KCS 11 80 15 : 2019

Gabion Retaining Wall

December 06, 2019
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국토교통부

Foreword

- To address needs that were caused by changes in the construction standard code system, the overlaps and conflicts between existing construction standards (design standards, standard specification) were compared and reviewed and then integrated into a new document that can be maintained as a standard code.

- These standards were revised and enacted as standards by integrating the Construction Work Slope Surface Standard Specification and the corresponding parts of the Road Construction Work Specification. Major matters related to the enactment and revision of these standards are as follows.

Construction Standards	Major Contents	Enactment · Revision (Month, Year)
Construction Work Slope Design Standards	• Construction Work Slope Surface Design Standards enacted.	Enactment (May 2006)
Construction Work Slope Design Standards	• Construction Work Slope Surface Design Standards revised.	Revision (Dec 2011)
KCS 11 80 15 : 2016	• Integrated and maintained as a code according to changes in the construction standard code system.	Enactment (June 2016)
KCS 11 80 15 : 2016	• Revised to harmonize Korean Standards with Construction Standards.	Revision (July 2018)

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1. General Matters

1.1 Scope of Application

(1) This standard applies to the construction of gabion retaining walls for stabilizing slope surfaces.

1.2 Reference Standards

1.2.1 Related Regulations

1.2.2 Related Standards

- KS D 7011 Zinc-coated low carbon steel wires
- KS D 7019 Hexagonal wire netting
- KS D 7036 Polyvinyl chloride coated color steel wires
- KS D 7037 Aluminium-coated steel wire

1.3 Definitions

Not applicable.

2. Materials

2.1 Materials

2.1.1 Steel Wire of Gabion

(1) The wires used for a gabion include zinc-coated steel wires, synthetic resin-covered steel wires, and aluminum-coated steel wires.

(2) The elongation percentage of steel wires shall be in accordance with the standards provided in KS D 7011, KS D 7036, and KS D 7037.

2.1.2 Shape and Dimensions

(1) A gabion consists of the main body, cap, rings, and stone hole-tightening wire. The parts shall be in accordance with Table 2.1-1. Hexagonal wire netting shall be in accordance with KS D 7019.

Table 2.1-1 Parts of gabion

Component	Requirement / Number
Main body	1
Cap	2
Ring	1 per 1 m of the main body
Stone hole-tightening wire	The same as the number of stone holes (Double the number of stone holes if the mesh size is equal to or less than 10)

(2) At the joint between the capping frame and the capping net, the steel wire shall be wound around the capping frame two times or more, and the joint shall not wobble.

(3) Table 2.1-2 shows the allowable errors of the gabion dimensions.

Table 2.1-2 Allowable errors of gabion dimensions.

Item	Allowable range (%)	Notes
Body size	+3, -1	
Length	+3	
Mesh size	+3, -1	

(4) The external diameter and the core diameter of the synthetic resin-covered wire for a gabion shall have a thickness of at least 32 to 26, according to KS D 7036. shall

(5) The quality of the zinc-coated wire shall satisfy the standards specified in KS D 7011, and the tensile strength shall be between 290 MPa and 540 MPa.

(6) Table 2.1-3 shows the standard quantity of coated zinc on zinc-coated wire gabions.

Table 2.1-3 Standard zinc attachment quantity on zinc-coated wire gabions

Item / Wire diameter (㎜)	Quantity of zinc attachment (g/㎡)	Uniformity test (Number of times of hardening)		Quality standard
		1 min	30 sec	
3.2	Equal to or over 90	1	1	Equal to or below -10%
3.5	Equal to or over 90	1	1	
4.0	Equal to or over 120	2	-	
4.5	Equal to or over 120	2	-	
5.0	Equal to or over 150	2	1	
6.0	Equal to or over 200	3	-	

(7) The quality standards for synthetic resin-covered wire for gabions are provided in KS

D 7036, where the tensile strength shall be between 290 MPa and 540 MPa.

(8) The quality standards for aluminum-coated steel wire for gabions are provided in KS D 7037, where the tensile strength shall be between 290 MPa and 590 MPa.

(9) The average tensile strength shall be 373 MPa and 490 MPa (3,800 ㎏f/㎠ ~ 5,000 ㎏f/㎠).

(10) The elongation percentage of the wires shall be equal to or over 12%.

2.1.3 Filling Material

(1) The filling material for gabions shall be stones with a diameter greater than the maximum mesh size and smaller than 25 cm. The stones shall have proper particle size distribution, high hardness and durability.

(2) Sedimentary rocks vulnerable to weathering, such as sandstone, shale, and limestone, are prohibited to be used as a filling material for gabions.

(3) The filling material shall not be flat, thin, or long and be a material that has a good engagement between the fillers with an angular shape.

3. Construction

3.1 Verification of Construction Conditions

(1) The foundation ground shall be inspected whether if it satisfies the bearing capacity conditions required by the design or not.

3.2 Work Preparation

Not applicable.

3.3 Construction Standards

3.3.1 General Matters of Construction

(1) The foundation ground shall be arranged and compacted in accordance with the inclination and shape specified in the design drawings in order to prevent differential settlement.

(2) If the foundation ground is soft, the ground shall be improved to support the load of the gabion retaining wall.

(3) Unless otherwise specified in the design drawings, the gabion retaining wall shall be installed to have an inclination of about 6° to 10°.

(4) The wire netting of a gabion shall be installed as a wire netting box by folding it in a wide and flat area in the size specified in the design drawings. In the stone filling

work, large stones shall be placed on the surface and the external sides, the pore size shall be minimized, and stones larger than the mesh size shall be used.

(5) Stone filling and wire connection shall be alternatively performed until the gabion is completely filled. To decrease the cracks of the gabion and thus minimize the pores, the stones shall be inserted using a machine or manually, maintaining the specifications of the design drawings.

(6) After completing stone filling, the cap shall be tightly bound with the steel wire. The boxes shall be tightly bound with each other at the joints to integrate them.

(7) All the wire nets and wires shall be connected by double-winding.

(8) After installing the gabion, the gaps between the stones shall be further filled uniformly.

(9) When a gap is unavoidably formed at a curved section, a short gabion with a length equal to the difference of the curve length between the upper one and the lower one shall be additionally constructed to minimize the gap between the adjacent gabions. A gap larger than 50 mm shall be filled with the filling material for a gabion.

(10) In stone filling work, middle wires shall be connected at the 1/3 and 2/3 positions of the box height to insert the stones while adjusting the deformation of the box.

3.4 Allowable Construction Errors

Not applicable.

3.5 Repair and Re-construction

Not applicable.

3.6 Site Quality Management

(1) The stone filling of the wire netting shall be performed carefully so as not to peel off the covering or coating of the wires.

(2) In the stone filling work, the filling material shall not leak from the wire netting after the completion of the work.

(3) The stability shall be reviewed if excessive swelling or settlement occurs.

(4) Aggregate source shall be selected as a point where the aggregate is suitable for the required quality and sufficient quantity can be collected.