



- *ISPE Workshops at SPATEX 2018*
- *Entrapment*
- *Under Wraps...  
The New PWTAG Book*



Here's Emma helping to build a pool in central London.

There's a lot that goes into a pool. It might have a Duratech heat pump, Triogen UV water treatment and LED lighting. Perhaps a couple of short neck skimmers and all the pipe and fittings.

But before any of that gets built into the pool it has to get delivered to the job.

And this means that Emma, our Office Manager, and her team have to get the right documents attached to it, from order number to delivery note to invoice.

We know that you take pride in the work that you do and you'll be glad to know that Emma does too. It's safe to say that when you're building a pool, she's a good person to have on your team.

Call us on 01271 378 100 and we can get Emma working for you.

 Golden Coast

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### NOTICE TO ALL READERS

Articles and advice in the ISPE Magazine are for guidance only. Further professional advice should always be sought before acting upon, or refraining from acting upon, a course of action. Health & Safety is of paramount importance and the correct PPE (personal protective equipment) should always be utilised before undertaking any job.

**If in doubt, ASK!**

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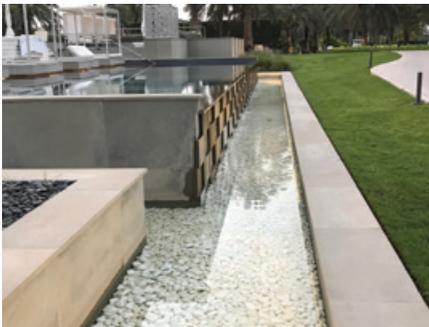


## Front Cover Picture

**Project: The Ritz Carlton Hotel  
and Spa, Bahrain  
Pool: Infinity Swimming Pool**



As part of a larger resort development including a 1350m<sup>2</sup> main swimming pool, 2 No. Jacuzzis and 4 No. water features; the infinity pool was designed as a relaxation space for hotel guests, overlooking the Arabian Gulf.



The pool incorporates a shallow bathing area for users to enjoy as well as various architectural features including Pietra Serena stone details to the infinity wall, a lower feature water body and hidden LED striplights to add to the ambience.



The plant equipment utilises a 42m<sup>3</sup>/h sand filter with 3 No. circulation pumps (2 No. 50% duty, 1 No. standby) providing a sub 4-hour turnover, and due to the extreme summer temperatures of the Middle East, we incorporated a plate heat exchanger connected to a primary chilled water supply, allowing bathers to comfortably use the pool during the hottest months.

As part of the lighting scheme we incorporated an end-omitting fibre optic array to the base of the pool to achieve a starry sky effect.

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(Also see Company Profile on page 30)

## Editorial

The Autumn is now upon us and the torrential rain and high winds of the Summer are now behind us. What is there to look forward to? Quite a lot actually. Traditionally, the Autumn is the start of the industry post-Summer educational and training activities, and we look forward to seeing lots of our members (and non-members too!) at our two forthcoming One-Day Seminars, the first on 12<sup>th</sup> October in Hertfordshire, all about water problems and water treatment, together with the 2017 AGM and Awards, followed soon after by the next one, this time in Clevedon, North Somerset, on 23<sup>rd</sup> November, looking at the new PWTAG book (hopefully) - see page 21. Programmes are sent to all paid-up ISPE members about six weeks prior to each seminar and are available to download from the ISPE website, [www.ispe.co.uk](http://www.ispe.co.uk) under Diary Dates.

Also during the Autumn, we hope to publicise details of all the industry free half- and full-day training sessions, as part of the ISPE's CPD Scheme. More information is on the ISPE website, but contact us now for your free CPD folder and Individual Activity Record Sheet.

Details of the ISPE Filtration Workshop are on page 28 of this issue, so don't miss the opportunity to book your place.

We also have four pages devoted to SPATEX 2018, starting on page 4 and you can see the (almost complete) ISPE Workshop Programme too - definitely do not miss this!

With company profiles, a theme of articles on entrapment and help for those thinking about sitting the 2018 ISPE Exams (page 16), plus much more, I hope all our readers can find something of interest.

Keep busy!

**Ross Alcock, September 2017.**

Innovative, professional pool dosing systems manufactured in the UK

The advertisement features a blue header with the text "Innovative, professional pool dosing systems manufactured in the UK". Below this, on the left, is a white Pellet+Pro Motive pool chlorinator system with a label that includes "Pellet+Pro Motive POOL CHLORINATOR SYSTEM" and "IMPORTANT" instructions. In the center is the Gaffey logo, a blue circle with a white stylized 'G', and the text "GAFFEY technical services Ltd". To the right of the logo are the website addresses "hyprolyser.com", "desoclenz.co.uk", and "gaffey.co.uk". On the far right is a white Hyprolyser dosing cabinet with a glass door showing internal components and a label that reads "Hyprolyser".

# SPATEX 2018

## Think you know all there is to know about SPATEX?

Think again! You may have been and got the T-shirt but each year there is something new to see at the UK's only dedicated water leisure Exhibition, both in terms of the stunning array of new products and the informative double workshop/seminar programme.

With just six months to go before the curtain rises on SPATEX 2018, the SPATEX team, with the help of ISPE, are busy gearing up for the 22<sup>nd</sup> edition and they promise to make it a show-stopping experience both for those familiar and those new to the Show.



### It's all about NEW!

Here's six reasons why you should make a diary date with SPATEX 2018 when it returns to Coventry's Ricoh Arena, Tuesday January 30<sup>th</sup> to Thursday February 1<sup>st</sup> 2018.

**1. Hands-on learning** - Thanks to ISPE and its highly regarded Workshop programme, SPATEX is a major facilitator of free learning in the Industry. ISPE will once again be providing an extensive and varied programme of workshops on all three days of the Show.

There are at least 16 new Workshop topics for 2018, together with some new speakers. A broad cross-section of subjects includes many aspects of the pool and spa trade, both domestic and commercial. Whether your interest is heat pumps, filters, tiling, control panels, or water treatment, there is something for everyone. The (almost complete) programme is on pages 6 & 7 of this issue so plan your trip to SPATEX 2018 to take advantage of the free expertise on offer during all three days of the show.

**2. Get accreditation** - All the ISPE Workshops offer one CPD point and an attendance certificate (supplied after the show from SPATEX) to those who like to keep a formal record of their training. Ask the ISPE for further details about its CPD scheme.

**3. Extend your skill set** - In addition to the ISPE workshops, SPATEX will once again be offering a parallel programme of seminars on topics

such as the most successful ways of marketing your company; commercial pool safety; specialist pools such as those for animal hydrotherapy, natural swimming ponds plus much more. The Pool Water Treatment Advisory Group (PWTAG) will also be holding a day of special seminars on water treatment on Thursday February 1<sup>st</sup>.

**4. Be the first to see 2018's new products** - Exhibition space has been selling like hotcakes so we are confident of well over 100 Exhibitors, from home and abroad. It's the ideal hunting ground to source new products and innovations. Every sector from the world of wet leisure will be represented, from wet and dry safety flooring, new spas, saunas, water play features, pool enclosures to energy saving chemical control and heating and ventilation units. You can be sure to find what you are looking for, whether it is for commercial or domestic use. New ways to save energy is a topic high on the agenda and there will be lots of new launches promising just that! Take advantage of special show discounts and offers. Not sure where to start or got a technical query? Come to the **SPATEX Welcome Desk** so we can point you in the right direction.

**5. Meet the experts** - SPATEX is the meeting place for the Industry's experts so if you have a project query or plan you'd like to talk through, then this is the place to be. With associations such as ISPE, SPATA (Swimming Pool & Allied Trades Association), BISHTA (British Irish Spa & Hot Tub Association) and PWTAG (Pool Water Treatment Advisory Group) out in force you can be assured you're getting the best advice the Industry has to offer.

**6. Make new contacts** - On the evening of Tuesday January 30<sup>th</sup> BISHTA and SPATA will be hosting a gala dinner in the Ricoh Arena for the British Pool & Hot Tub Awards (T: 01264 356210/1 to book tickets). Also, when the Exhibition closes for the day on the Wednesday at 5pm, all visitors and exhibitors are welcome in the Ricoh Arena's Clubhouse bar (conveniently situated just seconds away from the Ericsson Exhibition Hall) for a themed networking event including free drinks, nibbles, music and a lot of fun. With networking events, and of course the Ricoh Arena's G Casino (the UK's largest), there is plenty to justify a night away. For some excellent accommodation deals go to [www.spatex.co.uk](http://www.spatex.co.uk) for hotels in the vicinity.

Visitor registration is FREE – go to [www.spatex.co.uk](http://www.spatex.co.uk)  
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**PROGRAMME OF WORKSHOPS AND DEMONSTRATIONS**

*Organised by the ISPE on behalf of SPATEX Ltd.*

**ERICSSON EXHIBITION HALL, RICOH ARENA, COVENTRY**

**Tuesday 30<sup>th</sup> January - Thursday 1<sup>st</sup> February 2018**

Ref.	Subject Presentations	Tue. 30 <sup>th</sup> Jan.	Wed. 31 <sup>st</sup> Jan.	Thur. 1 <sup>st</sup> Feb.
1.	<i>To be revealed soon.</i> <a href="#">(20 minute session.)</a>	<b>10.00-10.20</b>		
2. <b>NEW</b>	<b>SWIMMING POOL LINERS</b> Minimising problems by managing customer expectations. Dan Thatcher, MISPE and Bradley Armstrong - Aquaflex <a href="#">(20 minute session)</a>	<b>10.30-10.50</b>		
3. <b>NEW</b>	<b>POOL AND SPA CONTROL PANEL TECHNOLOGY</b> Think beyond the box! Andy James, MISPE - Golden Coast <a href="#">(20 minute session)</a>	<b>11.00-11.20</b>		
4. <b>NEW</b>	<b>HEAT EXCHANGERS</b> Best practice for selection, installation, operation & maintenance. Tony Carter - Bowman <a href="#">(20 minute session)</a>	<b>11.30-11.50</b>		
5. <b>NEW</b>	<b>THE INCREASING SIGNIFICANCE AND ROLE OF UV IN THE MANAGEMENT OF SWIMMING POOL WATERS</b> The increasingly common use of UV in swimming pools has led to updated guidelines in the PWTAG "Red Book" to ensure the application is effective and to maximise the benefits of this technology. The background and principles behind these guidelines will be presented and discussed. Craig Young - Suez Water UK <a href="#">(30 minute session)</a>	<b>12.15-12.45</b>		
6. <b>NEW</b>	<b>A TYPICAL DOMESTIC POOL FILTER - STRIP DOWN &amp; REBUILD</b> A "hands on" demonstration detailing what would normally be involved when stripping down and rebuilding a domestic pool filter and the likely problems one might encounter. Chris Carr, FISPE - C.C. Filtration Services and Phil Barlow, MISPE - Philip Barlow Swimming Pools <a href="#">(45 minute session)</a>	<b>1.00-1.45</b>		
7. <b>NEW</b>	<b>FILTRATION</b> Just how important is a filter? Jimmy Lamb, TnISPE(Cert.) - Pollet Pool Group <a href="#">(30 minute session)</a>	<b>2.00-2.30</b>		
8. <b>NEW</b>	<b>AN INTRODUCTION TO THE BIOCIDAL PRODUCTS REGULATION (BPR)</b> The impact on European companies who manufacture, sell or distribute pool treatment products. Joanna Ganatsiou, BSc PhD - Lonza <a href="#">(30 minute session)</a>	<b>2.45-3.15</b>		
9. <b>NEW</b>	<b>LEGIONELLA RISKS WITHIN SWIMMING POOLS AND SPAS</b> Are swimming pools a risk for Legionella? We will review what increases a pool's Legionella risks and following the introduction of 'HSG282 Control of Legionella and other infectious Agents in Spa Pool Systems', we will discuss the realities of Spa Pool Legionella Risk Assessments, and how we can meet our obligations. Robert Byrne - Brio Group <a href="#">(30 minute session)</a>	<b>3.30-4.00</b>		

Ref.	Subject Presentations	Tue. 30 <sup>th</sup> Jan.	Wed. 31 <sup>st</sup> Jan.	Thur. 1 <sup>st</sup> Feb.
10.	<i>To be revealed soon.</i>  (30 minute session)		10.15-10.45	
11. NEW	<b>PUMP INVERTER TECHNOLOGY</b> How to fit a larger pump and still save money. Will Dando, FISPE - Plastica Ltd. (20 minute session)		11.00-11.20	
12. NEW	<b>HOT TUB &amp; SPA HEATING</b> A new approach for faster heat up and lower energy costs. Tony Carter - Bowman (20 minute session)		11.30-11.50	
13. NEW	<b>HSG282</b> What you & your spa customers need to know. Martin Rigby - Complete Pool Controls (30 minute session)		12.30-1.00	
14. NEW	<b>AN OVERVIEW OF WATER TESTING THROUGH THE YEARS</b> From humble beginnings to sophisticated technology including a reminder of what needs to be tested. Colin Day, FISPE - Lovibond Tintometer (30 minute session)		1.15-1.45	
15. NEW	<b>PLUNGE POOL CHILLERS</b> A beginners' guide to selecting, sizing and installing plunge pool chillers. Graham Kneale, FISPE and Michael Coyle, TrISPE(Cert.) - Certikin Int. (30 minute session)		2.00-2.30	
16. NEW	<b>SWIMMING POOL PIPEWORK - FILTRATION &amp; BACKWASH VELOCITIES</b> A closer look at what the objectives are when complying with the current Standards and the effect on different types of media available for swimming pool filtration. Chris Carr, FISPE - C.C. Filtration Services (20 minute session)		2.45-3.05	
17.	<b>OH NO! WHAT DO I DO WHEN THINGS GO WRONG?</b> How do I safely add chemicals if my controller packs up? At what levels should we close pools & spas? Why do we need to continuously floc? Why do I need to test every two hours in a spa? Why do I need to revalidate my qualification every three years? Allen Wilson, FISPE - Studies in Work (45 minute session)		3.30-4.15	

Ref.	Subject Presentations	Tue. 30 <sup>th</sup> Jan.	Wed. 31 <sup>st</sup> Jan.	Thur. 1 <sup>st</sup> Feb.
18.	<i>To be revealed soon.</i>  (30 minute session)			10.00-10.30
19.	<b>WHY WE MUST REGULARLY MICROBIOLOGICALLY TEST</b> How do we comply with the legal requirements of HASAW, COSHH and best guidance? What are TVCs, Coliforms and Pseudomonas? When should we close and how to prevent bad readings? Allen Wilson, FISPE - Studies in Work (30 minute session)			11.00-11.30
20. NEW	<b>CREATING A LOW HAZARD PLANT ROOM</b> Intended for the commercial/ public pool sector, this presentation will focus on the important health & safety, operational and pool water chemistry issues to consider when choosing between the various disinfection and pH correction methods available. Andrew Gaffey - Gaffey Technical Services (30 minute session)			12.15-12.45
21. NEW	<b>TILING IN SWIMMING POOLS</b> Ensuring that the correct waterproofing, adhesive and grout choices are made to ensure a quality long-lasting tiling installation. Adam Willmott - Ardex (30 minute session)			1.00-1.30
22.	<i>To be revealed soon.</i>  (30 minute session)			2.00-2.30

# Whose Responsibility is it to Eradicate Entrapment Risks?

The pool industry? Yes, but it's not as straightforward as putting all the responsibility on the pool sector. There are many players involved in the provision of pools and spas at holiday destinations across the world who also need to embrace this safety challenge, but most do not acknowledge the risk. Internationally, there are hundreds of thousands of pools and spas in hotels, rented villas, holiday camps and water parks, and many owners, operators and managers of these facilities remain oblivious to the risk of entrapment, particularly the dangers in older pools and spas that may not meet modern safety standards.

## What is Entrapment?

Entrapment occurs when a part of the body (stomach, bottom, arm, leg, hair, etc.) becomes trapped in the powerful suction of a pool or spa. Even if it were appropriate to put the onus on the bather to be vigilant, they cannot do so. Entrapment is an invisible threat and cannot be avoided by a bather in a danger zone. The suction happens very quickly, completely 'out of the blue'. Studies have shown that it can take 225kg of weight to release an object trapped on a single drain; imagine a human being trapped. Such incidents can result in drowning or terrible physical harm such as disembowelment.



## Where is the Risk?

While new pools in the UK operate to stringent safety standards, there are concerns that long established pools abroad and at home still harbour entrapment risks. There is an escalating number of media stories about victims who have been trapped by ferocious suction and could not be released because the pool or spa did not have an emergency vacuum release system. These stories highlight that children are most susceptible to becoming trapped, seriously maimed, drowned whilst held under water, or to later die from the effects of their injuries.





- On holiday in Lanzarote, 6-year-old Darcy's hair was sucked into the filter that operated the waterfall in the hotel pool – she was trapped for 2 minutes during which time her hair was torn from her scalp
- 5-year-old Sam nearly died after being sucked into a hot tub's underwater drain while on a family holiday
- 6-year-old Abigail lost 2 inches of her rectum and much of her small intestine when she sat on an open drain in a wading pool
- 4-year-old Isabella was sucked into the mechanism of a hot tub at a holiday hotel

### Regulations in the UK

UK regulatory standards (BS EN 15288 and SPATA) ensure that all new pools are equipped with two main drains, as this reduces the demands that circulating water places on a single drain. This means drains or other 'suction points' can accommodate 100% of the flow rate of water if the other fails. It is also recommended that pool operators install a failsafe system; a vacuum alert system, which responds instantaneously to any uptick in pump suction by opening the pipe to atmosphere, freeing a trapped person.

### Industry Health & Safety Guidelines

The PWTAG provides guidelines on entrapment safety to ensure the highest level of protection for bathers:

Inlets and outlets, grilles and covers should be designed in accordance with BS EN 13451-3. They should be inspected visually every day, and once a month they should

be subjected to closer examination for obstruction, impact damage and vandalism and make sure that they are correctly in place. If they are damaged or missing, swimming should be suspended immediately.

- **Inlets:** in water less than 800mm in depth and in sensitive areas (steps, teaching points, beside base inlets, etc.) the velocity of the water entering the pool should not exceed 0.5m/sec. In other areas, the velocity of the water entering the pool should not exceed 2.0m/sec.
- **Outlets** can cause entrapment and therefore have the capacity for serious harm. PWTAG guidance is that all pools should be tested to show that outlets comply with BS EN 13451-3. Newly completed pools should have this certification when built. Where this is not the case, pool outlets should be tested by a competent authority to show that they comply. Outlets should also be tested for hair entrapment.
- Pool outlets should be designed and installed so as to reduce the potential for entrapment of the user. As a general requirement, water speed through the outlet grilles should be  $\leq 0.5\text{m/sec}$ .
- Grilles in outlets and inlets should comply with the requirements of BS EN 13451-1 and have gaps no greater than 8mm to prevent entrapment hazards.
- All wall and floor outlets should be fitted with a sump to a design that accords with BS EN 13451-3.

## Where there is more than one outlet

Outlet systems should be designed in such a way that:

- There are at least two functioning suction outlets per suction line
- The distance between the nearest points of the perimeters of the devices is  $\geq 2m$
- If any one of the suction outlets become blocked, the flow through the remaining suction outlet/s shall accommodate 100% of the flow rate
- It is not possible to isolate one of the outlet sump suction lines by means of a valve

## One Outlet

In pools with only one outlet, the grille should be designed in such a way that:

- It cannot be blocked
- One user cannot cover more than 50% the opening
- Raised grilles can be domed opposite to the flow direction, with prevalent peripheral suction; the height of the dome shall be at least 10% of the main dimension (diameter)
- Single grilles should have a grille area of  $\geq 1m^2$

## The Tourism Industry Can Reduce Risk

There are hundreds of thousands of long-established pools in holiday accommodation across the world, pools that are likely to have a single main drain. While operators of holiday accommodation may not wish to close lucrative facilities for upgrading, doing nothing puts people's lives at risk and is unjustifiable especially given that an anti-entrapment device such as the MSI Vac-Alert would provide an added safety precaution.

The travel industry has a duty to ensure clients are protected from entrapment. To achieve this pools and spas need to be regularly inspected and should undergo specific entrapment risk assessments to ensure their safety. Tour operators can play a key role in eliminating entrapment by requiring hotels to submit regular pool/spa safety check reports. Greater acceptance of the problem will lead to preventative action that will save lives.

**With thanks to Althea Taylor-Salmon**



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## BUSINESS CARDS

I remember one of our esteemed Members many years ago recounting the story that the furniture in their re-fitted office cost £50,000 or some such astronomical figure.

Not so in the ISPE office, where the make-do-and-mend, mantra or in most cases, just get over it, has seen me through, over 28 years of service.

I will add at this point that the furniture doesn't actually belong to the Institute and much of it has been handed down from Molly's original office back in the early 1980s.

Recently, I had to, reluctantly, remove and dispose of an old side desk which has happily with its twin, supported a piece of worktop (a good worktop run is handy for collating, etc.) for about thirty five years, in a number of different "ISPE" offices. It had a single drawer which had ceased to satisfactorily carry out its function (I know how it feels!) and had partly collapsed (ditto!).

Needless to say, on actually coming to break the unit up, it showed a steely resistance to the large axe I tickled it with!

On removing the large box of pens, pencils and other bits of assorted stationery, including bulldog clips of various sizes, a four inch nail (always handy!) and a few paperclips, long since unfolded but kept for emergencies, there were three business cards 'sellotaped' to the bottom of the drawer and, as such, hidden for many years.



*From the top: John Wilkins, John Lamb and Ron Stempfer*

The memories came flooding back to me. This had been my original work station desk, allotted to me when I started work for ISPE as Molly's part-time assistant in 1988. In those days I took the odd 'phone call (I still take odd 'phone calls now, sometimes!) and I quickly realised that these three fine gentlemen were regular points of call for technical issues (and John Wilkins was the Founder President of the Institute, but sadly passed away in 2012). I therefore taped the business cards into the desk draw for handy and regular reference. Note the old style telephone numbers, and the fact that I had added '081' to Ron's number. Happy days!

**Ross Alcock August, 2017.**

# Product Profile

## Tap away to an improved Delta control panel

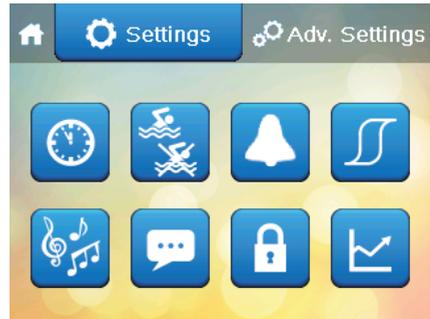
Featuring a streamlined user interface, the control system on the popular Calorex Delta has undergone some major improvements, making this swimming pool environmental control unit even more user friendly.

Calorex Deltas provide the ultimate environmental control system with a comprehensive range to suit pools of every size. These systems are specifically designed to economically provide the environmental comfort and moisture related structural protection necessary for a pool.

The popularity of the Delta continues to grow, with the touchscreen control panel giving Calorex customers a more flexible approach to system management that allows various functions of the unit to be controlled more closely, and many standard features that were previously optional extras.

But now Calorex have made some further enhancements to its controls, which gives customers some further upgrades such as sleeker graphics, BACnet connectivity for BMS and an

additional sensor for improved LPHW frost protection in cold climates.



As standard, the Calorex Delta has screen mirroring capabilities to Android and iOS mobile devices using a third-party app, and to a web browser with ActiveX, while Modbus and BACnet connectivity offer extensive options for BMS interfacing.

In addition to the redesigned user interface, one of the major improvements with these upgrades is the additional sensor to improve frost protection. The extra sensor measures LPHW temperature leaving the Delta, and combined with the fresh air temperature sensor, provides accurate frost protection in cold conditions.



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“We believe that these upgrades are an important addition to customer



experience and demonstrates Calorex’s continued commitment to remain the flag bearing manufacturer

of purpose designed swimming pool environmental control systems,” said Lee Austin, Head of UK Operations and Group Engineering at Calorex.

The upgraded control system is now available with all new Delta machines. For further information on the Delta machines, visit the ‘Product’ section of the Calorex website at calorex.com

For more information on Calorex’s comprehensive range of high performance units, contact Calorex on 01621 856611 or email sales@calorex.com or visit www.calorex.com

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# The ISPE Student Examinations 2018

## When, What and How to Pass

It is not that long to go now before some of our student members will be sitting their ISPE exams and many will be wondering what they need to do to obtain the marks needed to pass. In the last issue of the ISPE Magazine we included some model answers to the 2017 ISPE Filtration exam and in this issue we look at some sample answers to the Chemicals section, and some actual model answers for both the Heating paper of 2017 and a previous Construction paper.

The Student exams will be held at Bourne End, near Hemel Hempstead, Hertfordshire on Monday 19th March and all paid-up students will receive a letter with booking form in mid-February. Bookings must be made via the booking form before Monday 5th March so please contact us before that day if you have not received your exams letter. Bear in mind that students do not have to sit the exams in any particular year and those who do not feel ready to sit all four subjects can simply ignore the letter and wait until next year or beyond. Those looking to re-sit papers may respond to the exams letter, too, to book their place.

### Hints and Tips on how to Pass the Chemicals Paper

The following just gives a few hints and tips to make the exam easier, looks at a couple of example questions and the kind of detail we are looking for when answering these. Remember all the answers can be found in the

training manual.

There are 45 minutes allowed to complete the exam, which is divided into two sections.

Section A consists of five short questions and ALL of these have to be answered. You should allow 15 minutes to complete this section and your answers should be concise and accurate. There are 30 marks available for section A so a maximum of six for each question. As with all exams take time to read the question to make sure the answers you are giving are relevant to the question being asked.

Example Chemicals questions:

Question 1

- State an acceptable pH range for swimming pool water
- Name one chemical you might use to raise the pH of a swimming pool
- Name one chemical you might use to lower the pH of a swimming pool

Answers:

- 7.2 – 7.8 (ideally 7.4 – 7.6)
- Sodium carbonate
- Hydrochloric acid

Question 2

What is meant by the term 'free chlorine residual'? State how it should be measured.

Answer:

Free chlorine is the chlorine available within the water to be used for disinfection. Measurement should be carried out using a DPD No1 tablet and relevant measuring system.

Section B – In section B, you have a choice of two out of three questions and should allow 30 minutes to answer these (15 minutes per question). Each question has 35 marks available and therefore it is expected that the answers are longer and more detail is included. The hint here is to include as much information as possible, give the answers some structure and flow and remember to read back your answer just to make sure you have not missed anything. Again, read the question carefully to make sure your answer is relevant. If you think, you have some information that is important then write it down!

Example questions:

Explain the factors that influence corrosion and scale formation in swimming pools. What is balanced water and how is balanced water achieved?

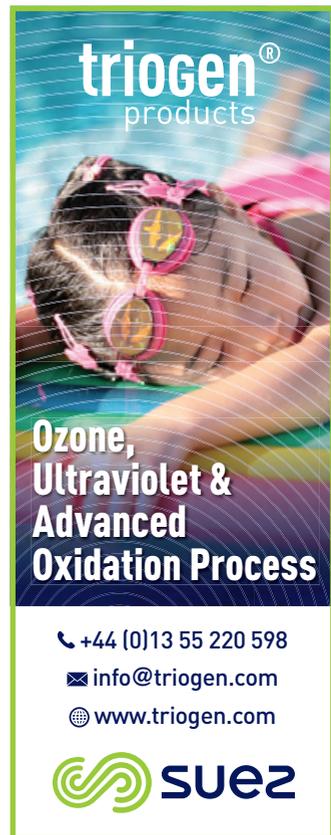
What your answer could include:

- A brief explanation of corrosion and scale formation and the problems these can cause in the pool and plant room;
- Discussion on the factors effecting it, i.e. pH, total alkalinity, calcium hardness, TDS and temperature and what happens if the levels are high / low;
- An explanation of balanced water and how it is calculated – maybe mention the balanced water / Langelier Index with details of readings and what they mean if you know them;
- If time allows, the corrective action you can take, for example, what you could add to raise alkalinity.

As has been stated, if you have

the information then write it down. All the above was included in an answer in a previous exam and this achieved the maximum mark of 35 so well on the way to passing the whole exam on one question!

Finally, just a bit of housekeeping. Although you will not be marked down for bad spelling or writing please try and make everything as legible and clear as possible – if examiners are unable to read things they may miss some of the key points and therefore you will miss out on marks. Also, make sure you add the number of the question you are answering.



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If you have the chance to attend one of the ISPE Back to Basics Revision Seminars, which go through the various exams with the aim of helping you pass I would recommend you go along – they're normally free!

**Model Answers to Section A questions of the 2017 ISPE Heating exam paper**

Q1 – What is the term “Coefficient of Performance” (COP) used to describe?

Answer: It is used to describe the efficiency of a heat pump. It is a comparison of the electrical consumption and the energy output of the heat pump.

Heat Output of Heat Pump divided by the Electrical Consumption (kW expressed as a number.

E.g.  $16.6 \text{ (kW)} \div 3.5 \text{ (kW)} = 4.7$  (to one decimal place)

The COP is 4.7.

Q2 – What is the approximate metric equivalent of 60,000btu/hr:

a) 176 kW , b) 20.5 kW, c) 17.6 kW? Show your workings.

Answer: There are 3412 btu/hr equivalent to 1kW, so:  $60,000 \div 3412 = 17.58 \text{ kW}$  or 17.6 kW, to one decimal place.

So the answer is (c) above.

Q3 – A rectangular pool measures 8.5m x 4.5m with a sloping floor 1m to 2m. Calculate the pool's capacity in litres.

Answer: Surface area of the pool is  $8.5\text{m} \times 4.5\text{m} = 38.25 \text{ m}^2$

Average depth of the pool is  $(1\text{m} + 2\text{m}) \div 2 = 1.5 \text{ m}$

Volume of pool is the surface area x average depth =  $38.25\text{m}^2 \times 1.5\text{m} = 57.375 \text{ m}^3$

(use your calculator)

Now,  $1\text{m}^3$  is the equivalent of 1000 litres of water. So,  $57.375 \text{ m}^3$  is the equivalent of  $57.375\text{m}^3 \times 1000 \text{ litres} = 57,375 \text{ litres}$ , and the capacity of the pool is 57,375 litres.

Q4 – Define the term ‘BTU’.

Answer: ‘BTU’ stands for ‘British Thermal Unit’ and it represents the quantity of heat (energy) needed to raise one pound of water by one degree Fahrenheit.

Q5 – List the four main ways that heat is lost from a swimming pool.

Answer: There are a number a factors that contribute to heat loss but so long as your answer includes the following four your answer will be correct: Evaporation/ Convection/ Radiation/ Conduction. Other loses include; Leaks/ Excessive Backwashing / Excessive Bather Use.

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## Typical Construction Section A questions with model answers.

Explain briefly how heavy clay can affect a pool shell.

Answer: Heavy clay can expand and contract when wet and dry and impose forces which would make the normal block construction method unsuitable unless proper care was taken and the backfill material was chosen to allow for possible movement (e.g. 10mm shingle).

From what two raw materials are liners made?

Answer: Polyvinyl-chloride liner material is made from 43% crude oil and 57% common salt.

Explain what a beaded liner is?

Answer: Normally tailored liners are

provided with a beaded top edge to fit a liner lock tracking. The bead is extruded PVC and is High Frequency Radio welded to the top of the liner side wall.

With particular emphasis on water retention, what is the main difference between a concrete pool and a liner pool?

Answer: The main difference between the water retention quality of a concrete pool is that a concrete pool has to be rendered and screeded internally with waterproof render/screed over all internal surfaces, while a liner pool achieves its water retention qualities from the liner material itself. The PVC skin liner provides a 'watertight' lining to the pool structure.

What is the normally accepted method of making a newly constructed concrete block shell watertight?

Answer: The normally accepted method of making a newly constructed concrete block shell watertight is to screed the floor of the pool with a waterproof screed of sharp sand and cement which includes a proprietary waterproofing agent. The screed thickness is to be around 40mm thick. In addition the walls should be rendered with two coats of waterproof render of sharp sand and cement including a proprietary waterproofing agent. The two coats should be 10mm to 12mm thick.

*With thanks to Colin Day, FISPE,  
Ben Studdy, FISPE and  
Ian Betts, FISPE.*

**If you would be interested in a  
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**It's all under wraps for now....**



**...but all will be revealed on 22<sup>nd</sup> November**

The new eagerly awaited PWTAG book will be launched on Wednesday 22<sup>nd</sup> November at the Drayton Manor Hotel, Tamworth, Staffordshire. See: 'www.pwtag.org.uk/events/internal\_events.php' for booking details.

The ISPE will be presenting a one-day seminar at the Walton Park Hotel, Clevedon, nr. Bristol, North Somerset, on the **following** day, on Thursday 23<sup>rd</sup> November, looking at what's new, how the book affects ISPE members and why everyone in the pool and spa trade should have one.

Programmes and booking forms will be sent to all ISPE members and will be available to download from the ISPE website, 'www.ispe.co.uk' under diary dates.

***Be among the first to obtain your copy.***

Reserve your copy from ISPE by emailing [ross@ispe.co.uk](mailto:ross@ispe.co.uk) with the subject 'New PWTAG Book', & including an invoice address in your email. Prices and 'early-bird' discounts will be emailed as soon as details are available.

## **Communication Problems**

Despite numerous requests we still do not have all our members' email addresses. As we have said before, we promise not to bombard you and we NEVER pass your personal details to any third party.

If you have not received an email from ISPE in the last six months please take one minute to email us your email address to [ross@ispe.co.uk](mailto:ross@ispe.co.uk) and we will ping back an acknowledgement.

Increasingly, many of our members supply us with generic email addresses such as 'sales@...' or 'info@...' etc., and this is not much good if we wish to send you an important notice such as a date change or something like that. Please let us have your personal email address, as quite often we hear that information has not been passed on to individual members from their office, particularly when they are out on the road all day.

**Keep in touch. Email [ross@ispe.co.uk](mailto:ross@ispe.co.uk) today!**

## Just How Important is a Filter?

By Jimmy Lamb TnISPE(Cert.)

All too often chemicals are blamed for poor water quality when in fact the root cause is more often than not, insufficient filtration. If a domestic pool owner only runs their pool pump for a few hours a day, they are relying far too much on the disinfectant (e.g. chlorine) in the water to keep the pool safe, clean and crystal clear. Moving water is safe water! This also applies to public swimming pools. The more filtration and circulation of the water the better the quality will be and the easier it will be to maintain. It is important to ensure that the water passes through the filter media at the right speed. Too fast and any captured debris is pushed through the media and back to the pool. The slower the water passes through, the better and more efficient the media will be. In fact, if you simply halve the speed at which the water passes, you will increase the filter efficiency by 4 times. Beware, if you reduce the speed of the pump, you will ultimately slow down the circulation of the water in the pool tank. This can result in dead spots with bacteria and algae taking hold. Unless a filter with a larger surface area can be installed, you may need to compromise with variable speeds to achieve a slower filtration speed for part of the day and increase the speed for the rest of the day to maintain good circulation.

What goes in, must come out. The purpose of the filter is to capture any physical debris from the water. This debris builds up over time to the extent that it will reduce the performance of the media and begin to block up. This is why the backwash process is just as important as is achieving an efficient filtration speed. Whatever the media used, it's important to get fluidisation of the media bed in order to release all the captured debris. According to German DIN standard, where sand is used as a filter media, the required speed for backwash is 60m/h ( $m^3/m^2/h$ ). This requires a lot of water and also will not guarantee a break up of the 'mud balling' that occurs in sand. The result of an insufficient backwash is the reduction of filtration efficiency. Captured debris remain in the filter, harbouring bacteria and increasing the demand on the disinfectant used. It's at this point that the water quality starts to suffer.

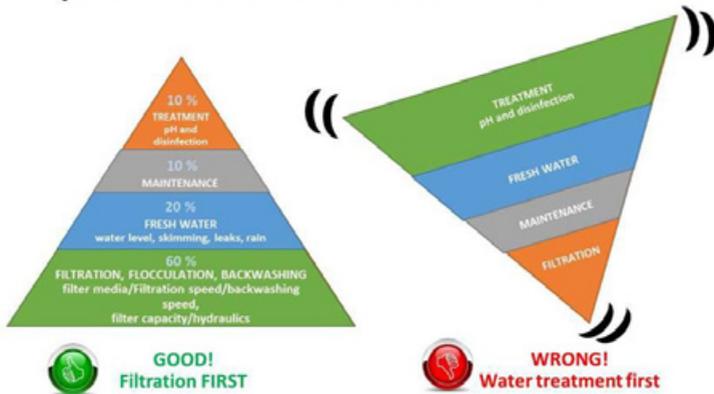
A more efficient backwash can be achieved at a slower backwash speed when glass media is used instead of sand. This stands to reason as glass is lighter than sand in weight so, less forces are required to achieve the same lift. We would recommend a speed of 45m/h to get the required fluidity. However, not all glass media will give the same filtration and/or backwash performance. The shape, size and colour of glass media available on the market vary considerably. Some are very round, almost sphere like. I liken this spherical media to the plastic balls you find in kids' play pits. You can quite easily push your hand right through them. This demonstrates a lack of mechanical performance, although I understand that it works well at very slow

speeds in grey water applications. Other glass media are quite flat, a bit like piling coins on top of one another and will block up a filter very quickly, resulting in the need for more frequent backwashing. Most will still be prone to 'mud balling' and encourage bacteria growth but, not to the same extent as sand.

AFM (Activated Filter Media) has been engineered to a specific shape and size and is available in various grades. It has been independently tested by IFTS (Institut de la Filtration et des Techniques Séparatives) outperforming all other medias. Because it is made from specially selected green and brown glass, the raw material already has a certain ionic charge to it. No other coloured glass carries an ionic charge at these levels. The charge is enhanced with further heat treatment and chemical processes. As a result, the surface of AFM is bio-resistant. No 'mud balling' can occur and bacteria cannot reach its surface. Captured debris is released very quickly during even the shortest of backwashes, resulting in huge reductions in water consumption and savings on heating for replacement backwash water. Disinfection demand is greatly reduced, thus resulting in less disinfection by-products which, in turn, results in a safer, more pleasant environment for bathers.

So, just like in the 'Pyramid of Pool Water Treatment', if you get the foundation correct in the first instance, with the correct dimensioning of the filter vessel, the correct flow rate, correct backwash speeds, the best filter media, you simply eliminate future water quality problems significantly.

## Pyramid of Pool Water Treatment



For more information contact Jimmy Lamb at Pollet Pool Group  
 Email [jimmy.lamb@polletpoolgroup.co.uk](mailto:jimmy.lamb@polletpoolgroup.co.uk) : Web [www.polletpoolgroup.co.uk](http://www.polletpoolgroup.co.uk)

## A Futuristic Swimming Pool Complex in Hong Kong

In 2011, two outdoor pools were built close to the harbour on reclaimed land. But later, the site was needed for construction work of an underground railway station.

Architect Terry Farrell, who founded his partnership in 1980 with offices in London, Hong Kong and Shanghai, was commissioned to design the station for the West Island Line extension to Kennedy Town. And to mark the roadway entrance to Kennedy Town, when approached by car or tram from the east, the partnership created a low-lying, shell-like building to complement the panoramic view enjoyed by nearby residents.



*Futuristic pool complex in Kennedy Town, Hong Kong.  
(Architect: Terry Farrell & Partners.)*

This new phase includes 50m and 25m heated indoor pools, as well as a Jacuzzi spa – the complex was completed in February 2017, six years after the pools first opened to the public. The tail of the building provides a useful canopy above open public space with louvre-like openings cut into the zinc-clad roof and long side windows for views out to the harbour.

John Dawes, FISPE.

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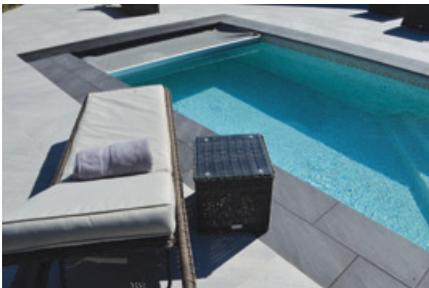
# Company Profile

## Blue Cube Pools

In recent times, we have noticed a gradual increase in people seeking smaller pools, whether due to economic viability or a lack of space for a full-size pool. With this in mind we have been asking whether big is always beautiful?



This year we completed an elegant, sleek and low maintenance outdoor pool, for a family who wanted the benefits of a pool without losing a vast amount of their garden. It suits their family life perfectly whilst providing a wonderful focal point in their garden and hours of fun for all the family.



We built a 3m x 5m x 1.5m in-ground outdoor pool with a corner step. It is incredibly well insulated due to the polystyrene blocks with reinforced concrete, beautifully finished using extreme onsite lining with Proflex sand mosaic snapir gold

providing an aesthetically contemporary finish which offers easy maintenance which is perfect for a busy family.

Using a grey coloured Aquaguard safety cover with disappearing lead edge we were able to create clean lines with a wonderfully modern appearance, perfectly bespoke for our customers. We fitted a highly efficient inverter heat pump to minimise running costs, & an SCP Haywood pump and filter to give excellent water clarity. This wonderful small pool offers all the fun without the large running and maintenance costs which were important factors to consider during the design phase of this build.



Blue Cube Pools have been designing, installing and maintaining pools for over 15 years. During this time we have been privileged to work on some amazing projects and have watched trends come and go. Whilst larger pools are amazing and fantastic if you can afford the space, small pools offer the benefits of a pool, fun, exercise, socialising, whilst at the fraction of the cost.

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**0800 037 0803**

### **Keeps your eyes peeled!**

There are literally thousands of pools that still have entrapment issues and the following is taken from The Mirror newspaper: In June this year a teenager was left fighting for his life after his intestines were sucked out by the filter of a swimming pool. The 14-year-old became trapped in the sump outlet of his local pool and was unable to free himself because of the force of the suction. His intestines were then horrifically sucked out, causing him serious injuries and requiring a lifesaving operation. The boy was taken to a hospital in La Fe, Valencia, and at the time of writing, is still in the intensive care unit. The boy was enjoying a swim in the pool of a private leisure centre in Carpesa, Valencia when the accident happened at 9.30pm.

The emergency services rushed to the scene and freed the youngster who was then taken to hospital. He underwent a four-hour life-saving operation in La Fe hospital in Valencia. It is understood he is now out of danger. The boy had been attending swimming lessons and according to witnesses, he and some of the other children had stayed behind afterwards to play in the water. It is thought the youngsters lifted the purifying vents (**AW I think they mean the sump outlets!**) off and then sat on them. A trainer on the scene turned hero by jumping into the water to save the boy, whilst ordering the

mechanism to be switched off. Other helpers dived under the water, where the boy was submerged, to breath oxygen into his lungs, according to Valencian newspaper Levante. "He was only under the water and trapped for seconds until the purifier (**AW I think they mean circulation system!**) was turned off but it seemed like hours," a witness told the paper. An investigation is being carried out by the Civil Guard but all the indications suggest the accident was a direct result of a deadly game. Article ends. **AW says: Outlets should be securely fixed to comply with both BS EN 13451-3 and BS EN15288 [both applicable in Europe] and their own Pool Standard Operating Procedures (PSOP). In a well operated pool it should not have been possible for this to happen. It seems if blaming it on the kids is an easy option.**

We, the guys (an asexual term) in the pool industry are the only people likely to recognise this potential hazard and should, if we see it, do something about it. There are still numerous single outlet pools in the UK and abroad, generally on skimmer or scum channel pools, where up to 80% of the water leaves the pool through this sump outlet. I actually carry a plastic dustbin lid (in my car, not on my person!) to carry out a simple test. Tie a rope to the handle and push it down over the drain cover using a pool brush and see if it sticks! If it is not a problem, repeat

the test with the skimmers/scum channels turned off. I find some operators turn these off whilst backwashing to prevent air being drawn in and sometimes fail to remember to turn them back on. This means 100% is now being dragged through this outlet. Ideally there should be two outlets, but this means draining and excavation, so is unlikely. A larger cover can be fitted and I saw this recently at Ilford High School where a cover of one metre squared was fitted ensuring that nobody, even somebody as corpulent as me, could cover all the holes and subject themselves to full suction forces. There are other 'anti vortex' grills available but some of these can unfortunately cause tripping and foot stubbing.



On a course in York, the suction was so strong that I was able to demonstrate to the delegates just how easy it is to snap the handle off a plastic dustbin lid. The only way we were able to retrieve what was left of the lid, was by turning off the circulation pump.

In Abu Dhabi, a couple of years ago, I worked in a deck level pool where, due to a leak between the promenade overflow pipework and the balance tank, the operators had dropped the water level of the pool by 150mm. So again all of the water was leaving the pool by just a single sump outlet. I wrote a spec. for this to be remedied but that was not going to happen any time soon. As an interim measure, I broke into the circulation pump control circuit and took a two-core cable up to the pool side where I integrated it into the 'normally closed' connections on the pool alarm. If there was an emergency, when that alarm was used it also shut down the electrical supply to the circulation pump. This is not a guarantee that it would allow someone to be released off the outlets. What, in fact, the pool operator did within a month, as they could not consider draining, was to fit an anti-vacuum device, in



the plant room, on the suction side of the pump. This unit, if it determined a vacuum, was calibrated to open within milliseconds allowing air into the line, preventing suction and allowing the trapped person to free themselves.



None of these measures are as good as designing out the problem. There should always be two sump outlets at least 2m apart with slots no greater than 8mm to hopefully prevent digit entrapment.

The area of the cover should be at least six times the area of the pipework from the outlet and the flow rate through them should be less than 0.5m/s. This of course is not of benefit to the thousands of pools where this problem exists and should be remedied by the replacement of the existing cover with one that is a minimum of 1m<sup>2</sup> or, alternatively, an anti-vac device. So keep your eyes open, stay vigilant and advise pool operators/holiday reps. This of course could be anywhere in the world!

**Allen J Wilson FISPE, Tech IOSH of Studies In Work & former President of ISPE, carries out Risk and COSHH assessments and the writing of PSOPs, NOPS & EAPS. Please join the 104,000+ recent visitors to his website at [www.studiesinwork.co.uk](http://www.studiesinwork.co.uk) or to get your FOC monthly magazine just send your email address to [info@studiesinwork.co.uk](mailto:info@studiesinwork.co.uk)**

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## **THE ISPE FILTRATION WORKSHOP**

**For Domestic Installations**

**Tuesday 7<sup>th</sup> November 2017**

***To be held at Plastipack Ltd., St Leonards-on-Sea, East Sussex***

This workshop will give basic training & guidance to new recruits and/or service personnel with limited experience of swimming pool filtration and servicing.

The cost for this comprehensive workshop, including lunch and all refreshments, will be £60.00 (ISPE Members and Students) and £80.00 (non-members).

Certificates indicating 6 CPD points will be emailed to delegates shortly after the Workshop.

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# Company Profile

M.Tutley Consultants - Design & Consultancy for Swimming Pools, Water Features and Wet Area Facilities

## Project Expectations

On any project, be it a large multi use development or a small private dwelling, many factors dictate whether the project runs smoothly to completion.

Mistakes in design can prove costly through potential delays, mismanagement and improper design. These can impact your reputation with customers as well as potential new clients.

Ensuring a team of skilled designers and engineers is fundamental to all aspects of your project being successful. A team that can incorporate your and your client's vision whilst managing their expectations and simultaneously coordinate and collaborate with other involved parties will result in satisfaction with all teams involved and with the project as a whole.

## Our Approach

We offer a bespoke design and consultancy service for Swimming Pools, Water Features and Wet Area Facilities to assist multi-national architects, construction firms and individual clients who may not have in-house specialists with the experience or knowledge on the intricacies of this field.

We understand that practically and financially it may not be feasible to employ an in-house team so we offer a service that allows you to build and maintain a relationship and understanding with an experienced specialist who can handle all aspects of design and consultancy.

## Who We Are

### Experienced Swimming Pool and Water Feature Professionals -

With over 60 years experience in all aspects of swimming pool, water feature and wet area facility design, construction and maintenance, we understand what works, providing assurance that not only will your project aesthetically fit within your concept, but operate correctly with no hidden surprises.

**Engineers** - Our team comprises chartered civil and structural engineers as well as members of the Institute of Swimming Pool Engineers. We provide full structural engineering solutions in addition to complete hydraulic and thermal designs. We operate in accordance with BS/ EN standards and the relevant trade governing bodies.

### International Experts -

Alongside our Bahrain agency (Gulf Leisure (Bahrain) W.L.L and our affiliate UK contracting company (Beaver International Ltd.) we operate internationally with extensive experience in the Middle Eastern and Indian Ocean markets. Our familiarity with these markets, working with international architects, consultants, hotel chains and high net-worth individuals helps us understand the local requirements and expectations.

## What We Can Offer

- Initial meeting at your premises to get to know you and understand both the project requirements and your own.

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- Fixed pricing structure based on the individual project and not a total contract value percentage based approach. This ensures no hidden costs or over-pricing with relation to over specification.
- Coordination with other specialists to ensure designs are carried out without future clashes with other aspects of the project.
- We will meet and create designs directly with the clients (if required).
- As part of our package we can include free training and maintenance/aftercare advice with an optional 12 month post-contract report.



### Design Scope

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- Water treatment advice and equipment proposal
- Detailed specifications and value engineering options

- Budget and cost analysis
- Sub-contractor reviews and recommendations
- Environmentally friendly alternatives and proposals
- Aftercare and maintenance guidance
- Troubleshooting/renovation advice for existing projects

### Contact Us

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## New Members and Students

We extend a very warm welcome to those that have recently joined (or re-joined) the Institute of Swimming Pool Engineers.

Baxter, G.	-	GIMB Group Ltd.
Bedford, N.	-	Red Fox Pools Ltd.
Bridgway, J.	-	RG Pools and Leisure Ltd.
Clarke, J.	-	IJ Cannings
Connell, J.	-	Hindley Community Pool
Denyer, T.	-	Aqua Platinum Products
Hart, B.P.	-	Aqua Platinum Products
James, R.P.M.	-	Penny Technical Services Ltd.
Jones, S.	-	Golden Coast
Laity, D.	-	Golden Coast
Mander, G.	-	GUS Swimming Pools Ltd.
McGrath, B.	-	Eagle Leisure Scotland Ltd.
Morris, K.	-	Fairlocks Pool Products Ltd.
Nimmo, A.P.	-	Penguin Swimming Pools Ltd.
Okafor, C.A.	-	Afamchris Nig Ltd.
Picken, S.	-	Elite TC Ltd.
Robertson, T.	-	Deep End Pools
Soderlund, E.	-	Golden Coast
Stevens, P.J.	-	Specialist Pools Services
Witt, R.	-	Blue Pools Ltd.

## Situations Vacant Summary

For full details of the positions summarised below and for the **latest vacancies** in the pool and spa industry, please see the Situations Vacant section of the ISPE website ([www.ispe.co.uk](http://www.ispe.co.uk)), telephone the office (01603 499959) or email [ross@ispe.co.uk](mailto:ross@ispe.co.uk) and we will forward the full advert to you.

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