

New Tubing Benefits Small Manufacturers

Custom Frame Builders Seek Alternatives to Titanium

BY MATT WIEBE

SAN DIEGO, CA—Is it insider trading when a father co-invents a steel alloy that could be used in a frame for his nationally-ranked daughter's new bike?

Maybe. But Kirstin Hemphill, a competitive junior, is still waiting for a frame-set to be made from AerMet® 100 alloy, a steel her father helped develop.

Carpenter Technology Corporation is betting that its alloy tubing will revive the use of steel by small, high-end frame builders. Like Boralyn, AerMet 100 alloy is another high tech spin-off from the defense industry.

"AerMet 100 alloy tubing has the strength-to-weight ratio of 6/4 titanium, which is being used by many builders, and it's stronger than 3/2.5 titanium," said Ray Hemphill, tool and alloy research and development supervisor for Carpenter Technology, a Fortune 500 company.

"Our tubing is less expensive than titanium, but you can work with it like you would any type of steel," Hemphill said. Titanium tubes cost approximately \$25 per foot. AerMet 100 alloy pricing, however, will be sensitive to quantity purchases.

Small shops, unable to invest in high-cost equipment to produce titanium frames, are watching from the sidelines as sales continue to climb for custom-made titanium frames.

"Our steel frame production has really tapered off over the last few years. These new AerMet 100 alloy tubes could really revive our steel frame business," said Jeff Duser, a frame builder for Spectrum Cycles.

Spectrum, owned by Tom Kellogg, is a high-end, custom frame manufacturer, but its titanium frame designs are built by Merlin.

"Using these AerMet 100 alloy tubes in the main triangle reduces frame weight by 3/4 of a pound. Once we get an entire tube set, and with double butting, the weight savings should increase," Duser said.

Three frames using AerMet 100 alloy straight-gauge tubes in the main triangle have been built at Spectrum's shop in Breinigsville, Pennsylvania, said

Dick Nye, new products development manager for Carpenter's special products division.

Track rider Marty Nothstein will use one frame in a series of European six-day races this winter. And independent fatigue testing will be done by the University of California at its Davis campus.

Curve Cycling components, formerly Piranha Racing, also is making seat posts out of AerMet 100 alloy, said Henrik Nejezchleb, Curve's president. Curve's specially designed seat posts need the strength offered by the alloy.

Patented in 1992, the alloy is 13½ percent cobalt and 11 percent nickel. The raw steel is made by Carpenter at its Reading, Pennsylvania, mill and shipped to San Diego for processing into seamed tubing.

The division has made tubing since 1962, supplying zirconium to the nuclear industry and titanium and stain-

less steel for aerospace and medical applications.

Hemphill, and co-inventor Dave Wert, developed AerMet 100 alloy for the U.S. Navy, whose F/A-18 fighter planes were plagued with landing gear failures.

AerMet 100 alloy is available as straight gauge tubing for main triangles in 1, 1 1/8 and 1 1/4-inch diameters with a wall thickness of .020 inch or .5 millimeters. Tubing in 1 3/8-inch diameter with a wall thickness of .026 inch or .65 millimeters will be available for mountain bikes or tandems.

Smaller tubes for seat and chainstays, and double-buttet tube sets, are being tested. AerMet 100 alloy is easily welded and can be welded to 4130 chromoly if AerMet 100 alloy weldwire is used.

AerMet 100 alloy can be cut with tungsten carbide equipment and AerMet 100 alloy has twice the corrosion resistance of chromoly.

AerMet 100 alloy frames must be heat-treated after brazing or welding at 200° to 300° Fahrenheit for at least two hours. "Many paint boxes can attain this temperature and the frames can be left in the paint box over night," Hemphill said.

