

**PANOLIN<sup>®</sup> +**  
Swiss Oil Technology



High Performance  
Environmentally Acceptable Lubricants  
for your marine application



**PANOLIN<sup>®</sup> +**  
Swiss Oil Technology

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# Company profile

- Founded in 1949 by Bernhard Lämmle
- Headquarters in Switzerland
- Inhouse R&D (Research and Development)
- Core competence: high performing EALs (Environmentally Acceptable Lubricants) since 1983
- Worldwide availability through PANOLIN warehouses and distribution network



Bernhard Lämmle  
\*1910 † 1986



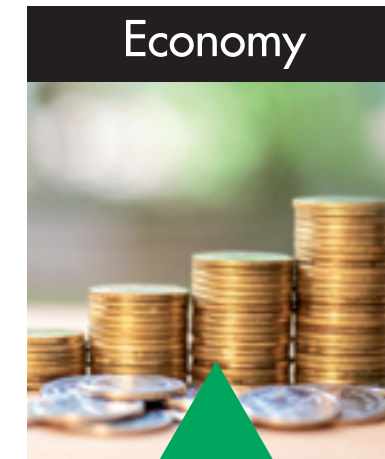
Market areas: Switzerland and Principality of Liechtenstein.

All international business.

R&D and production.

We want to standardize high performing EALs globally to preserve the environment.

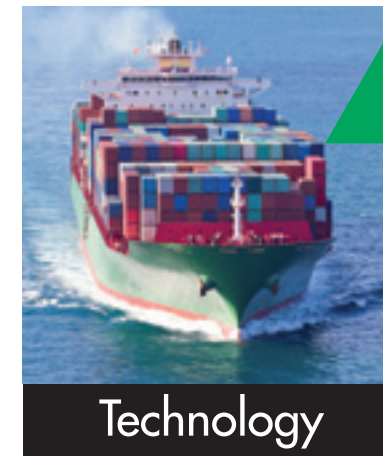
# The concept



## Economy

### Save money

- Preventative maintenance
- Extended oil change intervals
- Less equipment downtime
- Reduction of life-cycle cost



## Technology

### Increase performance

- Advanced technology
- More reliability
- Higher efficiency
- Improved availability



## Environment

### Protect the environment

- Environmentally acceptable
- Biodegradable
- Meets global regulations
- CO<sub>2</sub> reduction

Only economically viable, technically mature and environmentally friendly concepts are truly sustainable.



# Your benefits

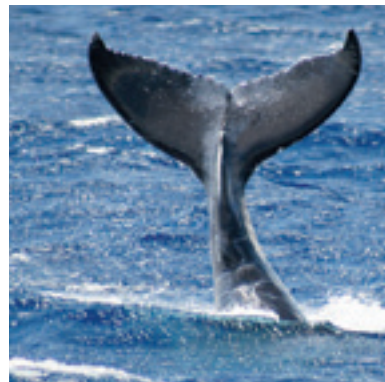
Over 35 years of experience in biodegradable oil technology



Technology

## Increase performance

- Fully saturated synthetic ester based lubricants made for marine applications
- High thermal and shear stability
- Excellent oxidation stability
- Outstanding wear and corrosion protection
- Hydrolytic stability – low acidity, non-emulsifying
- No deposits – protection of your system
- Numerous OEM approvals
- Higher efficiency – higher output of the equipment



Environment

## Protect the environment

- Readily biodegradable lubricants
- Minimally toxic
- CO<sub>2</sub> reduction due to less oil/fuel consumption; take advantage of the PANOLIN CO<sub>2</sub> calculator
- Compliant with global regulations and international eco-labels
- Beneficial for job tenders
- Supports your environmental compliance policy



Economy

## Save money

- Robust and reliable lubricants
- Longer lifetime
- Extended oil change intervals
- Less equipment downtime
- Less maintenance cost
- Less waste disposal
- Lifetime fill potential
- Advantage through inhouse oil sample analysis

High Performance Environmentally Acceptable Lubricants are our core competence since 1983.

# Global acceptance through eco-labels


# Approved by leading manufacturers


**Note** Selection of OEMs that use, recommend or approve PANOLIN lubricants

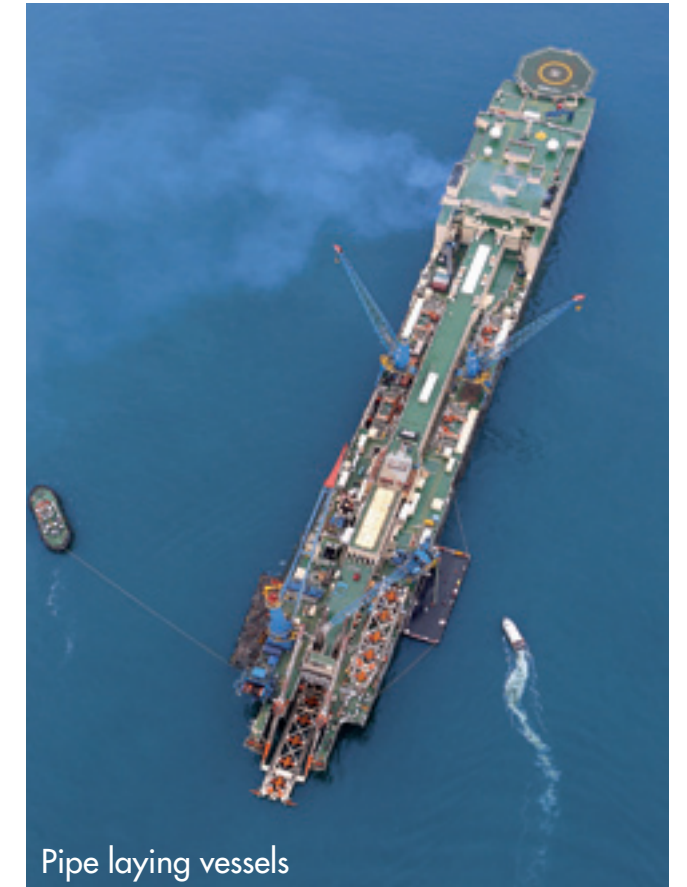




Bulk carriers



ROVs

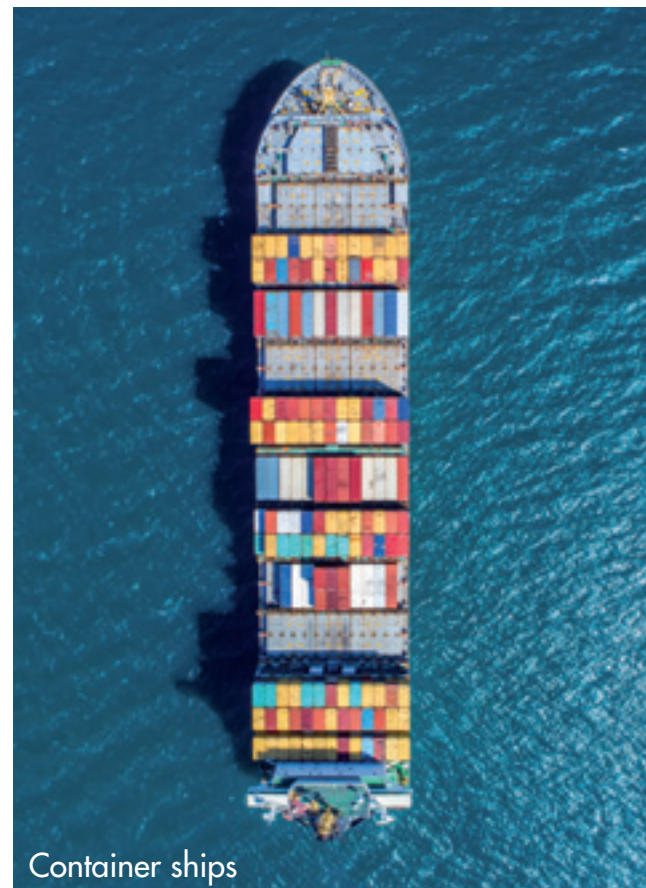


Pipe laying vessels

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Oil tankers



Container ships

Reliable lubricants:  
When you need to deliver the goods

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Cable layers

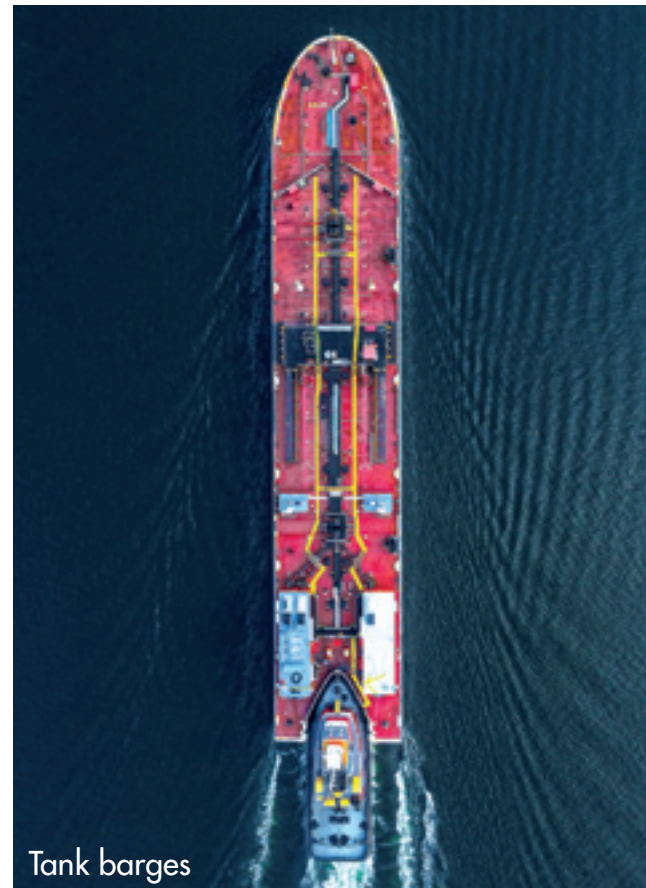
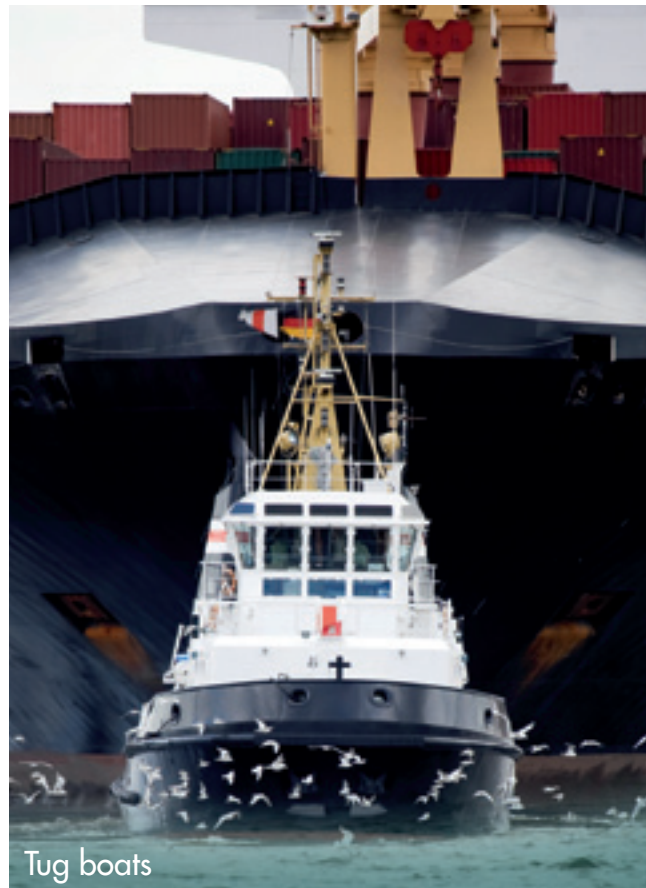
Low maintenance lubricants:  
When downtime is not an option



# References and industries



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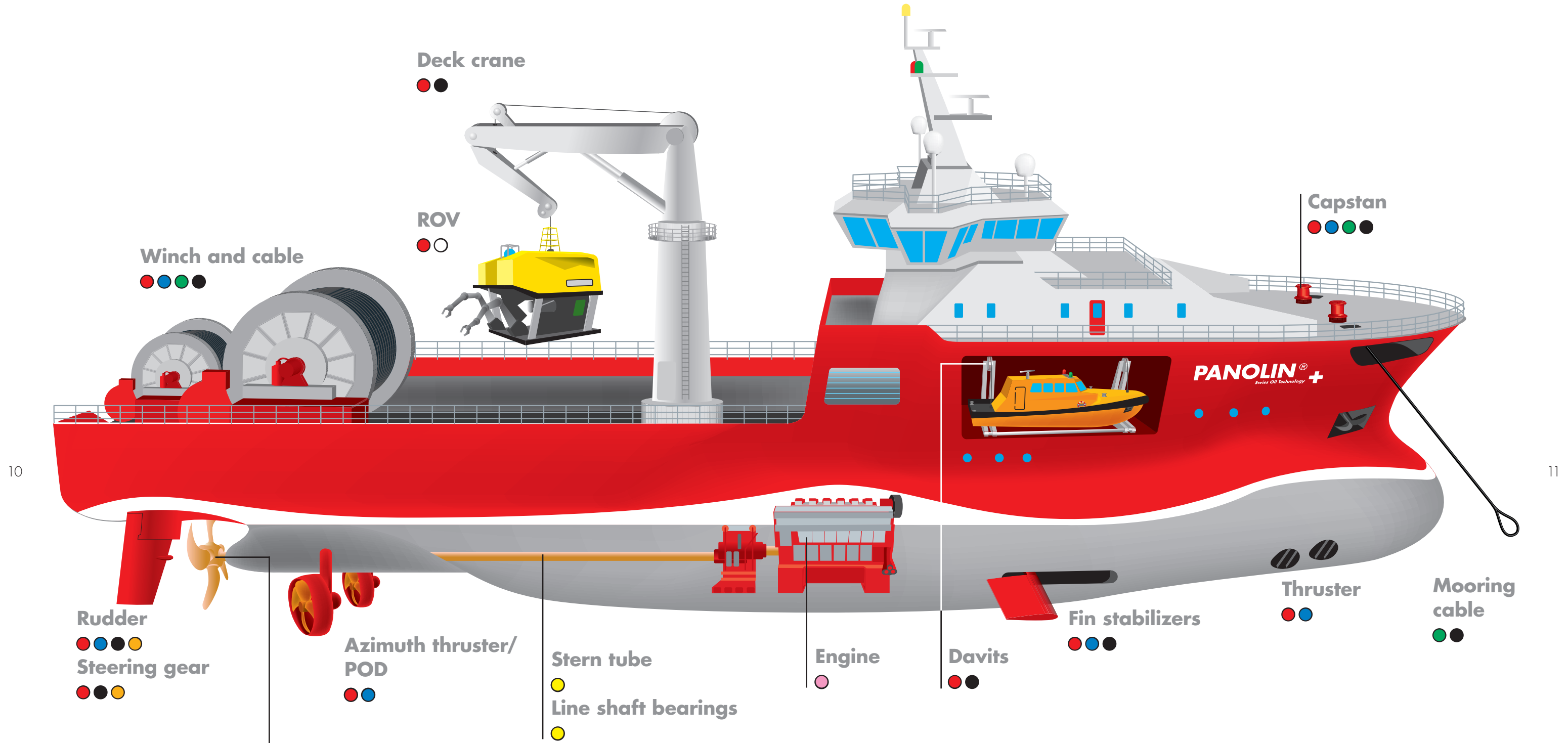
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Robust lubricants:  
When 24/7 is demanded

Long-life lubricants:  
Where time is money





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Product type	PANOLIN	Page
Hydraulic fluid	● HLP SYNTH or ATLANTIS 22/N 32	12
Industrial gear oil	● EP GEAR SYNTH or MARGEAR	13
Stern tube lubricant	● STELLA MARIS	14
Cable/chain lubricant	● BIOTRACK E	14
Control line fluid	○ ATLANTIS 5/15	15
LowSAPS diesel engine oil	● BIOMOT LX or LE-X	15
EP universal grease	● BIOGREASE EP 2 or MARGREASE EP 2	17
EP fluid grease	● MARGREASE EP 0	18



# PANOLIN HLP SYNTH

## Hydraulic fluid – readily biodegradable, saturated synthetic esters

### Features and benefits

- Fully synthetic, high-performance, readily biodegradable, zinc-free and environmentally friendly hydraulic fluid, based on saturated synthetic esters with special additive technology
- Minimally toxic
- Extremely long oil-change interval «lifetime filling» – enables higher machine efficiency
- Increases availability and reliability of your equipment due to greater power reserves
- Outstanding extreme-pressure characteristics
- Excellent cold flow characteristics (extremely low pour point)
- Prevents gumming and deposits of ageing products even under high thermal load
- Excellent oxidation resistance at high temperatures
- Great dielectric strength

### Environmental compatibility

It is decomposed by micro-organisms in water and/or soil almost without any residues.

- ASTM D-6046-98a: P<sub>w</sub>1, T<sub>w</sub>1, T<sub>s</sub>1
- Biodegradability acc. to OECD 301 B: > 60%
- CO<sub>2</sub> reduction thanks to longer oil-change intervals
- Eco Labels from: Czech Republic, Germany, Italy, Japan, Korea, Sweden
- US EPA VIDA (Vessel Incidental Discharge Act), VGP 2013 (Vessel General Permit) – **Note:** Page 16
- Water hazard classifications acc. to AwSV: awg (35020, 35030, 35040), WGK 1 (35050, 35060)

### Specifications

ASTM D 943 (Dry TOST test) > 5000 h / ASTM D 2070 (modified, 1 680 h) / ASTM D 8029  
 FZG Test A/8.3/90 load stage 12  
 ISO 15 380/HEES  
 Vickers V104 C



### Technical data (mean values, subject to normal tolerances)

PANOLIN HLP SYNTH	Product No.	Density g/cm <sup>3</sup> 15°C	Viscosity in mm <sup>2</sup> /s 40°C 100°C	Flashpoint COC in °C	Pour point in °C	Viscosity index	Iodine No.
15	35020	0.920	15.6 3.9	222	< -60	151	< 6
22	35030	0.920	20.5 4.5	220	- 58	136	< 6
32	35040	0.918	33.3 6.3	240	- 58	142	< 7
46	35050	0.918	46.7 8.2	240	- 57	150	< 10
68	35060	0.918	68.6 11.1	240	- 55	154	< 12

# PANOLIN ATLANTIS

## Hydraulic fluid – readily biodegradable, saturated synthetic esters

### Features and benefits

- Specially formulated from saturated synthetic esters and selected additives to protect hydraulic equipment operating in the offshore environment against corrosion and wear
- Fully complies to the low ecotox profile required by the OSPAR commission in order to protect the marine environment
- Contains no substitutable components according to the CEFAS classification procedure
- Minimally toxic
- Excellent cold flow characteristics
- Improved oxidation resistance to offer a wide operating temperature range
- Prevents gumming and deposits even under high thermal load

### Environmental compatibility

It is decomposed by micro-organisms in water and/or soil almost without any residues.

- Biodegradability acc. to OECD 301 B: > 60%
- CEFAS – United Kingdom: OCNS Group E
- Miljødirektoratet (former Klif) – Norway: Environmental Category Yellow
- OSPAR Recommendation 2010/3 on HOCNF (Harmonised Offshore Chemical Notification Format)
- RINA, Green Plus
- SODM – Netherlands: OCNS Group E (HMCS Category R)
- US EPA VIDA (Vessel Incidental Discharge Act), VGP 2013 (Vessel General Permit) – **Note:** Page 16



### Technical data (mean values, subject to normal tolerances)

PANOLIN ATLANTIS	Product No.	Density g/cm <sup>3</sup> 15°C	Viscosity in mm <sup>2</sup> /s 40°C 100°C	Flashpoint COC in °C	Pour point in °C	Viscosity index	Iodine No.
22	36062	0.920	20.7 4.5	220	- 54	136	< 6
N 32	36065	0.918	33.8 6.3	232	- 50	142	< 7

# PANOLIN EP GEAR SYNTH

## Industrial gear oil – readily biodegradable, saturated synthetic esters

### Features and benefits

- Fully synthetic, high-performance and readily biodegradable lubricant, based on saturated synthetic esters for industrial gear boxes, roller bearings and slide bearings
- Minimally toxic
- Reduces micro-wear of surface roughness on friction surfaces in aggregates
- Outstanding extreme-pressure characteristics
- Excellent oxidation resistance at high temperatures
- Prevents gumming even under high thermal load
- Better adhesion to metal surfaces than mineral-oil based gear oils
- Outstanding anti-wear and anti-corrosion properties
- Extreme shear-resistant multigrade gear oil with a wider thermal operating range than mineral oil

### Environmental compatibility

It is decomposed by micro-organisms in water and/or soil almost without any residues.

- Biodegradability acc. to OECD 301 B: > 60%
- US EPA VIDA (Vessel Incidental Discharge Act), VGP 2013 (Vessel General Permit) – **Note:** Page 16
- Water hazard classifications acc. to AwSV: WGK 1

### Specifications

DIN 51 517/CLP  
 FZG Test A/16.6/140 load stage 12

### Technical data (mean values, subject to normal tolerances)

PANOLIN EP GEAR SYNTH	Product No.	Density g/cm <sup>3</sup> 15°C	Viscosity in mm <sup>2</sup> /s 40°C 100°C	Flashpoint COC in °C	Pour point in °C	Viscosity index
68	27320	0.919	69.0 10.8	290	- 54	146
100	27325	0.920	100.0 14.1	300	- 45	144
150	27330	0.921	150.0 18.8	300	- 43	142
220	27335	0.923	220.0 24.0	300	- 41	136
320	27340	0.930	320.0 32.7	301	- 38	143

# PANOLIN MARGEAR

## Industrial gear oil – readily biodegradable, saturated synthetic esters

### Features and benefits

- Fully synthetic and environmentally friendly gear oil, based on renewable saturated synthetic esters
- Minimally toxic
- Reduces micro-wear of surface roughness on friction surfaces in aggregates
- Outstanding extreme-pressure characteristics
- Excellent oxidation resistance at high temperatures
- Prevents gumming even under high thermal load
- Better adhesion to metal surfaces than mineral-oil based gear oils
- Outstanding anti-wear and anti-corrosion properties
- Extreme shear-resistant multigrade gear oil with a wider thermal operating range than mineral oil

### Environmental compatibility

It is decomposed by micro-organisms in water and/or soil almost without any residues.

- Biodegradability acc. to OECD 301 B: > 60%
- EN 16 807
- US EPA VIDA (Vessel Incidental Discharge Act), VGP 2013 (Vessel General Permit) – **Note:** Page 16

### Specifications

DIN 51 502/CLP E, 51 517/CLP

### Technical data (mean values, subject to normal tolerances)

PANOLIN MARGEAR	Product No.	Density g/cm <sup>3</sup> 15°C	Viscosity in mm <sup>2</sup> /s 40°C 100°C	Flashpoint COC in °C	Pour point in °C	Viscosity index
68	28518	0.930	69.5 10.9	252	- 48	147
100	28520	0.953	101.5 14.3	258	- 48	145
150	28522	0.970	148.2 19.1	256	- 48	146
220	28524	0.994	210.7 24.3	240	- 45	144



# PANOLIN STELLA MARIS

## Stern tube lubricant – readily biodegradable, saturated synthetic esters

### Features and benefits

- Fully synthetic and environmentally friendly stern tube lubricant, based on renewable saturated synthetic esters
- Minimally toxic
- Excellent lubricity
- Does not contain emulsifiers
- High polarity that protects metal surfaces
- No varnish due to thermal oxidation
- Great hydrolytic stability
- Outstanding anti-wear and anti-corrosion properties

### Environmental compatibility

It is decomposed by micro-organisms in water and/or soil almost without any residues. Leads to no sheen on water surface.

- Biodegradability acc. to OECD 301 B: > 60%
- Croatia Eco-Label (28445, 28450, 28455, 28460)
- EN 16 807
- EU Ecolabel, category 3 (28445: DE/027/120, 28450: DE/027/121, 28455: DE/027/122, 28460: DE/027/123)
- RINA, Green Plus (28445, 28450, 28455, 28460)
- US EPA VIDA (Vessel Incidental Discharge Act), VGP 2013 (Vessel General Permit) – **Note:** Page 16



### Technical data (mean values, subject to normal tolerances)

PANOLIN STELLA MARIS	Product No.	Density g/cm <sup>3</sup> 15°C	Viscosity in mm <sup>2</sup> /s		Flashpoint COC in °C	Pour point in °C	Viscosity index
			40°C	100°C			
68	28445	0.934	64.8	10.6	282	-36	152
100	28450	0.937	96.5	14.5	284	-33	155
150	28455	0.941	156.5	21.1	286	-33	159
220	28460	0.944	228.6	28.5	288	-33	162
320	28465	0.947	331.2	37.8	290	-33	164

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# PANOLIN BIOTRACK E

## Cable/chain lubricant – readily biodegradable, synthetic esters

### Features and benefits

- Fully synthetic and environmentally friendly cable/chain lubricant, based on renewable synthetic esters
- Minimally toxic
- Excellent oxidation resistance at high temperatures
- Reduces friction
- Very good adhesion

### Environmental compatibility

It is decomposed by micro-organisms in water and/or soil almost without any residues.

- Biodegradability acc. to OECD 301 B: > 60%
- US EPA VIDA (Vessel Incidental Discharge Act), VGP 2013 (Vessel General Permit) – **Note:** Page 16
- Water hazard classifications acc. to AwSV: WGK 1

### Technical data (mean values, subject to normal tolerances)

PANOLIN BIOTRACK E	Product No.	Density g/cm <sup>3</sup> 15°C	Viscosity in mm <sup>2</sup> /s		Flashpoint COC in °C	Pour point in °C	Viscosity index
			40°C	100°C			
68	54918	0.921	73.8	13.5	274	< -45	188
320	54926	0.958	320.0	37.0	> 256	-36	164
700	54930	0.966	750.0	77.6	> 250	-21	180

# PANOLIN ATLANTIS

## Control line fluid – readily biodegradable, saturated synthetic esters

### Features and benefits

- Specially formulated from saturated synthetic esters and selected additives to protect subsea and topside production control systems against corrosion and wear
- Fully complies to the low ecotox profile required by the OSPAR commission in order to protect the marine environment
- Contains no substitutable components according to the CEFAS classification procedure
- Minimally toxic
- Excellent cold flow characteristics combined with oxidation resistance to offer a wide operating temperature range
- Prevents gumming and deposits even under high thermal load

### Environmental compatibility

It is decomposed by micro-organisms in water and/or soil almost without any residues.

- Biodegradability acc. to OECD 301 B: > 60%
- CEFAS – United Kingdom: OCNS Group E (registered for open and closed systems)
- Miljødirektoratet (former Klif) – Norway: Environmental Category Yellow (36060)
- Miljøstyrelsen – Danish Environmental Protection Agency: PR-No. 2318929 (36060)
- OSPAR Recommendation 2010/3 on HOCNF (Harmonised Offshore Chemical Notification Format)
- RINA, Green Plus (36060)
- SODM – Netherlands: OCNS Group E (HMCS Category R)
- US EPA VIDA (Vessel Incidental Discharge Act), VGP 2013 (Vessel General Permit) – **Note:** Page 16



### Technical data (mean values, subject to normal tolerances)

PANOLIN ATLANTIS	Product No.	Density g/cm <sup>3</sup> 15°C	Viscosity in mm <sup>2</sup> /s		Flashpoint COC in °C	Pour point in °C	Viscosity index	Iodine No.
			40°C	100°C				
5	36054	0.865	6.1	2.1	< 160	-30	162	< 10
15	36060	0.922	16.4	4.0	220	< -50	146	< 10

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# PANOLIN BIOMOT LX and LE-X

## LowSAPS diesel engine oil – readily biodegradable, saturated synthetic esters

### Features and benefits BIOMOT LX 10W-40

- Fully synthetic engine oil, based on saturated synthetic esters for the latest diesel engines
- Diesel engine oil with extremely low sulphate ash, phosphor and sulphur content
- The combination of synthetic base oils with special additive technology ensures extremely low oil consumption
- Sustainably prevents blockage of exhaust particle filters and corrosion of oxidation catalyzers
- Ensures excellent engine lubrication both at high operating temperatures and at extremely low ambient temperatures
- Prevents gumming and deposits of ageing products even under high thermal load
- Minimally toxic

### Features and benefits BIOMOT LE-X 5W-30

- Fully synthetic, readily biodegradable and long-life engine oil, based on saturated synthetic esters for the latest diesel engines
- Diesel engine oil with extremely low sulphate ash, phosphor and sulphur content
- The combination of synthetic base oils with special additive technology ensures extremely low oil consumption
- Extended oil-change intervals
- Reduces friction and wear
- Excellent oxidation resistance at high temperatures
- Outstanding anti-wear and anti-corrosion properties
- Good lubricating film stability
- Minimally toxic

### Environmental compatibility

It is decomposed by micro-organisms in water and/or soil almost without any residues.

- Biodegradability acc. to OECD 301 B: > 60%
- Water hazard classifications acc. to AwSV: WGK 1 (07410)

### Specifications

**BIOMOT LX 10W-40** ACEA E6, E7, E9. API CJ-4/SN. CAT ECF-3, ECF-2, ECF-1α. JASO DH-2.  
**BIOMOT LE-X 5W-30** ACEA E6, E7, E9. API CJ-4/CK-4.

### Technical data (mean values, subject to normal tolerances)

PANOLIN BIOMOT	Product No.	Density g/cm <sup>3</sup> 15°C	Viscosity in mm <sup>2</sup> /s		Flashpoint COC in °C	Pour point in °C	Viscosity index
			40°C	100°C			
LX 10W-40	07350	0.920	91.1	14.3	> 220	-40	163
LE-X 5W-30	07410	0.928	63.6	12.1	228	-60	191



# Compliance with EPA VIDA/VGP 2013

Assessment in accordance with requirements of Vessel General Permit 2013



- a** VGP accepts result based on formulation and main constituents. See Appendix A, VGP 2013 final version
- b** VGP accepts testing of formulation. See Appendix A, VGP 2013 final version
- c** OECD test method valid for single substances testing only; data reported should be seen as a summary of all single > 1% components in stated formulation
- d** Report

Characteristics of test	Units	Specification	Result	Method
Biodegradability <sup>a</sup>	% ThOD	> 60	<b>&gt; 60</b>	OECD 301, 306
Toxicity <sup>b</sup>				
Algae	LC <sub>50</sub>	> 100 mg/l	<b>&gt; 100</b>	OECD 201
Daphnia	EC <sub>50</sub>	> 100 mg/l	<b>&gt; 100</b>	OECD 202
Fish	LC <sub>50</sub>	> 100 mg/l	<b>&gt; 100</b>	OECD 203
Bioaccumulation <sup>c</sup>	Log K <sub>ow</sub>	< 3 or > 7	<b>pass</b>	OECD 107, 117
Visible sheen	Gloss, visual color etc.	- <sup>d</sup>	<b>no visual color</b>	58 FR 12 507

EPA test requirements state, all vessels must use an EAL in all oil to sea interfaces. "Environmentally Acceptable Lubricants" means lubricants that are "biodegradable" and "minimally toxic" and are "not bioaccumulative" as defined in Appendix A of the Vessel General Permit. PANOLIN has conducted tests to EPA requirements for all standards described in the 2013 Vessel General Permit (review above chart for test results)

## Product type

Product type	PANOLIN
Hydraulic fluid	● HLP SYNTH 15/22/32/46/68
Hydraulic fluid	● ATLANTIS 22/N 32
Industrial gear oil	● EP GEAR SYNTH 68/100/150/220/320
Industrial gear oil	● MARGEAR 68/100/150/220
Stern tube lubricant	● STELLA MARIS 68/100/150/220/320
Cable/chain lubricant	● BIOTRACK E 68/320/700
Control line fluid	○ ATLANTIS 5/15

A good feeling:  
Knowing that the lubricant is environmentally friendly

## PANOLIN MARGREASE EP 2

EP universal grease - readily biodegradable, synthetic esters

### Features and benefits

- Fully synthetic, readily biodegradable EP universal lubricating grease for exposed applications
- Excellent water wash-out resistance
- Minimally toxic
- Good mechanical stability
- Excellent oxidation resistance at high temperatures
- Outstanding anti-wear and anti-corrosion properties
- Wide temperature range
- Excellent load-bearing capacity due to special additive technology

### Technical data (mean values, subject to normal tolerances)

Product No.	72904
NLGI	2
Soap/thickener type	Lithium/Calcium
Dropping point (DIN ISO 2176)	> 160°C
VKA calotte (ASTM D2266)	0.50 mm
VKA (ASTM D2596)	400 kgf
VKA weld load (DIN 51350)	4200 N (LWI 82)
Behavior vs. Water (DIN 51807-1)	1
Corrosion protection (EMCOR - DIN 51802)	1-1
Copper corrosion (DIN 51811)	1
Water spray off (ASTM D4049)	16%
Water wash out (ASTM D1264)	< 2%
Operation temperature range (permanent)	-25°C to 120°C
Designation (DIN 51502)	KPE 2 K-25
Base	Synthetic esters
Base oil viscosity at 40°C	350
Base oil viscosity at 100°C	31.3
VI of base oil	125
Speed factor (n x dm)	350000 mm/min
Colour	Green
Environmental compatibility	Biodegradability acc. to OECD 301 B: > 60%, US EPA VIDA/VGP 2013 <b>Note:</b> Page 19

## PANOLIN BIOGREASE EP 2

EP universal grease - readily biodegradable, synthetic esters

### Features and benefits

- Fully synthetic, readily biodegradable EP universal lubricating grease for exposed applications
- Minimally toxic
- Good mechanical stability
- Excellent oxidation resistance at high temperatures
- Outstanding anti-wear and anti-corrosion properties
- Good water resistance
- Wide temperature range
- Excellent load-bearing capacity due to special additive technology

### Technical data (mean values, subject to normal tolerances)

Product No.	72868
NLGI	2
Soap/thickener type	Lithium
Dropping point (DIN ISO 2176)	> 180°C
Penetration decrease (ASTM D217)	< 30 (1/16 mm)
VKA calotte (ASTM D2266)	0.442 mm
VKA OK load (DIN 51350)	2600 N
VKA weld load (DIN 51350)	2800 N
Behavior vs. Water (DIN 51807-1)	1
Corrosion protection (EMCOR - DIN 51802)	0-0
Copper corrosion (DIN 51811)	1
Water wash out (ASTM D1264)	4.19%
Operation temperature range (permanent)	-35°C to 120°C
Operation temperature (short time)	130°C
Designation (DIN 51502)	KPE 2 K-30
Base	Synthetic esters
Base oil viscosity at 40°C	100
Speed factor (n x dm)	450000 mm/min
Oxidation stability (ASTM D942)	8,0 psi
Colour	Yellow-brown
Environmental compatibility	Biodegradability acc. to OECD 301 B: > 60%, US EPA VIDA/VGP 2013 <b>Note:</b> Page 19

# PANOLIN MARGREASE EP 0

EP fluid grease – readily biodegradable, synthetic esters

### Features and benefits

- Fully synthetic, readily biodegradable EP fluid grease for automatic injection systems
- Excellent water wash-out resistance
- Minimally toxic
- Good mechanical stability
- Excellent oxidation resistance at high temperatures
- Outstanding anti-wear and anti-corrosion properties
- Wide temperature range
- Excellent load-bearing capacity due to special additive technology

### Technical data (mean values, subject to normal tolerances)

Product No.	72902
NLGI	0
Soap/thickener type	Lithium
Dropping point (DIN ISO 2176)	> 170 °C
VKA OK load (DIN 51350)	3200 N
VKA weld load (DIN 51350)	3400 N
Behavior vs. Water (DIN 51807-1)	1
Copper corrosion (DIN 51811)	1
Operation temperature range (permanent)	-35 °C to 120 °C
Designation (DIN 51502)	KPE 0 K-30
Base	Synthetic esters
Base oil viscosity at 40 °C	200
Speed factor (n x dm)	300000 mm/min
Colour	Green
Environmental compatibility	Biodegradability acc. to OECD 301 B: > 60%, US EPA VIDA/VGP 2013 <b>Note:</b> Page 19

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# Compliance with EPA VIDA/VGP 2013

Assessment in accordance with requirements of Vessel General Permit 2013



- a VGP accepts result based on formulation and main constituents. See Appendix A, VGP 2013 final version
- b VGP accepts testing of formulation. See Appendix A, VGP 2013 final version
- c Limit for loss lubrication: > 1000 mg/l
- d OECD test method valid for single substances testing only; data reported should be seen as a summary of all single > 1% components in stated formulation
- e Report

GREENMARINE® Greases				
Characteristics of test	Units	Specification	Result	Method
Biodegradability <sup>a</sup>	% ThOD	> 60	<b>&gt; 60</b>	OECD 301, 306
Toxicity <sup>b</sup>				
Algae	LC <sub>50</sub>	> 1000 mg/l <sup>c</sup>	<b>&gt; 1000</b>	OECD 201
Daphnia	EC <sub>50</sub>	> 1000 mg/l <sup>c</sup>	<b>&gt; 1000</b>	OECD 202
Fish	LC <sub>50</sub>	> 1000 mg/l <sup>c</sup>	<b>&gt; 1000</b>	OECD 203
Bioaccumulation <sup>d</sup>	Log K <sub>ow</sub>	< 3 or > 7	<b>pass</b>	OECD 107, 117
Visible sheen	Gloss, visual color etc.	- <sup>e</sup>	<b>no visual color</b>	58 FR 12 507

EPA test requirements state, all vessels must use an EAL in all oil to sea interfaces.

“Environmentally Acceptable Lubricants” means lubricants that are “biodegradable” and “minimally toxic” and are “not bioaccumulative” as defined in Appendix A of the Vessel General Permit.

PANOLIN has conducted tests to EPA requirements for all standards described in the 2013 Vessel General Permit (review above chart for test results)

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### Product type

- EP universal grease
- EP universal grease
- EP fluid grease

### PANOLIN

- MARGREASE EP 2
- BIOGREASE EP 2
- MARGREASE EP 0

A good feeling:

Knowing that the lubricant is environmentally friendly



# PANOLIN is a statement for

- Advanced Technology
- Environmental Responsibility
- Security

The sustainable PANOLIN concepts

GREENMACHINE®

 GREENMARINE®

 GREENDREDGE®

PANOLIN offers a wide range of high performance biodegradable lubricants for diverse applications.  
For further information please contact PANOLIN International Inc.

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