

PRODUCT SELECTION FOR HYDRAULIC FLUIDS



Design high performance hydraulic fluids with excellent environmental profile

Recent trends in hydraulic systems are putting further strain on hydraulic fluids :

- › Smaller oil sumps increase oil exposure to heat, foam, air and water entrapment;
- › Increasing pump discharge pressures generate stronger wear phenomena;
- › Finer filter pore size requires better cleanliness and less insoluble oxidation products;

- › Improved energy efficiency implies better shear stability and higher VI;
- › Use of lower environmental impact products induces formulation restrictions;
- › Fire safety is a growing concern.

NYCO solutions include a range of superior performance synthetic esters and formulated fluids.

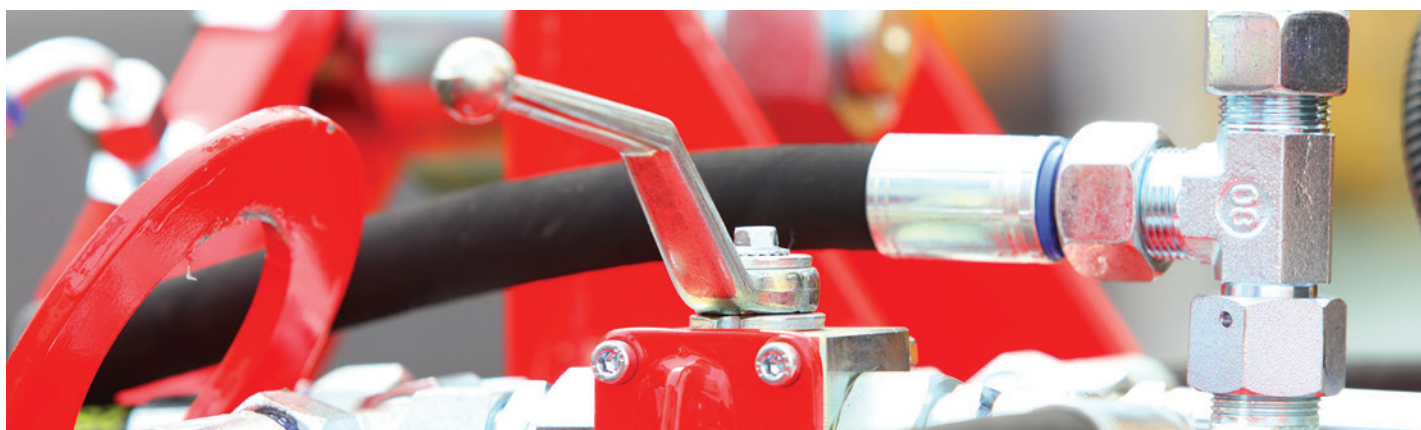
ADVANTAGES AND BENEFITS

Inherent friction modification and anti-wear performance
Excellent thermo-oxidative stability

High viscosity index
Low volatility

High level of biodegradability and renewable carbon contents

- › Excellent pump protection
- › Increased lifetime, delivering dry TOST performance of more than 7000 h
- › Reduced need for shear unstable polymers
- › High flash and fire points, bringing improved fire safety
- › Suitable for the formulation of hydraulic fluids compliant with the latest environmental standards (European Ecolabel, Vessel General Permit, USDA Biopreferred...)



SYNTHETIC ESTERS

REFERENCE	
Nycobase® 3118	Unsaturated neopolyol ester, good overall performance, moderate temperature stability, high flash point, ISO VG 46
Nycobase® 7300	Low viscosity saturated neopolyol ester, low temperatures, biodegradable
Nycobase® 8103	Low viscosity saturated neopolyol ester, thermally stable, biodegradable, renewable, LuSC-list registered
Nycobase® 9300	Low viscosity saturated neopolyol ester, thermally stable, biodegradable
Nycobase® 8311	Low viscosity saturated neopolyol ester, added lubricity, biodegradable, renewable, ISO VG 22, LuSC-list registered
Nycobase® 8345	Complex ester, mostly saturated, biodegradable, renewable, ISO VG 46, LuSC-list registered
Nycobase® 8812	Complex ester, mostly saturated, biodegradable, renewable, ISO VG 68, LuSC-list registered
Nycobase® 8361	Saturated complex ester, high oxidation resistance, biodegradable, renewable, ISO VG 320, LuSC-list registered
Nycobase® 8318S	High performance saturated neopolyol ester, biodegradable, renewable, ISO VG 46, LuSC-list registered
Nycobase® STM	High performance saturated neopolyol ester, biodegradable, renewable, ISO VG 100, LuSC-list registered, high flash point

Typical properties

PRODUCT NAME	Density @ 20°C kg/m3	Viscosity @ -54°C mm2/s	Viscosity @ -40°C mm2/s	Viscosity @ -18°C mm2/s	Viscosity @ 40°C mm2/s	Viscosity @ 100°C mm2/s	Viscosity Index	Pour Point °C	Flash Point °C	Biodegradability OECD 301B	Renewable Carbon %
Nycobase® 3118	917	-	-	1 200	46	9.4	192	-42	316	84	89
Nycobase® 7300	959	15 250	2 500	300	14	3.4	120	-66	235	85	0/77
Nycobase® 8103	943	-	-	460	19.6	4.4	136	-45	257	79	81
Nycobase® 9300	941	-	-	510	21	4.6	140	-45	260	85	-
Nycobase® 8311	937	-	-	550	22.6	4.9	148	-36	270	77	82
Nycobase® 8345	941	-	-	1 430	43	8	162	-45	271	81	82
Nycobase® 8812	942	-	-	3200	72.4	12.1	163	-38	270	65	82
Nycobase® 8361	1014	-	-	46 675	316	32	142	-33	270	67	55
Nycobase® 8318S	926	-	-	1 570	43	7.6	151	-36	283	67	84
Nycobase® STM	915	-	-	7 000	106	14.3	137	-30	310	63	90

FORMULATED PRODUCTS

REFERENCE	
Hydraunycoil® EL 4600	Unsaturated ester based, European Ecolabel certified, moderate temperatures, high flash points
Hydraunycoil® FH 4400	Saturated ester based, very good overall performance
Hydraunycoil® FH 4541 Hydraunycoil® FH 4551	Unsaturated ester based, fire-resistant fluids Unsaturated ester based, fire-resistant fluids, MSHA approved
Hydraunycoil® FH 4700 Hydraunycoil® FH 4900	Specialty fluids, extreme conditions, wide temperature coverage Specialty fluids, ultra low temperature coverage

Typical properties

PROPERTIES	UNIT	HYDRAUNYCOIL						TEST METHOD
		FH 4710	FH 4720	FH 4725	FH 4910	FH 4920	FH 4930	
Density at 20°C	kg/dm ³	0.822	0.836	0.920	0.872	0.881	0.886	ISO 12185
Flash point, COC	°C	93	116	226	94	100	144	ISO 2592
Pour point	°C	-60	-54	-45	-66	-63	-54	ISO 3016
Total acid number	mg KOH/g	0.02	0.03	0.02	0.03	0.64	0.07	ISO 6619
Kinematic viscosity	mm ² /s							ISO 3104
at 40°C		13.30	26.3	28.0	13.8	25.5	32.0	
at -20°C		70	350	560				
Viscosity Index	-	410	355	255	382	352	348	ISO 2909
Foaming at 24°C, tendency/stability	ml/ml			20/0				ASTM D892
Foaming at 94°C, tendency/stability	ml/ml			25/0				ASTM D892
Foaming at 24°C/94°C, tendency/stability	ml/ml			20/0				ASTM D892
Demulsibility	min			20			15	
Rust test	-					Pass	Pass	ASTM D665 A/B
Copper corrosion	-			1a	2a		1a	ASTM D130
4-ball wear scar – 1 h – 392 N	mm				0.88	0.68		ASTM D4172

Typical properties	HYDRAUNYCOIL FH										HYDRAUNYCOIL EL			
	4410	4420	4430	4440	4450	4541	4551	4630	4640	4650				
	TYPICAL RESULTS										TEST METHOD			
PROPERTIES	UNIT													
Density at 20°C	0.959	0.945	0.945	0.941	0.944	0.917	0.917	0.930	0.920	0.917	0.917	0.917	0.917	ISO 12185
Flash point, COC	236	264	266	264	274	305	300	254	310	292	292	292	292	ISO 2592
Pour point	<-57	-51	-48	-39	-36	-44	-30	-51	-45	-45	-45	-45	-45	ISO 3016
Total acid number	0.62	0.55	0.62	0.60	0.59	1.0	1.1	0.8	1.2	0.8	0.8	0.8	0.8	ISO 6619
Kinematic viscosity at 40°C	14.2	23.4	32.8	45.0	72.5	49	71	34.3	47.1	69	69	69	69	ISO 3104
at -20°C	350	841	1188	1892	2163	1 839	2 552	1064	1660	2054	2054	2054	2054	
Viscosity Index	122	146	151	161	156	185	197	178	185	212	212	212	212	ISO 2909
Foaming at 24°C, tendency/stability	0/0	20/0	50/0	0/02	50/0	1/0	10/0	10/0	30/0	5/0	5/0	5/0	5/0	ASTM D892
Foaming at 94°C, tendency/stability	0/0	0/0	20/0	0/0	30/0	10/0	30/0	20/0	30/0	20/0	20/0	20/0	20/0	ASTM D892
Foaming at 24°C/94°C, tendency/stability	0/0	10/0	40/0	0/0	20/0	1/0	5/0	20/0	30/0	10/0	10/0	10/0	10/0	ASTM D892
Demulsibility	10	10	15	15	30	-	-	20	30	20	20	20	20	
Rust test	Pass	Pass	Pass	Pass	Pass	-	-	Pass	Pass	Pass	Pass	Pass	Pass	ASTM D665 A/B
Copper corrosion	1a	1a	1a	1a	1a	1a	1a	1a	1a	1a	1a	1a	1a	ASTM D130
FZG A/8,3/90	-	>12	>12	>12	>12	12	12	12	12	12	12	12	12	ISO 14635-1
4-ball wear scar – 1 h – 392 N	0.49	0.42	0.40	0.39	0.39	0.41	0.41	0.40	0.42	0.39	0.39	0.39	0.39	ASTM D4172
Biodegradability	>60	>60	>60	79	>60	>60	>60	75	70	72	72	72	72	OECD 301B

PERFORMANCE TESTS SUMMARY

Nycobase® 8318S, Nycobase® 8345, Nycobase® 3118

ISO VG 46 – ISO 15380 – EUROPEAN ECOLABEL COMPLIANT				
COMPOSITION	METHOD	NYCOBASE 8318S : 98.746% LZ 5686EL : 1.250% LZ 888 : 0.004%	NYCOBASE 8345 : 9.095% IRGANOX ML811 : 0.900% SYNATIVE AC AMH2 : 0.005%	NYCOBASE 3118 : 98.845% ADDITIVES : 1.150% ANTIFOAM : 0.005%
Kinematic Viscosity, mm ² /s				
at 100°C		7.9	8.31	9.3
at 40°C	ISO 3104	45.6	45.0	47.1
at 0°C		380	367	319
at -20°C		2043	1854	1660
at -20°, 7 days		2065	1991	Hazy
Pour Point, °C	ISO 3016	-36	-45	-45
Flash Point, °C	ISO 2592	281	260	310
Acid Number, mg KOH/g	ISO 6618	0.10	0.38	1.2
Water content, mg/kg	ISO 12937	150	200	200
Copper corrosion 3 h – 100°C	ISO 2160	1b	1b	1b
Rust prevention, deionized water	ISO 7120A	Pass	Pass	Pass
Foam properties, ml				
Sequence I	ISO 6247	0-0	0-0	30-0
Sequence II		0-0	10-0	30-0
Sequence III		0-0	10-0	30-0
Air release (50°C), min	ISO 9120	1.9	9.1	1.2
Water separability (54°C), min	ISO 6614	10	25	30
Dry TOST, hours	ISO 4263-3	>7000	>2100	100
Baader test (72 h at 110°C) KV40 change, %	DIN 51554-3	2.10	0.65	11.40
FZG Load Carrying (A/8.3/90) Fail Load Stage	ISO14635-1	10	>12	12
Van Pump wear (V104C)				
Cam ring, mg	ISO 20763	2.0	4.1	0.3
Vanes, mg		12.3	1.1	0.9
Elastomer compatibility				
Shore A hardness, pts				
NBR 1	ISO 6072	-7	-8	-6
AU		1	-2	-1
HNBR		-6	-11	-5
FKM 2		0	0	0
Volume change, %				
NBR 1	ISO 6072	11	16	17
AU		-1	6	1
HNBR		10	16	4
FKM 2		1	2	0
Elongation change, %				
NBR 1	ISO 6072	-2	-24	-22
AU		-2	7	22
HNBR		-6	-13	-18
FKM 2		-11	2	4
Tensile strength change, %				
NBR 1	ISO 6072	-6	-20	-10
AU		-6	0	11
HNBR		-10	-5	10
FKM 2		4	-15	-10



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