



# Measuring and monitoring industrial and commercial pumping system energy performance



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# Contents

Technical Committee on Energy Efficiency of Industrial Equipment and Systems 3

Subcommittee on Benchmark Energy Factor for Pump Systems 5

Preface 6

**0 Introduction 7**

**1 Scope 7**

1.1 Inclusions 7

1.2 Exclusions 8

1.3 Terminology 8

**2 Reference publications 8**

**3 Definitions 9**

**4 Levels of assessment for pumping systems 9**

4.1 General 9

4.1.1 Data 9

4.1.2 Assessment level 9

4.2 Application of levels to various pumping systems 10

4.3 Data collection by levels for various pumping systems 11

4.3.1 Data sources 11

4.3.2 Data collection 11

**5 Definition of a pumping system boundary 15**

5.1 General 13

5.1.1 System boundary 13

5.1.2 Pumping system energy flow 13

5.2 Typical pumping system configurations 14

5.2.1 General 14

5.2.2 Open systems 14

5.2.3 Closed systems 15

5.2.4 Mechanical support systems 16

5.2.5 Electrical support systems 17

5.3 Deming pumping system boundary application for BEF 17

5.3.1 General 17

5.3.2 BEF 18

5.3.3 Model 18

5.3.4 Essential energy 18

5.3.5 Open systems 18

5.3.6 Closed systems 20

**6 Determining essential load 21**

6.1 General conditions 21

6.2 System flowrate requirements 21

|   |   |           |
|---|---|-----------|
| 6.3   | System essential head                                       | 22        |
| 6.3.1   | Total essential head  | 22        |
| 6.3.2   | Total static head ( $H_s$ )                                 | 23        |
| 6.3.3   | Total essential dynamic head, $H_D$                         | 23        |
| 6.3.4   | Total essential loss coefficient                            | 26        |
| 6.3.5   | Friction factor   | 26        |
| 6.3.6   | Loss coefficient for fittings and valves                    | 27        |
| 6.3.7   | Determination of static head dominance                      | 28        |
| 6.4   | Essential load  | 28        |
| <b>7</b>                                      | <b>Determining essential energy</b>                         | <b>29</b> |
| 7.1   | General conditions  | 29        |
| 7.1.1   | Introduction  | 29        |
| 7.1.2   | Components of essential energy                              | 29        |
| 7.2   | Predicting pump efficiency based on flowrate                | 29        |
| 7.2.1   | General   | 29        |
| 7.2.2   | Correcting pump efficiency based on viscosity               | 30        |
| 7.2.3   | Essential pump efficiency calculation                       | 31        |
| 7.3   | Essential pumping system energy                             | 32        |
| 7.4   | Essential electrical support system energy                  | 34        |
| 7.5   | Essential mechanical support system energy                  | 34        |
| 7.6   | Total pumping system essential energy                       | 35        |
| <b>8</b>                                      | <b>Actual energy of pumping systems</b>                     | <b>35</b> |
| 8.1   | General   | 35        |
| 8.2   | Level 1 assessment  | 36        |
| 8.3   | Level 2 assessment  | 37        |
| 8.4   | Level 3 assessment  | 40        |
| <b>9</b>                                      | <b>Computing the BEF</b>                                    | <b>40</b> |
| 9.1   | Calculating BEF   | 40        |
| 9.2   | Pumping system application types for benchmarking using BEF | 40        |
| <b>10</b>                                     | <b>Reporting the BEF</b>                                    | <b>42</b> |
| <b>11</b>                                     | <b>Potential energy savings using a BEF</b>                 | <b>43</b> |
| 11.1  | General   | 43        |
| 11.2  | Estimating technical potential using BEF                    | 43        |
| 11.3  | Estimating energy savings using BEF                         | 43        |
| <hr/>   |   |           |
| Annex A (informative) — Illustrative examples |   | 44        |
| Annex B (informative) — Bibliography          |   | 48        |

# 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.

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# CSA C504:20

## ***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<sup>3</sup>/h to 36 000 m<sup>3</sup>/h; and