CSA GROUP™

CSA S37:24
National Standard of Canada

Antennas, towers, and antenna-supporting structures

SCC CCN

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Contents

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Preface

This is the ninth edition of CSA S37, *Antennas, towers, and antenna-supporting structures*. It supersedes the previous editions published in 2018, 2013, 2001, 1994, 1986, 1981, 1976, and 1965.

The following are the major changes to this edition:

a) the addition of dynamic response to wind for tall, guyed masts and multi-sloped self-supporting towers in Clauses 6.9 to 6.11;
b) the inclusion of the oscillation and fatigue analysis in Clause 5.13;
c) the inclusion of a method to calculate vortex shedding response due to higher modes of vibration in Clause 5.13.2.3;
d) the updated ice map in Figure 1 and updated climatic data in Table E.1;
e) the inclusion of drag coefficients, C_d, for perforated shrouds in Table 1;
f) the updated earthquake loads and analysis in Clause 5.12;
g) the inclusion and update of the fatigue resistance calculation in Clause 7.9, replacing Annex N of the previous edition;
h) the addition of Clause 7.3.4.4 to provide factored resistance formulas for HSS members with slotted through plates;
i) Clause 7.5.5 has been updated for bolt tensioning requirements;
j) Clause 7.5.7.4 has been updated and a formula for prying action included;
k) commentary Annexes have been updated and consolidated into Annex S; and
l) the inclusion of additional recommendations for tower condition assessment (Annex D).

A commentary on this Standard can be found in Annex S.

CSA Group acknowledges that the development of this Standard was made possible, in part, by the financial support of Bell, Hydro-Québec, Rogers Communications Canada, Telus, CBC, NorthWesTel, and Vidéotron.

This Standard was prepared by the Technical Committee on Antenna Towers, under the jurisdiction of the Strategic Steering Committee for Construction and Civil Infrastructure, 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.*
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c) *wording of the proposed change; and*
d) *rationale for the change.*

SDG Foreword

CSA Group develops and maintains Standards across a broad range of topics, most of which support the United Nations Sustainable Development Goals (UN SDGs) towards shaping a sustainable and resilient future.

Through a robust mapping process, connections between CSA S37:24 and the following SDGs have been identified:

SDG

Targets 7.1, 7.a

CSA S37:24 has notable linkages with the following SDGs:

- SDG 7: *Affordable and Clean Energy*

For further information on CSA Group's SDG Mapping initiative, please visit: https://www.csagroup.org/sdg/

Disclaimer: It is important to note that although some Standards explicitly support SDG targets, not all Standards link to the SDGs. Standards users should always take care and be specific when claiming their support of SDGs through the use of Standards. The SDG mapping outcomes made available by CSA Group are intended to assist users in their evaluation of how the application of a Standard can support their work towards SDG achievement.

CSA S37:24
Antennas, towers, and antenna-supporting structures

0 Introduction

Antennas, towers, and antenna-supporting structures comprise a group that can be described as communications structures. They are usually of lattice steel construction, but can be of solid or tubular construction and can use a variety of materials. They can be guyed or self-supporting, and some structures can be mounted on platforms or building rooftops. The principal loads are wind and ice, while earthquake effects require a design check for designated post-critical installations in regions of medium to high seismicity.

This Standard is written to address these special characteristics using the applicable sections of other CSA structural design standards. It also refers to the *National Building Code of Canada* for the specification of seismic spectral accelerations.

Most design standards are written to address the requirements of new structures. The Technical Committee for this Standard is also concerned about the effect of changes on existing structures. While it is not mandatory to upgrade existing towers when new editions of the Standard are published, communications structures are frequently subject to changes in attached equipment. This necessitates conformance with the current edition. Changes are therefore carefully considered so as not to cause significant economic impact as a result of minor changes in equipment.

The latest amendments to Part II of the Canada Occupational Safety and Health Regulations (COSH) of the *Canada Labour Code* require the design and construction of every tower, antenna, and antenna-supporting structure meet the requirements of this Standard as amended from time to time. The safety of persons who are required to climb a tower is as important a consideration as the safety of the structure; therefore, requirements for ladders, safety devices, platforms, and cages are included as part of this Standard.

It has long been recognized that some structures, particularly tall, guyed masts, can be subject to dynamic effects that require a more in-depth study of the loads and responses than that provided by static analysis procedures. This Standard provides a quasi-dynamic pattern-loading procedure for the analysis of wind effects on tall-guyed towers and multi-sloped self-supporting towers.

1 Scope

1.1 General

This Standard applies to structural antennas, towers, antenna-supporting structures, and roof- and wall-mounted structures including their components, such as guys and foundations. It covers the structural design, fabrication, and erection of new structures and the modification of existing structures.

