Technical Data Sheet

- Extra Long Oil Life
- Extra efficiency

Shell Turbo *S4 X 32*

Premium based industrial steam, gas and combined cycle turbine lubricant

Shell Turbo S4 X 32 is based on Gas-to-Liquid (GTL) technology and has been developed to meet the demands of the latest high efficiency turbine systems. Designed to offer outstanding, long term performance under the most severe operating conditions Shell Turbo S4 X 32 will minimise deposit and sludge formation even under cyclic peak loading conditions.

DESIGNED TO MEET CHALLENGES

Performance, Features & Benefits

- **Extended oil life**

  Shell Turbo S4 X 32 delivers exceptional resistance to oxidation even under conditions of high oxidative and thermal stress. Excellent results in both the ASTM dry TOST and the TOST life test (ASTM D943) demonstrate the potential for Shell Turbo S4 X 32 to offer extended service life and reduced maintenance costs when compared to conventional mineral oil technology.

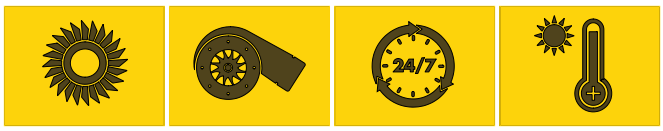
- **Enhanced Equipment protection**

  The greater resistance against varnish and sludge formation provided by Shell Turbo S4 X 32 allows turbine systems to operate reliably even during severe peak load operation. Minimising the formation of sludge and bearing deposits not only reduces the wear of critical system components, but can also reduce the risk of an unplanned turbine shutdown.

- **Enhanced System Efficiency**

  Demulsibility, air release and resistance to foaming are critical performance factors for oil in the latest turbine designs (especially turbines which have shorter oil residence times). Shell Turbo S4 X 32 offers excellent performance in all three areas, ensuring that optimum operating conditions are maintained.

Main Applications



- **Power and industrial steam, gas & combined cycle turbines**

  Shell Turbo S4 X 32 is used as the lubricating oil of choice in modern steam, gas and combined cycle turbines.

- Note that some applications with highly loaded gearboxes require a lubricant with enhanced anti-wear performance - for these applications use Shell Turbo S4 GX.

- **Further industrial applications**

  Shell Turbo S4 X 32 may also be used for other industrial applications requiring a high performance gas turbine oil, such as the lubrication of turbo compressors.

Specifications, Approvals & Recommendations

Shell Turbo S4 X 32 meets & exceeds international specification and requirements of the major turbine manufacturers including:

- ASTM 4304-13 Type I & III
- GB (China) 11120-2011, L-TGA, L-TSA, L-TGSB
- DIN 51515 Part 1 L-TD & Part 2 L-TG, 51524-1 HL
- ISO 8068:2006 L-TGB, 8068:2006 L-TGSB
- Shell Turbo S4 X 32 is approved by Siemens Power Generation, spec TLV 9013 04 and TLV 9013 05
- General Electric GEK 28143B, GEK 117064, GEK 32568Q, GEK 46506E
- Alstom HTGD 90117 V 0001 AA
- Dresser Rand 003-406-001 type I & III
- Westinghouse 21 TO591 and 55125Z3 and Eng Spec_DP21T-00000443
- Solar ES 9-224AA Class II
- MAN D&T SE TED 10000494596, Rev. 3
- Shell Turbo S4 X 32 meets the specification of Elliott Turbo-machinery X-18-0004
- GE Oil and Gas – Appropriate Specification listed under document ITN52220.04

- Shell Turbo S4 X 32 meets the requirements of MS04-MA-CL001 (Rev.5), MS04-MA-CL002 (Rev.5) and MS04-MA-CL005 (Rev.6)
- Shell Turbo S4 X 32 has been classified as a low varnishing type turbine oil by GE Oil & Gas against the specifications listed under document ITN52220.04

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

Typical Physical Characteristics

Properties			Method	Shell Turbo S4 X 32
ISO Viscosity Grade			ISO 3448	32
Kinematic Viscosity	@40°C	mm^2/s	ASTM D445	32.0
Kinematic Viscosity	@100°C	mm^2/s	ASTM D445	6.10
Viscosity Index			ASTM D2270	141
Density	@15°C	g/cm^3	IP 365	0.827
Flash Point (COC)		°C	ASTM D92	230
Pour Point		°C	ASTM D97	-42
Neutralisation Number		mg KOH/g	ASTM D974	0.10
Air Release	@50°C	minutes	ASTM D3427	1
Copper Corrosion	3hr/100°C		ASTM D130	1b
Rust Preventing Properties			ASTM D665 A & B	No Rust
Water Separability	minutes to 3 mL emulsion	minutes	ASTM D1401	15
Steam Demulsibility		Seconds	IP 19	80
Foaming Characteristics	tendency, stability	mL/mL	ASTM D892	
Sequence I				0/0
Sequence II				0/0
Sequence III				0/0
Load Carrying Capacity (FZG Gear Machine)		failure load stage	ISO 14635-1 A/8.3/90	7
Oxidation Stability				
RPVOT		minutes	ASTM D2272	1 400
Modified RPVOT		% of RPVOT		95%
TOST lifetime		hours minimum	ASTM D943	10 000
TOST 1000hr sludge		mg/kg	ASTM D4310	20
Dry TOST	@120°C		ASTM D7873	
Sludge Content at 25% RPVOT		mg/kg		51
Time to 25% RPVOT		hours		1 320

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 Turbo S4 X 32 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 Safety Data Sheet, which can be obtained from https://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.