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CSA NGV 4.3-2018

Temperature compensation guideline for compressed natural gas vehicle fueling

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***Temperature compensation
guideline for compressed natural
gas vehicle fueling***

IGAC

Interprovincial Gas Advisory Council



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Preface

This is the first edition of CSA NGV 4.3, *Temperature compensation guideline for compressed natural gas vehicle fueling*.

This Standard was prepared by the NGV 4.3 Technical Subcommittee on Standards for Temperature Compensation Devices & Priority and Sequencing for Natural Gas Vehicles, under the jurisdiction of the Automotive Technical Committee and the JB112 Natural Gas Powered Vehicles and Fueling Technical Committee and has been formally approved by the Technical Committees, and the Interprovincial Gas Advisory Council.

Notes:

- 1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
- 2) *This Standard contains SI (Metric) units corresponding to the yard/pound quantities, the purpose being to allow the standard to be used in SI (Metric) units. (IEEE/ASTM SI 10, American National Standard for Metric Practice, or ISO 80000-1:2009, Quantities and units – Part 1: General, is used as a guide in making metric conversion from yard/pound quantities.) If a value for a measurement and a corresponding value in other units are stated, the first stated value is to be regarded as the requirement. The given corresponding value may be approximate. If a value for a measurement and a corresponding value in other units are both specified as a quoted marking requirement, the first stated unit, or both, are to be provided.*
- 3) *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.*
- 4) *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.*
- 5) *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.*

Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization and are available on the Current Standards Activities page at standardsactivities.csa.ca.
- 6) *This Standard is subject to review within five years from the date of publication. Suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include “Proposal for change” in the subject line:*
 - a) *Standard designation (number);*
 - b) *relevant clause, table, and/or figure number;*
 - c) *wording of the proposed change; and*
 - d) *rationale for the change.*

CSA NGV 4.3-2018

Temperature compensation guideline for compressed natural gas vehicle fueling

1 Scope

1.1

This Standard details the performance requirements for temperature compensation control used to prevent compressed natural gas (CNG) dispensing systems from exceeding a safe fill level of vehicle fuel storage container(s). This Standard contains safety performance guidelines for compressed natural gas fueling dispenser temperature compensation systems. It applies to field evaluation of existing dispensing systems designed primarily to allow for full fill and to avoid over-pressurization of vehicle fuel storage containers under operating temperature conditions as specified in this Standard.

This Standard applies to CNG fueling of vehicle containers with service pressures of P30 [20 700 kPa (3,000 psi)], P30HD [20 700 kPa (3,000 psi)], P36 [24 800 kPa (3,600 psi)], and P36HD [24 800 kPa (3,600 psi)]. P30HD and P36HD are designations used in accordance with CSA/ANSI NGV 1, and throughout the document the use of P30 and P36 are also applicable to P30HD and P36HD, respectively (see Annex A regarding applicable vehicle service pressures). This guidance does not apply to onboard vehicle temperature compensation systems or components.

This Standard is applicable to the dispensing of only natural gas that meets quality and interchangeability specifications contained in U.S. Federal Energy Regulatory Commission (FERC)-approved gas tariffs.

1.2

All dimensions used in this Standard are in metric units [International System of Units (SI)], unless otherwise specified. If a value for a measurement, as given in this Standard, is followed by an equivalent value in other units, the first stated is to be regarded as the specification.

If a value for a measurement and a corresponding value in other units are both specified as a quoted marking requirement, either the first stated unit, or both, are to be provided.

1.3

All references to pressure throughout this document are to be considered gauge pressures unless otherwise specified.

1.4

The requirements of this Standard are not intended to constrain innovation. When considering fuel compositions, controls, materials, designs, or constructions not specifically dealt with in this Standard, these alternatives are to be evaluated as to their ability to yield levels of safety and performance equivalent to or better than those prescribed by this Standard.

1.5

In the case of conflict between this Standard and Federal, Provincial, State, or Local requirements, the governmental requirements take precedence.

1.6

In this Standard, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; “should” is used to express a recommendation or that which is advised but not required; and “may” is used to express an option or that which is permissible within the limits of the Standard.

Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material.

Notes to tables and figures are considered part of the table or figure and may be written as requirements.

Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

2 Reference publications

This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below, including all amendments published thereto.

CSA Group

B51-2014

Boiler, pressure vessel, and pressure piping code

B108-2014

Compressed natural gas fueling station installation code

NGV 1-2017

Compressed natural gas vehicle (NGV) fueling connection devices

CSA/ANSI NGV 2-2016

Compressed Natural Gas Vehicle Fuel Containers

NFPA (National Fire Protection Association)

NFPA 52-2016

Vehicular Natural Gas Fuel Systems Code

NIST (National Institute of Standards and Technology)

REFPROP

Reference Fluid Thermodynamic and Transport Properties Version 9.1