



# Shell Turbo S4 GX 46

- Extra long oil life
- Enhanced wear protection

## Premium based industrial steam, gas and combined cycle turbine lubricant for geared turbines

Shell Turbo S4 GX 46 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 GX 46 will minimise wear, deposit and sludge formation even under cyclic peak loading conditions.

### DESIGNED TO MEET CHALLENGES

#### Performance, Features & Benefits

##### • Extended oil life

Shell Turbo S4 GX 46 delivers exceptional resistance to degradation, 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 GX 46 to offer extended service life, reduced maintenance costs and less downtime when compared to conventional mineral oil technology.

##### • Enhanced Equipment protection

The excellent prevention of deposit formation provided by Shell Turbo S4 GX 46 enables it to lubricate the hottest gas turbine bearings with minimal deposit build up or sludge formation. This reduces the potential for critical component failure and the risk of unplanned turbine shutdown.

- As the pressure increases on gearboxes in turbines it is critical for an oil to provide greater anti-wear protection. Shell Turbo S4 GX 46 offers enhanced anti-wear protection for heavily loaded gear boxes helping end users maintain optimum operating conditions under challenging situations without sacrificing resistance to deposits or oil life.

##### • Enhanced System Efficiency

Demulsibility, air release, resistance to foaming, and filter blockage are critical factors for oil in the latest geared turbine designs (especially turbines which have shorter oil residence times). Shell Turbo S4 GX 46 offers excellent performance in all four areas, ensuring that optimum operating conditions are maintained.

##### • Power and industrial steam, gas & combined cycle turbines

Shell Turbo S4 GX 46 is used as the lubricating oil of choice in modern steam, gas and combined cycle turbines, especially those needing enhanced anti-wear performance to protect highly loaded gearboxes.

##### • Further industrial applications

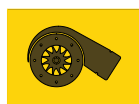
Shell Turbo S4 GX 46 may also be used for other industrial applications requiring a high performance gas turbine oil, such as the lubrication of turbo compressors

#### Specifications, Approvals & Recommendations

Shell Turbo S4 GX 46 meets & exceeds international specification and requirements of the major turbine manufacturers including:

- ASTM 4304-13 Type I, II & III
- GB (China) 11120-2011, L-TSE, L-TGE and L-TGSE
- DIN 51515 Part 1 L-TDP & Part 2 L-TGP, 51524-2 HLP
- JIS K 2213:2006 Type 2
- ISO 8068:2006 L-TSE, ISO 8068:2006 L-TGE, ISO 8068:2006 L-TGF, ISO 8068:2006 L-TGSE
- Shell Turbo S4 GX is approved by Siemens Power Generation, spec TLV 9013 04 and TLV 9013 05
- General Electric GEK 28143b, GEK 117064
- Alstom HTGD 90117 V 0001 AA
- Dresser Rand 003-406-001 Type I and III
- Solar ES 9-224AA Class II
- MAN D&T SE TED 10000494596
- Shell Turbo S4 GX meets Siemens Turbo-machinery specifications 1CW0047915, WN80003798, and report 65/0027
- Shell Turbo S4 GX meets Siemens Finspong MAT812109

#### Main Applications



- GE Oil and Gas – Appropriate Specification listed under document ITN52220.04
- ANSALDO TGO2-0171-E00000/B
- Shell Turbo S4 GX 46 is approved against the requirements of MHPS MS04-MA-CL003 (R-5)

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

### Typical Physical Characteristics

Properties			Method	Shell Turbo S4 GX 46
ISO Viscosity Grade			ISO 3448	46
Kinematic Viscosity	@40°C	mm <sup>2</sup> /s	ASTM D445	43.5
Kinematic Viscosity	@100°C	mm <sup>2</sup> /s	ASTM D445	7.50
Viscosity Index			ASTM D2270	139
Density	@15°C	g/cm <sup>3</sup>	IP 365	0.829
Flash Point (COC)			ASTM D92	250
Pour Point			ASTM D97	-27
Neutralisation Number			ASTM D974	0.15
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			IP 19	95
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	11
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	25
Dry TOST	@120°C		ASTM D7873	
Sludge Content at 50% RPVOT	mg/kg			26
Time to 50% RPVOT	hours			1 460

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 GX 46 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 (SDS) 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.