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Shell Lubricants

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# HELIX

## HX7 10W-40




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## SHELL HELIX HX7 10W-40
(synthetic motor oil)

### Product Description
- Better engine performance
  Shell Helix HX7 removes up to 39% more sludge than Shell Helix HX5.
- Longer protection thanks to enhanced oxidisation resistance-
  Shell Helix HX7 provides up to 24% more protection than Shell Helix HX5.

### Active cleansing and protection for your car

Shell Helix HX7 motor oil uses special active cleansing agents to help engines operate efficiently. The oil in a clean engine can flow quickly to where it is needed, ensuring the engine is better protected.
The excellent cleaning power and shear and oxidation stability of Shell Helix HX7 mean that it goes on delivering its benefits from one oil change to the next.
Shell Helix HX7 is specifically formulated for fuel-injection gasoline engines that are fitted with catalytic converters and blow-by-gas recirculation. The oil meets vehicle manufacturers' specifications and severe-service applications, and has formulations for different fuels, engines and environmental conditions.

### Why you should use Shell Helix HX7:
- Up to twice as effective at removing sludge as a normal mineral oil.
- It offers up to 19% more protection than other synthetic leading brands tested.
- Greater fuel efficiency.
- Maintains viscosity and stays in grade throughout the oil-change interval.
- Reduces oil volatility and therefore oil consumption and the need for top-up.
- Smoother, quieter drive.

### Specifications and approvals
Because lubricants vary in quality, universal criteria are used to describe oil performance and usage. Shell Helix motor oils not only meet these increasingly demanding international specifications but usually surpass them. Shell Helix HX7 exceeds these specifications:

- API SN/CF
- ACEA A3/B3/B4
- JASO SG+
- MB approval 229.1
- VW 5025 00/505 00
- PSA D Level III Compared with a normal mineral oil (API SG/CD)



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# HELIX

## ULTRA 5W-40




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## SHELL HELIX ULTRA 5W-40

(Fully synthetic oil – Shells most advanced formulation for high performance engines)

### Products Description

Shell Helix Ultra uses unique active cleaning technology to help high-performance engines operation at maximum efficiency by helping to protect them from power-robbing deposits and wear. It is suitable for even the longest OEM-recommended drain intervals.

### Performance, Features & Benefits

- **Shells ultimate active cleansing technology**
  Helps to protect high-performance engines from power and performance-robbing deposits.
- **Superior wear and corrosion protection**
  Helps to extend engine life by protecting surfaces from wear and by helping to neu tralise corrosive combustion acids.
- **Active clean-up**
  Help to remove sludge left behind by inferior oils
- **Superior resistance to oil degradation**
  Helps to maintain protection throughout the oil-drain interval.
- **Low-evaporation formulation**
  Low oil consumption for less frequent top-up
- **Exceptional low-temperature performance**
  Faster oil flow for quicker engine warm-up
- **Approved by car manufacturers**
  Approved for use by numerous makers of high-performance vehicles and recommended oil-drain intervals.
- **Long life**
  Exceptional protection and cleansing, even at the longest manufacturer-recommended oil-drain intervals
- **Multi-fuel capability**
  Can be used for gasoline,diesel and gas engines, and is also suitable for biodiesel and gasoline/ethanol blends.

### Main Applications

- Shell Helix Ultra's fully synthetic formulation offers Shell's maximum protection in very hot and extremely cold climates, and extremely cold climates, and severe driving conditions. Shell Helix Ultra can be used for modern gasoline engines, diesel engines (without particulate filters) and gas engines, and it is also suitable for use with biodiesel and gasoline/ethanol blends.

### Specifications, Approvals & Recommendations

- API SN.CF
- ACEA A3/B3, A3/B4
- BMW LL-01
- MB Approval 229.5, 226.5
- VW 502.00/505.00
- Porsche A40
- RN 0700, RN 0710
- PSA B71 2296
- Ferrari
- Fiat 9.55535.Z2 (Meets the requirements of)
- Chrysler MS-10725
- To find the right Shell Helix products for your vehicles and equipment, please consult Shell LubeMatch at:http://lubematch,shell.com



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Advice on applications not covered here may be obtained from your Shell or Shell Lubricants distributor representatives

## Typical Physical Characteristics

| Properties | | | Method | Shell Helix Ultra 5W-40 |
|---|---|---|---|---|
| **Kinematic Viscosity** | @100°C | cSt | ASTM D445 | 13.10 |
| **Kinematic Viscosity** | @40°C | cSt | ASTM D445 | 79.10 |
| **Viscosity Index** | | | ASTM D2270 | 168 |
| **MRV** | @-35°C | cP | ASTM D4684 | 19300 |
| **Density** | @15°C | kg/m³ | ASTM D4052 | 840.3 |
| **Flash Point** | | °C | ASTM D92 | 242 |
| **Pour Point** | | °C | ASTM D97 | -45 |

These characteristics are typical of current production. Whilst future production will confirm to Shell's specification, variations in these characteristics may occur.


# DIESEL ENGINE OIL



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# HELIX

## HX5 15W-40




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## SHELL HELIX HX5 15W-40

(premium multigrade multi oil)



### Product Description

- Better engine performance -Shell Helix HX5 removes up to 27% more sludge than Shell Helix HX3.
- Longer protection thanks to enhanced oxidisation resistance-Shell Helix HX5 provides up to 69% more protection than Shell Helix HX3.

### Active cleansing for proven protection

Shell Helix HX5 motor oil uses special Active Cleansing Technology to help engines operate efficiently for a smoother and quieter drive.
The oil in a clean engine can flow more quickly to where it is needed and has improved access to surfaces, so the engine is better protected. Shell Helix HX5 goes on delivering its benefits from one oil change to the next. Shell Helix HX5 is specifically formulated for fuel-injection gasoline engines with blow-by-gas recirculation. There are many formulations for different fuel types.

### Why you should use Shell Helix HX5:

- Significantly more effective at removing deposits from dirty engines than a normal motor oil.
- Resists oil degradation throughout the oil drain interval.
- See more reasons why you should use Shell Helix HX5.

### Specifications and approvals

Because lubricants vary in quality, universal criteria are used to describe oil performance and usage. Shell Helix motor oils not only meet these increasingly demanding international specifications but usually surpass them. Shell Helix HX5 exceeds these specifications:

- API SL/CF
- ACEA A2

Compared with a normal mineral oil (API SG/CD).

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# RIMULA

## R4 X 15W-40




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# SHELL RIMULA R4 X 15W-40

(CI-4/E7/DH-1) (Heavy Duty Diesel Engine Oil)



## Product Description

Shell Rimula R4 X contains selected additives that are designed to provide Triple Protection to improve engine and oil durability in 3 critical areas: Acid and Corrosion Control, Reduced Engine Wear and Deposit Control. It helps to lower maintenance and increase reliability of vehicles. It is suitable for most heavy-duty diesel engines, non-turbocharged and turbocharged alike, for on and off highway applications and has a wide array of engine manufactures approvals.

## Performance, Features & Benefits

### Acid and Corrosion Control

Shell R4 X shows excellent control of acids by reducing the accumulation of acids and chemical corrosion of engine bearing. Harmful acids from fuel combustion are controlled by using selected detergent additives to neutralise them and help to prevent corrosion of metal surfaces.

### Reduced Engine Wear

Shell Rimula R4 X offers high levels of engine wear protection in the valve train, piston ring and cylinder liners. This wear control is achieved through the addition of anti-wear additive that are design to form protective films in metal-to-metal contacts when needed under different engine operating conditions, and by the use of soot dispersant additives to keep soot particles finely dispersed to help prevent wear.

### Deposit Control

Shell Rimula R4 X helps to prevent oil thickening and the formation of harmful deposits in all areas of the engine, including sludge and piston deposits. The optimised detergent and dispersant additive system for Shell Rimula R4 X keeps engines cleaner than previous-generation Shell Rimula R3 products.

## Main Applications

### Severe duty heavy duty diesel engines

Shell Rimula R4 X provides demonstrated protection and performance in the latest high power heavy-duty diesel engines from European, US and Japanese manufacturers in both on highway and off – highway applications.

### High Technology Low Emission Engines

Shell Rimula R4 X is suitable for most modern low emission engines meeting Euro 5,4,3,2, and US 2002 emission requirements. For the latest low emissions engines especially those filters with exhaust diesel particulate filters (DPF), we recommend the use of our low-emissions products, Shell Rimula R4 L or Shell Rimula R5 LE.

## Specifications, Approvals & Recommendations

- API: CI-4,CH-4,CG-4,CF-4,CF.SL
- ACEA: E7,E5,E3
- Global DHD-1
- Caterpillar: CES 20078,77,76,75,72,71
- DDC:93K215
- Deutz: DQC III-10
- Mack: EO-M+,EO-M
- MAN: M3275-1
- MB Approval: 228.3
- MTU: Category 2
- Renault Trucks: RLD-2
- Volve: VDS-3
- JASO:DH-1



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## Typical Physical Characteristics

| Properties | Method | | | Rimula R4 X |
|---|---|---|---|---|
| SAE Viscosity Grade | | | | 15W-40 |
| Kinematic Viscosity | @40°C | mm2/s | ASTM D445 | 109 |
| Kinematic Viscosity | @100°C | mm2/s | ASTM D445 | 14.7 |
| Dynamic Viscosity | @-20°C | mPas | ASTM D5293 | 6700 |
| Viscosity Index | | | ASTM D2270 | 139 |
| Total Base Number | | mgKOH/g | ASTM D2896 | 10.6 |
| Sulphated Ash | | % | ASTM D874 | 1.45 |
| Density | @15°C | kg/l | ASTM D4052 | 0.888 |
| Flash Point | COC | °C | ASTM D92 | 230 |
| Pour Point | | °C | ASTM D97 | -36 |

These characteristics are typical of current production. Whilst future production will confirm to Shells specification, variations in these characteristics may occur.

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# RIMULA

## SAE-40




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## SHELL RIMULA R3+ 30
(Monograde Heavy Diesel Engine Oils)

### Product Description
Shell Rimula R3 Energised Protection oils feature proven lubricant chemistry that adapts to your driving needs to provide extra protection whatever the demands of your engine or equipment. Featuring an active-detergent system to keep pistons and other engine parts clean, it provides protection against wear for long engine life and protection against deposits for efficient engine performance.
Performance, Features & Benefits

- **Equipment manufacture**
  Shell Rimula R3 monogrades are approved for use in a variety of engine applications by leading OEMs.

- **High standard of piston cleanliness**
  The high thermal stability and oil oxidation resistance provide a high standard of piston cleanliness

- **Low engine wear and long component life**
  Overall engine cleanliness contributes to low engine wear, long component life, maintenance of power output, more operational stability and lower servicing costs.

### Main Applications

- Dedicated diesel engine oil performance
- Construction industry application
- Stationary equipment
- Detroit Diesel two-stroke engines

### Specifications, Approvals & Recommendations

- MAN : 270
- MB Approval: 228.0
- MTU: Category 1
- API : CF

### Typical Physical Characteristics

| Properties | | | Method | Shell Rimula R3 (CF/228.0) |
|---|---|---|---|---|
| Viscosity Grade | | | | 30 |
| Kinematic Viscosity | @40°C | $mm^2/s$ | ASTM D 445 | 93 |
| Kinematic Viscosity | @100°C | $mm^2/s$ | ASTM D 445 | 11 |
| Dynamic Viscosity | @-25°C | mPas | ASTM D 5293 | - |
| Viscosity Index | | | ASTM D 2270 | 103 |
| Density | @15°C | kg/l | ASTM D 4052 | 0.89 |
| Flash Point (COC) | | °C | ASTM D92 | 242 |
| Pour Point | | °C | ASTM D97 | -18 |

These characteristics are typical of current production. Whilst future production will confirm to Shells specification, variations in these characteristics may occur.

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# RIMULA

## R3+ 40




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## SHELL RIMULA R3+ 40
(multigrade engine oil)

### Product Description
Shell Rimula R3+40 Energized Protection oils use proven lubricant chemistry that adapts to your driving needs to provide extra protection whatever the demands of your engine or equipment. Featuring an active detergent system to keep pistons and other engine parts clean, it provides extra protection against deposits for efficient engine performance.

### The Energised Protection of Shell Rimula heavy duty diesel engine oils works relentlessly in three critical areas:
- **Acid control** – well proven performance additives help to protect against corrosion from acids formed as fuel burns.
- **Deposit control** – helps keeps engine clean for consistent performance and long life.
- **Wear control** – keeps moving metal engine surfaces apart for long engine life.

### Protective power
Shell Rimula R3+ provides the extra protection needed in more severe duty and turbocharged engine applications.

### Extra Deposit Control
Shell Rimula R3+ is formulated with up to 25% more deposit control components compared to basic quality API CF oils.

### Should you use Rimula R3+ oils?
- Shell Rimula R3+ is suitable for use in many medium and heavy duty trucking operations where turbo and non-turbocharged engines are used. Approved for use by Mercedes-Benz and MAN for older turbocharged engines.
- Shell Rimula R3+ is suitable for use in older turbo and non-turbocharged engines found in city bus applications, particularly vehicles manufactured by Mercedes-Benz and MAN.
- Shell Rimula R3+ oils may be used in both engine and certain transmission and hydraulic applications in off-highway construction and agricultural equipment.

| | SAE Viscosity Grade | | |
|---|---|---|---|
| | R3 10W | R3+ 30 | R3+ 40 |
| API: CF | ✓ | ✓ | ✓ |
| ACEA:E2 | | | ✓ |
| MAN:270 | | ✓ | ✓ |
| MB Approval:228.0 | | ✓ | ✓ |

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# RIMULA

## R3 10W




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## SHEL RIMULA R3 10W

(CF) (Monograde Heavy Duty Diesel Engine Oils)

### Product Description

Shell Rimula R3 oils feature proven lubricant chemistry that adapts to your driving needs to provide extra production whatever the demands of your engines or equipment. Featuring an active-detergent system to keep pistons and other engine parts clean, it provides protection against wear for long engine life and protection against deposits for efficient engine performance.

### Performance, Features & Benefits

- **Equipment manufacturer acceptance**
  Shell Rimula R3 monogrades are approved for use in a variety of engine application by leading OEMs.
- **High standard of piston cleanliness**
  The high thermal stability and oil oxidation resistance provide a high standard of piston cleanliness.
- **Low engine wear and long component life**
  Overall engine cleanliness contributes to low engine wear, long component life, maintenance of power output, more operational stability and lower servicing costs.

### Main Applications

- Dedicated diesel engine oil performance
- Construction industry application
- Stationary equipment

### Specifications, Approvals & Recommendations

- API: CF

### Typical physical characteristics

| Properties | | | Method | Shell Rimula R3 |
|---|---|---|---|---|
| (CF) | | | | |
| SAE Viscosity Grade | | | | 10W |
| Kinematic Viscosity | @40°C | mm²/s | ASTM D445 | 43 |
| Kinematic Viscosity | @100°C | mm²/s | ASTM D445 | 7 |
| Dynamic Viscosity | @-25°C | mPa s | ASTM D5293 | 6240 |
| Viscosity Index | | | ASTM D2270 | 122 |
| Density | @15°C | kg/l | ASTM D4052 | 0.885 |
| Flash Point (COC) | | °C | ASTM D92 219 | |
| Pour Point | | °C | ASTM D97 -33 | |

These characteristics are typical of current production. Whilst future production will confirm to Shells specification, variations in these characteristics may occur.

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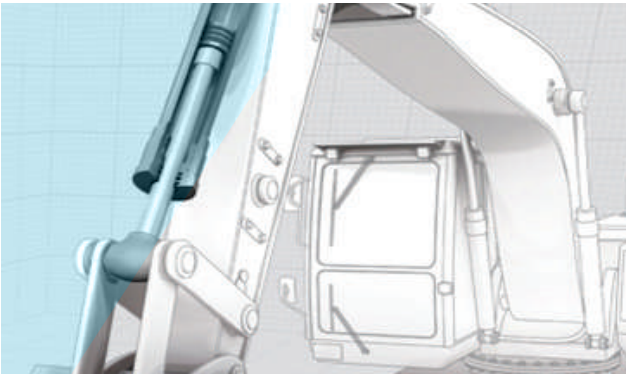

# HYDRAULIC OIL



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# TELLUS

## S2 M 68




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## SHELL TELLUS S2 M 68
(industrial hydraulic fluid)

### Product Description
Shell Tellus S2 M Fluids are high performance hydraulic fluids that use Shell's unique patented technology to provide outstanding protection and performance in most manufacturing and many mobile equipment operations. They resist breakdown under heat or mechanical stress and help prevent damaging deposit formation that can decrease the efficiency of your hydraulic power system.

### DESIGNED TO MEET CHALLENGES
### Performance, Features and Benefits

- **Long fluid life-maintenance saving** – Shell Tellus S2 M fluids help extend equipment maintenance intervals by resisting thermal and chemical breakdown. This minimizes sludge formation and provides excellent performance in the industry standard ASTM D943 TOST test (Turbine Oil Stability Test), providing better reliability and system cleanliness.

Shell Tellus S2 M fluids also have good stability in the presence of moisture, which ensures long fluid life and reduces the risk of corrosion and rusting, particularly in moist or humid environments.

- **Outstanding wear protection**- proven zinc-based anti-wear additives are incorporated to be effective throughout the range of operating conditions, including low load and severe duty high load conditions. Outstanding performance in a range of piston and vane pump tests, including the tough Denison T6C (dry and wet versions) and the demanding Vickers 35VQ25, demonstrate how Shell Tellus S2 M fluids can help system components last longer
- **Maintaining system efficiency**- superior cleanliness, excellent filterability and high performance water separation, air release and antifoam characteristics all help contribute to maintaining or enhancing the efficiency of hydraulic systems.

The unique additive system in Shell Tellus S2 M, in combination with superior cleanliness (meeting the requirements of ISO 4406 21/19/16 class or better ex Shell plant filling lines as recognised by DIN 51524 specification, the oil is exposed to various influences with transport and storage that could affect the cleanliness level), helps reduce the impact of contaminants on filter blocking, allowing both extended filter life and use of finer filtration for extra equipment protection.

Shell Tellus S2 M fluids are formulated for fast air release without excessive foaming to help efficient hydraulic power transfer and minimise fluid and equipment impacts of cavitation induced oxidation that can shorten fluid life.

### Main Applications

- **Industrial hydraulic systems**

With an extensive range of equipment maker approvals and recommendations, Shell Tellus S2 M fluids are suitable for a wide range of hydraulic power applications found in manufacturing and industrial environments.

- **Mobile hydraulic fluid power transmission systems**

Shell Tellus S2 M fluids can be used effectively in mobile hydraulic power applications such as excavators and cranes, except where significant ambient temperature variations are encountered. For these applications we recommend the shell Tellus "V" series.

- **Marine hydraulic systems**

Suitable for marine applications where ISO HM category hydraulic fluids are recommended.

### Specifications, Approvals and Recommendations

- Denison Hydraulics (HF-0, HF-1, HF-2)
- Cincinnati Machine P-68 (ISO 32), P-70 (ISO 46), P-69 (ISO 68)
- Eaton Vickers (Brochure 694)
- Listed by Bosch Rexroth Ref 17421-001 and RD 229-1/04.03
- ISO 11158 (HM fluids)
- AFNOR NF-E 48-6034
- ASTM 6158-05 (HM fluids)

## Compatibility and Miscibility

### Compatibility

Shell Tellus S2 M fluids are suitable for use with most hydraulic pumps.

### Fluid Compatibility

Shell Tellus S2 M fluids are compatible with most other mineral oil based hydraulic fluids. However, mineral oil hydraulic fluids should not be mixed with other fluid types (e.g. environmentally acceptable or fire resistant fluids).

### Seal and Paint Compatibility

Shell Tellus S2 M fluids are compatible with seal materials and paints normally specified for use with mineral oils.

## Typical Physical Characteristics

| Properties | | | Method | Shell Tellus S2 M |
|---|---|---|---|---|
| ISO Viscosity Grade | | | ISO 3448 | 68 |
| ISO Fluid Type | | | | HM |
| Kinetic Viscosity | @0°C | cSt | ASTM D445 | 1040 |
| Kinetic Viscosity | @40°C | cSt | ASTM D445 | 68 |
| Kinetic Viscosity | @100°C | cSt | ASTM D445 | 8.6 |
| Viscosity Index | | | ISO 2909 | 97 |
| Density | @15°C | kg/l | ISO 12185 | 0.886 |
| Flash Point (COC) | | °C | ISO 2592 | 235 |
| Pour Point | | °C | ISO 3016 | -24 |

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# TELLUS

## S2 V46




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## SHELL TELLUS S2 V46

(industrial hydraulic fluid for wide temperature range)

### Product Description

Shell Tellus S2 V fluids are high performance hydraulic fluids that use Shell's unique patented technology with excellent viscosity control under both severe mechanical stress and across a wide range of temperatures. They provide outstanding protection and performance in most mobile equipment and other applications subjected to wider ranges of ambient or operating temperatures.

### DESIGNED TO MEET CHALLENGES

### Performance, Features and Benefits

- **Long fluid life-Maintenance saving** – Shell Tellus S2 V fluids help extend equipment maintenance intervals by resisting thermal and chemical breakdown. This minimises sludge formation and provides excellent performance in the industry standard ASTM D943 TOST test (Turbine Oil Stability Test), providing better reliability and system cleanliness.

Shell Tellus S2 V fluids also have good stability in the presence of moisture, which ensures long fluid life and reduces the risk of corrosion and rusting, particularly in moist or humid environments.

Highly shear stable viscosity modifiers help minimize variations in the fluid properties throughout the fluid drain interval.

- **Outstanding wear protection** – Proven zinc-based anti-wear additives are incorporated to be effective throughout the range of operating condition. Outstanding performance in a range of piston and vane pump tests, including the tough Denison T6C (dry and wet versions) and the demanding Vickers 35VQ25, demonstrates how Shell Tellus S2 V fluids can help system components last longer.
- **Maintaining system efficiency** – the extended temperature range capability of Shell Tellus S2 V allows efficient operation of mobile equipment from cold start to normal operating conditions.

Superior cleanliness, excellent filterability and high performance water separation, air release and anti-foam characteristics all help contribute to maintaining or enhancing the efficiency of hydraulic systems.

The unique additive system in Shell Tellus S2 V, in combination with superior cleanliness (meeting the requirements of max ISO 4406 21/19/16 class, ex Shell filling lines. As recognised by DIN 51524 specification, the oil is exposed to various influences with transport and storage that could affect the cleanliness level) helps reduce the impacts of contaminants on filter blocking, allowing both extended filter life and use of finer filtration for extra equipment protection.

Shell Tellus S2 V fluids are formulated for fast air release without excessive foaming to help efficient hydraulic power transfer and minimise fluid and equipment impacts of cavitation-induced oxidation that can shorten fluid life.

### Main Applications

- **Mobile/exterior hydraulic applications**

Hydraulic and fluid power transmission systems in exposed environments can be subject to wide variations in temperature. The high viscosity index of Shell Tellus S2 V helps deliver responsive performance from cold start conditions to full load, severe duty operation.

- **Precision hydraulic systems**

Precision hydraulic systems require excellent control of fluid viscosity over the operating cycle. Shell Tellus S2 V provides greater temperature-viscosity stability compared to ISO HM fluids that can help improve the performance of such systems.





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## Specifications, Approvals and Recommendations

- Denison Hydraulics (HF-0, HF-1, HF-2)
- Cincinnati Machine P-68 (ISO 32), P-70 (ISO 46), P-69 (ISO 68)
- Eaton Vickers (Brochure 694)
- Swedish Standards SS 15 54 34 AM
- ISO 11158 (HV fluids)
- AFNOR NF-E 48-603
- ASTM 6158-05 (HV fluids)
- DIN 51524 Part 3 HVLP type
- GB 111181-1-94 (HV fluids)

## Typical Physical Characteristics

| Properties | | Method | Shell Tellus S2 V |
|---|---|---|---|
| ISO Viscosity Grade | | ISO 3448 | 46 |
| ISO Fluid Type | | | HV |
| Kinematic Viscosity | @20°C | cSt ASTM D445 | 2350 |
| Kinematic Viscosity | @40°C | cSt ASTM D445 | 46 |
| Kinematic Viscosity | @100°C | cSt ASTM D445 | 7.9 |
| Viscosity Index | | ISO 2909 | 143 |
| Density | @15°C | kg/l ISO 12185 | 0.872 |
| Flash Point (COC) | | °C ISO 2592 | 225 |
| Pour Point | | °C ISO 3016 | -36 |
| Dielectric Strength* | | kv ASTM D877 | >30 |

These characteristics are typical of current production.

* Dielectric strength value applies only to “point of manufacturer” at a Shell authorized manufacturing facility. As with all hydraulic fluids, contamination with water or particulate leads to a reduction in dielectric strength.

## Compatibility and Miscibility

### Compatibility

Shell Tellus S2 V fluids are suitable for use with most hydraulic pumps.

### Fluid Compatibility

Shell Tellus S2 V fluids are compatible with most other mineral oil based hydraulic fluids. However, mineral oil hydraulic fluids should not be mixed with other fluid types (e.g. environmentally acceptable or fire resistant fluids).

### Seal and Paint Compatibility

Shell Tellus S2 V fluids are compatible with seal materials and paints normally specified for use with mineral oils.

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# TELLUS

## S2 M 46


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## SHELL TELLUS S2 M 46
(Industrial Hydraulic Fluid)

### Product Description
Shell Tellus S2 M fluids area high performance hydraulic fluids that use Shells unique patented technology to provide outstanding protection and performance in most manufacturing and many equipment operations. They resist breakdown under heat or mechanical stress and help prevent damaging deposit formation that can decrease the efficiency of your hydraulic power system.

### Performance, Features & Benefits
- **Long Fluid life** – maintenance saving

Shell Tellus S2 M fluids help extend equipment maintenance intervals by resisting thermal and chemical breakdown. This minimizes sludge formation and provides excellent performance in the industry standard ASTM D946 TOST test (Turbine Oil Stability Test), providing better reliability and system cleanliness.
Shell Tellus S2 M fluid also have good stability in the presence of moisture, which ensures long fluid life and reduces the risk of corrosion and rusting, particularly in moist or humid environments.

- **Outstanding wear protection.**
- **Maintaining system efficiency.**
- **Industrial hydraulic systems.**
- **Mobile hydraulic fluid power transmission systems.**
- **Marine hydraulic systems.**

### Specifications, Approvals & Recommendations
- Denison Hydraulics (HF-0, HF-1, HF-2)
- Cincinnti Machine P-68 (ISO 32), P-70 (ISO 46), P-69 (ISO 68)
- Eaton Vickers (Brochure 694)
- Listing by Bosch Rexroth Ref 17421-001 and RD 220-1/04.03
- IOS 11158 (HM fluids)
- AFNOR NF-E 48-603
- ASTM 6158-05 (HM fluids)
- DIN 51524 Part 2 hlp type
- Swedish Standard SS 15 54 34 AM
- GB 111181-1-94 (HM fluids)

### Typical physical characteristics

| Properties | | | Method | Shell Tellus S2 M |
|---|---|---|---|---|
| ISO Viscosity Grade | | | ISO 3448 | 46 |
| ISO Fluid Type | | | | HM |
| Kinematic Viscosity | @0°C | cSt | ASTM D445 | 580 |
| Kinematic Viscosity | @40°C | cSt | ASTM D445 | 46 |
| Kinematic Viscosity | @100°C | cSt | ASTM D445 | 6.7 |
| Viscosity Index | | | ISO 2909 | 98 |
| Density | @15°C | kg/l | ISO 12185 | 0.879 |
| Flash Point (COC) | | °C | ISO 2592 | 230 |
| Pour Point | | °C | ISO 3016 - | 30 |

These characteristics are typical of current production. Whilst future production will confirm to Shells specification, variations in these characteristics may occur.

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# TELLUS

## S2 M 100




Shell Lubricants

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## SHELL TELLUS S2 M 100

Industrial Hydraulic Fluid.

### Products Description

Shell Tellus S2 M fluids are highly performance hydraulic fluids that use Shell's unique patented technology to provide outstanding protection and performance in most manufacturing and many mobile equipment operations. They resist breakdown under heat or mechanical stress and help prevent damaging deposit formation that can decrease the efficiency of your hydraulic power system

### Performance, Features & Benefits

- Long Fluid Life – maintenance saving
- Outstanding wear protection
- Maintaining system effiency

### Main Applications

- Industrial Hydraulic Systems
- Mobile hydraulic fluid power transmission systems
- Marine hydraulic systems

### Specifications, Approvals & Recommendations

- Denison Hydraulic (HF-0, HF-1, HF-2)
- Cincinnati Machine P-68 (ISO 32), P-70 (ISO 46), P-69 (ISO 68)
- Eaton Vickers M – 2950 S
- Eaton Vickers I-286 S
- Listed by Bosch Rexroth Ref 17421-001 and RD 220-1/04.03
- ISO 11158 (HM fluids)
- AFNOR NF-E 48-603
- ASTM 6158-05 (HM fluids)
- DIN 51524 Part 2 HLP type
- Swedish Standard SS 15 54 34 AM
- GB 111181-1-94 )HM fluids)

### Typical Physical Characteristics

| Properties | | | Method | Shell Tellus S2 M 100 |
|---|---|---|---|---|
| ISO Viscosity Grade | | | ISO 3448 | 100 |
| ISO Fluid Type | | | | HM |
| Kinematic Viscosity | @0 ˚C | cSt | ASTM D 445 | 1790 |
| Kinematic Viscosity | @40 ˚C | cSt | ASTM D 445 | 100 |
| Kinematic Viscosity | @100 ˚C | cSt | ASTM D 445 | 11.1 |
| Viscosity Index | | | ISO 2909 | 96 |
| Density | @15 ˚C | kg/l | ISO 12185 | 0.891 |
| Flash Point (COC) | | ˚C | ISO 2592 | 250 |
| Pour Point | | ˚C | ISO 3016 | -24 |

These characteristics are typical of current production. Whilst future production will confirm to shells specification, variations in these characteristics may occur.



Shell Lubricants

PACIFIC ENERGY

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# TELLUS

## S2 M 32




Shell Lubricants

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# SHELL TELLUS S2 M 32

Industrial Hydraulic Fluid

## Product Description

Shell Tellus S2 M fluid are high performance hydraulic fluids that use Shells unique patented technology to provide outstanding protection and performance in most manufacturing and many mobile equipment operations. They resist breakdown under heat or mechanical stress and help prevent damaging deposit formation that can decrease the efficiency of your hydraulic power system.

## Performance, Features & Benefits

- Long fluid life – maintenance saving
- Outstanding wear protection
- Maintaining system efficiency

## Main Applications

- Industrial hydraulic systems
- Mobile hydraulic fluid power transmission systems
- Marine hydraulic systems

## Specifications, Approvals & Recommendations

- Denison Hydraulics(HF-0, HF-1, HF-2)
- Cincinnati Machine P-68(ISO 32), P-70(ISO46), P-69 (ISO 68)
- Eaton Vickers M-2950 S
- Eaton Vickers I-286 S
- Listed by Bosch Rexroth Ref 1742-001 and RD 220-1/04.03
- ISO 1158 (HM fluids)
- AFNOR NF-E 48-603
- DIN 51524 Part 2HLP type
- Swedish Standard SS 15 54 AM
- GB 111181-1-94 (HM fluids)

## Compatibility & Miscibility

- Compatibility
- Fluid Compatibility
- Seal & Paint Compatibility

## Typical Physical Characteristics

| Properties | | | Method | Shell Tellus S2 M |
|---|---|---|---|---|
| ISO Viscosity Grade | | | ISO 3448 | 32 |
| ISO Fluid Type | | | | HM |
| Kinematic Viscosity | @0˚C | cSt | ASTM D 445 | 338 |
| Kinematic Viscosity | @40˚C | cSt | ASTM D 445 | 32 |
| Kinematic Viscosity | @100˚C | cSt | ASTM D 445 | 5.4 |
| Viscosity Index | | | ISO 2909 | 99 |
| Density | @15˚C | kg/l | ISO 12185 | 0.875 |
| Flash Point (COC) | | ˚C | ISO 2592 | 218 |
| Pour Point | | ˚C | ISO 3016 | -30 |

These characteristics are typical of current production. Whilst future production will conform to Shells specification, variations in the characteristics may occur.

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Shell Lubricants

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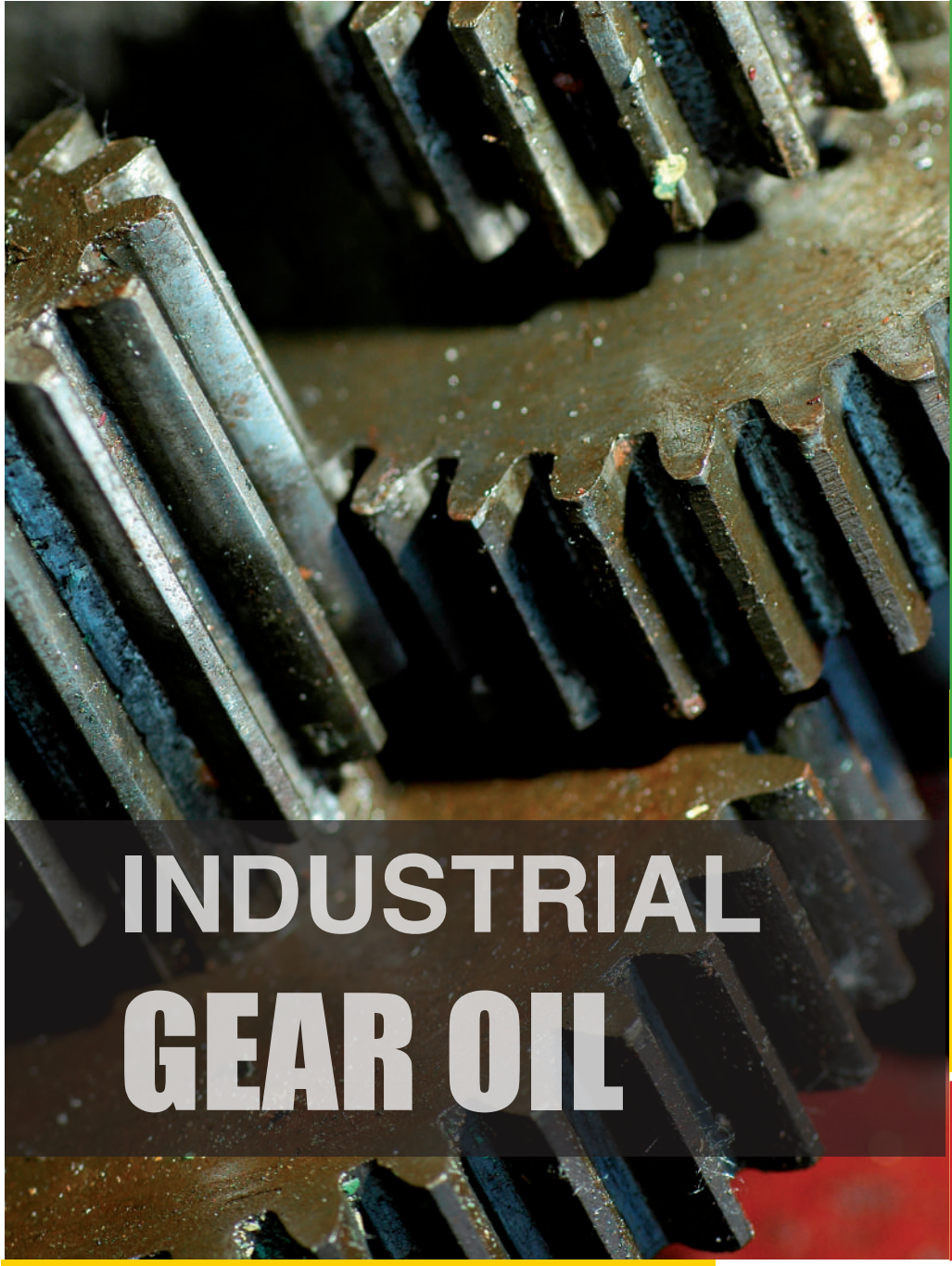

# INDUSTRIAL GEAR OIL



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# OMALA

## S2 G 68




Shell Lubricants

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# SHELL OMALA S2 G 68
**Industrial Gear Oil**

## Product Description
Shell Omala S2 G oils are high quality extreme-pressure oils designed primarily for the lubrication of heavy duty industrial gears. Their high load carrying capacity and anti-friction characteristics combine to offer superior performance in gear.

## Performance, Features & Benefits
- Long oil life – Maintenance saving
- Excellent wear & corrosion production
- Maintaining system sufficiency

## Main applications
- Enclosing industrial gear systems
- High loaded gears
- Other applications

## Specifications, Approvals & Recommendations
- David Brown S1.53.101,102,103,104
- Meets MAG (Cincinatti Machine) P34,35,59,63,74,76-78
- Meets ISO 12925-1 Type CKD, except ISO 680-1000.ISO 680 meet CKC
- DIN 51517-Part 3(CLP), except ISO 1000
- AGMA 9005-EO2 (EP)
- US Steel 224

## Typical Physical Characteristics

| Properties | | | Method | Shell Omala S2 G |
|---|---|---|---|---|
| ISO Viscosity Grade | | | ISO 3448 | 68 |
| Kinematic Viscosity | @40˚C | mm2/s | ISO 3104 | 68 |
| Kinematic Viscosity | @100˚C | mm2/s | ISO 3104 | 8.7 |
| Viscosity Index | | | ISO 2909 | 99 |
| Density | @15˚C | kg/m3 | ISO 12185 | 887 |
| Flash Point (COC) | | ˚C | ISO 2592 | 236 |
| Pour Point | | ˚C | ISO 3016 | -24 |

These characteristics are typical of current production. Whilst future production will confirm to Shells specification, variations in these characteristics may occur.

Shell

# OMALA

## S2 G 100




Shell Lubricants

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## SHELL OMALA S2 G 100
**Industrial Gear Oils**

### Product Description

Shell Omala S2 G oils are high quality extreme-preasure oils designed primarily for the lunbrication of heavy duty industrial gears. Their high load carrying capacity and anti-friction characteristics combine to offer superior performance in gears.

### Performance, Features & Benefits

- Long Oil life – Maintenance saving
- Excellent wear & corrosion production
- Maintaining system efficiency
- High loaded gear
- Other applications

### Main Applications

- **Enclosed industrial gear systems**
  Shell Omala S2 G oils are formulated using an effective sulphur – phosphorus additive system to provide an extreme pressure performance which allow trouble-free application in most en closed industrial gearboxes using steel spur and helical gears.

### Typical Physical Characteristics

| Properties | | | Method | Shell Omala S2 G |
|---|---|---|---|---|
| ISO Viscosity Grade | | | ISO 3448 | 100 |
| Kinematic Viscosity | @40 ˚C | mm2/S | ISO 3104 | 100 |
| Kinematic Viscosity | @100˚C | mm2/S | ISO 3104 | 11.4 |
| Viscosity Index | | | ISO 2909 | 100 |
| Density | @15˚C | kg/m3 | ISO 12185 | 891 |
| Flash Point (COC) | | ˚C | ISO 2592 | 240 |
| Pour Point | | ˚C | ISO 3016 | -24 |

These characteristics are typical of current products. Whilst future production will confirm to Shells specification, variations in these characteristics may occur.

Shell

# OMALA

## S2 G 150


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Shell Lubricants

PACIFIC ENERGY

(Industrial Gear Oils)

## Product Description

Shell Omala S2 G oils are high quality extreme-pressure oils designed primarily for the lubrication of heavy duty industrial gears. Their high load carrying capacity and anti-friction characteristics combine to other superior performance in gears.

### DESIGNED TO MEET CHALLENGES

### Performance, features & Benefits

- Long oil life-Maintenance saving
- Excellent wear & corrosion protection
- Maintaining system efficiency
- Highly loaded gears
- Other applications

## Specifications, Approvals & Recommendations

- Textron Power Transmissions (David Brown) 4E
- Meets MAG Specification P-77
- US Steel 224
- AGMA EP 9005 – EO2
- ISO 12925-1 Type CKD
- DIN 51517 – Part 3 (CLP)

## Main Applications

- Enclosed industrial gear systems

  Shell Omala S2 G oils are formulated using an effective sulphur-phosphorus additive system to provide an extreme pressure performance which allows trouble-free application in most enclosed industrial gearboxes using steel spur and helical gears.

## Typical Physical Characteristics

| Properties | | | Method | Shell Omala S2 G |
|---|---|---|---|---|
| ISO Viscosity Grade | | | ISO 3448 | 150 |
| Kinematic Viscosity | @40°C | $mm^2/s$ | ISO 3104 | 150 |
| Kinematic Viscosity | @100°C | $mm^2/s$ | ISO 3104 | 15 |
| Viscosity Index | | | ISO 2909 | 100 |
| Density | @15°C | $kg/m^3$ | ISO 12185 | 897 |
| Flash Point (COC) | | °C | ISO 2592 | 240 |
| Pour Point | | °C | ISO 3016 | -24 |

These characteristics are typical of current production. Whilst future production will confirm to Shells specification, variations in these characteristics may occur.

## Health, Safety & Environment

- Guidance on Health and Safety is available on the appropriate Material Safety Data Sheet, which can be obtained from http://www.epc.shell.com
- Protect the environment

  Take used oil to an authorised collection point. Do not discharge into drain, soil or water.

Shell

# OMALA

## S2 G 220




Shell Lubricants

PACIFIC ENERGY

## SHELL OMALA S2 G 220
(Industrial Gear Oils)

### Product Description
Shell Omala S2 G oils are high quality extreme-pressure oils designed primarily for the lubrication of heavy duty industrial gears. Their high load carrying capacity and anti-friction characteristics combine to offer superior performance in gears.

### Intended Use:
Enclosed industrial gear systems
highly loaded gears

### Performance, Features & Benefits
- Long oil life – Maintenance saving
- Excellent wear & corrosion protection
- Maintaining system efficiency
- Highly loaded gears
- Other applications

### Main Applications
Shell Omala S2 G oils are formulated using an effective sulphur-phosphorus additive system to provide an extreme pressure performance which allows trouble-free application in most enclosed industrial gearboxes using steel spur and helical gears.

### Qualifications/Specifications Met:
- Textron Power Transmissions (David Brown) 5E
- Meets MAG Specification P-74
- US Steel 224
- AGMA EP 9005 – EO2
- ISO 12925-1 Type CKD
- DIN 51517 – Part 3 (CLP)

For a full listing of equipment approvals and recommendations please consult your local Shell Technical Helpdesk, or the OEM Approvals website.

### Typical Physical Characteristics

| Properties | | | Methods | Shell Omala S2 G |
|---|---|---|---|---|
| ISO Viscosity Grade | | | ISO 3448 | 220 |
| Kinematic Viscosity | @40°C | mm²/s | ISO 3104 | 220 |
| Kinematic Viscosity | @100°C | mm²/s | ISO 3104 | 19.4 |
| Viscosity Index | | | ISO 2909 | 100 |
| Density | @15°C | kg/m³ | ISO 12185 | 899 |
| Flash Point (COC) | | °C | ISO 2592 | 240 |
| Pour Point | | °C | ISO 3016 | -18 |

These characteristics are typical of current production. Whilst future production will confirm to Shells specification variations in these characteristics may occur.

Shell

# OMALA

## S2 G 680




Shell Lubricants

PACIFIC ENERGY

## Products Description

Shell Omala S2 G Oils are high quality extreme-pressure oils designed primarily for the lubrication of heavy duty industrial gears. Their high carrying capacity anti-friction characteristics combine to offer superior performance in gears.

## Performance, Features & Benefits

- **Long oil life-Maintenance saving**
  Shell Omala S2 G Oils are formulated to resist thermal and chemical breakdown throughout the maintenance interval. They withstand high thermal loading and resist the formulation of sludge to provide extended oil life capability, even with bulk oil temperatures of up to 100°C in certain applications.
- **Excellent wear & corrosion protection**
  Excellent load carrying capacity reduces gear tooth and bearing w ear on select components. Shell Omala S2 G has excellent corrosion protection, protecting steel components, even in the presence of contaminat6uiobn of water and solid.
- **Maintaining system efficiency**
  Shell Omala S2 G Oils have excellent water separation properties, such that excess water can be drained easily from lubricant systems to help extend the life of the gears and ensure efficient lubrication of contact areas. Water can greatly accelerate surface fatigue of gears and bearings as well as promoting ferrous corrosion on internal surfaces. Water contamination should therefore be avoided or removed as quickly as possible after the occurrence.
- **Highly loaded gears**
  Shell Omala S2 G Oils an effective full extreme pressure (EP) additive system allowing them to be used in highly-loaded gears systems.
- **Other applications**
  Shell Omala S2 g Oils are suitable for lubrication of bearings and other components in circulating and splash-lubricated systems. For highly loaded worm drive, Shell Omala S4 WE, Shell Morlina S4 and Shell S1 W are recommended. For automotive hypoid gears, the appropriate Shell Spirax Oil Should be used.

## Specification, Approvals & Recommendations

- MAG (Cincinnati machine) P-34
- AGMA EP 9005 – EO2
- ISO 12925-1 Type CKC
- Din 51517 – Part 3 CLP

## Main Application

- **Enclosed industrial gear systems**
  Shell Omala S2 g Oils are formulated using effective sulphur – phosphorus additive system to provide an extreme pressure performance which allow trouble- free application in most enclosed industrial gearboxes using steel spur and helical gears.

## Typical Physical Characteristics

| Properties | | | Method | Shell Omala S2 G |
|---|---|---|---|---|
| ISO Viscosity Grade | | | ISO 3448 | 680 |
| Kinematic Viscosity | @40°C | $mm^2/s$ | ISO 3104 | 680 |
| Kinematic Viscosity | @100°C | $mm^2/s$ | ISO 3104 | 38 |
| Viscosity Index | | | ISO 2909 | 92 |
| Density | @15°C | $kg/m^3$ | ISO 12185 | 912 |
| Flash Point (COC) | | °C | ISO 2592 | 270 |
| Pour Point | | °C | ISO 3016 | -9 |

Shell

# OMALA

## F 320




Shell Lubricants

PACIFIC ENERGY

## SHELL OMALA F 320
(Premium quality industrial gear oils)

### Product Description.
Shell Omala F oils premium quality, lead-free, extreme-pressure oils designed, primarily, for the lubrication of heavy duty industrial gears. Their high load carrying capacity and anti-friction characteristics combine to offer superior performance in gears and other industrial applications.

They are formulated using high viscosity index, solvent refined, base oils and incorporate a special sulphur-phosphorus additive to provide an extreme pressure performance significantly better than that provided by leaded gear oils.

**Shell Omala F oils are formally approved by Flender AG.**

### Performance Features
- **Excellent load carrying and anti-friction characteristics**
  Reduces gear tooth and bearing wear on both steel and bronze components
- **Outstanding oxidation and thermal stability**
  Withstanding high thermal loading and resists the formation of sludge and other harmful products of oxidation. Extended oil life, even in bulk oil temperatures up to 100°C in certain applications
- **Effective corrosion inhibition**
  Protects both steel and bronze components, even in the presence of contamination by water and solids
- **Lead-free**
  Operation acceptability. Reduced health risk
- **Wide range of viscosities**
  Caters for the most varied and arduous industrial applications
- **Resistance to micro-pitting**
  Standard setting anti micro-pitting performance to reduce the risk premature failure through surface distress

### Applications
- Steel gear transmissions
- Industrial gear drives where a full EP performance is required
- Bearings
- Circulating and splash lubricated systems.

### Typical Physical Characteristics

| Shell Omala F | 68 | 100 | 150 | 220 | 320 | 460 | 680 | 1000 |
|---|---|---|---|---|---|---|---|---|
| Kinematic Viscosity @ 40°C cSt | 68 | 100 | 150 | 220 | 320 | 460 | 680 | 1000 |
| 100°C cSt (IP 71) | 8.7 | 11.4 | 15.0 | 19.4 | 25.0 | 30.8 | 38.0 | 44.3 |
| Viscosity Index (IP 226) | 100 | 100 | 100 | 100 | 100 | 97 | 92 | 82 |
| Density @ 15°C kg/l (IP 365) | 0.887 | 0.891 | 0.897 | 0.899 | 0.903 | 0.904 | 0.912 | 0.925 |
| Flash Point °C (PMCC) (IP 34) | 191 | 193 | 196 | 199 | 202 | 204 | 204 | 202 |
| Pour Point °C (IP 15) -27 | -27 | -21 | -18 | -18 | -9 | -9 | -6 | |

These characteristics are typical of current production. Whilst future production will conform to Shells specification variations in these characteristics may occur.



Shell Lubricants

PACIFIC ENERGY

Shell

# OMALA

## S4 GX 320




Shell Lubricants

PACIFIC ENERGY

# OMALA S4 GX 320

Advance Synthetic Industrial Gear Oil

## Product Description

Shell Omala S4 GX is an advance synthetic heavy duty industrial gear oil offering outstanding lubrication performance under severe operating conditions, including reduced friction, long service life and high resistance to micro-pitting for optional gear production.

## Performance, Features & Benefits

- Long oil life – maintenance saving
- Excellent wear and corrosion protection
- Maintaining system efficiency

## Main Applications

- Wind turbines and other inaccessible installations
- Enclosed industrial gear systems
- Other applications

## Specifications, Approvals & Recommendations

- David Brown S1.53.106, except ISO 1000
- Approval for wind turbine gearboxes by: Gamesa, Dongfang Wind Turbine, Dalian Heavy Industries and Sinovel
- ORBITAL2 approved for helical and planetary gear units for wind turbines
- ISO 12925-1 Type CKD, except ISO 1000
- ANSI/AGMA 9005-E02(EP), except ISO 1000
- US Steel 224, except ISO 1000

## Typical Physical Characteristics

| Properties | | Method | OMALAS4 GX 320 |
|---|---|---|---|
| Viscosity Grade | | ISO 3448 | 320 |
| Kinematic Viscosity | @40˚C mm2/s | | 335 |
| Kinematic Viscosity | @100˚C mm2/s | | 40 |
| Viscosity Index | | ISO 2909 | 159 |
| Flash Point | ˚C | ISO 2592 (COC) | 252 |
| Pour Point | ˚C | ISO 3016 | -42 |
| Density | @15˚C kg/m2 | ISO 12185 | 883 |
| FZG Load Carrying Test | | DIN 51354-2 | - |
| FZG Load Carrying Test | failure load stage | A/8,3/90 | >14 |
| FZG Load Carrying Test | | A/16,6/90 | >14 |
| Timken OK Load | | ASTM D2782 | >85 |

These characteristics are typical of current production. Whilst future production will confirm to Shells specification, variations in these characteristics may occur.

Shell

# AIR TOOL OIL

## S2 A 320




Shell Lubricants

PACIFIC ENERGY

## SHELL AIR TOOL OIL S2 A 320

Pneumatic Tool and Rock Drill Oils

### Product Description

Shell Air Tool Oil S2 A has been developed to meet the special lubrication requirements of pneumatic tools, including percussion type pneumatic tools subjected to the most arduous conditions. They are designed to maintain high oil film strength and effectively lubricate even the most demanding requirements of pneumatic drill impact mechanisms as well as providing excellent mist lubrication of general purpose air tools.

### Performance Benefits

- Reliable wear & corrosion protection
- Maintaining system efficiency

### Applications

- Percussive pneumatic tools
- Oil mist lubrication applications
- Other applications

### Specifications and Approvals

Meets ISO 6743-11 Type PAC and PBC

### Typical Physical Characteristics

| Shell Air Tool Oil S2 A | | 32 | 100 | 150 | 320 |
|---|---|---|---|---|---|
| ISO Viscosity Grade | ISO 3448 | 32 | 100 | 150 | 320 |
| Kinematic Viscosity | ISO 3104 | | | | |
| At 40°C mm2/s | | 32 | 100 | 150 | 320 |
| At 100°C mm2/s | | 5.6 | 11.5 | 15.1 | 25.0 |

# PACIFIC ENERGY



Shell Lubricants

PACIFIC ENERGY

# TRANSMISSION OIL



Shell Lubricants

PACIFIC ENERGY

Shell

# SPIRAX

## S3 ATF MD3


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Shell Lubricants

PACIFIC ENERGY

# SHELL SPIRAX S3 ATF MD3
**(automatic transmission fluid)**

## Product Description

Shell Spirax oils are designed to help keep your transmission components protected so that they can go on working efficiently. For example, Shell Spirax S6 AXME and Shell Spirax S6 GXME have special frictional properties and high fluidity that reduce power loss, lower the operating temperature and offer higher mechanical efficiency.

## Wear Protection

Protecting axles and gears from wear can help to reduce maintenance costs, extend onboard equipment life and maximise your return on investment.
The Shell Spirax range of axle and gear oils and automatic transmission fluids offer proven protection, including the latest synthetic oils that deliver exceptional wear, pitting, bearing-failure and corrosion protection for heavy-duty axles, transmissions and gears operating under highly stressed conditions. This can help to reduce your costs.
Oil Life

The Shell Spirax range contains oils that are designed to offer you value through exceptional oil life and protection that enable oil-drain intervals and component life to be extended.

## System Efficiency

Shell Spirax oils are designed to keep your transmission components protected so that they go on working efficiently.

## Specifications and approvals

Meet requirements of General Motors Dextron® III and Ford Mercon®.

## Applications

Heavy trucks, trucks, passenger car, bus/coach, heavy trucks cab over.

SHELL SPIRAX S3 ATF MD3

Shell

# SPIRAX

## S2 A 80W-90




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SHELL SPIRAX S2 A 80W-90

## Key Benefits

- Wear and corrosion protection for longer equipment life
- Good oxidation stability for long oil life

## High Quality GL-5 Axle Oil

Shell Spirax S2 A is dedicated, high quality axle oil. It is an oil that you can rely on to help protect heavily loaded differentials and gear sets under extreme pressure from wear and corrosion. Shell Spirax S2 A has good oxidation stability for long life.

## The Benefits of Using Dedicated Axle Oil

Many gearboxes and axles use different materials and operate under different conditions. A single oil used for both applications may lead to a compromise in either or both the axle and gear box wear protection and efficiency.

Using a dedicated axle oil, such as Shell Spirax S2 A, and a dedicated gearbox oil, such as Shell Spirax S2 G, means that the oils can be formulated to have the separate viscosity grades and different additive technologies needed to provide maximum protection, power and efficiency for each application.

## Designed to Protect

Protecting transmissions and axles from wear, pitting, and corrosion can help to extend component life and maximise your return on investment. Shell S2 A offers good wear and corrosion protection for longer component life.

## Designed for Long Life

Limiting fluid degradation can help to prolong oil and component life. Shell Spirax S2 has good resistance to physical and chemical breakdown, which means that it can go on protecting components for longer. It has good oxidation stability for long oil life, which can help to reduce your operating costs.

## Specifications and Approvals

Shell Spirax S2 A meets API service classification GL-5 classification requirements.

## Applications

Versatile applications-suitable for a wide variety of automotive axle units, including automotive transmissions and differentials; moderately to heavily loaded gear sets in stationary and ancillary equipment; hypoid gear axles; some motor cycle gear units that are separate from the engine; and other automotive transmission units operating under high-speed-shock- load, high-speed-low-torque, or low-speed-high-torque conditions. That is; Heavy truck, truck, passengers cars, excavators, heavy truck cab over and motorbike,

Shell

# SPIRAX

## S2 A 85W -140




Shell Lubricants

PACIFIC ENERGY

## SHELL SPIRAX S2 A 85W -140
**(high quality, GL-5 axle oil)**

### Product Description
Shell Spirax S2 A 85W-140 is blended for use in a wide variety of automotive axle units subjected to heavy duty conditions.
Designed to meet challenges.

### Performance, Features and Benefits
- **Comprehensive components** – specially selected additives impart good anti-wear, anti-rust characteristics and oxidation stability.
- **High quality base oils** – maintains low temperature flow in the designed temperature range, resists oxidation, and maintains oil film between gears.

### Main Applications
- Automotive transmissions, differentials.
- Moderate to heavily loaded gear sets in stationary and ancillary equipment.
- Hypoid gear axles.
- Motorcycle gear units separate from the engine.
- Other automotive transmission units operating under high speed/shock load, high speed/low torque and low speed/high torque conditions.

### Specifications, Approvals and Recommendations
- API Service Classification GL-5

### Typical Physical Characteristics

| Properties | | | Method | Shell Spirax S2 A 85W-140 |
|---|---|---|---|---|
| SAE Viscosity Grade | | | SAE J 306 | 85W-140 |
| SAE Viscosity | | | SAE J 306 | 85W-140 |
| Kinematic Viscosity | @40°C | mm2 /s | ISO 3104 | 358 |
| Kinematic Viscosity | @40°C | mm2 /s | ISO 3104 | 358 |
| Kinematic Viscosity | @100°C | mm2 /s | ISO 3104 | 25.6 |
| Kinematiac Viscosity | @100°C | mm2/s | ISO 3104 | 25.6 |
| Viscosity Index | | | ISO 2909 | 94 |
| Viscosity Index | | | ISO 2909 | 94 |
| Density | @15°C | kg/m3 | ISO 12185 | 908 |
| Density | @15°C | kg/m3 | ISO 12185 | 908 |
| Flash Point (COC) | | °C | ISO 2592 | 215 |
| Flash Point (COC) | | °C | ISO 2952 | 215 |
| Pour Point | | °C | ISO 3016 | -15 |
| Pour Point | | °C | ISO 3016 | -15 |

Shell

# SPIRAX

## S4 CX 30




Shell Lubricants

PACIFIC ENERGY

## SHELL SPIRAX S4 CX 30

(high performance off-highway transmission and hydraulic oil for many applications)

### Product Description

Shell Spirax S4 CX 30 is designed to provide operators with trouble free operation and maximum reliability for the lifetime of the equipment. Spirax S4 CX meets the demanding requirements of modern transmission, final drive, oil immersed brake and hydraulic systems fitted to heavy-duty off-highway.

### Designed to meet challenges Performance, Features and Benefits

- **Frictional performance and material compatibility** – highly consistent and reliable friction performance when used with the advanced metallic and non-metallic materials found in modern systems. Minimal clutch slippage, smooth and quiet brake operation, and trouble-free transmission operation.
- **Anti-wear protection** – the sheers-stable SAE 30 viscosity grade is free from viscosity index (VI) improvers and thickeners and gives the best protection of heavily loaded components.
- **Low temperature characteristics**- formulated to meet low temperature viscosity and fluidity requirements, providing superior protection during start-up and low operating temperature conditions.
- **Optimum mechanical performance and long oil life**-wide-ranging protection for critical components, such as bronze friction discs in powershift transmissions and gears in final drives and differential units.
- **Vickers 35V25 hydraulic pump test**-excellent performance in this demanding test.
  **Oxidation stability**-contains inhibitors to control oxidation and deposit formation. Protects both ferrous and non-ferrous metals from corrosion. Suppresses foaming with improved flow properties at low temperatures enhances efficiency.

### Main Applications

- Shell Spirax S4 CX 30 is recommended for use in heavy duty off-highway equipment produced by the world's leading manufacturers including; Caterpillar, Komatsu, Komatsu-Dresser and in transmissions manufactured by Eaton, Eaton Fuller, ZF, Dana, Rockwell amongst other:
- Powershift Transmissions
- Final drives
- Oil immersed brakes
- Hydraulic systems

### Specifications, Approval and Recommendations

- Caterpillar Tractor TO-4
- ZF TE-ML 03C, O7F
- Suitable for use in applications where Allison C-4 type fluids are required.
- Shell Spirax S4 CX 30 oil is suitable for use in many powershift or manuel transmissions, wet brake systems, and some hydraulic systems including Komats

Shell

# HEAT TRANSFER OIL




Shell Lubricants

PACIFIC ENERGY

# SHELL HEAT TRANSFER OIL

(High Performance Heat transfer fluid)

## Product Description

Shell Heat Transfer Oil s2 is based on carefully selected, highly refined mineral oil chosen for their ability to provide performance in indirect closed fluid heat transfer system.

## Applications

Enclosed circulated heat transfer systems for industrial applications such as process industry, chemical plants, textile producers etc. and in household equipment such as oil filled radiators. Shell Heat Transfer Oil S2 can be used in high temperature continuous heat transfer equipment with the following application limits.

| Shell HeatTransfer Oil S2 | |
|---|---|
| Max. film temperature | 340°C |
| Max. bulk temperature | 320°C |

## Performance Features and Benefits

### Extended maintenance intervals

Shell Heat Transfer Oil S2 is based on carefully selected highly refined mineral oils and resists oil cracking, oxidation and thickening. This provides extended oil life, provided efficient fluid heating and good pump circulation is ensured, such that film temperatures on the heater surface do not exceed the limits above

### System efficiency

Low viscosity enable excellent fluidity and heat transfer over a wide temperature range. Shell Heat Transfer Oil S2 also has a low vapour pressure so resists cracking. This minimises the formation of volatile decomposition products; these would require recovery via expansion chamber and condensate collector.

### Wear Protection

Shell Heat transfer Oil S2 is non-corrosive and has high solvency – this reduces deposit formation by holding oxidation products in solution and keeping internal surfaces of heat exchangers clean.

## Typical Physical Characteristics

| | | | |
|---|---|---|---|
| Density at 15°C | kg/m3 | ISO 12185 | 866 |
| Flash Point PMCC | °C | ISO 2719 | 210 |
| Flash Point COC | °C | ISO 2592 | 220 |
| Flash Point COC | °C | ISO 2592 | 255 |
| Pour Point | °C | ISO 3016 | -12 |
| Kinematic Viscosity | | ISO 3104 | |
| at 0 °C | mm2/s | | 151 |
| at 40 °C | mm2/s | | 25 |
| at 100 °C | mm2/s | | 4.7 |
| at 200 °C | mm2/s | | 1.1 |
| Initial Boiling Point | °C | ASTM D 2887 | 355 |
| Autoigition Temperature | °C | DIN51794 | 360 |
| Neutralisation Temperature | °C | ASTM D974 | <0.05 |
| Ash(Oxide) | %m/m | ISO 6245 | <0.05 |
| Carbon Residue (Conradson) | %m/m | ISO 10370 | 0.02 |
| Copper Corrosion (3h/100°C) | | ISO 2160 | Class 1 |

These characteristics are typical of current product. Whilst future product will confirm to Shell's specification, variations in these characteristics may occur.

## Typical Design Data

| Temperature | 0 | 20 | 40 | 100 | 150 | 200 | 250 | 300 | 340 |
|---|---|---|---|---|---|---|---|---|---|
| Density kg/m3 | 876 | 863 | 850 | 811 | 778 | 746 | 713 | 681 | 655 |
| Specific Heat Capacity kJ/kg*K | 1.809 | 1.882 | 1.954 | 2.173 | 2.355 | 2.538 | 2.72 | 2.902 | 3.04 |
| Thermal Conductivity W/m*K | 0.136 | 0.134 | 0.133 | 0.128 | 0.125 | 0.121 | 0.118 | 0.114 | 0.11 |
| Prandtl No. | 3375 | 919 | 375 | 69 | 32 | 20 | 14 | 11 | 9 |

## Specification and Approvals



Shell Lubricants

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# CORENA

## S4 R46




Shell Lubricants

PACIFIC ENERGY

## SHELL CORENA S4 R46

(Advance Synthetic Rotary Air Compressor Oil)

**Product Description**

Shell Corena S4 R is primarily advance synthetic air compressor oil incorporating a unique high performance additive system. It is designed to deliver the highest performance lubrication of rotary sliding vane and screw air compressors. It uses an advanced addition system to provide excellent and performance for compressors running at pressures over 25 bar and in excess of 100°C discharge temperature with oil maintenance intervals of up to 12,000 hours. Shell Corena S4 R is also perfectly suitable to cover applications where a synthetic being and & circulating oil or R&O oil (ISO VG 32-68) is needed.

**Main Applications.**

**Rotary sliding vane and screw air compressors**

- Shell Corena S4 R is suitable for oil-flooded/ oil injected, single or two-stage compressors, operating at pressures of in excess of 25 bar and with air discharge temperatures of over 100°C (including intermittent operation under these condition).

**Specifications, Approvals & Recommendations**

- ISO 6743-3A-DAJ.
  For a full listing of equipment approvals and recommendations please consult your Shell Technical Help team, or the OEM Approvals website

**Typical physical characteristics**

| Properties | | | Method | Shell Corena S4 R |
|---|---|---|---|---|
| ISO Viscosity Grade | | | ISO 3448 | 46 |
| Kinematic Viscosity | @40°C | $mm^2/s$ | ASTM D 445 | 46 |
| Kinematic Viscosity | @100°C | $mm^2/s$ | ASTM D 445 | 7.7 |
| Viscosity Index (VI) | | | DIN ISO 2909 | 135 |
| Density | @15°C | $kg/m^2$ | ASTM D 1298 | 843 |
| Flash Point | | °C | ASTM D 92 (COC) | 230 |
| Pour Point | | °C | ASTM D 97 | -45 |
| Air Release | | mins | | 2 |
| Rust Prevention-Synthetic Sea Water | | | ASTM D 665B | Pass |
| Water Separability | | mins | ASTM D 1401 | 10 |
| Rotating Pressure Vessel Oxidation | | mins | ASTM D 2272 | 2200 |
| FZG Load Carrying Test | | failure load stage | CEC-L-07-A-95 | >12 |





Shell Lubricants

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Shell

# CORENA

## S3 R68


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PACIFIC ENERGY

# SHELL CORENA S3 R 68

(Previous Rotary Air Compressor Oil)

## Products Description

Shell Corena S3 R is premium quality air compressor oil designed to deliver high performance lubricant of rotary sliding vane and screw air compressors. It uses an advanced additive system to provide excellent protection and performance for compressors running at up to 20 bars and 100°C discharge temperatures with oil maintenance intervals of up to 6000 hours.

## Performance, Features & Benefits

- **Long oil life – Maintenance saving**

Shell Corena S3 R is capable of providing oil maintenance intervals of up to 6000 hours (where allowed by manufacturers) even when operating at maximum discharge temperatures of up to 100°C.

## It is formulated to help:

- Resist formulation of carbon deposits in sliding vane slots in vane compressor.
- Resist formulation of deposits on rotating components in screw compressors
- Resist thermal breakdown and deposit formation to maintain excellent internal surface cleanliness

## Particularly in oil/air separator and coalesce systems.

- Exact oil maintenance interval will depend on intake air quality, duty cycle and ambient conditions. For hot and humid type climates as found un the Asian and Pacific regions, a reduced oil drain period is recommended (consult OEM recommendations)
- **Outstanding wear protection**

  With many years of successful application, Shell Corena S3 R helps provide effective protection of internal metal surfaces from corrosion and wear.
  It contains an advanced ashless anti-wear system to help prolong the life of critical parts such as bearing and gears.
- **Maintaining system efficiency**

  Air release and prevention of foaming are critical performance characteristics in a compressor oil, ensuring reliable start- up and continuous compressed air availability. Shell Corena S3 R is de signed to provide rapid air release without excessive foaming to give trouble- free operation even under cycling conditions.
  In addition Shell Corena S3 R has excellent water separation properties to help ensure continuous efficient operation of the compressor even in the presence of water.

## Main Applications

- **Rotary sliding vane air compressors**

  Shell Corena S3 R is suitable for oil-flooded or oil-injected vane compressors, operation at up to 10 bar and with air discharge temperature of up to 100°C.
- **Screw air compressors**

  Suitable for oil flooded or oil injected, single or two-stage rotary compressors, operating at pres sures of up to 20 bar and with air discharge temperatures of up to 100°C.

## Specifications, Approvals & Recommendations

- **ISO 6743-3A-DAJ**

  For a full listing of equipment approvals and recommendations, please consult your Shell Technical Helpdesk, or the OEM Approvals website.

## Compatibility & Miscibility

- **Shell Corena S3 R** oils are compatible with seal materials specified for use with mineral oils.

## Typical Physical Characteristics

| Properties | | | Method | Corena S3 R 68 |
|---|---|---|---|---|
| ISO Viscosity Grade | | | ISO 3448 | 68 |
| Kinematic Viscosity | @40°C | $mm^2/s$ | ASTM D 445 | 68 |
| Kinematic Viscosity | @100°C | $mm^2/s$ | ASTM D 445 | 8.9 |
| Density | @15°C | $kg/m^3$ | ASTM D 1298 | 873 |
| Flash Point (COC) | | °C | ASTM D 92 | 248 |
| Air Release | | mins | ASTM D 3427 | 5 |
| RPVOT | | mins | ASTM D 2272 | 700 |
| FZG Test | | LS Fail | CEC-L-07-A-95 | 11 |
| Pour Point | | °C | ASTM D 97 | -30 |
| Water separability | @54°C | mins | ASTM D 1401 | 15 |

These characteristics are typical of current production. Whilst future production will confirm to shell's specification, variations in these characteristics may occur.

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Shell Lubricants

Shell

# Refrigeration OIL

## S2 FR-A 68


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PACIFIC ENERGY

## SHELL REFRIGERATION OIL S2 FR-A 68

Shell Refrigeration Compressor Lubricant

### Product Description

Shell Refrigeration Oil S2 FR-A is a low miscibility compressor lubricant intended for use in refrigeration compressors using Ammonia refrigerant. It is formulated from specially refined paraffinic base oils in combination with additives selected to minimise system deposits and provide long service life.

### Performance, Features & Benefits

**System efficiency**

**Extended maintenance intervals**

### Main Applications

- **Refrigerator compressors**
- **Refrigerant compatibility**

### Specifications, Approval & Recommendations

- Shell Refrigeration Oil S2 FR-A meets the requirements of DIN 51503 KAA and KE.

### Compatibility & Miscibility

- **Seal Compatibility** – Shell Refrigeration Oil S2 FR-A is compatible with all commonly used sealing materials designed for use with mineral oils.
- **Lubricant Compatibility** – Shell Refrigeration Oils S2 FR-A is completely miscible with mineral oil, alkylated benzene and PAO based lubricants.

### Typical Physical Characteristics

| Properties | Method | Shell Refrigeration Oil S2 FR-A |
|---|---|---|
| ISO Viscosity Grade | ISO 3448 | 68 |
| Refrigerator Oil | DIN 51503 | KAA, KE |
| Kinematic Viscosity @40˚C mm2/s | | 68 |
| Kinematic Viscosity @100˚C mm2/s | | 9 |
| Flash Point (COC) ˚C | ISO 2592 | 232 |
| Pour Point ˚C | ISO 3016 | -39 |
| Density @15˚C kg/m3 | ISO 12185 | 862 |
| Neutralisation Number mg KOH/g | ASTM D664 (TAN) | - |
| Miscibility with R290 | | Completely miscible with hydrocarbon based refrigerants |

These characteristics are typical or current production. Whilst future production will conform to Shells specification, variations in these characteristics may occur.

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# GREASE



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# GADUS

## S2 V100 3




Shell Lubricants

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## SHELL GADUS S2 V100 3
(High Performance Multipurpose Grease)

### Description:
Shell Gadus S2 V100 1, 2 and 3 are general purpose greases based on a new lithium hydroxystearate soap thickener fortified with anti-oxidant, anti-wear and anti-rust additives. Shell Gadus S2 V100 3 is medium/ hard high performance industrial grease, particularly recommended for the lubrication of electrical motor bearings.

### Performance, Features & Benefits

**Reliable high temperature performance**
Very good performance up to +130°C, resulting in longer bearing life.

**Good oxidation and mechanical stability**
Resists the formation of deposits caused by oxidation at high operating temperatures. Shell Gadus S2 V100 greases are extremely stable under vibrations and give NO LEAKAGE even in repeating shock- loaded bearings.

**Good corrosion resistance characteristics**
Effective protection in hostile environments.

**Long storage life**
Does not alter in consistency during prolonged storage.

### Main Applications
- Rolling element and plain lubricant bearing.
- Electric motor bearing.
- Sealed-for-life bearing.
- Water pumps bearings.
- Maybe used under a wide range of operating conditions offering very significant advantage over conventional lithium grease at high temperature or in the presence of water.
- Medium / hard high performance industrial grease, particularly recommended for the lubricant of electrical motor bearings.

### Specifications, Approval & Recommendations
For addition questions regarding equipment approvals and recommendations, please consult your local Shell Technical Helpdesk, or the OEM Approvals website.

### Typical Physical Characteristics.

| Properties | | | Method | Shell Gadus S2 V1003 |
|---|---|---|---|---|
| NLGI Consistency | | | | 3 |
| Soap Type | | | | Lithium hydroxystearate |
| Base Oil (type) | | | | Mineral |
| Kinematic Viscosity | @40°C | cSt | IP 71/ASTM D445 | 100 |
| Kinematic Viscosity | @100°C | cSt | IP 71/ASTM D445 | 11 |
| Cone Penetration, Worked | @25°C | 0.1mm | IP 50/ASTM D217 | 220-250 |
| Dropping Point | | °C | IP 396/ASTM D2265 | 180 |

These characteristics are typical of current production. While future production will confirm to Shell's specification, variations in these characteristics may occur.

Shell

# GADUS

## S2 V220 2




Shell Lubricants

PACIFIC ENERGY

## SHELL GADUS S2 V220 2

(High Performance Multipurpose Extreme Pressure Grease)

### Product Description

Shell Gadus S2 V220 grease are highly quality multipurpose, extreme-pressure grease based on a blend of high viscosity index mineral oils and a lithium hydroxystrate soap thickener and contain extreme-pressure and other proven additives to enhance their performance in a wide range of applications.
Shell Gadus S2 V220 greases are designed for multipurpose grease lubricant of rolling element and high bearings as well as hinges and sliding surfaces such as those found in throughout most industrial and transport sectors.

### Applications

**Shell Gadus S2 V 220 2 grease are designed for**:

- Heavy duty bearings and general industrial lubricant.
- Heavy duty plain and rolling element bearings operating under harsh conditions including shock loading in wet environments.
- Operation over the temperature range-20°C to 100°C for bearing operating at 75% of the maximum rated speed (Can withstand up to 120°C intermittently).

### Performance, Features & Benefits

**Out Standing load carrying capacity**
Shell Gadus S2 V220 grease contains special extreme-pressure additives which enable them to withstand heavy and shock loads without failure of the lubricant film.

**Improved mechanical stability**
This is particularly important in vibrating environments where poor mechanical stability can lead to grease softening with subsequent loss of lubrication performance and leakage.

**Good resistance to water wash-out.**
Shell Gadus S2 V220 greases have been formulated to offer resistance to water wash-out.

**Oxidation stability**
Specially selected base oil components have excellent oxidation resistance. Their consistency will not alter in storage and they withstand high operating temperatures without hardening or forming bearing deposits.

**Anti-corrosion protection**
Shell Gadus S2 V220 grease have an affinity with metal and have the ability to protect bearing surfaces against corrosion, even when the grease is contaminated with water.

### Specifications and Approvals

Shell Gadus S2 V220 meets the requirements of a wide range of industry bodies and equipment manufactures. It is available in NLGI grades 00,0,1,2 and 3. Grades 00,0 and 1 are suitable for suitable for centralised dispensing systems and gearboxes.

Shell

# GADUS

## S2 V220 AC 2




Shell Lubricants

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## SHELL GADUS S2 V220 AC 2

(High Performance Multipurpose Extreme Pressure Grease)

### Product Description

Shell Gadus S2 V220AC is a full EP, red multipurpose grease for wet environments. It is grease that you can rely on to provide good wear protection and bearing life for your moderate-to high-speed bearings operating at moderate temperatures. It is widely recognised and listed by leading equipment manufactures.

### Applications

Heavy –duty plain and rolling element bearings operating in the following environments:

- Vibrating conditions
- Heavy load
- High temperature
- Shock load
- Presence of water

Multipurpose convenience, especially in the transport sector where product can be used for both wheel bearings and chassis lubrication of passenger car, light trucks and heavy duty trucks. These greases are also suitable for construction equipment exposed to intense water washout.

### Operating Temperature Range

Shell Gadus S2 V220AC greases are recommended for the grease lubricant of heavy duty bearings operating up to their maximum rated speed over the temperature range -20°C to 130°C (140°C peak).

### Specifications

- Meets ASTM D4950-08 LB

### Typical Physical Characteristics

| NLGI Consistency | | | | | |
|---|---|---|---|---|---|
| Shell Gadus V220AC | 0 | 1 | 1.5 | 2 | 3 |
| Colour | Red | Red | Red | Red | Red |
| Soap Type | Lithium/Calcium | Lithium/Calcium | Lithium/Calcium | Lithium/Calcium | Lithium/Calciu |
| Base Oil (type) | Mineral | Mineral | Mineral | Mineral | Mineral |
| Kinetic Viscosity @ 40°C cSt | 220 | 220 | 220 | 220 | 220 |
| 100°C cSt (IP 71/ASTM-D445) | 18 | 18 | 18 | 18 | 18 |
| Dropping Point °C (IP 322/ASTM-D566-76) | 170 | 170 | 170 | 170 | 170 |
| Cone Penetration Unworked @ 25°C 0.1mm (IP 50/ASTM-D217) | 355-385 | 310-340 | 300 | 265-295 | 220-250 |



Shell Lubricants

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# GADUS

## S3 V220C 2




Shell Lubricants

PACIFIC ENERGY

## SHELL GADUS S3 V220C 2

Premium multipurpose extreme-pressure grease

### Product Description

Shell Gadus S3 V220C grease are premium multi-purpose grease based on high viscosity index mineral oil and a lithium complex soap thickener. They contain the latest additives to other excellent high temperature oxidation performance and other additives to enhance its anti-oxidation, anti-wear and anti-corrosion properties. Shell Gadus S3 V220C grease are especially suitable for bearings operating at high temperature and under load.

### Performance, Features & Benefits

- Excellent mechanical stability even under vibrating conditions
- Enhanced extreme-pressure properties
- Good water resistance
- High dropping point
- Long operation life at high temperatures
- Effective corrosion protection

### Main Applications

- Shell Gadus S3 V220C grease are used for the grease lubricant of heavy-bearings used in machinery found in the following applications
- Continuous casting
- Vibrating sieves
- Quarries
- Breakers
- Roller conveyors
- Automotive Wheelbearings

### Specifications, Approvals & Recommendations

- ASTM D 4950-07GC-LB
- SEB 18 12 53

### Typical Physical Characteristics

| Properties | | | Method | Shell Gadus S3 V220C 2 |
|---|---|---|---|---|
| NLGI Consistency | | | | 2 |
| Colour | | | | Red |
| Soap Type | | | | Lithium complex |
| Base Oil Type | | | | Mineral |
| Base Oil Viscosity | @40˚C | cSt | IP 71 / ASTM D 445 | 220 |
| Base Oil Viscosity | @100˚C | cSt | IP 71 / ASTM D 445 | 19 |
| Cone Penetration, Worked | @25˚C | 0.1m | IP 50 / ASTM D 217 | 265-295 |
| Dropping Point | | ˚C | IP 396 | 240 |
| Pumpability Long Distance | | | | fair |

These characteristics are typical of current production. Whilst future production will conform to Shells specification, variations in these characteristics may occur.



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# 2 STROKE ENGINE OIL



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# NAUTILUS

## PREMIUM




Shell Lubricants

PACIFIC ENERGY

## NAUTILUS PREMIUM OBM

(Premium, high performance, ashless lubricant) products.

### Description

NAUTILUS® 2-CYCLE ENGINE OIL is a premium quality, high performance, ashless, two-cycle motor oil for water-cooled and air-cooled engines. NAUTILUS® 2-CYCEL ENGINE OIL is formulated for use in both premix and oil injected systems (see table below). It is dyed blue for each identification.

### APPLICATION

- Meet the warranty requirements for water-cooled two-cycle engines manufactured by Chrysler, Evinrude, Force, Johnson, Mariner, Mercury, OMC, Suzuki and Yamaha.
- Recommended for motorcycles, lawn mowers, snow blowers, chain saws, and other air-cooled two-cycle engines calling for JASO FB or API Service Category TC quality.

### APPROVALS AND RECOMMENDATIONS/BENEFITS

- NMMA TC-W3®
- TC-WII®, TC-W (obsolete)
- API TC
- JASO FB

| Gallons Of Gasoline | Gasoline to Oil Ratio | | | | | | |
|---|---|---|---|---|---|---|---|
| | 16.1 | 20.1 | 24.1 | 32.1 | 40.1 | 50.1 | 100.1 |
| | Ounces of Oil to be Added | | | | | | |
| 1 | 8 | 6 | 5 | 4 | 3 | 3 | 1.5 |
| 3 | 24 | 19 | 16 | 12 | 10 | 8 | 4 |
| 6 | 48 | 38 | 32 | 24 | 19 | 16 | 8 |

NAUTILUS® 2-CYCLE ENGINE OIL should be used at the engine manufacturers recommended fuel/oil ratio.

### TYPICAL PHYSICAL AND CHEMICAL PROPERTIES NMMA CERTIFIED FOR SERVICE TC-W3®

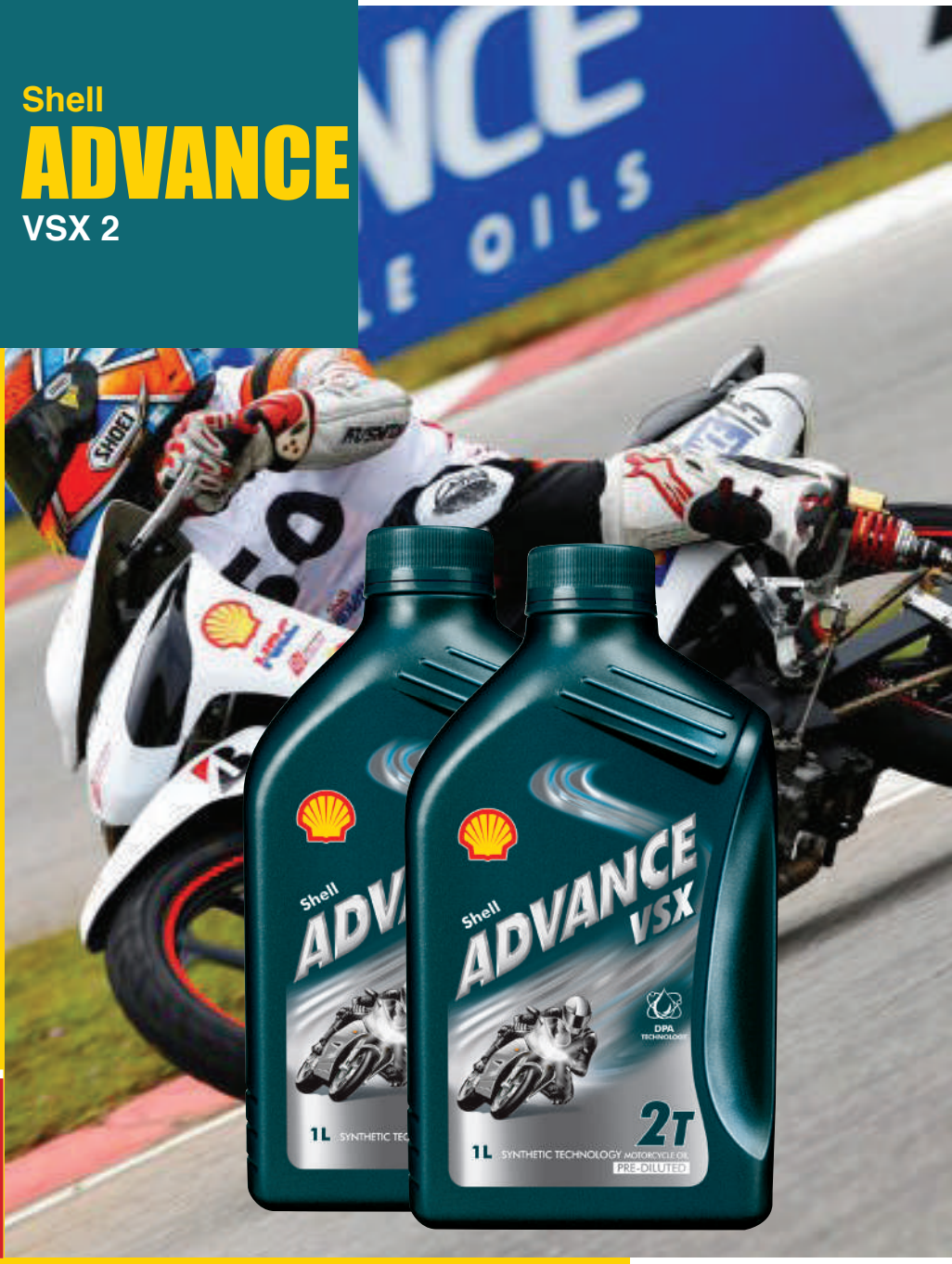
| TEST | TYPICAL RESULTS |
|---|---|
| Viscosity, @ 40°C cSt | 49.6 |
| Viscosity, @ 100°C cSt | 8.3 |
| Flash Point, PMCC °F | 203 |
| Sulfated Ash, w% | Nil |
| Color | Blue |
| Material Number | |
| 24/1 pint | 5548524116 |
| 12/1 quart | 5548512031 |
| 6/1 gallon | 5548506021 |

NAU-TCW3 7/01/03

Shell

# ADVANCE

## VSX 2

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PACIFIC ENERGY

## SHELL ADVANCE VSX 2

Synthetic Based Motorcycle 2 Stroke Engine Oil

### Product Description

Advance VSX 2 is a synthetic based lubricant specifically designed for designed for excellent engine protection and performance in 2-stroke motorcycle engines. It guarantees superior control against exhaust system blocking and minimises exhaust smoke. Advance VSX 2 is suitable both for all oil-injection and premix systems and exceeds the requirements of leading manufacturers.

### Performance, Features & Benefit.

- Excellent engine protection and cleanliness
- Superior control against exhaust system blocking
- Minimised exhaust smoke
- Superior engine efficiency and power
- Very good self-mixing properties

### Main Applications

- All 2-stroke motorcycle engines with oil injection or premix system.
- Recommended for high-performance air and water cooled 2-stroke engine
- Shell Advance VSX 2 should not be used in outboard engines. The appropriate Shell Nautilus Oil is recommended for this application.

### Specifications, Approvals & Recommendations

- API: TC
- JASO: FC
- ISO-L-EGD
- Shell Advance VSX 2 meets the requirements of all leading motorcycle manufactures.

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

| Properties | | | Method | Shell Advance VSX 2 |
|---|---|---|---|---|
| Kinematic Viscosity | @40°C | $mm^2/s$ | ASTM D445 | 67 |
| Kinematic Viscosity | @100°C | $mm^2/s$ | ASTM D445 | 9.14 |
| Viscosity Index | | | ISO 2909 | 130 |
| Density | @15°C | $kg/m^3$ | ASTM D 4052 | 863 |
| Flash Point COC | | °C | ISO 2592 | 132 |
| Pour Point | | °C | ISO 3016 | -20 |

# PACIFIC ENERGY



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# MARINE ENGINE OIL



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# ARGINA

## X40




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## SHELL ARGINA X 40

(Medium-speed trunk-piston diesel engine oil)

### Product

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

### Applications

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

- In newer engine designs, less than 10 years old and/ or fitted flame rings.
- where oil consumption is 0.5-1 g/kWh
- where load factors are >85%
- where fuels with sulphur >3% are in use

Marine engine reduction gears (SAE 40 only) and certain other ship- board applications, where specialist lubricant are not required.

Medium-speed engines burning residual fuel need much specialised lubricants. Heavy fuels contaminate the oil with asphaltenses, requiring special types of detergency to avoid sludges. The combustion of high sulphur fuels produces sulphuric 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 theses contaminants in the separator.

### Health & Safety

Argina X oils are unlikely to present any significant health or safety hazard when properly used in the recommended application, and good standards of industrial and personal hygiene are maintained.
Avoid contact with skin. Use impervious gloves with used oil. After skin contact, wash immediately with soap and water.
For further guidance on Product Health & Safety refer to the appropriate Shell Product Safety Data Sheet.

### Performance Features

- **Engine cleanliness**
  Has built a reputation over many years for very good engine cleanliness. The formulation has been further optimised to reduce deposits in critical area, e.g. piston under crown
- **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.

## Typical Physical Characteristics

| Shell Argina X | 30+ | 40 |
|---|---|---|
| **Kinematic Viscosity** | | |
| @ 40°C cSt | 110 | 135 |
| 100°C cSt | 12 | 14 |
| (ASTM D 445, IP 71) | | |
| **Viscosity index** | | |
| (ASTM D 2270, IP 226) | 100 | 100 |
| **Density** | | |
| @15°C kg/l | | |
| (ASTM D 4052, IP 365) | 0.913 | 0.916 |
| **Flash Point°C** | | |
| (Pensky-Martens Closed cup) | 212 | 205 |
| (ASTM D 93,IP 34) | | |
| **Pour Point °C** | | |
| (ASTM D 97, IP 15) | -18 | -18 |
| **Base Number** | | |
| Mg KOH/g | | |
| (ASTM D 2896, IP 276) | 40 | 40 |
| **Sulphated Ash** % wt | | |
| (ASTM D 874,IP 163) | 4.9 | 4.9 |
| **Load Carrying Capacity** | | |
| (FZG Gear Machine) | | |
| Failure load Stage (IP 334 A/8.3/90 ) | Not quoted | 10 |

**SAE 30 available only for use in power plant engines.**

Specifications and Approvals

Argina X enjoys a comprehensive range of Original Equipment Manufacturer's approvals through field experience over many years and meets the engine test criteria for API CF

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# Shell ARGINA T 40




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## Product Description
Lubricant for high rated, medium-speed diesel engines operating on residue fuel under moderate oil stress condition.

## Application
Shell Argina T40 oil is premium quality oil specifically developed to lubricate these engines and is suitable for use with fuel with a sulphur content of 1.5 to 3.5% wt.

## Delivering Reliability
Shell Argina oils are designed to manage differing effects of oil stress to reduce downtime, keep your engine cleaner and give longer oil and component life, thereby improving engine reliability. This delivers greater vessel reliability and helps to maximise commercial performance.

- **Greater power to clean and protect**. Clean engines are efficient engines. With their increased resistance to fuel oil contamination and physical thickening, Shell Argina oils form fewer depos its as a result of the thermal and asphaltene stresses in heavy-fuel engines.
- **Better general engine cleanliness.** Fewer crankcase and valve-deck deposits help to prolong filter life and reduce cleaning maintenance. A clean crankcase also indicates that the less visible engine parts are in good condition. Field trials have demonstrated the improved general engine cleanliness with Shell Argina oils, thanks to its increased resistance to oil stress, which results in fewer deposits.
- **Improved piston cleanliness**. In field trials, Shell Argina oils demonstrated visible improvements in ring belt cleanliness, which can help to prevent ring sticking, blow-by and liner damage.

## Summary of Benefits
- Improved standards of engine cleanliness
- Maximum intervals between oil change
- High equilibrium Total Base Number
- Superior protection against the effects of acidic combustion products.

## Performance Levels
- Shell Argina T Oil exceeds the diesel engine requirements of the API CD Classification.
- It exceeds the 11th stage pass in the FZG gear test rig for the SAE 40 grade and the 10th stage pass for the SAE 30 grade.

## Approvals
Shell Argina T Oil is approved by all leading manufactures of medium speed diesel engines.

## Specifications
Medium Speed Piston Diesel Engines Oils.

# Shell GADINIA

## 30 & 40




Shell Lubricants

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(Lubricants for medium-speed marine diesel engines running on distillate fuels)

## Product Description

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

## Main Applications

- Highly rated, medium speed, main propulsion & auxiliary truck-piston marine diesel engines
- Turbochargers, oil filled sterm tubes and variable pitch propellers.
- Deck machinery & other marine applications requiring SAE30 or 40 viscosity oils.

## Benefits of using Shell Gadinia

**Improve engine reliability:**

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

## Low maintenance costs:

- Extended diesel engines life through reduced risk of ring sticking and breakage.
- Longer oil life, especially in high stressed engines, because of 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.
- Improved control of liner lacquer leads to better control of oil consumption and contributes to lower cost of operation.

## Performance Specifications

- APICF

Shell Gadinia is approved by leading trunk piston engine manufacturers.

## Typical Physical Characteristics

| Shell Gadinia | | Test | 30 | 40 | Units |
|---|---|---|---|---|---|
| Kinematic Viscosity | 40C | ASTM D445/ IP 71 | 104 | 139 | mm2/s |
| Kinematic Viscosity | 100C | ASTM D445/ IP 71 | 11.8 | 14.4 | mm2/s |
| Density | 15C | ASTM D4052/ IP 365 | 0.897 | 0.900 | kg/l |
| Flash Point (Closed) | Pensky Martens | ASTM D93/ IP 34 | 200+ | 225+ | C |
| Pour Point | | ASTM D97/ IP 15 | -18 | -18 | C |
| BN | | ASTM D2896/ IP 276 | 12 | 12 | mg/KOH/g |
| Sulphated Ash | | ASTM D874/ IP 163 | 1.35 | 1.35 | %wt |

These characteristics are typical of current production. Whilst future production will confirm to Shell's specification, variations in these characteristics may occur.

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# POWER ELECTRICAL OIL



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# Shell DIALA S2 ZU-I




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## SHELL DIALA S2 ZU-I

(uninhibited electrical insulating oil)

### Product Description

Shell Diala S2 ZU-I gasoil tariff is an uninhibited electrical insulating oil manufactured from highly refined mineral oils. It offers good dielectric properties, good oxidation stability and provides efficient heat transfer even at low temperatures.

Shell Diala S2 Zu-I gasoil tariff meets both the established and the new industry copper corrosion tests.

### DESIGNED TO MEET CHALLENGES

Performance, Features and Benefits

**Extended oil life**

Shell Diala S2 ZU-I gasoil tariff offers inherent natural resistance to oil degradation through oxidation.

**System efficiency**

The good low temperature properties of the oil ensure proper heat transfer inside the transformer, even from low starting temperatures.

**Transformer protection**

Shell Diala S2 ZU-I gasoil tariff is non-corrosive towards copper, with no need for passivation. Shell Diala S2 ZU-1 gasoil tariff meets all relevant tests on copper corrosion, namely the established DIN 51353 (Silver Strip Test) and ASTM D1275, and also the latest more severe tests: IEC 62535 and ASTM D1275B.

### Typical Physical Characteristics

| Properties | Method | IEC 60296 Shell Requirement | Diala S2 ZU-I Gasoil |
|---|---|---|---|
| Appearance | IEC 60296 | Clear, free from sediment and suspended matters | Complies |
| Density @15°C kg/m3 | ISO 3675 - | | 878 |
| Density @20°C kg/m3 | ISO 3675 | Max 895 | 875 |
| Kinematic Viscosity @40°C mm2/s | ISO 3104 | Max 12 | 9.4 |
| Kinematic Viscosity @-30°C mm2/s | ISO 3104 | Max 1.800 | 940 |
| Flash Point (PM) °C | ISO 2719 / ASTM D93 | Min 135 | 144 |
| Pour Point °C | ISO 3016 | Max -40 | -57 |
| Neutralisation Value mgKOH/g | IEC 62021-1 | Max 0.01 | <0.01 |
| Corrosive Sulphur DIN 51353 | | Not corrosive | Not corrosive |
| Corrosive Sulphur | IEC 62535 | Not corrosive | Not corrosive |
| Corrosive Sulphur | ASTM D1275B | - | Not corrosive |

| | | | |
|---|---|---|---|
| Corrosive Sulphur | ASTM D1275B | - | Not corrosive |
| Breakdown Voltage As Delivered kV | IEC 60156 | Min 30 | >30 |
| Breakdown Voltage After Treatment kV | IEC 60156 | Min 70 | >70 |
| Dielectric dissipation factor (DDF)@90°C | IEC 60247 | Max 0.005 | 0.002 |
| Oxidation Stability (164 hrs) – Total Acidity@120°C mg KOH/g | IEC 61125 C | Max 1.2 | 0.9 |
| Oxidation Stability (164 hrs) – Sludge @120°C %m | IEC 61125 C | Max 0.8 | 0.3 |
| Oxidation Stability (164 hrs)-DDF at 90°C | IEC 60247 | Max 0.5 | 0.1 |

## Main Applications

- Transformers – electrical insulating oil for grid and industrial transformers.
- Electrical equipment – components such as rectifiers, circuit breakers and switchgears.

## Specifications, Approvals and Recommendations

- IEC 60296 (Edition 4.0 2012-02), Table 2 Transformer Oil (U) (uninhibited oil)
- IEC 62535
- ASTM D1275B

# 10 YEARS No.1

## GLOBAL LUBRICANTS SUPPLIER



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