

NA-SUL[®] ZS-HT

Performance In Hydraulic Fluids

NA-SUL ZS-HT is a unique zinc sulfonate/carboxylate that imparts outstanding steel corrosion and demulsibility to formulated functional fluids.

FORMULATIONS		
TESTS	HF-0 Type Package * Without NA-SUL ZS-HT	HF-0 Type Package With 9.0% NA-SUL ZS-HT
Treat Level of Additive Package, %	0.8	0.8
Base Oil	ISO VG 46 (Group II)	ISO VG 46 (Group II)
Additive Package Color	Light Amber	Light Amber
Demulsibility (ASTM D 1401, DIN 51 599) Oil-Water-Emulsion Time (minutes)	41-34-5 30	41-38-1 15
Steel Corrosion (ASTM D 665, DIN 51 585) A & B	Fail	Pass
Rotary Bomb (ASTM D 2272) Lifetime (minutes)	295	307
Four Ball Wear (ASTM D 4172) 1 hour, 75°C, 40 kg, 1200 rpm Scar Diameter (mm)	0.42	0.43
Copper Corrosion (ASTM D 130, DIN 51 759) 3 hours, 100°C 3 hours, 135°C 3 hours, 160°C	1b 1b 1b	1b 1b 1b
CM Thermal Stability (ASTM D 2070) CM Color Class: Copper Steel Viscosity Change, % Acid Number Change (mg KOH/g) Rod Weight of Deposit (mg/200ml) Rod Metal Loss (mg/200ml) Total Sludge (mg/100 ml) Whatman Precipitate (mg/100 ml) Millipore Precipitate (mg/100 ml)	1.5 1.5 1.8 0.23 Steel: 0.1 Copper: 0.1 Steel: 0.2 Copper: 0.6 5.5 2.7 2.8	1.5 2.0 2.8 0.2 Steel: 0.2 Copper: 0.0 Steel: 0.8 Copper: 0.9 1.0 0.2 0.8
Hydrolytic Stability (Beverage Bottle) (ASTM D 2619) Copper Loss (mg/cm ²) Total Acidity of Water Layer (mg KOH) Copper Appearance (ASTM D 130)	0.29 0.91 2a	0.10 1.0 2a
FZG A/8.3/90 (ASTM D 5182, DIN 51 354 Part 2) Damage Load Stage	12	12

* See Page 2

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.

(see reverse side)

NA-SUL[®] ZS-HT Performance In Hydraulic Fluids

This table compares the performance of a Denison HF-0 type package for hydraulic fluids with and without **NA-SUL ZS-HT**. **NA-SUL ZS-HT** was incorporated into the package at 9.0% replacing the oil. The concentrations of all other additives were held constant. Testing was conducted at a package treat level of 0.8% in an ISO VG 46 Group II oil. **The package without NA-SUL ZS-HT failed the steel corrosion and demulsibility test and resulted in significant copper loss in the hydrolytic stability test.**

Inclusion of **NA-SUL ZS-HT** in the formulation imparted excellent steel corrosion protection and demulsibility performance and greatly reduced the amount of copper loss in the hydrolytic stability test. In addition, **NA-SUL ZS-HT** exhibited no adverse effects on other performance tests including rotary bomb oxidation, four ball wear, copper corrosion, Cincinnati Milacron thermal stability and FZG.

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

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