King Industries, Inc. - Lubricant Additives Division

Technical Report

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NA-LUBE® BL-1400

Ashless Multifunctional Package
Performance in Compressor Oils

NA-LUBE BL-1400 is used to formulate compressor oils according to DIN 51506 (VBL, VCL, VDL) ISO / DP 6521 (DAA, DAB, DAH, DAG). The following tables demonstrate the performance of **NA-LUBE BL-1400** at 0.60% and 0.45% in Group I, II and PAO base oils (‡see Note on page 2).

Tests	**0.60% NA-LUBE BL-1400**	**0.60% NA-LUBE BL-1400**	**0.60% NA-LUBE BL-1400**	**Requirement**
Base Oil	**Group I ISO VG 46**	**Group II ISO VG 46**	**PAO 8 ISO VG 46**	
Conradson Carbon Residue After Aging Air in the Presence of Fe_2O_3 (DIN 51352-2) *				**DIN 51506 VDL**
Carbon Residue After Aging (%)	2.9 (fail)	2.5	2.1	2.5 max
Residue After Distillation of 80 Volume % (DIN 51356, DIN 51551)				**DIN 51506 VDL**
Conradson Carbon Residue (%)	<0.1	<0.1	<0.1	0.3 max
Viscosity at 40ºC Before Distillation (cSt)	47.1	43.2	45.8	41.4 – 50.6
Viscosity at 40ºC After Distillation (cSt)	77.0	74.6	83.8	5x the value of the fresh oil
Ratio of Viscosity	1.63	1.73	1.83	5 max
Conradson Carbon Residue After Aging by Passing Air (DIN 51352-1)				**DAA**
Carbon Residue After Aging (%)	0.3	1.1	0.2	1.5 max
Evaporation Loss (%)	1.4	1.9	1.1	15 max
Conradson Carbon Residue After Aging Air in Presence of Fe_2O_3 (DIN 51352-2)				**DAB**
Carbon Residue After Aging (%)	2.8 (fail)	2.2	1.9	2.5 max
Evaporation Loss (%)	2.0	3.8	2.2	20 max
Residue After Distillation of 80 Volume % (DIN 51356, DIN 51551)				**DAB**
Conradson Carbon Residue	<0.1	<0.1	<0.1	0.3 max
Viscosity at 40ºC Before Distillation (cSt)	44.5	44.1	45.5	41.4 – 50.6
Viscosity at 40ºC After Distillation (cSt)	79.4	72.9	83.8	5x the value of the fresh oil
Ratio of Viscosity	1.78	1.65	1.84	5 max
Foaming Behavior (ASTM D 892)				**DAH/DAG**
Sequence I, 25ºC (ml/ml)	0 / 0	0 / 0	0 / 0	300 / 0
Steel Corrosion (ASTM D 665)				**DAA/DAB/DAH/DAG**
Procedure A	Pass	Pass	Pass	Pass
Procedure B	Pass	Pass	Pass	Pass
Copper Corrosion (ASTM D 130)				**DAA/DAB/DAH/DAG**
3 hours, 100°C	1a	1a	1a	1b max
Demulsibility (ASTM D 1401)				**DAB/DAH/DAG**
Oil-Water-Emulsion (ml)	41-39-0	40-40-0	41-39-0	40-37-3 min
Time (minutes)	10	10	10	30 max

(see reverse side)

NA-LUBE® BL-1400
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Performance in Compressor Oils

(continued)

Tests	0.45% NA-LUBE BL-1400	0.45% NA-LUBE BL-1400	0.45% NA-LUBE BL-1400	Requirement
Base Oil	**Group I ISO VG 46**	**Group II ISO VG 46**	**PAO 8 ISO VG 46**	
Conradson Carbon Residue After Aging by Passing Air (DIN 51352-2)				**DIN 51506 VBL**
Carbon Residue After Aging (%)	0.1	1.1	0.3	2.0 max
Conradson Carbon Residue After Aging by Passing Air (DIN 51352-1)				**DIN 51506 VCL**
Carbon Residue After Aging (%)	0.1	1.0	0.3	1.5 max
Residue After Distillation of 80 Volume % (DIN 51342-1)				**DIN 51506 VCL**
Conradson Carbon Residue	<0.1	<0.1	<0.1	0.3 max

* The carbon residue was additionally evaluated at a reduced treat rate of 0.45% **NA-LUBE BL-1400**.

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.

(‡) Note: ISO VG 32, 46 and 68 hydraulic fluids formulated with **NA-LUBE BL-1400** at 0.6% have been approved in both Group I and Group II base stocks by Parker Hannifin (Denison) for HF-0, HF-1, and HF-2 requirements. Technical Reports are available for antiwear hydraulic fluid performance in Group I and II base oils.

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

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