

# Technical Report

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## NA-LUBE<sup>®</sup> AW-6330 Comparison with Zinc Dialkyldithiophosphates

**NA-LUBE AW-6330** is an *ashless multifunctional lubricant additive* that imparts excellent extreme pressure and antiwear properties, along with rust and oxidation protection, to functional fluids.

**NA-LUBE AW-6330** exhibits outstanding performance in Group I, II and synthetic base stocks and is an excellent ashless alternative to zinc dialkyldithiophosphates.

TESTS	1.00% AW-6330*	2.00% AW-6330	1.00% ZnDTP**	1.00% AW-6330 0.35% Blend ***	1.00% ZnDTP 0.35% Blend
Base Oil	ISO VG 46 Group I				
<b>Four Ball Wear</b> (ASTM D 4172) 1 hour, Room Temp., 1500 rpm Scar Diameter (mm) @ 15 kgf Scar Diameter (mm) @ 30 kgf 1 hour, 75°C, 1800 rpm Scar Diameter (mm)	0.23 0.42 --	0.28 0.49 --	0.25 0.37 --	-- -- 0.54	-- -- 0.45
<b>Four Ball Weld</b> (ASTM D 2783) 10 seconds, 25°C, 1800 rpm OK Load (kgf) Weld Load (kgf)	140 160	160 180	160 180	160 180	140 160
<b>Brugger Test</b> (DIN 51 347) (N/mm <sup>2</sup> )	29.5	31	Not Determined	Not Determined	Not Determined
<b>FZG A/8.3/90</b> (ASTM D 5182, DIN 51 354 Part 2) Damage Load Stage	12	--	12	12	12
<b>V 104C Vane Pump Test</b> (DIN EN ISO 20 763) Wear Loss Ring (mg) Wear Loss Vanes (mg)	115 4	Not Determined	Not Determined	Not Determined	Not Determined
<b>RPVOT</b> (ASTM D 2272) (minutes)	77	174	140	307	245
<b>TOST Test</b> (ASTM D 943) Starting Acid Number (mg KOH/g) Time to Acid Number 2.07 (hours)	0.07 1000	Not Determined	Not Determined	Not Determined	Not Determined
<b>Seal Compatibility</b> (DIN 53 521/53 538, Part 1) SRE-NBR/7 days/ 100°C Relative Change in Volume (%) Relative Change in Shore A Hardness (%) Change in Elongation at Break (%) Change in Tensile Strength (%)	+5.5 -3.7 -6.3 -14.8	Not Determined	Not Determined	Not Determined	Not Determined

(see reverse side)

# NA-LUBE<sup>®</sup> AW-6330

## Comparison with Zinc Dialkyldithiophosphates

(continued)

TESTS	1.00% AW-6330*	2.00% AW-6330	1.00% ZnDTP**	1.00% AW-6330 0.35% Blend ***	1.00% ZnDTP 0.35% Blend
<b>Base Oil</b>	<b>ISO VG 46 Group I</b>				
<b>Steel Corrosion</b> (ASTM D 665, DIN 51 585) (24hours, 60°C) Procedure A	Pass	Pass	Pass	Pass	Pass
<b>Copper Corrosion</b> (ASTM D 130, DIN 51 759) 3 hours, 100°C 3 hours, 135°C	2a 2a	2a 2a	1b 1b	1b --	1a --
<b>Demulsibility</b> (ASTM D 1401, DIN 51 599) Oil-Water-Emulsion (ml) Time (minutes)	42-38-0 5	41-39-0 10	41-35-4 30	42-38-0 5	43-35-2 30
<b>AFNOR Filtration (Wet)</b> Filterability Index	--	--	--	1.36	1.23
<b>Air Release Properties</b> (ASTM D 3427) Time (minutes)	5	Not Determined	Not Determined	Not Determined	Not Determined

\* NA-LUBE AW-6330 multifunctional additive – Zn: none, S: 10%; P: 4.5%

\*\* ZnDTP based on 2-ethylhexanol (stabilized) – Zn: 9.5%; S: 16%; P: 8%

\*\*\* 0.35% blend of yellow metal deactivator, aminic and phenolic antioxidants

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.

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

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