

Advanced Materials for Automotive Applications



CARPENTER



WHEN PERFORMANCE MATTERS, COUNT ON CARPENTER.

**INNOVATION, QUALITY AND
CAPABILITY: THE CARPENTER
LEGACY AND COMMITMENT.**

As long as there have been automobiles, from Main Street to Gasoline Alley, Carpenter has been at the forefront of materials innovation and quality.

We are fully committed to the automotive industry and globally recognized as a certified supplier to many leading manufacturers. Our metallurgists, research scientists and engineers work in close partnership with the industry's best and brightest to continually define and redefine the leading edge of automotive technology.

As a result, Carpenter alloys and engineered materials are renowned for their premium quality, their reliability and their extraordinary value in a wide variety of automotive applications. In fact, you are likely to find Carpenter

materials wherever demanding requirements exist.

Have a new or particularly challenging application? We can assist you in evaluating material properties, providing up-to-date information on existing alloys and engineered materials and developing new products to meet design challenges and market needs. We also provide immediate access to in-depth technical information, including data sheets for hundreds of specialty alloys, directly from our web site. To access this comprehensive database, go to www.carttech.com and select *Tech Center*.

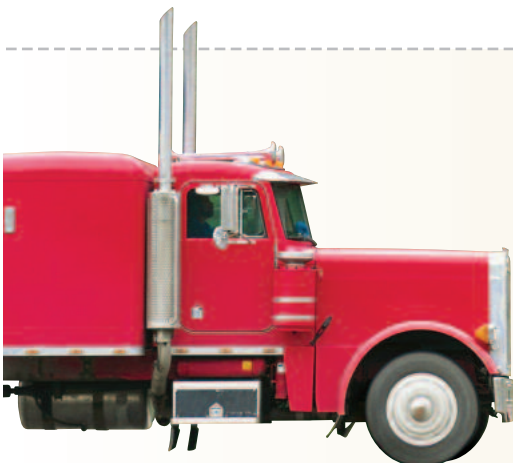
**TOTAL COMMITMENT MEANS
INNOVATION IN MANUFACTURING,
DELIVERY AND CUSTOMER SERVICE.**

To meet the demanding requirements of automotive applications, Carpenter combines a highly skilled workforce

with modern equipment. Exacting processes support the relentless drive toward product quality and variation reduction. What's more, Carpenter quality systems are approved to ISO 9001:2008 and AS9100 standards. The result: high-quality materials consistently produced to your specifications, lot after lot.

At Carpenter, we're committed to on-time delivery and personal, responsive service is a hallmark of all our professional support teams.

We have strategically located warehouses and operations centers throughout the world and an integrated communications system that links our worldwide offices to each other and to our mills. With these resources, our skilled and responsive sales and service professionals can quickly and accurately track order status, inventory and other essential delivery data.



Carpenter Technology Corporation (NYSE:CRS) produces specialty cast-wrought and powder metallurgy alloys and titanium alloys for the automotive industry.

Titanium bar and wire products from Dynamet Inc., a Carpenter subsidiary, can be found in wrist pins, retainers, valves and fasteners in high-performance and luxury cars. Carpenter Powder Products supplies powder metallurgy and cast wrought tool steel products for automotive tooling needs and uses a proprietary process to make customized or composite alloy tooling.

Whatever your application, count on Carpenter to leverage our deep technical expertise and extensive materials experience to deliver high-quality engineered materials.



Carpenter manufactures hundreds of specialty alloys in bar, wire, loose powder, fine wire, special shapes, strip and billet forms.

HIGH-PERFORMANCE MATERIALS FOR DEMANDING APPLICATIONS.

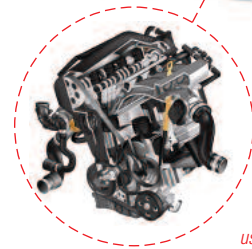
In the automotive business, Today's design and engineering breakthroughs are tomorrow's benchmarks and standard equipment. As a result, automakers and sub-assembly manufacturers have to expect the most from their materials suppliers. That's why so many leaders in the automotive industry specify Carpenter specialty alloys and engineered materials.

Carpenter is recognized globally for its combination of industry-leading

product offering, knowledgeable technical support and responsive, on-time delivery.

Whether the application is a safety-related sub-assembly or a high-performance engine and fuel management system for racing use—you can count on Carpenter to deliver high-quality products backed by extensive materials knowledge and technical capability. And as the state-of-the-art continues to advance, we'll provide the innovative next-generation alloys for tomorrow's breakthroughs as well.

That's Carpenter. Engineered materials for a changing world.



Explore Carpenter's interactive illustration at [www.cartech.com](http://www.carttech.com) to find out where our specialty alloys have been used in automotive applications.



MORE THAN A CENTURY OF AUTOMOTIVE INDUSTRY AND TECHNOLOGY LEADERSHIP.

For over a century, automotive pioneers, designers and manufacturers have relied on specialty alloys and engineered materials from Carpenter. As the industry grew, so did our reputation as a reliable supplier of specialty alloys for critical automotive applications. Today, Carpenter is recognized as a leading materials supplier to the automotive industry—one committed to excellence in manufacturing, dedicated to customer service and innovative enough to support the pioneering ideas still on the drawing board.



CARPENTER manufactures hundreds of specialty alloys in bar, wire, loose powder, fine wire, special shapes, strip and billet forms. Below is a listing of just some of Carpenter's alloys that have been used in automotive applications.

Stainless Steels

- 20Cb-3[®] stainless
- Custom 450[®] stainless
- Custom 455[®] stainless
- Custom 465[®] stainless
- No. 5-F
- Project 70+[®] stainless Type 303
- Project 70+ stainless Type 304
- Project 70+ stainless Type 416
- Type 302HQ

- Type 303
- Type 303 Se
- Type 304
- Type 305
- Type 316
- Type 410
- Type 416
- Type 420
- Type 431
- Type 440C
- Carpenter 2205 Duplex

Magnetic Alloys

- Electrical Irons
- Silicon Core Iron B and B-FM (free-machining)

Chromium-Iron Magnetic Stainless Steels

- Type 430F Solenoid Quality
- Type 430FR Solenoid Quality

Chrome Core[®] Alloys

- Chrome Core 8
- Chrome Core 12-FM
- Chrome Core 13-FM
- Chrome Core 13-XP
- Chrome Core 18-FM

High Temperature Alloys

- Carpenter 286-LNi
- NCF 3015*
- Pyromet[®] Alloy 31V

- Pyromet Alloy 80A
- Pyromet Alloy 718
- Pyromet Alloy 751
- Pyromet Alloy A-286
- Waspaloy

Ultra-High Strength Alloys

- AerMet[®] 100 Alloy
- AerMet 310
- MP35N**
- NiMark[®] Alloy 300

Titanium Alloys

- Ti 6Al-4V
- Ti 6Al-2Sn-4Zr-2Mo
- Ti 3Al-8V-6Cr-4Zr-4Mo

**Manufactured and sold under license agreement with Hitachi.
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CARPENTER'S SPECIALTY ALLOYS MAY BE CONSIDERED FOR A WIDE VARIETY OF HIGH PERFORMANCE AUTOMOTIVE APPLICATIONS.

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| <ul style="list-style-type: none"> ▶ Fuel injectors ▶ Turbochargers ▶ Piston rings and separators ▶ Transmission components ▶ Intake/exhaust valves ▶ Catalytic converter hardware ▶ EGR components and oxygen sensor parts ▶ Air-bag inflator components ▶ Anti-lock braking solenoids | <ul style="list-style-type: none"> ▶ Brake hose couplings ▶ Gears ▶ Headlight body screws ▶ Mirror cables ▶ Speedometer meter pins ▶ Decorative nuts ▶ Power window components ▶ Cruise control ▶ Magnetic circuit cores and relays | <ul style="list-style-type: none"> ▶ Armatures ▶ Fuel pump motor laminations ▶ ABS and ride control solenoids ▶ Manifold and turbocharger bolts ▶ Blades and vanes ▶ Performance and racing components ▶ Shafts and springs |
|--|--|--|



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