

MACJAMES® MOSD-18 - OIL SPILL DISPERSANT TECHNICAL DATA SHEET INFORMATION

UNIQUE FEATURES

- *It is environmentally friendly.*
- *Does not contain any petroleum distillates as solvents but glycols*
- *Manufactured from biodegradable surfactants and solvents*
- *Gives effective dispersion*
- *Non-toxic to oil degrading microorganisms.*
- *Very low possibility of re-coalescence and reformation of surface oil slicks.*
- *Completely water-soluble*
- *Does not change the basic composition of the oil on breaking it up.*
- *Can be diluted with sea water before application or sprayed neat.*

1.0 PRODUCT DESCRIPTION

MACJAMES® MOSD-18 – Oil Spill Dispersant (OSD) (ISO 9001:2015 Cert. No.: N1683535) is an innovative, effective and environmentally friendly viscous dispersant formulated and manufactured with a blend of high concentrates of ionic and nonionic surface-active agents (surfactants) into oleophilic solvents (oil-soluble). It is a third-generation dispersant (a concentrate water-dilutable dispersant) which contains higher concentration of surfactants in water miscible solvents. It does not contain any petroleum distillates but uses glycols as the solvents, making it more environmentally friendly (biodegradable) than most dispersants in use today. Formulated in collaboration with an oil-servicing company in Nigeria and use severally in different projects, when applied to oil spill on the surface of the sea, the solvent transports and distributes the surfactants throughout the oil to break up the surface tension of the oil-water interface. As result of the mixing energy provided by waves and the wind, it breaks up the oil into small droplets which are rapidly suspended into the water column and diluted to very low concentrations, enabling the oil degradation by micro-organisms already present in the sea. To achieve an effective dispersion, oil droplets are supposed to be in the range of 1µm to 70 µm with the most stable size being less than 40 µm. The speed with which the droplets of this range rise towards the surface is balanced by the turbulence of the sea so that they remain in the suspension and the oil and dispersants mixture dilute rapidly within the top few metres of the water. The presence of the surfactant molecules at the droplet surface and the reduced possibility of the oil droplets coming into contact as they dilute and move apart, minimizes the possibility of re-coalescence and reformation of surface oil slicks.

MACJAMES® MOSD-18 is formulated to aid the natural process of degradation and metabolization of the oil droplets by sea-present micro-organisms. Its effective dispersion of the oil also minimizes the possibility of surface drift and reduces sea surface exposure to birds, turtles, sea mammals, etc. in the spill vicinity as well as reducing the possibility of adherence of the oil to marine animals, shorelines and boats.

PACKAGING SIZES: 25 Litres : 200 Litres : IBC tank (1,000 Litres)
All in HDPE plastic containers (other packaging sizes on request)

2.0 APPLICATION INFORMATION

Methods of Application

MACJAMES® MOSD-18 is a third-generation dispersant - a concentrate water-dilutable dispersant which contains a higher concentration of surfactants in water miscible solvents. It can be applied from vessels or aircraft at typical ratios of between 1:5 and 1:30 dispersant to oil volume, limiting the quantity of product released in the environment during a spill. This “Concentrate” or “Water-dilutable” dispersant is sprayed or applied with specific equipment composed of 2 pumps (one for the dispersant, one for the sea water). The dispersant can only be used in this way when spraying from boats or ships but not aircraft where it is applied neat (undiluted), though MACJAMES® MOSD-18 is formulated to be sprayed neat by ships, boats, aircrafts or hand-held dispersant sprayer. In general, spraying dispersant from vessels and small aircraft or helicopters is more suitable for treating smaller spills and near shore areas. Large multi-engine planes are best equipped for handling large offshore spills. The key to successful chemical dispersion is the ability to target the thickest part of the oil slick in a timely manner before emulsification of the oil by weathering sets in.

Shoreline Application

MACJAMES® MOSD-18 is also formulated to clean up affected shorelines during the final stages of clean-up to remove the remaining oil from hard surfaces such as rocks, sea walls, and other man-made structures. The dispersed oil cannot be collected, and for this reason, dispersant use on the shoreline is restricted to areas of low environmental concern but high amenity value. Shoreline cleaners, specifically formulated for the task, may often provide a better alternative. The backpack or hand-held dispersant sprayer with a single hand-held sprayer arm is very effective in applying the dispersant to small and inaccessible areas.

2.1 DILUTION RATIOS AND APPLICATION METHODS

The ratios in the table below are approximations only. Actual requirements may vary due to composition, thickness/viscosities of oil, etc. Therefore, the approximations should be a guide and subject to operational conditions.

Description of product	Recommended treatment rates	Spraying equipment	Notes
MACJAMES® MOSD-18 - Oil Spill Dispersant. (Concentrate waterdilutable dispersant)	10% solution of dispersant in seawater to 2 to 3 parts oil (Equivalent to 1 part dispersant to 20 to 30 parts oil)	Ships and boats	High treatment rate when diluted with water and can only be sprayed from ships and boats in this way
	3% to 5% dispersant as volume of spilled oil or 1 part dispersant to 20 to 30 parts oil	Aircraft, ships and boat	Low treatment rate Used undiluted (or ‘neat’)

3.0 DISPERSANT EFFECTIVENESS

The effectiveness of **MACJAMES® MOSD-18** can be determined by visual inspection, conventional laboratory methods or at-sea Ultra-Violet Fluorometry (UVF). The effectiveness of **MACJAMES® MOSD-18** has been found to be high or optimum in different projects it was used depending on the salinities of the water, oil viscosities, wind and wave strengths/energies, among others.

VISUAL INSPECTION: If spilled oil on the sea is sprayed with **MACJAMES® MOSD-18**, a brown plume of dispersed oil is easily visible in the water soon after a wave passes through the dispersant-treated oil, it can empirically be said that it is working and effective.

LABORATORY TESTS: The conventional laboratory test method is used to determine dispersant effectiveness of **MACJAMES® MOSD-18**. In this case, a numerical percentage value, where 0% is equivalent to no dispersion of oil at all and 100% is equivalent to total dispersion of all of the oil is used. The dispersant is added to test oil on seawater in a particular apparatus (eg sample bottle, test tubes, conical flask, etc.) and the oil and water are mixed by some agitation method. After a specified period (say 30 minutes or less), the mixing may be stopped and a sample of the water containing dispersed oil is taken and analysed for oil content and compared with that of the control sample. The percentages of oil dispersion obtained in series of these tests, for example 70% and 80%, gives you a guide for the best dispersant to oil/water ratio that will give you higher effectiveness when applied at sea oil spill. A percentage value of dispersant effectiveness in this context is only strictly applicable to the test method, test oil and under the conditions (temperature, salinity, treatment rate etc.) it was obtained.

Ultra-Violet Fluorometry (UVF): The best method currently available for estimating how effective dispersant use at sea is has been to use Ultra-Violet Fluorometry (UVF). UVF detects the aromatic components in oil. A submerged 'fish' is towed at several depths from 1 to 10 metres below an oil slick with the oil being pumped from this depth to a UVF instrument in a boat. The UVF instrument will detect the dispersed oil droplets and the partially water-soluble aromatic compounds that are released from the oil. The instrument needs to be calibrated for different types of oil and the calibration changes with the dilution of the dispersed oil as the oil 'weathers'. The UVF instrument readings can be 'back-calibrated' by taking water samples for subsequent analysis in a laboratory. This will enable the relative concentration reading to be converted into absolute concentration readings such as ppm (parts per million) of dispersed oil in water.

Note: If there is an obvious increase in the dispersed oil in water concentration below the dispersant-treated slick, compared to that underneath the untreated slick, this is very indicative of a high level of 'dispersant effectiveness', but the oil concentration values along a line under the slick cannot be converted into a calculation of the total volume of oil dispersed from the slick. This is because the oil concentrations can only be measured along a 'transect' - a line across or along the slick - at a few water depths. In order to accurately calculate the total volume of oil dispersed at any time it would be necessary to measure the dispersed oil concentration at all points below the slick and this is not feasible with available equipment.

4.0 PRECAUTIONS

- KEEP ALL CHEMICALS AWAY FROM CHILDREN AND PETS
- Use chemical resistant hand gloves and goggles during application, even though product can be held in open palm without injury. All chemicals are handled with approved PPE.
- If in contact with skin, wash with plenty water and seek medical attention if there is irritation.
- Do not drink, if ingested drink water and seek medical attention.
- Avoid contact with eyes, otherwise flush with plenty water for 20 minutes and get medical attention. Remember to wear eye goggle with side protector.
- Dilute properly with water before disposal according to local regulations (dilute possibly to neutral or infinity).

5.0 PHYSICAL PROPERTIES

PHYSICAL PROPERTIES			
Appearance/Colour:	Amber to light yellow	State	Liquid
Odour	Ester-like (slightly sweet smell)	Odour Threshold:	No data
Specific Gravity	1.30	Water solubility:	Completely soluble in water
Flammability	May be combustible at high temperature	Viscosity	0.95 Pa.s
pH (100% at 25°C)	6.0 – 6.5	Vapour Pressure (37°C)	15 mmHg
Auto-ignition temp:	Not applicable	Boiling Point:	≥145°C

6.0 TYPICAL PHOTOS OF MACJAMES® MOSD-18



7.0 HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS) RATING

HEALTH	1
FLAMMABILITY	0
PHYSICAL HAZARD	0
PERSONAL PROTECTION	B

- 0 - Minimal
- 1 - Slight
- 2 - Moderate
- 3 - High
- 4 - Very High

NB: Read Material Safety Data Sheet (MSDS) and label of **MACJAMES® MOSD-18 – Oil Spill Dispersant** before use or contact us at info@macjamesglobal.com for more information.

NON-WARRANTY – All data, statements and recommendations contained herein are based upon the best information available and are believed to be reliable. However, no warranty, either expressed or implied, is made concerning the application of this product since the customer's use cannot be controlled directly by Macjames. Read the Material Safety Data Sheet (MSDS) and label of **MACJAMES® MOSD-18 – Oil Spill Dispersant** before use or handling.

