

# **Welded steel construction**



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# Revision History

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# Preface

This is the tenth edition of CSA W59, *Welded steel construction*. It supersedes the previous editions published in 2013, 2003, 1989, 1984, 1982, 1977, 1970, 1946, and 1940.

The following is a brief description of some of the most significant changes to the current edition of CSA W59:

- a) Clause 3 has been revised to add several steels to the prequalified list.
- b) Clause 5 has been updated to add clarification on the requirements related to hydrogen designators.
- c) Clause 7 has been reworked to provide clarity on roles and responsibilities for welding inspection.
- d) Clause 8 includes corrections related to terminology, equipment, and flaw length sizing. Calibration requirements have been revised to reflect digital instrumentation. Allowances for the use of an alternative ultrasonic technique and radiographic imaging systems have been added.
- e) In Clause 10, all the figures have been reworked into a new format which arranges prequalified joint by joint type rather than by welding process.
- f) As this Standard contains no commentary, various non-mandatory annexes have been included to generate a better understanding of certain aspects of welded steel construction. The annexes of the previous edition of this Standard have generally been reviewed for clarity. In addition,
  - Annex W has been added to provide additional requirements for welding consumables, welded fabrication techniques, weld repairs, demand critical welds and welding inspection for seismic-force resisting system (SFERS) of structures.
  - Annex X has been added to define an alternative ultrasonic examination technique for manual conventional and manual phased array ultrasound. New acceptance criteria were developed for equivalent sensitivity to the fixed attenuation (Clause 8.2) technique.

This Standard was prepared by the Technical Committee on Welding of Bridges, Buildings, and Machinery and the Offshore Welding Task Group, under the jurisdiction of the Strategic Steering Committee on Construction and Civil Infrastructure, 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.*
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  - d) *rationale for the change.*

# W59-18

## Welded steel construction

### 1 Scope

#### 1.1

This Standard covers welding requirements for carbon and low-alloy welded steel construction, with the exception of those types listed in Clause [1.2](#).

Requirements that are essentially common to all such structures are covered in Clauses [3](#) to [10](#), while provisions applying specifically to statically-loaded structures and to cyclically-loaded structures are included in Clauses [11](#) and [12](#), respectively.

#### 1.2

This Standard is not intended to apply to pressure vessels or to structures governed by special codes such as those of the American Petroleum Institute, the American Society of Mechanical Engineers, or the American Water Works Association.

#### 1.3

This Standard includes provisions for the following:

- a) shielded metal arc welding (SMAW);
- b) submerged arc welding (SAW);
- c) gas metal arc welding (GMAW);
- d) gas tungsten arc welding (GTAW);
- e) flux-cored arc welding (FCAW);
- f) metal-cored arc welding (MCAW);
- g) electroslag welding (ESW);
- h) electrogas welding (EGW); and
- i) stud welding (SW) processes.

#### 1.4

The provisions of this Standard are not intended for use with steels having a specified minimum yield strength over 700 MPa (100 000 psi).

#### 1.5

This Standard applies to the welding of base metals 3 mm (1/8 in) and thicker. In cases where base metals less than 3 mm (1/8 in) thick are to be welded to base metals 3 mm (1/8 in) and thicker, the requirements of AWS D1.3/AWS D1.3M and this Standard apply. In the case of any conflict between AWS D1.3/AWS D1.3M and this Standard, the requirements of this Standard govern.

**Note:** *In cases where base metals less than 3 mm (1/8 in) thick are to be welded to base metals less than 3 mm (1/8 in), the requirements of AWS D1.3/AWS D1.3M may be appropriate.*