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## Pump system energy assessment

*Évaluation énergétique des systèmes de pompage*



Reference number  
ISO/ASME 14414:2019(E)

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## Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 115, *Pumps*, in collaboration with ASME EA Standards Committee — *Industrial System Energy Assessment*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

This second edition cancels and replaces the first edition (ISO 14414:2015), which has been technically revised. It also incorporates the Amendment ISO 14414:2015/Amd.1:2016. The main changes compared to the previous edition are as follows:

- [4.2](#) has been slightly modified;
- [Table 2](#) has been modified to add descriptions of “histogram” and “duration” diagrams;
- [5.6.4](#) has been redrafted;
- the term “specific energy” has been replaced by “specific energy consumption”;
- [Formulae G.1, G.2 and G.4](#) have been corrected to align with ISO 17769-1;
- the bibliography has been modified;
- the document has been editorially revised.

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This standard was developed under procedures accredited as meeting the criteria for American National Standards. The Standards Committee that approved the standard was balanced to ensure 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.

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ISO/ASME 14414 was approved as an American National Standard by the American National Standards Institute on 2015-02-06.

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## Introduction

Pumping systems account for a significant portion of a facility's energy consumption in many industries. In the majority of pumping systems, the energy added to the working liquid by the pump is much greater than is required by the process. The excess energy added to the system (e.g. due to throttled control valve) increases heat, noise and vibration but also increases the system's maintenance costs. Oversized pumps will cause excessive energy within a system. Increasing the size of the components within the system such as pipes, valves and heat exchangers can, however, result in lower energy consumption.

This document provides a method to assess pump systems, to identify and quantify pump system energy consumption reduction opportunities and reliability improvement opportunities. It gives a common definition for what constitutes an assessment for both users and providers of assessment services. Its objective is to provide clarity for these types of services which have been variously described as energy assessments, energy audits, energy surveys and energy studies.

In all cases, systems (energy-using logical groups of equipment organized to perform a specific function) are analysed through various techniques such as measurement, resulting in identification, documentation and prioritization of energy performance improvement opportunities.

When contracting for assessment services, facility personnel can use this document to define and communicate their desired scope of assessment activity to third party contractors or consultants.

This document is expected to contribute to decreased energy consumption and consequently to decreased carbon footprint.

This document includes the required assessment report content in [Annex A](#). It gives examples of efficient system operation and energy reduction opportunities in [Annex B](#), information on competencies and experiences welcomed to perform audit in [Annex C](#), guidelines for analysis software in [Annex D](#), a typical example of pre-screening worksheet in [Annex E](#), information on specific energy consumption in [Annex F](#), information on the concept of parasitic power in [Annex G](#) and examples of pumping system efficiency indicator in [Annex H](#).

This document is developed within the framework of ISO 50001, ISO 50002 and ISO 50003.