



MATERION



**Automotive
Switches & Relays**

**BRUSH
PERFORMANCE
ALLOYS**

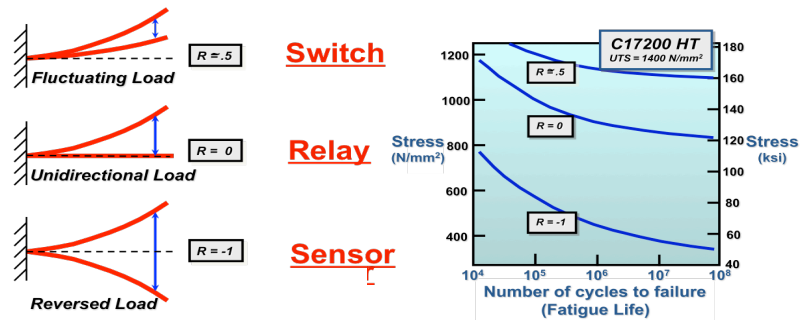


Materion Brush Performance Alloys' products provide a cost efficient solution for automotive applications requiring the highest reliability at material performance levels beyond the capability of other copper alloys.

Automotive Switches and Relays



Materion Brush Performance Alloys' copper alloys provide the longest life in cyclic loading applications, and they have the highest fatigue strength of any copper alloy.



Brush Performance Alloys' copper alloy conductivity can be up to 60% of pure copper.

Brush Alloy	Conductivity (%IACS)	Resistivity ($\mu\Omega \cdot \text{cm}$)	Tensile Strength (N/mm ²)	Fatigue Strength (N/mm ² , 10 ⁸ , R=-1)	Hardness (HV)
Brush 60	45-50	3.6	790-970	300	220-290
Alloy 174	45-60	3.1	650-900	340	180-280
Alloy 290	17-20	9.1	960-1200	400	285-430
Alloy 390	45-55	3.4	950-1090	270	280-340

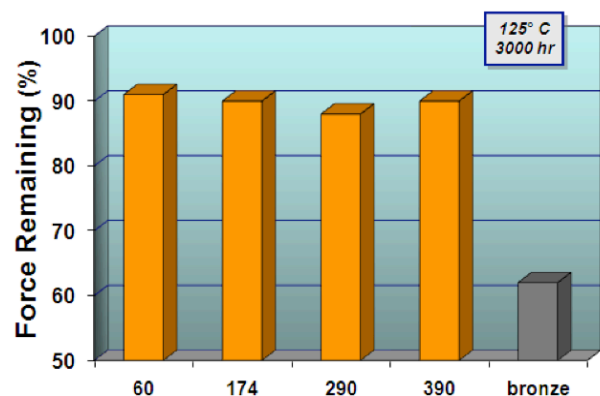
Design Requirements:

- Thousands to millions of activation cycles
- Consistent performance over ten+ year vehicle life
- Low temperature rise in power applications
- Allow for consistent performance in miniaturized designs

Contact Alloy Property to Meet Design Requirements:

- High fatigue strength
- High electrical conductivity
- Resistance to stress relaxation
- Resistance to permanent deformation
- Bend formability

Brush Performance Alloys' copper alloys provide stability by minimizing loss in contact force from stress relaxation at elevated temperature.



BRUSH PERFORMANCE ALLOYS

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MATERION CORPORATION

Materion (NYSE: MTRN) is a global advanced materials company dedicated to providing solutions that enable our customers' technologies and drive their growth. Our products include precious and non-precious specialty metals, precision optical filters, inorganic chemicals and powders, specialty coatings, specialty-engineered beryllium alloys, beryllium and beryllium composites, and engineered clad and plated metal systems. www.materion.com