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## Enhancing performance in electrosurgery: Macom Instrumental Cirúrgico's journey with the PVD coating BALIMED® ARGENTA

**A trusted partnership between Macom Instrumental Cirúrgico and Oerlikon Balzers delivers Brazil's most widely used bipolar forceps – combining antimicrobial protection and surgical precision.**

In neurosurgery, where precision and sterility are paramount, the performance of surgical instruments can directly influence patient outcomes. Macom Instrumental Cirúrgico, one of Brazil's leading manufacturers of surgical tools, faced a persistent challenge: tissue adhesion during coagulation (sealing of small blood vessels) with bipolar forceps.

The search for a more effective and biocompatible solution led to a collaboration with Oerlikon Balzers' antimicrobial coating: BALIMED® ARGENTA.

### From PFAS to PVD: A shift towards biocompatibility and performance

Macom Instrumental Cirúrgico initially used Teflon (PFAS) coatings to reduce tissue adhesion. However, concerns regarding potential health risks, environmental impact, and suboptimal surgical performance required a shift to more advanced surface technologies. Introduced to PVD coatings (Physical Vapor Deposition, an advanced thin-film technology used to improve surface properties) through industry partners, Macom Instrumental Cirúrgico began testing BALIMED® A and BALIMED® C – both promising. But it was BALIMED® ARGENTA, a silver-doped PVD coating, that delivered the breakthrough.

### FACTBOX



#### Macom Instrumental Cirúrgico

<https://www.macominstrumental.com.br/>

Leading manufacturer of surgical instruments, equipment, and materials in Brazil.

**Application:** Bipolar forceps for neurosurgery

#### BALIMED® ARGENTA

Key Benefits:

- Reduced tissue adhesion
- Antimicrobial effect
- High wear resistance
- Consistent performance after repeated sterilization cycles

## **BALIMED® ARGENTA: Antimicrobial protection combined with surgical precision**

BALIMED® ARGENTA is the only silver-doped coating in Oerlikon's medical portfolio. Designed for surgical applications, it combines low tissue adhesion with controlled silver ion release – providing antimicrobial protection without compromising biocompatibility. The coating is applied through combined PVD sputtering and arc evaporation techniques, ensuring high wear resistance and consistent performance even after repeated sterilization cycles in the autoclave.

"These forceps enable smooth, precise coagulation with minimal tissue sticking. They are also easier to clean, which is a major advantage in the operating room," says Dr. Cesar Andraus, neurosurgeon and consultant at Macom Instrumental Cirúrgico.



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## **Scaling innovation: from prototype to market leadership**

What began as a small-scale test with 300 coated pieces per month has grown into a production volume of over 10,000 units per month. Today, Macom's BALIMED® ARGENTA-coated bipolar forceps are the best-selling in Brazil. Hospitals and surgical teams cite improved handling, enhanced hygiene, and reliable performance as key reasons for their adoption.

## **Scientific validation and ongoing research**

In vitro laboratory tests conducted by Oerlikon and its research partners demonstrated that BALIMED® ARGENTA retains its antimicrobial properties and structural integrity after surgical use and exposure to simulated body fluids. These results highlight the coating's potential to support infection control in clinical settings.

Preclinical studies in mice (subcutaneous tests, i.e., just under the skin) further indicated a reduction in bacterial presence around coated implants compared to uncoated ones. Macom Instrumental Cirúrgico also carried out anti-adhesion performance evaluations – first in vitro and later in clinical environments – confirming the coating's effectiveness in reducing tissue adhesion. Additional clinical validations of the coating's antimicrobial performance are ongoing.

## **Looking ahead: Aesthetic and functional evolution**

Responding to customer feedback, Macom and Oerlikon are finalizing a silver-colored variant of BALIMED® ARGENTA. This new version maintains the coating's antimicrobial and anti-adhesion performance while offering a distinct aesthetic preferred by many surgeons. This development reflects the partners' commitment to continuous innovation and responsiveness to market needs.

## **About Macom Instrumental Cirúrgico**

Founded in 1993 and headquartered near São Paulo's Guarulhos International Airport, Macom is one of Brazil's leading manufacturers of surgical instruments, equipment, and materials. With a portfolio of over 5,000 products, the company specializes in neurosurgery, orthopedics, maxillofacial, and general surgery. Macom is recognized for its commitment to precision, regulatory compliance (Good Manufacturing Practice certification from the Brazilian Health Regulatory Agency – ANVISA, and ISO 13485 certification), and continuous innovation in surgical care.

## **About Oerlikon**

Oerlikon (SIX: OERL) is a global leader in surface technologies and advanced materials. With a unique portfolio spanning surface engineering, high-performance materials, coating equipment and components, we make products better by enhancing performance, efficiency and sustainability. Oerlikon serves a wide range of industries, including aerospace, automotive, defense, energy, medical, luxury and semiconductors. Headquartered in Pfäeffikon, Switzerland, Oerlikon together with its subsidiary Barmag operates in 38 countries with more than 12,000 employees across 199 locations, achieving sales of CHF 2.4 billion in 2024.

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