History of Confidence

Introduction:

Biocides, antibiotics, antimicrobials, fungicides, bactericides, disinfectants, sanitizers, fungistats, bacteristats. A maze of sometimes overlapping and sometimes imprecise terms commonly used to describe a family of chemicals. All part of a larger family that the EPA and the press generally call pesticides.

Each of these terms (whether scientific, regulatory, or popular) is used to express the property of chemicals or devices to control microorganisms. Each brings with it an array of positive and negative popular implications. Companies that market or use the products tend to use the softer, health and hygiene related terms for their own products and the harsher terms (like “pesticides”) for their competitors’s products. The end result is a jumble of nonscientific and misleading use. Confusing? Sometimes, yes! Sometimes, maybe. But always complex!

We use the term “antimicrobial” because it describes what TD Shield and its sister products do – they work against microbes.

This brief document is intended to provide the reader with background information on the antimicrobial used as a keystone in the TD Shield Program.

You, the potential user of TD Shield, can benefit from a basic understanding of the following information on the chemical, physical and biological properties of this technology. The exceptional value of the TD Shield Technology at providing long-term protection against bacteria, fungi, and algae and their staining, odors, defacement and human health effects is played out in a myriad of medical, consumer and commercial products. Registered with the EPA in 1976 and used commercially since that time, the technology has been reviewed and re-reviewed by hundreds of large and small companies and academics, and confirmed in the real world by twenty years of problem free use and daily contact with millions of consumers.

The History:

Dow Corning Corporation, the largest supplier of silicone and silane chemicals in the world, began a pure research program in the late 1960’s to see if it could utilize the unique properties of its silane technology to deliver pesticides. Silanes are complex chemical compounds, based on the element silicon, which are used primarily to change the surface characteristics (adhesion, water repellency, cleanability, etc.) of other materials. In general, they react easily with a target surface to form a new, permanent surface which has the desired properties.

In plain English, they asked: Is it possible for a pesticide to be permanently tied to target surfaces with a silane that: 1) will be effective for extended periods of time, and 2) will not have the classic pesticide problem of migration into the environment by leaching or volatilizing? If so, the outcome

would be safer, more efficient, and more effective pesticides.

A tremendous variety of chemicals were made and tested. These included all kinds of herbicides, insecticides, fungicides, and bactericides. The screening tests included standard ASTM protocols, other standard tests, and a variety of toxicological and environmental impact reviews. Out of this work came several patents and a focused effort on a particularly promising group of antimicrobials. This brought the most promising of materials into the commercialization stages of Dow Corning's staging system.

Because of the tremendous expense of staging a material for commercialization, especially one with EPA regulatory oversight and FDA listing, careful consideration is given at each step. Passing the Dow Corning internal performance, safety and utility screens is often more difficult than dealing with regulatory agencies or with customers. By 1974, Dow Corning was moving aggressively toward full EPA registration and commercialization.

Scientific Validation:

Important in this time frame was the publication of several technical papers in both chemical and microbiological technical journals. The significance of these publications is that noted scientists in these respected disciplines reviewed the work, recognized the merit of this new and unique discovery and allowed such publications to be printed as scientific fact. Scientific publication with "peer review" is the beginning of a checks and balance system that the scientific community uses to sort our verifiable discoveries from casual observances. Subsequent to these original publications, ten additional peer reviewed papers and chapters to books have been scientifically "peer reviewed" and published.

The quality of the data and the uniqueness of the discovery was such that Dow Corning was granted Industrial Research magazine's prestigious IR-100 Award. Submissions for this award are scrutinized by scientific review boards. Only one other antimicrobial has ever received this award. Mr. W. Curtis White, now Chairman, CEO, and Director of Research & Development of TD Shield, was the technical manager for the commercialization of that other IR-100 Award winner, a recirculating water slimicide for Dow Chemical Company.

Commercialization and Real-World Experience:

Commercialization of Dow Corning antimicrobial technology began in 1976 after receiving EPA registration under what are called "modern" standards of review. Years of research by Burlington Industries, outside laboratories, and Dow Corning verified the safety and utility of using this technology on direct human contact goods such as socks. Burlington's Bioguard brand socks revolutionized the marketing of that product.

Parallel to this project, American Hospital Supply Corporation (now part of Baxter International) was reviewing the use of antimicrobials on surgical drapes and other medical non-woven products. The stringent rules governing the use of any particulates or chemicals that could enter the body

via a wound or in a surgical procedure made this review protocol very severe. Every available antimicrobial, medical and industrial, was screened for basic toxicity, effectiveness against the types of microorganisms encountered in surgery, and compatibility with the variety of physical, chemical, and biological contaminants found on fabrics and in wounds. Most importantly, the agents were studied for durability against leaching. The consequences of contamination from migration of a biocide into a wound area are profound. Formation of granules, granulosis, fibrin clots, and coagulation along with migration into the blood stream, could cause clogging of critical blood vessels resulting in death. This eliminated all antimicrobials except what is known today as TD Shield. American Hospital, outside university laboratories, private laboratories, and Dow Corning contributed over thirty studies verifying the safety and performance of the technology in medical use. FDA listings were obtained and ISO-BAC Medical Nonwovens were introduced to the market in 1979 and are still being manufactured today. A publication on this work is available.

The success of the sock program at Burlington Industries led to a review of other potential applications and carpeting became a major target area of commercial consideration. To provide durability, hence safety and long-term performance, again the Dow Corning technology was chosen. Numerous real-world, in-use durability and performance tests were carried out in hospitals, office buildings and airport terminals. Publications on this work are also available.

Stimulation of the carpet market with durable antimicrobial treatment stirred the interest of the major carpet fiber manufacturers. DuPont, Allied, and Monsanto all started research and development programs aimed at producing an antimicrobial carpet fiber. After testing and reviewing all available antimicrobials, each of these companies decided to use the Dow Corning technology. Although the lack of strong commercial demand in the mid-80's for an antimicrobial feature for carpet made wide commercial use of this feature short-lived, their technical assessment was unquestionable in its verification of the utility of the Dow Corning, now TD Shield, Antimicrobial over any other technology available.