

ISO 15589-2:2012-12 (E)

Petroleum, petrochemical and natural gas industries - Cathodic protection of pipeline transportation systems - Part 2: Offshore pipelines

Contents		Page
Foreword		v
Introduction		vi
1	Scope	1
2	Normative references	1
3	Terms and definitions	2
4	Symbols and abbreviated terms	4
4.1	Symbols	4
4.2	Abbreviated terms	4
5	General	5
5.1	Competence assurance	5
5.2	Compliance	5
6	Cathodic protection system requirements	5
6.1	General	5
6.2	Selection of CP systems	6
6.3	Isolating joints	6
7	Design parameters	7
7.1	General	7
7.2	Protection potentials	8
7.3	Design life	10
7.4	Design current densities for bare steel	10
7.5	Coating breakdown factors	12
8	Galvanic anodes	15
8.1	Design of system	15
8.2	Selection of anode material	16
8.3	Electrochemical properties	17
8.4	Anode shape and utilization factor	17
8.5	Mechanical and electrical considerations	18
9	Galvanic anode manufacturing	18
9.1	Pre-production test	18
9.2	Coating	18
9.3	Anode core materials	19
9.4	Aluminium anode materials	19
9.5	Zinc anode materials	20
10	Galvanic anode quality control	20
10.1	General	20
10.2	Steel anode cores	20
10.3	Chemical analysis of anode alloy	21
10.4	Anode mass	21
10.5	Anode dimensions and straightness	21
10.6	Anode core dimensions and position	22

10.7	Anode surface irregularities	22
10.8	Cracks	22
10.9	Internal defects, destructive testing	23
10.10	Electrochemical quality control testing	24
11	Galvanic anode installation	25
12	Impressed-current CP systems	26
12.1	Current sources and control	26
12.2	Impressed-current anode materials	26
12.3	System design	26
12.4	Manufacturing and installation considerations	27
12.5	Mechanical and electrical considerations	27
13	Documentation	28
13.1	Design, manufacturing and installation documentation	28
13.2	Commissioning procedures	29
13.3	Operating and maintenance manual	29
14	Operation, monitoring and maintenance of CP systems	30
14.1	General	30
14.2	Monitoring plans	30
14.3	Repair	30
	Annex A (normative) Galvanic anode CP design procedures	31
	Annex B (normative) Attenuation of protection	37
	Annex C (normative) Performance testing of galvanic anode materials	40
	Annex D (normative) CP monitoring and surveys	42
	Annex E (normative) Laboratory testing of galvanic anodes for quality control	49
	Annex F (informative) Interference	51
	Annex G (informative) Pipeline design for CP	53
	Bibliography	59