

HIGH-STRENGTH SILVERTOP-ECO



High-strength Chromium-free Electro-galvanized Steel Sheet High-strength SilverTop-Eco

TOYO KOHAN

Introduction

Toyo Kohan is pleased to introduce its High-strength SilverTop-Eco, a new product ideal for electrical and electronic components. This new product is made of a high-strength steel sheet that is much stronger than conventional steel sheets; has an improved elongation property; and is given special electro-galvanizing surface treatment. Moreover, the product can be used for environmental applications because it is environmentally friendly thanks to its lead-free and hexavalent chromium-free specifications.

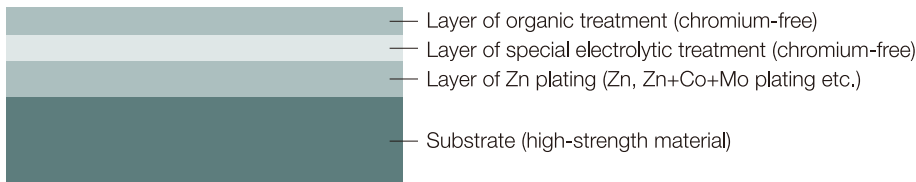


■ Features

- 1) This high-strength steel sheet has a tensile strength of 500 MPa ~ 1,200 MPa or over.
- 2) It is iron (steel) and differs from alloy steel of which Cr and Ni contents are 10% or over.
- 3) It is iron (steel) and a magnetic substance.
- 4) SilverTop-Eco is of an electro-galvanized specification product, therefore, enables easy environmental applications.
- 5) High-strength SilverTop-Eco provides not only high strength, but also has the following excellent properties.
 - The SilverTop-Eco specification for no painting use is excellent in anti-scratching property, slipping property, abrasion resistance, and fingerprint resistance.
 - The SilverTop-Eco specification for soldering use enables easy soldering, requiring no post-solder-coating.
 - The SilverTop-Eco specification for painting use is excellent in adherence with paint, rubber, and so forth.
 - Black color SilverTop-Eco requires no black color coating process and is excellent in heat releasing property, raising emissivity.

■ Representative Example of Layer Structure (one side)

(The layer structure differs depending on types of surface treatment.)



■ Types of Surface Treatment (Eco specification)

Type	Mark	Type of plating	Features
For painting use	TE-90 TE-91	Zn+Co+Mo	·Excellent adherence with rubber and paint
For no painting use	HE-71 HE-73	Zn+Co+Mo (with brightness)	·Excellent in fingerprint resistance, slipping property, abrasion resistance ·Excellent appearance with beautiful, bright finish.
For soldering use	ZE-36 ZE-38 ZEB26 (Black color)	Zn (without brightness)	·Zn-plated and adapted to soldering ·Excellent solder wettability in lead soldering or no-lead soldering
Black color	BEP22 BEX28 (High conductivity)	Zn+Co+Mo	·Film is thin and has an appearance similar to that of black coating. ·Excellent heat releasing property due to high emissivity

■ Examples of Processing and Use

Type	Mark	Use
Forming use	HS55F	<ul style="list-style-type: none"> ·Excellent burring and tap-screw processing ·Protection covers for DVD and CD-ROM ·Mechanical components of camcorders, digital cameras, etc.
Spring use	HS85S	<ul style="list-style-type: none"> ·Protection covers (thin) for DVD, CD-ROM ·Mechanical components (thin) of camcorders, digital cameras, etc.
	HS10S	<ul style="list-style-type: none"> ·Components of Note-PC keyboard (spring test : over 10 million times)
	HS12S	<ul style="list-style-type: none"> ·For simple processing ·Engine gasket for automobile

■ Photographs of Processing Examples



Components of CD·DVD-ROM



Components of LCD drive



Components of peripheral devices of PC



Components of electrical products

■ Types of Substrate for High Strength

Type	Tempering mark	Features	SUS with similar mechanical properties
For forming use	HS55F	Elongation is improved, in addition to high strength.	SUS430, SUS304
For spring use	HS85S	High strength almost equal to that of spring is secured	SUS304-1/2H
	HS10S		SUS301-3/4H
	HS12S		SUS304-3/4H

■ Mechanical Properties of Substrate for High Strength (reference values)

1) For forming use

Type	Tempering mark	Tensile strength (MPa)	Elongation (%)	Hardness	
				HR-30T	Hv
High strength ST	For forming (HS55F)	570	25	72	170
SPCC (Cold-rolled steel sheet)	Standard	350	35	53	—
	1	680	2	80	—
SUS304	—	≥520	≥40	—	≤200
SUS430	—	≥450	≥22	—	≤200

2) For spring (CSP)

Type	Tempering mark	Tensile strength (MPa)	Elongation (%)	Hardness	
				HR-30T	Hv
High strength ST	For spring (HS85S)	800	13	76	200
	For spring (HS10S)	1,000	9	82	290
	For spring (HS12S)	1,200	5	85	340
SUS304	1/2H	≥780	≥6	—	≥250
SUS304	3/4H	≥930	≥3	—	≥310
SUS301	3/4H	≥1,130	≥5	—	≥370

■ Processing Properties of Substrate for High Strength (reference values)

			For forming	For spring HS10S	For spring HS12S
90° bending		Parallel	Good	Good	Good
		Perpendicular	Good	Good	Good
Impact adherence bending	OT	Parallel	Good	Good	Minute cracks
		Perpendicular	Good	Good	Minute cracks
	1T	Parallel	Good	Good	Minute cracks
		Perpendicular	Good	Good	Minute wrinkles
	2T	Parallel	Good	Good	Minute cracks
		Perpendicular	Good	Good	Good

■ Surface Coefficient of kinetic friction (surface treatment : HE-71)

—	HS55F for forming	HS10S for spring	SUS304(2B) for reference
Coefficient of kinetic friction	0.11~0.15	0.13~0.19	0.15~0.21

- Samples tested : For both forming and spring, the type of surface treatment is 10GHE-71.
- Method of measurement : Coefficient of kinetic friction between samples, with a load of 1,100g.

■ Anti-scratching Property Test (surface treatment : HE-71)

—	HS55F for forming	HS10S for spring	SUS304(2B) for reference
Scratching property	No scratches	No scratches	Minute scratches

- Samples tested : For both processing and spring, the type of surface treatment is 10GHE-71.
- Method of measurement : Sutherland rub tester with a load of 980kg (contact area; 50 x 100mm), OA copy paper, 10,000 times (forward and backward)

■ Temperature-Humidity Chamber Test (surface treatment : HE-71)

Test hours	Sheet		Processed sheet (Processed part)
	Flat part	End part	
250hr	○	○	○
500hr	○	Spot-like red rust was observed little.	○

- Sample tested : Sheet for spring, HS12S, 10GHE-71, sheet thickness; 0.2mm
- Temperature-Humidity Chamber Test conditions : 60°C, 95%RH

■ Conductivity (surface treatment : HE-71)

—	HS55F for forming	HS85S for spring	SUS304 for reference	SUS430 for reference
Surface resistance	<0.5mΩ	<0.5mΩ	<0.5mΩ	<0.5mΩ

- Samples tested : For both forming and spring, the type of surface treatment is 10GHE-71.
- Test method : Roresta probe surface resistance measuring instrument, current; 1μA~100mA, contact area; 2mmφ x 4pieces (distance between probes; 5mm)

■ Sizes Possible to Produce

Type	Sheet thickness	Sheet width
High-strength ST for forming	0.15~0.8mm	750~914mm
High-strength ST for spring	0.15~0.4mm	700~840mm

- As to sizes other than the above, users are requested to contact the company for consultation.

■ Indication of High Strength ST- Eco Standard Products

- 1) High strength ST for forming, amount of Zn coating (one side) : 10g/m², no-painting use (HE-71)

Indication : HS55F, 10GHE-71

- 2) High strength ST for spring, amount of Zn coating (one side): 10g/m², soldering use (ZE-36)

Indication : HS12S, 10GZE-36

Cautions and requests

- All technical information contained in this material is provided for describing the representative properties and performances of products. It does no way mean the assurance of "standards."
- Moreover, the information will be changed without prior notice, therefore, as for the latest information, please contact each responsible department/section of the comapny.
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