KAL&C
Korea advanced lubrication & Chemical
936-12, ANYANG 3-DONG, MANAN-GU, ANYANG-CITY, KYUNGI-DO, KOREA
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KAL-SUPERLUBE 32

Ultra Long Life Screw Compressor Oil

Description

KAL-SUPERLUBE 32 ultra long life synthetic screw compressor oil which was extended service life significantly.
They keep in long service life by strong oxidation stability and prolonged machine elements life by exceptional wear protection and minimized sludge.
And their outstanding anti-foaming ability which prevent carryover give satisfied lubrication ability to be required in compressor equipment by controling rising temperature.

Feature & Benefits

- Ultra long life compressor oil
- Exceptional wear protection
- Rapid carryover preveting
- Prompt water separation
- Low sludge & breakup ability
- Rust preventing ability
- High flash point

Application

- Oil injection rotary screw compressor for stationary (in 14.9 bar)
- Low temperature season/ compressor that was recommended ISO VG 32

Typical Properties

Appearance		CLEAR SLIDE YELLOW	-
Base Fluid		Synthetic	-
Viscosity, cSt	40℃	32.5	ASTM D445
	100℃	6.0	ASTM D445
Viscosity Index		132	ASTM D2270
Speific Gravity		0.83	ASTM D1298
Flash Point ℃		240	ASTM D92

Pour Point ℃	-46	ASTM D97
EP, FZG gear test, Failure load stage	12	DIN 51354
4Ball wear test,mm (75℃,40kg,1200rpm, 1hr)	0.52	ASTM D2266
Color	L1.0	ASTM D1500
Copper Strip Corrosion	1a	ASTD D130
Form test, Tendency/ Stability, ml Seq. I,II,III	5/0,5/0,5/0	ASTM D892

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KAL-SUPERLUBE 46

Ultra Long Life Screw Compressor Oil

Description

KAL-SUPERLUBE 46 ultra long life synthetic screw compressor oil which was extended service life significantly.
They keep in long service life by strong oxidation stability and prolonged machine elements life by exceptional wear protection and minimized sludge.
And their outstanding anti-foaming ability which prevent carryover give satisfied lubrication ability to be required in compressor equipment by controling rising temperature.

Feature & Benefits

- Ultra long life compressor oil
- Exceptional wear protection
- Rapid carryover preveting
- Prompt water separation
- Low sludge & breakup ability
- Rust preventing ability
- High flash point

Application

- Oil injection rotary screw compressor for stationary (in 14.9 bar)
- Oil injection rotary screw compressor for potable (in 25 bar)
- high temperature season/ use for 4 seasons

Typical Properties

Appearance		CLEAR SLIDE YELLOW	-
Base Fluid		Synthetic	-
Viscosity, cSt	40℃	41.0	ASTM D445
	100℃	6.9	ASTM D445
Viscosity Index		131	ASTM D2270
Speific Gravity		0.84	ASTM D1298
Flash Point ℃		255	ASTM D92
Pour Point ℃		-41	ASTM D97
EP, FZG gear test, Failure load stage		12	DIN 51354
4Ball wear test,mm (75℃,40kg,1200rpm, 1hr)		0.52	ASTM D2266
Color		L1.0	ASTM D1500
Copper Strip Corrosion		1a	ASTD D130
Form test, Tendency/ Stability, ml Seq. I,II,III		5/0,5/0,5/0	ASTM D892

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KAL-SUPERLUBE 68

Long Life Oil Free Screw Compressor Oil

Description

KAL-SUPERLUBE 68 ultra long life synthetic oil free screw compressor oil which was extended service life significantly by using specific additives.
They keep in long service life by strong oxidation stability and prolonged machine gear's life by exceptional wear protection and minimized sludge.
They make possible to protect machine parts and extend service life compared with life of current gear by combining wear protection (for protecting gear), rust preventing and water-oil separation ability.

Feature & Benefits

- Ultra long life compressor oil
- Exceptional wear protection
- Rapid carryover preveting
- Prompt water separation
- Low sludge & breakup ability
- Rust preventing ability

- High flash point

Application

- Oil free rotary screw compressor
- Gear oil for high temperature & load equipment

Typical Properties

Appearance		CLEAR SLIDE YELLOW	-
Base Fluid		Synthetic	-
Viscosity, cSt	40℃	66.5	ASTM D445
	100℃	9.7	ASTM D445
Viscosity Index		127	ASTM D2270
Speific Gravity		0.85	ASTM D1298
Flash Point ℃		255	ASTM D92
Pour Point ℃		-39	ASTM D97
EP, FZG gear test, Failure load stage		12+	DIN 51354
4Ball wear test,mm (75℃,40kg,1200rpm, 1hr)		0.47	ASTM D2266
Color		L1.0	ASTM D1500
Copper Strip Corrosion		1a	ASTD D130
Form test, Tendency/ Stability, ml Seq. I,II,III		10/0,10/0,10/0	ASTM D892

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KAL-SUPERLUBE 100

Long Life Vane Compressor Oil

Description

KAL-SUPERLUBE 100 ultra long life synthetic oil free screw compressor oil which was extended service life significantly by using specific additives.
They keep in long service life by strong oxidation stability and prolonged vane's life by exceptional wear protection and minimized sludge.
Their outstanding lubrication ability and wear protection can hold down rising temperature and their carryover preventing ability contribute to make cleaness air.

Feature & Benefits

- Ultra long life compressor oil
- Exceptional wear protection : vane protection ability
- Rapid carryover preveting
- Prompt water separation
- Low sludge & breakup ability
- Rust preventing ability
- High flash point

Application

- Rotary vane compressor
- Gear oil for high temperature & load equipment

Typical Properties

Appearance		CLEAR SLIDE YELLOW	-
Base Fluid		Synthetic	-
Viscosity, cSt	40℃	96.7	ASTM D445
	100℃	11.7	ASTM D445
Viscosity Index		110	ASTM D2270
Speific Gravity		0.86	ASTM D1298
Flash Point ℃		255	ASTM D92
Pour Point ℃		-35	ASTM D97
EP, FZG gear test, Failure load stage		12+	DIN 51354
4Ball wear test,mm (75℃,40kg,1200rpm, 1hr)		0.45	ASTM D2266
Color		L1.0	ASTM D1500
Copper Strip Corrosion		1a	ASTD D130
Form test, Tendency/ Stability, ml Seq. I,II,III		10/0,10/0,10/0	ASTM D892

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KAL-SUPERLUBE FD32/46

Food Grade Screw Compressor Oil

Description

KAL-SUPERLUBE FD32/46 is very safe compressor oil for human body by using

pure base oil which was approved by FDA and specific additives.
They keep in long service life by strong oxidation stability and prolonged machine elements life by exceptional wear protection and minimized sludge.
And their outstanding anti-foaming ability which prevent carryover give satisfied lubrication ability to be required in compressor equipment by controling rising temperature.

Feature & Benefits

- Safe in human body
- Long life
- Carryover preveting
- Prompt water separation
- Low sludge & breakup ability
- Rust preventing ability
- High flash point

Application

- Oil injection rotary screw compressor for stationary (in 14.9 bar)

Typical Properties

		KAL-SUPERLUBE		-
		FD32	FD46	
Appearance		WHITE	WHITE	
Viscosity, cSt	40℃	32.5	41.3	ASTM D445
	100℃	5.9	7.0	ASTM D445
Viscosity Index		127	129	ASTM D2270
Speific Gravity		0.83	0.84	ASTM D1298
Flash Point ℃		240	260	ASTM D92
Pour Point ℃		-25	-20	ASTM D97
4Ball wear test,mm (75℃,40kg,1200rpm, 1hr)		0.90	0.90	ASTM D2266
Color		L0.5	L0.5	ASTM D1500
Copper Strip Corrosion		1a	1a	ASTD D130
Form test, Tendency/ Stability, ml Seq. I,II,III		20/0, 20/0, 20/0	20/0, 20/0, 20/0	ASTM D892

KAL-SUPERLUBE 32/46

Ultra Long Life Screw Compressor Oil

1. Description

KAL-SUPERLUBE 32/46 ultra long life synthetic oil was designed to keep highest lubrication ability and efficiency. So it's possible to lubricate for a long period of time in a severe condition which can't be overcomed by using mineral based oil.
They provide exceptional wear protection, superb oxidation stability and various advantages by using synthetic hydrocarbon fluid and high techenology additive system.

They give prolonged oxidation stability which determine service life time of compressor oil and create clean compressed air by preventing carryover with outstanding anti-foaming system and high flash point.

Their high viscosity index minimize wear and oxidation as making lubrication film in high temperature (summer) and extend endurance of motor by operating motor smoothly in low temperature (winter)when it start firstly.

Their thermal stability and wear protection minimize carbon formation. Even carbon was created, they breakup carbon fully.
So they always keep clean inside of lubrication system by preventing carbon and leading full discharge when oil is exchange.

And our KAL-SUPERLUBE FLO, flushing oil, make stable operating condition when exchange all other oil (synthetic and mineral based) for our synthetic oil.

2.Feature & Benefits

1) Ultra long life synthetic compressor oil
2) Outstanding carryover preveting
 - Clean compressed air and improving compressor efficiency
3) Great water separation
 - improving wear protection and preventing oxidation
4) Low sludge & carbon
 - extending service life of separator
5) Excellent carbon breakup ability
 - Keeping cleanness and extending service life of separator
6) For 4 seasons

3. KAL-SUPERLUBE 32/46

1) Typical Properties

		TEST METHOD	KAL-SUPERLUBE	
		ASTM	32	46
ISO VG		D2422	32	46
Base Oil			Synthetic Hydrocarbon	Synthetic Hydrocarbon
Specific Gravity@15℃		D1298	0.835	0.841
Flash Point ℃		D92	240	250
Pour Point ℃		D97	-45	-41
Color, ASTM			L0.5	L0.5
Viscosity	@40	D445	32.5	41.0
cSt	@ 100	D445	6.0	6.9
Viscosity Index		D2270	132	131
RBOT / min		D2272	2,000 (over)	2,000 (over)
Demulsibility @54℃,(oil-water-emulsion(min))		D1401	40-40-0(5)	40-40-0(5)
Copper Strip Corrosion (100℃*3Hr)		D130	1a	1a
Anti-Foaming test(ml) seq. I/ II/ III		D892	5/0 5/0 5/0	5/0 5/0 5/0
4Ball wear test,mm (75℃,40kg,1200rpm, 1hr)		D2266	0.52	0.52

2) KAL-SUPERLUBE 32/46

A. Life time

Compressor oil extremly require thermal and oxidation stability in high temperature and pressure due to accompany with moisture.

KAL-SUPERLUBE 32/46 keep ultra long life in a severe operating condition by using synthetic based oil specific additives.

Oxidation Stability Test

RBOT min, 150℃, ASTM D2272	over 2,000
TOST HR, 95℃, ASTM D943	over 2,000

As showing above oxidation stability teat which determined service life, KAL-SUPERLUBE 32/46 have oxidation stability for a long period of time . For carrying out long term lubrication ability, they can be used more than 8,000 hours by using specific additives.

Concerning period of exchange, it's better to follow manufacturer's exchange cycle (Please consider capacity of sump tank, cooler and installation environment, operation condition and so forth)

Exchange Period For Each Compressor

Compressor Maker	Oil Quantity	Life Exchange ,HR	REMARK
ATLAS COPCO, 100HP	26L	4,000 ~ 8,000	Normal operating-temperature (below 95℃)
INGERSOLL-RAND, 100HP	35L	5,000 ~ 8,000	
QUINCY, 100HP	80L	8,000 ~ 10,000	
SULLAIR, 100HP	60L	8,000	

B.Create sludge and exchange period of separator

There are a lot of pressure difference originated from compressor oil mainly by eye lock. This symptom cause from metal fraction, sludge and carbon.

Using of wear protection additives which create sludge and carbon have to be applied technically because compressor oil have to oprerate in high temperature (below 100℃)
Therefore KAL-SUPERLUBE are using specific additives which lead to extended service life of bearing and preventing pressure difference by holding down carbon and sludge.

Sludge creating test

220℃, 3Hr	Brown clarity
	No carbon, Breaking up perfectly, No smell

Even they have stronger wear protection compared with all other lubricants, They create minimized sludge, carbon, rust and metal fraction which affect exchange period of separator.

And they prevent eye lock of separator by breaking up minimized sludge fraction. This advantages give economical benefits in cost by extending service life of separator and exchange period of oil.

C. Carryover preventing ability

Carryover tendency was caused by capacity of sump tank, separator and oil. But ability of oil among all is major factor to prevent carryover problem. Generally oil carryover was caused by two reasons " anti-foaming system " & " flash point " but anti-foaming ability provide the cause of carryover mainly (more than 90 %)

- When anti-foaming ability can't be carried out properly

In the middle of turning from loading to unloading, temporarily create foams on the surface of oil. If foams don't disappear until resuming loading, foams will be carried out easily through separator.

Anti-foaming test

	KAL-SUPERLUBE 32 / 46
Anti-foaming test (ml) seq I /II /III	5/0 5/0 5/0

KAL-SUPERLUBE 32/46 minimize oil carryover with rapid anti-foaming ability compared with all other lubricants in any severe operating condition

- In case of low flash point

they can't prevent to evaporate with low flash point a number of oil will go out with air through separator.

Flash point

	KAL-SUPERLUBE 32	KAL-SUPERLUBE 46
Flash Point, ℃	240	250

KAL-SUPERLUBE 32/46 prevent oil carryover maintaining higher flash point than mineral based oil (more than 20 ℃)

D. Preventing ability of temperature rising

Temperature rising was caused from capacity of sump tank, cooler,oprerating condition, installation environment, season and so forth.

Preventing ability of temperature rising by oil is very important to compressor (If compressor oprerate in 10℃ higher temperature than normal temperature, oil service life wil be decreased to 1/2 of official life)

To the contrary, if compressor operate in 5℃ lower temperature than normal Temperature, oil service life wil be increased to 1/3 of official life (or extended 1,000 hours)

There are two factors of temperature rising mainly as follows ;

- Anti-foaming ability
- Proper viscosity

a. Anti-foaming ability

Anit-foaming ability of oil is very important same as oxiation stability. Because even the oil which have great oxidation stability, oxidation stability can be droped drastically with temperature rising of compressor by bad anti-foaming system.

- Cavitation : If a lot of foam which wasn't disappeared circulate through compressor, oil can't working their typical role such as cooling, sealing and lubrication due to lacking of same oil quantity as foam. It also cause high temperature.

- Increase of oil consumption by carryover :
In the middle of turning from loading to unloading, temporally create foams on the surface of oil. If foams don't disappear until resuming loading, foams will be carriedout easily through separator. It also cause high temperature.

Anti-foaming test

Anti-foaming test (ml)	seq I 23.9℃	5/0
	seq II 93.9℃	5/0
	seq III 23.9℃	5/0

KAL-SUPERLUBE 32/46 show below 5 ml foam for 5 minutes. Especially present rapid anti-foaming ability on seq II 93.9℃ which is close to actual operating temperature. This aspect means KAL-SUPERLUBE can prevent temperature rising caused by carryover.

b. Proper viscosity

Temperature of compressor which rotate rapidly is affected by Viscosity. Usually ISO VG32, 46 is used for compressor oil. But if choose lower no. than proper viscosity, cause destruct of lubrication film and it raise high temperature of compressor.

To the contrary, if choose higher no. than proper viscosty, cause fluid resistance and it also raise high temperature of compressor.

That's because choice of proper viscosity is very important for compressor.

E. Water- oil separation

Dut to compressor oil accompany with moisture which is included in compressed air, Moisture which disturb lubrication have to be removed rapidly.

Circulating oil with moisture is oxidated by O_2 out of moisture and cause rust and corrosion of machine parts such as bearing and so forth.

Bad water-separation ability reduce service time of machine elements.

As a result, water-oil separation abilty is important for compressor oil in a view of above aspects.

Water- oil separation test

KAL -SUPERLUBE 32 / 46

Demulsibility @54℃,(oil-water-emulsion(min))	40-40-0(5)

Water- oil separation is allegedly acceptable to divide within 10 minutes. KAL-SUPERLUBE have great water-oil separation ability.

F. Wear protection

Using of wear protection additives which create sludge and carbon have to be considered technically because compressor oil have to oprerate in high

temperature (below 100℃)
Therefore compressor oil have to be contained sepcific additives which restrain carbon and sludge creations leading to extend service life of bearing and prevent pressure difference.
KAL-SUPERLUBE have exceptional wear protection and lubrication ability.

Wear protection ability test

	KAL-SUPERLUBE 32 / 46
4 Ball Test, 1200rpm, 40kg, 75℃ (mm)	0.52

G. Pour point

In the winter season (under 0 ℃) the viscosity of oil will be increased and their high viscosity cause excessive high load against operating motor and increase consumption of elcectric power.
(In winter of Korea usually drop up to -10℃ and sometimes can be reached to nearly -30 ℃)
Synthetic based oil KAL-SUPERLUBE have low pour point due to they don't contain wax ingredient or have minimized wax ingredient.

Pour point

	KAL-SUPERLUBE 32	KAL-SUPERLUBE 46
Pour Point, ℃	-45	-41

KAL-SUPERLUBE's pour point have outstanding ability which endure low tempreatur like under -40℃.
So with KAL-SUPERLUBE, motor can be started smoothly and their low pour point extend exchange period of time of oil significantly.

H. Fire and explosion

Flash point

	KAL-SUPERLUBE 32	KAL-SUPERLUBE 46
Flash Point, ℃	240	250

Compressor equipment have a few devices to prevent fire by themselves.
Concerning fire and explosion, If we access by view of oil, it was mainly affected by flash point, sludge quantity and breakup ability of sludge.

Low flash point cause unexpected fire or explosion as a lot of evaporated oil and locked valves by sludge fractions.
KAL-SUPERLUBE 32/46 have 20℃ higher flash point than mineral based oil .
This advantages minimize fire and explosion danger extremly.

4. KAL-SUPERLUBE 32/46 Exchange Criterion

		KAL-SUPERLUBE 32	Exchange standard
Specific Gravity@15℃		0.83	-
Flash Point ℃		240	240 -10%
Pour Point ℃		-45	-45 +20%
Color,ASTM		L0.5	
Viscosity	@40	32.5	32.5 ± 20%
cSt	@ 100	6	6.0 ± 20%
Viscosity Index		132	132 ± 10%
TAN		0.13	1.0
N-Pentane, %		-	more than 0.2%
Demulsibility @54℃,(oil-water-emulsion(min))		40-40-0 (5)	40-40-0(30)
Copper Strip Corrosion (100℃*3Hr)		1a	under 1b

1) Specific Gravity

Through change of gravity we can verify whether another type of oil inflowed or not. If another type of oil inflow into current oil, immediately exchange current using oil for new one.

2) Flash Point

Flash point would be droped by inflowing of another oil or viscosity change which was occur from oxidation.
If flash point drop more than 10% from normal flash point, it can be the reason to exchange current oil for new one.

3) Pour Point

Pour point would be rised by inflowing of another oil or viscosity change which was occur from oxidation.
If pour point rise more than 20% from normal pour point, it can be the reason to exchange current oil for new one.

4) Color

Basically change of color can't be reason to exchange. But if they show opacity without any problem, we recommend to exchange current oil for new one.

5) Viscosity

When oil start to oxidate, viscosity would be changed by destructuring chains of oil constitution.
If viscosity change more than ±10% from normal pour point, it can be the reason to exchange oil for new one.

6) Total Acid Number

When oil start to oxidate, viscosity would be changed by destructuring chains of oil constitution.
Viscosity,pour and flash point change simultaneously as proceeding oxidation.
Total Acid Number 2.0 is criterion of oil exchange.

7) Anti-melting ingredient (n- pentane)

If dilute and evaporate current using oil with strong solvent n-pentane, there are some depostions like metal fractions which wasn't melted.
If depostion remain more than 2.0% compared with total oil quantity.

8) Demulsibility

When oil start to oxidate, water separation ability come down by changing of oil constitution.
Approximately if oil can't be separated from water within 20 minutes, it was regared as the right time to exchange current oil for new one.

9) Coorper Strip Corrosion

When oil start to oxidate, the level of corrosion begin to rise.
If they show 1b corrosion degree, it can be the reason to exchange current oil for new one.