Irish Standard
I.S. EN 17038-1:2019

Pumps - Methods of qualification and verification of the Energy Efficiency Index for rotodynamic pump units - Part 1: General requirements and procedures for testing and calculation of Energy Efficiency Index (EEI)

I.S. EN 17038-1:2019

Incorporating amendments/corrigenda/National Annexes issued since publication:

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This document is based on:	*Published:*
EN 17038-1:2019	2019-05-08

This document was published under the authority of the NSAI and comes into effect on:	ICS number:
2019-05-26	23.080
	NOTE: If blank see CEN/CENELEC cover page

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National Foreword

I.S. EN 17038-1:2019 is the adopted Irish version of the European Document EN 17038-1:2019, Pumps - Methods of qualification and verification of the Energy Efficiency Index for rotodynamic pump units - Part 1: General requirements and procedures for testing and calculation of Energy Efficiency Index (EEI)

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 17038-1

May 2019

ICS 23.080

English Version

Pumps - Methods of qualification and verification of the Energy Efficiency Index for rotodynamic pump units - Part 1: General requirements and procedures for testing and calculation of Energy Efficiency Index (EEI)

Pompes - Méthodes de qualification et de vérification de l'indice de rendement énergétique des groupes motopompes rotodynamiques - Partie 1 : Exigences générales et procédures d'essai et de calcul de l'indice de rendement énergétique (EEI)

Pumpen - Methoden zur Qualifikation und Verifikation des Energieeffizienzindexes für Kreiselpumpen - Teil 1: Allgemeine Anforderungen und Vorgehensweisen zur Prüfung und Berechnung des Energieeffizienzindexes (EEI)

This European Standard was approved by CEN on 15 July 2018.

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

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Ref. No. EN 17038-1:2019 E

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European foreword

This document (EN 17038-1:2019) has been prepared 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 November 2019, and conflicting national standards shall be withdrawn at the latest by November 2019.

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

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Introduction

This document is the first part of a series of standards describing a methodology to evaluate energy efficiency performance of pump units, comprising the pump, the motor with or without frequency converter, based on a non-dimensional numerical value called Energy Efficiency Index (*EEI*). An *EEI* allows the comparison of different pump sizes and types with one common indicator. Physical influences such as pump size, specific speed, pump unit part-load operation, motor-efficiency characteristic and frequency converter influence are implemented into this indicator.

This standard series covers pump units which component wise can be placed on the market and assembled into a pump unit or are placed on the market as one single product. To cover these two cases a semi-analytical model has been developed in order to derive the *EEI* based on nominal data of the components only. This case happens for example when an assembler of the components builds the pump unit on site and consequently a product test cannot be done by for this assembler or when a manufacturer is quoting a pump-unit which uses a combination of components not previously built.

This particular standard gives an overview of the basic concept of *EEI* (Clause 4), basic concepts of flow-time profiles and reference pressure control curves, the qualification (Clause 5) of a pump unit type regarding an *EEI* and the verification of *EEI* values (Clause 6) given for a pump unit type either by measurement or calculation.

Specific requirements for testing, a calculation method for an *EEI*, the so called semi-analytical model of a complete pump unit, specific flow-time profiles and reference control curves are given in the subsequent parts of this standard series.

1 Scope

This document describes a methodology to evaluate energy efficiency performance of pump units based on a non-dimensional numerical value called Energy Efficiency Index (*EEI*).

This document covers pump units consisting of:

— one single or several rotodynamic water pump(s), including where integrated in other products, and driven by a motor system, consisting of an electrical motor, and either:

  — a terminal box which only enables to operate the pump unit at constant motor stator frequency and thereby (nearly) constant rotational speed, or

  — a CDM (Complete Drive Module) which enables to operate the pump unit at variable rotational speed depending on a varying demand of flow rate and/or discharge or differential pressure.

NOTE A CDM is also often called VSD (Variable Speed Drive).

Pump units as defined above are treated as extended products in respect to their energy efficiency.

2 Normative references

There are no normative references in this document.

3 Terms and definitions, symbols and subscripts

For the purpose of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
fixed speed
constant motor stator frequency

3.2
variable speed
varying motor stator frequency

3.3
Energy Efficiency Index
EEI
ratio between $P_{1,\,avg}$ and $P_{1,\,ref}$

3.4
reference electrical power input $P_{1,\,ref}$
calculated power input of the pump unit at the best efficiency point

3.5
average electrical power input $P_{1,\,avg}$
power input weighted by the load profile