

Technical Report

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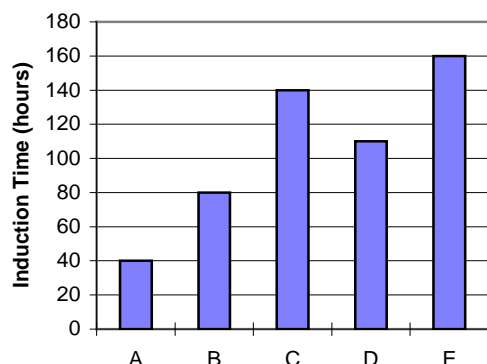
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NA-SUL[®] ZS-HT Synergism with Phenolic Antioxidants

NA-SUL ZS-HT is a zinc sulfonate/carboxylate rust inhibitor that uniquely improves the oxidative stability of lubricants when used in combination with antioxidants.

**Hours to Initial Increase In Acid
Value @ 150°C (ASTM D 4636)**



Base Oil: Paraffinic ISO VG 32

A: Oil + 0.25% phenolic AO

B: Oil + 0.50% phenolic AO

C: Oil + 0.75% phenolic AO

D: Oil + 0.15% phenolic AO + 0.10% **NA-SUL ZS-HT**

E: Oil + 0.25% phenolic AO + 0.15% **NA-SUL ZS-HT**

The results shown reflect data generated by King Industries' Technical Service Laboratory. Actual results may vary depending on the additive package, base oil, and test equipment design.

In lubricant oxidation tests, **NA-SUL ZS-HT** is synergistic with antioxidants. The bar-chart above shows results using test method ASTM D 4636 "Corrosiveness and Oxidation Stability of Hydraulic Oils, Aircraft Turbine Engine Lubricants and Other Highly Refined Oils". Combinations of **NA-SUL ZS-HT** and a phenolic antioxidant provide much longer induction periods than when the phenolic antioxidant is used alone. This is observed even when the phenolic antioxidant alone is used at double the combined concentration of the antioxidant with **NA-SUL ZS-HT**. Incorporation of **NA-SUL ZS-HT** into the antioxidant system of industrial lubricants allows for substantial reductions in the amount of antioxidant that is required.

(see reverse side)

NA-SUL[®] ZS-HT
Synergism with Phenolic Antioxidants

For Samples or Technical Service, contact King Industries or your King representative.

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