燁輝企業
YIEH PHUI

鋼之美　唯燁輝
Finest Steel at **Yieh Phui**



燁輝高效抗菌環保鍍面、烤漆鋼捲

Efficient PhuizerGreen® AMC Plus & ColorGreen AMC Plus®

AMC+

義联集團
E UNITED GROUP

本系列產品完全符合歐盟 RoHS 指令之法規要求　THE PRODUCTS COMPLY WITH EU ROHS DIRECTIVE.



我們該如何保護我們所愛的人呢？
How can we provide more protection to our loved ones?

1. 說明

「退伍軍人症」緣於 1976 年 7 月，美國退伍軍人協會在費城舉辦的大會期間，所爆發的一場大規模的細菌感染。美國每年約有 8,000 至 18,000 人感染退伍軍人症。2008 年 2 月，於英國的格拉斯哥 (Glasgow)，更爆發四起死亡之病例。

於 2007 年，被稱為超級細菌的抗藥性金黃色葡萄球菌 (簡稱為 MRSA)，在美國的致死率高於愛滋病。不僅紐約市遭到 MRSA 的襲擊，康乃迪克州、馬里蘭州、俄亥俄州及密西根州等相繼傳出 MRSA 病例。

根據美國醫學會期刊 (The Journal of American Medical Association) 報導，每 100,000 個美國人中每年有 32 人會受到 MRSA 的感染。世界衛生組織 (WHO) 2017 年 2 月 27 日公布 12 種對人類健康構成最大威脅的細菌，這些細菌已對大量抗生素產生耐藥性。根據 WHO 統計，估計每年有 70 萬人死於耐藥性細菌，如果不採取相關行動，預計到 2050 年，這些細菌每天將殺死 1000 萬人。WHO 根據需要開發新藥緊急程度，將 12 種耐藥性細菌分成 3 組，依序為極為重要、十分重要和中等重要。第 1 組 (極為重要) 的細菌有抗藥性鮑氏不動桿菌、抗藥性綠膿桿菌及抗藥性腸桿菌科，這 3 種細菌已對多種抗生素產生抗藥性，倫敦大學學院（UCL）的微生物學家恩尼 (Vicky Enne) 直言，這 3 種細菌基本上無藥可醫。

雖然人們相信未來的醫療科技將消滅所有致病的細菌，然而新的病菌卻不斷的在進化演變甚至釀成重大災難。細菌變異對人類的生存充滿威脅，所以我們以及下一代要如何遠離病菌的威脅呢？

Description

In July 1976, the first outbreak of Legionnaires' disease occurred among veterans attending a convention of the American Legion in Philadelphia. It's estimated that 8,000 to 18,000 people suffer from the disease in the United States each year. In February 2008, 4 deaths were reported in Glasgow, United Kingdom.

In 2007, a so-called MRSA (methicillin-resistant Staphylococcus aureus) superbug caused a higher fatality rate than HIV/AIDS did in the United States. Not only was New York City plagued by MRSA, similar cases were also reported in Connecticut, Maryland, Ohio and Michigan. According to the Journal of American Medical Association (JAMA), 32 of every 100,000 Americans fall victim to MRSA every year.

On February 27, 2017, World Health Organization (WHO) published 12 families of bacteria that pose the greatest threat to human health. These bacteria have become resistant to a large number of antibiotics. WHO estimated that 700,000 people die because of the antibiotic-resistant pathogens annually. If necessary measures are not taken, 10 million people would be killed by those pathogens every day in 2050. According to the urgency of need for developing new antibiotics, WHO divided the 12 families of antibiotic-resistant pathogens into three categories: critical, high and medium priority. The critical group includes antibiotic-resistant Acinetobacter, antibiotic-resistant Pseudomonas aeruginosa and various antibiotic-resistant Enterobacteriaceae. They have been resistant to multiple antibiotics. Dr. Vicky Enne, a microbiologist at the University College London, said frankly that the three pathogens are incurable.

People have always believed that pathogens will eventually be destroyed by medical advances. New pathogens and/or the mutation of microbes, however, keep posing a threat to humans. Seeking the protection for our loved ones becomes an important issue.

2. 建立抗菌環境的必要性

病菌充斥我們生存的環境，生活中常見的病菌如下：

The Necessity of Building an Anti-Microbial Environment

We live in an environment surrounded by pathogens. The most common ones and the diseases they cause are shown below.

菌種 Bacteria	造成之疾病 Disease Caused
金黃色葡萄球菌 Staphylococcus aureus	皮膚性感染、菌血症 skin infections and bacteremia
綠膿桿菌 Pseudomonas aeruginosa	敗血症、肺炎 septicemia and pneumonia
大腸桿菌 Escherichia coli	腹瀉、腎衰竭 diarrhea and kidney failure
肺炎克雷白氏菌 Klebsiella pneumoniae	肺炎、胸膜炎 pneumonia and pleurisy
退伍軍人菌 Legionella pneumophilia	呼吸衰竭、肺炎 respiratory failure and pneumonia
白喉桿菌 Corynebacterium diphtheriae	白喉病 diphtheria

經由消毒殺菌的方法雖可將細菌滅除，但效果短暫。要能夠有效抑制細菌的滋生，同時保護人體避免被病菌侵入才是關鍵。因此，近來為促進人體健康而極力推廣的抗菌相關材料，漸成世界風潮。

3. 綠色環保抗菌鋼捲

鋼材具有經濟、易加工成形、使用壽命長並可回收之優點，普遍運用於日常生活中，可稱為綠色環保材料。隨著健康意識的提昇，消費者對鋼材的性能不僅只限於符合環保訴求，可減少人體與細菌的接觸，進而改善健康環境的抗菌鋼材對消費者更具吸引力。

2009 年本公司為提供安全、健康的居住環境，率業界之先研發供應抗菌鍍面烤漆鋼品，稱為「**燁輝抗菌環保鍍面鋼捲**」與「**燁輝抗菌環保烤漆鋼捲**」。對於金黃色葡萄球菌、綠膿桿菌、大腸桿菌等生活中常見細菌具有優異的抑菌效果，應用於空調風管以及室內隔間裝潢面板成形，並成功獲得學校、醫院的採用。

2018 年本公司有鑑於近年來消費者對於居住環境安全意識的抬頭與重視，經多年研發，針對衛生條件要求更嚴苛的環境，例如藥廠、醫療院所、食品廠，更成功開發出高效型抗菌環保鍍面與烤漆鋼品，稱為「**燁輝高效抗菌環保鍍面鋼捲**」、「**燁輝高效抗菌環保烤漆鋼捲**」與「**燁輝抗靜電高效抗菌環保烤漆鋼捲**」。除對上述常見細菌具有抑菌效果外，對抗藥性金黃色葡萄球菌、退伍軍人菌及白喉桿菌更具有優異的抗菌能力，且後者更具抗靜電之功能，可更廣泛的應用及提供更安全、健康的工作與生活環境。

Disinfection provides an instant and, yet, temporary solution. The key point should be finding a solution to inhibit the growth of pathogens and protect humans from their attacks at the same time.

Anti-microbial materials appear to be the answer, and have been widely utilized to create a healthy living environment. Indeed, "anti-microbial" materials have become a trend worldwide.

Green Steel with Anti-Microbial Additive

Steel is formable, long lasting, recyclable and commonly used in our daily life. In fact, it is so-called green steel. With the increased health awareness, consumers are expecting steel to be more than just environmentally friendly. Anti-microbial coated steel now has a popular appeal for consumers as it prevents the growth of microbes on the surface, and, consequently, improves our well-being to a great extent.

In order to provide a safe and healthy living environment, Yieh Phui, as a pioneer among rivals, developed anti-microbial coated steel sheets in 2009. The products, named "**Yieh Phui Anti-Microbial Metallic Coated Steel Sheets**" and "**Yieh Phui Anti-Microbial Color Coated Steel Sheets**", offer excellent inhibition ability against Staphylococcus aureus, Pseudomonas aeruginosa, and Escherichia coli. They are applied to HVAC ducts and indoor partitions, and are widely adopted by schools and hospitals.

In view of the greater consciousness on the safe living environment in recent years, after years of research, Yieh Phui has developed anti-microbial plus metallic coated steel sheets (**PhuizerGreen® AMC Plus**), anti-microbial plus color coated steel sheets (**ColorGreen AMC Plus®**) and antistatic & anti-microbial plus color coated steel sheets (**ColorGreen AS & AMC Plus®**) in 2018 for hygienically rigorous places, such as pharmaceutical factories, hospitals, and food factories. Besides general restraint ability to bacteria, they provide with extraordinary inhibition to MRSA, Legionella pneumophilia and Corynebacterium diphtheriae. The latter product is antistatic. Thus, it creates a safer and healthier work and living environment.

4. 燁輝高效抗菌環保鍍烤鋼捲之特色

燁輝高效抗菌環保鍍面、烤漆鋼捲均符合歐盟 RoHS 與 REACH 等環保指令。

4.1 燁輝高效抗菌環保鍍面鋼捲

本公司及塗料供應商與抗菌材料業者合作，生產製造獨特的高效抗菌鋼捲。鋼捲表面含有高效奈米級長效穩定之抗菌成分塗膜，能有效抑制細菌的生長，可避免因細菌而造成異味、污漬、甚至是食物中毒及過敏等之威脅。

燁輝所使用之高效抗菌成分能更有效穿透細菌的細胞壁，破壞其結構組織，抑制生長繁殖。高效抗菌成分均勻分佈於環保表面鈍化層中，在鋼捲表面形成持久的抗菌塗膜，應避免受到外力及化學物質破壞，於正常使用條件下不易被沖洗或擦拭掉；而所使用之抗菌成分對人體或環境亦不會造成任何的傷害。

燁輝企業的高效抗菌環保鍍面鋼捲已通過 SGS、食品工業發展研究所和新加坡 TÜV SÜD PSB 權威機構的抗菌測試 (依據 JIS Z 2801：2010 標準)，能夠有效抑制常見之金黃色葡萄球菌、大腸桿菌、綠膿桿菌、肺炎桿菌、退伍軍人菌和白喉桿菌之生長。除此之外，對於常見於醫療院所中，如抗藥性金黃色葡萄球菌 (俗稱為「超級細菌」) 等頑強菌種及黴菌，均能達到抑制成長的效果。

4.2 燁輝抗菌環保烤漆鋼捲系列產品

本系列烤漆產品包括抗菌環保、高效抗菌環保與抗靜電高效抗菌環保烤漆鋼捲，其特色分述如下。

本公司及塗料供應商與抗菌材料業者合作，生產製造獨特的高效抗菌烤漆鋼捲。鋼捲表面含有高效且長效穩定之抗菌成分塗層，能有效抑制細菌的生長，可避免因細菌而造成異味、污漬，減少食物中毒及過敏等之威脅。

燁輝企業的抗菌環保烤漆鋼捲系列產品已通過 SGS、食品工業發展研究所的抗菌測試 (依據 JIS Z 2801：2010 標準)，能夠有效抑制常見之金黃色葡萄球菌、綠膿桿菌、大腸桿菌和肺炎克雷白氏菌之生長。除此之外，燁輝高效抗菌環保烤漆鋼捲對於常見於醫療院所中，如抗藥性金黃色葡萄球菌 (俗稱為「超級細菌」)、退伍軍人菌和白喉桿菌等頑強菌種及黴菌，均能達到抑制成長的效果。

針對醫藥生技廠與食品廠抗菌暨抗靜電功能要求，本公司開發出燁輝抗靜電高效抗菌環保烤漆鋼捲，其表面阻抗值為 10^6~10^9Ω/□，可有效避免靜電累積所造成的粉塵汙染。

Features of Yieh Phui Anti-Microbial Plus Coated Steel Sheets

Yieh Phui Efficient PhuizerGreen® AMC Plus & **ColorGreen AMC Plus® Series** all conform to EU's RoHS and REACH.

Yieh Phui Anti-Microbial Plus Metallic Coated Steel Sheets

Yieh Phui has been closely cooperating with our suppliers in development of anti-microbial products. Combining corrosion-resistant surface passivation and anti-microbial additives, we successfully bring you Yieh Phui metallic coated steel sheets with anti-microbial function. The anti-microbial additives effectively and lastingly inhibit the growth of bacteria which give rise to odor, stain, food poisoning, and allergies.

The additives are able to penetrate microbes' cell walls and disrupt their cell structure, stopping bacterial reproduction. Being incorporated into environmentally friendly surface passivation, the additives form a durable anti-microbial film which will not be easily wiped off or washed away. Besides, the additives are harmless to human body and our living environment.

Yieh Phui **Anti-Microbial Plus Metallic Coated Steel Sheets** are certified by SGS, Food Industry Research and Development Institute and Singapore TÜV SÜD PSB in compliance with JIS Z 2801:2010 for their efficacy in suppressing the growth of Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, Klebsiella pneumoniae, Legionella pneumophilia and Corynebacterium diphtheriae. Additionally, against bacteria with high anti-microbial resistance such as MRSA and fungi commonly found in hospitals and nursing homes, **Anti-Microbial Plus Metallic Coated Steel Sheets** could also provide continuous protection.

Yieh Phui ColorGreen AMC® Series

The series of products include anti-microbial, anti-microbial plus, and antistatic & anti-microbial plus color coated steel sheets. The features are shown below.

Yieh Phui has been closely cooperating with our suppliers in development of anti-microbial products. Combining corrosion resistant surface passivation and anti-microbial additives, we successfully bring you Yieh Phui color coated steel sheets with anti-microbial function. The anti-microbial additives effectively and lastingly inhibit the growth of bacteria which give rise to odor, stain, food poisoning, and allergies.

Yieh Phui ColorGreen AMC® Series are certified by SGS, Food Industry Research and Development Institute in compliance with JIS Z 2801:2010 for their efficacy in suppressing the growth of Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli, and Klebsiella pneumoniae. Additionally, against bacteria with high anti-microbial resistance, such as MRSA, Legionella pneumophilia, Corynebacterium diphtheriae and fungi, commonly found in hospitals and nursing homes, **Yieh Phui ColorGreen AMC Plus®** could also provide continuous protection.

To meet the anti-microbial and antistatic requirements of biomedical factories and food factories, Yieh Phui has developed **ColorGreen AS & AMC Plus®**. Its surface resistivity achieves 10^6~10^9Ω/□ that efficiently prevents dust contamination caused by static accumulation.

4.3 表面處理

採用特殊長效穩定之奈米級高效抗菌成分，可提供優越的分散性與較大的比表面積 (單位抗菌成分重量之總表面積)，以展現更全面性之高效抗菌效果，再配合環保鈍化處理，除了增進鍍面鋼捲之加工性能外，更具有以下之優良特性：

1. 為透明、無油之皮膜。
2. 提供較原有抗菌塗層鋼板 1~2 倍的板面防銹能力。
3. 於安全且適當之運輸、儲存與加工過程中，能提供良好的防蝕能力。
4. 因有乾式潤滑性能，可使鋼板表面摩擦係數由 0.4 以上降低至 0.25 以下，故於輥輪成形或沖壓加工過程中，可減少或免除潤滑油之使用。
5. 成形後之鋼板在適當儲存環境中仍具有良好之防蝕能力。
6. 具焊接性，經適度的焊接參數調整，可得與傳統鉻酸鈍化處理相當之焊接性。

• Surface Treatment

For comprehensive anti-microbial efficacy, nanoscale anti-microbial additives with excellent dispersion and large specific surface area (total surface area per unit of mass) are incorporated into environmentally friendly surface passivation to provide safe and durable anti-microbial protection with superior formability. Other properties are as follows.

1. Transparent and oil-free film.
2. 1-2 times of anti-corrosion performance than the original anti-microbial metallic coated steel sheets.
3. Protection against corrosion during safe and proper transit, storage and forming process.
4. Lower coefficient of friction (≤0.25) than traditional chromate (above 0.4), reducing or eliminating the use of lubricants during roll-forming or stamping process.
5. Good corrosion resistance even after being formed into profile sheets which are stored in proper environment.
6. With optimized welding parameter, weldability is comparable to conventional chromate treated steel sheets.

抗菌性能 - 抗黴菌能力試驗 (ASTM G21) Antifungal Test (ASTM G21)

	試 驗 菌 種 Bacteria tested		判定等級 Rating
	中文名稱 Chinese name	英文名稱 English name	
1	黑麴菌	Aspergillus brasiliensis ATCC9642	0
2	四松青黴菌	Penicillium funiculosum ATCC 11797	0
3	球毛殼菌	Chaetomium globosum ATCC 6205	0
4	綠黏帚黴菌	Trichoderma virens ATCC 9645	0
5	出芽短梗黴菌	Aureobasidium Pullulans ATCC 15233	0

試驗單位：SGS 超微量工業安全實驗室。Tested by the Ultra Trace & Industrial Safety Lab. of SGS.

測試方法：將黴菌植放於測試鋼板 28 天，觀察黴菌生長狀況。
Test method: Put fungi on the tested steel samples for 28 days and observe fungal growth.

判定等級標準：0：無黴菌
1：微量生長 (黴菌生長面積 < 10%)
2：輕度生長 (黴菌生長面積介於 10% ~ 30%)
3：中度生長 (黴菌生長面積介於 30% ~ 60%)
4：嚴重生長 (黴菌生長面積 > 60%)

Ratings: 0: no fungus
1: trace growth (area of fungal growth < 10%)
2: light growth (area of fungal growth between 10% ~ 30%)
3: medium growth (area of fungal growth between 30% ~ 60%)
4: serious growth (area of fungal growth > 60%)

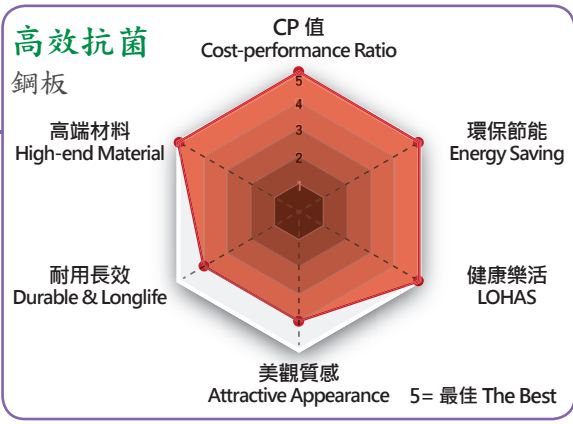
鹽水噴霧試驗 (ASTM B 117) Salt Spray Test (ASTM B 117)

表面處理 Surface Treatment	一般鉻酸處理 Chromating treated	高效抗菌 PhuizerGreen® AMC Plus
5% 白銹發生時間 (小時) Occurrence of 5% White Rust (hrs)	72~96*	144~192*

* 耐蝕性能依塗覆量而有所不同。Corrosion resistance depends on the coating mass.

PhuizerGreen® AMC Plus 環保鍍面鋼捲
PhuizerGreen® AMC Plus

高效抗菌鋼板



Efficient Anti-Microbial 高效抗菌

燁輝高效抗菌環保鍍面鋼板抗菌試驗 (食研所依 JIS Z 2801:2010 (amd 1:2012) 退伍軍人症菌 (L. pneumophila BCRC17854)：

Antibacterial test: JIS Z 2801:2010 (amd 1:2012)-- L. pneumophila (efficacy validated by Food Industry Research and Development Institute)



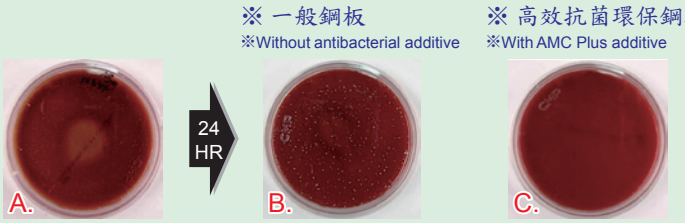
試驗組別 Sample	表面菌落數目 No. of bacterial colonies (CFU/cm^2)	抗菌活性值 Antibacterial activity (R)
A	6.31×10^3	--
B	9.69×10^3	--
C	≤ 0.63	>4.2

A：空白組 0 小時表面菌落數目。
B：空白組 24 小時後表面菌落數目。
C：抗菌鋼板 24 小時後表面菌落數目。
CFU/cm^2：每平方公分樣品表面的菌落形成單位
R (抗菌值) = [log(B/C)]
◎抗菌活性值 (R) 若大於 2.0，表示有抑菌效果

A. Number of bacterial colonies on the surface of the Blank sample at 0 hr.
B. Number of bacterial colonies on the surface of the Blank sample after 24 hrs.
C. Number of bacterial colonies on the surface of the AS & AMC Plus steel sample after 24 hrs.
CFU/cm^2: No. of bacterial colony forming units per square centimeter on surface.
Antibacterial activity (R)= [log(B/C)]
◎ The value of antibacterial activity (R) shall be over than 2.0 for antibacterial efficacy.

燁輝高效抗菌環保鍍面鋼板抗菌試驗 (食研所依 JIS Z 2801:2010 (amd 1:2012) 白喉棒狀桿菌 (C. diphtheriae BCRC 10654)：

Antibacterial test: JIS Z 2801:2010 (amd 1:2012)--C. diphtheriae (efficacy validated by Food Industry Research and Development Institute)

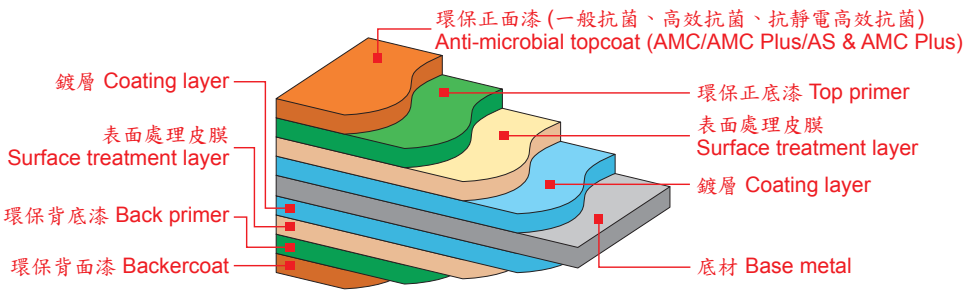


試驗組別 Sample	表面菌落數目 No. of bacterial colonies (CFU/cm^2)	抗菌活性值 Antibacterial activity (R)
A	6.44×10^3	--
B	7.00×10^3	--
C	--	3.2

A：空白組 0 小時表面菌落數目。
B：空白組 24 小時後表面菌落數目。
C：抗菌鋼板 24 小時後表面菌落數目。
CFU/cm^2：每平方公分樣品表面的菌落形成單位
R (抗菌值) = [log(B/C)]
◎抗菌活性值 (R) 若大於 2.0，表示有抑菌效果

A. Number of bacterial colonies on the surface of the Blank sample at 0 hr.
B. Number of bacterial colonies on the surface of the Blank sample after 24 hrs.
C. Number of bacterial colonies on the surface of the AS & AMC Plus steel sample after 24 hrs.
CFU/cm^2: No. of bacterial colony forming units per square centimeter on surface.
Antibacterial activity (R)= [log(B/C)]
◎ The value of antibacterial activity (R) shall be over than 2.0 for antibacterial efficacy.

ColorGreen AMC Plus® 環保烤漆鋼捲
ColorGreen AMC Plus® Series

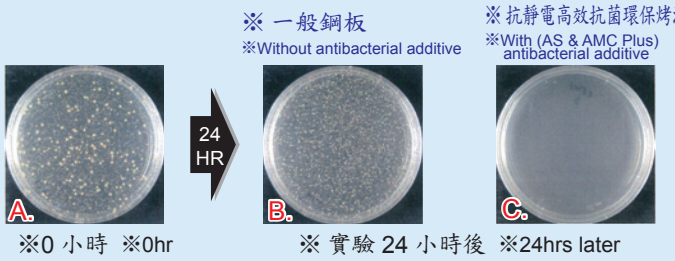




註：上圖未依實際比例繪製　Remarks: The graph above does not reflect the actual proportion.

燁輝抗靜電高效抗菌環保烤漆鋼板抗菌試驗 (食研所依 JIS Z 2801:2010 (amd 1:2012) 抗藥性金黃色葡萄球菌 (MRSA BCRC15211)：

Antibacterial test of Yieh Phui ColorGreen AS & AMC Plus®: JIS Z 2801:2010 (amd 1:2012)--MRSA (efficacy validated by Food Industry Research and Development Institute)



※0 小時 ※0hr　※ 實驗 24 小時後 ※24hrs later

試驗組別 Sample	表面菌落數目 No. of bacterial colonies (CFU/cm^2)	抗菌活性值 Antibacterial activity (R)
A	2.38×10^4	--
B	9.63×10^4	--
C	≤ 0.63	>5.2

A：空白組 0 小時表面菌落數目。
B：空白組 24 小時後表面菌落數目。
C：抗菌鋼板 24 小時後表面菌落數目。
CFU/cm^2：每平方公分樣品表面的菌落形成單位
R (抗菌值) = [log(B/C)]
◎抗菌活性值 (R) 若大於 2.0，表示有抑菌效果

A. Number of bacterial colonies on the surface of the Blank sample at 0 hr.
B. Number of bacterial colonies on the surface of the Blank sample after 24 hrs.
C. Number of bacterial colonies on the surface of the AS & AMC Plus steel sample after 24 hrs.
CFU/cm^2: No. of bacterial colony forming units per square centimeter on surface.
Antibacterial activity (R)= [log(B/C)]
◎ The value of antibacterial activity (R) shall be over than 2.0 for antibacterial efficacy.

燁輝抗靜電高效抗菌環保烤漆鋼板抗菌試驗 (食研所依 JIS Z 2801:2010 (amd 1:2012) 退伍軍人症菌 (L. pneumophila BCRC17854)：

Antibacterial test of Yieh Phui ColorGreen AS & AMC Plus®: JIS Z 2801:2010 (amd 1:2012)--L. pneumophila (efficacy validated by Food Industry Research and Development Institute)



※0 小時 ※0hr　※ 實驗 24 小時後 ※24hrs later

試驗組別 Sample	表面菌落數目 No. of bacterial colonies (CFU/cm^2)	抗菌活性值 Antibacterial activity (R)
A	1.34×10^4	--
B	7.31×10^4	--
C	≤ 0.63	>5.1

A：空白組 0 小時表面菌落數目。
B：空白組 24 小時後表面菌落數目。
C：抗菌鋼板 24 小時後表面菌落數目。
CFU/cm^2：每平方公分樣品表面的菌落形成單位
R (抗菌值) = [log(B/C)]
◎抗菌活性值 (R) 若大於 2.0，表示有抑菌效果

A. Number of bacterial colonies on the surface of the Blank sample at 0 hr.
B. Number of bacterial colonies on the surface of the Blank sample after 24 hrs.
C. Number of bacterial colonies on the surface of the AS & AMC Plus steel sample after 24 hrs.
CFU/cm^2: No. of bacterial colony forming units per square centimeter on surface.
Antibacterial activity (R)= [log(B/C)]
◎ The value of antibacterial activity (R) shall be over than 2.0 for antibacterial efficacy.

可使用本公司生產之熱浸鍍鋅、熱浸鍍5%/55%鋁-鋅作為底材，製造**輝輝抗菌環保烤漆鋼捲系列產品**。

The hot-dip galvanized, hot-dip 5%/55% Al-Zn coated steel sheets produced by Yieh Phui can be used as substrates to manufacture **ColorGreen AMC Plus® Series**.

4.4 耐消毒水性能

在衛生要求標準相對較高的醫療院所、食品廠、藥廠，每日均會以消毒水或酒精進行消毒作業；高效抗菌烤漆鋼板應用於這些場所之室內隔間板，必須對消毒水及酒精的擦拭具有耐破壞性能，以確保烤漆鋼板表面保持美觀與抗菌性。經實驗驗證，高效抗菌烤漆鋼板對於常用於消毒的0.05%消毒水與75%酒精具有優異的耐破壞性。

Anti-disinfectant Property

In hospitals, food factories, and pharmaceutical factories with relatively high hygiene requirements, disinfectant or alcohol is used daily for disinfection operations. **ColorGreen AMC Plus® Steel Sheets** applied to partitions in these places must be resistant to the wipes of disinfectant or alcohol to ensure beautiful surfaces and anti-microbial property of the steel sheets. It has been verified by experiments that **ColorGreen AMC Plus® Steel Sheets** have excellent damage resistance to 0.05% disinfectant and 75% alcohol which are commonly used for disinfection.

消毒劑種類 Disinfectant type	試驗方法 Test method	試驗結果 Test result	
		色差值 Color difference	敘述 Appearance
0.05% 消毒水 0.05% disinfectant	以500g力量，擦拭500次 To rub 500 times with force of 500g	△ E<0.05	目視無明顯色差，表面塗層無破壞 No apparent color difference with unaided eyes. Coating undamaged
	浸泡30分鐘 To immerse for 30 minutes	△ E<0.05	
75% 酒精 75% alcohol	以500g力量，擦拭500次 To rub 500 times with force of 500g	△ E<0.5	

4.5 加速腐蝕及耐候性試驗

◎鹽水噴霧試驗 (ASTM B 117)

在經過鹽水噴霧試驗500小時後，距刻痕及距邊5mm以外部分 (Unscribed Area) 無紅銹、起泡 (優於8F) 及鍍層腐蝕發生。

註：1. 非保證面 (背面) 試驗150小時。

2. 起泡程度之判定標準依ASTM D 714。

◎潤濕試驗 (ASTM D 2247)

在經過溼度98%以上之潤濕試驗1,000小時後，無顯著之顏色改變或腐蝕發生。

◎耐化性 (ASTM D 1308)

5%硫酸 (H_2SO_4) 滴在板面24小時後，無顯著變化或起泡。

5%氫氧化鈉 (NaOH) 滴在板面24小時後，無顯著變化或起泡。

Accelerated Corrosion and Weathering Test

◎ Salt Spray Test (ASTM B 117)

After 500 hours, no red rust, blisters (over 8F) and corrosions can be observed beyond 5mm to scribe mark and cut edge.

Note: 1. 150 hours for un-guaranteed side (back side).

2. Criteria for blisters conform to ASTM D 714.

◎ Humidity Resistance Test (ASTM D 2247)

After 1,000 hours at a minimum of 98% relative humidity, no apparent color change or corrosion occurs.

◎ Chemical Resistance-Spot Test (ASTM D 1308)

After dropping 5% H_2SO_4 on steel surface for 24 hours, there are no apparent changes or blisters.

After dropping 5% NaOH on steel surface for 24 hours, there are no apparent changes or blisters.

5. 鍍烤抗菌鋼捲之用途

• 風管 • 隔間 • 冷凍庫
• 家電 • 冷藏櫃

非常適用於醫藥生技廠、醫療院所、食品廠、圖書館、低溫運輸貨車、半導體工廠、電子廠、飯店、辦公住宅大樓、購物中心、戲院與機場、捷運站等公共建築物，其隔間壁板(庫板)與空調風管系統等易受病菌侵襲，更需要燁輝高效抗菌環保鍍烤鋼捲系列產品的保護。

Applications

• HVAC • Partitions • Walk-in coolers
• Home appliances • Freezers

Very suitable for biomedical factory buildings, hospitals, food factories, libraries, freezer vans, semiconductor factory buildings, electronics factory buildings, restaurants, office and residential buildings, shopping malls, and public facilities, such as theaters, airports and MRTs. Yieh Phui Anti-Microbial Plus Coated Steel Sheets are especially required for the partitions and HVAC systems in these places.

抗菌試驗 Test of for Antibacterial Activity and Efficacy

試驗菌種[1] Bacteria tested	燁輝高效抗菌環保鍍面鋼捲 PhuizerGreen® AMC Plus			燁輝抗菌環保烤漆鋼捲 ColorGreen AMC®		
	抗菌活性值 Antibacterial activity (R)		抗菌率 Antibacterial efficacy	抗菌活性值 Antibacterial activity (R)		抗菌率 Antibacterial efficacy
	台灣[2] Taiwan	新加坡[3] Singapore	百分比 Pct %	抗靜電高效抗菌 ColorGreen AS & AMC Plus®	高效抗菌 ColorGreen AMC Plus®	百分比 Pct %
1. 金黃色葡萄球菌 Staphylococcus aureus	>4.7	>4.22	≥99.99	>5.0	>5.0	≥99.99
2. 綠膿桿菌 Pseudomonas aeruginosa	>4.8	>5.44	≥99.99	>5.1	>6.1	≥99.99
3. 大腸桿菌 Escherichia coli	>4.7	>5.86	≥99.99	>6.2	>6.0	≥99.99
4. 肺炎克雷白氏菌 Klebsiella pneumoniae	>4.6	>4.13	≥99.99	>5.7	>5.5	≥99.99
5. 抗藥性金黃葡萄球菌 MRSA	>5.6	>4.16	≥99.99	>5.2	>4.3	≥99.99
6. 退伍軍人菌 Legionella pneumophilia	>4.2	>4.21	≥99.99	>5.1	>4.3	≥99.99
7. 白喉棒狀桿菌 Corynebacterium diphtheriae	3.2	>2.20	≥99.99	>5.0	>3.2	≥99.99

1. 原有燁輝抗菌環保鍍面鋼板僅對項次 1-4 具抑菌功能。
The original Yieh Phui anti-microbial metallic coated steel sheets only inhibit the microbes from Item 1-4.

2. 委託台灣食品工業研究發展所(食研所)進行試驗。
Tested by Food Industry Research and Development Institute
3. 委託新加坡 TÜV SÜD PSB Pte Ltd. 進行試驗。
Tested by TÜV SÜD PSB Pte Ltd., Singapore

6. 燁輝企業—最好的選擇

◎工程實績

燁輝企業長期與國內多所知名大學和其它專業研究單位合作，持續研發多種抗菌功能的鋼板。燁輝企業的抗菌環保鍍面鋼板在國外和台灣已都有應用實績，例如高雄義大醫院的國際微創手術訓練中心、義聯集團義享天地與台南成功大學之「孫運璿綠建築研究大樓」，皆採用**燁輝抗菌及高效抗菌環保鍍面鋼捲**做為壁材、天花板和空調風管系統之材料。

YIEH PHUI—Your First Choice

◎Engineering References of AMC Plus

Yieh Phui has been working hand in hand with many topnotch universities and prestigious research institutes to develop a variety of anti-microbial coated steel products. **PhuizerGreen® AMC** and **PhuizerGreen® AMC Plus** have achieved notable success both in domestic and international markets. For example, E-Da Hospital's Minimally Invasive Surgery Training Center and E Sky Land in Kaohsiung and the Y. S. Sun Green Building Research Center at National Cheng Kung University in Tainan utilized **PhuizerGreen® AMC** and **PhuizerGreen® AMC Plus**. The products are used for walling, ceiling, and ducting for the three constructions mentioned above.

Efficient PhuizerGreen® AMC Plus
ColorGreen AMC® | ColorGreen AMC Plus® | ColorGreen AS & AMC Plus®

輝輝抗菌及高效抗菌環保鍍面鋼捲在海外也獲得客戶採用，均選用本產品作為空調風管系統之材料。實績如下：

PhuizerGreen® AMC and **PhuizerGreen® AMC Plus** are also widely used for HVAC ducting in overseas districts. Below is the list of application references.

地區 District	項次 Item	建案中文名稱	Project
香港 Hong Kong	1	香港海關總部大樓	Hong Kong Customs Headquarters
	2	香港中文大學 校舍建築	The Chinese University of Hong Kong
	3	香港中文大學 學生宿舍	Student Hostel of Hong Kong Chinese University
	4	香港中文大學醫院	Hong Kong Chinese University Medical Centre
	5	瑪麗醫院 第 1 期高級職員宿舍改建工程	Queen Mary Hospital Phase I Senior Staff Quarters Redevelopment
	6	嘉諾撒醫院增建工程	New Extension to Canossa Hospital/Mid-levels
	7	廣深港高鐵西九龍總站	XRL High Speed Rail–West Kowloon Station
	8	港鐵 觀塘線延線–何文田站 & 黃埔站	MTR Kwun Tong Line Extension–HOM & WHA Stations
	9	形點 第 1 期增建工程 (形點 I 地下巴士站)	Yoho Mall I Extension Bus Stop
	10	帝景灣住宅大樓	Residential Project at TKO 117
	11	嘉悅住宅大樓	Residential Project at TKO 115 (Twin Peaks)
	12	峻瀅第 2 期住宅大樓	Residential Development–The Beaumount II/Tseung Kwan O
	13	臻頤住宅大樓	Residential Project–Atrium House
	14	瓏璽住宅大樓	Residential Project–Imperial Cullinan
	15	建生商業中心商辦大樓	Kin Sang Commercial Centre
	16	俊匯中心商辦大樓	Elite Centre/Kowloon
	17	將軍澳 56 區住宅商場複合大樓	Tseung Kwan O Area 56 Residential Project
	18	新時代廣場・新時代中城 住宅商場複合大樓	Residential Project–YOHO Town・YOHO Midtown
	19	麥花臣室內場館改建工程	Redevelopment of Macpherson Indoor Stadium
	20	源・區污泥處理中心	Sludge Treatment Facilities–T•PARK
澳門 Macau	21	威尼斯人酒店第 1 期整修工程	The Venetian Phase 1 Maintenance
	22	上葡京酒店	Grand Lisboa Palace
	23	美獅美高梅酒店 第 2 期工程	MGM Cotai
	24	新濠影匯酒店	Studio City
新加坡 Singapore	25	新加坡 國立健保集團 (NHG) 兀蘭智慧醫療健保園區	WHC, Woodlands Health Campus



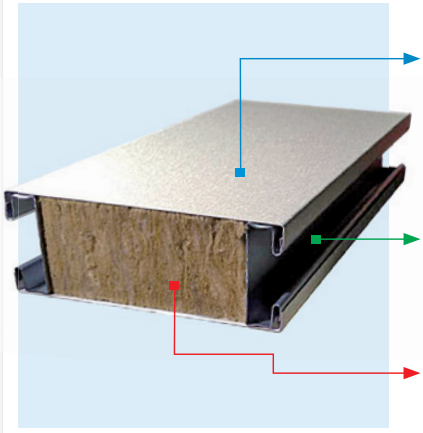


香港中文大學醫院
Hong Kong Chinese University Medical Centre



廣深港高鐵 西九龍總站 (香港)
XRL High Speed Rail-West Kowloon Station

* 以上兩實績均採用**輝輝高效抗菌環保鍍面鋼捲**。
The two projects above adopt Yieh Phui **PhuizerGreen® AMC Plus**.



室內隔間板應用
Indoor Partitions



高雄市義大醫院國際微創手術訓練中心　室內隔間牆板
International Minimally Invasive Surgery Training Center, E-Da Hospital, Kaohsiung, Taiwan

* 以上兩實績均採用**燁輝抗菌環保烤漆鋼捲**。
The two applications above adopt Yieh Phui **ColorGreen AMC® Series**.

為開創一個健康、衛生及舒適的生活環境，燁輝企業開發出兼具環保與抗菌功能的綠色產品。本著「我們只有一個地球」的理念，讓我們攜手共同開創一個更健康、更乾淨的地球。

7. 貯存與裝卸

本型錄**燁輝高效抗菌環保鍍面鋼捲**與**燁輝抗菌環保烤漆鋼捲系列產品**，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儲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，而浸入鈍化層或油漆層 (此時水氣更不容易蒸發脫離鈍化層或油漆層)。經一段時間後，易在鋼材表面產生白銹，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。

◎於輥輪成形或沖壓加工廠：

1. 鋼捲運抵工場時，必須在運輸板車上檢查外觀以確保包裝完整沒有浸水受潮及破損之情況。若有，則需與貨運行或保險公司聯繫處理。
2. 鋼捲必須儲存於乾燥且通風良好的環境。
3. 輥輪成形或沖壓加工後之成品，必須確保儲存於乾燥且通風之環境。
4. 於搬運至施工地點過程中，成形加工後之成品，必須施予適當之包裝以避免受潮。

We provide anti-microbial coated steel sheets to create a healthy, hygienic, and comfortable living environment. Our ultimate goal is to be one of the driving forces to create a healthier and cleaner earth. Let's work together to protect this only planet we have.

Storage & Handling

PhuizerGreen® AMC Plus and **Yieh Phui ColorGreen AMC® Series** 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 capillary effect may cause the absorption of moisture into the laps of steel sheets and gradually lead to the formation of white rust. This can easily deteriorate steel properties, affect its appearance and shorten its life span.

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

◎At Roll Former or Stamping Mill:

1. When steel coils arrive at a factory, their appearance should be inspected on the trailer truck to ensure the packaging is not dampened or damaged. Contact shipping agent or insurance company if the packaging is impaired.
2. Store the coils in dry and well-ventilated place.
3. Store the profile sheets in dry and well-ventilated area after forming.
4. Profile sheets should be re-packed properly to protect the sheets from humidity while transporting to the construction site.

◎於施工地點：

1. 成品於運抵施工地點後，必須施予外觀檢查以確保運輸過程中未受潮。
2. 成品於施工地點為避免受潮，應以室內儲存，或至少置於枕木上墊高並以防水帆布遮蓋，以防下雨淋溼，且下方留通風口以利空氣流通，避免結露。
3. 為避免損傷產品表面與減損抗菌性能，產品於搬運、運輸、成形加工及安裝過程中，表面須加以保護與小心處理，不同程度之表面刮傷將因而減損此產品之抗菌與耐蝕效果。使用不當之成形潤滑劑將影響產品特性，並造成表面污染，非必要時，建議勿使用。

※ 注意事項

1. 為了維持鋼板抗菌效果，必須保持鋼板表面之清潔。
2. 鋼板表面若有損傷將降低抗菌效果。
3. 本目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。
4. 對於產品的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，或與本公司技術人員諮詢。

PhuizerGreen®、ColorGreen AMC®、ColorGreen AMC Plus® 與 ColorGreen AS & AMC Plus® 為燁輝企業之註冊商標。

◎At a Construction Site

1. Inspection must be carried out for the incoming profile sheets to ensure that they are not affected by humidity during transportation.
2. The profile sheets at job site should be stored indoors, or at least be placed upon wooden sleepers and a waterproof cover should be placed over the bundle while allowing for air circulation under the cover.
3. While handling, transporting, forming, processing and installing, the surface of the steel sheets should be protected with extra care in order to keep the surface intact. Once the surface is damaged, the anti-microbial efficacy will decline. Any improper lubricants used will affect the function of steel sheet and pollute its surface. We strongly recommend not to do so, unless necessary.

* Note:

1. Care should be taken to protect the coated steel surface against damage when handling, transporting, forming, processing and installing.
2. Damages on the coated steel surface will diminish anti-microbial ability.
3. 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.
4. 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. You may consult with our Technology Division.

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燁輝企業 YIEH PHUI

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