Rail Baltica
Coordinated by RB Rail

TECHNICAL SPECIFICATION

FENCE COMPONENTS

RBCN-RWM-SPC-R-00004

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Co-financed by the Connecting Europe Facility of the European Union

CONTENTS

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1 Introduction

1.1 Scope

1. This Technical Specification defines the technical characteristics of railway fence components to be produced and supplied to the Purchaser. The fence components are intended to be installed along the railway tracks, excluding the Station areas.

1.2 Layout

2. This Technical Specification describes requirements for the properties of railway fence components as well as their transport, delivery, and storage conditions.
3. This Technical Specification concerns:
   3.1. single torsion galvanized wire mesh;
   3.2. tension wires;
   3.3. poles for the railway fence (regular, tension, bracing);
   3.4. barbed wires and barbed wire arms
   3.5. gates (Portals, Safety Gates);
   3.6. other fence components (turnbuckles and fasteners).

1.3 Design Working Life

4. The fence and its components shall have a Design Working Life of 50 years.
5. The steel parts and structures shall be designed considering atmospheric corrosion class C4 according to ISO 9223. Higher requirements might be requirement for specific location as per environmental conditions.

1.4 Quality Assurance and Control

6. The execution class for fence as a secondary structure according to EN 1090-2 is EXC2.
7. The Producer shall ensure that the goods/supplies are in conformity with the CE marking requirements for their supplied goods if such goods are identified under the applicable product groups listed by the European Commission.
8. Producer shall be ISO 9001 certified.

2 Normative References

The following documents, in whole or in part, are normatively referenced in this section of the Technical Specifications and are indispensable for its application. Latest edition of the referenced document (including any amendments and respective national annexes) applies.

Ref.:	Document number:	Document title:
1.	EN 1993-1-1:2005+A1:2014	Eurocode 3. Design of steel structures General rules and rules for buildings
2.	EN 10021:2006	General technical delivery conditions for steel and iron and steel products
3.	EN 1993-1-8:2005/AC:2009	Eurocode 3: Design of steel structures - Part 1-8: Design of joints
4.	ISO 1461:2022	Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods
5.	EN 10218-1:2012	Steel wire and wire products - General - Part 1: Test methods
6.	EN 10218-2:2012	Steel wire and wire products - General - Part 2: Wire dimensions and tolerances
7.	EN 10244-1:2009	Steel wire and wire products - Non-ferrous metallic coatings on steel wire - Part 1: General principles
8.	EN 10021:2006	General technical delivery conditions for steel products
9.	EN 10223-1:2012	Steel wire and wire products for fencing and netting - Part 1: Zinc and zinc-alloy coated steel barbed wire
10.	EN 10223-6:2012	Steel wire and wire products for fencing and netting - Part 6: Steel wire chain link fencing
11.	EN 10244-2:2009	Steel wire and wire products - Non-ferrous metallic coatings on steel wire - Part 2: Zinc or zinc alloy coatings
12.	EN 10210-2:2019	Hot finished steel structural hollow sections - Part 2: Tolerances, dimensions, and sectional properties
13.	EN 10219-2:2019	Cold formed welded steel structural hollow sections - Part 2: Tolerances, dimensions, and sectional properties

3 Requirements for fence components

3.1 Single torsion galvanized wire mesh

9. Wire mesh shall be made of steel and shall comply with the provisions of EN 10223-6:2012.
10. The steel mesh shall be hot dip galvanized - the thickness of zinc coating shall correspond to class A according to the provisions of EN 10244-2.
11. Steel wire nominal diameter shall be 2.7 mm before galvanizing.
12. Minimum tensile strength of the wire material (steel) shall be 500 N/mm^2.
13. The wire mesh shall form rhombuses with side length of 50 mm or 10 mm – see Annex 1 for details for each mesh type.
14. Heights of the torsion galvanized mesh for different lots is defined in Annex 1 – it varies between 0.85 m, 1.25 m, 1.80 m, 2.25 m or and 2.75 m.
15. Mesh selvage shall be twisted at top of the fence and knuckled at bottom of the fence.

3.2 Tension wires

16. Tension wires shall be hot dip galvanized - the thickness of zinc coating shall correspond to class A according to the provisions of EN 10244-2,
17. Steel tension wire nominal diameter shall be 2.7 mm before galvanizing.
18. Minimum tensile strength of the wire material (steel) shall be 500 N/mm^2.

3.3 Steel posts with non-removable caps

19. The posts shall be made of steel circular hollow sections and shall comply with the provisions of EN 10210-2:2006 or EN 10219:2006.
20. Dimensions of the circular hollow section shall be 60x3 mm.
21. Steel posts that are intended to be installed on existing structures shall have a welded base plate made of steel (grade S355). The dimensions of the base plate shall be 200x200mm, thickness – 12 mm. See Figure 1 for dimensions and placement of drilled holes for anchors. See Annex 1 for detailed information regarding the necessity and placement of base plates according to technical design.

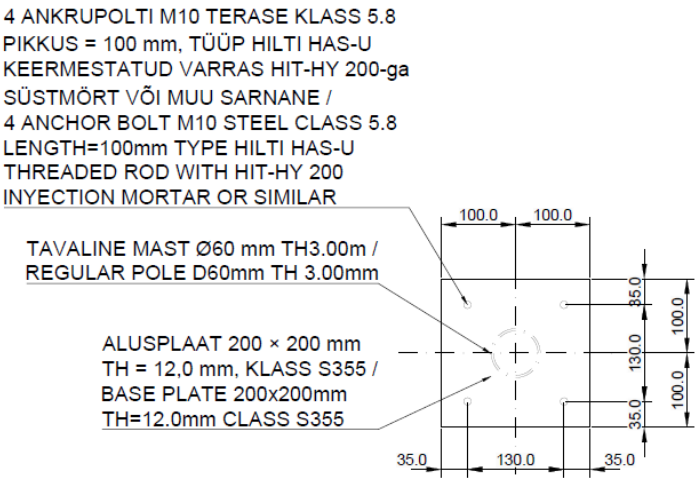


Figure 1: Dimensions of steel post base plate

22. The steel post profiles (including base plate, if any) shall be hot dip galvanized according to the provisions of ISO 1461:2022, the thickness of zinc coating shall be at least 80 µm at both sides.
23. Each post profile shall have a non-removable cap.
24. Heights of posts vary between 2.85 m, 3.00 m and 3.35 m – see Annex 1 for a detailed list of defined heights.

3.4 Bracing elements

25. Bracing elements shall be made of steel circular hollow sections and shall comply with the provisions of EN 10210-2:2006 or EN 10219:2006.
26. Dimensions of the circular hollow section shall be 42x3mm.
27. The steel bracing elements shall be hot dip galvanized according to the provisions of ISO 1461:2022, the thickness of zinc coating shall be at least 80 µm at both sides.

3.5 Barbed Wires

28. Barbed wires shall be made of steel and shall comply with the provisions of EN 10223-1:2012.
29. The steel barbed wire shall be hot dip galvanized - the thickness of zinc coating shall correspond to class A according to the provisions of EN 10244-2.
30. Barb wire diameter shall be 1.7 mm.
31. Barb spacing shall range between 60 mm to 80 mm.
32. Barb length shall range between 5 to 7 mm.
33. Barb twist type shall be single twist.
34. Minimum tensile strength of the material (steel) shall be 900 N/mm^2.

3.6 Barb Arm

35. Barb arm shall be made of steel with hot galvanized protective coating of thickness of at least 80 µm.

3.7 Turnbuckles and Fasteners

36. Turnbuckles and Fasteners shall be made of hot dip galvanized steel, thickness of zinc coating shall be at least 80 µm.

3.8 Gate Frame

37. Requirements for portals:
    37.1. Minimum passage width = 4.00 m with 2.80 m and 1.20 m leaves
    37.2. Portal frame shall be made of hot dip galvanized steel hollow square profiles with dimensions of 40x3 mm according to EN 10210-2:2006 or EN 10219:2006.
    37.3. The thickness of zinc coating for steel profiles shall be at least 80 µm at both sides.
    37.4. Leaves must have provisions to block them in open position.
    37.5. Portals shall have double barreled safety lock (for maintenance and emergency use).
    37.6. The portals shall have provision for closure using a padlock and chain.
    37.7. The portals shall have clamping devices for the leaves on the posts preventing their opening by removal of hinges.
38. Requirements for safety gates
    38.1. Safety gates shall have passage width of 1.20 m.
    38.2. Safety gate frame shall be made of hot dip galvanized steel hollow square profiles with dimensions of 40x3 mm according to EN 10210-2:2006 or EN 10219:2006.
    38.3. The thickness of zinc coating for steel profiles shall be at least 80 µm at both sides.
    38.4. Leaves must have provisions to block them in open position.
    38.5. Portals shall have double barreled safety lock (for maintenance and emergency use).
    38.6. The portals shall have provision for closure using a padlock and chain.
    38.7. The portals shall have clamping devices for the leaves on the posts preventing their opening by removal of hinges.

3.9 End posts at safety gates

    38.1. End posts shall be made of hot dip galvanized steel hollow square profiles with dimensions of 80x3mm according to EN 10210-2:2006 or EN 10219:2006.
    38.2. The thickness of zinc coating for steel profiles shall be at least 80 µm at both sides.

3.10 Electrical Protection

39. All exposed metal conductive parts of the fences shall be grounded using earth conductor (bare copper conductor) of fifty square millimeters (50mm^2) buried underneath the mesh at a depth of fifty centimeters (50cm) beneath finished ground level.
40. This earth conductor shall be connected to the fence posts by a copper conductor with the same characteristics (Cu; 50mm^2).

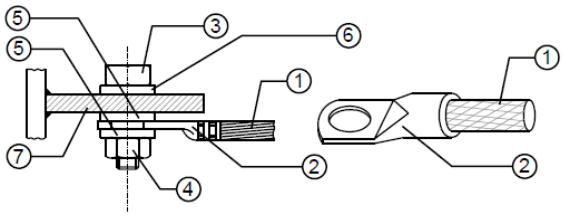
41. The maximum distance between the connections to the earth conductor is set at 250m.

42. The following connection elements will be made:

    42.1. Connection to the fence using a compression clamp for Cu 50mm^2 earth conductor;

    42.2. Connection to the buried earth conductor by an aluminothermic "T" welding for Cu 50mm^2 conductor;

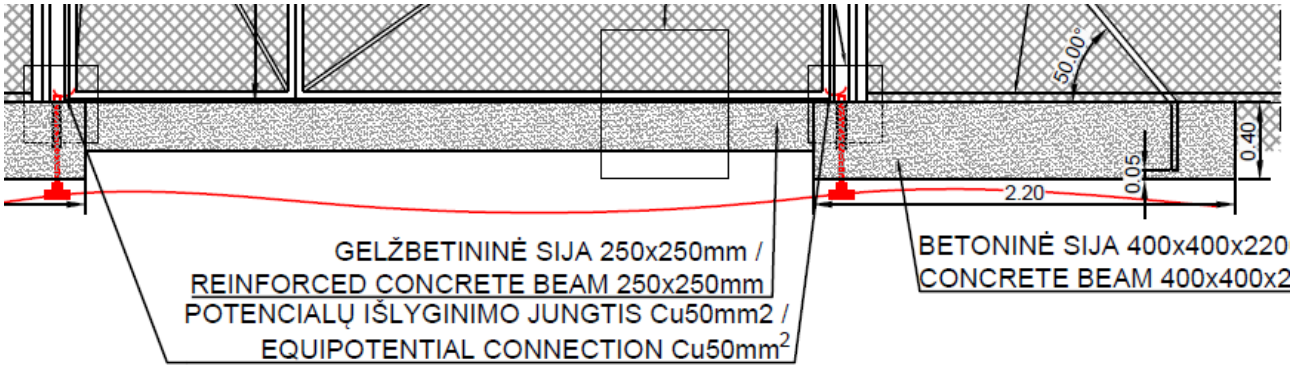
The design for components of the grounding, bonding system embedded within concrete structures shall comply with Design Working life of 100 years.

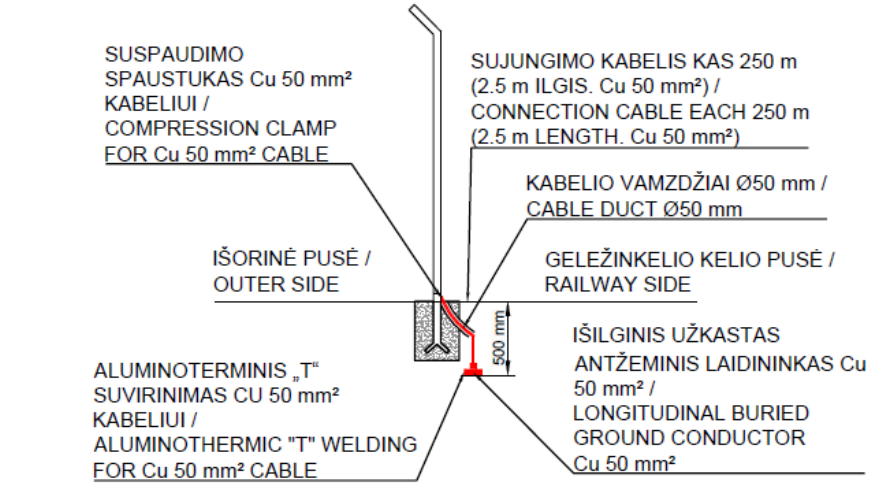


ELEMENTAS / ITEM	PAAIŠKINIMAS / DESCRIPTION
1	SUJUNGIMO KABELIS CU 50mm² / CONNECTION CABLE CU 50mm²
2	KILPOS FORMOS KABELIO ANTGALIS / COMPRESSION TERMINAL LUG
3	VARŽTAS / BOLT
4	VERŽLĖ / NUT
5	BIMETALINĖ POVERŽLĖ / BIMETALLIC WASHER
6	POVERŽLĖ / CONTACT WASHER
7	PLIENO PLOKŠTELĖ PRIVIRINTA PRIE RĖMO / WELDED STEEL PLATE TO FRAME

POTENCIALŲ IŠLYGINIMO JUNGTIS DETALĖ / EQUIPOTENTIAL CONNECTION DETAIL

BE MASTELIO / NOT TO SCALE





TVORŲ PLIENINIŲ DETALIŲ ĮŽEMINIMAS /
GROUNDING OF STEEL ELEMENTS IN FENCES

MASTELIS / SCALE 1:50

4 Packaging

43. All parts shall be clearly and durably marked and labelled for assembly and maintenance.
44. The Goods shall be packed with special care to prevent damage.
45. Each shipment of Goods shall contain a packing list, the following detailed drawings:

    general layout drawings, part assembly drawings, sections drawings for all supplied assemblies,

    and all additional documentation as necessary and/or as requested by the Principal in the order. All the aforementioned documents shall be supplied in hard and digital copy.
46. Fastenings and turnbuckles shall be supplied by the Producer with the according fence elements. Fastenings

    which are to be supplied as detached parts shall be supplied in a separate package, clearly marked.
47. The Producer shall submit handling and maintenance instructions for the fence elements and parts.
48. Each fence element shall have a barcode on it according to RR Rail AS guidelines and GS1 standards.

5 Required declarations and certificates.

49. The producer shall have a Certificate of Conformity of Factory Production Control in compliance with Regulation 305/2011/EU.
50. Fence elements shall have CE marking and applicable Declaration of Performance (DoP).
51. Producer shall submit to Principal all certificates and/or declarations applicable for each constituent material prior to supply of fence elements. All requirements (properties) stated in this Technical Specification must be indicated on these declarations. The Producer must provide Declaration of Performance to the Principal in an agreed format, certifying the month's production, itemizing any failures and actions, and attaching a tabulation of inspection and test results.
52. Designation, description, marking and labelling of products shall be in according with appropriate product standards.
53. Goods shall be labelled in accordance with ISO 15459 and GS1 standards based on Principal input and coordinated prior routine production.
54. A Manufacturing Quality Plan must be prepared and be submitted to Principal for approval as a controlled document within 4 (four) weeks of the date of award of the contract.

6 Documentation

6.1 Installation, Storage, Maintenance Manuals

55. The Producer shall provide to the Principal a Manual including the installation, operation, repair, and maintenance of fence elements.

56. Drawings must include sufficient detail to enable the easy identification of all components for the ordering of spares and replacement parts.
57. The manual shall provide full instruction of the installation, geometry tolerances and adjustment of delivered components and inspection and maintenance procedures as applicable.
58. Producer shall submit storage and stockpiling instructions of Goods considering Rail Baltica project environmental conditions for outdoor storage of Goods.
59. Producer shall submit storage and stockpiling instructions of Goods considering Rail Baltica project environmental conditions for outdoor storage of Goods.

6.2 BIM Deliverables

60. BIM – building information management is a process which coordinates information flow in supply chain of Rail Baltica project implementation. Provided Producers information is the base information for as-built approval. Data to be provided by the Producer for integration shall be agreed with RB Rail AS.
61. The Producer shall provide a detailed 3D model of all manufactured and delivered Goods according to Principal's requirements.

6.3 Warranty

62. Minimum warranty time shall be 60 months after signing the deed of acceptance. Extended warranty time can be proposed by Producer. Warranty concerns all manufacturing and material related defects – cracks, dents, etc.

6.4 Language

63. The Producer shall ensure the availability of the Documentation in either of the following bilingual versions upon the Principal's request:

    63.1. English and Estonian.

    63.2. English and Latvian.

    63.3. English and Lithuanian.