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Pumps - Methods of qualification and verification of the Energy Efficiency Index for rotodynamic pump units - Part 2: Testing and calculation of Energy Efficiency Index (EEI) of single pump units

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NATIONAL FOREWORD

See Eesti standard EVS-EN 17038-2:2019 sisaldab Euroopa standardi EN 17038-2:2019 ingliskeelset teksti.	This Estonian standard EVS-EN 17038-2:2019 consists of the English text of the European standard EN 17038-2:2019.
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Pumpen - Methoden zur Qualifikation und Verifikation des Energieeffizienzindexes für Kreiselpumpen - Teil 2: Prüfung und Berechnung des Energieeffizienzindexes (EEI) einzelner Pumpenaggregate

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European foreword

This document (EN 17038-2:2019) 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of an identical text or by endorsement, at the latest by November 2019, and conflicting national standards shall be withdrawn at the latest by November 2019.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.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This part of the European Standard is the second part of a series of standards describing a methodology to evaluate energy efficiency performance of single 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 metric.

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

EEI is an index to rate pump units according to their energy efficiency but does not replace the need to do a life-time cost analysis regarding energy consumption over the life time of the pump unit.

1 Scope

This document specifies methods and procedures for testing, calculating and determining the Energy Efficiency Index (*EEI*) of rotodynamic glanded single pump units for pumping clean water, including where integrated in other products.

The pump types and sizes covered by this document are described in the normative Annex A.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 16480, *Pumps — Minimum required efficiency of rotodynamic water pumps*

EN 17038-1:2019, *Pumps — Methods of qualification and verification of the Energy Efficiency Index for Rotodynamic pumps units — Part 1: General requirements and procedures for testing and calculation of energy efficiency index (EEI)*

EN 60034-1, *Rotating electrical machines — Part 1: Rating and performance (IEC 60034-1)*

EN 60034-2-1, *Rotating electrical machines — Part 2-1: Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles) (IEC 60034-2-1)*

EN 60034-2-2, *Rotating electrical machines — Part 2-2: Specific methods for determining separate losses of large machines from tests — Supplement to IEC 60034-2-1 (IEC 60034-2-2)*

EN 60034-30-1, *Rotating electrical machines — Part 30-1: Efficiency classes of line operated AC motors (IE code) (IEC 60034-30-1)*

EN 60038, *CENELEC standard voltages (IEC 60038)*

EN 61800-9-2, *Adjustable speed electrical power drive systems — Part 9-2: Ecodesign for power drive systems, motor starters, power electronics & their driven applications — Energy efficiency indicators for power drive systems and motor starters (IEC 61800-9-2)*

EN ISO 9906:2012, *Rotodynamic pumps — Hydraulic performance acceptance tests — Grades 1, 2 and 3 (ISO 9906:2012)*

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

IEC/TS 60034-2-3, *Rotating electrical machines — Part 2-3: Specific test methods for determining losses and efficiency of converter-fed AC induction motors*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in EN ISO 17769-1 and the terms, definitions, symbols and subscripts given in EN 17038-1, together with the following 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