School of Chemical & Biomelecular Engineering
The University of Sydney

Report

OilZorb Product as Oil Spill Control Agent Test
(ASTM 726-12 Test Standard)
For
Hanma Investments Pty Ltd

Compiled By

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Client	Hanma Investments Pty Ltd
Product	OilZorb as Oil Spill Control Agent (OSCA)
Testing for	Australian Maritime Safety Authority Application for Listing Under the Australian National Plan to Combat Pollution of the Sea by Oil and Other Noxious and Hazardous Substances (The National Plan)
Testing Consultancy	University of Sydney, School of Chemical & Biomolecular Engineering

Testing Methodology

Note Chemical Composition of OilZorb determined
Retained as Commercial In Confidence.
Details available on this basis for AMSA if required

- Product OilZorb
- Procedural Protocol by Based on Australian Maritime Safety Authority
- Testing Criteria ASTM F726-12 Test Standard
- Specific Items 3.3.4, 9.2.2 9.3.2
- Reference products tested

  Australian Kuwait Crude Reference Oil,
  IFO
  180 and IFO
  380 and Aviation fuel (Kerosene).

Testing Overview

1.2 Toxicity

Analysis shows that OilZorb is non toxic inorganic mineral containing in part
[Details Commercial in Confidence]

1.3 Degradation Test

Stable to 1050^{O}C

Other analytical tested including XRF for elemental contents, TGA for stability under temperature

Overview of Testing procedures

X-ray fluorescence (XRF) spectroscopy:
PHILIPS PW2400 XRF Rh end-window tube with "SUPERQ" SOFTWARE.

X-ray fluorescence (XRF) spectroscopy uses an X-ray source to eject core-shell electrons from an atom to create an excited state.

The resulting cascade of electrons to fill the holes results in emission of X-radiation from the atom (fluorescence) that has a characteristic wavelength/energy specific to each element.

The fluorescence can be quantified to enable elemental analysis from ppm to percent.

XRF samples were prepared with 40mm Glass Disk.

XRF data indicated that

- OilZorb was mainly [Commercial in Confidence]
- OilZorb is an inorganic non hazardous mineral powder.

Temperature Stability

• Equipment	Thermo gravimetric analyser (TGA): TA Instruments TGA SDT Q600
• Temperature range	Ambient to 1500°C
• Temperature sensitivity a	0.01°C
• Furnace heating rate	100°C /min.
• Balance resolution of	0.0001mg.

Actual Test

Heating rate	10 °C per min,
Targeted temperature	1200°C
Weight loss	Constantly monitored and recorded.
Final outcome	Almost no weight loss when heated to 1050°C

Density

OilZorb density	350 kg/m^3

Overview of findings

OilZorb is a stable non hazardous powder and can be used as oil absorbent. It is a light weighted substance and can float on water for effective oil catch and recovery.

Dr Jeffrey Shi obtained his BE in Chemical Engineering (1985), MSc in Applied Chemistry (1988) and PhD in Chemical Engineering (1992). Dr Shi carried out two years postdoctoral research in 1993 and 1994. He moved to Sydney Australia in 1995.

Dr Shi has been working for School of Chemical and Biomelecular Engineering at the University of Sydney since 1996. He is manager of Analytical and Testing Laboratory and chief consultant. He has undertaken a successful testing, consulting and contract research activities for various clients including government department, commercial companies, legal firms and others

Dr Shi is Fellow member of Royal Australia Chemical Institute (RACI) and member of Australia and New Zealand Forensic Science Society (ANZFSS).