



# Sandbach School Swimming Pool SOP

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Title: <b>SANDBACH SCHOOL SWIMMING POOL SOP</b>			

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## Aim

The Aim of this document is to provide a Sandbach School site step by step awareness / operational guide to Swimming pool Health & Safety, maintenance, sampling and Standard Operational Procedure.

## General description

The Pool

- A deck level pool with an extended shallow end that shelves steeply into a 3m deep end.
- Dimensions: 9m x 23m (10yds x 25yds) of which the shallow end is 10m long.
- Depths:
  - Shallow end: 0.9m leading to the deep end at 1.5m
  - Deep end: 3m.
- A red tiled line 1.5m before the steep drop off to deep water marks the limit of the shallow end.
- The deep end can be roped off with a float dividing rope.
- 4 lanes marked by tiled lines.
- 3 mini racing lane ropes are available to make training lanes.

**THE MAXIMUM BATHER LOAD FOR SANDBACH SCHOOL SWIMMING POOL IS 80 (including spectators)**

Access to the pool is via:

One external door at the shallow end is used for additional disabled access or staff only; This door to be locked from inside and in an emergency the door can easily be opened by 1 turn of the latch. Main entrance is the gallery door is where all user group admin should be completed. All parents should enter there.

Two doors from the old changing rooms (one of which is via a shower and foot bath) at the shallow end next to the external door only for use by swimmers or supervising staff.

**Note:** The outer doors from the change rooms are to be kept shut at all times, if shut too they cannot be opened from outside. They are for emergency exit only or exit in periods of high demand for space in the gallery.

Emergency exits can be made via:

- The old changing room.
- Each of the new main changing rooms exits.
- The external door.
- The spectator area door.
- The emergency double fire door located at the deep end.



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## Alarms and fire-fighting equipment are located as follows:

Pool alarm buttons – one is located in the deep end and another near to the spine board along the external door side of the pool.

Fire alarms are located in each of the main changing rooms near to the external doors.

## Staff changing rooms consists of:

an office (exclusively for the School PE staff use) in the old changing room;

a dedicated changing room accessed from the pool side. This Can be locked from inside only.

## Toilet and shower facilities;

Located in each of the changing rooms; disabled toilet facilities are located in each of the new changing rooms.

## Potential Risks;

### Physical Hazards -

- Floor slippery when wet.
- Steeply shelving pool bottom into deep water beyond the red tiled line.
- Edge tiles to pool have grooves in one direction only – grip only available when jumping or diving square into the pool.
- Ladders to pool steep – people entering the wrong way around i.e. back to the ladder not the pool.
- Objects made of glass.
- Changing rooms - poor ventilation, high humidity and heat.
- Crowded changing rooms and shower area.
- People standing on the spectator area / pool dividing wall.
- People standing on benches to get changed.

### People Hazards –

- Spectators are to be segregated away from the poolside in the spectator area. They can gain direct access to the pool surround. Spectators are not go on to the pool surround or to enter directly into the pool hall.
- Since spectators can gain direct access to the pool side their behaviour is the responsibility of the teacher / coach.
- The seating attached to the wall less than 2.5m from the pool edge is only to be used by members of the swimming class and are not to be used by spectators.
- Other members of the public can view the pool from outside the main door. Teachers / coaches are to be aware that this may cause unwanted intrusion and that it may become a Child Protection issue. If such behaviour is felt to be suspicious the Duty Caretaker/ officer should be called in the first instance. If the situation is not remedied then the police should be called.



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- The changing rooms need to be supervised especially at the beginning and end of the session. The outer doors must be secured during the session. If the changing rooms are being shared by two user groups at the finish of one and the start of another session then supervisors must be present from both groups.
- Participants should be encouraged to hand valuable items in for safekeeping in order to prevent pilfering.
- It is the responsibility of the user groups to ensure that all those who have responsibility for or who will have close contact with young people under 18 years of age or vulnerable people have the Enhanced level of Criminal Records Bureau check (this is currently free to voluntary organisations). Those who have responsibility are:
  - Teachers and coaches;
  - Lifeguards and first-aiders;
  - Careers and auxiliaries assisting pupils on a one to one basis.

**Note:** Under no circumstances must glass be brought into the pool hall- if it breaks and gets into the water a complete shut down and drain of pool filtration system required and potential shut down for 2 weeks.

Activity Hazards –

Use of risk assessments form located in **Appendix 1**

Teaching Hazards –

- The number of teaching hazards is reduced because there will only be one pool user group in the water at a time.
- Teachers / coaches must be aware that they are also responsible for any spectators present.
- Diving is only permitted in the deep end – see the section on The Teaching of Diving below for further information on hazards.

**Note:** All sessions must have a qualified lifeguard present. The club must provide this service. If there is no lifeguard the session cannot take place. Ideally with a ratio of 1:20 there should be 1 coach/instructor and 1 lifeguard who has sole responsibility for the safety of the swimmers and must not take on a coaching responsibility.

Molluscum Contagiosum –

- This virus from the pox family is a harmless viral infection of the skin and is a self-limiting disease; characterized by groups of small white lumps developing into white or pink dome shaped spots with a dimple in the Centre. It is passed on by direct skin contact or direct skin contact with inanimate objects (swim buoys, body floats, shared towels, etc.). The condition is quite itchy. The swimmer is infectious so long as they have lesions. Swimmers with other skin conditions e.g. eczema, are at a higher risk of infection. Those infected must not be allowed to swim. Inanimate objects (swim buoys, body floats, etc.) must be stored so that they dry out. The virus survives if equipment is stored wet. Towels should not be shared.



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## Access by Public / Spectators;

Access to the pool building is only for members of bone fide groups:

- Pupils of Sandbach School as part of the normal school curricula or extra-curricular activities.
- Staff of Sandbach School during designated times when appropriate lifeguard cover is in place.
- Members of groups / clubs that have hired the pool and have signed an agreement accepting the terms of hire.
- Members of visiting teams / clubs as part of organised competitions.

**Note:** Swimmers should access the pool through the main door / spectator area door –**over shoes must be worn on poolside** to ensure mud and debris are not brought into the pool.

Spectators should access the pool hall via the spectator area door at the deep end of the swimming pool. They are not to use the shallow end glass door, which is to be used only as an additional disabled persons entrance and emergency exit.

Spectators must remain in the spectator area and are not permitted onto the pool surround unless there is no space in the gallery during the session .If sitting on poolside then spectators must not distract/ talk to or engage the child or coach or lifeguard.

Outdoor shoes are not to be worn on the pool surround; group organisers are asked to rigidly enforce this rule in the interests of hygiene and cleanliness. Failure to comply will result in the additional cleaning costs being passed on to the hirer. Repeated infringement will result in the cancellation of the hire agreement and loss of use of the Sandbach School pool.

The consumption of drink and food is **not** allowed inside the pool building.

Although spectators are in the spectator area they are also in the immediate vicinity of the pool. Their behaviour and discipline is subject to the coach / teacher. If their behaviour or manner starts to interfere with the proper running of the class those concerned must be asked to leave the building and wait outside. If they refuse to comply the session must be suspended and all swimmers told to leave the water and return to the changing rooms under supervision until the situation is controlled.

All users should maintain a register of swimmers that can be used in the event of an emergency e.g. fire alarm.

Spectators must be included in the teacher / coach / lifeguard to swimmer ratio.



## **Lifeguards – duties and responsibilities;**

Supervision must be constantly maintained whilst the pool is in use. The pool must be patrolled constantly by a lifeguard, and all areas of the pool must receive attention.

The key tasks of the lifeguard on the poolside are:

Maintain concentrated observation of the pool and pool users in order to detect the genuine emergency:

Anticipate problems (e.g. rowdy behaviour, someone swimming into the path of a diver, etc.);

Identify any emergency quickly – some bathers may shout and splash about, others may simply sink below the water giving little indication of a problem.

To keep all swimmers away from the two grill covers in the bottom of the deep end – they **MUST** be deterred from touching them.

Carry out rescues and initiate other emergency action as appropriate.

Give immediate first aid in the event of injury or illness to a bather.

Communicate with bathers, coaches and any other lifeguards on duty to fulfill the above tasks.

The key responsibilities of lifeguards is to be physically fit, have good vision and hearing, be mentally alert, sensible and self-disciplined.

**Lifeguards must not, in any circumstances, form groups, undertake other activities or to be distracted from performing their duties whilst on the pool side.**

The lifeguard to swimmer ratio must not be more than 1:20; exceptionally this can increase to 1:30 if the swimmers are very competent i.e. older competitive swimmers. In the event of more than 20 swimmers being present an additional person qualified at least to National Pool Lifeguarding Qualification (NPLQ) – RSL UK - Level 2, must be on the pool side changed ready to enter the water.

Lifeguards should hold the National Pool Lifeguard Qualification (NPLQ) – RSL UK - Level 2.

Teachers and Coaches should hold as a minimum current National Rescue Award for Teachers, Coaches, Trainers and Assessors.

If no second suitably qualified person is present the group size changed and ready to swim must not number more than 20. This will mean that some swimmers are unable to take part.

If for any reason the senior coach or their qualified nominee supervising the session has to leave the Pool Hall then all activity must stop and all pupils must be asked to return to the changing rooms.



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No one should be allowed to enter the Pool Hall until there is sufficient lighting, the pool cover has been removed, the pool vac has been taken out and until they have showered and used the footbath.

Non-rescue qualified teachers and coaches can supervise the pool but an additional qualified lifeguard must be in attendance changed and ready to enter the water. The lifeguard will work under the direction of the teacher or coach but may if the situation requires it to act independently. Supervisory staff must have a whistle and be familiar with the Standard Operating Procedures and Emergency Action Plan.

Those employing lifeguards should be aware that the maximum working time without a break from being on the poolside is 30 minutes – this is to ensure that the lifeguards remain as alert as possible.

Lifeguards should be easily identifiable – they should wear the standard uniform when on duty.

## **System of work;**

Cleaning duties of external cleaning group;

- Daily
  - Check and clean changing rooms;
  - Clean toilets
  - Empty all bins
  - Clean sinks
  - Clean mirrors
  - Hose down / brush pool deck
- Once a week
  - Clean grouting in the showers
  - Clean drains on pool deck and in changing rooms;
  - Clean the grab channel in the edging tiles.
- Once a month:
  - Clean the scum line.

## **Detailed work instructions;**

Training session / galas

The lane ropes and backstroke turning flags need to be correctly fitted and tensioned.

Lane ropes should be stored on the reel when not in use and positioned in the top left-hand corner of the pool away from the emergency exit.

Teachers / coaches are expected to set up and take in lane ropes and to check that they are adequately tensioned.

The reel should not be taken too close to the pool edge and should be held by an assistant when the ropes are being pulled out.

The diving blocks should be physically tested for security before each session.

The backstroke turn flags should be in place for every training session or gala.



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Spectators and competitors seating are the red benches. Additional seating can be arranged in the form of chairs or gym benches; permission must be obtained from the Community Sport dept. The officials / scorer's table should be set up at the deep end near to the emergency exit but not blocking it.

The competitors marshalling area should be set up in the deep end corner away from the emergency exit.

The false start rope should be mounted from poles set into the poolside at the half way line.

**Note;** Canoes are stored upright and tied back with the safety rope supplied on pool side – teachers to ensure they are not moved/ used and that stored upright to avoid risk of falling. They rest on the pool guttering.

## **The Teaching of Diving;**

- No diving is permitted in the shallow end.
- Diving is only allowed in the deep end and then only from the starting blocks 'end' or from beside the starting blocks during training or 'free time'.
- No diving from the deep end pool 'sides' unless under the direction of a teacher / coach as part of a structured lesson.
- Swimmers must be briefed about the sudden decrease in depth and where the safe diving area limit is.
- Teachers / coaches must ensure that their pupils do not stray into water that is too shallow; they must ensure that the depth of water is appropriate.

## **The Teaching of SCUBA diving or Snorkeling;**

- Groups must be affiliated to BSAC.
- Scuba diving and snorkeling is only to be taught by qualified PADI instructors.
- The equipment used must be checked be for use for any faults and removed from use if found faulty.
- All equipment including wet suits, belts, air bottles and harnesses must be cleaned before use in the pool. Particular attention should be paid to the parts of the equipment where sand or small pebbles could be lodged.
- No other water based activity is to take place once divers are in the water.

## **The teaching of Canoeing / Sailing skills;**

Groups must be affiliated to the BCU / RYA / CCFA.

Canoeing / sailing must be taught by qualified instructors or appropriately trained PE staff (Sandbach School groups only).

All equipment must be in a safe and clean condition. Particular attention should be paid to the parts of the equipment where sand, small pebbles or mud could be lodged.

No other water based activity is to take place once canoes or sailing dinghies are on the water.





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Instructors must place particular emphasis on making their pupils aware that every reasonable effort should be made to stop canoes or dinghies from hitting the pool side in order to prevent damage.

## **Installing / removing disabled persons' hoist and steps;**

This is only to be done by those who have been trained in the correct methods.

The hoist and steps, once removed, are to be stored in the corners of the pool hall away from where users will walk and well away from emergency exits. The hoist is to be stored with the 'mechanism' off the floor.

When positioning the hoist for use it must be positioned so that the hooks engage on studs that have been fitted to the floor mounts before the chair guide is lowered into the pool. When the hoist is removed the mounting studs must be removed from the floor sockets and stored in the plastic box beside the emergency telephone.

When moving steps into and out of position the correct technique for lifting loads must be used; ensure that the two bars are properly located into the sockets and that the top step is level with the pool side before use.

## **Teacher / Coach to Pupil Ratios;**

In the majority of cases the ratio should not exceed 1:20.

If the teacher / coach is also responsible for spectators on the poolside the ratio may need to be smaller.

The teacher / coach ratios may need to be reduced if:

- There is a wide variation in swimming ability of the pupils;
- If there are language or learning difficulties;
- If there is a risk of pupils straying into the deep-end, which shelves steeply, causing them to be out of their depth.

The teacher / coach should remain on the poolside during the session. If there is a need for them to enter the water an additional teacher / coach must be present on the poolside.

## **Recommended ratios:**

- 1:12 Adult and infant (baby) classes – one adult holding one infant i.e. one teacher / coach per 12 adult / infant pairs.
- 1:12 Non-swimmers and beginners.
- 1:20 Mixed ability groups where the range is from improver standard to competent swimmer.
- 1:20 Competent swimmers where the swimmers can swim unaided at least 25m on back and front and tread water for 2 minutes.
- 1:30 Competitive Swimming – training only with very competent swimmers.
- 1:20 Synchro swimming.
- 1:20 Water Polo – training only.
- 1:20 Aerobics in water – Deep water.
- 1:30 Aerobics in water – Shallow water



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Swimmers with disabilities – each situation must be considered independently. Care must be taken to ensure that there are sufficient helpers in the water to produce a 1:1 ration for those needing constant support and a sufficient number of other helpers to provide the degree of support dictated by the range of disabilities within the group. (Further help can be gained from the national organisations for specific disabilities)

## **Alarm Systems, Lifesaving and First Aid Equipment;**

A telephone is located in the sliding windows – dial 9-999 to obtain the emergency services.

The Pool Alarm is located near to the spine board and office sliding window at the shallow end the alarm buttons at several locations along that side.

Fire alarms are located just inside the external changing rooms by the entrance doors.

Lifesaving and first aid equipment is located to allow easy and quick access by lifeguards, teachers, coaches or other assistants. Deficiencies should be reported immediately to the Duty officer in the first instance, the Site Facilities Manager or the extra-curricular sports manager.

A spine board is located near to the outside door in the shallow end.

Two throw ropes are located either side of the deep end.

Two horseshoe life rings are located either side of the deep end.

Short reaching poles are located leaning against the walls at the deep end – one by each of the deep end steps and one each side of the pool near to the 'steep slope'.

A long reaching pole fitted with a hook is located on the deep end wall.

**Note:** A first aid kit is located just inside the sliding windows beside the emergency telephone. And in the 'old testing room via the gallery. Face masks and space blankets can also be found there.

## **Health and Safety Issues;**

The normal pool safety rules are in operation in the Sandbach School Pool. Additions to the safety rules are:

- No diving in the shallow end – diving is only allowed in the deep end and then only from the starting blocks 'end' or from beside the starting blocks.
- No diving from the deep end pool 'sides' unless under the direction of a teacher / coach as part of a structured lesson. Swimmers must be briefed about the sudden decrease in depth and where the diving area limit is.
- No running on the pool side.
- No horseplay, pushing or throwing people in
- When canoes are in use there is to be no free or directed swimming; no deliberate capsizing; no pushing of canoes unless they are continuously held.

Participants and spectators must not wear outdoor shoes on the poolside. Slip-on overshoes are provided, which should be returned after use.

Spectators must remain well away from the pool edge.



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Food or drink is not to be consumed inside the pool building or changing rooms. The only exception to this rule

Smoking is not allowed on the School site – Sandbach School is a No Smoking Zone – this applies to all users and spectators.

All users should be aware of the potential for ‘stranger danger’ that could place youngsters at risk. Parents should be told to escort their children to the swimming pool and stay with them until the teacher / coach has accepted responsibility for them. Any suspicious activity should be reported immediately to the duty caretaker and the police called for assistance should the activity persist. A written report should be made giving full details of the incident and a description of the strangers involved to the duty caretaker, Site Facilities Manager or Member of Community Sport Staff as soon as possible after the incident.

## Pool Opening up Procedure

There are a number of important checks that need to be completed prior to pool users entering the pool building and entering the pool water.

- Conduct first pool test of the day from the pool, take sample from the RED central line, pool side at approx. 300mm down. Once results have been confirmed and entered into the pool analyzer, we now calibrate the automatic dosing unit (Discussed later in this document).
- All Pool test readings will be recorded entering poll test figures to DOC00128-14 “Pool Sampling Record Sheet”.
- Open up spectator gallery doors. Turn on lights in pool hall and changing rooms.
- Walk around pool side and ensure there are no obstacles or equipment lying around e.g. the canoes safely stored and all equipment has been returned to safe storage from the previous night.
- On a Saturday and Sunday – remove the cover off (Note: Mon-Friday-the school lifeguard will remove it).
- Clear the skimmers of hair and debris that has built up overnight.
- Brush the inlet and outlet filters (all cleaning brushes are found on the pool wall).
- Check water clarity and bathing levels.



## Pool close down procedure

- Assess pool clarity and cleanliness. Put the vacuum in if required.
- Conduct final pool water test and record results – importantly re-calibrate the dosing unit.
- Cover the pool using the pool cover (operating instructions outlined later).
- Clear skimmers and brush inlet and outlet filters
- Clear pool surround of any equipment/objects/litter.
- Lock changing rooms and turn off all lights.
- Top up chlorine tub to the required level with the pool water feed pipe (Note: Turn valve off after use!).

## Pool cleaning Rota

The cleaning of the pool is as follows:

Monday – Friday 1 cleaner in the morning and 1 cleaner in the afternoon.

Jobs include:

- Clean pool surround gutter of debris and mud
- Clear drains of rubbish (hair/plastics)
- Clean and mop toilets and changing areas
- Clean and mop spectator gallery

Lifeguards and users all have a duty of care to ensure hygiene is achieved at all times by cleaning as they go. The lifeguard on a Sunday morning will assist in the cleaning of pool side. Help may be needed to put the hose in if required by sports manager/Estates team.

## Operation of the pool cover

The cover is to be put on at all times when the pool is not in use. The cover saves energy and heating costs as the pool heat will be retained whilst the cover is on. It also acts as a safety feature in case the pool was left open and unattended then it acts as a deterrent from people entering the pool water unsupervised. The cover can be operated by all Estates team, lifeguards and the community sports personnel.

### To put the pool cover on;

- Attach the guide rope to the silver ring at the cover which is rolled up at the shallow end.
- Walk to the deep end unwinding the guide rope as you go.
- Press and point the button on the remote at the left hand side of the cover's stand. The cover will start to lower, use gentle force to guide the cover onto the pool and now gently pull the cover at a continued pace.
- The cover takes 2 minutes to unwind itself fully **it cannot be speeded up by pulling faster.**
- Point and re-press the remote button when the cover reaches the deep end skimmers.



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- The cover will now stop, put the rope onto the pool cover so that it does not become tangled in the dive blocks.
- Put the remote behind the glass window.

## Removal of the Pool;

To remove the cover, simply press the remote and it will automatically start to wind back up. Once it is half a meter away from the top of the stand press again and it will stop. Put the remote back on the glass window. (Again this will take 2 minutes and cannot be speeded up).

## Pool water sampling test sheets

It is important that all water tests are done **on time** and **recorded**. This allows the monitoring of the chlorine and pH levels, which provides important information to ensure safe water quality.

Tests should be done at approximately; 7.30am, 12pm, 4pm and 8pm. As required.

Once a test has been completed and results are recorded then calibrate the automatic dosing unit (details found in dosing levels section).

You must report any anomalies in the results to the community sports Staff / Site Facilities Manager as soon as possible.

## Pool vacuum operation

The pool vacuum is designed to clean the pool floor of algae and debris (plasters/hair). The pool should be vacuumed **at least 3 times** a week. Ideally, on a Monday – Wednesday – Friday. This Rota depends upon current bookings and man power available.

### Vacuum Procedure;

1. Position the vacuum by the benches in the middle of the pool surround in line with the red line.
2. Ensure the filter bag is clean and empty prior to use **(if it is not empty the vacuum will not start)**
3. Position the power supply on the red bench behind the vacuum stand and unwind the cable to the P.E. office sliding window. Ensure a circuit breaker is used.
4. Gently lower the vacuum into the pool (it may need a shake to get rid of the air trapped inside), once lowered unravel the blue cable to ensure freedom of the pool.
5. Turn on the vacuum and stay with the vac for 2 minutes whilst it goes to the far deep end wall (this is to ensure the vacuum has enough cable to reach the furthest most point of the pool). Uncoil the remaining cable on the edge of poolside and leave – this can be used as extra cable by the vacuum if needed.

**N.B. If there is not enough cable the vac battery and stand will be dragged into the pool by the vacuum.**



6. The parameters are automatically sorted in the memory of the vacuum and will now work automatically for 8 hours or until turned off. The community sport manager is only authorized to alter the set parameters and this is done by the pool remote.

## **Pool vacuum shut down;**

1. When the vacuum has done its cycle it will stop. The filter light on the power supply may be flashing, this is due to the bag being full.
2. Turn off the power supply on the stand.
3. Gently start to wind up the blue cable on the stand, this will pull the vacuum closer to the pool side.
4. When the vacuum is next to pool side, **gently** pull the cable (the vacuum will float) and lift out of pool to allow excess water to drain off the vacuum.
5. Place the vacuum on its side and open the catches on the bottom to remove filter bag. Clean the bag in the plant room using the hose. Replace the bag with the fresh one (the vacuum comes with two bags).
6. Lift the vacuum onto the stand and store neatly away in the cleaning cupboard.
7. Report any malfunctions to the community sports manager.

## **Dilutions**

A dilution is where fresh water is added to the pool water to 'dilute' the existing concentration of combined chlorine. It is also useful to dilute the pool to top up the water level after a backwash.

N.B. The water level should be half an inch from the top of the skimmers.

The hose should be put into the pool after a backwash, as a backwash reduces the pool water level by a few inches.

## **Pumps and strainers.**

The pumps and strainers are used to collect floating rubbish (hair, debris that are circulating in the internal pipes – (see attached pool diagram). The strainers need to be cleaned and changed at least 2 x per week as per ISRM Guidelines.

The pumps need to be rested to delay wear and tear of the motors.

There are 3 pumps 1,2, 3 as you face them. (2 pumps are only to be in use at any one time, one needs to be resting). You must record which pumps are in use at the start and end of the day and recorded in the pool water log book.



Procedure to change a pump.

1. Turn off the pump at the control panel.
2. Turn the valves in the opposite direction (this stops water flowing through them).
3. The seal and lid can now be taken off. (Use the plastic handle to turn as the pressure may make it hard to turn off).
4. Remove used strainer basket and replace with new clean basket – ensure that the 'O' Ring is in line with the hole in the pipe.
5. Put the ring and plastic seal on and tighten the lid.
6. Turn the valves back to their original positions.
7. Switch on at control panel.

**Note:** Never turn the valves whilst the motor is still running as the pipes/seals may burst. Always stop the motor first.

## Backwashing of the filters.

Backwashing serves three important functions:

1. Cleans internal pipes and sand filters by forcing the water in the opposite direction.
2. If the pipes remain clean then the water will be cleaned by the sand filter as it travels around the system in normal operation.
3. Backwashing also removes the top layer of surface water which contains gel, make up, hair that floats to the surface of a pool.

ISRM guidelines state **that no more than 3 backwashes per week** are required as filters become damaged. (Unless instructed otherwise by line manager).

Backwash procedure

1. All filters have four valves and must be backwashed for two minutes each.
2. (the whole process should take 6-8 minutes).

Each filter has four leavers numbered 13,14,15,16.

To perform a backwash on a filter turn valves 13 and 16 pointing down and 14 and 15 pointing horizontally. And leave for 2 minutes. Observe site glass and wait until it goes from cloudy to clear.

**In simple terms: the valves have reversed and swapped around.**

The pressure gauge is located between filters 1 and 2 and the ideal readings should be Inlet 1.0/ outlet 0.8.

If they are not these figures then turn valve 17 slightly to alter the pressures. Valve 17 controls the pool return water pressure and speed.



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## When to do a backwash?

1. When the inlet out let gauges are incorrect.
2. When CL is dosing but CL readings are decreasing. N.B. If CL is set at 1.6 then CL will not dose and hence CL readings will decrease, this does not mean a backwash is needed just that the dosing unit should be set under 1.5 so that it will dose.

## The Chlorine / pH automatic dosing unit

In simple term the dosing unit acts as a pump that puts chlorine (CL) and maintains the pH level in the pool by injecting CO<sub>2</sub>. The dosing unit pumps regularly and is calibrated after every pool test. This ensures, that the correct level of CL and pH is in the pool.

**CURRENT SET POINTS: cl – 1.5ppm, ph-7.3 – This is what we are working towards (as recommended by the ISRM)**

The levels do have acceptable ranges (CL 0.7-2.00) (PH 7.3-7.4) **Anything above or below these levels means that bathing must stop immediately. AND YOU MUST RESOND IMMEDIATELY TO CORRECT CHEMICAL LEVELS.**

***The dosing unit will not dose chlorine if it is set at anything above 1.5ppm.*** The level of dosage can be changed automatically by the person who has done the test.

### Science behind the dosing;

The levels to which it is set depend upon the bather loads for that day because swimmers take CL out of the water.

### Example 1-TYPICAL MORNING READING

TIME	DPD1	COMBINED	DPD3	PH
07.00	0.6	1.0	1.6	7.1
<b>07.00 (ideal result)</b>	<b>1.5</b>	<b>1</b>	<b>2.5</b>	<b>7.5</b>

This reading has been taken first thing in the morning when CL has dropped out because either the level was set above 1.5ppm the night before or the tub was not topped up. DPD1 should always be higher than the combined result. And the difference between the DPD1 and DPD3 should be 1.

Ideal result, (IN BOLD) shows perfect readings, as it has been dosing all night and maintained its CL levels. So with a reading as low as 0.6 the dosing unit should be set at that in order to increase the levels back up to 1.5ppm. You are basically telling the machine what the pool water contains, and it now puts in the required difference to get the levels back up.





# Sandbach School Swimming Pool SOP

## Example 2 – POOR READING

TIME	DPD1	COMBINED	DPD3	PH
12.00	1.2	1.3	2.5	7.4

This reading shows that the CL level is not high enough to create the 1 difference and secondly that the DPD3 level is a little high. **This does not mean a backwash is required, simply that CL needs to be set at 1.2ppm**

As mentioned earlier, swimmers take out CL so if the pool is in use all day/night then CL SHOULD BE MONITORED AND ADJUSTED.

## Example 3 – BACKWASH REQUIRED

TIME	DPD1	COMBINED	DPD3	PH
16.00	1.5	1.40	2.90	7.3

Here, CL DPD1 is perfect it's DPD3 that is too high, therefore the combined result is high and the difference between the DPD1 and 3 is minimal. Therefore a backwash is required on all 3 filters.

***It is important to note that because the CL has dropped and not increased, a backwash does not necessarily need to be done – the CL can drop for other reasons. (no top up of chemicals, wrong set point bather loads).***

Ph. is increased by more CL so the pH is a good indicator of the level of chlorine in the pool. If CL is 1.5 then pH should follow and be 7.5.

## Example 4 – setting the wrong calibration

TIME	DPD1	COMBINED	DPD3	PH
07.00am	<u>1.6</u>	0.80	2.40	7.30
12.00pm	<u>0.6</u>	1.60	2.20	7.10

This is an example of when the morning reading is 1.6 (above 1.5) and the person doing the reading has set it at 1.6ppm, therefore the CL will not dose for the next 4 hours and hence decrease to unsatisfactory levels by 12pm. The swimmers have taken the CL out of the pool since 7am.

**Use your judgment, if the 1<sup>st</sup> reading is 1.6ppm then set it at 1.4-1.5 to ensure it still doses 'little and often' this way CL levels will be maintained by 12pm.**

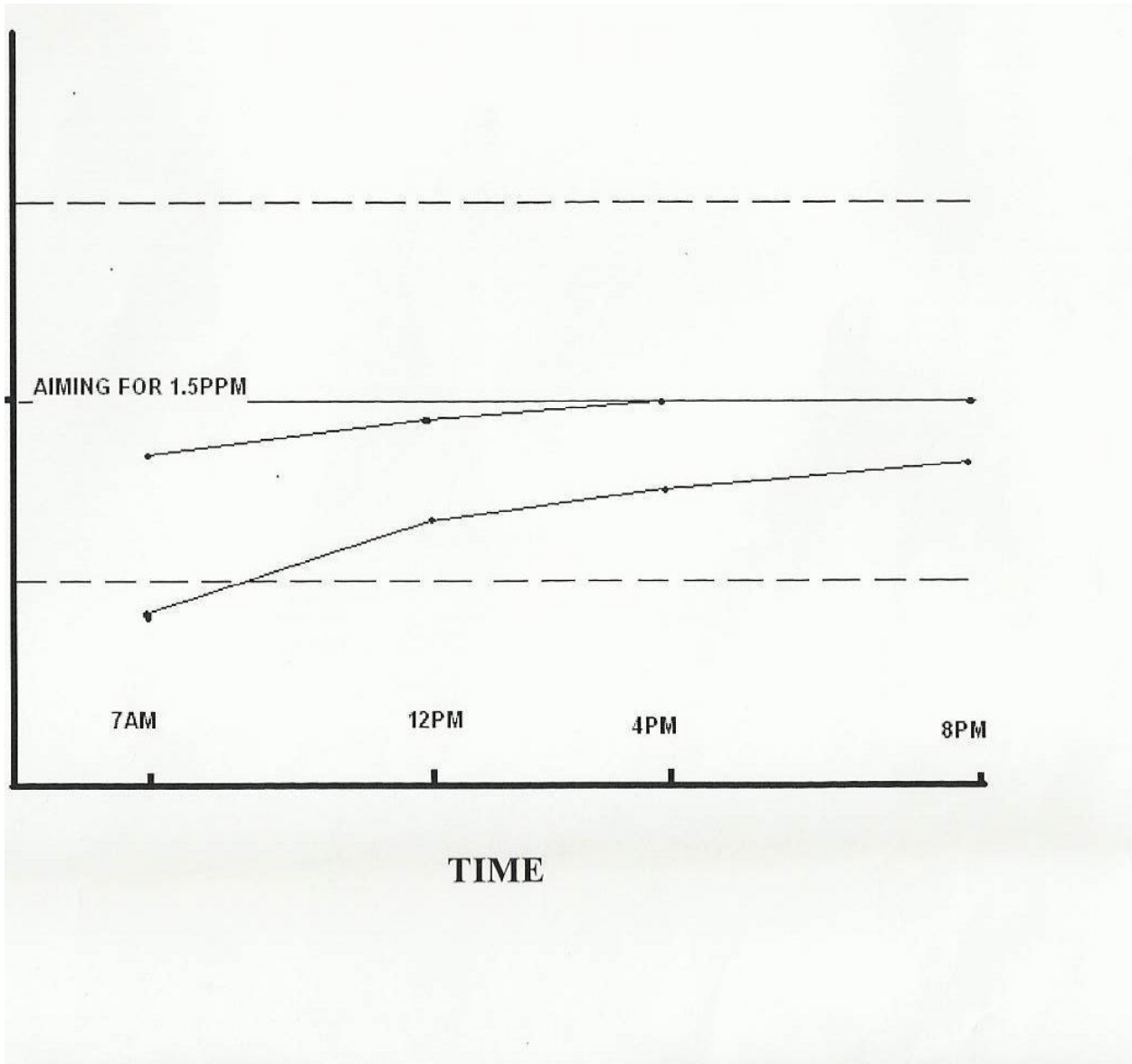
**In this case after the morning reading, take another reading between 7am and 12pm (10am).**



# Sandbach School Swimming Pool SOP

Diagram of typical day of dosage levels.

## CL LEVEL





## GET THE BASICS RIGHT

### Taking a water sample

It is important that a representative sample of the pool is taken for testing. Always take the sample from the same place in the pool, usually somewhere remote from where the freshly treated water enters the pool.

1. Use a plastic stoppered bottle to collect the water sample.
2. Always rinse the sample bottle several times in the pool water before taking the final sample.
3. The sample should be drawn from a point 300mm below surface level.
4. The test should be carried out as soon as possible after taking the sample.

### Using a comparator

When using a comparator it is **imperative** that the operator can interpret colours accurately.

1. It is essential that test kits are always kept scrupulously clean. This applies especially to glassware in which matching tests are carried out. Glassware should be thoroughly rinsed with tap water, so that all traces of previous test reagents are removed before the test. It is a good idea to dedicate one cell per test use, i.e. one for pH and one for chlorine.
2. Select the correct test disc for the test being undertaken and insert into the comparator ensuring the numbers are visible.
3. When taking a comparator reading, use the comparator against a source of white light (preferably a lighting unit) and rotate the disc until the colours give the closest match.
4. Take the disc reading which appears in the aperture in the front of the comparator.

### Using a photometer

Accurate photometer testing involves passing a beam of light through the coloured test solution onto a photo detector. Photometers vary, so it is essential to follow the guidance provided by the manufacturer and take note of the following best practice points:

- Some photometers may require the establishment of a zero (blank) reading using a clean sample without reagents, prior to analyzing the pool water sample.
- The correct type of reagent must be used – special photometer grades of tablets are often specified.
- The reagent must be completely dissolved with no particles floating in the test cell.
  
- There must be no bubbles adhering to the inside walls of the test cell.
- The test cell must be dry on the outside with no finger marks on the glass.
- The cell compartment must be kept clean and dry.
- The correct test cell lid or rim is used to prevent light contamination which can give a false reading.



## Test for free chlorine

1. The DPD No. 1 tablet is used in this test and will give a colour which is specific for free chlorine. The colour is measured either in a comparator or a photometer, using the correct tablet.
2. A clean test cell is rinsed with the water to be tested and is left empty.
3. A DPD No. 1 tablet is added and crushed with a clean stirring rod. The water sample is then added and the cell is filled to the 10ml mark.
4. The solution is mixed well with the stirring rod until the tablet is completely dissolved. The lid is put on the cell.
5. The cell is then inserted into the comparator or photometer and the colour measured immediately to determine the free chlorine content of the water in mg/l.

## Test for total chlorine

This test is a continuation of the free chlorine test above.

1. The cell containing the dissolved DPD No. 1 tablet – from the free chlorine test – is removed from the instrument.
2. Add a DPD No. 3 tablet and mix it until totally dissolved with the stirring rod.
3. Allow the cell to stand for 2 minutes for a complete reaction of the combined chlorine to take place.
4. Replace the cell in the instrument and measure the colour. The result is total chlorine in mg/l.

## Calculating combined chlorine

To obtain the results for combined chlorine, apply the following formula:

**Combined chlorine = Total chlorine – Free chlorine**

### Cautionary note:

Be aware that excess free chlorine (values of 5 mg/l and above) may bleach the colour of a sample, giving a false reading. When the cell is filled to the test mark the colour should not visibly alter. If the final colour is noticeably paler than the original sample in which the tablet was dissolved, excessive chlorine may be having a bleaching effect on the sample. If this is suspected, dilute the sample 50:50 with distilled water before filling the cell, and double the result.

## Test for pH

1. A freshly rinsed cell is filled to the 10ml mark with the water to be tested and a phenol red tablet is added.
2. Crush the tablet and mix thoroughly to dissolve using a clean stirring rod. Fit the cap to the cell and insert into the instrument.
3. The colour produced is matched either visually in a comparator, or by reading the photometer, to give the pH value of the sample.



## Test for total alkalinity

This test is carried out by adding total alkalinity (TA) tablets one at a time to a sample of water until the colour changes from yellow to bright red, the result being calculated from the number of tablets used in relation to the volume of sample water.

1. A freshly rinsed shaker bottle is filled to the 50ml mark.
2. Add total alkalinity tablets, one at a time, to the sample being tested. Ensure that each tablet is totally dissolved prior to adding additional tablets.
3. Continue adding the tablets one at a time in this manner until the colour of the solution changes from yellow to bright red. Ignore any intermediate orange-pink colouration.
4. Note the number of tablets used and calculate the result from the formula below appropriate to the volume of the sample taken.

$$\text{Total alkalinity (mg/l CaCO}_3\text{)} = (\text{No. of tablets} \times 40) - 20$$

## Test for calcium hardness

1. A freshly rinsed shaker bottle is filled to the 50ml mark.
2. Add one calcium hardness (CH) tablet and shake the container until the tablet dissolves.
3. Continue adding the CH tablets in this manner one at a time until the colour changes from pink to violet.
4. Note the number of tablets used and calculate the result from the formula:

$$\text{Calcium hardness (mg/l CaCO}_3\text{)} = (\text{No. of tablets} \times 40) - 20$$

## Langelier test for balanced water

This is a test to indicate if the pool water is corrosive or scale forming. Langelier testing was not designed for swimming pool applications. Water balance is a secondary issue to chlorine and pH values which becomes significant only when balanced water test results vary from those recommended.

1. Measure and note the temperature of the pool.
2. Take a calcium hardness test, note the result.
3. Take a total alkalinity test, note the result.
4. Take a test for the pH, note the result.
5. Take a reading for total dissolved solids (TDS).
6. Use the table below to obtain:
  - the temperature factor (TF)
  - the calcium hardness factor (CF)
  - the total alkalinity factor (AF)
  - the TDS factor (TDSF)
  - add the results of the pH test



# Sandbach School Swimming Pool SOP

Temp (°C)	Temperature Factor (TF)
0	0.0
6	0.2
10	0.4
18	0.5
24	0.6
29	0.7
34	0.8
41	0.9
53	1.0

Calcium hardness (mg/l)	Calcium hardness factor (CF)
5	0.3
50	1.3
100	1.6
150	1.8
200	1.9
300	2.1
400	2.2
500	2.5
1000	2.6

Total Alkalinity (mg/l)	Alkalinity factor (AF)
5	0.7
50	1.7
100	2.0
150	2.2
200	2.3
300	2.5
400	2.6
800	2.9
1000	3.0

Total dissolved solids (mg/l)	Total dissolved solids factor (TDSF)
1000	12.1
2000	12.2
3000	12.3



# Sandbach School Swimming Pool SOP

7. Apply the values from the table, with the pH value to the following formula:  
**Langelier index = TF + CF + AF + pH – The TDS Factor**
8. Analyse the results:
  - A positive Langelier index (0.0 to 0.5 or above) indicates the water is scale forming.
  - A negative Langelier index (0.0 to -0.5 or below) indicates the water is corrosive.

## RECOMMENDED WATER QUALITY VALUES

**For systems using sodium hypochlorite, calcium hypochlorite, electrolytic generation of sodium hypochlorite or chlorine gas.**

### Disinfectant residual

- Free residual chlorine. According to the type of pool and its use, aim as low as possible to achieve satisfactory bacteriological results. This should be possible at less than 1.0mg/l (0.5mg/l for fully ozonated pools and full treatment UV pools). No pool should require more than 1.5 – 2.0mg/l. When operating at low free chlorine levels the pH value of the water must be around 7.2 – 7.4 to obtain the greatest disinfection effect.
  - Ideally free chlorine should be no more than 1.5 – 2.0mg/l.
  - Free chlorine residuals above 2mg/l should not be necessary unless water re-circulation is slow, water distribution poor or bathing loads very heavy.
  - Free chlorine residuals above 3mg/l are unlikely to be necessary and chlorination should be reduced.
  - Above 5mg/l free chlorine, chlorination should be stopped immediately.
  - Above 10mg/l bathing should cease.
- The combined chlorine residual should be as low as possible, ideally no more than half the free.
- Where combined chlorine levels which are too high persist, despite constant chlorination, then dilution of the pool water with fresh water is required, up to 30 litres of fresh water per bather per day.

### Chlorinated isocyanurates

**Free residual chlorine:** Higher residuals of 2.5mg/l – 5.0mg/l are often necessary when using chloroisocyanurate compounds. This is dependent on the amount of cyanuric acid present.

**Cyanuric acid level:** Cyanuric acid levels must be monitored at least once a week until results are consistent, when the frequency may be reduced to once a month. The recommended targets are cyanuric acid below 200mg/l; the ideal range is 50 – 100mg/l. Concentrations of cyanuric acid above 100mg/l will significantly reduce the efficiency of the chlorine, and may lead to unsatisfactory microbiological conditions.



## Levels of cyanuric acid and effect on chlorine chemistry

<i>Cyanuric acid concentration in pool (mg/l)</i>	<i>Minimum free chlorine (mg/l)</i>
25	1.5
50	2.0
100	2.5
200	3.0

## pH value

Using chlorine the pH should be maintained between 7.2 – 7.8. The target should be 7.2 – 7.4 as disinfection will be more effective (as is coagulation).

## Total alkalinity

Alkalinity should be maintained within the range 75mg/l – 220mg/l. Alkalinity should be measured weekly. If it has to be increased because it is well below 75mg/l sodium bicarbonate is the standard chemical: 1.5kg added for each 50m<sup>3</sup> of pool water should increase total alkalinity by 20mg/l without affecting the pH unduly.

**Do not exceed 250mg/l.**

## Calcium hardness

Calcium hardness should be measured weekly and maintained between 75mg/l and 150mg/l as CaCO<sub>3</sub>. However, the source water for pools in hard water areas may have a calcium hardness level naturally higher than this, which is unlikely to have any detrimental effects on water quality. There is no theoretical upper limit but high readings can cause unwelcome scale deposits to occur and there is no virtue in levels above 500mg/l. Below 40mg/l CaCO<sub>3</sub> the water can be corrosive to the fabric of the pool plant. To raise calcium hardness calcium chloride can be added: 1.5kg for each 50m<sup>3</sup> of pool water will increase the calcium hardness by 20mg/l.

## Other tests

### TDS (mg/l)

Should not be allowed to rise more than 1000mg/l above the source water, up to a maximum level of 3000mg/l. If TDS is high, and chloramines also, dilution is likely to be the answer.

### Sulphates

Aim for as low a level as possible, to a maximum of 360mg/l.



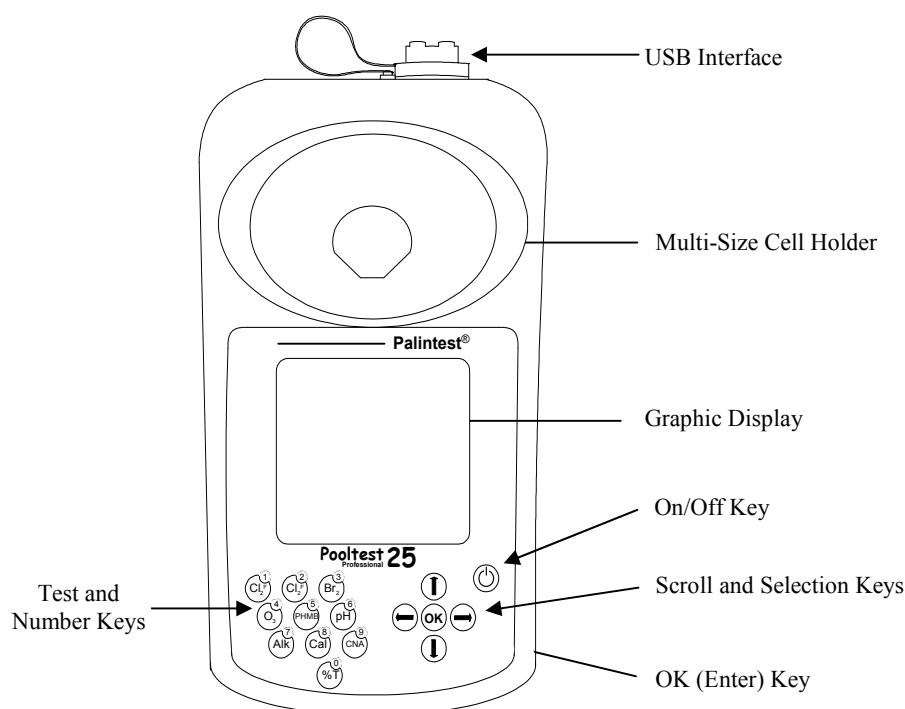


## POOL TEST 25 PROFESSIONAL

The Palintest Pool test 25 is a precision colorimeter specially developed for testing swimming pool water. Most importantly, the photometer is integrated with the Palintest system of analysis. It offers an instrumental method of analysis for an extensive range of swimming pool water tests.

The Palintest Pool test 25 features digital electronics and built-in filters. It is lightweight and portable for field or laboratory use. The instrument is direct-reading, has automatic blank setting, automatic wavelength selection, automatic power cut-off and offers the user a wide range of set-up options.

The Palintest Pool test 25 can be interfaced with a computer to provide a complete analytical test system and database.



### Features and Technical Specification

Application	For application in swimming pool and spa testing using Palintest tablet reagent systems.
Instrument Type	Single-beam colorimeter with built-in colour filters and pre-programmed test calibrations.
Wavelength Range	430 - 670 nm
Operating Wavelengths	450 nm, 500 nm, 550 nm, 570 nm, 600 nm and 650 nm built-in filters. Automatic wavelength selection by test program.
Display	Large graphic display with option of backlight.
Language	Test identification and prompts in English, French, German, Spanish and Italian.



## Sandbach School Swimming Pool SOP

Timer	Clock and timer feature to log test results and audible alarm for timing test procedure.
Units	Direct-reading of test results in mg/l or ppm.
User Selectable Options	10 digit sample number entry, dilution factor, time/date, date format, system lock and rounding of results.
Date Format	Date format selectable as day/month/year or month/day/year.
Zeroing	Automatic zeroing on blank tube and hold blank facility for series of tests. Continuation test facility without the need for reblanking.
Internal Memory	Stores 500 previous readings with option to view logged results on screen, or download to computer.
USB Interface	USB 1.1 full-speed, bus-powered device. Software selectable between either emulation of a removable hard-drive or emulation of a serial device connected via a virtual COM port.
Power	3 x 1.5V 'AA' alkaline batteries or via USB interface. Power management system with variable length auto switch-off or 'continuous' operation.
Size	250 x 150 x 70 mm
Weight	985g
Test Tubes	For tablet reagents - 10 ml glass test tubes, 20 mm OD (PT 595).
Cell Holder	Multi-size tube holder accepts test tubes from 12 – 20 mm OD and centres the tube for optimum optical performance.

V1-04/06

### **POOL TEST 25 TEST KITS**

Portable test kits based on the Palin test Pooltest 25 Photometer are available in a variety of formats including the Palin test Pooltest 25 Minilab which contains the equipment and reagents for pool testing in a moulded plastic work-tray. These kits are supplied complete with reagents, or without reagents, for use with Palin test reagent starter packs. The latter format enables the user to select the tests specifically needed. For a full list of reagents available see Palin test literature and price lists.



## USING THE POOLTEST 25 KITS

### BASIC PRINCIPLES

Tests are carried out on the pool water by adding the appropriate reagent tablet or tablets to a test tube containing a sample of the water. A distinctive test colour is formed and this is indicative of the concentration of the parameter being tested.

The Pooltest 25 Photometer is used to measure the colour formed in the test. Light is passed through the sample, then through an optical filter onto a photo detector. The test program selects different filters depending on the colour of the test solution.

When a measurement is being carried out, a 'BLANK' tube is first inserted into the photometer. It is important to understand the meaning of the term 'BLANK' tube. The 'BLANK' tube is a test tube containing pool water only. This tube is used to compensate for any inherent colour in the pool water and automatically sets the instrument for each test.

Once the photometer has been set, the 'SAMPLE' tube is then inserted into the instrument. The 'SAMPLE' tube is the test tube containing the coloured test solution prepared by adding the reagent tablets to the pool water sample in accordance with the test instructions. After the sample tube has been inserted, the photometer will display the test result in the form of a digital readout.

Different tests are carried out on the photometer by selecting the appropriate program or Test number. When used in conjunction with a computer system the test numbers can be selected automatically by the computer. The test instructions describe precisely how each of the tests should be carried out. Some of the instructions will indicate that the sample should be prepared in a certain way, or that the tablets should be added in a certain manner. It is important to observe these instructions in order to obtain accurate results.

Note that certain of the tests are based on turbidity methods. In these tests the photometer is used to measure the degree of cloudiness which forms in the test solution.

### GETTING THE BEST RESULTS

To get the best results follow these simple guidelines :-

- 1 Read the test instructions carefully and carry out the tests precisely as instructed. Become familiar with the instructions for each test.
- 2 Add the tablets to the sample in the manner described in the instructions. Crush or allow to disintegrate as indicated. Use a separate crushing rod for each tube. Do not shake the test tubes in order to dissolve the tablets.
- 3 Place cap on the test tube when the tablets have dissolved. For most tests it does not matter if a few small undissolved particles remain, provided these have settled to the bottom of the tube.
- 4 Before taking photometer readings ensure that the outside of the tube is clean and dry. Use a tissue to wipe off any water drips or condensation.



## Sandbach School Swimming Pool SOP

- 5 Wash test tubes, caps and crushing rods thoroughly under a running tap after use. Brush off any stains or deposits. Dry on a clean cloth or rinse with deionised water before re-use.
- 6 Replace any test tubes which become scratched or permanently stained.
- 7 Use the light cap when working out of doors in strong sunlight.

### **CARRYING OUT THE TESTS RAPIDLY**

When working in a pool shop or retail establishment, it is necessary to carry out tests as quickly as possible so as to achieve a good commercial throughput of samples. The following hints should help in developing a technique for carrying out the tests rapidly. Once you are familiar with the individual test procedures it should be possible to carry out a series of tests at the same time. The following procedure should be adopted :-

- 1 Note the tests which are required to be carried out.
- 2 Prepare a sample tube for each of the tests according to the test instructions.
- 3 Add test tablets to each tube in the manner described. Crush or allow to disintegrate as instructed. Cap the tubes.
- 4 Ensure that the tablets have properly dissolved then take the photometer reading on each tube in turn.

Make sure that sufficient time has elapsed for those tests which require a standing period. The preferable test sequence is to have tests which require a standing period at the end of the series. In this way the standing period can be accounted for by the time taken to perform the other tests.

### **DILUTING THE POOL WATER SAMPLE**

When the test result is outside the concentration range of the test, the photometer will display the '>>' symbol. In such cases it is necessary to dilute the pool water and repeat the test. If the result is close to the top of the scale (e.g. chlorine above 4 mg/l, calcium hardness above 300 mg/l and cyanuric acid above 150 mg/l) and a more accurate result is required, a dilution may be used to increase the sensitivity of the test :-

- 1 Take a Dilution Tube (PT 512) and fill to the x2 mark with pool water. Make up to the 'Deionised Water' mark with deionised water. Replace the tube cap and mix.
- 2 Carry out the test on the diluted sample in a 10 ml test tube as per the normal test instructions.
- 3 Switch the photometer into SYSTEM mode, then select Dilution Factor 'On'. Press [OK] key to switch back into PHOTOMETER mode.
- 4 Take the photometer reading in the normal manner. Photometer display sequence will ask for entry of dilution factor. Key in the factor '2'.
- 5 The test result displayed will represent the concentration in the original pool water sample.

Samples may be diluted to a greater extent if necessary. Enter the dilution factor appropriate to the dilution used. Note that it is not possible to dilute samples in the pH test, or when working in Transmittance.

### **SAMPLE COLLECTION**



## Sandbach School Swimming Pool SOP

The following points should be observed when taking water samples from the pool. Take pool water samples from below the water surface. Collect in a clean plastic bottle and fill to the neck so as to avoid unnecessary airspace.

The free chlorine, bromine or ozone levels may drop during sample storage. Other parameters such as pH and alkalinity can also change. Samples should therefore be tested as soon as possible after sample collection.

### **TEST INSTRUCTIONS**

The following sections give test procedures for tests available for the water lab and kits.

The test procedure headings show the photometer program number ('Test' number), the test name, the range of the test and the colour change which takes place over the test range. For additional technical information on tests and test methods see Palin test Photometer Test Instruction Manual (ZI PHOT AUTO), available as an optional extra.



# Sandbach School Swimming Pool SOP

## Test 1 ☐ FREE CHLORINE

**Range 0 - 5.00 mg/l (ppm)                      Colourless - Red**

- 1 Rinse test tube with sample leaving two or three drops in the tube.
- 2 Add one DPD No1 tablet, crush tablet and then fill the test tube with sample to the 10 ml mark. Mix to dissolve tablet and ensure any remaining particles have settled.
- 3 Take photometer reading at immediately as result may drift on standing.
- 4 Retain test solution if Total Chlorine test required.

## Test 2 ☐ TOTAL CHLORINE

**Range 0 - 5.00 mg/l (ppm)                      Colourless - Red**

- 1 Carry out this test on the solution remaining from the Free Chlorine test.
- 2 If any shock treatment chemicals have been added to the pool, add one DPD Oxystop tablet, crush and mix to dissolve. This will prevent a response caused by the shock treatment chemicals.
- 3 Add one DPD No 3 tablet, crush and mix to dissolve.
- 4 Stand for two minutes.
- 5 Take photometer reading.

To obtain COMBINED CHLORINE residual subtract Free Chlorine result from Total Chlorine result :-

$$\text{ie Combined Chlorine} = \text{Total Chlorine} - \text{Free Chlorine}$$

Note: To assess the level of shock dose chemicals in the pool, request supplementary instructions Phot 7.2.AUTO.

## Test 3 ☐ BROMINE

**Range 0 - 6.00 mg/l (ppm)                      Colourless - Red**

- 1 Rinse test tube with sample leaving two to three drops in the tube.
- 2 Add one DPD No 1 tablet, crush tablet and then fill the test tube with sample to the 10 ml mark. Mix to dissolve tablet and ensure any remaining particles have settled.
- 3 Take photometer reading immediately, as result may drift on standing.

Note: To separate chlorine and bromine residuals, request supplementary instructions Phot 5.1.AUTO.



## Test 4 ☐ OZONE

**Range 0 - 2.00 mg/l (ppm)    Colourless - Red**

- 1 Rinse test tube with sample leaving two to three drops in the tube.
- 2 Add one DPD No 4 tablet, crush tablet and then fill the test tube with sample to the 10 ml mark. Mix to dissolve tablet and ensure any remaining particles have settled.
- 3 Take photometer reading immediately.

This test also responds to chlorine and bromine. Pools using 'ozone with chlorine' treatment systems, or other combined treatments, require a special testing procedure. See separate leaflet.

## Test 5 ☐ PHMB (POLYBIGUANIDE-BASED BIOCIDES)

**Range 0 - 100 mg/l (ppm)                      Yellow - Green - Blue**

PHMB is the generic name for various polybiguanide-based swimming pool biocides. These biocides are normally sold under branded product names, for example Baquacil\* (Zeneca), Softswim\* (Biolab), Revacil\* (Mareva) and Nicosil\* (NICO Norge).

Commercial products normally contain 20% active PHMB. This test has been calibrated for the management of pools using commercial products of this strength. A factor will need to be applied if products of a different strength are being used. (*\*All trade marks acknowledged*).

- 1 Fill test tube with sample to the 10 ml mark.
- 2 Add one PHMB PHOT tablet, crush and mix to dissolve.
- 3 Take photometer reading immediately.

## Test 6 ☐ pH VALUE

**Range 6.8 - 8.4                      Yellow - Red**

- 1 Fill test tube with sample to the 10 ml mark.
- 2 Add one PHENOL RED tablet, crush and mix to dissolve.
- 3 Take photometer reading.



## Test 7 ALKALINITY (TOTAL ALKALINITY)

**Range 0 - 500 mg/l (ppm)    Yellow - Green - Blue**

- 1 Fill test tube with sample to the 10 ml mark.
- 2 Add one ALKAPHOT tablet, crush and mix thoroughly. Ensure all of the particles have dissolved completely.
- 3 Stand for one minute.
- 4 Take photometer reading.

## Test 8 CALCIUM HARDNESS

**Note – see Test 34 for Calcium Hardness in Salt Water Pools**

**Range 0 - 500 mg/l (ppm)    Violet - Orange**

- 1 Fill test tube with sample to the 10 ml mark.
- 2 Add one CALCICOL No 1 tablet, crush and mix to dissolve.
- 3 Add one CALCICOL No 2 tablet, crush and mix to dissolve.
- 4 Stand for two minutes.
- 5 Take photometer reading.

## Test 9 CYANURIC ACID

**Range 0 - 200 mg/l (ppm)    Clear - Cloudy**

Use this test for chlorine-treated pools stabilised with cyanuric acid or using 'stabilised chlorine' donors. Cyanuric acid is commonly referred to as 'Chlorine Stabiliser' or 'Pool Conditioner'.

- 1 Fill test tube with sample to the 10 ml mark.
- 2 Add one CYANURIC ACID tablet and allow to disintegrate for at least two minutes. A cloudy solution indicates the presence of cyanuric acid.
- 3 Crush any remaining undissolved tablet, mix and then take photometer reading. Use the light cap whilst taking reading.

## Test 10 IRON

**Range 0 - 1.00 mg/l (ppm)    Colourless - Pink**

- 1 Fill test tube with sample to the 10 ml mark.
- 2 Add one IRON LR tablet, crush and mix to dissolve.
- 3 Stand for one minute.
- 4 Take photometer reading.





## Test 11 ☒ FREE COPPER

**Range 0 - 5.00 mg/l (ppm) Colourless - Purple**

Use this test for pools treated by copper/silver ion generators or treated with uncomplexed forms of copper such as copper sulphate.

- 1 Fill test tube with sample to the 10 ml mark.
- 2 Add one COPPERCOL No 1 tablet, crush and mix to dissolve.
- 3 Take photometer reading.

## Test 12 ☒ TOTAL COPPER

**Range 0 - 5.00 mg/l (ppm) Colourless - Purple**

Use this test for pools treated with chelated or complexed forms of copper. Typically these compounds are used as algicides or winterising treatments.

- 1 Fill test tube with sample to the 10 ml mark.
- 2 Add one COPPERCOL No 1 tablet and one COPPERCOL No 2 tablet, crush and mix to dissolve.
- 3 Take photometer reading.

## Test 13 ☒ SALT (HIGH RANGE)

**Range 0 - 10,000 mg/l (ppm) Clear - Cloudy**

This test is used for testing the salt (sodium chloride) content of pools treated by 'salt chlorinators'.

- 1 Take a clean Sample Container (PT 510). Using the Measuring Syringe (PT 361) add 0.5 ml of pool water. Fill to the 100 ml mark with deionised water, cap and mix.
- 2 Fill test tube to the 10 ml mark with solution from the sample container.
- 3 Add one ACIDIFYING CD tablet, crush and mix to dissolve.
- 4 Add one CHLORIDOL tablet, and allow to disintegrate for at least two minutes. A cloudy solution indicates the presence of salt.
- 5 Crush any remaining undissolved tablet, mix and then take photometer reading. Use the light cap whilst taking reading.



## Test 14 ☐ SULPHATE

**Range 0 - 200 mg/l (ppm) Clear - Cloudy**

- 1 Fill test tube with sample to the 10 ml mark.
- 2 Add one SULPHATE TURB tablet, crush and mix to dissolve. A cloudy solution indicates the presence of sulphate.
- 3 Stand for five minutes then mix again.
- 4 Take photometer reading. Use the light cap whilst taking reading.

## Test 15 ☐ CHLORIDE

**Range 0 - 500 mg/l (ppm) Clear - Cloudy**

- 1 Take a clean test tube. Using the Measuring Syringe (PT 361) add 1 ml of pool water. Fill test tube to the 10 ml mark with deionised water.
- 2 Add one ACIDIFYING CD tablet, crush and mix to dissolve.
- 3 Add one CHLORIDOL tablet and allow to disintegrate for at least two minutes. A cloudy solution indicates the presence of chloride.
- 4 Crush any remaining undissolved tablet, mix and then take photometer reading. Use the light cap whilst taking reading.

## Test 16 ☐ TOTAL HARDNESS

**Range 0 - 500 mg/l (ppm) Pale Purple - Purple**

- 1 Fill test tube with sample to the 10 ml mark.
- 2 Add one HARDICOL No 1 tablet, crush and mix to dissolve.
- 3 Add one HARDICOL No 2 tablet, crush and mix. Ensure all particles are dissolved.
- 4 Stand for two minutes
- 5 Take photometer reading.

## Test 17 ☐ ALUMINIUM

**Range 0 - 0.50 mg/l (ppm) Yellow - Pink**

- 1 Fill test tube with sample to the 10 ml mark.
- 2 Add one ALUMINIUM No 1 tablet, crush and mix to dissolve.
- 3 Add one ALUMINIUM No 2 tablet, crush and mix gently to dissolve. Avoid vigorous agitation.
- 4 Stand for five minutes.
- 5 Take photometer reading.



## Test 18 ☐ NITRATE

**Range 0 - 100 mg/l (ppm)    Colourless - Red**

- 1 Take a clean Nitratest Tube (PT 526). Using the Measuring Syringe (PT 361) add 1 ml of sample. Fill the Nitratest Tube to the 20 ml mark with deionised water.
- 2 Add one level spoonful of NITRATEST POWDER and one NITRATEST TABLET. Do not crush the tablet. Replace screw cap and shake tube well for exactly one minute then allow contents to settle.
- 3 Then either -  
Invert tube gently 2 or 3 times and then allow to stand for at least two minutes to ensure complete settlement. Remove screw cap and wipe around top with a clean tissue. Decant clear solution into test tube, filling to the 10 ml mark.  
or  
Using the Palin test Filtration Set (PT 600) filter a portion of the solution through a GF/B filter paper into a test tube filling to the 10 ml mark.
- 4 Add one NITRICOL tablet, crush and mix to dissolve.
- 5 Stand for 10 minutes.
- 6 Take photometer reading.

## Test 19 ☐ AMMONIUM

**Range 0 - 1.00 mg/l (ppm)    Yellow - Green**

- 1 Fill test tube with sample to the 10 ml mark.
- 2 Add one AMMONIA No 1 tablet and one AMMONIA No 2 tablet, crush and mix to dissolve.
- 3 Stand for 10 minutes.
- 4 Take photometer reading.

## Test 20 ☐ PHOSPHATE

**Range 0 - 4.00 mg/l (ppm)    Colourless - Blue**

- 1 Fill test tube with sample to the 10 ml mark.
- 2 Add one PHOSPHATE No 1 tablet, crush and mix to dissolve.
- 3 Add one PHOSPHATE No 2 tablet, crush and mix to dissolve.
- 4 Stand for 10 minutes.
- 5 Take photometer reading.



## Test 21 ☐ MANGANESE

**Range 0 - 0.030 mg/l (ppm) Colourless - Blue**

This test should be carried out at 68°F ± 2°F (20°C ± 1°C).

- 1 Fill test tube with sample to the 10 ml mark.
- 2 Add one MANGANESE No 1 tablet, crush and mix to dissolve.
- 3 Add one MANGANESE No 2 tablet, crush and mix to dissolve.
- 4 Stand for exactly 20 minutes.
- 5 Take photometer reading.

## Test 22 ☐ CHLORINE (HIGH RANGE)

**Range 0 - 250 mg/l (ppm) Colourless - Brown**

Use this test for checking chlorine levels in the event of overdosing of the pool, or in situations where high doses of chlorine are used for disinfecting or cleaning of associated water services.

- 1 Fill test tube with sample to the 10 ml mark.
- 2 Add one ACIDIFYING GP tablet and one CHLORINE HR tablet, crush and mix to dissolve. Allow any undissolved particles to settle.
- 3 Take photometer reading.

## Test 23 ☐ HYDROGEN PEROXIDE (HIGH RANGE)

**Range 0 - 100 mg/l (ppm) Colourless - Brown**

Use this test for checking hydrogen peroxide levels in pools treated with PHMB.

- 1 Fill test tube with sample to the 10 ml mark.
- 2 Add one ACIDIFYING PT tablet and one HYDROGEN PEROXIDE HR tablet, crush and mix to dissolve.
- 3 Take photometer reading.

## Tests 31/32/33 ☐ FREE CHLORINE, MONOCHLORAMINE AND DICHLORAMINE

The photometer has test calibrations for the separation of chlorine residuals into free chlorine, monochloramine and dichloramine. The calculations necessary for calculating the monochloramine and dichloramine results are carried out automatically by the photometer.



## Test 34 ☐ CALCIUM HARDNESS in Salt Water Pools

**Range 0 - 500 mg/l (ppm) Violet - Orange**

- 1 Fill test with sample to the 10 ml mark.
- 2 Add one CALCICOL No 1 tablet, crush and mix to dissolve.
- 3 Add one CALCICOL No 2 tablet, crush and mix to dissolve.
- 4 Stand for two minutes.
- 5 Take photometer reading.

## TDS Test ☐ TOTAL DISSOLVED SOLIDS

**Range 0 - 10,000 mg/l TDS Sensor (Optional Extra)**

The total dissolved solids reading is taken using the TDS Sensor (PT 153/S). This model is specially calibrated for swimming pool water.

- 1 Pour about 20 ml of pool water into the Sample Container (PT 510).
- 2 Remove protective cap from the end of the TDS Sensor. Turn on the sensor.
- 3 Dip the sensor into the water in the container.
- 4 Note the reading on the sensor display. Multiply this result by 100. The result obtained represents the TDS content of the pool water in mg/l (ppm).
- 5 Remove the sensor, rinse probe in clean water. Switch off and replace cap.

## CARE AND MAINTENANCE

Palin test Pooltest kits are designed to give long service and require very little maintenance. The main requirement is to keep the components in a clean condition. Spillages of test solutions should be wiped up immediately with a damp cloth. In addition to routine cleaning, the test tubes and sample containers should be washed periodically in warm soapy water.



# Sandbach School Swimming Pool SOP

## COMPONENT RE-ORDER CODES

PT153/3	TDS Sensor
PT 745	Mains Adaptor
PT 746	Photometer-Computer Cable
PT 297	Lab Work-Tray
PT 361	Measuring Syringe, 1 ml
PT 500	De-Ion Pack Deionised Water Maker
PT 501	Test Tube Rack
PT 502	Crushing/Stirring Rods (Pack of 10)
PT 510	Sample Container, 10/50/100 ml plastic
PT 512	Dilution Tube
PT 595/5	Round Test Tubes, 10 ml glass (Pack of 5)
PT 518	Wash Bottle (for Deionised Water)
PT 525	Workplace Mat
PT 619	Packet Glassware Wipes
PT 663	Test Tube Brush

Palin test<sup>®</sup>, Alkaphot<sup>®</sup>, Calcicol<sup>®</sup>, Chloridol, Coppercol<sup>®</sup>, Hardicol<sup>®</sup>, Nitratest and Nitricol<sup>®</sup> are trademarks of Palin test Ltd.

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V3-02/07



## Appendix 1

### Amateur Swimming Association

### Hazard Identification and Risk Assessment Form

Risk Assessment for

Undertaken by : ..... Date.....  
( Name of person undertaking the assessment )

Identified Hazard	Persons at Risk	Risk Significance			Action required	Date Action taken
		Low	Med	High		
Depth of water						
Competency of swimmer						
Competency of supervisor						
Competency of teachers						
Number in pool at any one time						
Known health issues / disabilities						
Entrance to water						
Exit from water						
Awareness of first aid procedure						
Trained in EAP						

\*should all be taken care of in the main work place / site risk assessment.