



Brush Wellman Inc. Introduces Alloy 390™ for High Power Applications

CLEVELAND - September 22, 2003 -- With the recent launch of its proprietary Alloy 390™, Brush Wellman Inc. has broken through the performance barrier that has long required materials users to select between strength and conductivity.

Utilizing Lean Six Sigma methodology, Brush Wellman has made process breakthroughs that have enabled it to produce an alloy that has both high strength (nominal 140 ksi, 0.2% yield strength) and high conductivity (44% IACS minimum). Alloy 390™ combines the best attributes of two separate families of commercial copper beryllium alloys -- the strength of the "high strength" alloy C17200 with the conductivity of "high conductivity" alloys such as C17410 and C17510. In addition, Alloy 390™ has excellent stress relaxation resistance at elevated temperatures. The mill hardened alloy is available in strip form ranging from 0.002 to 0.010 inch thick.

Key Attributes	
Electrical Conductivity (Minimum % IACS)	44
Nominal Yield Strength (ksi)	140
Formability Transverse/Longitudinal (90° Bend)*	2.0/2.0
Fatigue Strength- 10 ⁸ Cycles, R = -1 (ksi)	48
Resilience Ratio (Yield Strength : Elastic Modulus)	7.37 x 10 ⁻³
Stress Relaxation at 150 C for 1000 hr (% S.R.), Initial stress = 75% of 0.2% Offset Yield Strength	83

*Formability for thickness in the range of 0.002" to 0.004"

Users of the new copper-nickel-beryllium alloy, including those in the computer burn in and test socket (BiTS) and production sockets as well as other high power consumer and communication equipment markets, are already seeing benefits. Richard J. Hipple, President, Brush Wellman Alloy Products, reported, "Alloy 390™ is providing a unique combination of properties that allows users to create small form factor electrical contacts in some extremely demanding applications."

"This has everything to do with removing hurdles for our customers," Hipple said, noting that with the push for further miniaturization, new generations of densely packaged, high-speed integrated circuit devices are increasing power requirements dramatically. This, in turn, drives the need for lower thermal resistance while maintaining the desired mechanical performance characteristics.

In the BiTS and production socket applications, Alloy 390™ is now being used to make electrical/mechanical contact springs (land grid array contacts) which provides the interconnection between the active device and the printed circuit board.

Jim L. Johnson, Asia Marketing and Technical Service Director for Brush Wellman added that the faster IC packages require less distance or "pitch" between contacts. As a result, new materials performance challenges are presented.

"Alloy 390™ allows for the large deflection range required by these high pin count devices, and by way of superior electrical and thermal conductivity, eliminates the resistive heating problems that hindered the effectiveness of other alloy solutions," he explained.

Johnson continued, "Device packages need to be tested to sort out those that are defective prior to further production. These tests require repeated actuation (package insertions and removals) over an extended period of time at elevated temperatures. The excellent low cycle fatigue strength of Alloy 390™ increases the durability of the sockets which reduces the cost to perform this non-value added testing."

The new Brush Wellman alloy is well suited for any application where power management and or harsh operating environments are of concern. The new alloy is gaining increasing interest from manufacturers of handheld communication devices for its promise of increasing battery life and reducing charging times due to its enhanced electrical conductivity.

Other potential applications for Alloy 390™ are automotive terminals, switches and relays; power connectors; SIM card contacts; and appliance switches, relays, sensors, and controls.

Brush Wellman Inc. is a wholly owned subsidiary of Brush Engineered Materials Inc. (NYSE: BW). Through its subsidiaries, Brush Engineered Materials supplies worldwide markets with beryllium products, alloy products, electronic products, precious metal products, and engineered material systems. Around the world, the company's engineered materials can be found in technically demanding end-use products with the telecommunications and computer, automotive electronics, industrial components, optical media, aerospace and defense, and appliance markets.

For further information, please visit our website, www.brushwellman.com or contact Don Moracz at 1-800-375-4205.