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Pool manager's guide

A daily workbook for addressing safe pool operation

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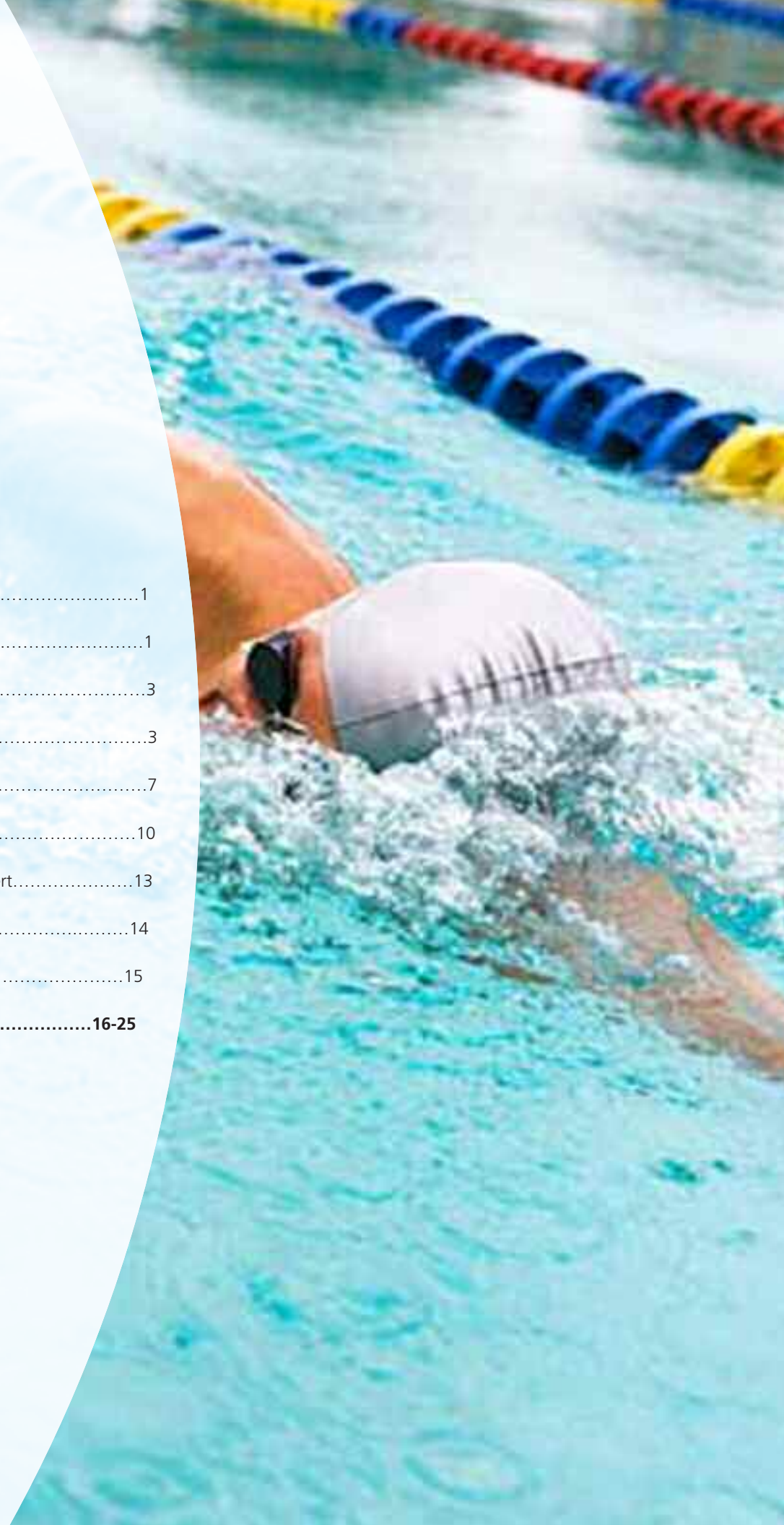


Pool operation

"Swimming pool accidents account for several hundred deaths each year."

Introduction

Operating a swimming pool is a major responsibility. Swimming pool accidents account for several hundred deaths each year. Because the swimming pool is intended as a fun place, a place for people to enjoy, the pool manager is faced with a multitude of responsibilities. You will need to ensure safety, sanitation and maintenance, in addition to recreational needs to make sure your fun place does not turn into an area of tragedy.

We have provided a sample supply of all forms discussed in this handbook. The forms included may be reproduced for your continued use.

This manual is neither intended to cover all aspects of pool safety nor serve as a reference source for all codes and regulations, but rather as a tool to help ensure that major safety areas of pool operation are addressed daily. Zurich Services Corporation recognizes the serious responsibility you have undertaken as a pool manager. We hope this handbook will help make your job a little easier.

Pool operation

Regulations

There are literally volumes of regulations and design criteria regarding pools. The requirements vary by state, county and even from one municipality to another. The purpose of this guide is not to supplant or republish those rules. Instead, we will give you some guidance and checklists to help you with the main aspects of your pool's physical features, operation and daily checks. The information is compiled from various published sources, including the National Pool and Spa Institute. The checklists are intended as a basic daily check only and are not intended to replace or supercede any state, county or municipal requirements. Appropriate references and regulations should be consulted for additional details and specific requirements in your local jurisdiction.

We strongly recommend that you determine which authority has jurisdiction over pools in your area, keeping in mind that there may be more than one jurisdiction. We also recommend that you obtain a copy of the regulations from the authority having jurisdiction, become familiar with them and make sure that they are followed. Your local Zurich Services Corporation risk engineering representative may be able to assist you in this area.

Pool access

Access to the pool area should be restricted by means of a self-closing and self-latching lockable gate and appropriate fence, wall or other suitable barrier. The barrier should be at least 48 inches high, with no openings that will allow a four-inch sphere to pass through. The barrier should not provide any footholds or handholds for a child to climb over it. Use of natural landscaping and hedges as a barrier may be acceptable only if permitted by the local authorities. Many hotels use guestroom keys (or access cards) to limit pool access to the guests registered at the hotel.

Diving boards

Diving boards are a source of many pool accidents and liability litigation. With the exception

Pool operation
(continued)

of swimming pools used for competitive diving and aquatic sports, most pools have opted to remove the diving boards. National Pool and Spa Institute (NSPI), United States Diving, Inc. (national governing body of diving) and regulatory authorities have specific criteria for water depth, springboards, vertical clearances above water line and other requirements. If diving boards are required, many planning and protective measures must be in place and enforced.

Many risk factors cause or contribute to diving accidents and fatalities. They include insufficient water depth at the diving point, bottom and side contour of the pool. In clear water, the depth of water is hard to estimate visually; the water marking is important for safety.

Pool slides

Swimming pool slides are also a source of many serious injuries. Consumer Products Safety Commission (CPSC) has developed specific regulations (16 CFR part 1207) for the manufacture and construction of swimming pool slides.

Although water parks have many similarities with pool operations, the increased level of activities, people of all ages and somewhat chaotic usage increases the need for more supervision and controls. The following list may be helpful in addressing these issues.

- **Slide ladders:** All slides should have a dedicated ladder and an attendant at the top and bottom.
  Additional items to consider:
  – Handrails (42 inches)
  – Proper platform and landings
  – Corrosion-resistant
  – Slip-resistant treads
  – Proper design, including structural integrity and steepness angle
- **Slide landing area:** The slide and the tube outlet should extend over the water for safe water entry. The landing area should be separated from the rest of the pool area and should have adequate depth. The layout of the slide landing area should consider the proximity to other slides and diving areas to reduce any collision potential.
- **Supervision:** Due to the high-energy environment in water parks, a stronger emphasis on supervision is important for safe operations.

Sanitation and administrative duties

Some of the issues to consider include:
– Signage and dispatch procedures to maintain spacing between riders to avoid collision
– Lifeguards at the bottom of the slide landing in the catch pool area to direct swimmers away from the landing zone
– Enforcement of rules

Sanitation

Sanitation is critical for proper pool operation. Not only is water purity important, but the deck area, showers, rest rooms and dressing facilities should also be properly rinsed daily and sanitized periodically.

Records must also be maintained to document completion of proper sanitation and to serve as a defense against any allegation of infection from the pool and pool area. Sample forms are included with this booklet to assist you in these efforts.

Slips and falls

Due to the presence of water, the pool walking surfaces tend to be slippery. Slips and falls remain a major cause of accidents and injuries in pools. The pool deck and walking surfaces in showers, rest rooms and dressing areas should be slip-resistant. Ceramic tiles are commonly used for these surfaces. They should be selected based on following criteria:

- Slip-resistance, especially in wet conditions
- Ease of daily cleaning with most cleaning chemicals
- Sanitary conditions for tiles and grout
- Chemical resistance
- Durability

Proper maintenance of these surfaces is extremely important as high numbers of slip and fall accidents occur in these areas. Cracked tiles and grout joints should be repaired promptly. Pools with sun decks present another problem. Use of sunscreens and body oils make the surfaces slippery. Consult your cleaning chemicals supplier for recommendations on suitable cleaning products for your deck and walking surfaces.

Many pools have pool toys and other items that can be a source of tripping hazards. Care must be taken for proper storage of these items when not in use.

Administrative duties

In addition to the areas already covered, it is usually the responsibility of the pool manager to establish pool rules, hire lifeguards, maintain guest lists, etc.

The following is intended to help you organize some of these areas of responsibility.

Lifeguards

Local authorities regulate lifeguard requirements, which depend on many factors such as bather load, area and depth of water, and the presence of adults and other responsible persons. When lifeguards are required, make sure all of your lifeguards are qualified and have the American Red Cross YMCA Certification or its equivalent. Their certification should be kept current as long as they are employed as a lifeguard. Copies of their certificates should be present at

Administrative duties

(continued)

"Lifeguards play a critical role in pool safety and proper hiring, selection and retention are critical issues in pool management."

the property and kept on file or posted as required by the authority having jurisdiction. The lifeguard training should include rescue, CPR, first aid and AED if approipriate. Lifeguards play a critical role in pool safety and proper hiring, selection and retention are critical issues in pool management. On-going training and reinforcement are also important to maintain their rescue ability. If you use a contracted service for lifeguards, they should still provide the required certification information.

1. Lifeguards must always be dressed in swimming attire when on duty (no exceptions).
2. Never assign any other duties to lifeguards that would distract their attention from observing patrons in the pool area.
3. If swimming instructions are offered, qualified instructors should conduct them.
4. Pool parties and use of the pool by large groups and children require greater emphasis on proper monitoring for safety.
5. Conduct rescue drills periodically to sharpen lifeguard rescue skills.
6. In the absence of lifeguards, any use of video cameras for remote observation requires constant and dedicated monitoring and ability for prompt response.
7. Lifeguards should be positioned to avoid any visual obstructions.

When no lifeguards are present, many local authorities have specific signage requirements. Sample signage includes:

- No lifeguard on duty
- Hours of operations
- Children must be accompanied by parents/guardians
- A minimum of two adults must be in the pool at all times
- A telephone for direct communication to emergency services

Lifesaving equipment

Appropriate lifesaving equipment must be available conspicuously and conveniently at all times. ANSI/NSPI-1-2003 Standard for Public Swimming Pools requires the following life-saving equipment on hand as a minimum:

- A light, strong pole (12 feet or more in length) including a body hook (commonly called a shepherd's hook)
- Throwing rope (1-1/2 times the maximum width of the pool or 50 feet) with a 15-inch ring buoy or other similar floatation device attached
- A direct telephone access with posted names and emergency services phone numbers (e.g., 911) or whatever local regulations call for.

Several states have or are considering Automatic External Defibrillators (AED) for cardiac safety to supplement first aid measures. Some states also require access to direct emergency phone numbers. It is important for you to know the specific requirements that apply to you.

Emergency response plan

An emergency response plan must be developed and be in place for all anticipated emergencies, including water drowning rescue, cardiac emergency (AED) and others. Practice drills should be conducted periodically to ensure proper communication, delegation and action items.

Administrative duties
(continued)

Surveillance camera
Use of video cameras in swimming pools can improve pool safety only if it is implemented carefully. Cameras must be constantly monitored by a staff person so assistance can be called promptly, if necessary. It is a poor substitute for lifeguards for pool safety. In recent years, sophisticated drowning detection systems have been deployed with some success, but they may not be very effective in high-activity environments such as wave pools and water parks.

Signage
Proper signage is critical to communicating specific avoidance behavior and consequences. Having too much information in a single sign can reduce its effectiveness, and an important safety message can be lost. Consider bold, big signs with graphics. Use of color combinations in designing signs for different applications can also enhance their effectiveness and visual impact. Experts also recommend posting signs at the entrance, in the pool area and on the deck to get maximum exposure. They should be visible from at least two points. Some jurisdictions have very specific requirements for pool signage, down to a specific font and size of letters. Contact your local authorities for requirements.

Pool rules
Although not an exhaustive list, the following should be addressed in your version of the pool rules. There may be additional requirements specific to local regulations such as letter size and visibility. The depth markers should be clearly visible on pool walls, floor, deck and in-water signage. Depth should be both in feet and meters and units identified.

- Refuse admission to the pool to any person having an obvious disease, infectious conditions such as colds and fevers, foot infections, skin lesions, boils, ear and nasal discharges or any other conditions that appear infectious. Any person with excessive sunburn, open wounds or wearing bandages should also be denied admission. Infants should not be permitted into the water wearing their diapers.
- The pool use is limited to members and registered guests.
- No food or drink should be permitted in the pool area.
- No glass or pop-top containers of any kind should be allowed into the pool area.
- All bathers should be required to shower before entering the pool.
- No running or horseplay should be permitted.
- No dunking, rough play or "fake" emergencies will be tolerated.
- Only bathers in proper attire should be permitted into the pool area, bathhouse and deck area.
- No diving. Use "International No Diving" symbol.
- Water depth markers visible on both ends and both sides (deep and shallow) of the pool.
- An adult must accompany children under age 12.

"Proper signage is critical to communicating specific avoidance behavior and consequences. Consider bold, big signs with graphics."

Administrative duties
(continued)

"Guest privacy and children in opposite-sex locker rooms are matters of concern for many guests. You may consider several alternate strategies, ranging from separate family locker rooms, age cut-off policy, signage and others."

- Bathing caps should be required for long hair.
- Alcoholic beverages shall not be permitted, and intoxicated persons should not be permitted in the pool and deck areas.
- Pool hours of operations
- In case of an emergency, call "911" on the telephone marked "Emergency" or use "instructions to summon emergency assistance" if other than 911 is used.

Whirlpool rules

In addition to the pool signage information, the following information should be included in the signage for the whirlpool and spa rules:

- Shower before entering the whirlpool.
- Use the steps and railings to enter the whirlpool.
- Do NOT exceed 15 continuous minutes in the whirlpool without cooling off. Long exposure may result in nausea, fainting or dizziness.
- Maximum water temperature should be 104 ° F or what local authorities stipulate.
- No pets allowed.
- Children under 12 must be accompanied by an adult.
- Do not use the whirlpool alone.
- Guests with the following conditions should **not** use the whirlpool without a doctor's permission:
  - Heart disease
  - High/low blood pressure
  - Diabetes
  - Pregnancy
  - Under influence of alcohol, medication or drugs

Locker room issues

The number of shower stalls, restroom facilities and other similar requirements are generally specified in the regulations. There are several other important considerations emerging in locker room usage in public pools and recreational facilities. You need to be aware of these issues and develop appropriate strategies to address them.

Privacy: Guest privacy and children in opposite-sex locker rooms are matters of concern for many guests. You may consider several alternate strategies, ranging from separate family locker rooms, an age cut-off policy, signage and others.

Chemical sensitivity: Many people are allergic to certain chemicals, ranging from personal-care products (soaps and shampoos dispensed in showers) to cleaning and sanitation chemicals. Some gyms have considered implementing a "fragrance policy" and reminder signage to accommodate this exposure.

Theft and security: With increased incidents of identity theft and stolen credit cards, this is an increasing concern for many gyms and pool locker rooms. This should be part of an overall security strategy. In addition to a good lock program, warning signs, random security sweeps by staff and locker room usage documentation by access card and ID checks can help provide some deterrent.

Equipment maintenance and safety

Video surveillance: Most states prohibit use of video cameras inside locker rooms. With the advent of cell phones with built-in digital cameras, there is a potential for concern. Although there is no known litigation involving improper cell phone usage in locker rooms, the potential exposure exists. You may want to consult your legal counsel regarding the need to develop a policy or prohibition/restriction on cell phone/camera usage in the locker room. This may be a particularly prudent measure in cases of facilities frequented by celebrity clientele.

Guest lists

If your facility offers memberships to the public, it is important that the members understand and adhere to local regulations. To help them understand the rules, they should be included on their membership form along with an acknowledgment that they have read the rules. One of the rules should be the clear distinction on who is allowed to be a guest of the member. Appropriate language should be present on the sign-in sheet that establishes the pool rules as well. You may want to consider the use of an indentification system such as a wristband to indentify members and quests.

Guest lists are important for the following reasons:

- They give you the bather's name, should an emergency occur.
- They ensure you collect the proper fees, if applicable.
- They give you the names of the members that brought the guests.
- Help you maintain statistics on pool usage.

Disabled guests

With passage of the Americans with Disabilities Act (ADA), accessibility of pool facilities by disabled guests must be considered in the design and operation of the pool facility. Adequate consideration should be given to alternate methods for entering and exiting the pool. The National Pool and Spa Institute (NSPI) recommends solutions ranging from fixed elements such as steps and ramps to portable equipment such as transfer tiers, lifts and other suitable devices. The locker rooms should also be designed to accommodate the specific needs of disabled guests. If you have equipment, staff should be promptly trained and competent in its use.

Equipment maintenance and safety

In order for your pool to remain clean and sanitary (and open), your equipment must operate properly, and that involves daily checks and maintenance.

The following list should help you in performing proper maintenance:

- Keep all manufacturers' instructions in a safe, convenient location. Read and follow their instructions carefully.
- Ensure that the "emergency shutdown controls" are located and clearly marked for emergency access by lifeguards and pool operators in case of an emergency.
- Check all pumps, filters, disinfectant feeders and gauges several times daily. Keep all equipment in continuous operation twenty-four hours a day when the pool is open.

"In order for your pool to remain clean and sanitary (and open), your equipment must operate properly, and that involves daily checks and maintenance."

Equipment maintenance and safety

(continued)

"Use of low-voltage lighting, UL-listed fixtures and bonding-grounding are critical to electrical safety."

- All recirculation system accessories and chemical feeders must be equipped with back-flow preventers to prevent cross-contamination and backflow into the water supply system. They must be tested when installed and at least annually by a certified technician.
- All hair and lint strainers should be cleaned out at least once a day. Be sure the pump is stopped first so that you do not draw air into it. If you have an earth filter system, the strainer basket should be cleaned during the filter backwash cycle.
- Check the flow meter and make sure it is accurate. Keep the glass clean so it can be easily read.
- Bleed the vacuum and pressure lines to prevent blockage.
- If your pool is equipped with a gas chlorination system, special precautions and maintenance are necessary to ensure safe operation.
- Anyone performing maintenance on chlorinating and chemical systems should have proper training, including the required HAZCOM training for chemical safety. The National Spa and Pool Institute has various training programs available.
- All piping systems should be color-coded to clearly identify raw water/filtered water/waste water/heated water/vacuum cleaning line.

You may also want to investigate the possibility of "Third-Party NSF/ANSI Standard 50 Certification" for all pool equipment. It is a voluntary standard developed by the National Sanitation Foundation (NSF) that covers testing and verification of design and production based on an independent review and an audit process.

Electrical safety

Although water and electricity are a deadly combination for electrocutions, they are not very common in pool operations. Use of low-voltage lighting, UL-listed fixtures and bonding-grounding are critical to electrical safety. In addition, periodic inspections of electrical connections, bonding and signs of corrosion damage can help maintain the electrical safety and avoid any risk of electric shock or electrocution.

Chemical safety rules

Safe storage and handling of chemicals are a necessary part of any pool manager's job. Certain precautions must be taken to ensure safety. Storage of pool chemicals in equipment and pump rooms is a poor safety practice and should be avoided. A list of the most commonly used chemical types and their uses is also included as an easy reference guide.

Here are some safety rules to consider:

- Keep all Manufacturers Material Safety Data Sheets (MSDS), which arrive with the chemicals you order. These sheets provide a wealth of information, including the hazards associated with the chemical, what protective equipment should be used when handling the chemical, danger signs for overexposure and first aid. Maintain a file of MSDS sheets for all the chemicals you use. It will provide you with a handy

Equipment maintenance and safety
(continued)

reference book of safety precautions and information on proper use and handling. Be sure to take the time to read these sheets before the chemicals are used. Make sure that the pool staff receives required HAZCOM training on chemical safety.

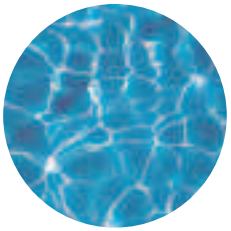
- Read and follow all manufacturers' warnings and instructions. In addition to the MSDS sheets, instructions and warning labels will be included with all chemicals. Read them before using the chemicals.
- Store all chemicals in secured original containers, in a dedicated secured room with adequate containment for spills and proper ventilation.
- Avoid contamination, especially by hydrocarbons and incompatibilities from dissimilar chemicals.
- Because most chemicals you use are for chlorination, special precautions associated with the use and storage of chlorine is needed.
  - The storage area must be free from potential flood, roof leakage or any water source. (Most dry chemicals containing chlorine react violently with water.)
  - Do not mix different types or brands of chlorine chemicals together in your pool or chlorinator. The chemical makeup of these products (chlorinated cyanurates compounds, sodium and calcium hypochlorites) may react violently with one another. Follow exactly the manufacturer's instructions for storage and use.
  - If you use chlorine gas, make sure the cylinders are properly secured and that the tanks are stored away from all other compressed gases, hydrocarbon fuels and dust or shavings. Chlorine mixed with these substances creates a severe fire and explosion hazard.
  - Make sure chlorine gas cylinders or dry chemicals are not stored in an area with electrical panels or equipment. The vapors from chlorine are corrosive and can cause considerable damage to electrical connections. All light switches should be located outside the storage room.
  - Make sure all pool personnel have received adequate training on the hazards associated with chlorine gas and chlorine chemicals.
  - Have an evacuation plan outlining the actions to be taken in case of a chlorine leak. Hold a practice drill at least once a year.

Additional precautions to consider:

- Never allow anyone to perform equipment maintenance except specially trained professionals. They should receive required HAZCOM training to be familiar with hazards associated with all of the pool chemicals and use of appropriate personal protective equipment.
- Have a written emergency plan in case of chemical leaks or other emergencies. It should list all emergency numbers and who to contact (by title, not by name), what action should be taken by whom and what

Chlorine mixed with other chemical gases, hydrocarbon fuels and dust or shavings creates a severe fire and explosion hazard.

Water quality



"Poor water quality and lack of proper disinfecting have resulted in several outbreaks of hot tub and spa-associated dermatitis due to *Pseudomonas aeruginosa*."

should be kept nearby. We suggest posting the emergency numbers nearby but not directly next to the system. You will need access to them in case of an emergency.

- An approved respirator and protective equipment suited for a chlorine atmosphere should be kept nearby but outside the chlorine room. Be sure the mask is accessible to all and well-maintained. Keep it in a closed, unlocked container. Check the mask frequently for overall condition, and make sure the filter has been changed regularly.
- The gas cylinders should be stored indoors and properly secured to a stable wall by a chain or other means. Make sure there is no heat source nearby.
- Daily maintenance includes daily checks for chlorine leaks. The chlorinator, gas line injector and cylinders should all be checked daily. The staff should be adequately trained in leak control procedures and may be supplied with a Chlorine Institute Emergency Kit A, containing devices for capping leaks in the cylinders. Absent this, the local Hazardous Materials Response Team should be called in the event of any leak. The local authorities may require special signage. Check with them for any special local requirements.

Obtain a copy of "Chlorine Manual" and a wall chart, "Handling Chlorine Cylinders & Ton Containers" from:

The Chlorine Institute, Inc.
2001 "L" Street, NW
Washington, DC 20036
Phone: 202-775-2790

Ventilation requirements

Ventilation of chemical storage areas and equipment rooms are important for safety and prevention of corrosion. This is particularly important in case of below-grade arrangements. The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) has requirements for acceptable air quality in spectator areas and recommends six to eight air changes per hour for pools with spectator areas. Since the exhaust air is rich in chlorine and can be corrosive, it should be discharged away from the locker rooms and sensitive equipment areas.

Water quality

Water quality and purity are important parts of the swimming pool, spa and hot tub operations. Algae growth can lead to cloudy water. Poor water quality and lack of proper disinfecting have resulted in several outbreaks of hot tub and spa-associated dermatitis due to *Pseudomonas aeruginosa*. Swimmer's ear, toe-web infection and other problems are common with poor water quality. Incidents of Legionnaire's Disease have also been documented from inhalation of contaminated aerosolized droplets of hot tub waters.

Although a whirlpool bath may appear fully drained during cleaning, its circulation system may have trapped water. The circulation system should be flushed in accordance with the manufacturer's instructions. For added precaution, the whirlpool should be professionally cleaned at least semiannually.

Water quality
(continued)

There is another controversy linking use of chlorine in pool water and prevalence of childhood asthma. Chlorine reacts with ammonia in sweat and urine to generate trichloroamine, and inhalation of these chloramines appears to be a potential culprit in causing lung damage and asthma in children. This is giving rise to a debate about consideration and moves toward non-chlorine-based disinfectants. Examples include use of ozonation, ultraviolet (UV) light and ionic purification in water treatment.

Although controlling use of chlorine can help reduce the formation of chloramines, enforcement of pool hygiene practices for children and mandatory showering before entering the pool can certainly help with this situation. The problem is not limited to swimmers only. Chloramines also affect the air quality in general and affect spectators.

Use of ozone as a disinfectant in pool water has other challenges. It breaks down quickly and does not have enough contact time with pool water for the critical biocide action. In addition, it kills bacteria but not algae.

The following guidelines are suggested for the operational parameters for the proper treatment and maintenance of pool water quality. The requirements will vary depending on temperature, pool usage, bather load and other factors, including local requirements in some cases. Refer to guidelines provided by your pool chemicals supplier for detailed specifications.

Suggested disinfection levels

	Minimum PPM	Ideal PPM	Maximum	Comments
Free chlorine	1.0	1.0-3.0 PPM	3.0-PPM	Hot weather and heavy use may require higher levels.
Combined chlorine	None	None	0.2 PPM	Signs of a problem include chlorine odor, algae growth, eye irritation
Bromine	2.0	2.4	4.0	Less irritating to skin and eyes
Iodine				Levels not established. Consult local authorities.

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Water quality
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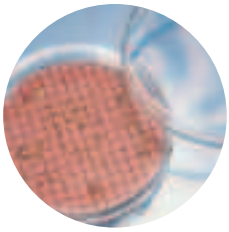

"Recreational Water Illness 'RWI' is a growing area of concern, because more and more people are using public swimming pools on vacations or at home."

Water balancing and chemistry

"Water balancing" is a term that is described to achieve a balance between optimizing water chemistry (eg., total alkalinity, pH and calcium hardness) and safeguarding of pool surfaces and equipment. Your local pool chemical specialist can help you set up an optimum program based on water analysis of your pool. A good test kit and test-protocol routine are essential for proper water testing and necessary chemical adjustments to maintain water balance and optimum chemistry.

Although chlorine disinfection is critical to water quality, poor water chemistry is undesirable for an efficient pool operation. Some of the adverse effects of poor water chemistry are described below. Consult your pool chemicals suppliers for details and assistance with water balancing and water chemistry.

Parameter	Possible adverse effects
Low pH	• Corrosion damage to pool equipment • Irritation to swimmer's eyes
High pH	• Cloudy water • Scaling • Limiting sanitizing activity of chemicals
Low Alkalinity	• Corrosion • Staining • Large fluctuation in pH • Additional chemical costs due to chemical usage
Low calcium content	• Damage to pool walls and floors by drawing calcium out from the construction (plastering) material • Staining

Recreational Water Illness "RWI" is a growing area of concern, because more and more people are using public swimming pools on vacations or at home. RWI is the generic name for a number of illnesses a person may contract after an enjoyable day at the local pool or spa. RWI in its common forms can be as simple as a skin infection, eye infection, upper respiratory infection or a case of diarrhea.

The most common reason for a RWI problem is the accidental swallowing of pool water that has been contaminated with fecal matter or vomit. The worst-case situation is a diarrhea incident generated from an ill swimmer or child. The incident can introduce cryptosporidium "crypto," Giardia, E.

Entrapment hazard and drain cover alert

Coli and Shigella into the pool water. Chlorine can kill most germs, but it requires varying levels of contact time for the desired result.

E-coli	< 1-minute
Hepatitis A	Approx. 16 minutes
Geardia	Approx. 45 minutes
Crypto	9600 minutes or 6-7 days

Most pools require small children to wear swim diapers and swim pants. The diapers are not effective in preventing leaks. The Center for Disease Control (CDC) recommends that children be taken to the toilet often and that parents change their diapers every 30 to 60 minutes. This can help with reducing the problem. The best prevention procedure is to make sure that ill swimmers are not using the pool.

Most jurisdictions have specific shutdown and sanitation procedures, depending on the RWI situation. Refer to public health guidelines for additional details. The CDC also has a lot of valuable information on RWI at their Web site: http://www.cdc.gov/healthyswimming/what.htm

Since many large swimming facilities use common water filtration systems, RWI-causing germs can spread from one pool to another, contaminating the entire operation and requiring a shutdown. It is recommended that kiddy pools have their own filtration system to limit the damage caused by an incident. RWI problems can also be generated from contaminated poolside furniture. The CDC tracks approximately 10 outbreaks of RWI every season that affect hundreds of people and, in some cases, have serious health consequences. A recent RWI outbreak in New York affected over 2,000 people, with 39 confirmed cases of crotosporidiosis.

Entrapment hazard and drain cover alert

Although drowning still remains the primary hazard with hot tubs and spas in young children, recent entrapment tragedies involving suction drain covers in swimming pools, spas, hot tubs and wading pools have resulted in significant public attention to this issue. An entrapment occurs when the flow of water through the drain and its high vacuum action causes suction of a person's body part or hair entaglement in the drain, causing the person to be held underwater. Based on the information available from the Consumer Products Safety Commission (CPSC), there have been at least 18 entrapment cases reported since 1980, including five fatalities involving children between the ages of 2 and 14. An estimated 10 incidents resulted in disembowlment in children who sat over the suction drain covers in pools and wading pools. In addition to these reported cases, there were likely to have been several other near misses and other incidents that never got reported.

The Consumer Products Safety Commission has helped develop a voluntary standard for drain covers that reduces the risk of entrapment. The following is a list of points to consider for assessing this hazardous condition and possible prevention measures:

"An entrapment occurs when the flow of water through the drain and its high vacuum action causes suction of a person's body part or hair entaglement in the drain, causing the person to be held underwater."

Closing procedures

The pool should always be closed immediately in the case of threatening weather, particularly lightning within a two-mile radius.

- Assure constant adult supervision is present when minors are using the pool, hot tubs or whirlpool.
- Assure there are no missing and broken drain covers or grates and all suction outlets have drain covers that are properly secured in place. "Properly secured" is defined as removal of the drain cover requiring specific deliberate action and use of tools.
- Assure that the drain covers are inspected periodically and there is a documented self-inspection program.
- Provide drain covers that comply with the latest edition of ANSI/ASME A112.19.8M (Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, Hot Tubs and Whirlpool Bathtub Appliances). A dome-shaped anti-vortex design for the drain cover (with the openings around the circumference) is now the preferred design and is strongly recommended. (Standard: The maximum velocity of the water passing through the drain opening does not exceed 1-1/2 feet per second at 100% of the design recirculation flow.)
- Assure that the suction pump is sized and installed according to the manufacturer's specifications. Refer to the National Sanitation Foundation (NSF) Standard 50 or Underwriters Laboratories (UL) Standard 1081 for additional details. An excess capacity suction pump creates a dangerous condition.
- ANSI/NSPI-2 recommends a minimum of two suction outlets per pump with a common plumbing line to the pump. In addition, these suction outlets should be separated by at least three feet or located in separate (levels) planes.
- Another engineering solution may be to install a vacuum breaker switch in the suction plumbing, which automatically shuts down the pump in case of excessive suction vacuum in the line when the suction drain outlet is blocked for whatever reason. Although this is an option, it may not be the best option, considering the time delay and poor reliability.
- Clearly identify and locate the pump emergency shut off switch in close proximity of the pool area so that it is quickly accessible by everyone for emergency shut off if necessary.

Closing procedures

Just as you have a check system for opening the pool, you should also have a routine for pool closure. The pool should always be closed immediately for the following reasons:

- Glass found in or near the pool (until all is checked and considered safe)
- Threatening weather, particularly lightning within a two-mile radius
- The water becomes too cloudy for life-guards to see the bottom of the pool
- Citing of formed fecal matter
- Any major malfunction in filtering or chlorination equipment
- If ordered by the health department or local authorities

- When bacteriological analysis results in any of the following:
  - Coliform concentration of 10 per 100 ml in two consecutive samples
  - Presence of fecal coliform in any sample
  - Presence of beta hemolytic streptococcus in any sample
- Any other emergency

Under normal circumstances, closing the pool should involve certain clean-up and security measures. Specific details for closing your pool may vary, but the following list can provide some guidance:

- Empty all trash containers and change linings.
- Sweep and wash down deck area.
- Brush sides of pool.
- File sign-in sheet and all other daily check sheets after reviewing them.
- Wipe down pool furniture.
- Return all safety equipment to bathhouse.
- Roll sun umbrellas down and secure.
- Turn off all lights and lock doors.
- Post "Pool Closed, No Trespassing" sign.
- Lock all outside gates.

Additional considerations

In addition to the normal pool operations, many pools have considered several instructional or recreational programs to expand pool operations. Examples of such programs that may be found in swimming pools include:

- Swimming lessons (various age groups, including toddlers)
- Scuba training classes
- Water therapy and water exercises
- Pool parties (eg., birthdays)
- Fund-raising events (eg., swimmathons)

Although most of these events may only be incidental to the primary pool operations, they present different or additional risks that must be considered in the planning process to manage any special risks presented.

Resources

1. **National Pool and Spa Institute, Alexandria, VA.** *www.nspi.org*
   - ANSI/NSPI-1-2003 Standard for Public Swimming Pools
   - ANSI/NSPI-2-1999 Standard for Public Spas
2. **United States Environmental Protection Agency**
   - EPA Chemical Emergency Preparedness and Prevention Advisory – Swimming Pool Chemicals: Chlorine – June 1990
3. **The Chlorine Institute, Inc., 2001 "I" Street, NW, Washington, DC 20036**
   - Chlorine Manual
4. **YMCA Program Store, Box 5076, Champaign, IL 61825-5076**
   - YMCA Pool Operations Manual
5. **International Aquatic Foundation** *www.iah20.org*
   - ANSI/IAF-9-2005 American National Standard for Aquatic Recreational Facilities
   - State Codes for Pools and Spas – *http://www.iafh20.org/IAF_PoolSpaCodes.asp*
6. **The National Swimming Pool Foundation** *www.nspf.org*
   - The Pool Spa Operator's Handbook
7. **Consumer Products Safety Commission** *www.cpsc.gov*
   - Safety Standard for Swimming Pool Slides: Consumer Product Safety Act (CPSA - 16 CFR part 1207)
8. **Centers for Disease Control: Recreational Water Illnesses**
   http://www.cdc.gov/healthyswimming/what.htm
9. **Aquatic Research Group** *www.aquaticsafetygroup.com*
   - The Complete Swimming Pool Reference – by Tom Griffiths, Ed.D
10. **Association of Pool and Spa Professionals (APSP)** *www.theapsp.org/home/*
11. **National Sanitation Foundation**
    - Pool and Spa Certification Program
      http://www.nsf.org/business/newsroom/pools99-1/

Pool sign-in sheet

Zurich pool manager's guide

Date: / /

Member name	Number	Guest name	ID#	Fee paid

Pool area sanitation check

Zurich pool manager's guide

Date: / / **Time:** :

Item	OK	Needs attention	Inspector initials
1. Pool is clear of debris, hair, silt, leaves and lint.		/ /	
2. Pool deck is rinsed daily.		/ /	
3. Indoor decks are sanitized weekly, at a minimum.		/ /	
4. Pool furniture is wiped down and sanitized daily.		/ /	
5. Skimmers are cleaned daily.		/ /	
6. Strainer basket is cleaned daily.		/ /	
7. Pool water level is even with the skimmer.		/ /	
8. Inlet fittings have been checked and flow properly.		/ /	

Actions taken:

Daily pool check sheet

Zurich pool manager's guide

Weather:		Date:	/ /	Checked by:	

Item	Yes	No
1. Side depth indicators are present and visible from the waterside and deck.		
2. All underwater lights are in working order, and there are no cracks.		
3. All electrical outlets near the water are protected with GFCI and are tested regularly.		
4. The bottoms of the pool and underwater ledges have not worn slick from use nor have they become too abrasive to bathers' feet.		
5. All pool ladders and stairs have uniform risers, slip-resistant treads and handrails for support. All diving boards are slip-resistant and well-secured. The high dive should have side rails.		
6. All pool cleaning equipment has been removed from the pool area prior to opening.		
7. Pool water is clear. (Should be able to see the deepest portion of the pool while standing at the edge of the deep end.)		
8. Deck and other surfaces are slip-resistant and easy to clean. Make sure there are no splinters, cracked boards and other trip hazards.		
9. Deck area has been sanitized (rinsed daily), and all trash from the pool area is removed daily.		
10. There are no broken grates, and all grates are securely in place. (Anti-vortex drain covers are preferred for all high-suction drains to prevent entrapment hazard.)		
11. All pool rules are posted along with emergency telephone numbers, including 911, if available.		
12. The emergency telephone is readily accessible and works.		
13. All lifesaving equipment is present, visible and easily accessible. It is in good state of repairs. ☐ Minimum of two (15 inch) life rings ☐ Life ring rope with (minimum of 1/2 inch diameter) 1 1/2 times the width of the pool or 50 feet, whichever is less. ☐ A shepherd hook of at least 12 feet in length.		
14. The first aid kit is present and adequately stocked. None of the items have expired shelf-life dates.		
15. Fence (minimum of four feet high) is in good condition. (No external handholds or footholds, no openings large enough for a four-inch sphere to pass through.)		
16. Gates are self-closing and self-latching. The closure mechanism is at least 45 inches above ground and with hardware for locking.		
17. Depth divider rope and floats are present and in good conditions.		

Daily water test results part 1

Zurich pool manager's guide

Date:	/ /	Checked by:	

Time a.m./p.m.	Bromine 2-4 PPM	Alkilinity 6-180 PPM	Cynauric acid <100 PPM	Total coliform bacteria 4 per 100ml-membrane filter
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Daily water test results part 2

Zurich pool manager's guide

Date:	/ /	Checked by:	

Time a.m./p.m.	Pool load	PH 7.2-7.8	Free chlorine 1-3 PPM	Temp. 78-82 F	Chlorine setting	Tested by	Corrective action
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Pool and spa water quality trouble-shooting

Date: / /

Symptoms	Possible causes	Recommended action
Algae	☐ Low free chlorine	☐ Scrub and remove algae ☐ Check and adjust pH between 7.2 and 7.6 ☐ Shock treat with chlorine ☐ Maintain free available chlorine between 1-3 parts per million (ppm)
Odor	☐ Low free chlorine	☐ Shock treat with chlorine ☐ Check and maintain pH between 7.2 and 7.6
Cloudy water	☐ Algae growth ☐ High pH ☐ High total alkalinity	☐ Check and adjust pool chemistry: pH 7.2-7.6, total alkalinity 60-180, free available chlorine 1-3 ppm, calcium hardness 200-1,000 ppm ☐ Precise control for residual chlorine ☐ Possible filter malfunction ☐ Greenish water may be caused by algae See treatment of algae problem above
Scale and calcium deposits	☐ High total alkalinity ☐ High pH (> 7.8) ☐ High calcium hardness (> 500 ppm) ☐ High total dissolved solids (3,000 ppm)	☐ Check and adjust pool chemistry: pH 7.2-7.6, total alkalinity 60-180, free available chlorine 1-3 ppm, calcium hardness 200-1000 ppm ☐ Use a scale controller
Stains	☐ Low total alkalinity ☐ Low pH ☐ Low calcium hardness ☐ Dissolved metals	☐ Remove stains with a stain controller ☐ Use a stain controller for prevention ☐ Test and balance water chemistry
Discolored water	☐ Hazy green: algae ☐ Clear green: copper ☐ Black/purple: manganese ☐ Red/brown: iron	☐ Check and adjust pH (7.2-7.6) ☐ Shock treat with chlorine ☐ Check filter operation ☐ Consider automation for precise pH control ☐ Use algaecides with no metals
Eye and skin irritation	☐ Improper pH ☐ Improper chlorination	☐ Check and adjust pH (7.2-7.6) ☐ If free available chlorine level is below 1 ppm, shock treat the pool with chorine
Scum ring	☐ Accumulation of body oils, cosmetics or dirt	☐ Remove with a cleaner ☐ Enforce “bathe and shower” rules before entering pool
Foaming	☐ Accumulation of body oils, cosmetics or dirt	☐ Use a defoamer ☐ Enforce “bathe and shower” rules before entering pool

Pool accident report

Zurich pool manager's guide

Date of accident: ____/____/____
Time of accident: ____:_____a.m./p.m.
Location: _____

Report completed by: Name: _____

Signature: _____ Date: ____/____/____

Name of injured person:
_____
Age: _____ Social Security Number: ____-____-_____
Phone number: _____
Address: _____
_____

Minor: ☐ Yes ☐ No Adult supervision: ☐ Yes ☐ No
Adult's name: _____
Social Security Number: ____-____-_____
Phone number: _____
Address: _____
_____

Detailed description of the accident:
_____
_____
_____
_____

What was the injured person doing at the time of accident?
_____
Activities at the time of accident:
_____

Pool supervision: ☐ Yes ☐ No
Any first aid provided: ☐ Yes ☐ No

Name: _____
Name: _____

Was the injured person referred to the hospital? ☐ Yes ☐ No
Accompanied by: _____

Hospital name: _____
Address: _____

Witness #1:
Name: _____
Address: _____
_____
Phone number: _____

Witness #2:
Name: _____
Address: _____
_____
Phone number: _____

Persons notified of injury:
Name: _____
Address: _____
_____
Phone number: _____

Persons notified of injury:
Name: _____
Address: _____
_____
Phone number: _____

Copy fowarded to: _____

Notes

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