

DEAERATOR PERFORMANCE ■
MONITORING AND ■
INSPECTION GUIDELINE ■

DEAERATOR PERFORMANCE MONITORING AND INSPECTION GUIDELINE

prepared by the
Water Technology Subcommittee of the
ASME RESEARCH AND
TECHNOLOGY COMMITTEE ON
WATER AND STEAM IN
THERMAL SYSTEMS



THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

Two Park Avenue, New York, New York 10016

© 2022, The American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016, USA
(www.asme.org)

All rights reserved. Printed in the United States of America. Except as permitted under the United States Copyright Act of 1976, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of the publisher.

INFORMATION CONTAINED IN THIS WORK HAS BEEN OBTAINED BY THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS FROM SOURCES BELIEVED TO BE RELIABLE. HOWEVER, NEITHER ASME NOR ITS AUTHORS OR EDITORS GUARANTEE THE ACCURACY OR COMPLETENESS OF ANY INFORMATION PUBLISHED IN THIS WORK. NEITHER ASME NOR ITS AUTHORS AND EDITORS SHALL BE RESPONSIBLE FOR ANY ERRORS, OMISSIONS, OR DAMAGES ARISING OUT OF THE USE OF THIS INFORMATION. THE WORK IS PUBLISHED WITH THE UNDERSTANDING THAT ASME AND ITS AUTHORS AND EDITORS ARE SUPPLYING INFORMATION BUT ARE NOT ATTEMPTING TO RENDER ENGINEERING OR OTHER PROFESSIONAL SERVICES. IF SUCH ENGINEERING OR PROFESSIONAL SERVICES ARE REQUIRED, THE ASSISTANCE OF AN APPROPRIATE PROFESSIONAL SHOULD BE SOUGHT.

ASME shall not be responsible for statements or opinions advanced in papers or . . . printed in its publications (B7.1.3). Statement from the Bylaws.

For authorization to photocopy material for internal or personal use under those circumstances not falling within the fair use provisions of the Copyright Act, contact the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923, tel: 978-750-8400, www.copyright.com.

Requests for special permission or bulk reproduction should be addressed to the ASME Publishing Department, or submitted online at: <https://www.asme.org/publications-submissions/journals/information-for-authors/journal-guidelines/rights-and-permissions>

ISBN: 978-0-7918-8574-1

Preface

The ASME steam/water cycle equipment performance monitoring and inspection guideline series focuses on specific pieces of equipment in the steam/water cycle and provides the user with information on how to plan for, conduct, and interpret the results of equipment inspections. This guideline was prepared by a task group of this subcommittee under the guidance of Colleen M. Scholl. The task group consisted of representatives of manufacturers, operators, and consultants involved with the design, manufacture, operation, and monitoring of industrial and utility deaerators and deaerating heaters. Members of this group are listed in the acknowledgments.

The ASME Research and Technology Committee will review, revise, and reissue this document from time to time as necessary to comply with advances in technology in the design of these units and the water treatment options.

Acknowledgements

This document was prepared by a Task Group of the Water Technology Subcommittee of the ASME Research and Technology Committee on Water and Steam in Thermal Systems. Recognition is given to the following members of these groups for their contributions in the preparation of this document.

Colleen M. Scholl, Chair

Aizaz Ahmed

Anton Banweg

Robert Bartholomew

Edward Beardwood

James Bellows

Wayne Bernahl

Deborah Bloom

Kevin Boudreaux

Kirk Buecher

Brad Buecker

Bob Cunningham

David Daniels

Douglas DeWitt-Dick

Virginia Durham

Frank Gabrielli

Robert Holloway

John Jevac

Jerry H. Jones

Eric Kangas

Jack Kelly

Ken Kuruc

Vickie Olson

George Patrick

Jim Robinson

Anthony Rossi

Joe Schroeder

K. Anthony Selby

Kevin Shields

Steve Shulder

Table of Contents

Introduction	3
Inspection Frequency.....	3
Routine Performance Checks.....	4
Daily Performance Checks	4
Annual Performance Checks	5
Pre-Inspection Planning	6
Conducting the Inspection.....	8
Prior to Entry.....	8
Visual Inspection	9
Vessel Shell.....	9
Spray Nozzle Inspections.....	11
Tray Section Inspections	12
Vent Line and Vent Line Appurtenances.....	14
Water and Steam Inlets and Outlets.....	14
Valves and Instrumentation.....	17
Chemical Injection Points.....	17
Vortex Breaker	17
Post Inspection Considerations.....	18
Glossary.....	20
References	21
Appendix A – Basics of Deaeration and Types of Deaerators.....	22
Appendix B – Spray Nozzle Design Information.....	28
Appendix C – Best Practices for Deaerator Operation.....	29
Appendix D – Troubleshooting Guide	31