



MARINE ON-BOARD PRODUCT GUIDE

IS YOUR LUBRICANT SUPPLIER
ABLE TO OFFER A WIDE RANGE
OF PRODUCTS TO SUIT YOUR
ENTIRE FLEET'S REQUIREMENTS?

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IT'S MORE THAN JUST OIL. IT'S LIQUID ENGINEERING.



Marine

WELCOME TO THE CASTROL MARINE ON-BOARD PRODUCT GUIDE. YOUR COMPREHENSIVE GUIDE TO SELECTING THE RIGHT WORLD-CLASS PRODUCT FOR YOUR SPECIFIC ON-BOARD NEEDS.

To help make the process of finding your ideal product even more straightforward, we've split our products into three categories:

HIGH PERFORMANCE

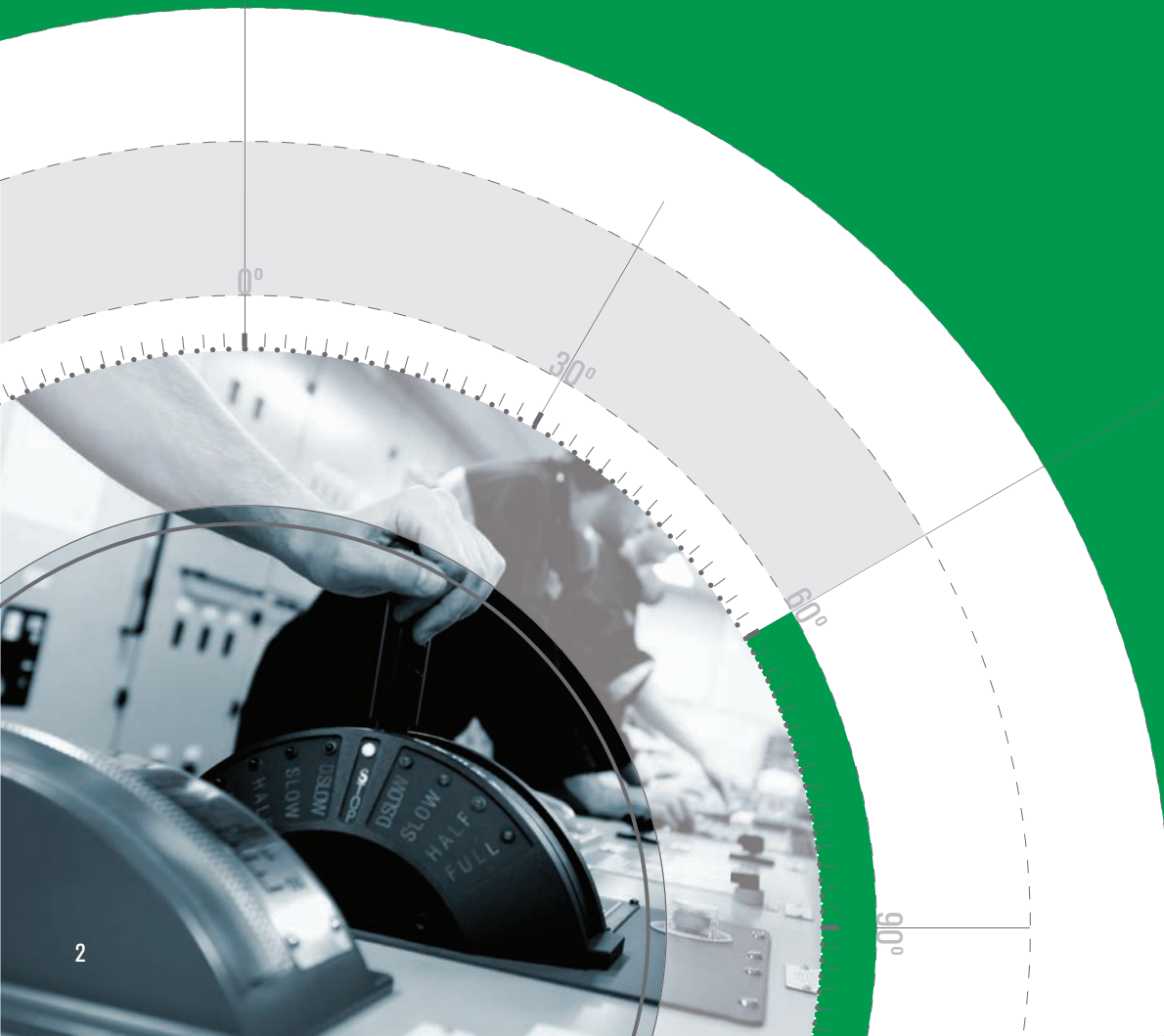
Are you looking to optimise your operations with advanced products with exceptional performance benefits?

ENVIRONMENTALLY RESPONSIBLE

Is your business committed to operating in an environmentally responsible way without compromising on performance?

TRUSTED QUALITY

Do you need proven products that always meet your application needs?



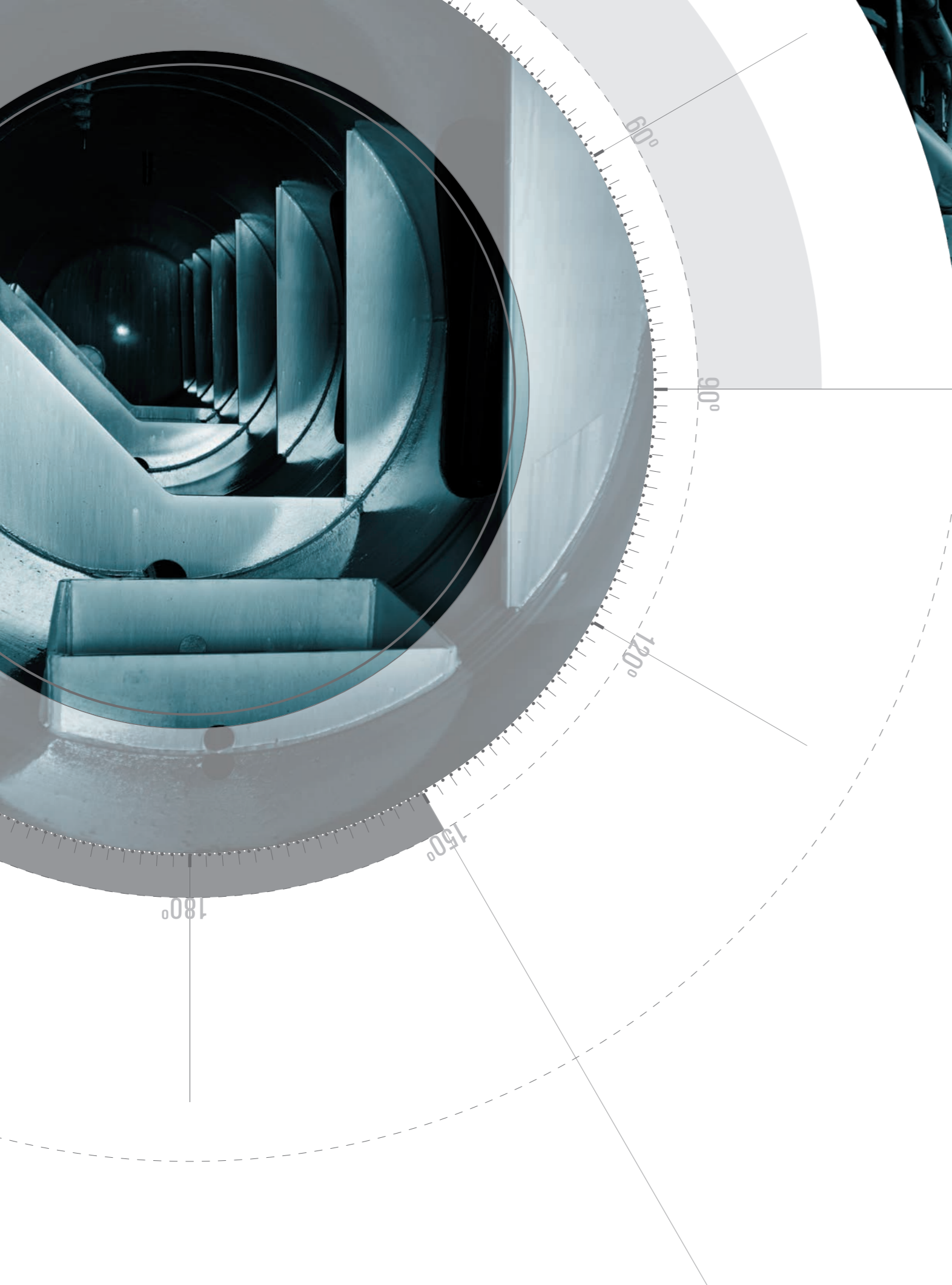
CASTROL RECOMMENDS

This mark indicates that a particular product goes far beyond standard requirements to deliver outstanding, industry-leading benefits and add maximum value to your operations.



VALUE PROVEN

Our products don't just optimise the performance of machinery, they can help to add measurable value to your fleet operations. Wherever you see the Castrol Value Proven stamp, it means that we have gathered clearly established evidence of the true value of our products, either from laboratory tests or customers in the field.



CONTENTS

This brochure covers multiple applications, which are referenced below. For products not listed in this brochure, please visit our Directory of Marine Services at www.castrol.com/marine or speak to your Castrol Account Manager.

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All figures within Technical Data tables in this brochure are typical of those obtained with normal production tolerance and do not constitute a specification.

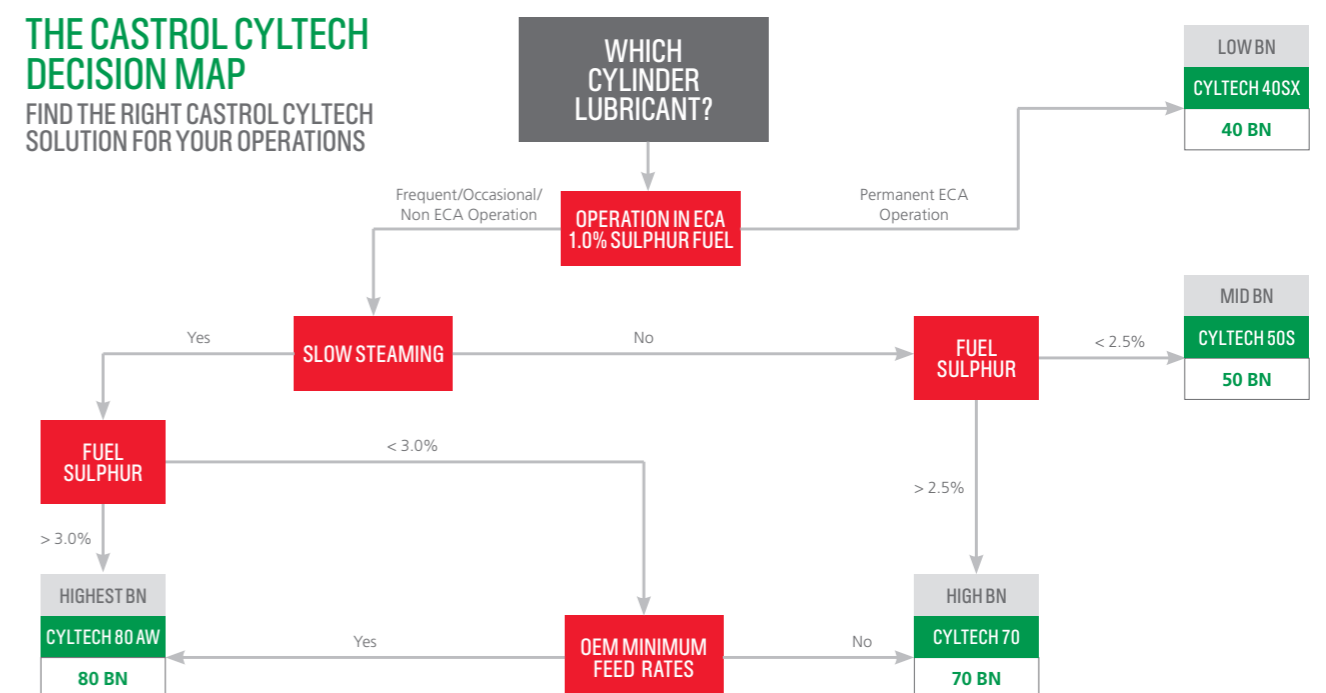


CYLINDER OILS

Is your cylinder lubricant matched to your vessel's predominant operating conditions?

PRODUCT	OIL TYPE	CATEGORY
Cyltech 80 AW	Mineral	HIGH PERFORMANCE
Cyltech 70	Mineral	TRUSTED QUALITY
Cyltech 50S	Mineral	TRUSTED QUALITY
Cyltech 40SX	Mineral	TRUSTED QUALITY

THE CASTROL CYLTECH DECISION MAP FIND THE RIGHT CASTROL CYLTECH SOLUTION FOR YOUR OPERATIONS





CYLTECH 80 AW

HIGH BN CYLINDER LUBRICANT

HIGH PERFORMANCE

The cylinder lubricant for engines running on high sulphur fuel under slow steaming/ super slow steaming conditions.

FEATURES	BENEFITS
80 BN product that provides high levels of 'controlled' acid neutralisation required when vessels are slow steaming.	Provides the high levels of protection to liners and rings against corrosive wear under slow steaming conditions, helping to maximise component life and time between overhauls.
Contains anti-wear technology which provides an 'added safety factor' under slow steaming conditions. Under these operating regimes, lubricant consumption may fall significantly, increasing the risk of mechanical as well as corrosive wear.	Helps to provide additional protection to liners and rings under slow steaming conditions and supports feed rate optimisation down to OEM minimum feed rates, potentially reducing overall engine operating costs.
Cyltech 80 AW is formulated to have a high level of thermal and oxidative stability.	When slow steaming, cylinder lubricants may be on the liner surface for up to three times longer than under normal operating conditions and are exposed to hot gases and temperatures. Cyltech 80 AW helps to reduce the risk of deposit formation under these conditions.

OEM Approvals

- Cyltech 80 AW is the only product currently approved by Wärtsilä for use under slow steaming conditions at minimum 'flat' feed rate for fuels up to 3.5% sulphur
- Cyltech 80 AW is approved by major OEMs including MAN and Wärtsilä. Approval from Wärtsilä is for fuels with sulphur content up to 3.5% or higher when used with scrubber technology
- In addition to engines operating under slow steaming conditions Cyltech 80 AW should be considered for use in next generation, super long stroke engines such as MAN Mark 9 (e.g. S80ME-C9, S90ME-C9) and all G-engines where an oil with minimum of 70 BN or higher is now mandatory
- Can be used by internationally trading vessels for short term ECA operation on low sulphur fuels (currently 1.0%) in line with OEM guidelines e.g. MAN engines for up to two weeks

Trial and Lab Test Data

- Laboratory tests showed that Cyltech 80 AW neutralised acids (equivalent to 2.5% sulphur fuel) in a controlled manner so that at the end of the test there was a higher alkaline reserve for 80 BN product compared to mid range and 70 BN lubricants
- A piece of liner material that was placed in the reaction vessel showed significantly less evidence of corrosive wear compared to mid range and 70 BN lubricants
- Thin film oxidation tests showed Cyltech 80 AW to form 23% less deposits than conventional 70 BN products

TECHNICAL DATA			
TYPICAL CHARACTERISTICS	METHOD	UNITS	CYLTECH 80 AW
SAE Number	-	-	50
Kinematic Viscosity @ 100°C	ASTM D445	mm ² /s	19.5
Base Number, BN	ASTM D2896	mg KOH/g	80
Relative Density @ 15°C	ASTM D4052	g/ml	0.933
Flash Point, PMCC	ASTM D93	°C	>190
Pour Point	ASTM D97	°C	-9 or below



CYLTECH 70

CROSSHEAD ENGINE CYLINDER LUBRICANT

TRUSTED QUALITY

The cylinder lubricant for normal international trade on high sulphur fuels and ECA transit.

FEATURES	BENEFITS
Provides high levels of engine protection required when vessels burn high sulphur fuels (3.5%) on ocean transits but can also be used for frequent or short term (10-14 days) in ECAs when lower sulphur fuels are used.	The ideal product for vessels on international trade that spend most of the time operating on HFO but switch to low sulphur fuels for relatively short periods when operating in ECAs. Such vessels do not need to switch to lower BN products when operating in ECAs, thus minimising on board complexity.
The proven technology of Cyltech 70 provides resistance to oil film breakdown at elevated temperatures and offers class-leading wear protection.	Cyltech 70 technology aids protection against liner scuffing and maintains a high level of piston ring zone cleanliness, both of which are key to extending component life and unit overhaul intervals.

OEM Approvals

- Approved by all major OEMs for use as specified in their oil recommendation service bulletins

TECHNICAL DATA			
TYPICAL CHARACTERISTICS	METHOD	UNITS	CYLTECH 70
SAE Number	-	-	50
Kinematic Viscosity @ 100°C	ASTM D445	mm ² /s	19.5
Base Number, BN	ASTM D2896	mg KOH/g	70
Relative Density @ 15°C	ASTM D4052	g/ml	0.94
Flash Point, PMCC	ASTM D93	°C	>190
Pour Point	ASTM D97	°C	-9 or below





CYLTECH 50S

CROSSHEAD ENGINE CYLINDER LUBRICANT

**TRUSTED
QUALITY**

The cylinder lubricant recommended for normal operating conditions when consistently burning fuel with sulphur levels between 2.0-2.5%



FEATURES	BENEFITS
Product has a balanced formulation with excellent detergency and wear protection.	Can help to control piston ring and liner wear, offering a margin of safety against scuffing under prolonged operation on lower sulphur fuels.

OEM Approvals

- Approved by major OEMs for use in two stroke engines as specified in recommended oil listings and service bulletins

TECHNICAL DATA			
TYPICAL CHARACTERISTICS	METHOD	UNITS	CYLTECH 50S
SAE Number	-	-	50
Kinematic Viscosity @ 100°C	ASTM D445	mm ² /s	19.5
Base Number, BN	ASTM D2896	mg KOH/g	50
Relative Density @ 15°C	ASTM D4052	g/ml	0.93
Flash Point, PMCC	ASTM D93	°C	>190
Pour Point	ASTM D97	°C	-9 or below



CYLTECH 40SX

CROSSHEAD ENGINE CYLINDER LUBRICANT

**TRUSTED
QUALITY**

The cylinder lubricant for predominant low sulphur (ECA) operation where fuels of 1.0%wt sulphur are specified



FEATURES	BENEFITS
Formulated with a combination of low ash and excellent detergency to prevent the formation of piston crown deposits.	May reduce the risk of cost being incurred as a result of damage caused by the formation of hard piston crown deposits. These could cause damage to cylinder liners through bore polishing and scuffing.
Provides excellent engine cleanliness, wear control and maximises engine life.	Helps to extend engine component life and time between overhauls.

OEM Approvals

- Cyltech 40SX meets the exact requirements of both Wärtsilä and MAN for prolonged operation on low sulphur fuels under conditions specified in recommended oil listings

Trial and Lab Test Data

- Piston crown deposits formed during short term full size engine tests running on low sulphur fuel:
 - Cyltech 40SX: 1.25 mg of deposits
 - Leading competitor product: 27.7 mg of deposits

TECHNICAL DATA			
TYPICAL CHARACTERISTICS	METHOD	UNITS	CYLTECH 40SX
SAE Number	-	-	50
Relative Density @ 15°C	ASTM D4052	g/ml	0.92
Kinematic Viscosity @ 100°C	ASTM D445	mm ² /s	19.5
Total Base Number, TBN	ASTM D2896	mg KOH/g	40.0
Flash Point, PMCC	ASTM D93	°C	>190
Pour Point	ASTM D97	°C	-9 or below



TWO STROKE CRANKCASES

Are you using an oil that provides long term bearing life and protection against corrosion in your crankcase?

PRODUCT	OIL TYPE	CATEGORY
CDX 30	Mineral	TRUSTED QUALITY



CDX 30

CROSSHEAD ENGINE SYSTEM LUBRICANT

**TRUSTED
QUALITY**

A premium two stroke system oil formulated to protect bearings against corrosion and wear over the lifetime of the engine.

FEATURES	BENEFITS
Excellent demulsibility, water tolerance and corrosion protection should the system oil suffer sea or fresh water ingress.	Can help to protect engines against corrosion should water ingress be a problem and allows water to be readily removed should water ingress occur.
High load bearing capability and excellent hydraulic oil properties.	Protection of main bearings and also booster and power take off units. Can be used on latest 'camless' or 'intelligent' engine designs.
Excellent detergency and alkaline reserve and provides excellent piston cooling gallery cleanliness.	Assists cleanliness of crankcase and bearings.

OEM Approvals

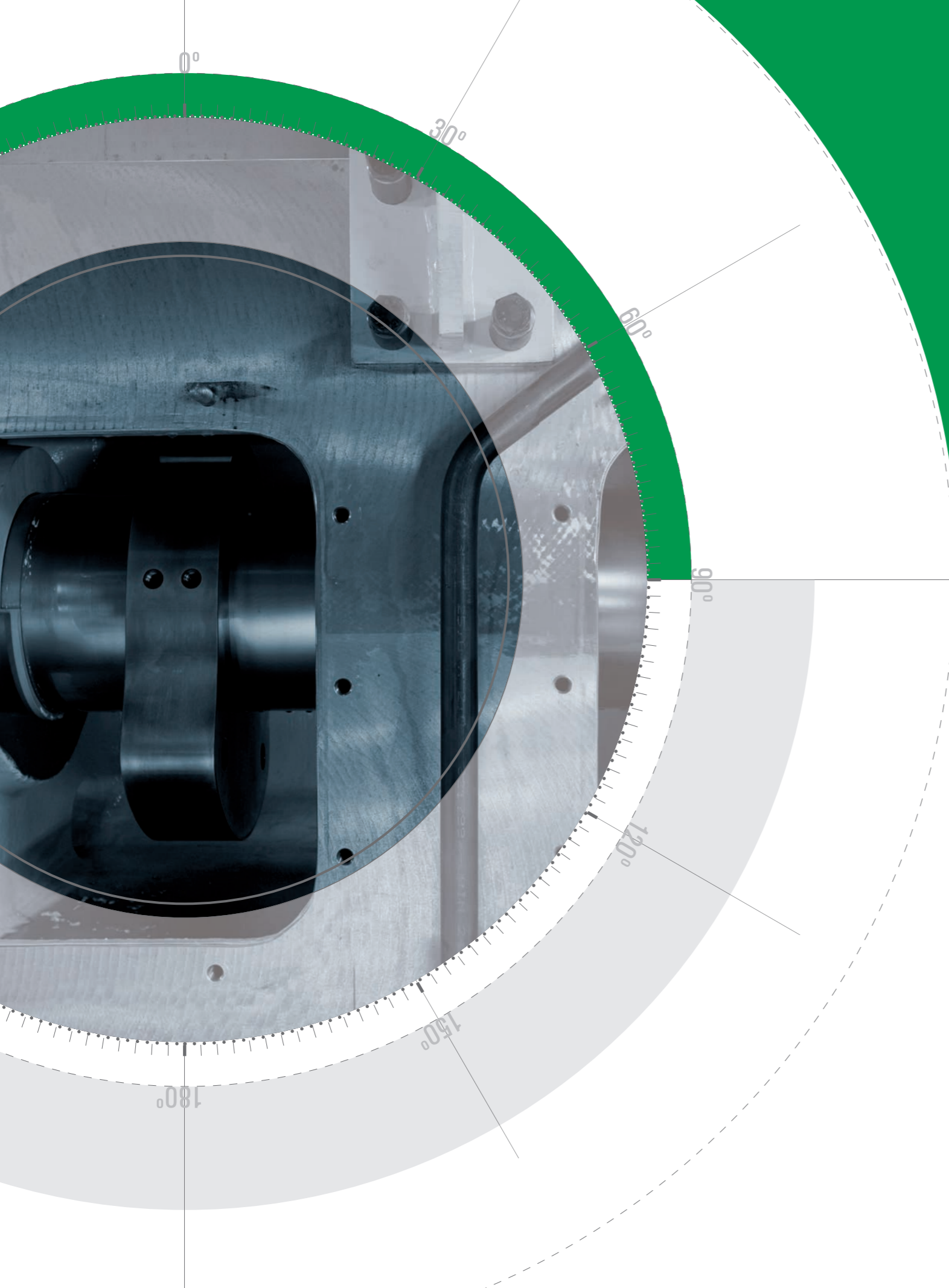
- Approved by all major OEMs

TECHNICAL DATA

TYPICAL CHARACTERISTICS	METHOD	UNITS	CDX30
SAE Number	-	-	30
Kinematic Viscosity @ 100°C	ASTM D445	mm ² /s	11.5
Base Number, BN	ASTM D2896	mg KOH/g	5
Relative Density @ 15°C	ASTM D4052	g/ml	0.89
Flash Point, PMCC	ASTM D93	°C	>190
Pour Point	ASTM D97	°C	-12 or below
FZG Gear Test, A/8.3/90	DIN 51 354	FLS	12

**VALUE
PROVEN**





DIESEL ENGINES – HFO

Are you using a lubricant that gives you potential cost savings by helping to extend engine overhauls?

PRODUCT	OIL TYPE	CATEGORY
TLX Plus	Mineral	HIGH PERFORMANCE



TLX PLUS

DIESEL ENGINE LUBRICANT



HIGH PERFORMANCE

The superior cleanliness performance of Castrol TLX Plus can make a real impact by offering the potential to extend overhaul intervals* by up to 33%. This can lead to significant savings in spare parts and labour costs.

FEATURES	BENEFITS
TLX Plus has a well balanced formulation, helping to keep both the engine crankcase and piston undercrowns clean.	Potential to extend time between overhauls leading to potential savings in spare parts and labour costs of up to 33%.
TLX Plus has excellent high temperature performance with respect to thermal stresses and oxidation resistance.	May result in less piston undercrown deposits and minimised risk of piston damage due to overheating.
The product is specifically formulated to minimise deposit formation when contaminated by heavy fuel oil and heavily loaded with insoluble asphaltenes.	TLX Plus helps to minimise deposit formation – even when heavily contaminated with heavy fuel oil – aiding engine cleanliness under extreme conditions.
TLX Plus has excellent Base Number retention and viscosity control even with relatively low oil consumption and small sump capacities.	Excellent Base Number retention and viscosity control helps to promote longer oil life and reduce oil consumption.
Engine tests have shown that TLX Plus is superior with regard to piston cleanliness (lands and grooves) when compared to equivalent market oils.	May also contribute significantly to savings on spare parts and labour costs.

*When compared to normal recommended overhaul intervals



OEM Approvals

- Approved by all major OEMs including MAN, Wärtsilä, Rolls Royce Bergen, Caterpillar MAK, Pielstick

Trial and Lab Test Data

- Laboratory tests comparing TLX Plus and other market oils showed that TLX Plus was overall the best product in the market, ranking first in deposit control when contaminated with HFO, wear protection and high temperature resistance to oxidation
- Engine trial results after 4,500 hours of intensive testing demonstrate a substantial improvement in engine wear performance with low piston ring wear rate compared to the oils previously used. Castrol TLX Plus is ideal for engines facing the challenge of long overhaul intervals

TECHNICAL DATA								
TYPICAL CHARACTERISTICS	METHOD	UNITS	TLX Plus 203	TLX Plus 204	TLX Plus 303	TLX Plus 304	TLX Plus 404	TLX Plus 504
SAE Number	–	–	30	40	30	40	40	40
Kinematic Viscosity @ 100°C	ASTM D445	mm ² /s	11.5	14	11.5	14	14	14
Total Base Number, TBN	ASTM D2896	mg KOH/g	20	20	30	30	40	50
Relative Density @ 15°C	ASTM D4052	g/ml	0.897	0.900	0.902	0.906	0.913	0.919
Flash Point, PMCC	ASTM D93	°C	>200	>200	>200	>200	>200	>200
Pour Point	ASTM D97	°C	-6	-6	-6	-6	-6	-6
FZG Gear Test, A/8.3/90	DIN 51 354	FLS	11	11	11	11	11	11



DIESEL ENGINES

Are you using engine lubricants that help to protect your engines against wear, keeping them clean under the widest range of operating conditions?

PRODUCT	OIL TYPE	CATEGORY
MHP	Mineral, Monograde	TRUSTED QUALITY
HLX	Mineral, Monograde	HIGH PERFORMANCE
RLX Super 40	Mineral, Monograde	TRUSTED QUALITY
Tection DD Monograde 40	Mineral, Monograde	TRUSTED QUALITY
Tection Global 15W-40	Mineral, Multigrade	HIGH PERFORMANCE
Enduron MT 10W-40	Synthetic, Multigrade	HIGH PERFORMANCE



MHP

DIESEL ENGINE LUBRICANT

TRUSTED QUALITY

A high performance diesel lubricant specially developed for use in modern marine diesel engines operating on distillate fuels.

FEATURES	BENEFITS
MHP has been formulated with enhanced detergency properties to provide excellent engine cleanliness and excellent thermal stability.	Helps to keep critical engine components clean. With superior gear performance built-in, MHP can be used as a common oil for both engine and transmission systems, giving you the opportunity to minimise oil inventory.

OEM Approvals

- MHP exceeds the requirements of API CF and is fully approved by all major engine manufacturers

Trial and Lab Test Data

- A fast ferry running on variable sulphur content fuel (as high as 0.8-1.0%), and using 'old technology' lubricants was forced to change oil after 1,600/1,800 hours, primarily due to OEM limits for BN depletion and insolubles being exceeded
- After switching to Castrol MHP, the oil change interval increased to 2,000/2,200 hours. Overall lube consumption and disposal costs were reduced by 25%

TECHNICAL DATA				
TYPICAL CHARACTERISTICS	METHOD	UNITS	MHP 153	MHP 154
SAE Number	-	-	30	40
Kinematic Viscosity @ 100°C	ASTM D445	mm ² /s	11.5	13.5
Total Base Number, TBN	ASTM D2896	mg KOH/g	15	15
Relative Density @ 15°C	ASTM D4052	g/ml	0.890	0.895
Flash Point, PMCC	ASTM D93	°C	>200	>200
Pour Point	ASTM D97	°C	-12 or below	-12 or below
FZG Gear Test, A8.3/90	DIN 51 354	FLS	12	12



HLX

DIESEL ENGINE LUBRICANT

HIGH PERFORMANCE

A super high performance diesel engine lubricant (SAE 30 & 40) specially formulated for use in the latest generation of very highly rated marine diesel engines.

FEATURES	BENEFITS
HLX uses premium additive technology blended with high quality base oils to provide excellent high temperature performance, high resistance to bore polishing and improved lacquer resistance.	The latest highly rated marine engines place significant stress on the engine oil. HLX is able to resist this stress and still provide protection from lacquering and bore polishing, potentially offering up to twice the drain interval demonstrated by standard mineral oils.

OEM Approvals

- Approved by all major marine OEMs including MAN, Wärtsilä, MTU, Caterpillar, and Rolls Royce
- Special approval from MTU that allows oil drain intervals to be extended to 15,000 hours for fast ferry applications, double that of lower specification marine engine oils
- Exceeds the requirements of API CF and ACEA E3

TECHNICAL DATA				
TYPICAL CHARACTERISTICS	METHOD	UNITS	HLX 30	HLX 40
SAE Number	-	-	30	40
Density @ 15°C	ASTM D4052	g/ml	0.900	0.900
Viscosity @ 100°C	ASTM D445	mm ² /s	11.5	14.0
Base Number, BN	ASTM D2896	mg KOH/g	12	12
Flash Point, PMCC	ASTM D93	°C	>200	>200
Pour Point	ASTM D97	°C	-15	-15





TECTION GLOBAL 15W-40

DIESEL ENGINE LUBRICANT

HIGH PERFORMANCE

A globally available mineral oil based multigrade engine oil designed to protect your engine against wear and deposits to prevent unscheduled downtime and help minimise maintenance costs.

FEATURES	BENEFITS
Tection Global has been formulated with the highest quality base oils and advanced additive technology to help you achieve superior engine protection.	Tection Global helps to protect your engine by minimising piston deposits, bore polishing and wear of critical engine components.

OEM Approvals

- Performance specifications:
 - SAE 15W-40
 - ACEA E3, E5, E7
 - API CI-4/CF
- Approved by all relevant global engine manufacturers to demanding specifications including:
 - Caterpillar ECF-2
 - MAN M3275
 - MB Approval 228.3
 - Volvo VDS-3
 - Cummins CES 20071, 20072, 20076, 20077, 20078

TECHNICAL DATA			
TYPICAL CHARACTERISTICS	METHOD	UNITS	TECTION GLOBAL 15W-40
SAE Viscosity Grade	SAEJ300	–	15W-40
Relative Density @ 15°C	ASTM D4052	g/ml	0.885
Kinematic Viscosity @ 40°C	ASTM D445	mm ² /s	106.4
Kinematic Viscosity @ 100°C	ASTM D445	mm ² /s	14.4
Base Number, BN	ASTM D2896	mg KOH/g	10.5
Flash Point, COC	ASTM D92	°C	>200
Pour Point	ASTM D97	°C	-39



RLX SUPER 40

DIESEL ENGINE LUBRICANT

TRUSTED QUALITY

A zinc and chlorine free engine crankcase lubricant specifically designed for the lubrication of GM-EMD, GE and ALCO engines.

FEATURES	BENEFITS
RLX Super 40 is a 5th Generation (LMOA) engine oil specially designed for engines where zinc free lubricants are required. Developed with an optimum balance of detergency and dispersancy.	The carefully balanced additive package used in RLX Super 40 helps to reduce ring sticking and engine deposits. Extended oil drain intervals compared to 4th Generation (LMOA) engine oils also helps to reduce downtime.

OEM Approvals

- Conforms to the requirements of Generation 5 for GM-EMD engines and Generation 4LL for GE engines. Suitable for use in ALCO engines. Meets the requirements for use in Caterpillar 3600 engines
- Exceeds the requirements of API CF and CF-2

TECHNICAL DATA			
TYPICAL CHARACTERISTICS	METHOD	UNITS	RLX Super 40
SAE Number	–	–	40
Density @ 15°C	ASTM D1298	g/ml	0.890
Kinematic Viscosity @ 100°C	ASTM D445	mm ² /s	14.5
Viscosity Index	ASTM D2270	–	100
Total Base Number, TBN	ASTM D2896	mg KOH/g	13.7
Flash Point, PMCC	ASTM D92	°C	>200
Pour Point	ASTM D97	°C	-15
Zinc Content	–	ppm	<10
Chlorine Content	–	ppm	<10
Sulphated Ash	ASTM D874	% wt	1.5





TECTION DD MONOGRADE 40

DIESEL ENGINE LUBRICANT

**TRUSTED
QUALITY**

A special low ash engine oil developed to provide complete protection for Detroit Diesel two stroke engines.

FEATURES	BENEFITS
Tection DD Monograde 40 has a special low ash formulation designed to minimise deposit build up in your engine. It also has advanced anti-wear additives to help protect critical engine parts.	Two stroke engines are very sensitive to deposits, which lead to burnt exhaust valves, reduced engine power and potential catastrophic failure. The special low ash formulation of Tection DD Monograde 40 helps to minimise this harmful deposit build-up.

OEM Approvals

- Suitable for Detroit Diesel 149 series engine
- Meets API CF-2 performance specification

Trial and Lab Test Data

- Protection against deposit formation ensures efficient engine operation and longer engine life
- Advanced anti-wear additives protect against premature engine failure and helps to reduce maintenance costs
- SAE 40
- API CF/CF-2
- Sulphated Ash 0.8% max
- Suitable for use in DD Series 149 engines

TECHNICAL DATA			
TYPICAL CHARACTERISTICS	METHOD	UNITS	TECTION DD MONOGRADE 40
SAE Number	-	-	40
Relative Density @ 15°C	ASTM D4052	g/ml	0.894
Kinematic Viscosity @ 100°C	ASTM D445	mm ² /s	15.5
Total Base Number, TBN	ASTM D2896	mg KOH/g	7.0
Sulphated Ash	ASTM D874	% wt	0.8
Flash Point, PMCC	ASTM D92	°C	>200
Pour Point	ASTM D97	°C	-27



ENDURON MT 10W-40

DIESEL ENGINE LUBRICANT

**HIGH
PERFORMANCE**

An advanced multigrade engine oil designed to deliver engine protection and extended oil drain performance in the latest generation of high-speed diesel engines.

FEATURES	BENEFITS
Enduron MT has been formulated with advanced additive technology designed to provide engine protection and maximise engine oil drain intervals.	The advanced additive technology used in Enduron MT provides protection from all types of engine wear, deposit build-up and bore-polishing. In addition, Enduron MT provides excellent cold start ability and is approved for use by relevant OEMs at their maximum oil drain intervals.

OEM Approvals

- Enduron MT is particularly recommended for MTU engines where Oil Category 3 is required, allowing for maximum possible drain intervals to be achieved
- Is also approved for extended drain performance in MTU, MAN, Volvo, Mercedes, Renault and Cummins engines
- Approved to ACEA E4, E5 E7 and API CF

TECHNICAL DATA			
TYPICAL CHARACTERISTICS	METHOD	UNITS	ENDURON MT 10W-40
SAE Viscosity Grade	SAE J300	-	10W-40
Density @ 15°C	ASTM D4052	g/ml	0.866
Kinematic Viscosity @ 40°C	ASTM D445	cSt	87
Kinematic Viscosity @ 100°C	ASTM D445	cSt	13.4
Viscosity Index	ASTM D2270		155
Base Number, BN	ASTM D2896	mg KOH/g	16
Flash Point, PMCC	ASTM D93	°C	>200
Pour Point	ASTM D97	°C	-42





HYDRAULIC SYSTEMS

Are you using the right fluid in all climatic conditions to help protect both your hydraulic systems and the world's oceans?

PRODUCT	OIL TYPE	CATEGORY
BioBar	Synthetic	HIGH PERFORMANCE ENVIRONMENTALLY RESPONSIBLE
Hyspin AWH-M	Mineral	TRUSTED QUALITY



BIOBAR

ENVIRONMENTALLY RESPONSIBLE HYDRAULIC FLUID



HIGH PERFORMANCE
ENVIRONMENTALLY RESPONSIBLE

A range of high performance environmentally responsible hydraulic fluids that last up to 50% longer than conventional mineral oils, helping to reduce lube consumption and potentially providing greater equipment reliability in operations, thus avoiding unnecessary maintenance.

VALUE PROVEN

FEATURES	BENEFITS
Fully tested to OSPAR requirements and approved by the Norwegian regulators for use offshore: – superior marine biodegradation. – significantly reduced bioaccumulation and toxicity* to marine organisms.	Reduced environmental impact Support your company's environmental agenda Enhance your reputation among customers and stakeholders Comply with current and future legislation
Excellent oxidation stability. Good thermal stability. Extremely resistant to hydrolysis. High shear stability.	The potential to extend product life by up to 50%*, minimising product consumption and waste.
Physical properties and system operating characteristics are comparable with those of mineral oil-based hydraulic fluids. Similar elastomer (seal) compatibility to standard hydraulic oils. BioBar is compatible with conventional mineral oil-based products.	Existing equipment can be readily converted to Castrol BioBar with minimal risk and few, if any, system changes. Hydraulic systems will operate without noticeable changes in response times or operating characteristics.
Low measured Friction Coefficient.	Resistance to 'judder' under high load / slow speed operating conditions on deck equipment, helping to prevent hazardous conditions in lifting operations.
High Viscosity Index and low Pour Point	Easier start-up in hydraulic systems operating at low temperatures. Provides a thicker lubricating film and enhanced component protection in hydraulic systems operating at high temperatures.
Exceeds the requirements of the Eaton-Vickers 35VQ25 Pump Test.	Assured hydraulic pump wear protection.

*When compared to conventional mineral oils

Trial and Lab Test Data

- Outstanding pump protection as demonstrated by very low wear in Vickers Eaton 35VQ25A Pump Test: ring loss of 6mg (limit 75mg) and vane loss of <1mg (limit 15mg)
- Reduced environmental impact when compared to conventional hydraulic fluids – demonstrable benefits in the following key performance criteria:
 - Castrol BioBar exceeds readily biodegradable standards in extended OECD 306 seawater biodegradation product testing.
 - the toxicity of Castrol BioBar was measured on 3 marine species and was found to exceed stringent OSPAR and US EPA requirements by at least 4 times. It also showed significantly reduced potential for bioaccumulation in marine organisms.*

TECHNICAL DATA

TYPICAL CHARACTERISTICS	METHOD	UNITS	BIOBAR 22	BIOBAR 32	BIOBAR 46	BIOBAR 68	BIOBAR 100
Kinematic Viscosity @ 40°C	ASTM D445	mm ² /s	22	32	46	68	104
Kinematic Viscosity @ 100°C	ASTM D445	mm ² /s	4.87	6.44	8.14	11.0	15.6
Viscosity Index	ASTM D2270	None	139	145	147	150	150
Pour Point	ASTM D97	°C	-45	-45	-30	-30	-30
Steel Corrosion – Sea Water	ASTM D665	None	No Rust	No Rust	No Rust	No Rust	No Rust
Foam Sequence I, Tendency/ Stability	ASTM D892	ml/ml	20/0	20/0	20/0	50/0	50/0
Hydrolytic Stability, Copper Weight Loss	ASTM D2619	mg/cm ²	0	0.1	0.1	0.1	0.1
Hydrolytic Stability, Water Layer Acidity	ASTM D2619	mgKOH/g	1.1	1.1	1.1	1.1	1.1
Hydrolytic Stability, Change in Acidity	ASTM D2619	mgKOPH/g	-1.5	-1.4	-1.3	-1.1	-0.9
Oxidation Stability, RPVOT	ASTM D2272	minutes	300	300	300	300	300

HYSPIN AWH-M

HIGH VISCOSITY INDEX HYDRAULIC LUBRICANT

TRUSTED QUALITY

The Castrol Hyspin AWH-M hydraulic oil range of premium high Viscosity Index lubricants are blended using highly refined mineral oils enhanced with the latest stabilised zinc additive system. Castrol Hyspin AWH-M contains a shear-stable Viscosity Index Improver (VII) which helps maintain the viscosity characteristics of the product over a wide temperature range, even after prolonged use. The VII also imparts a very low pour point which enables the product to be used in very cold environments. Castrol Hyspin AWH-M exhibits excellent corrosion and wear protection as well as outstanding thermal and oxidative stability. In addition, this product has excellent hydrolytic stability and separates water rapidly.

FEATURES	BENEFITS
Outstanding thermal and oxidative stability.	Helps to promote longer oil life, minimises sludge and deposit formation, assists reliable operation of equipment.
High Viscosity Index.	Wide operating temperature range and easier start up at low temperatures.
Excellent anti-wear performance and superior protection against corrosion.	Maximum component protection.
Excellent water separation. Outstanding filterability characteristics, both dry and wet.	Maximum filter life and minimum maintenance.





GEARBOXES

Have you considered the consequences of poor gear oil performance on the reliability of key machinery like propellers, fuel separators, cranes and winches? Are you willing to take the risk?

PRODUCT	OIL TYPE	CATEGORY
Alphasyn HG	Synthetic	HIGH PERFORMANCE
Alphasyn PG	Synthetic	HIGH PERFORMANCE
Alpha SP	Mineral	TRUSTED QUALITY



ALPHASYN HG

SYNTHETIC GEAR LUBRICANT



HIGH PERFORMANCE

The Castrol Alphasyn HG range of high performance polyalphaolefin-based synthetic gear oils deliver outstanding anti-wear performance where machinery is operating at higher temperatures and under heavy loads. Castrol Alphasyn HG helps to extend oil life when compared to conventional mineral oil based products, allowing you to achieve real maintenance cost savings.

FEATURES	BENEFITS
Excellent anti-wear, load-carrying and extreme pressure properties.	Helps to provide protection of gears against wear and shock-loading, leading to potential savings in both maintenance time and costs.
Exceptional lubricity properties.	May increase mechanical efficiency and minimise energy losses.
Low pour point and high Viscosity Index.	Can be used in extreme climatic zones without the need for significant heating. More protection at start-up.* Consistent lubricating film and wear protection on gears operating at high temperatures/high load.
Improved thermal and oxidative stability.	Helps promote longer oil life.*
Good viscosity characteristics, low pour point and excellent air and water separation capabilities.	Can help to reduce downtime through prolonged lubricant life and increased equipment reliability.
Low temperature fluidity, as required in deck machinery in very cold or Arctic temperatures.	The potential to maximise power consumption efficiency.

*Compared with conventional mineral oils



Trial and Lab Test Data

- The optimal coefficient of friction of Castrol Alphasyn HG achieves a Pass result in the Ortlinghaus clutch test after 10,000 cycles, replicating many years of service.
- Castrol Alphasyn HG achieves Fail Load stage >12 in the double-speed FZG test (A.16.6/90) demonstrating superior scuffing protection to gears, even during harsh operating conditions.

TECHNICAL DATA

NAME	METHOD	UNITS	ALPHASYN HG 100	ALPHASYN HG 150	ALPHASYN HG 220	ALPHASYN HG 320
ISO Grade	–	–	100	150	220	320
Density @ 15°C	ASTM D4052	g/ml	0.84	0.84	0.85	0.86
Viscosity @ 40°C	ASTM D445	cSt	100	150	220	320
Viscosity @ 100°C	ASTM D445	cSt	14.3	19.8	26.7	34.6
Viscosity Index	ASTM D2270	–	140	145	150	150
Flash Point, COC	ASTM D92	°C	270	270	270	286
Flash Point, PMCC	ASTM D93	°C	230	230	230	230
Pour Point	ASTM D97	°C	-51	-42	-42	-36
Oxidation (KV100 inc)	ASTM D2893	–	<1%	<1%	<1%	<1%
Steel Corrosion	IP 135B	–	Pass	Pass	Pass	Pass
FZG Gear Failure Load Stage, A/16.6/140	DIN 51 354	–	10	10	10	10
FZG Gear Failure Load Stage, A/8.3/90	DIN 51 354	–	>12	>12	>12	>12
Copper Corrosion	IP 154	–	1a	1a	1a	1a

ALPHASYN PG

SYNTHETIC WORM GEAR LUBRICANT

HIGH PERFORMANCE

The Castrol Alphasyn PG range of gear lubricants is primarily intended for use in worm reduction gear boxes. The low coefficient of friction of the polyglycol base fluid is designed to offer improvements in efficiency and consequent reductions in power consumption and operating temperatures. This is particularly important in applications where sliding contact is high.

FEATURES	BENEFITS
High load carrying capacity.	Outstanding wear protection for gears and bearings compared to conventional mineral based oils.
Low coefficient of friction.	Synthetic base oils help to promote reduced energy consumption and operating temperatures.
High viscosity index and low pour point, stable at high temperatures (up to 140°C).	Wide operating temperature range minimises or avoids the need for pre-heating during cold start-ups.
Good thermal and oxidative stability. Excellent corrosion protection for gearboxes operating in humid environments.	Reliable operation and extended operating life when compared to mineral oil based products.

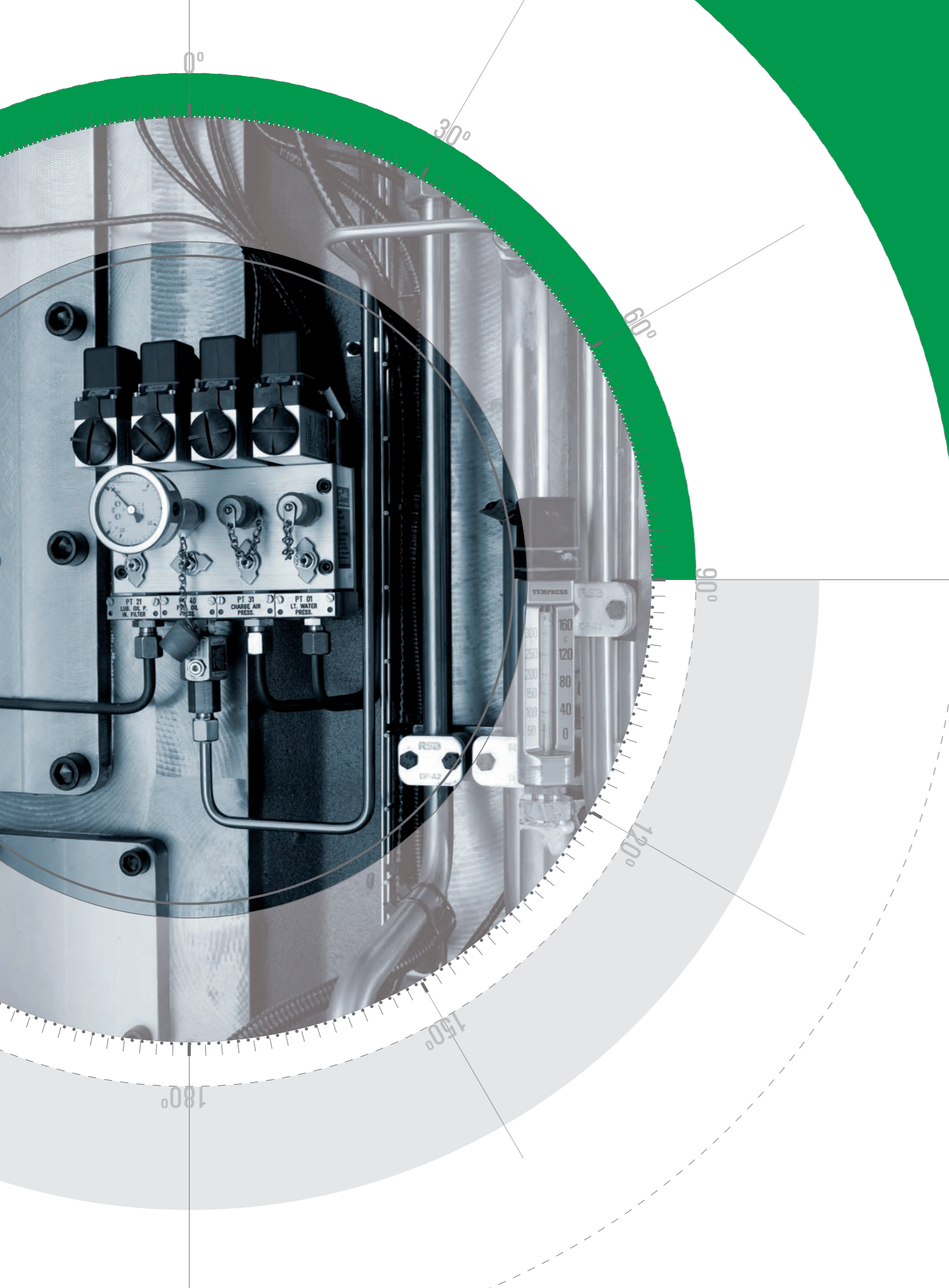
ALPHA SP

EXTREME PRESSURE GEAR LUBRICANT

TRUSTED QUALITY

The advanced extreme pressure additive system of the Castrol Alpha SP gear oil range not only provides high load-carrying capacity, but also high resistance to scuffing and micro-pitting, thereby extending gear life and meeting the evolving demands of smaller and higher output gearboxes.

FEATURES	BENEFITS
'Clean gear' additive technology.	Low deposit formation and promotes longer filter life.
Full Extreme Pressure (EP) performance.	Helps to protect gears against wear under high and shock loads.
Good water separation and demulsification characteristics.	Helps to prolong oil life and maximise equipment reliability.
High protection against corrosion and wear.	Can help to reduce maintenance.



AIR COMPRESSORS

Compressed air is critical for engine starting and also for pneumatic actuators widely used in process and equipment control. Are you using the right lubricant for your compressor?

PRODUCT	OIL TYPE	CATEGORY
Aircol SN	Synthetic	HIGH PERFORMANCE
Aircol SR	Synthetic	HIGH PERFORMANCE
Aircol PD	Mineral	TRUSTED QUALITY



AIRCOL SN

SYNTHETIC AIR COMPRESSOR LUBRICANT

HIGH PERFORMANCE

The Castrol Aircol SN range has been developed to cope with the severe operating conditions experienced in reciprocating air compressors operating at high compression ratios and high discharge temperatures.

FEATURES	BENEFITS
Superior oxidation stability.	Helps to promote long oil life and a cleaner compressor crankcase. Minimises carbon and varnish formation which helps to protect valves.
Good lubricity and film strength.	In some compressors, can help lower oil consumption due to a reduction in the feed rate to the cylinder walls and piston rings without increasing wear rates. Since less lubricant is consumed the downstream air is also of higher quality.
Excellent high temperature performance.	The operating temperature range of Aircol SN grades extends well beyond that of conventional mineral oils over an extended period or running time. The low deposit tendency and high spontaneous ignition temperature provides greater safety by reducing the possibility of downstream fires and explosions.

Trial and Lab Test Data

- Excellent oxidation resistance, thermal stability and solvency resulting in improved system cleanliness, helps to increase service life of the lubricant and opportunities for extending machine maintenance intervals
- Enhanced ability to separate rapidly from water and protect surfaces from corrosion damage
- Wider operating temperature range compared to mineral oil based products affording excellent protection under both high and low temperature conditions
- Low carbon formation

TECHNICAL DATA

TYPICAL CHARACTERISTICS	METHOD	UNITS	AIRCOL SN 68	AIRCOL SN 100
ISO Viscosity Grade	-	-	68	100
Relative Density @ 15°C	ISO 12185, ASTM D4052	g/ml	0.96	0.96
Kinematic Viscosity @ 40°C	ISO 3104, ASTM D445	mm ² /s	68	100
Kinematic Viscosity @ 100°C	ISO 3104, ASTM D445	mm ² /s	7.6	10.3
Viscosity Index	ISO 2909, ASTM D2270	-	67	89
Flash Point, COC	ISO 2592, ASTM D92	°C	>200	>200
Pour Point	ISO 3016, ASTM D97	°C	-40	-40



AIRCOL SR

SYNTHETIC ROTARY COMPRESSOR LUBRICANT

HIGH PERFORMANCE

Rotary screw compressors place high demands on lubricants and operate under severe conditions. The Castrol Aircol SR range is suitable for use in oil-flooded rotary screw compressors and provides longer protection for specialised and demanding applications compared to conventional mineral oil based products.

FEATURES	BENEFITS
Extended drain intervals.	Can help reduce operating costs.
Outstanding oxidation stability and good antiwear performance	Helps promote long lubricant and equipment life

TECHNICAL DATA

TYPICAL CHARACTERISTICS	METHOD	UNITS	AIRCOL SR 32	AIRCOL SR 46	AIRCOL SR 68
Density at 15°C	ISO 12185, ASTM D4052	g/ml	0.83	0.84	0.839
Kinematic Viscosity @ 40°C	ISO 3104, ASTM D445	mm ² /s	32	46	68
Kinematic Viscosity @ 100°C	ISO 3104, ASTM D445	mm ² /s	6.1	7.8	10.7
Viscosity Index	ISO 2909, ASTM D2270	-	137	137	142
Foam Sequence I	ISO 6247, ASTM D892	mls/mls	10/0	10/0	10/0
Pour Point	ISO 3016, ASTM D97	°C	-54	-54	-54
Flash Point, COC	ISO 2592, ASTM D92	°C	264	264	235
Rust Test (24hrs, Synthetic Sea Water)	ISO 7210, ASTM D665B	-	Pass	Pass	Pass
RPVOT	ASTM D2272	Mins	4,500	3,000	3,000
FZG Gear test (A/8.3/90)	DIN 51354	FLS	8	9	9



AIRCOL PD

AIR COMPRESSOR LUBRICANT

TRUSTED QUALITY

The Castrol Aircol PD range of ashless oils is recommended for the lubrication of reciprocating compressors and are available in the required viscosity grades.

FEATURES	BENEFITS
Excellent water separation characteristics.	This allows condensation to readily separate from the oil, minimising the risk of emulsion formation which could block the oil separator element.
Excellent corrosion prevention.	Helps protect equipment in humid conditions.

TECHNICAL DATA				
TYPICAL CHARACTERISTICS	METHOD	UNITS	AIRCOL PD 68	AIRCOL PD 100
ISO Grade	-	-	68	100
Density @ 15°C, Relative	ISO 12185, ASTM D4052	g/ml	0.88	0.89
Viscosity, Kinematic @ 40°C	ISO 3104, ASTM D445	cSt	68	100
Viscosity, Kinematic @ 100°C	ISO 3104, ASTM D445	cSt	8.57	11.4
Viscosity Index	ISO 2909, ASTM D2270		100	98
Flash Point, PMCC	ISO 2719, ASTM D93	°C	>200	>200
Pour Point	ISO 3016, ASTM D97	°C	-21	-12
Foam Sequential	ISO 6247, ASTM D892	mls/mls	30/0	30/0
Rust Test	ISO 7210, ASTM D665B	-	No rust	No rust
Conradson Carbon Residue after Ageing	DIN 51352/2	%	0.7	<3.0
RPVOT	ASTM D2272	mins	-	-





GAS COMPRESSORS

Are you involved in the transportation or processing of hydrocarbon gases? You should use a lubricant that ensures the safe and reliable operation of gas compressor installations.

PRODUCT	OIL TYPE	CATEGORY
Aircol PG 185	Synthetic	HIGH PERFORMANCE



AIRCOL PG 185

HYDROCARBON COMPRESSOR LUBRICANT

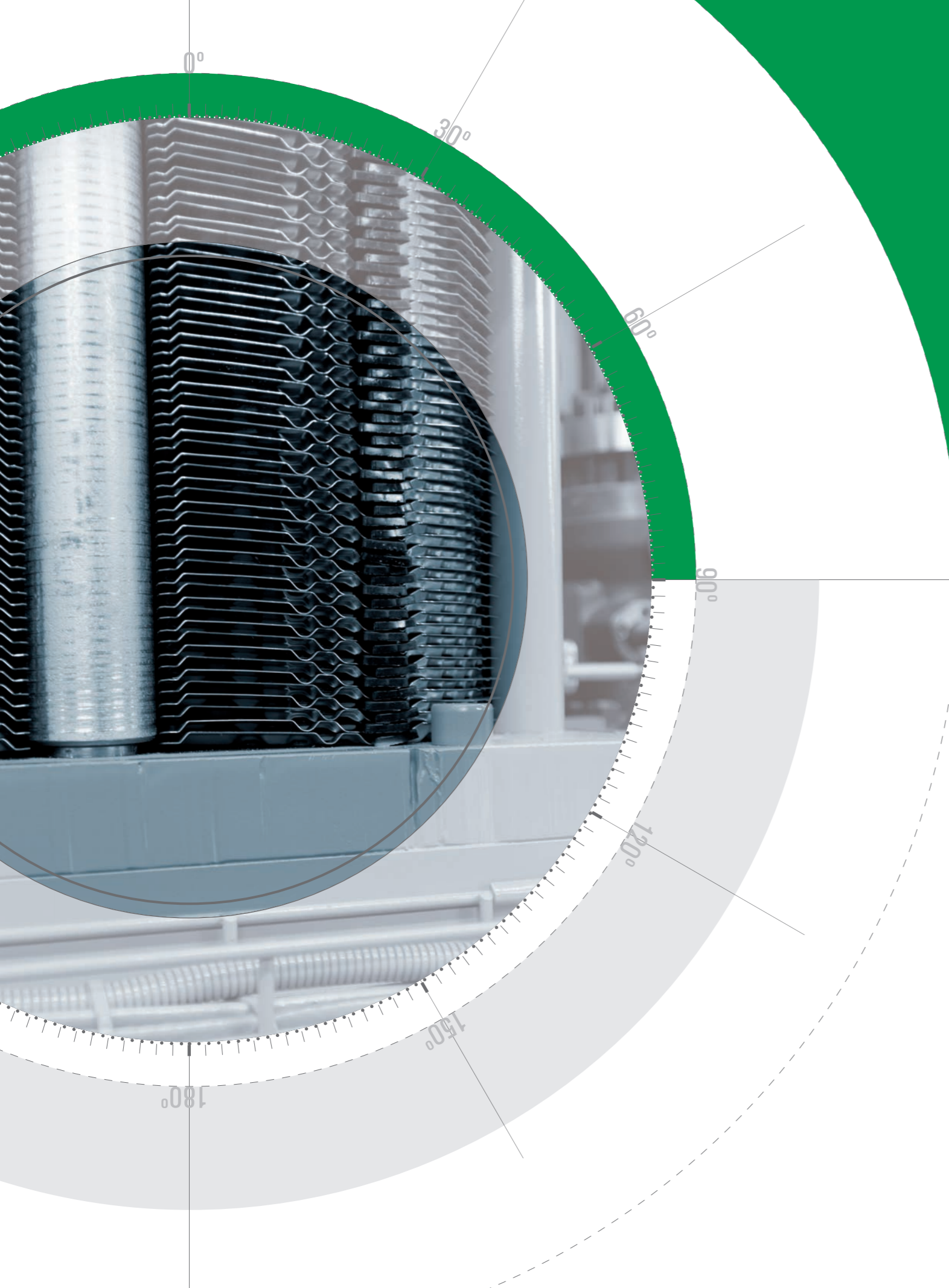
HIGH PERFORMANCE

Castrol Aircol PG 185 is a high performance synthetic gas compressor oil based on poly-alkylene glycol, for the lubrication of compressors handling hydrocarbon and chemical gases.

FEATURES	BENEFITS
Versatile product for use in a variety of applications.	Can be used with a wide range of LPG, LNG hydrocarbon and chemical gases including butadiene, methane, ethane and propane.
Low hydrocarbon solubility.	Helps to resist dilution by process streams, ensuring cylinder liners are protected against scuffing and wear, and reducing feed rate and lubricant consumption.
High thermal stability due to synthetic base fluid.	Helps to prevent polymerisation and the formation of gums and resins.

TECHNICAL DATA			
TYPICAL CHARACTERISTICS	METHOD	UNITS	AIRCOL PG 185
Relative Density @ 15°C	ISO 12185/ASTM D4052	g/ml	1.053
Viscosity @ 40°C	ISO 3104/ASTM D445	cSt	185
Viscosity @ 100°C	ISO 3104/ASTM D445	cSt	35
Viscosity Index	ISO 2909/ASTM D2270	-	200
Flash Point, COC	ISO 2592/ASTM D92	°C	>200
Pour Point	ISO 3016/ASTM D97	°C	-30
Foam Test @ 24°C	-	-	45/10
Foam Test @ 93.5°C	-	-	140/20





REFRIGERATION SYSTEMS

Do you realise how critical air conditioning is for the comfort of your crew and passengers, and for the protection of foodstuffs and cargo?

PRODUCT	OIL TYPE	CATEGORY
Aircol SW	Synthetic	TRUSTED QUALITY
Aircol 228	Synthetic	TRUSTED QUALITY
Aircol 229	Synthetic	TRUSTED QUALITY
Aircol 266 & 299	Mineral	TRUSTED QUALITY



AIRCOL SW

SYNTHETIC REFRIGERATION COMPRESSOR LUBRICANT

TRUSTED QUALITY

The Castrol Aircol SW range of compressor lubricants is designed for use with refrigeration systems using environmentally responsible HFC refrigerants, in particular R134a.

FEATURES	BENEFITS
The synthetic basestocks used in formulating these products are fully miscible with HFC refrigerants, including R134a, at low operating temperatures.	Helps promote good oil circulation through the evaporator ensuring efficient cooling and return of the lubricant to the compressor to provide smooth, trouble-free operation.
Enhanced hydrolytic stability.	Helps to promote longer product life when compared to conventional mineral oil based products.

TECHNICAL DATA								
TYPICAL CHARACTERISTICS	METHODS	UNITS	AIRCOL SW32	AIRCOL SW46	AIRCOL SW68	AIRCOL SW100	AIRCOL SW170	AIRCOL SW220
Density @ 20°	ASTM D4052	kg/m ³	977	980	980	969	968	975
Kinematic Viscosity @ 40°C	ASTM D445	mm ² /s	32	46	68	100	170	220
Kinematic Viscosity @ 100°C	ASTM D445	mm ² /s	5.4	6.9	8.5	11.4	17	19
Pour Point	ASTM D97	°C	-46	-42	-39	-30	-27	-27
Flash Point, PMCC	ASTM D93	°C	233	235	245	235	235	250



AIRCOL 228

SYNTHETIC REFRIGERATION COMPRESSOR LUBRICANT

TRUSTED QUALITY

The Castrol Aircol 228 series are synthetic compressor oils suitable for use in refrigeration systems with very low evaporator temperatures where Alkyl-benzene based lubricants are recommended by the manufacturer.

FEATURES	BENEFITS
Excellent miscibility and solubility characteristics with R22.	Works efficiently in refrigeration systems using HCFC refrigerants, such as R22
Very low floc points.	The Aircol 228 range can be used in systems where evaporator temperatures are extremely low.

TECHNICAL DATA					
TYPICAL CHARACTERISTICS	METHOD	UNITS	AIRCOL 2283	AIRCOL 2284	AIRCOL 2285
Density @ 15°	ASTM D4052	g/ml	0.87	0.87	0.87
Kinematic Viscosity @ 40°C	ASTM D445	cSt	46	68	100
Flash Point, PMCC	ASTM D93	°C	155	165	175
Pour Point	ASTM D97	°C	-33	-33	-30
Floc Point, R22	DIN 51 351	°C	-55	-55	-50



AIRCOL 229

SYNTHETIC REFRIGERATION COMPRESSOR LUBRICANT

TRUSTED QUALITY

The Castrol Aircol 229 series are specifically designed for refrigeration systems using screw type compressors operating with very low evaporation temperatures.

FEATURES	BENEFITS
Low miscibility and solubility with R22 refrigerant.	This characteristic gives significant advantages in screw type compressors where refrigerant absorption can adversely effect volumetric efficiency and reduce lubricant viscosity to unacceptably low levels.
Very low pour point.	Can be used in systems where evaporator temperatures are extremely low.

TECHNICAL DATA				
TYPICAL CHARACTERISTICS	METHOD	UNITS	AIRCOL 2294	AIRCOL 2295
Density @ 15°C	ASTM D4052	g/ml	0.84	0.85
Viscosity @ 40°C	ASTM D445	mm ² /s	68	220
Viscosity @ 100°C	ASTM D445	mm ² /s	10.8	25.2
Closed Flash Point	ASTM D93	°C	233	243
Pour Point	ASTM D97	°C	-45	-40



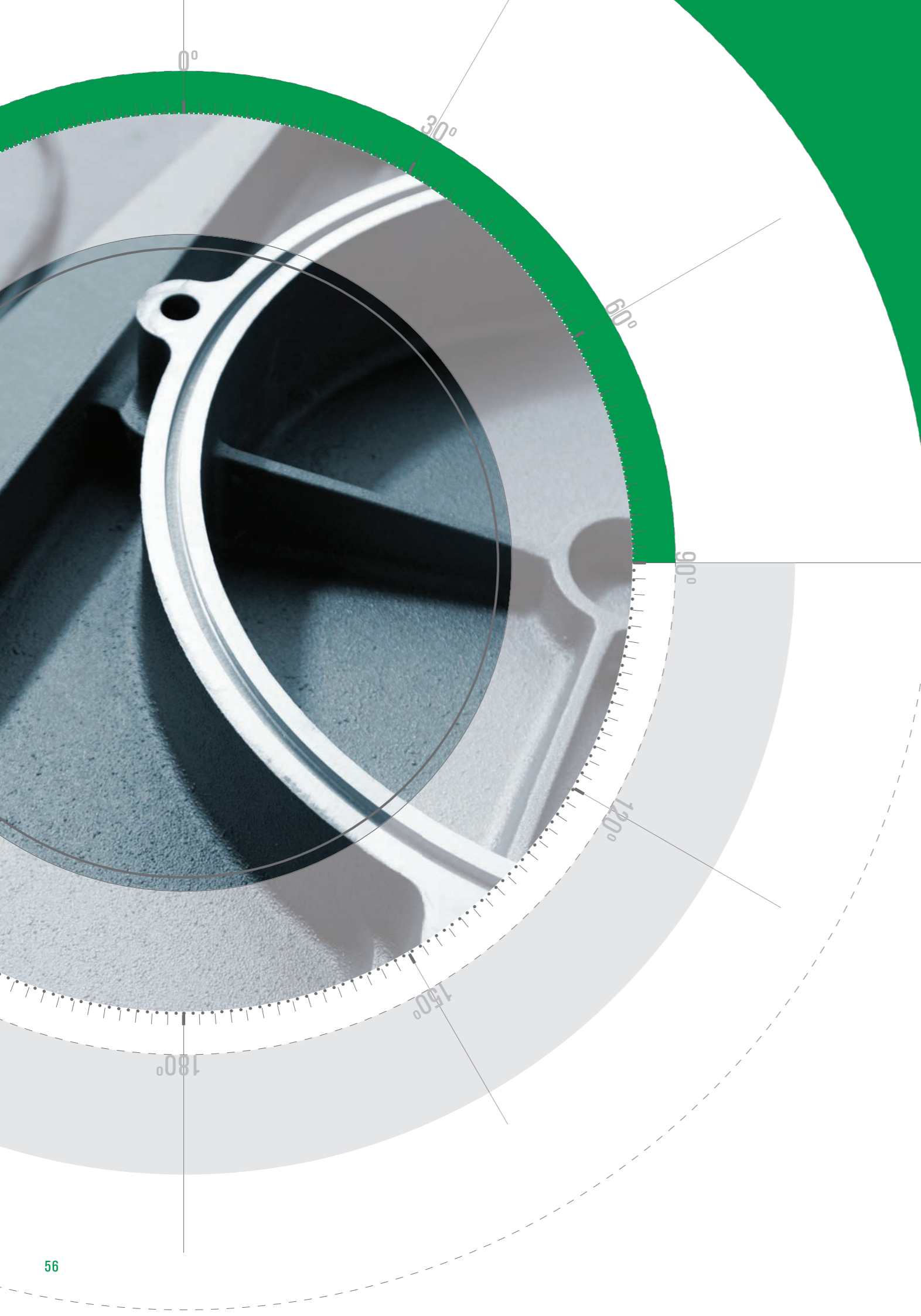
AIRCOL 266 & 299

MINERAL REFRIGERATION COMPRESSOR LUBRICANT

TRUSTED QUALITY

Castrol Aircol 266 and the Aircol 299 refrigeration compressor lubricants are for use in refrigeration and air conditioning plants using HCFC refrigerants such as R22. The exceptional low temperature characteristics of these oils helps to prevent the formation of wax which may occur in high performance systems using HCFC refrigerants such as R22.

FEATURES	BENEFITS
Compatible with R22 refrigerant.	When operating in systems using R22 refrigerant, helps to promote good oil circulation through the evaporator to provide smooth, efficient operation.
Low pour point ensures low wax forming tendency.	Can be used in systems where evaporator temperatures are extremely low.



TURBOCHARGERS

Turbochargers operate under severe conditions and can place high demands on lubricants and operate under severe conditions. Stability and cleanliness are essential to ensure reliable operation.

PRODUCT	OIL TYPE	CATEGORY
Aircol SR	Synthetic	HIGH PERFORMANCE
Aircol SN	Synthetic	HIGH PERFORMANCE



AIRCOL SR

SYNTHETIC TURBOCHARGER LUBRICANT

HIGH PERFORMANCE

The Castrol Aircol SR range are high performance synthetic turbocharger and rotary compressor lubricants offering superior operational benefits. They contain anti-wear additives to enhance lubrication, anti-oxidants to minimise oxidation deposit formation and an ester-free formulation with corrosion inhibitors to control the effects of moisture.

FEATURES	BENEFITS
Outstanding oxidation stability compared to conventional lubricants and good anti-wear performance.	Longer lubricant life compared to conventional mineral oil based products.
Excellent water separation.	Allows condensation to readily separate from the lubricant, minimising the risk of forming emulsions which could block the oil separator element.

OEM Approvals

- Aircol SR 68 is approved by ABB Turbo Systems for up to 5,000 hours drain intervals and as a low friction lubricant in their turbochargers. The use of a synthetic PAO 68 oil such as Aircol SR 68 is highly recommended in certain ABB VTR 4 series turbochargers.

TECHNICAL DATA

TYPICAL CHARACTERISTICS	METHOD	UNITS	AIRCOL SR 46	AIRCOL SR 68
Density at 15°C	ISO 12185, ASTM D4052	g/ml	0.84	0.839
Kinematic Viscosity @ 40°C	ISO 3104, ASTM D445	mm ² /s	46	68
Kinematic Viscosity @ 100°C	ISO 3104, ASTM D445	mm ² /s	7.8	10.7
Viscosity Index	ISO 2909, ASTM D2270	-	137	142
Foam Sequence I	ISO 6247, ASTM D892	mls/mls	10/0	10/0
Pour Point	ISO 3016, ASTM D97	°C	-54	-54
Flash Point, COC	ISO 2592, ASTM D92	°C	264	235
Rust Test (24hrs, Synthetic Sea Water)	ISO 7210, ASTM D665B	-	Pass	Pass
RPVOT	ASTM D2272	Mins	3,000	3,000
FZG Gear test (A/8.3/90)	DIN 51354	FLS	9	9



AIRCOL SN

SYNTHETIC TURBOCHARGER LUBRICANT

HIGH PERFORMANCE

The Castrol Aircol SN range of synthetic ester based lubricants resist oxidation and deposit formation to ensure long bearing life and reliable operation in service.

FEATURES	BENEFITS
Superior oxidation stability when compared to a conventional mineral oil.	The potential to reduce maintenance, extend oil life and help you achieve cleaner operation.
Excellent high temperature performance.	The operating temperature range of Aircol SN grades extends well beyond that of conventional mineral oils.

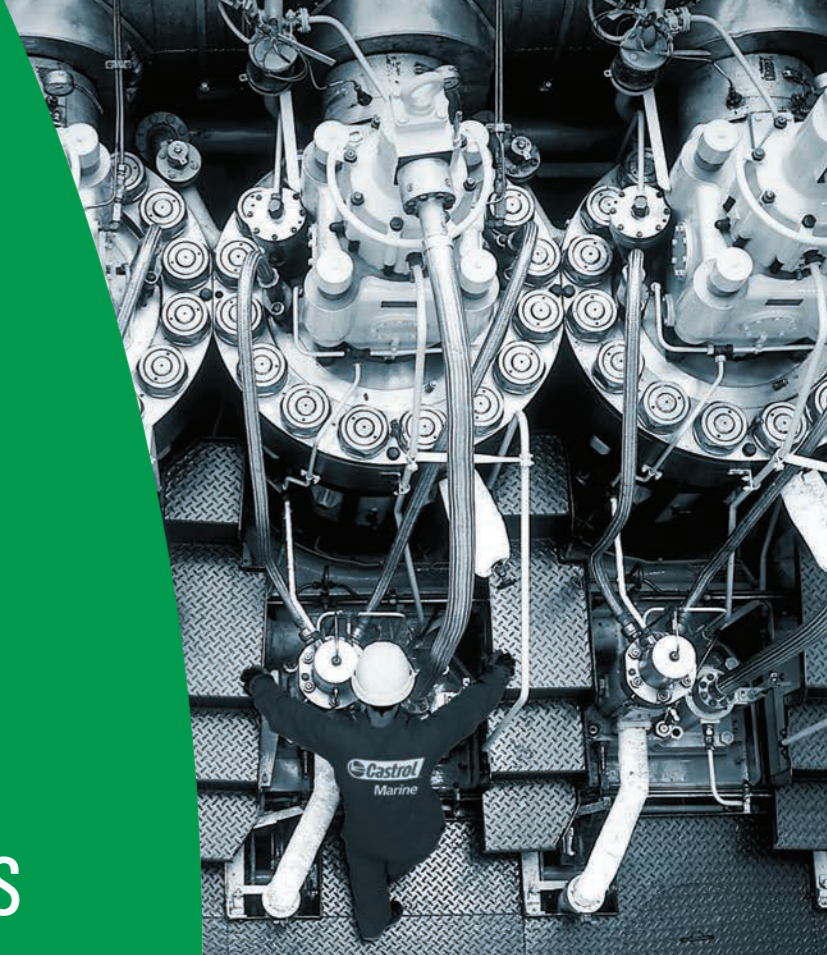
OEM Approvals

- Aircol SN 68 is approved by ABB Turbo Systems as a 'List 3' Synthetic oil.

TECHNICAL DATA

TYPICAL CHARACTERISTICS	METHOD	UNITS	AIRCOL SN 68	AIRCOL SN 100
ISO Viscosity Grade	-	-	68	100
Relative Density @ 15°C	ISO 12185, ASTM D4052	g/ml	0.96	0.96
Kinematic Viscosity @ 40°C	ISO 3104, ASTM D445	mm ² /s	68	100
Kinematic Viscosity @ 100°C	ISO 3104, ASTM D445	mm ² /s	7.6	10.3
Viscosity Index	ISO 2909, ASTM D2270	-	67	89
Flash Point, COC	ISO 2592, ASTM D92	°C	>200	>200
Pour Point	ISO 3016, ASTM D97	°C	-40	-40





GREASE APPLICATIONS

Are you using the correct grease for the diverse range of equipment and wide range of operating conditions it will experience? Have you considered the environmental impact of your on-deck grease?

PRODUCT	OIL TYPE	CATEGORY
Spheerol SX2	Mineral	TRUSTED QUALITY
High Temperature Greases	Mineral	HIGH PERFORMANCE
BioTac EP2	Synthetic	HIGH PERFORMANCE ENVIRONMENTALLY RESPONSIBLE
Spheerol EPL Series	Mineral	TRUSTED QUALITY
Spheerol LMM	Mineral	TRUSTED QUALITY
Spheerol AP3	Mineral	TRUSTED QUALITY



SPHEEROL SX2

CALCIUM COMPLEX GREASE

**TRUSTED
QUALITY**

Castrol Spheerol SX2 is a multipurpose lubricating grease, specifically developed to provide lubrication and protection for bearings, wire ropes and open gears.

FEATURES	BENEFITS
Excellent multipurpose product.	Can help to reduce inventory.
High dropping point.	Can be used in higher temperature applications than a conventional grease.
Excellent protection against corrosion.	Can help to extend the life of on-deck equipment.
High resistance to seawater wash off.	Maintains a protective coating for longer and helps extend re-greasing intervals.

Trial and Lab Test Data

- The high Dropping Point indicates how stable Spheerol SX2 is at higher temperatures.
- The high Weld Point value (measured by the 4 Ball EP wear test) indicates efficient operation under high loads.
- These properties are important for the lubrication of the bearings and open gears of deck hatches, mooring and anchor winches and cranes working under very high loads, low speeds and frequent stop-start operation.

TECHNICAL DATA			
TYPICAL CHARACTERISTICS	METHOD	UNITS	SPHEEROL SX2
NLGI Classification	ASTM D217	–	2
Base	–	–	Complex Calcium Sulphonate
Worked Penetration 60 Cycles	ASTM D217	0.01 mm	265-295
Oil Viscosity @ 40°C	ASTM D445	mm ² /s	180
Dropping Point	ASTM D566	°C	>280
Operating Temp, Min/Max		°C	-20/150
Four Ball EP Weld Point	ASTM D2596	kg	400



HIGH TEMPERATURE GREASE

MULTIPURPOSE HIGH TEMPERATURE GREASE

**HIGH
PERFORMANCE**

Intended for use in a wide range of plain and rolling element bearings, especially targeting those applications where upper operating temperatures are likely to exceed the limits of conventional, lithium-thickened greases.

FEATURES	BENEFITS
Excellent thermal and mechanical stability.	Helps to ensure prolonged product integrity across a wider operating temperature range.
Good extreme pressure and anti-wear properties.	Helps to promote long component life.

BIOTAC EP2

ENVIRONMENTALLY RESPONSIBLE EP GREASE

**HIGH
PERFORMANCE
ENVIRONMENTALLY
RESPONSIBLE**

Environmentally responsible wire rope grease providing excellent protection even when equipment is exposed to water wash.

FEATURES	BENEFITS
Enhanced renewability. Superior biodegradation. Significantly reduced bioaccumulation and toxicity.	Reduced environmental impact when compared to conventional mineral oils. Support your company's environmental agenda. Enhance your reputation among customers and stakeholders. Comply with current and future legislation.
Good pumpability at low temperatures.	Facilitates the use of pressurised lubrication equipment.
High resistance to water spray-off.	Helps reduce frequency of application.
Good load-carrying and anti-corrosion properties.	Contributes to extended component life and reduced maintenance for wire ropes.

SPHEEROL EPL SERIES

BEARING GREASE

TRUSTED QUALITY

Castrol Spheerol EPL series are a range of greases for selected marine applications where a lithium-thickened grease is more suitable. The range extends from a general purpose bearing grease to a semi-fluid grease for centralised lubrication systems and grease-filled gearboxes.

FEATURES	BENEFITS
Excellent EP and anti-wear performance.	Protects equipment against high loads and helps to reduce bearing and component wear. This in turn assists in maximising component life and reducing maintenance.

SPHEEROL LMM

LITHIUM BASED GREASE WITH MOLY DISULPHIDE

TRUSTED QUALITY

Castrol Spheerol LMM is suitable for heavily loaded and shock loaded plain bearings and roller element bearings.

FEATURES	BENEFITS
Excellent EP and anti-wear performance compared to conventional greases.	Helps to protect equipment against extreme loading and helps to minimise bearing and component wear, contributing to extended component life and reduced maintenance.

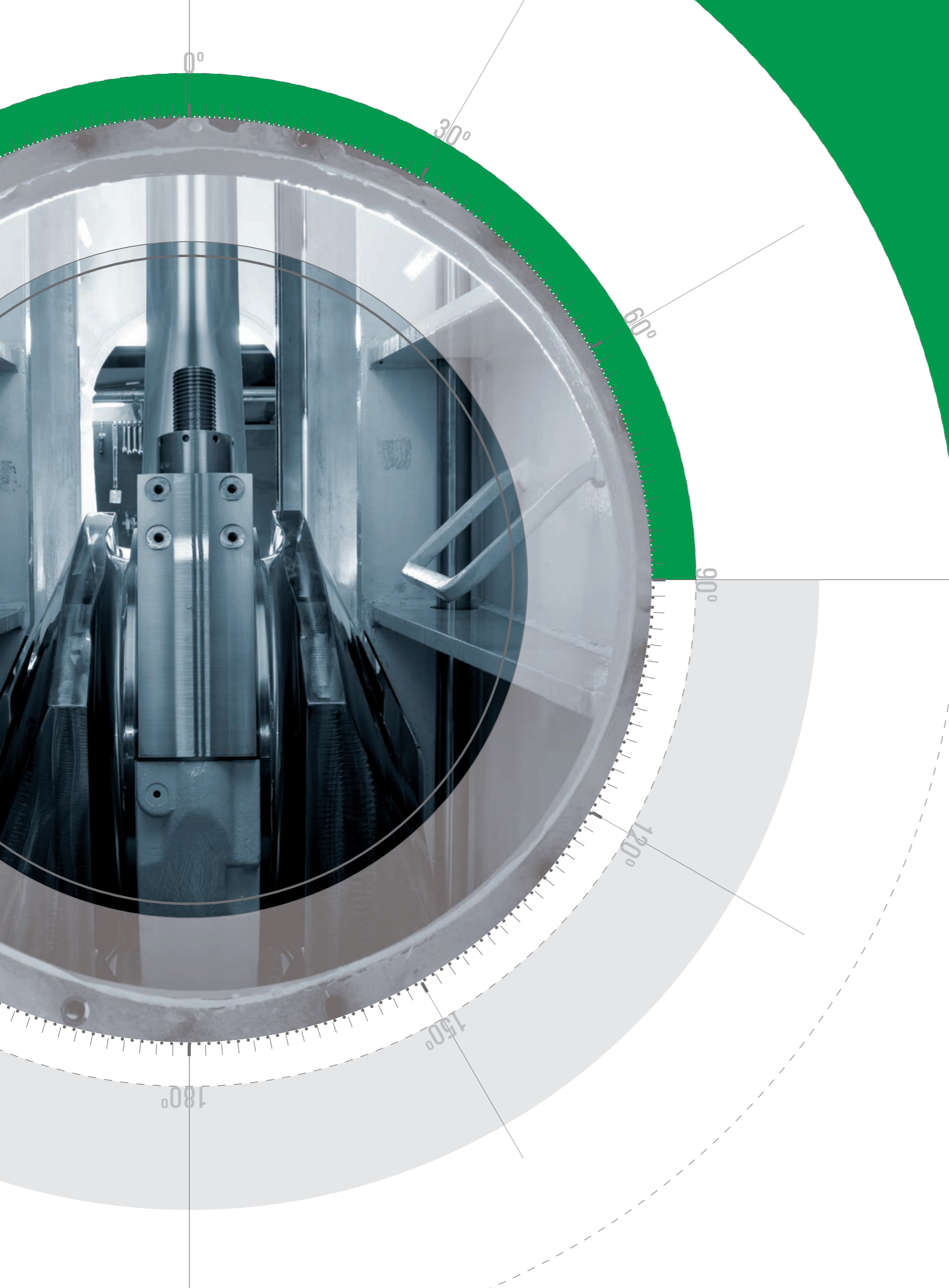
SPHEEROL AP3

LITHIUM BASED GREASE

TRUSTED QUALITY

Primarily intended for use in plain and roller bearings where a NLGI 3 lithium-thickened grease with a lower viscosity base oil is required.

FEATURES	BENEFITS
Corrosion inhibitor additive.	Provides protection for metal surfaces, helping to extend the life of equipment.
Oxidation inhibitors.	Helps to extend the life of the grease, reducing the need for frequent re-greasing.



STERN TUBES AND THRUSTERS

What is the real cost to your vessel operations of water ingress into your stern tube and thruster systems? What is the real damage from oil leakage into the sea?

PRODUCT	OIL TYPE	CATEGORY
BioStat	Synthetic	HIGH PERFORMANCE ENVIRONMENTALLY RESPONSIBLE



BIOSTAT

ENVIRONMENTALLY RESPONSIBLE STERN TUBE/GEAR OIL



HIGH PERFORMANCE
ENVIRONMENTALLY RESPONSIBLE

The Castrol BioStat range has been developed to effectively lubricate marine thrusters, stern tubes, spur, planetary and helical gears, rolling element and plain bearings and to minimise the environmental impact of the lubricant should it migrate into the sea. It delivers effective lubrication with up to 20% water contamination, significantly more than conventional mineral oils can tolerate. This allows continued operations under faulty conditions, helping you minimise downtime.

FEATURES	BENEFITS
Fully tested to OSPAR requirements and approved by the Norwegian regulators for use offshore: Superior marine biodegradation* Significantly reduced bioaccumulation* and toxicity* to marine organisms.	Reduced environmental impact Support your company's environmental agenda. Enhance your reputation among customers and stakeholders. Comply with current and future legislation.
Good thermal stability. Resistant to hydrolysis.	Highly stable product with long service life, minimises product consumption and waste.
Physical properties and hence system operating characteristics are comparable with those of mineral oil-based fluids. Good compatibility with all common types of elastomeric seals, comparable with standard lubricants. BioStat is compatible with conventional mineral oil-based products.	Existing equipment can be readily converted to Castrol BioStat with minimal risk. Equipment reliability and performance is not compromised by environmental benefits.
Passes Load Stage >13 in the FZG test. Biostat passes FZG micropitting test with high micropitting load carrying capacity.	High levels of protection for thrusters, gears and bearings, particularly when operating at high loads or rapidly fluctuating loads.
High viscosity index allows start-up at low temperatures and provides for a thicker lubricating film at high temperatures for additional antiwear protection.	Particularly suited for operations in the Arctic or other environmentally sensitive areas.

*When compared to conventional mineral oils.

VALUE PROVEN

Trial and Lab Test Data

- Excellent bearing protection as demonstrated in the FE-8 test: BioStat 150 only recorded 1mg weight loss (limit 30mg). When the load was increased from 80 to 100kN, BioStat 100 only recorded a weight loss of 4mg
- Very low levels of wear under slow speed conditions as demonstrated in the FZG DGMK test: wear weight loss of 26mg at 100°C and 24mg at 40°C compared to typical values >100mg for mineral based products
- Maintains wear performance with up to 20% water contamination as demonstrated in the FZG test*
- Readily exceeds the Biodegradability requirements of the OECD 306 seawater biodegradation test; when tested at product level, BioStat biodegraded by 100% within 28 days.
- Exceeds the stringent OSPAR** and US EPA*** toxicity requirements by at least 4 times.

TECHNICAL DATA

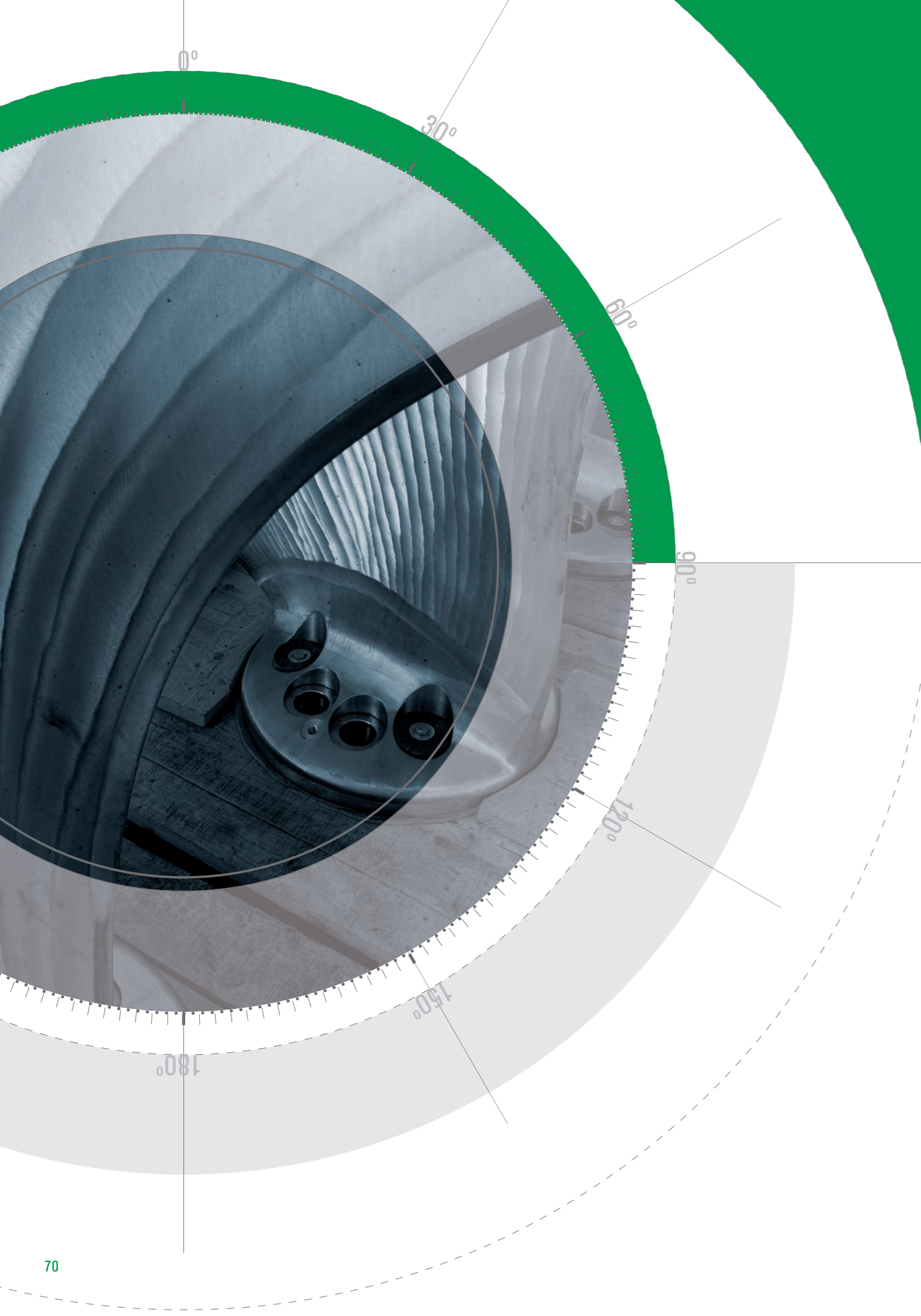
TYPICAL CHARACTERISTICS	METHOD	UNITS	BIOSTAT 68	BIOSTAT 100	BIOSTAT 150	BIOSTAT 220
Relative Density	ASTM D4052	–	0.93	0.93	0.93	0.93
Kinematic Viscosity @ 40°C	ASTM D445	cSt	70	103	144.6	207.8
Kinematic Viscosity @ 100°C	ASTM D445	cSt	13.27	16.93	21.73	28.41
Viscosity Index	ASTM D2270	–	178	178	177	178
Flash Point, COC	ASTM D92	°C	>240	>240	>240	>240
Pour Point	ASTM D97	°C	-39	-27	-24	-27
Steel Corrosion: Distilled Water	ASTM D665	–	No Rust	No Rust	No Rust	No Rust
Sea Water	ASTM D665	–	No Rust	No Rust	No Rust	No Rust
Copper Corrosion, 100°C/3hrs	ASTM D130	–	1A	1A	1A	1A
Foaming tendency/stability	ASTM D892	cm ³ /cm ³	50/0	50/0	50/0	50/0
Flender Foam Test	–	–	Pass	Pass	Pass	Pass
Demulsification Time	ASTM D1401	mins	0/23/57(30)	0/23/57(30)	0/23/57(30)	0/23/57(30)

PERFORMANCE TEST

FZG Gear Test, A/8.3/90	DIN 51354-2	–	>12	>12	>12	>12
FZG Micropitting Test	FVA. No.54	–	>10	>10	>10	>10

**As specified in the OSPAR Harmonised Pre-screening Scheme

***As specified in the NPDES permit GMG29000 for subsea production control fluids



TURBINES

Are you using a lubricant that has high levels of oxidation resistance, water tolerance and corrosion protection?

PRODUCT	OIL TYPE	CATEGORY
Perfecto T	Mineral	TRUSTED QUALITY



PERFECTO T

TURBINE LUBRICANT

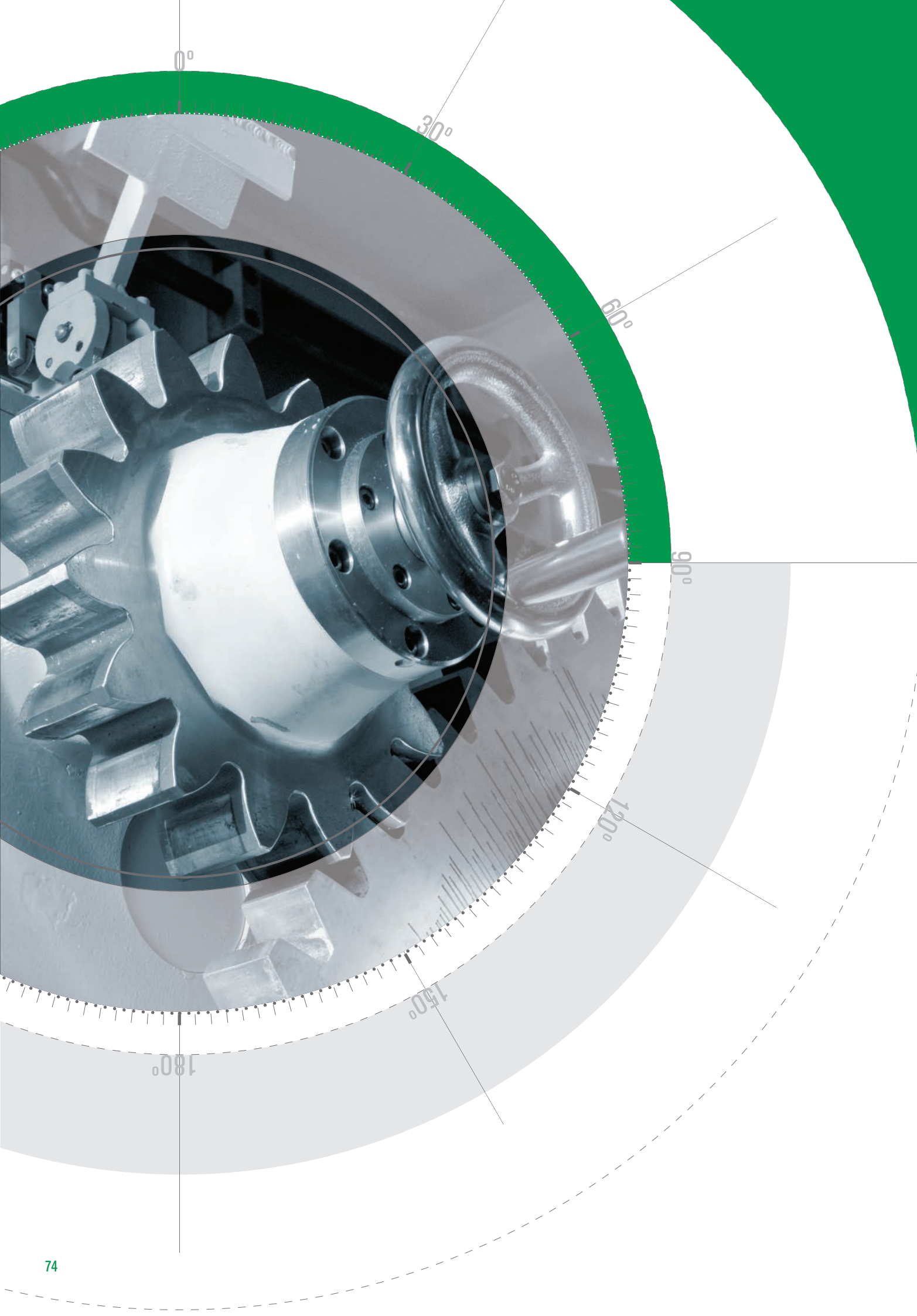
TRUSTED QUALITY

For the lubrication of gas and steam turbines. The base oils used have been selected to give the required water separation characteristics as well as providing resistance to foaming and air entrainment, all essential properties for this demanding application.

FEATURES	BENEFITS
Excellent oxidation stability.	Helps you achieve trouble free operation for extended periods of time in aggressive environments where heat, air, moisture and metals all contribute to oil degradation.
Good foam and air release properties.	Ensures that the product meets the requirements of most turbine manufacturers.
Excellent water separation and corrosion inhibition.	Helps to protect equipment, promote efficient lubrication and prolong oil life.

TECHNICAL DATA						
NAME	METHOD	UNITS	PERFECTO T 32	PERFECTO T 46	PERFECTO T 68	PERFECTO T 100
ISO Grade	-	-	32	46	68	100
Density @ 15°C	g/ml	ASTM D4052	0.87	0.88	0.88	0.88
Kinematic Viscosity @ 40°C	mm ² /s	ASTM D445	32	46	68	100
Kinematic Viscosity @ 100°C	mm ² /s	ASTM D445	5.3	6.7	8.6	10.8
Viscosity Index	-	ASTM D2270	102	102	102	97
Flash Point, PMCC	°C	ASTM D93	>200	>200	>200	>200
Pour Point	°C	ASTM D97	-12	-12	-12	-12
Neutralisation Number	mgK OH/g	-	<0.2	<0.2	<0.2	<0.2





WORLD CLASS PRODUCTS, SUPPORTED BY WORLD CLASS SERVICES

At Castrol Marine, we go the extra mile to provide you with a range of value-added services that complement our extensive range of Marine products and help you achieve maximum efficiency in every department.

DIRECTORY OF MARINE SERVICES (DMS)

Castrol's DMS is a powerful online tool to support your global lubricant supply planning, around the clock, 365 days a year. Castrol DMS gives you instant access to product availability including pack size and bulk availability, through your PC, mobile or tablet. It is also the place to go to source all PDS and MSDS information on our products. It's full of valuable, frequently updated information on ports and products, and you can access Google Maps to find every Castrol Marine port around the world.

CASTROL MARINE ACADEMY

A complete, easy-to-follow training programme unique to Castrol Marine; online, paper-based and face-to-face seminar training by lubrication experts, created specifically to address the recognised skills shortage in the marine industry. The result is more efficient, reliable vessel operation through better trained, more knowledgeable and capable crews, with a good understanding of marine lubricant applications.

CASTROL CAREMAX™

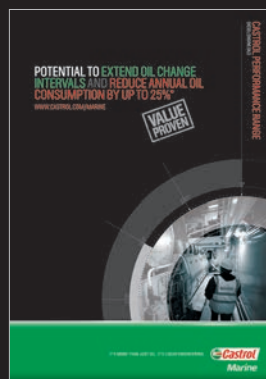
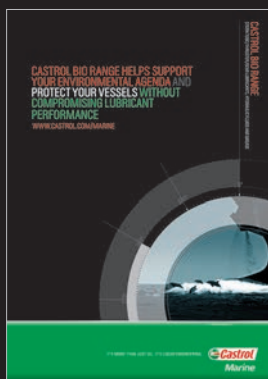
CAREMAX™ Online is an oil analysis program that allows your technical department to manage lubricants more easily than ever before. With CAREMAX™ Online, you can compare results across your fleet and identify potential problems before they result in unnecessary breakdowns and unscheduled downtime.

CASTROL NEW BUILD

We understand that the new build process needs to run as smoothly as possible. That's why we have developed the New Build Offer, providing you with a dedicated New Build Specialist who will work in close co-ordination with the shipyard to help ensure seamless, "On Time in Full" deliveries and help minimise any interruptions to your process. That's how we make sure it's all right from the start.



To find out more about Castrol Marine lubricants please visit: www.castrol.com/marine



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IT'S MORE THAN JUST OIL. IT'S LIQUID ENGINEERING.

