

TECHNICAL GUIDE

**Development, interpretation, and use of
rainfall intensity-duration-frequency
(IDF) information: Guidelines for Canadian
water resources practitioners**



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CSA PLUS 4013:19
September 2019

Title: *TECHNICAL GUIDE*

Development, interpretation, and use of rainfall intensity-duration-frequency (IDF) information: Guideline for Canadian water resources practitioners

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CSA PLUS 4013:19
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Development, interpretation, and use of
rainfall intensity-duration-frequency
(IDF) information: Guideline for
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Published in September 2019 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 13.060.10
ISBN 978-1-4883-2625-7

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Preface

CSA PLUS 4013 (2nd Ed. Pub. 2012) — TECHNICAL GUIDE: *Development, interpretation, and use of rainfall intensity-duration-frequency (IDF) information: Guideline for Canadian water resources practitioners*, has been designed for professionals with a role in the planning, design, management, inspection, and regulation of stormwater, drainage, wastewater, and flood management systems. It is not a design text book, but rather a resource for understanding the derivation, and application in water system planning and design, of rainfall intensity-duration-frequency (IDF) information.

In 2018, CSA was requested to update relevant parts of the document to reflect the latest scientific understanding of climate change and how to incorporate climate change into the formulation and application of IDF information. As such, work was undertaken to update Chapters 5 and Chapter 6 of this document. Most of the same members of the initial Working Group contributed to this (with the addition of a few others). All other material in the document remains the same as the version published in 2012, except for an update of the membership of the Working Group (Appendix 1) and the references for Chapters 5 and 6 (Appendix 8).

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CSA PLUS 4013:19

TECHNICAL GUIDE

Development, interpretation, and use of rainfall intensity-duration-frequency (IDF) information: Guideline for Canadian water resources practitioners

1 INTRODUCTION TO THE GUIDELINE

CHAPTER SUMMARY

This Guideline has been designed for professionals with a role in the planning, design, management, inspection, and regulation of stormwater, drainage, wastewater, and flood management systems. It is not a design text book, but rather a resource for understanding the derivation, and application in water system planning and design, of rainfall intensity-duration-frequency (IDF) information.

IDF information describes the frequency (probability of occurrence) of extreme rainfall events of various rates and durations. This Guideline is intended to equip the reader with the ability to ensure that rainfall IDF characteristics are properly considered in the planning and design of water infrastructure. In particular, this can be provided through familiarization with the assumptions contained within current IDF information, and clarification regarding any limitations of this information. The effects of climate change on the frequency and intensity of extreme rainfall events are also addressed.

1.1 Background and objectives of this Guideline

Canada has significant investments in stormwater, drainage, wastewater, and flood management systems. Every day, Canadians rely on this infrastructure to protect lives, property, and natural systems such as creeks, rivers, and lakes. In designing and managing these works, practicing professionals need to be concerned with the probability of occurrence of extreme values of rainfall amounts, often for specific storm durations. Rainfall IDF information commonly forms a critical input when applying the analytical techniques routinely used by practitioners.

IDF information is meant to describe the frequency (in terms of probability of occurrence) of extreme rainfall events of various rates and durations. The demand for rainfall IDF information has increased across Canada over recent years for a number of reasons. First, as the spatial heterogeneity of extreme rainfall patterns becomes better understood and documented, a stronger case is made for the value of “locally relevant” IDF information. Second, Canada continues to become increasingly urbanized. As urban areas expand, making watersheds generally less permeable to rainfall and run-off, many older water systems fall increasingly into deficit, failing to deliver the services for which they were designed. Understanding the full magnitude of this deficit requires information on the maximum inputs (extreme rainfall events) with which drainage works must contend. Finally, research now indicates that climate change will likely result in an increase in the intensity and frequency of extreme precipitation events in most regions in the future. As a result, IDF values will optimally need to be updated more frequently