

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 1101/1:2013)

Ta slovenski standard je istoveten z: EN ISO 11011:2015

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ICS:

23.140 Kompresorji in pnevmatični

Compressors and pneumatic

stroji

machines

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en

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EUROPEAN STANDARD NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 11011

March 2015

ICS 23.140

English Version

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

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

EN ISO 11011:2015 (E)

Contents	!		
Foreword			

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN ISO 11011:2015 https://standards.iteh.ai/catalog/standards/sist/8e2375c1-e848-4e0e-88a7-57111f71bad8/sist-en-iso-11011-2015

EN ISO 11011:2015 (E)

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of an identical text or by endorsement, at the latest by September 2015, and conflicting national standards shall be withdrawn at the latest by September 2015.

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INTERNATIONAL STANDARD

ISO 11011

First edition 2013-09-15

Compressed air — Energy efficiency — Assessment

Air comprimé — Efficacité énergétique — Évaluation

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Reference number ISO 11011:2013(E)

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Published in Switzerland

Contents		Page		
Fore	eword		v	
Intr	oductio	n	vi	
1	Scon	e	1	
2	•	native references		
3	Terms and definitions			
3	3.1	General		
	3.2	Flow		
	3.3	Pressure		
	3.4	Storage	5	
	3.5	Volume	5	
4	Roles and responsibilities			
	4.1	Identification of assessment team members		
	4.2	Site management support	7	
	4.3	Communications		
	4.4	Access to equipment, resources, and information		
	4.5	Assessment objectives and scope		
	4.6	Identification of other assessment team members		
	4.7	Objective check		
5	Asse	ssment methodology ANDARD PREVIEW General	8	
	5.2	Systems engineering methods rds.iteh.ai) Systems engineering process	8	
	5.3	Systems engineering process	8	
	5.4	System assessment process SIST EN ISO 11011:2015 meters and their determination dards/sis/8e2375e1-e848-4e0e-88a7-	9	
6	Para	meters and their determination dards/sist/8e2375c1-e848-4e0e-88a7-	10	
	6.1	General 57111f71bad8/sist-en-iso-11011-2015		
	6.2	Measurement		
	6.3 6.4	Pressure Flow rate		
	6.5	Power		
_				
7	Initia 7.1	al data collection and evaluation General		
	7.1 7.2	Plant background		
	7.2	Plant function		
	7.3 7.4	Compressed air system definition		
	7.5	Inventory of key end-use air demands		
	7.6	Heat recovery		
	7.7	Baseline period and duration of data logging		
	7.8	Energy use		
	7.9	Compressed air system supply efficiency		
	7.10	System volume		
	7.11	Pressure		
	7.12 7.13	Flowrate Critical air demands		
	7.13	Compressed air waste		
	7.14	Air treatment		
	7.16	Compressor control		
	7.17	Storage		
	7.18	Maintenance		
	7.19	Ambient intake conditions	16	
8	Anal	ysis of data from assessment	16	
_		Conoral	16	

iii

ISO 11011:2013(E)

	8.2	Baseline profiles	17
	8.3	System volume	19
	8.4	Pressure profile	19
	8.5	Perceived high-pressure demand	21
	8.6	Demand profile	22
	8.7	Critical air demands	23
	8.8	Compressed air waste	24
	8.9	Optimized air treatment	25
	8.10	Reduced system operating pressure	26
	8.11	Balance of supply and demand	27
	8.12	Maintenance opportunities	27
	8.13	Heat recovery opportunities	28
9	Repo	rting and documentation of assessment findings	28
	9.1	Assessment report	28
	9.2	Confidentiality	
	9.3	Energy-saving opportunities	
	9.4	Data for third-party review	
Ann	ex A (inf	ormative) Introduction to energy assessment	30
Ann	ex B (inf	ormative) Assessment activities — General	32
Ann	ex C (inf	ormative) Assessment activities — Supply	37
Ann	ex D (inf	formative) Assessment activities — Transmission	43
Ann	ex E (inf	ormative) Assessment activities — Demand D. P. P. F. V. F. V	47
		ormative) Competencies (standards.iteh.ai)	
Dibli	iograph	(standards.iten.ai)	E4
וטוס	เบยเสปแ	V	

SIST EN ISO 11011:2015

https://standards.iteh.ai/catalog/standards/sist/8e2375c1-e848-4e0e-88a7-57111f71bad8/sist-en-iso-11011-2015

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

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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*.

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Introduction

This International Standard has been developed with reference to available documentation¹⁾ (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.

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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 D PREVIEW

- analysing the data from the assessment ards.iteh.ai)
- 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 iTeh STANDARD PREVIEW

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

SISTEN ISO 11011:2015

3.1.7 https://standards.iteh.ai/catalog/standards/sist/8e2375c1-e848-4e0e-88a7-

compressed air system assessment 57111f71bad8/sist-en-iso-11011-2015

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 <u>3.1.15</u>.

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 iTeh STANDARD PREVIEW

demand flow rate

total airflow rate of demand-side consumption ds. iteh.ai)

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. 1011-2015

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.