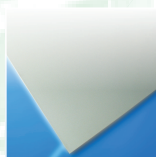




SINSIAM METAL CENTER (1984) LTD.,PART.
www.sinsiamgroup.co.th

Electro Galvanize



- Electro Galvanize Sheet
- Electro Galvanize in Coil



SINSIAM METAL CENTER



เหล็กชุบซิงค์แผ่น (Electro Galvanize Sheet)

ความหนา (Thickness) (มม.) (mm.)	เบอร์ (No.) (#)	ขนาด (Size) (กว้างXยาว) (WidthXLength)	น้ำหนัก (Weight) (กก./แผ่น) (Kg./Pcs.)	ราคา (Price)
0.40	# 27	4'X8'	9.50	
0.45	# 26	4'X8'	10.60	
0.50	# 25	4'X8'	11.80	
0.55	# 24	4'X8'	12.90	
0.60	# 23	4'X8'	14.20	
0.70	# 22	4'X8'	16.50	
0.80	# 21	4'X8'	18.80	
0.90	# 20	4'X8'	21.30	
1.00	# 19	4'X8'	23.60	
1.20	# 18	4'X8'	28.10	
1.40	# 17	4'X8'	32.90	
1.50		4'X8'	35.40	
1.60	# 16	4'X8'	37.80	
1.90	# 14	4'X8'	44.90	
2.00	# 14	4'X8'	47.50	
2.30		4'X8'	53.30	
2.80	# 11	4'X8'	65.40	
2.90	# 11	4'X8'	69.00	
3.00	# 11	4'X8'	70.50	

หมายเหตุ : น้ำหนักต่อแผ่น เป็นค่าเฉลี่ยที่ได้จากการคำนวณ ซึ่งน้ำหนักจริงอาจมีความคลาดเคลื่อนเล็กน้อย



เหล็กชุบซิงค์ม้วน (Electro Galvanize in Coil)

ความหนา (Thickness) (มม.) (mm.)	ความกว้าง (Width) (ฟุต) (Feet)	ราคา (Price)
0.40	4'	
0.45	4'	
0.50	4'	
0.55	4'	
0.60	4'	
0.70	4'	
0.80	4'	
0.90	4'	
1.00	4'	
1.20	4'	
1.40	4'	
1.50	4'	
1.60	4'	
1.90	4'	
2.00	4'	
2.30	4'	
2.80	4'	
2.90	4'	
3.00	4'	



Thai Coated Steel Sheet Co., Ltd.

Head Office

28/1 Prepawit Building, 8th Floor, Surasak Road Silom, Bangkok 10500
Tel. 0 2630-0390, Fax 0 2630-0398, 0 2630-0399

Bang Saphan Factory

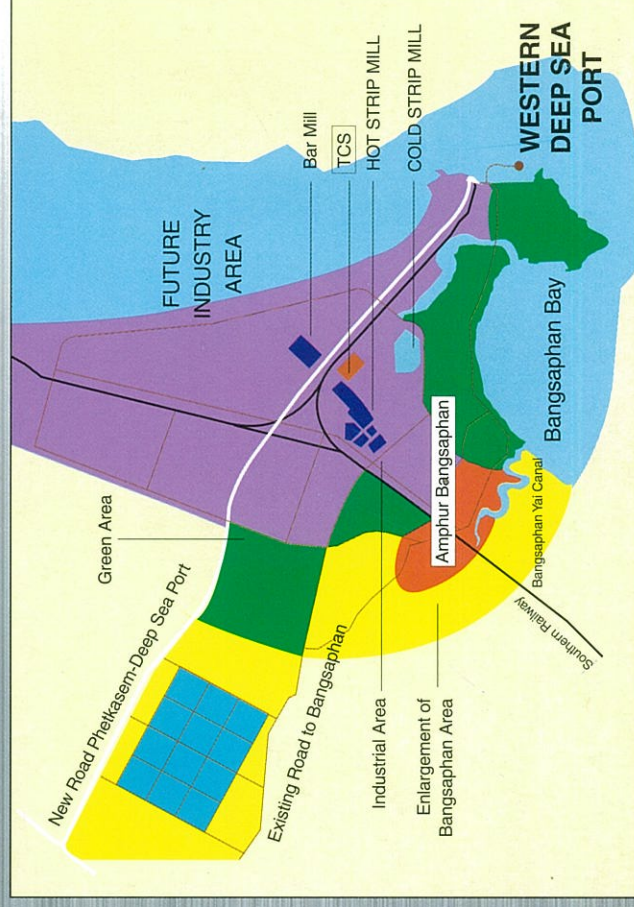
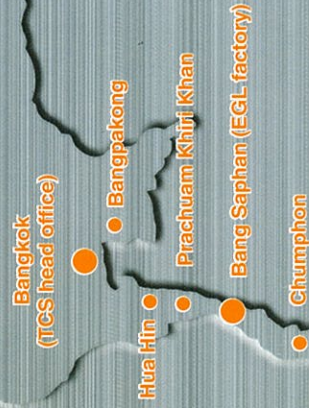
No. 2, Moo 7, Tambol Mae Rumphung Amphur Bang Saphan, Prachuab Kirikhan 77140, Thailand
Tel. 0 3269-1423-7, Fax 0 3269-1422



THAI COATED STEEL SHEET CO., LTD.

ISO 9002 ISO 14001

The First Manufacturer of High-Quality
Galvanized Steel Sheet in Thailand



Certificate No. 403854

Certificate No. 403450

General Features of Electrogalvanized Steel Sheet

1. Corrosion resistance

Of all metallic coatings, zinc offers the greatest corrosion resistance and the most economical method of protecting steels from rusting.

2. Formability

Formability in the base cold rolled steel sheet is maintained because it is not exposed to heat during the electrogalvanizing process unlike hot-dipped galvanizing method where the steel is heated and cooled in a short period of time. Therefore, it is well-fit to applications that will require better formability in the process.

3. Chemical treatment

Chemical treatment is used on the galvanized surface to improve corrosion resistance and paint adherence. The chemicals used include such popular ones as chromate, which guarantees high corrosion resistance, and phosphate, which ensures excellent paint adherence. Special chemical treatments have also been developed for specific purposes such as superior fingerprint repellence, higher corrosion resistance among others. Chromate free special treatment have been developed to meet the requirement for more comfortable environment.

With these features, "THAI-ZINC" provides :

- Excellent paintability without degreasing or chemical treatment if the painting process is properly applied.
- Paint-free property for some applications, thanks to its chemical treatment for high fingerprint repellence and corrosion resistance.
- Excellent formability to minimize the amount of oil required during the forming process because the original cold-rolled steel forming characteristics are maintained and good lubricant chemical layers are provided.

These are features THAI-ZINC provides for a user with more comfortable environment and more cost-efficiency in their operation

Types and Features of Chemical Treatments

Chemical treatment designations	Types of chemical treatment	Features (application)	Configuration of coating and chemical layers	Features			
				Corrosion resistance without painting	Paint * Adhesion	Lubricity	Fingerprint resistance
TZ-P	Phosphate	As a preparatory coat before painting	• Phosphate • Zinc		○		○
TZ-C	Chromate	For preventing rust temporarily	• Chromate • Zinc		○		○
TZ-C3	Organic composite resin + chromate	Medium corrosion resistance, Fingerprint repellence	• Organic composite resin • Chromate • Zinc	○		○	○
TZ-V2	Chromate free special composite resin	Medium corrosion resistance, Fingerprint repellence	• Chromate free special composite resin • Zinc	○	○	○	○

* Coating adhesion value for melamine alkyd resin

Evaluation : ○ very effective ○ effective

Note : In case of TZ-MM, degreasing and chemical treatment are needed before use.



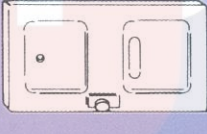
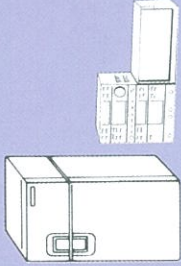
Application-based Selection

Important points in your selection process of the appropriate type for the applications can be summarized as follows:

- 1) Is the end product to be used outdoors or indoors?
- **Corrosion resistance**
- 2) Is painting required?
- **Paintability, fingerprint repellence**
- 3) Is heavy and complicated working involved?
- **Formability**
- 4) Is welding required?
- **Weldability**
- 5) Is electrical conductivity required?
- **Groundability**

The table at the right shows typical applications in different features and usages.



Typical applications	
Home and office equipments 	Outdoor storages
Building materials 	Office furnitures
	Shutters
Electrical / electric appliances 	Doors, Partition walls,
	Washing machines, Refrigerators
Automobiles 	Air-conditioners
	Office automation equipments
	Audio-visual equipments
Bodies	Bodies
	Interior parts, Reinforcing part

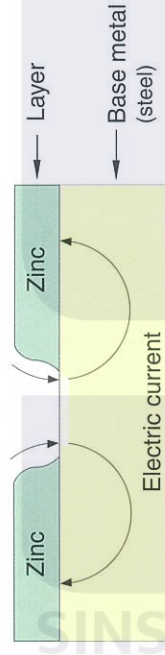
Conditions of use						Chemical treatment designations				
Painting		Heavy working		Welding		TZ-P	TZ-C	TZ-C3	TZ-V2	TZ-MM
Yes	No	Yes	No	Yes	No					
•			•	•		•	•			
•			•	•		•	•			
•			•		•	•	•			
•			•		•	•	•			
•			•	•		•	•	•		
•			•	•		•	•	•		
	•	•			•			•		
•		•								•
•		•								•

Corrosion resistance

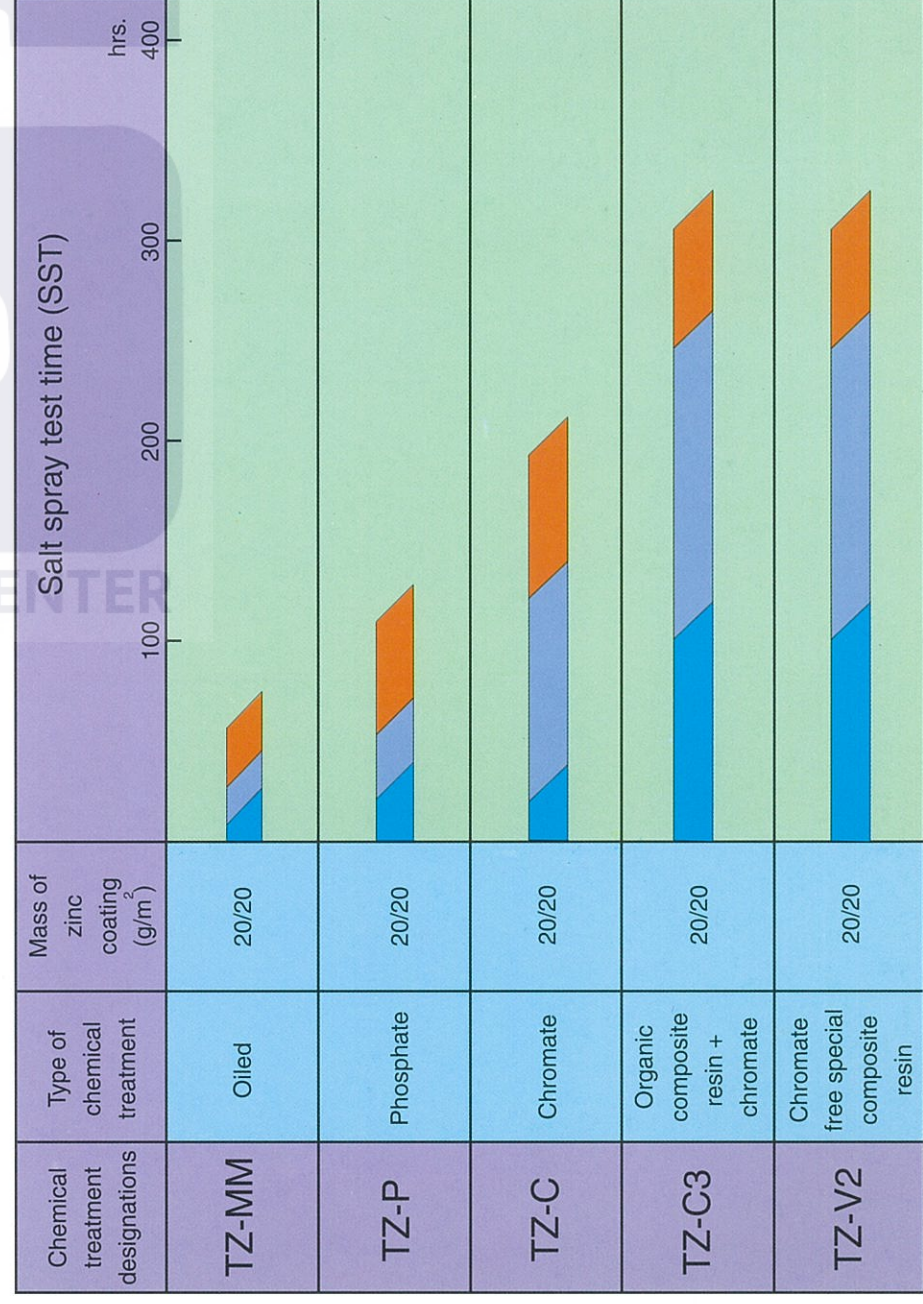
Mechanism of corrosion resistance of galvanized steel sheet

In galvanized steel sheets, the zinc coating undergoes electrochemical corrosion, a sacrificial action that keeps the base metal intact, as shown in the illustration. At the same time, the zinc oxidizes to form a protective film of zinc hydroxide on the surface of the base metal.

Thus, galvanized steel sheets provide corrosion resistance for a prolonged period, although their service life varies depending on such factors as the service environment, mass of the zinc coating and type of chemical treatment.



Corrosion Resistance of the Flat Surface of Chemically Treated Electrogalvanized Steel Sheet



■ NORMAL ■ WHITE RUST ■ RED RUST

Paintability

Galvanized steel sheets are used for paint purposes more than often. When they are painted, the comparison table shown below may help you know paintability features of each product and chemical treatment.

	Chemical treatment designations*	Solvent-based paint (melamine alkyd)	
		Primary adhesion	Secondary adhesion**
THAI-ZINC	TZ-P	○	○
	TZ-C	○	○
	TZ-C3	○	△
	TZ-V2	○	○
Hot-dipped galvanized steel sheet	SG-C	△	△
Cold-rolled steel sheet***		○	○

* For galvanized steel sheets chemically treated at the time of manufacturing
** After immersion in boiling water for three hours
*** After chemical treatment

○ Excellent ○ Standard △ Fair



Resistance welding of galvanized steel sheets is conducted under different conditions from those for hot- or cold-rolled steel sheets. This is because zinc is a mild metal and has a high electric conductivity with a low melting temperature. It is also because the zinc melted by the initial welding current disperses the current over an extended area, resulting in a lowered current density.

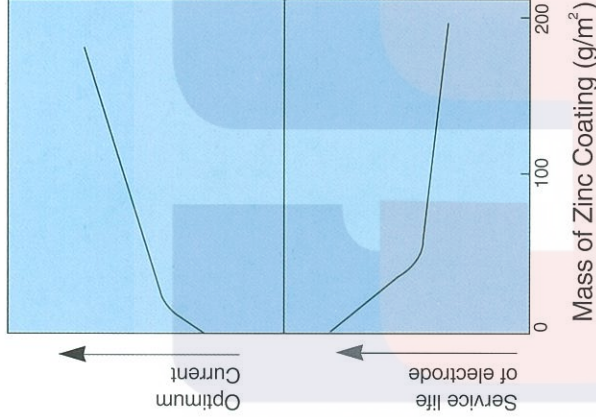
Another problem associated with the resistance welding of galvanized steel sheets is that zinc picked up by the electrodes shortens their service life. Zinc pickup also adversely affects the continuous multi-spot weldability of galvanized steel sheets, compared with hot- and cold-rolled steel sheets.

Galvanized steel sheets can be spot welded, seam welded or fusion are welded satisfactorily if appropriate welding conditions are employed. To obtain optimum welding results, however, attention should be paid to the following points:

- Spot welding
- Increase welding current by 10% to 30%.
 - Extend welding time by about 10%.
 - Use Cr-Cu alloy electrodes, preferably the JIS C-type truncated cone shape.
 - Service the electrodes often and provide sufficient water-cooling.

- Seam welding
- Set the welding current at a slightly higher level than normal.
 - Increase the electrode force to minimize bubbles and internal defects.
 - Use intermittent welding current where practical. Also, increasing the current interval ratio improves the welds.

Relations Between Mass of Zinc Coating, Optimum Current and Service Life of Electrodes



Fusion arc welding

- Use of covered electrodes with a high-basicity covering is recommended for arc welding of galvanized steel sheets, because these electrodes ensure highly fluid molten metal and produce excellent welds. JIS D 4316 (low hydrogen type) are among such electrodes.
- To repair areas damaged by welding heat, the use of a zinc-rich paint is generally advisable.
- Note that arc welding of galvanized steel should be carried out with adequate local ventilation or in an open space. The gas generated from zinc by the welding heat can be dangerous to human health when it reaches a certain concentration.

1. Product Grades and Specifications

Base metal	Quality	Base metal grade	Product designation
Ordinary cold-rolled steel sheets	Commercial	SPCC	SECC
	Drawing	SPCD	SECD
	Nonaging, deep drawing	SPCEN	SECEN
Cold-rolled high strength steel sheets	Forming use	SPFC-390-	SEFC-390
		SPFC-490-	SEFC-490
		SPFC-590-	SEFC-590

Corresponding to JIS G 3313

2. Mass of Zinc Coating

Product according to JIS specification

Symbol for mass of zinc on one side	Minimum g/m ²	(Reference) Standard	
		g/m ²	μm
EB	2.5	3	0.4
E8	8.5	10	1.4
E16	17	20	2.8
E24	25.5	30	4.2

one side

3. Chemical Treatment

Type	Symbol	Characteristics
Phosphate treatment	P	As a preparatory coat before painting
Chromate treatment	C	For preventing rust temporarily
Organic composite silicate resin + chromate treatment	C3	Medium Corrosion resistance, Fingerprint repellence
Chromate free special composite resin	V2	Medium Corrosion resistance, Fingerprint repellence
Untreated	MM	

* THAI-ZINC can be supplied oiled after chemically treated

4. Oil coating

Type	Symbol
No coating	X
With oil coating	N

5. Thickness Tolerances

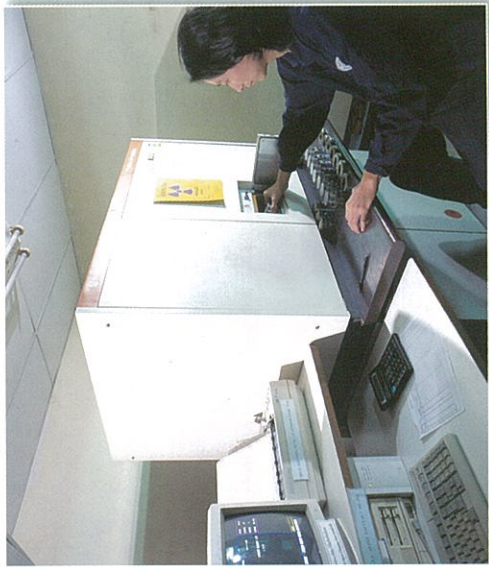
Cold-rolled base metals

Specified thickness of base metal	Specified width		mm	
	under 0.40	under 1,000	1,000 to 1,250 excl.	1,250 to 1,550
under 0.40	± 0.04	± 0.04	± 0.04	—
0.40 to 0.60 excl.	± 0.05	± 0.05	± 0.05	± 0.06
0.60 to 0.80 excl.	± 0.06	± 0.06	± 0.06	± 0.06
0.80 to 1.00 excl.	± 0.06	± 0.06	± 0.07	± 0.08
1.00 to 1.25 excl.	± 0.07	± 0.07	± 0.08	± 0.09
1.25 to 1.60 excl.	± 0.09	± 0.09	± 0.10	± 0.11
1.60 to 2.00 excl.	± 0.11	± 0.11	± 0.12	± 0.13
2.00 to 2.50 excl.	± 0.13	± 0.13	± 0.14	± 0.15

Tolerances on thickness shall be applied to the nominal thickness plus the equivalent zinc coating thickness given in the next table.

Equivalent Zinc Coating Thickness (one side)

Designation symbol of zinc coating mass	mm	
Equivalent zinc coating thickness	E8	E24
	0.001	0.004



Handling Precautions

In using galvanized steel sheets, the following precautions should be taken to ensure optimum results:

Storage

- If the product becomes damp during storage, white rust* may be generated.
- Check if moisture has penetrated the package when receiving the product. If moisture penetration from humidity is observed, dry the product immediately.
- Please ensure that the product is kept dry during storage and transportation.
- Repair packages if they become damaged. Keep them as dry as possible.
- The corrosion resistance, weldability and formability of the product remain effective even if the color of the chemical layer fades after a long period of storage.

Handling

- In order to obtain an excellent finish, cares should be taken during handling to prevent the material from being scratched.
- TZ-C3 and TZ-V2 may collapse by some severe coil handling conditions because of their high surface lubricity. Please avoid loading many coils on TZ-C3 and TZ-V2 and avoid shock when handling them.

Fabrication

Some kinds of lubricants used in forming processes can corrode zinc. Testing before use is recommended.

* White rust occurs because of humidity during storage. This is a zinc hydroxide that is formed by reaction of the zinc oxide coating with moisture.

Welding

For high-temperature brazing, the use of brass - based brazing metals containing nickel is recommended.

Degreasing

The material should be completely degreased. If painted before grease has been sufficiently removed, paint defects may result.

Avoid using strong alkaline degreasing agents because they may damage the surface of the material.

When degreased, the material should be cleaned completely. Check and see whether the material has been completely degreased by immersing it in clear water after degreasing. If water repulsion is found when the material is taken out of the water, degreasing is incomplete. The material should be degreased until it wets uniformly over its entire surface.

Painting

THAI-ZINC is chemically treated to provide good paintability, i.e. to obtain sufficiently strong paint adhesion. But since some paints have a poor affinity with galvanized steel sheet surfaces, it is recommended that a paint be used only after its adhesion has been confirmed in a preliminary test.

Regardless of the type of paint, application of a wash primer ensures stronger paint adhesion.

Reference

Major SI units used in JIS standard steels

Item	Quantities used in JIS standard steels	SI unit			Conventional symbols
		Symbol	Reading	Definition	Symbol used in practice
Mass	Mass	kg	Kilogram		kg
Force	Load	N	Newton	$1\text{ N} = 1\text{ kg} \cdot \text{m/s}^2$	kgf
Stress	Tensile strength, yield point, yield strength	N/mm ²	—	$1\text{ N/mm}^2 = 1\text{ MPa}$	kgf/mm ²
Pressure	Hydraulic pressure, Pneumatic Pressure	Pa	Pascal	$1\text{ Pa} = 1\text{ N/m}^2 = 10^{-6}\text{ N/mm}^2$	kgf/cm ²
Energy	Charpy absorbed energy	J	Joule	$1\text{ J} = \text{N} \cdot \text{m}$	kgf·m
	Charpy impact value	—	—	$1\text{ J/m}^2 = 1\text{ N} \cdot \text{m/m}^2$	kgf·m/cm ²

Conversion from conventional units to SI units

Unit name	Conversion equation		How to round off the figures
Load	$Y(\text{N}) = 9.80665 \times X(\text{kgf})$		Round off to three significant figures
Tensile strength, yield point, yield strength at high temperature	$Y(\text{N/mm}^2) = 9.80665 \times X(\text{kgf/mm}^2)$		Round off to the nearest whole number
Hydraulic pressure, Pneumatic pressure	$Y(\text{MPa}) = 0.0980665 \times X(\text{kgf/cm}^2)$		Round off to one decimal place
Charpy absorbed energy	$Y(\text{J}) = 9.80665 \times X(\text{kgf} \cdot \text{m})$		Round off to the nearest whole number
Charpy impact value	$Y(\text{J/cm}^2) = 9.80665 \times X(\text{kgf} \cdot \text{m/cm}^2)$		Round off to the nearest whole number

Conversion from SI units to conventional units

Unit name	Conversion equation	
Load	$Y(\text{kgf}) = X(\text{N}) \div 9.80665$	$= X(\text{N}) \times 0.101972$
Tensile strength, yield point, yield strength at high temperature	$Y(\text{kgf/mm}^2) = X(\text{N/mm}^2) \div 9.80665$	$= X(\text{N/mm}^2) \times 0.101972$
Hydraulic pressure, Pneumatic pressure	$Y(\text{kgf/cm}^2) = X(\text{MPa}) \div 0.0980665$	$= X(\text{MPa}) \times 10.19720$
Charpy absorbed energy	$Y(\text{kgf} \cdot \text{m}) = X(\text{J}) \div 9.80665$	$= X(\text{J}) \times 0.101972$
Charpy impact value	$Y(\text{kgf} \cdot \text{m/cm}^2) = X(\text{J/m}^2) \div 9.80665$	$= X(\text{J/m}^2) \times 0.101972$



Packing and Marking

THAI-ZINC is packed to protect the coils. After the products are packed properly, the following labels are attached to the package for coil identification.

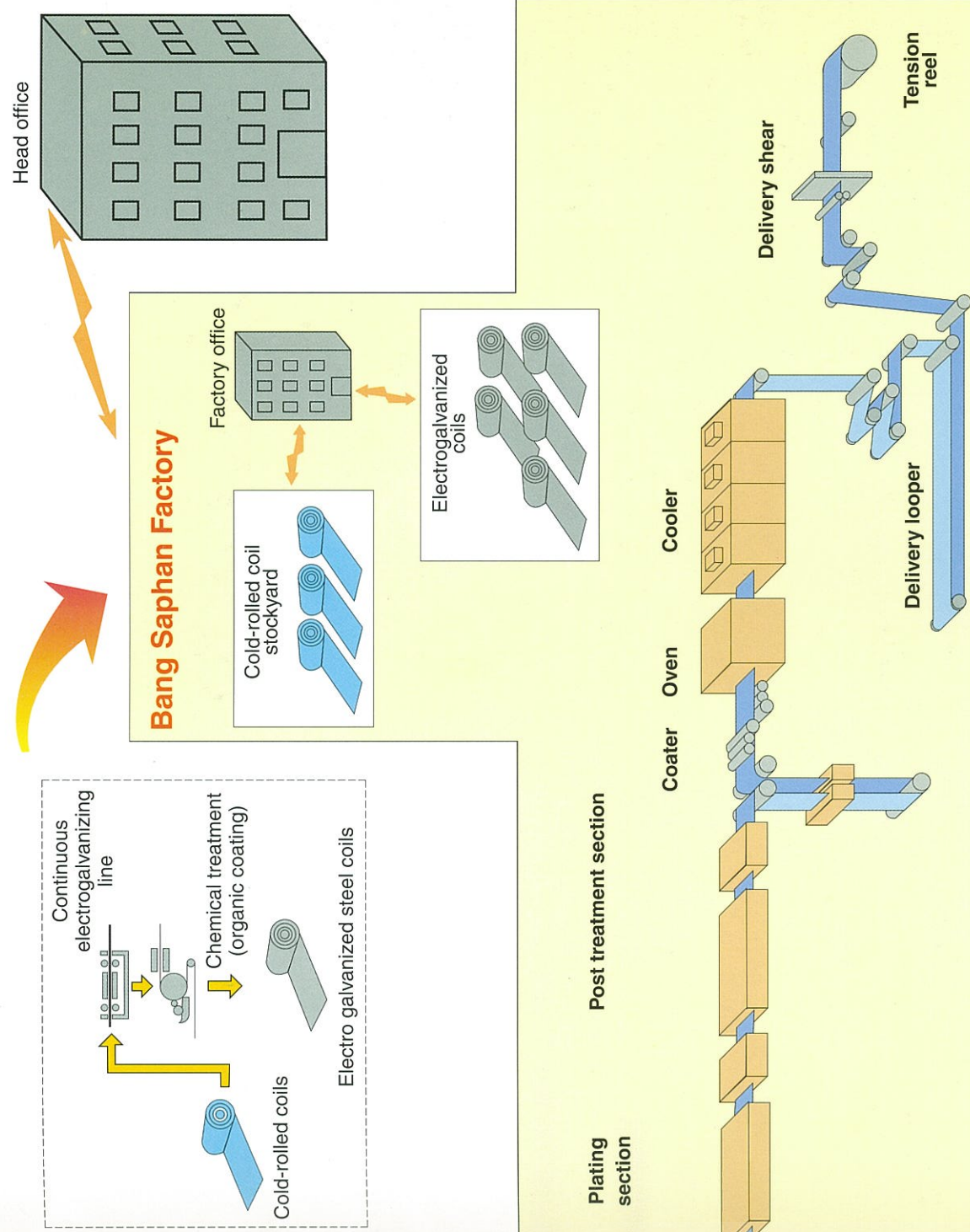
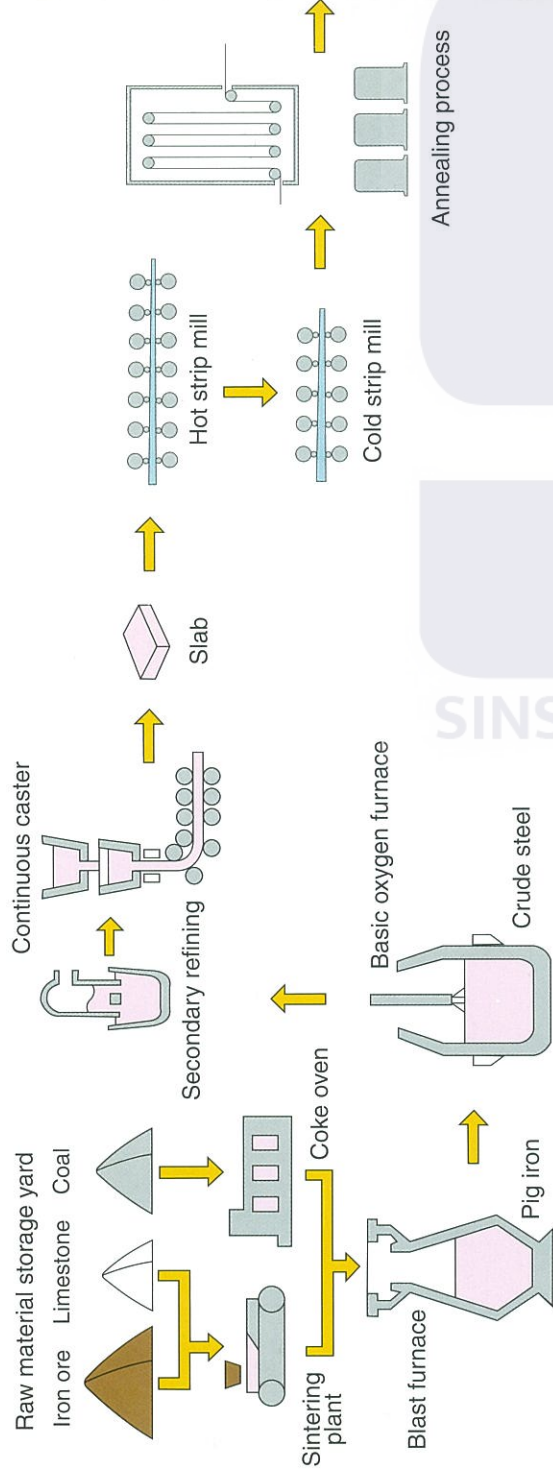
CUSTOMER ชื่อลูกค้า					
COMMODITY สินค้า					
STANDARD มาตรฐานที่ระบุ	NOMINAL COATING WEIGHT น้ำหนักที่เคลือบตามตั้ง				
SIZE ชื่อลูกค้า			NET WEIGHT นน. สุทธิ	GROSS WEIGHT นน. รวม	
PRODUCED DATE วันที่ผลิต					
PRODUCTION NO. (BARCODE) หมายเลขผลิตภัณฑ์ (บาร์โค้ด)			TCS CONTRACT NO. หมายเลขสัญญาของ TCS.		
REMARK หมายเหตุ					
THAI COATED STEEL SHEET CO.,LTD. บริษัท เหล็กแผ่นเคลือบไทย จำกัด BANGSAPHAN FACTORY MADE IN THAILAND โรงงานบางสะพาน ผลิตในประเทศไทย					



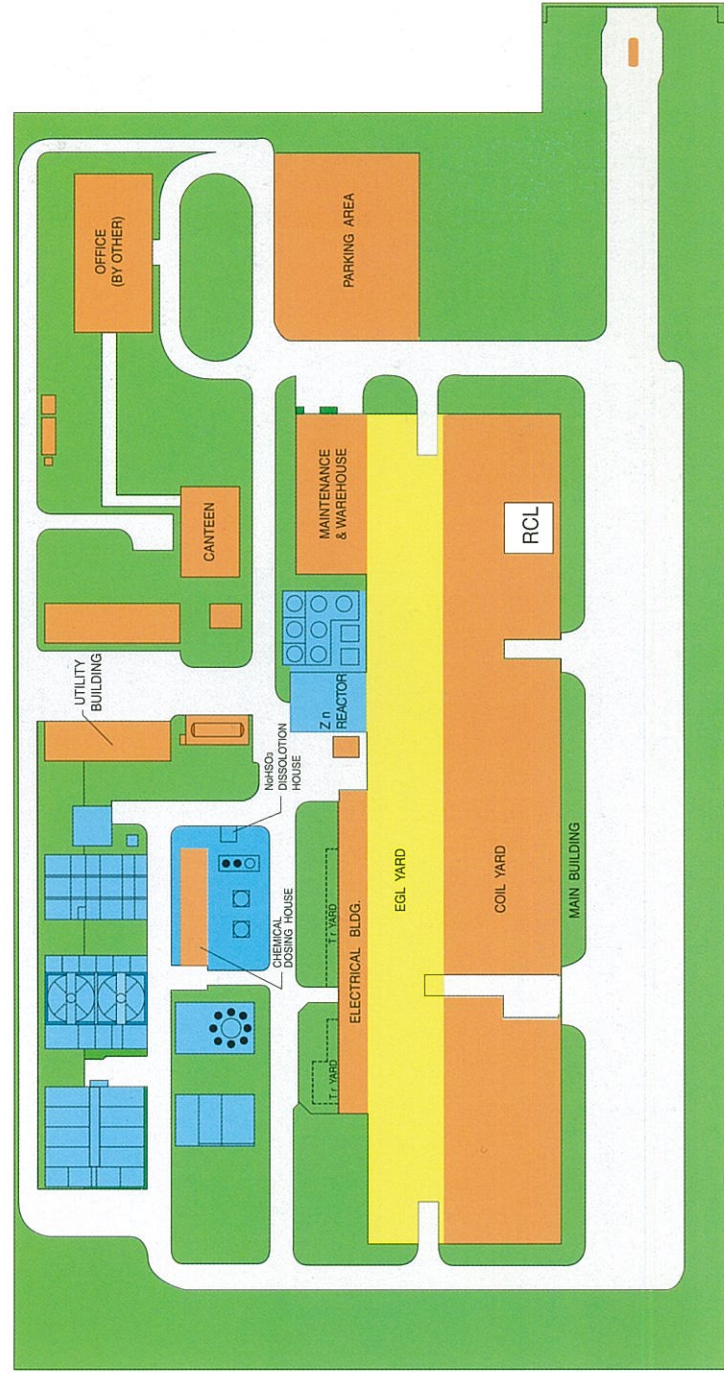
Typical Applications



Manufacturing Flow of Steel Products



LAYOUT OF TCS IN BANGSAPHAN



Technological Features

- The most advanced type of electrogalvanizing line, developed by JFE Steel
- Chemical treatment facility with organic coating equipment
- Computerized management system
- All necessary environmental protection measures operational

Product Features

- Thickness : 0.4-2.0 mm (Standard)
- Width : 800-1,320 mm (Standard)
- Coil Weight : Max. 15 MT
- Coil I.D. : 20" or 24" (508 or 610 mm)
- Coil O.D. : Max. 72.8" (1,850 mm)
- Zinc coating : Pure zinc, 20/20 g/m² or lighter
- Chemical treatment : Phosphate, chromate, (chromate and chrmate free) special chemical treatment, Oiling



THAI COATED STEEL SHEET CO.,LTD.

Products of TCS

TCS prepares the following products depending on a demand of a customer.
In addition, TCS adopts a chromate-free steel sheet corresponding to environmental regulation about all products.
(TZ=Thai Zinc is products name of TCS)

Type and features of chemical treatment

Products name		Structure of coating layerig	Type & Feature
Zn Coating	Chemical Treatment		
TZ	V2	 Special resin layer Zinc coat Steel	Chromate-free Anti-fingerprint (Standard resin layer) ※Standard type
	V3	 Special resin layer Zinc coat Steel	Chromate-free Anti-fingerprint (Thinner resin layer) ※Conductivity priority type
	PV	 Phosphate layer Zinc coat Steel	Chromate-free Phosphate ※Painting and general usage

Quality features of chemical treatment

Products name		Quality feature				
Zn Coating	Chemical Treatment	Corrosion resistance	Conductivity	Paintability	Lubricity	Anti-fingerprint property
TZ	V2	◎	○	○	◎	◎
	V3	○	◎	○	◎	◎
	PV	△	◎	◎	—	—

Evaluation: ◎very effective ○effective △fair

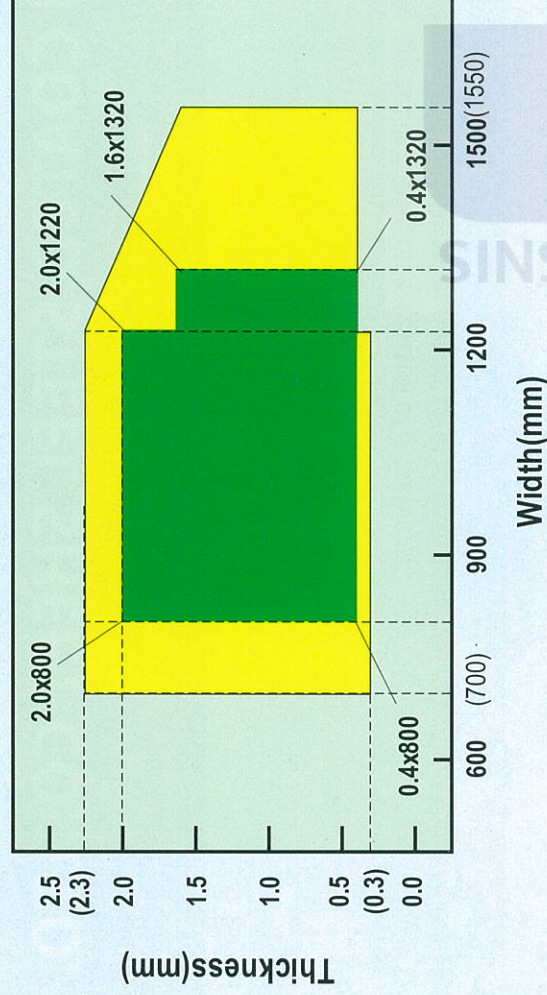
Typical Applications

TZ - V2 : OA/AV apparatus, Home appliance, Electric appliance, Car parts

TZ - V3 : OA/AV apparatus which require electrical conductivity.

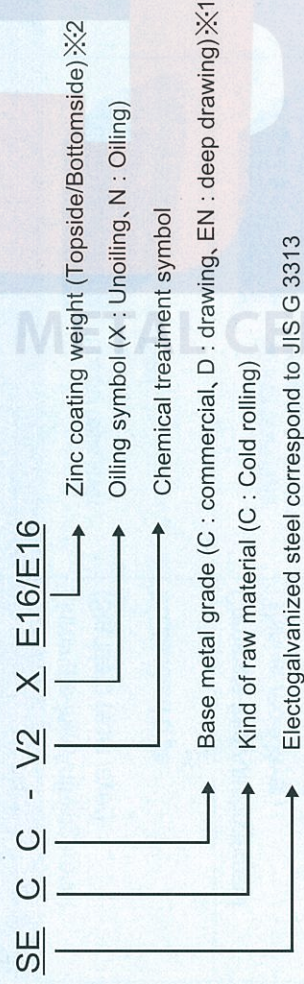
TZ - PV : General usage with painting. Home appliance, Car parts

Available size



Available size
Negotiable size

Steel grade



※1) Product grade and specification

Base metal	Quality	Product designation (JIS G3313)
Cold-rolled steel sheet	Commercial	SECC
	Drawing	SECD
	Nonaging, deep drawing	SECEN

※2) Zn coating weight (JIS G 3313)

Coating weight Designation	Minimum (g/m ²)	(Reference) Standard(g/m ²)
EB	2.5	3
E8	8.5	10
E16	17	20

Remark on product use

- 1) Coating layer might be removed during degreasing some case. Please confirm it before use.
- 2) Lubricated strips and sheets have a low friction coefficient and slide easily when piled.
Please handle them with special care.
- 3) Corrosion resistance or paint adhesion might be deteriorated during strong degreasing in some case.
Please confirm it before use.

Contact us

• Head Office

28/1 Prapawit Building, 8th Floor, Surasak Road, Silom, Bangrak, Bangkok 10500.

Tel. 0-2630-0390, Fax. 0-2630-0398-9

• Factory

No.2, Moo 7, Tambol Maeraphung, Amphur Bangsaphan, Prachuabkirikhan 77140. Thailand

Tel. 0-3269-1423-7, Fax. 0-3269-1422