

How can water's physical structure be improved? How can one structure be any different from another if it is all basically H₂O?

When we refer to the physical structure of water, it is important to realize that we are referring to a system of matter and energy teeming with activity. At the level of individual water molecules, the system is in perpetual activity, and due to the dipole moment of water and other physical qualities of the system, the way the individual molecules interact with one another is highly variable. It is this interaction that we are seeking to improve.

The function of the technology is to regenerate coherent relationships between the many dynamics that are occurring. A known example of coherence is laser light. A laser is generated when countless light emitting particles in the laser chamber spontaneously enter a coherent mode in which they all start emitting together, rather than as random and separate individuals. It is as if teamwork spontaneously arises from what was previously just an array of individuals working without regard for one another. Scientists have discovered that water has the capability to display coherent behavior, not to produce light like a laser, but as a type of "synchronizing" of the dynamic behavior that is taking place at the molecular level.

Very simply, coherence is a type of organization at the fundamental level of the water system. It is also characteristic of the fundamental structure of all living systems. We rely on coherent phenomena within our own bodies all the time to store and use energy in highly efficient ways. A coherent system can store and use energy in ways that an incoherent, or disorganized system, cannot, and living systems use this to their advantage all the time.

So, when we say we are improving the physical structure of water, we mean that we are improving the relationships between the individual particles of water (and minerals) in the system. We are not changing the form of H₂O, but are affecting how the countless H₂O molecules in the system behave with respect to one another.

How do these changes affect bacteria in the water?

To explain this simply, we often use the analogy to weather. Weather that is relatively stable produces conditions that make it easier for plants to grow, easier for us to work and play, easier for animals to survive, etc. Survival is less of an issue and so it is possible to spend time and energy on other activities, like producing fruit and seeds, building societies, and raising offspring.

If the weather becomes unstable, the resulting imbalances make it more difficult to simply survive. Shifting rains and droughts, massive and intense storms, and large swings in temperature all can occur unexpectedly and this challenges the ability of the entire ecology to adapt and survive. Often complex and thriving ecologies are reduced to much more simplified versions that are in "survival mode".

In water, if the water's physical structure is organized and coherent, it is analogous to good, stable weather patterns. It is possible for a wider variety of micro-organisms to thrive, and this results in a more beneficial ecological community in natural water systems. This more complex community of organisms naturally breaks down nutrients in the water at a faster rate and keeps pathogenic organisms in check.

If the water's physical structure is damaged,

however, as is often the case in our modern communities, then the micro-organisms in the water are under more stress, do not have as much energy for metabolizing food and waste in the environment, and the water quality begins to suffer. Pathogens have an easier time and a freer reign because the natural checks-and-balances found in the more beneficial ecology are absent.

This is a model of how the effects on the water's physical structure can impact the microbiological dynamics in the water system.

Is there any proof that these changes are actually occurring in the water?

The Russian Academy of Natural Science Vice President, Dr. Yuri Rachmanin, and his colleague Dr. Kondratov, have studied the Grander® Technology over several years, specifically to better understand how it works. They have measured and observed the changes in the water's physical structure and in how the water's physical structure utilizes energy from the environment, and have suggested that this is how the technology functions.

According to Dr. Rachmanin:

"[The] GRANDER® Technology can have its effect by absorbing very small energy spectra from its environment. And because of its structure, it is also capable of radiating a very specific energy spectrum to nearby water."

Their findings were not a surprise to Johann Grander, the inventor, who has said repeatedly that the water achieves its optimal qualities and internal order through its relationships with the environment.

Regarding the microbiological changes that develop in the water after treatment, these have been repeatedly confirmed by not only our own projects, but through literally thousands of bacteriological analyses performed by Dr. Felsch of Austria, (whose findings are available), by the Russian Academy scientists, and by various additional academic institutes.

How can this approach, which actually helps bacteria function even better than before, produce a situation in which bacteria counts are reduced?

It is true that in the most general sense the effects of the Grander® Technology result in improved conditions for all organisms within the water, pathogens and non-pathogens alike; however, a very interesting process occurs when the stresses in the system are reduced.

Instead of resulting in an explosion of undesirable bacteria, treatment helps many types of beneficial organisms that were not very active before, to become much more so. One of the first qualified scientists to study the technology, Dr. Felsch, has observed this response on more than 1,000 occasions through his laboratory observations of the so-called pin-point bacteria. When this increased activity develops, beneficial organisms access and metabolize nutrients at a faster rate in the water system, and so the food that was previously "lying around" to sustain many of the less desirable organisms is no longer as readily available. Thus, the overall nutrient loading is reduced, and the ecological system reaches a much healthier and more balanced condition. In this condition, the niches for the heartier types of organisms, which coincidentally are often less desirable from our perspective, are no longer as

readily available. In essence, their services are no longer required by the natural system.

Thus, the entire system functions better, producing an ecology that lowers nutrient loadings and crowds out more sluggish, less desirable populations. The more balanced system has more internal checks and balances that prevent undesirable organisms from multiplying out of control. This is what Johann Grander has termed “water’s immune system”. The objective of treatment is never to kill or increase the stress on the system, but to provide support for the system so it can achieve a balanced condition in the shortest period of time possible, and sustain it.

It turns out that when supported in this fashion, Nature produces a highly desirable and self-managing ecology within the water system.

How does the technology affect Legionella pneumonophilia bacteria? What about other pathogens such as salmonella or E. Coli?

The Russian Academy of Natural Science researchers have conducted tests on the viability of various specific types of bacteria in water systems treated by the Grander® Technology. Their experiences show an accelerated death rate of many types of pathogenic organisms in treated water. Included in their studies were E. Coli, salmonella, legionella, and klebsella among others. The results showed an accelerated death rate of these organisms in treated water systems.

In general, no guarantee may be made that any specific type of bacteria will be held to undetectable levels in a treated water system. What we can say, however, is that the more balanced ecology within the water system that develops in response to treatment with the

Grander® Technology is one which naturally constrains the growth of these pathogenic organisms. In our opinion, this solution is as good or better than the use of biocides in many applications, such as cooling towers, where the water is not being used for potable service, and where chemical treatment cannot guarantee that any specific organism will be undetectable either. The balanced ecology produced by treatment is self-sustaining, and actively working around the clock to maintain beneficial water conditions.

For drinking water systems, swimming pools, and other more critical applications, the Grander® Technology system should never be used as the primary disinfectant. Beneficial results may still be achieved in terms of the microbiological stability of the disinfected water.

How can the effects of Grander® Technology be explained in terms of the basic Laws of Thermodynamics, which seem to suggest these claims are impossible?

First, it is important to consider the thermodynamics of living organisms. Our own bodies maintain a very highly ordered system by converting the nutrients and raw materials from the food we eat into their structure. Thus, we use the flow of energy that we receive from our surroundings; in the form of the food we eat, to sustain ourselves. This does not violate the Laws of Thermodynamics because we are “open systems” that receive energy from our surroundings.

The issue is that it appears on the face of it that the Grander® Technology devices are “closed systems”. They are not being fueled, or plugged in to an outside energy source, so how can they be an open system like an organism?

The answer is that the water sealed inside of the units possesses a type of internal structure that allows it to receive various forms of energy from its surroundings. So, the units do not accomplish something from nothing, but are actually using the natural ability of water to receive energy from its surrounding environment to sustain the treatment effects.

How long do the units last? How soon do they wear out?

Since the units function by relying upon the characteristics of the highly-ordered water that is sealed within all of the devices, the only way to cause them to stop working is to drain the water out of them, which could occur if the structural integrity of the unit is damaged, or to damage the water contained within them. This could be accomplished using a high-energy source of radiation such as extended exposure to concentrated x-rays or nuclear radiation, but not through normal usage in the applications for which it is intended.

Keep in mind that the units function by receiving energetic spectra from the environment, and radiating it in specific fashion to nearby water. This process does not deplete the device itself, which is merely acting as a conduit and is continually being regenerated through its relationship to the surroundings. This is much like the functioning of a wind turbine, which does not wind down through normal usage, but instead functions so long as the wind blows.

In practice, since the first units were produced in 1989, and they are still working, we can safely say that the units will function properly for fifteen years. The structural integrity of the units is warranted for a period of five years.

Is the performance of the system guaranteed?

In some applications, such as cooling water treatment, we review the application with the customer and then publish performance targets much like any equipment manufacturer would do. After discussions with the customer, we often agree to tie the success of the project to guaranteed and measurable performance parameters. The majority of projects we have executed to date have been based on such a written performance guarantee, and in practice, our objective is to set reasonable customer expectations that we know we can meet or exceed based on our experiences using the system to date.

We do not, however, guarantee performance parameters in applications that are new to us. In these cases we review the specific situation with the customer, present reasonable expectations for results based on past experiences, and draft a purchase agreement satisfactory to both parties.



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