

RE: ARRESTING THE DECOMPOSITION OF ORGANIC ARTIFICIAL TURF INFILL BY ENCAPSULATION WITH AN ANTI-MICROBIAL AGENT

As evidence of the potentially harmful chemicals contained in conventional infill mounts, FieldShield has developed an organic infill alternative. This alternative, *Organite*[™], was developed after studying many potential materials, both organic and inorganic.

The primary constituent of *Organite* is walnut shell. Natural walnut shell is slow to decompose, non-absorbent, and non-allergenic. These qualities make it ideal as a major constituent of a natural infill.

While walnut shells are slow to decompose, it was necessary to find a way to insure that decomposition would not occur during the useful life of the turf. The heart of our intellectual property is the enhanced prevention of decomposition by encapsulating organic infill particles with the highly effective, extremely durable *Aegis*[®] anti-microbial agent. Microorganisms are essential to organic decomposition. *Aegis* kills microorganisms. The coated walnut shells will not decompose without the action of external microorganisms.

While no applicable method exists for the testing of decomposition in the present use, we can equate, by a scientifically viable assumption, antimicrobial effectiveness with prevention of decomposition. Furthermore, since a valid method exists for testing of anti-microbial effectiveness (ASTM E2149-01), we can use this test to predict decomposition or absence thereof.

Consequently, we can guarantee against decomposition (as detailed in our written guarantee), for the warranted life of the turf (8 or 10 yrs.) - but decomposition will not likely occur during the useful life of the turf or for as long as the anti-microbial is effective.

Note: Uncoated walnut shell buried in moist soil will decompose in 4 or 5 years. However, untreated walnut shell stored on a shelf will not decompose, even after 20 yrs. This indicates that it is external microorganisms that are causal and required for decomposition. The complete anti-microbial coating prevents the intrusion of external microorganisms. The Aegis anti-microbial that we use is permanent; does not dissipate with killing of microbes; and cannot wash-off or become diluted by the micro-environment. You will find that coconut shell (without husk, which is more susceptible to decomposition); pecan shell; almond shell; olive stone; or any other organic shell or pit materials, follow the same script.

The foregoing notwithstanding, the only negative we perceive from decomposition is decreased drainage rate through the infill, due to finer particles generated by decomposition. This is unlikely to develop to a point where drainage would be insufficient, even with untreated material. Of course, organic or inorganic materials left untreated (without anti-microbial coating) will propagate microbial growth in the depth of the infill, which could create other risks more concerning than decomposition.

Therefore, any discussion of infill decomposition should also consider the (more likely) functional decomposition of the turf system, especially regarding ecological safety. Over time, any untreated infill matrix will provide an environment, which promotes the growth of mold, fungi and bacteria that will eventually render the artificial turf system harmful to users and/or the environment, in addition to potential diminishing of drainage capacity and function. By preventing microbial growth for the warranty life of the turf, *Organite*[™] also deters this functional decomposition.

FieldShield can provide test results (BPB test) from every load, for completeness of the anti-microbial coating. We will also make available testing for anti-microbial effectiveness (ASTM E2149-01), which can be performed annually or at any other desired interval, on samples from the lower depth of the infill. Understanding that, as long as the anti-microbial remains effective, decomposition will not occur.

For more information or clarification of the above, feel free to contact us at the number listed, below.

A handwritten signature in black ink, reading "Philip G. Christiansen". The signature is written in a cursive style with a long, sweeping underline.

Philip G Christiansen M.S., P.E.