

CarTech® Glass Sealing 42

Identification

UNS Number

• K94100

Type Analysis

Single figures are nominal except where noted.

Carbon (Maximum)	0.05 %	Manganese	0.40 %
Silicon	0.20 %	Nickel	41.00 %
Iron	Balance		

General Information

Description

CarTech Glass Sealing 42 is a 41% nickel-iron controlled expansion alloy which has been used in a wide variety of glass-to-metal sealing applications.

While the expansion properties of this alloy most closely match 1075 glass, it has also been used in seals for the 0120 and 0010 glasses. It may also be used with hard glasses if a thin edged tubular seal is used.

For seals that are not hydrogen annealed prior to sealing, a variation of this alloy containing small additions of titanium, CarTech Glass Sealing 42 Gas-Free, has been used to promote gas-free sealing characteristics.

Applications

CarTech Glass Sealing 42 has been used for the glass-to-metal seals in electronic tubes, automotive and industrial lamps, transformer and capacitor bushings and other glass-to-metal and ceramic-to-metal applications.

Corrosion Resistance

Important Note: The following 4-level rating scale is intended for comparative purposes only. Corrosion testing is recommended; factors which affect corrosion resistance include temperature, concentration, pH, impurities, aeration, velocity, crevices, deposits, metallurgical condition, stress, surface finish and dissimilar metal contact.

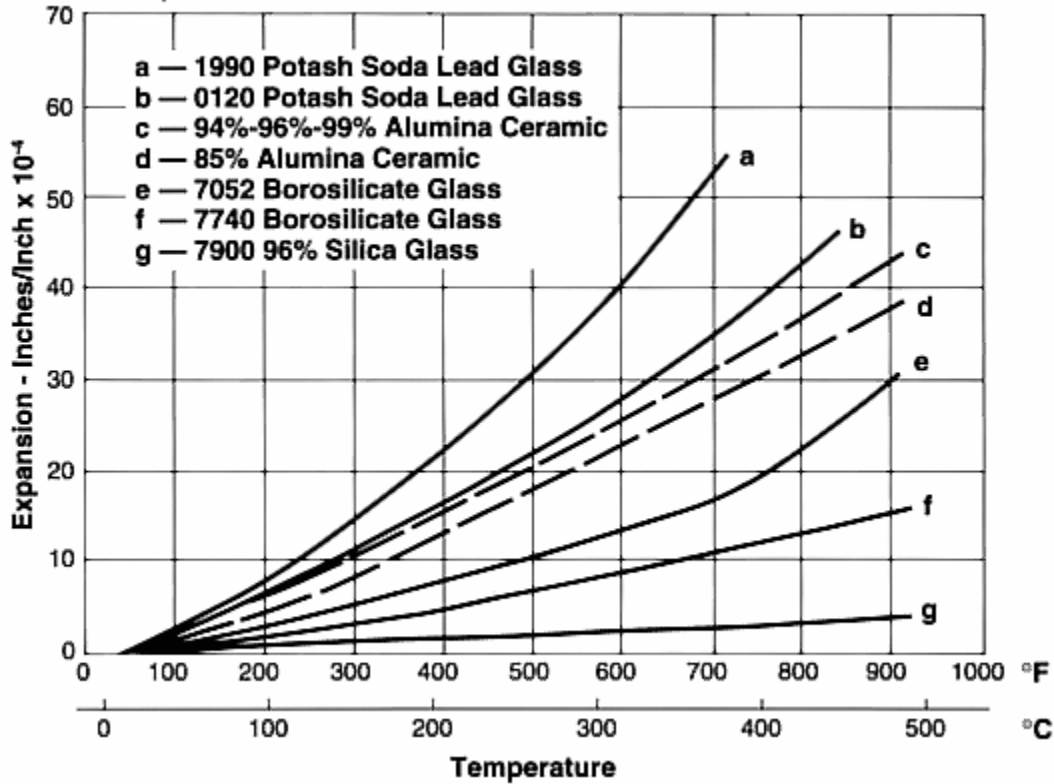
Humidity	Good
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Properties

Physical Properties

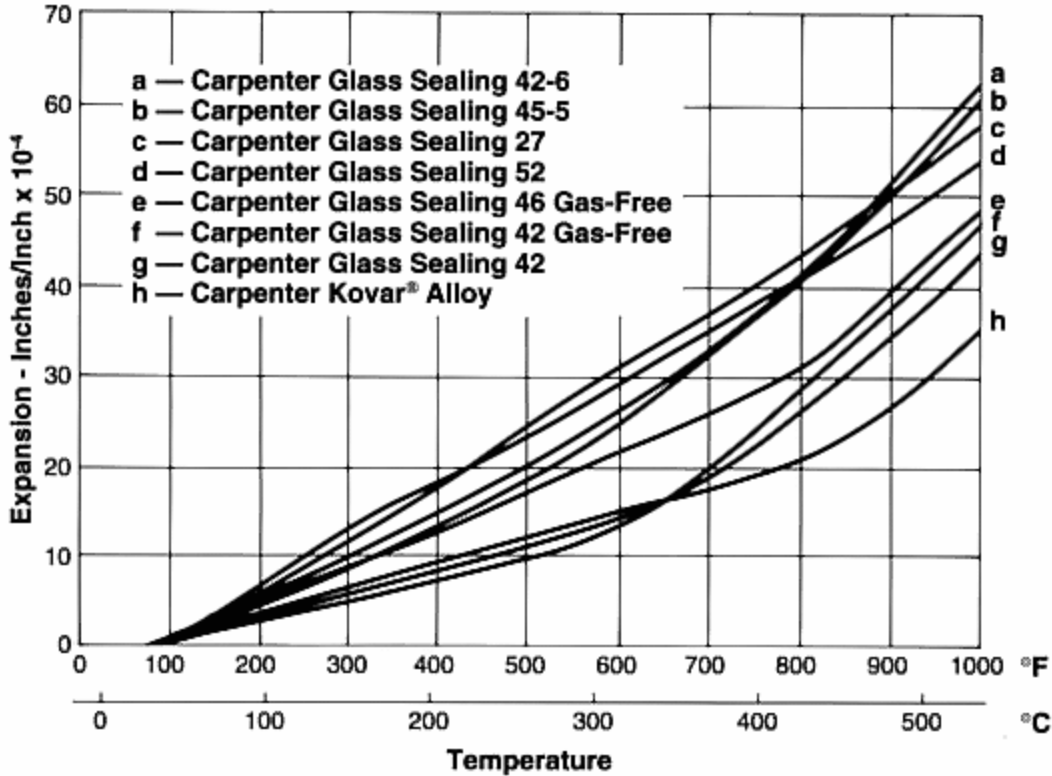
Specific Gravity	8.12
Density	0.2930 lb/in ³
Mean Specific Heat	0.1200 Btu/lb/°F
Mean CTE (70 to 650°F)	3.00 x 10 ⁻⁶ in/in/°F
Thermal Conductivity (68 to 212°F)	74.50 BTU-in/hr/ft ² /°F
Modulus of Elasticity (E)	21.5 x 10 ³ ksi
Electrical Resistivity (70°F)	400.0 ohm-cir-mil/ft
Temperature Coeff of Electrical Resist (70 to 212°F)	5.56 x 10 ⁻⁴ Ohm/Ohm/°F
Inflection Temperature	650 °F
Curie Temperature	715 °F
Melting Range	2600 °F

Thermal Expansion Curves - Common Glasses and Ceramics



Thermal Expansion Curves - Various Glass Sealing Alloys

Materials in the annealed condition.



CarTech® Glass Sealing 42

Typical Mechanical Properties

Typical Mechanical Properties - Carpenter Glass Sealing 42 Material in the annealed condition.

Tensile Strength		Yield Strength		% Elongation in 2"	Hardness Rockwell B
ksi	MPa	ksi	MPa		
75	517	40	276	30	76

Heat Treatment

Annealing

Heat to 1450°F (788°C) and hold at heat for at least one-half hour per inch of thickness, air cool.

Workability

Forging

The forging temperature should be 2150/2200°F (1177/1204°C). Avoid prolonged soaking to prevent sulfur absorption from the furnace atmosphere.

Cold Heading

Glass Sealing 42 may be swaged or cold upset.

Blanking and Forming

For clean blanking of Glass Sealing 42, a Rockwell hardness of about B 90 is suggested. Where any sharp bends are involved in forming finished parts from strip or rods, a hardness of not over Rockwell B 93 is suitable.

Grinding and Polishing

A silicon carbide wheel is desirable, preferably a soft wheel which will wear without loading. For finish grinding, a satisfactory grade to start with is No. 80 grit.

Weldability

Any of the conventional welding methods can be used. When filler rod is required, Glass Sealing 42 is suggested.

Brazing

Copper and zinc-free brazing alloys are suggested.

Plating

Glass Sealing 42 can be electroplated or zinc coated by the usual methods for ferrous alloys.

Other Information

Applicable Specifications

Glass Sealing 42 is manufactured to ASTM F30-77 and fully conforms to the requirements of this specification.

- ASTM F30

Forms Manufactured

- Bar-Rounds
- Strip
- Billet
- Wire

Technical Articles

- [After 100 Years, the Uses for Invar Continue to Multiply](#)

Disclaimer:

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