SLOVENSKI STANDARD
SIST EN ISO 14414:2015

01-julij-2015

Energetska ocena črpalk (ISO/ASME 14414:2015)

Pump system energy assessment (ISO/ASME 14414:2015)

Energetische Bewertung von Pumpensystemen (ISO/ASME 14414:2015)

Evaluation énergétique des systèmes de pompage (ISO/ASME 14414:2015)

Ta slovenski standard je istoveten z: **EN ISO 14414:2015**

ICS:

23.080	Črpalke	Pumps

SIST EN ISO 14414:2015 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 14414

April 2015

ICS 23.080

English Version

Pump system energy assessment (ISO/ASME 14414:2015)

Evaluation énergétique des systèmes de pompage (ISO/ASME 14414:2015)

Energetische Bewertung von Pumpensystemen (ISO/ASME 14414:2015)

This European Standard was approved by CEN on 10 January 2015.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword

This document (EN ISO 14414:2015) has been prepared by Technical Committee ISO/TC 115 "Pumps" in collaboration with by Technical Committee CEN/TC 197 “Pumps” the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2015, and conflicting national standards shall be withdrawn at the latest by October 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO/ASME 14414:2015 has been approved by CEN as EN ISO 14414:2015 without any modification.

INTERNATIONAL STANDARD

ISO/ASME 14414

First edition
2015-04-01

Pump system energy assessment

Évaluation énergétique des systèmes de pompage

Reference number
ISO/ASME 14414:2015(E)

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

ASME
Two Park Avenue • New York, NY 10016-5990 • USA
Tel. 800-843-2763
Fax 973-882-1717
E-mail CustomerCare@asme.org
Web www.asme.org

Published in Switzerland

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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. 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. 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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword - Supplementary information

ISO/ASME 14414 was prepared by ISO/TC 115, *Pumps*, in collaboration with ASME EA Standards Committee — *Industrial System Energy Assessment*.

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

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 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 assumes any such liability. Users of a 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 standard.

ASME accepts responsibility for only those interpretations of designated documents issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals. ASME will not issue written interpretations of this edition of this standard.

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

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 can bring the system's maintenance costs. The addition of excessive energy to the system often results in over-sizing piping system components such as pumps, process components, and control valves, resulting in an increase in capital costs.

This International Standard 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 may use this International Standard to define and communicate their desired scope of assessment activity to third party contractors or consultants.

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

This International Standard 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 in Annex F, information on the concept of parasitic power in Annex G and examples of pumping system efficiency indicator in Annex H.

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

Pump system energy assessment

1 Scope

This International Standard sets the requirements for conducting and reporting the results of a pumping system energy assessment (hereafter referenced as “assessment”) that considers the entire pumping system, from energy inputs to the work performed as the result of these inputs.

The objective of a pumping system energy assessment is to determine the current energy consumption of an existing system and identify ways to improve system efficiency.

These requirements consist of

— organizing and conducting an assessment,

— analysing the data from the assessment, and

— reporting and documenting assessment findings.

This International Standard is designed to be applied, to open and closed loop pumping systems typically used at industrial, institutional, commercial, and municipal facilities, when requested.

This International Standard is focused on assessing electrically-driven pumping systems, which are dominant in most facilities, but is applicable with other types of drivers, such as steam turbines and engines, and drives such as belt.

The International Standard does not

a) specify how to design a pumping system,

b) give detailed qualifications and expertise required of the person using the International Standard although provides a list of body of knowledge in Annex C,

c) address the training or certification of persons,

d) specify how to implement the recommendations developed during the assessment, but does include requirements for an action plan,

e) specify how to measure and validate the energy savings that result from implementing assessment recommendations,

f) specify how to make measurements and how to calibrate test equipment used during the assessment,

g) specify how to estimate the implementation cost or conduct financial analysis for recommendations developed during the assessment,

h) specify specific steps required for safe operation of equipment during the assessment. The facility personnel in charge of normal operation of the equipment are responsible for ensuring that it is operated safely during the data collection phase of the assessment,

i) address issues of intellectual property, security, confidentiality, and safety.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 17769-1, *Liquid pumps and installation — General terms, definitions, quantities, letter symbols and units — Part 1: Liquid pumps*

ISO 17769-2, *Liquid pumps and installation — General terms, definitions, quantities, letter symbols and units — Part 2: Pumping system*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 17769-1 and ISO 17769-2, and the following apply.

3.1
system energy demand
minimum amount of energy which a pumping system in a specified process requires

3.2
components
individual items of equipment within a system

EXAMPLE Pump, motor, drive, valve, heat exchanger.

3.3
hydraulic power
water horsepower
power imparted to the liquid by the pump

3.4
electrical power input
power required to support the pumping system operation

3.5
specific energy
energy consumed to move a certain volume of liquid through the system

3.6
parasitic power
power imparted to the shaft of a pump and not used to move the fluid through the system

4 Identification of the assessment team, authority and functions

4.1 Identification of assessment team functions

The assessment team composed of knowledgeable personnel shall have members that are assigned responsibility and authority to carry out the following functions:

— resource allocation, in order to:

  — allocate funding and resources necessary to plan and execute the assessment,

  — exercise final decision making authority on resources,

  — oversee the eventual participation of non-facility personnel including contracts, scheduling, confidentiality agreements, and statement of work.

— coordination, logistics and communications, in order to:

  — obtain necessary support from facility personnel and other individuals and organizations during the assessment,

— participate in organizing the assessment team and coordinate access to relevant personnel, systems, and equipment,

— organize, schedule activities and manage the assessment.

4.2 Assessment team structure, leadership and competency

The assessment team should comprise of personnel from cross functional backgrounds. It shall include:

— an assessor who has the pump system analysis competencies as described in Annex C;

— the host organization representative who has overall responsibility and ownership for the assessment;

— experts on the processes and the function of the system;

— experts on the maintenance practises of the pumping system;

— experts who can provide the team with cost data.

The assessment team may be from the host organization or enhanced by using outsourced specialists particularly considering the competence of the assessor

The host organization shall appoint the assessment team leader. This person may be a host facility employee or an external assessor. In small organisations, the team leader may be the competent assessor.

4.3 Facility management support

Facility management shall understand and support the purpose of the assessment.

Facility management shall allow assessment team members from the facility to participate in the assessment to the extent necessary.

The assessment team shall gain written support of facility management prior to conducting the assessment, as follows:

— commit the necessary funding, personnel, and resources to support the assessment;

— communicate to facility personnel the assessment's importance to the organization.

4.4 Communications

Lines of communication required for the assessment shall be established.

The assessment team shall provide clear guidance to facilitate communications among members of the assessment team so all necessary information and data can be communicated in a timely manner. This shall include administrative data, logistics information, as well as operational and maintenance data.

4.5 Access to facilities, personnel and information

The assessment team shall have access to:

— facility areas and pump systems required to conduct the assessment,

— facility personnel (engineering, operations, maintenance, …), their equipment vendors, contractors and others, to collect information pertinent and useful to the assessment activities and analysis of data used for preparation of the report,

— other information sources such as drawings, manuals, data sheet, maintenance records, test reports, historical utility bill information, computer monitoring and control data, electrical equipment panels, and calibration records.