

KS

KOREAN INDUSTRIAL STANDARD

Electrolytic Zinc-Nickel Coated Steel Sheets and Strip for Automobiles

KS D 3855 : 1997

Korean Agency for Technology and Standards
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1. Scope

This Korean Industrial Standard specifies the electrolytic zinc-nickel coated steel sheet and strip for automobile (hereinafter referred to as sheet and coil)

2. Normative Reference

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. The most recent editions of the standards indicated below shall be applied.

- KS A 0021 Rules For Rounding of Numerical Values
- KS B 0801 Test Pieces for Tensile Test for Metallic Materials
- KS B 0802 Method of Tensile Test For Metallic Materials
- KS B 0806 Method of Rockwell And Rockwell Superficial Hardness Test
- KS B 0811 Method of Vickers Hardness Test
- KS D 0001 General Rules for Inspection of Steel
- KS D 0201 Testing Methods for Rot-Dipped Zinc Coating
- KS D 1659 Methods for Atomic Absorption Spectrophotometric Analysis of Iron and Steel
- KS D 3512 Cold-Reduced Carbon Steel Sheets and Strip
- KS D 3528 Electrolytic Zinc-Coated Steel Sheets and Coils
- KS D 3617 Cold Rolled High Strength Steel for Automobile Uses
- SAE AMS 2417D Nickel-Zinc Alloy Plating

3. Class and Symbol

Sheet and coil, using cold-reduced base metal(hereafter referred to as "cold-reduced base metal"), Shall be classified into 16 classes, and their symbols shall be as given in Table 1.

Table 1. Class and Symbol

Symbol of class	Nominal thickness (mm)	Application	
		Main application	Class designation of base metal in relevant KS
SNCC	0.4 or over, up to and including 3.2	For commercial quality	SCP 1
SNCD	"	For drawing quality	SCP 2
SNCE(SNCEN)	"	For deep drawing quality	SCP 3(SCP3-N)
SNFC 340	0.6 or over, up to and including 2.3	For drawing forming quality	SPFC 340
SNFC 370			SPFC 370
SNFC 390	0.4 or over, up to and including 2.3	For forming quality	SPFC 390
SNFC 440			SPFC 440
SNFC 490			SPFC 490
SNFC 540			SPFC 540
SNFC 590			SPFC 590
SNFC 490Y	0.4 or over, up to and including 2.3	Lower yield ratio type	SPFC 490Y
SNFC 540Y			SPFC 540Y
SNFC 590Y			SPFC 590Y
SNFC 780Y	0.4 or over, up to and including 2.3		SPFC 780Y
SNFC 980Y			SPFC 980Y
SNFC 340H	0.4 or over, up to and including 2.3	Baked and hardening type	SPFC 340H

- Remarks**
1. when sheets and coils of standard temper grade and as-annealed in quality SNCC are requested by the purchaser to proof either the tensile tests, Erichsen tests., or both of them, a letter symbol T shall be suffixed to the class designation thus appears SNCCT.
 2. When sheets and coils of standard temper grade in quality SNCE are requested by the purchaser to proof non-aging property, a letter symbol N shall be suffixed to the class designation thus appears SNCEN.
 3. Nominal thicknesses other than those listed in Table 1 for SNCC, SNCD, and SNCE may be agreed between the purchaser and supplier.
 4. Designation symbols indicating the sort of temper grade for SNCC, SNCD, or SNCE shall comply with Table 2.
 5. The numerical values given in () are requested to proof non-aging property.

Table 2. Temper Requirements

Temper grade	Temper designation
As-annealed	A
Standard temper grade	S
1/8 hard	8
1/4 hard	4
1/2 hard	2
Full hard	1

4. Coating Mass

There are equally Zn-Ni-coated sheets and coils on their both surfaces(hereinafter referred to as "equal coating"), differentially Zn-Ni-coated ones(hereinafter referred to as "differential coating") and one-side Zn-Ni-coated ones(hereinafter referred to as "one-side coating"). The designation symbol of coating mass and the minimum coating mass on one surface shall comply with Table 3. In the case of differential coating, however, combination of the minimum coating masses listed in Table 3 shall be adopted. The coating mass shall be determined in accordance with 14.1. to be expressed as follows :

(1) For sheets

Minimum coating mass on the upper surface of a consigned sheet/ minimum coating mass on the lower surface(Example E15/E18).

(2) For coils

Minimum coating mass on the outside surface of a coil/minimum coating mass on the inside surface(Example E17/E19).

(3) For one side coating

Ferrous surface of one-side coating/minimum coating mass on the surface of a sheet or a coil(Example ES/E30).

(4) In case where the mark expressing differential coating is necessary to indicate on sheets and coils, the designation D shall be suffixed to the symbol of the minimum coating mass of the marked surface.(Example E9/E15D).

Table 3. Minimum Coating Mass

Designation symbol of coating mass on one surface	Minimum coating mass(one side) g/m ²		[Reference] standard coating mass (one side surface) g/m ²
	For equal coating	For differential coating (including one surface)	
E 8	8.5	8.0	10
E16	17.0	16.0	20
E24	25.5	24.0	30
E32	34.0	32.0	40
E40	42.5	40.0	50
E48	51.0	48.0	60
E56	59.5	56.0	70
E64	68.0	64.0	80
E72	-	72.0	90
E80	-	80.0	100
E88	-	88.0	110
E96	-	96.0	120

Remark The minimum and maximum coating mass other than this standard are agreed between the purchaser and supplier.

5. Oiling

The types and designation of oiling for sheets and coils shall be as given in Table 4. However, unless especially specified, unoiling shall be adopted.

Table 4. Types and Designation of Oiling

Types of oiling	Designation
Unoiling	×
Oiled	○

6. Mechanical Properties

Mechanical properties shall be as follows ;

6.1 Test Items

Test items for sheets and coils shall be a bend test and a tensile test.

6.2 Bendability

When bendability is tested in accordance with 13.2 and the results shall conform to Table 5 and Table 6.

Assurance of bendability are as agreed between the purchaser and supplier.

6.3 Yield point, Tensile strength, Elongation, Non-aging property, and Hardened amount by Baking of paint.

The yield point, tensile strength, elongation, non-aging property, and hardened amount by baking of paint of SNFC 340 shall be tested in accordance with Table 7.

Remark Non-aging means the property non-generated stretcher strain for forming.

Table 5. Bendability

Designation of class	bending angle 180°	Test piece
	Internal radius	
SNFC 340	Flat on itself	No. 3, perpendicular to the rolling direction
SNFC 370	Flat on itself	
SNFC 390	Flat on itself	
SNFC 440	Flat on itself	
SNFC 490	Flat on itself	
SNFC 540	One half of thickness	
SNFC 590	1.0 time thickness	
SNFC 490Y	Flat on itself	
SNFC 540Y	One half of thickness	
SNFC 590Y	1.0 time thickness	
SNFC 780Y	3.0 times thickness	
SNFC 980Y	4.0 times thickness	
SNFC 340H	Flat on itself	

Table 6. Bendability

Designation of class	Temper grade	Bending angle 180°	Test piece
		Internal radius	
SNCC SNCD SNCE	As-annealed	Flat on itself	No. 3, perpendicular to the rolling direction
	Standard temper grade	Flat on itself	
SNCC	1/8 hard	Flat on itself	
	1/4 hard	One half of thickness	
	1/2 hard	1.0 time thickness	
	Full hard	—	

Remarks 1. The test may be omitted for sheets and coils as-annealed and of standard temper grade.

2. This test shall apply for sheets and coils of 1/8 hard, 1/4 hard, and 1/2 hard on request by the purchaser.