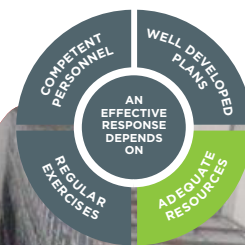


# Corexit™ EC 9500A Effectiveness, toxicity and biodegradability



This datasheet provides a summary of key facts about Corexit EC9500A.

<b>Name</b>	Corexit EC9500A
<b>Supplying company</b>	Nalco Environmental Solutions LLC

### Dispersant product approval

Development of dispersant regulations by competent national authorities or appropriate government regulators forms a critical part of national oil spill contingency planning processes, in alignment with the International Convention on Oil Pollution Preparedness, Response and Cooperation, 1990 (OPRC Convention).

Dispersant product approval requirements outline which dispersants are approved for use and how dispersants can be added to a list of approved dispersants

by meeting the requirements of specific laboratory-based tests.

The tests are designed to screen out least effective or more toxic dispersants and as such can only be used for comparative purposes and not for assessment of actual impacts or efficiency at sea where mixing and especially exposure conditions (as well as organisms types and life stages) would be very different.

During a response, field efficiency may be evaluated by a test application of dispersant.



Regulatory approval of dispersant products and authorization for their use

Further information on regulatory approval and authorisation can be found in the IPIECA-IOGP report on the subject:  
[bit.ly/DispersantAA](http://bit.ly/DispersantAA)

## Effectiveness

A dispersant should meet or exceed a threshold for effectiveness (or 'efficacy'). It is necessary for a dispersant to possess a minimum level of effectiveness to enhance the rate of natural dispersion when applied at sea.

A range of laboratory based tests are used globally that have been designed to allow for the assessment of good vs poor performance: IFP (>60%) in France, WSL (LR448, >60%) in UK and SFT in USA/ Canada (>45%).

These tests are designed to assess dispersant efficacy under specific conditions described in national regulations. None of the laboratory test methods can simulate the complex mixing scenarios and energies encountered in the marine environment. Therefore, results from laboratory tests typically expressed as 'percentage effectiveness', should not be extrapolated to the amount of oil likely to be dispersed in real world incidents. The tests will, however, provide data on the relative effectiveness of different dispersants under the parameters of that test.

	UK	USA	FRANCE
<b>Efficacy pass level</b>	<b>&gt;60%</b> Dispersants must achieve a minimum efficiency of 60%	<b>≥45%</b> A dispersant must attain an effectiveness value of 45% or greater (compared to the control) in order to be added to the US EPA NCP Schedule	<b>&gt;60%</b> Dispersants must achieve a minimum efficiency of 60%
<b>Efficacy achieved</b>	<b>Pass</b> Corexit EC9500A passed the LR448 approval test, i.e. has a minimum efficacy of 60%	<b>Pass</b> Corexit EC9500A is 50% effective (Average of two crude oils, Prudhoe 45.3%; South Louisiana 54.7%) <sup>1</sup>  Effectiveness of ~72% in temperatures as low as 0°C <sup>2</sup>	<b>Pass</b> Corexit EC9500A passed the IFP approval test i.e. has a minimum efficacy of 60%

<sup>1</sup>Regulatory approval using the Swirling Flask Test

[www.epa.gov/emergency-response/national-contingency-plan-product-schedule-toxicity-and-effectiveness-summaries](http://www.epa.gov/emergency-response/national-contingency-plan-product-schedule-toxicity-and-effectiveness-summaries)

<sup>2</sup>Data from BSEE (2015). The test procedure was adapted from the Ohmsett dispersant effectiveness test protocol developed between 2000 and 2003 and documented in "Dispersant Effectiveness Testing on Alaskan Oils in Cold Water" (SL Ross Environmental Research & MAR Incorporated, 2003).

# Toxicity

## Toxicity testing

A dispersant should not exceed a maximum toxicity threshold to marine life. Care needs to be taken when considering dispersant toxicity versus the toxicity of the dispersed oil (dispersant plus oil) since it is the toxicity of the oil that accounts for the largest contribution. When evaluating toxicity for inclusion onto a list of approved products the maximum toxicity threshold of a candidate dispersant is usually set at either:

- a) a level where the oil and dispersant mixture is no more toxic than the oil alone at the same exposure levels; or
- b) if the dispersant is tested alone, at a level which is significantly less toxic than a reference oil.

This testing can only evaluate the relative toxicity of different candidate dispersants under artificial laboratory conditions and is not intended to predict actual environmental impacts in the field where the exposure regime experienced by marine organisms will be much different.

The EPA (August, 2010) conducted independent studies to assess the relative acute toxicity of eight dispersants including Corexit EC9500A. Corexit EC9500A fell into the slightly toxic category for mysid shrimp and the practically non-toxic category for inland silverside fish. Corexit EC9500A proved to be the least toxic to small fish among tested dispersants. Oil alone was found to be more toxic to mysid shrimp than the eight dispersants.

Endocrine disruption and cytotoxicity tests were also performed (EPA, June 2010<sup>7</sup>) to assess the degree to which eight types of oil spill dispersants were toxic to various types of cells. Corexit EC9500A did not display endocrine disruption activity. In cytotoxicity tests cell death was observed in some tests at concentrations above 10ppm. The endocrine and the cytotoxicity screening were conducted at dispersant concentrations from 0.001 parts per million up to 10,000 parts per million. None of the dispersants triggered cell death at the likely concentrations of dispersants expected in open water.

# Biodegradability

A dispersant should be readily biodegradable and not contain persistent harmful constituents. This may require additional information to be provided as part of the product approval process.

[www.oilspillresponse.com](http://www.oilspillresponse.com)

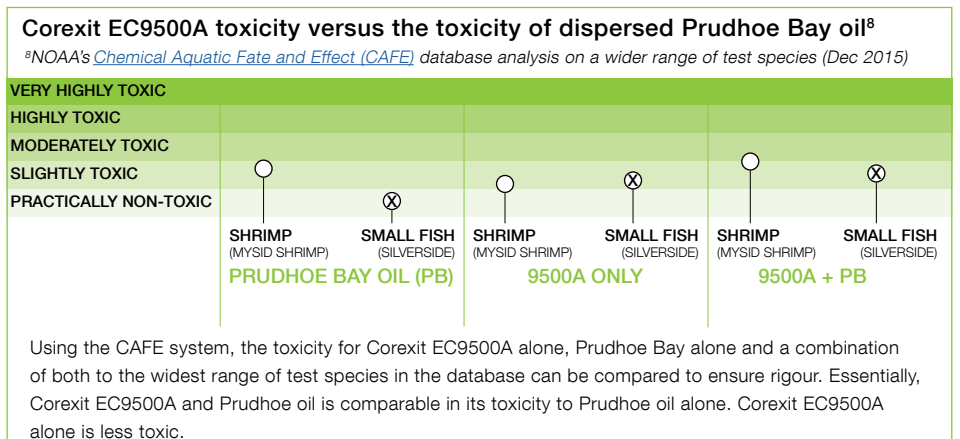
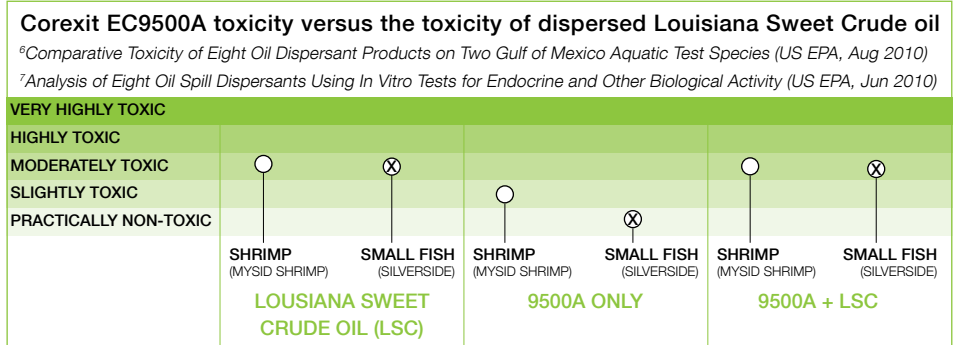
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UK	USA	FRANCE
Pass	Slight to moderate = Pass	Pass
Sea Test passed <sup>3</sup>	Corexit EC9500A alone = Slightly toxic No.2 Fuel Oil alone = Slightly toxic 9500A + No.2 Fuel Oil = Moderately toxic Reference toxicant = Moderately toxic <sup>4</sup>	Corexit EC9500A is approved for France using the standard NF.T.z90-349 method which requires the toxicity of 9500A to shrimp to be at least 10 times lower than the toxicity of a reference toxicant (Noramium DA50) <sup>5</sup>

<sup>3</sup>Test procedure exposes shrimps to a mixture of oil (i.e. a lightly weathered Kuwait crude oil) and dispersant. The mixture is 1 part of dispersant to 10 parts of oil. The dispersant will be approved based on nominal concentrations if the dispersant and oil mixture causes no more mortality than that caused by mechanically dispersed oil alone. Results are shown as a pass or fail. Kuwait Crude is used as the reference oil for toxicity testing.

<sup>4</sup>Current toxicity test involves testing with two US EPA standard species—inland silverside fish (*Menidia beryllina*) and mysid shrimp (*Americamysis bahia*)—five concentrations of the test product and No. 2 fuel oil alone, and in a 1:10 mixture of dispersant to oil. To aid comparisons of test results from assays performed by different laboratories, reference toxicity tests are conducted using sodium dodecyl sulphate (SDS) as a reference toxicant. The test length is 96 hours for *Menidia* and 48 hours for *Americamysis*. LC50 values are calculated. The exposure regime used in an LC50 test procedure is that required to kill 50% of the test organisms. Toxicity threshold descriptors are set as: 1 to 10ppm = moderately toxic; 10 to 100ppm = slightly toxic

<sup>5</sup>Corexit EC9500A is at least 10 times lower than the toxicity of a reference toxicant (Noramium DA50).



UK	USA	FRANCE
No requirement for testing	No requirement for testing	>50% = Pass <sup>8</sup>

<sup>8</sup>For France, biodegradability of the dispersant should be at least 50%. Tests are performed by INERIS, using the NF T90 346 test method.

