

PLUMBING OPTION QUESTIONS/RESPONSES

The following represents actual questions/comments received by the Working Group during the course of its activities. Responses to these questions/comments have been provided for your use.

I oppose the idea of a state-sponsored specialty, for several reasons, the primary of which is the rationale of "special knowledge" represents too small a fraction of the work done under the heading of "plumbing".

As was stated, the WG is only seeking to add a plumbing option within the framework of the Mechanical Engineering PP examination. This option would join HVAC, Machine Design and Thermal and Fluids Systems as options within the NCEES-developed and State Board-administered examination. NO attempt is being made to establish any "state-sponsored specialty".

Did the WG consider establishing a specialty qualification certification, similar to ASHRAE's certs for Energy, Commissioning, et al? This would bypass the requirement for registration, and the need to pass the EIT, which I have seen through the years as the primary obstacle to professional registration. From a practical standpoint, I have found little correlation between any form of certification (private or professional) and skill as practiced in building engineering.

The ASPE CPD/CPDT certifications do give some measure of the competency of a plumbing designer. But remember...these are "certifications" and not a "license". Based solely on the possession of these certifications, CPD/CPDT holders are not in and of itself in any way empowered to present themselves as "engineers" nor are they permitted to perform any act or right as governed by the licensing laws, rules and regulations of any State or Province nor are they making any professional commitment of legal and ethical conduct.

Registration would allow those engineers that have obtained a qualifying degree from an ABET-accredited course of study and the requisite experience under the responsible charge of a Registered Engineer to ultimately sit for the Mechanical Engineering PP exam and take this exam under the option of "plumbing." By providing a path to professional registration (which does not exist in our discipline), those that choose to practice in our discipline will have a viable career path to licensure which can only make a career in plumbing to be much more attractive (and as older practitioners within our discipline are retiring, the need for new blood is becoming more and more acute), we will have a measurable level of competency established and, most importantly, the health, safety and welfare of the public-at-large is addressed.

Anyone who has experience in the field knows quite well that the vast majority of plumbing design occurs at the technician level; basic practice in plumbing is so hugely regulated by Code that there is little engineering. Most plumbing practice can be characterized as memorization of existing standards.

This may have had some measure of truth 15-20 years ago. But codes, then and now, only establish a minimum standard. Codes do NOT purport to be and are NOT an engineering textbook. All design materials, wherever they may be derived, have their basis in the various engineering principles that form the cornerstone for what we, as engineers, routinely do in our profession. It was the realization of this that led me to acquire my BSME degree many years ago. After all, how often do we ask a designer about his/her design and calculations only to get a blank stare and a "That's what the book says"? In what we are pursuing, designers will continue to have their place in our

industry. But the competency of those individuals that sign/seal contract documents will be proven and established by a verifiable means.

While the plumbing field does have its specialty areas, they represent a tiny fraction of the base practice.

How tiny? We are already seeing domestic/potable water (specialized systems such as distilled, softened, deionized, reverse osmosis, grey water and black water, among others), sanitary waste and vent (specialized clinical, medical, laboratory and kitchen waste systems along with removal of Fats, Oils and Greases [FOG] from the kitchen waste), storm water removal and reuse (both conventional and siphonic), fuel systems (natural gas, liquefied petroleum [LP or propane] fuel oils, gasoline and others), industrial gases (oxygen, nitrogen, acetylene, argon, carbon dioxide and others), medical gas systems (oxygen, breathing air, instrument air, vacuum, waste anesthesia gas removal and others), laboratory gas systems (which can feature medical gases, industrial gases, fuels, etc.). And with the growth of “green” systems, rain and waste reclamation systems are being brought into the market. And when one considers the design and regulatory requirements (which, for better or for worse, will only increase as time marches on), Plumbing Engineering has definitely achieved a complexity all of its own.

My experience with supposed "experts" in specialty areas (e.g., LEED) has disappointed my expectation of real contribution to building quality. Ultimately, the creation of the separate certification turns out to be commercial advantage development, resulting in a side industry largely based on training and management of the certification process. In other words, it's just another scheme to elevate the mundane, and make money at it.

There is NO specialty area with a separate certification being established. There is NO attempt to make “Plumbing Engineering” a stand-alone discipline. The WG is only interested in providing an option under Mechanical Engineering for those individuals that have met the necessary qualifications to achieve licensure within the discipline. By working within the construct of the NCEES and the various State Boards, there will be no creation of a “specialty” certification...just an avenue for the proper licensing (yes, licensing...NOT certification) of individuals that have the necessary qualifications. To attempt anything else would be sheer folly.

I think it is far more likely that plumbing is further subsumed to HVAC as ASHRAE increases its involvement in plumbing.

It should also be noted that ASHRAE has NO involvement in plumbing or interest in increasing said involvement (which helped to foster the Memorandum of Understanding enjoyed between ASHRAE and ASPE).

There just isn't enough "There" there. I express this not without sympathy. For over 40 years I've observed the desire of plumbing specialists for recognition at the professional level, but I believe the current industry structure has worked as well or better than any proposed alteration, and will continue to do so.

So we should simply throw up our hands, turn, walk away and forget it? If that was the case, there would be no professional registration in Fire Protection or the options we currently see under Mechanical Engineering. Not to mention the options in various other disciplines that appear within the NCEES process.

No...our discipline...our industry...deserves and has demonstrated a legitimate need for individuals that meet the model as established by the NCEES and adhered to by the various State Boards and be given the opportunity to sit and prove their competency in

the field of plumbing. If plumbing is to grow as a discipline and industry, we, as ASPE members and registered professionals, need to treat it as more than “mechanical engineering’s red-headed stepchild”. It has become essential that we bring an elevated means of addressing public health, welfare and safety to the fore. This is a need that will only be more significant as our discipline moves into the future. And the WG is fully aware that this is not something that will be achieved overnight. But it can, with the dedication of the Society and its membership, become a reality.

Should we be focusing on a NICET Program, instead?

The WG is pursuing a NCEES program. As was stated, our goal is the placement of a plumbing option within the Mechanical Engineering PP examination as developed by NCEES and administered by the various State Boards. There is NO attempt being made to develop a stand-alone category of Plumbing Engineering within NCEES or any State Board. As the industry is already being served by the Society’s CPD/CPDT programs, there is little, if anything, to be gained by pursuing NICET certification.

Will this be grandfathered (like the Fire Protection Registration)?

There is no need to grandfather any Registered Engineer in this instance. As long as an individual is a registered engineer, practicing within his/her area(s) of expertise (as mandated by the various State Boards) and has demonstrated a satisfactory competence in plumbing to his/her peers, he/she will be able to continue to seal/sign plumbing contract documents. This will NOT change and the WG has NO interest in compromising any registered engineer’s practice or placing undue hardship on any engineering concern.

Should this be part of the Architectural Engineering program?

In a word, no. The WG considered this and felt it best to place this within the Mechanical Engineering category (where it would be offered alongside HVAC and Refrigeration, Machine Design and Materials and Thermal and Fluid Systems). Particularly since there are some states that do not recognize Architectural Engineering at this time.

How do they intend to deal with the Fundamentals of Engineering part of the process?

The Fundamentals component will be unaffected by this measure. Remember, the Fundamentals examination is intended to verify that a candidate has learned what they are supposed to learn in an ABET-accredited program of study. The Principles & Practices examination delves into specific disciplines within the practice of engineering.

Why would this be “under Mechanical Engineering” as opposed to a free-standing Plumbing Registration?

This was rejected by the WG VERY early in the process. It was quickly discovered that there would be NO support from the NCEES, several State Boards that were consulted or the National Society of Professional Engineers (NSPE; who is lending their support in our efforts) for this and would quickly kill any chance of success.

Generally, a registered Professional Engineer has no discipline specific title, other than Professional Engineer (PE). PE’s are mandated by law and ethics to work within their area of expertise. Yes, there are some States that limit a PE’s ability to seal drawings to the area in which they took the test, but that is a small fraction of the total.

It should be noted that the NSPE has a position statement against discipline specific titles. As a PE, you should be able to work within any area in which you can demonstrate

competency. That competency is verified when one's peers agree that the person has sufficient knowledge in the product/work they produce.

Mechanical does not mean HVAC. Plumbing and HVAC are two of many disciplines under the overall category of Mechanical.

But there are distinctions for HVAC and Refrigeration, Machine Design and Materials and Thermal and Fluids Systems. And each of these exist as a subset within the Mechanical Engineer PE exam as developed by the NCEES. While Thermal and Fluids Systems does touch upon some of the basics of our discipline, neither it nor HVAC fully address the growing complexity we are seeing within plumbing.

There is no distinction for HVAC versus Plumbing.

As stated above, yes there is.

A Plumbing PE can sign HVAC drawings and vice versa.

Provided they have demonstrated the necessary competency in each discipline (and yes, they are separate disciplines), there is no issue with this. As stated, this will not change under the WG's efforts.

However, there is the general requirement to only sign off that work for which you have responsible charge as you noted.

It is not a "general requirement". Under the rules established by the various State Boards of Registration, we as registered engineers are legally and ethically required to practice only in those areas of our expertise.

Some states, such as NY, have general PE licenses – there is no distinction of M or E or FP, so a PE can sign any discipline, but again there is the requirement for responsible charge.

Agreed...however, this is also why the issue of comity continually develops between the Empire State, Maryland (I believe) and others.

This decision would have to be made on a state by state basis, and that is a daunting task.

Not exactly. The basic licensing procedure is developed by the NCEES. While states may impose certain criteria/procedures of their own, they essentially administer the exam as developed by the NCEES. So while the task will be a long one, it is a "battle" that can and needs to be won...for our Society, membership, the discipline as a whole, future plumbing designers/engineers and, most importantly, the health, safety and welfare of the public-at-large.

This is the very reason ASPE came up with the CIPE and later the CPD (since the PE in CIPE sounded too much like Professional Engineer).

The CPD/CPDT and the now-defunct CIPE were developed to establish a measure of competency within the community...nothing more. They certainly were not intended to serve as a short-cut or as an alternate to professional licensure. The WG, under the auspices of the Society, are attempting to address this by working within the procedures developed by the NCEES and administered by the states. To attempt to accomplish this by any other means would be sheer folly.

In Texas, they do not recognize each independent branch of Engineering. You can get registered as a Mechanical Engineer, or an Electrical Engineer, or a Civil Engineer, and some other branches too. This means you are an Engineer in the State of Texas. By law, you can only seal the documents in which you have training and experience.

Yes, generally in our profession, a registered Professional Engineer has no discipline specific title, other than Professional Engineer (PE). PE's are mandated by law and ethics to work within their area of expertise. And, yes, there are some States that limit a PE's ability to seal drawings to the area in which they took the test.

I should add that the National Society of Professional Engineers (NSPE) has a position statement against discipline-specific titles. A statement to which I fully support. As a PE, one should be able to practice within any area that is within one's area of expertise and in which one can demonstrate competency therein. That competency is verified when one's peers are in agreement that the person has demonstrated sufficient knowledge in the product/work they produce. And under the WG's proposal, this will NOT change. Current PEs that can meet this criteria will continue to be able to place their seal/signature on plumbing documents. It is NOT in the WG's interests to restrict the practice of any registered engineer or place any undue hardship on any engineering concern.

Mechanical is the most diversified of the branches. Mechanical Engineers can do fluid flow, materials, welding, heat transfer, duct sizing, pipe sizing, etc.

Diversified AND with a complexity within each of the various sub-disciplines represented. Consider: within our discipline, we are already seeing domestic/potable water (specialized systems such as distilled, softened, deionized, reverse osmosis, grey water and black water, among others), sanitary waste and vent (specialized clinical, medical, laboratory and kitchen waste systems along with removal of Fats, Oils and Greases (FOG) from the kitchen waste), storm water removal and reuse (both conventional and siphonic), fuel systems (natural gas, liquefied petroleum (LP or propane) fuel oils, gasoline and others), industrial gases (oxygen, nitrogen, acetylene, argon, carbon dioxide and others), medical gas systems (oxygen, breathing air, instrument air, vacuum, waste anesthesia gas removal and others), laboratory gas systems (which can feature medical gases, industrial gases, fuels, etc.) and with the growth of "Green" systems rain and waste reclamation systems are being brought into the market. And when one considers the design and regulatory requirements (which, for better or for worse, will only increase as time marches on), Plumbing Engineering has definitely achieved a complexity all of its own.

If you have a separate branch for each phase of Engineering, I find this impractical. There would be no limit to the number of each branch that is possible.

And we are in basic agreement. The WG is only attempting to place a Plumbing OPTION within the Mechanical Engineering Principles and Practices (MEPP) exam as developed by the NCEES and administered by the various State Boards. This would be placed alongside the existing MEPP options of HVAC and Refrigeration, Machine Design and Thermal and Fluid Systems. There would be NO creation of a separate branch/stand-alone designation of "Plumbing Engineering" within the NCEES or any Board.

Electrical would be power generation, power distribution, design of computers, electronics, design of lighting systems, the list goes on and on.

True. But the WG's concern is only plumbing...I can safely state we have no interest in electrical or any other discipline of engineering.

Plumbing is a sub section of mechanical. I like this major sub set. It keeps the testing procedures at a minimum, and establishes a foundation for Registering Young Engineers.

And again, we are in basic agreement. As stated above, The WG is seeking only to properly recognize our discipline and serve the public's interests by placing it alongside the existing MEPP options of HVAC and Refrigeration, Machine Design and Thermal and Fluid Systems.

I do not recommend adding another sub section to be registered as a Plumbing Engineer.

Does this mean you would support the removal of the HVAC, Machine Design and Thermal and Fluid Dynamics options from the current NCEES Mechanical Engineering exam? As a WG, are not seeking a separate registration of Plumbing Engineer; only the placement of a Plumbing OPTION (alongside the aforementioned options above) within the framework of Mechanical Engineering as developed by the NCEES and administered by the various State Boards.

The ultimate goal of the WG's initiative is the establishment of a verifiable measure of competency for the discipline, the creation of a path to professional licensure (that plumbing, in and of itself, currently does not have) to those that meet the established criteria and the continued, no...ENHANCED, protection of the health, safety and welfare of the public-at-large.

The following is a "general" reply to several of the responses received by the WG:

For professional registration, we must work within the confines of the ABET/NECCS/State Boards model that exists. This requires that a candidate must first obtain their Bachelor of Science degree in a related field of engineering. Then by passing the Fundamentals of Engineering examination (a measure of what they are expected to learn in a typical 4-year course of study), acquire 4 years of practical experience under the responsible charge of a registered engineer, they may sit for the Principles and Practices (PP) examination. Successful completion of the PP exam confers upon them the rights and privileges of earning professional registration.

The WG is only attempting to place a plumbing option within the Mechanical Engineering Principles and Practices (MEPP) exam as developed by the NCEES and administered by the various State Boards. This would be placed alongside the existing MEPP options of HVAC and Refrigeration, Machine Design and Thermal and Fluid Systems. There would be NO stand-alone discipline of "Plumbing Engineering" created within the NCEES or any State Board. Generally, a registered Professional Engineer has no discipline-specific title, other than that of Professional Engineer (PE).

I should add that the National Society of Professional Engineers (NSPE) has a position statement against discipline-specific titles. A statement to which I fully support. As a PE, one should be able to practice within any area that is within one's area of expertise and in which one can demonstrate competency therein. That competency is verified when one's peers are in agreement that the person has demonstrated sufficient knowledge in the product/work they produce. And under the WG's proposal, this will NOT change. Current PEs that can meet these criteria will continue to be able to place their seal/signature on plumbing documents. It is NOT in the WG's interests to restrict the practice of any registered engineer or place any undue hardship on any engineering concern.

The thought of developing a curriculum for a 4-year course of study was considered, and ultimately rejected, by the WG early in the process. While laudable, it was decided that it was outside the stated charge of our group (after all, "PE" stands for Professional

Engineering in this instance) and would be best served by another WG at another time. And there would be some practical issues to be addressed therein: the costs involved, the potential amount of interest from prospective students, determining what institution/institutions would be willing to commit the resources to accomplish this, curriculum development and (ultimately) ABET accreditation among others.

The ultimate goal of the WG's initiative is the establishment of a verifiable measure of competency for the discipline, the creation of a path to professional licensure (that plumbing, in and of itself, currently does not have) to those that meet the established criteria and the continued, no...ENHANCED, protection of the health, safety and welfare of the public-at-large.

The following questions were generated by a State Board of Registration; the WG's responses have been provided.

In considering this initiative, the Board has asked some questions of relevance therein. The questions, with ASPE's responses, are provided below.

- How many potential test-takers does ASPE expect to take the plumbing option if developed?
 - That is a difficult question to answer with any certainty. Plumbing is a subset of Mechanical Engineering, in that it deals with fluid flows and heat transfer, but in forms that can be highly specialized within the nature of plumbing systems.
 - Based on NCEES' most recent report on PE pass rates, the 24 available exams cover the broad topics of the "Big Four:" Mechanical, Electrical, Civil, and Chemical Engineering.
 - First-time takers run from a high of 2,152 (Civil: Structural) to a low of 16 (Software Engineering).
 - Looking specifically at Mechanical Engineering, there are currently 3 subset exams: HVAC and Refrigeration (982), Mechanical Systems and Materials (866), and Thermal and Fluids Systems (1,022).
 - Fire Protection is a stand-alone exam with 147 first-time takers.
 - We estimate that plumbing should attract 50 to 150 first-time takers once it is developed and placed into the NCEES exam process.
- Are there any EAC/ABET-accredited engineering programs that offer plumbing engineering as a degree option or specialization? If so, how many?
 - There are currently no EAC/ABET-accredited programs dedicated to plumbing, but the same is true for the HVAC option within the Mechanical PP Exam.
 - The University of Wisconsin–Madison does have technical electives in plumbing within their Civil Engineering program.
 - Once ASPE has enough State Boards willing to support an option within the Mechanical Engineering PP Exam, our efforts will turn to expanding the offering of technical electives related to plumbing within numerous colleges and universities.
- Does ASPE have any data on the number of college graduates who are currently pursuing degrees that specialize in plumbing engineering?

- EAC/ABET-accredited degrees are focused on the underlying science, physics, and critical thinking of engineering.
- The application of that EAC/ABET-accredited degree does not generally occur until a degreed engineer joins the workforce. It is once that the degreed engineer begins to apply their basic knowledge, under the responsible charge of a Registered Engineer, that they move into a specialty such as plumbing or HVAC.
- ASPE is working towards having plumbing electives placed within engineering programs.
- However, in our experience, such options do not educate or train an engineer in the application of engineering principles specific to a design specialty (plumbing, HVAC, electrical systems, etc.). Consider this: I took HVAC options while earning my degree. While they did give me additional classes in fluid flow and heat transfer, they did not educate me on HVAC system design.
- It is also our experience that while adequate means exists of verifying the competency of candidates who are practicing within (for example) HVAC and Fire Protection, no such means exists for verifying the competence of those individuals who are practicing within the discipline of plumbing.
- What unique knowledge and skills that are important for safeguarding the public health, safety, and welfare are not covered in the Mechanical PE exam?
 - If one uses the standard definition of "plumbing" as the apparatus (as piping and fixtures) concerned in the distribution of water in a building and the transportation of sanitary and waste fluids, unique knowledge and skills encompass a simple understanding of code. Note that the underlying principle of codes and/or technical documents comes from the engineering principles that are the foundation of any engineering discipline.
 - However, the design of plumbing systems, beyond the standard definition, requires a deep understanding of the interaction of such systems within the environment into which they are being applied. The more technical plumbing systems require greater knowledge and skills, such as medical gas, water distribution on a macro scale, an understanding of water processes, etc.
 - Consider the City of Flint, MI, in which appropriate evaluation of the impact of switching water systems was neither understood nor considered. Changing the pH of the water allowed lead to be stripped from the existing piping and enter the drinking water of the consumer. This has and will continue to have a negative impact on the public's health, safety, and welfare (which is the paramount, and underlying, concern that ASPE is attempting to address).
 - Legionella continues to have an adverse impact on the public's health, safety, and welfare. Initially this was thought to be associated with HVAC cooling towers, and in some cases continues to be. However, a Legionella bacterium is a naturally occurring condition in all water. The lack of understanding as to how to adequately monitor and control such bacterium within the water will continue to have a negative impact on the public's health, safety, and welfare. This is another issue in which plumbing engineers play an important role in minimizing or eliminating public health problems.
 - A 19-year-old Kansas resident is now a student at the Kansas School for the Blind following a medical gas accident during a 2009 dental procedure.

Allegedly, oxygen and nitrous oxide lines were crossed during the design and construction of the dental office in question. It is also alleged that the city, during inspections of the office, should have caught the problem. The 19-year-old is now legally blind, walking with difficulty (requiring help from a cane) and has suffered some hearing loss.

- The level of knowledge needed for modern and complex water and sanitary systems continues to increase. This continued growth in complexity will continue to mandate a need for specialized knowledge that differs from engineers who specialize in environmental conditioning.
- No engineer, professional or degreed individual, can be knowledgeable of everything. That is why Professional Engineers focus on their core competencies—those to which they can show specific demonstrated and documented knowledge before their peers.

In addition, the Society would like to establish the following points for consideration:

- Note that what ASPE is proposing: placing plumbing as an **OPTION** under the MEPP examination as developed by the NCEES and administered by the various State Boards. There is **NO** attempt being made to develop "Plumbing Engineering" as a stand-alone discipline within the NCEES or any State Board.
- It is **NOT** in ASPE's interests to restrict the practice of any Registered Engineer or place any undue hardship on any engineering concern. As we understand it, that as a PE, one should be able to practice in any area that is within one's area of expertise and in which one can demonstrate competency therein. That competency is verified when one's peers are in agreement that the person has demonstrated sufficient knowledge in the product/work they produce. Under ASPE's proposal, this will **NOT** change. Current PEs who can meet this criterion **WILL** continue to be able to place their seal/signature on plumbing documents.
- The ultimate goal of the Society's initiative is the establishment of a verifiable measure of competency for the discipline of plumbing and the continued, no...**enhanced**, protection of the health, safety, and welfare of the public at large. As Registered Professional Engineers, we should not be expected to do any less?