ASME EA-4G–2010
(ANSI Designation: ASME TR EA-4G–2010)

Guidance for ASME EA-4, Energy Assessment for Compressed Air Systems

AN ASME TECHNICAL REPORT

The American Society of Mechanical Engineers

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Guidance for ASME EA-4, Energy Assessment for Compressed Air Systems

A TECHNICAL REPORT PREPARED BY ASME AND REGISTERED WITH ANSI

The American Society of Mechanical Engineers

Three Park Avenue • New York, NY • 10016 USA

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This Guide will be revised when the Society approves the issuance of a new edition. There will be no addenda or written interpretations of the requirements of this Guide issued to this edition.

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FOREWORD

This guidance document provides technical background and application details in support of the understanding and application of ASME EA-4, Energy Assessment for Compressed Air Systems. This guidance document provides background and supporting information to assist in carrying out the standard. The guidance document covers such topics as rationale for the technical requirements of the assessment standard; technical guidance, application notes, alternative approaches, tips, techniques, and rules-of-thumb; and example results from fulfilling the requirements of the assessment standard. This guidance document was developed to be used as an application guide on how to utilize ASME EA-4.

ASME EA-4 provides a standardized framework for conducting an assessment of compressed air systems. A compressed air system is defined as a group of subsystems composed of integrated sets of components used to deliver compressed air energy to manufacturing equipment and processes. Assessments performed using the requirements set by ASME EA-4 involve collecting and analyzing system design, operation, energy use, and performance data and identifying energy performance improvement opportunities for system optimization. These assessments may also include additional information, such as recommendations for improving resource utilization, reducing per unit production cost, and improving environmental performance of the assessed system(s).

ASME EA-4 provides a common definition for what constitutes an assessment for both users and providers of assessment services. The objective is to provide clarity for these types of services that have been variously described as energy assessments, energy audits, energy surveys, and energy studies. In all cases, systems (energy-using logical groups of industrial equipment organized to perform a specific function) are analyzed through various techniques such as measurement, resulting in the identification, documentation, and prioritization of energy performance improvement opportunities.

This Guide is part of a portfolio of documents and other efforts designed to improve the energy efficiency of industrial facilities. Initially, assessment standards and guidance documents are being developed for compressed air, process heating, pumping, and steam systems. Other related existing and planned efforts to improve the efficiency of industrial facilities include

(a) ASME assessment standards, which set the requirements for conducting and reporting the results of a compressed air, process heating, pumping, and steam assessments.

(b) a certification program for each ASME assessment standard that recognizes certified practitioners as individuals who have demonstrated, via a professional qualifying exam, that they have the necessary knowledge and skills to apply the assessment standard properly.

(c) an energy management standard, A Management System for Energy, ANSI/MSE 2000:2008, which is a standardized approach to managing energy supply, demand, reliability, purchase, storage, use, and disposal and is used to control and reduce an organization's energy costs and energy-related environmental impact.

NOTE: ANSI/MSE 2000:2008 will eventually be superseded by ISO 50001, now under development.

(d) an ANSI measurement and verification protocol that includes methodologies for verifying the results of energy efficiency projects.

(e) a program, Superior Energy Performance, that will offer an ANSI-accredited certification for energy efficiency through application of ANSI/MSE 2000:2008 and documentation of a specified improvement in energy performance using the ANSI measurement and verification protocol. Superior Energy Performance is now using the ISO Draft International Standard 50001 for plants. ISO 50001 is not yet final. The Measurement and Verification Protocol is anticipated to be a normative reference to ANSI/MSE 50021 and ANSI/MSE 50028.

The complementary documents described above, when used together, will assist organizations seeking to establish and implement company-wide or site-wide energy plans.

Publication of this Technical Report that has been registered with ANSI on July 27, 2010 has been approved by ASME. This document is registered as a Technical Report according to the Procedures for the Registration of Technical Reports with ANSI. This document is not an American National Standard and the material contained herein is not normative in nature. Comments on the content of this document should be sent to the Managing Director, Technical, Codes and Standards, ASME.

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Proposing Revisions. Revisions are made periodically to the technical report to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the technical report. Approved revisions will be published periodically.

The Committee welcomes proposals for revisions to this technical report. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

Attending Committee Meetings. The EA Committee holds meetings or telephone conferences, which are open to the public. Persons wishing to attend any meeting or telephone conference should contact the Secretary of the EA Standards Committee.

GUIDANCE FOR ASME EA-4, ENERGY ASSESSMENT FOR COMPRESSED AIR SYSTEMS

1 SCOPE AND INTRODUCTION

1.1 Scope and Purpose

1.1.1 Scope. This guidance document was developed to be used as an application guide on how to utilize ASME EA-4, Energy Assessment for Compressed Air Systems. This guidance document provides background and supporting information to assist in carrying out the standard.

1.1.2 Purpose. ASME EA-4 does not provide guidance on how to perform a compressed air systems energy assessment, but sets the requirements that need to be performed during the assessment. ASME EA-4 was written in a form suitable for a standard, with concise text and without examples or explanations. This document was developed to be used in conjunction with the standard to give basic guidance on how to fulfill the requirements of the standard. This document is only a guide, it does not set any new requirements, and ASME EA-4 can be used with or without this document.

1.2 Limitations

This guidance document does not set any new requirements for application of ASME EA-4.

1.3 Introduction — Using the System Assessment Standard

ASME EA-4 (the standard) is organized in the following sections:

(a) Section 1: Scope and Introduction. This section includes the scope for the standard, limitations of the standard, and an introduction on how to use the standard that includes information on the systems approach and the system engineering process. Guidance is provided in section 1 of this document.

(b) Section 2: Definitions. This section provides definitions of terms used in the standard. No guidance is provided for this section, although a glossary with definitions for additional terms is included as Nonmandatory Appendix A of this document. Section 2 of this document presents key elements and characteristics of industrial compressed air systems.

(c) Section 3: References. This section lists documents that are referenced in the standard. No guidance is provided for this section of the standard. Section 3 of this document provides background and rationale for the criteria that define an effective compressed air system assessment.

(d) Section 4: Organizing the Assessment. This section outlines requirements on how to organize an assessment including identification of team members and responsibilities; requirements for preliminary data collection and analysis; and requirements on the development of assessment goals and a plan of action. Guidance is provided in section 4 of this document.

(e) Section 5: Conducting the Assessment. This section describes that requirements for conducting an assessment (the implementation phase of the plan of action). Guidance is provided in section 5 of this document.

(f) Section 6: Analysis of Data From the Assessment. This section presents requirements for analyzing the data collected during an assessment, including the development of a baseline profile. Guidance is provided in section 6 of this document.

(g) Section 7: Reporting and Documentation. This section provides requirements for information presented in the assessment report. Guidance is provided in section 7 of this document.

Guidance on section 1 of ASME EA-4 is provided below. Sections 2 and 3 of this guidance document provide an introduction to industrial compressed air systems and background/rationale for that criteria that define an effective compressed air system assessment. Sections 4 through 7 of this guidance document parallel the sections in the standard at each subheading level.

1.3.1 The System Assessment Process. ASME EA-4 presents requirements for compliance when conducting a compressed air system assessment to reduce energy use and improve performance. It also describes a frame-