

PWTAG Technical Note 45

Re-opening a pool after Covid-19 shutdown

These instructions assume that you have shut your pool in accordance with one of PWTAG's two alternative recommended procedures (PWTAG Technical note no 43). Option 1 was reducing circulation, option 2 stopping circulation.

These instructions should be applied only as part of the re-opening programme advised by the government or public health agency e.g. Public Health England

This procedure is for reopening or commissioning a pool for use following temporary closure due to COVID-19: this technical guidance does not cover how the pool should be operated to ensure users are not at risk from the virus that causes Covid-19. This guidance will be provided shortly as a PWTAG Technical Note.

When reopening your pool and the other water systems in your facility you should first carry out a risk assessment of the process in accordance with the Health and Safety at Work Act and associated legislation.

This guidance presumes that the water services within the building have been fully re-instated as per the recommendations in the links below.

To control the risks on reopening the other building water systems, for example those in the changing room facilities, consult guidance produced by the ESCMID Study Group for Legionella Infections (ESGLI) which is also referred to by the Drinking Water Inspectorate.

https://www.escmid.org/research_projects/study_groups/legionella_infections/

<http://www.dwi.gov.uk/stakeholders/information-letters/2020/Advice%20Letter%20AL02-2020.pdf>

Whilst the risk of transmission of COVID-19 remains, the operating pH for your pool water should be reduced to between 7.0 to 7.4 and ideally maintained between 7.0 to 7.2. The free chlorine concentrations should also be raised to at least 1.5 mg/l and ideally at the top of the recommended range for your pool. These operating ranges may be adjusted in accordance with further guidance from other European Countries and other public health agencies e.g. Public Health England.

If your pool was closed using Option 1, by reducing circulation

This recommended switching off the heating to allow the water and air temperatures to drop to ambient but leaving the plant running with a free chlorine concentration of at least 1.5 mg/l but ideally at the top of the recommended range for your pool and pH 7.0 to 7.4.

How to re-open

- 1 Remove pool cover, if in place.
- 2 Check strainer and clean it.
- 3 Switch circulation pumps to run at 100% duty if they were reduced during shutdown. Reinststate the flow slowly so you don't drive suspended dirt out of the filter media and into the pool.
- 4 After one turnover check the chlorine concentration and pH; if necessary adjust to ensure that the free chlorine is at least 1.5 mg/l and ideally at the top of the recommended range for your pool, and pH 7.0 to 7.4, ideally pH 7.0 to 7.2.
- 5 Reinststate secondary disinfection systems (UV or ozone) and PAC flocculent dosing (checking the dosing line of the latter is not blocked).
- 6 Clean and disinfect the level deck grilles, scum channels and skimmers together with pool surround and all pool equipment in accordance with the COVID-19 cleaning recommendations (see PWTAG Technical Note no. 44).
- 7 Check the pool bottom and sides are clean and free from dirt, algae and evidence of biofilm slime; vacuum and brush as necessary.
- 8 Backwash all filters sequentially and replace the volume of fresh water discharged with mains or stored water makeup.
- 9 At this stage gradually start to reheat the pool water and air. The air handling system must be fully operational with the air temperature maintained above the water temperature and humidity controlled to 55-65% before starting to heat the pool water. The pool heating must be at a rate of no more than 1 degree C per 4 hours. The air handling system should be set to operate on 100% fresh air and with no recirculation.
- 10 Once the pool water has reached temperature, a microbiological sample should be taken from the pool, at the same time as checking the clarity and undertaking tests for free and combined chlorine, pH and total dissolved solids. The results should of course be satisfactory before re-opening to the public – i.e. free chlorine at least 1.5 mg/l, combined chlorine less than 1 mg/l and as near zero as possible, and pH 7.0 to 7.4, ideally at the lower end of this range and a microbiological quality of:
Aerobic Colony Counts 24hrs @ 37 deg C, Total Coliforms and *E.coli* 0 cfu/100ml and *Pseudomonas aeruginosa* 0 cfu/100ml

If you pool was closed using Option 2, stopping circulation

This recommended switching off the plant and dosing the pool to 20 mg/l free chlorine.

How to re-open

Equipment required: Pool water testing equipment including a dilution pot (may also be known as a shaker tube) and a method for dilution testing of free chlorine, thermometer, sodium thiosulphate pentahydrate (hereinafter referred to as sodium thiosulphate). You will also need to know the capacity of the pool in cubic metres. This can be calculated using the capacity calculator on the PWTAG website.

- 1** Remove pool cover if in place.
- 2** Check the chlorine level. Your free chlorine concentration is likely to be high, so a dilution test may well be needed to get an accurate free chlorine reading. The methodology is detailed at the end of this technical note. The target free chlorine concentration should be at least 1.5 mg/l but it is probably going to be much higher than usual or necessary at pH 7.0 to 7.4.
- 3** Turn on the pool circulation pump, reinstate flocculent dosing (checking the dosing line is not blocked) and any UV or ozone plant. Allow these to run for six pool turnovers.
- 4** Clean and disinfect the level deck grilles, scum channels and skimmers together with pool surround and all pool equipment in accordance with the COVID-19 cleaning recommendations (see PWTAG Technical Note no. 44).
- 5** Check the pool bottom and sides are clean and free from dirt, algae and evidence of biofilm slime; vacuum and brush as necessary.
- 6** Backwash all filters sequentially and replace the volume of fresh water discharged with mains or stored water makeup.
- 7** Allow the pool to circulate for one further turnover and undertake free chlorine and pH tests. Your free chlorine concentration is likely to be high, so a dilution test may well be needed to get an accurate free chlorine reading. The methodology is detailed at the end of this technical note.
- 8** Having established your free chlorine concentration, calculate the amount of sodium thiosulphate you need to add to the pool to lower the free chlorine concentration to around 2 mg/l (if it is only slightly above 2 mg/l you may consider water replacement an easier option):
 - 5 g of sodium thiosulphate in 1 cubic metre of water removes 1 mg/l free chlorine
 - so if your pool has a capacity of 425 cubic metres and your free chlorine concentration is 20 mg/l, you need to remove 18 mg/l free chlorine
 - 5 x 425 g removes 1 mg/l free chlorine
 - 5 x 425 x 18g removes 18 mg/l free chlorine
 - therefore 38.25 kg of sodium thiosulphate would be required.
- 9** The sodium thiosulphate should be added gradually in stages by sequentially dissolving 2 kg in a 9-litre bucket of warm water and spreading evenly in the pool water. This may be most easily achieved by adding to the level deck return or the strainer basket. You may wish to check the free chlorine concentration halfway through this process to avoid over dosing, but you should do so only after fully circulating for one turnover after addition of the sodium thiosulphate.
- 10** The pool should be left to circulate, allowing the chemical to react for a further turnover before re-testing. At this stage gradually start to heat the pool water and air. The pool heating must be at a rate of no more than 1 degree C per 4 hours. The air handling system must be fully operational, with the air temperature maintained above the water temperature and humidity controlled to 55-65% before starting to heat the pool water. The air handling system should be set to operate on 100% fresh air.
- 11** If too much sodium thiosulphate has been added then you may find there is no chlorine reading until sufficient chlorine has been added to neutralise the excess.
- 12** With the chlorine residual now restored, the auto controller and chemical dosing systems (acid, chlorine/bromine, UV and ozone) should be switched on. The pH should then be adjusted to 7.0 to 7.4 and ideally maintained at the lower end of this range.
- 13** Once the pool water has reached temperature, a microbiological sample should be taken from the pool, at the same time as checking the clarity and undertaking tests for free and combined

chlorine, pH and total dissolved solids. The results should of course be satisfactory before re-opening to the public – i.e. free chlorine is at least 1.5 mg/l and ideally at the top of the recommended range for your pool, combined chlorine less than 1 mg/l and as near zero as possible and pH 7.0 to 7.4 and a microbiological quality of:

Aerobic Colony Counts 24hrs @ 37 deg C, Total Coliforms and *E.coli* 0 cfu/100ml and *Pseudomonas aeruginosa* 0 cfu/100ml

How to do a dilution test to test high-range free chlorine

- 1 Take a sample of pool water from a representative point in the pool. Pour a portion of swimming pool water sample taken up to the 10ml mark of the dilution pot.
- 2 Add deionised or distilled water to the dilution pot, diluting the swimming pool water up to the 100 ml mark, replace the lid on the container and shake well. This gives you a ten times dilution of the pool water. This dilution is based on there being 10-30 mg/l free chlorine in your pool. If the diluted sample gives a reading of less than 1 mg/l before multiplication by the dilution factor then a smaller dilution – e.g. 1:5 (20 ml to 100 ml) – should be made.
- 3 Using the diluted sample in your pot undertake a free chlorine test. If a pink colour is produced that now gives a reading between 1.0 and 3.0 mg/l, multiply this reading by 10 to obtain the actual free chlorine concentration of the pool water.
- 4 If a strong pink colour is still produced (i.e. greater than 3 mg/l), it will be necessary to carry out further dilutions with distilled/deionised water until a suitable reading (1-3 mg/l) is obtained using the diluted solution. This is because possible partial bleaching of the test at higher free chlorine concentrations can give falsely low results. This recommended range is to ensure that this does not happen, and you obtain a true result.
- 5 To calculate the free chlorine concentration of the pool water when dilution has been necessary, use the following formula:

Comparator/photometer reading	=	A
Dilution necessary	=	B
The free chlorine	=	A x B mg/l

If you have no deionised or distilled water, first test your mains water supply for free chlorine. If you get a result of 0 mg/l then mains water can be used for dilution.