# JCP STEEL SUPPLIES

## AZM85 COLOUR-1-SIDE

# Ⅰ. AZM products introduction

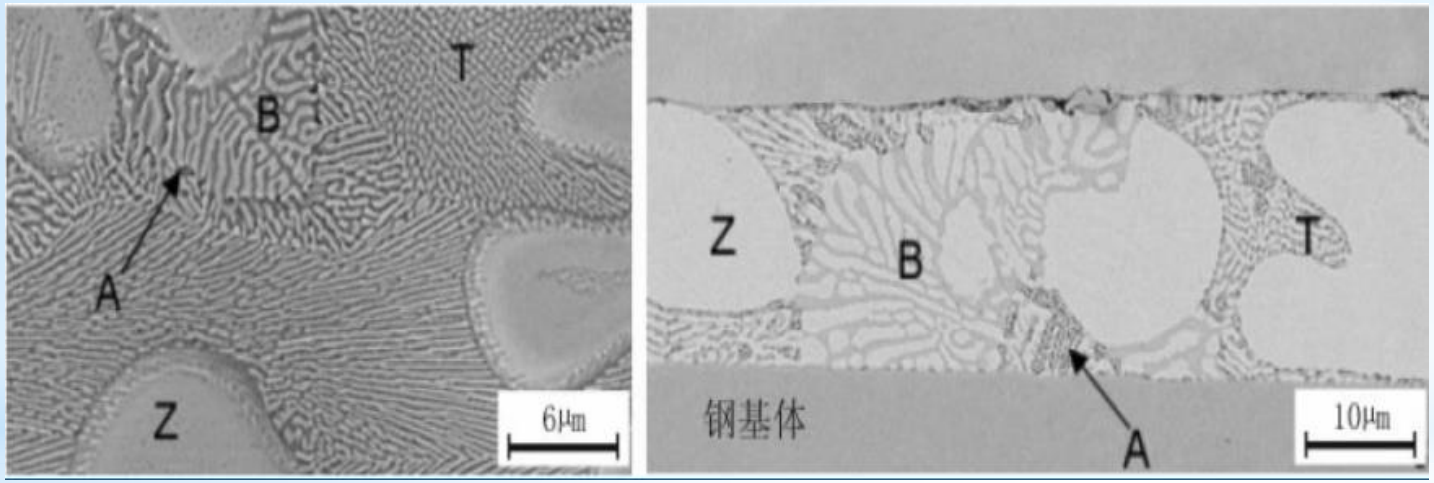
Zinc-Aluminum-Magnesium product is hot dipped by Aluminum, Zinc, Magnesium and other microelements.  Due to the formation of a compact microscopic crystal structure on the surface, it can greatly improve the corrosion resistance, and has better incision self-healing properties as well!

This technology was mainly from the United States and Japan but its commercial application began in Japan (Nisshion steel), in the 1990s. During these years, the technology was developed rapidly in Europe (Arcelor Mittal), America and Australia markets.  At present, there are about 10 enterprises in the world that can mass produce this product.

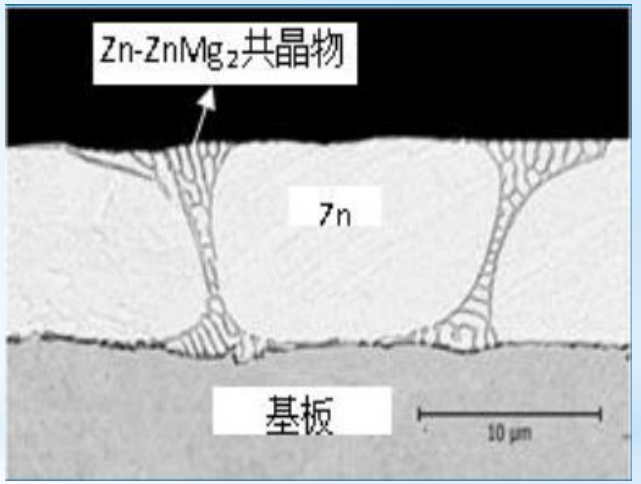
# Producers & Composition comparison Table

| Company Name | AL% | Mg% | Zn% | Remarks |
|---|---|---|---|---|
| Nippon Steel | 4.5 | 0.1 | Margin | GI base |
| | 0.2 | 0.5 | Margin | |
| | 11 | 3 | Margin | |
| Nisshin Steel | 6 | 3 | Margin | GI base |
| ThyssenKrupp | 1 | 1 | Margin | GI base |
| Voestalpine | 2.5 | 1.5 | Margin | GI base |
| TATA | 1.6 | 1.6 | Margin | GI base |
| JFE | 5 | 0.8 | Margin | GI base |
| Arcelor Mittal | 3.5 | 3 | Margin | GI base |
| POSCO | 2.5 | 3 | Margin | GI base |
| Dongkuk | 55 | 1.5 | Margin | GL base |
| Bluescope | 55 | 3 | Margin | |
| JCP MILL | 55 | 1 | Margin | |

# Structure diagram

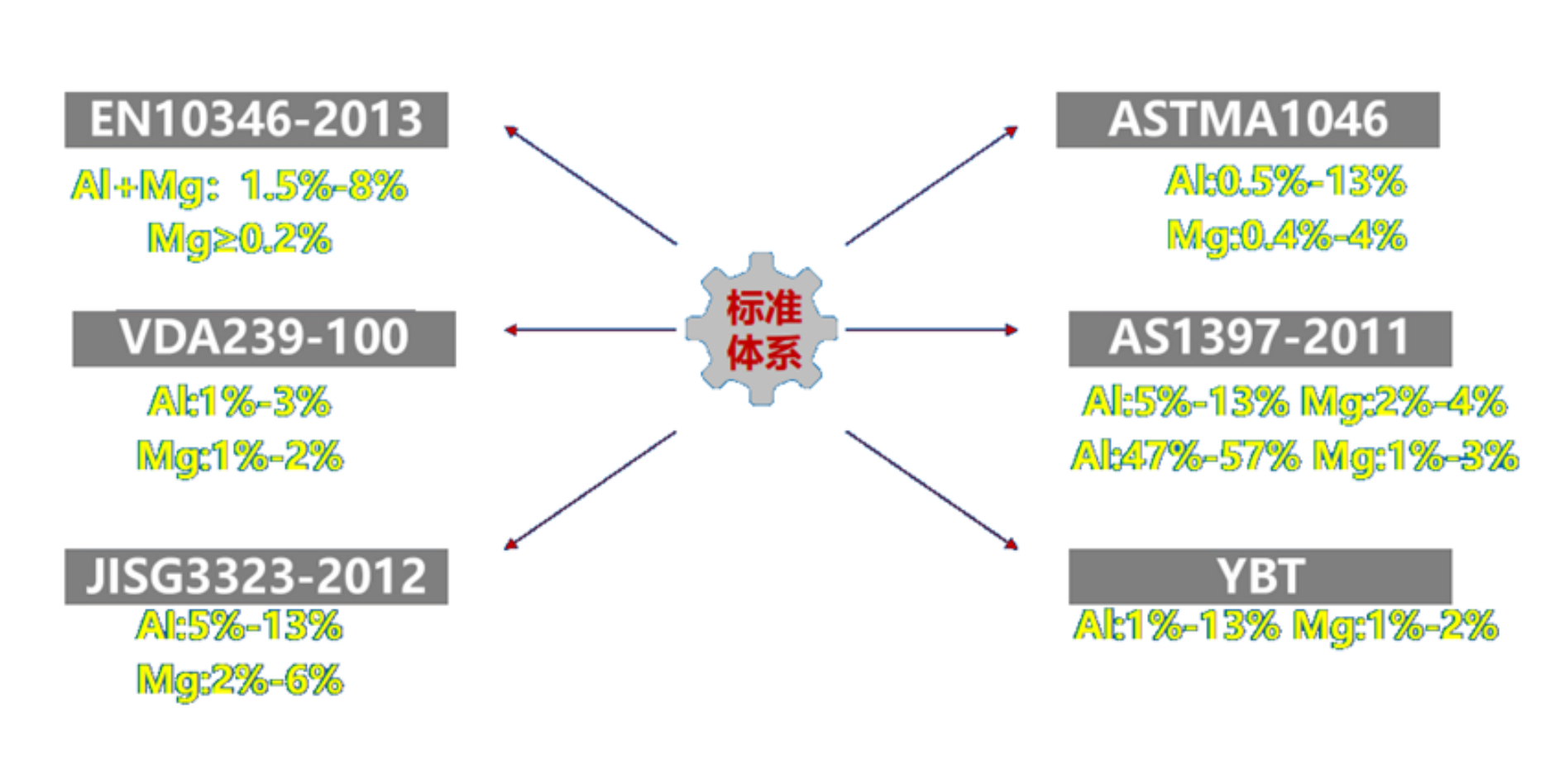



A—Aluminum Phase；B—Binary Eutectic Phase；
T—Ternary Eutectic Phase；Z—Zinc Phase




Plating cross section

# Standards


EN10346-2013
Al+Mg: 1.5%-8%
Mg≥0.2%
VDA239-100
Al:1%-3%
Mg:1%-2%
JISG3323-2012
Al:5%-13%
Mg:2%-6%
标准体系
ASTMA1046
Al:0.5%-13%
Mg:0.4%-4%
AS1397-2011
Al:5%-13% Mg:2%-4%
Al:47%-57% Mg:1%-3%
YBT
Al:1%-13% Mg:1%-2%

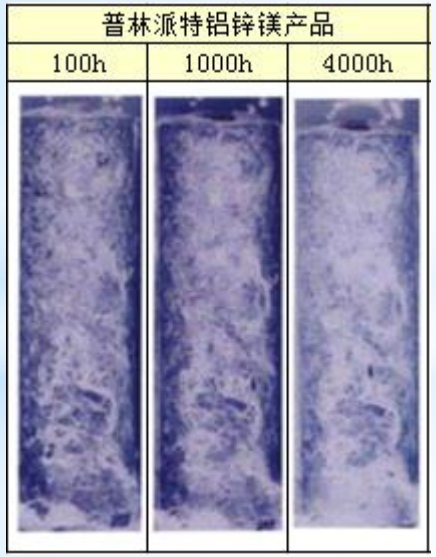
# Ⅱ. JCP Steel Supplies mill

Based on the technology from their Japanese partners, our supplier/mill spents a lot of money, time and energy in the development of Zn-Al-Mg products. After repeated testing and comparisons, they chose a high-aluminum and low-magnesium formula, that is more suitable for color coating products. They put 1-2.0% magnesium element to the international standard AL-ZN alloy.

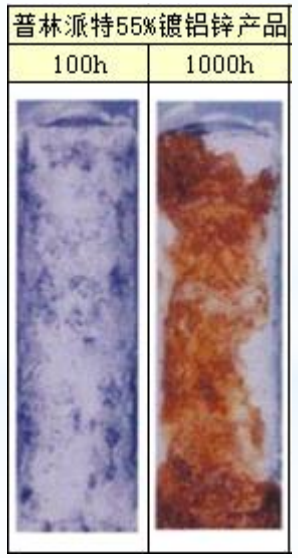
# Ⅲ. Excellent Performance of AZM

## 1. Ultra high corrosion resistance

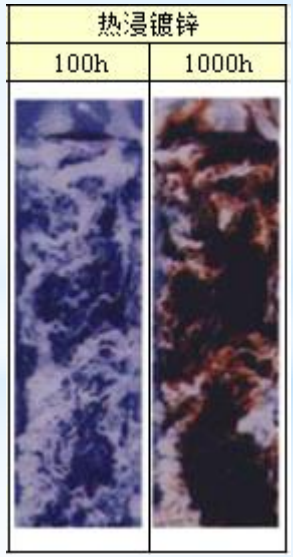
Due to the addition of active magnesium, a highly adherent dense protective film is formed on the surface of the coating, which effectively inhibit the corrosion of the coating and makes the steel sheet have excellent corrosion resistance in alkaline, marine, hot and humid environments. Its life time is 5-20 times that of ordinary galvanized products, 3-7 times of galvalume (AZ) products.




a. AZM product



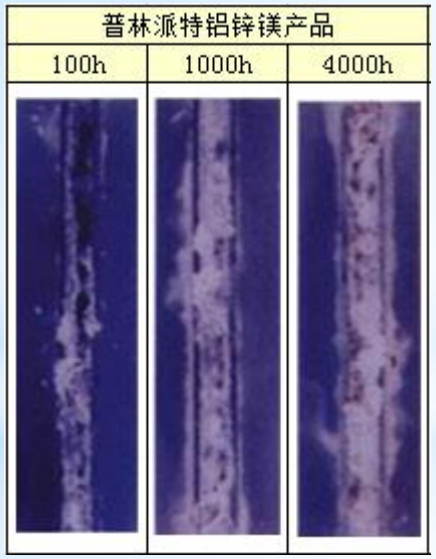

b. 55% GL _Surface



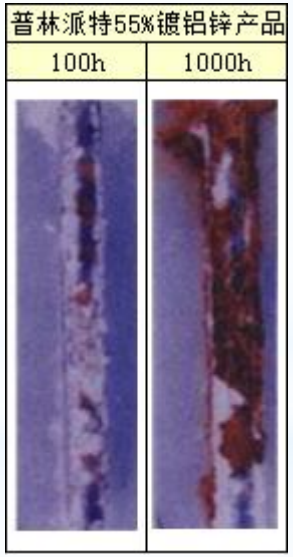

c. GI _Surface

## 2. Excellent incision self-healing property

Zn-Al-Mg sheet has a self-healing function when cutting and punching. If the cutting surface does not have a protective film, the incision of the traditional galvanized steel sheet will gradually react with the oxygen and water to cause rust. Due to the fluidity, the Zinc-Aluminum-Magnesium coating forms a new protective film on the uncovered portion of the cutting surface, thereby inhibiting the corrosion of the cutting surface.




a. AZM Cutting surface




b. 55% GL _Cutting Surface




c. GI_ Cutting Surface

## 3. Good processability

The Zinc-Aluminum-Magnesium coating is more dense than the traditional galvanized coatings. Therefore, it is not easy to cause peeling during processing. It also has excellent tensile, stamping, bending and other properties under severe conditions. At the same time, magnesium elements can improve the coating and make the product more resistant to damage.

## 4. Superior ammonia resistance

Zn-Al-Mg sheet can replace existing galvalume sheet for animal husbandry with superior Ammonia resistance.

# Ⅴ. AZM vs AZ testing report

## 1. AZM and 55% GL Salt Spray Performance Test comparison

| AZM and 55% GL Salt Spray Performance Test | | | | | |
|---|---|---|---|---|---|
| **Production Date: 2018.11.21** | | | Production Date: 2018.10.14 | | |
| **Production: line 1** | | | Production: line 1 | | |
| **Substrate: Name:** AZM 100 (unpainted) | | | Substrate: Name: GALVALUME AZ100 (unpainted) | | |
| **Coating weight: 100g/m²** | | | **Coating weight: 100g/m²** | | |
| Salt Spray Test Hours | Condition | Conclusion | Salt Spray Test Hours | Condition | Conclusion |
| 100 hours | 2%Black Rust | Qualified | 100 hours | 1%Black Rust | Qualified |
| 200 hours | 5%Black Rust | Qualified | 200 hours | 3%Black Rust | Qualified |
| 500 hours | 10%Black Rust | Qualified | 500 hours | 7%Black Rust | Qualified |
| 750 hours | 15%Black Rust | Qualified | 750 hours | 10%Black Rust | Qualified |
| 900 hours | 20%Black Rust | Qualified | 900 hours | 12%Black Rust | Qualified |
| 1200 hours | 40%Black Rust | Qualified | 1200 hours | 15%Black Rust, Red Rust Exist | Disqualified |
| 1300 hours | 50%Black Rust | Qualified | 1300 hours | 20%Black Rust, 5%Red Rust | Disqualified |
| 1400 hours | 70%Black Rust | Qualified | 1400 hours | 35%Black Rust, 8%Red Rust | Disqualified |
| 1500 hours | 90%Black Rust | Qualified | 1500 hours | 55%Black Rust, 10%Red Rust | Disqualified |
| 1600 hours | 100%Black Rust | Qualified | 1600 hours | 75%Black Rust, 12%Red Rust | Disqualified |
| 1700 hours | 100%Black Rust | Qualified | 1700 hours | 100%Black Rust, 15%Red Rust | Disqualified |
| 1800 hours | 100%Black Rust | Qualified | 1800 hours | 100%Black Rust, 18%Red Rust | Disqualified |
| 1860 hours | 100%Black Rust | Qualified | 1860 hours | 100%Black Rust, 20%Red Rust | Disqualified |

# AZM VS AZ UNPAINTED SALT SPRAY TEST

## Salt Spray1500h




**AZM** 100g （AFP）

Conclusion： No Red Rust




**55% Galvalume 100g （AFP）**

Conclusion: edge rust with largest 20mm
Average 15mm, red rust apperance

## Salt Spray2000h




**Super M 100g（AFP）**

Conclusion: No rust




**Galvalume 100g（AFP）**

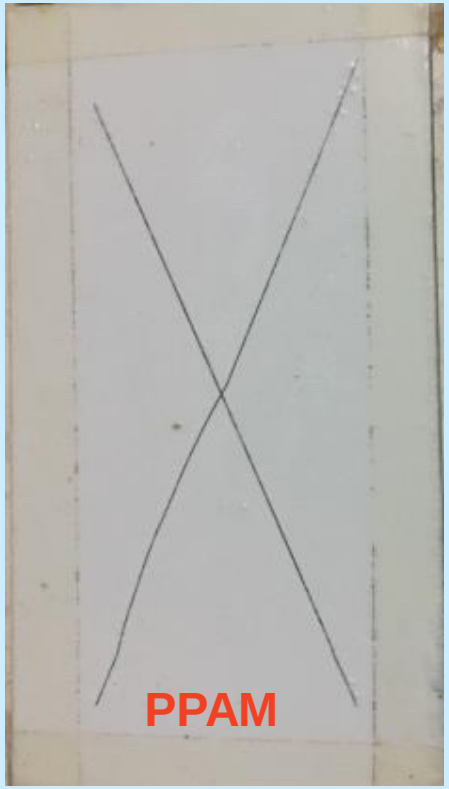
Conclusion: large scale red rust

# 2. AZM100 and AZ100 Salt Spray Performance Test comparison

| AZM and 55% PPGL Salt Spray Performance Test | | | | | |
|---|---|---|---|---|---|
| **Production Date**：2018.11.22 | | | Production Date：2018.07.05 | | |
| **Production**：**Line 3** | | | Production：Line 3 | | |
| **Substrate**：**Name**：**AZM100 (painted)** | | | Substrate：Name：AZ100 (painted) | | |
| | | | | | |
| **COATING**：**100g** | | | **COATING**：**100g** | | |
| **Paint Thickness**：**5+15/5** | | | **Paint Thickness**：**5+15/5** | | |
| Paint：White Grey | | | Paint：White Grey | | |
| Salt Spray Test Hours | Condition | Conclusion | Salt Spray Test Hours | Condition | Conclusion |
| 100 Hours | Non-Corrosive | Qualified | 100 Hours | Non-Corrosive | Qualified |
| 200 Hours | Non-Corrosive | Qualified | 200 Hours | Non-Corrosive | Qualified |
| 500 Hours | Non-Corrosive | Qualified | 500 Hours | 2% Corrosion | Qualified |
| 750 Hours | 0.5% Corrosion | Qualified | 750 Hours | 5% Corrosion | Disqualified |
| 900 Hours | 1% Corrosion | Qualified | 900 Hours | 6% Corrosion | Disqualified |
| 1200 Hours | 3% Corrosion | Qualified | 1200 Hours | 10% Corrosion | Disqualified |
| 1300 Hours | 3% Corrosion | Qualified | 1300 Hours | 12% Corrosion | Disqualified |
| 1400 Hours | 3.5% Corrosion | Qualified | 1400 Hours | 15% Corrosion | Disqualified |
| 1500 Hours | 3.5% Corrosion | Qualified | 1500 Hours | 18% Corrosion | Disqualified |
| 1600 Hours | 4.0% Corrosion | Qualified | 1600 Hours | 20% Corrosion | Disqualified |
| 1700 Hours | 4.0% Corrosion | Qualified | 1700 Hours | 22% Corrosion | Disqualified |
| 1800 Hours | 4.5% Corrosion | Qualified | 1800 Hours | 25% Corrosion | Disqualified |
| 1900 Hours | 4.5% Corrosion | Qualified | 1900 Hours | 28% Corrosion | Disqualified |
| 2000 Hours | 4.5% Corrosion | Qualified | 2000 Hours | 30% Corrosion | Disqualified |

# PAINTED SALT SPRAY TEST

## Salt Spray 1250h




**AZM100（RMP 5+15um）**

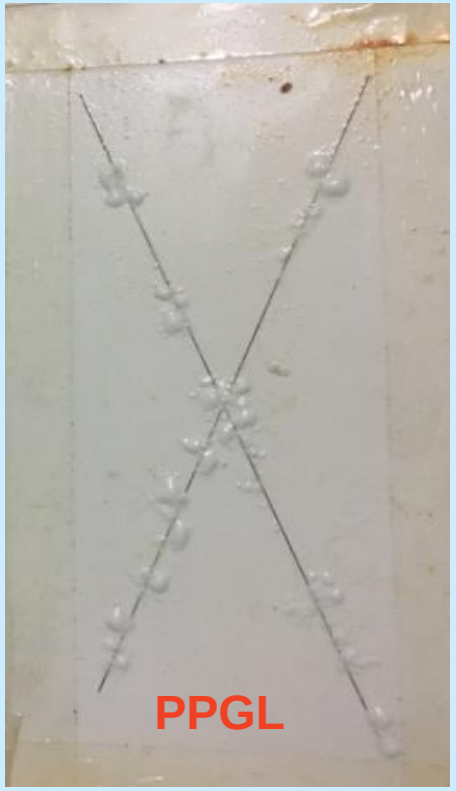
Conclusion： Free of bubbles




**AZM100（RMP 5+15um）**

Conclusion： Free of bubbles

## Salt Spray 800h




**AZ100（RMP 5+15um ）**

Conclusion： Have bubbles




**AZ100（ RMP 5+15um ）**

Conclusion: Have bubbles

# 3. Performance test

| Unpainted AZM | | | | | |
|---|---|---|---|---|---|
| Production Date: 2018.11.21 | | | Production Date: 2018.11.21 | | |
| Production: line 1 | | | Production: line 1 | | |
| Info: spec: 0.42*1000 | | | Info: spec: 0.4*1000 | | |
| Layer weight: 100g/m$^2$ | | | Layer weight: 50g/m$^2$ | | |
| **Items** | Data | Conclusion | Items | Data | Conclusion |
| T.S. (Mpa) | 370.1 MPa | Passed | T.S. (Mpa) | 380.1 MPa | Passed |
| Y.S. (Mpa) | 330.2 MPa | Passed | Y.S. (Mpa) | 341.6 MPa | Passed |
| EI. | 23.70% | Passed | EI. | 25% | Passed |
| Impact Test | No cracking<br>No peeling | Passed | Impact Test | No cracking<br>No peeling | Passed |
| T-bending | No cracking | Passed | T-bending | No cracking | Passed |

| Painted AZM | | | | | |
|---|---|---|---|---|---|
| Production Date: 2018.11.22 | | | Production Date: 2018.11.30 | | |
| **Production**: line 3 | | | Production: line 3 | | |
| Info: spec: 0.47*1200 | | | Info: spec: 0.5*1200 | | |
| Paint Thickness: 5um+15um/5um | | | Paint Thickness: 5um+10um/5um | | |
| Paint: WhiteGrey | | | Paint: White Grey | | |
| **Items** | Data | Conclusion | Items | Data | Conclusion |
| T.S. (Mpa) | 366.20% | Passed | T.S. (Mpa) | | Passed |
| Y.S. (Mpa) | 341.80% | Passed | Y.S. (Mpa) | | Passed |
| Adhesion | Grade 1 | Passed | Adhesion | Grade 1 | Passed |
| Impact test | 9J | No cracking<br>No peeling | Impact test | 9J | No cracking<br>No peeling |
| Pencil hardness | 3H | Passed | Pencil hardness | 4H | Passed |
| T-bending | 2T | Passed | T-bending | 4T | Passed |
| Cupping | Grade 1 | Passed | Cupping | Grade 4 | Passed |