Product	Benefits	Technology	ISO viscosity grades	Specifications and approvals (Full details of approvals for all products can be obtained from your Shell representative; approvals and claims will vary by viscosity grade.)
Shell **Corena *S4*** *R*	■ Extra long life and improved efficiency ■ Severe applications ■ Rotary air compressors	Synthetic, advanced ashless	32, 46, 68	Approved by: Shell Corena S4 R 68 is approved by ABB for use in VTR turbochargers with a maximum oil-drain interval of 5,000 hours (HZTL 90617, list 3a) Industry standards: ISO 6743-3A DAJ
Shell **Corena *S4*** *P*	■ Extra long life and improved efficiency ■ Severe applications ■ Reciprocating air compressors	Synthetic, advanced additive system	68, 100	Industry standards: ISO 6743-3: 2003 DAB (severe duty); DIN 51506 VDL/DP 6521-L-DAB (medium duty); EN 12021
Shell **Corena *S3*** *R*	■ Long life ■ Improved efficiency ■ Rotary air compressors	Conventional, advanced additive system	32, 46, 68	Industry standards: ISO 6743-3A DAH, DAJ
Shell **Corena *S2*** *R*	■ Reliable protection ■ Standard life applications ■ Rotary air compressors	Conventional, detergent	46, 68	Industry standards: ISO 6743-3A DAH
Shell **Corena *S2*** *P*	■ Reliable protection ■ Standard life applications ■ Reciprocating air compressors	Conventional	68,100, 150	Industry standards: ISO 6743-3A DAA (normal duty)
Speciality compressor oils				
Shell Refrigeration Oils	A range of specialised oils suitable for use in carbon dioxide, ammonia and hydrofluorocarbon refrigeration systems			Contact your Shell representative for details
Shell Gas Compressor Oils	A range of specialised oils suitable for use in hydrocarbon and chemical gas compression applications			Contact your Shell representative for details

FULL PRODUCT AND SERVICE PORTFOLIO

Shell Lubricants is named the market leader in lubricants [Kline & Company, 2009] and has a 60-year history of innovation. We are constantly investing to develop better lubrication solutions, as demonstrated by

- Shell Omala S4 GX synthetic gear oil – for long life in demanding environments
- Shell Tellus S4 ME synthetic hydraulic oil – for long life and energy saving.

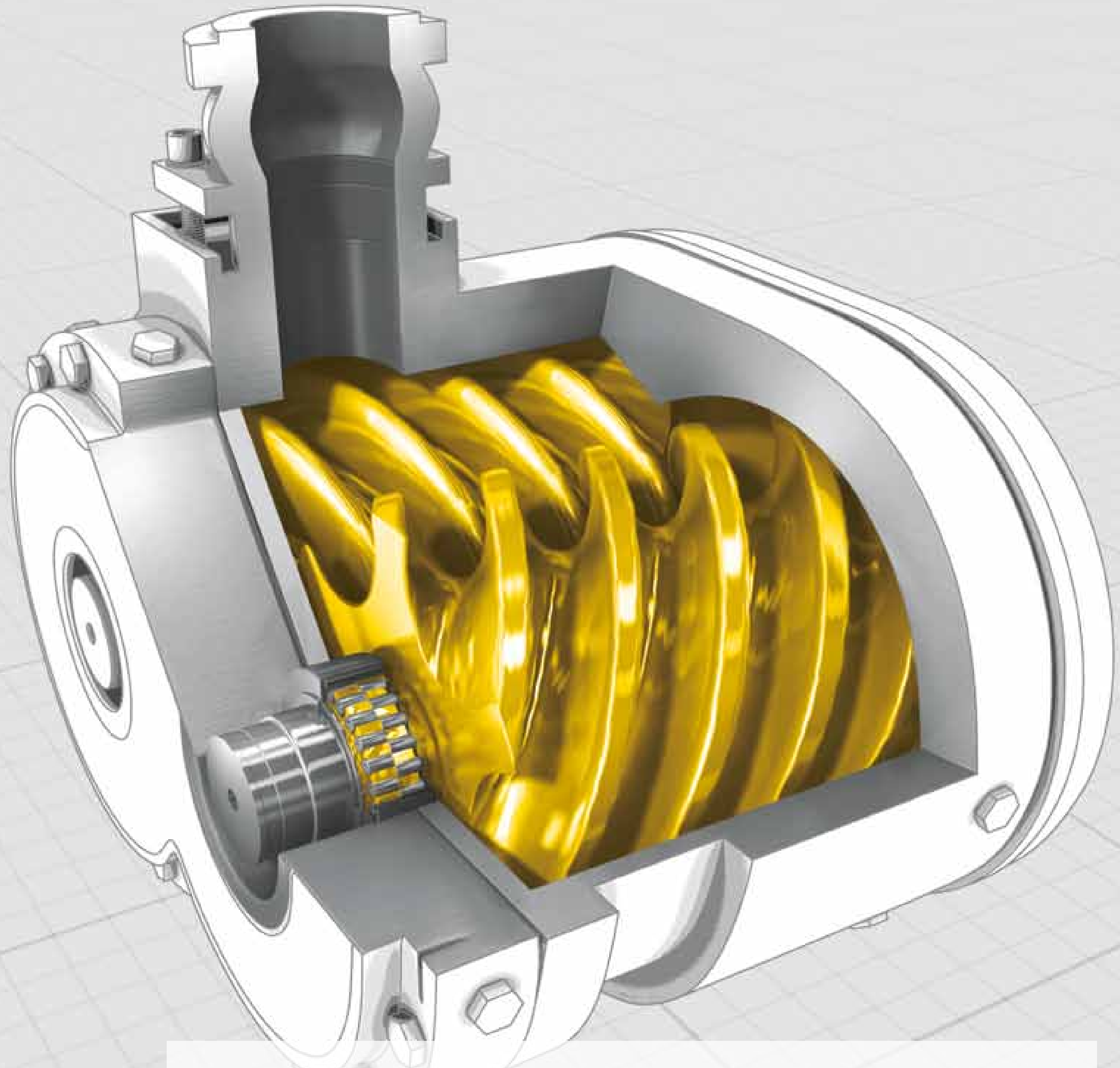
In addition, Shell provides the excellent Shell LubeAnalyst oil condition monitoring service, which is designed to help improve your business performance.

Whatever your needs or application, Shell can provide a full range of oils and greases, including synthetic, high-performance products and additional services.

"Shell Lubricants" refers to the various Shell companies engaged in the lubricants business.

For more information, please contact

shell.com/lubricants



DESIGNED TO ENHANCE PRODUCTIVITY

JUST LIKE OUR COMPRESSOR OILS – SHELL CORENA.

DESIGNED TO MEET CHALLENGES

EVERY PART OF YOUR MACHINE OR PROCESS HAS BEEN METICULOUSLY ENGINEERED, SO YOU WANT TO BE SURE THAT YOU CHOOSE A LUBRICANT THAT HAS BEEN DESIGNED TO ENSURE THAT YOUR EQUIPMENT IS WELL PROTECTED AND WORKS EFFICIENTLY.

The Shell Corena range of air compressor oils has been developed to enable equipment operators to select the oil designed to deliver optimum value to their operations through enhanced wear protection, long oil life and high system efficiency.

WEAR PROTECTION

Excess wear can seriously compromise an air compressor's life and efficiency. The Shell Corena range includes dedicated rotary compressor oils designed to control vane and screw wear, and oils for reciprocating compressors specifically to help control cylinder, piston-ring and valve wear.

Whatever your technical needs and operational conditions, there is a Shell oil that is designed to help you get the most from your equipment investment. The Shell Corena range includes the latest synthetic oils for enhanced wear protection in high-temperature conditions and for extended operations.

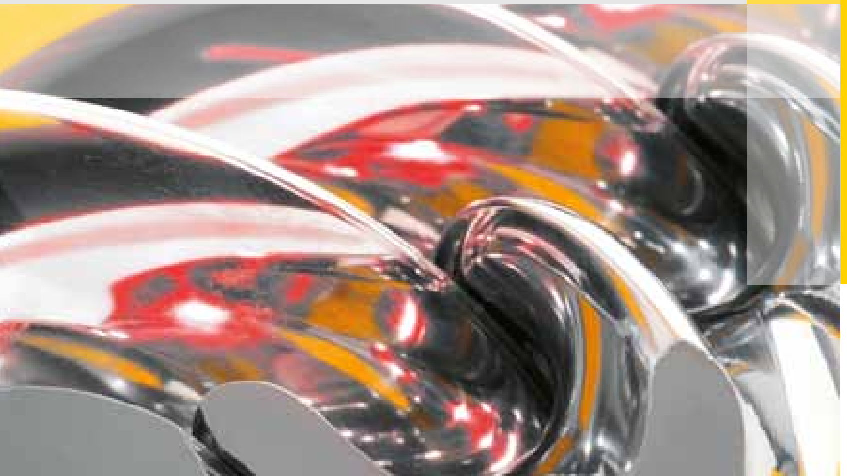
OIL LIFE

The longer an oil's life, the less fluid maintenance your equipment requires, so it can continue to operate with less interruption. The Shell Corena range enables you to best match oil life to your operational needs.

From mainstream oils for standard life applications to advanced synthetic oils that can last for up to three years, the Shell Corena range enables you to choose the right oil for your needs.

SYSTEM EFFICIENCY

Pressure loss in worn compressors can reduce operational efficiency and increase costs. Shell Corena oils are designed to promote system efficiency by suppressing foaming, releasing trapped air and rapidly separating out condensed water. The oils are also developed to help to reduce wear, which helps to keep your compressors working as their designers intended.



A RANGE OF AIR COMPRESSOR OILS DESIGNED TO MEET YOUR NEEDS

To meet the challenges of a wide range of air compressors and applications, Shell has designed a portfolio of oils that enables you to choose a product to match your needs.

PRODUCT NAME SUFFIX KEY

P = High pressure/reciprocating (piston) air compressors

R = Rotary vane and screw air compressors

APPLICATION ICON KEY

- High temperature
- Mobile compressors
- Rotary vane and screw air compressors
- Factory/machine applications
- Reciprocating (piston) air compressors

INCREASINGLY EFFICIENT PROTECTION

THE SHELL CORENA "R" RANGE

Rotary vane and screw air compressor oils for use in stationary and mobile air compressors

THE SHELL CORENA "P" RANGE

Reciprocating (piston) air compressor oils for safe and reliable operation in demanding high-pressure applications

ADVANCED TIER 4

Shell Corena *S4* R

SYNTHETIC
- Extra long life
- Improved efficiency
- Severe applications

Shell Corena *S4* P

SYNTHETIC
- Extra long life
- Improved efficiency
- Severe applications

Better protection, longer oil life and better system efficiency

Better protection and longer oil life

PREMIUM TIER 3

Shell Corena *S3* R

- Long life
- High efficiency

Better protection, longer oil life and better system efficiency

MAIN LINE TIER 2

Shell Corena *S2* R

- Reliable protection
- Standard life applications

Shell Corena *S2* P

- Reliable protection
- Standard life applications

PERFORMANCE YOU CAN COUNT ON

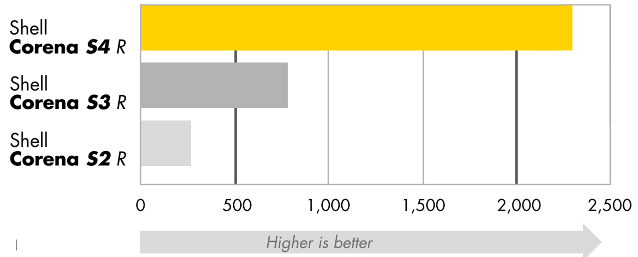
Shell's air compressor oils are developed in close co-operation with customers and equipment makers. The Shell Corena range is well known to equipment makers, and its performance has been demonstrated in real-life applications to help reduce the possibility of your equipment letting you down.

REAL-WORLD VALUE DELIVERY

Users of Shell Corena oils across a wide range of industries are benefiting from proven lubrication performance that adds value to their operations. For instance, by switching to Shell Corena S4 R, some customers are enhancing production and cutting maintenance costs by

- increasing oil-drain intervals by 100% compared with conventional oils
- extending equipment service life: one cement company is running its compressors for three times longer between overhauls
- reducing the high operating temperatures caused by thickening of the original oil, which prevented the oil valves from working efficiently.

Shell Corena S4 R – For the longest oil life in the Shell range



Relative oil life (minutes) (ASTM D2272 oxidation test)

Technical Data Sheet

Previous Name: **Shell Corena P**

Shell Corena *S2 P 100*

- *Reliable Protection*
- *Standard Life Applications*

Reciprocating (Piston) Air Compressor Oil

Shell Corena S2 P is high quality air compressor oil designed to deliver the lubrication performance for high pressure reciprocating compressors. It is suitable for most reciprocating air compressors running at up to 220°C discharge temperatures at elevated pressures.

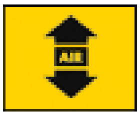
DESIGNED TO MEET CHALLENGES

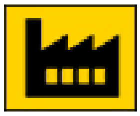
Performance, Features & Benefits

- **Long oil life – Maintenance saving**
  Shell Corena S2 P allows the interval between valve and piston maintenance to be extended under certain applications. Compressors can be kept in service for much longer periods, operating at a consistently high level of efficiency.

  Extended maintenance capability is supported by resistance to formation of carbon deposits and lacquer on valves and piston crowns at high working temperatures and pressures.
- **Outstanding wear protection**
  Shell Corena S2 P helps provide effective protection of internal metal surfaces from corrosion and wear to help prolong the life of critical parts such as bearings and pistons.
- **Maintaining system efficiency**
  Shell Corena S2 P helps prevent the formation of carbon deposits and lacquer on valves and piston crowns at high working temperatures and pressures. These can cause serious damage, lower compressor efficiency and increase maintenance costs. In addition, Shell Corena S2 P has good water separation to help prevent accelerated corrosion, facilitating easy condensate draining.
- **Enhanced air line safety**
  In discharge air-lines, the combination of rust particles, dispersed in carbonaceous deposits, coupled with heat from recently compressed air, can cause a reaction leading to the possibility of fires and explosion. Shell Corena S2 P helps to minimise the likelihood of this danger.

Main Applications





- **Reciprocating air compressors**
  Shell Corena S2 P is suitable for use in industrial reciprocating air compressors operating with air discharge temperatures of up to 220°C.
- **Breathing air compressors**
  Shell Corena S2 P may be used in breathing air compressors, provided subsidiary clean-up apparatus is used to ensure that the air produced is fit for breathing.

Specifications, Approvals & Recommendations

- ISO 6743-3A-: DAA Normal Duty
- For a full listing of equipment approvals and recommendations, please consult your local Shell Technical Helpdesk, or the OEM Approvals website.

Compatibility & Miscibility

- **Seal Compatibility**
  Shell Corena S2 P oils are compatible with all sealing materials commonly used in air compressors.

Typical physical characteristics

Properties			Method	Corena S2 P 100
ISO Viscosity Grade			ISO 3448	100
Kinematic Viscosity	@40°C	mm^2/s	ASTM D 445	100
Kinematic Viscosity	@100°C	mm^2/s	ASTM D 445	9.2
density	@15°C	kg/m^3	ASTM D 1298	899
Flash Point		°C	ASTM D 92 (COC)	240
Pour Point		°C	ASTM D 97	-33
Neutralisation Value		mg KOH/g	ASTM D 974	0.3
Sulphated Ash		% m	DIN 51575	0.06
Oxidation Stability (delta CCR)		% m	DIN 51352-2	2
Properties Of The Distillation Residue (20%) - Carbon Residue (C		% m	DIN 51551	0.3
Properties Of The Distillation Residue (20%) - Kinematic Viscosi	@40°C	mm^2/s	DIN 51562	160

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

Health, Safety & Environment

- **Health and Safety**

Shell Corena S2 P is unlikely to present any significant health or safety hazard when properly used in the recommended application and good standards of personal hygiene are maintained.

Avoid contact with skin. Use impervious gloves with used oil. After skin contact, wash immediately with soap and water.

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

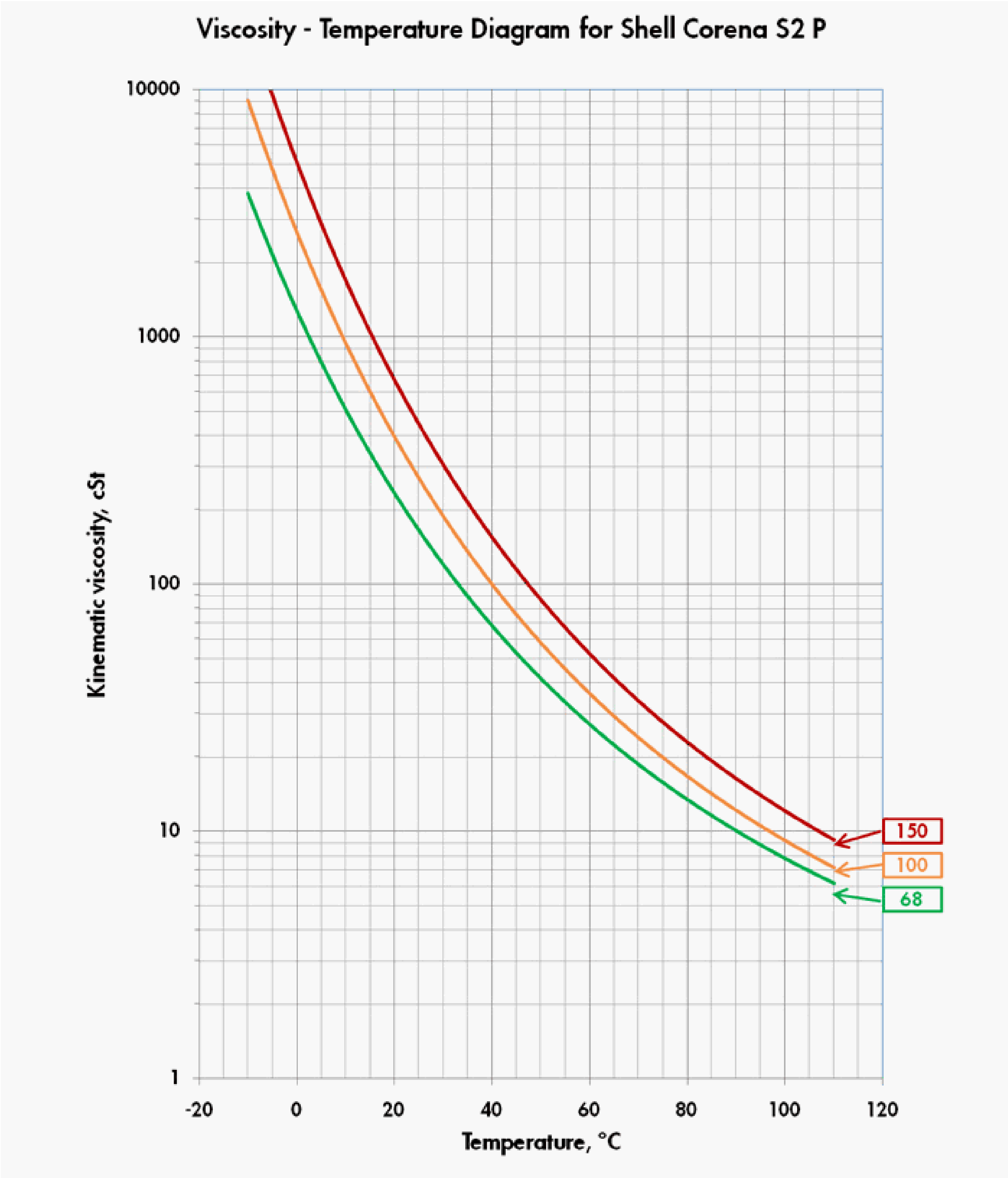
- **Protect the Environment**

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

Additional Information

- **Advice**

Advice on applications not covered here may be obtained from your shell representative.


Viscosity - Temperature Diagram for Shell Corena S2 P
10000
1000
100
10
1
Kinematic viscosity, cSt
-20
0
20
40
60
80
100
120
Temperature, °C
150
100
68

Technical Data Sheet

Previous Name: **Shell Corena P**

Shell Corena *S2 P 150*

- *Reliable Protection*
- *Standard Life Applications*

Reciprocating (Piston) Air Compressor Oil

Shell Corena S2 P is high quality air compressor oil designed to deliver the lubrication performance for high pressure reciprocating compressors. It is suitable for most reciprocating air compressors running at up to 220°C discharge temperatures at elevated pressures.

DESIGNED TO MEET CHALLENGES

Performance, Features & Benefits

- **Long oil life – Maintenance saving**

  Shell Corena S2 P allows the interval between valve and piston maintenance to be extended under certain applications. Compressors can be kept in service for much longer periods, operating at a consistently high level of efficiency.

  Extended maintenance capability is supported by resistance to formation of carbon deposits and lacquer on valves and piston crowns at high working temperatures and pressures.

- **Outstanding wear protection**

  Shell Corena S2 P helps provide effective protection of internal metal surfaces from corrosion and wear to help prolong the life of critical parts such as bearings and pistons.

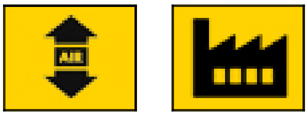
- **Maintaining system efficiency**

  Shell Corena S2 P helps prevent the formation of carbon deposits and lacquer on valves and piston crowns at high working temperatures and pressures. These can cause serious damage, lower compressor efficiency and increase maintenance costs. In addition, Shell Corena S2 P has good water separation to help prevent accelerated corrosion, facilitating easy condensate draining.

- **Enhanced air line safety**

  In discharge air-lines, the combination of rust particles, dispersed in carbonaceous deposits, coupled with heat from recently compressed air, can cause a reaction leading to the possibility of fires and explosion. Shell Corena S2 P helps to minimise the likelihood of this danger.

Main Applications



- **Reciprocating air compressors**

  Shell Corena S2 P is suitable for use in industrial reciprocating air compressors operating with air discharge temperatures of up to 220°C.

- **Breathing air compressors**

  Shell Corena S2 P may be used in breathing air compressors, provided subsidiary clean-up apparatus is used to ensure that the air produced is fit for breathing.

Specifications, Approvals & Recommendations

- DIN 51506 VDL
- ISO 6743-3A-L DAA Normal Duty
- ISO 6743-3A-L-DAB

  For a full listing of equipment approvals and recommendations, please consult your local Shell Technical Helpdesk.

Compatibility & Miscibility

- **Seal Compatibility**

  Shell Corena S2 P oils are compatible with all sealing materials commonly used in air compressors.

Typical Physical Characteristics

Properties			Method	Corena S2 P 150
ISO Viscosity Grade			ISO 3448	150
Kinematic Viscosity	@40°C	mm^2/s	ASTM D445	155
Kinematic Viscosity	@100°C	mm^2/s	ASTM D445	12.1
Density	@15°C	kg/m^3	ASTM D1298	902
Flash Point (COC)		°C	ASTM D92	240
Pour Point		°C	ASTM D97	-30
Neutralisation Value		mg KOH/g	ASTM D974	0.3
Sulphated Ash		% m	DIN 51575	0.06
Oxidation Stability (delta CCR)		% m	DIN 51352-2	2.3
Properties Of The Distillation Residue (20%) - Carbon Residue (C		% m	DIN 51551	0.3
Properties Of The Distillation Residue (20%) - Kinematic Viscosi	@40°C	mm^2/s	DIN 51562	280
Rust Prevention - Synthetic Sea Water		degree	ASTM D665B	Pass
Water Separability	@54°C	min	ASTM D1401	-
Water Separability	@82°C	min	ASTM D1401	20

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

Health, Safety & Environment

- **Health and Safety**

Shell Corena S2 P is unlikely to present any significant health or safety hazard when properly used in the recommended application and good standards of personal hygiene are maintained.

Avoid contact with skin. Use impervious gloves with used oil. After skin contact, wash immediately with soap and water.

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

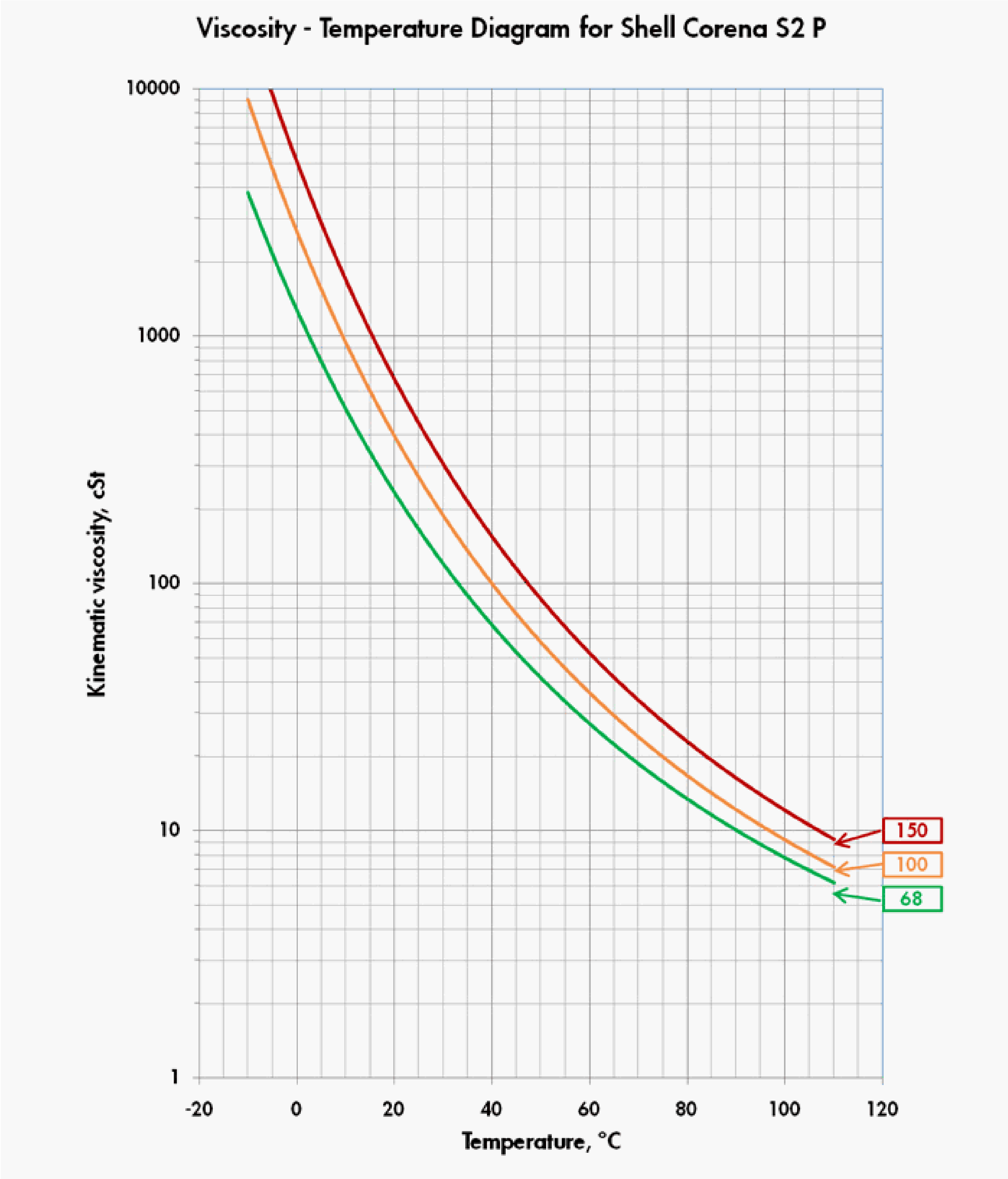
- **Protect the Environment**

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

Additional Information

- **Advice**

Advice on applications not covered here may be obtained from your Shell representative.


Viscosity - Temperature Diagram for Shell Corena S2 P
Kinematic viscosity, cSt
10000
1000
100
10
1
-20
0
20
40
60
80
100
120
Temperature, °C
150
100
68

Technical Data Sheet

Previous Name: **Shell Corena S**

Shell Corena *S3 R 46*

- *Long Life*
- *Improved Efficiency*

Premium Rotary Air Compressor Oil

Shell Corena S3 R is a premium quality air compressor oil designed to deliver high performance lubrication 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 bar and 100°C discharge temperatures with oil maintenance intervals of up to 6000 hours.

DESIGNED TO MEET CHALLENGES

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 formation of carbon deposits in sliding vane slots in vane compressors
- Resist formation 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 coalescer systems.
- Exact oil maintenance interval will depend on intake air quality, duty cycle and ambient conditions. For hot and humid type climates as found in 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.

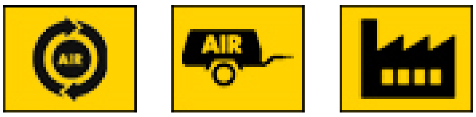
  It contains an advanced ashless anti-wear system to help prolong the life of critical parts such as bearings and gears.

- **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 designed 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, operating at pressures of up to 10 bar and with air discharge temperatures of up to 100°C.

- **Screw air compressors**

  Suitable for oil flooded or oil injected, single or two-stage rotary compressors, operating at pressures 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 local Shell Technical Helpdesk.

Compatibility & Miscibility

- **Seal Compatibility**

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

Typical Physical Characteristics

Properties			Method	Corena S3 R 46
ISO Viscosity Grade			ISO 3448	46
Kinematic Viscosity	@40°C	mm^2/s	ASTM D445	46
Kinematic Viscosity	@100°C	mm^2/s	ASTM D445	6.9
Density	@15°C	kg/m^3	ASTM D1298	868
Flash Point (COC)		°C	ASTM D92	230
Air Release		mins	ASTM D3427	3
RPVOT		mins	ASTM D2272	700
FZG Test		LS Fail	CEC-L-07-A-95	11
Pour Point		°C	ASTM D97	-30
Water Separability	@54°C	mins	ASTM D1401	15

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

Health, Safety & Environment

- **Health and Safety**

Shell Corena S3 R Oil is unlikely to present any significant health or safety hazard when properly used in the recommended application and good standards of personal hygiene are maintained.

Avoid contact with skin. Use impervious gloves with used oil. After skin contact, wash immediately with soap and water.

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

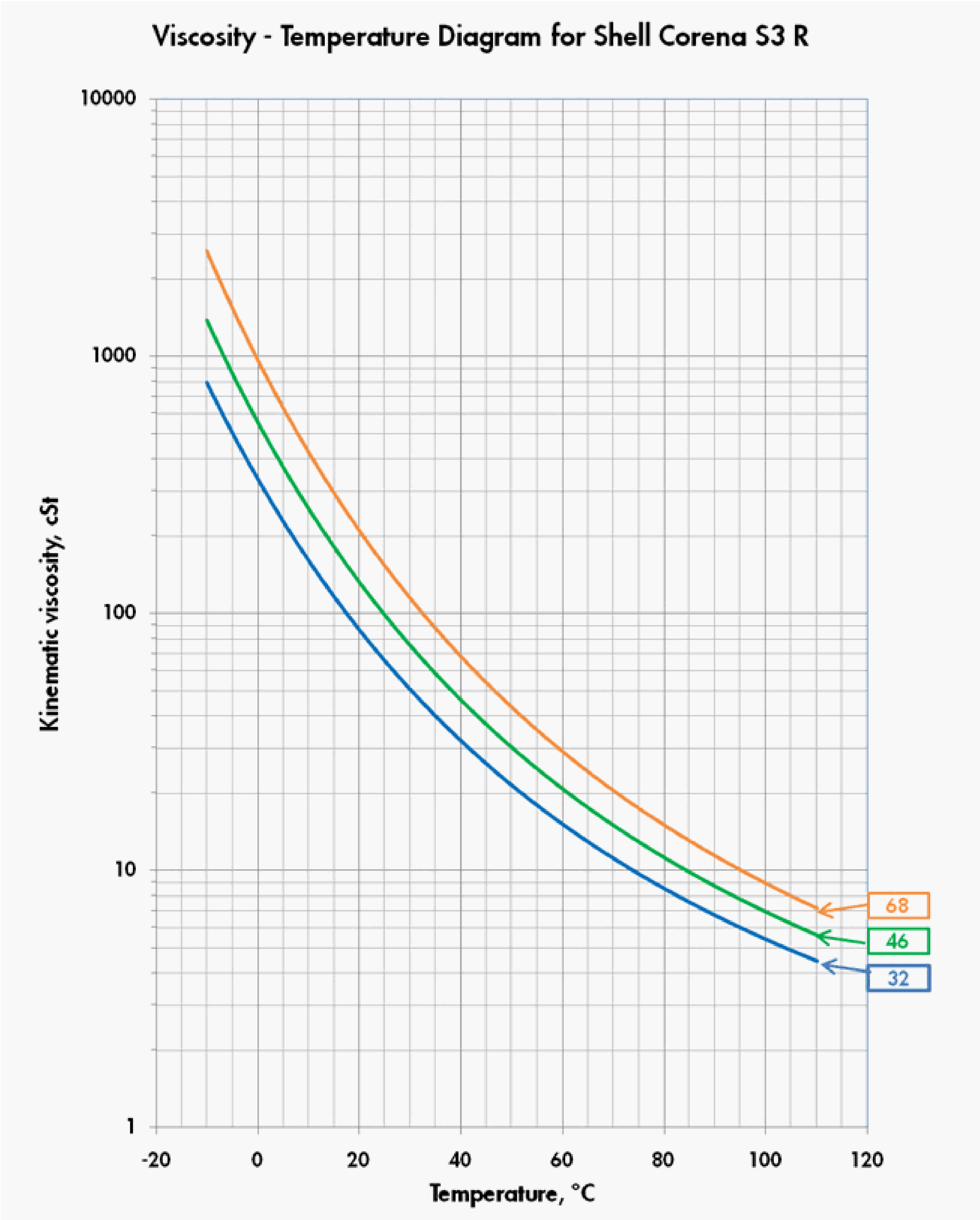
- **Protect the Environment**

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

Additional Information

- **Advice**

Advice on applications not covered here may be obtained from your Shell representative.


Viscosity - Temperature Diagram for Shell Corena S3 R
10000
1000
100
10
1
Kinematic viscosity, cSt
-20
0
20
40
60
80
100
120
Temperature, °C
68
46
32

Technical Data Sheet

Previous Name: **Shell Corena S**

Shell Corena *S3 R 68*

- *Long Life*
- *Improved Efficiency*

Premium Rotary Air Compressor Oil

Shell Corena S3 R is a premium quality air compressor oil designed to deliver high performance lubrication 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 bar and 100°C discharge temperatures with oil maintenance intervals of up to 6000 hours.

DESIGNED TO MEET CHALLENGES

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 formation of carbon deposits in sliding vane slots in vane compressors
- Resist formation 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 coalescer systems.
- Exact oil maintenance interval will depend on intake air quality, duty cycle and ambient conditions. For hot and humid type climates as found in 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.

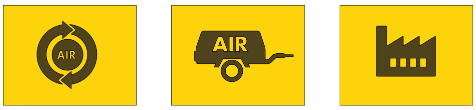
  It contains an advanced ashless anti-wear system to help prolong the life of critical parts such as bearings and gears.

- **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 designed 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, operating at pressures of up to 10 bar and with air discharge temperatures of up to 100°C.

- **Screw air compressors**

  Suitable for oil flooded or oil injected, single or two-stage rotary compressors, operating at pressures 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 local Shell Technical Helpdesk.

Compatibility & Miscibility

- **Seal Compatibility**

  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 D445	68
Kinematic Viscosity	@100°C	mm^2/s	ASTM D445	8.9
Density	@15°C	kg/m^3	ASTM D1298	873
Flash Point (COC)		°C	ASTM D92	248
Air Release		mins	ASTM D3427	5
RPVOT		mins	ASTM D2272	700
FZG Test		LS Fail	CEC-L-07-A-95	11
Pour Point		°C	ASTM D97	-30
Water separability	@54°C	mins	ASTM D1401	15

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

Health, Safety & Environment

- **Health and Safety**

Shell Corena S3 R Oil is unlikely to present any significant health or safety hazard when properly used in the recommended application and good standards of personal hygiene are maintained.

Avoid contact with skin. Use impervious gloves with used oil. After skin contact, wash immediately with soap and water.

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

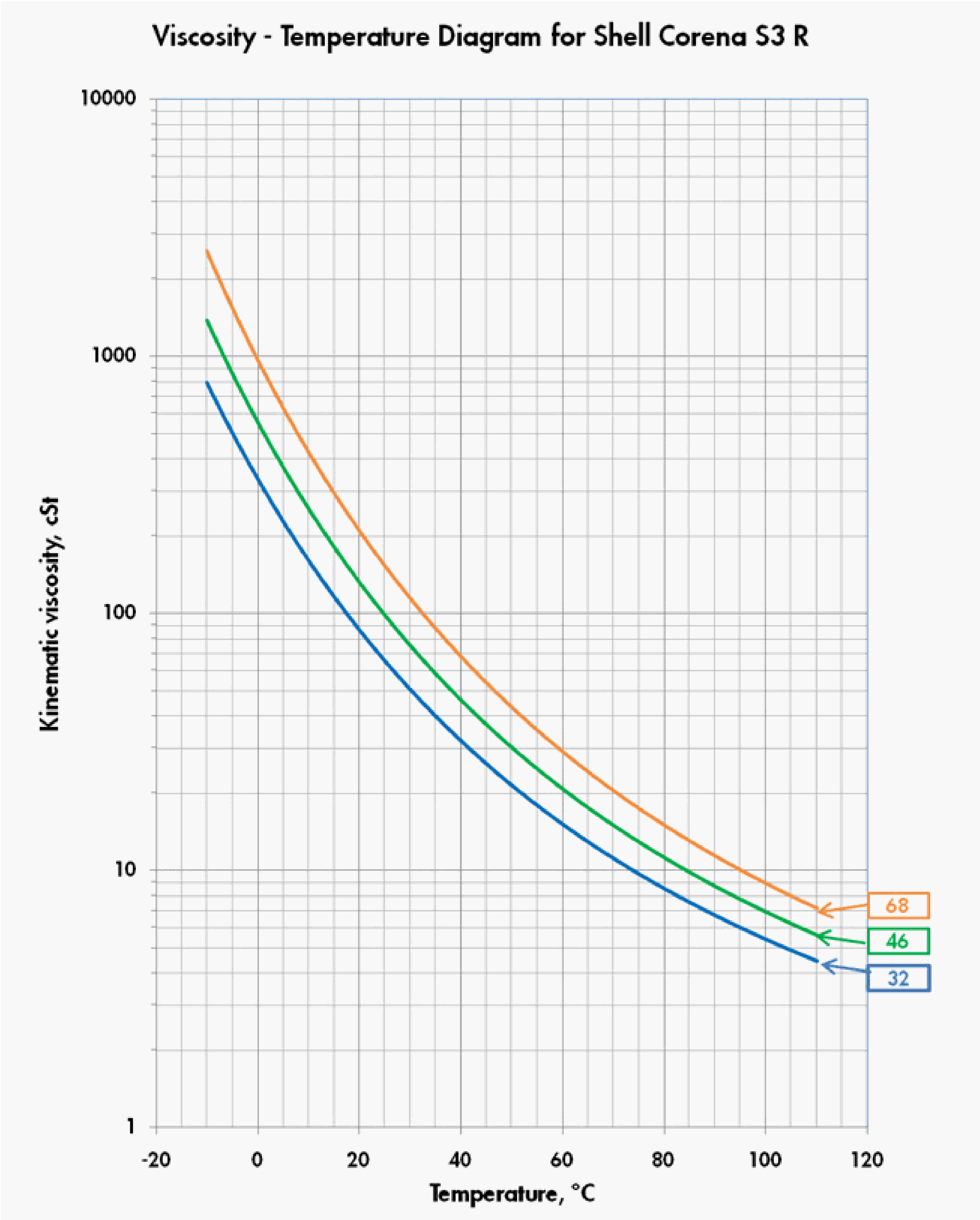
- **Protect the Environment**

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

Additional Information

- **Advice**

Advice on applications not covered here may be obtained from your Shell representative.


Viscosity - Temperature Diagram for Shell Corena S3 R
Kinematic viscosity, cSt
10000
1000
100
10
1
-20
0
20
40
60
80
100
120
Temperature, °C
68
46
32

Technical Data Sheet

Previous Name: **Shell Corena AP**

Shell Corena *S4 P 100*

- *Extra Long Life*
- *Improved Efficiency*
- *Severe Applications*

Advanced Synthetic Reciprocating (Piston) Air Compressor Oil

Shell Corena S4 P is an advanced synthetic air compressor oil incorporating synthetic ester base fluids and a unique high performance additive system. It is designed to deliver the highest performance lubrication for high pressure reciprocating compressors running in excess of 220°C discharge temperatures at elevated pressures.

DESIGNED TO MEET CHALLENGES

Performance, Features & Benefits

- **Long oil life – Maintenance saving**

  Shell Corena S4 P is designed to provide safe, reliable and effective lubrication for extended service periods where mineral compressor lubricants are unsatisfactory.

  With an extremely low tendency for deposit build-up Shell Corena S4 P helps ensure continued high performance of the compressor over long periods and reduces maintenance costs and shutdowns.

  Shell Corena S4 P can extend the normal valve maintenance period from typically up to 1000 hours of operation using conventional mineral oils, to 2000 to 4000 hours depending on operating conditions.

- **Outstanding wear protection**

  Shell Corena S4 P helps provide exceptional protection of internal metal surfaces from corrosion and wear to help prolong the life of critical parts such as bearings and gears.

- **Maintaining system efficiency**

  Shell Corena S4 P helps prevent the formation of carbon deposits and lacquer on valves and piston crowns at high working temperatures and pressures. These can cause serious damage, lower compressor
  efficiency and increase maintenance costs.

  In addition, Shell Corena S4 P has excellent water separation to help prevent accelerated corrosion and facilitating easy draining of condensate.

- **Enhanced air line safety**

  In discharge air lines, the combination of rust particles, dispersed in carbonaceous deposits, coupled with heat from recently compressed air, can cause a reaction leading to the possibility of fires and explosion. Shell Corena S4 P helps to minimise the likelihood of this danger.

Main Applications

- **Reciprocating air compressors**

  Shell Corena S4 P is suitable for all industrial reciprocating air compressors, in particular those operating under severe conditions of air discharge temperatures in excess of 220°C with continuous high delivery pressures.

- **Breathing air compressors**

  Shell Corena S4 P may be used in breathing air compressors, provided subsidiary clean-up apparatus is used to ensure that the air produced is fit for breathing.

Specifications, Approvals & Recommendations

- DIN 51506 VDL ISO/DP 6521-L-DAB - medium duty
- ISO 6743-3:2003 DAB - Severe duty
- EN 12021

  For a full listing of equipment approvals and recommendations, please consult your local Shell Technical Helpdesk.

Compatibility & Miscibility

- **Miscibility**

  Shell Corena S4 P oils are fully miscible with mineral oils, although dilution with mineral lubricants will markedly reduce its performance.

- **Seal Compatibility**

  Shell Corena S4 P, in common with other ester-based lubricants, is not compatible with all seal materials, and some older compressors may need to have the seals changed before they can be run on the new grades.

- **Compatibility Guide : Acceptable**

  High Nitrite content (SEB5)

  >36% acrylonitrile

- **Compatibility Guide : Majority Acceptable**

  Medium nitrile content (SE70)

  30 - 36% acrylonitrile

- **Compatibility Guide : Not recommended**

  Low nitrile content

  <30% acrylonitrile

Typical Physical Characteristics

Properties			Method	S4 P 100
ISO Viscosity Grade			ISO 3448	100
Performance Standard			DIN 51506	VDL 100
Kinematic Viscosity	@40°C	mm^2/s	ASTM D445	100
Kinematic Viscosity	@100°C	mm^2/s	ASTM D445	10.2
Density	@15°C	kg/m^3	ASTM D1298	988
Flash Point (COC)		°C	ASTM D92	260
Pour Point		°C	ASTM D97	-39
Sulphated Ash		%m	DIN 51575	<0.02
Rust Prevention - Distilled Water	24 hrs	Pass	ASTM D665A	Pass
Copper Corrosion	(100°C/3hr	°C	ASTM D130	1b
Water Separability	@82°C	min	ASTM D1401	25

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

Health, Safety & Environment

- **Health and Safety**

  Shell Corena S4 P Oil is unlikely to present any significant health or safety hazard when properly used in the recommended application and good standards of personal hygiene are maintained.

  Avoid contact with skin. Use impervious gloves with used oil. After skin contact, wash immediately with soap and water.

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

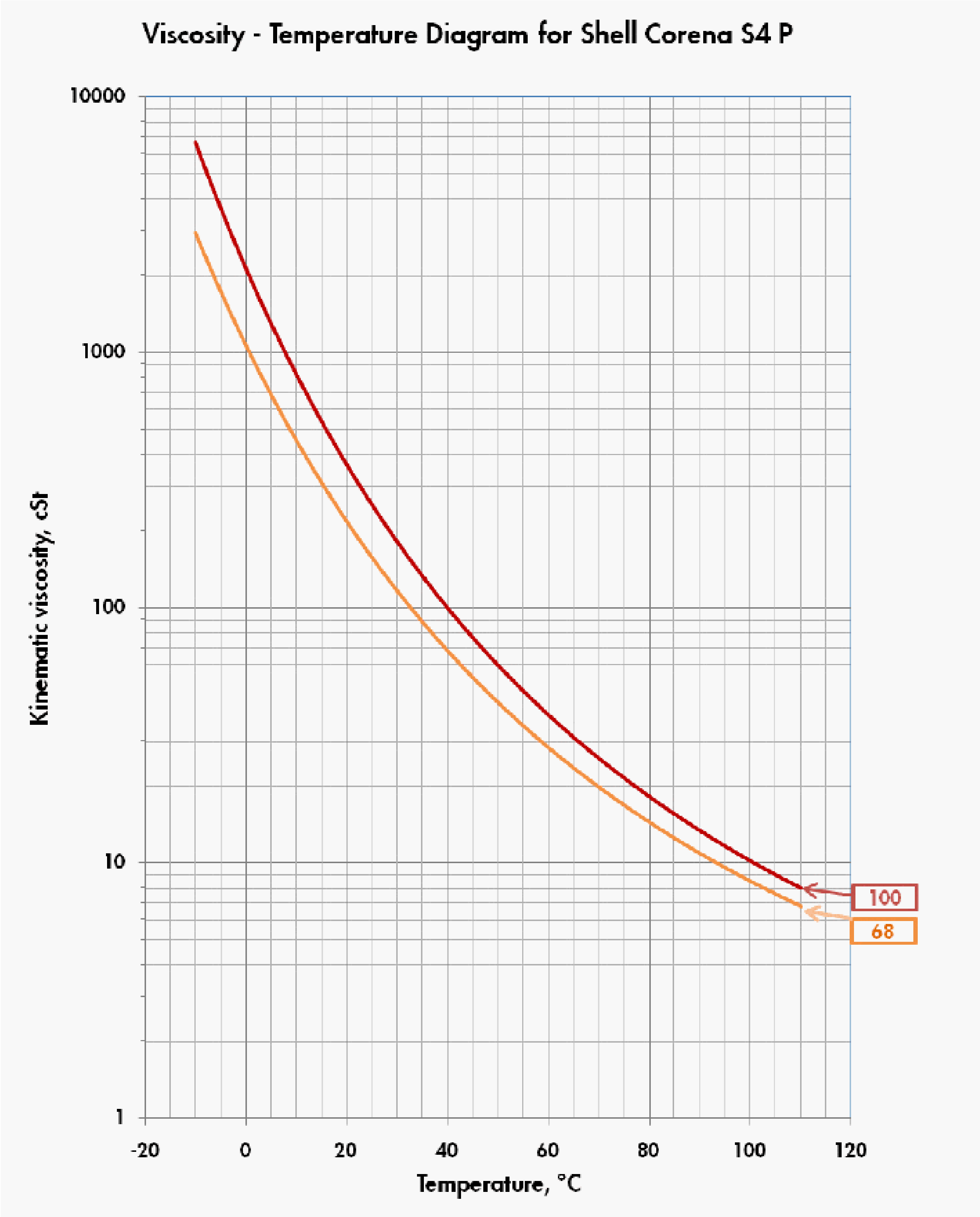
- **Protect the Environment**

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

Additional Information

- **Advice**

  Advice on applications not covered here may be obtained from your Shell representative.


Viscosity - Temperature Diagram for Shell Corena S4 P
10000
1000
100
10
1
-20
0
20
40
60
80
100
120
Kinematic viscosity, cSt
Temperature, °C
100
68

Technical Data Sheet

Previous Name: **Shell Corena AS**

Shell **Corena** ***S4 R 46***

- *Extra Long Life*
- *Improved Efficiency*
- *Severe Applications*

Advanced Synthetic Rotary Air Compressor Oil

Shell Corena S4 R is an advanced 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 additive system to provide excellent protection and performance for compressors running at pressures over 25 bar and in excess of 100°C discharge temperatures with oil maintenance intervals of up to 12,000 hours.

DESIGNED TO MEET CHALLENGES

Performance, Features & Benefits

- **Long oil life – Maintenance saving**

  Shell Corena S4 R is capable of providing oil maintenance intervals of up to 12,000 hours (where allowed by manufacturers) even when operating at maximum discharge temperatures in excess of 100°C.

  The advanced formulation of Shell Corena S4 R helps deliver exceptional oil life through:

- Exceptional resistance to thermal and chemical breakdown.
- Resist formation of deposits on rotating components in screw compressors and in sliding vane slots for continuous efficient operation.
- Exceptionally low levels of deposit formation to help maintain excellent internal surface cleanliness particularly in oil/air separator and coalescer systems.

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

- **Outstanding wear protection**

  Shell Corena S4 R helps provide exceptional protection and 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 bearings and gears.

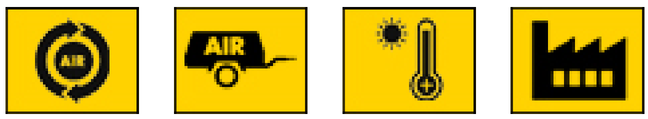
- **Maintaining system efficiency**

  Shell Corena S4 R is designed to provide rapid air release without excessive foaming to give trouble-free operation even under cycling conditions helping to ensure reliable start-up and continuous compressed air availability.

  Shell Corena S4 R has low volatility and oil carryover to provide reduced oil top-up requirements in combination with increased air quality.

  In addition, Shell Corena S4 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 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 conditions).

- **Severe service conditions**

  May also be used where exceptionally high ambient temperatures are found, when the oil temperature cannot be reduced to normal levels.

- **ABB Turbochargers**

  The product is recommended for use in ABB turbochargers fitted to low and medium speed diesel engines used in marine and power generation applications.

Specifications, Approvals & Recommendations

- ISO 6743-3A-DAJ.

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

Compatibility & Miscibility

- **Miscibility**

  Shell Corena S4 R oils are fully miscible with mineral oils, although dilution with mineral lubricants will markedly reduce its performance. Care must be taken to avoid mixing Shell Corena S4 R with certain other types of synthetic fluids. Contact your Shell representative for further information.

- **Seal Compatibility**

  Shell Corena S4 R oils are compatible with seal materials specified for use with mineral oils.

Typical Physical Characteristics

Properties			Method	Shell Corena S4 R
ISO Viscosity Grade			ISO 3448	46
Kinematic Viscosity	@40°C	mm²/s	ASTM D 445	46
Kinematic Viscosity	@100°C	mm²/s	ASTM D 445	7.7
Viscosity Index (VI)			DIN ISO 2909	135
Density	@15°C	kg/m³	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

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

Health, Safety & Environment

- **Health and Safety**

  Shell Corena S4 R Oil is unlikely to present any significant health or safety hazard when properly used in the recommended application and good standards of personal hygiene are maintained.

  Avoid contact with skin. Use impervious gloves with used oil. After skin contact, wash immediately with soap and water.

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

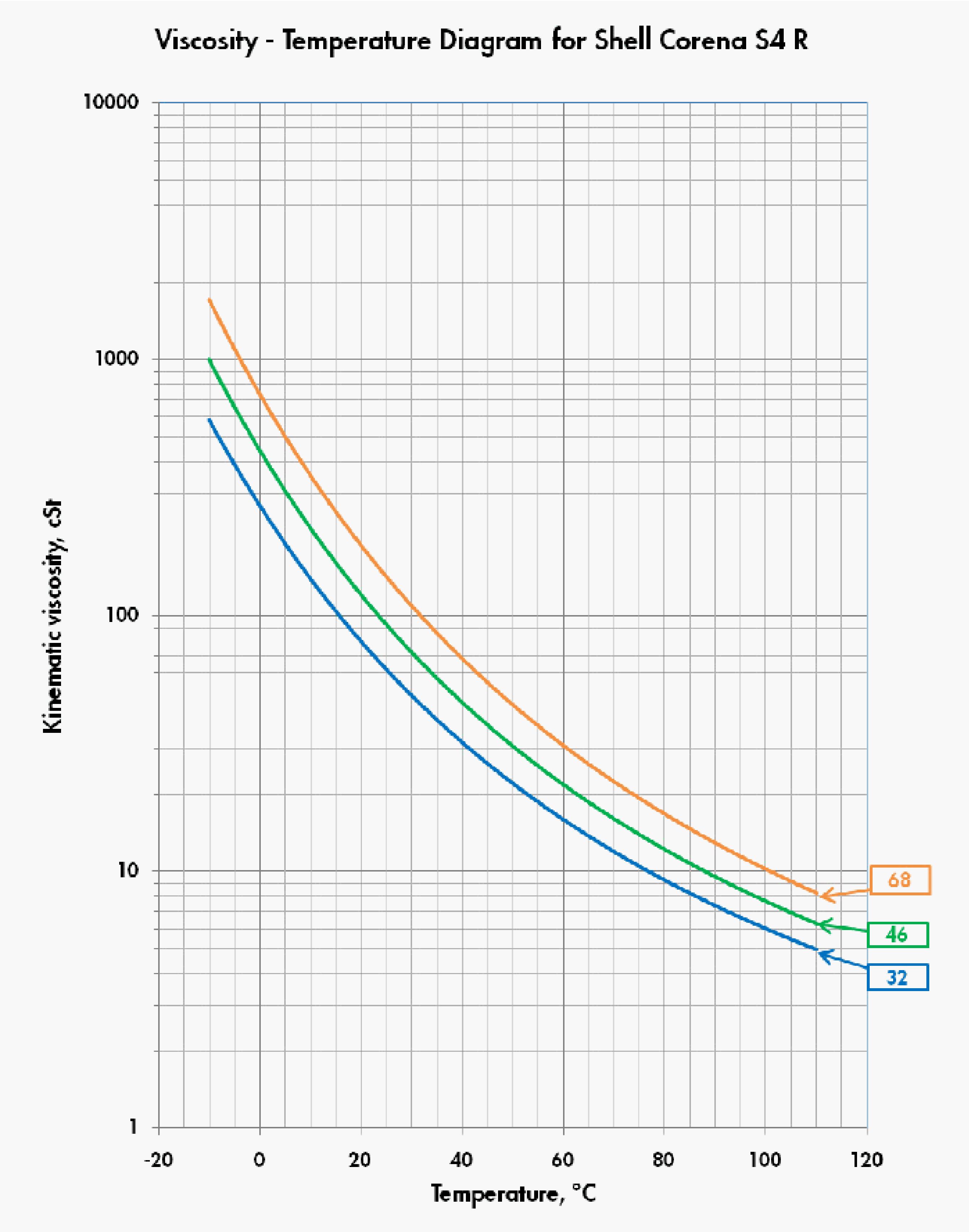
- **Protect the Environment**

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

Additional Information

- **Advice**

  Advice on applications not covered here may be obtained from your Shell representative.



Viscosity - Temperature Diagram for Shell Corena S4 R
10000
1000
100
10
1
Kinematic viscosity, cSt
-20
0
20
40
60
80
100
120
Temperature, °C
68
46
32

Previous Name: **Shell Corena AS**

Shell Corena *S4 R 68*

- *Extra Long Life*
- *Improved Efficiency*
- *Severe Applications*

Advanced Synthetic Rotary Air Compressor Oil

Shell Corena S4 R is primarily an advanced 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 additive system to provide excellent protection and performance for compressors running at pressures over 25 bar and in excess of 100°C discharge temperatures with oil maintenance intervals of up to 12,000 hours. Shell Corena S4 R is also perfectly suitable to cover applications where a synthetic bearing & circulating oil or R&O oil (ISO VG 32-68) is needed.

DESIGNED TO MEET CHALLENGES

Performance, Features & Benefits

- **Long oil life – Maintenance saving**

  Shell Corena S4 R is capable of providing oil maintenance intervals of up to 12,000 hours (where allowed by manufacturers) even when operating at maximum discharge temperatures in excess of 100°C.

  The advanced formulation of Shell Corena S4 R helps deliver exceptional oil life through:

- Exceptional resistance to thermal and chemical breakdown.
- Resist formation of deposits on rotating components in screw compressors and in sliding vane slots for continuous efficient operation.
- Exceptionally low levels of deposit formation to help maintain excellent internal surface cleanliness particularly in oil/air separator and coalescer systems.

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

- **Outstanding wear protection**

  Shell Corena S4 R helps provide exceptional protection and 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 bearings and gears.

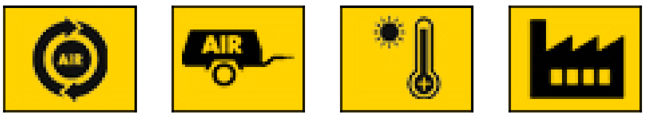
- **Maintaining System Efficiency**

  Shell Corena S4 R is designed to provide rapid air release without excessive foaming to give trouble-free operation even under cycling conditions helping to ensure reliable start-up and continuous compressed air availability.

  Shell Corena S4 R has low volatility and oil carryover to provide reduced oil top-up requirements in combination with increased air quality.

  In addition, Shell Corena S4 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 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 conditions).

- **Severe service conditions**

  May also be used where exceptionally high ambient temperatures are found, when the oil temperature cannot be reduced to normal levels.

- **ABB Turbochargers**

  The product is recommended for use in ABB turbochargers fitted to low and medium speed diesel engines used in marine and power generation applications.

- **Bearing & Circulating Oil**
  Perfectly suitable to cover applications where a synthetic bearing & circulating oil or R&O oil (ISO VG 32-68) is required and will provide benefits due to increased resistance to deposit formation, improved low temperature fluidity, and lowering equipment operating temperatures.
- When a higher viscosity grade synthetic oil is required we recommend to use Shell Morlina S4 B grades for such applications.

Specifications, Approvals & Recommendations

- Shell Corena S4 R 68 is approved by ABB for use in VTR turbochargers, with a maximum oil change interval of 5000 hours (HZTL 90617, list 3a).
- ISO 6743-3A-DAJ.

For a full listing of equipment approvals and recommendations, please consult your local Shell Technical Helpdesk.

Compatibility & Miscibility

- **Miscibility**
  Shell Corena S4 R oils are fully miscible with mineral oils, although dilution with mineral lubricants will markedly reduce its performance. Care must be taken to avoid mixing Shell Corena S4 R with certain other types of synthetic fluids. Contact your Shell representative for further information.
- **Seal Compatibility**
  Shell Corena S4 R oils are compatible with seal materials specified for use with mineral oils.

Typical Physical Characteristics

Properties			Method	S4 R 68
ISO Viscosity Grade			ISO 3448	68
Kinematic Viscosity	@40°C	mm^2/s	ASTM D445	68
Kinematic Viscosity	@100°C	mm^2/s	ASTM D445	10.2
Viscosity Index (VI)			DIN ISO 2909	135
Density	@15°C	kg/m^3	ASTM D1298	848
Flash Point (COC)		°C	ASTM D92	248
Pour Point		°C	ASTM D97	-45
Air Release		mins		4
Rust Prevention - Synthetic Sea Water			ASTM D665B	Pass
Water Separability		mins	ASTM D1401	10
Rotating Pressure Vessel Oxidation		mins	ASTM D2272	2200
FZG Load Carrying Test		failure load stage	CEC-L-07-A-95	>12

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

Health, Safety & Environment

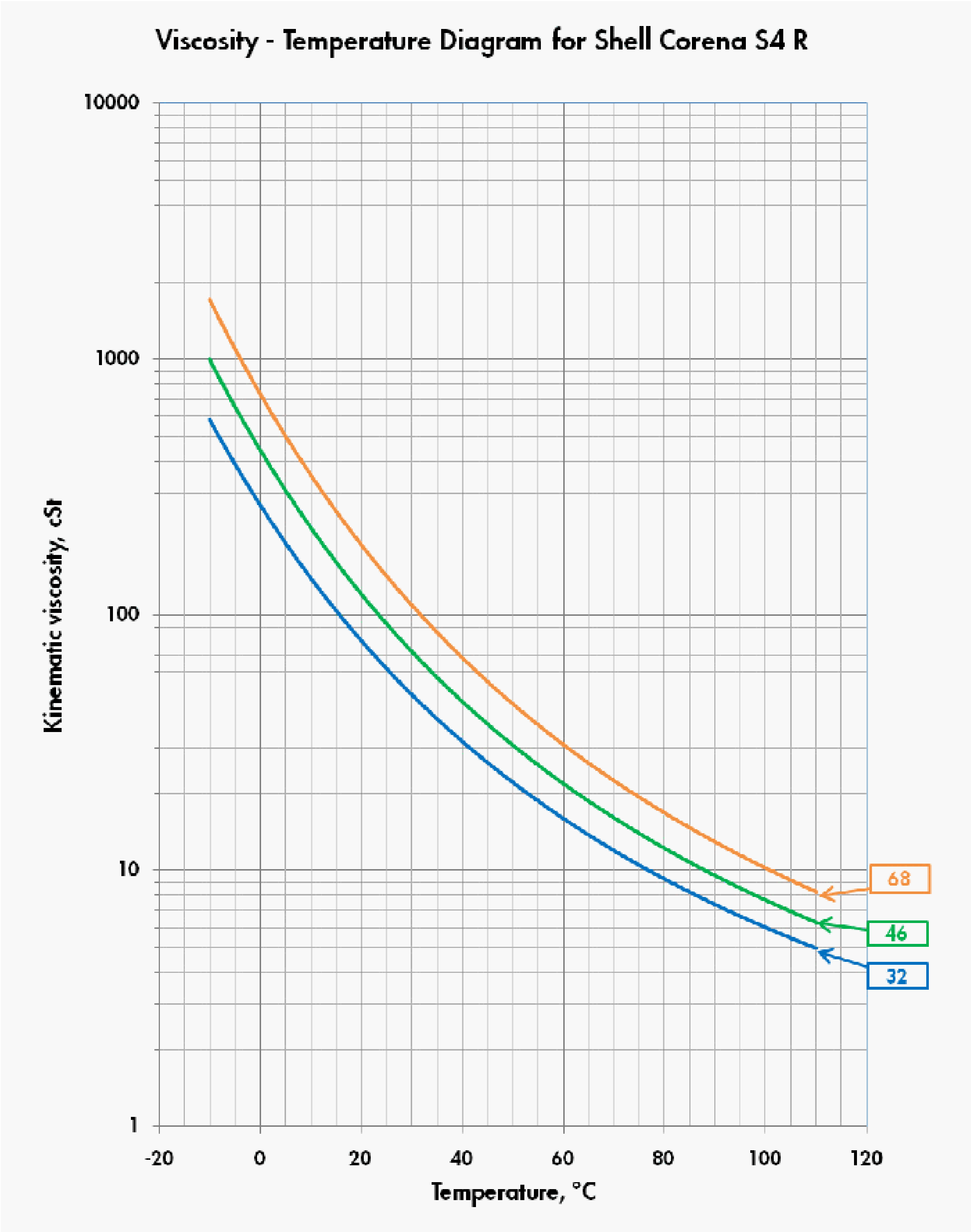
- **Health and Safety**
  Shell Corena S4 R Oil is unlikely to present any significant health or safety hazard when properly used in the recommended application and good standards of personal hygiene are maintained.

  Avoid contact with skin. Use impervious gloves with used oil. After skin contact, wash immediately with soap and water.

  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 drains, soil or water.

Additional Information

- **Advice**
  Advice on applications not covered here may be obtained from your Shell representative.


Viscosity - Temperature Diagram for Shell Corena S4 R
Kinematic viscosity, cSt
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Temperature, °C
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