ASME EA-4–2010

REAFFIRMED 2020

Energy Assessment for Compressed Air Systems

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

ASME SETTING THE STANDARD

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This Standard will be revised when the Society approves the issuance of a new edition. There will be no addenda issued to this edition.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Periodically certain actions of the ASME EA 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.

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FOREWORD

This document provides a standardized framework for conducting an energy assessment for compressed air systems, hereafter referenced as an "assessment." A compressed air system is defined as a group of subsystems comprised of integrated sets of components used to deliver compressed air energy to manufacturing equipment and processes. Assessments involve collecting and analyzing system design, operation, energy use, and performance data and identifying energy performance improvement opportunities for system optimization. An assessment may also include additional information, such as recommendations for improving resource utilization, reducing per unit production co reducing lifecycle costs, and improving environmental performance related to the assessed system(s).

This Standard provides a common definition for what constitutes an assessment for both users and pro ide of assessment services. The objective is to provide clarity for these types of services that have been variously de ribed as energy assessments, energy audits, energy surveys, and energy studies. In all cases, systems (ene gy usin logical groups of industrial equipment organized to perform a specific function) are analyzed through va ious niques, such as measurement, resulting in the identification, documentation, and prioritization of energy per rmance improvement opportunities.

This Standard sets the requirements for conducting and reporting the results of an assessme hat considers the entire system, from energy inputs to the work performed as the result of these inputs. An asse mer complying with this Standard does not need to address each individual system component or subsystem w thin an industrial facility with equal weight; however, it must be sufficiently comprehensive to identify the m or e ergy efficiency opportunities for improving the overall energy performance of the system. This Standard is de ned to be applied primarily at industrial facilities, but many of the concepts can be used in other facili s, uch as those in the institutional and commercial sectors.

This Standard is part of a portfolio of documents and other efforts de igned o improve the energy efficiency of industrial facilities. Initially, assessment standards are being develope for pressed air, process heating, pumping, and steam systems. Other related existing and planned efforts to imp ve he efficiency of industrial facilities include

(a) ASME guidance documents for the assessment standards w nich provide technical background and application details to support the understanding of the assessment stan rd The guidance documents provide rationale for the technical requirements of the assessment standard and give technical guidance, application notes, alternative approaches, tips, techniques, and rules-of-thumb.

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

(c) An energy management standard, "A Ma ag ent System for Energy, ANSI/MSE 2000:2008," which is a standardized approach to manage energy supply, de and, reliability, purchase, storage, use, and disposal and is used to control and reduce an organization's energy sts and energy-related environmental impact. NOTE: This ANSI standard will eventually be superseded by SO 50001, now under development.

(d) An ANSI-accredited measurem en a verification protocol that includes methodologies for verifying the results of energy efficiency projects.

(e) A program, Superior E ergy Performance, that will offer ANSI-accredited certification for energy efficiency through application of ANSI/M E 2000:2008 and documentation of a specified improvement in energy performance using the ANSI measure nt and erification protocol.

The complemen ary ocu ents described above, when used together, will assist organizations seeking to establish and implement comp ny or site-wide energy plans.

ASME EA-4–2 10 was approved by the EA Industrial System Energy Assessment Standards Committee on January 7, 2010 and a prove by the American National Standards Institute (ANSI) on March 3, 2010.

EA INDUSTRIAL SYSTEM ENERGY ASSESSMENT STANDARDS COMMITTEE

(The following is the roster of the Committee at the time of approval of this Standard.)

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General. ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions, and attending Committee meetings. Correspondence should be addressed to:

Secretary, EA Committee
The American Society of Mechanical Engineers
Three Park Avenue
New York, NY 10016-5990
http://go.asme.org/Inquiry

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

The Committee welcomes proposals for revisions to this Standard. 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.

Proposing a Case. Cases may be issued for the purpose of providing alternative rules when justified, to permit early implementation of an approved revision when the need is urgent, or to provide rules not covered by existing provisions. Cases are effective immediately upon ASME approval and shall be posted on the ASME Committee Web page.

Requests for Cases shall provide a Statement of Need and Background Information. The request should identify the Standard, the paragraph, figure or table number(s), and be written as a Question and Reply in the same format as existing Cases. Requests for Cases should also indicate the applicable edition(s) of the Standard to which the proposed Case applies.

Interpretations. Upon request, the EA Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the EA Committee.

The request for interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his request in the following format:

Subject: Cite the applicable paragraph number(s) and a concise description.

Edition: Cite the applicable edition of the Standard for which the interpretation is being requested.

Question: Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in this format will be rewritten in this format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

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.

ENERGY ASSESSMENT FOR COMPRESSED AIR SYSTEMS

1 SCOPE AND INTRODUCTION

1.1 Scope

This Standard covers compressed air systems, which are defined as a group of subsystems comprised of integrated sets of components, including air compressors, treatment equipment, controls, piping, pneumatic tools, pneumatically powered machinery, and process applications utilizing compressed air. The objective is consistent, reliable, and efficient delivery of energy to manufacturing equipment and processes.

The compressed air system can be considered as three functional subsystems.

supply: conversion of primary energy resource to compressed air energy. The supply subsystem includes generation, treatment, primary storage, piping, controls, performance measurement equipment, and reporting systems.

transmission: movement of compressed air energy from where it is generated to where it is used. The transmission subsystem includes distribution piping, mainline and branch headers, piping drops, secondary storage, treatment, transmission controls, performance measurement equipment, and reporting systems.

demand: the total of all compressed air consumers, including productive end use applications and various forms of compressed air waste. The demand subsystem includes all end uses, point-of-use piping, secondary storage, treatment, point-of-use controls, performance measurement equipment, and reporting systems.

This Standard sets requirements for conducting and reporting the results of a compressed air system energy assessment (hereafter referenced as an "assessment") that considers the entire system, from energy inputs to the work performed as the result of these inputs. An assessment complying with this Standard does not need to address each individual system component or subsystem within an industrial facility with equal weight; however, it must be sufficiently comprehensive to identify the major energy efficiency opportunities for

Fig. 1 Compressed Air System Hierarchy