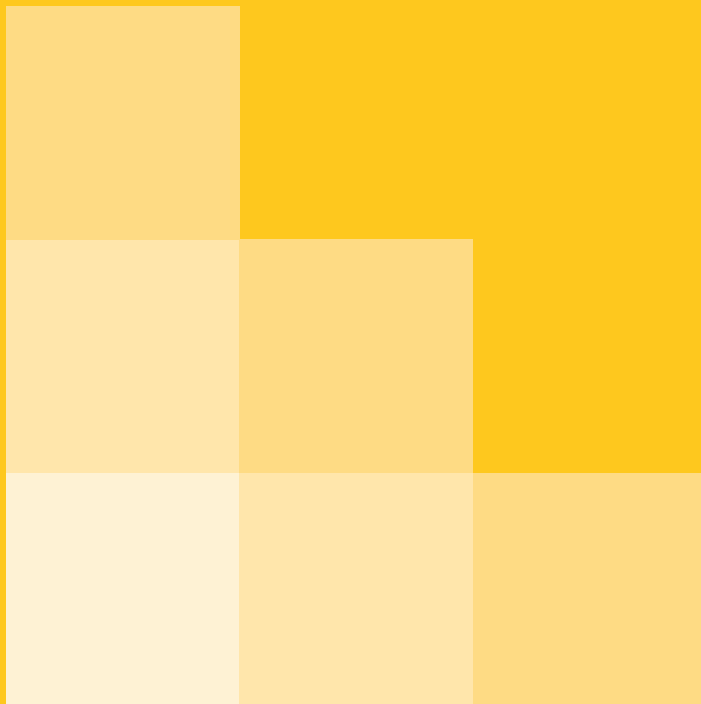


MARINE

SHELL ALEXIA S4
SHELL MORLINA S 30
SHELL ARGINA T, X 40 AND XL 40
SHELL GADINIA AL
SHELL SIRIUS X 40
SHELL STROMBUS MP



SHELL ALEXIA S4

CYLINDER LUBRICANT FOR TWO-STROKE LOW SPEED DIESEL ENGINES

DESIGNED TO MEET CHALLENGES

Shell Alexia S4 is a wide range cylinder lubricant designed for use in all two-stroke low speed diesel engines. Shell Alexia S4 is suitable for use with engines burning distillate and residual fuel and has been engineered to offer excellent performance under all operational conditions such as full power, "slow" and "flexible" steaming regimes. Shell Alexia S4 has been especially formulated to deal with all aspects of Oil Stress. Shell Alexia S4 has been particularly designed for the new generation of highly rated, fuel efficient, low speed marine diesel engines operating with higher pressures, higher temperatures and longer strokes.

PERFORMANCE FEATURES

ENGINE PROTECTION

- Shell Alexia S4 offers outstanding acid neutralising properties which help to prolong the life of components.
- It has superior deposit control and minimises deposit build up on pistons, piston rings, ring grooves, under piston spaces and in cylinder ports.
- Shell Alexia S4 has been engineered to provide enhanced boundary lubrication properties resulting in low cylinder and piston ring wear with typical cylinder wear rates below 0.05 mm per 1000 hours.

OPERATIONAL SIMPLICITY

- Shell Alexia S4 is a single, all purpose lubricant suitable for use with distillate* and all types of residual fuel oil. It will also offer protection from the effects of oil stress under different operating conditions from full power to flexible operation and slow steaming.

MAIN APPLICATIONS

TWO-STROKE LOW SPEED DIESEL ENGINES

- Cylinder lubrication of all types of 2-stroke low speed diesel engines burning distillates* and residual fuel oil from 0.5 – 3.5% sulphur levels.

SPECIFICATIONS, APPROVALS AND RECOMMENDATIONS

APPROVALS

- Shell Alexia S4 is approved for use by all manufacturers of low speed crosshead diesel engines including:
 - Wärtsilä
 - MAN.

CYLINDER OIL FEED RATES

- Insufficient cylinder oil feed rates can lead to corrosive wear, seized and broken rings and consequent blow-by and scavenge fire risks, and to the formation of excessive deposits. Shell Alexia S4 has a BN of 60, but has been used at the same feedrate as a BN 70 cylinder oil in all our field trials. To obtain optimum performance with Shell Alexia S4 it is important to:
 - Ensure the lubrication system is well maintained and properly adjusted
 - Use AnalexAlert to analyse used oil and seek advice from Shell's technical experts for advice on how to optimise oil feed rate.

MIXING OF CYLINDER LUBRICANTS

- Shell Alexia S4 is fully miscible with all other cylinder lubricants. However, for optimum performance, Shell Alexia S4 should not be used in conjunction with any other cylinder lubricant. For a full listing of equipment approvals and recommendations, please consult your local Shell Technical Help Desk, or the OEM Approvals website.

TYPICAL PHYSICAL CHARACTERISTICS

CHARACTERISTICS	S4
Kinematic Viscosity (ASTM D 445) @ 40°C mm ² /s	165
@ 100°C mm ² /s	15.5
Viscosity Index (ASTM D 2270)	>95
Density @ 15°C kg/m ³ (ASTM D 4052)	926
Flash Point °C (PMCC) (ASTM D 93)	>210
Pour Point °C (ASTM D 97)	<-6
Total Base Number mg KOH/g (ASTM D 2896)	60
Sulphated Ash % wt (ASTM D 874)	7.5

SHELL MORLINA S 30

MULTI-FUNCTIONAL LUBRICANT FOR LOW SPEED MARINE DIESEL ENGINES

DESIGNED TO MEET CHALLENGES

Shell Morlina S 30 is a high performance multifunctional low speed diesel engine lubricant based on a blend of highly refined high viscosity index mineral oils and a balanced selection of additives. It is designed to provide the highest levels of machinery protection in highly rated low speed marine engines, but being multi-functional, can also be used in many different items of marine equipment and used to rationalise the number of grades of lubricant carried on board ship.

PERFORMANCE FEATURES

ENGINE OPERATION AND RELIABILITY

- Shell Morlina S 30 effectively neutralises the highly corrosive combustion acids which can contaminate the main system when cylinder oil drains leak past piston rod glands.
- Good resistance to corrosion results in protection of metal surfaces from corrosion.
- Good detergency keeps crankcases and under piston spaces clean and helps optimise efficiency.
- Good air release and antifoam properties mean that air is released from the oil without foaming.

CONTROL MAINTENANCE COSTS

- Good oxidation stability combats thermal degradation of the oil and helps extend its useful life.
- Good water shedding properties mean that water can be easily removed by centrifuge.
- Extreme pressure properties make the oil suitable to many gear oil applications.

APPLICATIONS

- Low speed marine diesel engine crankcase and piston cooling systems.
- Turbochargers, geared transmissions, oil lubricated stern tubes and deck machinery.
- All ancillary equipment requiring an SAE 30 oil.

SPECIFICATIONS, APPROVALS AND RECOMMENDATIONS

RECOMMENDED FOR USE IN:

- Low speed diesel engines.

TYPICAL PHYSICAL CHARACTERISTICS

CHARACTERISTICS	30
Kinematic Viscosity (IP 71) @ 40°C mm ² /s	104
@ 100°C mm ² /s	11.6
Viscosity Index (IP 226)	102
Density @ 15°C kg/m ³ (IP 365)	888
Flash Point °C (PMCC) (IP 34)	227
Pour Point °C (IP 15)	-18
Total Base Number mg KOH/g (IP 276)	5
Sulphated Ash % wt (IP 276)	0.62
Load Carrying Capacity (FZG) Fail Stage	11

Shell Morlina S 30 is NOT recommended for trunk-piston engines and in these cases Shell Morlina 30 should be used.

SHELL ARGINA T

MEDIUM-SPEED TRUNK-PISTON DIESEL ENGINE OIL

DESIGNED TO MEET CHALLENGES

Shell Argina T is a multi-functional crankcase lubricant for highly rated medium-speed diesel engines operating on residual fuel. Shell Argina T is designed for conditions of moderate oil stress.

PERFORMANCE FEATURES

ENGINE CLEANLINESS

- Has built a reputation over many years for very good engine cleanliness.

RAPID NEUTRALISATION OF ACIDIC COMBUSTION PRODUCTS

- Gives long-term protection against corrosion of ferrous and non-ferrous metals.

THERMAL STABILITY AND RESISTANCE TO OXIDATION

- Provides excellent high temperature deposit control and contributes to long oil life.

SUITABILITY FOR CENTRIFUGAL SEPARATORS

- High detergency/low dispersancy formulation releases contaminants and water readily in centrifugal separators.

APPLICATIONS

Medium-speed industrial or marine propulsion and auxiliary engines, burning residual fuel oils, which create conditions of moderate oil stress. These conditions usually occur:

- in engine designs more than five years old;
 - where oil consumption is 1g/kWh or more;
 - in newer designs where load factors are predominantly 85% or less; or
 - where fuels with sulphur <3% are in use.
- Some medium and high-speed engines burning distillate fuel, where a high Base Number, high ash lubricant is suitable.
 - Marine engine reduction gears and certain other ship-board applications, where specialist lubricants are not required.
 - Medium-speed engines burning residual fuel need very specialised lubricants. Heavy fuels contaminate the oil with asphaltenes, requiring special types of detergency to avoid sludges. The combustion of high sulphur fuels produces sulphur acids, which cause high wear rates of piston rings and cylinder liners unless neutralised by a high basicity reserve in the oil. The oil is in service for very long periods, so centrifugal separators are used to remove water and combustion contaminants from the oil.

SPECIFICATIONS, APPROVALS AND RECOMMENDATIONS

MEETS THE ENGINE TEST CRITERIA FOR:

- API CF.

TYPICAL PHYSICAL CHARACTERISTICS

CHARACTERISTICS	30	40
Kinematic Viscosity (ASTM D 445, IP 71) @ 40°C mm ² /s	110	135
@ 100°C mm ² /s	12	14
Viscosity Index (ASTM D 2270, IP 226)	100	100
Density @ 15°C kg/L (ASTM D 4052, IP 365)	0.918	0.921
Flash Point °C (PMCC) (ASTM D 93, IP 34)	212	225
Pour Point °C (ASTM D 97, IP 15)	-18	-18
Total Base Number mg KOH/g (ASTM D 2896, IP 276)	30	30
Sulphated Ash % wt (ASTM D 874, IP 163)	3.7	3.7
Load Carrying Capacity (FZG) Fail Load Stage (IP 334)	11	11

SHELL ARGINA X 40

MEDIUM-SPEED TRUNK-PISTON DIESEL ENGINE OIL

DESIGNED TO MEET CHALLENGES

Shell Argina X 40 is a multi-functional crankcase lubricant for highly rated medium-speed diesel engines operating on residual fuel. Shell Argina X 40 is designed for conditions of high oil stress and has been formulated to help improve deposit control.

PERFORMANCE FEATURES

ENGINE CLEANLINESS

- Shell Argina X 40 has built a reputation over many years for very good engine cleanliness. The product has been formulated to help reduce deposits in critical areas (e.g. piston undercrown).

RAPID NEUTRALISATION OF ACIDIC COMBUSTION PRODUCTS

- Gives long-term protection against corrosion of ferrous and non-ferrous metals.

THERMAL STABILITY AND RESISTANCE TO OXIDATION

- Provides excellent high temperature deposit control and contributes to long oil life.

SUITABILITY FOR CENTRIFUGAL SEPARATORS

- High detergency/low dispersancy formulation releases contaminants and water readily in centrifugal separators.

APPLICATIONS

Medium-speed industrial or marine propulsion and auxiliary engines, burning residual fuel oils, which create conditions of high oil stress. These conditions usually occur:

- in newer engine designs, less than 10 years old and/or fitted with flame rings
- where oil consumption is 0.5 – 1g/kWh
- where load factors are >85% or
- where fuels with sulphur >3% are in use.
- Marine engine reduction gears (SAE 40 only) and certain other ship-board applications, where specialist lubricants are not required.
- Medium-speed engines burning residual fuel need very specialised lubricants. Heavy fuels contaminate the oil with asphaltenes, requiring special types of detergency to avoid sludges. The combustion of high sulphur fuels produces sulphur acids, which cause high wear rates of piston rings and cylinder liners unless neutralised by a high basicity reserve in the oil. The oil is in service for very long periods, so centrifugal separators are used to remove water and combustion contaminants from the oil.

SPECIFICATIONS, APPROVALS AND RECOMMENDATIONS

MEETS THE ENGINE TEST CRITERIA FOR:

- API CF.

TYPICAL PHYSICAL CHARACTERISTICS

CHARACTERISTICS	40
Kinematic Viscosity (ASTM D 445, IP 226) @ 40°C mm ² /s	135
@ 100°C mm ² /s	14
Viscosity Index (ASTM D 2270, IP 226)	100
Density @ 15°C kg/m ³ (ASTM D 4052, IP 365)	921
Flash Point °C (PMCC) (ASTM D 93, IP 34)	205
Pour Point °C (ASTM D 97, IP 15)	-18
Total Base Number mg KOH/g (ASTM D 2896, IP 276)	50
Sulphated Ash % wt (ASTM D 874, IP 163)	6.1
Load Carrying Capacity (FZG Gear Machine) Failure load stage	10

SHELL ARGINA XL 40

MEDIUM-SPEED TRUNK-PISTON DIESEL ENGINE OIL

DESIGNED TO MEET CHALLENGES

Shell Argina XL 40 is a multi-functional crankcase lubricant for highly rated medium-speed diesel engines operating on residual fuel. Shell Argina XL 40 is designed for conditions of very high oil stress and has been further optimised to improve deposit control.

PERFORMANCE FEATURES

EXCELLENT ENGINE CLEANLINESS

- Higher detergency than even Shell Argina X, leading to exceptionally clean crankcase, valve deck and pistons. The formulation has been further optimised to reduce deposits in critical areas (e.g. piston undercrown).

VERY HIGH OXIDATION RESISTANCE

- Longer oil life and greater resistance to oxidative thickening.

EXTRA HIGH BASE NUMBER (BN)

- Longer oil life in engines where life is limited by depletion of Base Number. In many cases a satisfactory equilibrium BN level can be maintained, in conditions where this would be impossible with a 40BN oil.

VERY GOOD BASE NUMBER RETENTION

- Resists secondary loss of Base Number due to oxidation.

SUITABILITY FOR CENTRIFUGAL SEPARATORS

- High detergency with low dispersancy formulation releases contaminants and water readily in centrifugal separators.

FULL COMPATIBILITY WITH SHELL ARGINA FAMILY

- Shell Argina XL can be used to top up engines already running on any other member of the Shell Argina family, giving immediate control of BN without the need for an oil change.

APPLICATIONS

Medium-speed industrial or marine propulsion and auxiliary engines, burning residual fuel oils, which create conditions of very high oil stress. These conditions usually occur:

- in newer engine designs, with flame rings, especially from Wärtsilä;
- where oil consumption is <0.5g/kWh;
- where load factors are >90%; or
- where fuels with sulphur >3% are in use.
- Medium-speed engines burning residual fuel need very specialised lubricants. Heavy fuels contaminate the oil with asphaltenes, requiring special types of detergency to avoid sludges. The combustion of high sulphur fuels produces sulphur acids, which cause high wear rates of piston rings and cylinder liners unless neutralised by a high basicity reserve in the oil. The oil is in service for very long periods, so centrifugal separators are used to remove water and combustion contaminants from the oil. Medium-speed engine oils must be specially designed to release these contaminants in the separator. Shell Argina XL 40 has been specially designed for very high stress conditions, found most often in modern Wärtsilä engines in power plant or ship propulsion applications.

SPECIFICATIONS, APPROVALS AND RECOMMENDATIONS

MEETS THE ENGINE TEST CRITERIA FOR:

- API CF.

APPROVED BY:

- Wärtsilä.

TYPICAL PHYSICAL CHARACTERISTICS

CHARACTERISTICS	40
Kinematic Viscosity (ASTM D 445, IP 71) @ 40°C mm ² /s	135
@ 100°C mm ² /s	14
Viscosity Index (ASTM D 2270, IP 226)	100
Density @ 15°C kg/m ³ (ASTM D 4052, IP 365)	916
Flash Point (PMCC) °C (ASTM D 93, IP 34)	205
Pour Point °C (ASTM D 97, IP 15)	-18
Total Base Number mg KOH/g (ASTM D 2896, IP 276)	20
Sulphated Ash % wt (ASTM D 874, IP 163)	6.1
Load Carrying Capacity (FZG) Fail Load Stage	11

Note: Due to its high Base Number, this oil has a high ash content. To avoid excessive ash deposits, do not use with low sulphur fuels, or engines with high oil consumption.

SHELL GADINIA

LUBRICANTS FOR MEDIUM-SPEED MARINE DIESEL ENGINES RUNNING ON DISTILLATE FUELS

DESIGNED TO MEET CHALLENGES

Shell Gadinia are premium quality multi-functional diesel engine lubricants that are specially designed for the most severe service main propulsion and auxiliary marine trunk piston engines burning distillate fuels with a sulphur content up to 1%. They also perform satisfactorily in smaller high speed engines of fishing fleets that operate under arduous conditions and have small sumps.

PERFORMANCE FEATURES

ENGINE RELIABILITY

- Great tolerance to engine overload or poor combustion due to improved piston cleanliness.
- Reduced deposits in piston ring belt and cylinder liners.

CONTROL MAINTENANCE COSTS

- Designed to extend diesel engine life through helping to reduce the risk of ring sticking and breakage.
- Formulated for long oil life, especially in high stress engines, because of Shell Gadinia's excellent resistance to oxidation and thermal degradation under severe operating conditions.
- Superior protection against corrosion for all engine components, due to Shell Gadinia's unique formulation giving excellent alkalinity retention.
- Control of liner lacquer assists in the control of oil consumption and helps to minimise the cost of operation.

RE-ASSURANCE

- Great safety margin to protect highly loaded bearings, in the event of water contamination, because of Shell Gadinia's water tolerance and separation in separators.
- OEM endorsement by leading diesel engine manufacturers following extensive field approval trials, means that Shell Gadinia is suitable for a range of modern diesel engines.

APPLICATIONS

- Highly rated, medium speed, main propulsion and auxiliary trunk-piston marine diesel engines.
- Turbochargers, oil filled stern tubes and variable pitch propellers.
- Deck machinery and other marine applications requiring SAE 30 or 40 viscosity oils.

SPECIFICATIONS, APPROVALS AND RECOMMENDATIONS

MEETS THE ENGINE TEST CRITERIA FOR:

- API CF.

RECOMMENDED FOR USE IN:

- Trunk piston engines.

TYPICAL PHYSICAL CHARACTERISTICS

CHARACTERISTICS	30	40
Kinematic Viscosity (ASTM D 445, IP 71) @ 40°C mm ² /s	104	139
@ 100°C mm ² /s	11.8	14.4
Flash Point (PMCC) °C (ASTM D 93, IP 34)	200+	225+
Density @ 15°C kg/m ³ (ASTM D 4052, IP 365)	0.897	0.900
Pour Point °C (ASTM D 97, IP 15)	-18	-18
Total Base Number mg KOH/g (ASTM D 2896, IP 276)	12	12
Sulphated Ash % wt (ASTM D 874, IP 163)	1.35	1.35

SHELL GADINIA AL

ADVANCED LUBRICANT FOR MEDIUM SPEED TRUNK-PISTON ENGINES RUNNING ON DISTILLATE FUEL

DESIGNED TO MEET CHALLENGES

Shell Gadinia AL is a premium quality marine diesel engine oil designed for use in medium-speed trunk piston engines, which operate on distillate fuels. Shell Gadinia AL is specially designed to control oil consumption in modern engines, where liner lacquering is a potential problem. Being multi-functional Shell Gadinia AL can also be used for other shipboard applications such as reduction gears.

PERFORMANCE FEATURES

ENGINE RELIABILITY

- Excellent piston and crankcase cleanliness, which helps to maintain engine efficiency.
- Load carrying properties required for use in reduction gears.

CONTROL MAINTENANCE COSTS

- Excellent liner lacquer control that maintains lubricating oil consumption at its normal level.
- A high level of protection against bore polishing – another cause of high oil consumption.

RE-ASSURANCE

- Protection for engines where cylinder liner lacquering is likely to occur.

APPLICATIONS

- Highly rated medium speed diesel engines operating under high load or overload conditions.
- General ship application, including gears, where specialist lubricants are not required.

SPECIFICATIONS, APPROVALS AND RECOMMENDATIONS

MEETS THE ENGINE TEST CRITERIA FOR:

- API CF.

RECOMMENDED FOR USE IN:

- Rolls-Royce and Bergen
- Deutz AG
- MAN B&W Diesel AG
- Simplex (Compact Sterntube Seals).

TYPICAL PHYSICAL CHARACTERISTICS

CHARACTERISTICS	40
Kinematic Viscosity (ASTM D 445, IP 71) @ 40°C mm ² /s	140
@ 100°C mm ² /s	14.3
Load Carrying Capacity (FZG) Fail Stage (IP 334)	12
Density @ 15°C kg/L (ASTM D 4052, IP 365)	0.900
Flash Point (Closed Cup) °C (ASTM D 92, IP 36)	>200
Pour Point °C (ASTM D 97, IP 15)	-18
Total Base Number mg KOH/g (ASTM D 2896, IP 276)	15
Sulphated Ash % wt (ASTM D 874, IP 163)	1.65

SHELL SIRIUS X 40

SUPER HIGH PERFORMANCE DIESEL ENGINE OIL

DESIGNED TO MEET CHALLENGES

Shell Sirius X 40 is a top quality lubricant, of the Super High Performance Diesel Engine Oil (SHPDO) class. It is designed for the highest output, high-speed diesel engines, burning distillate fuel and is formulated to give better engine protection and longer drain intervals than normal diesel engine oils. Shell Sirius X 40 is especially suitable for the high power/weight units used in fast vessels and compact generator sets.

PERFORMANCE FEATURES

OUTSTANDING PISTON CLEANLINESS

- Free-running piston rings, even under difficult operational conditions, assisting reliability.

EXCEPTIONAL PROTECTION AGAINST BORE POLISHING

- Control of blow-by and oil consumption, preserving engine efficiency. SHPDO type oils are preferred by many engine manufacturers to guard against bore polishing.

EXCEPTIONAL ENGINE CLEANLINESS

- Ability to retain high levels of soot safely in suspension, even with extended drain intervals.

OXIDATION RESISTANCE TWICE THAT OF CONVENTIONAL OILS

- Ability to withstand high temperatures for longer, in severe service or with extended drain intervals.

HIGH RESERVE ALKALINITY

- A Total Base Number (TBN) of 17 to neutralise acids and provide corrosion protection until the next drain interval, even with the higher sulphur levels sometimes found in marine distillate fuels.

APPLICATIONS

- High-speed diesel engines operating on distillate fuels.

Note: Not suitable for North American automotive type engines, for which API CF-4 type oils are required.

SPECIFICATIONS, APPROVALS AND RECOMMENDATIONS

APPROVED FOR USE BY:

- MTU (TYPE II high performance category)
- CWEC (Cummins Wärtsilä Engine Company)
- Wärtsilä (SACM).

MEETS THE REQUIREMENTS OF:

- Caterpillar 3600 Series.

MEETS THE TEST CRITERIA:

- API CF.

TYPICAL PHYSICAL CHARACTERISTICS

CHARACTERISTICS	40
Kinematic Viscosity (ASTM D 445) @ 40°C mm ² /s	139
@ 100°C mm ² /s	14
Density @ 15°C kg/m ³ (ASTM D 4052)	0.890
Flash Point °C (PMCC) (ASTM D 93)	230
Pour Point °C (ASTM D 97)	-18
Total Base Number mg KOH/g	17
Sulphated Ash % wt	1.85

SHELL STROMBUS MP

EMULSIFIABLE STERN TUBE OIL

DESIGNED TO MEET CHALLENGES

Shell Strombus MP is designed specifically for oil-filled stern tubes, particularly in the event of leakage. It is mainly used for the lubrication of stern tube bearings and protection of tail shafts in systems incorporating lip seal stern tube glands, but also some face seals.

PERFORMANCE FEATURES

COST EFFECTIVENESS

- Shell Strombus MP absorbs high amounts of seawater. There is no need to reduce the concentration of seawater emulsified in the oil until it reaches levels of over 20%.

HELPS MINIMISE RISKS OF WATER INGRESS

- Water is absorbed to form a stable emulsion which continues to offer good lubrication and protection against corrosion. The oil and its emulsion are sufficiently fluid to circulate around the stern tube bearing oil system.

HIGH LEVEL OF PROTECTION

- Its unique combination of base oils and carefully selected additives, give good emulsibility while offering a high level of protection to the metal surfaces, in the presence of water.

MISCIBILITY

- Compatible with most commercially available oils used for stern tube lubrication.

APPROVALS

- Accepted by most leading seal and bearing manufacturers. Suitable for Viton or Nitrile seals.

APPLICATIONS

The large majority of ships today are fitted with oil lubricated stern tubes. The stern tube bearings and the tail shaft are required to operate reliably, often in extreme conditions due to vibration, water ingress, flexing of the vessel's structure, movement of the vessel in heavy seas and with variations of speed and temperature.

Shell Strombus MP is specifically designed to be compatible with diesel engine oils used for stern tube lubrication. It is also suitable for the lubrication of the fin shafts of certain retractable stabilisers.

TYPICAL PHYSICAL CHARACTERISTICS

CHARACTERISTICS

Kinematic Viscosity (IP 71) @ 40°C mm ² /s	273
Density @ 15°C kg/m ³ (IP 365)	900
Flash Point °C (PMCC) (IP 34)	200
Pour Point °C (IP 15)	-5