



Renewable Lubricants, Inc.

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Bio-SYN™ Trans-Hydraulic **(Universal Tractor Fluid)**



"Biobased Lubricants that Perform Like Synthetics"

Bio-SYN™ Trans-Hydraulic is a universal tractor fluid that incorporates Stabilized* additive technology with biodegradable vegetable based stocks. This formulation contains special frictional modifiers for the Wet Brake's equipment design, and is compounded with detergent, dispersant, anti-wear, anti-rust, and anti-foam inhibitors. This Bio-SYN™ Trans-Hydraulic Fluid is an ultimately biodegradable¹, multi-grade lubricant that can be used in agricultural, industrial, and construction equipment and has proven field performance.

Meets or exceeds all of the requirements of John Deere's Hygard (Specification J20-C); Allison C-3, Cat TO-2 and API GL-4, Low-Speed/High Torque.

Meets and exceeds universal tractor specifications for OEMS.

John Deere

J20C, J14A

Quatrol™

J20D

Ford

M2C134-D

M2C86-C, M2C86-B

M2C41-B, M2C48-B

M2C53-A, M2C134-A

M2C134-B, M2C134-C

Massey-Ferguson

M1135, M1141

M1110, M1127, M1129-A

Case International

JIC-145/MS-1210

JIC-185/MS-1204

MS-1205, MS1127, M1129-A

White Farm

Q-1826

Q-1705, Q-1766, Q-1802

Deutz-Allis

Landini

Fiat-Hesston

Kubota

Steiger

Versatile

TRANSMISSION OEM'S

ATD Allison C-4

Caterpillar TO-2

Bio-SYN™ Trans-Hydraulic Fluid is an ENVIRONMENTALLY RESPONSIBLE hydraulic fluid that is formulated from renewable, agricultural plant resources. We believe Earth's environmental future rests in the use of renewable materials.

STABILIZED by Renewable Lubricants* is RLI's trademark on their proprietary and patented anti-oxidant, anti-wear, and cold flow technology. High Oleic Base Stock (HOBS) are agricultural vegetable oils. This Stabilized technology allows the HOBS to perform as a high performance formula in high and low temperature applications, reducing oil thickening and deposits.

¹ Ultimate Biodegradation (Pw1) within 28 days in ASTM D-5864 Aerobic Aquatic Biodegradation of Lubricants
Patented Product: US Patent 6,383,992, US Patent 6,534,454 with additional Pending and Foreign Patents

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Availability **F.O.B. :Hartville, Ohio, USA**

5 Gallon Pails **Drums** **Bulk**

Test	Typical Results	Specification Limits
Viscosity @ 100°C ASTM D-445	10.26	9.10 min.
Viscosity @ 40°C ASTM D-445	47.8	None
Viscosity Index ASTM D-2270	210	140
Shear Stability Orbahn ASTM D-6278		
Vis. @ 100°C (after shear)	9.38	9.10 min.
Brookfield Viscosity ASTM D-2983		
@-20°C	1,650	4,500 max.
5,500 per J. Deere		
@-35°C	11,150	70,000 max.
Flash Point, °C	251	200 min.
Stable Pour Point, °C	-39	-37 max.
Oxidation Stability JDQ 16		
Evaporation Loss	0.65%	5.0% max.
Viscosity Increase @ 100°C	5.02%	10.0% max.
Viscosity Increase @ 40°C	4.0	-----
Sludge Formation	None	None
Additive Separation	None	None
Rust Protection JDQ 22	>100	100 hrs. min.
Copper Corrosion JDQ 32	1A	1B max.
Foaming Characteristics JDQ 33		
Sequence I	40/0	25/0 ml. max.
Foam Breaktime	82	30 sec. max.
Sequence II	0/0	50/0 ml. max.
Foam Breaktime	0	30 sec. max.
Sequence III	30/0	25/0 max.
Foam Breaktime	0	30 sec. max.
Water Sensitivity JDQ 19		
Solids	0.0	0.1 %v max.
Additive Loss	0.0	15.0% wt. max.
Extreme Pressure Properties JDQ 34		
Timken Abrasion Mass Loss	0.5 mg.	1.5 mg. max
Timken OK Load	73 N	45 N min.
Rubber Compatibility JDQ 9		
Volume Change	+1	0 to +5%
Hardness Change	-0.5	0 to -5 pts.
Precipitation	None	Trace
Rubber Compatibility		
Reference 69X311111		
Volume Change	+2.5	0 to +5
Hardness Change	-1.5	0 to -5
Precipitation	None	None
Oil Compatibility JDQ 23		
Additive Separation	None	None
Foaming Characteristics		
Sequence I	0/0	25/0 ml. max.
Foam Breaktime	0	30 sec. max.
Sequence II	0/0	50/0 ml. max.
Foam Breaktime	0	30 sec. max.
Sequence III	0/0	25/0 ml. max.
Foam Breaktime	0	30 sec. max.
Oxidation Stability		
Evaporation Loss	1.6	5.0% max.
Viscosity Increase @ 100°C	6.0	10.0% max.
Viscosity Increase @ 40°C	9.8	-----
Sludge Formation	None	None
Additive Separation	None	None
Low Temperature Fluidity JDQ 73/74		
Cold Soak @ -35°C	27 secs.	30.0 sec. max.*
Slow Cool		
@ -30°C	30 mm in 3 sec.	30.0 sec. max.*
@ -35°C flow in 30 sec.	30 mm in 11 sec.	10.0 mm min.**

*Must flow 30 mm in a maximum of 30 seconds to pass.

**Must flow at least 10 mm in 30 seconds to pass.

<u>Test</u>	<u>Typical Results</u>		<u>Specification Limits</u>	
JDQ 94 PST Clutch Friction				
Total Cycles	2,000		2,000	
Initial Friction Coefficient	0.077		0.15 max.	
Final Friction Coefficient	0.105		0.08 min.	
Stall Time (sec.)	1.77		5.0 max.	
Disk #1 Wear (mm)	0.178		0.38 max.	
Disk #2 Wear (mm)	0.174		0.38 max.	
Disk #3 Wear (mm)	0.254		0.38 max.	
Disk #4 Wear (mm)	0.178		0.38 max.	
JDQ 102 Shear Stability				
Viscosity @ 100°C	10.51			
Viscosity @ 100°C (sheared)	9.38			
% Viscosity Loss	10.8%			
JDQ 95 Spiral Bevel/Final Drive Gear Wear				
Gear Surface Condition				
Pinion	None		No Scoring	
Ring	None		No Scoring	
Spiral Bevel Rating	9		Scale of 1-10, 10 = the best	
Sun Pinion Wear				
Left Side Average	<0.025		<0.025	
Right Side Average	<0.025		<0.025	
JDQ 84 Sundstrand Hydraulic Pump				
Flow Degradation	3.9%		Equal to or better than reference which is -2.0%.	
JDQ 96 Brake Torque Variation and Friction				
	Computer Results	Torque	SwRI	
Cycles	Relative Capacity	Variation	Variation	
1,000	293,131	44,470	559,780	
10,000	308,090	36,730	424,130	
20,000	310,651	36,220	421,620	
30,000	312,768	42,380	506,220	
Total	1,224,640	159,800	1,911,750	
Allison C-4 Oxidation Test				
Tan Increase	10.12		7.0 max.	
Carbonyl Absorbance	10.0		0.9 max.	
Front Pump Seal	Moderate to Heavy Hardening Light Sludge		Moderate to Heavy Hardening Light to Medium Sludge	
Allison C-4 Wear Test				
Total weight loss	1.4 mg		15.0 max.	
Allison C-4 Paper Clutch Friction test				
	<=5,000	>5,000	<=5,000	>5,000
	Cycles	Cycles	Cycles	Cycles
Slip Time, max.	0.70	0.55	0.72	0.61
Mid-Point Friction Coeff. min.	0.076	0.095	0.068	0.088
Allison C-4 Graphite Clutch Friction Test				
	1,500		5,500	
	Cycles			
Slip Time, max.	0.70	0.74	0.71 max.	
Mid-Point Friction Coeff. min.	0.101	0.097	0.104 min.	