



# **Aquatic Consulting Services**

4909 Orchard Ave. #104 • San Diego • California • 92107

# **Hot Water Spa Chemistry & Maintenance**

Alison Osinski, Ph.D.  
Aquatic Consulting Services  
4909 Orchard Ave. # 104, San Diego, CA 92109  
(619) 224-3100  
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There are unique demands associated with operating and maintaining a spa. "Spa" is the generic term used to describe a variety of pools, tubs, and aquatic facilities\* which utilize warm water or heated air for their therapeutic value. Spas are not just little swimming pools. Maintenance demands are higher, chemical usage is greater, and parameters change much more quickly. Most problems arise as a result of the high bather load to water volume ratios, and the elevated water temperatures. The heavy usage, and high density of people immersed in a small volume of water can lead to serious infection control problems if not properly addressed. Hydraulic and sanitation-oxidation systems must be designed by someone familiar with the heavy organic loading and demands placed on the water by users.

### **Impact of Users**

Users have an enormous impact on the small volume of water found in most spas. For instance, 5 people entering a typical residential 500 gallon spa have an equivalent effect on the water as do 3,600 bathers in a typical 360,000 gallon community swimming pool. The ratio is the same, 1 bather per 100 gallons of water.

\* The term "spa" encompasses: whirlpools, whirlpool bathtubs, ice baths or polar plunges, therapeutic whirlpools, therapy pools, hot tubs, swim spas, flotation tanks, environmental enclosures, mineral baths, mud baths, Turkish baths, saunas, and steam rooms.

## **Spa Maintenance**

The elevated water temperatures found in most spas – the exception being polar plunges or ice baths, cause water quality to change much more rapidly than in larger swimming pools.

Chloramines form quickly because bathers perspire more heavily in warm water and introduce ammonia into the water which then combines with chlorine to form objectionable by-products. Total dissolved solids build-up quickly because water evaporates more rapidly, and more chemicals are needed per volume of water on account of the large chemical loss due to dissipation in warm water and because of aeration from hydrotherapy jets. Because of body oils and fats excreted by users and the high TDS levels, foaming of spa water is common. Warm water provides favorable conditions for bacterial and algae growth, therefore there is an increased likelihood of disease transmission if the spa operator is not vigilant about chemical adjustment. Filter demands are heavier due to the larger amount of organic matter and bather waste being deposited into a spa by bathers. Operators have more difficulty maintaining water balance, because calcium is less soluble in warm water, and wants to precipitate out of solution.

## **Spa Safety Features & Practices for Commercial Spas**

Commercial spas have additional safety features usually not required by code on the swimming pools located within the same facility. The requirements do not usually apply to residential spas, but can be followed by concerned homeowners.

A temperature regulator must be installed to automatically shut off the

spa heater when the maximum permissible temperature, usually 104° Fahrenheit, has been achieved. Most bathing codes require that a drinking fountain be provided near the spa, and that exercising in spas be discouraged because rapid dehydration can result from the body's attempts to cool itself. Signs warning patrons of the dangers associated with using warm water spas must be posted. Specific wording of the signs may be specified by code.

A 15-minute timer must be installed on all commercial spas to shut off the hydrotherapy jets. The timer should be located near the spa, but positioned so that it cannot be reached by a bather sitting in the spa. This safety feature encourages patrons to leave the spa when the jets go off. A clearly labeled, emergency circulation pump shut-off switch must be installed on the deck within view of bathers using the spa, so that the pump can be shot off immediately in case of a suction entrapment accident.

Spa depth should not exceed four feet, and depth must be plainly and conspicuously marked in feet and inches at or above the water surface on the vertical wall of the spa, and on the coping or edge of the deck. Markings should conform to local and state code as to size, color, and spacing. Steps, treads, tiers, ledges or any other protrusion into the spa should be marked with a minimum one inch wide color contrasting stripe or tile on both the top and vertical rise. A pair of safety rails, rather than a single rail, should be installed to assist patrons when entering or exiting the spa, since most spa accidents occur when patrons are getting in or leaving the spa. Guard rails should be inspected daily to make sure they are tightly secured in place.

Physical barriers separating spas from pools may be required. And, a minimum separation from another pool is required. Typically, a distance of at

least 10 feet of deck space from the swimming pool, wading pool, or other pool in the same facility is mandated. Commercial codes also require separate circulation, filtration and chemical treatment systems for the spa and that there be no direct connection between the spa and any other pools in the same facility.

## Sidebar:

### Benefits

There are many psychological, physiological, and therapeutic benefits associated with soaking in warm water spas. Warm water soaking relieves pain from arthritis, stiff joints, sore muscles, and minor injuries. Warmth causes pores to open, inducing perspiration, and deep cleanses skin tissue. This stimulates circulation and increases blood flow to the skin, reduces tension, stress and fatigue; thereby heightening mental awareness.

### Contraindications

However, warm water immersion isn't for everyone. Anyone suffering from heart disease, blood pressure or circulatory problems, or taking medication to control those problems should be discouraged from using spa pools.

Pregnant women, especially during the first trimester; and individuals with Multiple Sclerosis or Diabetes should only use spas in certain circumstances with the consent of their medical doctor, and for a limited amount of time.

Persons under the influence of alcohol or drugs, or taking prescription or non prescription drugs such as tranquilizers or antihistamines which cause drowsiness, should also avoid prolonged exposure to heated water.

Individuals who fall into the above mentioned categories should be warned of the dangers of prolonged immersion at elevated temperatures. Drowsiness, elevated blood pressure, dehydration, hyperthermia (a warming of the body core temperature), and failure to heed warnings or take appropriate

precautionary measures while using a spa, can lead to drowning, fetal brain damage, slips-and-falls, suction entrapment, accidental electrocution, and disease transmission.

Unsupervised small children should never be permitted to use a spa. Health codes in some states, and organizations such as the YMCA, prohibit public spa use by young children entirely. Other states, restrict public spa usage to children over 14 years of age unless accompanied by a responsible parent. Enthusiastic, curious and normally active children are more at risk of being injured while in a spa than are members of the more sedentary general adult population. In their playful enthusiasm, many children have been injured from falls, from pulling heavy objects or electrical appliances into the water, and from suction entrapment accidents while in spas. Because of their relatively small size and skin surface area, a child may overheat very rapidly and suffer damaging effects from hyperthermia.