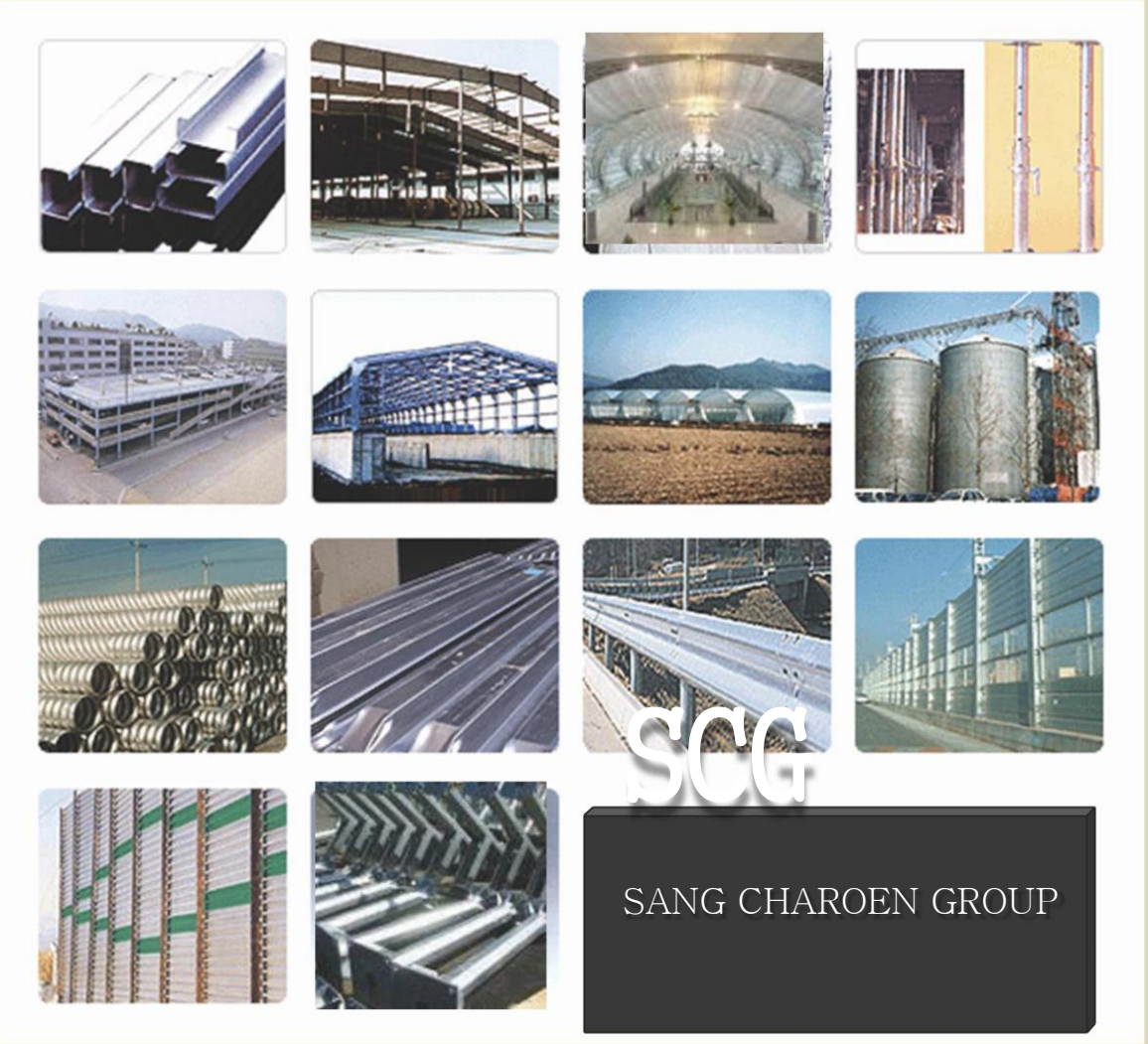
SANG CHAROEN GROUP



ZINC

Distributed Only Sangcharoen Group's Customer ®

SANG CHAROEN GROUP

BACKGROUND

Sangcharoen Galvanize Co., Ltd. was established in 1994 with the initial register capital of 25,000,000 baht on the area 6,400 square-meters for supporting works of construction and telecommunication business with the kettle size 7 meters. Kettle size 4 meters was built later for galvanizing nuts, screws, and studs by technology as called Spinning method. After growth of Thai Industries and Construction Investment between 1995-2007, capacity of factory was not enough to support customer expansion.

Sangcharoen Hot Dip Galvanize Co., Ltd. is the second factory. It was established in 2004 with the register capital of 30,000,000 baht on the area 52,800 square meters which it is able to support the work by the bigger kettle size 9.0 meters (capacity more than 4,500 Metric Tons). British Standard was applied on new factory with LPG system supply burners and Kettle was imported from Germany caused by better ferrous materials.

Sang Charoen Eastern Galvanize Co., Ltd. is a new factory in our group. It is located at Hemaraj Chonburi Industrial Estate which the area total is 52,800 sqm. It was established in 2011 for supporting the large structure steel galvanizing which the kettle can be galvanizing long- est at 14 meters.

SANG CHAROEN GROUP

Core Business

Hot Dip Galvanizer—Service hot dip galvanizing coat on steel finishing.

Ordinary Process
- Construction Item
- Telecom-Tower
- Infrastructure
- Etc.

Morningside Pedestrian Bridge
Location: Cambridge, ON
Date Galvanized: 2008 Project
Maintenance: 95 years

Spinning Process
- Small Steel Part
- Nut
- Screw
- Washer

Pilotec Substation
Location: Mountain Iron, MN
Date Galvanized: 2008
Project Maintenance: 72 years

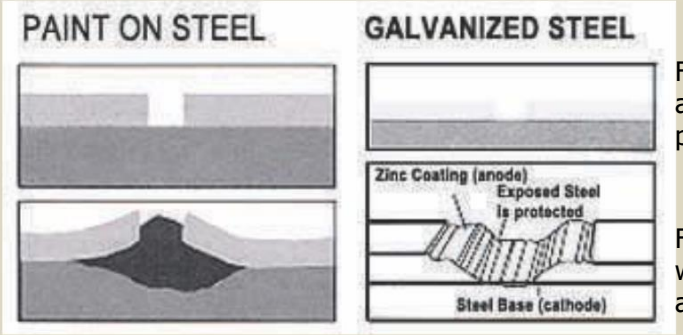


Figure Left Side shows how corrosion will begin and immediately progress at a scratch or gap in a paint coating.

Figure Right Side shows how corrosion will be prevented at a scratch or gap in a zinc coating.

SANG CHAROEN GROUP

BOARD OF DIRECTOR

WATTANA SUJITRANURUK

CHIEF EXECUTIVE OFFICER

SUKANYA SUJITRANURUK

ADMINISTRATION DIRECTOR

ANCHALEE SUJITRANURUK

FINANCIAL DIRECTOR

FACTORY

SANG CHAROEN HOT DIP GALVANIZE CO., LTD.

SOMBOON PEWNGARM

SANG CHAROEN GALVANIZE CO., LTD.

PONGTISIT KHUNTONG

SANG CHAROEN EASTERN GALVANIZE CO., LTD.

NITITORN LERDSATAPORN

Performance & Capacity

Sang Charoen Hot Dip Galvanize

Capacity:

Phase A
Kettle Size : 9.0 x 1.7 x 2.2 meters
Max. Size : 8.4 x 1.6 x 2.1 meters
Hot Dip Capacity Max : 3,000 MT/Month
Finishing Capacity Max : 3,000 MT/Month

Staffs Totally : 200 persons
Working Shift : 2 Shifts (12 hrs/shift)

Phase B
Kettle Size : 7.0 x 1.5 x 2.0 meters
Max. Size : 6.5 x 1.1 x 1.8 meters
Hot Dip Capacity Max : 2,000 MT/Month
Finishing Capacity Max: 2,000 MT/Month

Staffs Totally : 45 persons
Working Shift : 1 Shift (12 hrs/shift)

Sang Charoen Galvanize

Spinning Kettle:

Kettle Size : 2.0 x 1.2 x 2.0 meters
Max. Size : 1.5 x 1.0 x 0.9 meters
Hot Dip Capacity Max : 1,000 MT/Month
Finishing Capacity Max : 1,000 MT/Month

Staffs Totally : 50 persons
Working Shift : 2 Shifts (12 hrs/shift)

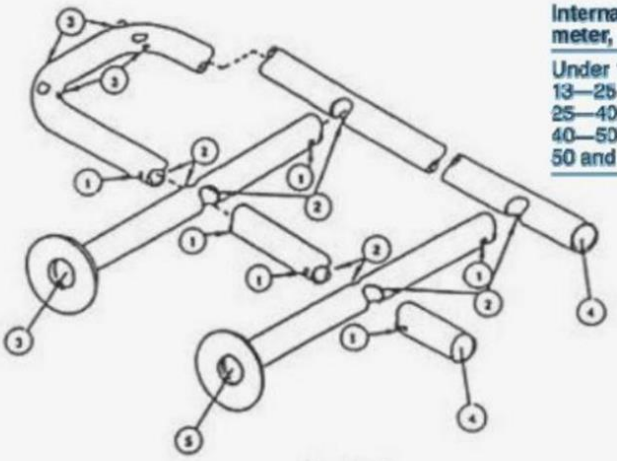
Sang Charoen Eastern Galvanize

Capacity:

Kettle Size : 14.0 x 1.8 x 2.5 meters
Max. Size : 13.8 x 1.65 x 2.4 meters
Hot Dip Capacity Max : 4,500 MT/Month
Finishing Capacity Max : 4,500 MT/Month

Staffs Totally : 200 persons
Working Shift : 2 Shifts (12 hrs/shift)

Preparation for Galvanized



Internal tube diameter, mm	Hole size, mm
Under 13	5—6
13—25	6—8
25—40	8—10
40—50	10—15
50 and above	< 15

Handrail

The above drawing illustrates desirable design features for fabrication of handrail that requires galvanizing.

1. Vent holes shall be as close to the weld as possible and and not less than 3/8 in. (9.5 mm) in diameter.
2. Internal holes shall be the full inside diameter of the pipe pipe for best galvanizing quality and lowest galvanizing cost.
3. Vent holes in end sections or similar section shall be a minimum 1/2 in (12.7 mm) in diameter.

4. and 5. Any device used for erection in the field that prevents full openings on ends of horizontal rails and vertical legs shall be attached after galvanizing.

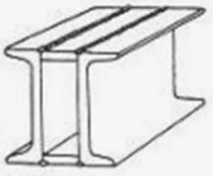
Vent holes should be visible on the outside of any pipe assembly.

Overlapping surfaces

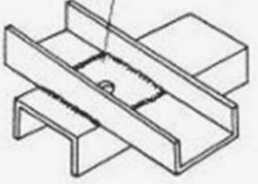
Avoid narrow gaps between plates, overlapping surfaces, and back-to-back angles and channels.

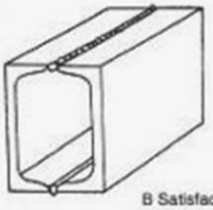
When small overlaps are unavoidable, seal edges by welding.

When left unsealed, small overlapping areas may trap pickle acid which can later escape to discolour or damage the galvanized coating.

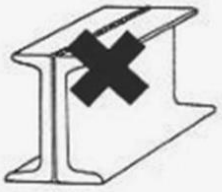


A Satisfactory





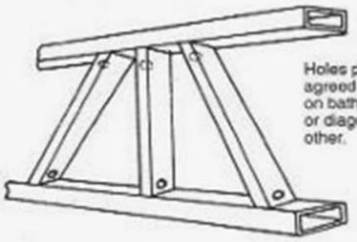
B Satisfactory



C Unsatisfactory

Larger overlapping surfaces

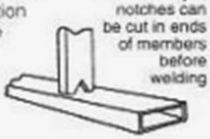
If contacting surfaces cannot be avoided, a hole 6 mm in diameter for every 100 cm² of overlap area should be placed in one of the members, and the perimeter of the contacting area should be continuously welded. The vent hole in one member will ensure the safety of galvanizing personnel and prevent damage to the article.



Holes placed at locations agreed with galvanizer ideally on both sides of members, or diagonally opposite each other.

Tubular Fabrications/hollow structurals

Vent holes must be provided, preferably 25% of internal diameter for sections up to 150 mm diameter. This percentage can be dependent on the shape of the fabrication, and consultation with the galvanizer at the design stage is recommended.



Alternatively V notches can be cut in ends of members before welding

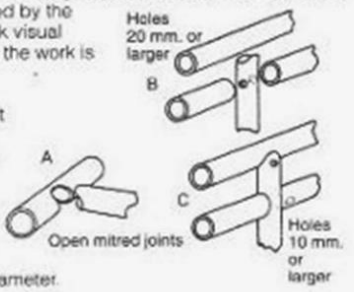
Welded pipe sections

Closed sections must never be incorporated. Sections should be interconnected using open mitred joints as illustrated at 'A', or interconnecting holes should be put in before fabrication as in 'B'

Alternatively external holes may be positioned as in 'C', a method which is often preferred by the galvanizer, since quick visual inspection shows that the work is safe to galvanize.

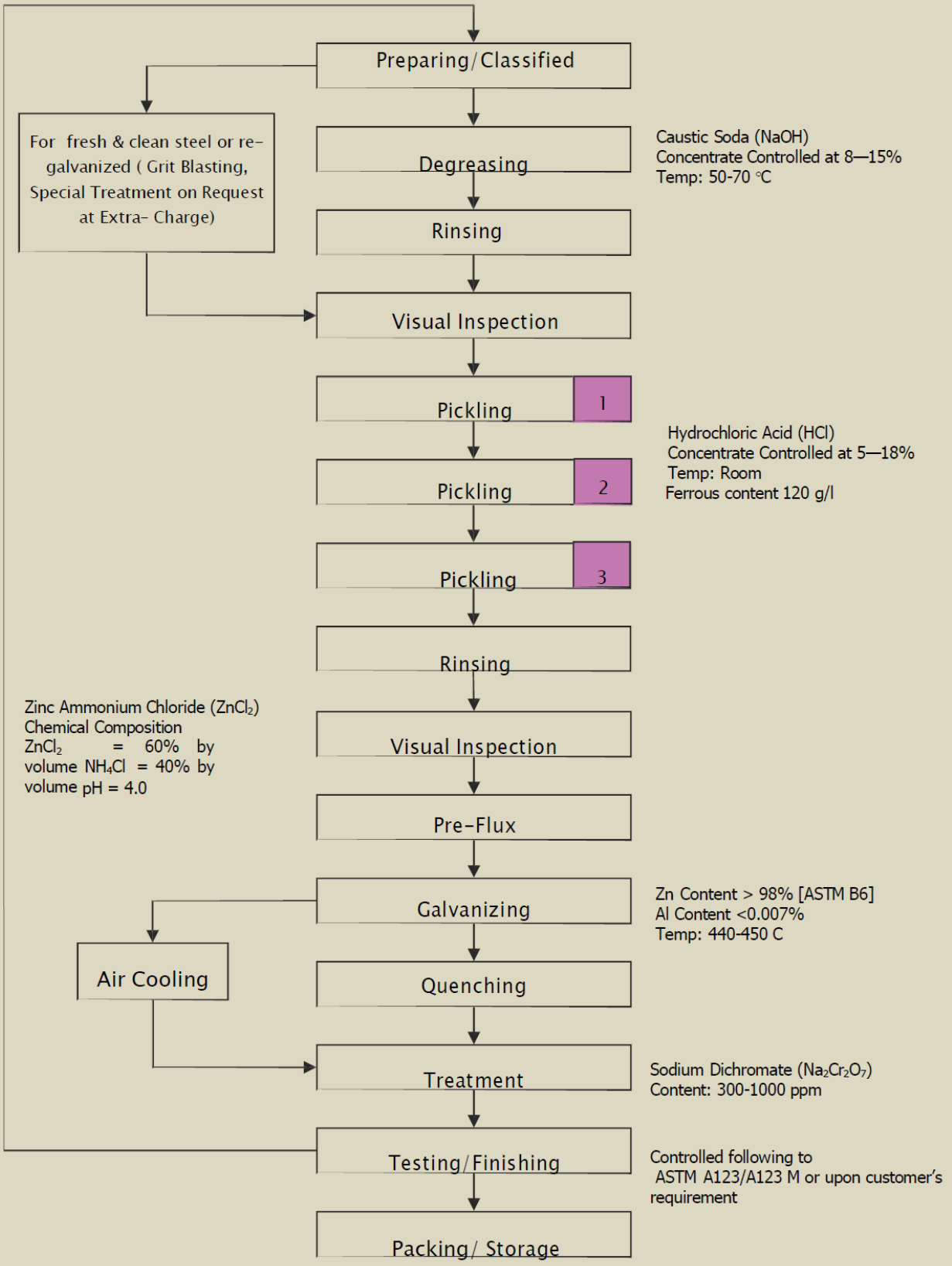
Pipe ends must be left open, or provided with removable plugs.

Small tubular fabrications such as pack racks must be vented, with holes not less than 6 mm diameter.

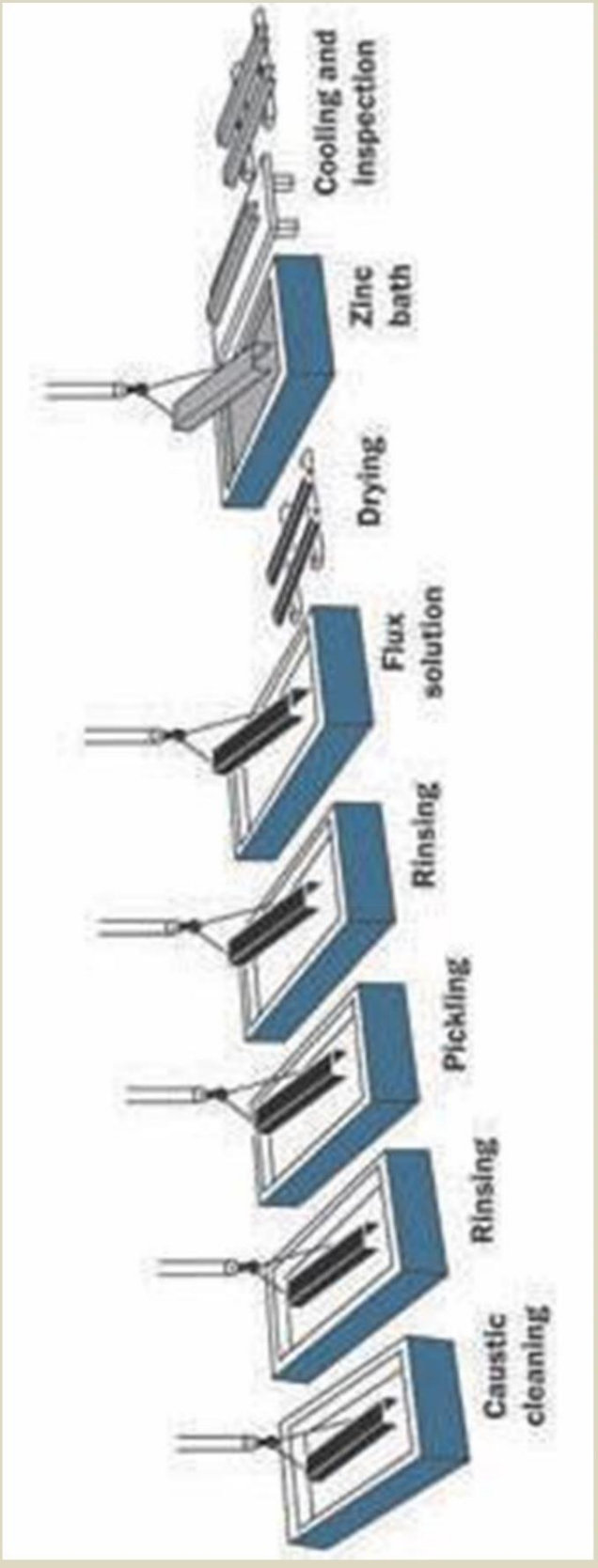


Unwanted vent holes may be closed by hammering in lead plugs after galvanizing and filling off flush with surrounding surfaces.

Process Flow



PRODUCTION


Cooling and inspection
Zinc bath
Drying
Flux solution
Rinsing
Pickling
Rinsing
Caustic cleaning

SANG CHAROEN HOT DIP GALVANIZE

Standardization

ASTM A123/A123 M:

Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

TABLE 1 Minimum Average Coating Thickness Grade by Material Category

Material Category	All Specimens Tested Steel Thickness Range (Measured), in. [mm]					
	<1/16 [<1.6]	1/16 to <1/8 [1.6 to <3.2]	1/8 to 3/16 [3.2 to 4.8]	>3/16 to <1/4 [>4.8 to <6.4]	≥1/4 to< 5/8 [≥6.4 to <16.0]	>5/8 [>16.0]
Structural Shapes	45	65	75	75	100	100
Strip and Bar	45	65	75	75	75	100
Plate	45	65	75	75	75	100
Pipe and Tubing	45	45	75	75	75	75
Wire	35	50	60	65	80	80
Reinforcing Bar	...	...	...	...	100	100

British Standard

BS EN ISO 1461:2009

Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods

Table 3 — Minimum coating thickness and mass on samples that are not centrifuged

Article and its thickness	Local coating thickness (minimum)[a] µm	Local coating mass (minimum)[b] g/m²	Mean coating thickness (minimum)[c] µm	Mean coating mass (minimum)[b] g/m²
Steel > 6 mm	70	505	85	610
Steel > 3 mm to ⩽ 6 mm	55	395	70	505
Steel ⩾ 1,5 mm to ⩽ 3 mm	45	325	55	395
Steel < 1,5 mm	35	250	45	325
Castings ⩾ 6 mm	70	505	80	575
Castings < 6 mm	60	430	70	505

NOTE This table is for general use: individual product standards may include different requirements including different categories of thickness. Local coating mass and mean coating mass requirements are set out in this table for reference in such cases of dispute.

[a] See 3.8.

[b] Equivalent coating mass using a nominal coating density of 7,2 g/cm³ (see Annex D).

[c] See 3.9.

Australian/New Zealand Standard

AS/NZS 4680:2006

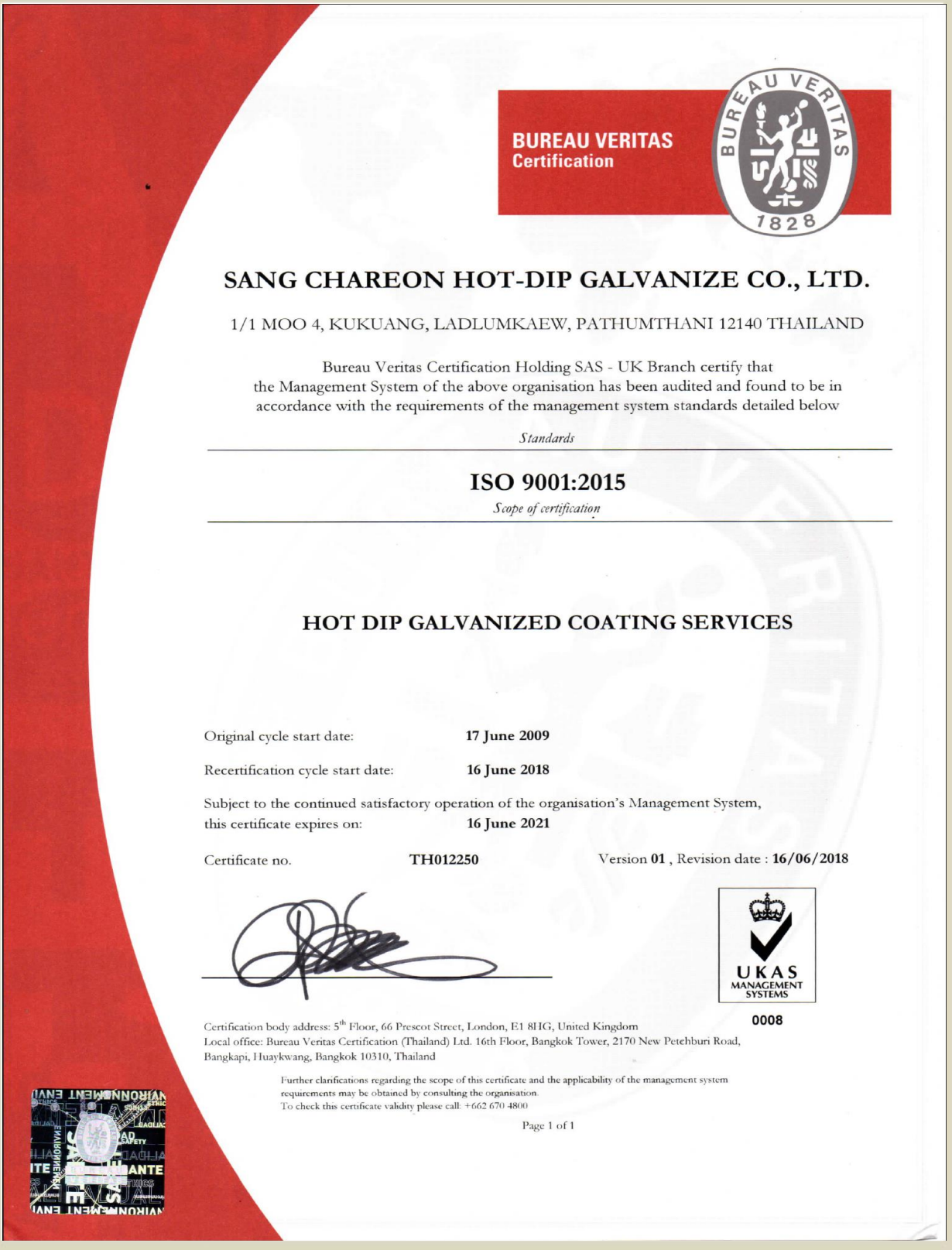
Hot-dip galvanized (zinc) coatings on fabricated ferrous articles

Article thickness mm	Local coating thickness minimum µm	Average coating thickness minimum µm	Average coating mass minimum µm
≤ 1.5	35	45	320
>1.5 to ≤ 3	45	55	390
>3 to ≤ 6	55	70	500
>6	70	85	600

Certification for Standard

QUALITY POLICY

We aim to serve the best quality and punctual on time by continuous improvement to meet customer satisfactions.



BUREAU VERITAS
Certification

BUREAU VERITAS 1828

SANG CHAREON HOT-DIP GALVANIZE CO., LTD.

1/1 MOO 4, KUKUANG, LADLUMKAEW, PATHUMTHANI 12140 THAILAND

Bureau Veritas Certification Holding SAS - UK Branch certify that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

Standards

ISO 9001:2015

Scope of certification

HOT DIP GALVANIZED COATING SERVICES

Original cycle start date: **17 June 2009**

Recertification cycle start date: **16 June 2018**

Subject to the continued satisfactory operation of the organisation's Management System, this certificate expires on: **16 June 2021**

Certificate no. **TH012250** Version **01** , Revision date : **16/06/2018**

UKAS MANAGEMENT SYSTEMS
0008

Certification body address: 5th Floor, 66 Prescot Street, London, E1 8HG, United Kingdom
Local office: Bureau Veritas Certification (Thailand) Ltd. 16th Floor, Bangkok Tower, 2170 New Petchburi Road, Bangkapi, Huaykwang, Bangkok 10310, Thailand

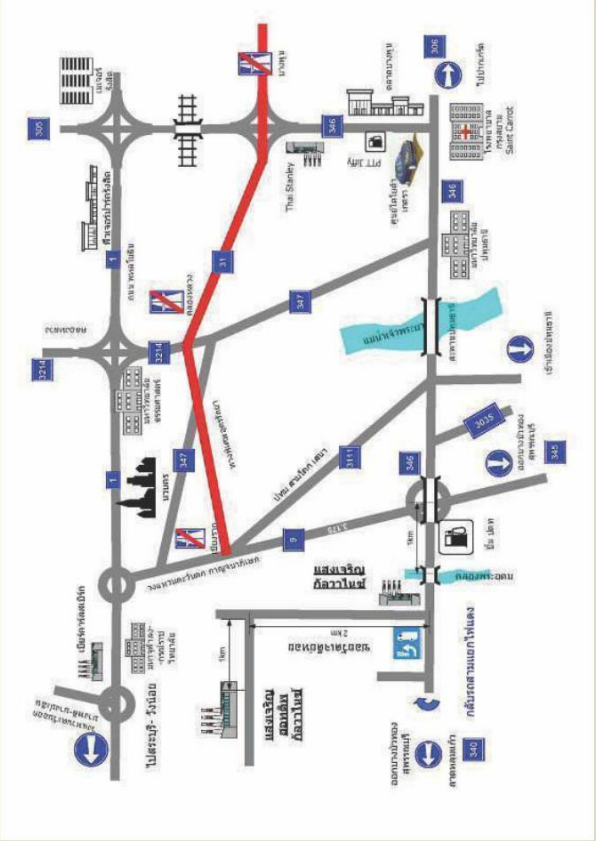
Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organisation.
To check this certificate validity please call: +662 670 4800

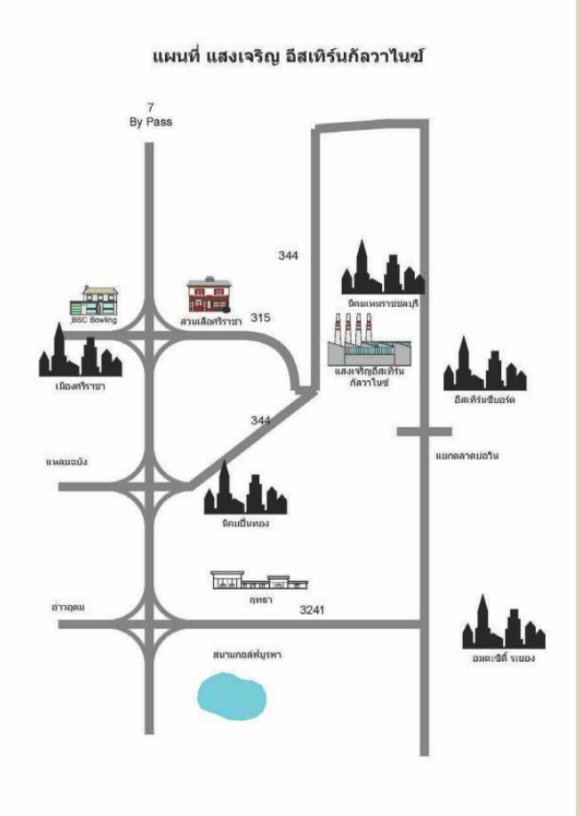
Page 1 of 1

REFERENCE

- Web Forge (Thailand) Co., Ltd.
- Toyo Thai Corporation Public Company Limited.
- Thai Nippon Steel Engineering & Construction Co.,Ltd.
- Visavakit Patana Corp., Ltd.
- Thai Woo Ree Engineering Co.,Ltd.
- Kijpunchai Industry Co.,Ltd.
- Sawatudom Engineering Co.,Ltd.
- Clough (Thailand) Co.,Ltd.
- Metropolis Electricity Authority (MEA)
- Electricity Generating Authority of Thailand (EGAT)
- Dynamic Engineering Co., Ltd.
- G.K. Assembly Co.,Ltd.
- TST Metalwork Co., Ltd.
- TIC ENGINEERING CO.,LTD./TIC MODULAR SYSTEM CO.,LTD
- Thai Rotary Engineering Public Company Limited
- Italian-Thai Development Public Company Limited.

MAP AND ADDRESS





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Tel/Fax: 0-2599-4115-8,0-2599-4195-6

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Tel/Fax: 0-2976-2118-20,0-2976-3021-2

SANG CHAROEN EASTERN GALVANIZE CO.,LTD.

Address: 371 Moo 6, Hemaraj Chonburi Industrial Estate, Bowin, Sriracha, Chonburi 20230.
Tel/Fax: 038-345-258-9,038-346-519