

**ASME BPE-2016**  
**(Revision of ASME BPE-2014)**

# Bioprocessing Equipment

---

**AN INTERNATIONAL STANDARD**



**The American Society of  
Mechanical Engineers**

**ASME BPE-2016**  
**(Revision of ASME BPE-2014)**

# Bioprocessing Equipment

---

**AN INTERNATIONAL STANDARD**



**The American Society of  
Mechanical Engineers**

Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: October 14, 2016

The next edition of this Standard is scheduled for publication in 2018. This Standard will become effective 6 months after the Date of Issuance.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Periodically, certain actions of the ASME BPE Committee may be published as Cases. Cases and interpretations are published on the ASME Web site under the Committee Pages at <http://cstools.asme.org/> as they are issued.

Errata to codes and standards may be posted on the ASME Web site under the Committee Pages to provide corrections to incorrectly published items, or to correct typographical or grammatical errors in codes and standards. Such errata shall be used on the date posted.

The Committee Pages can be found at <http://cstools.asme.org/>. There is an option available to automatically receive an e-mail notification when errata are posted to a particular code or standard. This option can be found on the appropriate Committee Page after selecting “Errata” in the “Publication Information” section.

ASME is the registered trademark of The American Society of Mechanical Engineers.

This international code or standard was developed under procedures accredited as meeting the criteria for American National Standards and it is an American National Standard. The Standards Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment that provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not “approve,” “rate,” or “endorse” any item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable letters patent, nor assume any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals.

No part of this document may be reproduced in any form,  
in an electronic retrieval system or otherwise,  
without the prior written permission of the publisher.

The American Society of Mechanical Engineers  
Two Park Avenue, New York, NY 10016-5990

Copyright © 2016 by  
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS  
All rights reserved  
Printed in U.S.A.

# CONTENTS

Foreword .....	x
Statements of Policy .....	xii
Committee Roster .....	xiii
Summary of Changes .....	xvii
<b>CHAPTER 1 INTRODUCTION, SCOPE, AND DEFINITIONS .....</b>	<b>1</b>
<b>Part GR General Requirements .....</b>	<b>1</b>
GR-1 Introduction .....	1
GR-2 Scope of the ASME BPE Standard .....	1
GR-3 Manufacturer’s Quality Assurance Program .....	2
GR-4 Inspection .....	2
GR-5 Documentation .....	6
GR-6 U.S. Customary and SI Units .....	8
GR-7 References .....	8
GR-8 Terms and Definitions .....	9
<b>CHAPTER 2 DESIGN .....</b>	<b>18</b>
<b>Part SD Systems Design .....</b>	<b>18</b>
SD-1 Purpose and Scope .....	18
SD-2 General Guidelines .....	18
SD-3 Process Components .....	21
SD-4 Process Utilities .....	59
SD-5 Process Systems .....	65
SD-6 Design Conformance Testing .....	100
<b>CHAPTER 3 MATERIALS .....</b>	<b>101</b>
<b>Part MM Metallic Materials .....</b>	<b>101</b>
MM-1 Purpose and Scope .....	101
MM-2 Alloy Designations .....	101
MM-3 Uses of Specifications .....	101
MM-4 Referenced Specifications .....	104
MM-5 Base Metals and Filler Materials .....	106
MM-6 Mechanical Properties .....	108
MM-7 Corrosion-Resistance Requirements .....	113
MM-8 Addition of New Alloys to Part MM .....	113
<b>Part PM Polymeric and Other Nonmetallic Materials .....</b>	<b>114</b>
PM-1 Purpose and Scope .....	114
PM-2 Materials .....	114
PM-3 Properties and Performance .....	117
PM-4 Applications .....	119
<b>CHAPTER 4 PROCESS COMPONENTS .....</b>	<b>128</b>
<b>Part DT Dimensions and Tolerances for Process Components .....</b>	<b>128</b>
DT-1 Purpose and Scope .....	128
DT-2 Pressure Rating .....	128
DT-3 Wall Thickness .....	128
DT-4 Dimensions .....	128
DT-5 Materials .....	129
DT-6 Tests .....	129

DT-7	Tolerances .....	129
DT-8	Weld Ends .....	129
DT-9	Hygienic Clamp Unions .....	129
DT-10	Minimum Examination Requirements .....	130
DT-11	Marking .....	130
DT-12	Packaging .....	131
<b>Part PI</b>	<b>Process Instrumentation</b> .....	157
PI-1	Purpose and Scope .....	157
PI-2	Process Instrumentation General Requirements .....	157
PI-3	Instrument Receiving, Handling, and Storage .....	158
PI-4	Flowmeters .....	158
PI-5	Level Instruments .....	163
PI-6	Pressure Instruments .....	165
PI-7	Temperature Sensors and Associated Components .....	165
PI-8	Analytical Instruments .....	170
PI-9	Optical .....	178
<b>Part SG</b>	<b>Sealing Components</b> .....	182
SG-1	Purpose and Scope .....	182
SG-2	Sealing Component Types .....	182
SG-3	Sealing Components General Design Requirements (General Provisions) .....	198
SG-4	Seal Performance Requirements .....	204
SG-5	Seal Applications .....	206
<b>CHAPTER 5</b>	<b>FABRICATION, ASSEMBLY, AND ERECTION</b> .....	209
<b>Part MJ</b>	<b>Materials Joining</b> .....	209
MJ-1	Purpose and Scope .....	209
MJ-2	Materials .....	209
MJ-3	Joint Design and Preparation .....	210
MJ-4	Joining Processes and Procedures .....	210
MJ-5	Procedure Qualifications .....	211
MJ-6	Performance Qualifications .....	211
MJ-7	Examination, Inspection, and Testing .....	212
MJ-8	Acceptance Criteria .....	213
MJ-9	Joining of Polymeric Materials .....	214
MJ-10	Documentation Requirements .....	229
MJ-11	Passivation .....	229
<b>Part SF</b>	<b>Process Contact Surface Finishes</b> .....	230
SF-1	Purpose and Scope .....	230
SF-2	Metallic Applications .....	230
SF-3	Polymeric Applications .....	234
<b>CHAPTER 6</b>	<b>CERTIFICATION</b> .....	235
<b>Part CR</b>	<b>Certification Requirements</b> .....	235
CR-1	Purpose and Scope .....	235
CR-2	General .....	235
<b>Figures</b>		
SD-3.1.1-1	Flat Gasket Applications .....	22
SD-3.1.2.2-1	Accepted Point-of-Use Designs .....	26
SD-3.1.2.3-1	Double Block-and-Bleed Valve Assembly .....	27
SD-3.2.1-1	Flexible Hygienic Hose Design .....	29
SD-3.3.2.2-1	Pump Impeller Configurations .....	30
SD-3.3.2.2-2	Acceptable Impeller Attachments .....	31
SD-3.3.2.2-3	Casing Drain Configurations .....	31
SD-3.3.2.2-4	Casing Drain <i>L/D</i> Ratios .....	32

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

- 
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
  - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-