
From protecting transformers to powering nations
Shell Diala makes it possible
The Shell Diala range of transformer oils helps to protect your equipment and to ensure efficient operation throughout its lifetime.
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The Shell Diala range has been extended with the introduction of Shell Diala S5 BD, a new GTL-based product engineered for providing the solution to meet the challenges of today's and tomorrow's power transformers.

Shell Diala S5 BD is biodegradable (OECD 301B) and has excellent low-temperature performance.[1] Powered by GTL technology, its outstanding oxidation performance makes it suitable for use in a highly loaded application with extended oil life, which means transformer performance is maintained for a longer period.

Resistance to corrosion

Shell is committed to minimising the possibility of insulating-oil-related corrosive sulphur developing, and the resultant copper corrosion. All Shell Diala products meet the industry standards for corrosive sulphur.

Enhanced protection

Oil is at the heart of your transformer. The Shell Diala range offers several options for the best possible protection. Shell Diala S4 ZX-I, Shell Diala ZX-IG and Shell Diala S5 BD exceed IEC 60296 (Edition 5, 2020) Type A with their higher oxidation stability and low sulphur specification. In fact, they are virtually sulphur free (below the detection limit), which means that the risk of oil-related copper corrosion is removed.

Longer oil life

Shell Diala transformer oils are designed to last, thereby supporting the extension of your transformer's lifetime. Shell Diala S4 ZX-I, Shell Diala ZX-IG and Shell Diala S5 BD exceed the 500-hour oxidation test limit and extend oil life through their exceptional resistance to the effects of ageing, sludge formation and deposit build-up.

Greater efficiency

For optimum transformer performance, electrical insulating oil must maintain its characteristics over a wide range of operating temperatures. Theoretical modelling predicts that Shell Diala S4 ZX-I, Shell Diala ZX-IG and Shell Diala S5 BD could deliver improved operational performance under overload conditions owing to their enhanced thermal properties.[1]

Shell has designed a portfolio of fluids that enables you to choose a product to match your technical and operational needs.

Special properties

Shell offers products designed for specialist applications. Within the Shell Diala range, these include

- **Shell Diala S5 BD –** powered by GTL technology, this product is designed to provide a biodegradable (OECD 301B) solution to meet the challenges of today's distribution transformer and tomorrow's power transformer. It offers excellent low-temperature performance and extended oil life.
- **Shell Diala S4 ZX-IG –** designed to meet the gassing tendency specifications as per ASTM D3487 and suggested for use in high-voltage instrument transformers and bushings. It helps to improve transformer reliability compared with conventional mineral oils.

A range of transformer oils to meet your needs

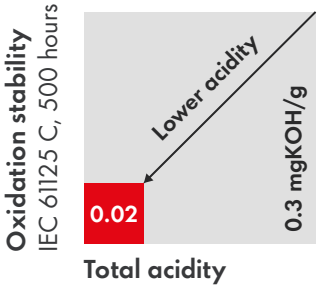
To meet the challenges of a wide range of equipment designs and applications, Shell has designed a portfolio of fluids that enables you to choose a product to match your technical and operational needs.

Standard applications	
IEC 60296:2020, Type A	**ASTM D3487, Type II**
Shell Diala S5 BD	**Shell Diala S2 ZX-A***
• Biodegradable (OECD 301B) • Excellent low-temperature performance • Also meets CAN/CSA-C50-14 Class A Type IV	• Reliable performance • Meets ASTM D3487 Type II
Shell Diala S4 ZX-I	**Shell Diala S4 ZX-IG**
• Biodegradable (OECD 301B) • GTL technology • Extra performance • Effectively sulphur free	• GTL technology • Extra performance • Low gassing tendency • Effectively sulphur free

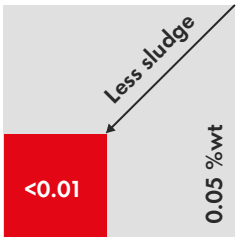
*Shell Diala S2 ZX-A is only available for North America.

Longer transformer protection

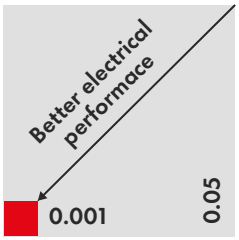
The longer an oil resists degradation, the longer you can keep your transformers working confidently.



Total acidity



Sludge



Dielectric dissipation factor, 90 °C

Relative performance

- Shell Diala S4 ZX-I and ZX-IG
- Maximum IEC 60296 Ed. 5 limits for Type A oils

The first diagram shows that the total acidities of both Shell Diala S4 ZX-I and Shell Diala ZX-IG (0.02 mgKOH/g) exceed the requirements of IEC 60296 Ed. 5 (0.3 mgKOH/g), as per the oxidation stability test IEC 61125 (Method C).

The second diagram shows that Shell Diala S4 ZX-I and ZX-IG have less than 0.01%wt of sludge compared to the maximum requirements of IEC 60296 Ed. 5 (0.05%wt), as per the oxidation stability test IEC 61125 (Method C).

The third diagram shows that the electrical performances of both Shell Diala S4 ZX-I and Shell Diala ZX-IG (with a dielectric dissipation factor of 0.001) exceed the maximum requirements of IEC 60296 Ed. 5 (with a dielectric dissipation factor of 0.005), measured at 90°C, as per the oxidation stability test IEC 61125 (Method C).

Enhanced temperature properties

The lower the temperature, the higher the oil viscosity and the lower the oil flow rate and cooling ability.

Optimum viscosity and performance in the temperature rage that matters most[1]

Shell Diala S4 ZX-I and ZX-IG have:

Pour point < −42°C
Viscosity lower than 381 mm2/s at −30°C
Viscosity lower than 1,157 mm2/s at −40°C

Shell Diala S5 BD has:

Pour point < −48°C
Viscosity lower than 253 mm2/s at −30°C
Viscosity lower than 1,000 mm2/s at −40°C
Very low cold start energising temperature (LCSET): −35/40°C

Lighter transformers

Lower density, which means more volume per tonne. Helping to reduce the total weight of the transformer for improved transport and installation efficiency.

Product	Density, kg/dm²	Shell Diala S4 ZX-I density effect*
Shell Diala S4 ZX-I and ZX-IG	0.805	– 8.5%
Shell Diala S5 BD	0.816	– 7.3%

Product	Category descriptor	Benefits	Technology	Specifications and approvals (Full details of approvals for all products can be obtained from your shell representative, or visit www.epc.shell.com for more product information; approvals and claims will vary by viscosity grade.)
Shell Diala S4 ZX-I	Premium, inhibited transformer oil	• Enhanced performance • Effectively sulphur free • Readily biodegradable (OECD 301B)	GTL	Meets and exceeds the performance requirement of • IEC 60296 (Edition 5, 2020) Type A, fully inhibited high grade oil. Approved/endorsed by most leading equipment manufacturers and utility companies.
Shell Diala S4 ZX-IG	Premium, inhibited, gas-absorbing transformer oil	• Enhanced performance • Effectively sulphur free • Low gassing tendency	GTL	Meets and exceeds the performance requirement of • IEC 60296 (Edition 5, 2020) Type A, fully inhibited high grade oil • ASTM D3487 Type II (inhibited). Approved/endorsed by most leading equipment manufacturers and utility companies.
Shell Diala S2 ZX-A*	Inhibited transformer oil	• Reliable performance	Conventional mineral oil	Meets and exceeds the performance requirement of • ASTM D3487 Type II (inhibited).
Speciality grades				
Shell Diala S5 BD	Premium, inhibited transformer oil	• Readily biodegradable (OECD 301B) • Excellent low-temperature performance • Effectively sulphur free	GTL	Meets and exceeds the performance requirement of • IEC 60296 (Edition 5, 2020) Type A, fully inhibited high grade oil • ASTM D3487 Type II (inhibited) • CAN/CSA-C50-14, Class A Type IV (inhibited).

*Shell Diala S2 ZX-A is only available for North America.

Comprehensive product and service provision

Shell Lubricants has been the number one lubricant supplier for 18 years (Kline & Company, 2024) and is built on over 40 years of technical innovation. It is constantly investing to develop better lubrication solutions, as demonstrated by

- **Shell Turbo S4 GX –** a premium industrial gas turbine oil based on Shell GTL technology for steam, light- and heavy-duty gas and combined-cycle turbines, including geared turbines with load requirements
- **Shell Mysella S5 N –** which offers extended oil life and extra protection from deposits for demanding stationary gas engines[2]
- **Shell Mysella S5 S –** a specially designed low-ash oil for sour gas applications providing extra protection against deposits and corrosion.[2]

In addition, Shell provides the Shell LubeAnalyst service, an early-warning system that helps to identify potential oil and equipment failures before they become critical and to extend oil-drain intervals. It is a global platform available in 95 countries and 27 languages, and with more than 75 million data points.

[1]Based on tests; compared with Shell and competitors' products.
[2]Based on tests compared with a competitor's product and lower-tier Shell products.

Find out more by visiting
shell.com/diala