Addison Raine
Co-Chair, CoP Steering Committee

Disposables Community of Practice (CoP)

ISPE Boston Chapter – Product Show

02 October 2024

Shaping the future of the global pharmaceutical industry by providing solutions to complex challenges through manufacturing and supply chain innovation, member and workforce development, technical, regulatory, and quality leadership.

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ISPE Disposables Communities of Practice (CoP)

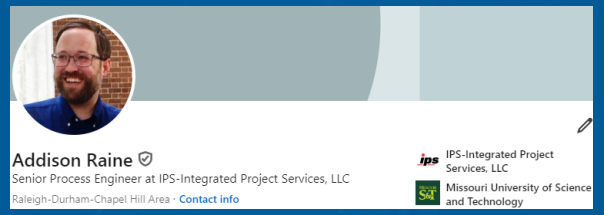
- The ISPE Disposables CoP provides ISPE members a venue for support among biopharmaceutical professionals working in the area of single-use disposables technologies.

- The aim of Disposables CoP is to support the growing adoption of single-use technology by providing recommendations for selection, validation and implementation of single-use technology.

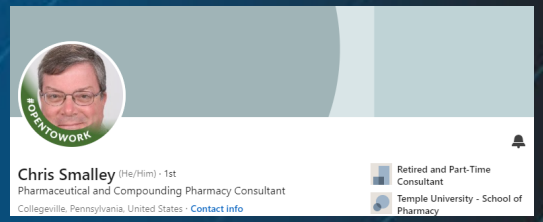
- Our members include end-users, vendors, consultants, and regulators that are involved in the design, manufacturing, quality, validation, implementation and use of single-use technology in pharmaceutical processes.

2024 ISPE Disposable CoP Steering Committee

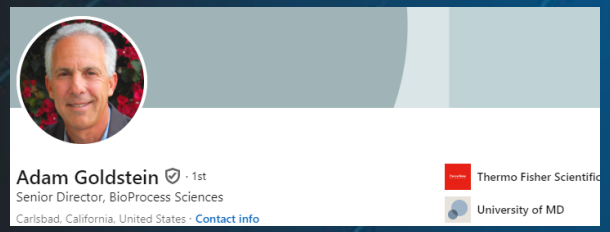
Chair

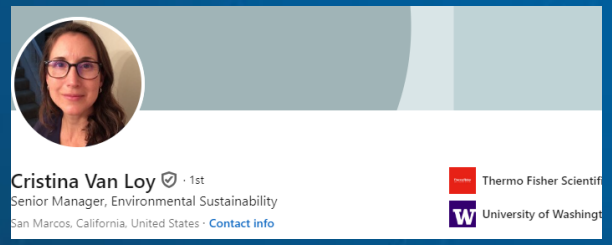


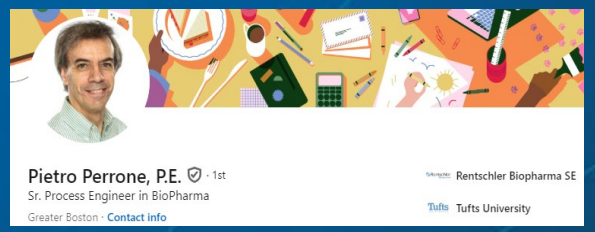
Co-Chair

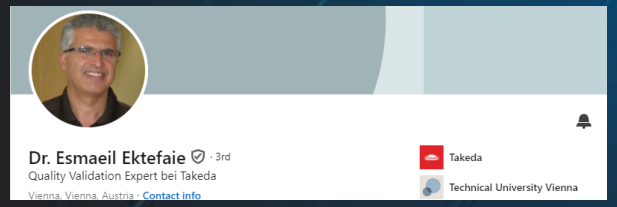


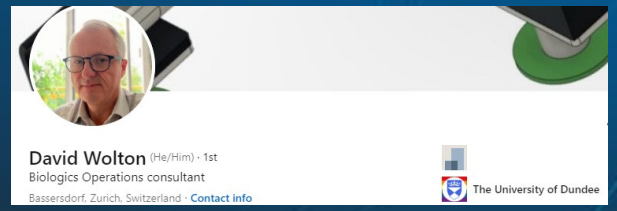
Secretary

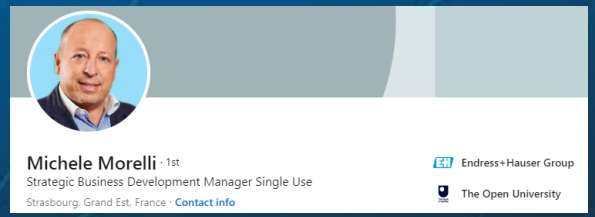


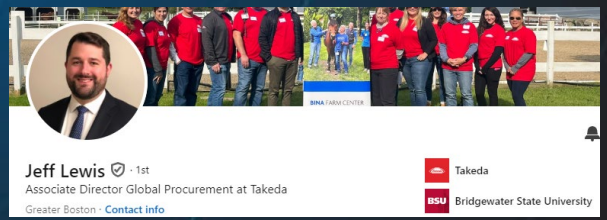












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ISPE Disposables CoP Activities
Sustainability Sub-Team

- SUT Waste Quantitation Project
  - Monoclonal antibody production used as basis for analysis
  - Accepted Pharmaceutical Engineering article – Nov/Dec 2024
  - Collaborative effort with BioPharm
- End of Life Survey
  - What is everyone doing with their single use after their single use?
  - Presented here in 2023
  - Accepted Pharmaceutical Engineering article – Nov/Dec 2024

- For more information or to volunteer, please contact:
  - Adam Goldstein – adam.goldstein@thermofisher.com
  - Cristina Van Loy – cristina.vanloy@thermofisher.com

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ISPE Disposables CoP Activities
Good Practice Guide Revision

- Reviewed all sections and revising most
- Catching up to current regulations
  - USP 88, 665, 1665; ICH Q3E
  - Country standards e.g. Japan, Brazil, China
- Updating latest technologies
  - PUPSIT
  - X-Ray sterilization
  - Single use for powders/OSD
- New chapter on Sustainability
- For more information or to volunteer, please contact:
  - Addison Raine – araine@ipsdb.com

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ISPE Disposables CoP Activities
Presentations, White Papers, Articles

- *Mechanical Recycling of Post-Use Bioprocessing Plastic Containers*
  - Javier Lozano, Simon Massot, Miriam Monge
  - Webinar, 10-Sep-2024
  - Available in the ISPE Webinar Library
- Implementing X-Ray for Single-Use Systems Sterilization
  - Samuel Dorey, Javier Lozano
  - Webinar, 07-Sep-2023
- *End-Of-Life Management for Single-Use Products in Bioproduction*
  - Sustainability Sub-Team
  - iSpeak Blog, 14-Mar-2023 & 24-Mar2023
- *Supply Crisis Roundtable*
  - *Dharti Pancholi*
  - *Presentation, 31-Oct-2022 ISPE Annual Meeting*

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ISPE Disposables CoP Activities

Organization Collaboration / Harmonization

- Many Voices and Lyrics, One Song
- All here to promote, advance, and make single use solutions better in the pharmaceutical industry.

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PDA®
Parenteral Drug Association

BPSA℠
Bio-Process Systems Alliance
Advancing Single-Use Worldwide

BioPhorum

ISPE®

All logos belong to their respective organizations.

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ISPE Disposables CoP Activities
Steering Committee Membership Call

- Current openings for steering committee members
  - One Teams meeting per month
  - Face-to-face meeting at ISPE Annual Meeting
  - Volunteer opportunities at ISPE events

- For more information, please contact:
  - Javier Lozano – Javier.Lozano@pmgroup-global.com
  - Addison Raine – araine@ipsdb.com
  - Tim Postlethwaite – Tpostlethwaite@ispe.org

ASME BPE

Structure of ASME BPE – Single-Use Content

ISPE Boston
Date: October 2nd, 2024
Presenter: Milena McFeeters – Chairperson ASME BPE

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Milena McFeeters— President, Refined Sciences Inc.

- +25 years experience in bioprocessing:
  - Manufacturer of multiuse and single-use components, assemblies and equipment
  - Bioprocessing consultant for end-users and equipment manufacturers
- 7 years experience in SUTs
- Chairperson ASME BPE, Standards Committee, Member, PM and MC Subcommittees, Member Board of Pressure Technology Codes and Standards
- Active ISPE GLC Member
- ChemE, MBA. Various publications on bioprocessing mixing technologies

Who or what is the ASME BPE?

- ✓ A globally industry standard that biopharmaceutical manufacturers and regulators can reference.
  - ✓ Intended for new construction
- ✓ A framework to provide cost savings on a project
  - ✓ Reduce qualification and validation costs
  - ✓ Eliminate unnecessary audits and URS
  - ✓ Streamline supply chain, and more…
- ✓ Provide development and production efficiencies.
  - ✓ By applying “lessons learned” by industry
- ✓ Enable growth, industrialization, and globalization.
  - ✓ International standardization simplifies many processes, procedures, and operations

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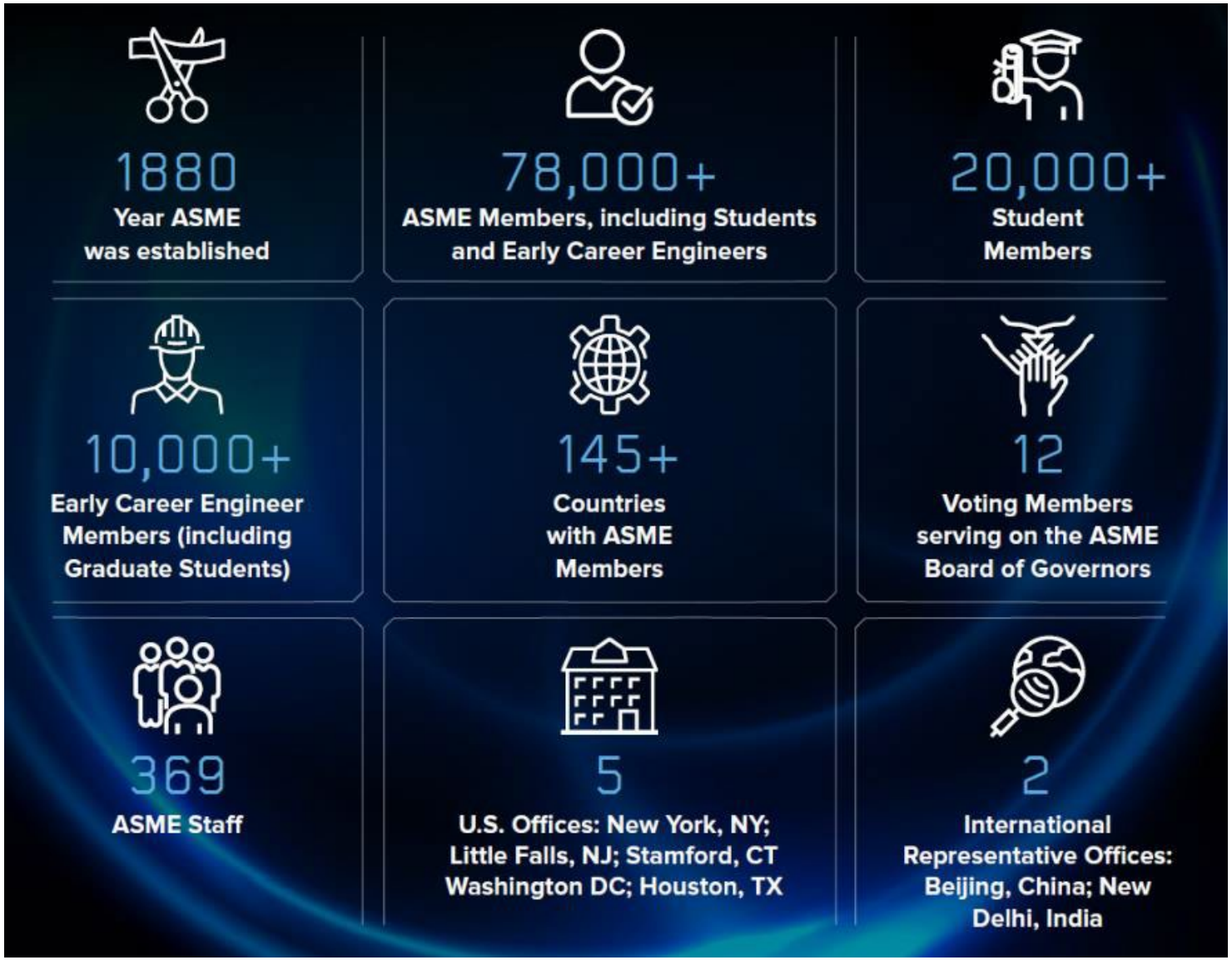
Who or what is the ASME BPE?



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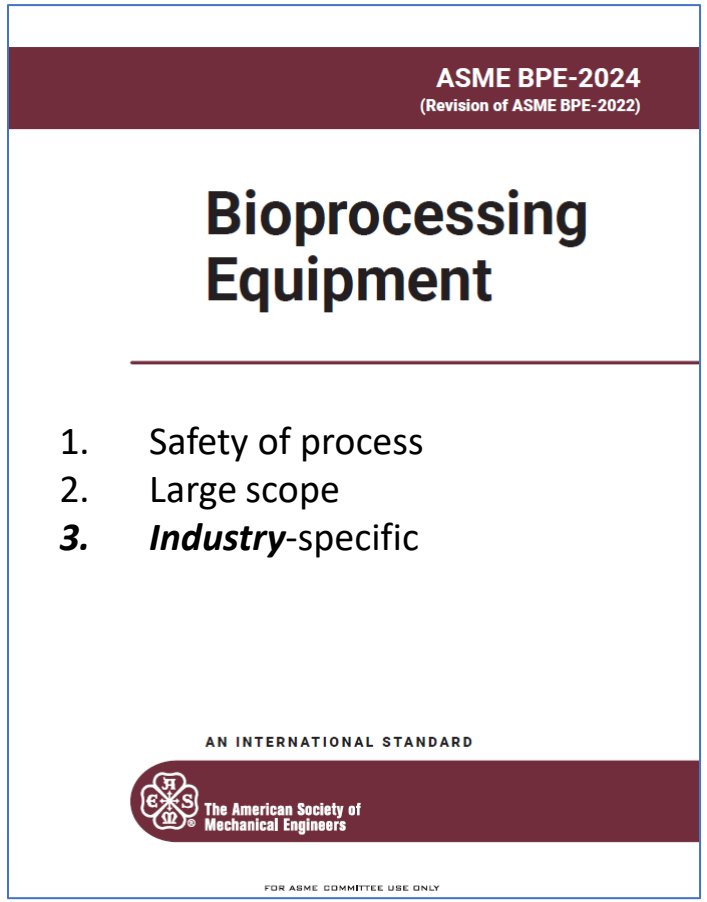
Who or what is the ASME BPE?

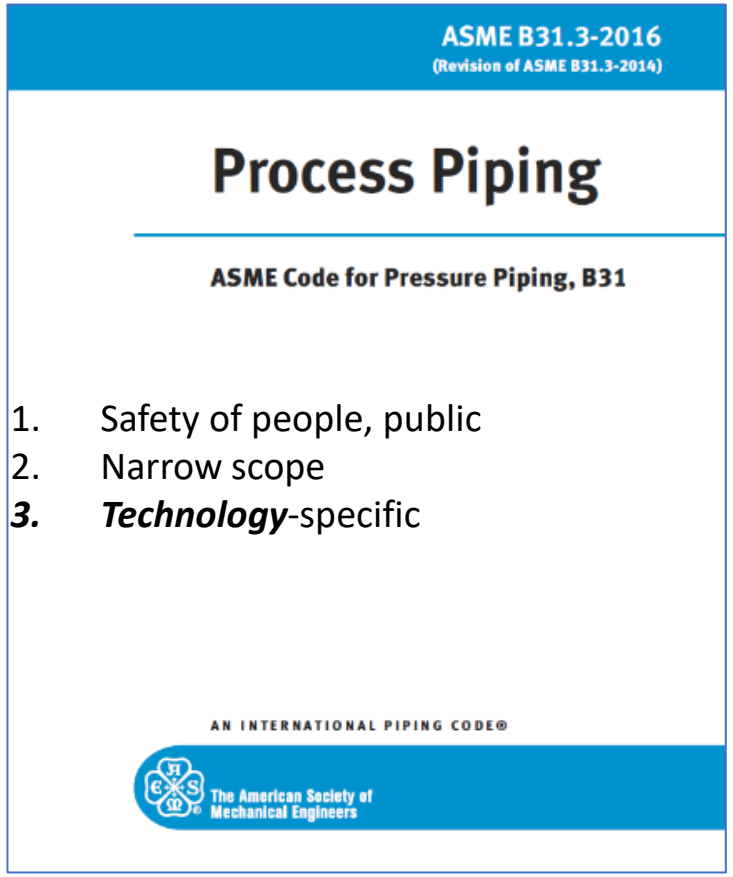
Patient Safety and Product Purity



1. Safety of process
2. Large scope
3. ***Industry***-specific

Standard

Operator and Public Safety

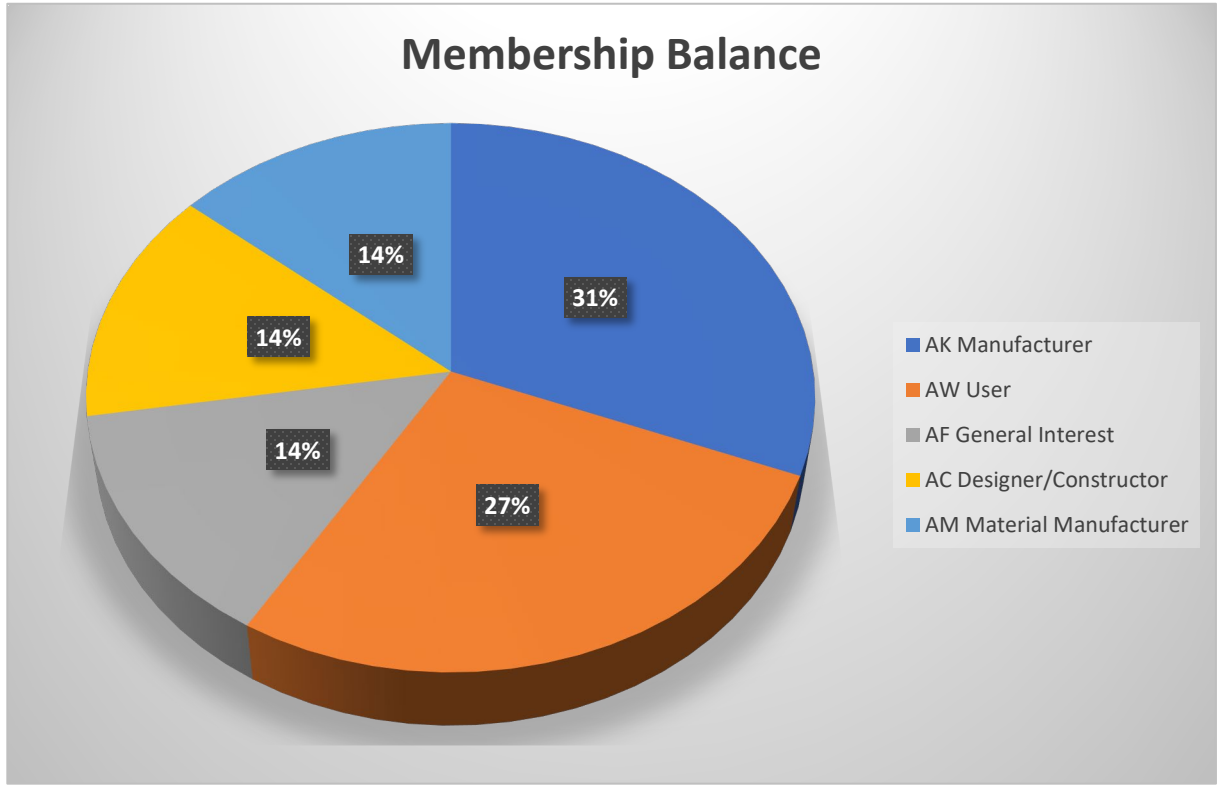


1. Safety of people, public
2. Narrow scope
3. ***Technology***-specific

Code

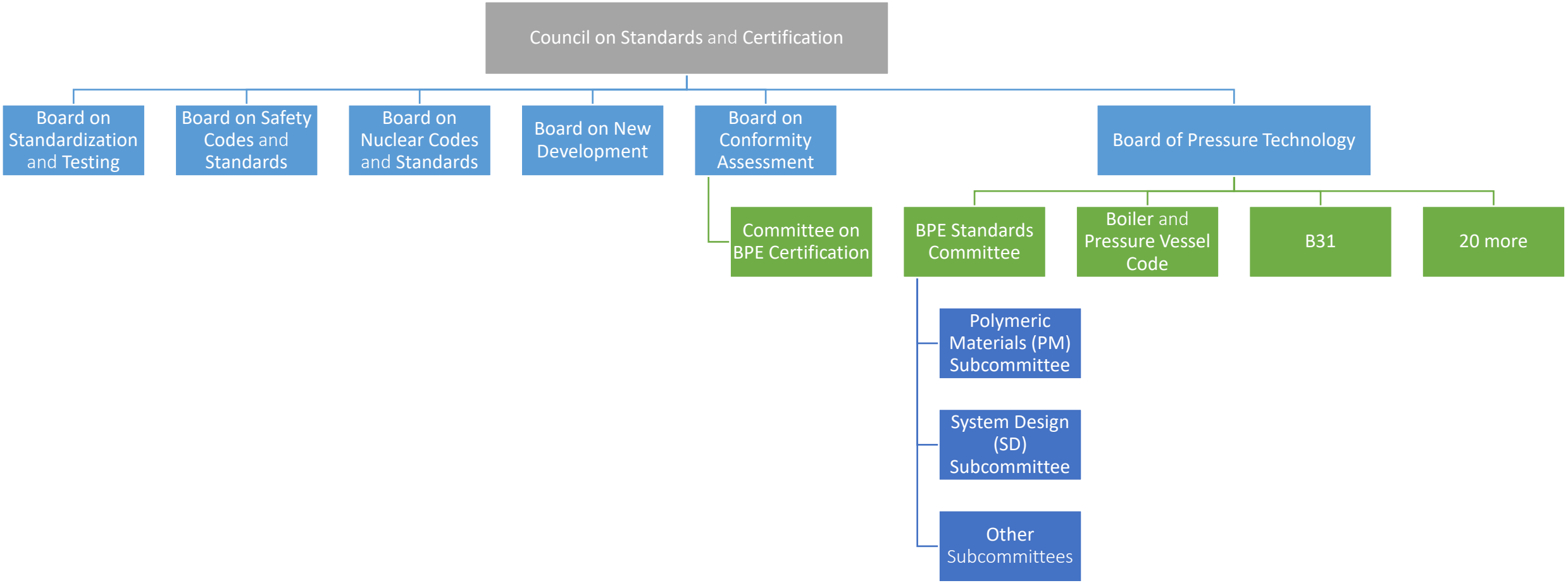
Who or what is the ASME BPE?

- Voluntary Consensus **Standard**
- Founded 1988, first edition in 1997
- Proprietary technology NOT PERMITTED
- Updated every (2) years
- Balanced team of Subject Matter Experts
  - Currently **292** voting “seats”!



Next meeting: Albuquerque, NM. Sept. 9–12, 2024

Who or what is the ASME BPE?



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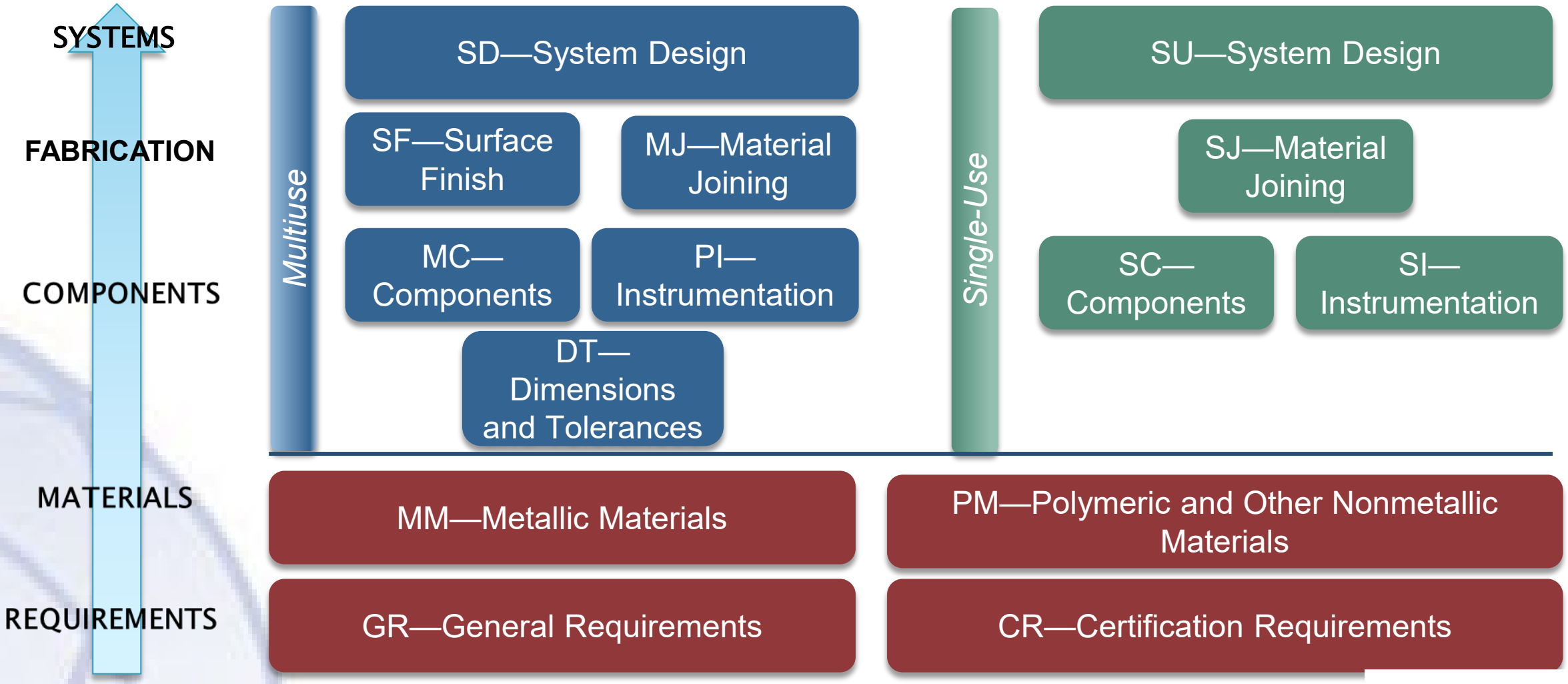

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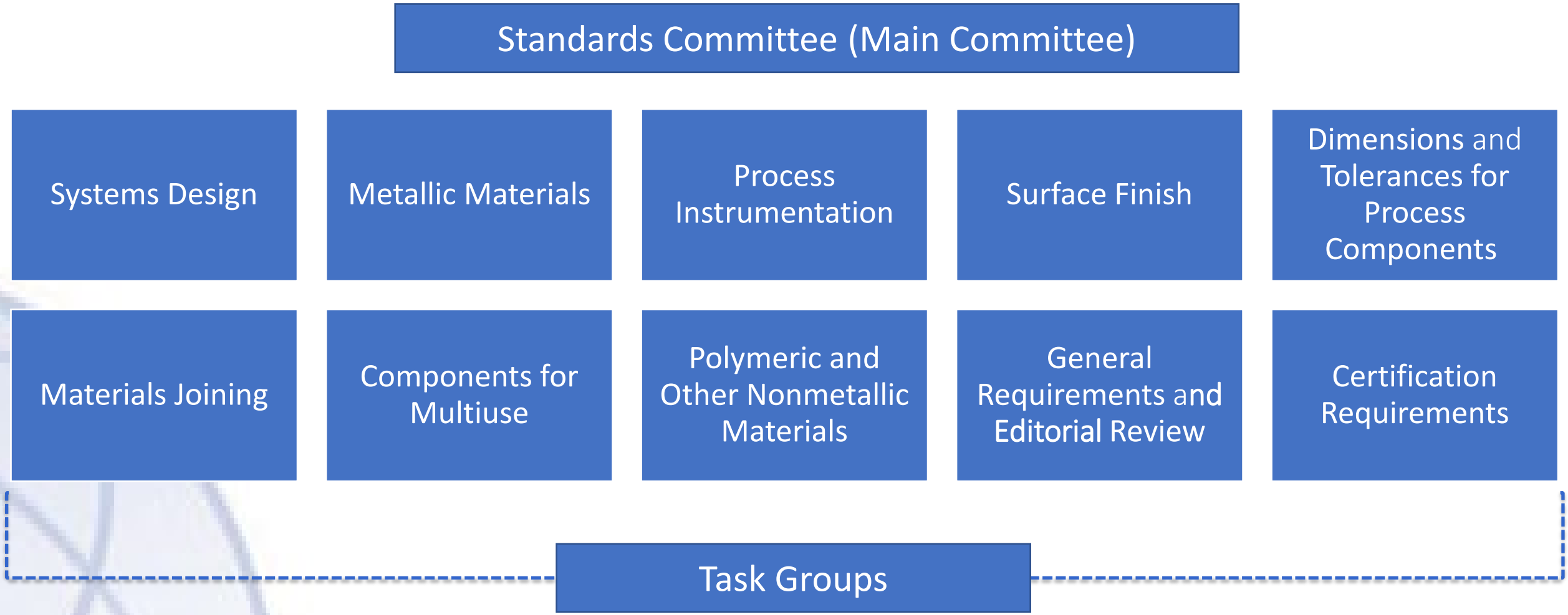


Why the ASME BPE for Single-Use?

2009 — First mention of Single-Use in BPE

2012 — Relocation to PM-4 Applications

One page:
-Identification
-Inspection and Packaging
-Joining methods
-Biocompatibility
-Sterilization

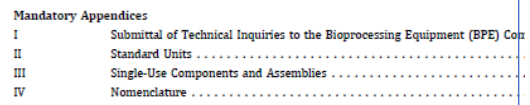
2014 — Additional content

Two pages:
-Revision of biocompatibility
-Addition shelf-life, storage, and expiration date

2016 — Additional content

Three pages:
-Addition of first component: Steam through connectors

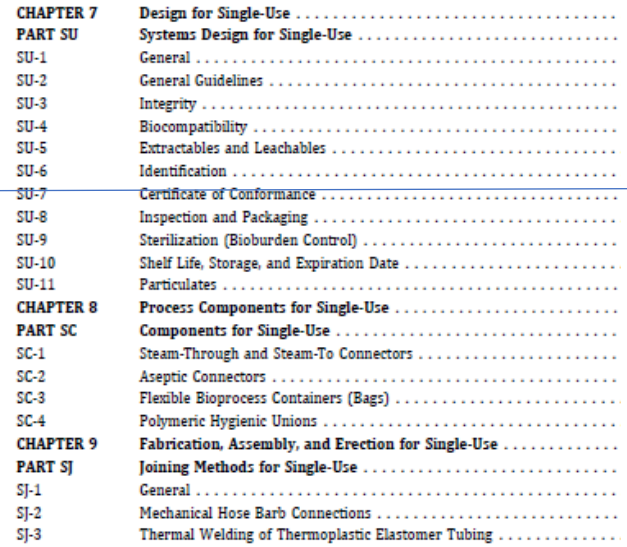
2019 — Move to Mandatory Appendix, new content


Mandatory Appendices

I	Submittal of Technical Inquiries to the Bioprocessing Equipment (BPE) Cor
II	Standard Units
III	Single-Use Components and Assemblies
IV	Nomenclature

2022 — New Structure and additional content

10 pages mandatory content,
3 Nonmandatory Appendices:
-NMA P: Extractables and Leachables
-NMA FF: Leak Test Methods for SUT
-NMA GG: SU Mechanical Hose Barb Design



CHAPTER 7	**Design for Single-Use**
PART SU	**Systems Design for Single-Use**
SU-1	General
SU-2	General Guidelines
SU-3	Integrity
SU-4	Biocompatibility
SU-5	Extractables and Leachables
SU-6	Identification
SU-7	Certificate of Conformance
SU-8	Inspection and Packaging
SU-9	Sterilization (Bioburden Control)
SU-10	Shelf Life, Storage, and Expiration Date
SU-11	Particulates
CHAPTER 8	**Process Components for Single-Use**
PART SC	**Components for Single-Use**
SC-1	Steam-Through and Steam-To Connectors
SC-2	Aseptic Connectors
SC-3	Flexible Bioprocess Containers (Bags)
SC-4	Polymeric Hygienic Unions
CHAPTER 9	**Fabrication, Assembly, and Erection for Single-Use**
PART SJ	**Joining Methods for Single-Use**
SJ-1	General
SJ-2	Mechanical Hose Barb Connections
SJ-3	Thermal Welding of Thermoplastic Elastomer Tubing

2024 — Additional content (Published May 2024)

13 pages mandatory content,
4 Nonmandatory Appendices:
-NMA P: Extractables and Leachables
-NMA FF: Leak Test Methods for SUT (revised)
-NMA GG: SU Mechanical Hose Barb Design
- NEW NMA HH: Testing References for SU Bags

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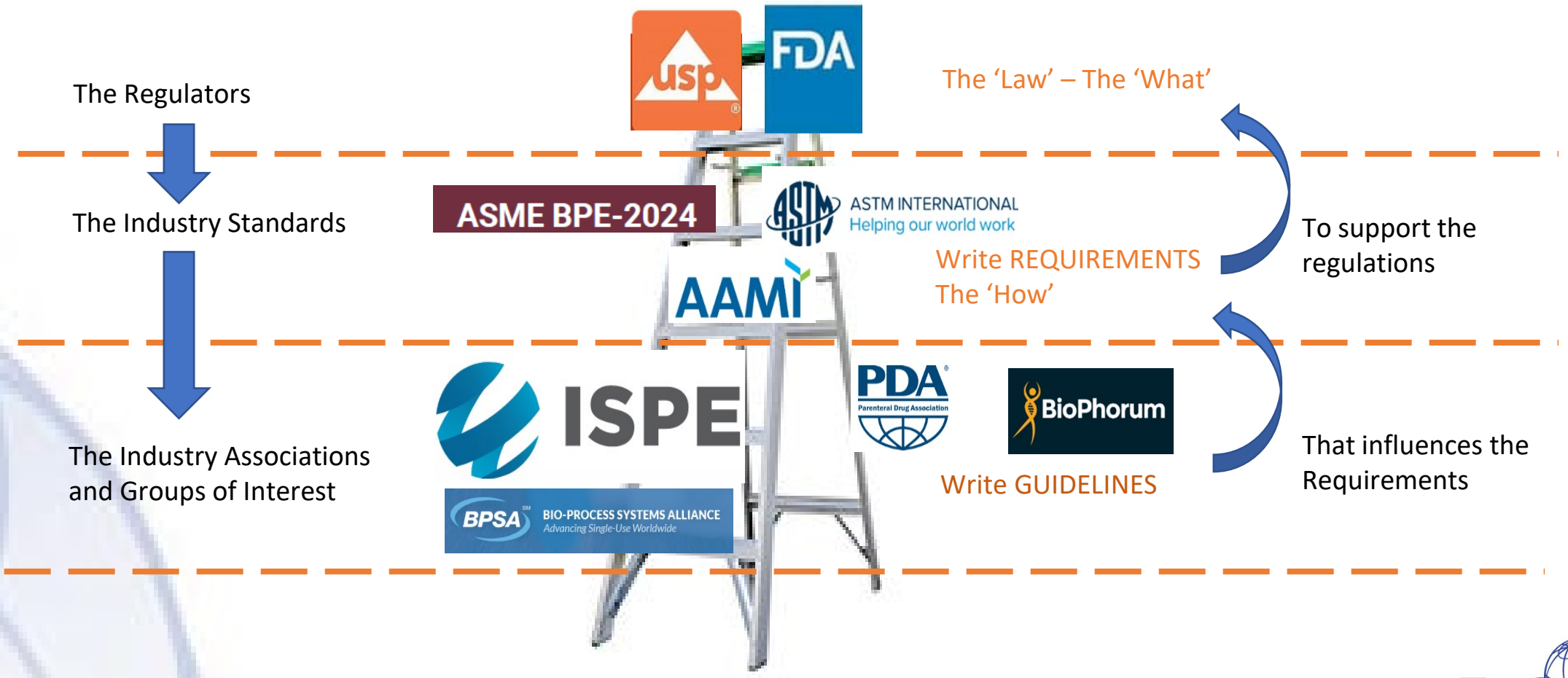
The Alphabet Soup Ladder

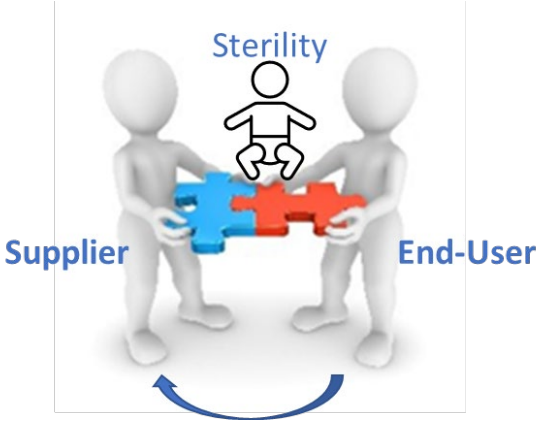


Why the ASME BPE for Single-Use?

State of SUTs Conformance Requirements

Clear requirements for SUTs are an imperative to mitigate risk:

- SUTs manufacturers are not audited by FDA or any other agency
- SUTs manufacturers are responsible for qualification, validation and monitoring of key processes
- No ability in many cases for end-users to check some of these unless conducting destructive test:
  - Sterility
  - Particulates
  - Endotoxins
  - Integrity



Why the ASME BPE for Single-Use?

State of SUTs Conformance Requirements

The Challenge:

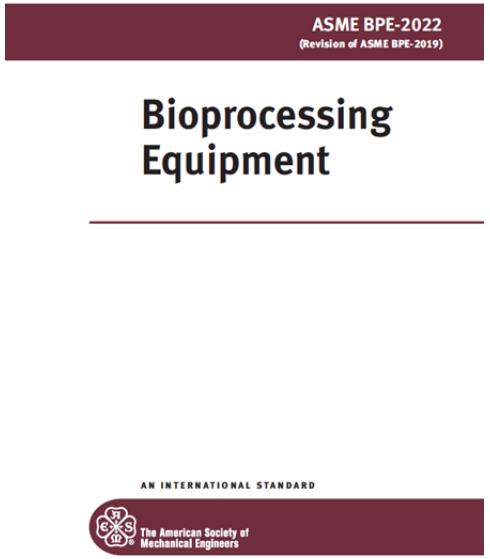
- A lot of work done at the Industry Guideline level – ***NOT MANDATORY***, not written as requirements, may be open to interpretation
- ***Medical device Standards are well developed but NOT 100% applicable to SUTs as bioprocess equipment***
- Early stages for Industry Standards adding clear mandatory requirements to SUTs.
- Need more understanding of SUTs from Consensus Body that have traditionally covered multiuse

Why the ASME BPE for Single-Use?

State of SUTs Conformance Requirements

The Opportunity:

- Establish clear requirements for SUTs (MOCs, design and performance requirements)
- 'Interpret' Med Device Standards to requirements that make sense to bioprocessing equipment (e.g., Sterilization Validation). Fill the void
- More requirements apply to the suppliers: the Standard can mandate requirements in areas where it cannot in multiuse:
  - ✓ Qualification
  - ✓ Validation
  - ✓ Design Conformance
- Establish a Certification Program for SUTs (future)



What's in the ASME BPE Standard today?

- CHAPTER 7 DESIGN FOR SINGLE-USE
  - PART SU SYSTEMS DESIGN FOR SINGLE-USE
    - SU-1 GENERAL
    - SU-2 GENERAL GUIDELINES
    - SU-3 INTEGRITY
      - SU-3.1 Maintenance of Integrity
      - SU-3.2 Integrity Versus Leak Testing and Correlation to Maximum Allowable Leakage Limit
      - SU-3.3 Common Leak and Integrity Test Methods
    - SU-4 BIOCOMPATIBILITY
    - SU-5 EXTRACTABLES AND LEACHABLES
      - SU-5.1 General
    - SU-6 IDENTIFICATION
      - SU-6.1 Labeling
    - SU-7 CERTIFICATE OF CONFORMANCE
    - SU-8 INSPECTION AND PACKAGING
      - SU-8.1 Inspection
      - SU-8.2 Packaging
    - SU-9 STERILIZATION AND BIOBURDEN REDUCTION
      - SU-9.1 Ionizing Radiation
      - SU-9.2 Steam Sterilization
      - SU-9.3 Chemical Sterilization
    - SU-10 SHELF LIFE, STORAGE, AND EXPIRATION DATE
    - SU-11 PARTICULATES
      - SU-11.1 General
      - SU-11.2 Particulate-Monitoring Program
      - SU-11.3 Mitigation Techniques
    - SU-12 DESIGN CONFORMANCE

Mandatory Content – 'SHALL' statements

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What's in the ASME BPE Standard today?

- CHAPTER 8 PROCESS COMPONENTS FOR SINGLE-USE
  - PART SC COMPONENTS FOR SINGLE-USE
    - SC-1 STEAM-THROUGH AND STEAM-TO CONNECTORS
    - SC-2 ASEPTIC CONNECTORS
      - SC-2.1 Manufacturer Responsibilities
      - SC-2.2 Owner/User Responsibilities
    - SC-3 FLEXIBLE BIOPROCESS CONTAINERS (BAGS)
      - SC-3.1 Materials
      - SC-3.2 Qualifications
    - SC-4 POLYMERIC HYGIENIC UNIONS
    - SC-5 VALVES
      - SC-5.1 General
      - SC-5.2 Pinch Clamps
      - SC-5.3 Pinch Valves
      - SC-5.4 Diaphragm Valves
      - SC-5.5 Material Requirements
      - SC-5.6 Valve Performance
      - SC-5.7 Identification Requirements

What's in the ASME BPE Standard today?

- CHAPTER 9 FABRICATION, ASSEMBLY, AND ERECTION FOR SINGLE-USE
  - PART SJ JOINING METHODS FOR SINGLE-USE
    - SJ-1 GENERAL
    - SJ-2 MECHANICAL HOSE BARB CONNECTIONS
      - SJ-2.1 Operating Conditions
      - SJ-2.2 Assembly
      - SJ-2.3 Qualification
    - SJ-3 THERMAL WELDING OF THERMOPLASTIC ELASTOMER TUBING
      - SJ-3.1 Specifications
      - SJ-3.2 Design Parameters
      - SJ-3.3 Acceptance Criteria
  - PART SI SINGLE-USE PROCESS INSTRUMENTATION
    - SI-1 PURPOSE AND SCOPE
    - SI-2 SINGLE-USE PROCESS INSTRUMENTATION GENERAL REQUIREME...

What's in the ASME BPE Standard today?

NONMANDATORY APPENDIX P GENERAL BACKGROUND/USEFUL INFORMATION FOR EXTRACTABLES AND LEACHABLES

NONMANDATORY APPENDIX FF LEAK AND INTEGRITY TEST METHODS FOR SINGLE-USE SYSTEMS

NONMANDATORY APPENDIX GG SINGLE-USE MECHANICAL HOSE BARB DESIGN RECOMMENDATIONS

NONMANDATORY APPENDIX HH PHYSICAL AND FUNCTIONAL TESTING REFERENCES USED TO CHARACTERIZE SINGLE-USE BAGS

Nonmandatory Content – 'SHOULD', recommendations

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What is the ASME BPE Standard working on?

Task Groups – New content published 2024 Edition and continued work

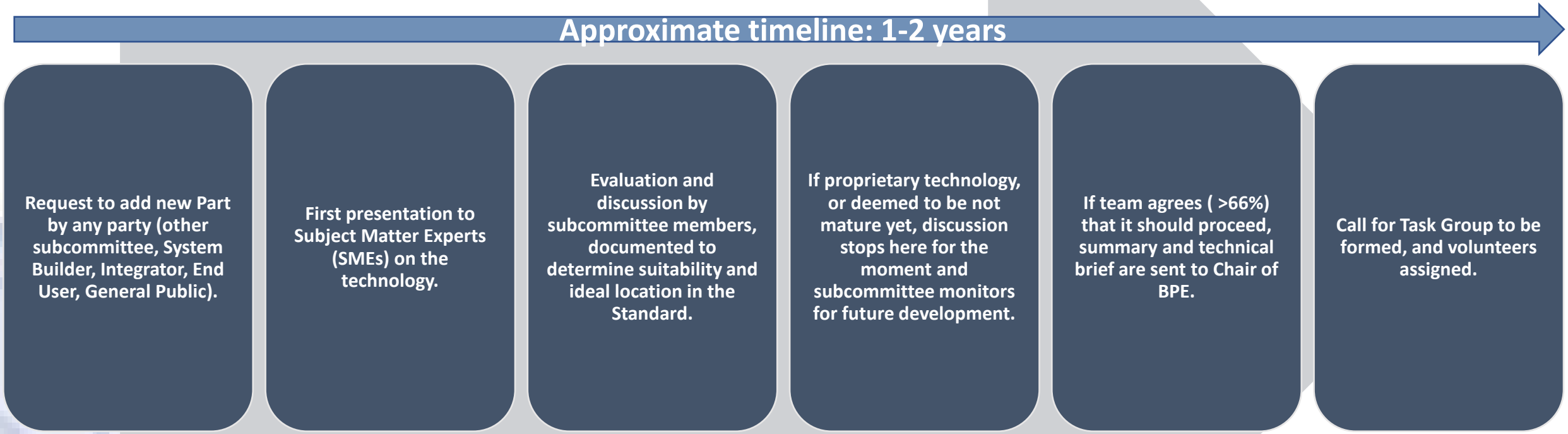
Task Group	Scope	Status
SU-3 Integrity	Revision SU-3 and NMA FF: Quality risk management and life-cycle approach to establish integrity assurance of single-use systems, such as but not limited to bag assemblies and liquid transfer sets for processing, storage, and shipping. Introduction of the terms 'leak test', 'integrity test' and 'MALL'. Update of nonmandatory appendix FF and harmonization with ASTM E3244	Revision approved. Target publication: 2024
SU-9 Sterilization/ Bioburden Control	Revision SU-9: Joint task with SD. Review and align content from SD and GR with Single-Use requirements. Expand on the requirements for bioburden control and sterilization of single use assemblies and components, by ionizing radiation, steam sterilization and chemical sterilization.	Revision approved. Target publication: 2024 Working on additional revisions for 2026 publication
SU-10 Shelf Life, Storage and Expiration Date	Revision SU-10: Addition of shelf-life requirements for nonsterile components marketed for use in sterilized assemblies.	Revision approved. Target publication: 2024
SU-12 Design conformance	New section SU-12: Develop new single-use design conformance content.	Revision approved. Target publication: 2024
SC-3 Flexible Bioprocess Containers (Bags)	Revision SC-3: Addition of material attributes, physical and functional qualification requirements. Addition of new nonmandatory appendix with physical and functional testing references used to characterize SU bags	Revision approved. Target publication: 2024 Working on additional revisions for 2026 publication
SC-5 Single-Use Valves	New section SC-5 Valves. Address design and performance requirements specific to single-use applications for single-use valves (pinch valves, pinch clamps and diaphragm valves).	Revision approved. Target publication: 2024 Working on additional revisions for 2026 publication

What is the ASME BPE Standard working on?

Task Groups – Working on content for 2026 Edition and beyond

Task Group	Scope	Status
SJ- 3 Thermal Welding of TPE Tubing	Revision SJ-3: Add acceptance criteria table and clarify responsibilities of the tube welding equipment manufacturer vs owner/user.	Revision approved at subcommittee level. Target publication: 2026
Single-Use Particulate	New nonmandatory appendix: Develop a template to exchange information between vendor and end-user on the methodology used to measure and control particulate in SUTs. Ensure alignment with the industry particulate monitoring and control practices and other Standards and guidance documents.	New NMA approved at subcommittee level. Target publication: 2026
Single-Use Hose barb connections	New nonmandatory appendix: Develop a template to qualify a mechanical hose barb connection in Single-Use applications.	New NMA approved at subcommittee level. Target publication: 2026
Single-Use Risk Management	Revision SU-12: Expand section to include risk assessment and management	Working on proposal Target publication: 2026
Irradiation terminology	Review the current terminology used for irradiation technologies to include other technologies besides gamma irradiation (such as e-beam and X-rays).	Working on revised proposals Target publication: 2026
Single-Use Tubing	New Task Group. Develop content for new section in SC	Target publication: 2026/2028
Single-Use Pumps	New Task Group. Develop content for new section in SC	Target publication: 2026/2028
Single-Use Centrifuges	New Task Group. First SUS to be included	Target publication: 2026/2028

How does new material get into the Standard?



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What else does the ASME BPE do?

- Certification program for Seals and Gaskets—APPROVED!
- Certification program for Diaphragm Valves—APPROVED!
  - Apply ***TODAY!***

What else does the ASME BPE do?

- PFAS “opinion letter” drafted, edited, modified and—APPROVED!
  - Submitted on behalf of all of ASME on July 24th, 2023, to the European Chemicals Agency (ECHA).

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July 24, 2023

ECHA Committee
c/o European Chemicals Agency
P.O. Box 400
00121 Helsinki
Finland
restriction@echa.europa

Subject: 2023 ECHA Annex XV Restriction Report Proposal

To whom it may concern:

These comments are submitted on behalf of the ASME Bioprocessing Equipment (BPE) Standards Committee regarding [1] *ECHA Annex XV Restriction Report Proposal* drafted for REACH by Danish, German, Swedish and the Netherlands Agencies. We take the opportunity to respond to the per- and polyfluoroalkyl substances (PFAS) REACH restriction public consultation period to share our initial views on how the proposed restrictions (The Proposal[i]) could impact the Bioprocessing Equipment Industry.

The following comments represent the majority opinions of the American Society of Mechanical Engineers (ASME) Bioprocessing Equipment Standards Committee members, rather than those of ASME. This Committee is responsible for the administration of the ASME Bioprocessing Equipment (BPE) standard. This standard is developed under procedures accredited by the American National Standards Institute (ANSI) as meeting the criteria for American National Standards. This standard is reviewed and updated on a regular basis with input from the Committee, industry, the public, and regulators using the consensus voting process. The ASME BPE Standards Committee has a diverse membership, comprised of members from engineering, government, and manufacturers from the United States and internationally.

Founded in 1880, ASME[ii] is a global standards organization that publishes consensus standards to help guide users in product manufacturing, current best practices, technology selection, and compliance with codes and regulations. Since its publication as a standard in 1997, the ASME BPE Standard (the Standard) has grown to become the world standard for equipment used in the production of biologics. The Standard represents the combined consensus efforts of hundreds of biopharmaceutical stakeholders representing the entire supply chain from material manufacturers, component, assembly and equipment manufacturers to the drug manufacturers themselves (equipment owner/users).

Get involve!

First Timer?

https://event.asme.org/Bioprocessing-Equipment-Meeting

ASME
SETTING THE STANDARD

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Bioprocessing Equipment

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