

Biodegradability Explained

What is biodegradability and why does it matter?



What is biodegradability?

Biodegradability is a measure of the breakdown of a chemical or a chemical mixture by microorganisms. It gives an indication of how long a chemical will remain in the environment (persistence).



Why does biodegradability matter?

Biodegradability is the natural ability of organic substances to be broken down into simpler and harmless substances through the action of microorganisms. This property gives an indication about the potential to persistence of a chemical in the environment, particularly important when events such as accidental spills or leaks of fluid or waste disposal occur. The longer a chemical remains in the environment, the higher the potential exposure an organism will have to that chemical.

To estimate the risks of detrimental effects on the environment, which could impact the people or businesses that use these ecosystems, the biodegradability of a chemical needs to be considered. Together with toxicity tests, these aspects help us to understand the potential risk that products may have to the environment if they were to be released.



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How does Shell test for biodegradability?

There are different experimental methods available to assess the potential of chemicals to biodegrade in the environment.


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Tests that focus on the “readily biodegradable” classification criteria are often applied in chemical safety assessments.
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Shell has found that among the commonly used OECD methods (OECD 301 series, OECD 310) – the OECD 301 B CO₂ (carbon dioxide) Evolution Test is reliable for assessing the biodegradation profile of lubricants and greases that are poorly soluble in water. This is also a test method recognised by the EU Ecolabel. According to the OECD 301 B test method a chemical is considered “readily biodegradable” when the 60% degradation is achieved by the end of the 28-day test period.^{3,4}
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Any test method used to support a claim of “readily biodegradable” for an oil-based lubricant must be internationally recognised, standardised and widely available.

How can Shell PANOLIN help customers?

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Shell PANOLIN balances performance and protection with a wide range of lubricants that help meet the demand for more performance, more regulations and more productivity, with less resources, less risk and less impact.
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At a time when cost-efficient output is paramount, Shell PANOLIN helps to deliver advanced performance for equipment operating in environmentally sensitive areas, across a broad range of temperatures and environmental conditions.^{5,6}
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All Shell PANOLIN products are readily biodegradable.¹ With a high proportion of EU Ecolabel endorsed products² Shell PANOLIN protects equipment and the environment with one solution to help customers navigate regulatory requirements and improve environmental stewardship.
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Designed to maximise customer output with less downtime while using fewer resources, Shell PANOLIN helps give customers confidence that their equipment is running efficiently and reliably, with expertise from four decades of combined experience in biodegradable and conventional industrial lubricants.⁷

Shell PANOLIN biodegradable lubricants are designed to provide excellent equipment protection in harsh conditions and offer a compelling choice for customers eager to take tangible steps towards environmental stewardship

¹ Readily biodegradable in accordance with OECD 301 B, >60% degraded by the end of the 28-day test.
² Shell PANOLIN products containing “EAL” in the name carry the EU Ecolabel.
³ Our finished lubricants biodegraded by over 60% after 28 days in the OECD 301 B carbon dioxide evolution test. ASTM D6384-99, “Standard Terminology Relating to Biodegradability and Ecotoxicity of Lubricants”
⁴ EN 17181-2019 specifies a procedure for determining the degree of aerobic degradation of fully formulated lubricants.
⁵ Shell PANOLIN S4 hydraulics range is designed to protect machines over a wide temperature operating range and high viscosity index fluids enable increased hydraulics efficiency, in comparison to typical HM mineral oils, tested in line with standards ASTM D97, ASTM D2270 and DIN 51360-6. The range also has good cold flow behaviour, reducing the risk of metal-on-metal wear.
⁶ Excellent foam control and demulsibility properties (water separation) are coupled with load carrying characteristics that help to reduce consumption in products such as Shell PANOLIN S4 Stern Tube EAL.
⁷ Shell Naturelle products were marketed for over 25 years and PANOLIN biodegradables since 1980s.