

## საქართველოს სტანდარტი

---

ფოლადის კონსტრუქციების და ალუმინის კონსტრუქციების შესრულება -  
ნაწილი 3: ტექნიკური მოთხოვნები ალუმინის სტრუქტურებისთვის

საინფორმაციო ნაწილი. სრული ტექსტის სანახავად შეიძინეთ სტანდარტი.

საქართველოს სტანდარტებისა და მეტროლოგიის  
ეროვნული სააგენტო  
თბილისი

# სსტ ენ 1090-3:2019/2019

## საინფორმაციო მონაცემები

1 შემუშავებულია საქართველოს სტანდარტების და მეტროლოგიის ეროვნული სააგენტოს სტანდარტების დეპარტამენტის მიერ

2 დამტკიცებულია და შემოღებულია სამოქმედოდ საქართველოს სტანდარტების და მეტროლოგიის ეროვნული სააგენტოს 2019 წლის 2 დეკემბრის № 95 განკარგულებით

3 მიღებულია გარეკანის თარგმნის მეთოდით სტანდარტიზაციის ევროპული კომიტეტის სტანდარტი ენ 1090-3:2019 “ფოლადის კონსტრუქციების და ალუმინის კონსტრუქციების შესრულება - ნაწილი 3: ტექნიკური მოთხოვნები ალუმინის სტრუქტურებისთვის”

### 4 პირველად

5 რეგისტრირებულია საქართველოს სტანდარტების და მეტროლოგიის ეროვნული სააგენტოს რეესტრში: 2019 წლის 2 დეკემბერი №268-1.3-016105

დაუშვებელია წინამდებარე სტანდარტის სრული ან ნაწილობრივი კვლავწარმოება, ტირაჟირება და გავრცელება სსიპ საქართველოს სტანდარტებისა და მეტროლოგიის ეროვნული სააგენტოს ნებართვის გარეშე

საინფორმაციო ნაწილი. სრული ტექსტის სანახავად შეიძინეთ სტანდარტი.

English Version

## Execution of steel structures and aluminium structures - Part 3: Technical requirements for aluminium structures

Exécution des structures en acier et des structures en  
aluminium - Partie 3: Exigences techniques pour  
l'exécution des structures en aluminium

Ausführung von Stahltragwerken und  
Aluminiumtragwerken - Teil 3: Technische  
Anforderungen an Aluminiumtragwerke

This European Standard was approved by CEN on 6 January 2019.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

**Contents**

Page

European foreword..... 7

Introduction ..... 8

1 Scope..... 9

2 Normative references..... 9

3 Terms and definitions ..... 16

4 Specifications and documentation..... 17

4.1 Execution specification ..... 17

4.1.1 General..... 17

4.1.2 Execution classes..... 18

4.1.3 Tolerance types..... 18

4.1.4 Tolerance class for shell structures ..... 18

4.1.5 Testing and acceptance criteria for welding..... 18

4.2 Constructor's documentation ..... 18

4.2.1 Quality documentation ..... 18

4.2.2 Quality plan ..... 19

4.2.3 Safety during erection ..... 19

4.2.4 Execution documentation ..... 19

5 Constituent products ..... 19

5.1 General..... 19

5.2 Identification, inspection documents and traceability ..... 19

5.3 Parent material..... 20

5.4 Aluminium products ..... 23

5.5 Welding consumables..... 24

5.6 Mechanical fasteners ..... 24

5.6.1 Bolts, nuts and plain washers ..... 24

5.6.2 Studs..... 26

5.6.3 Rivets ..... 26

5.6.4 Self-drilling and self-tapping screws..... 26

5.6.5 Bearings..... 26

5.7 Adhesive bonding..... 26

6 Preparation ..... 26

6.1 General..... 26

6.2 Identification ..... 27

6.3 Handling, storage and transportation ..... 27

6.4 Cutting..... 27

6.5 Forming..... 28

6.6 Holing for fasteners..... 28

6.7 Cut outs ..... 30

6.8 Full contact bearing surfaces ..... 30

6.9 Assemblies..... 30

6.10 Heat treatment..... 30

6.11 Straightening ..... 30

7 Welding..... 30

საინფორმაციო ნაწილი. სრული ტექსტის სახსრავად შეიძინეთ სტანდარტი.

7.1	General .....	30
7.2	Welding plan.....	31
7.2.1	Requirement for a welding plan.....	31
7.2.2	Content of a welding plan .....	31
7.3	Welding process.....	31
7.4	Qualification of welding procedures and welding personnel.....	32
7.4.1	Qualification of welding procedures .....	32
7.4.2	Validity of the welding procedure qualification.....	33
7.4.3	Qualification of welders and welding operators.....	33
7.4.4	Welding coordination personnel.....	34
7.5	Preparation and execution of welding.....	34
7.5.1	General .....	34
7.5.2	Joint preparation .....	35
7.5.3	Weather protection.....	35
7.5.4	Assembly for welding.....	35
7.5.5	Temporary attachments .....	35
7.5.6	Tack welds.....	35
7.5.7	Preheating and interpass temperature .....	36
7.5.8	Butt welds.....	36
7.5.9	Slot and plug welds .....	36
7.5.10	Fillet welds .....	36
7.5.11	Single sided welds .....	36
7.5.12	Friction stir welding .....	37
7.5.13	Other welds.....	37
7.6	Acceptance criteria .....	37
7.7	Post-weld heat treatment.....	37
8	Mechanical fastening and adhesive bonding.....	38
8.1	Joint assembly for mechanical fastening .....	38
8.1.1	Preparation of contact surfaces .....	38
8.1.2	Fit-up .....	38
8.1.3	Preparations of contact surfaces in slip-resistant connections.....	39
8.2	Bolting assemblies .....	39
8.2.1	General .....	39
8.2.2	Bolts.....	39
8.2.3	Fitted bolts .....	39
8.2.4	Countersunk bolt .....	40
8.2.5	Nuts.....	40
8.2.6	Washers.....	40
8.3	Tightening of bolting assemblies.....	41
8.3.1	Non-preloaded bolting assemblies.....	41
8.3.2	Preloaded bolting assemblies .....	41
8.4	Riveting .....	42
8.4.1	General .....	42
8.4.2	Installation of rivets .....	43
8.5	Adhesive bonded connections .....	43
9	Erection .....	43
9.1	General .....	43
9.2	Site conditions .....	43
9.3	Erection method statement .....	43
9.4	Supports.....	43
9.5	Execution on site.....	44
9.5.1	Site survey .....	44

9.5.2	Marking.....	44
9.5.3	Handling and storage at site.....	44
9.5.4	Erection methods .....	44
9.5.5	Alignment and grouting.....	44
9.6	Protection of surfaces, cleaning after erection.....	45
10	Surface treatment .....	45
10.1	General.....	45
10.2	Protection of the structure and components .....	45
10.3	Protection of contact surfaces and fasteners.....	45
10.3.1	General.....	45
10.3.2	Contact surfaces aluminium-to-aluminium and aluminium-to-plastics.....	45
10.3.3	Contact surfaces of aluminium and steel or wood .....	46
10.3.4	Contact surfaces of aluminium and concrete, brickwork and plaster, etc.....	46
10.3.5	Fasteners.....	46
10.3.6	Bonded joints.....	46
10.4	Fire protection .....	46
11	Geometrical tolerances .....	47
11.1	Types of tolerances.....	47
11.2	Essential tolerances .....	47
11.2.1	General.....	47
11.2.2	Manufacturing tolerances .....	47
11.2.3	Erection tolerances.....	48
11.3	Functional tolerances .....	49
11.3.1	General.....	49
11.3.2	Manufacturing tolerances .....	49
12	Inspection, testing and corrections .....	50
12.1	General.....	50
12.2	Constituent products and components .....	50
12.2.1	Constituent products .....	50
12.2.2	Components .....	50
12.3	Preparation .....	51
12.3.1	Forming.....	51
12.3.2	Geometrical dimensions of components .....	51
12.4	Welding.....	51
12.4.1	Inspection stages.....	51
12.4.2	Methods of inspection and personnel qualification .....	51
12.4.3	Extent of inspection.....	53
12.4.4	Acceptance criteria for welds .....	55
12.4.5	Acceptance criteria for ultrasonic testing.....	57
12.4.6	Repair welds .....	58
12.4.7	Inspection of temporary attachment locations after removal.....	58
12.5	Mechanical fasteners .....	58
12.5.1	Inspection of connections with non-preloaded bolting assemblies.....	58
12.5.2	Inspection of connections with preloaded bolting assemblies .....	59
12.5.3	Inspection of riveted connections.....	59
12.6	Adhesive bonding.....	59
12.7	Inspection of the erected structure geometry .....	59
12.8	Nonconforming products .....	59
12.8.1	Nonconforming constituent products.....	59
12.8.2	Nonconforming components and structures .....	60

საინფორმაციო ნაწილი. სრული ტექსტის სანახავად შეიძინეთ სტანდარტი.

<b>Annex A (normative) Required additional information, options to be specified and requirements for execution classes</b> .....	<b>61</b>
<b>A.1 List of required information</b> .....	<b>61</b>
<b>A.2 List of options to be specified</b> .....	<b>62</b>
<b>A.3 Requirements related to execution classes</b> .....	<b>63</b>
<b>Annex B (informative) Checklist for the content of a quality plan</b> .....	<b>66</b>
<b>B.1 Introduction</b> .....	<b>66</b>
<b>B.2 Content</b> .....	<b>66</b>
<b>Annex C (normative) Cruciform weld test</b> .....	<b>68</b>
<b>C.1 Introduction</b> .....	<b>68</b>
<b>C.2 Test piece</b> .....	<b>68</b>
<b>C.3 Examination and testing</b> .....	<b>70</b>
<b>Annex D (normative) Procedure for determination of slip factor</b> .....	<b>72</b>
<b>D.1 The purpose of testing</b> .....	<b>72</b>
<b>D.2 Significant variables</b> .....	<b>72</b>
<b>D.3 Test specimens</b> .....	<b>72</b>
<b>D.4 Slip test procedure and evaluation of results</b> .....	<b>74</b>
<b>D.5 Extended creep test procedure and evaluation</b> .....	<b>74</b>
<b>D.6 Test results</b> .....	<b>75</b>
<b>Annex E (informative) Surface treatment</b> .....	<b>77</b>
<b>E.1 Anodic oxidation</b> .....	<b>77</b>
<b>E.2 Coatings</b> .....	<b>77</b>
<b>E.3 Passivation</b> .....	<b>79</b>
<b>Annex F (normative) Geometrical tolerances – Essential tolerances</b> .....	<b>80</b>
<b>F.1 Manufacturing tolerances</b> .....	<b>80</b>
<b>F.2 Erection tolerances</b> .....	<b>88</b>
<b>Annex G (normative) Geometrical tolerances - Functional tolerances</b> .....	<b>92</b>
<b>G.1 General</b> .....	<b>92</b>
<b>G.2 Manufacturing tolerances</b> .....	<b>92</b>
<b>G.3 Erection tolerances</b> .....	<b>98</b>
<b>G.4 Bridges</b> .....	<b>100</b>
<b>Annex H (normative) Geometrical tolerances – Shell structures</b> .....	<b>102</b>
<b>H.1 General</b> .....	<b>102</b>
<b>H.2 Out-of-roundness tolerances</b> .....	<b>102</b>
<b>H.3 Non-intended eccentricity due to execution</b> .....	<b>103</b>
<b>H.4 Dent tolerances</b> .....	<b>104</b>
<b>H.5 Interface flatness tolerances</b> .....	<b>106</b>

**Annex I (informative) Designation of requirements to welds on drawings ..... 107**

**I.1 General..... 107**

**I.2 Global specification ..... 107**

**I.3 Specific designations for welds, part of welds, details ..... 108**

**Annex J (informative) Recommendations for description of site conditions and erection in the execution specification..... 109**

**J.1 Site conditions..... 109**

**J.2 Erection method statement..... 109**

**Annex K (informative) Guide for preparation of the execution specification for quality requirements of welds ..... 112**

**K.1 General..... 112**

**K.2 Utilization grades and utilization ranges ..... 113**

**K.3 Extent of additional NDT ..... 113**

**K.4 Extent of destructive testing for friction stir welds..... 114**

**K.5 Acceptance criteria for welds ..... 114**

**Annex L (informative) Guide for specification of quality requirements for components and structures in service category SC2..... 116**

**Annex M (informative) Chart for development and use of a welding procedure specification (WPS)..... 121**

**Annex N (informative) Weld studs connected by arc stud welding with tip ignition..... 122**

**N.1 Introduction ..... 122**

**N.2 Area of application..... 122**

**N.3 Construction..... 122**

**N.4 Design..... 123**

**N.5 Qualification of the welding procedure ..... 124**

**Bibliography..... 126**

საინფორმაციო ნაწილი. სრული ტექსტის სახსრავად შეიძინეთ სტანდარტი.



## European foreword

This document (EN 1090-3:2019) has been prepared by Technical Committee CEN/TC 135 “Execution of steel structures and aluminium structures”, the secretariat of which is held by SN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2019, and conflicting national standards shall be withdrawn at the latest by October 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 1090-3:2008.

The main changes with respect to the previous edition are contained in the following clauses: Clause 1, Clause 2, Clause 3, 4.1.1, 4.1.2, Table 1, Table 5, 5.6.2, 6.1, 7.3, 7.4.1, 7.4.3, 7.4.4, 7.5.1, 7.5.9, 7.5.10, 7.5.11, 7.5.12, 7.5.13, 7.6, 8.3.1, 11.2.3.1, 12.4.2.1, 12.4.2.2, 12.4.3.2, 12.4.4.3, 12.4.5 and 12.7. Annex E has been deleted and the annexes correspondingly renumbered. The main changes in the annexes are contained in the following sub-clauses: E.2.2, Table F.3, I.1, Table I.1, Table I.2, Table K.1, Table K.2 and K.4. Annex N is a new annex. The Bibliography has been revised. In addition to the major changes in the clauses listed above, some editorial changes have been made.

This document is part of the EN 1090 series, which comprises the following parts:

- EN 1090-1, *Execution of steel structures and aluminium structures - Part 1: Requirements for conformity assessment of structural components*
- EN 1090-2, *Execution of steel structures and aluminium structures - Part 2: Technical requirements for steel structures*
- EN 1090-3, *Execution of steel structures and aluminium structures - Part 3: Technical requirements for aluminium structures*
- EN 1090-4, *Execution of steel structures and aluminium structures - Part 4: Technical requirements for cold-formed structural steel elements and cold-formed structures for roof, ceiling, floor and wall applications*
- EN 1090-5, *Execution of steel structures and aluminium structures - Part 5: Technical requirements for cold-formed structural aluminium elements and cold-formed structures for roof, ceiling, floor and wall applications*

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Introduction

This European Standard specifies requirements for the execution of aluminium structures, in order to ensure adequate levels of mechanical resistance and stability, serviceability and durability.

This document specifies requirements for the execution of aluminium structures, in particular those that are designed according to EN 1999-1-1, EN 1999-1-2, EN 1999-1-3, EN 1999-1-4 and EN 1999-1-5.

This document presupposes that the work is carried out with the necessary skill and adequate equipment and resources to perform the work in accordance with the execution specification and the requirements of this document.

საინფორმაციო ნაწილი. სრული ტექსტის სანახავად შეიძინეთ სტანდარტი.