

Interlox®

Cr(VI)-free and Cr-free Passivates for Aluminum



Interlox®

Interlox® 338



- ▶ **Interlox® 338 produces a trivalent chromium conversion coating on both wrought and cast aluminum alloy surfaces.**
- ▶ **This coating is designed to be an effective corrosion resistant replacement for conventional hexavalent chromates.**
- ▶ **Benefits:**
 - Hexavalent chromium-free and phosphate-free formulation
 - Produces a clear, slightly iridescent film on aluminum alloys
 - Excellent corrosion resistance
(Can meet Mil DTL 5541 F requirements except on copper containing alloys)
 - Approved WMX In-house Trivalent Chromate Process (Wabtec PT-09801-050)
 - ELV, WEEE and RoHS compliant

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Interlox® 5705



- ▶ **Interlox® 5705 produces a Cr-free conversion coating on both wrought and cast aluminum alloys**
- ▶ **Designed to be an effective corrosion resistant chromate replacement for many aluminum alloys**
- ▶ **Benefits:**
 - Chromium-free aluminum passivation formulation
 - Excellent corrosion resistance
(Can be used meet Mil DTL 5541 F requirements except on copper containing alloys)
 - ELV, WEEE and RoHS compliant

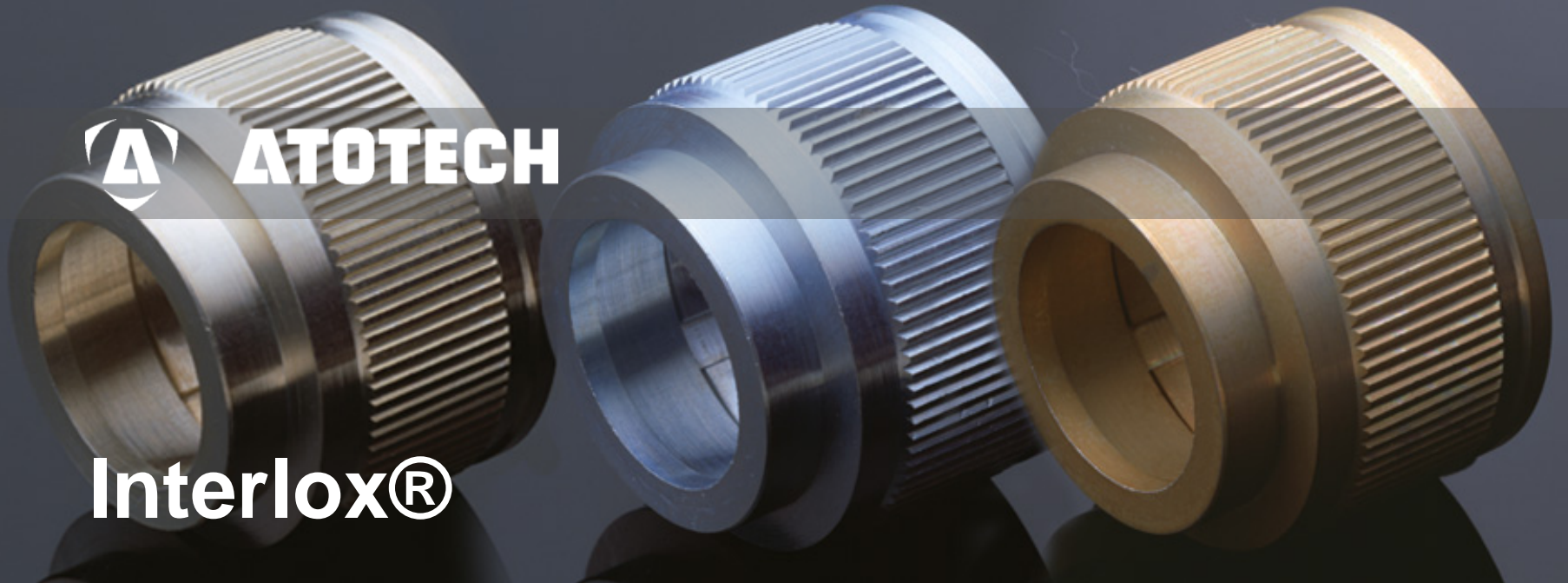


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Technology Comparisons



Characteristic	Interlox 338	Interlox 5705	Chromate Passivate Cr(VI) Process
Chromium type	Cr(III)	Cr-free	Cr(VI)
Substrate	Aluminum	Aluminum	Aluminum
Material	Liquid	Liquid	Liquid / Powder
Operating temp (°C)	23	50	25
Solution pH	3.0 - 3.5	4	1.5
Immersion time (mins)	3	4	2
Film color	Clear to iridescent	Clear, slightly iridescent	Strong yellow
Coating weight (mg/m ²)	200 - 300	75 - 150	400 – 1000
Electrical contact resistance	PASS	PASS	PASS
Application method	Spray/Immersion	Spray/Immersion	Spray/Immersion
ELV, RoHS, WEEE	Compliant	Compliant	Not Compliant



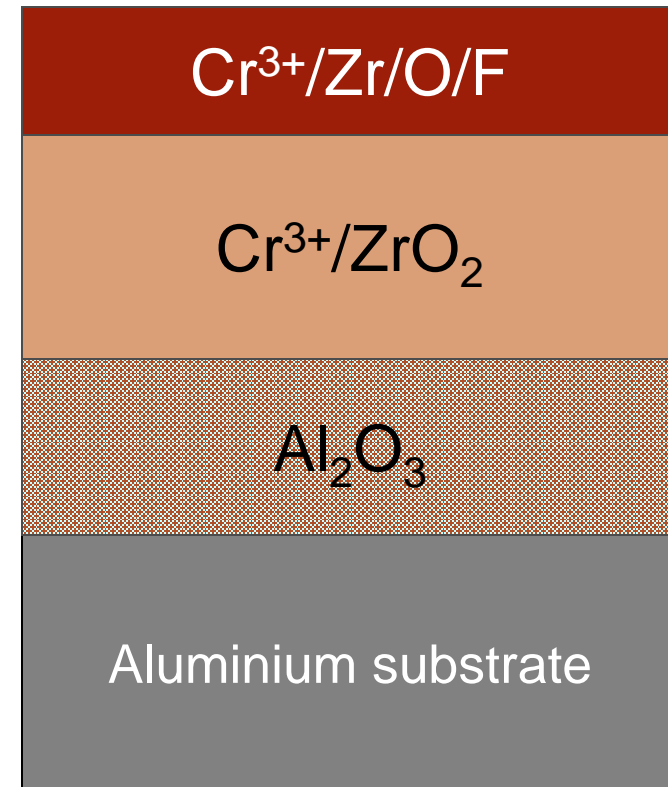
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Film Formation and Surface Analysis

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Trivalent Chromium

- ▶ Trivalent chromium coating composition and structure
- ▶ XPS depth profiling
 - **Outer mixed layer**
 - Trivalent, zirconium, oxygen & fluoride
 - **Intermediate layer**
 - Trivalent & zirconium oxide
 - **Separation layer**
 - Aluminum oxide
 - **Metallic base**
 - Aluminum substrate



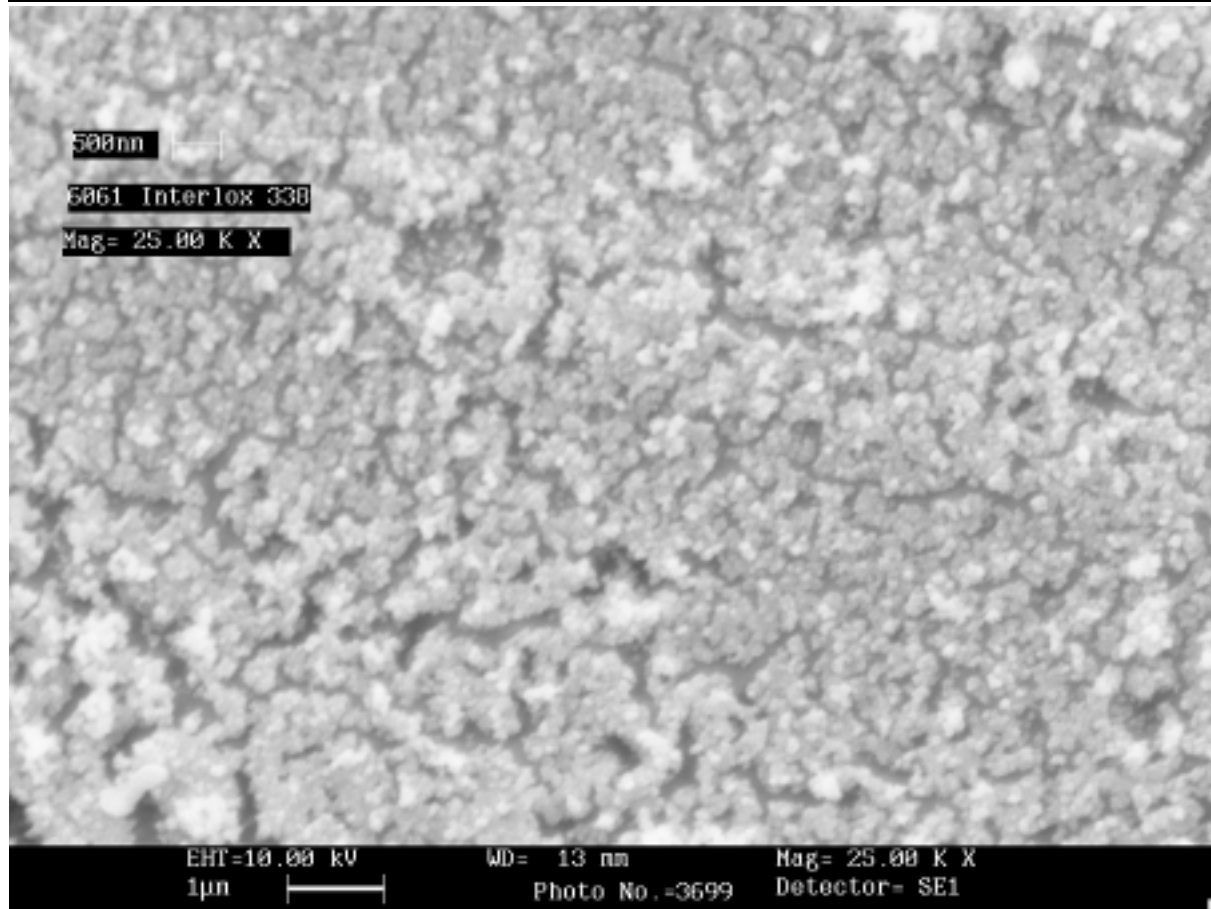
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Surface Analysis Interlox® 338

Aluminum

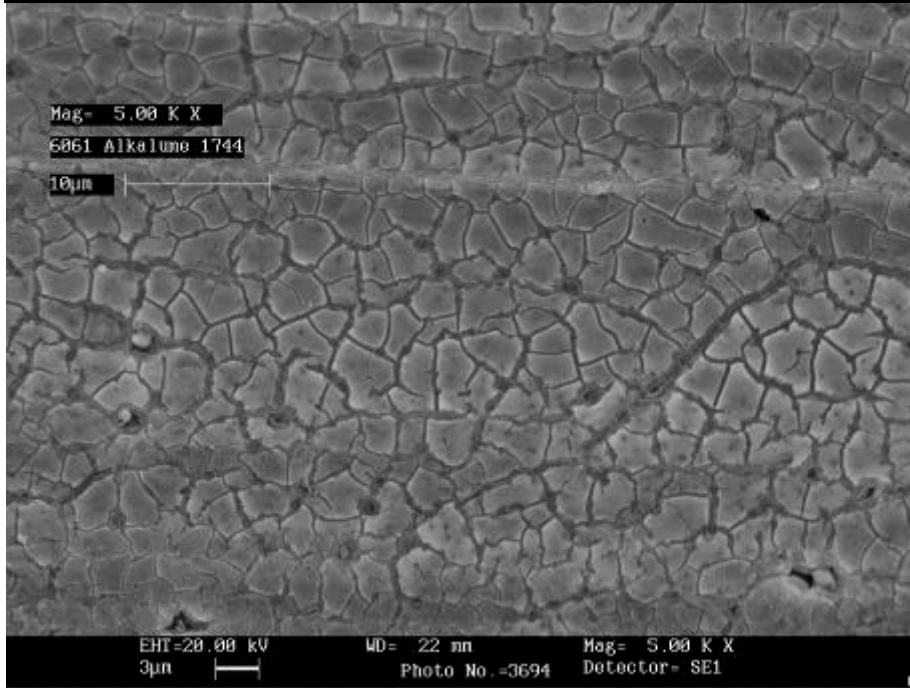


Interlox® 338 over Al 6061

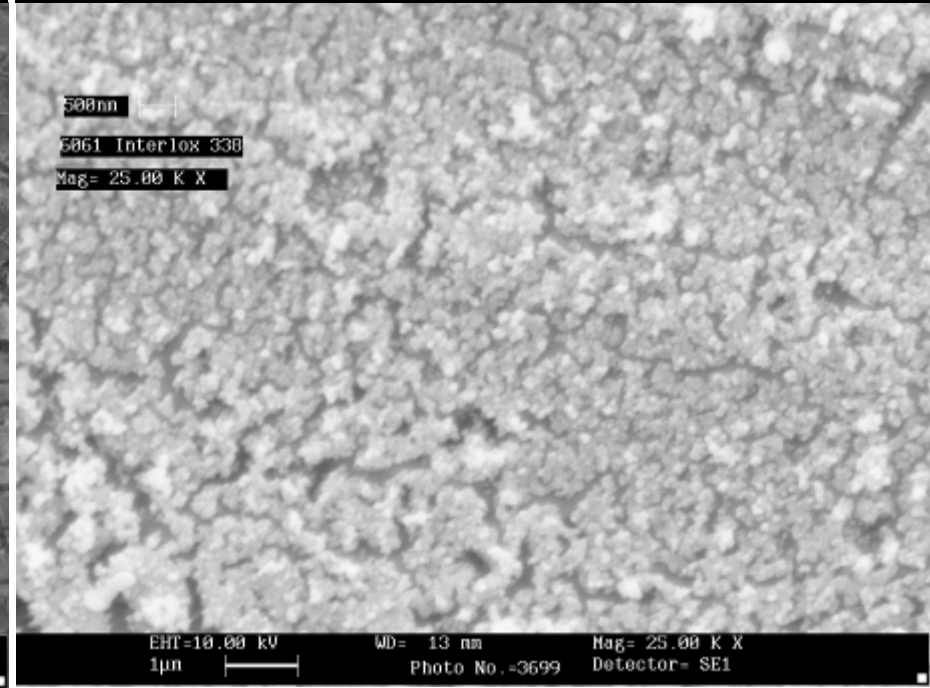


Interlox® Surface Analysis

Chromate Passivate over Al 6061



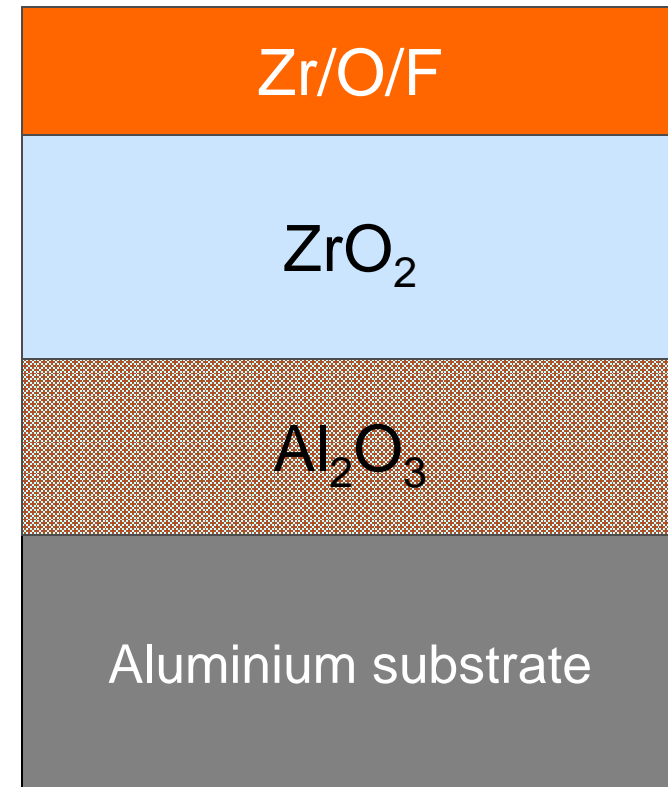
Interlox 338 over Al 6061



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Chromium-free

- ▶ Cr-free coating composition and structure
- ▶ XPS depth profiling
 - **Outer mixed layer**
 - Zirconium, oxygen & fluoride
 - **Intermediate layer**
 - Zirconium oxide
 - **Separation layer**
 - Aluminum oxide
 - **Metallic base**
 - Aluminum substrate



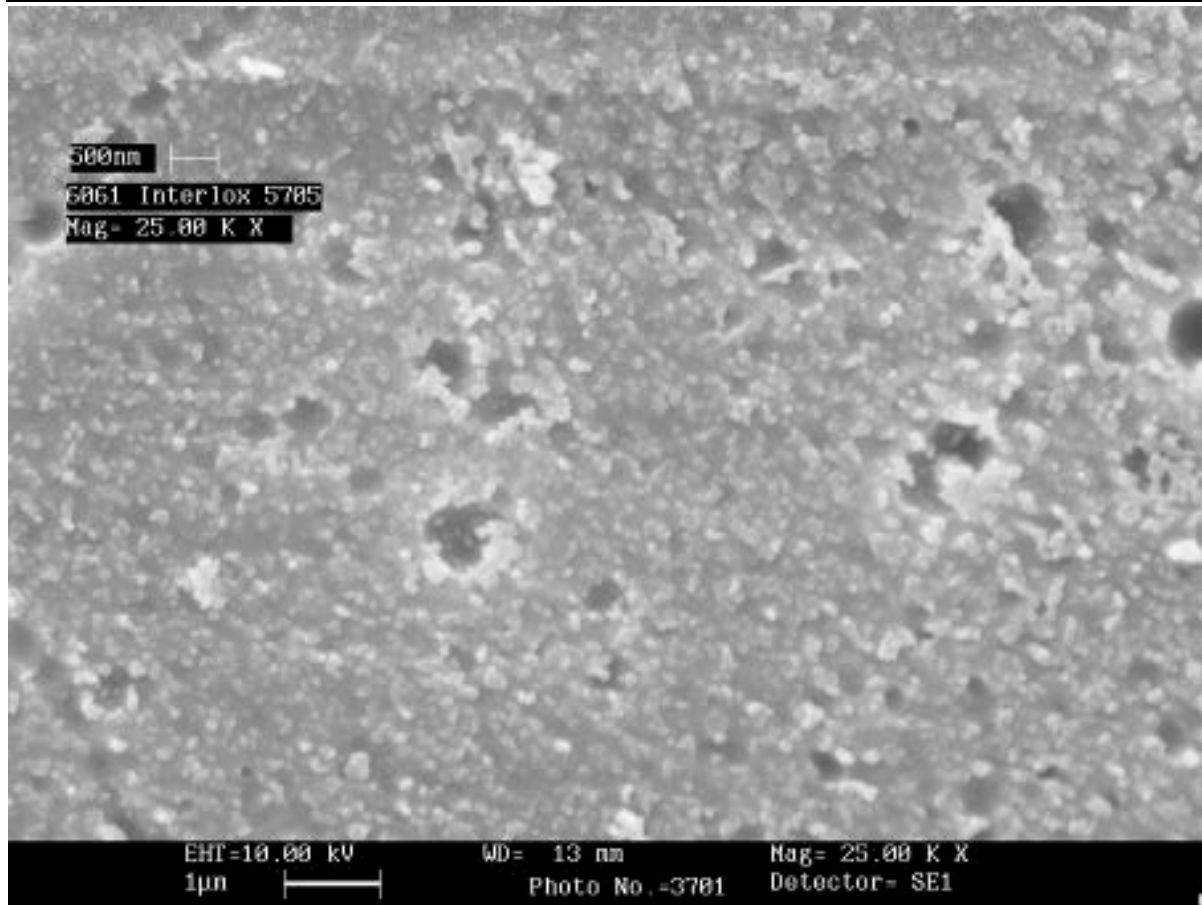
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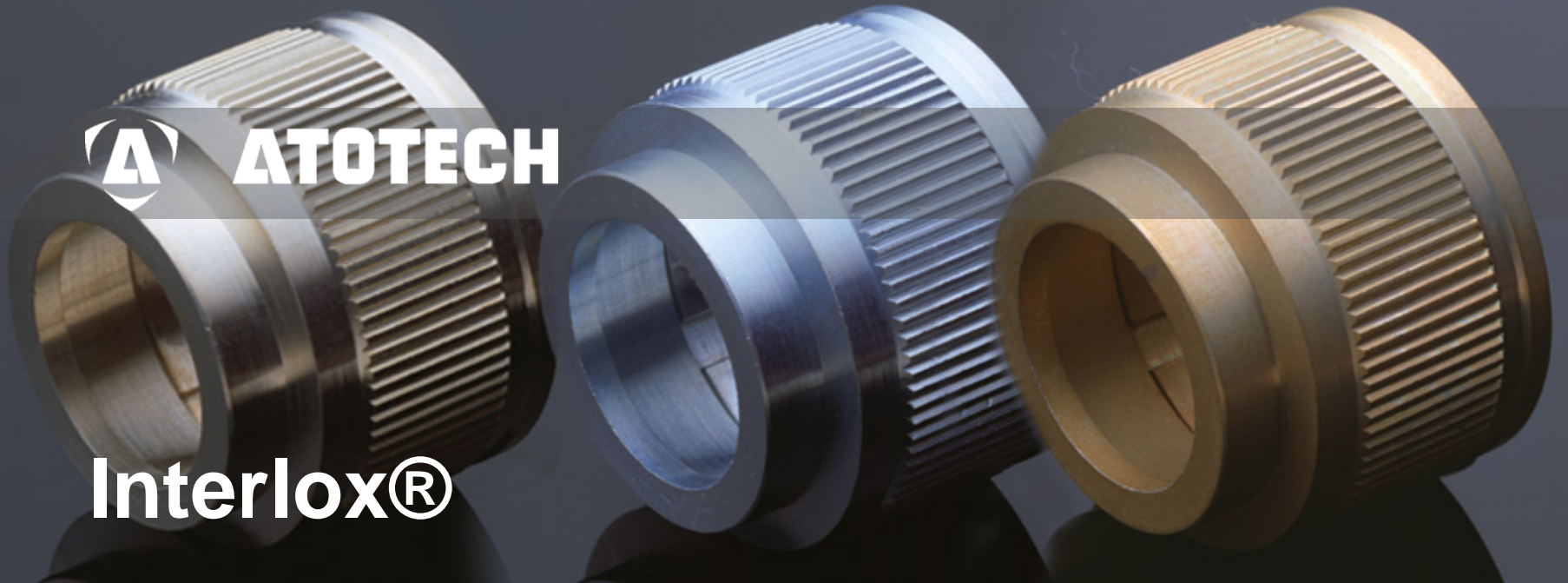
Surface Analysis Interlox® 5705

Aluminum



Interlox® 5705 over Al 6061





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Performance Experience

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Coating Appearance

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Interlox 5705



Chromate Passivate



* 6000 series Aluminum

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Electrical Contact Resistance



- ▶ **Analysis per Mil DTL 5541 F for Class 3 requirements**
 - Pass at < 775 micro-Ohms/cm²
 - Interlox products meet this requirement

Product	Aluminum Alloy		
	5052	6061	7075
No treatment	17.50	4.65	11.63
Interlox 338	89.90	93.00	313.10
Interlox 5705	48.05	30.32	72.08



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Corrosion Resistance 168hr

Interlox 338 on 5052 and 6061 Aluminum Alloys



Interlox 338

5052 Aluminum
168hr NSS
(no pits / spots)



Interlox 338

6061 Aluminum
168hr NSS
(no pits / spots)



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Corrosion Resistance 168hr Interlox 338 on 7020T6 Aluminum



After 0hr NSS



After 96hr NSS



After 168hr NSS



After 336hr NSS



Less than 0.5%
corrosion

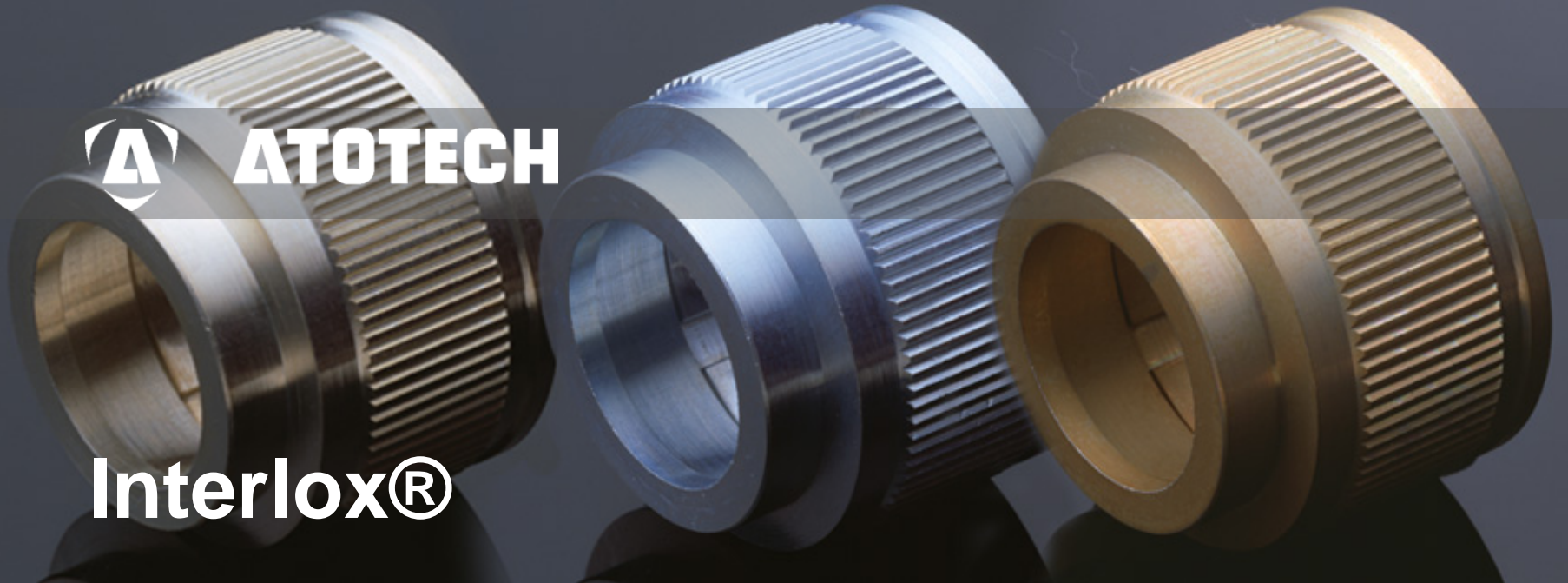
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Corrosion Resistance 168hr Interlox 5705 on 5052 Aluminum



Interlox 5705
5052 Aluminum
168hr NSS
(no pits/ spots)





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**Thank You for Your
Attention**