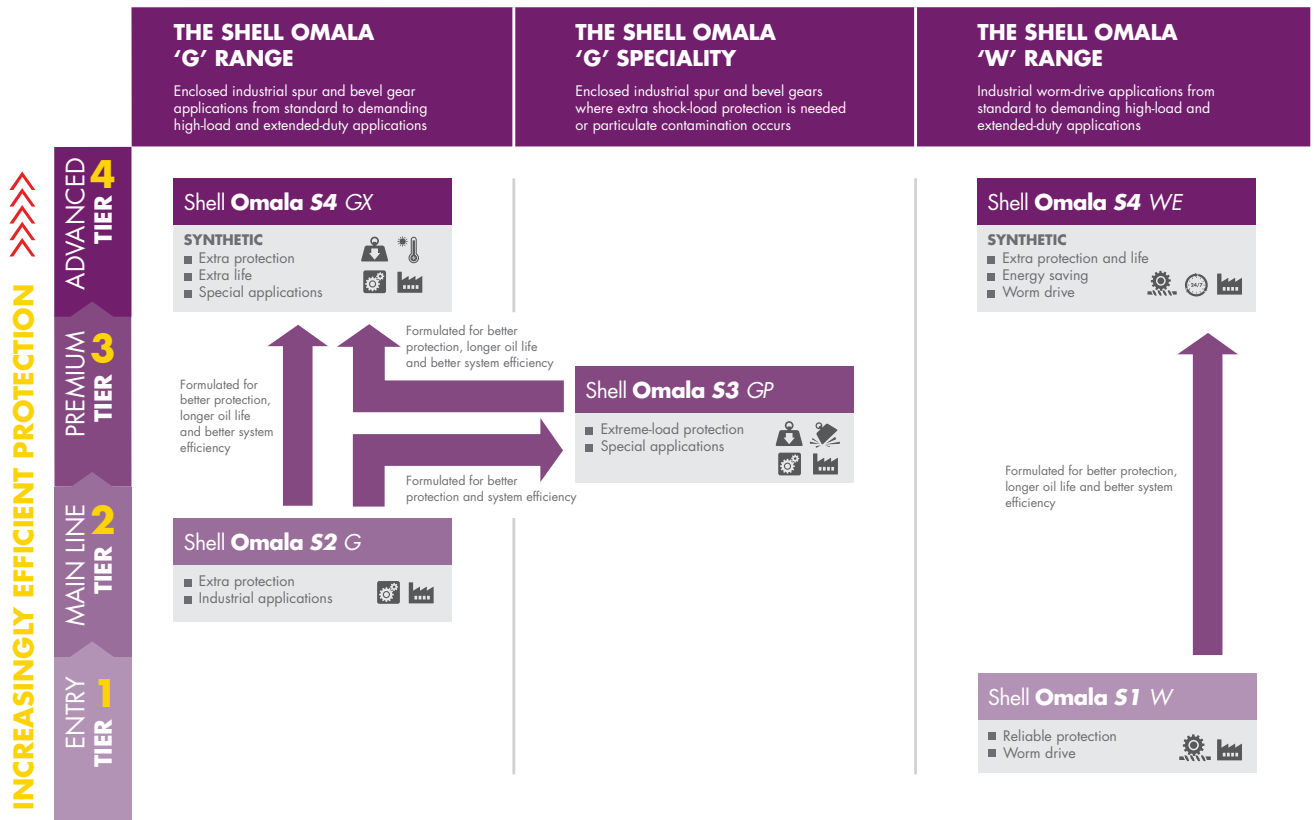


# SHELL OMALA

## INDUSTRIAL GEAR OILS

The Shell Omala range of industrial gear oils is designed to help make it easy for equipment operators to select the Shell oil that will best deliver value to their operations through enhanced wear protection, long oil life and high system efficiency.



### PRODUCT-NAME SUFFIX KEY

- E** = Energy saving, high efficiency
- G** = Gears – spur and helical
- P** = Extreme/high pressure
- W** = Worm drive
- X** = Extra/extreme performance

### APPLICATION ICON KEY

- Extreme load
- High temperature
- Enclosed gear
- Factory/machine application
- Worm drive
- Long life
- Shock load

# SHELL OMALA F

PREMIUM QUALITY INDUSTRIAL GEAR OIL

## DESIGNED TO MEET CHALLENGES

Shell Omala F are premium 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 and other industrial applications. They are formulated using high viscosity index, solvent refined, bases 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 are formally approved by Flender AG.

## PERFORMANCE FEATURES

### EXCELLENT LOAD CARRYING AND ANTI-FRICTION CHARACTERISTICS

- Helps to reduce gear tooth and bearing wear on both steel and bronze components.

### OUTSTANDING OXIDATION AND THERMAL STABILITY

- Withstands high thermal loading and helps resist the formation of sludge and other harmful products of oxidation. Extended life, even with bulk 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.

### WIDE RANGE OF VISCOSITIES

- Caters for the most varied and arduous industrial applications.

### RESISTANT TO MICRO-PITTING

- Standard setting anti micro-pitting performance to reduce the risk of premature failure through surface distress.

### WATER SHEDDING PROPERTIES

- Shell Omala F has excellent water separation properties. Excess water can be drained easily from lubrication systems. (Water can greatly accelerate surface fatigue on gears and bearings as well as promoting ferrous corrosion on internal surfaces. Water contamination should be avoided or removed as quickly as possible after the occurrence).

## APPLICATIONS

- Steel gear transmissions
- Industrial gear drives where a full EP performance is required
- Bearings.

### CIRCULATING AND SPLASH LUBRICATED SYSTEMS

- Shell Omala F should not be used for automotive hypoid gears. The appropriate Shell Spirax should be used for this purpose.

## SPECIFICATIONS, APPROVALS AND RECOMMENDATIONS

### APPROVED AGAINST FLENDER AG'S REQUIREMENTS OF 22/1/96 WHICH INCLUDE:

- Sufficient oxidation stability for a lifetime of 10,000 hours or two years at 80°C.
- A load stage 12 pass in the FZG double speed test (DIN 51354 Part 2).
- A pass in the FVA-54/II micro pitting (grey staining) test at load stage 10 at 90°C plus.
- Flender Foam Test.

### COMPATIBILITY WITH:

- Internal gearbox paints, solid seals, compatibility with liquid seals.

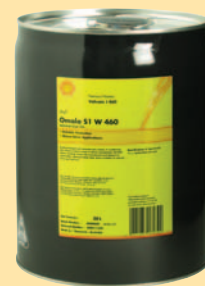
## TYPICAL PHYSICAL CHARACTERISTICS

CHARACTERISTICS	320	460
Kinematic Viscosity (IP 71)		
@ 40°C mm <sup>2</sup> /s	320	460
@ 100°C mm <sup>2</sup> /s	25.0	30.8
Viscosity Index (IP 226)	100	97
Density @ 15°C kg/m <sup>3</sup> (IP 365)	903	904
Flash Point °C (PMCC) (IP 34)	202	204
Pour Point °C (IP 15)	-18	-9

# SHELL OMALA S1 W

INDUSTRIAL GEAR OILS

PREVIOUSLY SHELL VALVATA J

**DESIGNED TO MEET CHALLENGES**

Shell Omala S1 W oils are quality refined, high viscosity mineral oils compounded with a small percentage of fatty oils. They are particularly suitable for the lubrication of low speed enclosed gears and worm drive application. They are also suitable for the lubrication of high temperature, high pressure steam cylinders.

**PERFORMANCE FEATURES****CONSISTENT PERFORMANCE**

- Shell Omala S1 W possesses low volatility and a natural resistance to the formation of gummy or carbonaceous deposits in high temperature conditions to give consistent performance through the lubrication maintenance intervals.

**WEAR PROTECTION**

- Provides a reliable oil film under low speed operation such as worm gear drives.

**APPLICATIONS****ENCLOSED INDUSTRIAL WORM GEAR SYSTEMS**

- Shell Omala S1 W may be used to advantage in worm gears prone to suffer extensive wear and to reduce the bulk oil temperature. Typical examples are gears running at low speed under stop-start conditions.

**STEAM CYLINDER LUBRICATION**

- Suitable for steam cylinder applications working under high temperature and high pressure conditions.
- For highly-loaded worm drives Shell Omala S4 WE is recommended.
- For industrial enclosed spur and helical gear systems the Shell Omala 'G' series is recommended.
- For automotive hypoid gears, the appropriate Shell Spirax Oil should be used.

**SPECIFICATIONS, APPROVALS AND RECOMMENDATIONS****MEETS THE SPECIFICATIONS OF:**

- AGMA 9005-EO2 (CP).

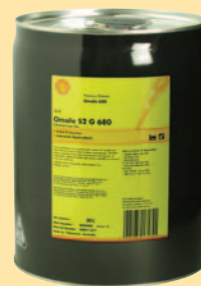
**TYPICAL PHYSICAL CHARACTERISTICS**

CHARACTERISTICS	460
Kinematic Viscosity (ISO 3104) @ 40°C mm <sup>2</sup> /s	460
@ 100°C mm <sup>2</sup> /s	31.5
Viscosity Index (ISO 2909)	98
Density @ 15°C kg/m <sup>3</sup> (ISO 12185)	887
Flash Point °C (PMCC) (ISO 2592)	318
Pour Point °C (ISO 3016)	-6

# SHELL OMALA S2 G

INDUSTRIAL GEAR OILS

PREVIOUSLY SHELL OMALA



## DESIGNED TO MEET CHALLENGES

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.

## PERFORMANCE FEATURES

### 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 help resist the formation of sludge to provide extended oil life capability, even with bulk oil temperatures of up to 100°C in certain applications.

### EXCELLENT WEAR AND CORROSION PROTECTION

- Excellent load carrying capacity, helps to reduce gear tooth and bearing wear on both steel and bronze components.
- Shell Omala S2 G has excellent corrosion protection, protecting both steel and bronze components, even in the presence of contamination by water and solids.

### MAINTAINING SYSTEM EFFICIENCY

- Shell Omala S2 G oils have excellent water separation properties, such that excess water can be drained easily from lubrication systems to help extend the life of the gears and ensure efficient lubrication of the contact areas.
- Water can greatly accelerate surface fatigue with 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.

## 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 enclosed industrial gearboxes using steel spur and helical gears.

### HIGHLY LOADED GEARS

- Shell Omala S2 G oils have an effective full extreme pressure (EP) additive system allowing them to be used in highly-loaded gear 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 drives the Shell Omala S4 WE series oils are recommended. For automotive hypoid gears, the appropriate Shell Spirax Oil should be used.

## SPECIFICATIONS, APPROVALS AND RECOMMENDATIONS

### MEETS THE REQUIREMENTS OF:

- ISO: 12925-1 Type CKD
- DIN: 51517- Part 3 (CLP)
- AGMA: 9005- EO2 (EP)
- US Steel 224
- David Brown: S1.53.101,102,103,104
- Cincinatti Machine: P34,35,59,63, 74, 76-78.

## TYPICAL PHYSICAL CHARACTERISTICS

CHARACTERISTICS	68	100	150	220	320	460	680	1000
Kinematic Viscosity (ISO 3104)								
@ 40°C mm <sup>2</sup> /s	68	100	150	220	320	460	680	1000
@ 100°C mm <sup>2</sup> /s	8.7	11.4	15.0	19.4	25.0	30.8	38.0	45.4
Viscosity Index (ISO 2909)	99	100	100	100	100	97	92	85
Density @ 15°C kg/m <sup>3</sup> (ISO 12185)	887	891	897	899	903	904	912	931
Flash Point °C (PMCC) (ISO 2592)	236	240	240	240	255	260	272	290
Pour Point °C (ISO 3016)	-24	-24	-24	-18	-15	-12	-9	-6

# SHELL OMALA S3 GP

SPECIAL APPLICATION INDUSTRIAL GEAR OIL

RECOMMENDED REPLACEMENT FOR SHELL MINE GEAR 1500

## DESIGNED TO MEET CHALLENGES



Shell Omala S3 GP oil is a specialist 'problem solving' lubricant developed to lubricate industrial gearboxes subject to extremely high and heavily shock loaded operations such as those found in steel, cement, mining and quarrying industries. They are formulated for use where ultra-high levels of extreme-pressure performance are required.

## PERFORMANCE BENEFITS

### LONG OIL LIFE

- Shell Omala S3 GP oil is formulated to resist thermal and chemical breakdown throughout the maintenance interval. They help resist the formation of sludge to provide good oil life capability even at temperatures up to 100°C.

### EXCELLENT WEAR AND CORROSION PROTECTION

- Shell Omala S3 GP oil is formulated with high levels of extreme pressure and anti-wear additives properties to help ensure optimal gear and bearing protection even under the severest operating conditions.
- Shell Omala S3 GP has excellent corrosion protection, protecting steel components, even in the presence of contamination by water and solids.

### MAINTAINING SYSTEM EFFICIENCY

- Shell Omala S3 GP oil has excellent water separation properties, such that excess water can be drained easily from lubrication systems to help maintain the integrity of critical oil films and extend the life of the gears.

## APPLICATIONS

- Highly loaded gears.
- Shell Omala S3 GP oil is designed for use in enclosed industrial gear systems subject to severe operating conditions including high shock loading applications.

### WORN OR DAMAGED GEARS

- The oil can be used in older gear systems that may be damaged or misaligned. The extreme pressure performance provides additional protection in such applications.

### OTHER APPLICATIONS

- Shell Omala S3 GP oil is suitable for lubrication of bearings and other components in circulating and splash-lubricated systems.
- For normal load applications the other Shell Omala 'G' series oils are recommended.
- For automotive hypoid gears, the appropriate Shell Spirax Oil should be used.

## SPECIFICATIONS, APPROVALS AND RECOMMENDATIONS

### MEETS:

- ISO 12925-1 Type CKD, except ISO 680 and 1500
- ANSI/AGMA 9005-E02 (EP)
- US Steel 224
- DIN 51517-3 (CLP), except ISO 680 and 1500
- David Brown S1.53.101E, except ISO 680 and 1500
- Arcelor Mittal FT163.

## TYPICAL PHYSICAL CHARACTERISTICS

CHARACTERISTICS	1500
Viscosity (ISO 3104) @ 40°C mm <sup>2</sup> /s	1500
@ 100°C mm <sup>2</sup> /s	82.6
Viscosity Index (ISO 2909)	124
Flash Point °C (COC) (ISO 2592)	224
Pour Point °C (ISO 3016)	-21
Density @ 15°C kg/m <sup>3</sup> (ISO 12185)	902
FZG-Test Failure Load Stage ZG (A/16.6/90)	>12
Four Ball Weld Load kg	500

# SHELL OMALA S4 WE

ADVANCED SYNTHETIC INDUSTRIAL GEAR OIL

PREVIOUSLY SHELL TIVELA S

## DESIGNED TO MEET CHALLENGES

Shell Omala S4 WE is an advanced synthetic heavy-duty industrial worm drive gear oil formulated using specially selected polyalkylene glycol base fluids and additives. It offers outstanding lubrication performance under severe operating conditions, including improved energy efficiency, long service life and high resistance to micro-pitting.

## PERFORMANCE FEATURES

### LONG OIL LIFE – MAINTENANCE SAVING

- Shell Omala S4 WE is formulated to provide excellent oxidation and thermal stability, extending lubricant life and resisting the formation of harmful oxidation products at high operating temperatures. This helps maintain system cleanliness over extended maintenance intervals.
- This performance is recognised by Flender AG where a formal approval for 20,000 hours (four years) at 80°C (bulk oil temperature) usage has been granted.
- Shell Omala S4 WE offers the potential to extend service intervals significantly compared to conventional industrial gear oils.

### EXCELLENT WEAR PROTECTION

- Shell Omala S4 WE is formulated to have excellent load carrying capacity providing long component life even under shock loading conditions. It also has a high resistance to micro-pitting. These features provide benefits over mineral oil-based products in terms of gear and bearing component life.

### MAINTAINING SYSTEM EFFICIENCY

- Shell Omala S4 WE offers improved energy efficiency and lower operating temperatures in worm gear applications. Rig testing has shown efficiency improvements of up to 15% in comparison with mineral oil-based products and 11% over other synthetic hydrocarbon-based lubricants. These results have been confirmed by OEM testing and field experience.

## APPLICATIONS

### ENCLOSED INDUSTRIAL WORM GEAR SYSTEMS

- Recommended for industrial worm gear reduction systems operating under severe operating conditions, such as high load, very low or elevated temperatures and wide temperature variations.

### EXTENDED LIFE SYSTEMS

- Shell Omala S4 WE is particularly recommended for certain systems where maintenance is infrequent or systems are inaccessible (e.g. yaw gears in wind turbine installations).

### OTHER APPLICATIONS

- Shell Omala S4 WE oils are suitable for lubrication of bearings and other components in circulating and splash-lubricated systems.
- Shell Omala S4 WE is not recommended for the lubrication of components manufactured from aluminium or aluminium alloys.
- For highly-loaded spur and helical gears the Shell Omala 'G' series oils are recommended.

- For automotive hypoid gears, the appropriate Shell Spirax Oil should be used.

## SEAL AND PAINT COMPATIBILITY

High quality epoxy paints are recommended, as polyalkylene glycols will tend to attack certain conventional paints. Shell Omala S4 WE has been found to be satisfactory with nitrile and Viton seal materials, although Viton seals are preferred.

## CHANGE-OVER PROCEDURE

Shell Omala S4 WE contains polyalkylene glycols and is not compatible with mineral oils or most other synthetic lubricant types. Care should be taken when changing from such products to Shell Omala S4 WE. The system should be flushed with the minimum quantity of Shell Omala S4 WE, operating under no load and draining while warm. Ideally, seals exposed to mineral oils should also be replaced. Inspect the lubricant after a few days use. Ensure that oil systems are clean and free from contamination.

Shell Omala S4 WE is also not miscible with some other polyalkylene glycols, so caution is needed when topping-up. Generally the preference is to avoid mixtures by draining and refilling.

## SPECIFICATIONS, APPROVALS AND RECOMMENDATIONS

### MEETS:

- David Brown: S1.53.105 G
- ISO: 12925-1 Type CKE
- ANSI/AGMA: 9005-E02 (EP).

### FULLY APPROVED BY:

- Flender: AG
- Bonfiglioli.

## TYPICAL PHYSICAL CHARACTERISTICS

CHARACTERISTICS	150	220	320
Kinematic Viscosity (ISO 3104) @ 40°C mm <sup>2</sup> /s	136	222	321
@ 100°C mm <sup>2</sup> /s	22.5	34.4	52.7
Viscosity Index (ISO 2909)	188	203	230
Density @ 15°C kg/m <sup>3</sup> (ISO 12185)	1076	1074	1069
Flash Point °C (PMCC) (ISO 2592)	268	278	270
Pour Point °C (ISO 3016)	-42	-39	-39
FZG Load Carrying Test (DIN 51354-2 A/8.3/90) – Failure load stage	>12	>12	>12

# SHELL OMALA S4 GX

ADVANCED SYNTHETIC INDUSTRIAL GEAR OIL

PREVIOUSLY SHELL OMALA HD

## DESIGNED TO MEET CHALLENGES



Shell Omala S4 GX is an advanced 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 optimal gear protection.

## PERFORMANCE FEATURES

### LONG OIL LIFE – MAINTENANCE SAVING

- Shell Omala S4 GX is formulated using an advanced additive system in combination with specially selected synthetic base fluids to provide outstanding resistance to breakdown over long duration and/or high temperature operation.
- This performance is recognised by Flender AG where a formal approval for 20,000 hours (four years) at 80°C usage has been granted.
- Shell Omala S4 GX can operate successfully at bulk temperatures up to 120°C.
- Shell Omala S4 GX offers the potential to significantly extend service intervals compared to conventional industrial gear oils.

### EXCELLENT WEAR AND CORROSION PROTECTION

- Shell Omala S4 GX is formulated to have excellent load carrying capacity and micro-pitting performance providing long component life even under shock loading conditions. These features provide benefits over mineral oil-based products in terms of gear and bearing component life.
- Shell Omala S4 GX also has excellent corrosion protection, even in the presence of contamination by water and solids.

### MAINTAINING SYSTEM EFFICIENCY

- Shell Omala S4 GX can help maintain or enhance the efficiency of industrial gear systems through improved low temperature performance and lower friction in comparison to mineral oil-based products. This provides better lubrication at low start-up temperatures.
- Shell Omala S4 GX oils have excellent water separation properties, such that excess water can be drained easily from lubrication systems to help extend the life of the gears and ensure efficient lubrication of the contact areas.

## APPLICATIONS

### WIND TURBINES AND OTHER INACCESSIBLE INSTALLATIONS

- Shell Omala S4 GX is particularly recommended for certain systems where extra long life is required, maintenance is infrequent or systems are inaccessible.

### ENCLOSED INDUSTRIAL GEAR SYSTEMS

- Recommended for industrial reduction gear systems operating under severe operating conditions, such as high load, very low or elevated temperatures and wide temperature variations.

## OTHER APPLICATIONS

- Shell Omala S4 GX oils are suitable for lubrication of bearings and other components in circulating and splash-lubricated systems.
- For highly loaded worm drives the Shell Omala S4 WE series oils are recommended.
- For automotive hypoid gears, the appropriate Shell Spirax Oil should be used.

## COMPATIBILITY AND MISCIBILITY

- Shell Omala S4 GX is compatible with all seal materials and paints normally specified for use with mineral oils.

## SPECIFICATIONS, APPROVALS AND RECOMMENDATIONS

### MEETS THE REQUIREMENTS OF:

- ISO 12925-1 Type CKD (except ISO 1000)
- ANSI/AGMA 9005-E02 (EP) (except ISO 1000)
- US Steel 224 (except ISO 1000)
- David Brown S1.53.106 (except ISO 1000)
- DIN 51517-3 (CLP) (except ISO 1000).

### APPROVED BY:

- Flender AG.

### APPROVED FOR WIND TURBINE GEARBOXES BY:

- Gamesa
- Dongfang Wind Turbines
- Dalian Heavy Industries
- Sinovel.

## TYPICAL PHYSICAL CHARACTERISTICS

CHARACTERISTICS	220	320	460	680
Kinematic Viscosity (ISO 3104)				
@ 40°C mm <sup>2</sup> /s	230	335	462.6	670.4
@ 100°C mm <sup>2</sup> /s	30.0	40.0	50.0	64.9
Viscosity Index (ISO 2909)	160	159	170	169
Density @ 15°C kg/m <sup>3</sup> (ISO 12185)	881	883	879	881
Flash Point °C (COC) (ISO 2592)	250	252	264	256
Pour Point °C (ISO 3016)	-45	-42	-36	-33
FZG Load Carrying Test (DIN 51354-2 A/8.3/90 A/16, 6/90) – Failure load stage	>14	>14	>14	>14
Timken OK Load lbs (ASTM D 2782)	>85	>85	>85	>85

# SHELL OMALA S4 WHEEL

ADVANCED SYNTHETIC INDUSTRIAL GEAR OIL

PREVIOUSLY SHELL HYPERIA S



## DESIGNED TO MEET CHALLENGES

Shell Omala S4 Wheel is an advanced synthetic heavy-duty industrial gear oil offering outstanding lubrication performance under severe operating conditions, including improved energy efficiency and long service life. It is recommended specifically for use in General Electric Off-Highway Motorised Wheels fitted to load haul dump trucks used in mining applications.

## PERFORMANCE FEATURES

### EXCELLENT WEAR CORROSION PROTECTION

- Provides high levels of load carrying capacity even under shock loading conditions. This provides benefits over mineral oil-based products in terms of gear and bearing component life.
- Shell Omala S4 Wheel oil provide outstanding rust and corrosion protection on metal surfaces.

### LONG OIL LIFE-MAINTENANCE SAVING

- Resists the formation of harmful products of oxidation at high operating temperatures, improving system cleanliness and therefore reliability of the equipment.
- Extended component and lubricant life offers the opportunity to extend service intervals and to help reduce maintenance and disposal costs.

### ENHANCED SYSTEM EFFICIENCY

- Offers improved low temperature performance and reduced change in viscosity with increase in temperature in comparison to mineral oil-based products. This provides better lubrication at low start-up temperatures and the opportunity for energy savings by optimising the viscosity for normal operating conditions.
- Shell Omala S4 Wheel oils also have excellent water shedding and air release properties helping it maintain critical oil films and efficient lubricant.

## APPLICATIONS

- Gearcases of General Electric motorised wheels fitted to load haul dump trucks used in mining applications.
- Enclosed industrial reduction gear systems operating under severe operating conditions, such as high load, very low or elevated temperatures and wide temperature variations.
- Plain and rolling element bearings.
- Oil circulation systems.
- For highly-loaded worm drives, Shell Omala S4 Wheel oil is recommended.
- For automotive hypoid gears, the appropriate Shell Spirax oil should be used.

## SEAL AND PAINT COMPATIBILITY

Shell Omala S4 Wheel is compatible with all seal materials and paints normally specified for use with mineral oils.

## SPECIFICATIONS, APPROVALS AND RECOMMENDATIONS

### MEETS THE SPECIFICATIONS OF:

- David Brown S253.106H
- US Steel 224
- DIN 51517-3 (CLP).

### APPROVED UNDER GE UNDER GEK-30375H AGAINST THE FOLLOWING:

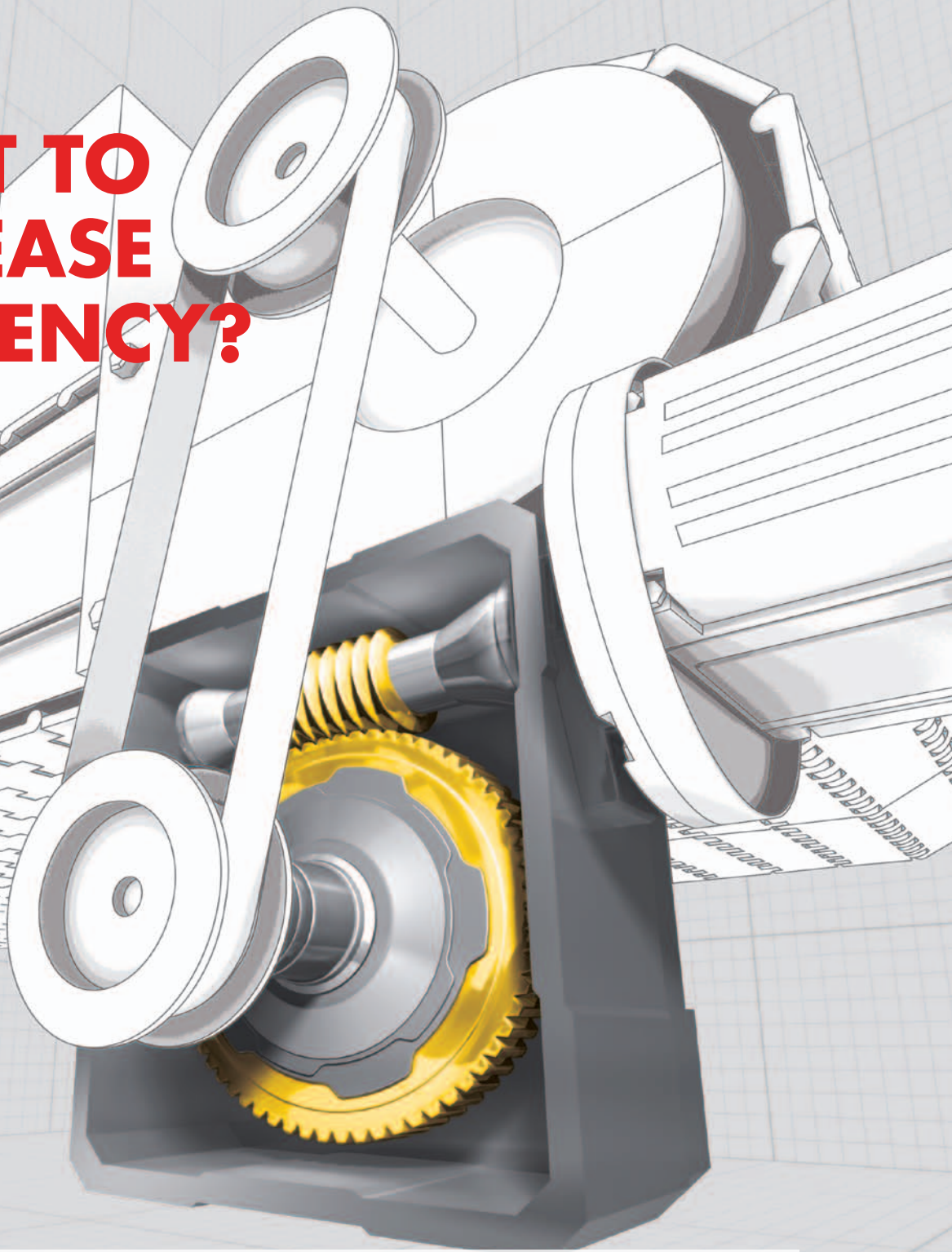
- ISO 320 GE Specifications D50E 27C
- ISO 460 GE Specifications D50E 27D
- ISO 680 GE Specifications D50E 27E.

## TYPICAL PHYSICAL CHARACTERISTICS

CHARACTERISTICS	680
Kinematic Viscosity (ISO 3104) @ 40°C mm <sup>2</sup> /s	680
@ 100°C mm <sup>2</sup> /s	61
Viscosity Index (ISO 2909)	157
Density @ 15°C kg/m <sup>3</sup> (ISO 12185)	860
Flash Point (ISO 2592) (PMCC) °C	274
Pour Point °C (ISO 3016)	-43
FZG Load Carrying Test (DIN 51354-2) A/8, 3/90 A/16, 6/90 – Failure load stage	>12
Timken OK Load lbs (ASTM D 2782)	>80



# WANT TO INCREASE EFFICIENCY?



## Shell Omala S4 WE

ADVANCED SYNTHETIC OIL FOR WORM GEARS

- Designed to help increase energy efficiency
- Excellent oil life and wear protection
- Increased productivity and reduced maintenance costs

Part of the Shell Omala industrial gear oil range  
– designed to help you make the right choice

**DESIGNED TO MEET CHALLENGES**