PIPING NEWS

A Newsletter published by W. M. Huitt Co.
for designers and engineers involved with process piping

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TRAINING COURSE FOR INDUSTRIAL PIPING DESIGN/ENGINEERING

With a planned launch in April 2019 we will be introducing a comprehensive 10 hour (10 PDH = 1 CEU) online training course for industrial piping design and engineering.

The syllabus for this course will be out soon outlining the many need-to-know aspects of piping design/engineering contained in this course.

The course guides you through and teaches you about the world of codes and standards. How they came about, how they are developed, how to interpret the language of codes and standards, what is the difference between a code and a standard, how do you handle code compliance when tying into existing piping systems, when would it be necessary for design and construction to meet the requirements of a code or standard, is it acceptable to adopt multiple codes for a single facility, and more.

After learning how codes and standards apply to your projects the course then moves into describing the various manual valves and fittings followed by a Chapter by Chapter discussion of the ASME B31.3 Process Piping Code.

After learning about the B31.3 Process Piping Code it then steps you through the process of preparing piping material specifications, selecting manual valves, and how to determine flange ratings. This is followed by key design elements, pipe fabrication, installation, testing, and finally turnover to the owner.

This course brings together the fundamental knowledge of interpreting and applying codes and standards, and key best practices of piping design/engineering.

And the best part, it can be done at your desk, at your gate in an airport, on board your flight, at home, anywhere you can connect to the internet.

More will be broadcast on the rollout of this course throughout April 2019, including the date it will be available, its cost, and how to register. If interested or have questions, please email us at: courses@wmhuittco.com. We will be happy to answer any questions and keep you abreast of the rollout progress.■

AN EXCERPT

What follows is an excerpt from an article on the multiple industry application of the ASME BPE Standard written by W. M. Huitt and published by Chemical Engineering magazine (https://www.chemengonline.com/):

Chemical Processing Industry (CPI) is a broad term generally considered to categorize such industries as chemical, petrochemical, and petroleum refining. It can also be argued that since extensive chemical processing is required in the pharmaceutical and biofuel industries they too fall into the category of a CPI as well. It

essentially denotes those industries that use raw and intermediate chemicals in a process to create a finished or intermediate product.

In fact Chemical Engineering is much more definitive in its definition of what constitutes a CPI. It includes: "...petrochemicals; drugs and cosmetics; explosives and ammunition; fats and oils; fertilizers and agricultural chemicals; foods and beverages; leather tanning and finishing; lime and cement; synthetic fibers; metallurgical and metal products; paints and coatings; petroleum refining and coal products; plastics; rubber; soap and detergents; stone, clay, glass and ceramics; wood, pulp, paper and board; other chemically processed products."

The initial clarification above is made in an attempt at re-directing the popular notion that the term CPI is narrowly focused on chemical, petrochemical, and petroleum refining facilities alone, the big three as it were. Even though an end product ostensibly defines or characterizes the singular type of industry that produces it, much of the equipment, instrumentation, pipe, tubing, design elements, and industry Standards used to design and construct a facility to manufacture such a product are typically utilized throughout multiple industries; multiple industries that include the big three as well as other industries also characterized as CPI's. Meaning that an industry Standard created for one industry, such as the pharmaceutical industry, will have content that is meaningful and relative to other CPI's such as the biofuel and chemical industries.

Across the wide spectrum of the more than 200 American National Standard (ANS) Developers, those organizations accredited by ANSI (American National Standards Institute) to develop industry Standards, and the more than 10,000 American National Standards that are published by the ANS developers, there is an ongoing effort to ensure harmonization among those Standards.

As a result of this harmonization effort the engineer of a CPI facility can readily make use of multiple Industry Standards on a single project without concern of conflicting statements between those Standards. That is not to say that a more stringent requirement will not exist in one Standard over another. This is normally rectified by including, in proprietary specifications and guidelines, a statement to the effect that, "the more stringent requirement shall govern".

In adopting these industry Standards an engineer is drawing upon the consensus of committees of experts in which the results of pertinent subject matter have been assessed, analyzed, debated, and voted on at multiple levels, culminating in accredited standardization. Not only is the content of these industry Standards arrived at through a rigid internal process, but also through inter-Standard communication.

What this means for the end user is this: Unless a project is regulated by a specific Code that has been adopted as a Federal, State, or municipal regulation, you may specify, through contract stipulation or project specifications, the requirement to comply with a particular set of Codes and Standards. These requirements may specify ASME B31.3 – Process Piping as the main compliance piping Code for a project, with or without exceptions. Additionally, the project requirements will dictate the need to reference Codes and Standards beyond those requirements captured in B31.3.

Such requirements will include Standards for components and material of construction (MOC), as well as specialized needs such as those carried in the ASME – BPE (Bioprocessing Equipment) Standard or requirements for boiler external piping, which is not covered by B31.3, but is instead covered by B31.1 – Power Piping. In the case of the component related Standards, these are generally adopted as a whole with optional requirements within the particular Standard that need to be specified in the procurement documentation. The same thing holds true with material Standards such as

ASTM A53, A106, A312, etc. These Standards too are adopted as a whole with optional requirements within the Standard that need to be specified in the procurement documentation.

When using a piping Code such as B31.3 as a base Code for a project other piping Codes and Standards can be referenced for compliance when the following occurs:

1 The referenced requirement is not already contained in the base Code.
2 The referenced requirement is more stringent than that contained in the base Code,
3 The referenced requirement does not conflict with a "not permitted" statement in the base Code. Such as:

a. B31.3 Para. 306.4.4(c) A flared lap is not permitted under severe cyclic conditions.

This discussion thus far leads me to make the point that even though a project has adopted a base piping code, either by the authority of government regulation or by engineering decision, it is beneficial and even necessary for the engineer to look to other standards in defining additional requirements a project will need beyond those covered in the base Code.

Rather than a company spending time and money defining needed requirements not covered by B31.3 or B31.1, look to other Standards in which vetted requirements matching a project's needs may already exist; Case in point, the BPE Standard. (To be continued.)■

Next month's Newsletter will continue the discussion on this topic of crossover code applications.

PIPE VS TUBE (AND MORE)

Pipe vs tube. What's the difference between these two terms? This is a question that comes up more often than one would think. Particularly while pondering the deep rich foam on an ice cold Guinness Stout. But to be quite honest, and perhaps a little flippant about this question, it's like nuancing a hole surrounded by a solid mass that has length. But, in turning to my more pragmatic side, let's look at how these two terms might differ, and whether or not they actually do.

The first thing we will do is find out what Mr. Webster (The dictionary, not your 8th grade English teacher.) and Oxford has to say about the two terms. And in doing so I will point out that, like most terms, there are also multiple definitions for these two subject terms. But the definitions we present here are only the definitions of the nouns that most closely relate to industrial pipe and tube, as follows:

Webster:

pipe: a long tube or hollow body for conducting a liquid, gas, or finely divided solid or for structural purposes.

tube: any of various usually cylindrical structures or devices: such as a hollow elongated cylinder especially one to convey fluids

Oxford:

pipe: A tube used to convey water, gas, oil, or other fluid substances.

tube: A long, hollow cylinder of metal, plastic, glass, etc. for holding or transporting something, chiefly liquids or gases.

With regard to the term *pipe* the two definitions above coalesce around the essential definition of "a tube that conveys a fluid." Suggesting that pipe is essentially a tube.

With regard to the term *tube* the two definitions above coalesce around the essential definition of "a long, hollow cylinder used to transport fluids." Which, inversely can also mean pipe.

Not really much, if any difference between the two terms, according to our two sourced dictionaries at any rate. They mean basically the same thing, just phrased differently. That being said, the two terms, as generally used, are then

PIPE VS TUBE (cont.)

synonymous. So why do some sources imply that these two terms hold different meanings? The answer is that codes and standards, like any legal document, are written in a very precise manner. A manner in which a rule is very narrowly defined by its terminology, leaving no ambiguity, hopefully, as to the intent of that rule.

Problem is that the definition of many general use terms carry multiple variations, or nuances to a term's meaning, as alluded to above. Such multiple choice in a term's definition opens the door to misinterpretation and misunderstanding. Two outcomes the developers of codes and standards try, with extreme effort, to avoid. The intent could otherwise become lost on the reader. Leaving open the possibility of damages and liable. A perception that is not lost on those developing and maintaining codes and standards.

To avoid such an issue, a code or standard will create what is generally referred to as a "term of art." This is where a general use term, or a form of that term is used in a certain and very specific manner. A manner that requires its intended meaning to be better and more specifically defined in the code or standard in which it is used. This is why codes, standards, and government regulations have a section of definitions within their content. The terms included in a code, standard, or regulation are those that are defined specifically for the document it is included in.

Here are definitions, as examples, of pipe and tube as defined by the ASME BPE Standard, B31.3 Process Piping Code, and the B31.1 Power Piping Code:

BPE definitions of pipe and tube:

> *pipe*: pipe size is determined by diameter and schedule, series, or SDR. For bioprocessing equipment, pipe does not include tube.

PIPE VS TUBE (cont.)

tube: tube is sized by its nominal outside diameter. For bioprocessing equipment, tube does not include pipe.

B31.3 definitions of pipe and tube:

pipe: a pressure-tight cylinder used to convey a fluid or to transmit a fluid pressure, ordinarily designated "pipe" in applicable material specifications. Materials designated "tube" or "tubing" in the specifications are treated as pipe when intended for pressure service.

Types of pipe, according to the method of manufacture, are defined as follows: (It then goes on with a lengthy description of the types of pipe.)

tube: see pipe.

B31.1 definitions of pipe and tube:

pipe and tube: the fundamental difference between pipe and tube is the dimensional standard to which each is manufactured.

A pipe is a tube with a round cross section conforming to the dimensional requirements for nominal pipe size as tabulated in ASME B36.10M, Table 1, and ASME B36.19M, Table 1. For special pipe having a diameter not listed in these Tables, and also for round tube, the nominal diameter corresponds with the outside diameter.

A tube is a hollow product of round or any other cross section having a continuous periphery. Round tube size may be specified with respect to any two, but not all three, of the following: outside diameter, inside diameter, wall thickness; types K, L, and M copper tube may also be specified by nominal size and type only. Dimensions and permissible variations (tolerances) are specified in the appropriate ASTM or ASME standard specifications.

Types of pipe, according to the method of manufacture, are defined as follows: (It then goes on with a lengthy description of the types of pipe.)

PIPE VS TUBE (cont.)

As you can see by the above preferential definitions of pipe and tube, the BPE Standard and the B31.1 and B31.3 codes each have their own slant on what those terms mean within the context of each of those documents.

The BPE standard avoids defining either term by electing to describe contributing factors as to what constitutes pipe or tube. It then states that pipe is not tube and tube is not pipe.

B31.3 gets closer to a definition by stating that pipe is, "a pressure-tight cylinder used to convey a fluid…" It then goes on to state that tube is, "…treated as pipe when intended for pressure service." For a definition of *tube* it refers the reader back to pipe.

B31.1 gets closest when it states that, "the fundamental difference between pipe and tube is the dimensional standard to which each is manufactured." It then goes on to define *pipe* as, "…a tube with a round cross section conforming to the dimensional requirements…" And it further defines *tube* as, "…a hollow product of round or any other cross section having a continuous periphery."

The bottom line being, when it comes to designing and building a process facility under rules governed by a construction code or standard, such as those mentioned above, the two terms, *pipe* and *tube*, are defined as indicated in the appropriate code or standard. General use dictionary definitions in such cases do not apply.

But, in taking the broader view, always check the proprietary definition of terminology used in codes, standards, and regulations. Or, as Inigo Montoya was heard to say to Vizzini: *You keep using that word. I do not think it means what you think it means*.■

ASME B31.3 and BPE MEETINGS

The ASME B31.3 Process Piping Committee meets two times each year and the BPE Committee meets three time each year. This year their Meetings, which are open to the public, will be held as follows:

ASME B31.3 and BPE MEETINGS (cont.)

B31.3 Process Piping Committee Meeting

Spring 2019

April 15 2019 08:30 AM to April 17 2019 05:00 PM, Monday - Wednesday

Venue & Location:

Marriott University Park Salt Lake
http://www.marriott.com/slcup
480 Wakara Way
Salt Lake City, UT, United States

Fall 2019

September 16-18, 2019 – Monday-Wednesday, with B31 Code Week

Venue & Location:

Lord Baltimore Hotel
http://www.lordbaltimorehotel.com
20 West Baltimore Street
Baltimore, MD, United States

Spring 2020

April 06 2020 08:30 AM - April 08 2020 05:00 PM, Monday - Wednesday

Venue & Location:

Royal Sonesta New Orleans
http://https://www.sonesta.com/us/louisiana/new-orleans/royal-sonesta-new-orlenas
300 Bourbon Street
New Orleans LA, United States

Bioprocessing Equipment (BPE) Committee Meetings

Spring 2019

May 20 2019 08:00 AM to May 23 2019 12:00 PM, Monday - Thursday

Venue & Location: (Following page)

Bioprocessing Equipment (BPE) Committee Meetings (cont.)

Venue & Location: (cont.)

Portland Marriott City Center
http://www.marriottportland.com
520 SW Broadway Date Offered (5/20-5/23)
Portland Oregon, United States

Fall 2019

September 09 2019 08:00 AM to September 12 2019 12:00 PM, Monday - Thursday

Venue & Location:

Lord Baltimore Hotel
http://www.lordbaltimorehotel.com
20 West Baltimore Street
Baltimore, MD, United States

For information with regard to any of the meetings, registration, etc. please contact us at wmhuitt@wmhuittco.com. We will either provide the information you need or put you in contact with the appropriate ASME staff member.■

FINAL COMMENTS

If you have a particular piping design topic you would like us to cover please let us know. Going forward we hope to touch on many of the unanswered questions you might have with regard to code compliance, regulatory issues, and general design essentials.

Among many other things, we will discuss how codes and standards are harmonized in order to work together without conflict and how to maintain code compliance when tying into a system that has been in operation for many years.■

QUICK NOTE ON PRESSURE

Not the kind of pressure you feel around tax time, but the pressure your pipe and equipment feel while in operation. There are three main pressure terms used in defining processing pressures, as follows:

- Operating (or working) pressure
- System design pressure
- Leak test pressure

There are many more pressure terms that come into play when the discussion gets around to pressure safety devices, but those will be visited in a later issue.

Back to the above pressures; you will not find a standardized definition of these terms. Their definitions are, in many cases, implied, but never defined within a code or standard. The term “design pressure” under B31.3 refers the reader to para. 301.2, which describes the design pressure parameters for components, not a piping system.

Having said that, we will attempt to provide definitions that are generally acceptable for these terms, as follows:

Operating (aka working) pressure: The expected gage pressure a fluid is expected to operate at.

System design pressure: A gage pressure limit at a coincident temperature at which a fluid is not expected to exceed. (Note: The design pressure can be based on a pump’s TDH, process limitations, or equipment limitations. Such limitations are controlled by pressure relief devices and/or pressure control devises.)

Leak test pressure: The internal gage pressure, depending on the type of test, at which a system undergoes a joint integrity test. The test pressure is calculated based on system design pressure.

That’s all for this issue. Thanks for reading.■

QUESTION OR COMMENTS

If you would like us to address a specific topic or simply answer a question, related or unrelated to the content of this Newsletter, please contact us at: staff@wmhuittco.com. In the subject line of the email please enter “Newsletter Question/Comment.”

If you no longer wish to receive this Newsletter please contact us at: staff@wmhuittco.com. In the subject line of the email please enter “Cancel Newsletter.” We do respect your right to privacy.

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