

# THE MINISTRY OF ENVIRONMENTAL PROTECTION, PHYSICAL PLANNING AND CONSTRUCTION

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Pursuant to Article 19 of the Physical Planning and Construction Act (Official Gazette 76/07) the Minister of Environmental Protection, Physical Planning and Construction hereby passes the

## TECHNICAL REGULATION FOR STEEL STRUCTURES

### I GENERAL PROVISIONS

#### Article 1

(1) This Technical Regulation (hereinafter: Regulation), in compliance with the fulfilment of essential requirements for buildings, lays down technical characteristics for load-bearing steel structures in buildings (hereinafter: steel structures), requirements for designing, constructing, usability, maintenance and other requirements for steel structures, and technical characteristics and other requirements for construction products intended for incorporation in steel structures (hereinafter: construction products).

(2) This Regulation also concerns the components of buildings that are not integral parts of steel structures (non-structural elements), i.e., the elements of steel structures that do not affect mechanical resistance and the stability of the building as a whole.

(3) This Regulation does not concern steel structures that are not encompassed by standards referred to in Annex H.

#### Article 2

Design, construction, maintenance and manner of usage of structures must be such as to fulfil the requirements laid down in this Regulation.

#### Article 3

(1) The steel structure is a part of the construction assembly of the building.

(2) The fulfilment of the essential requirements of mechanical resistance and stability of the structure and of a part of the essential requirement of fire protection related to preservation of the load-bearing capacity of a steel structure in the case of fire during a certain period determined by a special regulation (hereinafter: resistance to fire), is attained with a steel structure that has the technical characteristics and fulfils the requirements laid down in this Regulation.

#### Article 4

Construction products made of steel to which this Regulation applies are:

- steel products (warm and cold formed steel profiles, sheets, strips, bars, wires, cast steel),
- mechanical connection elements,
- additional welding materials,
- high strength tensile elements,
- structural bearings,
- other construction products for which requirements have been laid down in annexes of this Regulation because of their incorporation together with products from subparagraphs 1 to 5 of this paragraph.

#### Article 5

(1) Steel structures and construction products to which this Regulation applies must fulfil technical characteristics and other requirements laid down in this Regulation.

(2) Integral parts of a steel structure (foundations and the like) and construction products that are incorporated in them and are not encompassed by this Regulation, must, in addition to the provisions of this Regulation, fulfil the provisions of a special regulation which regulates such structures.

### II TECHNICAL CHARACTERISTICS OF A STEEL STRUCTURE

#### Article 6

(1) The technical characteristics of a steel structure must be such that during the life of a building, while complying with the construction and maintenance specified in the design of the steel structure, they would withstand usual exploitation and environmental effects, so that during its construction and use, foreseeable impacts on a building do not cause:

- collapse of the building or some of its parts,
- deformation to an unacceptable level,
- damage of a construction assembly or equipment due to the deformation of a steel structure, and
- unproportionately high damage to the building or its parts in relation to the cause from which it arises.

(2) Technical characteristics of a steel structure, along with the conditions from paragraph 1 of this Article, must be such that in the case of fire the load-bearing of the structure or its part is preserved for a time laid down in a special regulation.

(3) Technical characteristics of a steel structure referred to in paragraphs 1 and 2 of this Article are attained by designing and constructing the steel structure in accordance with the provisions of this Regulation.

(4) Preservation of technical characteristics of a steel structure referred to in paragraphs 1 and 2 of this Article is attained by the maintenance of a steel structure in accordance with the provisions of this Regulation.

#### Article 7

(1) If a steel structure has technical characteristics as laid down in Article 6, paragraphs 1 and 2 of this Regulation it is assumed that the building fulfils the essential requirement of mechanical resistance and stability and fulfils the specified resistance to fire.

(2) When, in accordance with special regulations, the additional protection of a steel structure to fulfil the requirements of fire resistance is necessary (lining, sprinkler installation and similar), that protection will be viewed as a part of a technical solution for the steel structure.

## Article 8

Technical characteristics of a steel structure have to be such that, in addition to fulfilling the requirements of this Regulation, other requirements of special regulations that specify the fulfilment of other essential requirements of a building are fulfilled.

## Article 9

(1) A steel structure must, after reconstruction of a building of which it is an integral part, have the technical characteristics as regulated by Article 6, paragraphs 1 and 2, and Article 8 of this Regulation.

(2) As an exception to paragraph 1 of this Article, a steel structure must, after reconstruction of a building which does not significantly affect the technical characteristics of a steel structure, have at least the technical characteristics it had before reconstruction (hereinafter: pre-existing technical characteristics), if the characteristics are in conformity with regulations valid at the time of the construction of a steel structure.

(3) It is considered that the reconstruction of a building should not affect significantly the technical characteristics of a steel structure if the pre-existing technical characteristics related to the mechanical resistance and the stability of the building are satisfactory and if they do not change more than 10 percent.

(4) The provision of paragraph 2 of this Article does not apply:

- to multiple reconstructions of a building which change the pre-existing technical characteristics of a steel structure as a whole or in part, which characteristics are related to the mechanical resistance and the stability of the building,
- to reconstruction of a building whose steel structure is damaged so that a danger is present to the lives and health of people, environment, nature, other buildings and things, or the stability of the ground on the surrounding land,
- to reconstruction of a building for public use for which the design was completed before 8 October 1964, in which case the building must have, after reconstruction, seismic resistance in accordance with this Regulation.

## Article 10

(1) Technical characteristics of corrosion protection of a steel structure must ensure fulfilment of the requirements referred to in Article 6 of this Regulation.

(2) The corrosion protection of a steel structure must be conducted in such way as to ensure the attainment of the corrosion protection characteristics referred to in paragraph 1 of this Article.

(3) If the protection is conducted in accordance to standards indicated in Annex I to this Regulation, it is considered that the attainment of the corrosion protection characteristics referred to in paragraph 1 of this Article is ensured.

(4) It is allowed to use other standards in addition to those indicated in Annex I to this Regulation if the same level of harmonisation is attained.

(5) The corrosion protection of a steel structure is considered to be an integral part of a technical solution for the steel structure.

(6) The corrosion protection of a steel structure is specified in more detail in Annex I to this Regulation.

## III CONSTRUCTION PRODUCTS FOR STEEL STRUCTURES

## Article 11

(1) Construction products are produced in production plants (factories) outside of construction sites, unless specified otherwise in this Regulation for certain construction products.

(2) An exception to paragraph 1 of this Article, the prefabricated elements of a steel structure (hereinafter: prefabricated elements) may be fabricated on a construction site for the needs of that construction site.

(3) The construction site, in addition to being the place as defined by the Physical Planning and Construction Act, implies, within the meaning of paragraph 2 of this Article, a production plant in which the prefabricated elements, applying suitable construction technology, are produced or fabricated for needs of a given construction site in accordance with the design of a steel structure.

## Article 12

(1) A construction product produced in a production plant (factory) outside of construction site may be incorporated into a steel structure if it fulfils the requirements laid down in this Regulation and if a certificate of conformity was issued for it in accordance with the provisions of a special regulation.

(2) Prefabricated elements fabricated on the construction site for needs of that construction site may be incorporated into a steel structure if their usability is proven in accordance with the design of a steel structure and this Regulation.

(3) In the case of the lack of conformity of the construction product with technical specifications for that product and/or the design of a steel structure, the producer of a construction product or the contractor constructing the steel structure must immediately stop the production or fabrication of that product and undertake measures for the determination and removal of the faults which caused the lack of conformity.

(4) If the delivery of a construction product lacking in conformity occurs, the manufacturer or importer must inform, without delay, all buyers, distributors, authorised legal person that took part in certifying the conformity and the Ministry of Environmental Protection, Physical Planning and Construction.

(5) The manufacturer or the importer and distributor of the construction product are obliged to undertake corresponding measures to maintain the properties of a construction product during handling, storing and transport, as is the contractor constructing the steel structure during transport, handling, storing and incorporation of a construction product.

## Article 13

(1) Specified properties, attestations of fitness for use, certifications of conformity and marking of construction products, testing of construction products, specifics during design and construction, necessary control procedures and other requirements that construction products must fulfil are laid down in annexes to this Regulation for:

- steel products (warm and cold formed steel profiles, sheets, strips, bars, wires, cast steel) – in Annex A,
- mechanical connection elements – in Annex B,
- additional welding materials – in Annex C,
- high strength tensile elements – in Annex D, and
- structural bearings – in Annex E.

(2) The certifications of conformity of products that are not encompassed by standards or deviate significantly from harmonised standards indicated in Annexes A to E as referred to in paragraph 1 of this Article are to be conducted according to technical permissions for such products.

(3) Certifications of conformity, within the meaning of paragraphs 1 and 2 of this Article, encompass the activities of assessing conformity of construction products and, depending on the specified system of assessing conformity, issuing the certificate of factory production control or issuing the certificate of conformity of construction products.

#### IV DESIGNING STEEL STRUCTURES

##### Article 14

(1) While designing a steel structure for the construction and designed usage life of the building, all impacts on the steel structure must be predicted stemming from the method and sequence of construction, from foreseeable conditions of usual usage of the building and foreseeable impacts of the environment on the building.

(2) With the design of steel structure, it must be proven, in accordance with this Regulation, that the building will, during its construction and the designed usage life, fulfil the essential requirement of mechanical resistance and stability, fire resistance and other essential requirements in accordance with special regulations.

(3) If not specified otherwise, with this or special regulations, the usage life of the building referred to in paragraph 1 of this Article must be at least 50 years.

##### Article 15

(1) The mechanical resistance and stability and fire resistance of the building are to be proven in the main design, with calculations of load-bearing capacity and usability of the steel structure for foreseeable activities and impacts on the building.

(2) As an exception to paragraph 1 of this Article, fire resistance does not have to be proven unless there is a special regulation that determines the period during which the upper limits of the load-bearing capacity of the steel structure are maintained during fire.

(3) The calculations referred to in paragraph 1 of this Article are to be conducted by suitable calculation procedures that, when necessary, may be complemented by tests, in which all relevant parameters must be included.

(4) Calculation models and other models must be such that, when the appropriate entry parameters are used and the modelling is carried out correctly, correspond to the behaviour of the structure during construction and use.

##### Article 16

(1) During the designing of steel structures, the Croatian standards from Annex H are to be applied.

(2) The application of other rules for designing steel structures which differ from the rules laid down in the Croatian standards from Annex H to this Regulation is allowed, if proven that by applying those rules the requirements of this Regulation are fulfilled at least at the level specified in Croatian standards from Annex H.

(3) Annex H referred to in paragraph 1 of this Article specifies in more detail the designing of steel structures.

## Article 17

(1) An exception to the provisions of Article 16 of this Regulation, in the period until 31 December 2010, the approved technical rules and provisions of Annex G to this Regulation apply when designing steel structures.

(2) Annex G referred to in paragraph 1 of this Article specifies in more detail the designing of steel structures.

(3) In the period specified in paragraph 1 of this Article, the reliability of steel structures may also be determined on the basis of scientifically proven theories and experiments, if these are in accordance with the approved technical rules and provisions of Annex G to this Regulation.

## Article 18

When designing a steel structure, it is not permitted to use, for the same steel structure, at the same time both the approved technical rules and provisions of Annex G and the standards from Annex H to this Regulation, except in cases and in the manner allowed by this Regulation.

## Article 19

(1) Construction design – design of a steel structure which is an integral part of the main design of the building must contain in particular:

1. in technical description

- a description of impacts of the function and usage of the building and impacts of the environment on the properties of the steel structure,
- data from the design report of earlier researches and data from other design reports, studies and documents about the events that might affect the properties of a steel structure,
- description of steel construction, including foundation work,
- description of the means of constructing the steel structure and the incorporation of particular construction products,
- level of exposure for sections of the steel structure, including concrete sections,
- description of measures for corrosion protection,
- description of the necessary measures for fire protection, including data on fire behaviour and analysis of possible fire sources.

2. in the calculation of mechanical resistance and stability

- data on foreseeable activities and impacts on the building,
- data on foundation soil and earthquake area,
- calculation of load-bearing capacity and usability of the steel structure for foreseeable activities and impacts, and calculations on particular parts of the steel structure, for all phases of transport, transfer, construction and use of the building,
- calculation of the global stability of the construction,
- calculation of fire resistance of the steel structure, if necessary in accordance with paragraph 2 of Article 15 of this Regulation.

3. In a programme of control and quality assurance of a steel structure:

- properties that the construction products that are incorporated in the steel structure must have, including corresponding data required by the provisions on marking of construction products in accordance with the annexes to this Regulation,
- testing and procedures for attestation of fitness for use of construction products fabricated on a construction site for needs of that construction site,

- control of construction products incorporated into the steel structure that has to be conducted before their incorporation,
- testing and procedures for attestation of load-bearing and fitness for use of construction products,
- construction conditions and other requirements that must be fulfilled during the construction of the steel structure which affect the attainment of the designed and specified technical characteristics of steel structure and fulfilment of essential requirement of that building, and
- other conditions relevant for the fulfilment of requirements laid down in this Regulation and special regulations.

(2) Requirements from item 3, paragraph 1 of this Article, depending on conditions, procedures and other circumstances of construction, may be elaborated in more detail in the implementation design of the steel structure.

#### Article 20

If the design of a steel structure, in fulfilling the conditions of Article 19 of this Regulation, specifies the application of standards from the Annex to this Regulation in a way specified in the given Annex, it is considered that the steel structure fulfils the requirements laid down in the part that is covered by the standard.

#### Article 21

In addition to conditions laid down in Articles 14 to 20 of this Regulation, the design of a steel structure in which the construction of the steel structure is elaborated must contain technical solutions for:

- elements of the steel structure and ways of their production or fabrication,
- the incorporation of elements into a steel structure, including the calculation and required properties of joints of the elements with other elements of the steel structure,
- transfer and transport of elements of a steel structure (points of support and suspension and description of lifting systems, position of elements during transfer and transport, transport path, and other), and the designed weight and permitted weight tolerances of elements of the steel structure,
- arrangement of props, necessary supports, systems and other measures to ensure stability and prevent damage to elements of the structure during transport, incorporation and connection of elements of the structure.

#### Article 22

(1) In addition to conditions laid down in Articles 14 to 20 of this Regulation, the design for the reconstruction of a building, in which the steel structure is changed, must necessarily contain data on determined pre-existing technical characteristics of a steel structure.

(2) Pre-existing technical characteristics of a steel structure are being determined with insight into the documentation of the building, tests, calculations and other appropriate ways.

### V CONSTRUCTION AND USABILITY OF STEEL STRUCTURES

#### Article 23

(1) The construction of buildings that contain a steel structure must be such that the steel structure has technical characteristics and fulfils other requirements laid down in this

Regulation, in accordance with the technical solution of the building and construction conditions given in the design, and so that it ensures the preservation of such properties and usability of the building during its life.

(2) When constructing a steel structure a contractor is obliged to follow the design of steel structure and technical instructions for incorporation and usage of construction products and comply with the provisions of this Regulation.

#### Article 24

(1) When taking over a construction product produced outside the construction site, the contractor has to determine:

- whether the construction product was delivered with the mark in accordance with a special regulation and if the data in the documentation with which the construction product was delivered match the data in the mark,
- whether the construction product was delivered with technical instructions for incorporation and use,
- whether the properties, including the useful life of the construction product and data relevant for its incorporation, usage and impact on properties and duration of a steel structure are in accordance with properties and data specified in the main design.

(2) The facts determined in accordance with paragraph 1 of this Article are recorded in accordance with a special regulation on conducting daily progress reports, whereas the documentation with which the construction product was delivered is saved among the proofs about the conformity of construction products that the contractor must have at the construction site.

#### Article 25

(1) Specified properties and usability of a construction product produced at the construction site are determined in the way specified in the design and in this Regulation.

(2) Data attesting to the usability and attained properties of the construction product from paragraph 1 of this Article must be recorded by the contractor in accordance with a special regulation on writing daily progress reports.

#### Article 26

(1) It is forbidden to incorporate a construction product which:

- is delivered without a mark in accordance with a special regulation,
- is delivered without technical instruction for incorporation and use,
- does not have the properties required by the design or its useful life has expired, or whose data relevant for incorporation, use and impact on properties and durability of the steel structure are not in accordance with the data specified in the main design.

(2) The incorporation of a construction product, i.e., the continuation of work must be allowed by the supervision engineer, which is recorded in accordance with a special regulation on conducting daily progress report.

#### Article 27

(1) Construction of a steel structure must be such that the steel structure has the technical characteristics and fulfils the requirements laid down in the design and in this Regulation.

(2) Conditions for constructing a steel structure are specified with a programme of control and quality assurance that is an integral part of the main design of the steel structure, at least in accordance with the provisions of Annex I to this Regulation.

(3) If the technical elaboration of a steel structure and conditions in which construction work and other circumstances that could affect technical characteristics of a steel structure are such that they are not encompassed within the provisions of Annex I to this Regulation, in the programme of control and quality assurance, such special conditions of construction must be specified which fulfil the requirements of paragraph 1 of this Article.

(4) Annex I referred to in paragraphs 2 and 3 of this Article specifies in more detail the construction and maintenance of steel structures.

#### Article 28

(1) It is considered that a steel structure has the technical properties foreseen by the design and that it is usable if:

- the construction products are incorporated in a steel structure in a specified way and have a certificate of conformity according to Article 12, paragraph 1 of this Regulation, or proofs of usability according to Article 12, paragraph 2 of this Regulation,
- the conditions of building and other circumstances which could affect the technical characteristics of a steel construction are in accordance with the requirements of the design,
- the steel structure has proofs concerning load-bearing capacity and usability determined in testing by trial load-bearing, when it is laid down as mandatory or required by the design, and if for checking of these facts the specified records or documentation exist.

(2) It is considered that the usability of a steel structure is proven if the conditions in paragraph 1 of this Article and in Article 27 of this Regulation have been fulfilled.

#### Article 29

(1) If it is determined that the steel structure does not have properties foreseen in its design, additional verification must be carried out to prove that the steel construction fulfils the requirements of this Regulation.

(2) Proof from paragraph 1 of this Article is considered a part of the implementation design.

(3) In the case that it is confirmed that the attained technical characteristics do not fulfil the requirements of this Regulation, it is necessary to produce the repair design of a steel structure.

### VI MAINTENANCE OF STEEL STRUCTURES

#### Article 30

(1) Maintenance of a steel structure must be such that during the life of the building its technical characteristics remain preserved and the requirements specified in the design of the building and in this Regulation are fulfilled, as well as other essential requirements that the building must fulfil in accordance with a special regulation.

(2) Maintenance of a steel structure that is constructed or is being constructed in accordance with regulations that were valid earlier must be such that during the life of the building its technical characteristics remain preserved and the requirements specified in the design of the building and in regulations in accordance with which the steel structure was constructed are fulfilled.

#### Article 31

(1) Maintenance of a steel structure implies:

- regular inspections of a steel structure, in periods and in the way specified in the design of the building, this Regulation or a special regulation passed in accordance with the Physical Planning and Construction Act,
- special inspections of a steel structure after some exceptional event or when an inspection body requires it,
- conducting work in which the steel structure remains in the condition, or is returned to the condition specified in the design of the building and this Regulation or a regulation in accordance with which the steel structure was constructed.

(2) Fulfilment of specified conditions for maintenance of a steel structure is documented in accordance with the design of the building and:

- reports on inspections and testing of a steel structure,
- records on maintenance work,
- in some other suitable way, if something else is not specified in this Regulation or other regulation passed in accordance with the Physical Planning and Construction Act.

#### Article 32

(1) It is permitted to use for maintenance only those construction products for which special conditions were fulfilled and for which a certificate of conformity was issued in accordance with a special regulation or for which their usability was proved in accordance with the design of the building and this Regulation.

(2) By the maintenance of the building or by any other way the technical characteristics and fulfilment of specified requirements for steel structures must not be endangered.

#### Article 33

On performing of maintenance work on steel structures the provisions of this Regulation that concern the construction of steel structures apply appropriately.

### VII TRANSITIONAL AND FINAL PROVISIONS

#### Article 34

(1) Annexes A, B, C, D, E, F, G, H and I, with corresponding contents, are printed along with this Regulation and are integral parts thereof.

(2) The Minister authorised to pass this Regulation will, with a special decision, in addition to the standards specified in annexes referred to in paragraph 1 of this Article, specify the standards to which standards from these annexes indicate, as well as other standards and approved technical rules essential for the application of this Regulation. This decision is to be published on the official internet pages of the Ministry of Environmental Protection, Physical Planning and Construction

#### Article 35

(1) On 31 December 2010 will cease to apply the parts of the approved technical rules and

technical specifications which are related to design, construction and maintenance of steel structures encompassed by this Regulation, contained in:

- Ordinance on technical work standards for activities of load-bearing engineering structures (Official Journal of the SFRY, 26/88),
- HRN U.C7.121/88: Basics of designing engineering structures. Useful loads of residential and public buildings,
- HRN U.C7.122/88: Basics of designing engineering structures. Determining useful loads of ceilings in production plants and storages,
- HRN U.C7.123/88: Basics of designing engineering structures. Dead weight of structures and structure elements and weight of stored materials considered when estimating dimensions,
- Ordinance on technical work standards for construction of high-rise constructions in earthquake zones (Official Journal of the SFRY, 31/81, 49/82, 29/83, 21/88 and 52/90),
- Provisional technical regulations for construction in earthquake zones (Official Journal of the SFRY, 39/64),
- Technical regulations for wind action on load-bearing steel structures (Official Journal of the SFRY, 41/64),
- Ordinance on technical work standards for load-bearing steel structures (Official Journal of the SFRY, 61/86),
- Technical regulations for simple structures of buildings with load-bearing steel structures (Official Journal of the SFRY, 6/65),
- Technical regulations for light steel buildings with load-bearing steel structures (Official Journal of the SFRY, 6/65),
- HRN U.E7.010. Load-bearing steel structures made of common structural steels. Choice of basic materials,
- HRN U.E7.081. Testing of stability of load-bearing steel structures. Centrally pressed rods with constant one-part cross-section,
- HRN U.E7.086. Testing of stability of load-bearing steel structures. Determination of the length of bar buckling,
- HRN U.E7.091. Testing of stability of load-bearing steel structures. Centrally pressed rods with constant multi-part cross-section,
- HRN U.E7.096. Testing of stability of load-bearing steel structures. Rods exposed to pressure and bending,
- HRN U.E7.101. and HRN U.E7.101/1. Testing of stability of load-bearing steel structures. Lateral bending of supports,
- HRN U.E7.106. Stability of load-bearing steel structures. Pressed rods with elastic cross props,
- HRN U.E7.111. Testing of stability of load-bearing steel structures. Stability of frame girders,
- HRN U.E7.116. Stability of load-bearing steel structures. Stability of arched girders,
- HRN U.E7.121. Testing of stability of load-bearing steel structures. Calculation of sheet buckling,
- HRN U.E7.131. Seats and hinges of load-bearing steel structures,
- HRN U.E7.140. Joints with screws of high-class strength at load-bearing steel structures. Technical conditions,
- HRN U.E7.145. and HRN U.E7.145/I/91. Load-bearing steel structures linked using rivets and screws. Technical conditions,
- Order on mandatory attesting of screws, nuts and washers for joints of load-bearing steel

structures (Official Journal of the SFRY, 61/85),

and approved technical rules and technical specifications to whose application the approved technical rules from subparagraphs 1 to 26 of this paragraph indicate.

(2) Main design in which the technical solution of a steel structure is laid down in accordance with approved technical rules from paragraph 1 of this Article will be considered a valid document to:

- begin the work on a building whose construction (gross) surface does not exceed 400 square meters and on a building used for exclusively agricultural activities whose construction (gross) surface does not exceed 600 square meters, for which the investor has a valid decision on constructing conditions, if he registers the beginning of construction by 30 June 2011,
- issue the certificate of the main design or of the building permit if the request to issue that certificate or permit is submitted together with the main design by 30 June 2011.

#### Article 36

(1) In a building that is constructed in accordance with the approved main design or building permit of which the main design is an integral part produced in accordance with approved technical rules from Article 35 of this Regulation, a construction product specified in accordance with this Regulation or having the corresponding or better technical characteristics can be incorporated, if that was specified in an implementation design and if in accordance with it was determined that it can be used for that building, including the conditions for its incorporation and impacts of the environment.

(2) For the implementation of provisions from paragraph 1 of this Article, for the part of a steel structure constructed before the beginning of the incorporation of construction products specified according to this Regulation, the condition of executed work must be listed in accordance with a special regulation on conducting daily progress record.

(3) The implementation design from paragraph 1 of this Article must, for the incorporation of construction products specified in accordance with this Regulation, contain the detailed elaboration of programmes for the control and quality assurance given in the main design in which will be specified, in accordance with this Regulation, especially:

- properties that the construction products being incorporated into a steel structure must possess, including corresponding data laid down in the provisions on marking of construction products in accordance with annexes to this Regulation,
- tests and procedures of attestation of fitness for use of construction products that are fabricated at the construction site for needs of that construction site,
- tests and procedures for proving the load-bearing and usability of a steel structure
- constructing conditions and other requirements that must be fulfilled during the construction of a steel structure, and which will have effect on attainment of a designed and specified technical characteristics of a steel structure and fulfilment of essential requirements for the building, and,
- other conditions relevant for fulfilment of requirements laid down in this Regulation and in special regulations,

and referring to the subparagraphs 1 to 5 of this paragraph and the assessment of mutual harmonisation of methods for proving usability of a part of a steel structure constructed until the beginning of incorporation of construction products specified in accordance with this Regulation and later constructed part of a steel structure.

(4) Provisions of paragraphs 1, 2 and 3 of this Article correspondingly apply to the main design and other documentation of a building whose construction (gross) surface does not exceed 400 square meters and on a building used for exclusively agricultural activities whose construction (gross) surface does not exceed 600 square meters, for which the investor has a

valid decision on constructing conditions, and when the main design is made in accordance with the approved technical rules from Article 35, paragraph 1 of this Regulation.

#### Article 37

If for designing a steel structure in accordance with Article 16, paragraph 1 of this Regulation the technical specifications do not exist – Croatian standards or standards to which the line of standards HRN EN 1990, HRN EN 1991, HRN EN 1993, HRN EN 1997 and HRN EN 1998 indicate, the provisions shall be applied of the corresponding approved technical rules that do not contradict the Physical Planning and Construction Act (Official Gazette 76/2007), this Regulation and standards indicated by this Regulation, for specification of which, in accordance with the Physical Planning and Construction Act, a designer is responsible.

#### Article 38

- (1) After 31 December 2009 the approved technical rules for proving the usability of construction products for which the approval of conformity is provided in annexes to this Regulation cease to apply, unless specified otherwise with a special regulation.
- (2) Procedures for issuing of certificates about testing the usability of construction products from paragraph 1 of this Article started before 31 December 2009 in accordance with recognised technical rules, will be completed in accordance with the same technical rules.
- (3) Certificates about testing the usability of construction products from paragraph 1 of this Article issued in accordance with recognised technical rules, will be recognised as a proof of usability of construction products until the validity date specified in them but not after 30 June 2010.

#### Article 39

Before the day of the accession of the Republic of Croatia to the European Union, marking of construction products that correspond to the Croatian standards passed in accordance with principles of harmonisation of the European judiciary is implemented in accordance with the provisions of a special regulation regulating that issue.

#### Article 40

(1) After the accession of the Republic of Croatia to the European Union, for designing, constructing and maintenance of steel structures, construction products may be used that are in conformity with the harmonised technical specifications to which this Regulation indicates if:

- the titles, referential marks, the date of the beginning of the application of those technical specifications and the date of the cessation of the simultaneous application of the contradictory national technical specifications are published in the official journal of the European Union,
- for those construction products conformity with those technical specifications was confirmed,
- those products are usable in the Republic of Croatia considering the geographic, climatic and other features of the Republic of Croatia.

(2) In the steel structure that is constructed in accordance with the approved main design or building permit of which the main design is an integral part produced in accordance with

technical specifications to which this Regulation indicates, a construction product from paragraph 1 of this Article can be incorporated if it has corresponding or better technical characteristics, if it was specified in an implementation design and if in accordance with the design it was determined that it can be used for that steel structure, including the conditions for its incorporation and impacts of the environment.

(3) Provisions of paragraphs 1 and 2 of this Article correspondingly apply to the main design of a building whose construction (gross) surface does not exceed 400 square meters and on a building used for exclusively agricultural activities whose construction (gross) surface does not exceed 600 square meters, for which the investor has a valid decision on constructing conditions, and when the main design is made in accordance with the technical specifications to which this Regulation indicates.

(4) In cases from paragraphs 2 and 3 of this Article, the provisions of paragraphs 2, 3 and 4 of Article 36 of this Regulation are correspondingly applied.

#### Article 41

(1) This Ordinance shall enter into force on 1 January 2009, except for the provisions of Annex H that shall enter into force on the day of entry into force of all Croatian standards with its national features given in nationally specified parameters within particular standards, to which that Annex refers.

Class: 360-01/07-04/9  
Reg. No.: 531-01-266-08-1  
Zagreb, 25 September 2008

The Minister

**Marina Matulović Dropulić, m.p.**

### ANNEX A

#### STEEL PRODUCTS

##### A.1 Area of application

A1.1 In this Annex, in accordance with Article 13 of this Regulation, technical characteristics and other requirements are specified for steel products that are integral parts of steel structures and/or prefabricated elements from Annex F to this Regulation, and the manner of certifying the conformity of steel products unless specified differently in this Regulation.

A.1.2 Technical characteristics and other requirements and certifying of conformity of steel products are determined or conducted in accordance with the standards stated in item A.6 of this Annex, standards to which those standards indicate and the provisions of this Annex, and in accordance with provisions of a special regulation.

A.1.3 Steel products, within the meaning of item A.1.1 of this Annex, are products produced in a production plant (factory) for such kind of a product, and encompass:

Products made of non-alloy structural steels

a) hot rolled sheets, profiles, strips, bars and wires

b) hot formed hollow profiles

- c) cold rolled sheets, profiles, strips and wires
  - d) cold formed hollow profiles
- Products made of stainless steels
- e) hot and cold rolled sheets, profiles, strips, bars and wires
  - f) welded pipes
  - g) seamless pipes
- Cast products
- h) cast steel.

## A.2 Specified properties, certification of conformity and marking

### A.2.1 Specified properties

A.2.1.1 Technical properties of steel products must fulfil general and special requirements essential for the end purpose and must be specified in accordance with the standards stated in item A.6 of this Annex and standards to which these standards indicate, as well as the provisions of this Annex.

A.2.1.2 Technical properties of steel products must be specified in the design of a steel structure.

### A.2.2 Certification of conformity

A.2.2.1 Certification of conformity of steel products from item A.1.3 of this Annex is to be conducted:

- in accordance with the procedure and criteria of Appendix ZA of standard HRN EN 10025-1 for hot rolled products made of structural steel, Appendix ZA of standard HRN EN 10210-1 for hot formed hollow profiles made of non-alloy and fine-grained structural steels and Appendix ZA of standard HRN EN 10219-1 for cold formed hollow profiles made of non-alloy and fine-grained steels, and provisions of this Annex and a special regulation
- in accordance with a system of assessing of conformity 2+ and appropriate procedures and criteria of assessing of conformity, for all properties of steel products specified with a corresponding standard from the list in item A.6, which properties refer to the fulfilment of the essential requirement of mechanical resistance and the stability of the building and fire resistance, for steel products for which the standards do not contain Appendix ZA, and provisions of this Annex and a special regulation.

### A.2.3 Marking

A.2.3.1 A steel product produced in accordance with a technical specification is marked on the bill of lading and on a product in accordance with that specification. The mark must contain the reference to that specification, in accordance with a special regulation.

## A.3 Testing

A.3.1 Taking of samples, preparation of samples and testing of steel products, depending on the kind of a product, is conducted in accordance with the standards to which the corresponding standard from item A.6 refers.

## A.4 Control before incorporation

A.4.1 Steel product produced in accordance with technical specification for which the conformity is confirmed as laid down in this Annex and the certificate of conformity is issued, may be incorporated in the element of the steel structure if it conforms with the requirements from the design of a steel structure.

A.4.2 Immediately before the incorporation of a steel product appropriate supervisory activities are conducted as laid down in Annex I to this Regulation.

#### A.5 Maintaining properties

A.5.1 Producer and distributor of a product and the contractor employed, are obliged to undertake appropriate measures to maintain the properties of a product during handling, transport, transshipment, storing and incorporation according to technical rules and instructions of a producer.

#### A.6 List of standards

##### A.6.1 Standards for non-alloy structural steels

HRN EN 10017:2007, Steel rod for drawing and/or cold rolling – Dimensions and tolerances (EN 10017:2004)

HRN EN 10020:20XX, Definition and classification of grades of steel (EN 10020:2000)

HRN EN 10021:20XX, General technical delivery requirements for steel and steel products (EN 10021:2006)

HRN EN 10024:2005, Hot rolled taper flange I sections – Tolerances on shape and dimensions (EN 10024:1995)

HRN EN 10025-1:2006, Hot rolled products of structural steels – Part 1: General technical delivery conditions (EN 10025-1:2004)

HRN EN 10025-2:2007, Hot rolled products of structural steels – Part 2: Technical delivery conditions for non-alloy structural steels (EN 10025-2:2004)

HRN EN 10025-3:2007, Hot rolled products of structural steels – Part 3: Technical delivery conditions for normalised heated to a glow/normalised rolled weldable fine grain structural steels (EN 10025-3:2004)

HRN EN 10025-4:2007, Hot rolled products of structural steels – Part 4: Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels (EN 10025-4:2004)

HRN EN 10025-5:2007, Hot rolled products of structural steels – Part 5: Technical delivery conditions for structural steels with improved atmospheric corrosion resistance (EN 10025-5:2004)

HRN EN 10025-6:2007, Hot rolled products of structural steels – Part 6: Technical delivery conditions for flat products of high yield strength structural steels in the quenched and tempered condition (EN 10025-6:2004)

HRN EN 10027-1:2007, Designation systems for steels – Part 1: Steel names (EN 10027-1:2005)

HRN EN 10027-2:1999, Designation systems for steels – Part 2: Numerical system (EN 10027-2:1992)

HRN EN 10029:2000, Hot rolled steel plates 3 mm thick or above – Tolerances on dimensions, shape and mass (EN 10029:1991)

HRN EN 10034:2003, Structural steel I and H sections – Tolerances on shape and dimensions (EN 10034:1993)

HRN EN 10048:2003, Hot rolled narrow steel strip – Tolerances on dimensions and shape (EN 10048:1996)

HRN EN 10051:2003, Continuously hot-rolled uncoated plate, sheet and strip of non-alloy and alloy steels – Tolerances on dimensions and shape (includes amendment A1:1997) (EN 10051:1991+A1:1997)

HRN EN 10055:2005, Hot rolled steel equal flange tees with radiused root and toes – Dimensions and tolerances on shape and dimensions (EN 10055:1995)

HRN EN 10056-1:2005, Structural steel equal and unequal leg angles – Part 1: Dimensions (EN 10056-1:1998)

HRN EN 10056-2:2005, Structural steel equal and unequal leg angles – Part 2: Tolerances on shape and dimensions (EN 10056-2:1993)

HRN EN 10058:2007, Hot rolled flat steel bars for general purposes – Dimensions and tolerances on shape and dimensions (EN 10058:2003)

HRN EN 10059:2005, Hot rolled square steel bars for general purposes – Dimensions and tolerances on shape and dimensions (EN 10059:2003)

HRN EN 10060:2005, Hot rolled round steel bars for general purposes – Dimensions and tolerances on shape and dimensions (EN 10060:2003)

HRN EN 10061:2005, Hot rolled hexagon steel bars for general purposes – Dimensions and tolerances on shape and dimensions (EN 10061:2003)

HRN EN 10080:2005, Steel for the reinforcement of concrete – Weldable reinforcing steel – General (EN 10080:2005)

HRN EN 10130:20XX, Cold-rolled low carbon steel flat products for cold forming – Technical delivery conditions (EN 10130:2006)

HRN EN 10131:20XX, Cold rolled uncoated and zinc or zinc-nickel electrolytically coated low carbon and high yield strength steel flat products for cold forming – Tolerances on dimensions and shape (EN 10131:2006)

HRN EN 10139:2000, Cold rolled uncoated mild steel narrow strip for cold forming – Technical delivery conditions (EN 10139:1997)

HRN EN 10140:20XX, Cold rolled narrow steel strip – Tolerances on dimensions and shape (EN 10140:2006)

HRN EN 10143:20XX, Continuously hot-dip metal coated steel sheet and strip – Tolerances on dimensions and shape (EN 10143:2006)

HRN EN 10149-1:2007, Hot-rolled flat products made of high yield strength steels for cold forming – Part 1: General delivery conditions (EN 10149-1:1995)

HRN EN 10149-2:2007, Hot-rolled flat products made of high yield strength steels for cold forming – Part 2: Delivery conditions for thermomechanically rolled steels (EN 10149-2:1995)

HRN EN 10149-3:2007, Hot-rolled flat products made of high yield strength steels for cold forming – Part 3: Delivery conditions for normalised or normalised rolled steels (EN 10149-3:1995)

HRN EN 10152:2000, Electrolytically zinc coated cold rolled steel flat products for cold forming – Technical delivery conditions (EN 10152:1993)

HRN EN 10163-1:2007, Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections – Part 1: General requirements (EN 10163-1:2004)

HRN EN 10163-2:2007, Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections – Part 2: Plate and wide flats (EN 10163-2:2004)

HRN EN 10163-3:2007, Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections – Part 3: Sections (EN 10163-3:2004)

HRN EN 10164:20XX, Steel products with improved deformation properties perpendicular to the surface of the product – Technical delivery conditions (EN 10164:2004)

HRN EN 10169-1:20XX, Continuously organic coated (coil coated) steel flat products – Part 1: General information (definitions, materials, tolerances, test methods) (EN 10169-1:2003)

HRN EN 10169-2:20XX, Continuously organic coated (coil coated) steel flat products – Part 2: Products for building exterior applications (EN 10169-2:2006)

HRN EN 10169-3:20XX, Continuously organic coated (coil coated) steel flat products – Part 3: Products for building interior applications (EN 10169-2:2003)

HRN EN 10204:20XX, Metallic products – Types of inspection documents (EN 10204:2004)

HRN EN 10210-1:20XX, Hot finished structural hollow sections of non-alloy and fine grain structural steels – Part 1: Technical delivery requirements (EN 10210-1:2006)

HRN EN 10210-2:20XX, Hot finished structural hollow sections of non-alloy and fine grain structural steels – Part 2: Tolerances, dimensions and sectional properties (EN 10210-2:2006)

HRN EN 10219-1:20XX, Cold formed welded structural hollow sections of non-alloy and fine grain steels – Part 1: Technical delivery requirements (EN 10219-1:2006)

HRN EN 10219-2:20XX, Cold formed welded structural hollow sections of non-alloy and fine grain steels – Part 2: Tolerances, dimensions and static sectional properties (EN 10219-2:2006)

HRN EN 10268:20XX, Cold-rolled flat products made of high yield strength micro-alloyed steels for cold forming – General delivery conditions (EN 10268:2006)

HRN EN 10279:2007, Hot rolled steel channels – Tolerances on shape, dimensions and mass (EN 10279:2000)

HRN EN 10292:20XX, Continuously hot-dip coated strip and sheet of steels with high yield strength for cold forming – Technical delivery conditions (EN 10292:2007)

HRN EN 10326:2007, Continuously hot-dip coated strip and sheet of structural steels – Technical delivery conditions (EN 10326:2004)

HRN EN 10327:20XX, Continuously hot-dip coated strip and sheet of low carbon steels for cold forming – Technical delivery conditions (EN 10327:2004)

HRN ISO 4997:20XX, Cold-reduced carbon steel sheet of structural quality (ISO 4997:2007)

#### A.6.2 Standards for stainless steels

HRN EN 10051:2003, Continuously hot-rolled uncoated plate, sheet and strip of non-alloy and alloy steels – Tolerances on dimensions and shape (includes amendment A1:1997) (EN 10051:1991+A1:1997)

HRN EN 10088-1:2007, Stainless steels – Part 1: List of stainless steels (EN 10088-1:2005)

HRN EN 10088-2:2007, Stainless steels – Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes (EN 10088-2:2005)

HRN EN 10088-3:2007, Stainless steels – Part 3: Technical delivery conditions for semi-finished products, bars, rods, wire, sections and bright products of corrosion resisting steels for general purposes (EN 10088-3:2005)

HRN EN 10296-2:2007, Welded circular steel tubes for mechanical and general engineering purposes – Technical delivery conditions – Part 2: Stainless steel (EN 10296-2:2005)

HRN EN 10297-2:2007, Seamless circular steel tubes for mechanical and general engineering purposes – Technical delivery conditions – Part 2: Stainless steel (EN 10297-2:2005)

HRN EN ISO 1127:20XX, Stainless steel tubes – Dimensions, tolerances and conventional masses per unit length (ISO 1127:1992; EN ISO 1127:1996)

HRN EN ISO 9445:20XX, Continuously cold-rolled stainless steel narrow strip, wide strip, plate/sheet and cut lengths – Tolerances on dimensions and form (ISO 9445:2002)

#### A.6.3 Standards for cast steel

HRN EN 1559-1:2001, Founding – Technical conditions of delivery – Part 1: General (EN 1559-1:1997)

HRN EN 1559-2:2001, Founding – Technical conditions of delivery – Part 2: Additional requirements for steel castings (EN 1559-2:2000)

HRN EN 10293:2007, Steel castings for general engineering uses (EN 10293:2005)

HRN EN 10340:2008, Steel castings for structural uses (EN 10340:2007)

HRN EN 10283:2001, Corrosion resistant steel castings (EN 10283:1998)

## **ANNEX B**

### **MECHANICAL CONNECTION ELEMENTS**

#### **B.1 Area of application**

B.1.1 In this Annex, in accordance with Article 13 of this Regulation, technical characteristics and other requirements are specified for mechanical connection elements in steel structures, and the way of certifying their conformity unless specified differently in this Regulation.

B.1.2 Technical characteristics and other requirements and certifying of conformity of mechanical connection elements are determined or conducted in accordance with the standards stated in item B.6, standards to which those standards indicate and the provisions of this Annex, and in accordance with provisions of a special regulation.

B.1.3 Mechanical connection elements, within the meaning of item B.1.1 of this Annex, are elements stated in item B.2.1.4, (a) to c)), of this Annex, produced in a production plant (factory) for such kind of a product.

#### **B.2 Specified properties, certification of conformity and marking**

##### **B.2.1 Specified properties**

B.2.1.1 Technical properties of mechanical connection elements must fulfil general and special requirements essential for the end purpose and must be specified in accordance with the standards stated in item B.6 of this Annex and standards to which these standards indicate, as well as the provisions of this Annex.

B.2.1.2 Technical properties of mechanical connection elements must be specified in the design of a steel structure.

B.2.1.4 Kinds of the mechanical connection elements are:

- a) screws with nuts and washers,
- b) rivets,
- c) pins.

##### **B.2.2 Certification of conformity**

B.2.2.1 Certification of conformity of mechanical connection elements from item B.2.1.4 of this Annex is conducted in accordance with the procedure and criteria of Appendix ZA of standard HRN EN 15048-1, and HRN EN 14399-1, and provisions of this Annex and a special regulation.

##### **B.2.3 Marking**

B.2.3.1 Mechanical connection elements produced in accordance with a technical specification are marked on the bill of lading and on packaging in accordance with provisions of that specification. The mark must contain the reference to that specification, in accordance with a special regulation.

### B.3 Testing

B.3.1 Taking of samples, preparation of samples and testing of mechanical connection elements, depending on a kind of a mechanical connection element, is conducted in accordance with standards to which the corresponding standard from item B.6 refers.

### B.4 Control before incorporation

B.4.1 Mechanical connection elements produced in accordance with standards in item B.6 of this Annex for which the conformity is confirmed in the way laid down in this Annex and the certificate of conformity is issued, may be incorporated in the steel structure or the elements of the steel structure if they conform with the requirements of the design of that steel structure.

B.4.2 Immediately before the incorporation of mechanical connection elements appropriate supervisory activities are conducted as laid down in Annex I to this Regulation.

### B.5 Maintaining properties

B.5.1 The producer and distributor of mechanical connection elements and the contractor employed, are obliged to undertake appropriate measures to maintain the properties of a product during handling, transport, transshipment, storing and incorporation according to technical instructions of a producer.

### B.6 List of standards

#### B.6.1 Standards for mechanical connection elements

HRN EN 15048-1:20XX, Non-preloaded structural bolting assemblies – Part 1: General requirements

HRN EN 898-1:2005, Mechanical properties of fasteners made of carbon and alloy steels – Part 1: Screws and blind screws

HRN EN 20898-2:20XX, Mechanical properties of fasteners made of carbon and alloy steels – Part 2: Nuts with specified proof load values, coarse thread

HRN EN ISO 3269:2005, Fasteners – Acceptance inspection

HRN EN 14399-1:20XX, High-strength structural bolting assemblies for preloading – Part 1: General requirements

HRN EN 14399-2:20XX, High-strength structural bolting assemblies for preloading – Part 2: Suitability test for preloading

HRN EN 14399-3:20XX, High-strength structural bolting for preloading – Part 3: System HR – Hexagon bolt and nut assemblies

HRN EN 14399-4:20XX, High-strength structural bolting for preloading – Part 4: System HV – Hexagon bolt and nut assemblies

HRN EN 14399-5:20XX, High-strength structural bolting for preloading – Part 5: Plain washers for System HR

HRN EN 14399-6:20XX, High-strength structural bolting for preloading – Part 6: Plain chamfered washers for Systems HR and HV  
HRN EN 14399-7:20XX, High-strength structural bolting for preloading – Part 7: Countersunk head bolt and nut assemblies  
HRN EN 14399-8:20XX, High-strength structural bolting for preloading – Part 8: System HV – Hexagon fit bolts and nut assemblies  
HRN EN 14399-9:20XX, High strength structural bolting for preloading – Part 9: System HR or HV – Bolt and nut assemblies with direct tension indicators  
HRN EN 14399-10:20XX, High-strength structural bolting for preloading – Part 10: System HRC – Bolt and nut assemblies with calibrated preload  
HRN EN ISO 1479:2005, Hexagon head tapping screws  
HRN EN ISO 1481:2005, Slotted pan head tapping screws  
HRN EN ISO 2320:2005, Prevailing torque type steel hexagon nuts – Mechanical and performance requirements  
HRN EN ISO 3506-1:2005, Mechanical properties of corrosion-resistant stainless-steel fasteners – Part 1: Screws and blind screws  
HRN EN ISO 3506-2:2005, Mechanical properties of corrosion-resistant stainless-steel fasteners – Part 2: Nuts  
HRN EN ISO 7040:2005, Prevailing torque type hexagon nuts (with non-metallic insert), style 1 – Property classes 5, 8 and 10  
HRN EN ISO 7042:2005, Prevailing torque type hexagon nuts, style 2 – Property classes 5, 8, 10 and 12  
HRN EN ISO 7719:2005, Prevailing torque type all-metal hexagon nuts, style 1 – Property classes 5, 8 and 10  
HRN EN ISO 10511:2005, Prevailing torque type hexagon thin nuts (with non-metallic insert)  
HRN EN ISO 10512:2005, Prevailing torque type hexagon nuts (with non-metallic insert), style 1, with metric fine pitch thread – Property classes 6, 8 and 10  
HRN EN ISO 10513:2005, Prevailing torque type all-metal hexagon nuts, style 2, with metric fine pitch thread – Property classes 8, 10 and 12  
HRN EN ISO 15480:2005, Hexagon washer head drilling screws with tapping screw thread  
HRN EN ISO 15976:2005, Closed end blind rivets with break pull mandrel and protruding head – St/St  
HRN EN ISO 15979:2005, Open end blind rivets with break pull mandrel and protruding head – St/St  
HRN EN ISO 15980:2005, Open end blind rivets with break pull mandrel and countersunk head – St/St  
HRN EN ISO 15983:2005, Open end blind rivets with break pull mandrel and protruding head – A2/A2  
HRN EN ISO 15984:2005, Open end blind rivets with break pull mandrel and countersunk head – A2/A2

## ANNEX C

### ADDITIONAL WELDING MATERIALS

#### C.1 Area of application

C.1.1 In this Annex, in accordance with Article 13 of this Regulation, technical characteristics and other requirements are specified for additional welding materials used in steel structures, and the way of certifying their conformity, unless specified differently in this Regulation.

C.1.2 Technical characteristics and other requirements and certifying of conformity of additional welding materials are determined or conducted in accordance with the standards stated in item C.6, standards to which those standards indicate and the provisions of this Annex, and in accordance with provisions of a special regulation.

C.1.3 Additional welding materials, within the meaning of item C.1.1 of this Annex, are stated in item C.2.1.2, (a) to d)), of this Annex, produced in a production plant (factory).

## C.2 Specified properties, certification of conformity and marking

### C.2.1 Specified properties

C.2.1.1 Technical properties of additional welding materials from item C.2.1.2, (a) to d)), must fulfil general and special requirements essential for the end purpose and must be specified in accordance with the standards stated in item C.6 of this Annex and standards to which these standards indicate, as well as the provisions of this Annex.

C.2.1.2 Additional welding materials are:

- a) covered electrodes
- b) wire electrodes
- c) fluxes
- d) powder-filled wire
- e) shielding gases.

### C.2.2 Certification of conformity

C.2.2.1 Certification of conformity of additional welding materials from item C.2.1.2 of this Annex is conducted in accordance with the procedure and criteria of Appendix ZA of standard HRN EN 13479, and provisions of this Annex and a special regulation.

### C.2.3 Marking

C.2.3.1 Additional welding materials from item C.2.1.2 of this Annex, produced in accordance with technical specifications, are marked on the bill of lading and on packaging in accordance with provisions of those specifications. The mark must contain the reference to that specification, in accordance with a special regulation.

## C.3 Testing

C.3.1 Taking of samples, preparation of samples and testing of additional welding materials, depending on its kind, is conducted in accordance with standards to which the corresponding standard from item C.6 of this Annex refers.

## C.4 Control before incorporation

C.4.1 Additional welding materials produced in accordance with technical specification for which the conformity is confirmed in the way laid down in this Annex and a certificate of conformity is issued, may be incorporated in the steel structure if they conform with the requirements of the design of that steel structure.

C.4.2 Immediately before the incorporation, appropriate supervisory activities are to be conducted as laid down in Annex I to this Regulation.

### C.5 Maintaining properties

C.5.1 The producer and distributor of additional welding materials and the contractor employed, are obliged to undertake appropriate measures to maintain the properties of a product during handling, transport, transshipment, storing and incorporation according to technical rules and instructions of a producer.

### C.6 List of standards

#### C.6.1 Standards for additional welding materials used on load-bearing steel structures

HRN EN 13479:2007, Welding consumables – General product standard for filler metals and fluxes for fusion welding of metallic materials (EN 13479:2004)

HRN EN ISO 2560:2007, Welding consumables – Covered electrodes for manual metal arc welding of non-alloy and fine grain steels – Classification

HRN EN 439:1999, Welding consumables – Shielding gases for arc welding and cutting

HRN EN 440:1997, Welding consumables – Wire electrodes and deposits for gas shielded metal arc welding of non alloy and fine grain steels – Classification

HRN EN 756:2004, Welding consumables – Solid wires, solid wire-flux and tubular cored electrode-flux combinations for submerged arc welding of non alloy and fine grain steels – Classification

HRN EN 757:1999, Welding consumables – Covered electrodes for manual metal arc welding of high strength steels – Classification

HRN EN 758:1999, Welding consumables – Tubular cored electrodes for metal arc welding with and without a gas shield of non alloy and fine grain steels – Classification

HRN EN 760:1999, Welding consumables – Fluxes for submerged arc welding – Classification

HRN EN 14295:2004, Welding consumables – Wire and tubular cored electrodes and electrode-flux combinations for submerged arc welding of high strength steels – Classification

HRN EN 13918:2001, Welding – Bolts and ceramic rings for arc welding of bolts

HRN EN ISO 14343:20XX, Welding consumables – Wire electrodes, strip electrodes, wires and rods for fusion welding of stainless and heat resisting steels – Classification

HRN EN ISO 16834:20XX, Welding consumables – Wire electrodes, wires, rods and deposits for gas-shielded arc welding of high strength steels – Classification

HRN EN ISO 17633:20XX, Welding consumables – Tubular cored electrodes and rods for gas shielded and non-gas shielded metal arc welding of stainless and heat-resisting steels – Classification

HRN EN ISO 18276:20XX, Welding consumables – Tubular cored electrodes for gas-shielded and non-gas-shielded metal arc welding of high-strength steels – Classification

HRN EN 1600:1999, Welding consumables – Covered electrodes for manual arc welding of stainless and heat resisting steels – Classification

HRN EN 1668:1999, Welding consumables – Rods, wires and deposits for tungsten inert gas welding of non alloy and fine grain steels – Classification

## ANNEX D

### HIGH STRENGTH TENSILE ELEMENTS

## D.1 Area of application

D.1.1 In this Annex, in accordance with Article 13 of this Regulation, technical characteristics and other requirements are specified for high strength tensile elements used in steel structures, and the way of certifying their conformity, unless specified differently in this Regulation.

D.1.2 Technical characteristics and other requirements and certifying of conformity of high strength tensile elements are determined or conducted in accordance with the standards stated in item D.6, standards to which those standards indicate and the provisions of this Annex, and in accordance with provisions of a special regulation.

D.1.3 High strength tensile elements, within the meaning of item D.1.1 of this Annex, are elements stated in item D.2.1.2, (a) to e)), of this Annex, produced in a production plant (factory).

## D.2 Specified properties, certification of conformity and marking

### D.2.1 Specified properties

D.2.1.1 Technical properties of high strength tensile elements from item D.2.1.2, (a) to e)), must fulfil general and special requirements essential for the end purpose and must be specified in accordance with the standards stated in item D.6 of this Annex and standards to which these standards indicate, as well as the provisions of this Annex.

D.2.1.2 High strength tensile elements are:

- a) steel rods
- b) steel wire
- c) steel wire ropes
- d) steel cables
- e) terminations (anchors).

### D.2.2 Certification of conformity

D.2.2.1 Certification of conformity of high strength tensile elements from item D.2.1.2 of this Annex is conducted in accordance with a system of assessing of conformity 1+ and appropriate procedures and criteria of assessing of conformity, for all properties of high strength tensile elements specified with a corresponding standard from the list in item D.6, which properties refer to the fulfilment of the essential requirement of mechanical resistance and the stability of the building and fire resistance, and provisions of this Annex and a special regulation.

### D.2.3 Marking

D.2.3.1 High strength tensile elements from item D.2.1.2 of this Annex, produced in accordance with technical specifications, are marked on the bill of lading and on packaging in accordance with provisions of those specifications. The mark must contain the reference to the specification, in accordance with a special regulation.

## D.3 Testing

D.3.1 Taking of samples, preparation of samples and testing of additional welding materials, depending on its kind, is conducted in accordance with standards to which the corresponding standard from item D.6 of this Annex refers.

## D.4 Control before incorporation

D.4.1 High strength tensile elements produced in accordance with technical specification for which the conformity is confirmed in the way laid down in this Annex and the certificate of conformity is issued, may be incorporated in the steel structure if they conform with the requirements of the design of that steel structure.

D.4.2 Immediately before incorporation, appropriate supervisory activities are to be conducted as laid down in Annex I to this Regulation.

## D.5 Maintaining properties

D.5.1 Producer and distributor of high strength tensile elements and the contractor employed, are obliged to undertake appropriate measures to maintain the properties of a product during handling, transport, transshipment, storing and incorporation according to technical rules and instructions of a producer.

## D.6 List of standards

D.6.1 Standards for high strength tensile elements used in load-bearing steel structures

HRN EN 10138-3:20XX, Prestressing steels – Part 3: Strands

HRN EN 10264-3:2003, Steel wire and wire products – Steel wire for ropes – Part 3: Cold drawn and cold shaped non alloyed steel wire for heavy duty applications

HRN EN 10264-4:2003, Steel wire and wire products – Steel wire for ropes – Part 4: Stainless steel wire

HRN EN 12385-1:2003, Steel wire ropes – Safety – Part 1: General requirements

HRN EN 12385-10:2004, Steel wire ropes – Safety – Part 10: Spiral ropes for general structural appliances

HRN EN 13411-4:2003, Terminations for steel wire ropes – Safety – Part 4: Metal and resin socketing

## **PRILOG E**

### **STRUCTURAL BEARINGS**

#### **E.1 Area of application**

E.1.1 In this Annex, in accordance with Article 13 of this Regulation, technical characteristics and other requirements are specified for structural bearings used in steel structures, and the way of certifying their conformity, unless specified differently in this Regulation.

E.1.2 Technical characteristics and other requirements and certifying of conformity of structural bearings are determined or conducted in accordance with the standards stated in item E.6, standards to which those standards indicate and the provisions of this Annex, and in accordance with provisions of a special regulation.

E.1.3 Types of structural bearings, within the meaning of item E.1.1 of this Annex, are stated in item E.2.1.2, (a) to e)), of this Annex, produced in a production plant (factory).

#### **E.2 Specified properties, certification of conformity and marking**

## E.2.1 Specified properties

E.2.1.1 Technical properties of structural bearings from item E.2.1.2 , (a) to e)), must fulfil general and special requirements essential for the end purpose and must be specified in accordance with the standards stated in item E.6 of this Annex and standards to which these standards indicate, as well as the provisions of this Annex.

E.2.1.2 Types of structural bearings:

- a) neoprene bearings
- b) roller bearings
- c) pot bearings
- d) spherical and cylindrical PTFE bearings
- e) guided bearings and restrained bearings.

## E.2.2 Certification of conformity

E.2.2.1 Certification of conformity of structural bearings from item E.2.1.2 of this Annex is conducted:

- in accordance with a system of assessing of conformity and procedures and criteria of Appendix ZA of a corresponding standard from the list in item E.6, for structural bearings for which the standards contain Appendix ZA,
- in accordance with a system of assessing of conformity 1 and appropriate procedures and criteria of assessing of conformity, for all properties of structural bearings specified with a corresponding standard from the list in item E.6, which properties refer to the fulfilment of the essential requirement of mechanical resistance and the stability of the building and fire resistance, for structural bearings for which the standards do not contain Appendix ZA, and provisions of this Annex and a special regulation.

## E.2.3 Marking

E.2.3.1 Structural bearings from item E.2.1.2 of this Annex, produced in accordance with technical specifications, are marked on the bill of lading and on packaging in accordance with provisions of those specifications. The mark must contain the reference to the specification, in accordance with a special regulation.

## E.3 Testing

E.3.1 Taking of samples, preparation of samples and testing of structural bearings, depending on their kind, is conducted in accordance with standards to which the corresponding standard from item E.6 of this Annex refers.

## E.4 Control before incorporation

E.4.1 Structural bearings produced in accordance with technical specifications for which the conformity is confirmed in the way laid down in this Annex and the certificate of conformity is issued, may be incorporated in a steel structure if they conform with the requirements of the design of that steel structure.

E.4.2 Immediately before the incorporation appropriate supervisory activities are conducted as laid down in Annex I of this Regulation.

## E.5 Maintaining properties

E.5.1 Producer and distributor of structural bearings and the contractor employed, are obliged to undertake appropriate measures to maintain the properties of a product during handling, transport, transshipment, storing and incorporation according to technical rules and instructions of a producer.

## E.6 List of standards

### E.6.1 Standards for structural bearings used in load-bearing steel structures

HRN EN 1337-2:2004, Structural bearings – Part 2: Sliding elements (EN 1337-2:2004)

HRN EN 1337-3:2005, Structural bearings – Part 3: Elastomeric bearings (EN 1337-3:2005)

HRN EN 1337-4:Corr.1:2008, Structural bearings – Part 4: Roller bearings (EN 1337-4:2004/AC:2007)

HRN EN 1337-4:2004, Structural bearings – Part 4: Roller bearings (EN 1337-4:2004)

HRN EN 1337-5:2005, Structural bearings – Part 5: Pot bearings (EN 1337-5:2005)

HRN EN 1337-6:2004, Structural bearings – Part 6: Rocker bearings (EN 1337-6:2004)

HRN EN 1337-7:2004, Structural bearings – Part 7: Spherical and cylindrical PTFE bearings (EN 1337-7:2004)

HRN EN 1337-8:20XX, Structural bearings – Part 8: Guided bearings and restrained bearings

## ANNEX F

### PREFABRICATED ELEMENTS

#### F.1 Area of application

F.1.1 In this Annex, in accordance with Article 13 of this Regulation, technical characteristics and other requirements are specified for prefabricated elements used in steel structures (hereinafter: prefabricated elements), unless specified differently in this Regulation.

F.1.2 Prefabricated element within the meaning of item F.1.1 is the element produced or fabricated at the place different from its final place in the building, at a construction site for needs of that construction site or in a production plant for production of prefabricated elements, made of steel products produced in accordance with the Annexes A to F, and of possibly other products.

F.1.3 Technical characteristics and other requirements and certifying of conformity of prefabricated elements are determined and conducted in accordance with item F.1.3.1 and F.1.3.2 of this Annex respectively, and in accordance with provisions of a special regulation.

F.1.3.1 Technical characteristics and other requirements, and attestation of fitness for use of a prefabricated element fabricated in accordance with a design of a steel structure are determined and conducted in accordance with that design.

F.1.3.2 Technical characteristics and other requirements, and certifications of conformity of a prefabricated element fabricated in accordance with technical specification (standard or technical approval) are determined and conducted in accordance with that specification.

#### F.2 Specified properties, certification of conformity and marking

##### F.2.1 Specified properties

F.2.1.1 Technical properties of prefabricated elements must fulfil general and special requirements essential for the end purpose in the building, and must be specified in accordance with the standard HRN EN 1090-1 and standards to which these standards indicate, as well as the provisions of this Annex.

F.2.1.2 Technical properties of steel products and preservatives of which the prefabricated element is fabricated or produced must be specified in accordance with Annexes A, B, C, D or E of this Regulation.

F.2.1.3 Prefabricated element is fabricated or produced for:

- a) structural use (element of a partially prefabricated steel structure, element of a prefabricated steel structure or a separate structure),
- b) non-structural use (formwork, fences, etc).

F.2.1.4 Technical properties of prefabricated elements must be specified in a design of a steel structure, and in case of a prefabricated element produced in accordance with technical specification, they shall be specified in the technical specification for this element.

## F.2.2 Attestation of fitness for use and certification of conformity

F.2.2.1 Attestation of fitness for use of a prefabricated element fabricated in accordance with a design of a steel structure is conducted in accordance with the design of a steel structure and provisions of this Annex, and includes the requirements for:

- a) contractor's fabrication control and type approval of a prefabricated element, and
- b) supervision of a production plant and supervision of contractor's fabrication control of a prefabricated element,

in the way appropriate for the attainment of technical characteristics of a steel structure in accordance with this Regulation.

F.2.2.2 Certification of conformity of a prefabricated element produced in accordance with technical specification is conducted in accordance with provisions of that specification, and provisions of this Annex and a special regulation.

## F.2.3 Marking

F.2.3.1 Prefabricated element fabricated in accordance with the design of a steel structure is marked on a bill of lading and on the element itself in accordance with the mark in the design.

F.2.3.2 Prefabricated element produced in accordance with a technical specification is marked on a bill of lading and on the element itself in accordance with provisions of that specification. The mark must contain the reference to that specification, in accordance with a special regulation.

## F.3 Testing

F.3.1 Prefabricated element fabricated in accordance with the design of a steel structure is tested in accordance with that design.

F.3.1 Prefabricated element produced in accordance with technical specification is tested in accordance with that specification.

## F.4 Design

F.4.1 Prefabricated element is designed in accordance with provisions of Annex G and Annex H, and the provisions of this Regulation.

F.4.2 Design of a prefabricated element must prove technical characteristics and behaviour in all phases of the foreseen useful life of the elements, i.e., for the phases of fabrication, transfer, storing in the storage, transport to the construction site, incorporation, use, maintenance and disassembly.

#### F.5 Construction, fabrication and production

F.5.1 When constructing a steel structure with prefabricated elements the rules laid down in Annex I of this Regulation must be applied correspondingly, and:

- details related to all phases of the foreseen useful life of elements,
- details related to constituent materials and standards that certify the conformity of those materials,
- details related to use and maintenance, stated in the design of a steel structure and/or technical instruction for incorporation and use.

F.5.2 When fabricating a prefabricated element the provisions of Annex I of this Regulation are applied correspondingly.

F.5.3 When producing a prefabricated element the rules specified in corresponding technical specification for that product must be followed.

#### F.6 Control before incorporation

F.6.1 Prefabricated element fabricated in accordance with a design of a steel structure may be incorporated in a steel structure if the conformity of steel products and preservatives is certified and if the usability of a prefabricated element is proven in the way determined in the design of a steel structure and this Annex.

F.6.2 Prefabricated element produced in accordance with technical specification for which the conformity was certified in the way determined in this Annex and the certificate of conformity was issued, may be incorporated in a steel structure if it conforms with the requirements of the design of that steel structure.

F.6.3 Immediately before the incorporation of a prefabricated element appropriate supervisory activities are conducted as laid down in Annex I of this Regulation.

#### F.6 List of standards

F.6.1 Standards for prefabricated elements

HRN EN 1090-1:2008, Steel and aluminium structural components - Part 1: General delivery conditions

### ANNEX G

#### DESIGNING STEEL STRUCTURES IN ACCORDANCE WITH APPROVED TECHNICAL RULES

##### G.1 Area of application

G.1.1 In this Annex, in accordance with Article 16 of this Regulation, rules for designing steel structures of buildings from paragraph 1 of the same Article are specified, in accordance with approved technical rules, unless specified differently in this Regulation.

G.1.2 This Annex refers to designing steel structures of buildings considering also the corresponding rules for activities on load-bearing steel structures, construction rules in earthquake zones and rules for foundation work.

## G.2 Design, calculation and constructing

G.2.1 For design and calculation of steel structures of buildings the provisions of this Annex and approved technical rules determined in this Annex apply. Terms “building” and “construction building” which are used in approved technical rules corresponds to the term “building” in accordance with Physical Planning and Construction Act.

G.2.2 For activities on load-bearing steel structures the Ordinance on technical work standards for activities of load-bearing engineering structures apply, as well as provisions of this Annex and approved technical rules related to the application of that ordinance.

G.2.3 For constructing buildings in earthquake zones the Ordinance on technical work standards for construction of high-rise constructions in earthquake zones apply, as well as approved technical rules related to the application of such regulations and ordinances.

G.2.4 For calculation and building of steel structures of buildings the Ordinance on technical work standards for load-bearing steel structures apply, as well as approved technical rules related to the application of that ordinance.

G.2.5 For foundation work of buildings the Ordinance on technical work standards for foundation work of construction buildings apply, as well as approved technical rules related to the application of that ordinance.

G.2.6 For fire resistance the activities specified in HRN ENV 1991-2-2 apply.

G.2.7 If in accordance with Article 15, paragraph 2 of this Regulation the calculation of fire resistance is not conducted, the steel structure of the building designed in accordance with provisions of this Annex must satisfy general principles of protection from fire activity.

## G.3 Application of the Ordinance on technical work standards for activities of load-bearing engineering structures

G.3.1 In Provisional technical regulations for loading of buildings which are related to the application of the Ordinance on technical work standards for activities of load-bearing engineering structures, instead of item 213, items G.3.1.1 to G.3.1.5 of this Annex apply.

G.3.1.1 For flat roofs or for sloped roofs inclined up to 20° towards the horizon, when calculating a steel structure, the basic load of snow per m<sup>2</sup> of roof's plan view must be taken, depending on the location of the building, which is not less than:

Lika and Gorski Kotar  $s_0 = 2.00 \text{ kN/ m}^2$

Other continental areas  $s_0 = 1.25 \text{ kN/ m}^2$

In mountainous regions more than 300 meters above sea-level which abound with snow the increased load of snow is taken, depending on local conditions, so that the load, at roofs inclined up to 20° towards the horizon is:

$$s = s_0 + (h - 300)/400$$

s – load of snow (kN/ m<sup>2</sup>)

s<sub>0</sub> – basic load of snow (kN/ m<sup>2</sup>)

h – altitude (m)

At locations in Gorski Kotar and Lika, with exceptionally abundant snowfalls and at altitudes higher than 700 m, actual data prepared by the Meteorological and Hydrological Service should be taken.

G.3.1.2 In areas without snow (coastline and islands), an alternative load should be taken when calculating a steel structure, that is not less than  $s = 0.35 \text{ kN/m}^2$ .

G.3.1.3 For roofs with incline  $\alpha > 20^\circ$ , decreased load of snow per  $\text{m}^2$  of roof's plan view may be taken, depending on the location of the building, which is not less than:

$s\alpha = s[1 - 14(\alpha - 20^\circ)/1000]$ , where:

$s$  – load of snow from item G.3.1.1

$\alpha$  – incline of the roof surface towards the horizontal expressed in  $^\circ$ .

G.3.1.4 Occasional accumulations of snow on roofs in depressions or in shelters and in other unsuitable configurations of roofs when there is a possibility of snow accumulation, has to be regarded appropriately.

In formed bays minimum snow density of  $5.0 \text{ kN/m}^3$  should be considered.

G.3.1.5 At double-sloping roofs, in addition to the calculations with a full load of snow, it is necessary to calculate also the full load of snow from one side of the roof and half of a full load at the other side.

#### G.4 Technical properties of steel products

G.4.1 Technical properties of non-alloy structural steels are specified in a design in accordance with item A.6.1 of Annex A of this Regulation unless specified otherwise in this Annex.

G.4.1.1 In calculations of load capacity and deformations in accordance with approved technical rules, it is necessary to use in an appropriate way values of steel qualities, as specified in standards stated in item A.6.1 of Annex A of this Regulation.

G.4.1.2 Marks of steel products in accordance with standard HRN EN 10025-2 correspond approximately to marks of steel products in accordance with standard HRN C.B0.500, in the way displayed in Table G.1 of this Annex.

Table G.1 Marks of steel products HRN C.B0.500 and approximately corresponding marks of steel products in accordance with standard HRN EN 10025-2

	Mark in accordance with HRN C.B0.500:1988	Mark in accordance with HRN EN 10025-2:2007
Hot rolled products Non-alloy structural steels	Č.0361	S 235 JR
	Č.0362	S 235 J0
	Č.0363	S 235 J2+N
	Č.0363	S 235 J2
	Č.0451	S 275 JR
	Č.0452	S 275 J0
	Č.0453	S 275 J2+N
	Č.0453	S 275 J2
	Č.0561	S 355 JR
	Č.0562	S 355 J0
	Č.0563	S 355 J2+N
	Č.0563	S 355 J2

	Č.0545	E 295
	Č.0645	E 335
	Č.0745	E 360

## G.5 Technical properties of other products

G.5.1 Technical characteristics of mechanical connection elements are specified in the design of a steel structure in accordance with provisions of Annex B of this Regulation.

G.5.2 Technical characteristics of additional welding materials are specified in the design of a steel structure in accordance with provisions of Annex C of this Regulation.

G.5.3 Technical characteristics of high strength tensile elements are specified in the design of a steel structure in accordance with provisions of Annex D of this Regulation.

G.5.4 Technical characteristics of structural bearings are specified in the design of a steel structure in accordance with provisions of Annex E of this Regulation.

G.5.5 Technical characteristics of preservatives are specified in the design of a steel structure in accordance with provisions of Annex I of this Regulation.

## G.6 List of approved technical rules and design standards

### G.6.1 Actions (Loading)

Ordinance on technical work standards for activities of load-bearing engineering structures (Official Journal of the SFRY, 26/88) and approved technical rules related to application of that ordinance.

HRN U.C7.121/88: Basics of designing engineering structures. Useful loads of residential and public buildings.

HRN U.C7.122/88: Basics of designing engineering structures. Determining useful loads of ceilings in production plants and storages.

HRN U.C7.123/88: Basics of designing engineering structures. Dead weight of structures and structure elements and weight of stored materials considered when estimating dimensions.

Ordinance on technical work standards for construction of high-rise constructions in earthquake zones (Official Journal of the SFRY, 31/81, 49/82, 29/83, 21/88 and 52/90) and approved technical rules related to application of that ordinance.

Provisional technical regulations for construction in earthquake zones (Official Journal of the SFRY, 39/64) and approved technical rules related to application of that regulations.

Technical regulations for wind action on load-bearing steel structures (Official Journal of the SFRY, 41/64).

Ordinance on technical work standards for determining loads of bridges (Official Journal of the SFRY, 1/91).

HRN ENV 1991-2-2 Eurocode 1: Basics of designing and actions on structures – 2 Part 2: Actions on structures – Actions on structures exposed to fire (ENV 1991-2-2:1995).

### G.6.2 Dimensioning and designing

Ordinance on technical work standards for load-bearing steel structures (Official Journal of the SFRY, 61/86) and approved technical rules related to application of that ordinance.

Technical regulations for simple structures of buildings with load-bearing steel structures (Official Journal of the SFRY, 6/65).

Technical regulations for light steel buildings with load-bearing steel structures (Official

Journal of the SFRY, 6/65).

Load-bearing steel structures made of common structural steels. Choice of basic materials. HRN U.E7.010.

Testing of stability of load-bearing steel structures. Centrally pressed rods with constant one-part cross-section. HRN U.E7.081.

Testing of stability of load-bearing steel structures. Determination of the length of bar buckling. HRN U.E7.086.

Testing of stability of load-bearing steel structures. Centrally pressed rods with constant multi-part cross-section. HRN U.E7.091.

Testing of stability of load-bearing steel structures. Rods exposed to pressure and bending. HRN U.E7.096.

Testing of stability of load-bearing steel structures. Lateral bending of supports. HRN U.E7.101. and HRN U.E7.101/1.

Stability of load-bearing steel structures. Pressed rods with elastic cross props. HRN U.E7.106.

Testing of stability of load-bearing steel structures. Stability of frame girders. HRN U.E7.111.

Stability of load-bearing steel structures. Stability of arched girders. HRN U.E7.116.

Testing of stability of load-bearing steel structures. Calculation of sheet buckling. HRN U.E7.121.

Seats and hinges of load-bearing steel structures. HRN U.E7.131.

Joints with screws of high-class strength at load-bearing steel structures. Technical conditions. HRN U.E7.140.

Load-bearing steel structures linked using rivets and screws. Technical conditions. HRN U.E7.145. and HRN U.E7.145/I/91.

## ANNEX H

### DESIGNING STEEL STRUCTURES

#### H.1 Area of application

H.1.1 In this Annex, in accordance with Article 14 of this Regulation, rules for designing steel structures of buildings are specified, unless specified differently in this Regulation.

H.1.2 The provisions of this Annex refers to designing steel structures of buildings considering also basics of calculations and actions on structures, geotechnical design and design of structures resistant to earthquakes.

#### H.2 Design, calculation and construction

H.2.1 Rules for designing steel structures are specified with Croatian standards in sequences HRN EN 1990, HRN EN 1991, HRN EN 1993, HRN EN 1997 and HRN EN 1998, with national features given in nationally determined parameters within particular standards, and Croatian standards indicated by these standards.

H.2.2 When doing basic calculations and actions on steel structures, the Croatian standards in sequences HRN EN 1990, HRN EN 1991 and HRN EN 1993 apply, including the associated nationally determined parameters, and standards indicated by standards in these sequences.

H.2.3 When designing steel structures related to earthquake resistance, the Croatian standards in sequence HRN EN 1998 apply, including the associated nationally determined parameters, and standards indicated by standards in this sequence.

H.2.4 When designing steel structures, the Croatian standards in sequence HRN EN 1993 apply, including the associated nationally determined parameters, and standards indicated by standards in this sequence.

H.2.5 For geotechnical design the Croatian standards in sequence HRN EN 1997 apply, including the associated nationally determined parameters, and standards indicated by standards in this sequence.

H.2.6 If in accordance with Article 15, paragraph 2 of this Regulation calculation of resistance to fire activity according to HRN EN 1993-1-2 is not conducted, a steel structure of a building designed in accordance with provisions of this Annex must satisfy general principles of protection from fire activity.

### H.3 Technical properties of steel products, mechanical connection elements, additional welding materials, high strength tensile elements and structural bearings

H.3.1 Technical properties of steel products are specified in the design of steel structures in accordance with provisions of Annex A of this Regulation.

H.3.2 Technical properties of mechanical connection elements are specified in the design of steel structures in accordance with provisions of Annex B of this Regulation.

H.3.3 Technical properties of additional welding materials are specified in the design of steel structures in accordance with provisions of Annex C of this Regulation.

H.3.4 Technical properties of high strength tensile elements are specified in the design of steel structures in accordance with provisions of Annex D of this Regulation.

H.3.5 Technical properties of structural bearings are specified in the design of steel structures in accordance with provisions of Annex E of this Regulation.

### H.4 List of standards

#### H.4.1 Standards for design and calculation

HRN EN 1990:20XX

Eurocode 0: Eurocode. Basis of structural design (EN 1990:2002)

HRN EN 1991-1-1:20XX

Eurocode 1: Actions on structures – Part 1-1: General actions – Densities, self-weight, imposed loads for buildings (EN 1991-1-1:2002)

HRN EN 1991-1-2:20XX

Eurocode 1: Actions on structures – Part 1-2: General actions – Actions on structures exposed to fire (EN 1991-1-2:2002)

HRN EN 1991-1-3:20XX

Eurocode 1: Actions on structures – Part 1-3: General actions – Snow loads (EN 1991-1-3:2003)

HRN EN 1991-1-4:20XX

Eurocode 1: Actions on structures – Part 1-4: General actions – Wind actions (EN 1991-1-4:2005)

HRN EN 1991-1-5:20XX

Eurocode 1: Actions on structures – Part 1-5: General actions – Thermal actions (EN 1991-1-5:2003)

HRN EN 1991-1-6:20XX

Eurocode 1: Actions on structures – Part 1-6: General actions – Actions during execution (EN 1991-1-6:2005)  
HRN EN 1991-1-7:20XX  
Eurocode 1: Actions on structures – Part 1-7: General actions – Accidental actions (EN 1991-1-7:2006)  
HRN EN 1991-3:20XX  
Eurocode 1: Actions on structures – Part 3: Actions induced by cranes and machinery (EN 1991-3:2006)  
HRN EN 1993-1-1:20XX  
Eurocode 3: Design of steel structures – Part 1-1: General rules and rules for buildings (EN 1993-1-1:2006)  
HRN EN 1993-1-2:20XX  
Eurocode 3: Design of steel structures – Part 1-2: General rules – Structural fire design (EN 1993-1-2:2006)  
HRN EN 1993-1-3:20XX  
Eurocode 3: Design of steel structures – Part 1-3: General rules – Supplementary rules for cold-formed members and sheeting (EN 1993-1-3:2006)  
HRN EN 1993-1-4:20XX  
Eurocode 3: Design of steel structures – Part 1-4: General rules – Supplementary rules for stainless steels (EN 1993-1-4:2006)  
HRN EN 1993-1-5:20XX  
Eurocode 3: Design of steel structures – Part 1-5: General rules – Plated structural elements (EN 1993-1-5:2006)  
HRN EN 1993-1-6:20XX  
Eurocode 3: Design of steel structures – Part 1-6: Strength and stability of shell structures (EN 1993-1-6:2007)  
HRN EN 1993-1-7:20XX  
Eurocode 3: Design of steel structures – Part 1-7: Strength and stability of planar plated structures subject to out of plane loading (EN 1993-1-7:2007)  
HRN EN 1993-1-8:20XX  
Eurocode 3: Design of steel structures – Part 1-8: Design of joints (EN 1993-1-8:2005)  
HRN EN 1993-1-9:20XX  
Eurocode 3: Design of steel structures – Part 1-9: Load-bearing of steel structures and fatigue (EN 1993-1-9:2005)  
HRN EN 1993-1-10:20XX  
Eurocode 3: Design of steel structures – Part 1-10: Choice of steels regarding material toughness and through-thickness properties (EN 1993-1-10:2005)  
HRN EN 1993-1-11:20XX  
Eurocode 3: Design of steel structures – Part 1-11: Design of structures with steel tension components (EN 1993-1-11:2006)  
HRN EN 1993-1-12:20XX  
Eurocode 3: Design of steel structures – Part 1-12: Additional rules for high strength steels (EN 1993-1-12:2007)  
HRN EN 1993-2:20XX  
Eurocode 3: Design of steel structures – Part 2: Steel bridges (EN 1993-2:2006)  
HRN EN 1993-3-1:20XX  
Eurocode 3: Design of steel structures – Part 3-1: Towers, masts and chimneys – Towers and masts (EN 1993-3-1:2006)

HRN EN 1993-3-2:20XX

Eurocode 3: Design of steel structures – Part 3-2: Towers, masts and chimneys – Chimneys (EN 1993-3-2:2006)

HRN EN 1993-4-1:20XX

Eurocode 3: Design of steel structures – Part 4-1: Silos (EN 1993-4-1:2007)

HRN EN 1993-4-2:20XX

Eurocode 3: Design of steel structures – Part 4-2: Tanks (EN 1993-4-2:2007)

HRN EN 1993-4-3:20XX

Eurocode 3: Design of steel structures – Part 4-3: Pipelines (EN 1993-4-3:2007)

HRN EN 1993-5:20XX

Eurocode 3: Design of steel structures – Part 5: Piling (EN 1993-5:2007)

HRN EN 1993-6:20XX

Eurocode 3: Design of steel structures – Part 6: Crane supporting structures (EN 1993-6:2007)

HRN EN 1997-1:20XX

Eurocode 7: Geotechnical design – Part 1: General rules (EN 1997-1:2004)

HRN EN 1997-2:20XX

Eurocode 7: Geotechnical design – Part 2: Ground investigation and testing (EN 1997-2:2007)

HRN EN 1998-1:20XX

Eurocode 8: Design of structures for earthquake resistance – Part 1: General rules, seismic actions and rules for buildings (EN 1998-1:2004)

HRN EN 1998-2:20XX

Eurocode 8: Design of structures for earthquake resistance – Part 2: Bridges (EN 1998-2:2005)

HRN EN 1998-3:20XX

Eurocode 8: Design of structures for earthquake resistance – Part 3: Assessment and retrofitting of buildings (EN 1998-3:2005)

HRN EN 1998-4:20XX

Eurocode 8: Design of structures for earthquake resistance – Part 4: Silos, tanks and pipelines (EN 1998-4:2006)

HRN EN 1998-5:20XX

Eurocode 8: Design of structures for earthquake resistance – Part 4: Foundations, retaining structures and geotechnical aspects (EN 1998-5:2004).

## ANNEX I

### CONSTRUCTION AND MAINTENANCE OF STEEL STRUCTURES

#### I.1 Area of application

I.1.1 In this Annex, in accordance with Article 27 of this Regulation, technical and other requirements and conditions for construction of steel structures and supervisory activities and control procedures in the construction of steel structures are specified, as well as maintenance of steel structures, unless specified differently in this Regulation.

I.1.2 Technical and other requirements and conditions from item I.1.1 of this Annex are determined, i.e., construction and maintenance of steel structures is conducted in accordance with standards from item I.4.1 and I.4.2 of this Annex, standards indicated by these standards and provisions of this Annex and in accordance with provisions of a special regulation.

I.1.3 Also applied to construction and maintenance of steel structures are the corresponding standards for construction and maintenance of other kinds of products used in steel structures

in accordance with rules for those products, except those to which Annexes A, B, C, D, and E of this Regulation refer.

## I.2 Construction, supervisory activities and control procedures at a construction site

### I.2.1 Construction

I.2.1.1 Elements of steel structures are constructed from steel products, produced in accordance with Annexes A to E, from other products, or as prefabricated elements produced in accordance with Annex F, in accordance with the design of a steel structure and provisions of this Annex.

### I.3 Maintenance of steel structures

I.3.1 Activities of maintenance of steel structures must be conducted in accordance with provisions of this Annex and standards indicated by this Annex, as well as with corresponding application of provisions in other Annexes to this Regulation.

### I.4 List of standards for construction, protection, maintenance, control and testing

#### I.4.1 General

HRN EN 1090-1:20XX Steel and aluminium structural components – Part 1: General delivery conditions

HRN EN 1090-2:20XX Execution of steel structures and aluminium structures – Part 2: Technical requirements for steel structures

Technical regulation for maintenance of steel structures during exploitation, Official Journal of the SFRY, 6/65

Technical regulation for inspection and testing of load-bearing steel structures, Official Journal of the SFRY, 6/65

#### I.4.2 List of standards according to work routines

##### I.4.2.1 Preparation

HRN EN ISO 9013:2003, Thermal cutting – Classification of thermal cuts – Geometrical product specification and quality tolerances (ISO 9013:2002; EN ISO 9013:2002)

HRN ISO 286-2, ISO system of dimensional tolerances – Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts

HRN CEN/TR 10347, Guidelines for forming of structural steels during its production

##### I.4.2.2. Welding

HRN EN 287-1/AC:2007, Qualification test of welders – Fusion welding – Part 1: Steels (EN 287-1:2004/AC:2004)

HRN EN 287-1:2004, Qualification test of welders – Fusion welding – Part 1: Steels (EN 287-1:2004)

HRN EN 1011-1/A1:2003, Welding – Recommendations for welding of metallic materials – Part 1: General guidance for arc welding (EN 1011-1:1998/A1:2002)

HRN EN 1011-1/A2:2007, Welding – Recommendations for welding of metallic materials – Part 1: General guidance for arc welding (EN 1011-1:1998/A1:2003)

HRN EN 1011-1:1999, Welding – Recommendations for welding of metallic materials – Part 1: General guidance for arc welding (EN 1011-1:1998)

HRN EN 1011-2:2002, Welding – Recommendations for welding of metallic materials – Part 2: Arc welding of ferritic steels (EN 1011-2:2001)

HRN EN 1011-3:2001, Welding – Recommendations for welding of metallic materials – Part 3: Arc welding of stainless steels (EN 1011-3:2000)

HRN EN 1418:1999, Welding personnel – Approval testing of welding operators for arc welding and resistance weld setters for fully mechanised and automatic welding of metallic materials (EN 1418:1997)

HRN EN ISO 3834-1:2007, Quality requirements for fusion welding of metallic materials – Part 1: Criteria for the selection of the appropriate level of quality requirements (ISO 3834-1:2005; EN ISO 3834-1:2005)

HRN EN ISO 3834-2:2007, Quality requirements for fusion welding of metallic materials – Part 2: Comprehensive quality requirements (ISO 3834-2:2005; EN ISO 3834-2:2005)

HRN EN ISO 3834-3:2007, Quality requirements for fusion welding of metallic materials – Part 3: Standard quality requirements (ISO 3834-3:2005; EN ISO 3834-3:2005)

HRN EN ISO 3834-4:2007, Quality requirements for fusion welding of metallic materials – Part 4: Elementary quality requirements (ISO 3834-4:2005; EN ISO 3834-4:2005)

HRN EN ISO 3834-5:2007, Quality requirements for fusion welding of metallic materials – Part 5: Documents with which it is necessary to conform to claim conformity to the quality requirements of ISO 3834-2, ISO 3834-3 or ISO 3834-4 (ISO 3834-5:2005; EN ISO 3834-5:2005)

HRN EN ISO 4063:2001, Welding and allied processes – Nomenclature of processes and reference numbers (ISO 4063:1998; EN ISO 4063:2000)

HRN EN ISO 5817:2004, Welding – Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) – Quality levels for imperfections (ISO 5817:2003; EN ISO 5817:2003)

HRN EN ISO 9692-1:2004, Welding and allied processes – Recommendations for joint preparation – Part 1: Manual metal-arc welding, gas-shielded metal-arc welding, gas welding, TIG welding and beam welding of steels (ISO 9692-1:2003; EN ISO 9692-1:2003)

HRN EN ISO 9692-2:1999, Welding and allied processes – Joint preparation – Part 2: Submerged arc welding of steels (ISO 9692-2:1998; EN ISO 9692-2:1998+AC:1999)

HRN EN ISO 13916:1999, Welding – Guidance on the measurement of preheating temperature, interpass temperature and preheat maintenance temperature (ISO 13916:1996; EN ISO 13916:1996)

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#### I.4.2.3. Tests

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HRN EN 473:199, Non-destructive testing – Qualification and certification of NDT personnel – General principles (ISO 473:1982)

HRN EN 571-1:2002, Non-destructive testing – Penetrant testing – Part 1: General principles (EN 571-1:1997)

HRN EN 970:2000, Non-destructive examination of fusion welds – Visual examination (EN 970:1997)

HRN EN 1290/A1:2003, Non-destructive examination of welds – Magnetic particle examination of welds (EN 1290:1998/A1:2002)

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#### I.4.2.5. Corrosion protection

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HRN EN ISO 8503-2:1999, Preparation of steel substrates before application of paints and related products – Surface roughness characteristics of blast-cleaned steel substrates – Part 2: Method for the grading of surface profile of abrasive blast-cleaned steel – Comparator procedure (ISO 8503-2:1988; EN ISO 8503-2:1995)  
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HRN EN ISO 12944-8:1999, Paints and varnishes – Corrosion protection of steel structures by protective paint systems – Part 8: Development of specifications for new work and maintenance (ISO 12944-8:1998; EN ISO 12944-8:1998)

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#### I.4.2.6. Tolerances

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#### I.4.3. Other

HRN EN 508-1:20XX, Roofing products from metal sheet – Specification for self-supporting of steel, aluminium or stainless steel sheet – Part 1: Steel

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