



# Shell Turbo CC 46

## Premium Quality Industrial Gas, Steam & Combined Cycle Turbine Oils

Shell Turbo Oils CC have been developed to meet the severe demands imposed by modern, heavy duty turbine applications, exceeding OEM specifications for both gas and steam turbines. A patented, metal free additive technology, ensures that these products offers substantially improved performance over conventional turbine oils. The unique combination of excellent oxidation and thermal stability, coupled with the resistance to formation of deposits and varnish, sludge control and surface properties make Shell Turbo Oils CC an excellent choice lubricant for emerging combined cycle turbine technology, as well as existing gas and steam turbine plants.

### DESIGNED TO MEET CHALLENGES

#### Performance, Features & Benefits

- **Superior oxidation and thermal stability**

Modern combined cycle and stationary gas turbines operating at high power outputs can be very stressful on the oxidation and thermal properties of the turbine oil.

Lubrication stability failure in this area can create operational problems, system deposits and the formation of varnish in critical areas. Shell Turbo Oils CC are especially designed to cope with these conditions. Their outstanding oxidation and thermal stability, coupled with the resistance to form deposits and varnish reduces the possibility of unplanned outages. The result is extended oil life, less maintenance and less downtime.

- **Rapid air release and high resistance to foaming**

High oil flows contribute to the possibility of entrapped air, which can lead to pump cavitation, premature oil oxidation and excessive wear. Shell Turbo Oils CC exhibit excellent surface properties with minimal foam formation and rapid air-release, which minimises air entrapment, reducing these effects of high oil flows to a minimum.

- **Excellent water-shedding properties**

Water contamination is commonplace in steam turbines, causing corrosion and affecting bearing lubrication. Because of Shell Turbo Oils CC outstanding demulsibility water can be drained easily from the lubrication system, protecting the installation against corrosion and premature wear.

- **Good load carrying capacity**

An ashless, non-zinc anti-wear system reduces excessive gear tooth and turbine component wear making it suitable for use in turbines with highly loaded gears. Minimising downtime and maintenance costs.

#### Main Applications

- Power generation combined cycle turbines.
- Industrial steam turbines.
- Industrial gas turbines.

#### Specifications, Approvals & Recommendations

- Siemens TLV 9013 04 & TLV 9013 05
- Alstom HTGD 90117 V 0001 AA
- General Electric GEK 28143b, GEK 32568h, GEK 46506E, GEK 101941A and GEK 107395a
- Siemens-Westinghouse 21 T0591 & 55125Z3
- Siemens/Mannesmann Demag 800 037 98 TD 32 / TD 46
- Solar ES 9-224Y Class II
- DIN 51515 Part 1 L-TD & Part 2 L-TG
- GEC Alstom NBA P50001A
- JIS K 2213:2006 Type 2
- ASTM D4304-06a Type I, II & III
- Skoda Technical Properties Tp 0010P/97 use in steam turbines.
- Shell Turbo CC 46 meets the specification of Siemens Finspong MAT 812109

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

## Typical Physical Characteristics

| Properties   |        |                 | Method                             | Shell Turbo Oil CC 46 |
|--|--------|-----------------|------------------------------------|-----------------------|
| Viscosity  | @40°C  | cSt             | ASTM D445                          | 46                    |
| Viscosity  | @100°C | cSt             | ASTM D445                          | 6.9                   |
| Viscosity Index  |        |                 | ASTM D2270                         | 105                   |
| Colour   |        |                 | ASTM D1500                         | L 1.0                 |
| Pour Point   |        | °C              | ASTM D97                           | -12                   |
| Flash Point (COC)  |        | °C              | ASTM D92                           | 238                   |
| Total Acid Number  |        | mg KOH/g        | ASTM D974                          | 0.16                  |
| Foaming, Sequence I  |        | ml/ml           | ASTM D892                          | 10/Nil                |
| Foaming, Sequence II   |        | ml/ml           |                                    | 20/Nil                |
| Foaming, Sequence III  |        | ml/ml           |                                    | 10/Nil                |
| Air Release  |        | minutes         | ASTM D3427                         | 4                     |
| Water Demulsibility  |        | minutes         | ASTM D1401                         | 15                    |
| Rust Control, after water washing                                |        |                 | ASTM D665B                         | Pass                  |
| Load Carrying Capacity - FZG - Load Stage Fail                   |        | minutes         | DIN 51354                          | 9                     |
| Oxidation Control Test – Oxidation Stability at high temperature |        | 72h at 175°C    | ASTM D4636 – Alternate Procedure 2 |                       |
| Oxidation Control Test - TOST Life                               |        | hours minimum   |                                    | 10 000                |
| Oxidation Control Test - RPVOT                                   |        | minutes minimum |                                    | 1 300                 |
| Oxidation Control Test - FTM-791b-5308 - Tan Increase            |        | mg KOH/g        |                                    | +0.6                  |
| Oxidation Control Test - FTM-791b-5308 - Viscosity Increase      | @40°C  | %               |                                    | +8.0                  |
| Oxidation Control Test - FTM-791b-5308 - Sludge Formation        |        | mg              |                                    | 98                    |

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

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.