

Welding of reinforcing bars in reinforced concrete construction



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Preface

This is the fourth edition of CSA W186, *Welding of reinforcing bars in reinforced concrete construction*. It supersedes the previous editions published in 1990, 1981, and 1970.

Several clauses have been updated extensively and there have been additions as well. The revisions were made to reflect the experience and knowledge gained during recent years. An important consideration was to ensure that this Standard continues to relate to the limit states (load factor) design.

The new items introduced in this edition relate to the X-ray method for non-destructive examination of direct butt joints and the introduction of non-load-bearing joints.

This Standard deals with the certification of companies for fusion welding of reinforcing bars, weld design, fabrication, and inspection of welds of reinforcing bars in reinforced concrete construction. It is not a product Standard and cannot be used to evaluate or approve products. It is not intended to supersede Codes and Standards that govern specific products.

This Standard stipulates minimum requirements that a company must meet and adhere to in order to obtain and maintain certification. Certification is granted by the Canadian Welding Bureau (CWB), the administrative body for this Standard, to companies that comply with the requirements of this Standard. Certification of a company indicates that, consistent with the requirements of the division in which the company is certified, it has the organization, personnel, welding procedures, and equipment required to produce satisfactory welds and weldments.

Production of satisfactory welds and weldments is the responsibility of the certified company. It is the responsibility of the purchaser to ensure, through adequate inspection, that the required quality is attained. Although the CWB makes periodic inspections of certified companies to ensure that they continue to comply with the requirements of this Standard, these inspections do not eliminate the need for a certified company's quality control method or a purchaser's comprehensive inspection program.

This Standard was prepared by the Technical Committee on Welding of Bridges, Buildings, and Machinery and the Technical Committee on Certification of Companies for Welding of Steel and Aluminum, under the jurisdiction of the Strategic Steering Committee on Construction and Civil Infrastructure, and has been formally approved by both Technical Committees.

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 ing.erie@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 W186:21

Welding of reinforcing bars in reinforced concrete construction

1 Scope

1.1

This Standard governs the certification of companies. Certification pertains to the capability of the company with respect to welding. Certification should not be construed as approving any products or services of the certified company.

Note: *The requirements of this Standard are based on the principle that a certified company has full responsibility for the quality of the welded product it produces, and this responsibility cannot be transferred to its employed or retained personnel or to the administrator of this Standard.*

1.2

This Standard provides the requirements for the

- a) certification of companies engaged in the fusion welding of reinforcing bars and the qualification of their personnel and welding procedures;
- b) the design, fabrication, and inspection of welded connections utilizing deformed reinforcing bars;
- c) welding of deformed reinforcing bars either directly to each other or through splice members; and
- d) welding of deformed reinforcing bars to structural or low-alloy steel members used as anchorages in precast or cast-in-place concrete construction either in the fabricating shop or in the field.

In lieu of meeting requirements of this Standard, companies performing welding of reinforcing bars to steel elements may apply testing requirements of CSA W47.1 and have their welding personnel and welding procedures accepted with CSA W47.1.

Note: *Some examples of applications that can apply certification of CSA W47.1 are welding of deformed bars (anchors) to structural or hardware elements when installing precast panels to buildings, lifting devices, base plates, ladders, catwalks, etc. Whenever the welding of reinforcing rebars is required to reinforce the concrete in applications like concrete, precast, cast in place construction, etc., provisions of CSA W186 apply. Applications required by the following standards require certification to this standard: CSA A448.1, A23.1, A23.3, A23.4, N287.2, N287.3, N287.4, N287.5, S304.1, S6, S474, S850, and Z98.*

1.3

This Standard stipulates requirements for

- a) welding engineers;
- b) welding supervisors;
- c) welders and welding operators; and
- d) documentation.

Notes:

- 1) *The qualification requirements for welders, and welding operators specified in this Standard are intended to demonstrate an individual's basic welding skills and to provide a means of verifying that individual's continuing ability in the fusion welding of steel.*
- 2) *Provisions for recognition of personnel qualified under other jurisdictions are included in this Standard.*