SLOVENSKI STANDARD
SIST EN ISO 11011:2015

01-junij-2015

Stisnjeni zrak - Energijska učinkovitost - Ocenjevanje (ISO 11011:2013)

Compressed air - Energy efficiency - Assessment (ISO 11011:2013)

Druckluft - Energieeffizienz - Bewertung (ISO 11011:2013)

Air comprimé - Efficacité énergétique - Évaluation (ISO 11011:2013)

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Compressed air - Energy efficiency - Assessment (ISO 11011:2013)

Air comprimé - Efficacité énergétique - Évaluation (ISO 11011:2013)

Druckluft - Energieeffizienz - Bewertung (ISO 11011:2013)

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Page

Foreword

The text of ISO 11011:2013 has been prepared by Technical Committee ISO/TC 118 “Compressors and pneumatic tools, machines and equipment” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 11011:2015 by Technical Committee CEN/TC 232 “Compressors, vacuum pumps and their systems” the secretariat of which is held by SIS.

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of an identical text or by endorsement, at the latest by September 2015, and conflicting national standards shall be withdrawn at the latest by September 2015.

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The text of ISO 11011:2013 has been approved by CEN as EN ISO 11011:2015 without any modification.

INTERNATIONAL STANDARD

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Compressed air — Energy efficiency — Assessment

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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

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The committee responsible for this document is ISO/TC 118, *Compressors and pneumatic tools, machines and equipment*, Subcommittee SC 6, *Air compressors and compressed air systems*.

Introduction

This International Standard has been developed with reference to available documentation[1)] (see Bibliography) relating to energy assessment of compressed air systems.

This International Standard is produced to support the objectives of energy management for those organisations utilizing compressed air and wishing to improve the energy efficiency of such systems. Remembering the words of Lord Kelvin who said in 1883, "If you cannot measure it, you cannot improve it", this International Standard aims to assist with measurement and provide the knowledge to enable improvement.

The prime consideration for any compressed air system is the ability to generate air with the least amount of energy. Having done this, the next consideration is to transmit energy from the point of generation to the point of use with the least loss. The final consideration is to eliminate waste and use the least amount of air for the production process.

This International Standard uses speciality terms which relate the needs of assessment activities to those of compressed air systems. Many terms will appear new to the users of this International Standard who are familiar with general compressed air terms.

A general introduction to energy assessment is given in Annex A.

1) Extracts from ASME EA-4-2010 were used with permission from ASME. The core elements used are from Scope and Introduction, Organizing the Assessment, Analysis of Data From the Assessment, Reporting and Documentation, and Mandatory Appendices — I, Preliminary Data Collection Matrix.

Compressed air — Energy efficiency — Assessment

WARNING — Users of this International Standard are advised that energy-related judgements should not compromise safety issues.

1 Scope

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

This International Standard considers compressed air systems as three functional subsystems:

— supply which includes the conversion of primary energy resource to compressed air energy;

— transmission which includes movement of compressed air energy from where it is generated to where it is used;

— demand which includes the total of all compressed air consumers, including productive end-use applications and various forms of compressed air waste.

This International Standard sets requirements for

— analysing the data from the assessment,

— reporting and documentation of assessment findings, and

— identification of an estimate of energy saving resulting from the assessment process.

This International Standard identifies the roles and responsibilities of those involved in the assessment activity.

This International Standard provides indicative information in Annexes B, C, D, and E of the type of data to be collected to assist in a successful assessment. The information provided is not exhaustive and therefore is not intended to restrict the inclusion of other data. The form and presentation of the information given in the annexes is also not intended to restrict the manner of presentation of the reporting to the client.

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 1217, *Displacement compressors — Acceptance tests*

ISO 5598, *Fluid power systems and components — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1217 and ISO 5598 and the following apply.

3.1 General

3.1.1
air treatment
any process provided for the purpose of separation and purification of the compressed air

3.1.2
artificial demand
excess air consumed by a system's unregulated or poorly regulated uses due to operating at a pressure in excess of actual requirements

3.1.3
assessment team
authority to fulfil roles and responsibility of the assessment having appropriate functions and knowledge

3.1.4
baseline
set of typical operating period, work conditions, and performance parameters revealed by assessment and used for comparison of efficiency of measures recommended as a result of energy efficiency assessment procedures

3.1.5
compressed air point of use
components using the pneumatic energy for physical or chemical actions

3.1.6
compressed air systems
group of subsystems comprising integrated sets of components, including air compressors, treatment equipment, controls, piping, pneumatic tools, pneumatically powered machinery, and process applications utilizing compressed air

3.1.7
compressed air system assessment
activity which considers all components and functions, from energy inputs (SUPPLY SIDE) to the work performed (DEMAND SIDE) as the result of these inputs; undertaken to observe, measure, and document energy reduction and performance improvement opportunities in a compressed air system

3.1.8
data logging
measurement of physical parameters while tabulating a periodic log (record) of their numerical value using time-aligned data frames for the plurality of recorded parameters

Note 1 to entry: Two types of data logging are:

a) dynamics: data logging while creating a sufficiently high frequency periodic log (record) so as to investigate the time-based variation of measured physical parameters

b) trending: data logging during an extended duration of time for the purpose of investigating regularities, irregularities, or both in the measured physical parameters throughout time

3.1.9
demand
total of all compressed air consumers, including productive end-use applications and various forms of compressed air waste

3.1.10
drawdown
circumstance observed in a compressed air system that is characterized by continual pressure decay arising from a compressed air system event whereby air demand exceeds the capacity of supply

3.1.11
operating period
group of typical time periods that share similar compressed air energy and compressed air demand profiles

Note 1 to entry: See 3.1.15.

3.1.12
spot check measurement
measurement of physical parameters creating a log (record) of their numerical value that is carried out at random time intervals or limited to a few instances

3.1.13
supply
conversion of primary energy resource to compressed air energy

3.1.14
transmission
movement of compressed air energy from where it is generated to where it is used

3.1.15
typical operating period
time period that represents a period of typical plant operation

3.2 Flow

3.2.1
demand flow rate
total airflow rate of demand-side consumption

Note 1 to entry: Demand-side consumption includes productive consumers, inappropriate usage, artificial demand, and demand-side waste. This takes into account supply flow plus or minus the compressed air supplied to system demand from secondary storage as system pressure decreases. This can also account for the airflow entering secondary storage as system pressure increases.

3.2.2
flow dynamic application
end use wherein the peak airflow rate and minimum pressure occur simultaneously

3.2.3
flow static application
end uses characterized when peak airflow rate and minimum pressure required do not occur simultaneously

3.2.4
generation flow rate
airflow rate of compressed air generated by the air compressor(s) before any air treatment equipment air use and supply-side waste

3.2.5
peak airflow
maximum value of the airflow during the daily or other periodic operating cycle

3.2.6
storage flow rate
airflow rate entering the storage volume as pressure increases or the airflow rate exiting the storage volume as pressure decreases

Note 1 to entry: The airflow can be either entering or exiting the system or the primary or secondary storage.