

February 21, 2019

State Board of Registration for Professional Engineers and Surveyors  
77 S High Street  
Suite 2472  
Columbus, OH 43215

Dear Sirs:

RE: Plumbing Option for the Mechanical Engineering Principles and Practices Examination

The American Society of Plumbing Engineers (ASPE), through its Working Group, is seeking the placement of a plumbing option within the framework of the Mechanical Engineering Principles and Practices examination (MEPP) as developed by the National Council of Examiners for Engineering and Surveying (NCEES) and administered by the various State Boards.

In considering this initiative for the State of Ohio, the Board has asked some questions relative to this initiative. 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, there are 24-exams available that cover the broad topics of the "Big Four;" Mechanical, Electrical, Civil & Chemical engineering.
  - First time takes 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.
- Does ASPE have any data on the number of college graduates that 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 work force. It is once 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 toward getting plumbing electives within engineering programs.
- However, in our experience, such options do not educate or train an engineer in the application of engineering principles to the specifics of a design specialty; plumbing, HVAC, electrical systems, etc. Consider: 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 my experience that while adequate means exists of verifying the competency of candidates that are practicing within (for example) HVAC and Fire Protection, no such means exists for verifying the competence of those individuals that are practicing within the discipline of plumbing.
- What unique knowledge's 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 transpiration of sanitary and waste fluids; unique knowledge and skills are a simple understanding of code. Note that the underlying principles of code 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 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 or considered. Changing the pH of the water, allowed lead to be stripped from the existing piping and enter to drinking water of the consumer. This has and will continue to have a negative impact on the public 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 health, safety and welfare. Initially this was thought to be associated with HVAC cooling towers and some cases continue to be. However, a Legionella bacterium is a natural 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 publics' health, safety and welfare.
  - 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 design and construction of the dental office in question. It also alleges the city, during inspections of the office, should have caught the problem. The 19-year is now walking with difficulty, with help from a cane. Also, he is legally blind 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, can be knowledgeable of everything. That is why professional engineers focus on their core competencies; those to which they can show 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 is plumbing placed 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 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 ASPE'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.
- The ultimate goal of the Society's initiative is the establishment of a verifiable measure of competency for the discipline and the continued, no...**enhanced**, protection of the health, safety and welfare of the public-at-large. As registered engineers, should we be expected to do any less?

Therefore, we respectfully request the Board's support of our proposal and that the Board inform NCEES of said support.

On behalf of the Society, the Working Group and the membership, thank you for the opportunity to address the Board with our concerns.

Sincerely yours,

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