Material Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

Material Name : **Shell Turbo Fluid DR 46**
Uses : Fire-resistant hydraulic fluid.

Product Code : 001A9774

Manufacturer/Supplier : **Shell India Markets Private Limited**
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143 Dr. MGR Road, Perungudi
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2. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture Description : Blend of synthetic esters and additives.

Hazardous Components

Chemical Identity	CAS	EINECS	Symbol(s)	R-phrase(s)	Conc.
Trixylyl Phosphate	25155-23-1	246-677-8	N, Repr. 2, Xn	R50/53; R60; R48/22	95.00 - 100.00 %
tris(methylphenyl) phosphate	1330-78-5	246-677-8	N, Repr. 3	R50/53; R62	0.25 - < 1.00 %

Additional Information : Refer to chapter 16 for full text of EC R-phrases.

3. HAZARDS IDENTIFICATION

EC Classification : Toxic to Reproduction, category 2.
Dangerous for the environment.

Health Hazards : Harmful: danger of serious damage to health by prolonged exposure if swallowed. May impair fertility. High-pressure injection under the skin may cause serious damage including local necrosis. Used oil may contain harmful impurities.

Signs and Symptoms : Local necrosis is evidenced by delayed onset of pain and tissue damage a few hours following injection. Ingestion may result in nausea, vomiting and/or diarrhoea.

Safety Hazards : Fire resistant fluid that is unlikely to burn without assistance from combustible materials.

Environmental Hazards	:	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

4. FIRST-AID MEASURES

General Information	:	Not expected to be a health hazard when used under normal conditions.
Inhalation	:	No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice.
Skin Contact	:	Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention. When using high pressure equipment, injection of product under the skin can occur. If high pressure injuries occur, the casualty should be sent immediately to a hospital. Do not wait for symptoms to develop. Obtain medical attention even in the absence of apparent wounds.
Eye Contact	:	Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
Ingestion	:	In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.
Advice to Physician	:	Treat symptomatically. High pressure injection injuries require prompt surgical intervention and possibly steroid therapy, to minimise tissue damage and loss of function. Because entry wounds are small and do not reflect the seriousness of the underlying damage, surgical exploration to determine the extent of involvement may be necessary. Local anaesthetics or hot soaks should be avoided because they can contribute to swelling, vasospasm and ischaemia. Prompt surgical decompression, debridement and evacuation of foreign material should be performed under general anaesthetics, and wide exploration is essential.

5. FIRE-FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Specific Hazards	:	Fire resistant fluid that is unlikely to burn without assistance from combustible materials.
Suitable Extinguishing Media	:	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable Extinguishing Media	:	Do not use water in a jet.
Protective Equipment for Firefighters	:	Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe the relevant local and international regulations.

Protective measures	:	Avoid contact with skin and eyes. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or

other appropriate barriers.

Clean Up Methods : Slippery when spilt. Avoid accidents, clean up immediately. Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent. Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.

Additional Advice : Local authorities should be advised if significant spillages cannot be contained.

7. HANDLING AND STORAGE

General Precautions : Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.

Handling : Avoid prolonged or repeated contact with skin. Avoid inhaling vapour and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires.

Storage : Keep container tightly closed and in a cool, well-ventilated place. Use properly labelled and closeable containers. Store at ambient temperature.

Recommended Materials : For containers or container linings, use mild steel or high density polyethylene.

Unsuitable Materials : PVC.

Additional Information : Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

If the American Conference of Governmental Industrial Hygienists (ACGIH) value is provided on this document, it is provided for information only.

Occupational Exposure Limits

Biological Exposure Index (BEI)
No biological limit allocated.

Exposure Controls : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances.
Appropriate measures include: Adequate ventilation to control airborne concentrations. Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.
Define procedures for safe handling and maintenance of controls. Educate and train workers in the hazards and control measures relevant to normal activities associated with this

product. Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation. Drain down system prior to equipment break-in or maintenance. Retain drain downs in sealed storage pending disposal or for subsequent recycle. Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

Personal Protective Equipment : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Respiratory Protection : No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for combined particulate/organic gases and vapours [boiling point >65°C(149 °F)].

Hand Protection : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.
For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same, but recognise that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time may be acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material.

Eye Protection : Wear safety glasses or full face shield if splashes are likely to occur.

Protective Clothing : Skin protection not ordinarily required beyond standard issue work clothes.

Monitoring Methods : Monitoring of the concentration of substances in the breathing

zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate. Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory. Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.

National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods http://www.cdc.gov/niosh/
Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods http://www.osha.gov/
Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances http://www.hse.gov.uk/
Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA), Germany. http://www.dguv.de/inhalt/index.jsp
L'Institut National de Recherche et de Securité, (INRS), France http://www.inrs.fr/accueil

Environmental Exposure Controls : Take appropriate measures to fulfil the requirements of relevant environmental protection legislation. Avoid contamination of the environment by following advice given in Chapter 6. If necessary, prevent undissolved material from being discharged to waste water. Waste water should be treated in a municipal or industrial waste water treatment plant before discharge to surface water. Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Colourless. Liquid at room temperature.
Odour	:	Slight.
pH	:	Not applicable.
Initial Boiling Point and Boiling Range	:	> 300 °C / 572 °F
Pour point	:	Typical -20 °C / -4 °F
Flash point	:	Typical 270 °C / 518 °F (COC)
Upper / lower Flammability or Explosion limits	:	Data not available
Auto-ignition temperature	:	Typical 575 °C / 1,067 °F
Vapour pressure	:	Typical 0.440 hPa at 200 °C / 392 °F
Specific gravity	:	Typical 1.13 at 15 °C / 59 °F
Density	:	Typical 1,130 kg/m3 at 15 °C / 59 °F
Water solubility	:	Negligible.
Solubility in other solvents	:	Data not available
n-octanol/water partition coefficient (log Pow)	:	Typical 5.63
Dynamic viscosity	:	Typical 100 mPa.s at 25 °C / 77 °F
Kinematic viscosity	:	Typical 44 mm2/s at 40 °C / 104 °F
Vapour density (air=1)	:	> 1 (estimated value(s))

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Electrical conductivity	:	This material is not expected to be a static accumulator.
Evaporation rate (nBuAc=1)	:	Data not available
Decomposition Temperature	:	Data not available

10. STABILITY AND REACTIVITY

Stability	:	Stable.
Conditions to Avoid	:	Extremes of temperature and direct sunlight.
Materials to Avoid	:	Strong oxidising agents. Strong acids. Strong bases.
Hazardous Decomposition Products	:	Oxides of phosphorous.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	:	Information given is based on data on the components and the toxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).
Acute Oral Toxicity	:	Expected to be of low toxicity: LD50 > 5000 mg/kg , Rat
Acute Dermal Toxicity	:	Expected to be of low toxicity: LD50 > 5000 mg/kg , Rabbit
Acute Inhalation Toxicity	:	Not considered to be an inhalation hazard under normal conditions of use.
Skin Irritation	:	Expected to be slightly irritating. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
Eye Irritation	:	Expected to be slightly irritating.
Respiratory Irritation	:	Inhalation of vapours or mists may cause irritation.
Sensitisation	:	Not expected to be a skin sensitiser.
Repeated Dose Toxicity	:	May cause damage to organs or organ systems through prolonged or repeated exposure.
Mutagenicity	:	Not considered a mutagenic hazard.
Carcinogenicity	:	Not expected to be carcinogenic.

Trixylyl Phosphate	:	GHS / CLP: No carcinogenicity classification

Reproductive and Developmental Toxicity	:	May impair fertility at doses which produce other toxic effects.
Additional Information	:	Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible. High pressure injection of product into the skin may lead to local necrosis if the product is not surgically removed.

12. ECOLOGICAL INFORMATION

Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

Acute Toxicity	:	Poorly soluble mixture. May cause physical fouling of aquatic organisms. Expected to be practically non toxic: LL/EL/IL50 >

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		100 mg/l LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract.
Aquatic crustacea	:	Very toxic: LC/EC/IC50 <= 1 mg/l
Mobility	:	Liquid under most environmental conditions. If it enters soil, it will adsorb to soil particles and will not be mobile. Sinks in water.
Persistence/degradability	:	Expected to be not readily biodegradable.
Bioaccumulation	:	Has the potential to bioaccumulate.
Other Adverse Effects	:	Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.

13. DISPOSAL CONSIDERATIONS

Material Disposal	:	Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses.
Container Disposal	:	Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
Local Legislation	:	Disposal should be in accordance with applicable regional, national, and local laws and regulations.

14. TRANSPORT INFORMATION

Land (as per ADR classification): Regulated

Class	:	9
Packing group	:	III
Hazard indentification no.	:	90
UN number	:	3082
Danger label (primary risk)	:	9
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Trixylyl phosphates)
Environmentally Hazardous	:	Yes

IMDG

Identification number	UN 3082
Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Technical name	(Trixylyl phosphates)
Class / Division	9
Packing group	III
Marine Pollutant:	Yes (Trixylyl phosphates)

IATA (Country variations may apply)

UN number	:	3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s.
Technical name	:	(Trixylyl phosphates)
Class / Division	:	9

Packing group	:	III
Additional Information	**:**	MARPOL Annex 1 rules apply for bulk shipments by sea.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

EC Classification	:	Toxic to Reproduction, category 2. Dangerous for the environment.
EC Symbols	:	T Toxic. N Dangerous for the environment.
EC Risk Phrases	:	R48/22 Harmful: danger of serious damage to health by prolonged exposure if swallowed. R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. R60 May impair fertility.
EC Safety Phrases	:	S23 Do not breathe gas/fumes/vapour/spray. S36/37 Wear suitable protective clothing and gloves. S53 Avoid exposure. Obtain special instructions before use. S57 Use appropriate container to avoid environmental contamination. S60 This material and its container must be disposed of as hazardous waste. S61 Avoid release to the environment. Refer to special instructions/safety data sheets.

Chemical Inventory Status

EINECS	:	All components listed.
TSCA	:	All components listed.
Classification triggering components	:	Contains trixylyl phosphate.
Other Information	:	The Manufacture, Storage and Import of Hazardous Chemicals Rules 1989 (amended version issued 2000). The Factories Act, 1948, The Second Schedule: Permissible levels of certain chemical substances in work environment, as amended through 1987. India Central motor Vehicles (Amendment) Rules 1993.

16. OTHER INFORMATION

R-phrase(s)

R48/22	Harmful: danger of serious damage to health by prolonged exposure if swallowed.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R60	May impair fertility.
R62	Possible risk of impaired fertility.

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SDS Effective Date : 26.11.2013

SDS Revisions : A vertical bar (|) in the left margin indicates an amendment from the previous version.

SDS Distribution : The information in this document should be made available to all who may handle the product.

Disclaimer : This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.