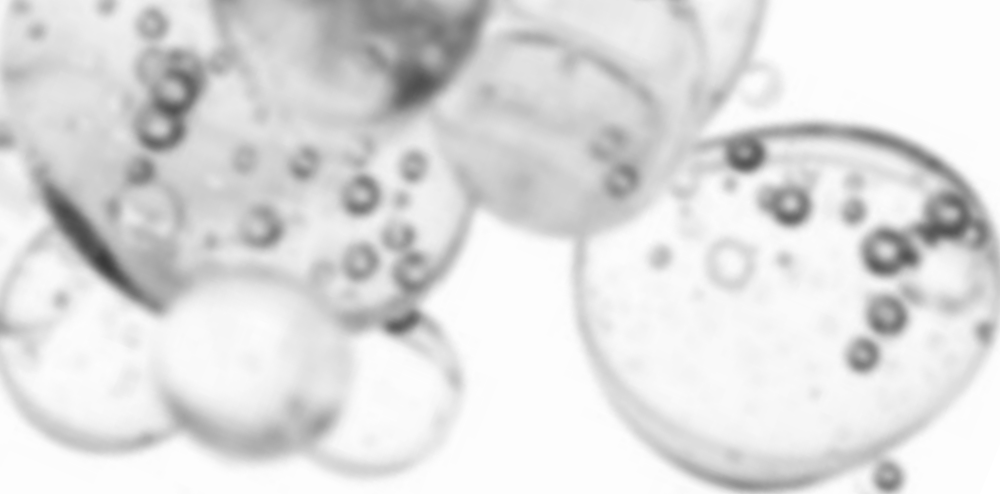


PALMESTER & TEMEST

Ester range

Base Oils & Additives for Lubricants



KLK TEMIX SpA is part of the Oleochemical division (or known as KLK OLEO) of Kuala Lumpur Kepong Berhad (KLK). We are an oleochemical producer based in Italy with strong traditions and values, and the combination of its broad portfolio and customer-focused approach provides the versatility to help you develop special solutions.

As a worldwide oleochemical producer with over 100 years of experience, **KLK OLEO** is committed to providing the best sustainable solutions to meet global needs and consumer trends. Indeed, our extensive product portfolio serves a wide range of industries and markets, including Beauty & Personal Care, Home Care, I&I Cleaning, Polymers, Lubricants, Food & Nutrition, and Pharmaceuticals.

Headquartered in Malaysia, **KLK OLEO** has established several sites in Europe (Belgium, Germany, Italy and Switzerland). Our global presence ensures that we can effectively support all our customers' formulation goals at a local level. By thinking globally and acting locally, we are the leading oleochemical producer in the Old Continent.

Through the delivery of high-quality products, continuous improvement, integrity and ethics, **KLK OLEO's** vision is to become the most trusted global partner in oleo-based solutions, constantly enriching lives in a sustainable manner.

Real Sustainability

Now a well-known resource for speciality oleochemical esters, **KLK TEMIX** focuses on sustainable chemistry, promoting the use of selected renewable and biodegradable raw materials. Even internally, **KLK TEMIX** promotes eco-compatible business management practices, encouraging its team to continually seek innovative, sustainable and qualitative solutions.

Research and Development

With an ever-changing market, the ability to innovate is paramount. **KLK TEMIX** continually invests in technological innovation, particularly through its Research and Development efforts.

Customised Products

KLK TEMIX has the ability to develop tailor-made products designed to meet each customer's needs. For more information on the technical details of this process, our sales office would be happy to help you.

Approvals & Certifications

RSPO MB, Kosher and Halal certified products are available upon request. More than 60 products are listed in the LuSC-list.





It's All About **RISE**

R

Reliable

KLK OLEO's knowledge and expertise will help you achieve your product development goals, while ensuring performance, quality and supply reliability.

I

Integrated

KLK OLEO offers a comprehensive product portfolio, from basic oleochemicals to downstream derivatives, that can be easily adapted to the needs of different industries.

S

Sustainable

KLK OLEO products allow you to meet your sustainability goals and further improve your ethical, environmentally friendly profile.

E

Efficient

The KLK OLEO team is committed to delivering the benefits of market knowledge, sales responsiveness and formulation support, maximising efficiency and improving the quality of your products.



Our Product Range is based on Several Raw Materials

Alcohols

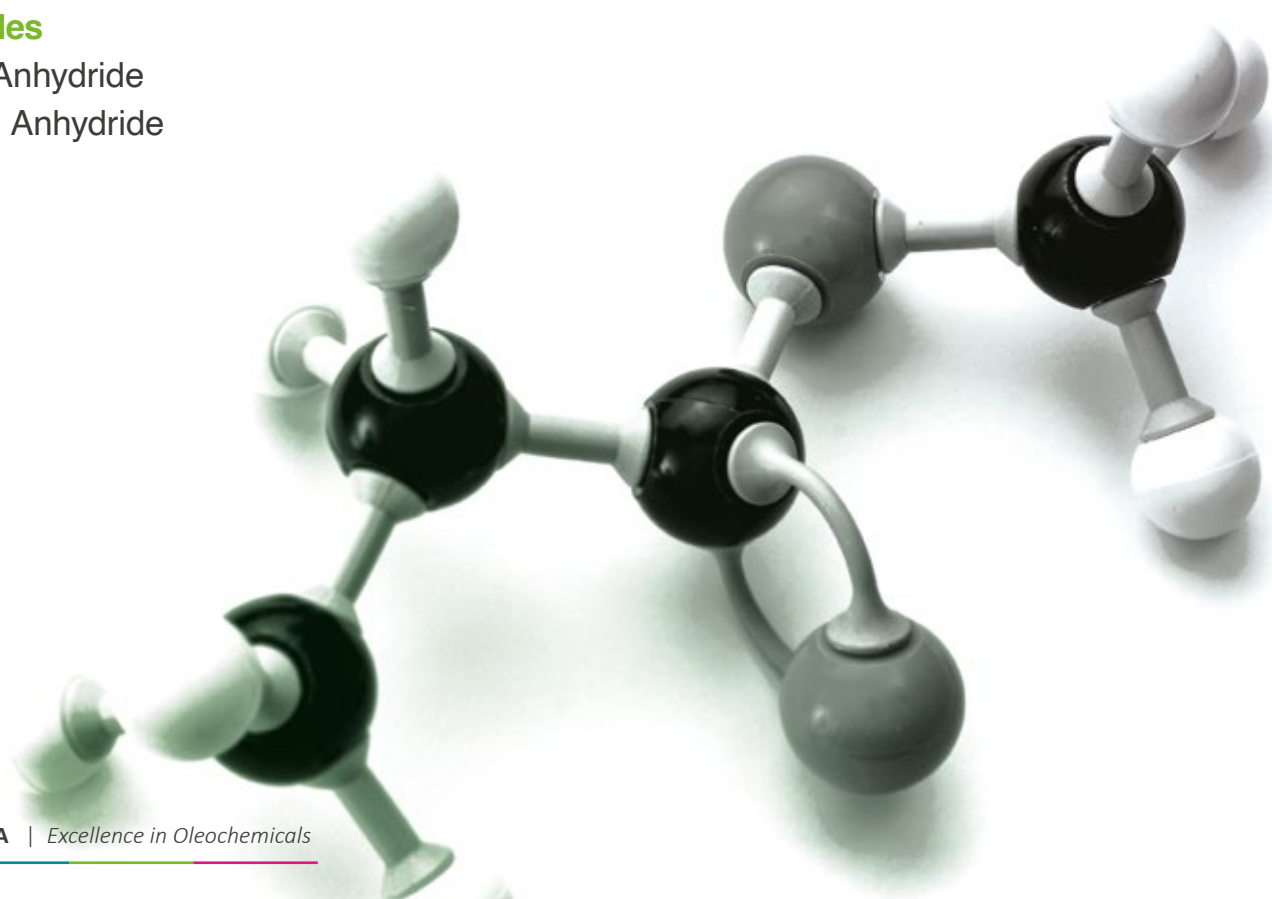
Methyl Alcohol
Isopropyl Alcohol
Ethylhexyl Alcohol
Isodecyl / n-Decyl Alcohol
Isotridecyl / Tridecyl Alcohol
Neopentylglycol
Glycerol
Trimethylol Propane
Pentaerythritol
PEG

Fatty Acids

Caprylic Acid
Pelargonic Acid
Capric Acid
Caprylic/Capric Acid
Lauric Acid
Coconut Acid
Palmitic Acid
Stearic Acid
Isostearic Acid
Oleic Acid
Adipic Acid
Azelaic Acid
Sebacic Acid

Anhydrides

Phthalic Anhydride
Trimellitic Anhydride



Mono Esters

Methyl Esters

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gI ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST A20	1,5	80	-39	30 (APHA)	0,3	>75%	>85
TEMEST A4050	4	140	n.a.	90 (APHA)	0,5	>70%	>90
TEMEST A85	5	180	-15	3 (Gardner)	105	>75%	>90
TEMEST A6055	6,5	130	5	30 (APHA)	67	>75%	>90
PALMESTER 1502	2,5	132	3	<25 (APHA)	<1	n.a.	>90
PALMESTER 1500	4,4	179	0	<100 (APHA)	92,8	n.a.	>90
PALMESTER 1501	4,5	190	9	<25 (APHA)	61	n.a.	>90

n.a. (not available)

Isopropyl Esters

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gI ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
PALMESTER 1505	2,9	148	-12	<30 (APHA)	< 1	>65%	>80
PALMESTER 1509	3,9	163	-9	<30 (APHA)	< 1	n.a.	>80
PALMESTER 1528	5,2	176	12	<30 (APHA)	< 1	n.a.	>80
PALMESTER 1412	5,4	192	-24	<3 (Gardner)	82	100%	>80

n.a. (not available)

Butyl Esters

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gI ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST D60	6	160	18	2 (Gardner)	<1	>80%	>60
TEMEST E65	6,2	160	-20	2 (Gardner)	80	>95%	>80
PALMESTER 1451	6,3	195	18	< 1 (Gardner)	<1	>80%	>80
PALMESTER 1456	6	202	-26	200 (APHA)	78	n.a.	>80

n.a. (not available)

Isotridecyl Esters

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gI ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST M40	10	>240	-20	60 (APHA)	1	>80%	>50
TEMEST M60	16	>240	0	80 (APHA)	2	>70%	>55

PEG Esters

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gI ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST S65	46	310	0	4 (Gardner)	55	n.a.	>65

n.a. (not available)



Sorbitan Esters

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gI ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST Q65	1000	280	0	8 (Gardner)	75	>80	100

2-Ethylhexyl Esters

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gI ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST 2EHL	5	170	-30	20 (APHA)	1	>90%	>55
TEMEST 2EHC	6	170	-20	60 (APHA)	10	>90%	>55
TEMEST J65	8,5	240	-20	0,5 (ASTM)	60	>85%	>65
TEMEST J65A	8,5	240	-20	0,5 (ASTM)	60	>85%	>65
TEMEST J70	8,5	210	-9	1 (Gardner)	38	>75%	>60
TEMEST 2EHP	8,5	210	-3	20 (APHA)	1	>80%	>60
TEMEST J60	9	190	-5	4 (Gardner)	30	>75%	>60
TEMEST 2EHS	9	220	7	30 (APHA)	1	>80%	>65
TEMEST J110	10,5	250	-60	50 (APHA)	0,5	>80%	>40
TEMEST J100	84	260	-50	50 (APHA)	0,5	0	0
TEMEST J200	94	260	-35	8 (Gardner)	60	>60%	>65



Di-Esters

Neopentylglycol Esters

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gl ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST F35	8,5	218	-36	5 (Gardner)	1	>80%	>70
TEMEST HF65	32	285	-25	4 (Gardner)	80	>75%	>80
TEMEST F95	46	270	-30	4 (Gardner)	3	>90%	>80
PALMESTER 5400	24,5	276	-33	<3 (Gardner)	84	>90%	>80

Adipates

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gl ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST E05M	5	136	n.a	1 (Gardner)	0	>80% (OECD 301D)	0
TEMEST J05	8	207	-68	20 (APHA)	0	>90% (OECD 301F)	0
TEMEST L05	15	216	-55	20 (APHA)	0	>75% (OECD 301B)	0
TEMEST M05	27	230	-50	50 (APHA)	0	>65% (OECD 301F)	0

Phthalates

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gl ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST L105	39	231	-48	20 (APHA)	0	>70%	0
TEMEST M105	85	254	-42	50 (APHA)	0	20 - 60%	0

Sebacates

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gl ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST J30	11.5	225	-60	70 (APHA)	0	>80%	0

Polyol Esters

Glycerol Esters

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gI ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST 810	15	>250	-9	20 (APHA)	0,3	>90%	100
TEMEST N65	37	280	-3	4 (Gardner)	90	>60%	100
TEMEST 810S	75	>250	-5	150 (APHA)	2	>60%	100
TEMEST GMO	75	180	15	4 (Gardner)	70	>60%	100
TEMEST N85	80	240	0	6 (Gardner)	100	>60%	100
TEMEST 810S2	220	250	-5	150 (APHA)	2	>60%	100

Trimellitates

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gI ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST K100	54	218	-45	80 (APHA)	0	20 - 60%	0
TEMEST J100	84	260	-50	50 (APHA)	0,5	20 - 60%	0
TEMEST L100	135	280	-28	80 (APHA)	0	20 - 60%	0
TEMEST M100	315	260	-15	70 (APHA)	0	20 - 60%	0

TMP

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gI ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST H20 serie	20-46-100 300-500-1000	270	-48	150 (APHA)	0,5	>60%	>60
TEMEST H35 serie	21-100-320	255	-48	100 (APHA)	1	>60%	>60
TEMEST H45 serie	160-320	300	-6	5 (Gardner)	10	>60%	>60



TMP Trioleate

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gI ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST H65V	46	300	-12	0,7 (ASTM)	78	>75%	>85
TEMEST H65S	46	300	-42	1 (ASTM)	90	>75%	>85
TEMEST H65SLL	46	300	-42	0,8 (ASTM)	78	>75%	>85
TEMEST H65SV	46	300	-42	4 (Gardner)	78	>75%	>85
TEMEST H6505S	68	300	-42	1,5 (ASTM)	78	>75%	>85
TEMEST H65100	100	300	-33	1,5 (ASTM)	78	>60%	>60
TEMEST H65150	150	300	-33	1,5 (ASTM)	78	>60%	>60
TEMEST H6509	220	300	-33	1,5 (ASTM)	78	>60%	>60
TEMEST H6507S	320	300	-33	8 (Gardner)	78	>60%	>60
TEMEST H6506S	480	310	-33	2 (ASTM)	78	>60%	>60
TEMEST H6508S	680	300	-24	8 (Gardner)	78	>60%	>60
TEMEST H6505P	1500	300	-15	2 (ASTM)	60	>60%	>60

Pentaerythrityl Esters

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (g ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST G65	60	280	-20	1 (ASTM)	85	>70%	>85
TEMEST G6505	110	300	-20	3 (ASTM)	85	>65%	>85
TEMEST G95	150	290	-20	80 (APHA)	0,5	>65%	>85
TEMEST GG6506	350	290	-5	3 (ASTM)	80	>60%	>70
TEMEST G6506	450	290	-5	3 (ASTM)	80	>60%	>70

Special Esters

LEAD TO SUSTAINABLE INNOVATION AND RENEWABLE PRODUCTS

KLK TEMIX pursues the creation of sustainable business management and an eco-compatible internal process on a daily basis, which lead to the re-thinking of suitable, sustainable and qualitative solutions.

Pelargonic Esters

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (g ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST J35	3,5	150	-50	350 max (APHA)	1	>75%	>50
TEMEST F35	8,5	218	-36	5 (Gardner)	1	>80%	>70
TEMEST H35	21	255	-48	100 (APHA)	1	>75%	>75
TEMEST H4535	36	275	-18	350 max (APHA)	15	>60%	>80
TEMEST H35100	100	255	-48	100 (APHA)	1	>60%	>60
TEMEST H35320	320	232	-48	5 (Gardner)	1	>60%	>60



Saturated Esters

Isotridecyl Esters

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gl ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST M40	10	>240	-20	60 (APHA)	1	>80%	>50
TEMEST M60	16	>240	0	80 (APHA)	2	>70%	>55

Ethylhexyl Esters

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gl ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST 2EHL	5	170	-30	20 (APHA)	1	>90%	>55
TEMEST 2EHC	6	170	-20	60 (APHA)	10	>90%	>55
TEMEST 2EHP	8,5	210	-3	20 (APHA)	1	>80%	>60
TEMEST J100	84	260	-50	50 (APHA)	0,5	20 - 60%	0
TEMEST J110	10	240	-50	50 (APHA)	0,5	>80%	>40

Tmp complex Esters

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gl ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST H20 serie	20-46-100 300-500-1000	270	-48	150 (APHA)	0,5	>60%	>60
TEMEST H35 serie	21-100-320	255	-48	100 (APHA)	1	>60%	>60
TEMEST H45 serie	160-320	300	-6	5 (Gardner)	10	>60%	>60

Complex Esters

Products	Viscosity @40°C (cSt)	Flash Point (°C)	Pour Point (°C)	Colour	Iodine Value (gl ₂ /100g)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST MH05	46	260	-30	0,5 (ASTM)	1	n.a.	0
TEMEST MH06	68	260	-36	0,5 (ASTM)	1	n.a.	0
TEMEST MH07	100	260	-30	0,5 (ASTM)	1	n.a.	0
TEMEST MH08	460	260	-25	0,5 (ASTM)	1	n.a.	0
TEMEST U05/7	4000*	260	-20	250 (APHA)	1	n.a.	0
TEMEST U05/8	7000*	260	-20	150 (APHA)	1	n.a.	0

n.a. (not available)

* Dynamic viscosity @25°C (mPa.s)



Application Guide

Industrial Gear Oils

Hydraulic Fluids

Turbine & Compressor Oils

Metalworking Fluids

High Temperature Oils

Engine Oils

Chain Oils

TEMEST 2EHC				✓				
TEMEST 2EHL				✓				
TEMEST 2EHP				✓				
TEMEST J65				(WMF) ✓				
TEMEST F65		✓						
TEMEST HF65		✓						
TEMEST L05			✓					
TEMEST M05			✓					
TEMEST H20	✓	✓	✓	✓	✓	✓		✓
TEMEST H35	✓	✓				✓	✓	
TEMEST G95			✓				✓	✓
TEMEST H65S		(FR) ✓		✓				✓
TEMEST H6505S		(FR) ✓						
TEMEST J100							✓	✓
TEMEST J110							✓	✓
TEMEST MH08				✓				
TEMEST K100	✓		✓		✓	✓	✓	
TEMEST L100	✓		✓		✓	✓	✓	
TEMEST L105			✓					
TEMEST M100	✓		✓		✓	✓		
TEMEST M105			✓					

*WMF: Water Miscible Fluid | *FR: Fire Resistant

Esters for Stroke Engine Oils

Products	Applications	Biodegradability (OECD 301)	Bio-based Carbon (%)
TEMEST J05	2 and 4 strokes engine oils	>90% (OECD 301F)	0
TEMEST L05	2 and 4 strokes engine oils	>75% (OECD 301B)	0
TEMEST J30	2 and 4 strokes engine oils	>80% (OECD 301B)	0
TEMEST H35	2 and 4 strokes engine oils	>75% (OECD 301B)	>75
TEMEST J200	2 strokes motor oils	>60% (OECD 301B)	>65
TEMEST MH08	High competition	n.a.	0

n.a. (not available)

Esters for Gear Oils

The gear lubrication oil is a machine component of particular significance for gear and transmission. During operation, the lubricant comes into contact with most of the other built-in machinery components. Apart from the important function of lubricating the sliding rolling contacts, the oil also fulfills the task of cooling and removing the friction heat generated in the sliding rolling contacts. In many areas of machine designing, lubricants gears require:

- High oxidative stability,
- Good scuffing,
- Scoring and wear load capacity;
- Ability to create a film thickness with an adequately high viscosity at operating temperature.

In our portfolio, we can offer synthetic esters that match the requirements for this application:

TMP Complex Esters

Products	Viscosity @40°C (cst)	Pour Point °C	Thermal Resistance	Biodegradability OECD 301B	Bio-based Carbon (%)
TEMEST H20 serie	20-46-100 300-500-1000	-48	high	>60%	>60
TEMEST H35 serie	21-100-320	-48	high	>60%	>60
TEMEST H45 serie	160-320	-6	high	>60%	>60

- Saturated
- High stability at thermo-oxidation
- High flash point
- Excellent lubricity
- Eco-friendly
- Longer life than minerals

In the application, you can add the same additive used in mineral oil or PAO-based products. Eventually, we can also provide products with additives. This class of esters is completely miscible in mineral oil or PAO-based products.



Esters for Hydraulic Fluids

In general, hydraulic fluid characteristics have these primary functions and properties:

- Transferring pressure and motion energy;
- Transferring forces and moments when used as a lubricant;
- Minimisation of wear to sliding surfaces under boundary friction conditions;
- Minimisation of friction;
- Protection of components against corrosion (ferrous and non-ferrous metals);
- Dissipation of heat;
- Suitability for a wide range of temperatures, good viscosity-temperature behavior;
- Prolonging the life of machinery, etc.

The wide variety of different characteristics required for hydraulic fluids necessitates special performance, which cannot be satisfied by just one base oil. In our product portfolio, we have esters for extended life applications or products suitable for fire resistant applications:

Long Life:

The required fluid life, availability, economic and ecological factors also determine the type of hydraulic oil used.

Main Properties:

- Low viscosity
- Saturation assures long stability high flash point
- Unsaturated fire resistance
- Excellent lubricity
- High thermo-oxidation stability

Our Main Products:

TEMEST H35

- Fully saturated
- Excellent thermo-oxidation stability
- Extremely high flash point

TEMEST H45

- Almost saturated
- Excellent thermo-oxidation stability
- Moderate pour point

TEMEST M05/MH05

- Fully saturated
- Extremely low pour point
- Extremely high flash point

Fire Resistant:

These fluids have significantly higher ignition temperatures and fire resistant properties than mineral oils.

Main Properties:

- Unsaturated products
- High flash point
- Fire resistant
- Poor thermo-oxidation stability

Our Main Products:

TEMEST H65S (ISO VG 46)

TEMEST H6505S (ISO VG 68)

TEMEST H65 serie (high viscosity range)

- Very low pour point

TEMEST F65 - TEMEST HF65

TEMEST Esters are suitable to formulate **HFDU** (fire resistant) and **HEES** (biodegradable) hydraulic oils

Fire Resistant and Biodegradable Hydraulic Oils

Products	Viscosity @40°C (cst)	Additive package	Flash Point °C	Thermal Resistance	Biodegradability OECD 301B	Bio-based Carbon (%)
TEMEST H65SA	46	x	300	medium	>80%	>85
TEMEST H6505SA	68	x	300	medium	>80%	>85

Esters for Metalworking Fluids

Different conditions influence the life of a metal tool: one is the process temperature to which it is subject. In order to extend tool life, an efficient cooling is necessary, to lower the temperature, have good lubrication in the contact area and reduce friction. For this purpose, we use coolants, whose functions are as follows:

Cooling:

Keep the temperature in the cut area constant, removing the heat caused by machining the tool, to avoid deformation of the piece.

Lubrication:

Lubricate the contact area between the chip and the tool chest, thus reducing the cutting forces caused by friction between piece, chip and tool.

Chips Removal:

- Remove and clean the working area of the process.
- These three functions generate energy savings, lower tool wear and therefore overall reduction of total costs.
- For cutting fluids, an excellent lubrication and a great cooling capacity are mainly required.

Furthermore, numerous other features must be taken in consideration, such as:

- Cutting fluid must not produce side effects, such as odors or allergic reactions.
- It must not produce foam even at high pressures.
- It must not dissolve the paints of the machine tool and must not corrode the gaskets.
- It must not cause corrosion on most of the materials from which the piece can be made in such a way that different materials can be processed without the need to change the type of refrigerant.

It is very important to consider the risk of corrosive attack with non-ferrous materials, as for example of copper, brass and aluminium; it must not adhere causing the agglomeration of the shavings, consequently making the cleaning of the tank more difficult or ruining the surface of the piece.

Main Esters for Water-based Formulations

Products	Viscosity @40°C (cSt)	Flash point (°C)	Pour point (°C)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST J65	8,5	240	-20	>85% (OECD 301B)	>65
TEMEST J60	9	190	-5	>75% (OECD 301B)	>60
PALMESTER 1505	2,9	148	-12	>65% (OECD 301B)	>80
PALMESTER 1509	3,9	163	-9	n.a.	>80
PALMESTER 1500	4,4	179	0	n.a.	>90
PALMESTER 1528	5,2	176	12	n.a.	>80
PALMESTER 1412	5,4	192	-24	100% (OECD 301B)	>80
PALMESTER 1501	4,5	190	9	n.a.	>90
PALMESTER 1451	6,3	195	18	>80% (OECD 301B)	>80
PALMESTER 1456	6	202	-26	n.a.	>80

n.a. (not available)

Main Esters for Neat Oil Formulations

Products	Viscosity @40°C (cSt)	Flash point (°C)	Pour point (°C)	Biodegradability (OECD 301B)	Bio-based Carbon (%)
TEMEST A6055	4,5	173	12	>75% (OECD 301B)	>90
TEMEST 2EHL	5	170	-30	>90% (OECD 301B)	>55
TEMEST 2EHC	6	170	-20	>90% (OECD 301B)	>55
TEMEST D60	7	180	20	>80% (OECD 301B)	>60
TEMEST J70	8,5	210	-9	>75% (OECD 301B)	>60
TEMEST 2EHP	8,5	180	-5	>80% (OECD 301B)	>60
TEMEST 2EHS	10	180	0	>75% (OECD 301B)	>65
TEMEST M40	10	200	-20	>80% (OECD 301B)	>50
TEMEST H20	20	240	-40	>75% (OECD 301B)	>75
TEMEST H35	21	240	-40	>75% (OECD 301B)	>75
TEMEST M05	27	200	-45	>65% (OECD 301F)	0
PALMESTER 1505	2,9	148	-12	>65% (OECD 301B)	>80
PALMESTER 1509	3,9	163	-9	n.a.	>80
PALMESTER 1528	5,2	176	12	n.a.	>80
PALMESTER 1412	5,4	192	-24	100% (OECD 301B)	>80
PALMESTER 1456	6	202	-26	n.a.	>80
PALMESTER 1451	6,3	195	18	>80% (OECD 301B)	>80

n.a. (not available)

We also developed the **TEMEST CUT VEG** range: fully additivated fluids based on refined vegetable oil from renewable sources.

Main advantages

- Vapor tension generated by esters is much lower than the vapor tension generated by mineral oils.
- **No exposure limits** (mineral oil has tlv: 5 mg/m³ according to acgih).
- **High health & safety profile:** **TEMEST CUT VEG** does not irritate the skin or the respiratory system.
- **Greater cooling capacity:** the specific heat of **TEMEST CUT VEG** is greater than that of mineral oil.
- **High flash point:** **TEMEST CUT VEG** allows unattended performance of mechanical processing.
- **High fire point.**
- **High smoke point.**
- Esters allow for an increase in productivity without generating mists or emissions.
- Long chain vegetable oils are not explosive at atmospheric pressure in any proportion with air.

Esters for Turbine Oils

Products	Viscosity @40°C (cst)	Viscosity Index	Flash point (°C)	Pour point (°C)	Thermal & Oxidation Stability	Biodegradability OECD 301B	Bio-based Carbon (%)
TEMEST M05	27	135	230	-45	✓✓	>65% (OECD 301F)	0
TEMEST H20 serie	20-46-100 300-500-1000	135	250	-40	✓✓✓	>75% (OECD 301B)	>75
TEMEST G65	60	80	280	-30	✓✓	>75% (OECD 301B)	>85
TEMEST G95	150	135	290	-25	✓✓✓	>65% (OECD 301B)	>85

Esters for Chain Oils

To work properly, chainsaw chains and bars must be lubricated. In particular for high temperature chain oil, the base oil must be selected with the following properties:

- Stability at high temperature
- High flash point
- Lack of sludge formation
- Low volatility

The selected products are:

- **TRIMELLITATE ESTERS:** those have very low deposit and sludge
- **TEMEST H35** with high temperature stability
- A blend of these products can be used to satisfy the requirements

Products	Viscosity @40°C (cSt)	Flash Point °C)	Pour Point (°C)	Colour	Iodine Value (g ₁ /100g)	Biodegradability OECD 301B	Bio-based Carbon (%)
TEMEST J110	10	240	-50	50 (APHA)	0,5	>80%	>40
TEMEST H35	21	255	-48	100 (APHA)	1	>75%	>75
TEMEST K100	54	218	-45	80 (APHA)	0	20 - 60%	0
TEMEST J100	84	260	-50	50 (APHA)	0,5	20 - 60%	0
TEMEST L100	135	280	-28	80 (APHA)	0	20 - 60%	0
TEMEST G95	150	290	-25	80 (APHA)	0,5	>95%	>85
TEMEST M100	300	250	-13	70 (APHA)	0	20 - 60%	0



Esters for Air and Refrigerating Compressor Oils

The lubrication of air and refrigeration compressors occupies a special position in lubrication technology. The expected longevity of refrigeration compressors is closely connected to the required high quality of refrigeration oils.

The interaction with other substances, which the refrigeration oil comes into contact with, and especially the extremely high and low temperatures, makes very specific demands on refrigeration oils. In our product range, we can offer some esters suitable for this application.

Ester oils are suitable for all refrigerant systems but they can hydrolyse if they come into contact with water in the compressor. It is therefore essential that these products be shielded from water, and moisture in general, during storage and use. Polyol esters offer good performance in this application for the following reasons:

- Good miscibility in FC, HFC and HFO refrigeration gases;
- Lack of oil build-up in the condenser/evaporator;
- Constant thermal conductivity;
- High natural Viscosity Index, good stability behaviour and thus adequate lubrication at high temperatures;
- Very good thermal and chemical stability even in the presence of refrigerants;
- Excellent flowing properties at low temperatures;
- Long oil life;
- Compatibility with all commonly-used sealing materials such as NBR, HNBR, EPDM and others.

The products are ultra-dried.

Polyol esters are hygroscopic lubricants (i.e. they absorb water) which may hydrolyse over longer periods of time when their water content is >200 ppm. Our sales department is able to identify the suitable product for your specific need, for both refrigeration and air applications.

Product	Viscosity @40°C (cst)	Pour Point °C	Thermal Resistance	Biodegradability OECD 301B	Bio-based Carbon (%)
TEMEST H20 serie	20-46-100 300-500-1000	-40	high	>60%	>60
TEMEST H35 serie	21-100-320	-48	high	>60%	>60
TEMEST MH05	46	-30	high	n.a.	0
TEMEST MH06	68	-25	high	n.a.	0
TEMEST MH07	100	-30	high	n.a.	0
TEMEST MH08	450	-25	high	n.a.	0

n.a. (not available)



Excellence in Oleochemicals

KLK TEMIX SpA

Head Office

Via Mecenate 90, Edificio B
Milan - Italy
Ph +39 02 50 99 431

Production Site

Via Giuseppe Garibaldi, 10
Calderara di Reno, Bologna - Italy
ph +39 051 6467220

www.temixoleo.com
global.temix@klkoleo.com

KLK OLEO Corporate Office

Level 8, Menara KLK, No.1, Jalan PJU 7/6, Mutiara
Damansara, 47810, Petaling Jaya, Selangor, Malaysia
Ph +603 7809 8833
www.klkoleo.com

PALMESTER and TEMEST are registered trademarks of KLK OLEO. All information provided herein is true and accurate to the best of our knowledge, based on information available to us as at the date hereof. Recommendations or suggestions as to the use of the Products are given in good faith but it is for a buyer to be satisfied (by trial processing if necessary) as to the fitness or suitability of the Products for any particular purpose. No warranty is given as to their fitness for any particular purpose. **KLK OLEO** is not aware of any competing claims to the patent/intellectual property rights of the Products but accepts no liability in relation to any disputes or other claims whatsoever in respect thereof. The buyer needs to satisfy itself on all requirements on local product safety, consumer and health legislation and **KLK OLEO** accepts no responsibility in this regard. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, published or transmitted, in any form or by any means, without the prior written permission of **KLK OLEO**.