Swimming Pool Supervision Technology

ING01

Guidance for Automated Monitoring and Detection systems

To provide an additional layer of safety in swimming pools to save lives.

CIMSPA

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Fourth Edition published January 2026 (Replacing Third Edition published January 2025)

1. INTRODUCTION AND SCOPE

This guidance has been prepared for and intended for consideration by UK Swimming Pool Operators that have or are considering installation of an automated monitoring and detection system.

It has been written, considering guidance including BS EN 15288-2; BS EN ISO 20380:2017; Health and Safety in Swimming Pools (HSG179) Fourth Edition published 2018.

This guidance includes both lifeguarded and non-lifeguarded swimming pools.

This guidance:

- is aimed to guide the performance and design elements that should be considered when installing and operating an automated monitoring and detection system;
- is not intended to guide swimming pool operators as to whether they require lifeguards or not, as this should be completed by operators, carefully considering the guidance within HSG179;
- is not intended to cover the local operational aspects of automated monitoring and detection systems detailed in the risk assessment;
- does not cover the operation of stand-alone CCTV systems;
- does not cover the operation of swimming pool user wearables and non-camera systems.

2. THE USE OF AUTOMATED MONITORING AND DETECTION SYSTEMS

2.1 Systems for Lifeguarded Swimming Pools

Where swimming pools are required to have lifeguards, any automated monitoring and detection systems are not intended to eliminate the lifeguard function.

The primary function of an automated monitoring and detection system in a swimming pool with lifeguards is to support and alert lifeguards to promptly identify and respond to a developing emergency; and to support lifeguards, allowing a blended lifeguard approach to pool supervision.

Automated monitoring and detection systems may be used to help fulfil the guidance in Managing Safety in Swimming Pools, HSG179, which requires 100% visibility of the pool (full volume of water, from the surface to the pool basin floor), but careful consideration must be given to the system's limitations, e.g., coverage.

Lifeguard Zone Visibility Tests (LZVTs) will need to be completed to ensure the lifeguard, and the system can achieve 100% together.

Lifeguards should be proactive in preventing pool user accidents and educating pool users. In many cases, lifeguards identify hazards on the surface of the water and provide education to prevent an accident. Where an automated monitoring and detection system is used to help achieve 100% visibility, the operator will need to ensure the lifeguard can still fulfil their role of preventing accidents.

2.2 Systems for Non-Lifeguarded Swimming Pools

Where a swimming pool operator does not deem it necessary (through risk assessment and guidance) to have lifeguards present to supervise the swimming pool; an operator may choose to use an automated monitoring and detection system to enhance safety and provide surveillance for the swimming pool.

In these circumstances, operators should carefully consider who will respond in an emergency, what skills they will require and how they will be notified of an emergency.

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3. DEFINITIONS

3.1 Alarms (Visual and/or audible) – a warning of danger, distinguishable from other alarms; in the context of detection and monitoring systems; the system may raise an alarm to highlight an emergency. A pool alarm is also used by a lifeguard to notify the team and request assistance.

Health and Safety in Swimming Pools (HSG179) paragraph 41 "Pool halls may have a number of alarms for different types of emergencies, for example, fire, plant failure, help etc. Each alarm should be distinctive, and it may help in buildings with a public address system to have recorded messages alerting staff to a particular type of emergency. A visual beacon may be useful in some circumstances if, for example, pool users are likely to be hearing impaired, and there is no other way to alert them."

3.2 Alerts – a warning of any unusual or potentially dangerous or difficult circumstance, in the context of detection and monitoring systems, the alert will be for the lifeguard or other staff to investigate.

3.3 Assisted Lifeguard Technology – Technology that assists lifeguards in swimming pool safety.

3.4 Blended Lifeguarding – Blended Lifeguarding combines human supervision of the pool through scanning, hazard identification, accident prevention and rescue with monitoring and detection systems, creating the capability to produce a safer swimming environment.

3.5 Blind Spots – areas that cannot be seen; a blind spot could be created by the design of the pool, features, plants, reflections and glare from windows and artificial lighting or anything that provides an obstruction.

- The nature of the pool
- Pool design (for example, layout, control of access from changing rooms alerting any unauthorised use)
- Pool water area
- Pool water depth
- Abrupt changes in water depth
- Pool and pool hall features (for example, glare, reflections, blind spots)

3.6 Observation with Technology - see paragraphs 116 to 120 in HSG179.

3.7 Glare – a very strong, bright, dazzling light which is difficult to look at. Caused by direct or reflected sun light or artificial lights.

3.8 Specular Reflection – a type of surface reflection often described as a mirror-like reflection of light onto the surface of the water.

3.9 Lifeguard Zone Visibility Test (LZVT) – is used to determine the number of lifeguards. HSG179 paragraphs 84 - 86. The LZVT is a practical exercise designed to highlight any areas of the pool surface or pool basin floor where a casualty cannot be seen from any particular lifeguard position, especially those furthest away and closest to the lifeguard position.

The LZVT will allow you to confirm that:

- your lifeguard numbers are correct;
- positions are correct and give 100% visibility of the pool;
- positions cover the full volume of pool water and designate observation zones for each lifeguard position

(see www.rlss.org.uk/hsg179).

3.10 Monitoring – close observation to monitor the pool area or part of the pool. HSG179 - "Lifeguards are in the front line of pool-user education and can help prevent accidents; therefore, good communication skills are essential." (See HSG179 Paragraph 41, 164 and 167).

3.11 Scanning – Constantly watching either a particular part of the pool (zone) or the whole pool using a steady sweeping action by moving your head.

3.12 Natural Scan: 20 – a system RLSS UK have developed following research*, to give lifeguards the best opportunity to supervise a swimming pool/zone and identify hazards, Lifeguards must continuously scan the pool and/or zone they are responsible for to ensure the full surface area and volume of pool water is covered. Pool operators must ensure lifeguards can get to any area within their zone within 20 seconds.

3.13 Turbidity – the cloudiness or haziness of water, which can be caused by large numbers of individual particles that are generally invisible to the naked eye. Turbidity should be measured using a nephelometer commonly referred to as a turbidimeter. PWTAG provide more information here **www.pwtag.org/cloudy-water-technical-note/**

** Contact RLSS UK for further details of the research. Completed at swimming pools without technology installed.*

4. SYSTEMS

4.1 Monitoring and Detection Systems

This guidance refers to underwater and/or overhead cameras combined with computer software, which provides real-time footage of the swimming pool. In both cases, the system detects a person in difficulty activating an alarm giving a location (necessary when there are blind spots or specular reflection areas) which can be responded to by a lifeguard or other staff.

Systems may be made up of underwater or overhead cameras or a combination of both. Cameras are coupled with computer software. When an observation is made the system will activate an alert/alarm and provide the location and/or image of the person which allows the lifeguard or other staff to respond.

A swimming pool monitoring and detection system may provide active and constant monitoring of people in the pool and provide real-time information on a monitor with alerts/alarms.

Some systems provide footage and alerts/alarms via mobile devices (e.g., Smart Watches, Smartphones, etc) that lifeguards or other staff can use. These devices may provide two-way communication between lifeguards and other staff in the facility on a monitor that lifeguards can view.

The system detects people in difficulty by learning what a typical pool user looks like in order to identify someone who may need assistance.

4.2 System Coverage

Early dialogue between the supplier and the operator is essential and will support in determining the optimum location of the cameras and pool equipment. Where the facility is a new build the architect and designer should also be included.

For new build swimming pools, the scope of the coverage should be agreed upon early in the design process.

It is important to understand the location of specific equipment such as access steps, movable floors, bulkheads, water slides, hoists/chairs/pods etc. as they could influence the placement of cameras to allow for full underwater coverage.

There are specific questions the operator needs to address:

- In a multi-pool complex will the system cover all pools or just one pool?
- Has the location of cameras (underwater and/or overhead) to ensure 100% coverage of the area the system been considered in the design?
- Location of hardware for systems, if required?
- Are monitors required? if so, how many?

- If monitors are required, where will they be located? Will they be attached to lifeguard chairs?
- Will monitors be available to employees in another area (i.e., office, reception etc.)?
- Where the infrastructure and cabling will be located throughout the facility to camera placement?
- Is WIFI required?
- Is the strength of the WIFI and coverage of the facility adequate to support devices used by lifeguards or other staff?

4.3 Integration with Other Systems

Consideration needs to be given as to how the detection and monitoring system integrates with other systems in the building. This will include emergency alarms, including where and how the alarm sounds in the event of detection. A manual emergency pool alarm should always be provided alongside or within the monitoring and detection system to ensure the team backup can be alerted and will respond in the event of an emergency. For new builds, architects and designers should liaise with operators and suppliers to establish any integrated system requirements.

4.4 Maintenance, Inspection and Testing

The system should be maintained in line with the manufacturer's guidance. Any testing advised by the manufacturer should be conducted by the operator with all tests recorded.

4.5 Design for Maintenance

The accessibility of cameras for maintenance purposes should be considered as part of the design. Ideally, cameras should be accessible without the need for access equipment.

5. PROCUREMENT AND INSTALLATION

5.1 Design and Retrofitting

Architects and designers must be familiar with monitoring and detection systems by engaging at the earliest opportunity with clients, manufacturers, installers, and operators when designing a pool to understand the requirements and how this type of technology can be integrated.

It is arguably more effective (and with fewer challenges to the pool structure) if the system is designed and built in, rather than retrofitted, especially in systems requiring underwater cameras. That being said, this guidance can also be used by way of assistance for retrofitted installations.

5.2 Lighting Levels

Some systems may require high lighting levels to ensure the system works effectively. Systems can be negatively affected by lighting levels produced by overhead and/or underwater lights.

The manufacturer must stipulate the lighting level required for the system to operate effectively and this should be in line with the Sport England Design Guidance. This guidance may be considered alongside guidance from the Chartered Institution of Building Services Engineers (CIBSE) www.cibse.org/society-of-light-and-lighting.

5.3 Positioning of Monitors and Lifeguard Positions

Some systems include a monitor with real-time footage. These monitors may be used by lifeguards or other staff to monitor the swimming pool and/or respond to alarms.

Operators will need to ensure the monitor position(s) are suitable to allow use as intended at the particular venue.

Where monitors are used by Lifeguards:
Lifeguards may use the monitor as part of their scanning pattern; use it for periodic checks; and/or refer to it when the system provides an alert/alarm. Systems should be used following the manufacturer's guidance and HSG179.

The position of the lifeguard(s) is a critical factor which should be determined at the design stage to ensure 100% visibility, as detailed in para 86 HSG179.

When monitors are mounted on the lifeguard chairs, and/or podiums, consider:

- the correct chair for the position used;
- that sight lines of lifeguards are not obstructed;
- use of an ergonomically designed chair;
- the power and data needed to supply to the monitor;

- visibility – the monitors should not be impacted by glare and specular reflection from natural or artificial sources;
- regularly checking monitors to ensure compliance with the Health and Safety (Display Screen Equipment) Regulations 1992;
- the additional weight pressure on the chair and anchoring the base as a result of the monitor(s).

The design should consider all events that may be held in the pool, e.g., swimming competitions, inflatable sessions etc. following a review of the activity specific LZVT. It may be a requirement to move the lifeguard chair and therefore the monitor on the lifeguard chairs may need to be equipped with a detachable cord to allow movement of the chair for specific events.

5.4 Pool Water Quality and Tank

Some systems require a certain level of water quality and design of pool tanks. When selecting a system, operators should understand the requirements for that particular system.

When considering system installation, architects, designers, manufacturers, and installers should engage with clients and operators to consider the following (noting this list is not exhaustive):

- Colour of the pool tank, the surface of the pool tank, including lines or other markings;
- Water quality required to function effectively;
- Blind spots;
- Use of specialist pool equipment, e.g., movable floors, accessible steps, platforms, hoists, pods, inflatables, moveable booms etc.;
- Turbidity - Pool water turbidity should be maintained below 0.5 Nephelometric Turbidity Unit (NTU) [* 90% efficiency is a PWTAG recommendation in Swimming Pool Water and the Code of Practice for a sand filter];
- Clarity of water and the impact of poor filtration which may result in the “Tyndall effect” causing reflection in the water;
- Placement of temporary equipment such as timing pads, hoists, teaching platforms, lane dividers;
- Glare and specular reflection, including natural and artificial lighting;
- The dimensions and gradients of the pool tank;
- The swimmer (bather) load; based on filtration and surface area;
- The type of pool and how it will be used;
- Depth limitations (shallow and deep).

5.5 Selecting a System

It is important to review different types of systems to identify which system is best suited to the individual premises and user types. For example, some systems are not as effective in shallow and/or turbulent water or irregularly shaped pools.

Operators should understand the technical capabilities and limitations of the system. Any limitations should be accounted for in the risk assessment process and Pool Safety Operating Procedures (PSOP), with the necessary control measures put in place. For example, there may be areas of pool that the system cannot cover, or WIFI coverage may not be adequate to support the system.

5.6 Building the Infrastructure

Ideally, installation should be considered and arranged at the design stage. Some systems require niches to be incorporated into the pool tank.

For systems using underwater cameras, the benefit of a system installed at the build stage is that the pool tank integrity is not later compromised, and the pool tank is not subject to protruding camera housings. Early consultation with the monitoring and detection supplier will determine the number, type, and location of niches, including the depth below the water surface.

For systems using underwater cameras, containment will also be required, due to the swimming pool environment; and the requirement to carry the Cat 6 cabling from the underwater cameras to the system hardware, with continuously sealed containment from the niches to the termination box above the water level.

6. OPERATIONS AND TRAINING

6.1 Management of Information

A recording system provides detailed evidence for an effective incident review. Consideration should be given to the operator's CCTV policies. Information should be kept securely, following the operator's General Data Protection Policy (GDPR). See the Data Protection Act (www.gov.uk) . This will include the storage of data by operators who should upon installation, understand the storage of data, including visual images and the process of accessing. The operator should include the system in the GDPR policy, notifying The Information Commissioner where necessary.

Due to the recording of footage, the location of the system hardware should be considered to ensure compliance with Data Protection legislation. The data rack should be in a secure cool environment with power and an internet connection where it can be accessed for review and management information.

6.2 Staff Using Monitoring and Detection Systems

Systems must be used following the swimming pool's Normal Operating Procedure (NOP) and Emergency Action Plan (EAP) as well as the HSE Legislation and Guidance; RLSS UK Guidance and other relevant guidance.

6.3 Pool Safety Operating Procedures and Risk Assessment

Following risk assessment, which is a legal requirement under the Management of Health and Safety at Work Regulations 1999 and referenced in HSG179, a risk assessment must be undertaken to determine the level of supervision required, considering pool and pool hall features - including glare, reflections, and blind spots.

HSG179 Paragraph 82 states that a risk assessment must be undertaken to determine the level of supervision required. Consider the following when carrying out your risk assessment:

- The NOP should include arrangements for how the system is used by lifeguards and/or other staff.
- The EAP should include details in how to manage problems with the system and alternative arrangements should the system fail, and the swimming pool is to remain operational.
- Swimming Pool Operators using lifeguards should have completed Lifeguard Zone Visibility Tests (LZVTs) to ensure 100% visibility of the pool.

6.4 Staff Training

6.4.1 Staff Training - All Staff

Staff should receive training before using the system. Training should include:

- how the system operates and how it should be used;
- the NOP relevant to the system;
- the EAP relevant to the system;

- testing of the system, if applicable;
- how to report issues and faults with the system;
- how to respond to customer questions about rationale and data security/privacy;
- what action to take if there is a system failure - screens, monitors, watches, wifi, connectivity, server (a system failure is one that has a component not working correctly)

All staff should have the opportunity of training, to practice using the system. Once the system is operational, staff may be monitored periodically whilst using the system and be given the chance to provide feedback to ensure its effectiveness.

Operators should ensure all staff are trained and competent to use the system, and this should be recorded.

6.4.2 Staff Training – Lifeguards

Lifeguards in swimming pools with automated monitoring and detection systems, should be reminded that the primary function of the system is to support and alert lifeguards to a situation in the pool that may require intervention.

It is important that lifeguards do not assume the system is doing their job for them – instead, it is a tool to assist them in undertaking their role effectively.

In addition to the training for all staff, lifeguards should understand:

How to manage:

- concerns around swimmers blocking cameras (especially for systems with underwater cameras);
- concerns about water quality;

When and how to:

- respond to an alert/alarm;
- review an alert/alarm;
- use the monitor (if applicable);
- cancel an alert following the review;
- activate the pool alarm.

6.5 Customer Information

Consideration should be given to notifying customers before any system installation. Provision should be made for signage to inform customers that recording is taking place.

REVIEW PROCESS

This document will be formally reviewed annually, with changes published (if required), each January.

During September the document will be available for review by the industry through open consultation.

During October the review will be led by the RLSS UK, who will formally consult and agree on any change with CIMSPA, Swim England and ukactive.

The team that reviews this document will comprise a minimum of two multi-site operators using a monitoring and detection system, a minimum of two independent swimming pool experts (when possible approved and registered 'Expert' Witnesses), and a representative from CIMSPA, RLSS UK, Swim England and ukactive.

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