

Water Chemistry Monopersulfate (Non-Chlorine Shock)

Monopersulfate is a non-chlorine shock treatment often used by spa owners because it requires only a short waiting period before bathers can re-enter the water. It also cuts down on the odour and irritation caused by elevated levels of chlorine. Monopersulfate is being used more frequently today, primarily due to the rising popularity of mineral purification systems.

Using Monopersulfate With Chlorine – Chlorine is by far and away the most popular sanitizer used by pool and spa owners because of its ability to quickly and effectively sanitize pathogenic (disease-causing) bacteria and viruses. Surprisingly, only 10 per cent of the chlorine added to spa water goes on to kill living organisms, the other 90 per cent of the chlorine oxidizes (destroys) waste products in the water, such as sweat, skin particles, and sun screen introduced into the water by bathers.

Chlorine also has to oxidize dust, bugs or grass, which always seem to find their way into the water all by themselves. The by-products of chlorine oxidation are chloramines, also known as combined chlorine. Chloramines have a very strong chlorine odour, and they cause nasal and eye irritation, shocking the water with chlorine will eliminate excessive chloramines, but it requires raising the spa chlorine level to approximately 10 ppm.

After superchlorinating the water, bathers must wait until the chlorine residual comes down to the acceptable range, between 1 ppm and 5 ppm, before getting back in the water, this can take hours, depending on how high the chlorine level gets. It is difficult to add just the right amount and the higher the level gets, the longer bathers will have to wait to get in. Monopersulfate can eliminate wastes in a spa without the unpleasant side effects of chlorine. While it cannot effectively sanitize (kill bacteria) in a spa, monopersulfate can be used to shock the water. This allows bathers to return to the water sooner – typically less than 30 minutes after the monopersulfate shock has been added to the water.

Monopersulfate eliminates impurities through oxidation, conserving the chlorine residual for killing bacteria. Best of all, monopersulfate does not leave behind any irritating or unpleasant by-products when it oxidizes wastes.

Using Monopersulfate With Bromine – Another popular choice for sanitization in spas is bromine. This is a good alternative to chlorine because it is more stable in hot water, does not produce the same strong chloramine odour, and is still an effective sanitizer in the combined bromamine state. For this reason, most bromine test kits measure total bromine instead of free bromine. The one drawback to bromine is that it tends to be slightly more expensive than chlorine. Monopersulfate in a bromine system is used as an activator for the bromine that has been used up and converted into a non-active form. Monopersulfate performs some oxidation of waste as in the chlorine system, but it is also capable of reactivating the bromine so that it is once again capable of sanitization and oxidation.

Chlorine is not capable of this type of reactivation; therefore, monopersulfate tends to increase the bromine level in spas when it is added to an established bromine system.

Again the unique advantage of the monopersulfate shock is that bathers can re-enter the water a short time after the shock has been added – typically less than 30 minutes after the monopersulfate shock has been added to the water.

Monopersulfate With Mineral Purification Systems – Because of the unpleasant odour and irritation associated with chlorine, mineral purification systems and other alternate methods of sanitization have been growing in popularity. These systems use dissolved minerals such as copper (to kill algae) and silver (to kill bacteria). While these minerals can keep the spa safe from pathogenic organisms, minerals are incapable of oxidation, so a monopersulfate residual is maintained in the mineral purification systems to oxidize wastes and debris. (In the presence of high levels of chlorine or bromine, monopersulfate dissipates very quickly in mineral purification systems, where the level of chlorine or bromine is lower, the monopersulfate residual level will stay in place much longer).

Testing Monopersulfate – Monopersulfate needs to be measured after each use, especially if it is being used as the primary shocking agent. This ensures proper oxidation of wastes, yielding clear water for bather enjoyment. There are few kits available to test for monopersulfate. Almost all testing methods have chlorine interference, meaning that the chlorine level interferes with the monopersulfate test results. These tests actually depend on oxidation of an indicator by monopersulfate. Since chlorine is also a strong oxidizer, it usually causes false positive results in monopersulfate tests.

A subtractive testing method, however, will provide an accurate monopersulfate value even in the presence of chlorine. First, it registers the total oxidizer value by a chemistry that detects both chlorine and monopersulfate. Second, the user completes a test that detects chlorine but not monopersulfate. The difference between the first value and the second value is the monopersulfate value