

# Smart Sponge® and Antimicrobial Smart Sponge® Plus

AbTech's Smart Sponge® technology is at the heart of its product innovation. Its unique molecular structure is based on innovative polymer technologies that are chemically selective to hydrocarbons and can destroy bacteria. Smart Sponge® fully encapsulates recovered oil, resulting in a substantially more effective response that prevents absorbed oil from leaching. It is also capable of removing low levels of oil from water, thereby successfully removing sheen. In addition, the Smart Sponge® remains buoyant in calm or agitated water, permitting it to remain in place until fully saturated and resulting in no wasted product.

Once oil is absorbed, the Smart Sponge® transforms the pollutants into a stable solid for easy recycling, providing a closed-loop solution to water pollution. Smart Sponge® technology provides a cost-effective BMP with low installation and maintenance labor costs. In comparison to other products, the Smart Sponge® technology also allows for less expensive and less problematic handling and disposal of the waste product since its technology transforms liquid oil and other pollutants into a stable solid. The Smart Sponge® was designed not to deteriorate in water, allowing for a longer product life.

## Benefits

- Chemically selective to hydrocarbons
- Capable of removing up to 3 times its own weight in hydrocarbons
- Removes or reduces sheen
- Destroys bacteria on contact (if Smart Sponge Plus® is used)
- Inhibits growth of mildew and mold
- Capable of transforming hydrocarbons into a stable solid per EPA's Toxicity Characteristic Leaching Procedure (TCLP)
- Capable of remaining completely buoyant even after being saturated with hydrocarbons
- Meets or exceeds Stormwater Best Management Practices (BMP)
- Offers non-point source pollution prevention
- Provides potential for long-standing remediation
- Does not require modification of existing structures
- Effective in fresh or salt water temperatures ranging from 32F to 130F

## Antimicrobial Smart Sponge® Plus

AbTech has developed an antimicrobial technology synergistic with the Smart Sponge® technology. This effort produced Smart Sponge® Plus, which features an antimicrobial agent chemically and permanently bound in a proprietary process to the Smart Sponge polymer surface which destroys bacteria. Due to this permanent bond, the antimicrobial agent is active but does not leach or leak, avoiding any downstream toxicity issues. AbTech's antimicrobial Smart Sponge targets bacteria such as enterococcus, Escherichia coli and fecal coliforms.

The Agent used for this innovative technology is an Organosilane derivative which is widely used in a variety of fields including medical, consumables, pool equipment, and consumer goods to destroy bacteria. This Smart Sponge® Plus mode of action, through its bound agent, is very simple (no chlorine or heavy metals involved) and - in surfacebound applications - it neither introduces chemicals into the treated water nor produces toxic metabolites. The antimicrobial mechanism is based on the patented agent's interaction with the microorganism cell membrane, causing microorganism inactivation, but no chemical or physical change in the agent. Antimicrobial activity therefore does not reduce the agent's capability or cause its depletion, and maintains long-term effectiveness. Additionally, the hydrocarbon absorption capability is not inhibited. The antimicrobial agent is registered with the EPA for a variety of applications and has performed well specifically in cases where a reduction in harmful bacterial counts in storm water runoff is desired.



## Simple Implementation

Products incorporating Smart Sponge® technology are non-mechanical, do not require structural changes to stormwater systems and are easily installed and maintained, often requiring only one person and no equipment. Products such as the Ultra-Urban® Filter with Smart Sponge® Inside fit into most existing catch basins. The Smart Sponge® technology is deployed in products that offer customized solutions for stormwater pollution prevention, oil spill response, process water filtration and other industrial applications to meet specific environmental needs. AbTech Industries offers an extensive product line that is upgradeable to meet evolving community needs and regulatory requirements.

## Field Installations

RIDOT contracted with Crossman Engineering, Inc. to design a treatment system to reduce bacteria concentrations in stormwater runoff discharged via outfall pipes on Scarborough Beach. Upon consideration of alternatives, Smart Sponge® Plus was selected for implementation and used for retrofitting several outfall pipes. Based on the results of the post construction dry weather and wet weather sampling, the anti-microbial filter systems installed at the Scarborough Beach outfalls significantly reduced the bacteria concentrations within the stormwater runoff.

The City of Norwalk, CT in cooperation with EPA is running one of the largest federally funded projects to date for catch basins. The project is successfully demonstrating the ability of the Smart Sponge® Plus Ultra-Urban® Filter deployed in catch basin inserts to remove trash, debris, sediment, oil and hydrocarbons as well as reduce bacteria concentration from stormwater runoff. The project is in progress.

AbTech's Smart Sponge® Plus Ultra-Urban® Filter was selected by the City of Long Beach, CA to address bacteria contamination in recreational waters. The retrofit project covers a large watershed and the initial monitoring results confirmed a positive effect of the Smart Sponge® Plus in bacteria reduction.

## Disposal Options

As local conditions, product use, and exposure can vary widely, the end user must determine the most appropriate disposal method for a spent Smart Sponge® or Smart Sponge Plus® product. However Smart Sponge® samples saturated with hydrocarbons both in the lab and in the field have been tested according to the EPA's Toxicity Characteristic Leaching Procedure ("TCLP"). These tests show that Smart Sponge® is a "non-leaching" (i.e., non-detect or "N.D.") product. As a result, Smart Sponge® technology can afford many cost effective and environmentally friendly disposal options. The following waste disposal and resource recovery industries have accepted spent Smart Sponge® products for disposal and/or recycling.

**Waste-to-Energy Facilities** - A specialized segment of the solid waste industry has used spent Smart Sponge® as an alternative fuel in the production of electricity. WTE is acknowledged at the federal level as a renewable energy source under the Federal Power Act, Title IV of the Clean Air Act and is a participant in the Department of Energy's National Renewable Energy Program.

**Cement Kilns** - This industry has used the spent Smart Sponge® as an alternative fuel in the production process of Portland Cement. This process is considered a beneficial reuse of waste products. The BTU value of spent Smart Sponge® is consistently above the average acceptable levels set for this high temperature.

**Landfills** - As discussed above, spent Smart Sponge® products have been classified as a solid waste and have been accepted at Subtitle D Landfills.

For more information about the Smart Sponge® technology, visit [www.abtechindustries.com](http://www.abtechindustries.com) or call 1-800-545-8999.

Please keep in mind that, depending upon local conditions, product use, and exposure, a spent Smart Sponge® product could contain one or more of a wide range of contaminants that may impact available disposal options. As a result, generators of spent Smart Sponge products must have their waste analyzed, tested, and classified to determine the appropriate disposal method.

AbTech Industries does not take any responsibility for handling, transport, disposal, or recycling of spent Smart Sponge® products. For a more detailed disposal/recycle overview, please see the "Smart Sponge® Products Disposal Option" documents available upon request from AbTech Industries.

AbTech Smart Sponge® products have been extensively tested both in the laboratory and in the field – with additional testing on-going all the time. Nevertheless, because local conditions, product use, and exposure can vary widely, individual results may differ.

AbTech Smart Sponge® products must be used properly and in accordance with all manufacturer instructions. AbTech Industries does not take responsibility for any product misuse.

