



## Technical Data Sheet

Previous Name: Shell Diala DX Dried

# Shell Diala S3 ZX-I Dried

- Extra Performance
- Meets IEC 60296 - High

## Premium Inhibited Electrical Insulating Oil

Shell Diala S3 ZX-I Dried is a premium inhibited electrical insulating oil manufactured from specially refined mineral oils with an ultra-low sulphur content. It offers very high oxidation stability and excellent dielectric and low temperature properties. Shell Diala S3 ZX-I Dried is dried to achieve a higher breakdown voltage than required by standard industry norms.

Shell Diala S3 ZX-I Dried meets both the established and new industry copper corrosion tests.

## DESIGNED TO MEET CHALLENGES

### Performance, Features & Benefits

#### Extended oil life

Shell Diala S3 ZX-I Dried is a fully inhibited oil giving outstanding oxidation performance and an extended oil life.

Shell Diala S3 ZX-I Dried is also suitable for use in highly loaded applications.

#### Transformer protection

Shell Diala S3 ZX-I Dried is manufactured from an ultra low sulphur base oil, making it intrinsically non-corrosive towards copper, without the need for passivation.

#### System efficiency

The good low temperature properties of the oil ensure proper heat transfer inside the transformer, even from very low starting temperatures.

Shell Diala S3 ZX-I Dried is specially dried and handled to achieve a low water content and retain a high breakdown voltage at point of delivery. This enables it to be used in many applications without further treatment.

### Main Applications



#### Transformers

All Power transformer types and applications (e.g. generator transformers, shunt reactors, distribution transformers).

#### Electrical equipment

Components such as rectifiers, circuit breakers and switchgear.

### Specifications, Approvals & Recommendations

- IEC 60296 (Edition 4.0 2012-02): Table 2
- Transformer Oil (I) (Inhibited oil)
- Section 7.1 ("Higher oxidation stability")
- Baader oxidation test of (obsolete) DIN 57370-1 (1978)

For a full listing of equipment approvals and recommendations, please consult your local Shell Technical Helpdesk, or the OEM Approvals website.

### Typical Physical Characteristics

| Properties           |        |            | Method      | IEC 60296 Requirement                           | Shell Diala S3 ZX-I Dried |
|----------------------|--------|------------|-------------|-------------------------------------------------|---------------------------|
| Appearance           |        |            | IEC 60296   | Clear, free from sediment and suspended matters | Complies                  |
| Density              | @15°C  | kg / m³    | ISO 3675    | -                                               | 881                       |
| Density              | @20°C  | kg / m³    | ISO 3675    | Max 895                                         | 878                       |
| Kinematic Viscosity  | @40°C  | mm² / s    | ISO 3104    | Max 12                                          | 8.0                       |
| Kinematic Viscosity  | @-30°C | mm² / s    | ISO 3104    | Max 1 800                                       | 720                       |
| Flash Point (PM)     |        | °C         | ISO 2719    | Min 135                                         | 138                       |
| Pour Point           |        | °C         | ISO 3016    | Max -40                                         | -60                       |
| Neutralisation Value |        | mg KOH / g | IEC 62021-1 | Max 0.01                                        | <0.01                     |
| Corrosive Sulphur    |        |            | DIN 51353   | Not corrosive                                   | Not corrosive             |

| Properties                                                       |                 | Method       | IEC 60296 Requirement | Shell Diala S3 ZX-I Dried |
|------------------------------------------------------------------|-----------------|--------------|-----------------------|---------------------------|
| Corrosive Sulphur                                                |                 | IEC 62535    | Not corrosive         | Not corrosive             |
| Corrosive Sulphur                                                |                 | ASTM D1275 B | -                     | Not corrosive             |
| Breakdown Voltage - As Delivered                                 | kV              | IEC 60156    | Min 30                | >60                       |
| Breakdown Voltage - After Treatment                              | kV              | IEC 60156    | Min 70                | >70                       |
| Dielectric dissipation factor (DDF)                              |                 | IEC 60247    | Max 0.005             | 0.001                     |
| Oxidation Stability (500 hrs) - Total Acidity                    | @120°C mg KOH/g | IEC 61125 C  | Max 0.3               | 0.02                      |
| Oxidation Stability (500 hrs) - Sludge                           | % m             | IEC 61125 C  | Max 0.05              | 0.01                      |
| Dielectric dissipation factor (DDF)                              |                 |              | Max 0.05              | 0.005                     |
| Oxidation Stability Baader (28 d / 110°C) - Neutralisation Value | @90°C mg KOH/g  | DIN 51554    | -                     | <0.03                     |
| Oxidation Stability Baader (28 d / 110°C) - Sludge Content       | %m              |              | -                     | <0.006                    |
| Dielectric Dissipation Factor (DDF)                              | @90°C           |              | -                     | 0.005                     |
| Inhibitor - DBPC                                                 | %               | IEC 60666    | 0.08 - 0.40           | Max 0.3                   |

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 Diala S3 ZX-I Dried 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, 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.

### Polychlorinated Biphenyls

Shell Diala S3 ZX-I Dried is free from polychlorinated biphenyls (PCB).

## Additional Information

### Storage Precautions

The critical electrical properties of Shell Diala S3 ZX-I Dried are easily compromised by trace contamination with foreign material. Typically encountered contaminants include moisture, particles, fibres and surfactants. Therefore, it is imperative that electrical insulating oils be kept clean and dry.

It is strongly recommended that storage containers be dedicated for electrical service and include airtight seals. It is further recommended that electrical insulating oils be stored indoors in climate-controlled environments.

### Advice

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