expertise that simply keeps growing. It means that we are local to our customers, wherever in the world they are and can be responsive to their needs, including fast local delivery straight to the door.

1300 employees, 12 locations, 7 countries



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### **About Luvata Special Products**

Luvata Special Products is a world leader in metal solutions manufacturing and related engineering services to industries such as renewable energy, automotive, healthcare, and power generation and distribution. The company's continued success is attributed to its longevity, technological excellence and strategy of building partnerships beyond metals. Employing over 1,300 staff in 7 countries, Luvata Special Products works in partnership with customers such as ABB, CERN, Siemens and Toyota. Luvata Special Products is a group company of Mitsubishi Materials Corporation.



[www.mmluvata.com](http://www.mmluvata.com)



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