

# CASTELOX

Anodizing Oxide (AAO) System  
designed to improve the  
Performance of Aluminum Cast Alloys





## INTRODUCTION

CASTELOX was developed by the R&D team at our Aluminum Surface Treatment Innovation Facility in Tuzla (Turkey). The process provides many benefits and high-performance characteristics for aluminum anodized oxide (AAO) coating. These include options for design/appearance and high functionality for modern market applications where OEMs/engineers can consider silicon-containing (>5% w/w Si) cast aluminum and alloys. The technology platform benefits applicators who provide AAO layers to meet the demands of their customers and markets. OEM's and engineers can rely on consistent performance to deliver market expectations with high reliability.

But what is CASTELOX technology? Well, it's a new portfolio (patent pending) of products that provide high-quality anodized coatings for cast alloy types. Aluminum's use for reducing weight for many applications will

continue its growth across many industries to meet both current and future sustainability requirements. A reliable coating process that increases aluminum usage is clearly sustainable and important for future considerations.

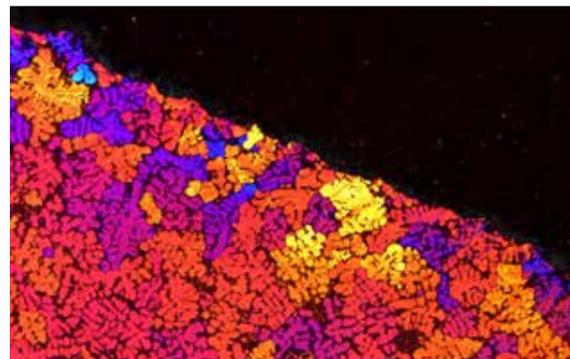
High-silicon cast aluminum alloys are ideal for manufacturing lightweight, complex shape part geometries — particularly for automotive applications. Past limitations in the successful application of anodized coatings to these alloy ranges had limited their use and availability for many parts or components. Good anodized layer quality is especially important where high corrosion performance or aesthetic appearance is the target. Welcome to the future: CASTELOX eliminates many issues related to cast alloys and provides increased potential for industries to consider aluminum parts and components to meet many of their demands well into the future.

# CASTELOX – An Evolution in Aluminum Surface Treatment (AST)

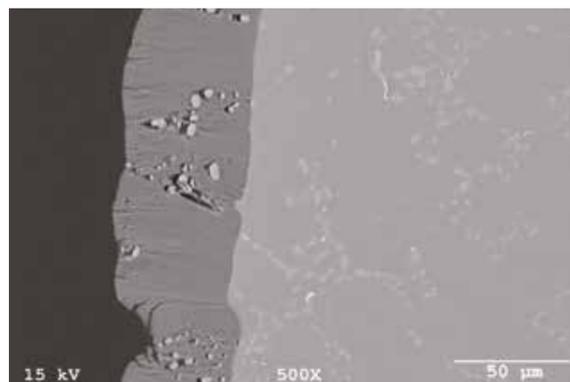
Achieving the numerous benefits of high-functionality and appearance requires a uniform anodized oxide (AAO) coating that is not interrupted by "zero spots". These areas result from part surfaces that lack a sufficiently formed AAO layer, influenced by intermetallic silicon-rich zones in the casting. CASTELOX overcomes these concerns, while boosting the process productivity and efficiency of the anodizing process — so cast alloys will now find a new use and purpose across many industry applications.

CASTELOX offers industry-wide performance advantages for OEM engineers that are considering cast aluminum, as well as applicators that operate anodizing process plants. CASTELOX provides OEMs greater flexibility and options for selecting cast aluminum with confidence in order to meet the higher quality and performance demands expected by their customers. Entire supply chains can benefit from the anodized layer's key functional characteristics, underlined by

a higher-quality visual appearance with broader market appeal. Now it's easier for process plant operators to provide a high-quality range of AAO coatings and finishes for cast alloys.



15-degree cross-section optical polarized image, showing the critical areas at 50X



Cross-section of a perfectly anodized high silicon containing cast aluminum. (AlSi7Mg)

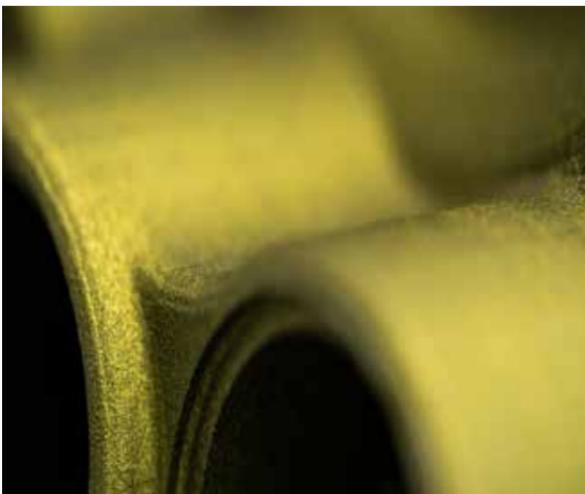
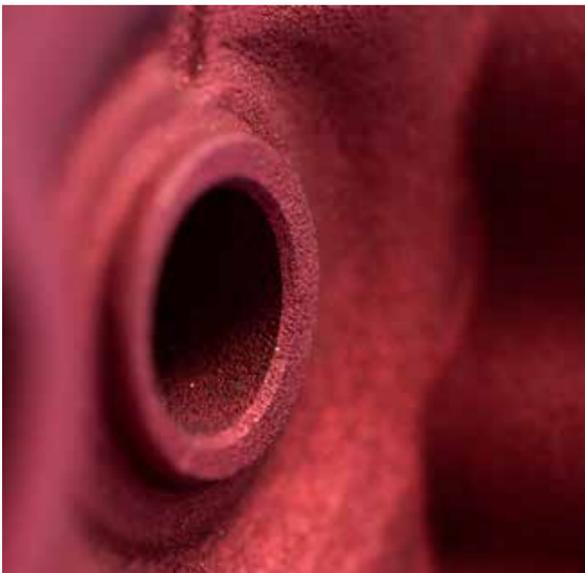
# CASTELOX processing benefits for applicators

- ✿ High process efficiency that improves throughput and productivity
- ✿ Improved AAO integrity, functionality, and visual quality
- ✿ Reduced burning tendency and fewer cast alloy rejects
- ✿ Applicable on a wide range of casting surfaces
- ✿ AAO power consumption savings due to reduced process energy costs for chilling and less power demand
- ✿ A process tailored to meet a wide range of requirements
- ✿ Allows a wider range of color options with higher quality color performance
- ✿ The post-sealing and dye absorption coloring process is easier to manage & control
- ✿ Global availability

## APPEARANCE

With high market and customer expectations, demand for an improved aesthetic and surface appearance is important today. With CASTELOX, the AAO process can provide a wider range of color choices and palettes (e.g. black, blue, or red). There is an overall higher-quality color performance that is realized from improved dye penetration, as well as enhanced fade resistance for high-silicon cast aluminum alloy parts and components.

CASTELOX makes it simple to achieve a decorative, high-quality visual appearance for high-silicon cast alloys — all while meeting expectations and requirements for production reproducibility in terms of the AAO coating system's functional application. CASTELOX's AAO microstructure provides a smoother surface finish that results in higher surface gloss: this benefit directly influences a final part's appearance and gives additional design and market appeal.



## FUNCTIONALITY

A surface coating and finish is the interface between a part/component and any given environment – and this means that systems must have high functionality to fulfill all of the key requirements of an application. This is in particularly high demand when creating quality AAO layers for any industrial use of aluminum. Using the CASTELOX process in AAO coating operations for castings can overcome the problem of inconsistent anodic oxide film thickness for these alloys.

Improved consistency of the AAO layer increases the overall functionality of a part/component by creating higher thickness ranges that have greater uniformity over the complex shape geometries common for cast alloys. Oxide layer cracking is also avoided thanks to the lower stress potential that directly avoids premature performance failures for all application types. The resulting AAO pore sizes are better defined with greater uniformity – an attribute especially important and beneficial for complex shape cast aluminum parts/components. The AAO layer also has an immediate improvement of resulting hardness – without increased brittleness – resulting in a positive impact on coating wear resistance. This is a key consideration, as wear performance is often

an important factor in many automotive and industrial equipment applications. More importantly, overall improved corrosion resistance can also be achieved for CASTELOX-coated articles, which is a critically important metric for contemporary OEM requirements and engineering standards.

Our team looks forward to working with you on establishing the viability of CASTELOX for your specific application needs.





## COVENTYA: your global partner for aluminum surface treatment

We research, design, manufacture, and distribute specialty chemical solutions to support various industries across the globe.

We are a top three global supplier of specialty chemistry and chemical solutions — delivering surface finishing to markets with outstanding products that meet global requirements for coatings and their systems.

Coventya provides customer support through local technical field service expertise in over 60 countries — this ensures state-of-the-art know-how that strengthens trust and confidence.

COVENTYA is driven forward by continual innovation that ensures our customers are

always benefiting from the latest technology. Our surface finishing expert excellence is provided through our nine R&D sites located strategically around the world — these support technical exchanges with key industries. Our experienced, highly-qualified aluminum surface treatment team in Tuzla (Istanbul, Turkey) works with customers to develop solutions for their most demanding applications.

Variations in specific casting processes often necessitate individual parts that require specific solutions. And that's exactly why our team can tailor the CASTELOX process to meet the highest requirements and job-specific detailing — we work with you to fully deliver the benefits of the CASTELOX system.

## France HEADQUARTERS

COVENTYA Holding S.A.S.  
Parc d'Activités des Chanteraines  
7 Rue du Commandant d'Estienne d'Orves  
CS 30001 F – 92396 Villeneuve La Garenne CEDEX, France  
Tel : +33 (0)1 47 15 73 00  
coventya\_fr@coventya.com

### BRAZIL

COVENTYA Quimica LTDA  
Av. Deputado Oswaldo  
Moraes e Silva, 55 – Prédio 02  
Bairro Conceição – Diadema  
SP, 09991-190, Brazil  
coventya.br@coventya.com  
Tel : + 55 11 4055.6600

### BRAZIL

COVENTYA Quimica LTDA  
Rua Jacob Lucchesi, 4852  
Santa Lucia – Caxias do Sul  
RS, 95032-000, Brazil  
Tel : +55 54 2101 3800  
coventya.br@coventya.com

### CHINA

COVENTYA Environmental Plating  
Technology (JiangSu) Co., Ltd  
1 XuHua Road, Xushuguan Town,  
SND, Suzhou,  
215151, China  
Tel : +86 (0) 512 6708 2628

### FINLAND

COVENTYA GmbH  
Sienitie 17  
FI-00760 Helsinki, Finland  
Tel : +358 400 650 106  
j.nummisalo@coventya.com,

### FRANCE

COVENTYA S.A.S.  
Parc d'Activités des Chanteraines  
7 Rue du Commandant d'Estienne d'Orves  
CS 30001 F – 92396 Villeneuve La Garenne  
CEDEX, France  
Tel : +33 (0)1 47 15 73 00  
coventya\_fr@coventya.com

### GERMANY

COVENTYA GmbH  
Stadtring Nordhorn 116  
D – 33334, Gütersloh, Germany  
Tel : +49 52 41 93 620  
coventya\_de@coventya.com

### GERMANY

microGLEIT Spezialschmierstoffe GmbH  
Blütenstrasse 62 – 64  
86558 Hohenwart  
OT Koppenbach, Germany  
info@microgleit.de  
Tel : +49 (0) 8443 91757 0

### INDIA

COVENTYA India Private Limited  
Gat n° 520 B, Shelkewadi, Rihe Road,  
At and Post Ghotawade,  
Taluka Mulashi  
Pune 412 115, India  
Tel: +91 20 67 90 19 00  
s.sunkle@coventya.com

### ITALY

COVENTYA S.p.A.  
Divisione Precious Metals  
Via Chiusa, snc  
IT – 51031 Agliana (PT), Italy  
Tel : +39 0574 67 11  
coventya\_it@coventya.com

### ITALY

COVENTYA S.p.A.  
Via Fratelli Rosselli, 2  
IT – 31050 Villorba (TV), Italy  
Tel : +39 0422 6145  
coventya\_it@coventya.com

### ITALY

COVENTYA S.p.A.  
Via 1° Maggio, snc 5/A  
IT – 22060 Carugo (CO), Italy  
Tel : +39 031 75 90 11  
coventya\_it@coventya.com

### KOREA

COVENTYA Korea Co. Ltd.  
77–8, 5 Sandan 3ro,  
Seongnam-myeon,  
Dongnam-gu, Cheonan-si  
Chungcheongnam-do  
31245, Korea  
Tel: +82 (0)41 558 2921  
coventya\_kr@coventya.com

### MALAYSIA

COVENTYA Malaysia Sdn. Bhd  
No. 9, Jalan Padu  
Tampoi Industrial Estate  
80350 Johor Bahru, Johor, Malaysia  
Tel: +607 239 57 57 x222  
l.huang@coventya.com

### MEXICO

COVENTYA Mexico SA de CV  
Bolivar 752 – Col Alamos  
Deleg. Benito Juarez  
MX – 03 400, Mexico  
Tel : +52 55 5696 1412  
m.reyes@coventya.com

### POLAND

COVENTYA S.A.S. Poland  
ul. Mydlana 1 Pokój 105  
PL – 51-502 Wroclaw, Poland  
Tel: +48 71 34 50 043  
biuro@coventya.pl

### SINGAPORE

COVENTYA South East Asia Pte. Ltd.  
1 Science Park Road  
#01-07 The Capricorn  
Singapore Science Park II  
Singapore 117528  
Tel: +65 6908 4870  
coventya\_sg@coventya.com

### SPAIN

COVENTYA Technologies S.L.  
C/ Romani, 2  
P.I. Castellbisbal Sud  
E – 08755 Castellbisbal (BCN), Spain  
Tel : +34 937 723 770  
coventya\_esp@coventya.com

### SWEDEN

Ödegårdsgatan 3  
S – 504 64 Borås, Sweden  
Tel : +46 33 20 28 40  
order@coventya.com

### TURKEY

Politeknik Metal San ve Tic A.S.  
Tuzla Kimya Sanayicileri Organize San. Bolgesi  
Kristal Cad. No : 2  
Tuzla / Istanbul  
Turkey  
Tel: +90 0216 504 02 75 (pbx)  
f.korkunc@coventya.com

### USA

COVENTYA Inc.  
132 Clear Rd  
Oriskany, NY 13424, USA  
Tel: +1 315 768 6635  
coventya\_us@coventya.com

### USA

COVENTYA Inc.  
4639 Van Epps Road  
Brooklyn Heights, OH 44131, USA  
Tel : +1 216 351 1500  
coventya\_us@coventya.com