

T-114 Oxidation Retardant

Technical Data Sheet 6032

GRAFSTAR™ Graphite - Oxidation Characteristics

Various forms of GRAFSTAR™ graphite are now in use in applications where resistance to oxidation is a primary consideration. Research on the oxidation characteristics of GRAFSTAR™ graphite has shown the following:

Untreated graphite obeys an Arrhenius activation energy equation within certain temperature ranges up to 700°C. This means that the oxidation rate is essentially a linear function of temperature. Above 700°C oxidation is not governed solely by temperature.

The treatment of GRAFSTAR™ graphite materials with the 114 oxidation retardant has been found to materially enhance oxidation resistance. In general practice, the oxidation retardant maintains a high degree of efficiency and is superior to untreated graphite at temperatures up to 750°C.

T-114 Treatment - Non-Hygroscopic, Oxidation Retardant

Moisture Insensitive

The 114 treatment is non-hygroscopic and thus will not absorb moisture in humid atmospheres. Buildup of hygroscopic moisture on the surface of GRAFSTAR™ graphite is nonexistent.

Oxidation Resistance

This table* shows the typical effects of air oxidation of untreated and 114 treated graphite at 700°C and 750°C.

Oxidation Rate (g/m ² /hr)	CBY	CS	CBY-114 CS-114
At 700°C	685	800	23
At 750°C	1,775	1,900	200

Notes:

* Properties listed are typical and cannot be used as accept/reject specifications

Tests were conducted over a 24-hour air oxidation period. Specimen size 2.0 OD x 0.5 ID x 5.5" long. Weight approximately 500 grams.

The 114 treated graphites, at 750°C, are about ten times more effective in reducing oxidation than untreated graphite.

Data is presented in terms of an equilibrium temperature between the graphite body and the application environment. As application and graphite temperatures increase to 750°C and go beyond the oxidation resistance of 114, it becomes less effective. However, it is important to understand that while environmental temperatures may exceed 750°C, the graphite body may be at a lower temperature.

The merit of the 114 oxidation retardant must be judged on the basis of the operating conditions involved. In oxidizing temperatures up to 750°C, 114 treated GRAFSTAR™ graphite has demonstrated superior results to untreated graphite. Above if this temperature limit, where the oxidation rate is less dependent upon temperature, the effectiveness of this treatment is reduced.

CAUTION: The T-114 anti-oxidation treatment is stable to 750°C in an oxidizing environment. Use only in air or oxygen. Do not use this product in inert, reducing or vacuum application.

Above 750°C, this treatment may decompose to form oxides of phosphorous or phosphine at low (ppm) levels. These may concentrate in closed systems. Provide exhaust or dilution ventilation.

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Redefining limits

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