SVENSK STANDARD
SS-ISO 1217:2016/Amd 1:2016

Fastställd/Approved: 2016-09-08
Publicerad/Published: 2016-09-12
Utgåva/Edition: 1
Språk/Language: engelska/English
ICS: 23.140

Beräkningsmetod för insentropisk verkningsgrad och förhållandet till specifikt värmevärde (ISO 1217:2009/Amd 1:2016, IDT)

Calculation of isentropic efficiency and relationship with specific energy (ISO 1217:2009/Amd 1:2016, IDT)

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Den internationella standarden ISO 1217:2009/Amd 1:2016 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 1217:2009/Amd 1:2016.

The International Standard ISO 1217:2009/Amd 1:2016 has the status of a Swedish Standard. This document contains the official English version of ISO 1217:2009/Amd 1:2016.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS Förlag AB, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Kompressorer, SIS/TK 245.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

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 (see 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).

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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

Amendment 1 to ISO 1217:2009 was prepared by Technical Committee ISO/TC 118, *Compressors and pneumatic tools, machines and equipment*, Subcommittee SC 6, *Air compressors and compressed air systems*.

Displacement compressors — Acceptance tests

AMENDMENT 1: Calculation of isentropic efficiency and relationship with specific energy

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Replace the term and definition with the following:

isentropic power

power that is theoretically required to compress an ideal gas under constant entropy, from given inlet conditions to a given discharge pressure

Note 1 to entry The term "ideal gas" is used to indicate any gas in a condition or state so that it follows closely the ideal gas law.

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Replace the term and definition with the following:

isentropic efficiency

ratio of the required isentropic power to measured power for the same specified boundaries with the same gas and the same inlet conditions and outlet pressure

$$\eta_{\text{isen}} = \frac{P_{\text{isen}}}{P_{\text{real}}}$$

Note 1 to entry Examples of specified boundaries may be shaft power of bare compressor or motor power of the package including inlet and discharge losses or total input power of the package.

Note 2 to entry In many turbo compressor textbooks, the adiabatic stage gas power $P_i = \Delta h \cdot q_m = \left(h_2 - h_1\right) \cdot q_m$ is taken as P_{real}. Isentropic efficiency is then defined as $\eta_{\text{isen}} = \frac{P_{\text{isen}}}{\Delta h \cdot q_m} = \frac{\Delta h_{\text{isen}}}{\Delta h}$. In this special case, the most narrow boundaries are used which are enclosing only the gas volume. In this sense, it corresponds with the formula for isentropic efficiency given in ISO 5389:2005, Formula (E.101).

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Add a new Annex H as follows.

Annex H
(informative)

Isentropic efficiency and its relation to specific energy requirement

H.1 General

This annex provides general derivation of isentropic power and calculations for the relationship between isentropic efficiency as defined in this annex and specific energy requirement in accordance with this International Standard.

No additional data or measurements are required for the calculation of isentropic power and isentropic efficiency.

This annex also provides calculations for the relative tolerances between specific power and isentropic efficiency.

H.2 Symbols and subscripts

Table H.1 — Symbols

Symbol	Term	SI unit	Other practical units
c_p	specific heat at constant pressure	J/(kg·K)	—
h	specific enthalpy	J/kg	kJ/kg
Δh	specific enthalpy difference	J/kg	kJ/kg
P	power	W	MW, kW
p	pressure	Pa	MPa, bar, mbar
Δp	pressure difference	Pa	MPa, bar, mbar
R	gas constant	J/(kg·K)	
T	absolute temperature	K	
q_m	mass rate of flow	kg/s	kg/h
q_V	volume flow rate	m^3/s	m^3/h, m^3/min, L/s
K	isentropic exponent (ratio of specific heats)		min^{-1}
L	lower limit		
η	efficiency		
ρ	density	kg/m^3	
U	upper limit		

Table H.2 — Subscripts

Subscript	Term	Remark
isen	isentropic	
η	efficiency	
m	mass	Characterizes the mass-specific rates of flow, energies and volumes
P	power	
real	real	