CSA R100:20
National Standard of Canada

Canadian metadata standard for hydrometeorological monitoring stations

Standards Council of Canada
Conseil canadien des normes

Legal Notice for Standards

Canadian Standards Association (operating as “CSA Group”) develops standards through a consensus standards development process approved by the Standards Council of Canada. This process brings together volunteers representing varied viewpoints and interests to achieve consensus and develop a standard. Although CSA Group administers the process and establishes rules to promote fairness in achieving consensus, it does not independently test, evaluate, or verify the content of standards.

Disclaimer and exclusion of liability

This document is provided without any representations, warranties, or conditions of any kind, express or implied, including, without limitation, implied warranties or conditions concerning this document’s fitness for a particular purpose or use, its merchantability, or its non-infringement of any third party’s intellectual property rights. CSA Group does not warrant the accuracy, completeness, or currency of any of the information published in this document. CSA Group makes no representations or warranties regarding this document’s compliance with any applicable statute, rule, or regulation.

IN NO EVENT SHALL CSA GROUP, ITS VOLUNTEERS, MEMBERS, SUBSIDIARIES, OR AFFILIATED COMPANIES, OR THEIR EMPLOYEES, DIRECTORS, OR OFFICERS, BE LIABLE FOR ANY DIRECT, INDIRECT, OR INCIDENTAL DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES, HOWSOEVER CAUSED, INCLUDING BUT NOT LIMITED TO SPECIAL OR CONSEQUENTIAL DAMAGES, LOST REVENUE, BUSINESS INTERRUPTION, LOST OR DAMAGED DATA, OR ANY OTHER COMMERCIAL OR ECONOMIC LOSS, WHETHER BASED IN CONTRACT, TORT (INCLUDING NEGLIGENCE), OR ANY OTHER THEORY OF LIABILITY, ARISING OUT OF OR RESULTING FROM ACCESS TO OR POSSESSION OR USE OF THIS DOCUMENT, EVEN IF CSA GROUP HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES.

In publishing and making this document available, CSA Group is not undertaking to render professional or other services for or on behalf of any person or entity or to perform any duty owed by any person or entity to another person or entity. The information in this document is directed to those who have the appropriate degree of experience to use and apply its contents, and CSA Group accepts no responsibility whatsoever arising in any way from any and all use of or reliance on the information contained in this document.

CSA Group is a private not-for-profit company that publishes voluntary standards and related documents. CSA Group has no power, nor does it undertake, to enforce compliance with the contents of the standards or other documents it publishes.

Intellectual property rights and ownership

As between CSA Group and the users of this document (whether it be in printed or electronic form), CSA Group is the owner, or the authorized licensee, of all works contained herein that are protected by copyright, all trade-marks (except as otherwise noted to the contrary), and all inventions and trade secrets that may be contained in this document, whether or not such inventions and trade secrets are protected by patents and applications for patents. Without limitation, the unauthorized use, modification, copying, or disclosure of this document may violate laws that protect CSA Group’s and/or others’ intellectual property and may give rise to a right in CSA Group and/or others to seek legal redress for such use, modification, copying, or disclosure. To the extent permitted by licence or by law, CSA Group reserves all intellectual property rights in this document.

Patent rights

Attention is drawn to the possibility that some of the elements of this standard may be the subject of patent rights. CSA Group shall not be held responsible for identifying any or all such patent rights. Users of this standard are expressly advised that determination of the validity of any such patent rights is entirely their own responsibility.

Authorized use of this document

This document is being provided by CSA Group for informational and non-commercial use only. The user of this document is authorized to do only the following:

If this document is in electronic form:

- load this document onto a computer for the sole purpose of reviewing it;
- search and browse this document; and
- print this document if it is in PDF format.

Limited copies of this document in print or paper form may be distributed only to persons who are authorized by CSA Group to have such copies, and only if this Legal Notice appears on each such copy.

In addition, users may not and may not permit others to

- alter this document in any way or remove this Legal Notice from the attached standard;
- sell this document without authorization from CSA Group; or
- make an electronic copy of this document.

If you do not agree with any of the terms and conditions contained in this Legal Notice, you may not load or use this document or make any copies of the contents hereof, and if you do make such copies, you are required to destroy them immediately. Use of this document constitutes your acceptance of the terms and conditions of this Legal Notice.

Standards Update Service

CSA R100:20
November 2020

Title: *Canadian metadata standard for hydrometeorological monitoring stations*

To register for e-mail notification about any updates to this publication
- go to **store.csagroup.org**
- click on **Product Updates**

The **List ID** that you will need to register for updates to this publication is **2428593**.

If you require assistance, please e-mail **techsupport@csagroup.org** or call 416-747-2233.

Visit CSA Group's policy on privacy at **www.csagroup.org/legal** to find out how we protect your personal information.

Canadian Standards Association (operating as "CSA Group"), under whose auspices this National Standard has been produced, was chartered in 1919 and accredited by the Standards Council of Canada to the National Standards system in 1973. It is a not-for-profit, nonstatutory, voluntary membership association engaged in standards development and certification activities.

CSA Group standards reflect a national consensus of producers and users — including manufacturers, consumers, retailers, unions and professional organizations, and governmental agencies. The standards are used widely by industry and commerce and often adopted by municipal, provincial, and federal governments in their regulations, particularly in the fields of health, safety, building and construction, and the environment.

Individuals, companies, and associations across Canada indicate their support for CSA Group's standards development by volunteering their time and skills to Committee work and supporting CSA Group's objectives through sustaining memberships. The more than 7000 committee volunteers and the 2000 sustaining memberships together form CSA Group's total membership from which its Directors are chosen. Sustaining memberships represent a major source of income for CSA Group's standards development activities.

CSA Group offers certification and testing services in support of and as an extension to its standards development activities. To ensure the integrity of its certification process, CSA Group regularly and continually audits and inspects products that bear the CSA Group Mark.

In addition to its head office and laboratory complex in Toronto, CSA Group has regional branch offices in major centres across Canada and inspection and testing agencies in eight countries. Since 1919, CSA Group has developed the necessary expertise to meet its corporate mission: CSA Group is an independent service organization whose mission is to provide an open and effective forum for activities facilitating the exchange of goods and services through the use of standards, certification and related services to meet national and international needs.

For further information on CSA Group services, write to
CSA Group
178 Rexdale Boulevard
Toronto, Ontario, M9W 1R3
Canada

A National Standard of Canada is a standard developed by a Standards Council of Canada (SCC) accredited Standards Development Organization, in compliance with requirements and guidance set out by SCC. More information on National Standards of Canada can be found at www.scc.ca.

SCC is a Crown corporation within the portfolio of Innovation, Science and Economic Development (ISED) Canada. With the goal of enhancing Canada's economic competitiveness and social well-being, SCC leads and facilitates the development and use of national and international standards. SCC also coordinates Canadian participation in standards development, and identifies strategies to advance Canadian standardization efforts.

Accreditation services are provided by SCC to various customers, including product certifiers, testing laboratories, and standards development organizations. A list of SCC programs and accredited bodies is publicly available at www.scc.ca.

Standards Council of Canada
600-55 Metcalfe Street
Ottawa, Ontario, K1P 6L5
Canada

Standards Council of Canada
Conseil canadien des normes

Cette Norme Nationale du Canada n'est disponible qu'en anglais.

National Standard of Canada

CSA R100:20

Canadian metadata standard for hydrometeorological monitoring stations

Published in November 2020 by CSA Group
A not-for-profit private sector organization
178 Rexdale Boulevard, Toronto, Ontario, Canada M9W 1R3

*To purchase standards and related publications, visit our Online Store at **store.csagroup.org** or call toll-free 1-800-463-6727 or 416-747-4044.*

ICS 17.020
ISBN 978-1-4883-3251-7

Contents

Technical Committee on Weather Stations

T. Weick	BC Ministry of Environment and Climate Change Strategy, Vancouver, British Columbia, Canada *Category: Regulatory Authority*	*Chair*
A. Chipanshi	Agriculture and Agri-Food Canada, Regina, Saskatchewan, Canada	*Non-voting*
H. Dagenais	Wildfire Management Branch, Saskatchewan Ministry of Environment, Saskatoon, Saskatchewan, Canada *Category: User Interest*	
M. Gaube	FTS Forest Technology Systems Ltd., Victoria, British Columbia, Canada	*Non-voting*
E. Gionet	Wood PLC, Dartmouth, Nova Scotia, Canada	*Non-voting*
D. Jobin	Kije Sipi Ltd., Gatineau, Québec, Canada *Category: Owner/Operator/Producer*	
T. Kowalczyk	Southern Alberta Institute of Technology (SAIT), Calgary, Alberta, Canada *Category: General Interest*	
F. Lenormand	Meteorological Service of Canada, Montréal, Québec, Canada *Category: Regulatory Authority*	
C. Lindsay	Forest Technology Services, Vancouver, British Columbia, Canada *Category: Owner/Operator/Producer*	
O. Lundqvist	Société de protection des forêts contre le feu (SOPFEU), Québec, Canada	*Non-voting*
D. MacLanders	Automatic Technical Services, Guelph, Ontario, Canada	*Non-voting*

L. Managaire	Manitoba Agriculture, Winnipeg, Manitoba, Canada	*Non-voting*
M. Marchildon	Oak Ridges Moraine Groundwater Program, Toronto, Ontario, Canada	*Non-voting*
S. Pinzariu	Environment and Climate Change Canada, Toronto, Ontario, Canada *Category: Owner/Operator/Producer*	
I. Russell	Pelmorex Weather Networks Inc., Oakville, Ontario, Canada *Category: User Interest*	
A. Sass	Manitoba Agriculture and Resource Development, Winnipeg, Manitoba, Canada	*Non-voting*
B. Sieben	Environment and Climate Change Canada/Canadian Centre for Climate Services, Yellowknife, Northwest Territories, Canada *Category: Regulatory Authority*	
J. Shields	Ontario Ministry of Natural Resources — AFFES, Sault Ste. Marie , Ontario, Canada	*Non-voting*
S. Tam	British Columbia Ministry of Agriculture, Abbotsford, British Columbia, Canada	*Non-voting*
G. Walker	National Hydrological Services Monitoring and Data Services Directorate, Environment and Climate Change Canada, Gatineau, Québec, Canada	*Non-voting*
F. Weber	BC Hydro, Vancouver, British Columbia, Canada	*Non-voting*
P. Steenhof	CSA Group, Ottawa, Ontario, Canada	*Project Manager*

R-100 Weather Stations Metadata Committee

F. Weber	BC Hydro, Vancouver, British Columbia, Canada	*Chair*
H. Dagenais	Wildfire Management Branch, Saskatchewan Ministry of Environment, Saskatoon, Saskatchewan, Canada	
R. Drolet	Rene Drolet Consulting Services, Ottawa, Ontario, Canada	
M. Gaube	FTS Forest Technology Systems Ltd., Victoria, British Columbia, Canada	
E. Gionet	Wood PLC, Dartmouth, Nova Scotia, Canada	
J. Karn	Meteorological Service of Canada, Toronto, Ontario, Canada	
C. Lindsay	Forest Technology Services, Vancouver, British Columbia, Canada	
I. Russell	Pelmorex Weather Networks Inc., Oakville, Ontario, Canada	
M. Smith	Yukon Wildland Fire Management Branch, Whitehorse, Yukon Territory, Canada	
G. Walker	National Hydrological Services Monitoring and Data Services Directorate, Environment and Climate Change Canada, Gatineau, Québec, Canada	
T. Weick	BC Ministry of Environment & Climate Change Strategy, Vancouver, British Columbia, Canada	

R. Wiederick	B.C. Ministry of Environment and Climate Change Strategy, Victoria, British Columbia, Canada	
S. Lindsay	CSA Group, Cleveland, Ohio, USA	*Project Manager*

Preface

This is the first edition of CSA R100, *Canadian metadata standard for hydrometeorological monitoring stations*.

CSA Group has been commissioned to develop four national standards focusing on data collected by hydrometeorological monitoring stations and descriptive data about the stations. The standards are for

a) the collection and public dissemination of metadata for hydrometeorological monitoring stations;
b) siting, design, and operations of hydrometeorological stations;
c) a data quality rating system; and
d) the exchange of hydrometeorological data sets across information systems.

These standards will promote the standardization of methods, procedures, techniques, and practices used for collecting hydrometeorological data and related information across Canada. Standardization and improved best practices will help make more hydrometeorological observations become more easily accessible to a larger and better-informed audience. The availability of standardized sets of metadata, and through a single portal, also helps gain access to information required for homogenizing data, improving asset management, and optimizing monitoring networks.

CSA Group acknowledges that the development of this Standard was made possible, in part, by the financial support of the Standards Council of Canada.

This Standard was reviewed, evaluated, and tested for Canadian adoption by the CSA R-100 Weather Stations Metadata Committee, under the jurisdiction of the CSA Technical Committee on Weather Stations and the CSA Strategic Steering Committee on Environment and Business Excellence, 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.*

   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.*
5) *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 R100:20
Canadian metadata standard for hydrometeorological monitoring stations

0 History of the development of this Standard

To avoid the creation of non-technical barriers to trade under the World Trade Organization Agreement, organizations accredited by the Standards Council of Canada for developing standards must evaluate whether existing international standards could be adopted or adapted, or whether a national standard should be newly developed.

The CSA Subcommittee on Metadata for Hydrometeorological Monitoring Stations compiled and reviewed regional, national, and international reference literature. It concluded that the WMO WIGOS Metadata Standard and its associated OSCAR/Surface metadatabase is, at the time of writing, the most sophisticated system for inventorying metadata.

This global standard was developed to ensure maximum usefulness of observations. The development of the WIGOS standard occurred over the 2016 to 2019 period. OSCAR/surface was developed jointly by the WMO and MeteoSwiss and has been operational since May 2016.

The Subcommittee then concluded that the WIGOS-OSCAR/Surface system is comprehensive and logically structured. The system currently supports all hydrometeorological variables that were within the scope of the Subcommittee. Further, the Subcommittee was confident that the system is designed such that additional hydrological or air quality variables can be added in the future. Being supported by both the WMO and Environment and Climate Change Canada, the Subcommittee is sufficiently confident that the system will be supported going forward.

1 Scope

This Standard promotes best practices for collecting metadata for hydrometeorological stations and for publishing those metadata publicly at a central repository.

Any operator of a hydrometeorological station located in Canada should follow the WIGOS Metadata (see https://library.wmo.int/doc_num.php?explnum_id=10109). The metadata collected includes information about the observed variable, purpose of the observations, station, monitoring environment, instruments and methods of observation, sampling, data processing and reporting, data quality, ownership and data policy and contacts.

This Standard also provides data users with the metadata taxonomy and the necessary definitions of the metadata elements.

Metadata for any hydrometeorological station located in Canada, and for which the data are available, should be uploaded to the OSCAR/Surface metadata base (see https://oscar.wmo.int/surface/#/).

This Standard is an adoption without modification of the WMO WIGOS Metadata Standard (WMO 2019c), a semantic standard that specifies the metadata elements for observations, that can be recorded and exchanged, and the WMO OSCAR/Surface metadatabase (WMO 2020).

