

# Lubrication Technologies, Inc.

## Lube Base Oils Reference Center Data

### API Group V Lube Base Stocks



Base Stock	2	3	4	5	6	8	10	11	12	14	19	24	40	100	150
<b>MONO ESTERS</b>															
Lexolube	IPP, IPO, NBS (all 3 are 2 cSt) T-110, HS-S B-109 (3) (3) (4)														
<b>DIESTER</b>															
Lexolube	2X-114	2X-108		2X-109											
<b>NEOPOLYOL ESTERS</b>															
Lexolube	21-214	31-310	3N-310		4N-415		3G-310								
<b>POE</b>															
Lexolube							POE-68HT		POE-100HT		POE-220HT		POE-350HT		
<b>COMPLEX ESTERS</b>															
Lexolube								CPE-70 (11)				CPE-220 (27)	CP-460LC (46)		CPE-2200 (180)
<b>PYROMELLITATES</b>															
Lexolube											4PM-114 (15)				
<b>FOOD GRADE POE</b>															
Lexolube							FG-68 HX1		FG-100 HX1		FG-220 HX1		FG-350 HX1		

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<i>Base Stock</i>	10	15	22	32	<i>Nominal Viscosity at 40C, cSt</i>									
					46	68	100	150	220	320		460		
<b>Diesters</b>														
Emery	2958 (10.3)	2970, (13.7),	2960 (17.5)	2971 (26.7)	2961 (33.5)									
<i>Base Stock</i>		68	100	150	<i>Nominal Viscosity at 40C, cSt</i>									
					460			2000						
<b>Dimer Esters</b>														
Emery		2900 (83)		2905 (150)		2908, (430),	2902 (500)	2873 (2030)						
<i>Base Stock</i>					<i>Nominal Viscosity at 40C, cSt</i>									
	10	15		22					32	46	68	100	150	220
<b>Polyol Esters</b>														
Emery	2917 (8.4)	2930, (15.3),	2932 (18.1)		2925, (19.8),	2934, (21.2),	2935, (23.1),	2965, (24.3),	2939, (25.4),	2931, (25.6),	2995, (25.7),	2929 (26.5)	2918 (32.2)	2921 (249)
<i>Base Stock</i>					<i>Nominal Viscosity at 40C, cSt</i>									
	22	32	46	68	100	150		460						
<b>Polyol Esters</b>														
ProEco	2965 (24.3)	2969 (37.1)	2964 (47.5)	2898, (65.6),	2951 (82.6)									




<i>Base Stock</i>					<i>Nominal Viscosity at 100F, SUS</i>					<i>Primary Applications</i>		
			55	100	170	260	660	2000	3520	5100		
<b>PAG (Water Soluble)</b>												
PLURASAFE WS Typical			55 (48)	100 (101)	170 (173)	260 (258)	660 (655)	2000 (1992)	3520 (3560)	5100 (5142)	Hydraulic, Gear, Compressor	
<i>Base Stock</i>					<i>Nominal Viscosity at 100F, SUS</i>							
			65	135	165	200	285	625	1715			
<b>PAG (Water Insoluble)</b>												
PLURASAFE WI Typical			65 (58)	135 (130)	165 (174)	200 (203)	285 (291)	625 (617)	1715 (1718)		Hydraulic, Chain, Gear, Compressor	
<i>Base Stock</i>					<i>Nominal Viscosity at 40C, cSt</i>							
			32	46	68	100	150	220	460	680	1000	
<b>PAG (Water Soluble)</b>												
PLURASAFE WS VG Typical			32 (35.1)	46 (47.2)	68 (69.4)	100 (102.1)	150 (154.1)	220 (230.1)	460 (468.9)	680 (700.4)	1000 (1030)	Hydraulic, Gear, Compressor

<i>Base Stock</i>			<i>Nominal Viscosity at 40C, cSt</i>							
	32	46	68	100	150					
<b>PAG (Water Insoluble)</b>										
PLURASAFE WI VG	32	46	68	100	150					Hydraulic, Chain, Gear, Compressor
Typical	(33.8)	(45.8)	(69.3)	(103)	(153)					
<i>Base Stock</i>			<i>Nominal Viscosity at 40C, cSt</i>							
	32	46	68	100	150	220	460	680	1000	
<b>PAG (Water Soluble)</b>										
PLURASAFE WS D				60-100			60-460		60-1000	Gear, Bearing, Chain
Typical				(110)			(445)		(1118)	
<i>Base Stock</i>			<i>Nominal Viscosity at 40C, cSt</i>							
	20	32	46	68	100	150	220	460	680	1000
<b>PAG (Water Soluble)</b>										
PLURASAFE WS B	45-20			45-100						Hydraulic, Gear, Compressor
Typical	(20.2)			(99.3)						
<i>Base Stock</i>			<i>Nominal Viscosity at 40C, cSt</i>							
	32	46	68	100		150	220	320	460	
<b>PAG</b>										
PLURASAFE				SRF 2, SRF 216			WS 270 CF			Chain, Gas Compressor
Typical				(102.1), (90.3)			(272)			
<i>Base Stock</i>			<i>Nominal Viscosity at 40F, cSt</i>							
				460	680	1000	1500	90000	270000	
<b>PAG (Water Soluble)</b>										
PLURASAFE WT				450			1400	90000	270000	Quench, FR Hydraulic, Gas Compressor
Typical				(486)			(1397.5)	(88749)	(268800)	
<i>Base Stock</i>			<i>Nominal Viscosity at 40C, cSt</i>							
							20000	60000		
<b>PAG</b>										
PLURACOL V							5	10		FR Hydraulic, Quench
Typical							(18000)	(65000)		



<i>Base Stock</i>			<i>Nominal Viscosity at 40C, cSt</i>				
	32	46	68	100	150	220	
<b>Triaryl Phosphate Ester</b>							
Reolube	140	225, 225S			620B		
	(32)	(46), (46)			(125)		

## INEOS Oligomers

Base Stock	Nominal Viscosity at 100C, cSt													
	4	10	12	15	30	50	100	200	600	3,000	4,000	10,000	40,000	
<b>Polybutene (PIB)</b>														
<b>INDOPOL®</b>	L-14	L-50	H-7	H-8	H-15	H-25	H-35	H-50	H-100	H-300	H-1500	H-1900	H-6000	H-18000
	(4.2)	(9.4)	(12.5)	(15.3)	(30.5)	(52.0)	(74)	(108)	(218)	(630)	(3050)	(4050)	(12,200)	(40,500)



Base Stock	Nominal Viscosity at 100C, cSt																			
	1	2	3	4	5	6	7	8	10	12	14	18	20	40	50	100				
<b>Monoesters</b>																				
	2976 (1.1)																			
	2311 (1.4)																			
<b>Diesters</b>																				
		2906 (2.7)	3110 (3.2)	2910 (3.6)	5203, 2901, 2923 (4.8), (5.4), (5.5)	2955 (6.9)	2922 (8.2)				2949 (13)									
<b>Triesters</b>																				
									2920 (9.4)	2932 (13)	2930 (16)		2940 (20)							
<b>POEs</b>																				
					Nominal Viscosity at 100C, cSt															
<b>HATCOL</b>	2			3		4		5												
	2957, 1507, 2962, 3330 (2.1), (2..2), (2.5), (2.6)			2915, 3336, 3337 (3.0), (3.4), (3.6)		2925, 2938, 2377 (4.0), (4.4), (4.4)		2330, 3505, 3502, 2989, 2960, 2970, 2954, 2965, 3508 (4.7), (4.7), (4.9), (4.9), (4.9), (5.0), (5.0), (5.1), (5.3),												
<b>HATCOL</b>					Nominal Viscosity at 100C, cSt															
					6		7		8		9		10		11					
					3306, 3506, 3178, 3304, 2352, 2990, 3329, 3146, 3169 (5.5), (5.5), (5.6), (5.6), (6.2), (6.2), (6.2), (6.3)		3501, 3354 (6.9), (7.1)		3504 (8.3)		3320, 5068, 1106, 3373 (8.6), (8.7), (8.8), (9.4)		5127, 3391 (9.9), (10)		3503 (11)					
<b>HATCOL</b>					Nominal Viscosity at 100C, cSt															
					12		14		18		19		20		21		26		36	
					2999 (12)		2372 (14)		5150 (18)		3507 (19)		3316 (20)		3349, 2300 (21), (21)		3365 (26)		3371 (36)	









**Port Arthur, TX**

<i>Base Stock</i>					<i>Nominal Viscosity at 100C, cSt</i>							
	2	3	4	5	6	8	10	12	14	28	40	100
Star	2											
	(2.56)											

Note: Star 2 is similar to Motiva's Group II base oils but does not meet all requirements for such.

**Naphthenic Oils**



*Calumet Specialty Products, L.P.* **Princeton, LA**

<i>Base Stock</i>				<i>Nominal Viscosity at 100F, SUS</i>								
	40	60	100	150	200	300	500	600	1,000	1,200	2,500	
Hydrocal	38	60	100				500			1200	2400	
	(37.9)	(61.5)	(107)				(510)			(1226)	(2400)	
Hydrocal	3146	3147										low pour point
	(36)	(52.5)										
Hydrosol		60	100			300	500			1200	2000	produced by Houston Refining
		(53.4)	(111)			(309)	(505)			(1260)	(2092)	
HR Tufflo		60-T	100			300	500			1200	2000	
		(53.4)	(111)			(309)	(505)			(1260)	(2092)	



**Three Rivers, TX**

<i>Base Stock</i>				<i>Nominal Viscosity at 40C, cSt</i>									
	5	10	22	32	46	68	100	150	220	460	680	1000	4,000
	T4	T9	T22							T400			T 4000
	(4.5)	(9.1)	(22)							(376)			(4445)

The above base oils are made at the Valero Three Rivers, TX refinery, but marketed by Nynas.



**Nynashamn, Sweden**

Base Stock

	5	10	22	<i>Nominal Viscosity at 40C, cSt</i>									
		BS 8.5	BS 14	S 25B	32	46	68	100	150	220	460	680	1000
		(8.5)	(14)	(25)				S 100B	SR130				
								(102)	(137)				
	NS 3	NS 8						NS 100	BNS 150		BNS 400	BNS 600	BNS 800
	(2.88)	(7.7)						(103)	(150)		(400)	(600)	(800)
	T4	T9	T22					T110		T400	PMBT 30	BBT 28	T 4000
	(4.5)	(9.1)	(22)					(114)		(376)	(499)	(700)	(4445)



**Smackover, Ark**

Base Stock

				<i>Nominal Viscosity at 100F, SUS</i>								
	40	60	100	150	200	300	500	600	1,000	1,200	2000	2,500
L-series	40	60	100	150	200	300	500	750		1200	2000	2400
	(43)	(61.2)	(104.6)	(154.8)	(201.8)	(315)	(525)	(772)		(1281)	(2031)	(2421)
B-series		60	100	150	180, 200		550	750				
		(60.2)	(104.9)	(154)	(197) (218)		(550)	(780)				



**Vicksburg, MS**

Base Stock

				<i>Nominal Viscosity at 100F, SUS</i>								
	60	100	150	200	300	500	600	1,000	1,200	2000	3,500	5,000
Hyprene	60	100	L150	L200	L300	L500	L750		L1200	L2000		V175BS
	(59.5)	(112)	(157)	(209)	(310)	(533)	(772)		(1236)	(2093)		(5091)
Hyprene							MVI750		MVI1200	MVI2000	MVI150BS	
							(769)		(1247)	(2143)	(3528)	
Hygold	60	100	L150	L200	L300	L500	L750		L1200	L2000		V175BS
	(59.5)	(112)	(157)	(209)	(310)	(533)	(772)		(1236)	(2093)		(5091)
Hygold							MVI750		MVI1200	MVI2000	MVI150BS	
							(769)		(1247)	(2143)	(3528)	



**Bakersfield, CA**

<i>Base Stock</i>				<i>Nominal Viscosity at 100F, SUS</i>						
	40	60	100	150	200	300	500	1,000	2,000	4,000
HYNAP	N40HT (40.8)	N60HT (60.2)	N100HTS (109)			300 (304)	500 (500)		2000 (1953)	4000 (4140)

<i>Base Stock</i>				<i>Nominal Viscosity at 100F, SUS</i>						
	40	60	100	150	200	300	500	1,000	2,000	4,000
RAFFENE					200L (199)			750L (876)	1200L (1445)	2000L (2034)



**PETROBRAS**

**Petrobras, Fortaleza, Brazil**

<i>Base Stock</i>				<i>Nominal Viscosity at 40C, cSt</i>					
		10	20	32	46	68	100	150	500
		NH 10 (10)	NH 20 (20)					NH 140 (140)	