



[www.shehkai.com](http://www.shehkai.com)



**世鎧精密股份有限公司**  
**SHEH KAI PRECISION CO.,LTD.**

No.1,Bengong 1st Rd.,Gangshan Dist.,  
Kaohsiung City 82059,Taiwan.  
TEL: 886-7-622-5669  
FAX: 886-7-622-6002  
E-mail: [info@shehkai.com.tw](mailto:info@shehkai.com.tw)  
[Http://www.shehkai.com](http://www.shehkai.com)



2020/04/28 (Inch)



**世鎧精密股份有限公司**  
**SHEH KAI PRECISION CO.,LTD.**



*300 Series Austenitic Stainless Steel*  
**Bi-Metal Self-Drilling Screws**



## Company Profile

**SHEH KAI PRECISION CO., LTD.** was established in 1992 in Kaohsiung, Taiwan. Our main plant is located at the center of GangShan industrial park. Specialized in manufacturing premium stainless steel Bi-metal self-drilling screws, Bi-Metal self-tapping screws, and Bi-Metal concrete screws, and SDS plus hammer drill bits with material of tungsten carbide. As a global leader of manufacturer of Bi-Metal fastener, in these twenty years, we have developed a superior and unique production process such as dissimilar metal welding and induction heat treatment which are suitable for producing premium Bi-Metal products that meet the highest end requirements world-wise. With dedicated supports from our own stainless steel wire drawing factory, the stainless steel raw materials of the fasteners can be easily planned and acquired for mass production. As a forerunner of the bi-metal fastener industry, we constantly strive to provide our customers with unique innovative solutions, high quality products as well as professional service along.

## Quality Control



ISO 9001:2015 Certified



ISO 9001:2015 Certified



ISO 14001:2015 Certified



**SHEH KAI**  
PRECISION CO., LTD.



## Contents

01 /  
Contents

02 /  
Company Profile

03 /  
Advantages of Using  
Bi-Metal Self-Drilling  
Screw

04 /  
Mechanical Properties Tests

05 /  
Fastener Coating

07 /  
Bi-Metal Self-Drilling Screw  
(304-A2) Hardened Drill Point

09 /  
Bi-Metal Self-Drilling Screw  
NIBS Under Head Countersunk Head  
Wing Screw

10 /  
Bi-Metal Self-Drilling Screw  
(SUS 302) Bi-Metal Window Screw

11 /  
Bi-Metal Self-Drilling Screw  
Direct application on stainless steel  
plate

12 /  
Bi-Metal Self-Drilling Screw  
(304-A2) Sharp Point/Blunt Point

13 /  
Modify Self-Tapping Screw  
(304-A2) Sharp Point/Blunt Point

14 /  
Metric Thread Bolts / Screws  
Carbon Steel / Alloy Steel /  
Stainless Steel (302/304-A2/316-A4)

15 /  
Double Ends Hanger Bolts  
Carbon Steel / Alloy Steel /  
Stainless Steel (302/304-A2/316-A4)

16 /  
Special Bolts/ Screw  
Carbon Steel / Alloy Steel /  
Stainless Steel (302/304-A2/316-A4)

17 /  
Quality Control

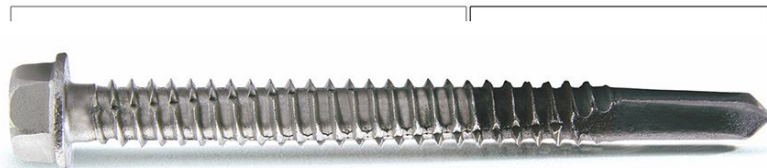
18 /  
Project



### Longer Life time in outdoor environment

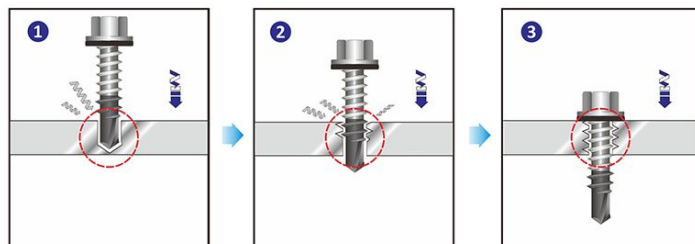
**300 series Austenitic stainless steel**  
(Cold Forging, non Magnetic, Corrosion Resistance)

**Alloy steel with induction heat treatment**  
(Superior Drilling Performance)



③ Fastening      ② Tapping      ① Drilling

One Working Process

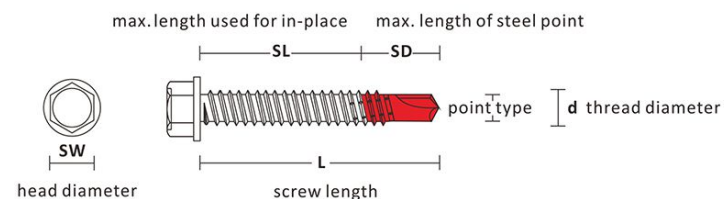


1. Drilling

2. Tapping

3. Fastening

### Choose The Right Screw From Dimensional Viewpoint



#### #12 X 1" Drilling Point

( thickness of application )  
L screw length (inch)  
d body diameter (inch)

drilling point No.1 SD < 0.039" + 0.039" (1+1mm)  
drilling point No.2 SD < 0.118" (3mm)  
drilling point No.3 SD < 0.236" (6mm)  
drilling point No.5 SD < 0.472" (12mm)

### Pull-Out Tests

Steel Thickness (inch)	Tensile Strength in.lbs (min)			
	#12 (Ø5.5)		#14 (Ø6.3)	
	NO.3 Point	NO.5 Point	NO.3 Point	NO.5 Point
1/16	660	—	683	—
1/8	1168	—	1278	—
5/32	1720	—	1763	—
1/4	1785	—	1984	—
3/8	—	2028	—	2314
1/2	—	2028	—	2314

■ Note : For the length below 2", it can not apply the pull-out test for tensile. Therefore, length below 2" will be tested per standard of torque.

■ Steel Plate for Testing : According To DIN 7504, HV110~125 (HRB62.3~69.0).

■ Tighten & Pull Test : According To ASTM F606-06 standard.

### Mechanical Properties Tests

Drill Point	Size	Torque Strength in.lbs (min)		Tensile Strength in.lbs (min)	Shear Strength in.lbs (min)
		SUS304 SUS316	SUS302		
NO.3 Point	#8 (Ø4.2)	31	31	—	—
	#10 (Ø4.8)	45	42	—	—
	#12 (Ø5.5)	72	58	1785	1366
	#14 (Ø6.3)	114	—	1984	1565
NO.5 Point	#12 (Ø5.5)	72	58	2028	1432
	#14 (Ø6.3)	114	—	2314	1642

■ Note : For the length below 2", it can not apply the pull-out test for tensile. Therefore, length below 2" will be tested per standard of torque.

### Screws Chemical Compositions : %

Steel	C	Si	Mn	P	S	Ni	Cr	Mo	Cu
SUS XM7 (302 HQ)	Max 0.03	Max 1.00	Max 2.00	Max 0.045	Max 0.030	8.00~ 10.00	17.00~ 19.00	—	3.00~ 4.00
SUS 304 (304 M)	Max 0.08	Max 1.00	Max 2.00	Max 0.045	Max 0.030	8.00~ 10.00	18.00~ 20.00	—	—
SUS 316 (316CU)	Max 0.03	Max 1.00	Max 2.00	Max 0.045	Max 0.030	10.00~ 14.00	16.00~ 18.00	2.00~ 3.00	3.00~ 4.00

■ Note : According to DIN ISO 3506, stainless steel chemical composition requirement of Cu contain can accept 4% and below.

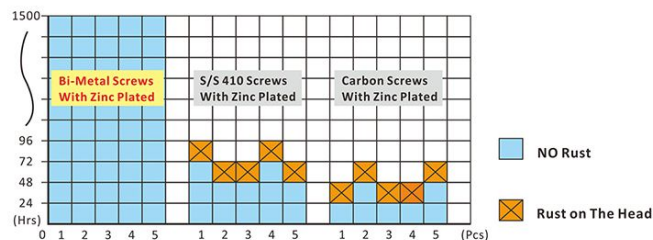


## Corrosion of Fastener



From the past experience about the failure modes of the metal building, "Corrosion" is one major failure of the metal construction industries. Inside the interface-connection component of the Metal Building construction system, Corrosion of the screw always plays a major reason for the failure. Therefore, choosing a right material for screw has been a very important issue to the designer. According to the America Uniform Building Code, the proposed product time limit of the public safety is required for at least 30-50 years. The material in which can reach its requirement is the Austenitic Stainless Steel Fastener of the SUS 300 series. It can prevent the corrosion process happened inside the panel & cladding. Not only to ensure the safety of the building and also to avoid the huge amount of the repair cost !

## Salt Spray Test Comparison According to ASTM B117



## Coating of Bi-Metal Fastener

Coating	Zinc W/WAX		Ruspert		Tufcote (Ruspert)	
Salt Spray Test	24 hrs (2 $\mu$ )	72 hrs (8 $\mu$ )	500 hrs	1000 hrs	1500 hrs	2000 hrs
Kesternich Test	NO	NO	5 cycle	15 cycle	25 cycle	25 cycle
Australian Standard	NO	Class 1	Class 2	Class 3	Class 4	Class 4
Basic Characteristic	Zinc Coating Consists of 1 Layer : ① 1st layer is metallic zinc protecting the metal.		Ruspert Coating Consists of 2 Layers : ① 1st layer is metallic zinc protecting the metal. ② 2nd layer is the baked ceramic coating.		Tufcote Coating Consists of 3 Layers : ① 1st layer is metallic zinc protecting the metal. ② 2nd layer is a Ceramic Surface Coating. ③ 3rd layer is a PU modified Epoxy	
Recommend	General use in internal application.		External use in mild moderate industrial or marine environments.		External use in severe marine environment.	

## Self-Drilling Screws for the building and construction industries

Corrosion Resistance Class Requirements ( Australian Standard AS 3566.2-2002 )

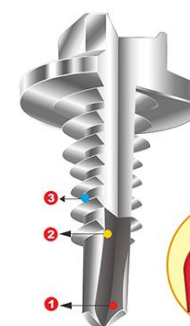
Corrosion Resistance Class	Atmosphere of Intended Use
Class 1	General use in internal application. AS 2331.3.1 (Salt Spray Test) for 72 h.
Class 2	General use in other than external applications but where significant levels of condensation occurs. AS 2331.3.1 (Salt Spray Test) for 500 h, DIN50018 (Kesternich Test) for 5 Cycles.
Class 3	External use in mild moderate industrial or marine environments. Corrosivity categories C2 and C3 classified accordance with ISO 9223. AS 2331.3.1 (Salt Spray Test) for 1000 h, DIN50018 (Kesternich Test) for 15 Cycles.
Class 4	External use in severe marine environment. Corrosivity C4 classified in accordance with ISO 9223. AS 2331.3.1 (Salt Spray Test) for 1500 h, DIN50018 (Kesternich Test) for 25 Cycles.

■ Originated as AS 3566-1988 Revised and redesignated in part as AS3566.2-2002

## Fastener Coating

**Bi-Metal Screw Applied With Ruspert Coating :**  
AS-3566 Class 3 AS 2331.3.1 for 1000h standard.

**Ruspert** metal finish is a high-grade metal surface processing technology that prevents corrosion. It is the tight joining of the baked ceramic surface coating and metallic zinc protection. These layers are bonded together through chemical reactions, and this unique method of combining layers results in a rigid combination of the coating films. Ruspert treatment does not attribute its anti-corrosion properties to merely a single material, but the synergy of these two layers, which combined have superb rustproof qualities. Corrosion resistance against scratches, gas, weathering and other kinds of corrosive factors including salt water. Low processing temperature, as the drying temperature below 220°C protects the products from metallographic changes. It strengthens the product by prevent embrittlement & hole corrosion after the heating treatment. Electrolytic corrosion resistance as it is less contact corrosion with other metals.



**Ruspert coating Consists of 2 Layers:**

- 1st layer is metallic zinc protecting the metal.
- 2nd layer is the baked ceramic coating.



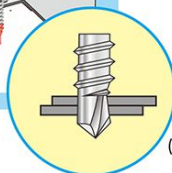
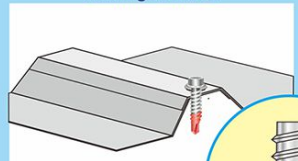


### Industrial Lightweight Construction

Austenitic Stainless Steel SUS A2-302 / A2-304 / A4-316

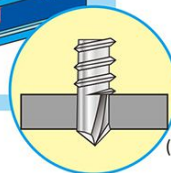
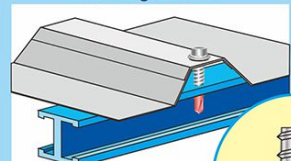


Drilling Point #1



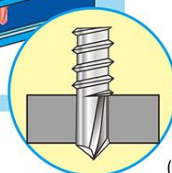
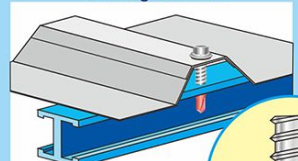
(0.039"+0.039")

Drilling Point #2



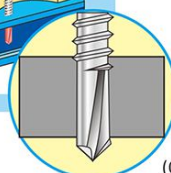
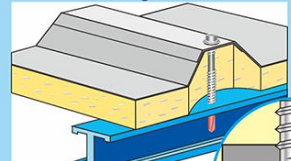
(0.118")

Drilling Point #3



(0.236")

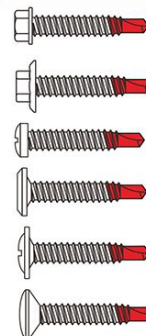
Drilling Point #5



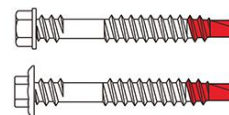
(0.472")

### Industrial Lightweight Construction

Austenitic Stainless Steel SUS A2-302 / A2-304 / A4-316



Diameter Size	Length(inch)		Point Size	Max Drilling capacity(inch)	Drive Speed (R.P.M)
	min	max			
#8	5/8	1-3/4	#1	0.039+0.039	1800-2500
#10	3/4	7-1/8	#1	0.039+0.039	1800-2500
#12	7/8	12	#1	0.039+0.039	1800-2500
1/4	7/8	12	#1	0.039+0.039	1800-2500
#8	5/8	1-3/4	#2	0.078	1800-2500
#10	3/4	7-1/8	#2	0.118	1800-2500
#12	7/8	12	#2	0.118	1800-2500
1/4	7/8	12	#2	0.118	1800-2500
#8	5/8	1-3/4	#3	0.118	1800-2500
#10	3/4	7-1/8	#3	0.157	1800-2500
#12	1	12	#3	0.236	1800-2500
1/4	1	12	#3	0.236	1000-1800
#12	1-1/2	12	#5	0.472	1000-1800
1/4	1-1/2	12	#5	0.472	1000-1800



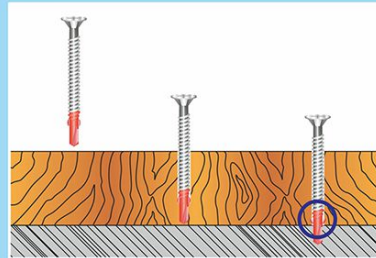
Diameter Size	Length(inch)		Point Size	Max Drilling capacity(inch)	Drive Speed (R.P.M)
	min	max			
#12/#10	2	12	#1	0.039+0.039	1800-2500
1/4/#12	2	12	#1	0.039+0.039	1800-2500
#12/#10	2	12	#2	0.118	1800-2500
1/4/#12	2	12	#2	0.118	1800-2500
#12/#10	2	12	#3	0.236	1800-2500
1/4/#12	2	12	#3	0.236	1800-2500
1/4/#12	2-1/2	12	#5	0.472	1000-1800





## Countersunk Head Wing Screw Austenitic Stainless Steel SUS A2-302 / A4-316

Application Example



- Wing screws for fastening timber to steel rails and purlins from 0.236"-0.472"(6-12mm)  
The screw wings ream a hole through the timber, and break away before drilling into steel.

### Flat Head



Diameter Size	Length(inch)		Point Size	Max Drilling capacity(inch)	Drive Speed (R.P.M)
	min	max			
#8	1	1-5/8	#3	0.118	1800-2500
#10	1	3	#3	0.157	1800-2500
#12	1-1/4	8	#3	0.236	1800-2500
#12	2-1/8	5	#5	0.236-0.472	1000-1800
1/4	2-1/8	12	#5	0.236-0.472	1000-1800

## Bi-Metal Self-Drilling Screw Austenitic Stainless Steel Flat Head Screw SUS A2-302 / A4-316

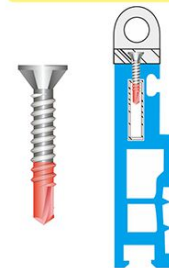
### Flat Head



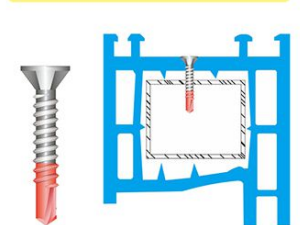
Diameter Size	Length(inch)		Point Size	Max Drilling capacity(inch)	Drive Speed (R.P.M)
	min	max			
#8	3/4	1-3/4	#2	0.118	1800-2500
#9	3/4	7-1/8	#2	0.118	1800-2500
#12	1	12	#2	0.118	1800-2500
#8	3/4	1-3/4	#3	0.118	1800-2500
#10	1	7-1/8	#3	0.157	1800-2500
#12	1	12	#3	0.236	1800-2500
1/4	1-1/8	12	#3	0.236	1000-1800
#12	1-1/2	12	#5	0.472	1000-1800
1/4	1-1/2	12	#5	0.472	1000-1800

## Bi-Metal Window Screw Austenitic Stainless Steel SUS A2-302

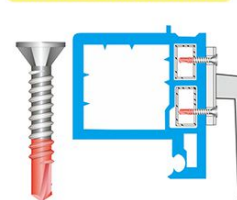
Shoot Bolt Locking:Flat Head



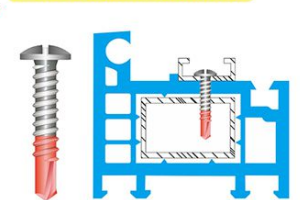
PVCu Window Profile:Flat Head



Handle Locking:Flat Head



Hinges Fastening:Pan Head



### Flat Head



Diameter Size	Length(inch)		Point Size	Max Drilling capacity(inch)	Drive Speed (R.P.M)
	min	max			
#8	3/4	1-3/4	#3	0.118	1800-2500
#9	3/4	1-3/4	#3	0.118	1800-2500

### Pan Head



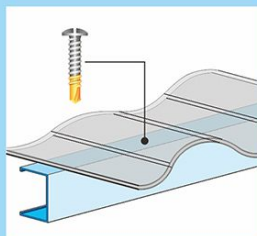
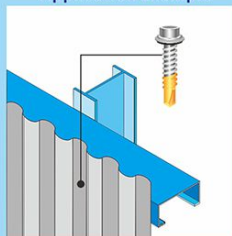
Diameter Size	Length(inch)		Point Size	Max Drilling capacity(inch)	Drive Speed (R.P.M)
	min	max			
#8	5/8	1-1/8	#3	0.118	1800-2500
#9	5/8	1-1/8	#3	0.118	1800-2500



### Bi-Metal Self-Drilling Screw Austenitic Stainless Steel

- Direct application on stainless steel plate.  
(maximum 0.078"(2mm)-Bi-Metal technology)

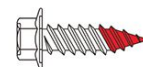
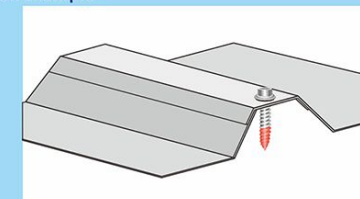
Application Example



### Side Lap Screw ( Special Thread, Pre-drilled unnecessary ) Austenitic Stainless Steel SUS A2-304

- Designed to attach the Steel Plate or Aluminium.

Application Example



Diameter Size	Length(inch)		Point Size	Max Drilling capacity (inch) on Steel plate	Drive Speed (R.P.M)
	min	max			
#10	3/4	1	sharp point	0.031+0.031	Max. 1800
#12	3/4	1	sharp point	0.031+0.031	Max. 1800
1/4	7/8	1	sharp point	0.031+0.031	Max. 1800

### Hex Washer/Pan/Wafer/Truss Head



Diameter Size	Length(inch)		Point Size	Max Drilling capacity (inch) on S.S.plate	Drive Speed (R.P.M)	Max Drilling capacity (inch) on Steel plate	Drive Speed (R.P.M)
	min	max					
#8	5/8	1	#3	0.078	Max.1800	0.118	Max. 2500
#10	3/4	1	#3	0.078	Max.1800	0.157	Max. 2500
#12	3/4	1-1/4	#3	0.078	Max.1800	0.236	Max. 2500
1/4	1	1-1/2	#3	0.078	Max.1800	0.236	Max.1800

### Flat Head



Diameter Size	Length(inch)		Point Size	Max Drilling capacity (inch) on S.S.plate	Drive Speed (R.P.M)	Max Drilling capacity (inch) on Steel plate	Drive Speed (R.P.M)
	min	max					
#8	5/8	1	#3	0.078	Max.1800	0.118	Max. 2500
#10	3/4	1	#3	0.078	Max.1800	0.157	Max. 2500

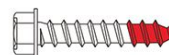
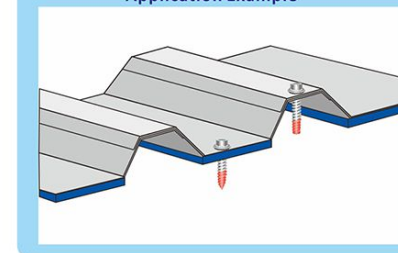
### Bi-Metal Self-Tapping Screw Austenitic Stainless Steel

- Self-Tapping Screw, stainless steel(A2), type B for fastening steel sheet to steel framing profiles with or without intermediate insulation material.

- Sharp Point Drilling Capacity :  
0.039"+0.078"(Pre-drilled hole 0.196")  
0.024"+0.024"(Pre-drilled hole 0.137")

- Blunt Point Drilling Capacity :  
0.059"(Pre-drilled hole 0.192")  
0.118"(Pre-drilled hole 0.198")  
0.157"(Pre-drilled hole 0.210")  
0.196"(Pre-drilled hole 0.222")  
0.236"(Pre-drilled hole 0.228")  
0.393"(Pre-drilled hole 0.230")

Application Example



Diameter Size	Length(inch)		Point Size	Drive Speed (R.P.M)
	min	max		
1/4	3/4	12	sharp / blunt	Max. 1800





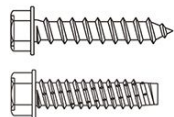
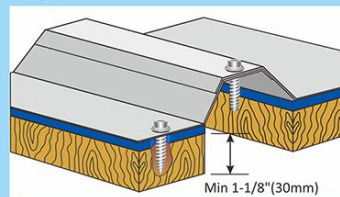
### High Strength A2 Stainless Steel Tapping Screw

#### Austenitic Stainless Steel SUS A2-304

- "8-18" Stainless Steel with special treatment to improve strength characteristics.
- Easier to tapping, thread wear resistance.
- Higher torsion strength characteristics (20% improve).
- Higher pull-out strength.

#### (A2-304) Modify Self-Tapping Screw Sharp / Blunt point

Application Example



Diameter Size	Length(inch)		Point Size	Drive Speed (R.P.M)
	min	max		
1/4	3/4	12	sharp/blunt	Max. 800

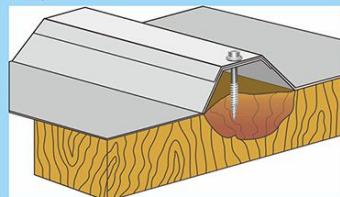
- Self-Tapping Screw, stainless steel(A2), type B for fastening steel sheet to steel framing profiles with or without intermediate insulation material.

- Sharp Point Drilling Capacity :  
0.039"+0.078"(Pre-drilled hole 0.196")  
0.024"+0.024"(Pre-drilled hole 0.137")

- Blunt Point Drilling Capacity :  
0.039"(Pre-drilled hole 0.171") 0.196"(Pre-drilled hole 0.222")  
0.059"(Pre-drilled hole 0.192") 0.236"(Pre-drilled hole 0.228")  
0.118"(Pre-drilled hole 0.198") 0.393"(Pre-drilled hole 0.230")  
0.157"(Pre-drilled hole 0.210")

### Stainless Steel Screw Type 17 ( Hex Washer Flange Head )

Application Example



Diameter Size	Length(inch)		Point Size	Drive Speed (R.P.M)
	min	max		
1/4	3/4	12	sharp	Max. 800

- Drilling Capacity : 0.039"+0.078"(Pre-drilled hole 0.196")  
0.024"+0.024"(Pre-drilled hole 0.137")

### Metric Thread Bolts / Screws



#### Size

Diameter Size		Length(inch)		Material
		min	max	
#8	1-3/8	0.787	12	Carbon Steel/Alloy Steel/Stainless Steel (302/304-A2/316-A4)

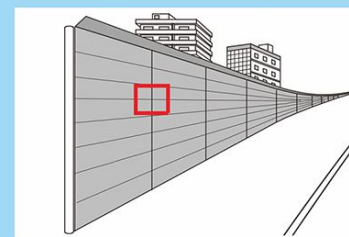
#### Standard

IFI, DIN931, DIN933, DIN603, DIN912, DIN7984, DIN 7380, DIN7991..etc.

#### Finish

Zinc Plated( White/ Yellow/ Blue/ Green/ Black), Nickel Plated, Zinc-Iron Alloy Plated, Geomet, Dacromet, Ruspert, Hot Dip Galvanized, Mechanical Plated, Nylon Patch, Passivation..etc.

Application Example



#### Application

Industry, Construction and Machinery.  
Metric Thread Bolts can be in widespread use such as fastening wood and steel, mechanical equipments, outdoor facility and other construction materials, the docks, bridges, highway structures and buildings.





## Double Ends Hanger Bolts (Dowel Screw)



### Size

Diameter Size		Length(inch)		Material
min	max	min	max	
#8	1-3/8	1.968	12	Carbon Steel/Alloy Steel/Stainless Steel (302/304-A2/316-A4)

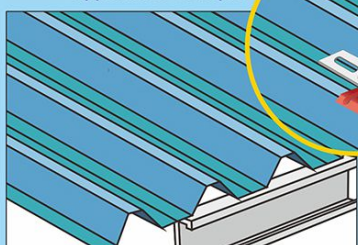
### Standard

DIN88149

### Finish

Zinc Plated ( White/ Yellow/ Blue/ Green/ Black), Nickel Plated, Zinc-Iron Alloy Plated, Geomet, Dacromet, Ruspert, Hot Dip Galvanized, Mechanical Plated, Nylon Patch, Passivation..etc.

### Application Example



### Application

Solar Panel Fastening and Overhead Installation. Designed for insertion into the pre-drilled hole of an outdoor solar panel facility or overhead installation.

## Special Bolts/ Screw



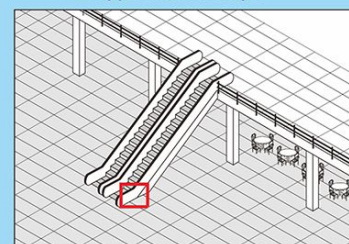
### Size

Diameter Size		Length(inch)		Material
min	max	min	max	
#8	1-3/8	0.787	12	Carbon Steel/Alloy Steel/Stainless Steel (302/304-A2/316-A4)

### Finish

Zinc Plated ( White/ Yellow/ Blue/ Green/ Black), Nickel Plated, Zinc-Iron Alloy Plated, Geomet, Dacromet, Ruspert, Hot Dip Galvanized, Mechanical Plated, Nylon Patch, Passivation..etc.

### Application Example



### Application

Customized Design and Drawing Mostly. Special Bolts/ Screws can be used in a wide range of configurations or a specific projects such as escalator, elevator, T-extrusion track and all kinds machinery.



## Quality Control

Based on the customer guidelines and continuous improvement, our company has formulated the innovative, professional, efficient and impeccable service as our quality policies. Quality control during each production process, with computerized testing and knowledgeable personnel, ensures that the highest standard is upheld. The quality of our manufacturing processes ensures us that we can meet and surpass the level of standard our customer expected.



Coating thickness testing machine



Vickers hardness testing machine



Non contact visual measuring microscope



Metallographic analysis microscope



Computerized drill through testing machine



Computerized pullout testing machine



Kesternich testing machine



Salt spray testing machine



## Project

### Taiwan construction projects that use Bi-Metal Screw from SHEH KAI

- Taiwan High Speed Rail Platform Construction Project.
- Kaohsiung Mass Rapid Transit Project.
- Formosa Petrochemical Corp Mailiao Refinery Project.
- Taipei NeHu Mass Rapid Transit Platform Project.
- Xindian Light Weight-Steel Housing Construction Project.
- FPCC MAILIAO IEM Plant Circular Salt Storage Dome Engineering.
- Taiwan TaiChong Dragon Steel Expansion Project.
- China Steel Mill Renovation Project.
- Taipei Farglory Dome.
- Kaohsiung Wei-Wu-Ying Center for the Arts Roof Project.
- Changhua District Court Relocation Office of New Project.
- Taipei World Universiade Games Village Turnkey Project.

