

STN	Čerpadlá Metódy kvalifikácie indexu energetickej účinnosti hydrodynamických čerpacích agregátov Časť 4: Skúšanie a výpočet indexu energetickej účinnosti (EEI) ponorných viacstupňových čerpacích agregátov	STN EN 17038-4 11 0035
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Pumps - Methods of qualification of the Energy Efficiency Index for rotodynamic pump units - Part 4: Testing and calculation of energy efficiency index (EEI) of submersible multistage pump units

Táto norma obsahuje anglickú verziu európskej normy.
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**Pumps - Methods of qualification of the Energy Efficiency
Index for rotodynamic pump units - Part 4: Testing and
calculation of energy efficiency index (EEI) of submersible
multistage pump units**

Pompes - Méthodes de qualification de l'indice de rendement des groupes motopompes rotodynamiques
- Partie 4 : Essais et calcul de l'indice de rendement énergétique (EEI) pour les unités de pompage submersibles des forages

Pumpen - Methoden zur Qualifikation des Energieeffizienzindex für Kreiselpumpen - Teil 4: Prüfung und Berechnung des Energieeffizienzindex (EEI) mehrstufiger Tauchmotorpumpenaggregate

This European Standard was approved by CEN on 29 October 2023.

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COMITÉ EUROPÉEN DE NORMALISATION
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EN 17038-4:2023(E)**European foreword**

This document (EN 17038-4:2023) 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of an identical text or by endorsement, at the latest by March 2024, and conflicting national standards shall be withdrawn at the latest by March 2024.

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.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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Introduction

This document is the fourth part of a series of standards describing a methodology to evaluate energy efficiency performance of submersible multistage pump units, comprising a rotodynamic pump part and a submersible motor which is either directly fed from the grid or combined with a frequency converter (CDM) to form a Power Drive System (PDS). For consistency purposes with other referred standards, CDM is used in this document. VSD, for variable speed drive, is the term used in Ecodesign regulations. Rotodynamic pump and motor are designed with outer diameters and special design features that enable to install them in boreholes and operate them completely surrounded by the pumped liquid. The methodology is based on a non-dimensional numerical value called Energy Efficiency Index (*EEI*). An *EEI* value allows the comparison of different configurations by one common indicator. Physical influences such as size and stage number of the incorporated rotodynamic 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 *EEI*, the so called semi-analytical model (SAM) of submersible multistage pump units, specific flow-time profiles and reference pressure control curves are given in this document.

EEI is an index to rate submersible multistage 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 lifetime of the submersible multistage pump unit.

EN 17038-4:2023(E)**1 Scope**

This document specifies methods and procedures for testing, calculating, and determining the Energy Efficiency Index (EEI) of submersible multistage pump units.

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 16480:2021, *Pumps — Rotodynamic pumps — Minimum required efficiency of rotodynamic water pumps and determination of Minimum Efficiency Index (MEI)*

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)*

EN 17038-2:2019,¹ *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*

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

EN ISO 17769-1:2012, *Liquid pumps and installation - General terms, definitions, quantities, letter symbols and units - Part 1: Liquid pumps (ISO 17769-1:2012)*

EN 60034-1:2017, *Rotating electrical machines — Part 1: Rating and performance (IEC 60034-1:2010)*

EN 60034-2-1:2014, *Rotating electrical machines - Part 2-1: Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles) (IEC 60034 2 1:2014)*

EN IEC 60034-2-3:2020, *Rotating electrical machines - Part 2-3: Specific test methods for determining losses and efficiency of converter-fed AC motors (IEC 60034 2020)*

EN IEC 60038:2011/prA1:2020, {fragment 1}, *Standard voltages for LVDC supply and LVDC equipment (Proposed horizontal standard)*

EN IEC 60038:2011/prA1:2020, {fragment 2}, *Standard voltages for AC supply and AC equipment (Proposed horizontal standard)*

EN IEC 60038:2011/prA1:2020, {fragment 3}, *Standard voltages for DC and AC traction systems (Proposed horizontal standard)*

EN 61800-9-2:2017, *Adjustable speed electrical power drive systems - Part 9-2: Ecodesign for power drive systems, motor starters, power electronics and their driven applications - Energy efficiency indicators for power drive systems and motor starters (IEC 61800 9 2:2017)*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN

¹ As impacted by EN 17038-2:2019/AC:2020.