posco

PosMAC® 3.0

POSCO Magnesium Aluminium alloy Coating product

PosMAC®3.0 is a range of steel products that provide 5 to 10 times greater corrosion resistance compared with ordinary hot-dip galvanized steel sheet (GI, GI(H)) of the same coating weight. PosMAC®3.0 especially has an excellent cross section corrosion resistance. Ordinary products having thick plating can be replaced with it. The same processing, assembly and painting processes can be applied to PosMAC®3.0 as one would apply to GI steels.

Contents

PosMAC® 3.0

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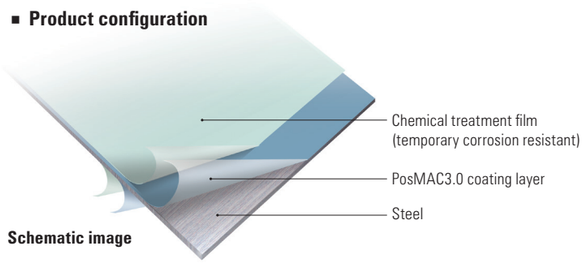
What is PosMAC®3.0?

What is PosMAC®3.0 ?

PosMAC3.0(POSCO Magnesium Aluminium alloy Coating product) is a ternary alloy coated steel(Zn- 3%Mg- 2.5%Al) with high corrosion resistance developed with POSCO's own technology.

* **PosMAC®3.0** is the registered trademark of POSCO.

■ Product configuration



Schematic image

■ Product characteristics

- PosMAC3.0 is a corrosion resistant products that is 5 to 10 times stronger resistance than that of a normal hot-dip galvanized steel sheet(GI, GI(H)) with the same coating weight. PosMAC3.0 has an excellent cross-section corrosion resistance; normal thick plating products can be replaced with this product.
- The same processing, assembly and painting process can be applied to PosMAC3.0 as one would apply to GI.

■ Product characteristics comparison

- PosMAC3.0 is superior to GI in corrosion resistance on flat, machined, cross-section parts and is superior to galvalume in cross-section corrosion resistance.

Quality items		PosMAC3.0	GI
Hardness(Hv) of coating layer		110~130	60~80
Friction characteristics		◎	X
Corrosion resistance	Flat sheet	◎	△
	Bending	◎	△
	Cup	◎	△
	Cross-section	◎	△
Chemical resistance		◎	△
Weldability		◎	◎

Equipment specifications

Classification		Pohang #1CGL	Gwangyang #2CGL
Operation date		2012. 04	1992.6
Capacity		750 thousands ton/year	510 thousands ton/year
Product dimensions	Thickness	0.4~4.5mm	0.45~2.3mm
	Width	800~1650mm	720~1860mm
Coating weight		60~400 g/m^2	80~350g/m^2
Product grade		General, Structural	Automobile, General, Structural
Post treatment		Chromate(Cr^{6+}, Cr^{3+}), Cr-free, Oiling	Chromate(Cr^{3+}), Oiling

Manufacturing equipment

Entry

The equipments at the entry section are composed of two pay off reels and a welder.

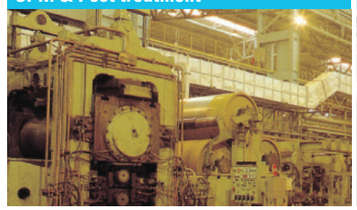
Shot blast, Pickling

The scales from an HR coil can be removed completely by passing through the shot blast and pickling tank.

Galvanizing

Zn-Mg-Al is coated onto the surface of the steel sheet after passing the annealing furnace in the pot reserved for PosMAC3.0, and then the targeted coating weight is achieved by spraying high pressurized air from the air knife.

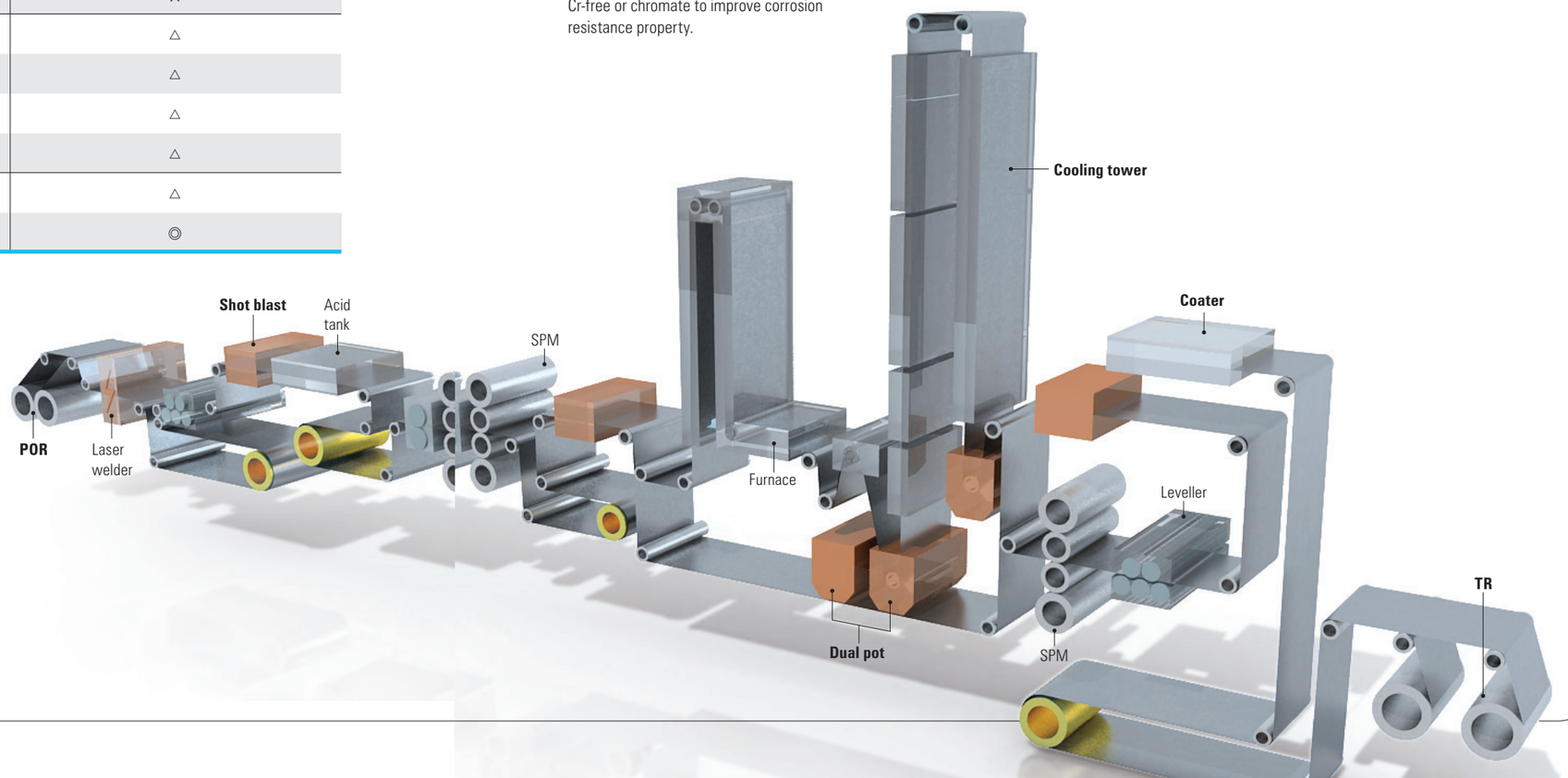
SPM & Post treatment



In order to obtain the flat shape and elegant surface, PosMAC3.0 product get passed through a skin pass mill. Also to prevent any white rust, product surface is coated with Cr-free or chromate to improve corrosion resistance property.

Inspection & Coiling

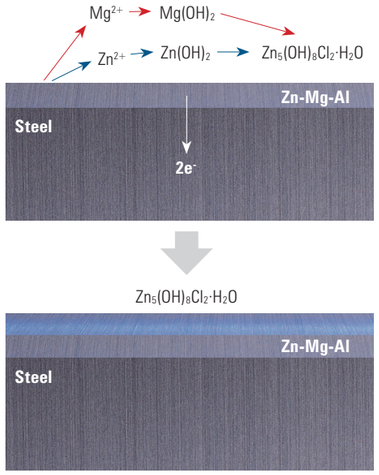
The equipment at the exit section are composed of an inspection table and an oiler equipment where the products are inspected synthetically and judged whether they are adequate for sale.

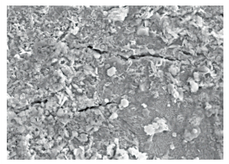
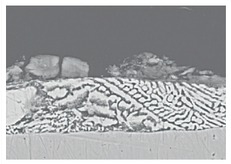
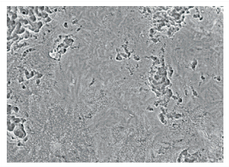
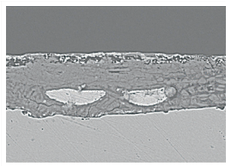


Corrosion resistance of PosMAC®3.0

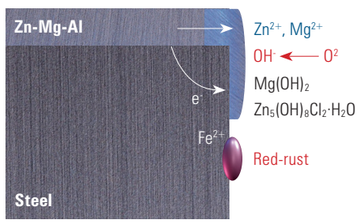
Why PosMAC®3.0 has excellent corrosion resistance?

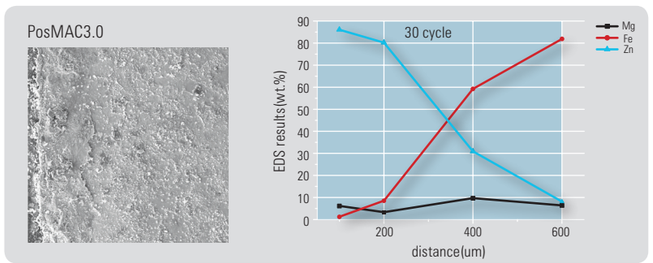
The magnesium(Mg) in PosMAC3.0's coating layer will accelerate the formation of a dense corrosion product called "($Zn_5(OH)_8Cl_2{\cdot}H_2O$)" which is extremely stable. When simonkolleite is formed on the surface of the coating layer in a film-like-form, it plays a role as a corrosion inhibitor for the base metal.

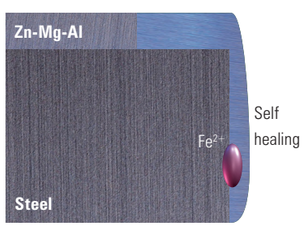


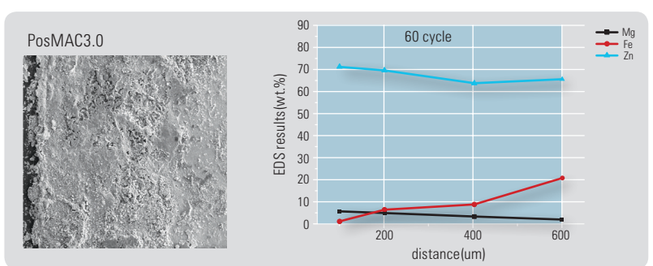
CCT	Surface	Cross-section
30 cycle		
60 cycle		

In addition, the upper coating layer can be dissolved to cover the cross-section and accelerate the growth of a stable corrosion product. However red-rust can be found in the already exposed steel plate, but fortunately, the film of the corrosion products covers the cross-section and serves to prevent corrosion.

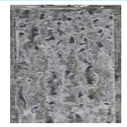
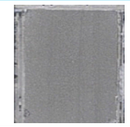
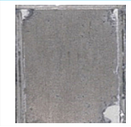
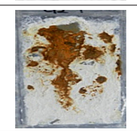
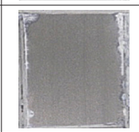
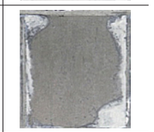
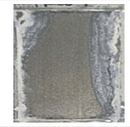
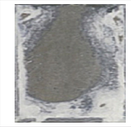
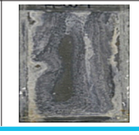
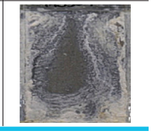








Comparison to galvanized(GI(H)) in corrosion resistance on flat surfaces(SST)

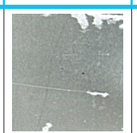
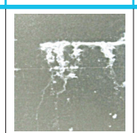
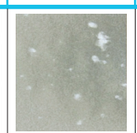
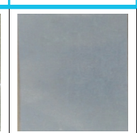
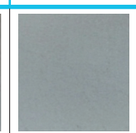
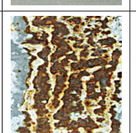
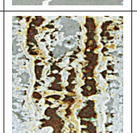
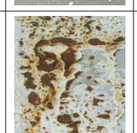
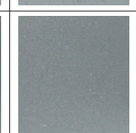
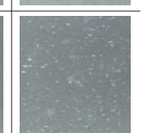
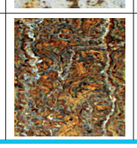
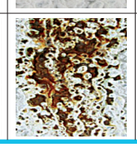
SST	GI(H)	PosMAC3.0	
The coating weight on both sides	600g/m²	200g/m²	350g/m²
480Hr			
720Hr			
1440Hr			
2400Hr			

· PosMAC3.0 shows 5 to 10 times the corrosion resistance compared to galvanized steel sheet on flat surfaces.

Test method :
Salt Spray Test (SST),
[ISO 9227, JIS Z2371, ASTM B117] 5%NaCl, 35℃

Comparison to galvanized(GI(H)) in corrosion resistance on flat surfaces(CCT)

· PosMAC3.0 shows 5 to 10 times the corrosion resistance compared to galvanized steel sheet on flat surfaces.

CCT	GI(H)				PosMAC3.0		
The coating weight on both sides	120g/m²	200g/m²	300g/m²	600g/m²	140g/m²	200g/m²	275g/m²
10 cycle (80Hr)							
70 cycle (560Hr)							
120 cycle (960Hr)							

Test method : Cyclic Corrosion Test (CCT),
[ISO 14993] 1Cycle : Salt Spray 2Hr(5%NaCl, 35%) → Dry 4Hr(25%RH, 60℃) → Wet 2Hr(95%RH, 50℃)

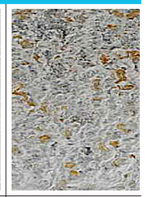
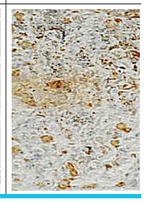
Corrosion resistance of PosMAC®3.0

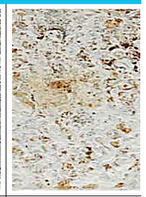
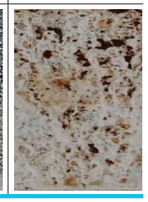
Batch

PosMAC®3.0's corrosion resistance on flat sheets compared to batch plated GI

(Korea Testing & Research Institute : Test No. TBO-000048)

PosMAC3.0 shows 5~10 times corrosion resistance to that of batch plated GI sheet.

SST	PosMAC3.0		Batch plated GI
Coating weight	60g/m²	300g/m²	550g/m²
480 Hr			
720 Hr			

SST	PosMAC3.0		Batch plated GI
Coating weight	60g/m²	300g/m²	550g/m²
1200 Hr			
2400 Hr			

Test method : Salt Spray Test (SST), [ISO 9227, JIS Z2371, ASTM B117] 5%NaCl, 35°C

PosMAC®3.0's corrosion resistance on bent areas compared to that of hot dip galvanized steel(GI(H))

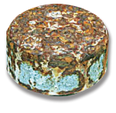
PosMAC3.0 shows 2~3 times corrosion resistance to that of GI(H) on bent areas.

Thickness/ Steel type	2.0 mmt CQ Grade	
SST	PosMAC3.0	GI(H)
Coating weight	140g/m²	140g/m²
800 Hr		
1200 Hr		

Test method : Salt Spray Test (SST), [ISO 9227, JIS Z2371, ASTM B117] 5%NaCl, 35°C

Corrosion resistance of cup drawing region

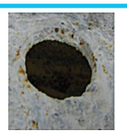
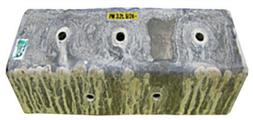
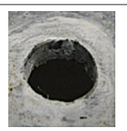
Corrosion resistance of PosMAC3.0 is 2~3 times higher than that of GI(H)

CCT	PosMAC3.0	GI(H)
Coating weight	275g/m²	350g/m²
60 cycle		 35 cycle Red-rust
80 cycle		
100 cycle		-

Test method : Cup Drawing → Cyclic Corrosion Test (CCT),
[ISO 14993] 1Cycle : Salt Spray 2Hr(5%NaCl, 35%) → Dry 4Hr(25%RH, 60°C) → Wet 2Hr(95%RH, 50°C)

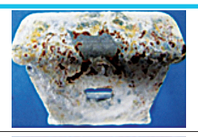
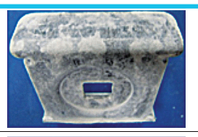
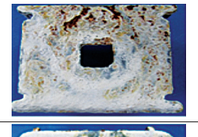
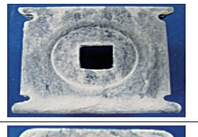
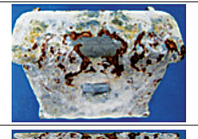
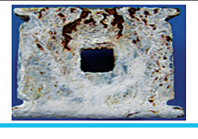
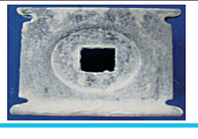
PosMAC®3.0's corrosion resistance of processed product

■ **Processed product** : C-Type steel for solar photovoltaic power generator support structure.

Division		Coating weight	Processed area	Frontal cross-section
SST 500Hr	Batch-GI	370.3g/m² (One side)		
	PosMAC3.0	116.1g/m² (One side)		

Test method : Salt Spray Test (SST), [ISO 9227, JIS Z2371, ASTM B117] 5%NaCl, 35°C

■ **Processed product** : Square type part for solar photovoltaic power generator support structure

Division	Batch-GI	PosMAC3.0
	432g/m²(One side)	195g/m²(One side)
SST 1000Hr		
		
SST 2000Hr		
		

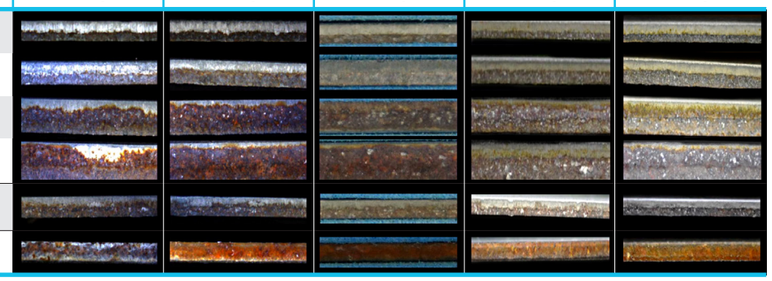
Test method : Salt Spray Test (SST), [ISO 9227, JIS Z2371, ASTM B117] 5%NaCl, 35°C

Corrosion resistance of PosMAC®3.0

Weathering test on cross-section part (Korea conformity laboratories)

- Corrosion resistance in cross-section parts of PosMAC3.0, is superior to that of GI(H).
- PosMAC3.0 also gets red-rust in cross-section parts when initially exposed outdoors. However as the time goes by, the corrosion(red-rust) area of PosMAC3.0 tends to decrease through the formation of its distinctive oxide-based material.
- If the thickness of PosMAC3.0 is more than 1.6t, we recommend post-treatment, because it is not fully covered after 1 year. And when the thickness of PosMAC3.0 is less than 1.6t and cross-section parts is clean without red-rust at initial construction, it is recommended to carry out post-treatment by the option of the customers.

Outdoor exposure test

Sample	Thickness	Coating weight (g/m^2)	Cross-section image				
			After 1 year	After 2 year	After 3 year	After 5 year	After 6 year
PosMAC3.0	1.6	120					
	2.0	350					
	3.0	180					
	4.0	180					
GI(H)	1.6	180					
GI(H)	1.6	120					

Note. Outdoor exposure test at seosan chemical industrial complex(Oct. `12 ~ Oct. '14, Korea conformity laboratories)

Estimation of PosMAC®3.0's longevity (KOBELCO from Japan)

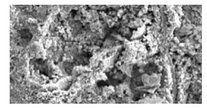
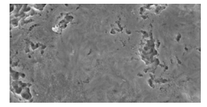
Classification	Test sample	Thickness(mm)	Coating weight (Both sides, g/m^2)	Post-treatment	Corrosion start time of Fe(CCT)	Estimate of longevity (Salt damage environment)
Ternary alloy coated steel	PosMAC3.0 (POSCO)	2.0	140	Cr	1,920Hr	50 years
		2.0	350	Cr-free(NB)	3,700Hr	100 years
	Competitor's high corrosion resistant Type 1	2.0	120	Cr-free	1,920Hr	50 years
		1.6	190	Cr	2,200Hr	60 years
	Type 2	0.27	120	Cr-free	2,200Hr	60 years
Galvanized steel	GI(H) (POSCO)	2.0	600	Cr	960Hr	25 years(Base)
	Batch GI (Domestic galvanizer)	2.0	1,000	-	960Hr	25 years

Test Method : Cyclic Corrosion Test (CCT), [ISO 14993] 1Cycle : Salt Spray 2Hr(5%NaCl, 35%) → Dry 4Hr(25%RH, 60℃) → Wet 2Hr(95%RH, 50℃)
Evaluation of longevity : Japan's bridge construction association stated that the longevity of a GI with K600 zinc coating has a corrosion resistance longevity of 25years. Based on this study the relative longevity of other comparable steel products was extracted.

White rust occurrence of the PosMAC®3.0

- PosMAC3.0 is strong corrosion-resistant steel to protect the base metal by forming oxide of a dense structure.
- Therefore, white rust also can occur as usual galvanized steel. To avoid white rust of PosMAC3.0 before the construction, the following should be noted.

■ FE-SEM image comparision of the corrosion product of the PosMAC3.0 & GI

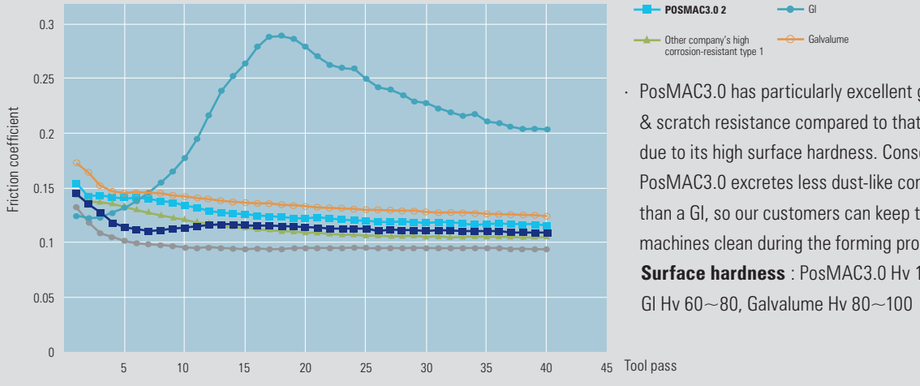
Division	GI	PosMAC3.0
Classification	ZnO	$Zn_5(OH)_8Cl_2$, H_2O, $Zn_4CO_3(OH)_6$, H_2O
Image	 Porous & incompact structure	 Stable & dense structure

■ Precautions when storing the PosMAC3.0 before the construction

- Coils, sheet, and processed products must be kept dry and smooth-ventilated place. White rust can be caused by water vapor on the ground floor when storing.
- Set vinyl and the thick pentagonal timber(thicker than 10mm recommended) on the ground first and stack the coils to ventilate ordinarily.
- The coil and sheet should be wrapped when raining and if the rain stops, the package should be removed so that the internal water could evaporate and get removed.
- To cover vinyl above the unpackaged coil where it has moisture in the air should not be kept for a long time as it might promote the reaction with coil and the moisture.
- When keeping the coil for a long time, it should be used quickly and in first-in-first-out manner since there is the possibility that white rust might occur.
- The unpackaged or package-seperated coils have to be used quickly.

Galling & scratch resistance of PosMAC®3.0

■ Surface hardness vs. Tool pass for various plated steels



- PosMAC3.0 has particularly excellent galling & scratch resistance compared to that of GI due to its high surface hardness. Consequently, PosMAC3.0 excretes less dust-like compound than a GI, so our customers can keep their press machines clean during the forming process.
  Surface hardness : PosMAC3.0 Hv 110~130, GI Hv 60~80, Galvalume Hv 80~100

■ Surface appearance after friction test

Test condition

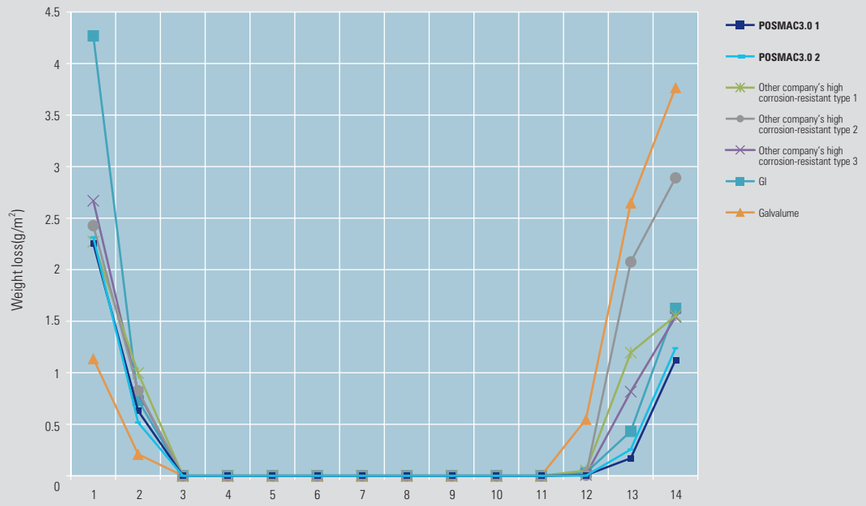
- Target force : 333.3 kgf, Pressure : 3.736 MPa
- Tip movement : 200 mm length, 20 mm/sec rate
- Avg. calculation region : 30mm ~ 170mm
- P-DBH(washing oil) oiled.

Type 1, 2 Other company's high corrosion-resistant

Chemical resistance of PosMAC®3.0

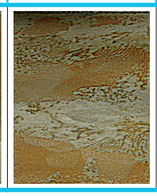
- PosMAC3.0 shows less weight loss of plating layer in comparison to GI and galvalume under either an acidic or an alkaline environment. This means that PosMAC3.0 is much more resistant to potent chemicals than other plated steels products.
- GI and galvalume are especially weak under the strong acidic condition(pH 1~2) and strong basic condition(pH 13~14), respectively.
- PosMAC3.0 is applicable for building materials thanks to its excellent chemical resistance.

■ Weight loss of plating layer vs. pH for various plated steels

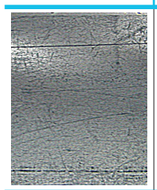
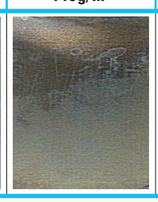
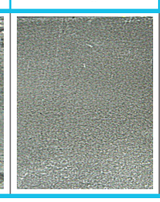
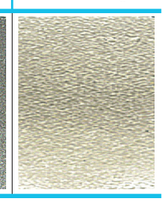


Test method : Weighing the loss of plated layer after dipping into various solutions(pH 1~14, H_2SO_4, NaOH and NH_3 single or mixed) for 24 hours.

■ Chemical resistance against pH 1 solutions

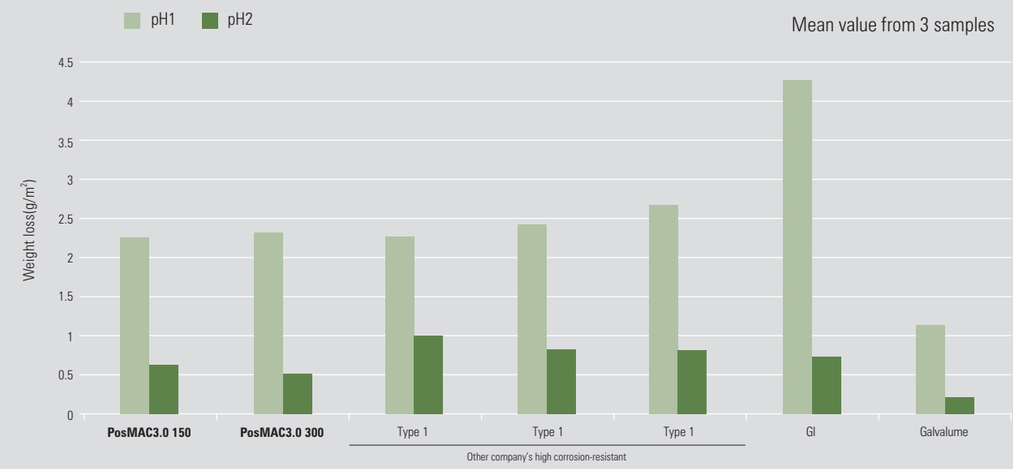
PosMAC3.0 **150g/m²**	PosMAC3.0 **300g/m²**	Other company's high corrosion-resistant **140g/m²**	Other company's high corrosion-resistant **280g/m²**	Other company's high corrosion-resistant **280g/m²**	GI **180g/m²**	Galvalume **120g/m²**
						

■ Chemical resistance against pH 2 solutions

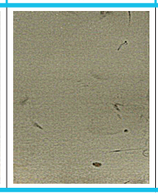
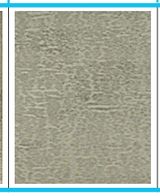
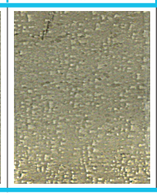
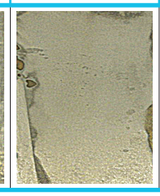
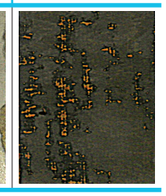
PosMAC3.0 **150g/m²**	PosMAC3.0 **300g/m²**	Other company's high corrosion-resistant **140g/m²**	Other company's high corrosion-resistant **280g/m²**	Other company's high corrosion-resistant **280g/m²**	GI **180g/m²**	Galvalume **120g/m²**
						

- All of the commercial alloy plated steels above shows similar chemical resistance under acidic conditions(pH 1~2).
- The galvalume which has the highest Al content shows the highest chemical resistance under acidic conditions(pH 1~2).

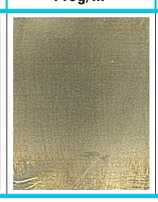
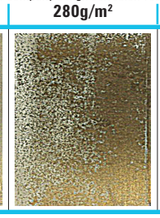
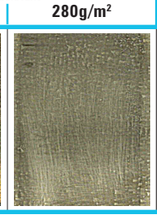
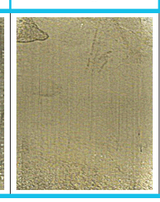
■ Weight loss from pH 1 and 2 solutions



■ Chemical resistance against pH 13 solutions

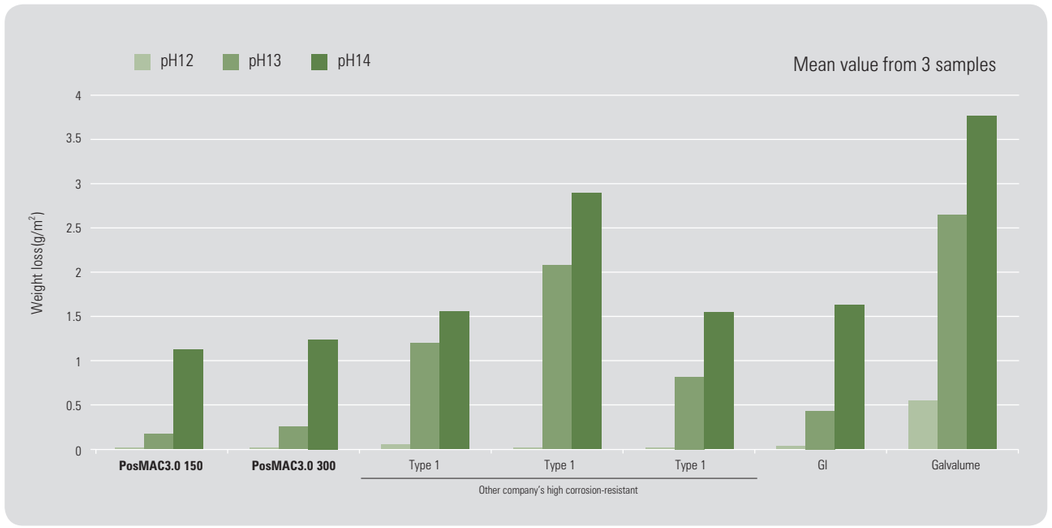
PosMAC3.0 **150g/m²**	PosMAC3.0 **300g/m²**	Other company's high corrosion-resistant **140g/m²**	Other company's high corrosion-resistant **280g/m²**	Other company's high corrosion-resistant **280g/m²**	GI **180g/m²**	Galvalume **120g/m²**
						

■ Chemical resistance against pH 14 solutions

PosMAC3.0 **150g/m²**	PosMAC3.0 **300g/m²**	Other company's high corrosion-resistant **140g/m²**	Other company's high corrosion-resistant **280g/m²**	Other company's high corrosion-resistant **280g/m²**	GI **180g/m²**	Galvalume **120g/m²**
						

Chemical resistance of PosMAC®3.0

■ **Weight loss from pH 12, 13 and 14 solutions**



· Galvalume's chemical resistance is the poorest under alkaline conditions(pH 12~14) although its chemical resistance was excellent under acidic conditions(pH 1~2).

· PosMAC3.0's chemical resistance is especially excellent under alkaline conditions(pH12~14).

Chemical resistance to ammonia solutions

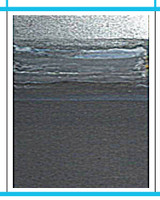
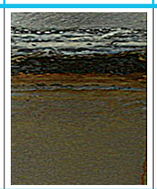
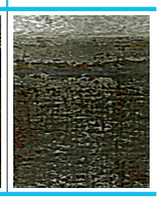
■ **Evaluation method**

· Dipping into a 10% ammonia solution(pH 12.5).

· Replace with fresh solution every 100 hours.

· Surface inspection after 1200 hours.

■ **Anti-corrosiveness after 1000, 1200 hours**

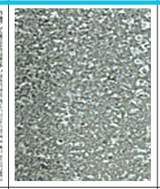
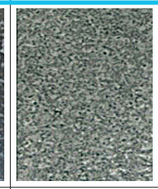
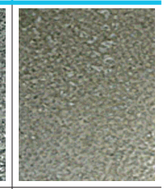
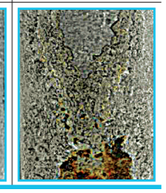
Diffing Time	PosMAC3.0 120g/m²	GI 275g/m²	Galvalume 100g/m²	Diffing Time	PosMAC3.0 120g/m²	GI 275g/m²	Galvalume 100g/m²
1000Hr				1200Hr			

· Galvalume displayed red-rust formation after 400 hours. / · GI displayed rapid red-rust formation after 1000 hours.

· PosMAC3.0 did not display red-rust formation after 1200 hours.

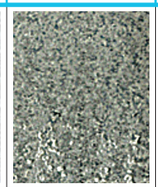
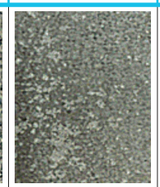
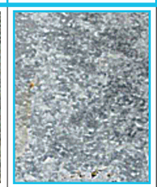
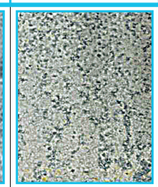
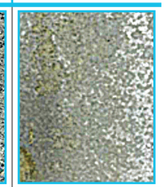
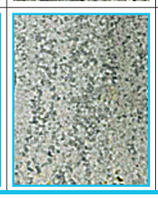
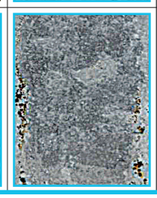
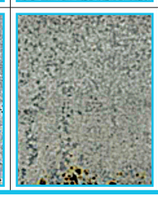
Acid rain simulation test results

· Red-rust formed on the exposed edge of the galvalume after 30 cycles / similar symptoms became visible on the GI after 60 cycles.

Acid rain simulation	30 Cycle			60 Cycle		
	PosMAC3.0	GI	Galvalume	PosMAC3.0	GI	Galvalume
The coating weight on both sides	100g/m²	275g/m²	100g/m²	100g/m²	275g/m²	100g/m²
Cut surface edge taped						
Cut surface edge exposed						

Test condition : Artificial acid rain(0.1% NaCl solution+H_2SO_4, 35˚C, 1Hr, pH4) → Drying(30%RH at 60˚C, 4Hr) → Humid environment(95%RH at 50˚C, 3Hr).

· Red-rust did not form on the exposed edge of the PosMAC3.0 after 90 cycles.

Acid rain simulation	90 Cycle			120 Cycle		
	PosMAC3.0	GI	Galvalume	PosMAC3.0	GI	Galvalume
The coating weight on both sides	100g/m²	275g/m²	100g/m²	100g/m²	275g/m²	100g/m²
Cut surface edge taped						
Cut surface edge exposed						

Test condition : Artificial acid rain(0.1% NaCl solution+H_2SO_4, 35˚C, 1Hr, pH4) → Drying(30%RH at 60˚C, 4Hr) → Humid environment(95%RH at 50˚C, 3Hr).

Main usage


Foundation structure supporting solar power panels


Foundation structure supporting solar power panels on the water


PEB(Pre-engineered metal building system)


Cooling tower


Silo


Distributing board


Pipe

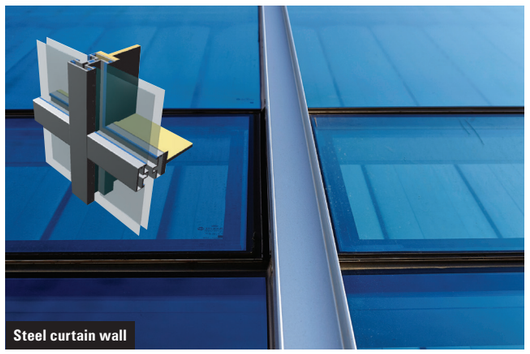

Plant factory structure


Vinyl house pad


Vinyl house switch


Stock farm


Fish farms


Steel curtain wall


Cable tray

Main usage

High corrosion resistance required part of an air conditioner

Motor case

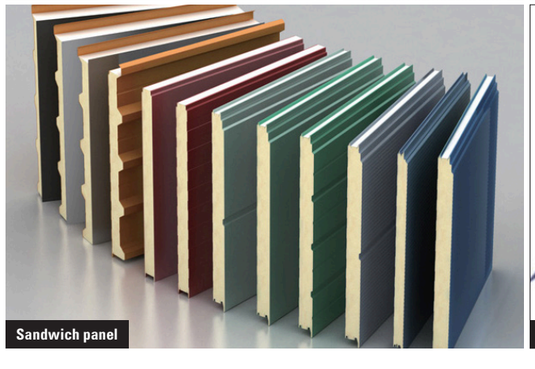
Rock bolts

Corrugated steel

Back plate of noise barrier

Guard rail

Water storage tank



Sandwich panel

Roof, Wall

Resort building wall in coast(PosMAC3.0+PVDF treatment)

General house(PosMAC3.0+Polyester or PVDF treatment)

Apartment roof(PosMAC3.0+PVDF treatment)

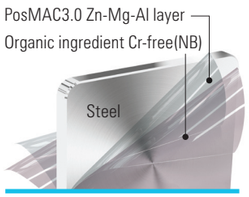
PD panel

Post-treatment

Organic ingredient Cr-free(NB)

Excellent corrosion resistance It displays excellent white-rust resistance with its organic ingredient Cr-free membrane.
Environment friendly Because it is a membrane that does not contain chromate, it is an environment-friendly material.

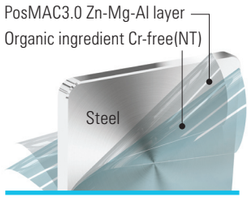
Post treatment	Corrosion resistance of flat sheet		Corrosion resistance of erichsen sheet	
	SST 72Hr	SST 96Hr	SST 24Hr	SST 48Hr
NB				



Inorganic ingredient Cr-free(NT)

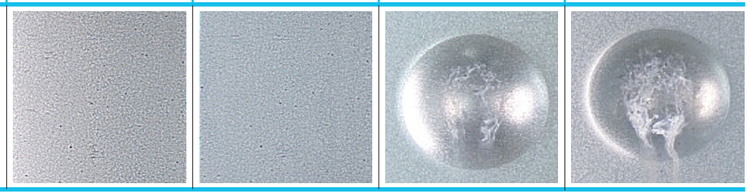
Corrosion resistance It has white-rust resistance similar to that of chromate.
Conductivity Because it is an inorganic ingredient membrane, electric resistance is low while the conductibility of the surface is excellent.
Environment friendly Because it is a membrane that does not contain chromate, it is an environment-friendly material.

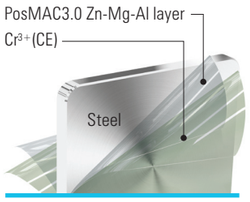
Post treatment	Corrosion resistance of flat sheet		Corrosion resistance of erichsen sheet	
	SST 72Hr	SST 96Hr	SST 24Hr	SST 48Hr
NT				



Cr^{3+} Eco chromate(CE)

Excellent corrosion resistance It displays excellent white-rust resistance by blocking corrosive factors with its chromium nitrate and chromium phosphate.
Environment Friendly Because it does not contain Cr^{6+}, it is an environment friendly material.

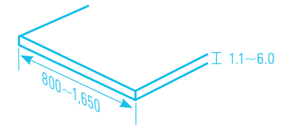
Post treatment	Corrosion resistance of flat sheet		Corrosion resistance of erichsen sheet	
	SST 120Hr	SST 168Hr	SST 24Hr	SST 48Hr
CE				



PosMAC®3.0(HR Base) specification

HR Base PosMAC®3.0

- Coating mass : 80~400g/m^2 (Both Sides)
- Post treatment : Cr-Free (NB, NT), Chromate(CL), Cr^{3+} ECO Chromate(CE)
- Size in production(CQ) : Thickness 1.1~ 6.0mm / Width 800 ~ 1,650mm
  ※ Width may vary depending on the thickness



Grade	POSCO	KS D 3030	Mechanical properties(MPa,%)			
			YP	TS	EL	CMB
CQ	PM3HT270CQ	KS-SGMHC	170~400	270~450	30~	1T
DQ	PM3HT270DQ	-	~280	270~450	36~	1T
Structural	PM3HT340R	KS-SGMH245Y	245~450	340~500	20~	1T
	PM3HT400R	KS-SGMH295Y	295~	400~	18~	2T
	PM3HT440C	KS-SGMH335Y	335~	440~	18~	2T
	PM3HY340C	-	340~	410~	21~	2T
	PM3HT490C	KS-SGMH365Y	365~	490~	16~	3T
	PM3HT540C	KS-SGMH400Y	400~	540~	16~	3T

*CMB : Coating Metal Bending test

Grade	DIN EN 10346	POSCO (Equivalents)	Mechanical properties(MPa,%)		
			YP	TS	EL
CQ	EN-DX51D	PM3HT270CQ	-	270~500	22~
DQ	EN-DX52D	PM3HT270DQ	140~300	270~420	26~
Structural	EN-S220GD	-	220~	300~	20~
	EN-S250GD	PM3HT340R	250~	330~	19~
	EN-S280GD	PM3HT400R	280~	360~	18~
	EN-S320GD	PM3HT440C	320~	390~	17~
	EN-S350GD	PM3HY340C	350~	420~	16~
	EN-S390GD	-	390~	460~	16~
	EN-S420GD	-	420~	480~	15~
	EN-S450GD	PM3HT540C	450~	510~	14~
	EN-S550GD	-	550~	560~	-

Grade	ASTM 1046M ( )* ksi unit	POSCO (Equivalents)	Mechanical properties(MPa,%)		
			YP	TS	EL
CQ	A1046-CSA	PM3HT270CQ	170~380	-	20~
	A1046-CSB	PM3HT270CQ	205~380	-	20~
DQ	A1046-FSA	PM3HT270DQ	170~310	-	26~
Structural	A1046-SS230(SS33)	-	230~	310~	20~
	A1046-SS255(SS37)*	PM3HT340R	255~	360~	18~
	A1046-SS275(SS40)	PM3HT400R	275~	380~	16~
	A1046-SS340(SS50)	-	340~	450~	12~
	A1046-HSLAS340(HSLAS50)*	PM3HT440C	340~	410~	20~
	A1046-HSLAS380(HSLAS55)*	PM3HT490C	380~	480~	16~
	A1046-HSLAS410(HSLAS60)*	PM3HT540C	410~	480~	16~

* Please be sure to consult with our associates when making orders for that spec.

PosMAC®3.0(HR Base) specification

* The following manufacturing spec is the standard when the mill edge order.
In case of the slit edge order, possible width decrease with 20mm.

PM3HT270CQ, PM3HT270DQ, PM3HT340R

Can be produced Require consultation

w \ t	1.05<	1.15<	1.25<	1.35<	1.45<	1.55<	1.65<	1.75<	1.85<	1.95<	2.05<	2.15<	2.25<	2.35<	2.45<	2.55<	2.65<	2.75<	2.85<	≤4.0	≤4.5	≤6.0
800 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
850 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
900 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
950 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1000 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1050 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1100 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1150 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1200 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1250 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1300 ≤						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1350 ≤							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1400 ≤							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1450 ≤								■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1500 ≤									■	■	■	■	■	■	■	■	■	■	■	■	■	
1550 ≤										■	■	■	■	■	■	■	■	■	■	■	■	
1600 ≤													■	■	■	■	■	■	■	■	■	
1650 ≤															■	■	■	■	■	■	■	

PM3HT400R

Can be produced Require consultation

w \ t	1.05<	1.15<	1.25<	1.35<	1.45<	1.55<	1.65<	1.75<	1.85<	1.95<	2.05<	2.15<	2.25<	2.35<	2.45<	2.55<	2.65<	2.75<	2.85<	≤4.0	≤4.5	≤6.0
800 ≤			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
850 ≤			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
900 ≤			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
950 ≤			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1000 ≤			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1050 ≤			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1100 ≤			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1150 ≤			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1200 ≤					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1250 ≤					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
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1550 ≤												■	■	■	■	■	■	■	■	■	■	
1600 ≤																						
1650 ≤																						

⚠ Please be sure to consult with our associates when making orders for specific usage.

PM3HT440C, PM3HY340C

Can be produced Require consultation

w \ t	1.05<	1.15<	1.25<	1.35<	1.45<	1.55<	1.65<	1.75<	1.85<	1.95<	2.05<	2.15<	2.25<	2.35<	2.45<	2.55<	2.65<	2.75<	2.85<	≤4.0	≤4.5	≤6.0
800 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
850 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
900 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
950 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1000 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1050 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1100 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1150 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1200 ≤					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1250 ≤						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1300 ≤							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1350 ≤									■	■	■	■	■	■	■	■	■	■	■	■	■	
1400 ≤										■	■	■	■	■	■	■	■	■	■	■	■	
1450 ≤											■	■	■	■	■	■	■	■	■	■	■	
1500 ≤												■	■	■	■	■	■	■	■	■	■	
1550 ≤																						
1600 ≤																						
1650 ≤																						

PM3HT490C

Can be produced Require consultation

w \ t	1.05<	1.15<	1.25<	1.35<	1.45<	1.55<	1.65<	1.75<	1.85<	1.95<	2.05<	2.15<	2.25<	2.35<	2.45<	2.55<	2.65<	2.75<	2.85<	≤4.0	≤4.5	≤6.0
800 ≤					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
850 ≤					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
900 ≤					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
950 ≤					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1000 ≤					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1050 ≤					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1100 ≤					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1150 ≤						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1200 ≤							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1250 ≤							■	■	■	■	■	■	■	■	■	■	■	■	■	■		
1300 ≤								■	■	■	■	■	■	■	■	■	■	■	■	■		
1350 ≤									■	■	■	■	■	■	■	■	■	■	■	■		
1400 ≤										■	■	■	■	■	■	■	■	■	■	■		
1450 ≤											■	■	■	■	■	■	■	■	■	■		
1500 ≤																			■	■		
1550 ≤																						
1600 ≤																						
1650 ≤																						

POSCO Magnesium Aluminium alloy Coating product 3.0

PosMAC®3.0(HR Base) specification

PM3HT540C

Can be produced Require consultation

w \ t	1.05<	1.15<	1.25<	1.35<	1.45<	1.55<	1.65<	1.75<	1.85<	1.95<	2.05<	2.15<	2.25<	2.35<	2.45<	2.55<	2.65<	2.75<	2.85<	≤4.0	≤4.5	≤6.0
800 ≤						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
850 ≤						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
900 ≤						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
950 ≤						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1000 ≤						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1050 ≤						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1100 ≤						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1150 ≤						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1200 ≤									■	■	■	■	■	■	■	■	■	■	■	■	■	
1250 ≤										■	■	■	■	■	■	■	■	■	■	■	■	
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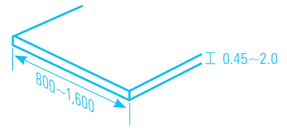
1650 ≤																						

PosMAC®3.0(CR Base) specification

CR Base PosMAC®3.0

- **Coating mass** : 80~350g/m² (Both sides)
- **Post treatment** : ECO Chromate(CE)
- **Size in production(CQ)** : Thickness 0.45~ 2.3mm / Width 720 ~ 1,860mm

※ Width may vary depending on the thickness



Grade	POSCO	KS D 3030	Mechanical properties(MPa,%)			
			YP	TS	EL	CMB
CQ	PM3CT270CQ	KS-SGMCC	170~400	270~450	30~	1T
DQ	PM3CT270DQ	KS-SGMCD2	~280	270~450	36~	1T
DDQ	PM3CT270DD	KS-SGMCD3	~280	270~450	43~	1T
Structural	PM3CT340R	KS-SGMC245Y	245~450	340~500	20~	1T
	PM3CT400R	KS-SGMC295Y	295~	400~	18~	2T
	PM3CT440C	KS-SGMC335Y	335~	440~	18~	2T
	PM3CY340C	-	340~	410~	21~	2T
	PM3CT490C	KS-SGMC365Y	365~	490~	16~	3T
	PM3CT570C	KS-SGMC560Y	500~	570~	8~	3T

*__CMB__ : Coating Metal Bending test

Grade	DIN EN 10346	POSCO (Equivalents)	Mechanical properties(MPa,%)		
			YP	TS	EL
CQ	EN-DX51D	PM3CT270CQ	-	270~500	22~
DQ	EN-DX52D	PM3CT270DQ	140~300	270~420	26~
DDQ	EN-DX53D	PM3CT270DD	140~260	270~380	30~
Structural	EN-S220GD	-	220~	300~	20~
	EN-S250GD	PM3CT340R	250~	330~	19~
	EN-S280GD	PM3CT400R	280~	360~	18~
	EN-S320GD	PM3CT440C	320~	390~	17~
	EN-S350GD	PM3CY340C	350~	420~	16~
	EN-S390GD	-	390~	460~	16~
	EN-S420GD*	-	420~	480~	15~
	EN-S450GD*	-	450~	510~	14~
	EN-S550GD*	PM3CT570C	550~	560~	-
Grade	**ASTM 1046M** ( )* ksi unit	**POSCO** (Equivalents)	**YP**	**TS**	**EL**
CQ	A1046-CSA	PM3CT270CQ	170~380	-	20~
	A1046-CSB	PM3CT270CQ	205~380	-	20~
DQ	A1046-FSA	PM3CT270DQ	170~310	-	26~
DDQ	A1046-DDS	PM3CT270DD	140~240	-	32~
Structural	A1046-SS230(SS33)	-	230~	310~	20~
	A1046-SS255(SS37)	PM3CT340R	255~	360~	18~
	A1046-SS275(SS40)	PM3CT400R	275~	380~	16~
	A1046-SS340(SS50)	-	340~	450~	12~
	A1046-HSLAS340(HSLAS50)*	PM3CT440C	340~	410~	20~
	A1046-HSLAS380(HSLAS55)*	PM3CT490C	380~	480~	16~
	A1046-HSLAS410(HSLAS60)*	PM3CT540C	410~	480~	16~
	A1046-HSLAS480(HSLAS70)*	PM3CT570C	480~	550~	12~

* Please be sure to consult with our associates when making orders for that spec.

PosMAC®3.0(CR Base) specification

* The following manufacturing spec is the standard when the mill edge order.

PM3CT270CQ

Can be produced Require consultation

w \ t	0.4≤	0.45≤	0.5≤	0.6≤	0.7≤	0.8≤	0.9≤	1.0≤	1.1≤	1.2≤	1.3≤	1.4≤	1.5≤	1.6≤	1.7≤	1.8≤	1.9≤	2.0≤	2.1≤	2.2≤	≤2.3
800 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
850 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
900 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
950 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1000 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1050 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1100 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1150 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1200 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1250 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1300 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1350 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1400 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1450 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1500 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1550 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1600 ≤					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1650 ≤					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

PM3CT270DQ, PM3CT270DD

Can be produced Require consultation

w \ t	0.4≤	0.45≤	0.5≤	0.6≤	0.7≤	0.8≤	0.9≤	1.0≤	1.1≤	1.2≤	1.3≤	1.4≤	1.5≤	1.6≤	1.7≤	1.8≤	1.9≤	2.0≤	2.1≤	2.2≤	≤2.3
800 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
850 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
900 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
950 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1000 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1050 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1100 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1150 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1200 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1250 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1300 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1350 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1400 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1450 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1500 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1550 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1600 ≤					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1650 ≤					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

⚠ Please be sure to consult with our associates when making orders for specific usage.

PM3CT340R, PM3CT400R

Can be produced Require consultation

w \ t	0.4≤	0.45≤	0.5≤	0.6≤	0.7≤	0.8≤	0.9≤	1.0≤	1.1≤	1.2≤	1.3≤	1.4≤	1.5≤	1.6≤	1.7≤	1.8≤	1.9≤	2.0≤	2.1≤	2.2≤	≤2.3
800 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
850 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
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950 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1000 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1050 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1100 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1150 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1200 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
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1350 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1400 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1450 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1500 ≤				■			■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1550 ≤							■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1600 ≤																					
1650 ≤																					

PM3CT440C

Can be produced Require consultation

w \ t	0.4≤	0.45≤	0.5≤	0.6≤	0.7≤	0.8≤	0.9≤	1.0≤	1.1≤	1.2≤	1.3≤	1.4≤	1.5≤	1.6≤	1.7≤	1.8≤	1.9≤	2.0≤	2.1≤	2.2≤	≤2.3
800 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
850 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
900 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
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1000 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1050 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1100 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1150 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
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1250 ≤		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1300 ≤			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1350 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
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1450 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1500 ≤				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1550 ≤																					
1600 ≤																					
1650 ≤																					

PosMAC®3.0(CR Base) specification

* The following manufacturing spec is the standard when the mill edge order.

PM3CT490C

Can be produced Require consultation

w \ t	0.4≤	0.45≤	0.5≤	0.6≤	0.7≤	0.8≤	0.9≤	1.0≤	1.1≤	1.2≤	1.3≤	1.4≤	1.5≤	1.6≤	1.7≤	1.8≤	1.9≤	2.0≤	2.1≤	2.2≤	≤2.3
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1550 ≤																					
1600 ≤																					
1650 ≤																					

PM3CT570C

Can be produced Require consultation

w \ t	0.4≤	0.45≤	0.5≤	0.6≤	0.7≤	0.8≤	0.9≤	1.0≤	1.1≤	1.2≤	1.3≤	1.4≤	1.5≤	1.6≤	1.7≤	1.8≤	1.9≤	2.0≤	2.1≤	2.2≤	≤2.3
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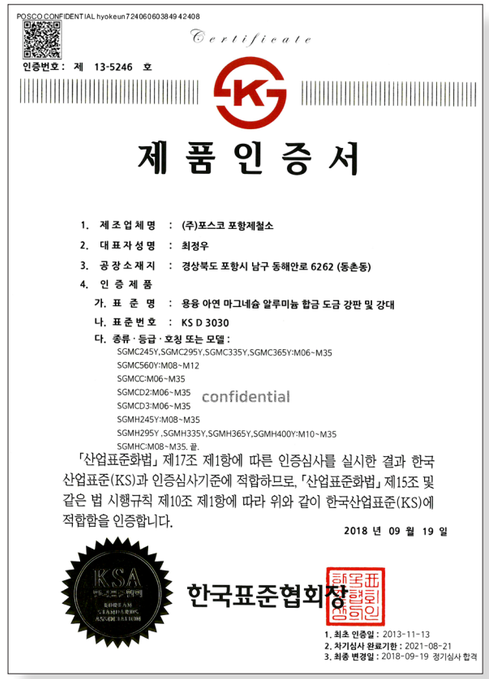
KS D 3030



POSCO CONFIDENTIAL hyokeun 72406060384942408

Certificate

인증번호 : 제 13-5246 호

제 품 인 증 서

1. 제 조 업 체 명 : (주)포스코 포항제철소
2. 대 표 자 성 명 : 최정우
3. 공 장 소 재 지 : 경상북도 포항시 남구 동해안로 6262 (동촌동)
4. 인 증 제 품
   가. 표 준 명 : 용융 아연 마그네슘 알루미늄 합금 도금 강판 및 강대
   나. 표 준 번 호 : KS D 3030
   다. 종류 · 등급 · 호칭 또는 모델 :
   SGMC245Y,SGMC295Y,SGMC335Y,SGMC365Y:M06~M35
   SGMC560Y:M08~M12
   SGMCC:M06~M35
   SGMCD2:M06~M35
   SGMCD3:M06~M35
   SGMH245Y:M08~M35
   SGMH295Y ,SGMH335Y,SGMH365Y,SGMH400Y:M10~M35
   SGMHC:M08~M35. 끝.

confidential

「산업표준화법」 제17조 제1항에 따른 인증심사를 실시한 결과 한국산업표준(KS)과 인증심사기준에 적합하므로, 「산업표준화법」 제15조 및 같은 법 시행규칙 제10조 제1항에 따라 위와 같이 한국산업표준(KS)에 적합함을 인증합니다.

2018 년 09 월 19 일

한국표준협회장

1. 최초 인증일 : 2013-11-13
2. 차기심사 완료기한 : 2021-08-21
3. 최종 변경일 : 2018-09-19 정기심사 합격

POSCO acquired the certification of KS D 3030(hot-dip zinc-magnesium-aluminum alloy coated steel sheet and strip) standard in Aug 2018.

Cold-rolled products :
SGMCC, SGMCD2, SGMCD3, SGMC245Y, SGMC295Y, SGMC335Y, SGMC365Y, SGMC560Y

Hot-rolled products :
SGMHC, SGMH245Y, SGMH295Y, SGMH335Y, SGMH365Y, SGMH400Y

Yield strength, Tensile strength, Elongation

■ **Hot-rolled products**

Designation	YS Min, N/mm²	TS Min, N/mm²	EL Min, %	Test piece
SGMHC	(205)	(270)	-	No.5, Rolling direction
SGMH245Y	245	340	20	No.5 Rolling direction or Cross-section
SGMH295Y	295	400	18	
SGMH335Y	335	440	18	
SGMH365Y	365	490	16	
SGMH400Y	400	540	16	

Remark1) 1N/mm² =1MPa
Remark2) ( ) is only for reference

KS D 3030

Yield strength, Tensile strength, Elongation

■ **Cold-rolled products**

Designation	YS Min, N/mm²	TS Min, N/mm²	EL Min, % Thickness(mm) 0.25≤t < 0.40	0.40≤t < 0.60	0.60≤t < 1.0	1.0≤t < 1.6	1.6 ≤ t < 2.3	Test piece
SGMCC	(250)	(270)	-	-	-	-	-	No.5, Rolling direction
SGMCD1	-	270	-	34	36	37	38	
SGMCD2	-	270	-	36	38	39	40	
SGMCD3	-	270	-	38	40	41	42	
SGMC245Y	245	340	20	20	20	20	20	No.5 Rolling direction or Cross-section
SGMC295Y	295	400	18	18	18	18	18	
SGMC335Y	335	440	18	18	18	18	18	
SGMC365Y	365	490	16	16	16	16	16	
SGMC560Y	560	570	-	-	-	-	-	

Remark1) When the anti-aging characteristics is featured in the SGMCD3 sheets and coils, the anti-aging characteristics is guaranteed for 6 months.
Anti-aging refers to the characteristic preventing stretcher strains from occuring during manufacturing.
Remark2) In principle, tensile strength tests are not perfomed on plates with thickness under 0.25mm.
Remark3) ( ) is only for reference.
Remark4) 1N/mm² =1MPa

Coating weight(Both sides)

Coating designation	Triple point test (g/m², Average)	Single point test (g/m², Min)
(M06)[a]	60	51
M08	80	68
M10	100	85
M12	120	102
M14	140	119
M18	180	153
M20	200	170
M22	220	187
M25	250	213
M27	275	234
(M35)a	350	298
(M45)a	450	383

Remark1) For both sides, triple spots coating weight, the average value of the measurement of 3 test pieces is applied.
Remark2) For one side, single spot coating weight, the minimum value of the measurement of 3 test pieces is applied.
Remark3) Separate consultation is available for the maximum coating weight on both sides.

Coating weight(Both sides)

■ **Hot-rolled products(CQ~DQ)**

(Unit : mm)

Order thickness	Width W < 1200	1200 ≤ W <1500	1500 ≤ W <1800
1.20 ≤ t < 1.60	±0.16	±0.17	±0.18
1.60 ≤ t < 2.00	±0.17	±0.18	±0.19
2.00 ≤ t < 2.50	±0.18	±0.20	±0.22
2.50 ≤ t < 3.15	±0.20	±0.22	±0.25
3.15 ≤ t < 4.00	±0.22	±0.24	±0.27
4.00 ≤ t < 5.00	±0.25	±0.27	-

■ **Hot-rolled products(Structural steel)**

(Unit : mm)

Order thickness	Width W < 1600	1600 ≤ W < 1800
1.20 ≤ t < 1.60	±0.19	-
1.60 ≤ t < 2.00	±0.20	±0.24
2.00 ≤ t < 2.50	±0.21	±0.26
2.50 ≤ t < 3.15	±0.23	±0.30
3.15 ≤ t < 4.00	±0.25	±0.35
4.00 ≤ t < 5.00	±0.46	-

■ **Cold-rolled products**

(Unit : mm)

Order thickness	Width W < 630	630 ≤ W < 1000	1000 ≤ W < 1250	1250 ≤ W < 1600	1600 ≤ W
t < 0.25	±0.04	±0.04	±0.04	-	-
0.25 ≤ t < 0.40	±0.04	±0.05	±0.05	±0.06	-
0.40 ≤ t < 0.60	±0.06	±0.06	±0.06	±0.07	±0.08
0.60 ≤ t < 0.80	±0.07	±0.07	±0.07	±0.07	±0.08
0.80 ≤ t < 1.00	±0.07	±0.07	±0.08	±0.09	±0.10
1.00 ≤ t < 1.25	±0.08	±0.08	±0.09	±0.10	±0.12
1.25 ≤ t < 1.60	±0.09	±0.10	±0.11	±0.12	±0.14
1.60 ≤ t < 2.00	±0.11	±0.12	±0.13	±0.14	±0.16
2.00 ≤ t < 2.30	±0.13	±0.14	±0.15	±0.16	±0.18
2.30 ≤ t	±0.15	±0.16	±0.17	±0.18	±0.21

Remark) ( ) is only for reference

KS D 3030

Tolerances on width

(Unit : mm)

Width	Hot-rolled products		Cold-rolled products
	Mill edge(A)	Cut edge(B)	
W ≤ 1500	0～+25	0～+10	0～+7
1500 < W			0～+10

Tolerances on length(for sheet)

(Unit : mm)

Hot-rolled products	Cold-rolled products
0～+15	0～+15

Tolerances on camber

■ **Hot-rolled products**

(Unit : mm)

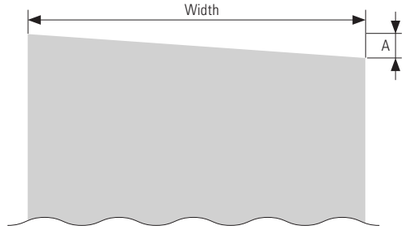
Width	Sheet Length			Coil
	L < 2500	2500 ≤ L < 4000	4000 ≤ L	
W < 630	5	8	12	5mm/About an arbitrary length of 2000mm
630 ≤ W <1000	4	6	10	
1 000 ≤ W	3	5	8	

■ **Cold-rolled products**

(Unit : mm)

Width	Sheet Length		Coil
	L < 2000	2000 ≤ L	
W < 630	4	4mm/About an arbitrary length of 2000mm	
630 ≤ W	2	2mm/About an arbitrary length of 2000mm	

Tolerances on out-squareness



⚠ Out-of-squareness $\frac{A}{W} \times 100(\%)$

Do not exceed 1%!

Tolerance on flatness

■ **Hot-rolled products**

(Unit : mm)

Thickness	Width				
	W ≤ 1250	1250 ≤ W < 1600	1600 ≤ W < 2000	2000 ≤ W < 3000	W ≥ 3000
1.20 ≤ t < 1.60	18	20	-	-	-
1.60 ≤ t < 3.15	16	18	20	-	-
3.15 ≤ t < 4.00	16			-	-
4.00 ≤ t < 6.00	14			24	25

Remark) Unless otherwise specified, the maximum value of steel flatness shall be 1.5 times of the above table on the steels of the minimum tensile strength spec of over 570N/mm² or the minimum yield strength of over 430N/mm² or having equivalent chemical element or hardness.

■ **Cold-rolled products**

(Unit : mm)

Width	Designation		
	Bow	Edge wave	Center wave
w < 1000	12	8	6
1000 ≤ w < 1250	15	9	8
1250 ≤ w < 1600	15	11	8
1600 ≤ w	20	24	9

Warranty

PosMAC3.0 Durability Warranty

Recipient of Warranty

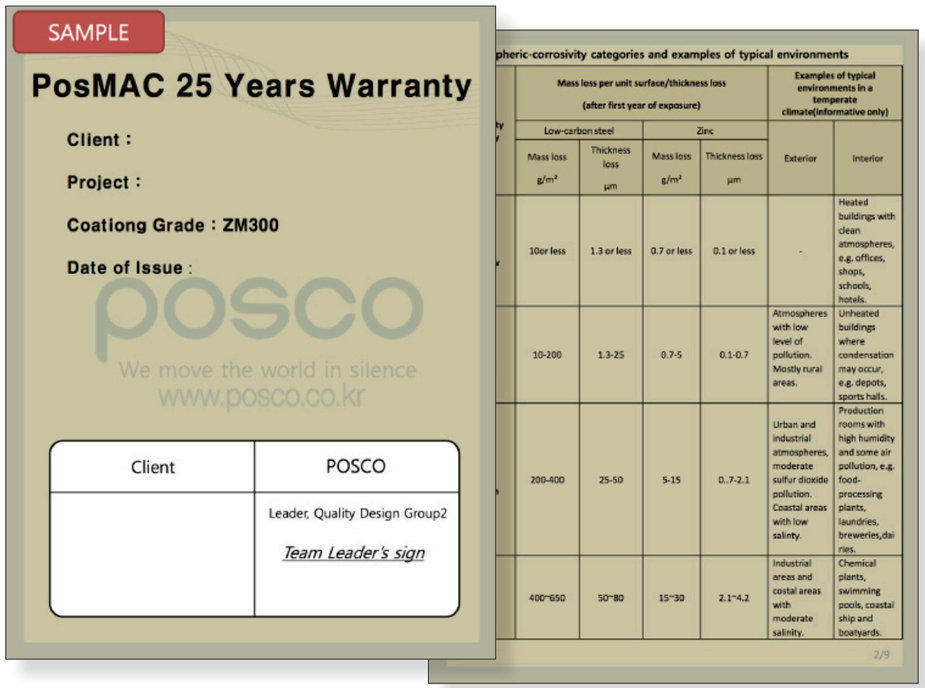
The First Buyers purchasing POSCO products But, warranty can be issued on a (Solar Energy) Project Basis

Warranty Period

20 years (for coating weight 250g/m² or more), 25 years (for coating weight 300g/m² or more)
- Type1. C1~C4 environments specified (ISO 12944-2 C1~C4)
- Type2. Solar Energy Project(Progect name, Installed area(longitude, latitude))

Warranty Contents

Durability Warranty (not distrupted by perforation or rupture)Guaranteed only when the structure is made of bare metal.
Exceptions include application environment, surface damage, corrosion factor contact, etc.
*It is not about red or white rust


SAMPLE

PosMAC 25 Years Warranty

Client :

Project :

Coationg Grade : ZM300

Date of Issue :

posco

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Client	POSCO
	Leader, Quality Design Group2 *Team Leader's sign*

pheric-corrosivity categories and examples of typical environments

Mass loss per unit surface/thickness loss (after first year of exposure)				Examples of typical environments in a temperate climate(informative only)	
Low-carbon steel		Zinc			
Mass loss g/m²	Thickness loss µm	Mass loss g/m²	Thickness loss µm	Exterior	Interior
10or less	1.3 or less	0.7 or less	0.1 or less	-	Heated buildings with clean atmospheres, e.g. offices, shops, schools, hotels.
10-200	1.3-25	0.7-5	0.1-0.7	Atmospheres with low level of pollution. Mostly rural areas.	Unheated buildings where condensation may occur, e.g. depots, sports halls.
200-400	25-50	5-15	0..7-2.1	Urban and industrial atmospheres, moderate sulfur dioxide pollution. Coastal areas with low salinty.	Production rooms with high humidity and some air pollution, e.g. food-processing plants, laundries, breweries,dairies.
400~650	50~80	15~30	2.1~4.2	Industrial areas and costal areas with moderate salinity.	Chemical plants, swimming pools, coastal ship and boatyards.

2/9

[Part of the original Warranty text]

The Client may not assign the warranties hereunder without POSCO's prior written approval, and even if with POSCO's prior written approval, the assigned warranty may not exceed the scope of this warranty provided herein.

Patent / Environment Product Declaration

PosMAC3.0 Patent

A total of 37 patents are registered for PosMAC technology.

No.	Patent No.	Title of invention
01	KR10-0498092	The zinc plating bath excellent in terms of corrosion resistance and galvanized alloy strip
02	KR10-1439693	Surface treatment composition for galvanized steel, surface treatment method for galvanized steel and galcanized steel sheet
03	KR10-1714935	Zn alloy plated steel sheet having excellent weldability and processed part corrosion resistance and method for manufacturing same
04	KR10-1665912	Hot dip zn alloy plated steel sheet having excellent anti-corrosion and method for manufacturing the steel sheet using the same
05	KR10-1819381	Zn alloy plated steel sheet having excellent bendability and method for manufacturing same


특허증 CERTIFICATE OF PATENT

특허 제 0498092 호 (PATENT NUMBER)

특허증 CERTIFICATE OF PATENT

특허 제 10-1439693 (PATENT NUMBER)

특허증 CERTIFICATE OF PATENT

특허 Patent Number 제 10-1657841

특허증 CERTIFICATE OF PATENT

특허 Patent Number 제 10-1665912

특허증 CERTIFICATE OF PATENT

특허 Patent Number 제 10-1819381 호

발명의 명칭 Title of the Invention 금형가공성이 우수한 아연합금도금강판 및 그 제조방법

특허권자 Patentee 주식회사 포스코(174611-*******) 경상북도 포항시 남구 동해안로 6261 (괴동동)

발명자 Inventor 등록사항란에 기재

위의 발명은 「특허법」에 따라 특허등록원부에 등록되었음을 증명합니다.
This is to certify that, in accordance with the Patent Act, a patent for the invention has been registered at the Korean Intellectual Property Office.

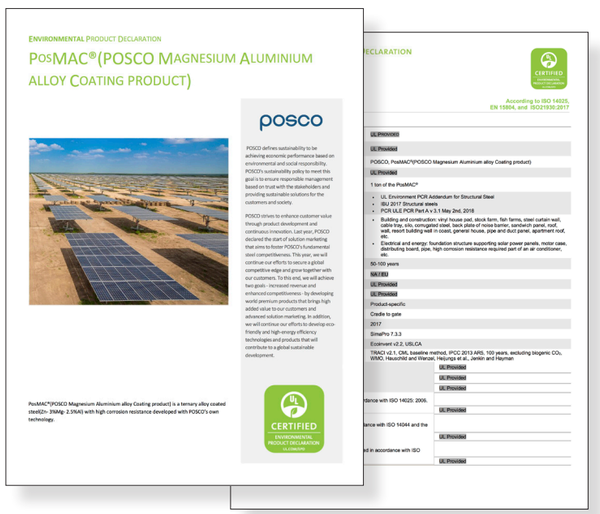
2018년 01월 10일

특허청장
COMMISSIONER,
KOREAN INTELLECTUAL PROPERTY OFFICE

특허청 Korean Intellectual Property Office

EPD(Environment Product Declaration)

PosMAC is EPD certified, eco-friendly products.
(ISO 14025, EN15804, ISO 21930:2017)


ENVIRONMENTAL PRODUCT DECLARATION

PosMAC®(POSCO Magnesium Aluminium alloy Coating product)

posco

CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION UL ENVIRONMENT

Order guide

Please refer to the instructions mentioned below in order for you to select the products appropriate for your final usage when you place an order.

Specifications
It is important for you to select a size appropriate for your final usage when you place an order for a product in a specific size.
In addition, since there are various grades of products which you can choose, even if the product is for general commercial use, please consult it with us before you place an order.

Post-treatment
Please select a post-treatment method for the product following the surface treatment, and a surface treatment method appropriate for the conditions under which the final product is to be used. Please refer to the relevant catalog.
Cr-treated or Cr-free treated materials for post-treatment is effective in preventing white rust on the surface of galvanized steel sheet.

Coating weight
Please select a proper coating weight according to the targeted durable life-span of the coating weight, the conditions of use, the method in which it will be processed and other various conditions where the final product will be used. A post-plating treated product is better under corrosive conditions, while on the other hand, a foil plating method is better for products requiring good formability and weldability.

Oiling
Customer can choose the oiling volume according to the usage conditions. However, if you place an order for untreated and un-oiled product, white rust may formed on the surface of the product.

Dimensions
The dimensions of a product greatly affects the actual yield ratio and the formability. If you need stricter dimensions within the available sizes in our catalogs, please consult with us when placing an order.

Edge
Customer can select a product with mill edge or slit edge according to the usage of the product.
If the edge of our company's product is to be used as is for the final product, it is better to place an order with slit edge.

Weld zone
In case of a coil product, a pickled weld zone and a plated weld zone could be mingled. Although such weld zones are relatively small parts of the product, their hardness is high and they are a little thick. Therefore, in case that it is hard for a customer to remove such parts, please select an option, 'No Mingle', then, we will take a measure for it.

Packaging
An appropriate packaging type can be selected according to the conditions of the transportation and storage of a product, but if no packaging is selected, a warranty for white rust can not be issued.

Cautions on use

Since hot-dip galvanized steel sheets cannot exert its various characteristics when utilized inappropriately, please heed the follwing instructions concerning the care of the product.

Storage
Do not keep the product in a place where excess moisture or water may permeate into the product's packaging. If excess moisture or water does come in contact with the product's surface, please dry it off right away. Keep the product indoors in a well ventilated facility, away from conditions where the daily temperature fluctuation is a norm. If the wrapping paper, etc., is damaged while it is being kept, please repair it right away, but keep in mind that even when the packaging is perfectly intact, white rust is known to formate when a galvanized product is kept in stock over a extended period of time. Lastly please take caution and be careful that the plated surface is not damaged during transportation or other operations.

Processing
Since certain lubricant products contains additives that causes zinc erosion, please use lubricants without corrosive properties, and in case the usage of such corrosive lubricant is inevitable, please remove it and treat the surface with an anti-corrosion agent after processing. If the product is to be processed, please select a size appropriate for the usage. Please avoid processing the product under highly moist, sulfurous conditions. Processing environments with either acid gas or sooty smoke should also be avoided.

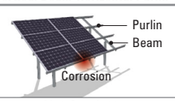
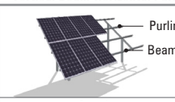
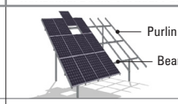
Welding
In case of a resistance welding(RW), since zinc is attached to the electrode, it is necessary to clean it periodically. In case of a seam welding, the life span of the electrode can be extended by using the KNURL-GEAR DRIVE System. In case of a high-temperature brazing, especially, please avoid brazing with a GA material. Since some fumes are generated when welding, please weld a product at an airy place. Usually, a hot-dip galvanized product is not good for soldering with some general flux.

Degreasing
It is good to use a weak alkaline degreasing agent, either a natural degreasing agent or an organic solvent. Since strong alkaline degreasing agent corrodes zinc, please do not use such agents.

Coating
Since zinc is a highly active metal, it is difficult to attain the neccessary adhesiveness when coated directly on to the surface of a hot-dip galvanized steel sheet without some additional treatments.

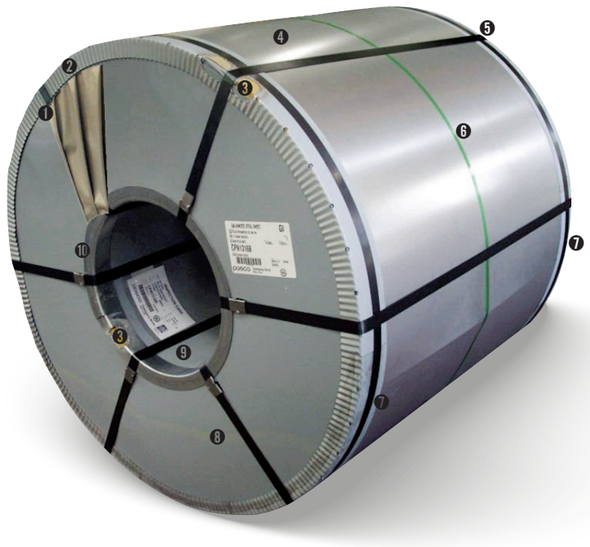
Darkening
As time progresses, the surface and its color may get less glossy and darkened.
Generally, high temperature and high humidity promote darkening. Darkening is a natural process caused by the oxidation of the zinc plated layer and is irrelevant to the anti-corrosion performance.

Installation
In the parts where the PosMAC3.0 coating layer is continuosly exposed to moisture, it might cause corrosion in the early stage.
To prevent continuous and direct exposure to moisture, it is highly recommended to reform the installation or alternative protection is necessary.

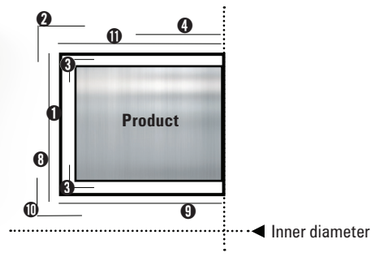
Type	Vertical Beam-Horizontal Purlin	Horizontal Beam-Vertical Purlin	Vertical Beam-Horizontal Purlin	Horizontal Beam-Vertical Purlin
Module				
Corrosion resistance	Not Good X	Good ●	Good ●	▲

Others
When using a processed product, if certain treatments, such as coating, and etc., are not conducted on the plated surface, the effects of using a plated steel sheet decreases. (The corrosion levels of the products can vary depending on the conditions it is used.) So, please be noted.

Packing



Name of outer pack



Name of cross-sectional pack

NO	Name	Material
❶	PP VCI WRAP	VINYL
❷	OUTER RING	STEEL
❸	CORNER WRAP	ANTI-RUST BOARD
❹	OUTER PROTECT BOARD	STEEL
❺	HORIZONTAL BAND	STEEL
❻	CENTER BAND	PET
❼	VERTICAL BAND	STEEL
❽	SIDE BOARD	PLASTIC
❾	INNER PROTECT BOARD	PLASTIC
❿	INNER RING	STEEL
⓫	OUTER PROTECT BOARD	ANTI-RUST BOARD

* Packing type and materials are changeable.

PosMAC® 3.0

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