



燁輝企業  
YIEH PHUI



燁輝(中國)  
YIEH PHUI(CHINA)

Yieh Phui PhuizerFan & COLORFAN

鋼之美 唯燁輝  
*Finest Steel at Yieh Phui*

熱浸鍍5%鋁-鋅(鋁鋅鳳)及  
5%鋁-鋅烤漆(彩色鳳)鋼捲

PHUIZERFAN AND COLORFAN STEEL SHEETS  
(Hot-Dip 5%Al-Zn Coated &  
Pre-Painted 5%Al-Zn Coated Steel Sheets)





### 熱浸鍍 5% 鋁-鋅鋼捲、鋁鋅鳳及彩色鳳

熱浸鍍 5% 鋁-鋅 (以下簡稱 GF) 於 1977 年首先由美國內陸鋼鐵公司 (Inland Steel) 開發，並且擁有註冊專利。1979 年美國國際鉛鋅組織 (ILZRO, International Lead & Zinc Research Organization) 取得該項專利後，2000 年 10 月，ILZRO 將 Galfan® 專利權與技術轉移予為於美國賓州的 Galfan 技術中心 (GTC, GalfanTechnology Centre Inc.)

熱浸鍍 5% 鋁-鋅鋼捲是在鋼板表面以熱浸方式鍍製一層鋁-鋅合金鍍層的鋼品，其鍍層成份是由約 95% 鋅、5% 之鋁與微量之銻、釧稀土元素 (mischmetal) 所組成之獨特共晶組織，如圖一。它具有遠超過傳統熱浸鍍鋅各項特性優點，並且可以抑制易脆之金屬間化合物之合金層 (intermetallic alloy layer) 的生長，使鋼材具有絕佳的防蝕性、優異的成形性及沖壓性，同時具備有優良的塗裝性及良好的熔接性，如表一。

熱浸鍍 5% 鋁-鋅具有和傳統熱浸鍍鋅相近的鍍層厚度，適用於鋼板、鋼線及鋼管等產品。燁輝公司所生產之熱浸鍍 5% 鋁-鋅鋼捲，中文取名為鋁鋅鳳熱浸鍍 5% 鋁-鋅鋼板，簡稱鋁鋅鳳鋼板或鋁鋅鳳，英文名為 PhuizerFan。

鋁鋅鳳 (熱浸鍍 5% 鋁-鋅鋼板) 提供廣泛之規格，可適用於多種用途，且因具有優良之耐蝕性與絕佳的成形性更可適用於上漆或製成預塗烤漆鋼品。燁輝公司所生產之熱浸鍍 5% 鋁-鋅烤漆鋼捲稱為彩色鳳熱浸鍍 5% 鋁-鋅烤漆鋼板，簡稱彩色鳳鋼板或彩色鳳，英文名為 COLORFAN。

### 鋁鋅鳳 (熱浸鍍 5% 鋁-鋅鋼板) 之應用

鋁鋅鳳 (熱浸鍍 5% 鋁-鋅鋼板) 可適用於要求成形性、沖壓性及耐腐蝕性等兼具較高等級之用途。這些應用包括：

- 商業大樓之樓承板
- 工業廠房之輕型鋼
- 電器組件及空調設備外殼
- 戶外報紙自動販賣機
- 高成形之汽車零件
- 預塗覆彩色鋼板
- 農用筒倉與管件
- 農業溫室支架管與棚架管

### Hot-Dip 5% Al-Zn Coated Steel, PhuizerFan & COLORFAN

Hot-dip 5% Al-Zn coated steel (called "GF" hereinafter) was developed and patented by United States Inland Steel company in 1977. The subsequent development of the 5% Al-Zn coated steel began in 1979 in research sponsored by the International Lead & Zinc Research Organization (ILZRO) In October 2000, the ownership rights to Galfan® were transferred to the Galfan Technology Centre Inc. (GTC) located at Pittsburgh, Pennsylvania, USA.

5% Al-Zn coating is a zinc alloy coating on the steel sheet. Its eutectic structure, as shown in Fig. 1, consists of 95% zinc, 5% aluminum, and a trace of mischmetal, which offers performance advantages that go far beyond the limits of conventional hot-dip galvanizing and inhibits the growth of brittle intermetallic alloy layer. The 5% Al-Zn alloy coating provides superior corrosion protection, extraordinary formability and drawability, excellent paintability, and good weldability. See Table 1.

Ideal for sheet steel, wires and tubes, 5% Al-Zn coating can be applied in the same coating thicknesses as conventional hot-dip galvanizing coatings. The 5% Al-Zn coated steel product produced by Yieh Phui is called PhuizerFan.

Available in a wide range of specifications, 5% Al-Zn coated sheet steel can be used for almost any application. 5% Al-Zn coated sheet provides excellent corrosion resistance, superior formability and is available unpainted or coil coated. The pre-painted 5% Al-Zn coated steel product produced by Yieh Phui is called COLORFAN.

### Applications of PhuizerFan

Applications for PhuizerFan steel sheet are extremely diverse. Ideal applications for GF steel are ones that require the combination of maximum formability, drawability and corrosion resistance. They include:

- flooring decks
- purlins
- electrical components and air conditioning unit covers
- outdoor newspaper vending machines
- highly formed automotive unexposed parts
- base metals for pre-painted steel sheets
- silos and piping
- steel tube supporters and shacks for greenhouses

備註：鋁鋅鳳®、彩色鳳®、PhuizerFan® 與 COLORFAN® 均為本公司之註冊商標。內文將不再加印 "®" 字。

Remark : PhuizerFan® and COLORFAN® are registered trademarks of Yieh Phui. "®" will not be shown hereinafter.



顯著出眾優點之鍍層 The Remarkable Coating With Remarkable Advantages

表一 鋁鋅鳳(熱浸鍍 5% 鋁-鋅鋼板)和其他鍍層之比較

Table1 Comparison of 5% Al-Zn Coating to Other Coatings

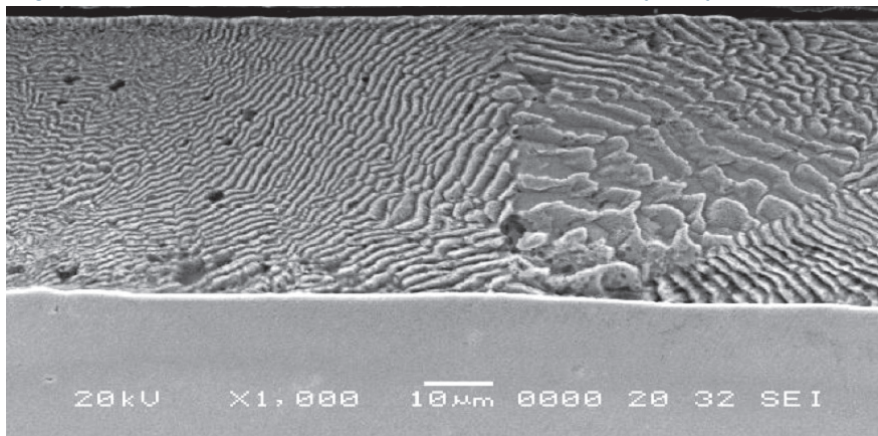
鍍層特性 Coating Type	鋁鋅鳳 (熱浸鍍 5% 鋁-鋅) 5% Al-Zn Coated GF	熱浸鍍鋅 Hot-Dip Galvanized GI	熱浸鍍 55% 鋁-鋅 55% Al-Zn Coated GL	電鍍鍍鋅 Electro-Galvanized EG
鍍層成形性 Formability of Metallic Coating	1	3	3	1
犧牲保護性 Sacrificial Protection	1	1	3	3
防蝕性 (加工或塗裝前) Corrosion Resistance (bare)	2	3	1	3
防蝕性 (加工後) Corrosion Resistance (formed)	1	3	3	3
防蝕性 (塗裝後) Corrosion Resistance (painted)	1	2	3	2
塗裝附著性 Paint Adhesion	1	2	2	1
焊接性 Weldability	2	2	4	1
耐熱性 Heat Resistance/ Reflectivity	3	3	2	3
總評價 Total Evaluation	成形性、防蝕性、 塗裝性均佳 Good Formability, Corrosion Resistance & Paint Adhesion	犧牲保護性佳 Good Sacrificial Protection	未成形之防蝕性較好 Good Corrosion Resistance for Unformed Sheet	鍍層較薄、防蝕性差 Poor Corrosion Resistance owing to Light Coating

備註：等級 1 優 → 5 劣  
Remark Grade Best Worst

資料來源：燁輝企業檢測試驗室  
Source: Yieh Phui Testing and Measurement Laboratory

圖一 鋁鋅鳳(熱浸鍍 5% 鋁-鋅鋼板)之鍍層顯微組織照片(鍍層量 Y27)

Fig.1 The Microstructure of Intermetallic Alloy Layer of 5% Al-Zn Coated Steel (Y27)



鋁鋅鳳 (熱浸鍍 5% 鋁-鋅鋼板)  
之金屬鍍層：共晶組織  
Intermetallic Alloy Layer of  
5% Al-Zn Coated Steel:  
eutectic structure

底材 Base Metal

資料來源：燁輝企業檢測試驗室  
Source: Yieh Phui Testing and Measurement Laboratory



#### 鋁鋅鳳鋼板耐蝕性優越

鋁鋅鳳鋼板之獨特鍍層具有兩種方式保護鋼材表面，具有較傳統之熱浸鍍鋅鋼板(以下簡稱 GI) 高二至三倍的防蝕性能。

首先是由 95% 鋅及 5% 鋁所形成均勻且緻密之共晶組織鍍層，它提供了絕佳的防護層，以阻礙腐蝕因子直接穿透鍍層到鋼材表面之速率，進而提高其防蝕壽命。

第二是因鍍層中有較低的鋁含量，與較多的富鋅成份，故對鍍層表面之刮痕或切邊與扣件孔部位，可利用鋅的氧化充當犧牲保護功能進而達到防蝕效果，故其切邊犧牲保護之功能，是遠優於高含鋁量之鍍 55% 鋁-鋅鋼板(以下簡稱 GL)。

#### 鹽水噴霧試驗性能

參照 ASTM B117 鹽水噴霧試驗之規定，分別測試 GI 及 GF 產品於平板狀態(未加工)及零 T 彎曲狀態(成形加工)開始發生 3% 紅銹比率所需之時間，進一步證實鋁鋅鳳熱浸鍍 5% 鋁-鋅鋼板優越之防蝕性能。

GI 及 GF 產品於平板狀態(未加工)下各種不同的鍍層重量之鹽水噴霧試驗中，顯示 GF 鋼板紅銹發生達 3% 所需之時間明顯高於 GI 鋼板。依試驗結果所示，相同的鍍層厚度，GF 鋼板之使用壽命約為 GI 鋼板之 2 倍，如圖二所示。

GI 及 GF 產品於零 T 彎曲狀態(成形加工)下各種不同的鍍層重量之鹽水噴霧試驗中，亦顯示 GF 鋼板發生 3% 紅銹所需之時間更是遠高於熱浸鍍鋅鋼板。圖三為試驗結果，在相同的鍍層厚度下，GF 鋼板之使用壽命甚至可達 GI 鋼板之 6 倍。其主要原因係 GF 鋼板之共晶組織可提供較佳之腐蝕屏障，故其具優異之成形性與絕佳之防蝕性，此兩項性能皆遠勝於 GI 鋼板。

由實際的鹽水噴霧試驗與循環腐蝕試驗結果得知，在使用 GF 鋼板時，與 GI 鋼板比較，可採用較少的鍍層重量而達到相同的防蝕效

#### PhuizerFan steel corrosion resistance performance goes far beyond normal

This ability to protect the steel surface is due to the unique 5% Al-Zn coating which provides protection in two ways. Thus, it provides two to three times the corrosion protection of conventional hot-dip galvanized coating (called "GI" hereinafter).

First, the two-phase eutectic structure of 95% zinc and 5% aluminum alloy provides a uniform barrier that helps prevent elements from reaching the steel surface.

Second, the coating also serves as a sacrificial protection against corrosion by oxidizing galvanically at any scratches, bare edges, fastener holes or profile bends. GF coating shows even more superior sacrificial protection than Al-rich 55% Al-Zn coating (called "GL" hereinafter).

#### Salt Spray Performance

We compared both GF and GI in flat sheets (bare) and bent sheets (formed). In compliance with ASTM B117, salt spray test has proved excellent corrosion resistance of GF as measured by time to 3% red rust.

When GI and GF were in flat sheets with various coating mass, the salt spray test showed that GI achieved 3% red rust significantly earlier than GF. Besides, under the same coating thickness, GF's useful life is two times as long as GI. See Fig. 2.

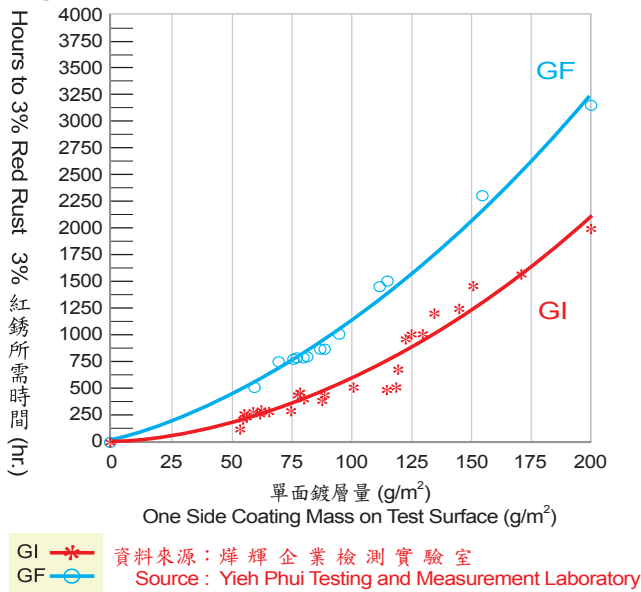
When GI and GF were in bent condition (formed) with various coating mass, the salt spray test showed that GI achieved 3% red rust much earlier than GF. Fig. 3 shows the test result that GF's useful life can reach at least two times as long as GI under the same coating mass. It is mainly due to the eutectic structure of GF providing better corrosion resistance. Thus, its excellent formability and extraordinary corrosion resistance far exceed GI's.

From the salt spray test and cycling corrosion test results, we know that GF steel sheet with less coating mass achieved the same corrosion resistance performance as



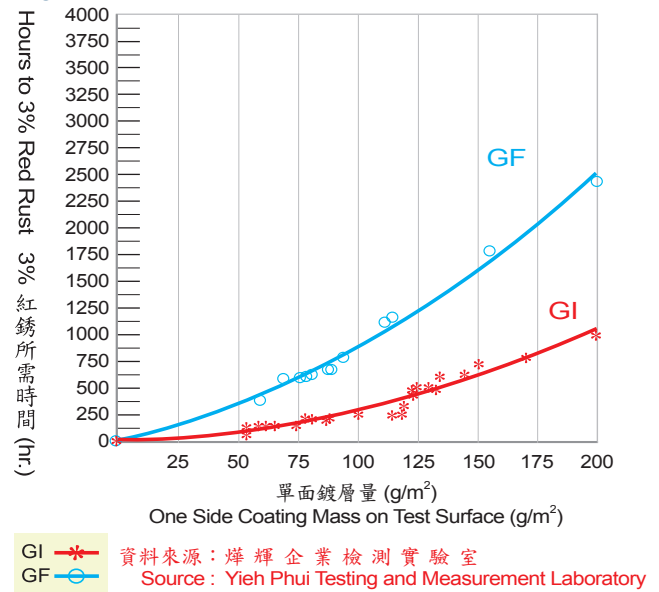
圖二 平板鹽霧試驗

Fig. 2: SST on GF & GI Steel Sheets



圖三 零T折彎試片之鹽霧試驗

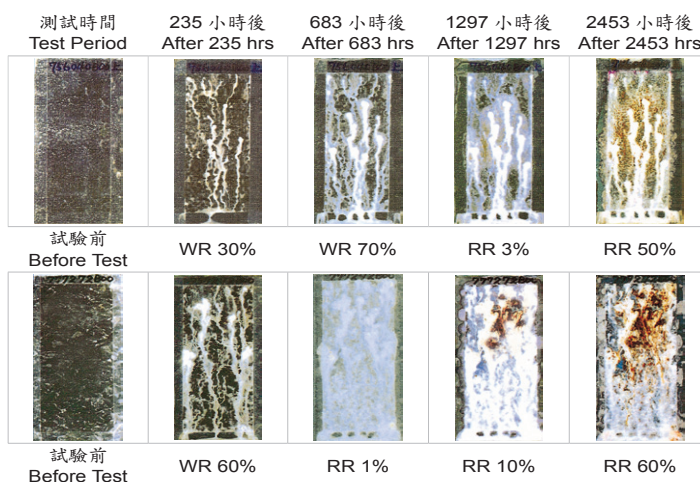
Fig. 3: SST on Zero T-Bent GF & GI Samples



果。例如在鹽水噴霧試驗中，試驗板在經過 235 小時之後，鍍層量  $180\text{g/m}^2$  (鍍層代號：Y18) 之 GF 鋼板表面發生之白銹面積，僅是鍍層量  $275\text{g/m}^2$  (鍍層代號：Z27) GI 鋼板之一半；而紅銹發生之時間亦較 GI 鋼板長一倍。同樣地，在循環腐蝕試驗中， $180\text{g/m}^2$  GF 鋼板表面在 40 個循環後才發生白銹，而鍍層量  $275\text{g/m}^2$  GI 鋼板在 10 個循環便發生，如圖四與圖五所示。

GI steel sheet. For example, after a 235-hour salt spray test was completed, red rust occurred on the surface area of GF steel sheet with  $180\text{g/m}^2$  (coating mass designation: Y18) coating mass was merely about half of the GI steel sheet with  $275\text{g/m}^2$  (coating mass designation: Z27). Similarly, in the cycling corrosion test, GF steel sheet with  $180\text{g/m}^2$  coating mass had white rust after 40 cycles, whereas white rust appeared on the GI steel sheet with  $275\text{g/m}^2$  coating mass merely after 10 cycles. See Fig. 4 & 5 for the test results.

圖四：平板之鹽水噴霧試驗之比較 Fig. 4: Salt Spray Test on Steel Sheets



備註：WR：White Rust, 白銹  
Remark: RR：Red Rust, 紅銹

GF 鋼板

一般鋅花，無調質，鉻酸處理

鍍層量 Y18,  $104.4\text{g/m}^2$  (單面)，鍍層代號：Y18

GF sheet:

Regular Spangle, Non-skinpassed, Chromated

Coating Mass:  $104.4\text{g/m}^2$  (single side)

Coating Mass Designation: Y18

GI 鋼板

一般鋅花，無調質，鉻酸處理

鍍層量 Z27,  $146.0\text{g/m}^2$  (單面)，鍍層代號：Z27

GI sheet:

Regular Spangle, Non-skinpassed, Chromated

Coating Mass:  $146.0\text{g/m}^2$  (single side)

Coating Mass Designation: Z27

資料來源：燁輝企業檢測實驗室

Source: Yieh Phui Testing and Measurement Laboratory

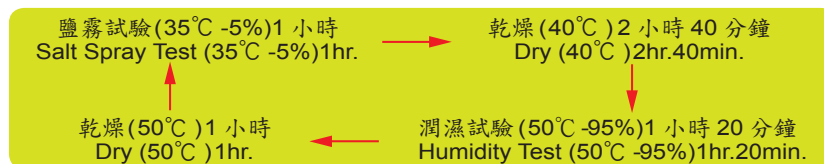


圖五 平板之循環腐蝕試驗之比較

試驗條件：每循環 6 小時

Fig. 5 Cycling Corrosion Test on Steel Sheets

Test Condition: Each cycle takes 6 hours.



鋁鋅鳳鋼板 GF Steel Sheet								
一般鋅花，無調質測試板 Regular Spangle, Non-skinpassed	Before test	10 cycles	25 cycles	40 cycles	50 cycles	70 cycles	90 cycles	100 cycles
	WR 0%	WR 0%	WR 0%	WR 1%	WR 1%	WR 3%	WR 5%	WR 10%
鍍層量 Coating Mass Y18 106.6g/m <sup>2</sup> (單面, Single side)								
熱浸鍍鋅鋼板 GI Steel Sheet								
一般鋅花，無調質測試板 Regular Spangle, Non-skinpassed	Before test	10 cycles	25 cycles	40 cycles	50 cycles	70 cycles	90 cycles	100 cycles
	WR 0%	WR 1%	WR 3%	WR 5%	WR 20%	WR 30%	WR 100%	WR 100%
鍍層量 Coating Mass Z27 160g/m <sup>2</sup> (單面, Single side)								

備註 Remark: WR: White Rust, 白鏽

資料來源：燁輝企業檢測試驗室  
Source: Yieh Phui Testing and Measurement Laboratory

圖六 折彎試片鹽水噴霧試驗之比較

試驗條件：試片以零 T 彎曲程度彎曲後，再以彎曲部位依據 JIS Z 2371 之鹽水噴霧試驗要求進行試驗。

Test Condition: Samples with zero T Bend are tested according to the requirements of JIS Z 2371.

鋁鋅鳳鋼板 GF Steel Sheet																	
A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B		
鍍層量 Coating Mass Y18 板厚 Thickness 1.15mm 94.7g/m <sup>2</sup> (單面， Single side)	鍍層量 Coating Mass Y18 板厚 Thickness 1.15mm 106.2g/m <sup>2</sup> (單面， Single side)	Before test	72 hrs	170 hrs	235 hrs	324 hrs	418 hrs	518 hrs	583 hrs	683 hrs	801 hrs	983 hrs	1100 hrs				
		WR 0%	WR 100%	WR 100%	WR 100%	WR 100%	WR 100%	WR 100%	WR 100%	WR 100%	WR 100%	WR 100%	WR 100%	WR 100%			
熱浸鍍鋅鋼板 GI Steel Sheet																	
A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
鍍層量 Coating Mass Z27 板厚 Thickness 1.2mm 141.7g/m <sup>2</sup> (單面， Single side)	鍍層量 Coating Mass Z27 板厚 Thickness 0.61mm 158.2g/m <sup>2</sup> (單面， Single side)	鍍層量 Coating Mass Z27 板厚 Thickness 0.6mm 146g/m <sup>2</sup> (單面， Single side)	Before test	72 hrs	170 hrs	235 hrs	324 hrs	418 hrs	518 hrs	583 hrs	683 hrs	801 hrs	983 hrs	1100 hrs			
			WR 0%	WR 100%	WR 100%	WR 100%	WR 100%	WR 100%	RR% 3, 1, 1	RR% 5, 5, 1	RR% 10, 10, 1	RR% 10, 10, 1	RR% 10, 30, 3	RR% 10, 40, 3			

備註: WR: White Rust, 白鏽  
Remark: RR: Red Rust, 紅鏽

資料來源：燁輝企業檢測試驗室  
Source: Yieh Phui Testing and Measurement Laboratory



## 埋入土壤與農田耐蝕性試驗

- 試驗樣品：取不同鍍層種類、鍍層代號（鍍鋅附著量）、管徑的鋼管，計 15 組，如表二所示，再依試驗項目切取適當長度進行試驗。

## Soil Corrosion Test and Farming Test

- Test specimen: 15 pipe specimens with different metallic coating, coating mass, and outside diameter are acquired as shown in Table 2. Proper length of the specimens is cut according to test type.

表二 試驗樣品一覽表

Table 2 List of Pipe Specimens

No.	產品別 Specimen	鍍層類別 Coating	鍍層代號 Coating Mass	鋼管外徑 O.D.	管外鍍層量 Coating Mass on Pipe Body (g/m <sup>2</sup> )
1	預熱浸鍍製鋼管 Pre-hot-dip Metallic Coated Steel Pipe	鍍鋅 Galvanized	Z120	1/2"	60~80
2				3/4"	
3				1"	
4			Z275	1/2"	120~150
5				3/4"	
6				1"	
7		鍍 5% 鋁-鋅 5% Al-Zn	Y27	3/4"	120~150
8				1"	
9			Y35	1/2"	170~200
10				3/4"	
11	後熱浸鍍製鋼管 Post-hot-dip Zinc Coated Steel Pipe	鍍 55% 鋁-鋅 55% Al-Zn	AZ150	1/2"	70~90
12				3/4"	
13				1/2"	
14				3/4"	
15				1"	

### 2. 試驗方法

#### 2.1 埋入土壤試驗

將鋼管（長度約 200mm）一半插入在市售培養土內，試驗過程中每 3 天澆水乙次。

備註：所使用的培養土為 Floradur® ANZUCHT SUBSTRAT。

#### 2.2 農田耐蝕性試驗

將鋼管（長度約 600mm）一半插入在種植蔬菜農地中。

備註：蔬菜農田地點在高雄市梓官區（距海邊 4km）。

### 2. Test Method

#### 2.1 Soil Corrosion Test

Half length of the steel pipes was buried in the cultured soil. Full length of a steel pipe was around 200mm. The soil was watered every three days during the test period.

Remark: The cultured soil we used is Floradur® ANZUCHT SUBSTRAT.

#### 2.2 Farming Test

Half length of the steel pipes was buried in the land where veggies were grown. Full length of a steel pipe was around 600mm.

Remark: The farmland was located 4km to the seashore in Kaohsiung City, Taiwan.



圖七 土壤試驗  
Fig.7 Soil Corrosion Test



培養土 Cultured soil



圖八 CCT 農地實測  
Fig.8 CCT at Actual Farmland



### 3. 埋入土壤試驗與農田耐蝕性試驗之綜合試驗結果:

試驗持續進行 3 個月, 觀察結果如下 (如圖九~十一)。

- a) 預熱浸鍍鋅鋼管 (No. 1~5)、預熱浸鍍 5% 鋁-鋅鋼管 (No. 6~10)、與後熱浸鍍鋅鋼管 (No. 13~15) 表面皆出現黑變以及輕微白銹現象。
- b) 預熱浸鍍 55% 鋁-鋅鋼管 (No. 11~12), 在 3 個月後觀察產生輕微點狀紅銹。

### 4. 結論

於鹼性環境 (如農業、畜牧), 預熱浸鍍 5% 鋁-鋅鋼管的耐鹼性最佳, 預熱浸鍍鋅鋼管次之, 而預熱浸鍍 55% 鋁-鋅鋼管最差。故建議農業用使用預熱浸鍍 5% 鋁-鋅鋼管。

### 3. Test Result:

The tests continued for three months. Below is the result. (Also see Fig. 9~11.)

- a) Black tarnish and slight white rust occurred on the surface of the pre-hot-dip galvanized steel pipes (No. 1~5), pre-hot-dip 5% Al-Zn coated steel pipes (No. 6~10), and post-hot-dip zinc coated steel pipes (No. 13~15).
- b) Spotted red rust occurred on the pre-hot-dip 55% Al-Zn coated steel pipes (No. 11~12).

### 4. Conclusion










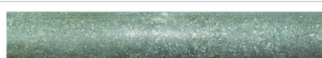

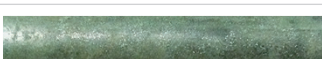

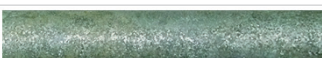

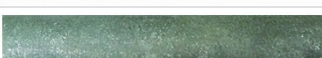
In an alkaline environment, such as agriculture and pasturage, pre-hot-dip 5% Al-Zn coated steel pipes show the best performance against alkali. Pre-hot-dip galvanized steel pipes are the second, and pre-hot-dip 55% Al-Zn coated steel pipes are the worst. Thus, for agricultural use, we recommend pre-hot-dip 5% Al-Zn coated steel pipes.

圖九 埋入土壤試驗—預熱浸鍍 5% 鋁-鋅鋼管、預熱浸鍍 55% 鋁-鋅鋼管  
Fig. 9 Soil Corrosion Test for Pre-hot-dip 5% & 55% Al-Zn Coated Steel Pipes

試片說明 Description	試驗前 Before Test	3 個月後 3 Months Later
預熱浸鍍 5% 鋁-鋅鋼管 Pre-hot-dip 5% Al-Zn Coated Steel Pipe 鍍層代號 Coating Mass: Y27 由左→右的試片編號 (外徑) Specimen No. (O.D.) from left to right: No.6(3/4" ), No.7(1" )		
預熱浸鍍 5% 鋁-鋅鋼管 Pre-hot-dip 5% Al-Zn Coated Steel Pipe 鍍層代號 Coating Mass: Y35 由左→右的試片編號 (外徑) Specimen No. (O.D.) from left to right: No.8(1/2" ), No.9(3/4" ), No.10(1" )		
預熱浸鍍 55% 鋁-鋅鋼管 Pre-hot-dip 55% Al-Zn Coated Steel Pipe 鍍層代號 Coating Mass: AZ150 由左→右的試片編號 (外徑) Specimen No. (O.D.) from left to right: No.11(1/2" ), No.12(3/4" )		

圖十 農田耐蝕性試驗—預熱浸鍍鋅鋼管、後熱浸鍍鋅鋼管




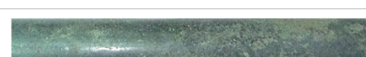



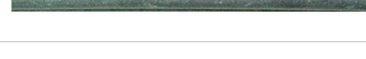

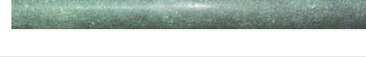
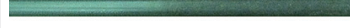



Fig. 10 Farming Test for Pre- & Post-hot-dip Zinc Coated Steel Pipes

No.	試片說明 Description	3 個月後 3 Months Later	
1	預熱浸鍍鋅鋼管 Pre-hot-dip Zinc Coated Steel Pipe (1/2") 鍍層代號 Coating Mass: Z120		
2	預熱浸鍍鋅鋼管 Pre-hot-dip Zinc Coated Steel Pipe (3/4") 鍍層代號 Coating Mass: Z120		
3	預熱浸鍍鋅鋼管 Pre-hot-dip Zinc Coated Steel Pipe (1") 鍍層代號 Coating Mass: Z120		
4	預熱浸鍍鋅鋼管 Pre-hot-dip Zinc Coated Steel Pipe (1/2") 鍍層代號 Coating Mass: Z275		
5	預熱浸鍍鋅鋼管 Pre-hot-dip Zinc Coated Steel Pipe (3/4") 鍍層代號 Coating Mass: Z275		
13	後熱浸鍍鋅鋼管 Post-hot-dip Zinc Coated Steel Pipe (1/2") 鍍層附著量 Coating Mass: 300g/m <sup>2</sup>		
14	後熱浸鍍鋅鋼管 Post-hot-dip Zinc Coated Steel Pipe (3/4") 鍍層附著量 Coating Mass: 300g/m <sup>2</sup>		
15	後熱浸鍍鋅鋼管 Post-hot-dip Zinc Coated Steel Pipe (1") 鍍層附著量 Coating Mass: 300g/m <sup>2</sup>		

資料來源：燁輝企業檢測實驗室  
Source: Yieh Phui Testing and Measurement Laboratory

圖十一 農田耐蝕性試驗—預熱浸鍍 5% 鋁-鋅鋼管、預熱浸鍍 55% 鋁-鋅鋼管

Fig. 11 Farming Test for Pre-hot-dip 5% & 55% Al-Zn Coated Steel Pipes

No.	試片說明 Description	3 個月後 3 Months Later	
6	預熱浸鍍 5% 鋁-鋅鋼管 Pre-hot-dip 5% Al-Zn Coated Steel Pipe (1/2") 鍍層代號 Coating Mass: Y27		
7	預熱浸鍍 5% 鋁-鋅鋼管 Pre-hot-dip 5% Al-Zn Coated Steel Pipe (3/4") 鍍層代號 Coating Mass: Y27		
8	預熱浸鍍 5% 鋁-鋅鋼管 Pre-hot-dip 5% Al-Zn Coated Steel Pipe (1/2") 鍍層代號 Coating Mass: Y35		
9	預熱浸鍍 5% 鋁-鋅鋼管 Pre-hot-dip 5% Al-Zn Coated Steel Pipe (3/4") 鍍層代號 Coating Mass: Y35		
10	預熱浸鍍 5% 鋁-鋅鋼管 Pre-hot-dip 5% Al-Zn Coated Steel Pipe (1") 鍍層代號 Coating Mass: Y35		
11	預熱浸鍍 55% 鋁-鋅鋼管 Pre-hot-dip 55% Al-Zn Coated Steel Pipe (1/2") 鍍層代號 Coating Mass: AZ150		
12	預熱浸鍍 55% 鋁-鋅鋼管 Pre-hot-dip 55% Al-Zn Coated Steel Pipe (3/4") 鍍層代號 Coating Mass: AZ150		

資料來源：燁輝企業檢測實驗室  
Source: Yieh Phui Testing and Measurement Laboratory



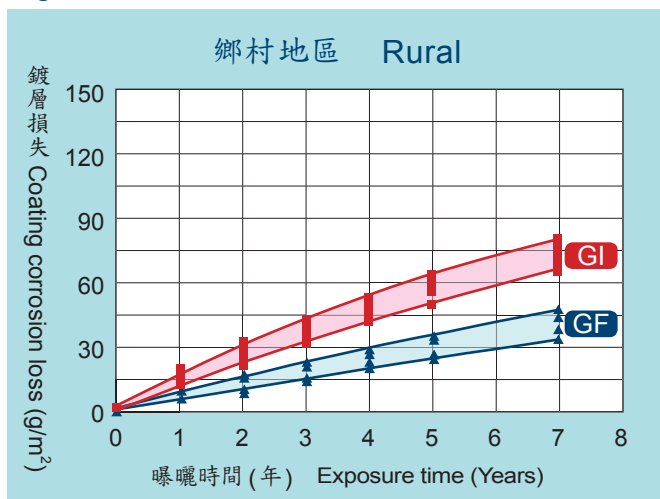
### 鋁鋅鳳鋼板之大氣曝曬試驗

鋁鋅鳳 (鍍 5% 鋁-鋅) 鋼板與熱浸鍍鋅鋼板在不同地區大氣曝曬的鍍層重量損失比較

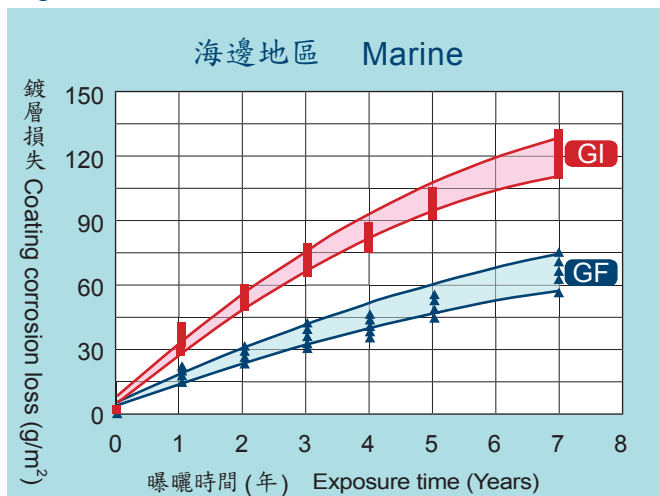
- 曝曬地點：1. 鄉村地區  
2. 工業地區  
3. 海邊地區→墾丁 (距海岸 50m)

在相同鍍層條件下，鍍 5% 鋁-鋅鋼板比傳統鍍鋅鋼板高出約 2 倍的耐蝕能力。

圖十二 不同鋼板在鄉村地區之鍍層損失  
Fig.12 Coating loss in rural area



圖十四 不同鋼板在海邊地區之鍍層損失  
Fig.14 Coating loss in marine area



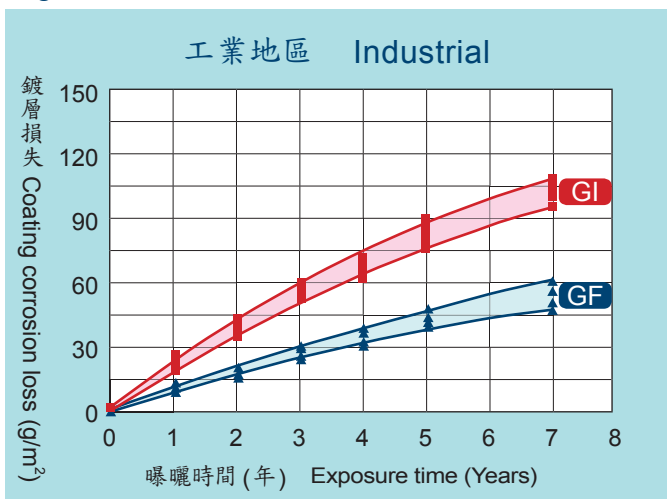
### Outdoor Exposure Test for PhuizerFan

Comparison of Coating Weight Loss between GF and GI under Different Outdoor Exposure Conditions

- Test Site: 1. Rural  
2. Industrial  
3. Marine: Kenting, Taiwan (50m to the coast)

With the same coating weight, GF's corrosion resistance is approximately two times better than conventional GI.

圖十三 不同鋼板在工業地區之鍍層損失  
Fig.13 Coating loss in industrial area



圖十五 南台灣海邊地區試驗實景  
Fig.15 Actual test site in southern Taiwan



表三 鋁鋅鳳鋼板與鍍鋅鋼板在不同地區環境使用壽命 (年)<sup>1</sup> 之比較

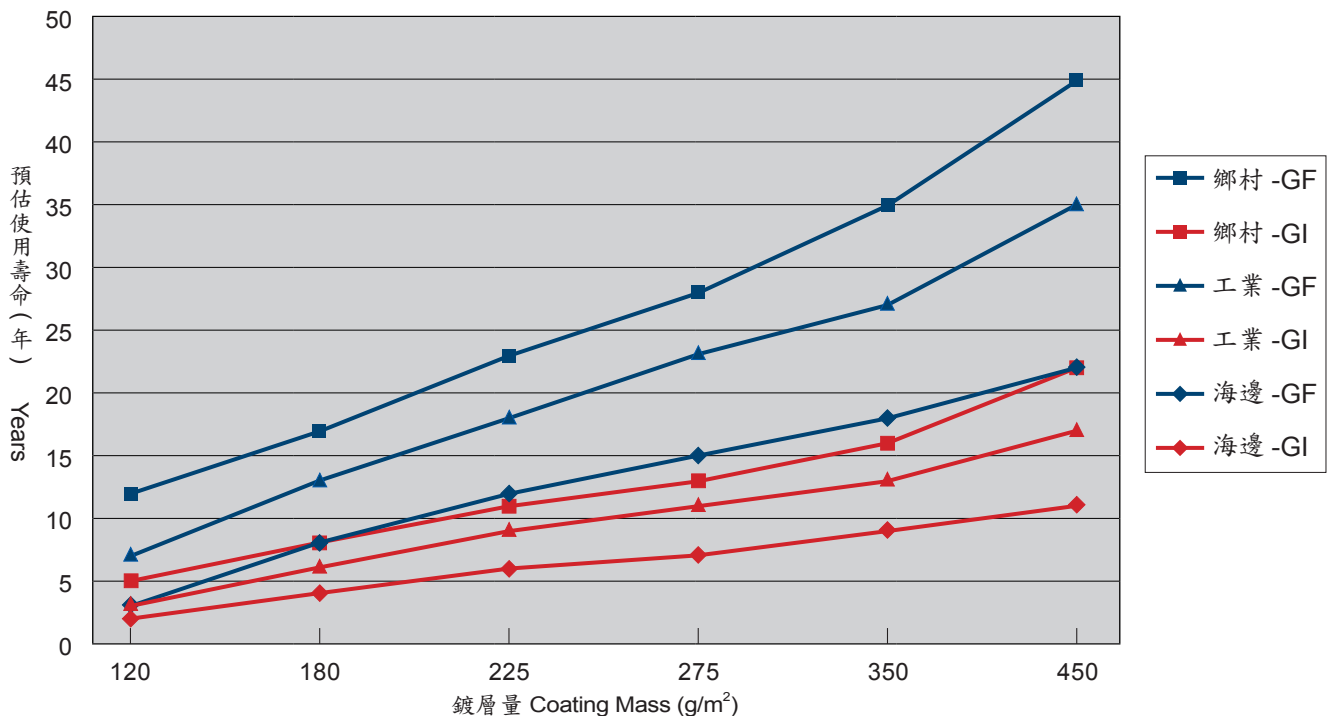
Table 3 Years of Useful Life<sup>1</sup> of PhuizerFan & GI

最小雙面鍍層量 Min. Two-side Coating Mass (g/m <sup>2</sup> )			120	180	225	275	350	450
使用壽命 (年) Years of Useful Life	鄉村地區 Rural	GF	12	17	23	28	35	45
		GI	5	8	11	13	16	22
	工業地區 Industrial	GF	7	13	18	23	27	35
		GI	3	6	9	11	13	17
	海邊地區 Marine	GF	3	8	12	15	18	22
		GI	2	4	6	7	9	11

資料來源：燁輝企業檢測試驗室  
Source: Yieh Phui Testing and Measurement Laboratory

圖十六 鋁鋅鳳鋼板與鍍鋅鋼板在不同地區環境預估之使用壽命 (年)<sup>1</sup>

Fig.16 Estimated Years of Useful Life<sup>1</sup> of PhuizerFan & GI



資料來源：燁輝企業檢測試驗室  
Source: Yieh Phui Testing and Measurement Laboratory

註 1 表三、圖十六中之「使用壽命」係指鍍層厚度完全因腐蝕而損失至鋼材完全裸露之時間。

Note 1 "Useful life" refers to the time consumed when coating is completely corroded and the base metal is exposed to the air in Table 3 & Fig.16.



### 混凝土試驗：試驗一

為評估鍍鋅與鍍鋁-鋅產品用於工地建材之耐蝕性，特進行此項混凝土試驗。本試驗共歷時1年8個月。

試驗條件：

#### 1. 試片：

- (1) 擇 GI、GF、GL 產品，以不同鍍層量及不同化成處理（CL、AF、N）鋼板，共計 18 顆鋼捲。（備註：CL 表鉻酸處理、AF 表耐指紋藥劑、N 表無化成處理）
- (2) 將上述鋼捲裁切成 75mm×150mm 試片，並以 3M 膠帶進行單邊封邊（為評估腐蝕切邊保護）。每組試片為 18 片，共準備兩組試片。其試片資料（表四）以及試片封邊情況（圖十七）如下。

2. 泥漿：將市售預拌混凝土包，加入適量水分拌勻。其酸鹼值落於 pH11~12。

3. 將上述試片插入泥漿中，並且試驗開始一個禮拜內，每日需在試片上澆水，以符合標準土木工程施工法（試驗配置如圖十八所示）。

4. 於預定時間，將試片取出觀察試片腐蝕情形。

表四 試片資料

Table 4 Specification information

No.	鍍層別 Coating	化成處理 Surface treatment	鍍層量 Coating mass	鋼捲號碼 Coil no.	試片厚度 Thickness (mm)
1	GI	CL	Z12	91A739A00	1.550
2			Z18	91A772A00	0.490
3			Z27	8CA993A00	0.483
4		AF	Z12	86C360B00	0.476
5			Z18	91A061X00	0.356
6			Z27	88B809B00	2.670
7	GL	CL	AZ100	93B691B00	0.584
8			AZ150	8AB285B00	1.000
9		AF	AZ70	85C500B00	0.254
10			AZ100	85D328B00	0.356
11			AZ150	85C665B00	0.500
12	GF	CL	Y45	94B443B00	0.700
13			Y60	7CA582B00	0.750
14			Y90	94L912B00	0.630
15		AF	Y40	91A585B00	0.762
16			Y60	92L054B00	0.711
17			Y115	7CA721B00	1.550
18		N	Y60	89L928B00	2.720

### Concrete Test: Test 1

In order to evaluate the corrosion resistance among GI, GF, and GL when the steel products are used in a construction site, we conducted the test below. It has lasted one year and eight months.

Test Condition:

#### 1. Specimen:

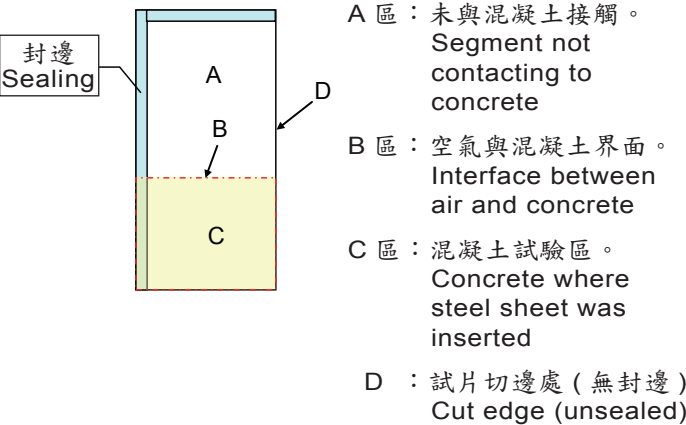
- (1) Different coating weights and surface treatments were applied on the GI, GF, and GL products we prepared. The specimens were sourced from 18 coils. Surface treatments were chromate (CL), anti-fingerprint (AF), and non-surface treated (N).
- (2) The size of the specimens is 75mm×150mm and 3M tape was adopted to seal single side of the specimens in order to see cut edge protection. Each set has 18 pieces of specimens, and there are 2 sets prepared. Table 4 shows the specimen information and Fig. 17 demonstrates cut edge sealing condition.

2. Concrete: Ready mixed concrete purchased from the market was properly mixed with water. The pH is around 11~12.

3. The specimens were inserted into the concrete. Within the first week of test, water was sprayed onto the concrete so as to simulate a standard civil engineering construction. (See Fig. 18.)

4. We removed the specimens and observed corrosion on them.

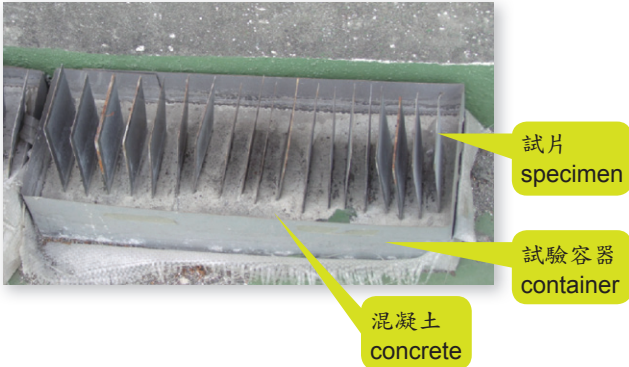
圖十七 試片封邊、試驗示意圖  
Fig. 17 Specimen segments



試驗結果：

1. 第一組試片於試片埋入第 10 天起出，觀察鋼板與混凝土初期反應，其結論如下：  
(1) 【空氣與混凝土界面】（見圖十七，B 區）之腐蝕能力較強，其原因為空氣與混凝土界面含水量較高，鹼性水質依舊存在，繼續與鋼板鍍層起反應。  
(2) 依實驗結果觀察可知，GL 普遍抗鹼能力較弱，GF 最佳。
2. 第二組試片經 1 年 8 個月後取出，其試驗結果如附件所示，經觀察僅【空氣與混凝土界面】有明顯紅銹現象，其餘部分僅出現明顯白銹以及黑變。
3. 針對試片紅銹面積大小，作為試片耐蝕能力之比較，其結果如表五；結果顯示 GF 耐蝕性表現優越，GI 次之，GL 最差。

圖十八 試驗配置圖  
Fig. 18 Test arrangement



Test Result:

1. The first set of specimens was taken out 10 days later. We observe the initial reaction between the steel sheets and concrete. Below is the result.  
(1) Only [B: Interface between air and concrete] in Fig. 17 demonstrates stronger corrosion. It is because the water content is higher in the interface. Alkaline water still reacted with the metallic coating.  
(2) According to the test result, GL's alkali resistance basically is relatively weaker, whereas GF is the best.
2. The second set of the specimens shows obvious red rust on Segment B, and the rest segments have obvious white rust and black tarnish.
3. The size of red rust connects with corrosion resistance of the specimen. Table 5 also shows that GF's corrosion resistance is superior to the other two products. GL is the worst.

表五 空氣與混凝土界面之耐鹼能力

Table 5 Alkali resistance of the interface between air and concrete

	CL	AF	N
GI	2	5	—
GF	2	1	2 ~ 3
GL	4 ~ 5	4	—

備註：等級 1 優 → 5 劣  
Remark：Grade Best Worst

資料來源：燁輝企業檢測試驗室  
Source：Yieh Phui Testing and Measurement Laboratory



圖十九 鍍鋅與鍍鋁-鋅產品之混凝土試驗結果

Fig. 19 Test results of concrete test for GI, GF & GL

No.1: GI/CL/Z12	No.2: GI/CL/Z18	No.3: GI/CL/Z27	No.4: GI/AF/Z12	No.5: GI/AF/Z18	No.18: GI/AF/Z27
					
No.6:GL/CL/AZ100	No.7:GL/CL/AZ150	No.8:GL/AF/AZ70	No.9:GL/AF/AZ100	No.10:GL/AF/AZ150	No.11:GF/CL/Y45
					
No.12: GF/CL/Y60	No.13: GF/CL/Y90	No.14: GF/AF/Y40	No.15: GF/AF/Y60	No.16: GF/AF/Y115	No.17: GF/N/Y60
					

資料來源：燁輝企業檢測試驗室  
Source : Yieh Phui Testing and Measurement Laboratory

## 混凝土試驗：試驗二

為比較 GF 鋼板 (鍍層量 Y18, 耐指紋處理) 與 GI 鋼板 (鍍層量 Z350, 鉻酸處理) 之混凝土附著性與耐蝕性, 將混凝土倒入不同鍍層種類鋼板為底之圓柱內, 乾燥 10 天後將凝固之混凝土移除。高鹼性混凝土 (pH 值約 11) 明顯地讓熱浸鍍鋅鋼板產生腐蝕與黑污, 但鋁鋅鳳耐指紋皮膜尚未有腐蝕狀況產生, 如圖二十所示。

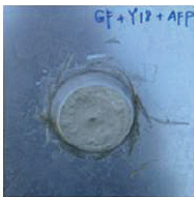
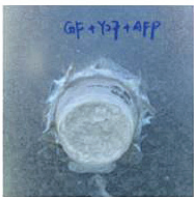
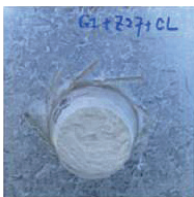
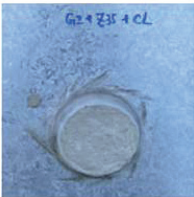

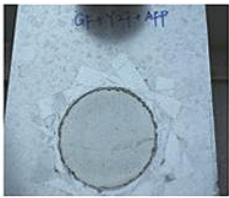
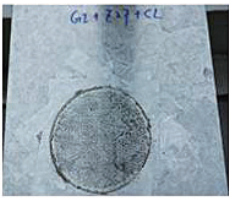
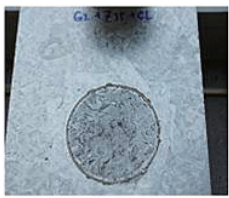
混凝土種類：

預拌混凝土，混凝土設計強度為 3000 psi (210 kg/cm<sup>2</sup>)

試驗時間：一週

圖二十 一週後混凝土測試結果

Fig. 20 Test result after one week

鋁鋅鳳鋼板 PhuizerFan		熱浸鍍鋅鋼板 Galvanized	
A (Y18, 1.00mm)	B (Y27, 0.65mm)	C (Z270, 1.20mm)	D (Z350, 1.50mm)
			
			

資料來源：燁輝企業檢測實驗室

Source: Yieh Phui Testing and Measurement Laboratory

## 試驗結果：

1. 在本試驗中，表面施以耐指紋處理的 GF 鋼板比傳統鉻酸處理之 GI 鋼板具更佳之耐鹼性。
2. 水泥之附著性：  
GF 鋼板施以耐指紋處理之鋼板表面水泥附著性十分良好，無不良結果。
3. 其他優點：  
表面施以耐指紋處理的 GF 鋼板具較佳之潤滑性，在成形時可減少潤滑劑之使用量。

## Concrete Test: Test 2

In order to compare concrete adhesion and corrosion resistance between GF steel sheet (coating mass: Y18, surface treatment: anti-fingerprint) and GI steel sheet (coating mass: Z350, surface treatment: chromate), concrete was poured into cylinders with different materials of bottoms. 10 days later, the concrete was dried and removed. High alkali concrete (pH value about: 11) has apparently caused chromated GI to corrode and produce black tarnish, but the anti-fingerprint film of GF has not yet appeared corrosion condition in part, as shown in Fig. 20.

Concrete Type:

Ready mixed concrete, concrete strength is 3000 psi (210 kg/cm<sup>2</sup>)

Test Time: 1 week

## Test Result :

1. In the concrete test, Y18 steel with AFP treatment could offer better caustic resistance than Z350 with traditional chromate treatment.
2. Concrete adhesion:  
According to the result of the concrete test, Y18 steel with the AFP treatment do not cause any adhesion problem since the concrete adhered to the coated sheet very tightly.
3. Other advantage:  
PhuizerFan with AFP treatment could offer better lubricity which could decrease the consumption of lubrication oil during forming.



### 成形性／沖壓性

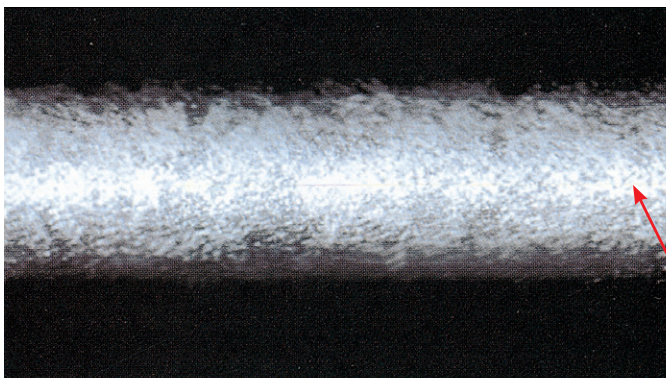
#### 鋁鋅鳳鋼板成形性設立新標準

GF 鋼板是第一個比其所保護的鋼材更具成形性的熱浸鍍層，介於鋼材及 GI 鍍層之間的脆性金屬間合金層幾乎不存在於 GF 鋼板，一般在成形加工作業時所發生之鍍層龜裂大部分都是起於此合金層所造成，此乃傳統 GI 鍍層的缺點。

GF 鋼板特別適合用在深沖、沖壓成形、輥輪成形及多重嚴厲彎曲，即使最嚴厲變形亦較 GI 鋼板及 GL 鋼板不易發生鍍層龜裂或剝落的現象，如圖二十一所示。

圖二十一 GF 鋼板與 GI 鋼板零 T 彎曲試驗  
Fig. 21 Zero T Bend of GF and GI Steel

零 T 彎曲試驗  
Zero T Bend



a. 鋁鋅鳳鋼板在 OT 彎曲試驗中無龜裂現象  
GF shows no cracking or flaking at zero T bend.



b. 熱浸鍍鋅鋼板在 OT 彎曲試驗中鍍層表面有裂痕現象  
Hot-dip galvanized steel exhibits flaking on the coating surface at zero T bend.

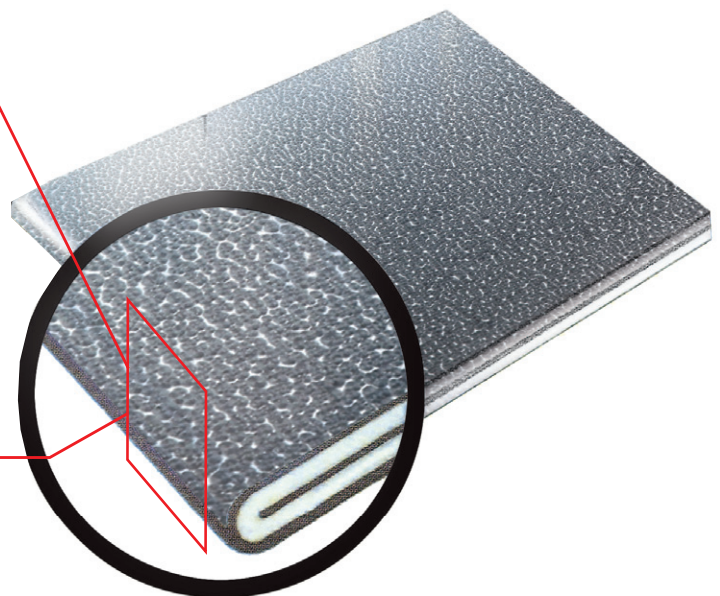
### Formability/Drawability

#### PhuizerFan steel sets new standards in formability

GF is the first hot-dip coating that is more formable than the steel it protects. The brittle intermetallic layer between the steel substrate and GI coating is virtually eliminated with GF. This layer is the site where most cracks originate during forming operations--a disadvantage of conventional hot-dip coatings.

Particularly suited for applications involving deep drawing, press forming, profiling and multiple severe bending, GF can take the most severe deformation with virtually no cracking or flaking compared with GI and GL. See Fig. 21.

GF 鋼板與 GI 鋼板 OT 彎曲試驗之情形 (示意圖)  
Diagram below shows zero T bend of GF and GI steel sheets.



## 彩色鳳 ( 熱浸鍍 5% 鋁-鋅 ) 鋼板及塗料 Pre-Painted 5% Al-Zn Coated Steel Sheet and Paint

### 彩色鳳及塗料

#### 表面處理最好的選擇

GF 鋼板適用於傳統熱浸及電鍍鍍鋅鋼材所使用之傳統及先進的表面前處理技術。如磷酸鋅、複合氧化物、鉻酸鹽及軋塗成膜 (Dry-in-Place) 處理。

#### 塗料

經適當的前處理，GF 鋼板是底漆及上塗漆最佳之基材。風乾型底漆及面漆、烘乾型底漆及上塗漆、粉漆、PU 底漆及環氧樹脂底漆均可成功地塗覆於 GF 鋼板上。

已成形之 GF 鋼板施以粉漆塗裝亦可得到優良之表面附著性及外觀。

GF 鋼板的鋅／鋁成分提供了重要的表面均質性，免於外物沾附，及結晶方向等特性而形成良好的塗料附著力。和其他的鍍製鋼材比較，GF 鋼板鋼材對表面前處理及塗料附著力而言是一絕佳的底材。

即使經過了嚴厲的成形加工，GF 鋼板展現出最高的鍍層附著力，也因此改善耐塗料裂痕、耐邊緣銹蝕、耐腐蝕及耐起泡等性能，如表六所示。



### COLORFAN & Paint

#### Your pick of pre-treatments...

GF readily accepts all conventional and advanced technology pre-treatments used on conventional hot-dip and electrogalvanized products. A few examples include zinc phosphate, complex oxide, chromate and Dry-in-Place treatments.

#### ... and paints

When properly pre-treated, GF is an excellent base for primers and topcoats. Air-drying primers and topcoats, bake drying primers and topcoats, powder paints, urethane primers and epoxy primers can be successfully applied to GF.

Powder coating has also been used on formed GF components with excellent surface adherence and appearance.

GF's zinc/aluminum composition provides the important surface homogeneity, free from tramp elements, and crystal orientation required for good paint adhesion. Compared to other coated steels, GF products are a superior substrate for pre-treatment and paint adhesion.

Even after severe forming, GF exhibits the highest adhesion and substantially improved resistance to paint crazing, edge creep, corrosion, and blistering. See Table 6.



表六 絕佳的結合—彩色鳳 ( 熱浸鍍 5% 鋁-鋅烤漆 ) 鋼板之烤漆性能

Table 6 An Excellent Combination -- Pre-Painted Sheet Performance of 5% Al-Zn Coated Sheet Coated with Coil-Coating Paint Systems

鋼板產品 Steel Sheet Product			彩色鳳 ( 鍍 5% 鋁-鋅烤漆 ) 鋼板 Pre-painted GF	熱浸鍍鋅烤漆鋼板 Pre-painted GI	備註 Remarks
塗料系統  Paint System	A 壓克力樹脂底漆 + 聚酯面漆 Primer Acrylic +Topcoat Polyester	附著力衝擊試驗 1.62kg.m 反向受力 Adhesion after 140 in. Lb Rev.Impact	10	9	(1) 評分等級：10 = 優， 0 = 差，最低可接受等級 = 7  (2) 附著力評定係根據 1.62 kg.m 反向衝擊後，以 Scotch 膠帶剝除受衝擊的區域（凸面）來檢查塗料附著力的損失。
		經劃叉之腐蝕狀況 <sup>(3)</sup> Corrosion (cross cut)	9	8	(3) 以 5% 鹽水噴霧試驗進行 500 小時的腐蝕試驗。
		經 3T 彎曲試驗之腐蝕狀況 <sup>(3)</sup> Corrosion (3T Bend)	9	4	
	B 環氧樹脂底漆 + 聚酯面漆 Primer Epoxy+ Topcoat Polyester	附著力衝擊試驗 1.62kg.m 反向受力 Adhesion after 140 in. Lb Rev.Impact	10	9	
		經劃叉之腐蝕狀況 <sup>(3)</sup> Corrosion (cross cut)	9	1	(2)Adhesion rating is based on 140 inch-pound reverse impact followed by Scotch-tape stripping of the impacted (convex) area to detect loss of paint adhesion.
		經 3T 彎曲試驗之腐蝕狀況 <sup>(3)</sup> Corrosion (3T Bend)	9	3	(3) Corrosion tested by 500 hours 5% salt spray.
	C 環氧樹脂底漆 + 壓克力水性面漆 Primer Epoxy+ Water-Based Topcoat Acrylic	附著力衝擊試驗 1.62kg.m 反向受力 Adhesion after 140 in. Lb Rev.Impact	10	10	
		經劃叉之腐蝕狀況 <sup>(3)</sup> Corrosion (cross cut)	9	3	
		經 3T 彎曲試驗之腐蝕狀況 <sup>(3)</sup> Corrosion (3T Bend)	9	4	

資料來源：燁輝企業檢測實驗室  
Source : Yieh Phui Testing and Measurement Laboratory

## 彩色鳳鋼板之耐蝕性 COLORFAN Steel Corrosion Resistance

### 彩色鳳鋼板耐蝕性優越

#### COLORFAN 與 PPGI 之鹽水噴霧試驗結果






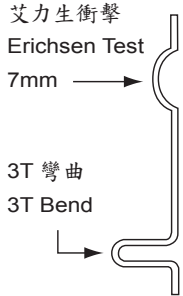
1. 試驗條件：試驗片以 3T 彎曲程度彎曲及 7mm 之艾力生衝擊後，再依據 JIS Z 2371 之鹽水噴霧試驗條件進行試驗。
2. 試驗結果：由圖二十二與圖二十三照片可知，在經過 2000 小時之鹽水噴霧試驗之後，彩色鳳鋼板之 Y18 鍍層（經 2000hrs 後，白銹發生面積 8%），其耐蝕性比預塗覆熱浸鍍鋅烤漆鋼板（PPGI）之 Z18 鍍層（經 2000hrs 後，白銹發生面積 50%）更為優越。

### COLORFAN with Excellent Corrosion Resistance The Salt Spray Test Results of COLORFAN & PPGI

1. Test condition: Samples with 3T Bend and 7mm Erichsen mechanical process are tested according to the requirements of JIS Z 2371.
2. Test result: As shown in Fig. 22 & 23, the corrosion resistance property of COLORFAN steel sheet with Y18 (8% white rust after 2000hrs salt spray test) is superior to pre-painted hot-dip galvanized coated steel sheet (PPGI) with Z18 (50% white rust after 2000hrs salt spray test).

圖二十二 熱浸鍍鋅烤漆鋼板 (PPGI)






Fig. 22 Pre-painted Hot-Dip Galvanized Coated Steel Sheet (PPGI)

鍍層量 Coating Mass Z18 (180g/m <sup>2</sup> min.) 塗層 Paint: PE 25μm					
Before test	500 hrs	1000 hrs	1500 hrs	2000 hrs	剖面圖 Section
WR 0%	WR 0%	WR 0.5%	WR 30%	WR 50%	艾力生衝擊 Erichsen Test 7mm →  3T 彎曲 3T Bend
					

資料來源：燁輝企業檢測試驗室  
Source: Yieh Phui Testing and Measurement Laboratory

圖二十三 彩色鳳鋼板

Fig. 23 COLORFAN Steel Sheet

鍍層量 Coating Mass Y18 (180g/m <sup>2</sup> min.) 塗層 Paint: PE 25μm					
Before test	500 hrs	1000 hrs	1500 hrs	2000 hrs	剖面圖 Section
WR 0%	WR 0%	WR 0%	WR 0%	WR 8%	艾力生衝擊 Erichsen Test 7mm →  3T 彎曲 3T Bend
					

備註 Remark: WR: White Rust, 白銹

資料來源：燁輝企業檢測試驗室  
Source: Yieh Phui Testing and Measurement Laboratory



### 綠色環保鋼材

燐輝鋁鋅鳳產品為符合歐盟 RoHS 指令之鋼品，鋼材表面可施以耐指紋處理，對於環境之永續發展貢獻良多。

### 節能利器

鋁鋅鳳鋼品由於具有優異的成型性與較 GI 鋼品更佳的耐蝕性能，對於目前各國積極開發的太陽能發電產業提供最佳的鋼品應用。鋁鋅鳳鋼品可應用於太陽能面板框架、底板及相關太陽能發電設備結構（桁架支架）及五金固定扣件沖壓成型等用途，降低大氣腐蝕現象對設備結構侵蝕損壞設備情況，延長設備機組壽命。

19

### 對直接環境衝擊較小

與其他熱浸鍍製產品的比較試驗中，鋁鋅鳳的金屬鍍層流失量最少。

### 使用壽命更長

鋁鋅鳳可避免金屬鍍層提早受到破壞，讓產品使用壽命更長。

### 可回收

鋁鋅鳳鋼品 100% 可回收。

### Green Steel

PhuizerFan complies with EU RoHS Directive, contributing a lot to a sustainable environment. Anti-fingerprint treatment can be applied on PhuizerFan surface.

### Energy saving steel

GF steel sheets possess excellent formability and better corrosion resistance compared with GI steel sheets. GF provides the best products for solar energy industry that is vigorously developed by every country all over the world. For this industry, GF can be used for solar panel frame, base panel, solar generator apparatus (beam or stand), and hardware fastener for drawing. The material lowers the atmospheric corrosion affecting apparatus structure and extends the useful life of the apparatus.

### Less impact on the immediate environment

In tests against other hot-dip coatings, PhuizerFan demonstrated the least amount of coating loss.

### Longer useful life

PhuizerFan avoids untimely coating deterioration, so the product lasts longer.

### Recyclable

PhuizerFan is 100% recyclable.





## 產品用途與應用實績

Applications and Application References

### 用途與實績



高雄市大社區台灣菸酒公司發貨中心  
鍍層量 Y30，SMP 塗料  
Distribution center of Taiwan Tobacco & Liquor Corp., Kaohsiung, Taiwan  
Coating mass: Y30; paint type: SMP



台南市精剛精密科技股份有限公司  
鍍層量 Y30，PVDF 塗料  
S-Tech Corp., Tainan, Taiwan  
Coating mass: Y30; paint type: PVDF



高雄市中鋼機械廠房  
鍍層量 Y30，PE 塗料  
Plant building of China Steel Machinery Corp., Kaohsiung, Taiwan  
Coating mass: Y30; paint type: PE

### Applications & References



屏東農業生物科技園區  
鍍層量 Y30，PVDF 塗料  
Pingtung Agricultural Biotechnology Park, Pingtung, Taiwan  
Coating mass: Y30; paint type: PVDF

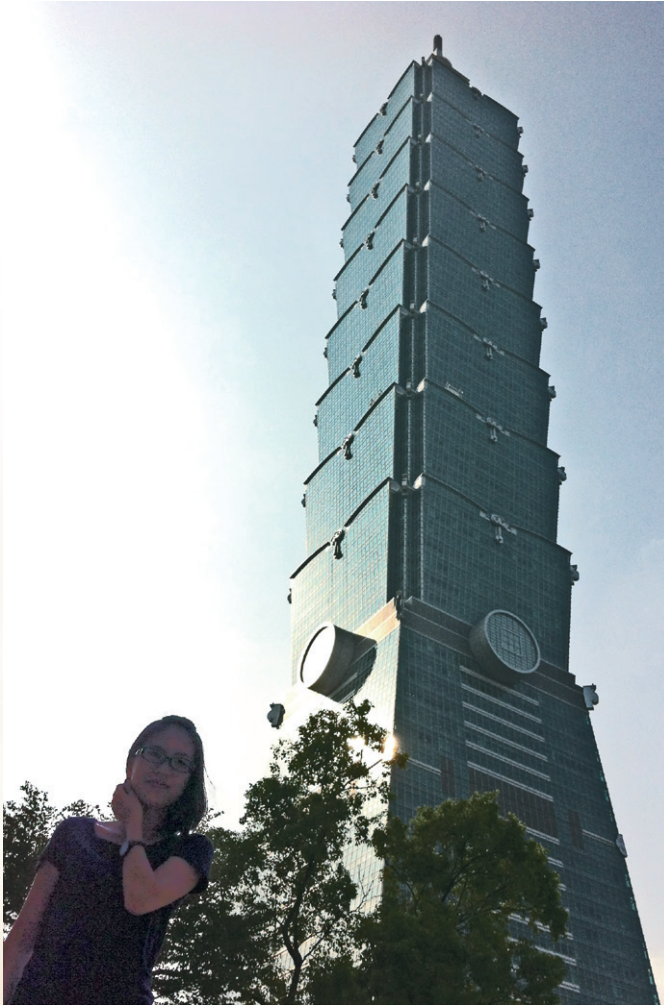


台南市森田印刷廠股份有限公司  
鍍層量 Y27，PVDF 塗料  
Sentien Printing Factory Co., Ltd., Tainan, Taiwan  
Coating mass: Y27; paint type: PVDF



苗栗縣裕隆汽車廠房  
鍍層量 Y27，PVDF 塗料  
Plant building of Yulon Motors, Miaoli, Taiwan  
Coating mass: Y27; paint type: PVDF





樓承板 (台北 101 大樓實照)  
Floor decks (Photo of Taipei 101 Building)



樓承板 (澳洲墨爾本皇家兒童醫院實照)  
Floor decks of the Royal Children's Hospital in  
Melbourne, Australia



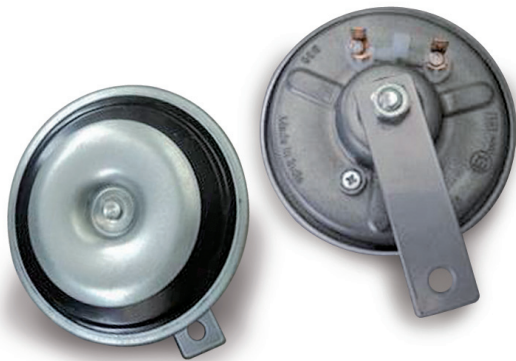
高雄市義大癌治療醫院樓承板  
Floor decks of E-Da Cancer Hospital, Kaohsiung, Taiwan







太陽能板支架  
Solar Panel Bracket



汽車喇叭  
Motor Speaker



汽車電動椅馬達蓋  
Motor Housing of Power-Adjustable Automotive Seat



穀物筒倉  
加拿大 Twister Pipe 公司提供  
Grain bin  
Courtesy of Twister Pipe Ltd., Canada



中國大陸福州高鐵站  
使用燁輝(中國)熱浸鍍 5% 鋁-鋅鋼板  
China High-Speed Railway--Fuzhou Station  
Hot-Dip 5% Al-Zn Coated Steel





自動化禽畜養殖設施用料  
鍍層量 Y35  
Frame of an automatic poultry feeding system  
Coating mass: Y35



家禽飼餵系統，鍍層量 Y35  
Poultry trough  
Coating mass: Y35



溫室棚架管，鍍層量 Y27  
Steel tube shacks for greenhouse  
Coating mass: Y27



溫室支架管，鍍層量 Y35  
Steel tube supporters for greenhouse  
Coating mass: Y35



鋁鋅鳳鋼捲可生產之規格尺寸  
PhuizerFan Specification

燐輝與燐輝 (中國) 鋁鋅鳳鋼捲規格與尺寸

Yieh Phui and Yieh Phui (China) PhuizerFan Specifications

品名 Product Name		鋁鋅鳳 ( 熱浸鍍 5% 鋁-鋅 ) 鋼捲 PhuizerFan (5%Al-Zn Coated Steel Coil)																	
規格 Specifi- cations		CNS 15236 2013			JIS G 3317 2017			ASTM A875M 2013				AS 1397 2011			EN10346 2015				
		SZACD1	SZACC	SZAC340 SZAC400 SZAC440 SZAC490 SZAC540 SZAC570	SZAH SZAH 340 400 440 490	SZACC SZAC 340 400 440 570	SZACD1	Comm- ercial Steel Type A B C	Form- ing Steel Type A B	DDS	Struct- ural Steel Grade 230 255 275 340	Struct- ural Steel Grade 550	G3	G1 G2	G250 G300 G350 G450 G500 G550	DX51D	DX52D DX53D	S220GD S250GD S280GD S320GD S350GD	S550GD
底材 厚度 Base Steel Thickness (mm)	燐輝 Yieh Phui	0.27 1.10	0.2 1.8	0.2 1.75	1.30 4.50	0.2 1.80	0.27 1.10	0.20 4.50		0.27 1.10	0.20 4.50	0.20 2.00	0.27 1.10	0.2 1.8	0.2 4.50	0.20 4.50	0.27 1.10	0.20 4.50	0.20 1.80
	燐輝 ( 中國 ) Yieh Phui (China)	0.40 2.20	0.26 2.20	0.28 2.20	1.80 2.20	0.26 2.20	0.40 2.20	0.26 2.20	0.30 2.20	0.40 2.20	0.28 2.20	0.25 1.30	0.40 2.20	0.26 2.20	0.25 2.20	0.26 2.20	0.40 2.20	0.3 2.0	0.25 2.0
鍍層量 Coating Mass		Y08 Y35			Y08 Y10 Y12 Y18 Y20 Y22 Y25 Y27 Y35			ZGF 90 ZGF135 ZGF180 ZGF225 ZGF275 ZGF350				ZA90 ZA450			ZA 095 ZA 130 ZA 185 ZA 200 ZA 255 ZA 300				
表面精整 Surface Finish		一般鍍 5% 鋁-鋅鋅花、微細鋅花 <sup>1</sup> Regular Spangle, Minimized Spangle <sup>1</sup>																	
表面處理 Surface Treatment		鉻酸或塗油或有機樹脂 ( 耐指紋塗膜 ) 處理 Chromating Treatment, Oiled or Resin Coated (anti-fingerprint)																	
備註 Remarks		1. 鋅花大小直徑 3mm 以上為一般鋁鋅鳳鋅花，3mm 以下為微細鋅花。 2. 厚度、寬度、平坦度……等之公差容許範圍，依各製品規範之要求。 3. 對各種表面精整厚度 2.0mm 以下，可再實施調質處理。 4. 客戶訂購厚度未滿 1.6mm 之 JIS G3302 HGI 製品，其規格要求比照厚度 1.6mm JIS G3302 HGI 製品之規定。 5. 鋼捲內徑為 508 或 610mm；外徑之最大容許值為 2000mm。 6. 不在上述範圍之產品，如尺寸、鍍層、規格等，請以個案詢問專案開發方式進行。  1. Spangle diameter above 3mm is regular spangle. Under 3mm is minimized spangle. 2. Tolerance for thickness, width, flatness and so on conforms to individual product specification. 3. All products with thickness 2.0mm and under can be skinpassed. 4. The specification for thicknesses under 1.6mm for hot-rolled base metal according to JIS G3302 will be the same as for thicknesses 1.6mm and above. 5. Coil inside diameters can be either 508mm or 610mm. Maximum coil outside diameter is 2000mm. 6. Please make inquiries to our Sales & Marketing Division for products with special specifications.																	



燐輝與燐輝 ( 中國 ) 彩色鳳鋼捲規格與尺寸

Yieh Phui and Yieh Phui (China) COLORFAN Specifications

品名 Product Name		彩色鳳鋼捲 COLORFAN Steel Coil																
規格 Specifi- cations		CNS 15298 2013			JIS G 3318 2013		ASTM A755M 2016					AS 2728 2013			EN10169 2010+A1			
		CZACD1~3	CZACC	CZAC340 CZAC400 CZAC440 CZAC490 CZAC540 CZAC570	CZACC CZAC 340 400 440 570	CZACD1	Comm- ercial Steel Type A B C	Form- ing Steel Type A B	DDS	Struct- ural Steel Grade 230 255 275 340	Struct- ural Steel Grade 550	G3	G1 G2	G250 G300 G350 G450 G500 G550	DX51D	DX52D DX53D	S220GD S250GD S280GD S320GD S350GD	S550GD
底材厚度 Base Steel Thickness (mm)	燐輝 Yieh Phui	0.30 ┆ 1.10	0.2 ┆ 1.4	0.2 ┆ 1.25	0.2 ┆ 1.25	0.30 ┆ 1.10	0.2 ┆ 1.4	0.30 ┆ 1.10	0.2 ┆ 1.25	0.2 ┆ 1.25	0.3 ┆ 1.10	0.2 ┆ 1.4	0.2 ┆ 1.25	0.2 ┆ 1.4	0.3 ┆ 1.10	0.2 ┆ 1.25	0.2 ┆ 1.25	
	燐輝 ( 中國 ) Yieh Phui (China)	0.40 ┆ 1.20	0.23 ┆ 1.50	0.23 ┆ 1.30	0.23 ┆ 1.50	0.40 ┆ 1.20	0.23 ┆ 1.50	0.30 ┆ 1.30	0.40 ┆ 1.20	0.23 ┆ 1.30	0.25 ┆ 0.80	0.40 ┆ 1.20	0.23 ┆ 1.50	0.23 ┆ 1.50	0.23 ┆ 1.50	0.30 ┆ 1.30	0.23 ┆ 1.30	0.25 ┆ 0.80
鍍層量 Coating Mass		Y08 ┆ Y35			Y08 Y10 Y12 Y18 Y20 Y22 Y25 Y27 Y35		ZGF 90 ZGF 135 ZGF 180 ZGF 225 ZGF 275 ZGF 350					ZA90 ┆ ZA350			ZA 095 ZA 130 ZA 185 ZA 200 ZA 255 ZA 300			
鋅花 Coating Spangle		一般鍍 5% 鋁-鋅鋅花、微細鋅花 Regular Spangle, Minimized Spangle																
樹脂種類 Paint Type		聚酯、矽質強化聚酯、氟碳、聚氯乙烯可塑溶膠、聚氣酯 PE, SMP, PVDF, PVC, PU																





## 貯存與裝卸

本型錄鋁鋅鳳與彩色鳳鋼捲，均由本公司施予適當的包裝，此包裝僅提供出貨後至客戶成形、加工前短期室內儲存之保護，而對此期間之儲存保護，相關業者（含成形廠）均負有妥善保管之責任。無論如何絕不可將鋼捲產品貯存於潮濕環境或戶外，濕氣結露或戶外雨水可能滲入鋼捲包裝，此時會因毛細管現象之作用汲入鋼板表面，導致水氣無法正常蒸發，而浸入油漆層（此時水氣更不容易蒸發脫離油漆層）。經一段時間後，易在鍍層與漆層間產生白銹，導致產品特性惡化，減短預期的使用壽命，並影響產品之外觀。

已成形之裁板的貯存，同樣必須特別注意此問題。

### ※ 備註：

1. 本型錄所提供的資料已力求準確。對該等資料，燁輝及其子公司不會就其所產生的錯誤陳述或失實陳述承擔任何責任。
2. 對於產品用途之建議及陳述僅供參考，燁輝及其子公司不承擔任何責任。使用燁輝及其子公司所提供或生產的產品之前，客戶應自行斟酌／判斷其適當性。

本型錄內規格變動時不另行通知

## Storage and Handling

PhuizerFan and COLORFAN Steel Sheets are properly packaged in our works. The packaging only provides short term protection indoors during the period when delivering from Yieh Phui's works till forming or further processing at customer's plant. For the storage of this duration, relevant parties, including roll forming factories, shall take mutual responsibility for proper storage. Never store these steel coils in a humid environment or outdoors. When packaging of steel coils soaks mist or raindrops, the capillarity may cause moisture inhaling into the laps of steel sheets and later immersing the paint. (The moisture is then unable to evaporate easily from the paint.) After some time, white rust easily occurs between metallic coating and paint. This can easily deteriorate steel properties, affect its appearance and shorten its life span.

The storage methods foresaid are recommended likewise for the cut-to-sheet products.

### ※Remarks:

1. Efforts have been made to ensure that this information is accurate, but Yieh Phui Enterprise and its subsidiaries do not accept responsibility or liability for errors or information that is found to be misleading.
2. Suggestions for, or descriptions of, the end use or application of products or methods of working are for information only and Yieh Phui Enterprise and its subsidiaries accept no liability thereof. Before using products supplied or manufactured by Yieh Phui Enterprise and its subsidiaries, the customer should satisfy themselves of their suitability.

Specifications are subject to change without notice.





台正字第7932、7979、7980號  
熱浸鍍5%鋁-鋅(鋁鋅鳳)及5%鋁-鋅烤漆(彩色鳳)鋼捲  
PHUIZERFAN AND COLORFAN STEEL SHEETS  
(Hot-Dip 5%Al-Zn Coated & Pre-Painted 5%Al-Zn Coated Steel Sheets)



Taiwan Authorized  
Economic Operator

Registered Firm  
安全認證優質企業



ISO 14064-1

Registered Firm  
溫室氣體盤查  
查證通過工廠

TWAEQ



CNS 12681/  
ISO 9001

Registered Firm  
經濟部標準檢驗局  
正字標記



ISO 14067-1  
PAS 2050

Registered Firm  
產品碳足跡  
查證通過工廠



G 3302 G 3312  
G 3317 G 3318  
G 3321 G 3322  
CRTW15001

JIS Mark  
Qualified Factory  
韓國KTR審查  
驗證合格工廠



ISO 14025  
ISO 14040  
ISO 14044

Registered Firm  
產品環境宣告  
查證通過工廠



OHSAS 18001

Registered Firm  
職業安全衛生管理  
系統驗證通過工廠

總公司 (Head Office)

永遠最好



燁輝企業股份有限公司  
YIEH PHUI ENTERPRISE CO., LTD.

82544 高雄市橋頭區芋寮路369號

No. 369, Yuliao Road, Qiaotou District

Kaohsiung City 82544, Taiwan (R.O.C.)

內銷部(台灣地區)專線: +886-7-6114134 · 6120697

外銷部(海外地區)專線: +886-7-6122303 · 6122328

技術服務專線: +886-7-6114131 · 傳真: +886-7-6114180

免付費服務電話: 0800-666-723

Global Marketing & Sales Division

TEL: +886-7-6122303 · 6130443 · 6112400 · 6122328

Technical Service Division

TEL: +886-7-6114131. FAX: +886-7-6114180

WEBSITE: www.yiehphui.com.tw

E-MAIL: sales@yiehphui.com.tw



QC 080000  
IECQ HSPM

Registered Firm  
有害物質流程管理  
系統驗證通過工廠



ISO 9001

Registered Firm  
品質管理系統  
驗證通過工廠



ISO 14001

Registered Firm  
環境管理系統  
驗證通過工廠



ISO 50001

Registered Firm  
能源管理系統  
驗證通過工廠

燁輝(中國)常熟廠 Yieh Phui (China) Changshu Works

永遠最好



燁輝(中國)科技材料有限公司  
YIEH PHUI (CHINA) TECHNOMATERIAL CO., LTD.

江蘇省常熟經濟開發區沿江工業區燁輝路1號 郵編: 215536

1, Yiehphui Road, Riverside Industrial Park, Changshu

Economic Development Zone, Jiangsu

People's Republic of China ZIP: 215536

營業專線: +86-512-52298412 · 52298413 · 52298414

Marketing & Sales Division

TEL: +86-512-52298412 · 52298413 · 52298414

WEBSITE: www.yiehphuichina.com

E-MAIL: sales@yiehphuichina.com



OHSAS 18001

Registered Firm  
職業安全衛生管理  
系統驗證通過工廠



QC 080000  
IECQ HSPM

Registered Firm  
有害物質流程管理  
系統驗證通過工廠



ISO 9001

Registered Firm  
品質管理系統  
驗證通過工廠



ISO 14001

Registered Firm  
環境管理系統  
驗證通過工廠



IATF 16949

Registered Firm  
品質管理系統  
驗證通過工廠



ISO 50001

Registered Firm  
能源管理系統  
驗證通過工廠



G 3302 G 3312 JIS Mark  
G 3317 G 3318 Qualified Factory  
G 3321 G 3322 韓國KTR審查  
CRCN15001 驗證合格工廠