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2017 – Quarter 4

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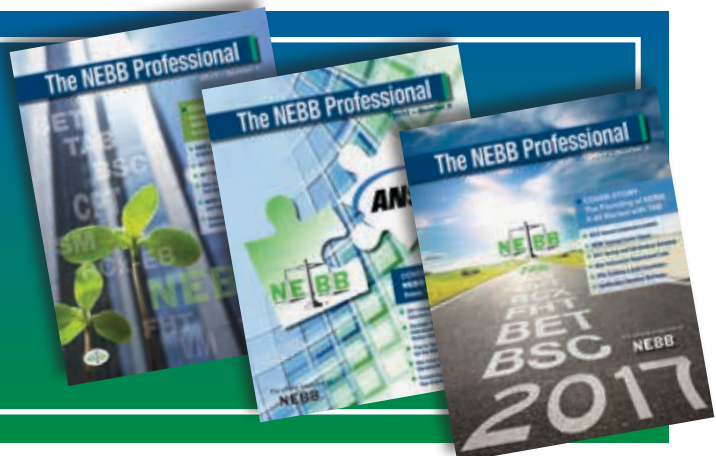
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President's Message

By: Don Hill

I am honored the NEBB board of directors selected me to serve as your President for 2018. This year will fly by and my goal is to reflect on a very productive year. The board of directors and executive/finance committee work tirelessly and are committed to the platform Jim Kelleher started, "to make NEBB's training, education and certifications the best in the industry." I plan to continue that platform.

NEBB has a great staff, led by our Executive Vice President, Tiffany Suite. The entire staff works hard in their respective departments to meet special projects the board sets forth while simultaneously managing their regular responsibilities. One of those special projects, led by Tiffany, was the creation and opening of the new training center located adjacent to the NEBB national office in Gaithersburg – NEBB TEC. The location leverages staff logistical experience in an efficient and effective manner without the huge expense of using off-site locations. NEBB TEC is ready to go and several seminars are scheduled now and moving through 2018.

Next year we will focus on the second phase of our grand plan: developing and implementing hands-on training in NEBB TEC. The space was planned not only for NEBB's training seminars and exams, but also to launch intensive hands-on field type training necessary for our technician base. Business owners can send entry-level technicians to obtain week-long field-type training from industry experts in a comfortable and technology advanced classroom setting. The goal: to provide this specialized technician training and to reduce the time business owners experience before they have the level of confidence required to "cut someone loose on a job site." All NEBB Committees sent their "Wish List" and from that, we are developing floor plans and schematics to solicit and purchase the necessary equipment to accomplish this goal.

The Certification Board's Exam Development Committee is hard at work vetting all exams, creating new ones and working with the Discipline Chairs to create their specialized Bodies of Knowledge. Our Director of Certification, Cynthia Hereth and the Exam Development Committee have successfully recruited an outstanding number of volunteers. Recruitment of Subject Matter Experts for exam development is a great place to start with NEBB as a volunteer. It provides insight into how our organization works and is a great springboard to other volunteer opportunities.

Volunteering with NEBB allows everyone to remain on top of the industry and for changes to take place daily. Every quarter, I attend various meetings for several different organizations, but I always gain more insight and opportunities from NEBB events than any other event. I might be biased, but NEBB continues to raise the bar on many levels. Current volunteers and business owners: I encourage you to consider promoting the idea of volunteering to your peers and staff. Several people have expanded their involvement in NEBB to more than one committee or "level." When they expand their involvement, they experience exponential rewards. Jim Kelleher who is our 2017 president is heavily involved in his local chapter and has employees who volunteer on the TAB committee. NEBB past president Bill Neudorfer encourages his staff to serve on committees. One of his employees is a Committee Chair and Bill's staff is heavily involved in their local chapter.

With every beginning there must be an ending, I cannot move forward without expressing my gratitude to Jean Paul Leblanc for his great mentorship and unwavering leadership during his years on the board, his involvement with the TAB committee and helping to launch the Young Professionals Network (YPN). This will be my first year on the board without Jean Paul there to provide his sound advice. JP – you will be missed!

Jim Kelleher: thank you for your leadership and setting the precedence of engaging the entire E/FC in the planning of each annual meeting. To my knowledge, this was not done before and the process has helped us on the E/FC understand the effort that goes into planning and developing curriculum and logistics for the annual meeting - both by staff and volunteers. Jim, thanks to you we got an early start on the 2018 annual conference. We look forward to seeing many of you in San Diego, Ca, and I know we will have a great program for you.

Don Hill
NEBB President 2018



Past President's Message

By: Jim Kelleher

I am honored to have served as NEBB's president for 2017 and now look forward to helping Don Hill in any way that I can while he is our president for 2018. There is no shortage of talent available to this organization and being directly in the mix allows you to clearly see it. The board of directors provides an excellent look ahead and directional challenge to the organization, but it is the staff and volunteers who work tirelessly to carry out the necessary activities to make our programs flourish.

To that end, thanks must be attributed to the many great NEBB volunteers and staff for their amazing hard work and dedication during this past year. There is an inherent and never-ending desire to make NEBB the example for others to follow in the technical applications for building testing and processes. Thanks and appreciation must be passed to where it is due.

Everyone who participates in NEBB's special projects like standards, training or certification development are a testament to those efforts. The great lengths that our volunteers go through to bring their technical experience to curriculum development, exam writing, standards development, marketing, or compliance issues -- just to share that knowledge and experience with others -- is inspiring. The coordination and application of these efforts by staff is instrumental in keeping it all together.

Fortune dealt NEBB a great hand of cards this year as many aspects of our Leadership's future planning came into alignment over the recent months.

1. NEBB's ANSI accreditation of the new RCx Standard and the BSC Standard paved the way for two new initiatives; committees are working hard and you will be impressed by those efforts soon.
2. A successful, recording-breaking annual conference this past March solidified partnerships and friendships, plus reacquainting many with the "New NEBB."
3. NEBB TEC, NEBB's training center/meeting space became operational in record time to meet the needs of the fall seminar schedule. Check out the article further on in the NEBB Professional. You will be impressed. I know I was.
4. We launched, and learned much from our online certification database system, Certelligence, listening to you along the way, making necessary adjustments to streamline the processes, bringing our training into the expanding technology environment.
5. NEBB's 2018 Seminar schedule is set early enough to help everyone plan to make the most of their training budgets in the new year. Check out the full schedule, complete with dates and locations at www.nebb.org or in the accompanying article in this issue. (NEBB's training seminars have been filling up fast, so don't wait until the registration deadline to register.)
6. NEBB introduced a new endeavor, still unfolding, with the Young Professionals Network. The YPN Ad Hoc Committee is committed to the incoming generation and we're proud of them.
7. And of course, our Certification Board and staff was successful in achieving accreditation status for the CxPP certification, not to mention the work they've done with all our Committee Chairs to develop Bodies of Knowledge, the guiding document for curriculum development and exam writing, plus writing new exams in their spare time.
8. The CxPP certification started the process in how NEBB handles its certifications and all of NEBB has benefited from the best practices model we have been operating within since the CxPP project was initiated.

No one person can make all these great accomplishments happen on their own. Surely I claim no personal achievement for all the work that goes on at NEBB. I was fortunate to be close enough to see it all as it happened. Again, thank you to the staff and volunteers who have, and continue to make NEBB the quality technical, training, and certification organization we have grown to appreciate supporting our business operations.

Serving you as your president this year has been an enlightening and rewarding experience. Thank you for the opportunity.

Jim Kelleher
NEBB Past President

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Why NEBB?

Todd Larson | ArchiText



- *What makes NEBB the gold standard in environmental systems?*
- *Why is NEBB certification – be it firm or individual – essential for building systems professionals, technicians, and firms?*
- *How do firms, professionals, and technicians benefit from NEBB?*

NEBB certified firms, professionals, and technicians agree that their primary motivation to choose NEBB as their certification agency over others: it upholds the highest standards of specifications, procedures, and professional conduct anywhere in its field and offers certification in the largest number of disciplines in the building systems industry.

This enables certified firms and certified individuals to achieve the highest level of operational efficiency and carbon footprint reduction in any residential, commercial, or industrial building.

NEBB certifies individuals and firms in a variety of disciplines through a comprehensive certification process. The discipline certifications are:

1. Testing, Adjusting and Balancing (TAB) of a building's HVAC systems so they operate at maximum environmental efficiency and minimize the carbon footprint;
2. Building Systems Commissioning (BSC), verification of the correct installation of a building's mechanical (HVAC) systems into a new construction project according to its contract document's specifications, as well as the operational efficiency of those systems according to the requirements of their design;
3. Cleanroom Performance Testing (CPT), verification that the environmental state of a workroom meets established air-quality standards;
4. Commissioning Process Professional (CxPP), an individual certification, recently American National Standards Institute (ANSI) accredited, that leads, plans, coordinates and manages a commissioning team to implement commissioning processes in new and existing buildings;
5. Fume Hood Testing (FHT), verification of the effective operation of fume hoods in hospitals, laboratories, and educational facilities;
6. Sound Measurement (SM), verification that sounds emitted from energy systems are at acceptable decibel levels to preclude sound conditions injurious to hearing;
7. Vibration Measurement (VM), the use of vibration meters, testers, and/or sensors to measure frequencies of vibrations and oscillations in mechanical systems as signs of energy overuse;
8. Building Enclosure Testing (BET), which includes testing for air leakage and building air-tightness; and
9. Retro-Commissioning of Existing Buildings (RCx-EB), correction and verification of operational efficiency of existing mechanical (HVAC) systems so they can meet the building's energy and water performance standards as well as occupant comfort and productivity.

Training: The Continuum

Training is the crux for any solid base of knowledge – be it live, online, or self-study and NEBB offers an expanding program moving into the future. Its seminar programs are continually filled prior to the registration deadline dates, self-study courses are available, and the Certification Board is venturing into online practice tests for candidates.

The rigor, constancy, and currency of these training programs and ancillary opportunities assure clients of NEBB-certified firms the highest level of service from Certified Professionals and Certified Technicians.



Terry Townsend

NEBB training benefited Terry Townsend, president of Townsend Engineering Inc. of Chattanooga, TN, from the time he joined the association as a mechanical engineer to his current position as chairman of the NEBB Standards Council, which supervises any NEBB Standards Committee's actions regarding NEBB industry standards approved by ANSI.

"The training I received before was theory, but NEBB's education is practical application, so now you're looking at what a system is supposed to do," said Townsend, whose firm provides mechanical and electrical engineering, fire protection, plumbing services and commissioning and retro-commissioning services for commercial, institutional, and industrial clients. "NEBB gives you tools to help you go through the process to determine the best solution for making systems work properly. Clients like hospitals or educational facilities realize what long-term benefits they have from technicians doing the job correctly the first time rather than just doing the job. NEBB professionals drive their associates to do the job correctly initially, thus giving the best service to the client."



Jonathen Lloyd

NEBB has clear-cut standards. "NEBB is the only agency, to my knowledge, that requires proof of knowledge of industry-leading standards and procedures and forces its firms, professionals, and technicians to uphold them," said Jonathen Lloyd, owner of Lloyd's Air & Hydronic Testing, Adjusting and Balancing in Reedy

Creek, Queensland, Australia. "All other agencies merely have a set of guidelines."

Quality Assurance, Standards, and Compliance

Breadth of coverage of technical processes in its procedural standards, education, certification, and recertification programs also distinguishes NEBB in its industry. "In my 17 years of TAB, I have had hands-on experience with most HVAC applications," said Lloyd, whose firm was NEBB-certified 3 years ago. "Whilst studying and completing my professional certification, my horizon was drastically broadened, enabling me to be a greater asset to my clients and a more efficient TAB professional."



Brian Keller

Another quality assurance initiative governing member firms is NEBB's compliance enforcement program. "If a firm encounters clear misappropriation with others in the field, there's an opportunity within NEBB to rectify the problem," said Brian Keller, Director of Commissioning at Cleary Zimmerman Engineers of

San Antonio, TX, which specializes in building analytics, commissioning, and retro-commissioning, IT/security systems, plumbing, and mechanical, electrical, and water/wastewater engineering. "There's a process for following compliance procedures for investigating issues as it relates to its particular case, be it a certified firm or certified individual."

Firm Certification

NEBB's unique emphasis on firm certification assures a firm's readiness to remedy an emergency or get it right the first time. Firm certification focuses on the collaborative process necessary to deliver top-notch work. "NEBB is the only industry association that requires a firm to have skin in the game," said Keller. "Specific guidelines for the firm and the individual help maintain a higher level of integrity."

NEBB-certified firms qualify to be emergency standbys and superior-delivery units by maintaining quality standards in all aspects of the business, including multiple steps toward certification and in all industry disciplines beyond the TAB-discipline on which NEBB was founded in 1971.

This is particularly true in two disciplines not formally standardized or certified by any other industry associations: (1) building enclosure testing (BET), which ensures the constructional solidity and security of the building envelope from walls to roof glazing to doors, to ease strain on the operating systems; and (2) retro-commissioning, which pinpoints changes in a building's energy-efficiency requirements and adjusts its environmental systems to reflect those changes.



Jim Kelleher

The scope of building envelope and systems coverage ensures the most efficient operation of all systems contained in the envelope, thus reducing the building's carbon footprint – it is a more holistic approach. Accordingly, these two disciplines "are most commonly involved with producing more energy-efficient

or smaller-carbon-footprint buildings,” said NEBB Past President Jim Kelleher, vice president of Metro Test & Balance of Capitol Heights, MD, which provides sheet-metal fabrication and installation and TAB for HVAC systems.

In addition to having the industry’s only retro-commissioning standard, NEBB “adds a technician’s handbook of practical knowledge to the retro-commissioning procedure,” said Keller. “I don’t think our industry competition is doing it at that level. NEBB has a retro-commissioning process approach and has developed a technical approach to support that process which covers the what, how, and who.”

NEBB’s retro-commissioning certification program allows mechanical engineers to complete a higher standard of work by delegating retro-commissioning duties to separate specialists beforehand. “I’m a designer, so I can be blind to things I have missed; an independent firm can become objective to the design review process,” said Townsend. “You need someone objective to identify problem areas and have them resolved before going and doing your work.”



Phil Emory

NEBB certification in BET has been beneficial for Phil Emory, a building enclosure testing lead engineer at Neudorfer Engineers Inc. of Seattle, WA, and Portland, OR, who is certified in TAB, BSC, CPT, and S&V. “The advantage I have from my competitors is carrying the NEBB professional certifications for the work I perform,” said Emory. “Our firm is considered one of the leaders, especially in the Pacific Northwest, when it comes to many of the NEBB disciplines.”

Emory contributed to the development of NEBB’s formal BET Procedural Standards to ensure all NEBB-certified firms adhere to BET standards. “We have worked with other associations in developing a testing procedure and made sure the NEBB BET testing procedural manual is on par with the leaders of the industry and that the certification program is solid,” stated Emory.

Individual Certifications: The Defining Difference

“The quality procedures required for certification, including pre-requisite experience requirements, education, training, and specific certification examination are all areas in which NEBB exceeds the other organizations,” said NEBB Vice President Jim Whorton, PE, vice president of ViroCon Inc. of Kansas City, MO, whose services include TAB, building sys-



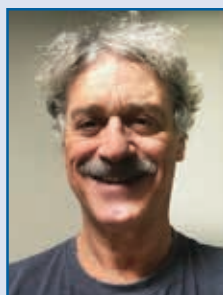
Jim Whorton

tems, LEED commissioning, retro-commissioning, and Sound and Vibration testing. “The number of certification disciplines is also a factor that helps our firms expand their business opportunities.”

The certification preparation process includes meeting specific prerequisites before applying for candidacy, self-study, and, if possible, attending training seminars. When ready, candidates sit for stringent certification examinations. Once officially certified, certificants are required to attend continuing education opportunities to keep up with new building systems technologies.

NEBB’s individual certifications are, in short, “an in-depth, all-aspects requirement of the discipline’s process,” said Lloyd. “For me, the TAB CP certification demands me to be my best. Anything short of this would result in failure.”

Certification as a NEBB professional demands passing the industry’s most comprehensive examinations, which are designed to reflect the procedures, details, and nuances of the candidate’s actual on-the-job duties, plus more.



“NEBB firms are gaining more recognition and respect from all corners of our industry. NEBB firms are now requested on a majority of project specification which is finally eliminating the meter holding companies. Because of this, NEBB business owners are now able to get the prices we require and deserve, more than ever before. NEBB has produced excellent standards creating strong recognition and sometimes giving us the option on what jobs we prefer to do.”

Frank Wiederer, NEBB CP

“Essentially, your professional experience and educational background level is set to high standards and scrutinized,” said Keller. “NEBB’s Certification Department cannot allow any applicant who thinks the certification process is merely paying an application fee to be approved. Our prerequisites for individual certification are rigorous. Some industry organizations have a simple process of registering, paying for an online test, and taking it. NEBB focuses on the quality and depth of its certifications, not the quantity of certificants.”

NEBB ensures precision in its exams by basing them directly on the benchmarks of ANSI, a nonprofit organization that has set and overseen nationwide voluntary consensus standards for engineering, testing, material qualities, and related disciplines since its founding in 1918.

To ensure NEBB’s exams test a candidate’s knowledge rigorously and impartially with uniquely designed questions, exams are created by the Certification Board’s Exam Development Committee (EDC) and Subject Matter Experts (SMEs) using ANSI best practices.

“The EDC and Discipline Committees work together on the creation of the specific Body of Knowledge (BoK) and agree on the major content domains and sub-domains that a CP or CT Candidate should know to pass the exam,” said Townsend, who also sits on the NEBB Certification Board’s Examination Development Committee that develops certification exams for the eight disciplines. “Trainers and exam writers both have access to the discipline’s Body of Knowledge and from that, the curriculum is developed and the exam is written. The ANSI process is very rigid, but it provides the best possible testing procedures of candidates to become certified professionals.”

There is also a scientific method by which exams are created. It begins by assembling a group of subject matter experts (SME) in any of the eight disciplines. “They analyze the necessary tasks a candidate must be able to perform for the specific certification group,” said Whorton. “These tasks are grouped and weighted for importance within the body of knowledge. Our Exam Development Committee uses the body of knowledge to develop test questions. The number of questions is weighted based on the importance to the certification.”

To ensure the fairness and accuracy of the exams and to streamline their grading process, the NEBB certification committees use the Angoff test-scoring method, by which they forecast in advance how often each question would be correctly answered by certification candidates.



“Clients want to hire NEBB Certified Firms because NEBB stands for quality and integrity. NEBB supports its certified professionals

and technicians by offering in-depth education and training to every individual. When a client hires someone with NEBB credentials, they are assured of high quality and superior specific discipline procedure standards. NEBB is a melting pot of disciplines that makes us stronger together. People can go to other organizations and become certified, but the result is not of the level NEBB requires. Those who want to put in a minimal effort aren’t for NEBB. Our certifications are well-known for being hard to get, but valued and respected when obtained. Anything of quality takes effort, time, and is not easily obtained. NEBB is well-established and has a reputation for adhering to compliance issues. Standing for quality is the NEBB way and that says a great deal about our heritage and our future.”

Eric Jenison, NEBB CP

Continuously Evolving

Passing a demanding exam and receiving certification does not end the educational process for NEBB-certified professionals and technicians. For one, the constant evolution, improvement and substitution of building systems technologies means all certified professionals and technicians must keep abreast of the latest technological developments so they can maintain NEBB’s internationally-renowned seal of quality in all departments, and that may entail recertification.

“A discipline’s Body of Knowledge is reviewed on a three-year cycle, either to modify and improve, or to reaffirm it,” said Keller. “We want to reaffirm where a BoK needs to be and to reflect the industry trends affected by that discipline.”

Giving Back

Why NEBB? NEBB gives certificants an avenue to keep up with industry progress beyond attending training for recertification or achieving additional certifications. Volunteering in the organization, learning more about the nuts and bolts of the industry, and networking with fellow NEBB members are also part of NEBB’s value.

NEBB is the world’s largest building systems testing-and-balancing organization—boasting over 700 certified firms and 1800 Certified Professionals, 2000 Certified Technicians and 24 chapters worldwide—opportunities to learn the latest from the best in the industry and to grow the association’s knowledge base are endless.

“The people I have been able to work with as a volunteer have benefited me and my company due to the ability to share problem-solving skills in an open environment,” said Whorton. “We all face identical issues on many projects. Collaborating with peers and developing solutions to issues that arise has been the main benefit. We can then incorporate those solutions into training and procedural standards to benefit all NEBB firms.”

The EDC has helped to recruit NEBB certified professionals to become SMEs for exam item writing, thereby expanding their industry knowledge and employment prospects.

“Being an SME gives these CPS an opportunity to work in disciplines in which they’re certified and with cross-disciplines, because on the EDC there is representation from retro-commissioning, TAB, and other backgrounds,” said Keller. “They have interactions with other disciplines as subject matter experts.”


Lloyd, a founding member of the Young Professionals Network Ad Hoc Committee of his NEBB chapter, echoes Townsend’s sentiments about the benefits of volunteering for NEBB. “I have been blessed with providing some mentorship support to some young professionals, one of whom recently completed his TAB Certified Technician certification,” Lloyd said. “It is apparent that through this volunteer work, I, as both a professional and a firm, have become more well-known. This has opened the doors to more volunteer opportunities, and even more contract opportunities.”

Why NEBB? The answer is clear: high quality training, stringent firm certification requirements, comprehensive individual certification programs, expanding volunteer opportunities, precision in standard-setting, ANSI-accredited standards and certifications, and quality assurance on all levels. ■

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Differences Matter: Knowing BMS and EMS Systems



Jason Kelly | Lighthouse Systems Group

An Environmental Monitoring System (EMS) is very different from a Building Management System (BMS). A BMS, also referred to as a Building Automation System (BAS), is a computer-based control system installed in facilities to control and monitor the facilities' mechanical and electrical equipment such as heating, cooling, ventilation, lighting, power, fire, and security systems.

In industries like aseptic manufacturing of pharmaceutical medicinal products, facilities require Control (BMS) and Monitoring (EMS) solutions. Questions invariably arise regarding system validation. Since critical steps are mandated for Good Manufacturing Practices (GMP) based on validation and regulatory compliance, an EMS is authenticated based on validating that the system design meets the system's functionality, which should be outlined in a User Requirement Specification (URS) document.

A URS is typically developed following a formal risk analysis study of the facility, the processes, and the product critical locations. All EMS data must be GMP compliant: data records with timestamps and alarm details are used to provide evidence that a product batch has been manufactured in ideal environmental conditions and product quality, safety, and efficacy remained intact before market release.

What Is the Difference Between a BMS and an EMS?

An EMS monitors the environment of a facility, collecting and recording critical environmental data to verify compliance; **a BMS controls the environment and other process driven automation functions**.

A BMS controls facility and process temperature, humidity, and pressure throughout a facility. Other controls may include automation process equipment. The main function of a BMS is to control environmental conditions and offer other levels of facility control and access.

An EMS monitors environmental conditions that are deemed GMP-critical, including parameters such as particle counts, humidity, temperature, and pressure and to monitor and record critical data logging of support equipment such as fridges, freezers, incubators, or product warehouse storage.

All are GMP-critical for product release based on set parameters for environmental and support equipment not exceeding certain alarm set-points during the product life-cycle from production to shipping. Some EMS systems utilize data logging sensors to monitor transportation environments for products where set environmental conditions must remain stable in transport.

Combining a BMS and an EMS

Combining BMS and EMS requires a well-planned risk assessment from conceptual design to validation of the critical sensor devices that monitor critical environmental parameters. Unfortunately, the level of risk becomes a question of reliability when the control sensor is also used as the monitoring sensor.

Scenario:

1. Room pressure or temperature and humidity is controlled by the same sensors and are also recording the historical data.
2. That data is used for GMP compliance.
3. Since the control aspect of the system is also the GMP monitoring solution, there are some issues.
4. If the control sensor was to drift, it would go on unnoticed.
5. Since most BMS system users do not regularly calibrate the sensors, the chances of drift issues become greater.
6. With a separate EMS sensor, the drift would be picked up immediately and when alarm limits exceed the operating set-points, a production manager would be notified.

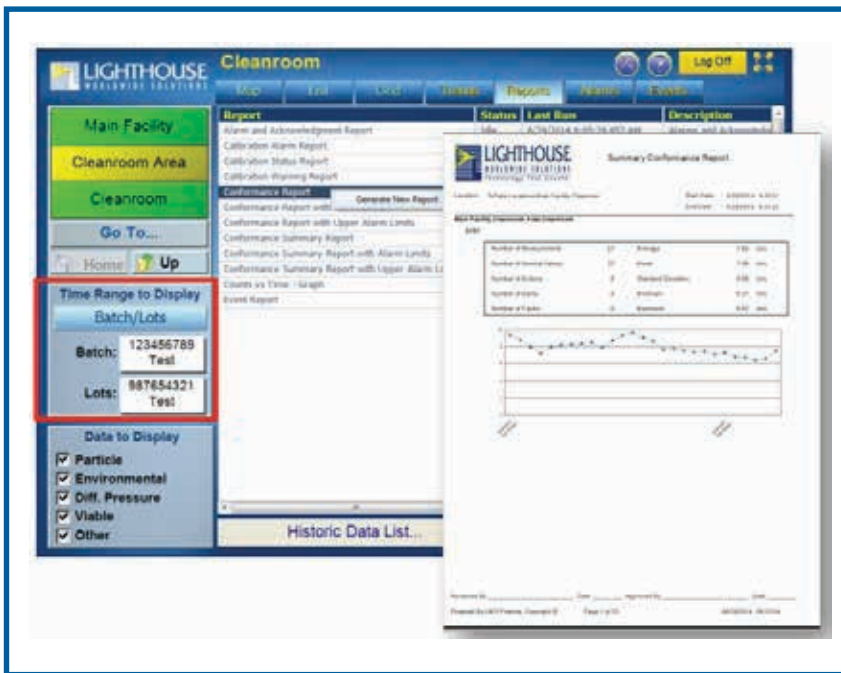


Fig.1 EMS software with GMP Conformance report indicating critical alarms

Another issue surrounding the use of a BMS and providing GMP data is FDA 21 CFR Part 11 compliance. Many BMS systems have not been designed to meet FDA 21 CFR 11 compliance and therefore the data could be rejected as true compliant GMP data.

EMS systems require strict security access control, including audit trail, electronic records, and electronic signatures in line with FDA 21 CFR Part 11 and PIC/S Annex 11 on Computerized Systems.

The Advantages of Separate BMS and EMS

If a BMS control system was also used to provide GMP data, data integrity risks arise that cannot be ignored, especially when FDA and other regulatory bodies are scrutinizing data integrity and validation. The advantages of segregating a BMS and an EMS should be considered and below are some of those advantages outlined:

- With the EMS, all GMP data from critical environmental locations is logged and stored on a secure database that is backed up. The BMS does not require full validation however, it will require a level of commissioning to verify control limits and functions are working correctly. Having separate systems only requires validation of the EMS system, otherwise the entire BMS system would require validation and the end-user would have to undergo a change control process to even adjust the office thermostat.

- If the BMS system experiences a software or sensor failure, the EMS would continue to keep data records from critical locations. For example, if product storage equipment like a refrigerator was compromised, the EMS would verify if the environment was compromised, allowing for informed decisions to be made regarding the release or rejection of valuable product. This is critical when there are temperature-sensitive products.

- Some BMS systems use lower rated HVAC quality sensors that are not easy or impossible to calibrate in the field. These sensors may not have the resolution required to validate GMP data. EMS system suppliers typically use field-calibrated, high-resolution sensors that are also

designed for cleanroom use.

- From a regulatory perspective, segregation of control and monitoring is desirable because critical data is verifiable and integrity remains intact – unless the end-user can justify using a BMS to the regulator. A BMS cannot be made to act as an EMS. Regulatory auditors have been known to write up deviations where a BMS are also designed to provide GMP data.
- EMS with particle counters are generally digitally connected to EMS software using IP addresses. Raw data is managed accurately and transferred to the EMS software without any necessary conversion via manufacturer-developed drivers. Where particle counters are connected to a BMS without integration of manufacturer drivers, using analog output signals from the particle counter, issues can arise in data resolution and accuracy. 4-20mA analog signals are susceptible to resolution issues especially when using low-quality analog to digital convertors (12 bit A/D). Where alarm limits for 5.0µm particle sizes are so low in ISO 5 or Grade A Cleanrooms (the expectation is 0 and current GMP guidelines accept ≤ 20 particles per cubic meter of air sampled), any deviation in data resolution or accuracy could trigger alarms and falsely notify end users where the production process is halted or if the batch was compromised. When stakes are high, accurate and reliable data is necessary.



Fig.2 Cleanroom operator connecting to EMS monitoring particle counts inside an isolator

EMS Minimum Requirements

There are many EMS vendors on the market, so choosing the right EMS is important, especially when much ground work and research is required. The following is a list of attributes an EMS should possess:

- User should design the EMS URS following a formalized risk assessment and work closely with the vendor in designing the Functional Design Specification (FDS),
- Capable of immediate alert and action alarm notifications,
- Provide a full audit trail capability,
- Possess security features in line with FDA 21 CFR Part 11,
- Possess a redundancy and back-up system automatically,
- Possess a redundant vacuum system when using remote particle counters,
- Designed to be FDA 21 CFR Part 11 and PIC/s Annex 11 compliant,
- Follow Good Automated Manufacturing Practice (GAMP) guidelines from design to start up and operation,

- Offer Vendor Service Level Agreements for technical support, and
- Designed with business continuity.

In Summary

There are major differences between a BMS and an EMS.

Today's GMP aseptic product manufacturing requires an independent, validated monitoring system following GAMP guidelines. Environmental sensors should have the highest resolution and accuracy, be cleanroom-friendly, and allow for field calibration.

Sharing one sensor for control and monitoring is not the best approach in providing GMP validated data. Regulatory auditors expect control and monitoring functions to be independent of each other. System validation must be conducted on critical sensors with the validation tracing back to the user-supplied URS with proof that the system was designed, is operational, and meets GMP compliance. Data integrity is mandatory and data accuracy is required when reviewing GMP conformance reports and making critical quality decisions about product release to the market. ■

About the Author

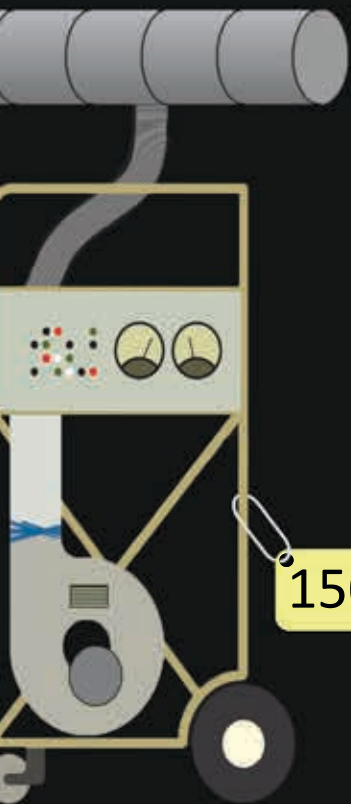
With over 20 years in management, Jason Kelly now manages the Lighthouse Systems Group, located in Oregon. A specialist on Environmental Monitoring Systems Service, design, installation, validation, and ongoing support, his experience includes working for top life-science, semi-conductor companies assisting in procurement, delivery, and compliance to ensure regulatory acceptance, along with BMS and HVAC vendors such as Siemens and Honeywell to integrate BMS and EMS independent monitoring systems in GMP processes. Jason's international work includes projects in the UK, Ireland, Europe, and Australia. Contact Jason at jasonk@golighthouse.com or LinkedIn.

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- PIC/s Annex 11 Computerized systems www.picscheme.org

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NEBB and ASHRAE: A Winning Combination

From leading PC manufacturer Hewlett Packard's Bill Hewlett and Dave Packard to Ben & Jerry's Ben Cohen and Jerry Greenfield, many famous business partnerships have yielded great results. And with over four decades of involvement, the working relationship between NEBB and ASHRAE is as dramatic and interesting as any other dynamic duo.



Darryl Boyce

"My memory of the two organizations' history goes back to the NEBB-SMACNA days and ASHRAE. The relationship evolved over the years with crossover members," said Darryl Boyce, Assistant Vice President of Facilities Management and Planning, Carleton University, Ottawa, Canada. "The two groups

are very supportive organizations to one another with the cross-pollination of members between ASHRAE and NEBB, and having NEBB certificants working with ASHRAE on the standards and guidelines. This type of cooperation has been very important."

According to Terry Townsend, president of Townsend Engineering Inc. of Chattanooga, TN, and 2006 - 2007 ASHRAE president, the connection between ASHRAE and NEBB began in the 1980s when Damon Gowan was NEBB president and became ASHRAE president in the 90s. With Gowan's involvement, the interrelationship began to get stronger. "Because of this involvement between the leadership of each organization, NEBB's input and participation became an important part of ASHRAE," said Townsend.

ASHRAE numbers up to 57,000 members worldwide in over 135 countries. NEBB's roster includes nearly 2000 Certified Professionals in 8 disciplines, 1200 Certified Technicians in 4 disciplines, over 700 Certified Firms worldwide, and 24 NEBB Chapters. International representation includes Australia, Asia, Canada, South America, Europe, and more.

Boyce has been involved in ASHRAE, becoming a full member in 1983, actively involved at the society level since 1985 in committees, and now is Treasurer and a Senior Officer on ASHRAE's Executive Committee of the ASHRAE Board. He has also served on NEBB's Certification Board as an Industry Stakeholder.

"I've known about NEBB from the very beginning. Interestingly, in 1984, I worked for a balancing and commissioning company, training new people to implement new projects and used the NEBB educational materials to successfully complete the projects," said Boyce. "Here's another collaborative tidbit – I worked for one of NEBB's presidents, Preston 'Jack' Twa, who helped me acquire the training materials to properly train our employees!"

Quality Training Benefits Both Sides

Prior to becoming ASHRAE President, Townsend was assigned as the official ASHRAE Liaison to NEBB. He had not been overly-exposed to NEBB prior to that appointment. What impressed Townsend most was NEBB's "very ordered and comprehensive structured training programs that produced well-trained certified technicians and professionals."



Terry Townsend

"I observed NEBB had more going on than I realized and pursued my BSC CP and RCx-EB CP which weren't easy tasks for a consulting engineer," said Townsend. "As an engineer, you don't normally go into the depth of detail required for the operational and control aspects of HVAC systems and components that are necessary to become a NEBB certified professional."

He looked at other training programs and saw the comprehensiveness of NEBB. "When I became certified in commissioning and retro-commissioning, I was offered the most comprehensive support in my duties as well as in the scope

of my work as both a commissioning and retro-commissioning professional. I felt less comfortable with other options that were available in the marketplace. NEBB has the best, detailed training and broad-based support for certified technician and professionals in the industry,” said Townsend.

ASHRAE’s members are predominately engineers and, according to Boyce, NEBB brings in the real-world knowledge of how things work. “That’s beneficial to the engineer because the result is that the industry is trying to promote effective building operations, so the relationship between ASHRAE and NEBB is very complementary,” said Boyce.

With a full complement of live and online courses, ASHRAE is a powerhouse on the training front, providing easy-to-access, affordable learning. Four years ago, NEBB and ASHRAE created three specific online commissioning courses, and NEBB is working with ASHRAE to offer online courses in a variety of subjects that can be used by certification candidates for general knowledge or by certified individuals for continuing education credits.

“The opportunity for NEBB to offer its candidates and certificants this type of online learning opportunity is tremendous and shows the collaborative nature of the two groups,” said Tiffany Suite, NEBB Executive Vice President. “To have the type of working relationship with ASHRAE is incredible – it’s a win-win partnership.”

Certification

No stranger to certification, ASHRAE offers a wide array of specialized certifications, as does NEBB, which has supported ASHRAE’s certification development along the way.

According to Boyce when ASHRAE decided to create the commissioning management certification, the association met with various groups, NEBB being one of them. NEBB was an early adopter of the ASHRAE commissioning certification program. On the flip side, as an Industry Stakeholder on NEBB’s Certification Board, Boyce had a unique opportunity to see NEBB’s certification program in action.

“NEBB is very committed to having properly operating certification programs and its commitment to the certification process is similar to how ASHRAE operates. It’s very stringent –sometimes more so than following the ANSI standards,” said Boyce. “NEBB definitely plays by the rules and runs a very effective certification program. My comparison is looking at other organizations where people participate in a workshop, take a test, and get certified.”

Boyce’s volunteer experience with NEBB’s Certification Board has impacted him positively and will play a significant part as he moves through the ranks of ASHRAE leadership. “I have a

much better appreciation of NEBB’s certification programs and NEBB overall. I have a better understanding of how ASHRAE and NEBB can work together on cooperative projects.”

Research and Beyond

One can’t mention ASHRAE and NEBB without recognizing the ASHRAE Research Fund, to which NEBB contributes \$10,000 each year through Hole Sponsorships at NEBB’s annual Golf Tournament. The monies donated are earmarked for the areas of interest to NEBB.

An avid supporter of the ASHRAE Research Fund is NEBB past president Eric Jenison who has been raising funds since 1991.



Eric Jenison

Jenison states ASHRAE research is not only funded by ASHRAE and their local chapters, it is also funded by other organizations. From this, they conduct significant research in energy efficiency standards for HVAC equipment for the betterment of the built environment.

“Initially I raised money for ASHRAE through my local chapter; however, because it’s a bigger picture project and I thought it was such a good cause, it led to me bringing the project to NEBB at the national level,” said Jenison. “While NEBB is a consistent ASHRAE Golden Circle Investor, it’s really those who invest and sponsor NEBB’s golf tournament each year who are the heroes.”

Jenison adds “ASHRAE disperses a certain amount of monies to various universities for specific research that benefits NEBB, for example: ‘How an air handler gets tested under certain conditions.’ Money goes into a pot and goes to fund universities that implement research projects for ASHRAE.”

“NEBB wanted the ability to fund what affects our industry, so NEBB recommends the specific projects that insure NEBB’s donation from its supporters is used in a valuable way,” said Jenison. “Each year when the research check is presented, NEBB’s EFC and NEBB Board receives a list of various projects that require funding and NEBB recommends projects.”

Since 2000, NEBB has raised over \$160,000 for ASHRAE research.

It seems like this partnership is destined to successfully move forward into the future, with bold ideas, cooperative ventures, complimentary skill sets, and a collaborative respect that promises to yield enviable results! ■

CPT Project Personnel Requirements



Don Fedyk | NEBB Technical Director

The NEBB Board of Directors (BOD), after careful deliberation, has approved the requirement that all NEBB CPT Projects be staffed by at least one CPT Certified Technician. The policy was publicized in October 2017 to be fully implemented for enforcement on January 1, 2020.

In 2009 NEBB approved a policy requiring a TAB Certified Professional or TAB Certified Technician to be on site for all TAB projects where NEBB was specified. This policy took effect on January 1, 2013. The latest NEBB TAB Procedural Standards 8th Edition 2015, section 2.4.3 COORDINATION/SUPERVISION requires the following:

“The NEBB Certified Professional is responsible for ensuring either a NEBB CP or NEBB CT is continually present while TAB work is being performed on every NEBB certified project, and directing those technicians in performing the work. The NEBB CP is ultimately responsible for the accuracy of any field measurements and certified reports generated.”

With this requirement in place for the NEBB TAB Program, the level of quality on NEBB Projects has increased dramatically and it was decided that this would be the perfect fit for Cleanroom Performance Testing. In recent conversations with major cleanroom operation managers, it was noted in no uncertain terms, that they have been less than satisfied with firms utilizing untrained personnel to perform the required certification processes.

There were instances mentioned where the workers did not even know the Certified Professional when on site. This is a common complaint that is industry wide, across various certification organizations and firms, but one that NEBB will not tolerate. One of the major chip manufacturers indicated they will be issuing a new requirement for all personnel performing cleanroom performance testing be either a Certified Professional (CP) or Certified Technician (CT).

This proactive approach adopted by NEBB provides a remedy for the cleanroom industry's complaints, while bringing NEBB to the forefront in the cleanroom certification field. The training and certification process for technicians and professionals enhances the quality of competency that cleanroom operators and project managers expect and will receive from NEBB Certified CPT Firms, Professionals, and Technicians.

NEBB's training and certification programs are second to none as witnessed by the acceptance of the NEBB certification throughout the build industry, whether CPT, TAB, BSC, RCx, FHT, BET, or S&V. We have proven that we are the innovators through specialized training for various disciplines instead of the all-in-one approach in some other industry organizations. Consistent upgrading of the specialized programs to meet the everchanging build environment and requirements has been one of the major initiatives.

With the NEBB TEC project well underway, we look forward to an even more comprehensive hands-on training experience for the NEBB CPs and CTs by providing a state-of-the-art training and testing facility with industry experts sharing their knowledge at the seminars. NEBB is constantly evolving and moving forward, providing training and certification programs for technicians in a number of disciplines while reaching out to the various industries to find and meet their wants and needs. The mandate for Certified Technicians (CTs) on CPT projects provides the cleanroom operators and managers the expert testing personnel they have come to expect from NEBB and NEBB Certified Firms. Our goal at NEBB is to provide the training and certifications for the NEBB CP's and CT's so they may provide the competency their clients require. ■

Don Fedyk is NEBB's Technical Director and is certified in most of the organization's disciplines. He can be reached at don@nebb.org.

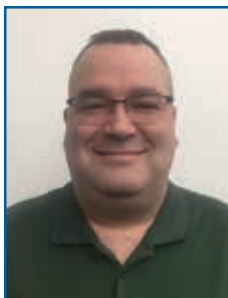
Certification Board SME/Item Writers Grow in Numbers

NEBB's Certification Board's Exam Development Committee (EDC) continues to expand its talent pool with industry professionals covering a wide variety of experience and NEBB discipline knowledge.

"The EDC actively began recruiting SMEs back in early 2016 and we have all our original SMEs, working consistently on exams or special projects," said Brian Keller, EDC Chairperson. "We're fortunate. These SME volunteers keep coming to us and the quality of experience they bring can only help NEBB create highly defensible exams."

Current projects worked on by the EDC with item writing assistance by SMEs include a new TAB CT exam, new RCx-EB CP exams, FHT CP exam, CPT CP exam, and the BET CP exam. Plans are also underway to create a TAB CT Practice Test for TAB CT Candidates.

New SME/Item Writers



Dan Velasquez

Dan Velasquez is the Environmental Services Operations Manager for John W. Danforth Company based in Tonawanda, NY. A graduate of the State University of New York at Buffalo, he served in the U.S. Coast Guard Service. A NEBB TAB Certified Professional, Dan has been in the business since 1994.



Michael Pfarr

Michael Pfarr is President of Technical Balance, LLC, INC., based in Indianapolis, IN, in the business for 30 years. A graduate of IUPUI, his focus of study was engineering and he carries numerous industry training certificates. He is a NEBB Certified Professional in BSC, FHT, TAB and CPT.



Ed Culp

With MacDonald-Miller Facility Solutions based in Seattle, WA, Ed Culp has 32 years' experience in the HVAC Industry including fabrication and installation of HVAC duct systems and architectural sheet metal, and TAB and Commissioning of HVAC Systems. A graduate of Ivy Technical State College, he is a NEBB Certified Professional in TAB and a Certified Energy Manager (CEM) from the Association of Energy Engineers (AEE).



Firas Hakim

In 2008, Firas Hakim graduated with his mechanical engineer degree and became a NEBB TAB certified professional in 2016. Employed at T&C technology, Hakim is a Project Manager supervising over 25 technicians and engineers on various projects across the United Arab Emirates.



Oguzhan Ardic

Oguzhan Ardic is a Technical Principle for Salt Engineering, Consulting and Commissioning located in Istanbul, Turkey. He carries a bachelor of science in mechanical engineering and a master of social science, MBA from Cukurova University, Adana, Turkey. Ardic is a NEBB Certified Professional in Vibration, Sound, BET, and TAB in addition to achieving his CxPP.

Those interested in learning more about NEBB's SME item Writing Volunteer program, can contact Cynthia Hereth, Director of Certification at cindi@nebb.org or by visiting the NEBB website at http://www.nebb.org/assets/1/7/SME_Volunteer_Description_Application_Form-_FINAL_for_website-3.21.17.pdf ■

NEBB Achieves ANSI Accreditation for Commissioning Process Professional (CxPP)



Cynthia Hereth | NEBB Director of Certification



On September 22, 2017 NEBB received official notice that its Commissioning Process Professional (CxPP) certification had earned accreditation from the American National Standards Institute Personnel Certification Accreditation Program.

NEBB's CxPP certification is an individual certification and those certified as a Commissioning Process Professional (CxPP) lead, plan, coordinate and manage a commissioning team to implement commissioning processes in new and existing buildings. CxPP certificants have met a stringent combination of education and experience requirements and demonstrate their knowledge of process commissioning by passing the CxPP examination.

"ANSI commends NEBB for achieving accreditation and demonstrating its commitment to the continual improvement of its certification program," said Dr. Vijay Krishna, senior director, credentialing programs at ANSI. "Accreditation by ANSI demonstrates compliance to a rigorous international-

ly recognized accreditation process and creates a valuable market distinction for these credentials."

This ANSI accreditation process - based on the ANSI/ISO/IEC 17024:2012 standard - is designed to increase the integrity, confidence, and mobility of certified professionals. Since the launch of ANSI's Personnel Certification Accreditation Program in 2003, the Institute has accredited 60 personnel certification bodies for 185 certification programs across a range of industry sectors involving more than 5 million people.

"Having been on NEBB's board of directors since the project's inception, I have seen the entire process unfold first-hand. It is a fantastic achievement for NEBB to be recognized as an ANSI accredited certifying body. The CxPP certification provides NEBB certificants with another tool to better serve their customer base," said Jim Kelleher, NEBB President. "We are extremely proud of the diligent efforts from our certification board and certification staff that made the CxPP ANSI accreditation a reality."

ANSI's personnel certification accreditation program was the first such program in the United States to fulfill the requirements of ISO/IEC 17011, Conformity assessment - General requirements for accreditation bodies accrediting conformity assessment bodies, which represents the global benchmark for accreditation body practice. Accordingly, ANSI's accreditation program is recognized as a world-renowned leader in personnel credentialing. ANSI's 17024 accreditation program is recognized under the Pacific Accreditation Cooperation (PAC) Multilateral Recognition Arrangement (MLA) for Persons.

"The formation of the CxPP certification was a pivotal moment for the association," said Tiffany Suite, NEBB Executive Vice President. "By following the ANSI standards and best practices, it has made our other certifications stronger, more

defensible and in alignment with elevating the level of professionalism expected of NEBB certificants. We're extremely proud of this achievement."

About NEBB

Established in 1971, NEBB is the premier international association of Certified Firms and Certified Professionals and Technicians that perform Building Systems Commissioning, Commissioning Process Professional, Building Envelope Testing, Cleanroom Performance Testing, Fume Hood Testing, Retro-Commissioning, Sound Measurement, Vibration Measurement, and Testing, Adjusting, and Balancing of HVAC systems.

NEBB personnel certification programs are designed to recognize individuals who have demonstrated the experience, knowledge, and skills necessary to provide competent testing and tuning of building systems as defined for each discipline. Certified Professionals understand the standards and specifications for work in their discipline, are qualified in the proper methods and procedures for their discipline, and understand how to use properly calibrated equipment to establish, accurately measure, and verify building systems performance. Certified Professionals represent their firms in matters related to their discipline to provide accurate and reliable reporting.

About ANSI

The American National Standards Institute (ANSI) is a private non-profit organization whose mission is to enhance U.S. global competitiveness and the American quality of life by promoting, facilitating, and safeguarding the integrity of the voluntary standardization and conformity assessment system. Its membership is comprised of businesses, professional societies and trade associations, standards developers, government agencies, and consumer and labor organizations. The Institute represents the diverse interests of more than 125,000 companies and organizations and 3.5 million professionals worldwide.

The Institute is the official U.S. representative to the International Organization for Standardization (ISO) and, via the U.S. National Committee, the International Electrotechnical Commission (IEC), and is a U.S. representative to the International Accreditation Forum (IAF). ■

To obtain information on NEBB's CxPP individual certification program, please email certification@nebb.org.

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2018 NEBB Annual Conference *San Diego* April 26-28, 2018



Achieving Excellence in a Changing Environment

2018 Keynote Speaker: Dr. Steve Taubman

Kicking off the 2018 NEBB Annual Conference on Thursday April 26, 2018 is Dr. Steve Taubman who will bring a unique and interesting twist to mastering your subconscious.

Despite dealing with crippling anxiety, depression, and low self-esteem in his early years, Dr. Taubman graduated valedictorian from one of the nation's top chiropractic colleges. Operating a thriving practice, Dr. Steve found that his outer success did little to calm his inner turmoil.

To understand the root of his suffering, he began a thirty-year journey, exploring Western psychotherapy, Eastern teachings of mindfulness, hypnosis, and the science of neurology. His learning provided profound insight into the universal nature and cause of suffering - the subconscious mind - which ultimately led to the creation of his successful *UnHypnosissystem* and bestselling book.

Blending his teachings with a long-time passion for comedy and magic, Dr. Steve developed a series of insightful, fun presentations about mastering the subconscious mind which were embraced by organizations for their ability to get people in action.

Since then, Dr. Steve's excitement, motivation and enthusiasm have earned him fans from every profession. He continues to enthrall audiences worldwide, helping them remove mental barriers to achieving their dreams.



2018 Annual Conference Schedule-at-a-Glance (Subject to Change)

Monday, April 23, 2018

- 8:00 am – 5:00 pm NEBB Building Enclosure Testing Seminar (BET) for Certified Professionals
- 8:00 am – 5:00 pm NEBB Building Systems Commissioning Seminar for Technicians (CxCT)

Tuesday, April 24, 2018

- 8:00 am – 5:00 pm NEBB Building Enclosure Testing Seminar (BET) for Certified Professionals
- 8:00 am – 5:00 pm NEBB Building Systems Commissioning Seminar for Technicians (CxCT)
- 12:00 pm – 5:00 pm Annual Conference Pre-Registration Open



Wednesday, April 25, 2018

7:00 am – 5:00 pm	Annual Conference Registration Open
8:00 am – 5:00 pm	NEBB Exam Day
8:00 am – 5:00 pm	Closed Committee Meetings
6:00 pm – 10:00 pm	NEBB Volunteer Appreciation Dinner

Thursday, April 26, 2018

7:00 am – 5:00 pm	Annual Conference Registration Open
6:00 am – 2:30 pm	NEBB 21st Annual Golf Tournament
1:00 pm – 5:00 pm	Exhibit Hall Open
4:00 pm – 5:00 pm	NEBB Past Presidents Meeting
5:30 pm – 6:45 pm	Opening Session: Welcome and Keynote Speaker Presentation
7:00 pm – 10:00 pm	Get Acquainted Reception

Friday, April 27, 2018

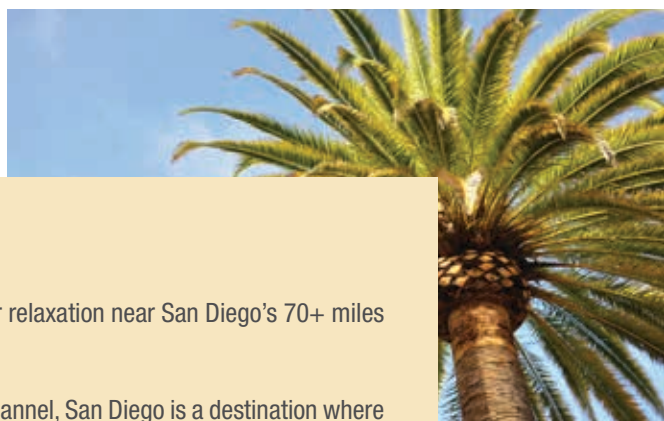
6:30 am – 8:00am	Breakfast
7:00 am – 5:00 pm	Annual Conference Registration Open
7:00 am – 5:30 pm	Exhibit Hall Open
8:00 am – 3:45 pm	Technical Track Sessions
11:15 am – 12:30 pm	Networking Luncheon

Saturday, April 28, 2018

6:30 am – 8:00 am	Breakfast
7:00 am – 2:00 pm	Annual Conference Registration Open
7:00 am – 1:00 pm	Exhibit Hall Open
8:00 am – 9:30 am	NEBB Business and Town Hall Meeting
9:45 am – 3:45 pm	Technical Track Sessions
11:15 am – 12:30 pm	Networking Luncheon
4:00 pm – 6:00 pm	Vendor Reception and Prize Giveaway
5:00 pm – 6:00 pm	Closing Session

Sunday, April 29, 2018

8:00 am – 12:00 pm	Board of Directors Meeting – OPEN
12:00 pm – 5:00 pm	Board of Directors Meeting – CLOSED



About San Diego!

While we know you've come for business, there are plenty of opportunities for relaxation near San Diego's 70+ miles of breath-taking beaches.

The only U.S. city to be named a "World Smart City" by National Geographic Channel, San Diego is a destination where attendees achieve the extraordinary. The award-winning, bay front San Diego Convention Center is now designated a LEED Gold certified venue where green meetings meet blue waters!

Seven unique meeting regions are minutes from San Diego International Airport, national parks, and iconic attractions like SeaWorld, San Diego Zoo, the USS Midway Museum, and Balboa Park.*

NEBB does not endorse, warrant or guarantee any of the items/activities listed. Items are for informational purposes only. All descriptions are courtesy of San Diego's Convention and Visitors Bureau – Visit San Diego

NEBB NEWS

CHAPTER NEWS

Mid-South EBB Chapter (MEBB)

By Ginger Slaick

MEBB celebrated its 45th anniversary during the recent Recertification Seminar and Annual Meeting. The event took place at the beautiful Marina Inn Grand Dunes in Myrtle Beach, SC on September 23rd-24th. The seminar was well attended by chapter members and guests seeking required NEBB continuing education credits.

Attendees heard about topics on industry-related technical issues, contract law, safety and also participated in a field trip to EBTRON. Speakers including Sarah E. Carson with Smith, Currie, & Hancock, LLP, Robert Turner, III with Smart Profitability Solutions, LLC, Dave Dougan, President of EBTRON and NEBB President, Jim Kelleher. Additionally, attendees heard from Joe Medosch with Retrotec; Brent Baird with Instruments Direct; Pete Secor with Evergreen Telemetry; Peter Van Winkle with DP2, LLC; and Jim Schumacher with TSI, Inc., all speaking on the latest technology.



MEBB's Field Trip to Ebtron

MEBB also hosted its 2nd Annual Vendor Exhibit during the event with hands-on demonstrations of the latest instruments and technology, giving attendees and vendors the chance to communicate directly with each other. Many attendees were the lucky recipients of some fabulous door prizes. MEBB thanks all sponsors for their continued support of the Vendor Exhibit and the chapter. Gold level sponsorships included DP2, Evergreen Telemetry, Instruments Direct, and Retrotec;



MEBB's lucky Door Prize Winners and Participating Vendors

Silver level sponsorships included TSI; and Bronze level sponsorships included Ameritech Computer Consultants, Building Start, Dwyer, Technical Maintenance Inc., and Testo.

MEBB's 2018 Recertification Seminar and Annual Meeting will be held September 22-23 at the Hilton Wilmington Riverside in Wilmington, NC. Save the date and plan to attend this annual event. For additional information about MEBB, please visit the MEBB website at www.midsouthebb.com, or contact MEBB's EVP/Chapter Coordinator, Ginger Slaick at 678-407-2754 or gslaick@midsouthebb.com.

Florida Chapter- FEBB: 2018 Save the Date

By Terry Wichlenski

NEBB's FEBB Chapter is working ahead of the game with a "Save The Date" notice for its 2018 Annual Recertification Conference and Business Meeting, set for May 17-18, 2018.

The event will be held at the recently refurbished Mission Inn Resort & Club with optional activities arranged for Thursday and Friday mornings. Spouses and Guests are always welcome. Located in a Spanish architecture setting with spring-fed lakes and historic oaks, Mission Inn is a property touched by history and natural beauty is found 35 minutes northwest of Orlando. For details on the family-owned property, check out www.missioninnresort.com.

Registration fees and other information is available for CP/CT/Owners/Guests/and Vendors-Exhibitors-Sponsors. Contact Terry Wichlenski at FebbCoordinator@gmail.com.

FEBB 2018 TAB Practical Exams Dates

The 2018 TAB Certified Professional's Practical Exam is scheduled at the FEBB Testing Labs [Jacksonville, Largo & Deerfield] on January 19 or 20; June 1 or 2; and September 14 or 15 Friday exams are conducted at the Jacksonville location, Saturday exams are held at the Largo and/or Deerfield locations.

Reservations are now being accepted by email or telephone for testing in January 2018. The Registration Deadline is December 15, 2017. Candidate name(s) and fees are to be provided to the FEBB Chapter Coordinator prior to December 15th. Check payment of fees is to be made payable to "FEBB." Candidates may indicate their preference as to date, and every attempt will be made to accommodate this request. Space is limited - so call today to reserve your spot!

CapMarva Chapter

Over 120 certified individuals gathered at The Waterford at Springfield, Virginia to get the latest and greatest information during CapMarva's 2017 Annual Recertification Seminar.



Shown here is NEBB Board Member Allen King as he gives his Board Report and overview of "what's happening within NEBB."



CapMarva's recertification seminar is an opportunity for Certificants to network and connect with their industry friends. CapMarva represents a wide variety of countries and had Certificants attend from South America and beyond.

COMMITTEE REPORTS

BET

Building Enclosure Testing

The BET Committee is putting the finishing touches on its new Body of Knowledge which was reviewed by the Certification Board's Exam Development Committee. Once completed, the BET BoK will be used to develop and enhance training and the EDC will begin creating a new BET exam. A 2018 spring Seminar is scheduled for San Diego during the NEBB convention.

BSC

Building Systems Commissioning

The BSC Committee is working on the re-development of its RCx Seminar scheduled for roll-out in August 2018 at NEBB Tec. The Committee completed its BSC Procedural Standard which will be voted on within the near future.

CPT

Cleanroom Performance Testing

The CPT Committee is completing its Body of Knowledge for both Technicians and Professionals. A sold-out Cleanroom Seminar was held in Holly Springs, NC with 29 in attendance and more than 40 exams taken post seminar. Working with the Certification Board, the CPT CT exam is online in the Imperial Standard via Kryterion and will soon be available via Kryterion in the Metric exam version. SME Brian Weldon was instrumental in converting the CPT CT exam to metric. The Committee also approved members of the ANSI/NEBB Compounding Pharmacy Committee.

EDC

CB Exam Development Committee

Working under the auspices of NEBB's Certification Board, The EDC continues to work with all discipline committee chairs to either create, finalize or review specific Bodies of Knowledge. Exams for cleanroom and fume hood have been updated and are in the final Angoff scoring process. New exams are currently being created for the RCx-EB CP, TAB CT, and CxPP. Six new Subject Matter Experts were recruited and trained to assist with item writing.

FHT

Fume Hood Testing

FHT Body of Knowledge was submitted to Certification Board for review and comment. The Committee is currently working on its practical test grading structure and criteria, in addition to developing seminar curriculum to match the FHT's new Body of Knowledge.



Marketing Committee

The Marketing Committee continues to oversee article development for the NEBB Professional and seminar promotion.

Additionally, members are working with NEBB Staff on finalizing the 2018 Industry Exhibit Show schedule. A proposal for a NEBB website upgrade was presented for consideration by the NEBB Board.



Standards Council

The Standards Council approved the Revision 1 BSC Standards Committee Technical Cx Standard S120 for submittal to the NEBB

Board of Directors for approval to submit to ANSI. They also submitted Standards Council Report on Public Review Comments for Revision 1 BSC Standards Committee Technical Cx Standard S120 to NEBB BOD. The Standards Council Project Liaison is working with BSC Standards Committee on developing responses to issues from Technical BSC Standard S110 formal Public Review period. Standards Council Project Liaisons to the proposed Cleanroom Performance Testing Standard and the Standards for Compounding Pharmacy Certification are waiting for completion of Rosters by the CPT Standards Committee.



Sound and Vibration

The S&V Committee is working on its Body of Knowledge and sound questions are being re-reviewed, modified and Angoff scored,

worked on by the Discipline Chair and EDC and the same process will be conducted for the vibration written exam. The committee is slated to develop outlines for the next Home Study Course. In October, S&V held a successful seminar at NEBB TEC.

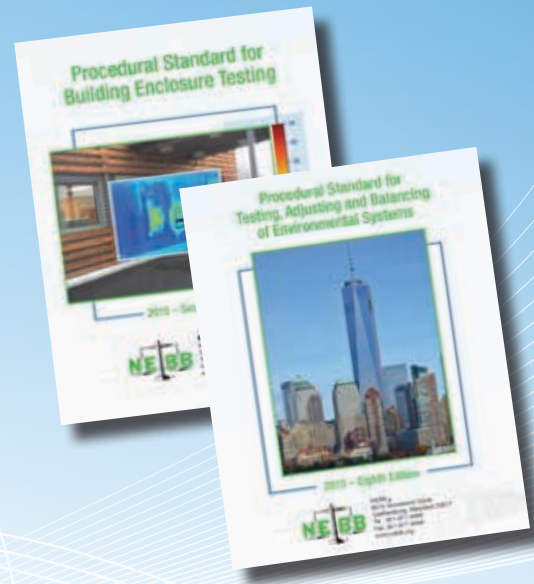


Testing, Adjusting and Balancing

The TAB CP Seminar was updated include specific technical areas and to be in sync with the recently completed TAB CP/CT BOK.

Both TAB 2017 seminars were sold out. The TAB Technician Manual is in process for review and updating. The TAB Procedural Standard is under review for update.

Keep Current with the Latest NEBB Publications



To order, go to www.nebb.org and complete the [publications order form](#). You can also contact our office at 1.301.977.3698 or email marketing@nebb.org.

Got an Article Idea?

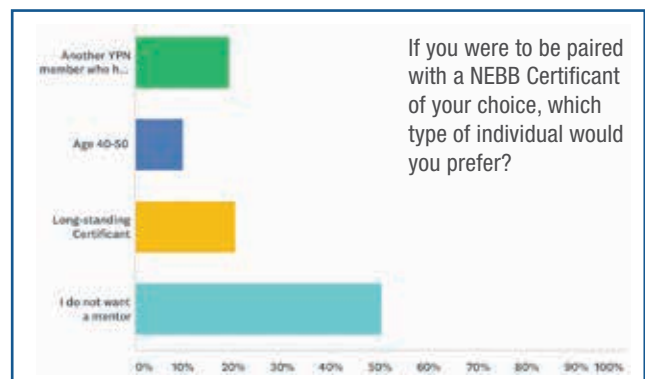
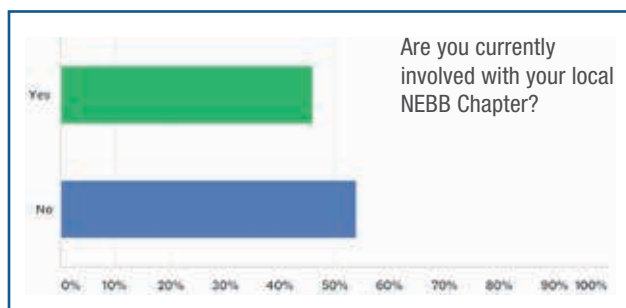
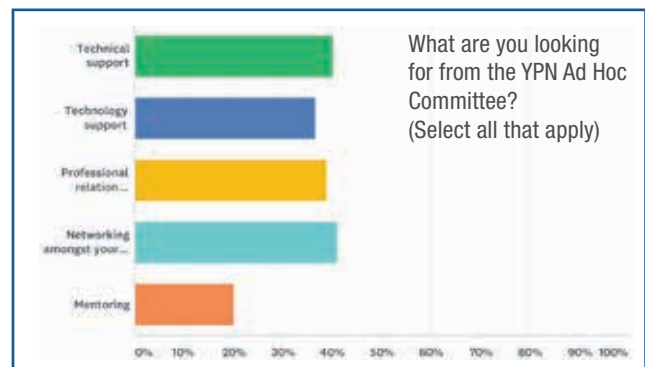
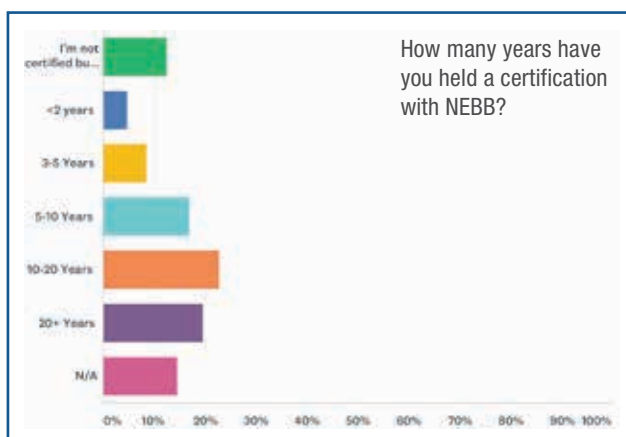
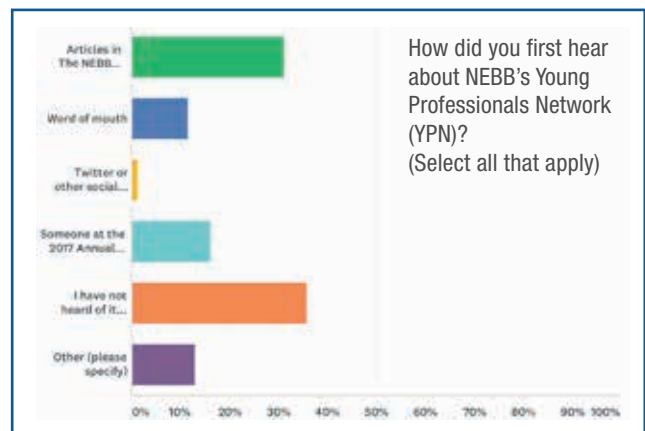
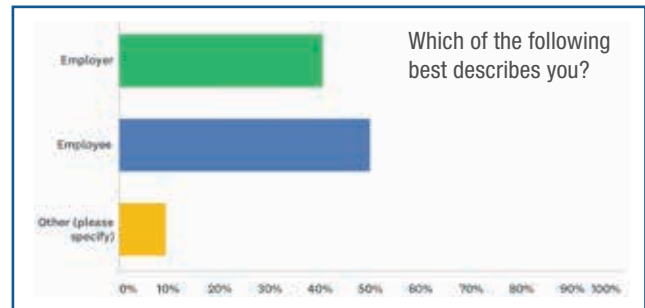
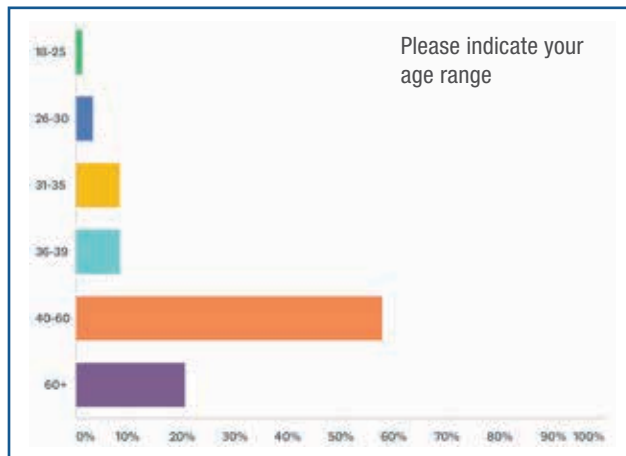
Contact *The NEBB Professional* magazine (communications@nebb.org) with your story idea.

You don't have to write a word; just talk with the staff writer and your story will be put together for you. Ask any of the NEBB professionals who have appeared in this issue how easy their story was to write.



YPN Survey Highlights

In September, NEBB's YPN Ad Hoc Committee created a targeted survey of 10 questions, which was sent to over 8,000 contacts. The response rate was a whopping 6%, 4 percentage points over the national average for survey responses. Data garnered covered a wide array of information and highlighted here in chart form are some of the findings. More details will be covered in the Q1 2018 NEBB Professional. ■





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NEBB TEC: Ready for Business

The Q3 issue of the NEBB Professional featured “before” pictures of NEBB TEC. In this issue, readers get to view the finished product. With state-of-the-art technology, comfortable seating, ample space, and display décor reminiscent of the associations’ early days, NEBB’s new training facility is ready for action. This October, NEBB Tec hosted attendees for the Sound & Vibration Seminar for its inaugural launch.

Overseeing the project under the direction of EVP Tiffany Suite, was NEBB’s Meetings & Events Manager Tori Mitchell.

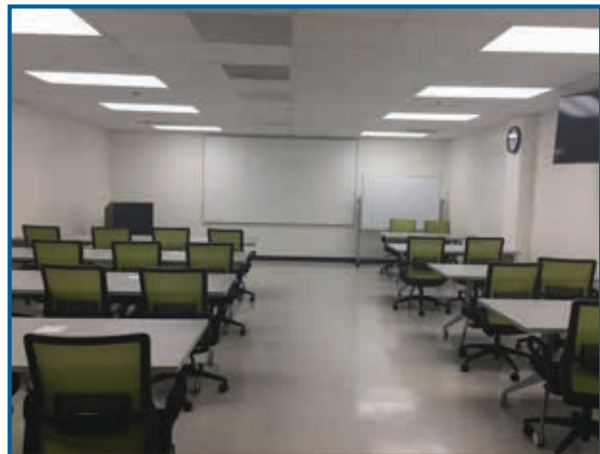
“Working on the launch of NEBB TEC has been an exciting experience for everyone involved,” said Mitchell. “We’re very

proud of how the training center came together and believe our attendees will enjoy the environment in which to learn, grow and connect with their peers.”

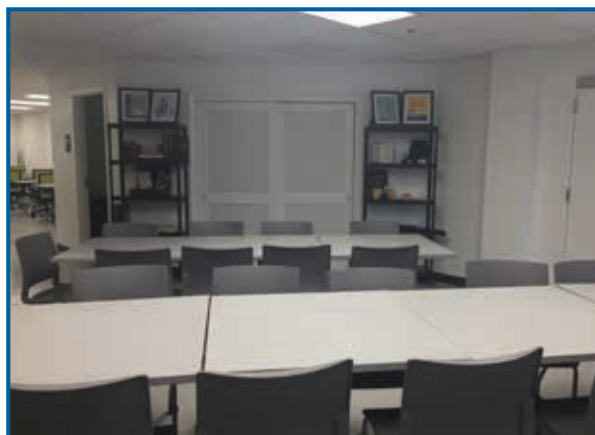
“The opening of NEBB TEC is as exciting as it is essential,” said Tiffany Suite, NEBB EVP. “Not only does this mark a significant milestone but it also shows that NEBB is a forward-thinking organization that is willing to go the distance to prepare its certificants and candidates to meet the challenges of the industry.” ■



Looking from the front of the Training Room to the back.



Looking from the back of the Training Room.



In the lunch/break room.



Attendees in action at the Sound & Vibration Seminar and Exam Day, held at NEBB TEC.

Save the Date!



2018 NEBB
Annual Conference

San Diego
April 26-28, 2018

Achieving Excellence in a Changing Environment

April 26-28, 2018

Hotel Room Reservation Deadline Date:
March 30, 2018

The Sheraton San Diego Hotel & Marina

1380 Harbor Island Drive, San Diego, California

Call 1.877.734.2726 to make room reservations and mention
"NEBB" to get the NEBB special room rate.

- **Traditional guestrooms:** \$199.00 plus tax, Single and Double Occupancy
- **Deluxe guestrooms:** \$219.00 plus tax, Single and Double Occupancy
- **Club guestrooms:** \$249.00 plus tax, Single and Double Occupancy

*Optional \$22.00 plus tax resort charge per room night available for purchase. Resort charge includes the following amenities: In-room High Speed Internet Access, Local and Long distance phone calls and access to hotel tennis facility.

2018 Annual Conference
Registration is now open @
nebb.cvent.com

2018 Technical Seminar Schedule

NEBB's Technical Seminars sell out at a fast pace, so don't wait to register. Dates and locations are set, but keep a watch on the 2018 NEBB Events Calendar page at www.nebb.org because completed seminars brochures will be posted to that site and are coming soon! **For more information, email training@nebb.org!**

MARCH 2018

BSC Advanced Certificate Course

Monday, March 12 – Friday, March 16, 2018

Course Registration Deadline: Monday, February 26, 2018
NEBB TEC, Gaithersburg, MD

Optional Certificate Test Dates: Daily, at the conclusion of the training

APRIL 2018

S&V CP Seminar

Monday, April 2 – Friday, April 6, 2018

Seminar Registration Deadline: Monday, March 5, 2018
Total Dynamic Balance Facility, Deerfield Beach, FL

Optional SM Exam Date: Wednesday Morning, April 4, 2018
Optional VM Exam Date: Friday Afternoon, April 6, 2018

BSC CxCT Seminar

Monday, April 23 & Tuesday, April 24, 2018

Seminar Registration Deadline: Monday, April 9, 2018
Sheraton Hotel and Marina in San Diego, CA

Optional Exam Day: Wednesday, April 25, 2018

Building Enclosure Testing (BET) Seminar

Monday, April 23 & Tuesday, April 24, 2018

Seminar Registration Deadline: Monday, April 9, 2018
Sheraton Hotel and Marina in San Diego, CA

Optional Exam Day: Wednesday, April 25, 2018

MAY 2018

CPT Seminar

Monday, May 21 – Wednesday, May 23, 2018

Seminar Registration Deadline: Monday, May 7, 2018
Vancouver, WA

Optional Exam Dates: Thursday, May 24 – Friday, May 25, 2018

JUNE 2018

FHT Seminar

Monday, June 4 & Tuesday, June 5, 2018

Seminar Registration Deadline: Monday, May 21, 2018
Labconco, Kansas City, MO

Optional Exam Day: Wednesday, June 6 – Friday, June 8, 2018



TAB CP Seminar

Monday, June 11 – Wednesday, June 13, 2018

Seminar Registration Deadline: Monday, May 28, 2018
NEBB TEC, Gaithersburg, MD

Optional Exam Day: Thursday, June 14, 2018

AUGUST 2018

RCx Seminar

Monday, August 13 – Thursday, August 16, 2018

Seminar Registration Deadline: Monday, July 30, 2018
NEBB TEC, Gaithersburg, MD

Optional Exam Day: Friday, August 17, 2018

OCTOBER 2018

CPT Seminar

Monday, October 1 – Wednesday, October 3, 2018

Seminar Registration Deadline:
NEBB TEC, Gaithersburg, MD

Optional Exam Dates: Thursday, October 4 – Friday, October 5, 2018

TAB CP Seminar

Monday, October 8 – Wednesday 10, 2018

Seminar Registration Deadline: Monday, September 24, 2018
IMI Training Facility, Rosewell, GA

Optional Exam Day: Thursday, October 11, 2018

BSC Seminar

Monday, October 15 – Wednesday, October 17, 2018

Seminar Registration Deadline: Monday, October 1, 2018
NEBB TEC, Gaithersburg, MD

Optional Exam Day: Thursday, October 18, 2018

NOVEMBER 2018

FHT Seminar

Monday, November 5 & Tuesday, November 6, 2018

Seminar Registration Deadline: Monday, October 22, 2018
Labconco, Kansas City, MO

Optional Exam Day: Friday, November 7, 2018

Certification Reminders for Firms & Certified Individuals

FIRMS

Firm Recertification reminder – If your firm stamp and certificate has an expiration date that reflects March 31, 2018, your firm is due to recertify through the online portal.

Certelligence instrument lists (pull-down menus) have been updated to include approved instruments in each of the categories. While the lists are updated periodically and are extensive, they are not all-inclusive and may not contain all instrumentation that meet the requirements. Any instrument not on the list but meeting the conditions of the specific standard requirements should be added as “other” along with data specifications in the documentation/photo upload for review by the chapter. You can access the new requirements on the NEBB website, under the Resources TAB (http://www.nebb.org/resources/instrument_requirements/). Please be sure to check in with your local chapter regarding your submission and the requirements.

Failure to pay the NEBB annual fees and/or complete your firm recertification by December 31, 2017 will result in the following late fees being automatically assessed to the NEBB profile.

1. Submissions received by NEBB between January 1 - 31, 2018 will result in a \$150 late fee being automatically assessed to the firm.
2. Submissions received by NEBB February 1 - 28, 2018 will result in a \$250 late fee being on automatically assessed to the firm.
3. Submissions received by NEBB March 1 - 31, 2018 will result in a \$350 late fee being automatically assessed to the firm.
4. Submissions received by NEBB after April 1, 2018 will result in automatic suspension of the firm certification (NEBB OP 4.5.2) as well as a \$1000 reinstatement fee automatically being assessed to the firm.

All late fees will need to be satisfied before NEBB can process the submission for recertification. If NEBB does not receive the approved submission and any NEBB late fees or the reinstatement fee before June 30, 2018 the NEBB Certified Firm will be automatically be de-certified (OP 4.6.1) and must wait 12 months to be eligible to reapply for certification.

CERTIFIED INDIVIDUALS

Individual Recertification reminder: if your individual certification certificate has an expiration date of March 31, 2018, you are due to recertify through Certelligence, NEBB's online portal. NEBB's Certification Department is reminding all CPs and CTs about a new policy that will be in effect January 1, 2018 for late submissions, specifically any submission entered after December 31, 2017.

Individual recertification is comprised of two components:

1. Paying the certification annual fee.
2. Submitting the required number of CECS.
 - o If the Individual Certificant's two-year cycle ends 12.31.2017 (certificate expiration date reflects March 31, 2018), they must submit the required number of continuing education credits (CECs) obtained within that two-year certification cycle.
 - o CP and CT recertification submissions (payment and CECS) are due to NEBB by December 31, 2017 (OP 2.4.1).
 - o Failure to submit the CP or CT recertification to NEBB by December 31, 2017 will result in late fee assessments, as listed below.

Certified Professional (CP) LATE FEES

January 1, 2018: \$50.00
February 1, 2018: \$100.00
March 1, 2018: \$150.00
April 1 – June 30, 2018: \$200.00 (suspension)

Certified Technician (CT) LATE FEES

January 1, 2018: \$25.00
February 1, 2018: \$50.00
March 1, 2018: \$75.00
April 1 – June 30, 2018: \$100.00 (suspension)

All late fees must be satisfied before NEBB can process the submission for recertification. If NEBB does not receive the approved submission and any NEBB late fees or the reinstatement fee before June 30, 2018 the NEBB CP or CT will be automatically forfeit their certification.

IMPORTANT: CEC Submissions

1. All continuing education credit submissions must be uploaded to the Individual Certificant's profile in Certelligence.
2. If an Individual Certificant does not have access to their Certelligence profile, please email certification@nebb.org and a reset password will be sent.
3. All CEC submissions must have the proper documentation to upload which is used to validate the CEC submissions. Validation documentation is listed out on the CEC Submission Policy found at the bottom of this webpage: http://www.nebb.org/certified/nebbs_recertification_program/.

If you have any questions, please email certification@nebb.org.



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- To update mailing address and to continue to receive *The NEBB Professional*, please send an email to communications@nebb.org.

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