

# AeroCres® Fracture-tough Airframe Products

## Fracture-tough airframe products enhance corrosion resistance

For many years, corrosion has been a significant problem with bearings used in the aircraft industry. While CRES 440C has been used successfully in many aircraft applications, it is not suitable for the demands of rod end banjos or track roller studs. These two bearing components require a full Rc 58 hardness in the raceway area and a softer, tougher material elsewhere. This is not attainable with CRES 440C. RBC's AeroCres® products provide the unique solution that meets these dual material requirements.

We have selected a specialized carburized stainless steel, and have developed and optimized the heat treatment process that resulted in a homogeneous microstructure — delivering both corrosion protection and core fracture toughness.

Currently, this new material is being used for many structural bearing components such as rod end banjos, track roller studs, and outer rings. Fracture toughness, corrosion resistance, and long fatigue life are critical requirements for these components.



*AeroCres® fracture-tough airframe products offer enhanced corrosion resistance in harsh operating environments.*

AIRFRAME CONTROL NEEDLE ROLLER BEARINGS

### Benefits

- Excellent fracture toughness superior to CRES 440C.
- Proven corrosion resistance similar to CRES 440C.
- Compressive residual stresses in carburized case.
- Lower starting torque after extended exposure to a neutral salt solution (ASTM-G44).

- Meets or exceeds government requirements for fatigue and static testing per AS 39901.
- Longer bearing life resisting premature corrosion.

### Applications

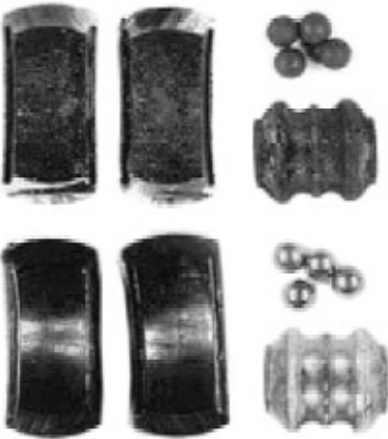
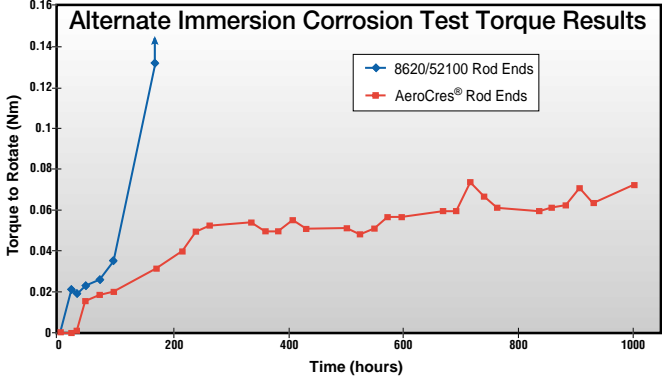

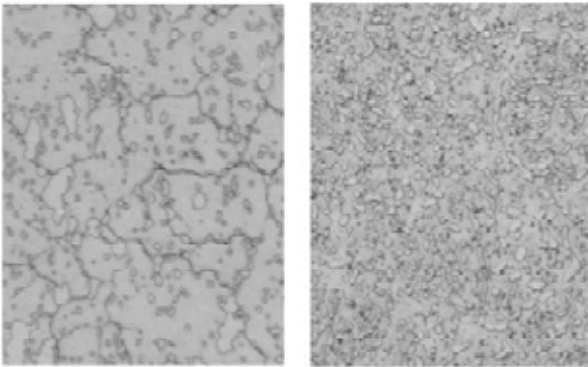
Bearings located in exposed corrosive positions of aircraft such as:

- Landing gear and doors
- Leading and trailing edges
- Engine controls
- Tail sections

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**Corrosion Resistance Comparison**

**AeroCres® Rod End vs. 8620/52100 Rod End**

	<p><b>Alternate Immersion Corrosion Test ASTM G44-88 Results* (1,000 hours)</b></p> <p><b>Standard Assembly:</b> 8620 rod end outers with 52100 steel inner ring and balls</p> <p><b>Corrosion Resistant CRES Assembly:</b> AeroCres® rod end outer with CRES 440C inner ring and balls</p>	 <table border="1"> <caption>Approximate data from Fig. 6</caption> <thead> <tr> <th>Time (hours)</th> <th>8620/52100 Rod Ends (Nm)</th> <th>AeroCres® Rod Ends (Nm)</th> </tr> </thead> <tbody> <tr><td>0</td><td>0.00</td><td>0.00</td></tr> <tr><td>50</td><td>0.02</td><td>0.01</td></tr> <tr><td>100</td><td>0.03</td><td>0.02</td></tr> <tr><td>150</td><td>0.04</td><td>0.02</td></tr> <tr><td>200</td><td>0.13</td><td>0.03</td></tr> <tr><td>250</td><td>-</td><td>0.05</td></tr> <tr><td>300</td><td>-</td><td>0.05</td></tr> <tr><td>350</td><td>-</td><td>0.05</td></tr> <tr><td>400</td><td>-</td><td>0.05</td></tr> <tr><td>450</td><td>-</td><td>0.05</td></tr> <tr><td>500</td><td>-</td><td>0.05</td></tr> <tr><td>550</td><td>-</td><td>0.05</td></tr> <tr><td>600</td><td>-</td><td>0.05</td></tr> <tr><td>650</td><td>-</td><td>0.05</td></tr> <tr><td>700</td><td>-</td><td>0.07</td></tr> <tr><td>750</td><td>-</td><td>0.06</td></tr> <tr><td>800</td><td>-</td><td>0.06</td></tr> <tr><td>850</td><td>-</td><td>0.06</td></tr> <tr><td>900</td><td>-</td><td>0.07</td></tr> <tr><td>950</td><td>-</td><td>0.06</td></tr> <tr><td>1000</td><td>-</td><td>0.07</td></tr> </tbody> </table>	Time (hours)	8620/52100 Rod Ends (Nm)	AeroCres® Rod Ends (Nm)	0	0.00	0.00	50	0.02	0.01	100	0.03	0.02	150	0.04	0.02	200	0.13	0.03	250	-	0.05	300	-	0.05	350	-	0.05	400	-	0.05	450	-	0.05	500	-	0.05	550	-	0.05	600	-	0.05	650	-	0.05	700	-	0.07	750	-	0.06	800	-	0.06	850	-	0.06	900	-	0.07	950	-	0.06	1000	-	0.07
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 <p>Plated 8620 Rod End Outer with 52100 Steel Inner Ring and Balls</p> <p>Plated AeroCres® Rod End Outer with CRES 440C Inner Ring and Balls</p>		 <p><b>CRES 440C</b></p> <p><b>AeroCres® fracture-tough material</b></p>																																																																		

**AIRFRAME CONTROL NEEDLE ROLLER BEARINGS**

**Approvals**

- BACB10GS
- BACB10GY
- BACB10GZ

**Engineering Support**

- Application consultation
- Product design
- Product testing
- Metallurgical analysis
- Heat treating, stainless, and other high-alloy steels

**Ordering Information**

- Contact RBC Customer Service