Technical Data Sheet

Shell **Turbo** *Fluid DR 46*

Fire resistant hydraulic and lubricating fluid for turbines

Shell Turbo Fluid DR 46 is a fire-resistant hydraulic and lubricating fluid based on Tri-Aryl Phosphates manufactured from carefully selected raw materials.

DESIGNED TO MEET CHALLENGES

Performance, Features & Benefits

- **Excellent fire resistance**
  Shell Turbo Fluid DR 46 is inherently fire-resistant, offering high flash point, high fire point and high auto ignition temperature. It eliminates the risk of fire, potentially caused by mineral oil products.
- **Good oxidation stability**
  To provide long service life under normal operating conditions.
- **Good hydrolytic stability**
  Shell Turbo Fluid DR 46 is to a great extent able to withstand rapid decomposition of the Ester base fluid under the influence of moisture and water in the oil system.
- **Good demulsibility**
  To enable rapid separation from water for improved service intervals.
- **Good air release**
  Rapid air-release minimises air entrapment in lubrication and governor control systems in order to ensure safe operation of the whole equipment.
- **Low foaming**
  Minimal tendency for foaming to provide proper lubrication and heat transfer.

Main Applications

- **Lubrication of steam and gas turbines**
  Shell Turbo Fluid DR 46 can be used as lubrication oil for main bearings in steam and gas turbines, generators and cooling pumps.
- **Hydraulic fluid**
  It can be used as hydraulic fluid in electrohydraulic governor control systems in steam and gas turbines.

Specifications, Approvals & Recommendations

- Shell Turbo Fluid DR 46 is approved and/or exceeds the requirements of the major original equipment manufacturers such as General Electric (GE), Mitsubishi Hitachi Power Systems (MHPS), and Siemens, etc.
- Shell Turbo Fluid DR 46 appears in the FM Global (formally Factory Mutual) Approvals Guide against project identification number 3024866 as an approved fire resistant hydraulic fluid for turbine applications.
- For a full listing of equipment approvals and recommendations, please consult your local Shell Technical Helpdesk.

Compatibility & Miscibility

- **Compatibility - Packing, seals and hoses**
  The following materials are recommended for use with Shell Turbo Fluid DR 46: Butyl rubbers, Nylon, PTFE, VITON rubber (depending on operation temperature range).
- **Compatibility - Paintings**
  Attention must be paid to painted surfaces. Epoxy paints can be seen as resistant to Shell Turbo Fluid DR46.

Typical Physical Characteristics

Properties			Method	Shell Turbo Fluid DR 46
ISO Viscosity Grade			ISO 3448	46
Kinematic Viscosity	@40°C	mm^2/s	ISO 3104	43.4

Properties			Method	Shell Turbo Fluid DR 46
Kinematic Viscosity	@100^{0}C	mm^{2}/s	ISO 3104	5
Density	@20^{0}C	kg/m^{3}	ISO 3675	1130
Flash Point (COC)		min. ^{0}C	ISO 2592	270
Fire Point (COC)		min. ^{0}C	ISO 2592	368
Auto ignition temperature		^{0}C	IEC 79/4	575
Pour Point		^{0}C	ISO 3016	-20
Neutralisation Number		mg KOH/g	ISO 6619	0.06
Water Content		m-%	ISO 6296	0.06
Cleanliness			ISO 4406	-/15/12
Air Release, Minutes		minutes	ISO 9120	1

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

- 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

- **Fluid Conditioning**

  In order to ensure a long fluid life it is essential to keep the fluid clean and dry and to maintain a low level of acidity. Special advice for the treatment of the product in service can be requested from your supplier.
- **Advice**

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