

ICS 77.060
CCS H 25



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 39155-2020

**Corrosion of metals and alloys - Cathodic protection of harbour
installations**

Issued on: October 11, 2020

Implemented on: May 1, 2021

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

1 Scope	1
1.1 General provisions	1
1.2 Structure	1
1.3 Material	1
1.4 Environment	1
1.5 Safety and environmental protection	1
2 Normative references	1
3 Terms and definitions	2
4 Personnel capacity	3
5 Design basis	4
5.1 Objective	4
5.2 Cathodic protection criteria	4
5.3 Design parameters	5
5.4 Current demand	5
5.5 Cathodic protection system	7
5.6 Electrical continuity	8
5.7 Interaction	8
6 Impressed current system	9
6.1 Purpose	9
6.2 Design	9
6.3 Equipment	10
7 Sacrificial anode system	11
7.1 Purpose	11
7.2 Design	12
7.3 Materials	12
7.4 Anode position	12
7.5 Installation	12
8 Commissioning, operation and maintenance	13
8.1 Purpose	13
8.2 Commissioning---Sacrificial anode system	13
8.3 Debugging---impressed current system	13
8.4 Operation and maintenance	14

9 File	15
9.1 Purpose	15
9.2 Impressed current system	15
9.3 Sacrificial anode system	15
Appendix A (informative appendix) Guide to current requirements for cathodic protection of seaport facilities	17
Appendix B (informative appendix) Determination of anode resistance, current and life ...	19
Appendix C (informative appendix) Typical electrochemical characteristics of impressed current auxiliary anode	23
Appendix D (informative appendix) Design Guide	24
References	25

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

The translation method used in this standard is equivalent to ISO 13174.2012 "Cathodic Protection of Seaport Facilities".

The Chinese documents that have a consistent correspondence with the international documents of the normative reference documents in this standard are as follows.

---GB/T 31316-2014 Seawater Cathodic Protection General Principles (ISO 12473.2006, IDT);

---GB/T 39154-2020 Corrosion of metals and alloys Cathodic protection of steel bars for concrete (ISO 12696.2016,

IDT).

This standard has made the following editorial changes.

--- In order to be consistent with the existing standards, the standard name is changed to "Cathodic Protection of Corrosion of Metals and Alloys in Seaport Facilities."

---Chapter 4 "Notes" mentioned in the qualification certificate needs to be sent abroad to obtain the staff, and our country is preparing to have equivalent

Qualification assessment management measures, so "Note" is deleted.

This standard was proposed by the China Iron and Steel Association.

This standard is under the jurisdiction of the National Steel Standardization Technical Committee (SAC/TC183).

Drafting organizations of this standard. China Metallurgical Construction Research Institute

Co., Ltd., Metallurgical Industry Information Standards Research Institute, Zhejiang Transportation Planning and Design Research Institute

Research Institute Co., Ltd., Shenzhen University, Hangzhou Benchuang Technology Co., Ltd., China Metallurgical Testing and Certification Co., Ltd.

1.1 General rules

This standard specifies a method for the effective application of cathodic protection for steel ports, seaports, and coastal areas that are immersed/buried in seawater/sea mud.

And the metal outer surface of flood control facilities and auxiliary facilities provide corrosion protection.

1.2 Structure

This standard specifies the cathodic protection of fixed and floating ports and seaport structures, including bridge piers, wharfs, bollards (berthing, mooring

Mooring), sheet piles or pipe piles, buoys, buoys, floating docks, ship locks and sluices. It also stipulates the submerged area of auxiliary facilities that is not electrically isolated from the structure

Cathodic protection, such as an anchor chain connected to a structure.

This standard applies to cathodic protection systems where anodes are exposed to water or sea mud. For submud areas, usually the soil behind the pile wall or inside the caisson

Or the sand-filled area is seriously affected by corrosion. EN12954 specifies the cathodic protection design and operation requirements for anodes exposed to soil.

This standard does not apply to the cathodic protection of fixed or floating offshore structures (including offshore loading platforms), submarine pipelines and ships.

This standard does not apply to cathodic protection inside components, such as ballast tanks, floating components of flood gates or steel pipe piles.

1.3 Materials

This standard applies to the cathodic protection of structures made of carbon steel and carbon-manganese steel with or without coating.

Since some parts of the structure may be made of metal materials other than carbon steel, the design of the cathodic protection system should be able to completely control all

Electrical coupling, and minimize the risk of hydrogen embrittlement or hydrogen-induced cracking (see ISO 12473).

This standard does not apply to cathodic protection of reinforced concrete structures (see

ISO 12696).

1.4 Environment

This standard applies to fixed or floating areas that are all immersed in sea water, brackish water, sea mud and sub-mud areas in ports, seaports, coastal areas and flood control facilities.

Floating structures.

For surfaces that are alternately submerged and exposed to the atmosphere, cathodic protection can only work when the submersion time is long enough to polarize the steel.

effect. Generally, effective cathodic protection can be achieved when all surfaces are below the mid-tide level.

This standard applies to structures that are nailed into the seabed or partially buried or covered with silt, such as steel plates and steel pipe piles; it is also applicable to buried and nailed structures.

Or surfaces exposed to mud, these surfaces are cathodic protected as they are submerged by sea water.

The back of the steel sheet pile wall and the inner surface of the caisson can also be protected by cathodic protection. EN12954 specifies the cathodic protection of such surfaces.

This standard applies to structures that may be affected by "accelerated low water corrosion" (ALWC), microbiological corrosion (MIC), and concentration corrosion

These corrosion forms are related to galvanic couple, oxygen concentration difference and other local corrosion factors.

Note. See Article 59 of BS6349-1.2000 and CIRIAC634.

1.5 Safety and environmental protection

This standard does not involve national laws and regulations on the safety and environmental protection of cathodic protection.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article