



MATERION



High Performance
Contact Springs in
Two-Piece Connectors

**BRUSH
PERFORMANCE
ALLOYS**



Connector designers frequently choose Brush Performance Alloys' high performance copper alloys for the spring contact beams in two-piece power connectors. These copper beryllium alloys provide both design flexibility and a cost effective solution to today's increased performance and reliability requirements. Harsh environments, severe service and demanding applications all drive the use of high performance alloys in contact springs.

Contact Springs in Two-Piece Connectors

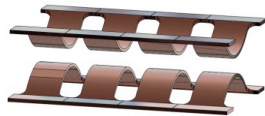
Two-Piece Design

Small, thin, high performance copper alloy springs allow the designer to tailor the contact force to achieve the desired performance. The spring beams can be designed for low insertion force while maintaining sufficient contact force to insure the mechanical integrity of the contact interface under a wide range of deflections.

The larger body of the connector terminal, that houses the contact spring, can be produced from more ductile, crimpable, commodity copper alloys for cost control. Round and flat blade pins in a range of sizes can be engineered in two-piece designs. The active elements of the spring insert can be an arch, torsion beam or a tapered cantilever beam. Examples are shown below. Plating of the spring at the contact interface can further improve connector performance and reliability.



High Performance Alloy, Supported Arch Insert for Round Pin Terminal



High Performance Alloy, Supported Arch Inserts for Flat Blade Terminal

Technological Driving Forces that Favor Two-Piece Designs

- Miniaturization
- Improved reliability
- Extended range – longer life, higher current rating, elevated temperature capability
- Design flexibility
- Wide range of pin tolerances
- Low contact resistance, low power loss
- Severe service conditions, harsh environments

End Use Markets Using Two-Piece Connectors to Enhance Performance

- Aerospace
- Automotive
- Construction, Heavy Equipment
- Energy, Oil & Gas
- Industrial
- Medical
- Photovoltaic

Two-Piece Design Advantages in Severe Environments

Two-piece designs can enhance performance in severe applications:

- At elevated temperatures
- At high current with low temperature rise
- In shock and vibration resistance
- When you need high contact force for miniaturized designs
- By providing high contact surface area and multiple contact points
- With resistance to permanent deformation for multiple insertions
- By allowing a wide range of force-deflection conditions to suit the design

Brush Performance Alloys' High Performance Copper Alloys Provide Your Designs With

- High yield strength and hardness
- Stability at elevated temperature
- Excellent resistance to thermal and mechanical fatigue
- High conductivity, ductility and elastic resilience
- Consistent properties and performance

What Brush Performance Alloys Provides for High Reliability Connector Design

- More choices of high performance copper alloy products
- Tight dimensional tolerances
- Certified properties on each order
- Design assistance
- Worldwide availability with technical support
- RoHS compliant products



Two Examples of the Many Alloy Choices Available From Brush Performance Alloys.

Brush Alloy		Yield Strength		Electrical Conductivity		Contact Force Remaining (150° C, 10,000 hrs)
		MPa	ksi	MS/m	% IACS	
Alloy 25	(C17200)	1300	190	14	24	80%
Brush 60®	(C17460)	825	120	30	50	85%

Alloy 25 is the highest strength copper alloy; it is often used in miniaturized designs. Brush 60® is used in larger power applications requiring both conductivity and strength.

BRUSH PERFORMANCE ALLOYS

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MATERION CORPORATION

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