Leading hot stamping solutions

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VACUUM HOT FORMING ZINC

-GALVANIZED DOORRING

CONTENTS

COMPANY PROFILE

Pressler Advanced Forming Technology Ltd. was established in 2014. We are a manufacturer and supplier of key equipment and hot-formed parts in the field of hot forming. We offer high performance vacuum galvanized ring doors and automotive hot-formed parts. With independent innovation of vacuum hot-formed production lines and mold technology, we can meet the application needs of global customers & partners, and contribute to the lightweight and energy saving of automotive and related industries.

Pressler not only has its production base in Kunshan (the Long Triangle region) but also many plants in North China and Eastern China, with a total area of more than 140,000 square meters and an annual production capacity of 7 million times. As a company focuses on hot forming technology, we enjoy proprietary intellectual property rights in the hot forming production line, laser blanking production line, advanced laboratory and R&D equipment, and other automated production facilities, and a professional team consisting of 500 people, including experts in material, tooling and technical designing.

Pressler has 100 patents, of which some core patents have been authorized in the United States, Germany, Japan, and other countries. Innovation-oriented technology drives us towards a global leading player in hot forming who can turn challenges into solutions through innovative process systems and production management.

49 INVENTION PATENTS

70 UTILITY MODEL PATENT CERTIFICATE

8 SOFTWARE COPYRIGHTS

DEVELOPMENT HISTORY

2014

Kunshan Factory Plate1

2018

Jiangxi Factory

2019

Tianjin Factory

2020

Changshu Factory

2021

Haimen Factory

2023

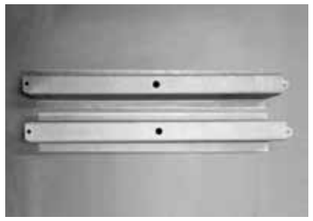
Kunshan Factory Plate 2

R&D CENTER

Pressler has a complete production line and supporting equipment independently developed and manufactured, including multi-layer roller bottom hot forming production line, vacuum hot forming production line, single laser cutting machine, six station laser cutting machine, laser feeding production line and software system products. And the establishment of hot forming equipment R&D department, new material R&D department and mold factory, which breaks through the technical barriers, provides customers with competitive galvanized door rings and other products.

2000Mpa galvanized hot-formed parts

The 2000Mpa galvanized hot formed parts producing from Pressler vacuum heating furnace can increase the corrosion resistance of parts, improve weldability and reduce the risk of hydrogen brittlement.



2000MPa Al-Si coated hot-formed parts

The 2000Mpa Al-Si coated hot formed parts producing from Pressler vacuum heating furnace can prevent the aluminum-silicon from reacts with water vapor in the heating process to form hydrogen and reduce the risk of hydrogen embrittlement.

Integrated ultra-high-strength steel composite battery pack

The newly developed battery packs for the new energy industry have better fire and stone resistance. Because its side wall is strengthened for protection, squeezing and collision performance is improved, adopting an ultra-high-strength bottom guard plate.

Vacuum hot froming line

Pressler has the world' s first vacuum hot forming line and six multi-layer roller bottom hot forming lines. The vacuum hot forming line is self-developed, designed, and manufactured by Pressler and enjoys patents in the Chinese mainland, the United States, and Germany.

Automatic galvanizing line

Automatic galvanizing line is a set of advanced environmental protection and energy saving equipment, can meet the needs of automatic production, improve production efficiency, rate, using digital control system, to ensure the controllability of the production line.

Six-station laser cutting machine

This self-developed, designed, and manufactured cutting equipment can replace long cutting cycle equipment by matching the cycle time of a standard hot forming line, which greatly improves cutting efficiency and overall lean management.

PRODUCTION CENTER

> MAIN EQUITMENTS

- **1200T High speed hydraulic press**

Press Capacity: 1200T
Table size：3400*2600mm
Type: Full-automation Hydraulic
Part：BIW/PHS

Vacuum furnace

Manufacturer: Pressler
Continuous furnace:Chamber furnace
Heating length and width： 2400*2200mm
Parts: Bare plate +2000MPa AlSi coating

Full-automation manufacture line

System	Before furnace	After furnace	After press
			
Manufacturer of the automation	Pressler	Pressler	Pressler
Type of automation (robot, feeder, other)	ABB 6-axis robot	Feeder	ABB 6-axis robot
Component/blank marking	point needle	N/A	N/A
Temperature monitoring	No monitor	1 high temperature infrared thermometer +1 high temperature thermal camera	1 low temperature thermal camera
Other	Plate position detection	Plate position detection	

100% Temperature control by Thermocamera for each part/nest for hot stamping / PHS process required

Laser

Manufacturer： TRUMPF/Pressler
Table size： 2100*1600mm
Laser-type： solid-state laser
Note: Laser cutting ensures that all scrap is removed from each part (100% controlled). Maximum allowable burr ≤0.15mm.

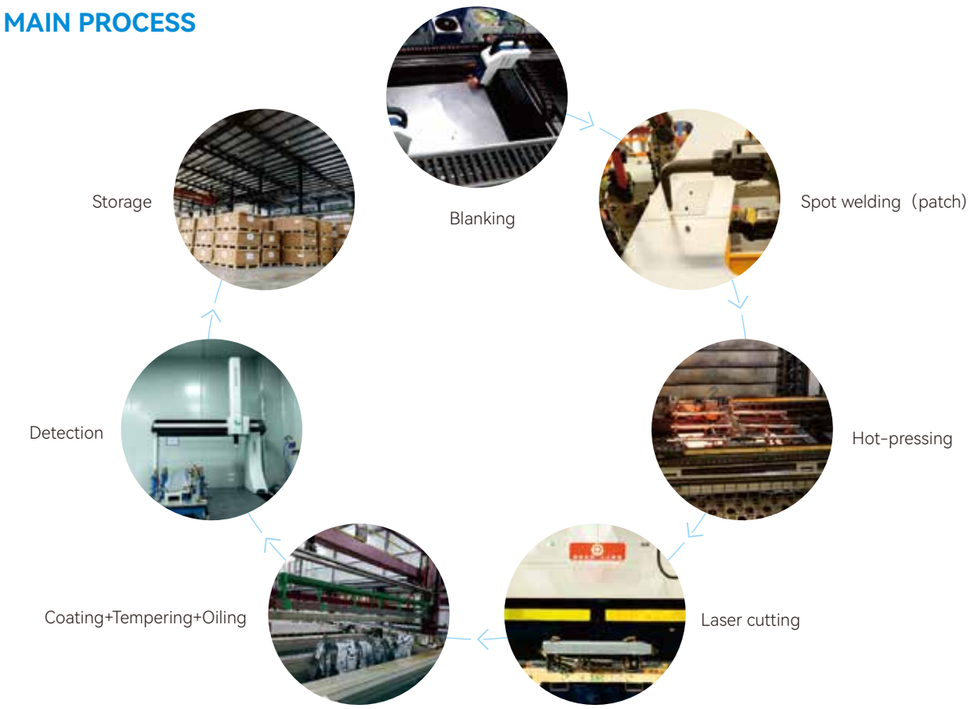
Coating line

Size: 100m*30m*8m
Capacity: 2.4 million pcs/year
Frequency: 30 flybar /3min

Tempering line

Size： 75m*4.7m*1.75m
Capacity: 2.4 million pcs/year
Speed of chain drives : 0.5m（1.2 hanger)/min，≈10pcs/hanger

> MAIN PROCESS



> Manufacturing Execution System

From raw material to product delivery, every process data is stored in the MES system.

MOLD WORKSHOP

The mold workshop is equipped with perfect data processing equipment, including 10 sets of 5-axis deep drilling, 4 meters gantry CNC machining equipment, and 12 sets of small 850-CNC, which can complete the processing of all kinds of hot forming molds; Besides, the mold workshop also has two test mold lines (800T 400T), self-developed test mold heating furnace and blue light scanning equipment

With an annual output of 60+ sets of hot-forming mold, Pressler Mold Workshop provides hot-formed mold, mold designing and manufacturing, small batch trial production, and after-sales integrated services, that's why Pressler wins customers and markets with the most competitive price and excellent quality.

TESTING CENTER

We can perform quantitative detection of chemical elements, micro-structure analysis, which can provide data for further study. (Japanese Electron microscope scanner SEM, German Leica metallographic microscope, Metallographic quantitative analysis software, tensile strength machine, hydrogen content detector, roughness profiler and coordinate machine).

Digital Display Microhardness

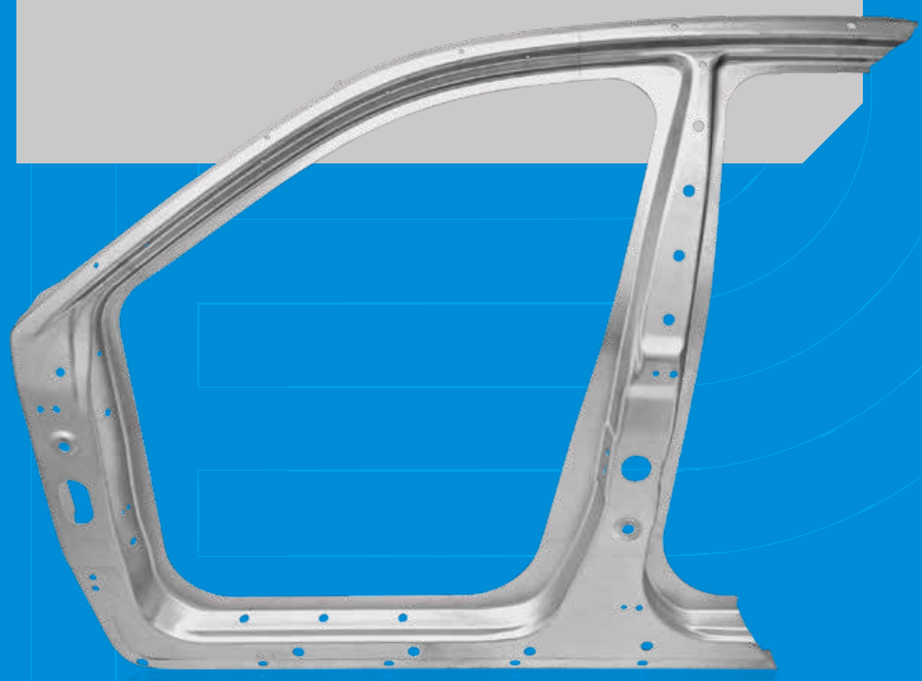
Metallurgical Microscope

CMM

Tensile Testing Machine

PRESSLER

VACUUM HOT FORMING ZINC -GALVANIZED DOORRING



Given some problems in corrosion resistance of formed bare and aluminum-silicon plates, brittleness of the Al-Si coating, and manual removal of spot welding burrs, this abstract introduces a kind of process---all-in-one electric galvanized door rings whose film thickness is 7-13um. Using both vacuum hot forming and electro-galvanizing, this process stamps the laser welded material with different hardness into door rings after heating at 930℃ and 10pa for 6min before putting them into the electric galvanizing production line for degreasing, pickling, galvanizing, tempering and other processes.

What's more, bare plates don't need to remove their coating in laser welding compared with Al-Si coated plates, thus decreasing 10%-15% the cost of the all-in-one door rings.

In addition, the electric galvanizing contributes to better corrosion resistance and resilience of the electric galvanized door ring, splash-free and burr-free in welding, improved production environment of the spot welding line, reduced rework of manual burr removal, decreased cost but improved security.

- **Advantages**

1. no patent limit in aluminium-silicon welding
2. better anti-corrosion
3. Bigger welding window, no splash and burr, excellent welding performance
4. better bending angle and impact energy absorption
5. no need for shot blasting, no worry for deformation

MAIN MANUFACTURING PROCESS

> About Vacuum hot forming

- **Core technology**

Its core is to create a vacuum environment for the heating process of metal sheets, minimizing the oxidation phenomenon that is prone to occur during the heating process. This process makes the uncoated sheets' heating possible for the automobile hot-pressed parts, which are widely used for the hot forming of uncoated door rings, TWB sheets, uneven-thickness plates, and other uncoated plates. Combined with subsequent electroplating processes, the hot-formed galvanized parts need no shot blasting, which may result in deformation.

- **Advantage**

Pressler independently R & D, design and manufacture the world's first - vacuum hot pressing production line, has applied for Chinese mainland, the United States, Germany and other places invention patents.

1. Better performance in spot welding compare with Al-Si coating parts
2. Lower cost

> About Zinc-galvanized

Features:

1. Fully automatic
2. Our vacuum hot forming parts are treated with galvanized coating increasing the part surface anti-corrosion property.
3. Tempering process reduces the probability of hydrogen embrittlement and the risk of delayed fracture.


Hang up


Coating

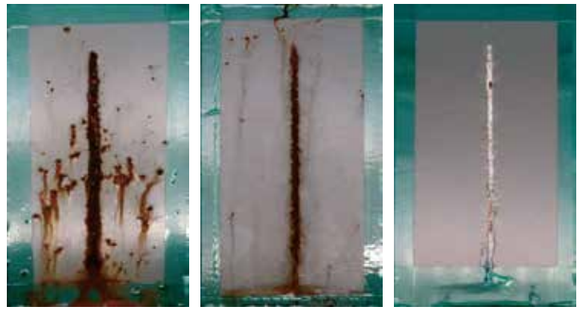

Tempering


Oiling

EXCELLENT PERFORMANCE

Zinc coating is unaffected by heating, and it is dense, has good perfor-mance in anodic protection and corrosion resistance.

From the ten-week cyclic corrosion resistance test, we found that the Pressler vacuum hot formed electro-galvanized door ring has good anodic protection effect. (Rusitng Ri 0 level, Blistering B 0level, Rust creeps Ud (mm) 0mm)



22MnB5 bare plate | Aluminum-silicon coated 22MnB5 | Galvanized plate 7-10um coating oiling

Cyclic corrosion resistance test (10 weeks)

> EXCELLENT WELDING PERFORMANCE

Welding window is bigger than 1000A, and there is no splash , burr in the spot welding process.

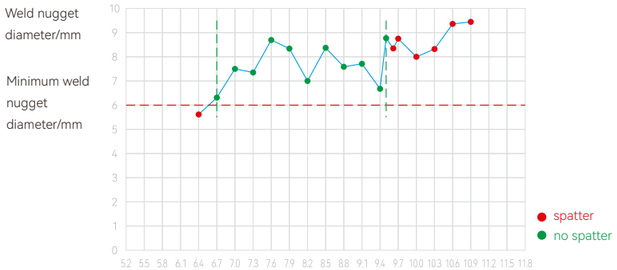
● COMPARISION OF WELDING WITH THREE SHEETS

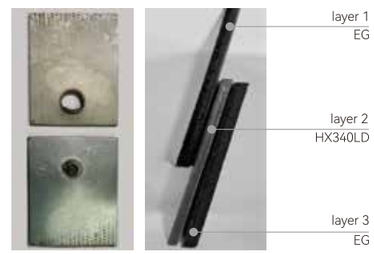
Testing	Material	Coating	Thickness(mm)	Note
Sheet1	HX340LAD	GI50/50	1.0	
Sheet2	HS950Y1300T-BORON	EG	1.4	PRESSLER
Sheet3	HS950Y1300T-BORON	EG	1.4	PRESSLER

Testing	Material	Coating	Thickness(mm)	Note
Sheet1	HX340LAD	GI50/50	1.0	
Sheet2	HS950Y1300T-BORON	Al-Si150	1.4	Al-Si Coating
Sheet3	HS950Y1300T-BORON	Al-Si150	1.4	Al-Si Coating

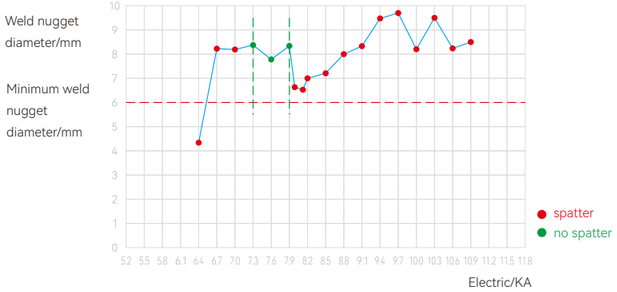
● WELDING WINDOW

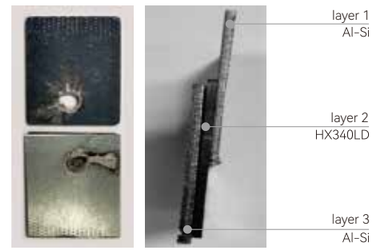
Results	Min(KA)	Max(KA)	Range(KA)
Welding Window	6.7	9.5	2.8KA





Results	Min(KA)	Max(KA)	Range(KA)
Welding Window	7.3	7.9	0.6KA





Conclusion	The welding window of galvanized hot formed steel is 2.8KA, and the welding window of alumi-num-silicon hot formed steel is 0.6KA. In addition, there is no splash or burr in the spot welding process of galvanized sheet.

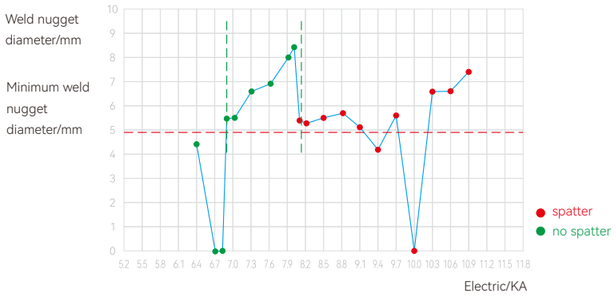
STRUCTURAL ADHESIVE

Testing	Material	Coating	Thickness(mm)	Adhesive	Note
Sheet1	HS950Y1300T-BORON	EG	1.4	BM1460N	PRESSLER
Sheet2	HS950Y1300T-BORON	EG	1.4	BM1460N	PRESSLER

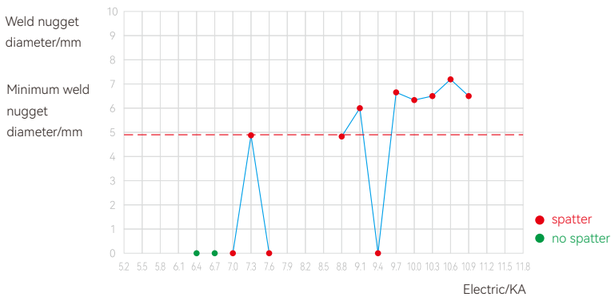
Testing	Material	Coating	Thickness(mm)	Adhesive	Note
Sheet1	HS950Y1300T-BORON	Al-Si150	1.4	BM1460N	Al-Si Coating
Sheet2	HS950Y1300T-BORON	Al-Si150	1.4	BM1460N	Al-Si Coating

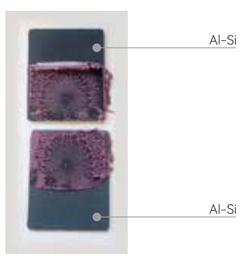
WELDING WINDOW

Results	Min(KA)	Max(KA)	Range(KA)
Welding Window	6.9	8.0	1.1KA



Results	Min(KA)	Max(KA)	Range(KA)
Welding Window	/	/	0KA



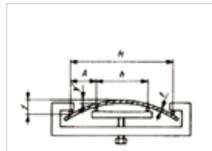


Conclusion The welding window of galvanized plate is 1.1KA and that of aluminum-silicon plate is 0KA . In addition, there is no splash or burr during spot welding of galvanized plate.

> REDUCE THE RISK OF HYDROGEN EMBRITTLEMENT AND DELAYED CRACKING

STRESS CORROSION

Hydrogen content	Testing condition	Four point bending angle	Conclusion
qualified	0.1mol/L HCl solution (PH=1)， 120h	No cracking	OK



FOUR POINT BENDING ANGLE

Project	Description
Process	Using the method of wire-electrode cutting, roasted at 170℃ for 20 minutes and adjusted to bending stress 100% of the yield strength of the material (according to the measured tensile value -1185MPa), samples (size: 15*115mm, number: 3) taken from the plane area of the hot-formed part according to the four-point bending method in the standard GB/T15970.2-2000 will not break after soaking in the 0.1mol/L hydrochloric acid solution (PH =1±0.2, 24-hour PH adjustment) for 120 hours.
Testing result	No cracks in the sample after the test.
Conclusion	qualified


After 96H

Conclusion The galvanized parts were tested at 190 degrees and 2h for dehydrogenation by tempering, and the parts after electrogalvanized tempering were tested at 300 degrees and 20min for diffused hydrogen content, and the zinc layer hydrogen content was 0.2PPm. The U-shaped bending test of SEP 1970 for 30 days, the constant load test of 96H and the four-point bending test of 0.1mol/L HCl immersion for 120h showed no hydrogen embrittleness cracking.

> EXCELLENT COLD BENDING PERFORMANCE

Type		Thickness (mm)	Three point bending angle						
			Position 1	Position 2	Position 3	Position 4	Position 5	Position 6	Position 7
Ordinary hot forming	Al-Si coating	1.5mm	50.8°	52.7°	52.6°	51.6°	52.3°	51.4°	51.9°
Vacuum hot forming & galvanized	galvanized 1	1.5mm	76.6°	78.3°	69.5°	73.5°	82.2°	73.5°	75.6°
	galvanized 2	1.5mm	80.6°	81.7°	76.4°	81.2°	76.1°	67.6°	77.3°

Three point bending angle

Conclusion It is found that the bending Angle of hot-formed galvanized parts is above 60 degrees, which is better than that of aluminum-silicon hot-formed products.

> EVEN THICKNESS (THE SPOT WELDING PROCESS IS CONTROLLABLE)

Position	cs1	cs2	cs3	cs4	cs5	cs6	cs7	cs8	cs9	cs10	cs11	cs12	cs13	cs14	cs15	cs16	cs17	cs18	cs19	cs20	cs21	cs22	cs23	cs24	cs25	cs26	cs27	cs28	cs29	cs30	cs31	cs32	cs33	cs34	cs35	cs36	cs37	cs38	cs39	cs40
Front Thickness	7.2	7.6	8.1	7.4	7.9	6.1	6.2	6.4	9.5	8.6	11.1	9.8	11.4	10.2	10.9	9.6	10.5	11.2	10.6	9	11.5	11.6	10.5	11.9	12	10.9	12.3	10.9	11.7	12.2	9.7	10.7	8.8	9.6	9.1	9.8	9.1	10.2	9.5	8.6
Back Thickness	8.5	8.7	10.9	7.5	7.9	8.5	10.1	9.5	10.0	9.5	8.5	9.1	11.0	9.5	9.0	9.1	9.5	9.5	11.0	8.3	11.8	11.9	10.5	10.8	10.6	9.0	10.0	11.5	10.5	11.6	10.1	10.0	9.8	8.5	9.2	10.9	10.8	12.5	12.2	11.4

▸ Galvanized parts with different positions

Conclusion: The thickness tolerance of Pressler's galvanized thickness is ±3um, and the thickness thickness can be customized according to customer requirements.

> NO COATING CRACKING

铝硅涂层22MnB5

电镀锌

裸板

Falling test: From the test（drop tower test）, we found that there is no coating cracking of the vacuum hot formed electrogalvanized parts and the three-point bending Angle of the 1.5mm sample is above 70 degrees.

PRESSLER

2000MPA ZINC- GALVANIZED PRODUCTS

2GPa hot forming steel emerges with higher demand for improved lean design capability, functional requirement and hot forming material in the automobile industry.

> HOT FORMING TECHNOLOGY

● **Status of parts using existing process** Aluminum-silicon coated vacuum hot formed 2000MPA parts

TENSILE STRENGTH
2000MPA

Note:
Ordinary hot forming equipment on the market produce 2000MPa parts with high risk of delayed cracking.

● **PRESSLER Vacuum hot forming technology**

TENSILE STRENGTH
2000MPA

Note:
PRESSLER produce 2000MPa with low risk of delayed cracking and better corrosion resistance and well welding performance.

> WELDING PERFORMANCE

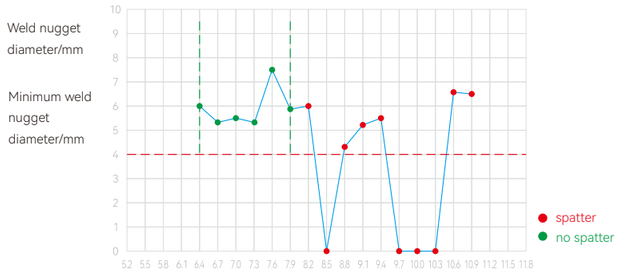
Welding performance test with structural adhesive

Testing	Material	Layer	Thickness (mm)	Sealant	Note
Sheet1	2000Mpa	EG	1.4	BM1460N	PRESSLER
Sheet2	2000Mpa	EG	1.4	BM1460N	PRESSLER

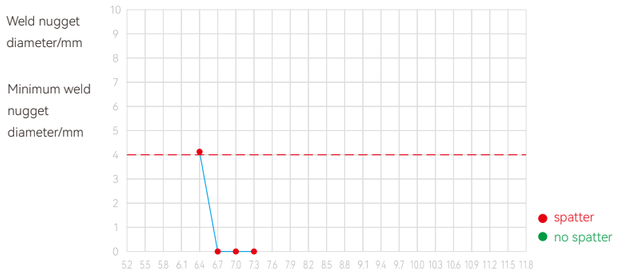
Testing	Material	Layer	Thickness (mm)	Sealant	Note
Sheet1	2000Mpa	AlSi150	1.5	BM1460N	Al-Si Coating
Sheet2	2000Mpa	AlSi150	1.5	BM1460N	Al-Si Coating

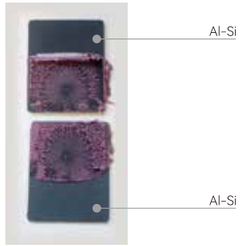
● WELDING WINDOW

Results	Min(KA)	Max(KA)	Range(KA)
Welding Window	6.4	7.9	1.3KA



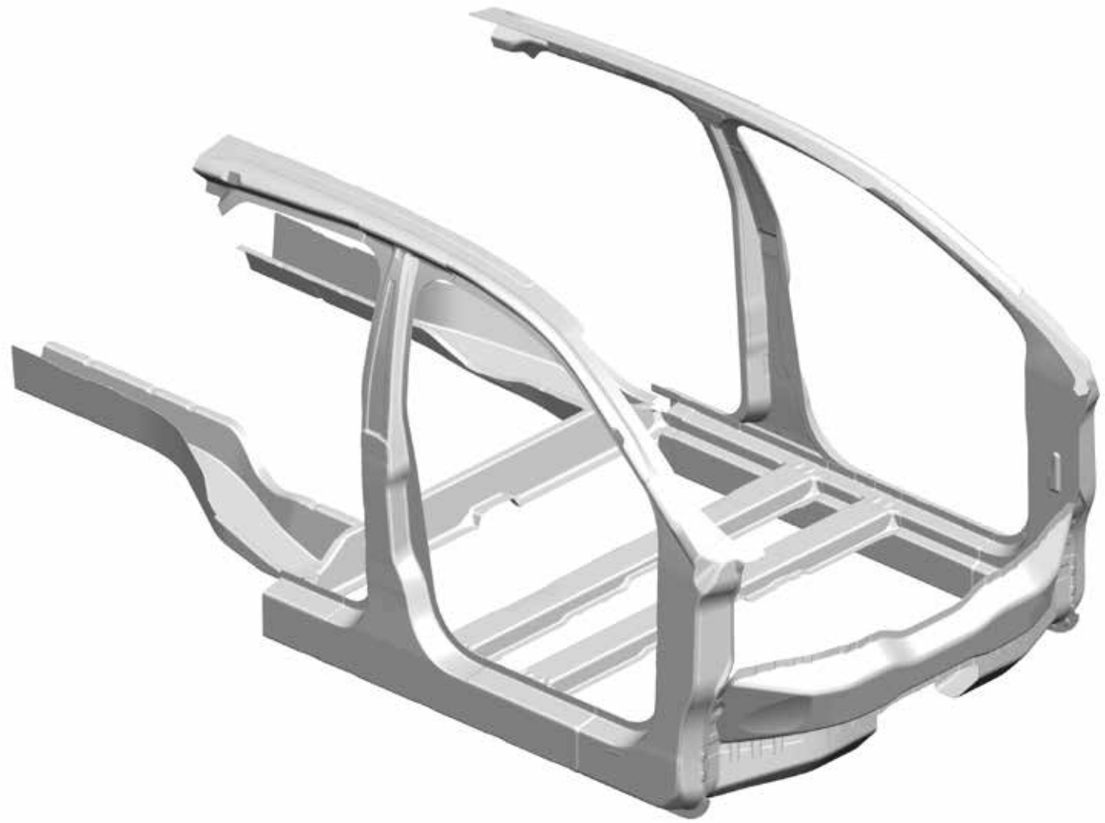
Results	Min(KA)	Max(KA)	Range(KA)
Welding Window	/	/	0KA





Conclusion	The welding window between 2000Mpa galvanized parts is 1.3KA, and the welding window between aluminum and silicon is 0KA.

OTHER ZINC-GALVANIZED PRODUCTS



A wealth of experience in hot forming enables mass production of various white body parts possible.