



Material Data Sheet

690

Cu	Ni	Fe	Al
81%	4%	4%	10.5%

Applications:

690 is used as a mold material in the glass container industry and other high temperature controlled heat transfer applications with severe wear conditions at elevated temperatures. Although slightly more susceptible to sulfur corrosion than 700XX, the ability to maintain consistent linear expansion during the heating and cooling cycles makes alloy 690 the perfect choice for glass container bottle moulds.

Corrosion Resistance:

690 has a time proven ability to resist corrosion in the glass making environment. When using 690, avoid using sulfur based swabbing compounds as release agents in either the blank or finish operation. Compounds used on the blank side will generally carry-over to the finish side. When swabbing compounds containing sulfur are used in repeated production cycles, the sulfur will attack the aluminum and an orange peel texture will develop on the casting surface. To increase mold life, use a non sulfur based swabbing compound.



Welding Instructions:

For repair of 690 castings, TIG welding is recommended. Suggested filler metal for TIG welding is Ampco - Trode 46. Gas should be 100% argon. Spray welding is also an acceptable procedure for repair of 690 castings. Use a Nickel based powder for filler metal in the spray welding procedure. Castings being repaired using one of the above mentioned methods is to be pre-heated to 500° F - 800° F, depending on process and casting size.

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690

Physical Properties:

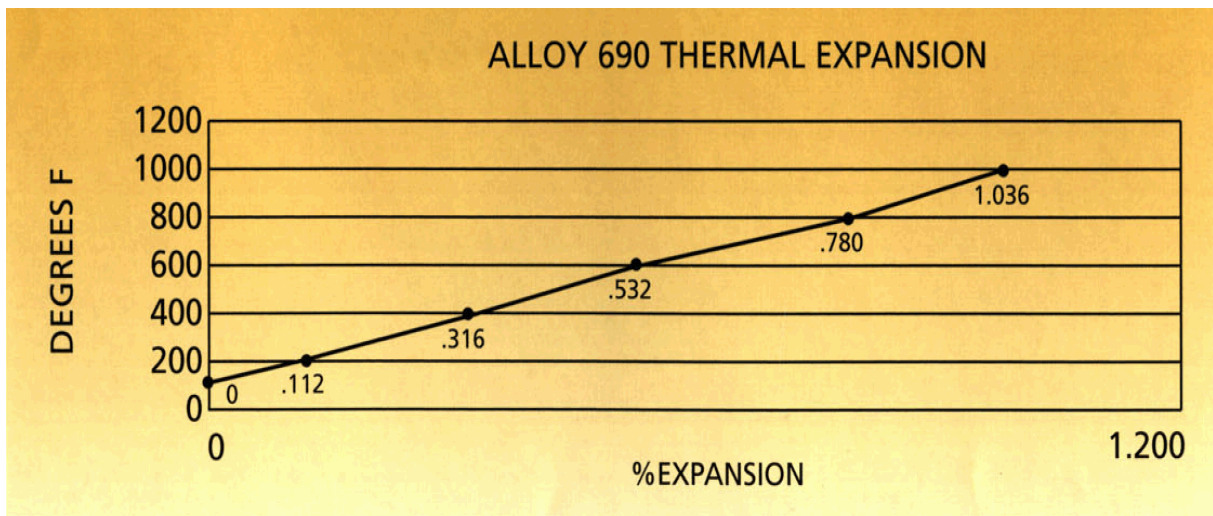
Density:	0.257 lbs/in ³ (7.124 grams/cm ³)
Tensile Strength:	96,000 psi typical at room temp.
Yield Strength:	47,000 psi typical at room temp. (0.5% Ext. under load)
Elongation:	5% (in 2 inches) typical at room temp.
Modulus of Elasticity:	Tension: 16,000 ksi typical
Melting Temperature:	1900° F
Specific Gravity:	7.53
Machinability Rating:	50 (Free Cutting Brass = 100)
Typical Hardness:	Brinell Hardness @ 3000 Kg load = 190 - 220

Elevated Thermal Properties:

Temperature Degrees F	Thermal Diffusivity cm ² /Sec	Density g/cm ³	Specific Heat cal/g-°C	Thermal Conductivity	
				W/m-K	Btu-ft/hr-ft ² -Degree F
600	0.1529	7.124	0.117	53.3478	30.82
800	0.1325	7.124	0.122	48.2057	27.85
1000	0.1237	7.124	0.126	46.4797	26.86

Test conducted in accordance with ASTM E-1461.

Thermal Expansion:



Test conducted in accordance with test Specification ASTM E-228. Sample size of 0.25 inches in diameter by 2.00 inches long.