

DIN EN 10202:2022-07 (E)

Cold reduced tinmill products - Electrolytic tinplate and electrolytic chromium/chromium oxide coated steel

Contents	Page
European foreword	6
1 Scope	8
2 Normative references	8
3 Terms and definitions	8
4 Classification and designation	12
4.1 Classification	12
4.2 Designation	12
5 Information to be supplied by the purchaser	12
5.1 Mandatory information	12
5.2 Options	13
5.3 Ordering examples	13
6 Manufacturing features	13
6.1 Steelmaking process	13
6.2 Annealing	14
6.3 Finish	14
6.4 Passivation	15
6.4.1 General	15
6.4.2 Titanium / Zirconium passivation	15
6.4.3 Chromium passivation	15
6.5 Oiling	16
6.6 Imperfections	16
6.6.1 Coils	16
6.6.2 Sheets	16
7 Coatings	17
7.1 Electrolytic tinplate	17
7.1.1 Properties	17
7.1.2 Test method	18
7.2 Electrolytic chromium coated steel	18
7.2.1 General	18
7.2.2 Test method	19
8 Mechanical properties	19
8.1 General	19
8.2 Tensile test measurement	20
8.2.1 General	20
8.2.2 Location of test pieces	20
8.2.3 Aging	20
8.2.4 Thickness	20
8.2.5 Testing conditions	20
8.2.6 Strength characteristics	20
8.3 Mechanical properties of tinmill products	24
9 Tolerances on dimensions and shape	26
9.1 General	26

9.2	Thickness and feather edge	26
9.2.1	Thickness	26
9.2.2	Test method for thickness	26
9.2.3	Feather edge	26
9.2.4	Test method for feather edge	26
9.3	Linear dimensions	27
9.3.1	Width and length	27
9.3.2	Out-of-squareness of sheets	27
9.3.3	Short pitch camber (lateral weave) of coils	28
9.3.4	Test method for short pitch camber	28
9.4	Shape	29
9.4.1	Edge wave	29
9.4.2	Test method for edge wave	29
9.4.3	Bow	29
9.4.4	Test method for bow	30
9.4.5	Centre fullness	30
9.4.6	Test method for centre fullness	31
9.4.7	Burr	32
10	Welds within a coil	32
10.1	General	32
10.2	Number of welds	32
10.3	Location of welds	32
10.4	Dimensions of welds	32
10.4.1	Thickness	32
10.4.2	Overlap	33
11	Marking of differentially coated cold reduced tinplate	33
12	Selection of samples	33
12.1	For quality control	33
12.2	In case of dispute	34
13	Retests	34
14	Dispatch and packaging	35
14.1	Coils	35
14.1.1	Coil dispatch	35
14.1.2	Coil winding	35
14.2	Sheets	35
Annex A (informative) De-tinning	36	
A.1	Principle	36
A.2	Clarke's solution	36
A.3	Procedure	36
Annex B (normative) Determination of chromium using the diphenylcarbazide method	37	
B.1	General	37
B.2	Principle	37
B.3	Reagent	37
B.4	Apparatus	37
B.5	Procedure	37
B.6	Calibration	38
Annex C (normative) Determination of titanium content using the Inductively Coupled Plasma (ICP) method	39	
C.1	General	39
C.2	Principle	39
C.3	Reagent	39

C.4	Apparatus	40
C.5	Procedure	40
Annex D (normative) Determination of tin oxides by galvanostatic potentiometry		41
D.1	General	41
D.2	Principle	41
D.3	Reagents	41
D.4	Apparatus	41
D.5	Procedure	41
Annex E (normative) Electromechanical method for determining tin coating mass		43
E.1	Principle	43
E.2	Reagents	43
E.3	Apparatus	43
E.3.1	Cell and electrodes	43
E.3.2	Power supply	43
E.3.3	Voltmeter	43
E.4	Procedure	43
E.5	Calibration of the measuring system	43
E.6	Calculation	44
Annex F (normative) Methods for determination of metallic chromium and chromium in the oxide on the surface of electrolytic chromium coated steel (ECCS or ECCS-RC)		47
F.1	Determination of chromium in the oxide	47
F.1.1	Principle	47
F.1.2	Reagents	47
F.1.3	Apparatus	47
F.1.4	Preparation of the chromium calibration curve	48
F.1.5	Procedure	48
F.1.6	Calculation	48
F.2	Determination of metallic chromium	48
F.2.1	Principle	48
F.2.2	Reagents	49
F.2.3	Apparatus	49
F.2.4	Preparation of the chromium calibration curve	49
F.2.5	Procedure	50
F.2.5.1	General	50
F.2.5.2	Removal of chromium oxide layer	50
F.2.5.3	Removal and determination of metallic chromium	50
F.2.6	Calculation	50
Annex G (informative) The Rockwell Hardness test for routine determination of proof strength for double reduced materials		54
G.1	General	54
G.2	Test pieces	54
G.3	Test method	54
G.4	Hardness for tinmill products	56
Annex H (informative) The springback test for routine determination of proof strength for double reduced material		57
H.1	General	57
H.2	Principle	57
H.3	Test pieces	57
H.4	Test method	57
Annex I (normative) Tensile testing conditions in case of dispute		58

I.1	General	58
I.2	Tensile test piece dimensions	58
I.3	Elongation measurement	58
I.4	Testing velocity	58
I.4.1	General	58
I.4.2	Material displaying no discontinuous yielding	58
I.4.3	Discontinuous yielding material	59
	Annex J (informative) Indicative tensile strength of tinnill products	60
	Annex K (informative) Alternative marking system for electrolytic tinplate -- differentiallycoated	61
	Bibliography	63