S413-14
(reaffirmed 2019)

Parking structures

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Preface

This is the fourth edition of CSA S413, *Parking structures*. It supersedes the previous editions published in 2007, 1994, and 1987.

This Standard differs from the previous edition as follows:

a) The scope has been expanded to include pedestrian areas adjoined to or contained within parking structures; and
b) The annexes have been revised.

This Standard has been adopted by the Canadian Commission on Building and Fire Codes as the reference standard for parking structures in Section 4 of the *National Building Code of Canada*.

This Standard was prepared by the Technical Committee on Parking Structures, under the jurisdiction of the Strategic Steering Committee on Structures (Design), and has been formally approved by the Technical Committee.

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.*

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5) *This Standard is subject to review 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.*

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Parking structures

0 Introduction

0.1

This Standard specifies the minimum design, construction, and maintenance requirements necessary for the structural durability of new parking structures, storage garages, parts of buildings subject to vehicular traffic or used for parking, and pedestrian areas adjoining to or contained within parking structures.

The provisions of this Standard are intended to address both ultimate and serviceability limit states, and more specifically, to

a) protect against the deterioration of concrete and metal elements caused by de-icing chemicals alone or by de-icing chemicals in combination with the effects of freeze-thaw cycling;
b) protect against damage to vehicles caused by leakage through floors; and
c) control the flow of water and avoid ponding.

The structural design methods, loadings, and limit states referenced and specified in this Standard are those set forth in the *National Building Code of Canada (NBCC)*.

0.2

The requirements of this Standard are applicable to all parking structures susceptible to corrosion, whether the corrosion is caused by atmospheric conditions or de-icing chemicals. In geographic areas where de-icing chemicals are not used and are not expected to be used in the foreseeable future, some of the corrosion protection provisions in this Standard do not apply.

0.3

Acceptable protection systems are specified in Table 1. The provision of multiple protection systems is a fundamental principle of this Standard. The appropriate choices should be made by the designer and specified in the drawings and related documents. Some parking structures, or portions of parking structures, require more than the minimum protection required by this Standard because of factors such as environmental conditions, the extent of utilization of salt by the municipality, the number of daily vehicle in-and-out trips, the difficulty of access for repairs, or the desire to minimize maintenance.

For types of construction or construction details not covered by this Standard, the same principles of protection required by this Standard apply.

0.4

To obtain the intended durability, parking structures designed and constructed in conformance with this Standard need to be regularly maintained by the owner in accordance with a comprehensive regularly scheduled inspection and maintenance program. Maintenance information is provided in Annex E and Table E.1.

0.5
Many clauses of this Standard specify only performance requirements. The specific details, materials, and procedures should be shown and specified in the drawings and related documents.

0.6
The commentary in Annex H provides explanatory material, as well as useful supplementary information, and should be read in conjunction with this Standard.

0.7
The Standard and commentary in Annex H do not cover other important aspects of parking structure design such as layout, lighting, design loads, etc. Advice on these aspects should be sought from professionals who are knowledgeable in the special requirements of parking structures.

1 Scope

1.1 General
This Standard specifies special requirements for the durability aspects of the design and construction of new parking structures and parts of buildings subject to vehicular traffic.

This includes pedestrian traffic areas adjoining to or contained within parking structures. These include areas such as stairs, and pedestrian bridges from parking structures.

1.2 Structure types
New parking structures constructed of structural steel, reinforced concrete (including prestressed concrete), or a combination of these materials fall within the scope of this Standard.

1.3 Repair of existing parking structures
This Standard does not cover the repair of existing parking structures, and the provisions of this Standard are not necessarily appropriate for the repair and protection of existing structures.
Note: *See CSA S448.1 for information on the repair of concrete structures.*

1.4 Reference standards
In the event of conflict between this Standard and the reference standards, this Standard takes precedence.

1.5 Terminology
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; “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.