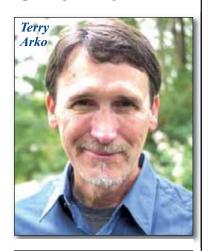
Understanding the Power of Chlorine



By Terry Arko

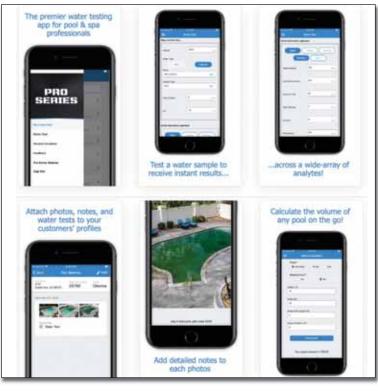
I have taught water chemistry classes for over 30 years. The key to the understanding of chlorine and its power has always been the water balance. When we get to the section on chlorine my first question to students is always; "What is the main objective for adding chlorine to the pool, what are we attempting to do?" The majority answer is to "kill bacteria". This leads to an explanation of the effectiveness of chlorine and the different types of chlorine products available. If our primary objective is to destroy harmful bacteria then the question remains what is the best and most effective way to accomplish this in the pools that are being serviced?

How cyanuric acid CYA changes basic water chemistry

When it comes to the power of chlorine one of the primary

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Video link information: https://youtu.be/urrLENT4yO8 Link to download the app for iPhones:

https://apps.apple.com/us/app/pro-series-pool-spa/id1500461028 Link to download the app for Droids:

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Understanding the Power of Chlorine

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tenets of water chemistry is the reaction that takes place when it is added to the pool. For many of my 30 years teaching I have explained how chlorine immediately forms a killing agent known as hypochlorous acid or HOCl. The HOCl has a 99% killing ability of bacteria and algae. However, due to the ionizing capabilities of water and based on pH, hypochlorite ions or -OCl will also begin to from. The -OCl is weak and only has a 1% killing ability. If the main objective of adding chlorine to our pools is to kill harmful organisms, then it goes without saying that we want most of the chlorine we add to water to form the maximum HOCl killing agent. The greatest determiner of effective killing agent in pool water is the pH. A lower pH leads to the formation of a higher percent of killing agent HOCl. When the pH is high, less HOCl is formed and there is a majority of weak -OCl. At a pH of 7.5 there is 50% HOCl and 50% -OCl. This has been considered a good balance based on water chemistry standards. However, this is only applicable in pool water with zero CYA. In pools with any measurable amount of CYA the percent of active killing agent HOCl is affected by the presence of the CYA and not the pH. Higher levels of CYA bind to HOCl and lower the percentage available for killing bacteria and algae. Using chlorine in the presence of high levels of CYA will reduce the killing ability of the chlorine being added. This doesn't make sense because the primary purpose of adding chlorine is to accomplish the efficient killing of bacteria by the production of a good percentage of HOCL. This being the case, it is obvious that to get the best killing agent percent of chlorine an un-stabilized form of chlorine with no CYA would be preferred as a shock or primary sanitizer source and always maintaining the CYA level in the recommended range of 30-50ppm

The True Strength of Chlorine

Professional pool service techs have some choices when it comes to chlorinating pools. For many the type of chlorine being used may be based on anything from the make-up of regional source water, storage, safety or cost. Liquid sodium hypochlorite (chlorine) or calcium hypochlorite Cal-hypo) are both unstabilized forms of chlorine, so they contain no CYA. Trichlor tablets contain cyanuric acid and have a very low pH. Because they are acidic, they will lower both pH and total alkalinity. When choosing a type of chlorine, it is important to understand the by-product that is left behind after chlorination and how this will affect the water and type of pool surface. When it comes to cost what really matters is knowing what you are getting for your money. When evaluating the power of chlorine, we start with elemental chlorine. This is chlorine gas. We use chlorine gas as the standard to measure other types against because it is 100% pure chlorine. Since all other types of chlorine in the pool industry are chlorinating compounds and not 100% pure, we need to determine how much pure chlorine there is in the compound. There can be confusion on this because of chlorine labels and available percentages. Which

of these would you say produces the highest amount of free chlorine in 10,000 gallons?

- Liquid sodium hypochlorite 2 5%
- Trichlor 90%

• Calcium Hypochlorite -65% Just looking at percentage numbers on labels an obvious answer may be the 90% trichlor. However, this would be incorrect. To clarify first we are comparing 1 liquid gallon to 1 dry pound. The correct answer would be the 12.5% liquid sodium hypochlorite. The reason is that liquid sodium hypochlorite percentage available chlorine is listed as a liquid weight percent. The trichlor and cal hypo are listed as dry weight percent. There is some involved mathematics in figuring the differences of volume to weight and in determining the amounts of actual pure product in a compound. A simple math formula for determining pure chlorine is to take the percentage of the weight. If we take:

- 1 gallon of 12.5% liquid sodium hypochlorite which weighs 10 pounds, we get 10 x. 125 = 1.25 lbs. pure chlorine.
- For 90% trichlor, we take 1-pound x . 90 = 0.91bs
 - For 65% cal hypo, we take

ees lo-

1-pound x .65 = 0.65lbs.

Based on pounds there is more pure chlorine in one gallon of 12.5% liquid sodium hypochlorite than in one pound of either cal hypo or trichlor.

Power of Free Available Chlorine FAC

Another determiner in the power of chlorine in pool water is looking at the ppm of FAC that is formed in 10,000 gallons compared to 1bs chlorine gas. Again, chlorine gas is used because it is 100% pure chlorine.

- One pound of chlorine gas = 12 ppm
- One pound of cal hypo 65% = 7.7 ppm
- One pound of trichlor 90% = 11 ppm.
- One gallon of Liquid sodium hypochlorite 12.5% =

12.5 ppm.

Pounds of Pure Chlorine

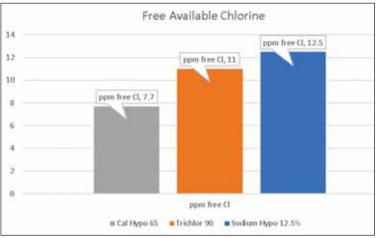
What about the by-product

1.4

Another consideration when choosing chlorine is to realize the final by-product left in the water. The end by-product of cal hypo is calcium. 1 pound of 65% calhypo

will increase the calcium hardness by 8 ppm in 10,000 gallons of water. Higher levels of calcium can lead to the formation of calcium carbonate scale especially on heat exchangers. Cal hypo also increases total dissolved solids TDS by 12 ppm. Trichlor will leave a by-product of cyanuric acid CYA. For every pound of trichlor 6 ppm of CYA is left in 10,000 gallons of water. Trichlor also contributes 16 ppm of TDS. Liquid sodium hypochlorite leaves a by-product of sodium chloride this contributes only to TDS approx. 30 ppm per gallon. There is no CYA or calcium left from liquid sodium hypochlorite.

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Pool Industry Software – Are you ready to take the plunge?

By Rachael Pritz

RB Retail & Service Solutions

This summer, probably more than just about any other summer, has been extremely challenging and intense. From creating new business offerings such as curbside service, and home delivery to expanding online store options and redesigning retail stores for social distancing—every pool and spa retailer in our industry has had to adjust. As the intensity of the summer tapers off, it is time to ask: "How did we do? And in particular: How did our business software support our business? If you think your company could have been more suc-



cessful with a different business software solution, now is the time to join the many pool and spa

businesses that are making the switch to pool industry software. Selecting a software solution

Implementing a pool industry software will immediately reduce or eliminate stressors that are currently inhibiting your business growth. This summer emphasized the importance of having MOBILE software solutions to thrive during this pandemic and into the future. With resources stretched, be sure to select indussoftware try-specific includes:

Mobile Live – Retail: Provide better and faster service with retail features using a mobile device - look up inventory in

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Calling all IPSSA Regular Members!

IPSSA is recruiting for volunteers to serve on the IPSSA BORD committees.

The committees meet four times a year through video or conference call. With this format very little time is taken away from your business or family. You will be able to work with the IPSSA BORD to ensure your organization is doing all it can to help the members and the community it serves.

The committees are as fol-

• Marketing and Communications - designs and implements strategies for promoting IPSSA by continuously strengthening its brand and developing web, social media, and print materials (including the IPSSAN). MCC's objective will be to execute a

comprehensive marketing and communications strategy which clearly presents IPSSA's mission and its services.

- Legislation and Regulation develops and implements strategies to ensure that the association's public policies and government affairs activities are addressed and communicated.
- Membership Program promotes and facilitates the recruitment and continuity of IPSSA members.
- Education provides advice to the BORD on the strategic directions and development of the educational activities of IPSSA and supports the ED FUND.

Please submit your email intent with your name, and committee you wish to serve. Those wishing to volunteer may select one-committee to serve. Committees may have no more than eight to serve on a committee. If interested, please submit your name right away. If you are not selected for the committee of choice, please know that committees change throughout the year and we will keep your name on file. If you are interested or would like more information about the committee purpose and how best you can serve, please feel free to contact me, Rose Smoot at 888-360-9505 or rose@ipssa.com



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IPSSAN

The Importance of Continuing Education

By Alicia Stephens BioLab

With the influx of new water and inexperienced pool owners on the rise, education will become more important than ever in 2021. Continuing education is one of the best investments you can make in your future. As a self-employed pool and spa service professional, gaining new skills and certifications can help you grow your income. Learning how to do something new means you don't have to outsource these tasks to others allowing you to make more money. In addition to growing your income, continued education provides networking opportunities, promotes innovation and helps you stay sharp and healthy. Luckily, today's advances in online training allow pool and spa service professionals to take courses online from the convenience of their phone, tablet or desktop computer! Imagine taking a course while sitting in your truck during your lunch break! With increased consumer demand and competition for pool and spa service, now is the time to increase your knowledge and skills to stay ahead of the competition and make more

Live Training options

One of the newest advancements in continuing education is LIVE training. These training opportunities not only provide invaluable skills but also give you a chance to "meet" new people—albeit virtually. One of these new LIVE training options available is now located on the Pro Series Pool website found in the IPSSA Member education portal (wwww.proseriespool.com). In that section you can 'Schedule Training' and pick the topic of interest and schedule a customized, live training to problemsolve issues in pools and spas or refresh your knowledge on water chemistry. And you will get a well-respected instructor with over 20 years of industry experi-

Pre-Recorded Training options If LIVE training doesn't work



Alicia Stephens

for your schedule or style of learning, there are also self-paced training modules that provide indepth coverage on a variety of topics. For example, Natural Chemistry is launching 10-new, pre-recorded training modules in January of 2021-the perfect time to delve into learning some new water chemistry or refresh existing knowledge. The topics included in the training modules will include everything from the use of enzymes to phosphate removal and hot topics such as staining, scale and LSI. Designed for busy pool and spa professionals, the modules are quick-hitting and range from 10-20 minute each and contain a 10 question quiz at the end to test your comprehension. With a score of 80% or higher, attendees will even receive a certificate of completion that can be displayed on your website, truck and service shop.

These training modules can also connect students to forums or groups to join or even work together in study groups -allowing you to learn and network at the same time. You might find that taking a course will connect you with a new partner who can help your business grow. Keeping connections, through education and associations like IPSSA, is essential for successful business

Getting advanced certifications isn't just about adding credentials to your resume. You are also learning valuable skills that you can apply to your day-to-day job. This can help you become better at regular tasks that might otherwise be time-consuming. You can also take on new challenges and offerings that you once weren't qualified to do. Maybe you want to learn to install variable speed pool pumps, install safety covers, learn new stain-removal techniques or master leak detection. Hard work is only one important part of career success. Learning new skills can make it easier to get more work done and do a better job overall.

Stay Sharp and Healthy with new classes and technologies

What many people don't realize is there's a strong link between education and health. Continuing to learn new tricks even when you're older helps keep your brain active and healthy. Learning new things can also help improve memory. Research shows that there is a

strong link between learning and overall health. Learning is a form of mental exercise that can keep you healthy. In fact, learning a new technology or downloading a new app on your mobile device is a great way to challenge your mind and give your business a

There are several helpful apps now available specifically for pools and spa service professionals that provide new insight into water chemistry and offer techs a

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Southern California

Sean Murphy (Los Angeles, Central Coast, Bakersfield) 949-237-1589 SeanMurphy@hasapool.com

Michelle Keane (San Diego/ Orange County) 619-633-9322 MichelleKeane@hasapool.com

Jason Brown (Inland Empire/Desert) 951-634-1209 JBrown@hasapool.com

Brian Rivera (Greater Bay Area/Monterey) 925-997-3640 brivera@hasapool.com

Dave Shepard (Central/No. CA/ No. NV)

DaveShepard@hasapool.com

916-949-2662

Texas David Gilbreath (No. TX/OK) 972-482-2439 DGilbreath@hasapool.com

Erin Young (Greater Houston) 469-992-1664 ErinYoung@hasapool.com

Eddie Lopez III (Austin-San Antonio) 210-347-9786 ELopez@hasapool.com

Arizona Karen Snay (AZ/NM/EI Paso) 520-709-3287 KarenSnay@hasapool.com

Pacific Northwest Gabe Talese (Pac NW/ No. UT) 360-218-8742 GabeTalese@hasapool.com

<u>PHTA</u>

UPDATED APSP-16 STANDARD EFFECTIVE DATE: May 24, 2021

Dear Industry Friends,

In case you are not aware, the testing deadline of November 24, published 2020, ANSI/APSP/ICC-16 American National Standard for Suction Outlet Fitting Assemblies (SOFA) for Use in Pools, Spas and Hot Tubs, has been updated to May 24, 2021.

PHTA PRESS RELEASE

Consumer Product Safety Commission Votes to Effective Date ANSI/APSP/ICC-16 2017

http://www.globenewswire.co n e W release/2020/08/28/2085506/0/en /U-S-Consumer-Product-Safety-Commission-Votes-to-Delay-Effective-Date-of-ANSI-APSP-ICC-16-2017.html

BACKGROUND

Product Consumer Commission (Commission, or CPSC) issued a direct final rule incorporating sections of APSP-16 2017 as the successor drain cover standard under the Virginia Graeme Baker Pool and Spa Safety Act (VGBA, or Act), with an effective date of November 24, 2020. On March 24, 2020, the Pool & Hot Tub Alliance (PHTA) requested a minimum 6-month extension of the effective date for the drain cover standard, citing as justification, closures of third party testing laboratories due to the COVID-19 health crisis. On May 28, 2020, PHTA updated its request, seeking a minimum 60day extension, citing COVID-19 disruptions to testing and SOFA manufacturing.

Two FOIA news items relate to this development, found here On May 24, 2019, the https://www.cpsc.gov/Newsroom

Safety /FOIA/ReportList and also attached as pdfs. A Federal Register notice will be published.

> • August 18 Record of Commission Action Commissioners Voted (4-0) to Issue Final Rule

> Link - Draft Federal Register Final Rule: Virginia Graeme Baker Pool and Spa Safety Act; Delay of Effective Date for Drain Cover Standard

> August 12 Ballot Vote Sheet - Provides background, impacts of delay of effective date of the rule. Includes PHTA letters dated May 28, 2020 and March 24,

> Link - RCA - Draft FR Final Rule- VGBA Delay Effective Date for Drain Cover Standard

EXCERPTS FROM THE FOIA ITEMS:

Supplementary Information, B. APSP-16 2017

APSP-16 2017 establishes materials, testing, use, installation, and marking requirements for new or replacement batheraccessible suction outlet fitting assemblies (SOFAs), other than maintenance drains, which are designed to be fully submerged in any pool. CPSC incorporated changes from the 2011 to the 2017 version of the standard into its mandatory drain cover standard, 16 CFR part 1450. The changes include: a change in the hair test approach time; changes that require assessment and hair testing at all suction outlet pipes; the addition of an "unblockable drain" definition; and labeling requirements.

Supplementary Information, C. Impacts of Delaying the Effective Date of the Rule

PHTA requested that the Commission extend the effective date of the mandatory drain cover standard. This may delay the implementation of the changes that were made to APSP-16 2017 and incorporated into the mandatory drain cover standard. The multiple outlet testing has some direct benefit to public safety due to modestly lowered water flow ratings for those multiple outlet SOFA types. The other changes – hair entrapment test times, the new definitions and labelling are in the public interest and may indirectly benefit public safety. However, the Commission does

not believe extending the effective date would have a significant negative impact on safety. The Commission believes that up to a 6-month extension of the effective date is not expected to adversely affect public safety because:

(1) Multiple outlet SOFAs are typically installed in large public pools, predominately located outdoors and open in the warmest months, and are less likely to be installed in public spas open during other seasons. Outdoor pools are likely to continue to transition towards full capacity for summer 2020, at a pace dependent upon developments with the COVID-19 crisis. Less exposure overall to outdoor pools will lessen the public's exposure to affected SOFA installations, which are those in new construction or replacements. Accordingly, Commission does not expect a delay in the availability of SOFAs complying with APSP-16 2017 to adversely impact public safety;

(2) According to the 2019 CPSC entrapment report, 2 there have been six injuries (and no deaths) due to hair entrapment in the years 2014 to 2018. The report includes incidents with all types of SOFAs in both public and residential pools. CPSC staff estimates that each year, all new SOFAs installed as replacements,

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Understanding the Power of Chlorine

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SANITIZER	CAL HYPO 65%	TRI-CHLOR 89%	SODIUM HYPOCHLORITE 12.5%
By Product in pool water	Calcium Hydroxide	Cyanuric Acid	Sodium Chloride
pH of Chlorine	11.8	2.8	13.0
Increased Hardness	Yes	No	No
Increased CYA	No	Yes	No
Lowers pH and Alkalinity	No.	Yes	No
Scale formation	Yes	No	No

When choosing chlorine, it is important to consider the pure chlorine, the effective amount of free chlorine produced and the byproduct remaining behind in the pool. While more convenient means of chlorination may seem easier the payback could be in more algae problems, dissatisfied customers and increased labor costs from draining and re-treating with chemicals. Understanding the

true power of chlorine can help pool pros to keep pool water maintenance more consistent and their pools safer for their customers.

Terry Arko is Product Training Content Manager for Hasa, Inc. He is a CPO Instructor and Member of the Recreational Water Quality Committee (RWQC). He can be contacted at 425-343-9595 or terryarko@hasapool.com..

Continuing Education

Continued from page 13

powerful tool with an added 'mental exercise' bonus. The new Pro Series app, for example, offers custom water analysis, expert water treatment solutions and a mobile-ready database for professionals who want to store a profile for each of their customers. The Pro Series app allows you to load in your customer's pool and spa information and contact information, take photos of equipment, track service with before and after photos, provide customized 'door hangers' after each visit with notes to your clients and more! Take the time to download a mobile app that helps your business and also challenges your mind. People who prioritize educating themselves and trying new technologies are more likely to develop healthy behaviors and less likely to suffer from illness. So believe it or not, continuing to learn throughout your life has benefits for both mental and physical health.

Professional Development Helps You Innovate

Getting a broader understanding of a topic can help you brainstorm more creative ways to handle related tasks and challenges. Very rarely does innovation come from someone who's always thinking inside the box. Refer to IPSSA's education portal for opportunities available from various sources. The best entrepreneurs today have a well-rounded education, and they're always looking for new opportunities to learn

Don't Put Off Gaining New Skills

Continuing to gain new certifications, training and education is really a must for pool and spa service professions to remain competitive in today's market. Sign up for a LIVE training, a pre-recorded training module and download a new app to challenge your knowledge and your mind. In addition to growing your income, continued education provides networking opportunities, promotes innovation and helps you stay sharp and healthy. Don't wait. This winter take the time to continue your education—it is guaranteed to be one of the best investments you can make in your future.

Alicia Stephens is the education and training manager for Biolab Inc. In her 19 years with the company, she has focused primarily on education, training, and development, as well as technical support and new product research and integration. Currently, Stephens supports all education and training initiatives for the Biolab Pro Dealer division. She can be reached via email at alicia.stephens@bio-









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