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CSA C504:20
National Standard of Canada

Measuring and monitoring industrial and commercial pumping system energy performance

Standards Council of Canada
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Preface

This is the first edition of CSA C504, *Measuring and monitoring industrial and commercial pumping system energy performance*.

CSA Group acknowledges that the development of this Standard was made possible in part by the financial support of BC Hydro, the Canadian Electricity Association (CEA), Hydro Québec, Independent Electricity System Operator, Manitoba Hydro, and Natural Resources Canada (NRCan).

This Standard was prepared by the Subcommittee on Benchmark Energy Factor For Pump Systems, under the jurisdiction of the Technical Committee on Energy Efficiency of Industrial Equipment and Systems and the Strategic Steering Committee on Performance, Energy Efficiency, and Renewables, and has been formally approved by the Technical Committee.

This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

Notes:

1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
2) *Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*
3) *This Standard was developed by consensus, which is defined by* CSA Policy governing standardization — Code of good practice for standardization *as "substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity". It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this Standard.*
4) *To submit a request for interpretation of this Standard, please send the following information to* ***inquiries@csagroup.org*** *and include "Request for interpretation" in the subject line:*
   a) *define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;*
   b) *provide an explanation of circumstances surrounding the actual field condition; and*
   c) *where possible, phrase the request in such a way that a specific "yes" or "no" answer will address the issue.*

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   a) *Standard designation (number);*
   b) *relevant clause, table, and/or figure number;*
   c) *wording of the proposed change; and*
   d) *rationale for the change.*

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Measuring and monitoring industrial and commercial pumping system energy performance

0 Introduction

Historically, there has been a lack of consistency in the methods used to determine the energy performance of clean-water pumping systems. This often makes it difficult for stakeholders to make informed decisions concerning energy efficiency. This lack of consistent information complicates the task of ensuring any existing, new, or optimized system is operating efficiently.

This Standard is intended to be used for assessing the overall energy performance of existing clean-water pumping systems by using the benchmark energy factor (BEF) concept. The BEF is the energy consumption of a system divided by the essential energy required to provide the same work under ideal conditions.

This Standard enables one to adopt an approach that is logical and transparent and includes reporting that supports the assumptions and conclusions, as well as any information that will facilitate evaluating a pumping system.

This Standard includes three levels of data monitoring and analysis depending on the complexity of the system and available information. For more complex systems, the process for collecting the required data through on-site measurements can be done via an integrated energy management information system (EMIS) at the facility level. The Standard may be used as part of an ISO 50001 implementation program. It enables organizations to establish a systematic approach on energy management information systems at the facility level to achieve continual improvement of energy performance with benefits such as

- customer engagement opportunities;
- energy savings opportunities;
- controlled persistence of energy conservation measures; and
- recognition of market transformation and spillover.

This Standard is not intended as a replacement for a pumping system energy study, nor does it specify measures that can be used to improve the energy efficiency of a pumping system.

1 Scope

1.1 Inclusions

This Standard is intended to be used with an industrial or commercial clean-water pumping system with the following characteristics:

a) any application of electrically driven single- and multi-stage rotodynamic pumps;
b) pumping system with a flow range between 20 m^3/h to 36 000 m^3/h; and