



# Shell Turbo S4 X 32

- Extra Long Oil Life
- Extra efficiency

*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
- 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 32568K, 46506e, 28143b, 107395a and 120498
- Alstom HTGD 90 117 V0001 Z
- Dresser Rand 003-406-001 type I & III
- Westinghouse 21 TO591 and 55125Z3 and Eng Spec\_DP21T-00000443
- Solar ES 9-224Y Class II
- MAN D&T SE TED 10000494596
- 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 S4X 32 meets the requirements of MS04-MA-CL001 (Rev.4), MS04-MA-CL002 (Rev.4) and MS04-MA-CL005 (Rev.2)

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 <sup>2</sup> /s | ASTM D445       | 32.0                |
| Kinematic Viscosity                      | @100°C                   | mm <sup>2</sup> /s | ASTM D445       | 6.10                |
| Viscosity Index                          |                          |                    | ASTM D2270      | 141                 |
| Density                                  | @15°C                    | g/cm <sup>3</sup>  | IP 365          | 0.827               |
| Flash Point (COC)                        |                          |                    | ASTM D92        | 230                 |
| Pour Point                               |                          |                    | ASTM D97        | -42                 |
| Neutralisation Number                    |                          |                    | 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                      |                          |                    | 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 - FZG - failure load stage |                          |                    | DIN 51354       | 7                   |
| Oxidation Stability                      |                          |                    |                 |                     |
| RPVOT                                    |                          |                    | ASTM D2272      | 1400                |
| Modified RPVOT                           |                          |                    |                 | 95%                 |
| TOST lifetime                            |                          |                    | ASTM D943       | 10 000+             |
| TOST 1000hr sludge                       |                          |                    | ASTM D4310      | 20                  |
| Dry TOST                                 | @120°C                   |                    | ASTM D7873      |                     |
| Sludge Content at 25% RPVOT              |                          |                    |                 | 51                  |
| Time to 25% RPVOT                        |                          |                    |                 | 1320                |

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 Material Safety Data Sheet (MSDS), which can be obtained from [www.epc.shell.com](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.