

涂镀板 产品手册

COATED PLATE PRODUCT MANUAL





Chapter 1 Products Introduction of Aluminum-Zinc Coated Steel Sheet

第一章 镀铝锌产品介绍

1.1 牌号和用途 Steel grades and applications

牌号 Steel Grades	用途 Applications	执行标准 Standard		
DC51D+AZ、[DX51D+AZ]				
DC52D+AZ、[DX52D+AZ]	一 冷成形用 Drawing			
DC53D+AZ、[DX53D+AZ]				
DC54D+AZ、[DX54D+AZ]				
S220GD+AZ				
S250GD+AZ		GB/T 14978-2008		
S280GD+AZ				
S320GD+AZ	结构用 Structure			
S350GD+AZ				
S420GD+AZ				
S550GD+AZ				

1.2 化学成分 Chemical Compositions (单位 Unit:%)

牌号 Steel Grades	C ≤	Si ≤	Mn		S ≤
DC(X)51D+AZ	0.18	0.50	1.20	0.12	0.045
DC(X)52D+AZ DC(X)53D+AZ DC(X)54D+AZ	0.12	0.50	0.60	0.10	0.045

牌号 Steel Grades	C ≤	Si ≤	Mn≤		S≤
\$220GD+AZ、\$250GD+AZ、\$280GD+AZ、\$320GD+AZ、\$350GD+AZ、\$420GD+AZ、\$550GD+AZ	0.20	0.60	1.70	0.10	0.045

1.3 力学性能 Mechanical Properties

牌号 Steel Grades	屈服强度 Yield strength ^{a,b}	抗拉强度 Tensile strength ^a		(mm) 的断后伸长率 °, ongation °,A80mm,%,	
	MPa	MPa	≤ 0.50	> 0.50 ~ 0.70	> 0.70
DC(X)51D+AZ°	_	270 ~ 500	18	20	22
DC(X)52D+AZ°	140 ~ 300	270 ~ 420	22	24	26
DC(X)53D+AZ ^d	140 ~ 260	270 ~ 380	26	28	30
DC(X)54D+AZ ^d	120 ~ 220	260 ~ 350	32	34	36

å 试样为 GB/T 228.1 中的 P6 试样 (L₀=80mm,b₀=20mm), 试样方向为横向。

The mechanical properties are valid for 6 months after the products are manufactured.

牌号 Steel Grades	屈服强度 , ≥ Yield strength ^{a,b}	抗拉强度,≥ Tensile strength³		(mm) 的断后伸长率 ³,A80mm,%, ≥ ongation ³,A80mm,%, ≥	
Steet Glades	MPa, ≽	MPa, ≽	≤ 0.50	> 0.50 ~ 0.70	> 0.70
S220GD+AZ	220	300	16	18	20
S250GD+AZ	250	330	15	17	19
S280GD+AZ	280	360	14	16	18
S320GD+AZ	320	390	13	15	17
S350GD+AZ	350	420	12	14	16
S420GD+AZ	420	480	-		
S550GD+AZ ^d	550	560	-		

[。] 。 试样为 GB/T 228.1 中的 P6 试样 (L0=80mm,b0=20mm), 试样方向为纵向。

No. P6 test piece (L₀=80mm, b₀=20mm) specified in GB/T 228.1 shall be used, and the test shall be carried out in the transverse direction.

^b 无明显屈服现象时采用 R_{p0.2}, 否则采用下屈服强度 R_{eL}。

If the yield point is not pronounced, the values apply to the 0.2%- proof strength $R_{p0.2}$, otherwise the lower yield point R_{eL} is applied.

⁵力学性能有效期为制造完成后1个月内。

The mechanical properties are valid for 1 month after the products are manufactured.

^d 力学性能有效期为制造完成后 6 个月内。

No. P6 test piece (L0=80mm, b0=20mm) specified in GB/T 228.1 shall be used, and the test shall be carried out in the longitudinal direction.

^b 无明显屈服现象时采用 Rp0.2, 否则采用上屈服强度 ReH。

If the yield point is not pronounced, the values apply to the 0.2%- proof strength Rp0.2, otherwise the upper yield point ReH is applied.

⁵力学性能有效期为制造完成后1个月内。

The mechanical properties are valid for 1 month after the products are manufactured.

[,]当厚度≤ 0.7mm 时,由于厚度减薄效应,导致伸长率过低,以致无法测到屈服强度。此时屈服强度由抗拉强度代替。 When thickness is less than 0.7mm, the yield strength cannot be measured because of the low elongation. The yield strength is replaced by



1.4 可订货规格 Available dimensions (单位 Unit: mm)

牌号 Steel Grades	公称厚度 Nominal thickness	公称宽度 Nominal width
DC(X)51D+AZ DC(X)52D+AZ	0.45~0.479	900~1210
DC(X)51D+AZ DC(X)52D+AZ	0.48~0.599	900~1360
DC(X)51D+AZ DC(X)52D+AZ	0.6~1.199	900~1410
DC(X)51D+AZ DC(X)52D+AZ	1.2~2.3	900~1356
DC(X)53D+AZ	0.48~0.599	900~1260
DC(X)53D+AZ	0.6~1.199	900~1410
DC(X)53D+AZ	1.2~1.5	900~1360
S250GD+AZ S280GD+AZ S320GD+AZ	0.45~1.5	900~1260
S350GD+AZ	0.5~1.5	900~1260
S420GD+AZ S550GD+AZ	0.65~1.2	900~1290

1.5 拉伸应变痕 Stretcher strain marks

由于此类钢种时效的影响,建议用户尽早使用。

Aging often occurs on Cold rolled steel sheets & strips for painting and coating base plate, it is recommended to use it as soon as possible.

1.6 表面质量 Appearance

级别代号 Code	特征 Feature
FB	表面允许有缺欠,例如小锌粒、压印、划伤、凹坑、色泽不均、黑点、条纹、轻微钝化斑、锌起伏等。 Surface defects are allowed, such as small zinc particles, imprints, scratches, pits, uneven color, black spots, stripes, slight passivation spots, and zinc fluctuations.
FC	较好的一面允许有小缺欠,例如光整压印、轻微划伤、细小锌花、锌起伏和轻微钝化斑。另一面至少为表面质量 FB。 Minor defects on the better side of steel plate are allowed, such as optical finishing imprints, slight scratches, fine zinc flowers, zinc fluctuations and slight passivation spots. The other side meets the surface quality FB at least.

对于钢带,由于不易切除有缺陷部分,因此允许带缺陷交货,但有缺陷部分不应超过每卷总长度的6%。

For steel strips, it is so hard to cut the defect part that the delivered with defects is allowed. But the length of the defect part shall be no more than 6% of the total.

钢板及钢带表面不应有漏镀、镀层脱落和肉眼可见裂纹等影响用户使用的缺陷。不切边钢板及钢带边部允许存在微 小锌层裂纹和白边。

It is not allowed for the existence of surface defects which will affect usage such as scabs, cracks, inclusions, etc. No delamination is allowed.

1.7 厚度允许偏差 Tolerances on Thickness (单位 Unit: mm)

		下列公称宽度下的厚度允许偏差 ^{a,b,c} Allowable deviation of thickness				
规定的最小屈服强度 Re MPa	公称厚度 Nominal thickness	普通精	度 PT.A	高级精度 PT.B		
		≤ 1200	> 1200~1550	≤ 1200	> 1200~1550	
	> 0.40~0.60	±0.04	±0.05	±0.035	±0.040	
	> 0.60~0.80	±0.05	±0.06	±0.040	±0.045	
	> 0.80~1.00	±0.06	±0.07	±0.045	±0.050	
Re < 260	260 > 1.00~1.20	±0.07	±0.08	±0.050	±0.060	
	> 1.20~1.60	±0.10	±0.11	±0.060	±0.070	
	> 1.60~2.00	±0.12	±0.13	±0.070	±0.080	
	> 2.00~2.50	±0.14	±0.15	±0.090	±0.100	
	> 0.40~0.60	±0.05	±0.06	±0.040	±0.045	
	> 0.60~0.80	±0.06	±0.07	±0.045	±0.050	
	> 0.80~1.00	±0.07	±0.08	±0.050	±0.060	
260 ≤ Re < 360 ^d	> 1.00~1.20	±0.08	±0.09	±0.060	±0.070	
	> 1.20~1.60	±0.11	±0.13	±0.070	±0.080	
	> 1.60~2.00	±0.14	±0.15	±0.080	±0.090	
	> 2.00~2.50	±0.16	±0.17	±0.110	±0.120	

[®]钢带两端总长度 30m 内的厚度允许偏差:当钢带厚度< 1.50mm 时,可比规定值超出 50%;当钢带厚度≥ 1.50mm 时,可比规定值超出 30%。

1.8 宽度允许偏差 Tolerances on Width (单位 Unit: mm)

公称宽度 Nominal width	宽度允许偏差 Allowable deviation of width		
	普通精度 PW.A	高级精度 PW.B	
≤ 1200	0/+5	0/+2	
> 1200 ~ 1500	0/+6	0/+2	

The allowable deviation of thickness within 30 m of the total length at both ends of the strip: when the strip thickness is less than 1.50 mm, 50 % more than the specified value is allowed. When the thickness of the steel strip is \geqslant 1.50mm, 30 % more than the specified value is allowed. b 距焊缝 10m 内的厚度允许偏差:可比规定值超出 50%。

Thickness allowable deviation within 10 m from welded seam: 50 % more than the specified value is allowed.

⁶ 纵切钢带的厚度允许偏差:应符合纵切前钢带的相关规定。

Thickness allowable deviation of longitudinal slitting steel strip: compliance with relevant provisions for steel strip before longitudinal slitting. d 牌号 DC51D+AZ、S400GD+AZ 和 S550GD+AZ 厚度允许偏差应符合此档规定。

The allowable thickness deviation of DC51D + AZ, S400GD + AZ and S550GD + AZ should compliance with the provisions.



1.9 本标准牌号与国内外标准近似牌号对照 Reference list of similar steel grades

Q/SGZGS 0363-2019	AS 1397-2011	EN 10346:2015	ASTM A792/ A792M-2010	JIS G 3321:2010	ISO 9364:2011
DC51D+AZ	_	DX51D+AZ	CS type B CS type C	SGLCC	01
DC52D+AZ	G2+AZ	DX52D+AZ	FS	SGLCD	02
DC53D+AZ	G3+AZ	DX53D+AZ	DS	SGLCDD	03
DC54D+AZ	_	DX54D+AZ	-	_	03
S220GD+AZ	_	S220GD+AZ	-	_	220
S250GD+AZ	G250+AZ	S250GD+AZ	Grade 255	_	250
S280GD+AZ	_	S280GD+AZ	Grand 275	SGLC400	280
S320GD+AZ	_	S320GD+AZ	-	_	320
S350GD+AZ	G350+AZ	S350GD+AZ	Grade 345 Class 1	SGLC440	350
S400GD+AZ	_	S390GD+AZ	-	_	_
S550GD+AZ	G550+AZ	S550GD+AZ	Grade 550 Class 1	SGLC570	550

1.10 产品应用 Product applications









主要用途1: 家电用钢

主要用途 2: 建筑 - 轻钢别墅

主要用途 3: 电气柜

典型工程案列 Typical engineering projects:

冬奥会五棵松冰上运动项目 Winter Olympic Wukesong Ice Sports Project

冬奥会五棵松冰上运动项目建成于 2019 年,该项目使用 0.8mm 首钢镀铝锌板作为屋顶板,镀层重量 150g/m2, 钢种 S280GD+AZ, 用钢量 150 吨。

The project was completed in 2019, using 0.8mm Shougang galvanized aluminum plate as roof plate, coating weight 150g/m2, S280 GD + AZ, 150 tons.

辽宁福耀玻璃厂房项目 Fuyao Glass Group Factory Project in Liaoning

辽宁福耀玻璃厂房项目于 2017 年 10 月完工,该项目使用 0.5mm 首钢镀铝锌板作为屋顶板,镀层重量 150g/ m2,钢种S350GD+AZ,用钢量600吨。

The project was completed in October 2017, using 0.5 mm Shougang galvanized aluminum plate as roof plate, coating weight is 150 g/m2, S350 GD + AZ, 600 tons.

山东淄博陶瓷工业园项目 Ceramic Industrial Park Project in Zibo, Shandong

山东淄博陶瓷工业园项目于 2017 年 9 月完工,该项目使用 0.8mm 首钢镀铝锌板作为屋顶板,镀层重量 150g/ m2,钢种 S350GD+AZ,用钢量 3100吨。

The project was completed in September 2017, using 0.8mm Shougang galvanized aluminum plate as roof plate, coating weight 150g / m2, S350 GD + AZ, 3100 tons.

广东佛山苏宁物流园项目 Suning Logistics Park Project in Foshan, Guangdong

广东佛山苏宁物流园项目于 2017 年 8 月完工,该项目使用 0.6mm 首钢镀铝锌板作为屋顶板,镀层重量 150g/ m2,钢种S350GD+AZ,用钢量700吨。

The project was completed in August 2017, using 0.6mm Shougang galvanized aluminum plate as roof plate, coating weight 150g/m2, S 350GD + AZ, 700 tons.



Chapter 2 Products Introduction of Prepainted Steel Sheets and Strips

第二章 彩涂产品介绍

2.1 彩涂板简介 Products Introduction of Prepainted Steel Sheets and Strips

彩色涂层钢板是以热镀锌板、热镀铝锌板、电镀锌板、冷轧板等为基板,经表面预处理(化学脱脂及化学转化处理) 之后,在表面涂敷一层或几层有机涂料,随后经过烘烤固化而成的产品。彩涂产品兼有钢板的强度和加工性以及有机涂 层的耐腐蚀性。

与传统混凝土以及其他传统建筑材料相比,彩涂钢板符合绿色建材的要求。造型美观新颖、色彩丰富、装饰性强、 组合灵活多变、可表达不同的建筑风格,属于环境友好型材料。强度高(屈服强度最高可达 550MPa),具有良好的蒙皮 刚度,防水性能好。抗震性能优秀:由于彩涂钢板在屋面是长向连续铺设,紧固件连接。材料强度高,韧性好,钢材可 延展,可适用不同方向的地震力的作用,与其他建筑材料的脆性和不可变形相比优势明显。

彩涂板的生产工艺从最初的一涂一烘型,逐渐发展到二涂而烘,部分新建产线已出现三涂三烘工艺。

The prepainted steel sheets are prepared by coating one or more layers of organic coating on hot-dip galvanized sheet, hot-dip Al-Zn steel sheet, electrolytic galvanized sheet, cold rolled sheet, etc, and then cured by baking, which provides higher anti-corrosion property and a longer lifespan than that of galvanized steel sheets.

Compared with traditional concrete and other traditional building materials, prepainted steel sheet meets the requirements of green building materials. The high strength (yield strength up to 550 MPa), good waterproof performance, good toughness, excellent seismic performance of prepainted steel sheet, made it as an irreplaceable candidate in construction industry.

The production process of prepainted steel sheet has evolved from one-coating-and-one-baking to doublecoating and double baking, and even three-coating-and-three-baking.



彩涂板的选用 Selection

基板类型和镀层重量: 基板类型和镀层重量是影响彩涂板耐腐蚀性的重要因素, 应根据用途、环境腐蚀性、使用寿 命和耐久性等因素进行选择。室外用彩涂板通常选用热镀锌 / 镀铝锌基板,镀层重量增加耐腐蚀性相应提高。

例如,在工业污染严重或沿海潮湿地区,建议使用镀锌层重量为 180g/m2 以上的基板。室内装饰或家电用彩涂板 可以选用普通热镀锌基板。

涂层种类:彩涂板涂层是影响其使用效果的关键因素,选材时应根据不同的用途、不同环境因素、不同寿命要求等 确定合适种类的涂层。

同样以沿海潮湿地区为例,建议使用涂层耐久性高的彩涂板(如 PVDF、HDP 等),在工业污染严重区域,不仅要 考虑彩涂板较好的耐腐蚀性要求,还应考虑涂层耐污染性性能,如选择 PVDF 彩涂板、易清洁涂层彩涂板等。

Type and coating weight of base metal: Type and coating weight of base metal are important factors that influence the corrosion resistance of prepainted coils. The choice of base metal type and weight of coating should be determined in accordance with usage, environmental corrosion, service life and durability. The prepainted steel sheet with hot-dip galvanized / aluminized substrates are usually selected as candidate for outdoor use, and the corrosion resistance increase with the coating weight.

For example, in areas of severe industrial pollution or coastal wetness, it is recommended to use the substrate with a zinc coating weight of more than 180 g / m2. Interior decoration or home appliance, prepainted steel sheet with ordinary galvanized substrate is suggested.

Category of coating: Coating is the key factor which influence the usage of prepainted coil. Appropriate type of coating should be determined according to usage, service environment, and service life requirement.

Taking the coastal wet area as an example, it is recommended to use the prepainted steel sheet with high durability coatings (such as PVDF, HDP, etc.). In severe industrial pollution area, not only take the better corrosion resistance of the prepainted steel sheet into account, but also the pollution resistance. Here, PVDF or self-cleaning prepainted steel sheet is a reasonable choice.

2.2 首钢彩涂板种类 Types of prepainted plates

2.2.1 面漆种类 Category of finish coats

在卷钢涂料中,起耐久性作用的是树脂和颜料。常用的面漆涂料类型有聚酯、硅改性聚酯、高耐久性聚酯、聚偏氟 乙烯等。

Among all the ingredients of coil coatings, resin and pigment play the role of duration. The primers commonly used consist of polyester, silicon modified polyester, polyvinylidene fluoride, high durability polyurethane, etc.

1、聚酯 (PE) Polyester

附着力良好、颜色丰富,具有较好的成型性和室外耐久性,耐化学药品性中等,成本低。

This kind of finish coat has strong adhesive force, a variety of colors, wide scope of properties in formation and durability outdoors, moderate chemical resistance and low cost, with a warranty period of 7-10 years in the normal environment.



2、硅改性聚酯 (SMP) Silicon modified polyesters

漆膜硬度、耐热性和耐磨性良好,良好的外部耐久性和耐粉化性,光泽保持性、柔韧性一般,成本中等。

The membrane of the finish coat of this kind has excellent rigidity, abrasion resistance, thermal resistance, good outside durability, chalking resistance, high retention of color and luster, ordinary flexibility, moderate cost, etc.





3、高耐久性聚酯(HDP)High-durability polyester

HDP 采用高分子量的树脂,聚合物支链少,键能稳定,不易光解,因此产品具有优良的颜色保持性和抗紫外性, 优良的室外耐久性和抗粉化性,漆膜附着力好、颜色丰富,性价比高,为用户提供15年的品质保证承诺。

High molecular weight resin is used in the finish coat, which has fewer branches, stable bond energy, and photolysis resistance. Therefore, the product possesses excellent color retention and UV resistance, excellent outdoor durability and anti-pulverization, good film adhesion, rich color, and high cost-performance.

首钢海蓝 OUV B 光泽保持率(%)

时间	500 h	1000 h	1500 h	2000 h
PVDF	102.2	99.8	93.2	83.2

首钢海蓝 QUV B 色差值

时间	500 h	1000 h	1500 h	2000 h
PVDF	0.53	0.89	1.03	2.03

4、聚偏氟乙烯 (PVDF)Polyvinylidene fluoride

优异的耐候、耐化学,耐腐蚀性能;在酸碱及污染严重的环境中尤其显现出良好的稳定性;优异的机械加工性能; 高柔韧性,耐磨,耐冲击;适用于对抗污染和耐候性有特别要求的,需要保持超长持久性的建筑,比如重大公共工程建 筑屋面、墙面及外罩等。

首钢氟碳涂料的供应商为世界上最早的也是最大的氟碳涂料公司之一,提供20年涂层质量保证,确保20年内涂层 不脱落,不粉化。

目前部分彩涂产线,为降低成本,选用氟树脂含量< 70% 甚至更低含量的氟树脂。首钢彩涂线 PVDF 涂层氟树脂 含量≥ 70%。

选用≥70% 氟树脂含量涂料的理由:

70%PVDF涂料结晶度高: PVDF/ 丙烯酸树脂混合物的微观结构中, 所用的 PVDF 和丙烯酸树脂的比例是非常敏感的, 当 PVDF 的含量降低至 70% 以下时,PVDF 混合物的结晶度明显下降,MEK 擦拭性能远不及大于 70% 的 PVDF 涂层。

70%PVDF 涂料光泽度保持率高: PVDF 涂料的最关键性能是漆长期耐候性。由于 C-F 键的高稳定性和保护作用, PVDF 树脂具有耐化学和耐光学特性,但不同含量的 PVDF 涂层及聚酯涂层失光率不同。

为保证氟碳涂层具有优异得耐候、耐蚀及光泽保持率,首钢氟碳类彩涂产品选用 Kynar500 及 Hynar5000 氟树脂 PVDF 涂料,氟树脂含量≥ 70%。由于氟树脂含量高、丙烯酸树脂含量相对较低,涂层相对较软,在加工成品过程中应 避免涂层划伤,或覆膜后加工。

The finish coat features in its excellent weatherability, chemical resistance and corrosion resistance. It shows good stability in acid-base and polluted environment, excellent machining performance, high flexibility, and impact resistance. These outstanding properties make the product meets the requirements of major public building which need to maintain super-long-lasting.

At present, some prepainted coil production lines, choose fluorine resin content < 70 % or even lower content of fluorine resin coating in order to reduce costs. The fluorine resin content of PVDF coating used in our prepainted steel sheet lines is \geq 70 %.

Reasons for selecting coatings with ≥ 70 % fluororesin:

High crystallinity: Microstructure of PVDF / acrylic resin mixture is closely related to the proportion of PVDF and acrylic resin. When the content of PVDF is reduced to less than 70 %, the crystallinity of PVDF mixture decreases significantly, and the MEK wipe performance is far less than the one content ≥ 70 %. PVDF.

High gloss retention: The most critical performance of PVDF coating is the long-term weather resistance of paint. Due to the high stability and protection of C-F bond, PVDF resin has excellent chemical and optical resistance. However, the contents affect gloss retention of PVDF coating and polyester coating obviously.

In order to ensure the excellent weatherability, corrosion resistance and gloss retention of fluorocarbon coatings, Kynar500 and Hynar5000 fluororesin PVDF coatings, which fluororesin content was ≥ 70 %, were selected for fluorocarbon prepainted coils in Shougang. Because the high content of fluorine resin and relatively low content of acrylic resin, Shougang products coating is relatively soft. It is suggested that the scratch of the coating should be avoided in the process of processing.



2.2.2 面漆功能 Finish coat function

1、抗静电彩涂板 Antistatic prepainted steel sheet

抗静电彩涂板产品,是在涂层中加入导电性材料,使原本绝缘的涂层变成半导体涂层,表面电阻值位于 10-6~10-9 Ω/m^2

(常规涂层电阻值约为 $10-13\Omega/m^2$)。配合工程接地线的安装, 可使彩涂板表面因空气对流或摩擦产生的静电导 入大地,从而防止涂层因静电吸附灰尘和细菌而降低使用性能、引起静电放电等危害。

广泛应用于净化房,如:半导体厂房,电子厂厂房,微机房,化学工厂等。

After adding conductive materials into the coating, the originally insulated coating becomes a semiconductor coating, and the surface resistance value is $10-6\sim10-9~\Omega$ / m² (the resistance value of conventional coating is about $10-13\Omega/m^2$). The sheet with a coating described above is named antistatic prepainted steel sheet. With the installation of engineering grounding wire, the static electricity generated by air convection or friction on the surface of prepainted plate can be imported into the earth, to keep the coating performance by prevent the coating from electrostatic adsorption of dust and bacteria.

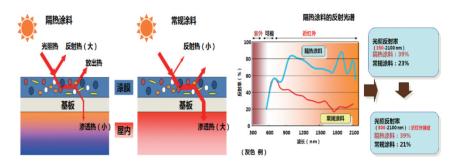
It is suitable for clean rooms in semiconductor factory, electronic factory, microcomputer room, chemical factory, etc.



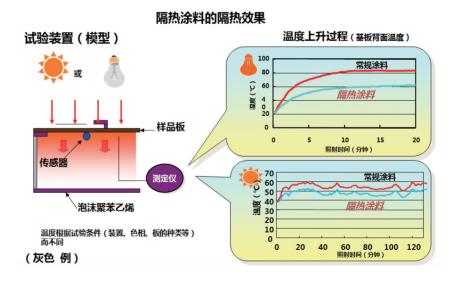
2、隔热彩涂板 Thermal insulation prepainted steel sheet

隔热彩涂板,俗称"冷屋顶"。其所用的涂料中,使用了对近红外线部分的反射性很高的着色颜料,所以即使是与 过去涂料同一种颜色(可视光谱相同),因对不可视近红外线部分的反射性很高,所以反射其热光线,使之很难渗透到 内部。隔热彩涂板,能有效降低能源消耗量,并延长彩涂板使用寿命。

增加翻译: Thermal insulation prepainted steel sheet, commonly known as "cold roof". Pigment with high reflectivity to the near-infrared part is used in coating. Therefore, it is difficult for thermal light to penetrate into the interior because of its high reflectivity to the invisible near-infrared part. Thermal insulation prepainted steel sheet effectively reduces energy consumption and prolong the service life.



隔热涂料试验效果图:





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