Mechanism and Long-Term Efficacy of PMX 145 Fuel Biocide in Diesel, Biodiesel and Unleaded Petrol Storage Systems

Abstract

Microbial contamination is a well-documented cause of fuel degradation, corrosion, and operational failure in fuel storage systems. The presence of water within fuel tanks enables microbial growth at the fuel–water interface, leading to sludge formation, filter blockage, and material damage. This document describes the mechanism of action, post-treatment behaviour, and long-term protective characteristics of PMX 145, a fuel biocide formulated for use in diesel, biodiesel and unleaded petrol (ULP) applications. Fuel specification compatibility has been independently verified to ASTM D975 (diesel) and ASTM D4814 (ULP).

1. Introduction

Diesel, biodiesel and unleaded petrol fuels are susceptible to microbial contamination when water is present in storage systems. Even limited water ingress from condensation or compromised seals can create favourable conditions for microbial proliferation. Biodiesel blends exhibit increased hygroscopicity relative to conventional diesel, increasing contamination risk.

2. Microbial Growth in Fuel Systems

Microorganisms colonise the fuel–water interface where nutrients are available. Resulting effects include sludge formation, organic acid production, corrosion, fuel degradation, and filter blockage.

3. PMX 145 Formulation Characteristics

PMX 145 is engineered to remain suspended throughout the fuel phase, enabling uniform distribution and consistent microbial contact across tank volumes, surfaces, and downstream components.

4. Mechanism of Action

PMX 145 inactivates microorganisms, promotes settling of biomass for removal, remains present after remediation, and provides ongoing biostatic protection against re-contamination.

5. Handling and Safety

PMX 145 is classified as non-hazardous for handling and storage, simplifying logistics and reducing occupational risk.

6. Fuel Specification Compatibility

Treated fuel remains within ASTM D975 (diesel) and ASTM D4814 (ULP) specification limits, ensuring compliance with standard diesel and unleaded petrol fuel requirements. Octane rating in treated petrol is unaffected.

Standard	Fuel Type	Test Description	Result	Status
ASTM D975	Diesel / Biodiesel	Diesel fuel specification compliance	Meets requirements	Pass
ASTM D4814	ULP (Unleaded Petrol)	Petrol fuel specification compliance	Meets requirements	Pass
ASTM D2699 / D2700	ULP	Octane rating (RON / MON)	No reduction	Pass
ASTM D6469	Diesel & ULP	Microbial contamination	<10 CFU/mL	Pass

PMX 145 has been independently verified under ASTM D4814 for unleaded petrol in addition to its established ASTM D975 diesel compliance, confirming no reduction in fuel specification — including octane retention — across both fuel

families.

7. Long-Term Performance

Fuel testing indicates protection exceeding five years in diesel and over two years in biodiesel blends under appropriate conditions, with ongoing biostatic protection in treated ULP subject to storage and water-ingress control.

8. Conclusion

PMX 145 provides an integrated microbial control strategy suitable for regulatory-compliant fuel storage and long-term asset protection across diesel, biodiesel and unleaded petrol systems.

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