

DUPONT™ ZYTEL®

GREATARIO'S HEXA-COVER® FLOATING COVERS FOR OIL & GAS INDUSTRY

ZYTEL® NYLON DELIVERS STRONG CHEMICAL RESISTANCE AND LOW MOISTURE ABSORPTION IN HIGHLY AGGRESSIVE TANK APPLICATIONS

Application

The newly patented Oil & Gas Duty Hexa-Cover® Floating Cover developed by Greatario Covers Inc., Calgary, Alberta, is an effective solution for hot heavy-duty oil and gas storage applications. The unique floating cover system, made of DuPont™ Zytel® 612 nylon resin, reduces greenhouse gas (GHG) emissions and eliminates water vapor that acts as a carrier of VOCs and harmful carcinogenic hydrocarbons such as benzene, toluene, ethylbenzene, and xylene. In addition to protecting the environment, the covers also reduce costs for the oil and gas operator by lowering heating loss on heated tanks and reducing or eliminating heavy oil foaming which results in significant chemical defoamer equipment cost savings.

The Hexa-Cover®, also known as Crude Oil Vapor Emission Reduction System (COVERS), is designed as hexagonal shapes with symmetric ribs on both sides. The ribs allow for the floating structures to distribute naturally and uniformly on the liquid surface without overlapping and form an interconnecting blanket barrier at the surface of the heavy oil, impeding odor and vapor. A low density of 0.375 g/cc (\pm 5%) ensures that the COVERS will float above the surface of the hydrocarbon liquid. A special helical scalloped edge allows the COVERS to interlock and form an integrated matrix. The floating cover can be installed while existing tanks are in operation through a roof-mounted opening as small as 8 in (205 mm) in diameter.

The patented injection molded Hexa-Cover® floating covers have proven to be an effective option for over 2100 installations

in Western Canada including applications such as Dilbit sales oil tanks, diluent storage, heated heavy oil process tanks, and bitumen storage.

Benefits Gained

Chemical Resistance: Zytel® nylon 612 was chosen over the incumbent polyolefin polymer due to its strong resistance to a range of aggressive chemicals. Polyolefin continues to be used in water tanks and other less chemically aggressive fluid tanks such as boiler feed water, sour sand slurry tanks, process

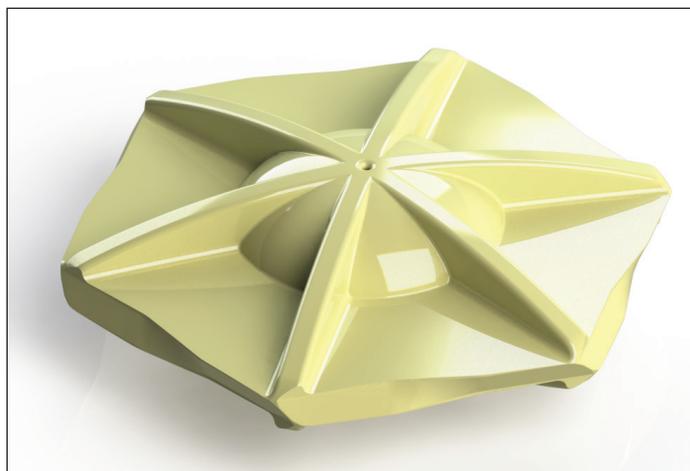
water ponds, purified tailings ponds, and hydraulic fracking reservoirs.

Low moisture absorption:

Zytel® 612 resin's low water absorption enables the Hexa-Cover® floating cover to maintain its specific gravity, thus preventing any gaps in the floating design. The thermoplastic floating cover, measuring 21.59 cm by 18.79 cm by 8.38 cm (8.5 in by 7.4 in by 3.3 in), maintains its hexagonal shape with the symmetric ribs to ensure the

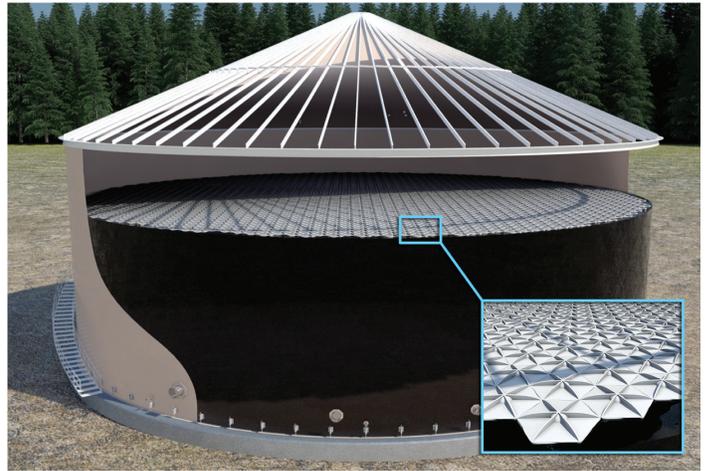
tiles will interlock naturally and uniformly on the surface of the heavy oil. This reduces odor release and product evaporation, thus offering environmental benefits and reduced cost.

Thermal stability: Zytel® nylon resin is chemically compatible with heavy oil components up to temperatures of 100 °C (212 °F). It is also resistant to thermal shock with testing completed at -40°C (-40° F) to 100 °C (212 °F) for sudden rapid temperature exposure.



Material Selected, and Why

Zytel® nylon resin facilitated the floating cover's innovative design by withstanding the aggressive end-use environment, unlike lesser-performing thermoplastics like polyolefins. Along with its exceptional chemical resistance, low moisture absorption, and excellent thermal stability, Zytel® nylon delivers the required anti-static capabilities and corrosion resistance. Greatario, in conjunction with DuPont, conducted extensive testing of various polymer grades to confirm chemical compatibility and long-term performance. Hexa-Cover® floating covers made of Zytel® nylon have found strong commercial success in Canada and new opportunities in the rest of the Americas are currently being explored.



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