

First edition
2023-12

Steel structures — Execution of structural steelwork —

Part 6: Bolting

*Structures en acier – Exécution des charpentes et ossatures en
acier —*

Partie 6: Boulonnage



Reference number
ISO 17607-6:2023(E)

© ISO 2023



COPYRIGHT PROTECTED DOCUMENT

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

This is a preview of ISO 17607-6:2023. [Click here to purchase the full version from the ANSI store.](#)

Contents

	Page
Foreword	vi
Introduction	vii
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Execution specification and quality requirements	2
4.1 General.....	2
4.2 Execution specification.....	2
5 Constituent products	3
5.1 General.....	3
5.1.1 Selection of constituent products.....	3
5.1.2 Verification of conformance.....	3
5.2 Structural bolting products.....	4
5.2.1 Property classes.....	4
5.2.2 Structural bolting assemblies for non-pretensioned applications.....	4
5.2.3 Structural bolting assemblies for pretensioned applications.....	4
5.2.4 Washers.....	4
5.2.5 Direct tension indicators.....	5
5.2.6 Alternative direct tension indicators.....	5
5.2.7 Coated structural bolting components.....	6
5.2.8 Atmospheric corrosion-resistant structural bolting components.....	6
5.2.9 Locking devices.....	6
5.2.10 Special structural fasteners.....	6
5.2.11 Packaging.....	7
5.2.12 Test reports.....	7
5.2.13 Delivery and identification.....	7
5.2.14 Storage of structural bolting components and assemblies.....	7
5.2.15 Reconditioning of structural bolting components and assemblies.....	7
5.3 Studs and shear connectors.....	8
5.4 Anchorages.....	8
5.4.1 Foundation bolts.....	8
5.4.2 Other anchorage systems.....	8
6 Preparation and assembly	8
6.1 General.....	8
6.2 Holes for structural bolting.....	8
6.2.1 General.....	8
6.2.2 Dimensions of holes.....	9
6.3 Faying surfaces for bearing-type joints.....	10
6.4 Preparation of friction surfaces in slip-resistant joints.....	10
6.4.1 General.....	10
6.4.2 Surface preparation.....	10
6.4.3 Precautions prior to assembly.....	10
6.5 Assembly.....	11
7 Structural bolting	12
7.1 General.....	12
7.2 Joint types and assembly.....	12
7.2.1 Joint type.....	12
7.2.2 Fit of joint and shims.....	12
7.2.3 Packing plates.....	12
7.2.4 Snugging of joint.....	13
7.2.5 Sequence of tightening.....	13
7.2.6 Structural bolts.....	14

This is a preview of ISO 17607-6:2023. [Click here to purchase the full version from the ANSI store.](#)

7.2.7	Nuts	14
7.2.8	Washers	15
7.2.9	Locking methods	17
7.3	Tightening of non-pretensioned bolts	18
7.4	Tightening of pretensioned bolts	18
7.4.1	Bolting procedure for pretensioned bolts	18
7.4.2	Pretensioning tools	18
7.4.3	Minimum pretension	19
7.4.4	Bolting assembly k-class calibration	19
7.4.5	k-factor	19
7.4.6	Pre-installation verification testing	20
7.4.7	Torque method	20
7.4.8	Combined method	20
7.4.9	Spline-drive twist-off method	20
7.4.10	Direct tension indicator method	20
7.4.11	Turn-of-nut method	20
7.5	Fit bolts	20
7.6	Temporary bolts	21
7.7	Loss of pretension	21
7.8	Reuse of structural bolts	22
7.9	Use of special fasteners	22
7.10	Galling and seizure of stainless-steel structural bolts	23
8	Inspection, testing, and correction	23
8.1	General	23
8.2	Structural bolting inspection	23
8.2.1	Inspection prior to erection of steelwork	23
8.2.2	Inspection prior to installation of bolts	24
8.2.3	Inspection after installation of bolts	24
8.2.4	Inspection of pretensioned bolts	24
8.2.5	Inspection of special structural fasteners and special methods	27
8.3	Correction	28
8.3.1	Excessive coating thickness	28
8.3.2	Replacement of structural bolting components and assemblies	28
9	Documents required to claim conformity to this document	28
9.1	General	28
9.2	Declaration of conformity	28
Annex A (normative)	Additional information, list of options and requirements related to the execution levels	29
Annex B (normative)	Bolting component, assembly and coating standards	34
Annex C (normative)	Nominal hole clearances for bolts	38
Annex D (normative)	Bolted friction surface slip factors	41
Annex E (normative)	Nominal minimum pretension	43
Annex F (normative)	Threads in grip, thread protrusion, and use of taper washers	45
Annex G (normative)	Pre-installation verification testing for pretensioned bolting assemblies	47
Annex H (normative)	Calibration test for the EN 14399 series pretensioned bolts under site conditions	48
Annex I (normative)	Pretensioning bolting assemblies — Torque method	53
Annex J (normative)	Pretensioning bolting assemblies — Combined method	55
Annex K (normative)	Pretensioning bolting assemblies — Spline-drive twist-off method	59
Annex L (normative)	Pretensioning bolting assemblies — Direct tension indicator method	60

This is a preview of ISO 17607-6:2023. [Click here to purchase the full version from the ANSI store.](#)

Annex M (normative) Pretensioning bolting assemblies — Turn-of-nut method	61
Annex N (informative) Bolt tightening qualification procedure (BTQP)	63
Annex O (normative) Method for structural bolting inspection	73
Annex P (normative) Test to determine slip factor	78
Annex Q (informative) Test to determine loss of pretension	85
Bibliography	87

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 167, *Steel and aluminium structures*.

This first edition cancels and replaces ISO 10721-2:1999, which has been technically revised.

A list of all parts in the ISO 17607 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This is a preview of ISO 17607-6:2023. [Click here to purchase the full version from the ANSI store.](#)

Introduction

Specific requirements for the achievement of structures that are optimal with respect to safety, the state of the economy, development and general values of a nation are given in the appropriate regional or national standards, if they exist.

Many nations do not have their own standards for structural steelwork. Some reference other national or regional standards. Some permit the project's standard to be selected by the owner, designer or constructor of the structure. Some do not require any standards to be followed.

The ISO 17607 series of standards on the execution of structural steelwork was developed to serve as a means to provide a set of requirements and guidance for projects that are constructed without a governing regional or national standard. The ISO 17607 series can also serve to reduce trade barriers.

Additional requirements to be addressed in the execution of structural steelwork, as structures or as fabricated components, can be found in the other parts of the series:

- ISO 17607-1 (General requirements and terms and definitions);
- ISO 17607-2 (Steels);
- ISO 17607-3 (Fabrication);
- ISO 17607-4 (Erection);
- ISO 17607-5 (Welding).

This is a preview of ISO 17607-6:2023. [Click here to purchase the full version from the ANSI store.](#)

Steel structures — Execution of structural steelwork —

Part 6: Bolting

1 Scope

This document defines the general requirements for structural bolting in the execution of structural steelwork as structures or as fabricated components, in conjunction with ISO 17607-1.

Additional requirements to be addressed in the execution of structural steelwork, as structures or as fabricated components, can be found in other parts of ISO 17607.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs with specified property classes — Coarse thread and fine pitch thread*

ISO 898-2, *Mechanical properties of fasteners made of carbon steel and alloy steel – Part 2: Nuts with specified property classes – Coarse thread and fine pitch thread*

ISO 898-3, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 3: Flat washers with specified property classes*

ISO 2859-5, *Sampling procedures for inspection by attributes — Part 5: System of sequential sampling plans indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 3506-1, *Mechanical properties of corrosion-resistant stainless-steel fasteners — Part 1: Bolts, screws and studs*

ISO 3506-2, *Mechanical properties of corrosion-resistant stainless-steel fasteners — Part 2: Nuts*

ISO 4014, *Hexagon head bolts - Product grades A and B*

ISO 4017, *Fasteners – Hexagon head screws – Product grades A and B*

ISO 4032, *Hexagon nuts (style 1) - Product grades A and B*

ISO 4033, *Hexagon nuts, (style 2) - Product grades A and B*

ISO 4042, *Fasteners — Electroplated coating systems*

ISO 6789-1, *Assembly tools for screws and nuts — Hand torque tools — Requirements and test methods for design conformance testing, quality conformance testing and recalibration procedure*

ISO 7089, *Plain washers — Normal series — Product grade A*

ISO 7090, *Plain washers, chamfered — Normal series — Product grade A*

ISO 7091, *Plain washers — Normal series — Product grade C*

ISO 7092, *Plain washers — Small series — Product grade A*