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TECHNICAL DATA SHEET

BIOTAL MDS-PAK 3000

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Biotal MDS-PAK 3000 is a biological additive designed to start and maintain biological sewage treatment plants (also known as marine sanitation devices) and ensure they are at peak operating efficiency. It will also improve operations and reduce odours on vessels operating sewage holding tanks.

Product Description

Biotal MDS-PAK 3000 contains a synergistic blend of billions of proprietary bacteria strains in convenient to use water soluble packages. These bacteria have been scientifically selected to promote the rapid breakdown and digestion of the variety of materials found in sewage systems including human waste, detergents, fats, oils and grease, paper, and other organic materials.

Although other companies offer apparently similar products, it is important to differentiate between a product containing bacteria strains chosen specifically for the application and a product containing generic 'off the shelf' bacteria. At Biotal Marine we use our in house R&D capability to select the optimum bacteria for any particular application and then produce these bacteria in our own state of the art fermentation facility and formulate the bacteria with optimised chemistry to create the Biotal Marine products. We have an ongoing Research and Development program to demonstrate the capabilities of the Biotal Marine strains and this can also show the superiority of the Biotal MDS-PAK 3000 application. Just as with human beings, not all bacteria strains are the same or will carry out a specific task with the same capability!

When used as part of a regular programme, Biotal MDS-PAK 3000 will continually promote the presence of powerful waste-degrading bacteria which will ensure the sewage treatment unit is fully biologically active. Although use of bleach that may enter a sewage plant should always be avoided, in reality it still happens. Our latest research has shown that the MDS-PAK bacteria continue to grow and degrade waste in the presence of 10-20ppm sodium hypochlorite. Therefore regular dosing with MDS-PAK will increase the ability of the sewage plant biomass to survive chemical loads of this type.

Application Area

Some ships may have a sewage treatment plant but may not use it all the time depending on where they are operating. The use of MDS-PAK 3000 can achieve more rapid start up of a sewage plant and mean full operating efficiency is achieved much more consistently than relying on natural processes alone.

Most marine sewage treatment plants receive hydraulic shocks due to uneven sewage flow and inadequate holding tank facilities or other shock loads such as laundry detergents, harsh cleaning agents, paper, and fats, oils, and grease. The uneven input and shock doses upset the delicate environment of the naturally occurring bacteria in the waste treatment system, meaning that the plant does not always operate at the design efficiency. The waste treatment process can be slowed or even stopped and solids can then build up within the system. The loss of biological activity is often characterized by foul odours which may be emitted from toilets and drains.

Those ships taking the holding tank option can also benefit from the use of Biotal MDS-PAK 3000. Addition of Biotal MDS-PAK 3000 can reduce odours and the prevent the build-up of deposits of sludge in holding tanks, vacuum tanks and associated equipment, making the disposal of the sewage either to port facilities, or overboard when regulations permit, a quicker and more reliable process.

Regulatory Environment

A revised Annex IV of the International Convention for the Prevention of Pollution from Ships (MARPOL) entered into force on 1 August 2005 and immediately applied to new ships engaged in international voyages of 400 gross tonnage and above or which are certified to carry more than 15 persons. Existing ships were required to comply with the provisions of the revised Annex IV by 27 September 2008. The Annex requires ships to be equipped with either 1) an approved sewage treatment plant or 2) an approved sewage comminuting and disinfecting system or 3) a sewage holding tank.

According to the revised Annex, the discharge of sewage into the sea is prohibited, except:

- When the ship is operating an approved sewage treatment plant
- When the ship is discharging comminuted and disinfected sewage using an approved system at a distance of more than three nautical miles from the nearest land
- Sewage which is not treated or comminuted and disinfected has to be discharged at a distance of more than 12 nautical miles from the nearest land

Further revisions to the Annex adopted in 2011 designated certain Special Areas where discharge of untreated sewage is now prohibited. Thus the management of sewage and sewage systems is one of the many challenges on board today's ships.

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Biotal MDS-PAK 3000: Features and Benefits

Features

- Contains application specific bacteria for optimum efficiency in the marine sanitation device application
- The consortium of our own proprietary bacterial strains are specially selected for degradation of the organic wastes commonly found in shipboard sewage plants i.e. faeces, urine and paper
- The bacteria have also been proven to be effective at degradation of a broad range of other organic wastes such as fats, oils and grease
- Strains are effective over a wide range of pH and temperature environments
- Bacteria strains are also effective in low oxygen situations such as a sewage holding tank

Benefits

- Fast growing for commissioning and upset recovery of marine sanitation devices
- Maintains optimum operating efficiency of biological sewage treatment plants
- Will create a biomass that is more resistant to chemical loads such as bleach
- Prevents odours associated with overloaded or poorly operating systems
- Reduces build up of sludge and odours in holding tanks, making discharge easier
- Eliminates need for costly manual or hazardous chemical cleaning of sewage treatment plants and holding tanks
- Convenient water soluble packaging for easy dosing and no mess
- Long product shelf-life

Biotal MDS-PAK 3000 has received approval from the North Atlantic Treaty Organization and has been assigned NATO number 7930222583623.

Application/directions for use

The table below shows the number of sachets required for various plants sized in terms of the number of people on board the ship. Dosing for intermediate sizes or requirements for longer periods can be obtained by simple calculations from the numbers provided.

To commence dosing place the required number of sachets into warm water and disperse the sachets and their contents by gentle mixing, Add the dispersion directly to the tank if practical, or if more convenient, by flushing the mixture down the toilet nearest to the plant.

Maximum number of people on board **t**	Start up dose Biotal MDS-PAK 3000	Maintenance dose (Weekly) Biotal MDS-PAK 3000	Total requirement for start up and 12 months operation
25	4 sachets in 4 litres of water	1 sachet in 1 litre of water	56 sachets (less than 1 pail)
50	8 sachets in 8 litres of water	1 sachet in 1 litre of water	60 sachets (less than 1 pail)
100	16 sachets in 16 litres of water	2 sachets in 2 litres of water	120 sachets (just over 1 pail)
250	*40 sachets in 40 litres of water	5 sachets in 5 litres of water	300 sachets (3 pails)

t *or per sewage plant if multiple plants*

* *Volumes of greater than 20 litres should be added using multiple mixtures due to manual handling issues.*

Note: these figures are for conventional, non membrane systems. For membrane systems, or for larger plants, consult your Biotal Marine representative for further information.

Packaging

Biotal MDS-PAK 3000 is available in

11.4 Kg square buckets each containing

100 by 114g water soluble packets.

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