



MATERION

PRODUCT BRIEF

NICKEL BERYLLIUM ALLOY 360 FOR BELLEVILLE WASHERS IN FIRE SPRINKLERS

AUTOMATIC SPRINKLER SYSTEMS HAVE TO WORK WHEN THEY'RE NEEDED—BUT AN ACCIDENTAL ACTIVATION CAN CAUSE DEVASTATING DAMAGE.

To prevent an unintentional fire sprinkler activation, the pressure retaining components used in the system must resist corrosion and stress relaxation for the lifetime of the sprinkler. In bulb-type sprinkler heads, the water pressure retention depends on a single dime-sized Belleville washer.

Because of the pressure put on this single component, in the U.S., Belleville washers used in fire sprinkler systems are required to be made from nickel beryllium because it offers an ideal solution to withstand the challenging conditions and ultimately prevent an accidental activation.

DESIGN REQUIREMENTS

Belleville washers must meet the following requirements to be used in fire sprinkler systems:

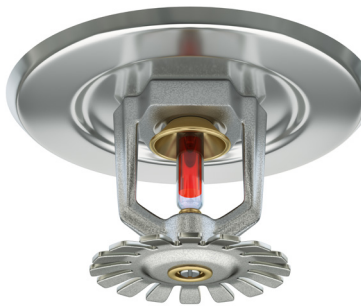
- Stress corrosion resistance in ammonia and magnesium/sodium chloride solutions
- Resistance to stress relaxation
- High strength in excess of 200,000 psi

AN IDEAL MATERIAL SOLUTION

Materion's nickel beryllium strip Alloy 360 is the ideal solution in sprinkler heads because it resists corrosion and meets the stress relaxation resistance requirements—retaining 95% of its initial stress after 1,000 hours at 600°F.

Alloy 360 also provides excellent formability and strength that can reach 300,000 psi after a simple one-step heat treatment.

With age hardening, Alloy 360 offers the following physical properties:



Elastic Modulus	Density	Thermal Conductivity	Coefficient of Thermal Expansion
28-30x10 ⁶ psi 195-210 GPa	0.299 lb/in ³ 8.27 g/cm ³	28 BTU/hr ft °F 48 W/m K	8.0 x 10 ⁻⁶ in/in °F 14.5 x 10 ⁻⁶ mm/mm °C