

Ceramawire
High Temperature
Magnet Wire
Technical Specifications

BASIC DESCRIPTION

CERAMAWIRE HT Wire is a high temperature magnet wire insulated with a fully cured 1400° - 1500° F) vitreous enamel film* that is firmly bonded to the wire conductor and that assumes the same flexibility and temperature coefficient as the base wire. It is suitable for coil winding and lead wire applications in aerospace, nuclear, steam, chemical and other high temperature applications.

TEMPERATURE RANGE

-450° F to +1000° F continuous operation; up to 1500° F for short periods of time.

NOTE: HT Wire has been successfully used in applications on a continuous basis above 1000° F. Please consult with the Sales Department if your application includes temperatures above 1000° F.

CONDUCTOR TYPES

- 27% Nickel Clad Copper (Kulgrid 28)
- All Nickel (Nickel 205)

SIZES AVAILABLE

- Kulgrid: 18 - 38 AWG
- All Nickel: 24 - 41 AWG
- Other sizes by special request.

FLEXIBILITY AND ADHERENCE

Coating is warranted to not crack when wound on a form 7X diameter of wire.

NOTE: Wire typically passes a 5X mandrel test and is inspected at time of manufacture by a twist test performed by wrapping the wire tightly around itself to insure adhesion and lack of cracking. Wire is also snap and scratch tested to insure adhesion.

COATING THICKNESS

.0003" - .0006" (increase in diameter), depending on size.

NOTE: Thicker coatings are possible to meet special needs, although the greater the coating thickness, the more prone the coating is to "powdering".

DIELECTRIC RATING

150 volts D.C. for wire diameters up to .008" (#32 wire);
200 volts D.C. for larger diameter wires.

THERMAL SHOCK

No appreciable degradation from cryogenic to ambient and/or high temperature to ambient cycling.

TENSILE STRENGTH

Same as base wire.

ELECTRICAL RESISTANCE

Electrical resistance of Kulgrid HT Wire is 26.9 ohms/circ mil ft at 500 O F and 42.3 ohms at 1000° F. All Nickel HT Wire has an electrical resistance of 138 ohms/circ mil ft at 500°F and 228 ohms at 1000°F. Initial resistance of Kulgrid HT Wire is slightly higher than copper but will become less than copper after a period of operation at higher temperatures.

POROSITY

Coating is porous and will absorb moisture if left exposed to the atmosphere. Wire can be baked out at 125°C for 12 hours on a metal spool.

FLAMMABILITY

Wire will not burn when exposed to flame. At extremely high temperatures (e.g. 2000°F) HT Wire may start to melt but will not burn.

RADIATION RESISTANCE

Various tests at Oak Ridge Laboratory, etc. have indicated that HT Wire has a high resistance to radiation and is suitable for nuclear application.

NOTE: Because of the critical nature of such use, the following test results are being listed as a guide only. Each application should be thoroughly and independently tested to determine suitability:

- .1012 NVT exposure resistance to thermal neutrons, fast neutrons and gammaphotons.
- .108 Roentgen of Gammaray resistance (4.6 x 10⁸ Rads in latest 1992 test).
- .1015 Fast Neutrons/centimeter² resistance.

CHEMICAL RESISTANCE

Wire is inert to solvents, oils, organic materials, thinners and water. Molten sodium hydroxide will attack and strip coating from the wire.

MIGRATION

Kulgrid HT Wire is subject to nickel migration at temperatures above 600°F. The affect is negligible on larger sizes but will be noticeable on wire diameters smaller than .006" (#34 AWG) after prolonged use.

All Nickel HT Wire is unaffected by migration.

SERVICE LIFE

Both Kulgrid and All Nickel HT Wire have a life expectancy greater than 2500 hours at 1000°F and above. Service life significantly increases with a decrease in operating temperature.

FEET PER POUND

Same as standard "single build" magnet wire.

WINDING INSTRUCTIONS

Exercise care when unspooling HT Wire. Do not run wire over spool flanges or metal rollers or guides. Use Teflon or nylon guides and rollers to avoid damaging the coating. Use a light tension when winding coils.

Handle wire with surgical gloves. This will avoid moisture and body oils being transferred to the wire, which will reduce dielectric strength. It will also prevent injury because of the abrasive surface of the wire.

TERMINATION METHODS

Silver solder termination may be accomplished without stripping as the ceramic will mix with most fluxes. All flux must be removed before sealing or exposing the wire to high temperature.

Termination may also be accomplished by spot welding after the ceramic coating is stripped. Stripping can be obtained by mechanical methods or by immersion in molten sodium hydroxide at 600°F to 800°F for 15 to 30 seconds followed by a water quench (the ceramic coating is then loosened and can be wiped off).

NOTE: If a mechanical method is used with Kulgrid HT Wire, care must be exercised not to strip the nickel from the copper to insure a good weld.

A third method of termination is to use crimp type connectors.

STORAGE

Store HT Wire in a closed container with a desiccant to minimize moisture absorption.

WARRANTY

HT Wire will be replaced free of charge if it fails to meet the above specifications.

CERAMAWIRE makes no warranties either express or implied as to the suitability of HT Wire for a particular application or use. Buyer and user must determine the suitability for his intended use and assume all risk and liability in connection therewith. Each application must be judged for suitability of performance by the user.

*Proprietary Formulation