



INVESTIGATION GUIDELINE

Swimming Pools, Spas and Hot Tubs (Submersions)

Revised March 2005

I. Introduction

A. Background Information

Over the years there have been a consistently high number of young children who have drowned in residential swimming pools, spas, and hot tubs. About 240 children under the age of 5 die in residential swimming pool drowning incidents annually.

For some individuals who survive a non-fatal drowning incident, the outcome may be neurological impairment due to being submerged (under water) for a long period of time without oxygen. The resulting brain damage could range from mild to severe and largely depends on the length of time without oxygen, the age of the victim and the water temperature.

Many jurisdictions throughout the United States are seeking ways to reduce the number of drownings associated with pools, spas and hot tubs. Some states where aquatic activities are popular have conducted their own campaigns and studies to try to address the drowning problem. One approach has been to enact legislation to mandate barriers/fencing and alarms with new home construction. Often the requirements are written into the local building codes. Legislation varies by jurisdiction. There are no uniform legislation or code requirements for the United States as a whole. However, CPSC has developed general guidelines for swimming pool barriers and drain/suction outlet entrapment prevention.

B. Product Category Description

1. Definitions and General Description

- a.) **Residential Pool:** Any non-commercial swimming pool that is intended for recreational use by not more than 3 private owner families and their guests, contains more than 24 inches in water depth and a volume of more than 250 gallons. Excluded are decorative or landscaping ponds/pools, reflecting pools,

decorative fountains and small lightweight, portable wading pools used for toddlers.

- b.) **In-ground Residential Swimming Pool:** Any pool with sides/walls that are below surface level and are permanent construction. This includes indoor pools.
- c.) **Above Ground Residential Swimming Pool:** A removable swimming pool that should have a minimum water depth of 36 inches and a maximum water depth of 48 inches at the wall. The walls of an above ground swimming pool sit on the ground and the pool can be disassembled and reassembled, maintaining its original integrity. This category includes the large, deep inflatable pools that have recently come on the market. These inflatables are not to be confused with a “kiddy”-type inflatable pool.
- d.) **On-ground Residential Swimming Pool:** A removable swimming pool whose walls rest on the surrounding ground with an excavated area below the ground level. The main difference between an on-ground and in-ground pool is that an on-ground pool is normally set partially into the ground rather than being fully in the ground. These types of pools work well on slopes where the pool can be installed partially in the ground and partially out. On-ground pools can also have a deep end instead of all one depth as in an above-ground pool. On-ground pools can have a surrounding deck.
- e.) **Spa or Hot Tub:** A unit designed for recreational or therapeutic use which is not drained, cleaned or refilled for each use. It may have hydro jet circulation, hot or cold water mineral baths, air induction bubbles or any combination of these features. Terminology for these products may include “hydrotherapy pool”, “whirlpool”, “hot tub”, etc. The terms hot tub and spa have become interchangeable in today’s terminology. For the purpose of this guideline the term spa will be used for both.

In the past, a “hot tub” spa was constructed like a large wooden barrel. Spa units today can be portable, set in the ground or in a deck, and can be indoors or outdoors. Spas that are in-ground can be made of concrete, plastic or acrylic. The portable spas are molded fiberglass or acrylic encased in a supporting frame that contains the unit’s pump and equipment. All controls, and water-heating or water circulating equipment are an integral part of a portable spa.

- f.) **Barrier:** A fence, wall, building wall, or combination thereof that completely surrounds the swimming pool and obstructs access to the pool.
- g.) **Layers of Protection:** The concept of “layers of protection” is that in addition to supervision, a pool or spa has multiple devices to delay a child’s access to the water and to warn of the child’s presence in the pool/spa area.

Layers of protection can include such items as pool/spa covers, fences, self-closing/self latching gates and alarms.

C. Specific Items of Interest

Field investigators shall conduct an on-site investigation, if the product is available. Otherwise, conduct a telephone interview. On-site investigations are the most desirable, since they afford the investigator the opportunity to gather the best information possible.

1. Document all manufacturer, brand and serial/model information, including construction or production dates, if possible. In the case of in-ground swimming pools and spas obtain the name of the construction company that built/installed the pool.
2. Identify all labels regarding certification, testing or conformance with mandatory or voluntary standards, or building codes. The text of any warning label or age labeling on or accompanying the product is also of interest and should be documented and photographed, if possible.
3. Submersions resulting in drowning or non-fatal drowning are of the greatest interest. Of primary interest are drowning incidents involving children under 5 years of age and all incidents involving suction entrapment, regardless of the victim's age.
4. Describe what barriers or other layers of protection (e.g. fence, wall, self-closing/self latching gate, alarms, window guards, pool cover, etc.) were in place to prevent children from accessing the pool or spa area unattended. It is essential to determine the route that the victim took to gain access to the pool/spa. Prior to the incident was the victim inside or outside of the residence? Was access gained through a door, gate, etc? Was the door or the gate locked/latched and if so, how? Did the victim ever receive instruction on how to open a locked/latched gate or door?
5. It is essential to determine the route that the victim took to gain access to the pool/spa. Prior to the incident was the victim inside or outside of the residence? Was access gained through a door, gate, etc? Was the door or the gate locked/latched and if so, how? Did the victim ever receive instructions on how to open a locked/latched gate or door?
6. How, why, when and where did the victim enter the water? If possible, determine if the victim entered the water on purpose or by accident. Children sometimes ride riding toys into pools unintentionally when navigating around the pool deck or fall in while trying to retrieve a toy or ball from the water.

Were there any toys or objects floating in the pool?

7. Where in the pool was the victim found in relationship to the edge, diving board, steps, etc? Document the depth of the water in the pool or spa at the point where the victim was found. Inquire whether the depth of the water was the same at the time of the incident. Determine the length and depth of the pool/spa from the deepest to the shallowest area. Indicate the equipment present with the unit such as a retractable pool cover, automatic pool cleaner, hot tub lid, etc., and whether any of the equipment played a role in the incident.
8. Drowning and near-drowning can result from entanglement of hair or entrapment of body parts in or on the drains/suction outlets of pools and spas due to the suction/pressure differential created. The suction alone from a drain/suction outlet can cause a severe and potentially devastating injury. Determine whether a drain/suction outlet cover (or grate) was in place at the time of the incident and whether the pool/spa had any suction relief device(s) installed. If so, what type of device(s) was present. Determine the make and model of the drain/suction outlet cover, if known and whether it is labeled as meeting ASME/ANSI A112.19.8.
9. Specify where the pool was located such as in the victim's backyard, a neighbor's home, grandparent's home etc. Also, if the incident did not occur at the victim's home specify why the child was at the location. For example, was the child visiting, attending a party or did the child enter into a yard uninvited? This information is important since there is a misconception on the part of some pool owners who don't have children that they don't need barriers or layers of protection to prevent drownings in their pool.

C. Headquarters Contacts

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II. Instructions for Collecting Specific Information

It is essential to provide a detailed narrative description of the incident in order to provide a clear understanding of the sequence of events before, during, and after the incident, and the circumstances involved. If a telephone investigation (rather than an on-site investigation) is done, it is still important to obtain as much information about the product as possible. Ask the respondent to describe the product to you in detail, including features that are unique to the product and product identification, such as the manufacturer/construction firm, model or date of manufacture/installation.

Timely contact with the victim's family will improve the likelihood of accurate recollection by the respondent of the circumstances involved in the incident. However, keep in mind that the respondent/family member has experienced a very traumatic event, if a drowning or severe non-fatal drowning event has occurred. Sensitivity to the respondent's situation is paramount in gaining their cooperation.

A. Synopsis

Describe the sequence of events, the product(s) involved, the victim's activity during the incident and how the victim became submerged. Include the victim's age, sex and whether the drowning incident resulted in a fatality. Specify the location (e.g. home, childcare, etc.) where the incident occurred and the specific type of pool or spa involved.

For data retrieval purposes, please include the following key words in the synopsis as appropriate: DROWNED, SUBMERGED, NON FATAL DROWNING, SPA, IN-GROUND POOL, ABOVE GROUND POOL, ON-GROUND POOL, INFLATABLE, HOT TUB, WHIRLPOOL, POOL/SPA COVER, RESIDENTIAL, FENCE, BARRIER, ALARM, GATE, LATCH, LOCK

B. Description of Product

1. Swimming Pool or Spa Involved and the Surrounding Area

- a.) Describe the type of product involved. Was it a swimming pool or spa, was it an in-ground, above ground or on-ground unit, and was it indoors or outdoors?
- b.) What was the water capacity of the product and approximately how much water was in it at the time of the incident? Note the depth markings (or measure the depth) at the deep and shallow end. Try to determine the distance from the surface of the water to the top edge of the pool/spa.
- c.) Note the position of steps, ladders and seating. Diagram the pool/spa's shape and dimensions and the depth in a cross-section. Did the pool have any unusual characteristics or features (like a waterfall or a rocky perimeter, for example)?
- d.) Identify the manufacturer, brand and model number or serial number if it was a spa, on-ground or above-ground pool.
- e.) If it was an in-ground pool or spa determine contractor/company who installed it and when it was installed.
- f.) How old was the product and what was its general condition (e.g., well-maintained, deteriorating, damaged)?

- g.) Was the water contained in the pool or spa clear, murky, contaminated, etc? Could the bottom of the pool or spa be seen? In the case of a spa, was the bottom obscured due to the action of the jets (producing bubbles/aeration)?
- h.) Had there ever been a component failure of the pool or spa, such as the pumps, etc? Had it been modified or repaired in any way?
- i.) How many drains/suction outlets did the unit have and did they all have covers? If so, were all covers in place and were there any features installed to prevent suction injuries (such as 2 drains/suction outlets per pump, anti-vortex covers, etc.)?
- j.) Who did the pool or spa belong to (the victim's family, a neighbor, a relative, etc.)?
- k.) Describe the location of the pool or spa relative to the house. Diagram the location and the layout of the property. Document the distance from the house to the pool and from the nearest home entrance to the pool. Describe all access ways from the home to the pool, including doors, windows, dog doors, etc. If there are doors from the house directly in the water/pool area, please describe them and their features. Are the doors self-closing, do they lock/latch properly? Were there alarms on the doors? How much of the yard is taken up by the pool?
- l.) Were there any windows that provided access to the pool? If so, how high were they above floor level? Were they equipped with window guards or safety devices that limited the access to less than 4 inches? If window guards were present, was there any labeling or literature that indicated that they met requirements of ASTM F2006 *Standard Safety Specification for Window Fall Prevention Devices for Non-Emergency Escape (Egress) and Rescue (Ingress) Windows*? Determine the age, brand, model and serial number of any window devices that were present.
- m.) What barriers and layers of protection are present to prevent access to the pool? These might include a gate, locking/latching mechanisms on access doors or gates, pool covers, doors, alarms, window alarms or locks, etc. Describe how the layers of protection/barriers were breached by the victim. For more information consult CPSC's publication *Safety Barrier Guidelines for Home Pools*.
- n.) For any pool barrier, how far above the ground level was the bottom of the barrier? If the victim accessed the pool area by entering under a barrier, please indicate whether additional space had been dug out below the barrier at the point of entry. Was the barrier flush with the ground or did the barrier start below ground like a wall that has footers?

- o.) Was the barrier configured in such a way as to prevent other permanent structures or objects from being used to climb the barrier? If the barrier was a solid structure like a brick or stone wall, were there any structural features (indentations, protrusions, etc.) that would enable a child to get a toehold or handhold for climbing, other than the masonry joints? If the barrier was a fence made up of horizontal and vertical members (slats, pickets, etc.) describe, diagram and photograph the configuration. Measure the distance between the horizontals and the spaces between the verticals. Were the horizontals inside or outside of the pool area?
- p.) Were there any openings or decorative cutouts in the barrier? If, so please measure and photograph them.
- q.) What was the general condition of the barrier(s)? Were there any broken or missing portions that would have allowed access to the pool? Were there any gaps or large spaces? Was the barrier well-maintained?
- r.) The American National Standards Institute (ANSI) and the Association for Pool & Spa Professionals (ASPS, formerly NSPI) maintain the Model Barrier Code for Residential Swimming Pools, Spas and Hot Tubs (ANSI/NSPI-8 1996). The scope of the standard is to establish layers of protection for young children against submersion in residential pools and spas. This voluntary standard establishes requirements for the forms of barrier protection available.
- s.) Is the pool area fenced? Is the fence permanent or portable/moveable? Describe the fencing characteristics, materials and height. Does the fencing surround the pool completely (isolation fencing) or is the house used as part of the barrier?
- t.) Is there an entrance gate(s) to the pool area? If so, is the gate self-closing and self latching? If there was a latching mechanism, how high was it from ground level? Which side of the gate was the latch on (inside or outside of the pool area)? Was the latch below the top level of the gate and if so, how far? Did the gate have any openings within reach of the latching mechanism that could have allowed the victim access to the release? If so, measure the placement of the release mechanism in relationship to the access point. Does the gate open inwards towards the pool/spa or outwards? Had the gate been propped or left open in some manner, at the time of the incident?
- u.) If there was an alarm system for the property, describe it (including brand and model of the system, and age or when it was installed). Was it in working order and did the alarm sound off at the time of the incident? Was the alarm system in use at the time of the incident or was it turned off? Is it for windows, doors or a combination? Was there any labeling on the alarm or the accompanying literature indicating that it met the UL 2017 *General Purpose Signaling Devices and Systems*, Section 77? Does the alarm operate on a

motion detection system, laser system, etc? What powers the system(s) (a battery, hard wiring, etc.)? Where is the deactivator located in relationship to the door/window it covers (including the height of the deactivation switch above the threshold of the door) and is it in an area that the victim could access?

- v.) Were any pool alarms in use at the time of the incident? If so, please specify the type of alarm(s) (surface, underwater, perimeter, wristband, etc.). What was the power source for the alarm? Was the alarm designed to sound both in the pool area and inside the home? Did it function properly at the time of the incident? Was there any labeling or literature to indicate that the alarm met ASTM F2208 *Standard Specification for Pool Alarms*. Determine the make, model, serial number and age of the alarm.
 - w.) For any alarms present, did they have a distinctive sound that would differentiate them from other household sounds, such as a telephone, doorbell, smoke alarms, etc.? For approximately how long would the alarm sound when activated?
 - x.) If there is a pool or spa cover is it a hard or soft cover and how does it operate? What type of pool cover is it (solar, power, safety, winterizing, etc.)? Is the cover completely removed when the pool or spa is in use and replaced when not in use? Did the child remove the cover, if it was in place prior to the incident?
 - y.) Are there stairs, ladders or steps by which the pool or spa must be accessed and are they permanent or can they be removed or retracted to prevent entrance into the pool?
2. Labeling and Instructional Literature
- a.) Describe any labeling on the product. Indicate where it was on the product and its exact wording.
 - b.) Obtain any instructional literature that came with the product. In-ground pools and spas are probably an exception, except for their equipment. If the consumer no longer has the literature, ask if they reviewed it when the product was first obtained/constructed. Were there any warning or cautionary statements in the literature? If so, what were they?

3. Guidance on Investigating Specific Products

In-ground Swimming Pools

- ANSI and ASPS (formerly NSPI) have a voluntary standard for residential in-ground pools, *American National Standard for Residential In-ground*

Swimming Pools (ANSI/NSPI-5 2003). This standard applies to permanently installed in-ground swimming pools intended for noncommercial use by not more than 3 owner families and their guests. The pool must exceed 24 inches in water depth and have a volume over 3,250 gallons to be covered by this standard. The standard gives specifications for general design criteria, plans and permits, structural design, and pool dimensions and tolerances, entry and exit, decks, construction materials and finishes, circulation systems, water supply, waste water disposal, chemical feeders, ozone generators, electrical requirements, instructions for operating components and safety features.

- If possible, find out what laws or building codes are in place in the jurisdiction in which the in-ground pool incident occurred. If possible, obtain copies to include in the investigation.
- Document all features unique to the incident pool, including the depth markings and position of any diving boards, slides, stairs or ladders.
- Describe the configuration of the gutter/coping (edge of the pool) and the adjacent deck. Describe the material that the decking is made of and whether it is slip-resistant.
- If the pool has a pool cover, what type is it (power, solar, etc.) and what is it made of? Also, when is the cover used and how is it used? Was it in place at the time of the incident? Was there any indication from labeling or literature that the cover conformed to ASTM F1346 *Standard Performance Specification for Safety Covers and Labeling Requirements for All Covers for Swimming Pools, Spas and Hot Tubs*? Determine the brand, model, serial number and age of the cover.

Above Ground Pool and On-Ground Pools

- Did the above ground pool have any type of fencing or enclosure around it? Was there a deck around the pool? If it had a barrier around the top edge of the pool wall, measure the clearance between the bottom of the barrier and the top of the wall, if a gap existed.
- What was the normal mode of entry to the pool—a ladder, a deck, etc.?
- If there was a ladder to gain access to the pool, was it normally removed or rendered inaccessible when the pool was not in use? Was the ladder in place at the time of the incident?
- Did the pool have a cover? If so, was it in place during the incident and what type was it?

On-Ground Pool

- The most recent class of swimming pools to come into the marketplace is “on-ground” pools (or semi-in ground pools). These pools have the distinct feature of being able to be installed partially in-ground while having the remainder of the pool sit on the ground.
- Determine how the on-ground pool was placed on the property; was it installed to accommodate a sloping terrain? How much of the pool was set into the ground? Did the pool have a deep end or was it all one depth? What material was the pool constructed from (steel, etc.)?
- Was the pool surrounded by a deck? Did the pool have any barriers or layers of protection in place?
- When was the pool installed and by whom? Determine the make, model and serial number of the pool.

Residential Spas

- If a spa was involved, please indicate the specific type and the features unique to that unit. Was the spa permanent or portable? If it was portable, determine the make, model, serial number and age of the spa. If it was permanent, determine who constructed it and when.
- Describe the control panel for operation of the spa. Was there a timer with an automatic shut-off that controlled the length of time the spa operated? Were the owner and/or victim aware of any recommendations concerning the length of time to be spent in the spa, especially recommendations for children? If so, please indicate what they understood to be a recommended length of time and where they obtained that information.
- Were there any barriers or layers of protection present? Please note that portable spas are exempt from the barrier guidelines that CPSC has developed for pools and spas.
- Was the spa equipped with a cover? If so, what type? Was it functioning properly at the time of the incident? Was it in place at the time of the incident? Was there any indication through labeling or literature that the spa cover conformed to ASTM F1346 *Standard Performance Specification for Safety Covers and Labeling Requirements for All Covers for Swimming Pools, Spas and Hot Tubs*?
- Check the thermostat setting and if possible, measure the water temperature. Determine the temperature of the water at the time of the incident and how

long the person was in the spa. Drowning can result from hyperthermia (high body temperature). Also, inquire what the thermostat is usually set to by the owner. Inquire whether the setting is ever changed, by whom and why. Determine whether the thermostat has a locking mechanism for the temperature setting. List the manufacturer and model of the thermostat.

- Determine if the spa heater had an automatic overheating shut-off system and if so, document the manufacturer and model.
- Determine the number of spa suction outlets and whether any were clogged. Also determine the number of jets. If the incident involved a suction entrapment, make sure to indicate with which suction outlet it occurred.
- Specify whether the spa was wired into the home circuitry or if it was a plug-in type. Indicate if there was an over current protection device or a GFCI and if it was functioning at the time of the incident. Document the manufacturer and model of the over current device or GFCI.
- Were there any warning labels or instructions anywhere on the spa concerning safety or operation of the unit?

C. Description of Interaction Between Injured Person(s) and Product

1. Was the victim able to swim? If so, describe the victim's level of proficiency. Had the victim received formal swimming/life saving instruction? Did the victim have regular access to a pool for recreation purposes?
2. Ask the parent if the victim was afraid of the water or naturally drawn to it.
3. What were the normal activities the victim engaged in while in or around the spa or pool? Was the victim allowed to be/play in the pool area unsupervised?
4. What was the victim doing just prior to the incident? Where was the victim last seen and how long was it before the child was found in the pool or spa? Was there something that drew the victim to the pool or spa? Concentrate on the path that the victim took to access the pool and any protective barriers that were breached. Children have gained access to pools by way of gates, open and closed doors, through windows and even through dog doors.
5. Did the victim ever wear a life jacket, "floaties" or other swimming aid in the pool or spa? Was the victim using such a device on the day of the incident?

D. Description of the Victim

1. What was the age of the victim (in years and months) at the time of the incident?

2. What was the victim's height and weight at the time of the incident?
3. What was the sex of the victim?
4. In the case of a young child, what developmental abilities did the victim display? Could the victim walk, talk, roll over, sit up, pull up to a standing position, stand alone, etc.?
5. Did the victim have any physical or mental disabilities that contributed to the incident? Document if the victim had any pre-existing medical problems (cardiac, blood pressure, seizure disorder, etc.).
6. Drowning can result from the use of alcohol, medications or drugs (although alcohol and drug use would likely not apply to a child under 5.) Document any evidence of the use of alcohol or drugs by the victim while in the pool/spa.
7. What was the victim wearing at the time of the incident (a bathing suit, street clothes, etc.)?
8. Please describe the injury diagnosis associated with the incident. If the incident resulted in a fatality, please determine the official cause of death. Non-fatal drowning victims are those that survive a submersion for at least 24 hours, but may die from complications at a later time. However, some victims survive submersion with permanent injuries or recover fully. If the victim survived the incident with injuries, try to determine the long-term prognosis, if known.
9. Describe any medical treatment (e.g., CPR, tests, observation, etc.) received by the drowning victim. Specify whether the treatment was administered, by whom and where (at home, by emergency medical personnel on the scene, in a doctor's office/clinic or at a hospital). If treatment was administered by non-medical personnel, specify if the person had been trained in CPR techniques. If the victim was hospitalized, document the length of stay.

E. Description of Environment

1. Determine if the victim was playing alone or with other children. Were any other children involved in the incident? If the victim was playing in or swimming in the pool, how many other individuals were also in it?
2. Were there any toys or other objects in the pool or pool area that may have gotten the victim's attention and contributed to the incident? Were toys and floats kept in the pool or removed when the pool was not being used?
3. Were any adults nearby? Were they actively watching the victim or were they distracted? Did the incident happen during a party or other gathering where activity and the number of people in attendance may have been a distraction?

4. If the pool or spa was at a non-residential location (hotel, community pool, etc.) were there any lifeguards on duty? Was there any signage about pool hours and when a life guard would be present?
5. Who discovered the victim was submerged and how long had it been since the victim was last seen?
6. Was there any lifesaving equipment in the pool area? If so, describe.
7. Was there a telephone in the pool area?
8. Were there any “Rules of the Pool” posted in the pool area?

III. Instructions for Photographing and/or Diagramming the Product

Photograph and/or diagram the entire pool or spa area, including any “layers of protection” involved. Indicate in a photo or diagram the approximate area where the victim was found. If a suction outlet was involved, try to photograph that area, if possible. Also attempt to photograph the equipment room (pumps and filters) and indicate the valve positions at the time of the incident, if known. Diagram where all the suction outlets were on the spa or pool. Also, indicate where the deepest part of the pool/spa was.

Photograph any labels or warnings on the pool, pool equipment or “layers of protection” that are relevant to the investigation.