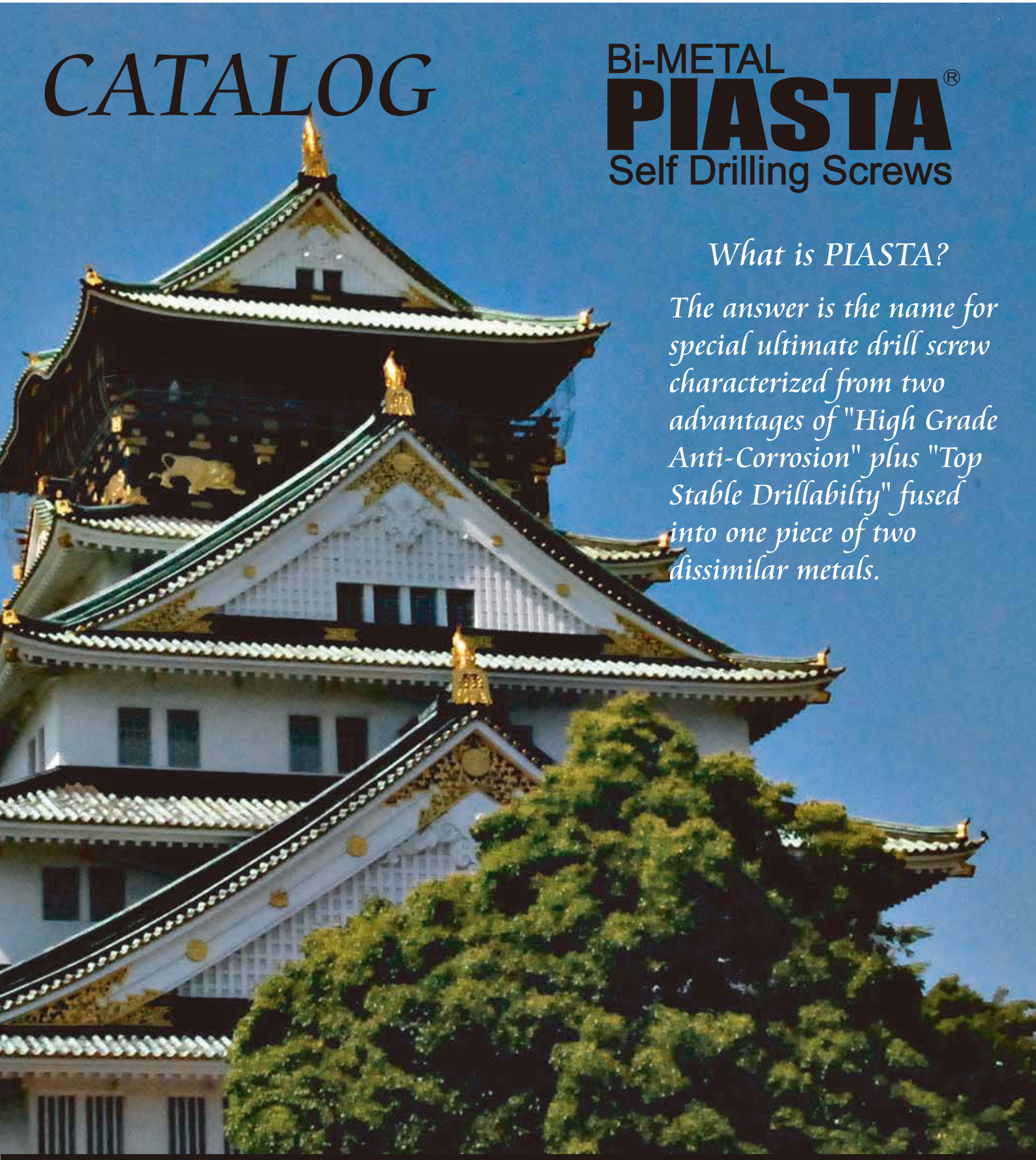
CATALOG

Bi-METAL
PIASTA®
Self Drilling Screws



What is PIASTA?

The answer is the name for special ultimate drill screw characterized from two advantages of "High Grade Anti-Corrosion" plus "Top Stable Drillabilty" fused into one piece of two dissimilar metals.

The top reliable brand firmly cultivated under brightful long history, "PIASTA"

In the field of construction industry, colored steel sheets were screwed to steel beams of metal buildings such as factory, warehouse, gymnasium and indoor pool. At the initial stage of the fixation with screws, pre-holing was necessary before materials were fastened with tapping screws. The exterior of the buildings is exposed to weather, hence at that time the heads of the screws were covered with stainless steel caps or plastic caps, or all the parts were made of austenitic stainless steel for antirust.

In the new stage, one company in the US created a screw with the top formed in a drill by a cutting operation. This new screw had an innovative quality which was to drill and tap into materials at the one time and therefore this screw came into wide use all over the world. Afterwards another company in the US made the drill part by cold working. As a result, the market expanded further.

Soon after these screws were created, several companies in Japan copied those screws, but Shinjo Mfg Co., Ltd. also invented our own original drill point under our long experience on welding parts and obtained a patent. We, Shinjo, started the mass-production and mass-distribution of this screw with the brand name, Pias, becoming to be a pioneer toward a current huge demand against self-drilling screws by the world-top quality, varieties and production.

Along with the popularization of self-drilling screws, the products, that is to say, austenitic stainless steel self-drilling screws, were required for metal buildings. However, austenitic stainless steel is no way hardened without the impoverishment of corrosion resistance and therefore self-drilling screws by austenitic stainless at that time couldn't drill, thus tap either, into the steel materials of metal buildings.

The first company to solve this problem was in Europe. They invented the way that the thin drill point hardened was pressed into the end of a tapping screw and started to sell it. This is an event more than 25 years ago. After a short while, some companies thought about welding process to settle the same problem and in fact the attempt was executed and they sold them in the marketplace. However, it was difficult to keep the qualities of drilling and tapping sufficient after welding, as a result the self-drilling screws by welding process were recalled continuously.

At that time, Shinjo Mfg affiliated with Adolf Würth GmbH&Co.KG in West Germany for production and distribution of PIAS screws. In 1989, they called on us to find a new way of creating an austenitic bi-metal stainless steel screw. The reason of this request originated from the change of building law in West Germany. A broken-off bolt because of acid rain resulted in a roof fall and an injured person at the station of West Germany. The revision of the law was that stainless steel screws had to be used for the parts on the exterior of public buildings which were exposed to weather.

To cope with this emergency case, we dedicated our knowledge for that, as a result completed the prototype of the austenitic bi-metal stainless steel self-drilling screw, by welding process, 2 weeks after the request and applied for the patent. This was accomplished from our accumulated knowledge of welding technology which had been gained from the position as the pioneer of welding nuts for Japanese car industry.

We started to manufacture and sell welding nuts after having referred to GM specification of welding nuts TSB-013, which is the origin of the specification of square welding nuts JIS B1196.

We, Shinjo, created the world's first bi-metal screw as complete goods by welding process. This was the bi-metal version of PIAS screws that had been known as one of the best self-drilling screws in the world and we considered this would become a new star in our lineup, so that this was named PIASTA, namely "PIAS" and "STAR" joined.

PIASTA screws were distributed via the large sales network of Adolf Würth group which employs tens of thousands salesmen all over the world and therefore were known so famous in European marketplace. Furthermore we affiliated with Mage AG in Swizerland which specializes in roof and exterior business, to develop. We have designed variety of bi-metal screws continuously which have been required by marketplace and resulted in our present position as the leading company of bi-metal stainless steel self-drilling screws in the world in terms of the variety, ptoduction volume and technology.

Products in this catalogue are most popular ones and many others not in this catalogue are also available and in actual use too. It would be firmly promised to update our bi-metal catalogues next by next and you will find what you want in an actual requirement in such series.

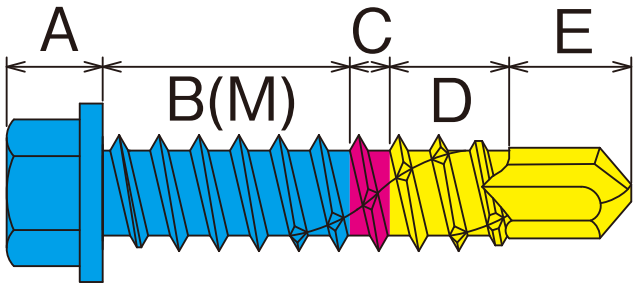
With deepest thanks in advance for your favor to use and enjoy our highest quality of PIASTA screws hereafter.

History of Shinjo group

1943 : Shinjo Mfg. established as a private company.
1954 : Production of Hexagon nuts started.
1959 : Shinjo Mfg. Co., Ltd. established.
1962 : Production of Square weld nuts started.
1964 : Kishiwada factory started operation.
1972 : Kyushu Shinjo Co., Ltd. established.
1979 : Production of PIAS screws started.
1982 : Pias Sales Co., Ltd. established.
1990 : Production of PIASTA screws started.
2005 : Self-drilling screw business taken over to Pias Sales Co., Ltd.

Basic Concept

PIASTA screw, combined together two parts by welding, the one consisting of a stainless head which shall be exposed air and a stainless shank which undergoes the pull-stress after fastened into materials, and the another is a carbon steel hardened for self-drilling and self-tapping.



Basic Configuration

A : Head, part for torque transfer and bearing surface
B : Thread part for fastening
C : Welding part

⟩ Stainless steel with corrosion resistance (No case-hardening)

D : Thread part for tapping
E : Drilling point

⟩ Case-hardened carbon steel

Basic strength

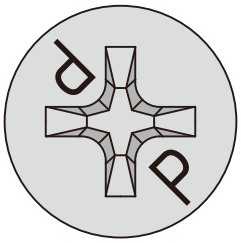
A : No case-hardening for keeping anti-corrosion high. Surface hardness 350HV
B : Tensile stress value over A2 (700N/mm²)
C : Welding strength over the breaking values for torsion and tensile of part B
D : Case-hardening for over 600HV
E : Case-hardening for over 600HV

Basic surface treatment

Ruspert silver about 8～12μ, Non-Chrome

Head marking

Basically, the marking is PP. On Hex Head, each P placed reversely back to back and on Pan Head, PP placed in symmetry diagonally. These head marks are registered.



The stainless part of PIASTA screws are manufactured with more than A2-70 strength.

Description of "A2-70"

It consists of 2 sections divided with a hyphen. First section represents stainless steel classes, of which the alphabet indicates stainless steel materials, table 1, and the number, chemical compound types, table 2. Second section represents strength classes and the two-digit number is tenth part of tensile strength of a completed product.

POINT

In other words, A2-70 is austenitic stainless, which is non-magnetic and high corrosion resistance, 18-8 stainless SUS-300 series, whose tensile strength is at over 700N/mm²(700MPa)

Table 1

Steel material	Magnetism	Hardenability
A : Austenite	X	X
C : Martensite	O	O
F : Ferrite	O	X

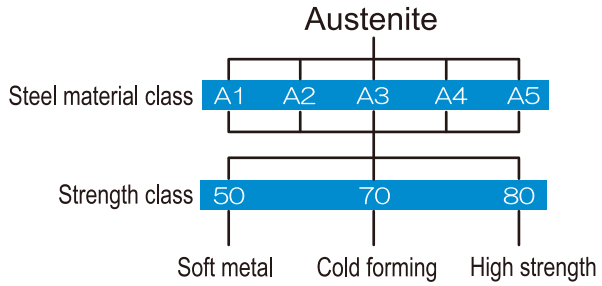


Table 2

Chemical compounds of A2 (%)

Ni	C	Si	Mn	P	S	Cr	Cu
8~19	0.1	1	2	0.05	0.03	15~20	4

Chemical compounds of A4 (%)

Ni	C	Si	Mn	P	S	Cr	Cu	Mo
10~15	0.08	1	2	0.045	0.03	16~18.5	1	2~3

※Values without range indicates the maximal ones.

Reference : JIS Handbook Fasteners&Screw Threads 2003

The material of PIASTA screws is mostly XM7 which is equivalent to A2, 18-8 stainless, but if the cold-forming is not enough, the tensile strength gets no more than around 600N/mm²(600MPa) and hence twisting and bending occurs during use. However, we produce PIASTA screws at over 700N/mm²(700MPa) with our special manufactural know-how.

Therefore A2 stainless steel is of high corrosion resistance and used for kitchenware and equipments in an ordinary factory, but not suitable for use under such environments as contacting non-oxidized acid and chloride, such as swimming pool and sea. For such envitonments, A4 stainless steel, which is often used for food industry and shipbuilding industry, is recommended. A4 PIASTA is available on all items on order.

PIASTA®

Technical data of stainless parts "A" and "B"

Chemical Composition

Austenite SUS-305J1 (%)

Ni	C	Si	Mn	P	S	Cr
11.00-13.50	max0.08	max1.00	max2.00	max0.045	max0.03	16.5-19.00

Austenite SUS-XM7 (%)

Ni	C	Si	Mn	P	S	Cr	Cu
8.50-13.50	max0.08	max1.00	max2.00	max0.045	max0.03	17.0-19.00	3.0-4.0

Pull Out Value

(N)

Thread Dia	Thickness 1.2mm	Thickness 1.6mm	Thickness 2.3mm	Thickness 3.2mm	Thickness 4.0mm	Thickness 6.0mm
4	3260	3618	5952	6702		
5		5490	6060	8624	7716	
5.5			6030	8022	10204	11532
6			6442	9662	10704	13732

Tensile and Shear Strength

※Test Sheet : 2.3mm (N)

Thread Dia	Tensile Strength	Shear Strength
4	6606	5194
5	8502	6256
5.5	11634	8042
6	15440	10732

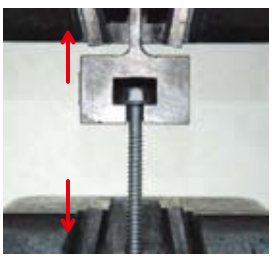
Torsion Strength

(N.m)

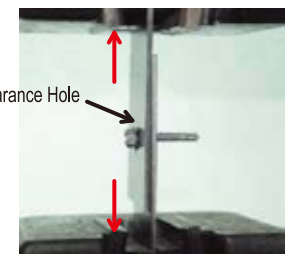
Thread Dia	Torsion Strength
4	4.8
5	6.9
5.5	9.6
6	14.7

Pull-Out Value

Tensile Strength



Shear Strength



Torsion Strength

Clearance Hole For Pull-Out Test (mm)

Thread Dia	Clearace Hole Dia
4	4.4
5	5.4
5.5	5.9
6	6.4

Clearance Hole For Shearing Test (mm)

Thread Dia	Clearace Hole Dia
4	4.7
5	5.7
5.5	6.2
6	6.7

These are measured values, not guaranteed one.

Thread and drill point in carbon steel aren't concerned with the values.

Stainless strength for all screws over A2-70.

For anti-corrosion, hexavalent chromate treatment over zinc plating had been generally applied.

Hexavalent chromium has high corrosion resistance, however, on the other hand, there are hazardous natures that it causes dermatitis and tumor if contacting with your skin for a long time, and causes cancer if it is stored in a certain amount in your body. In fact, health hazard was reported because hexavalent chromium was absorbed into land through acid rain and contaminated groundwater. This became a social problem to be solved urgently.

In 2003, European Union nations issued RoHS directive and WEEE directive, which both restrict specified toxic substances. As a result, hexavalent chromium was gradually replaced with trivalent chromium in car and light electric appliance industries in Europe and movement towards the elimination of hexavalent chromium has been accelerating globally.

Consequentially, in October 2006, we, Shinjo Mfg, also fully changed over to trivalent chromium for PIAS screw series, but for PIASTA screws, the replacement had been a pending issue.

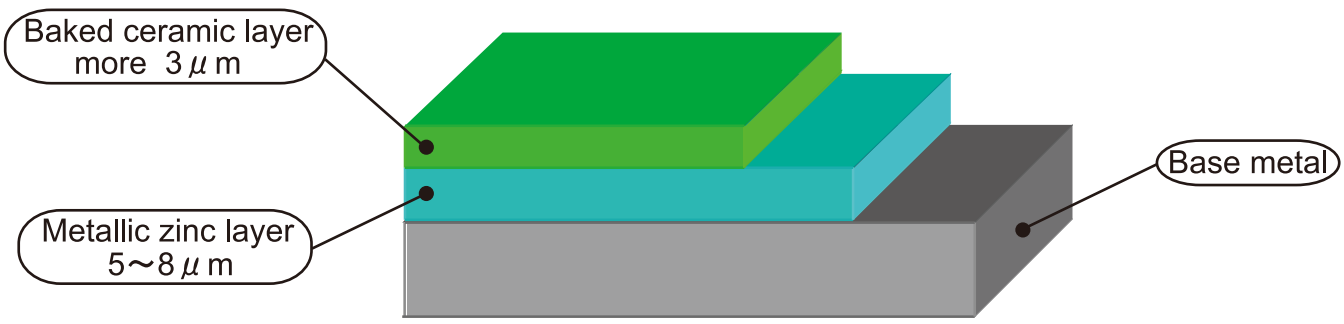
Up to this day, PIASTA screws have been finished in Ruspert Silver which has beautiful silver color, lubricity and high corrosion resistance, but new coating was invented in non-chromium and high corrosion resistance without quality impoverishment. It was named Ruspert Plus and will be coated for PIASTA screw series - Ruspert is a registered trademark of Nihon Ruspert Co., Ltd and Shinjo Mfg.Co., Ltd has the sole right of use for Ruspert Plus.

PIASTA screw has, as explained in this catalogue by now, the austenitic stainless shank and it contributes to economical use with resources and cost saving due to the fastening longevity, which should be a drill screw, what we call, quite gentle against environment.

Concept of Ruspert Plus

Sacrificial protection by zinc in zinc electroplating layer, non-chromium, and a barrier effect by upper baking layer forms the coating with high corrosion resistance.

Coating layers



To use PIASTA screws properly, keep the following in mind.

- Torque adjustment when fastening installation and recommendation of torque controller.

  The head, which transmits fastening torque, and thread shank are not hardened, so fastening torque must be controlled enough not to exceed needful torque otherwise it would damage the recess and thread.

- The nominal length never equal to the effective fastening length.

  In connecting multi-layers, the total thickness connected must not be any longer than "M" of stainless length. Namely, sufficient stainless shank length must be chosen to cover total thickness to be connected.

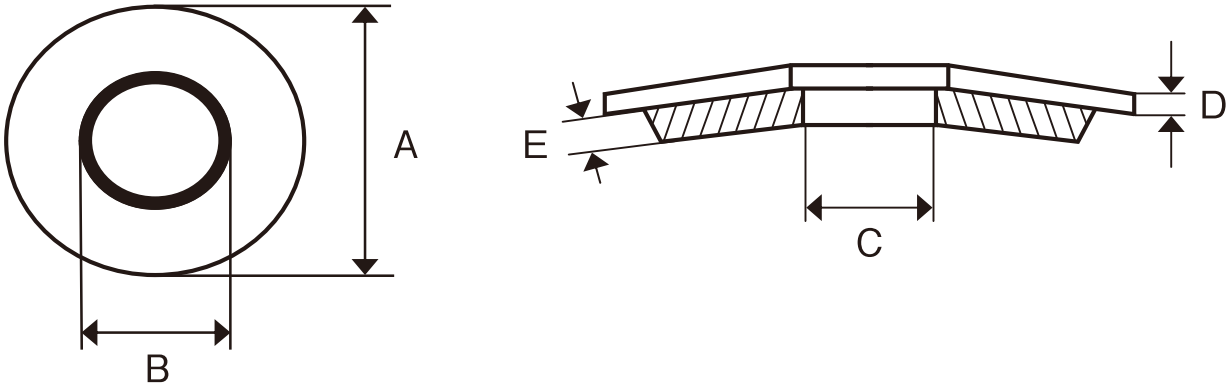
  Therefore, as the bi-metal screws with minimum length for thread-cutting and drilling, please check carefully on effective stainless length in especially short nominal length screws.

  E.g. P-HEX 5×19 Effective Fastening Length 8.5mm
  Nominal Length 19mm
  P-HEX 6×25 Effective Fastening Length 10.5mm
  Nominal Length 25mm

- Recommendation for an electric screwdrivers

  In case M6 screw is used, the high-rotation would result in heat sticking and drilling may be failed. Recommended drill speed is approx. 1800.

PIASTA screws are mostly used with assembled stainless washers bonded with EPDM water-proof function, on roofing or exterior of building, for its anti-corrosion characters.



(mm)

Thread Dia	A Outer Dia of BW	B Inner Dia of BW	C Inner Dia of Rubber	D Washer Metal Thickness	E Rubber Thickness
M5 screws	16	5.3	3.8	0.8	2.0
M5.5 screws		5.8	4.4		
M6 screws		6.8	5.2		

Material of Washer : Stainless(SUS304/305)

Material of Rubber : EPDM

Color of Rubber : Grey

※Outer diameter ϕ14 and ϕ19 are available by special order.

Pan Head

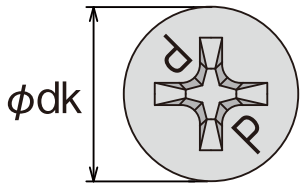
★Common Metal Sheet

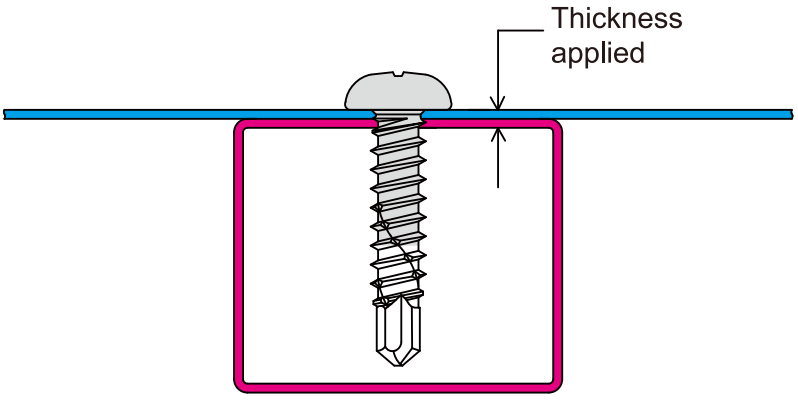
Sarface Treatment RUSPERT·PLUS®

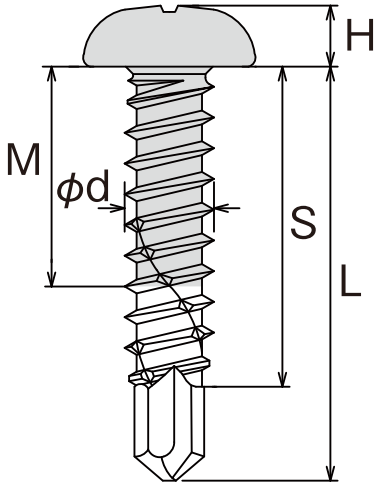
(mm)

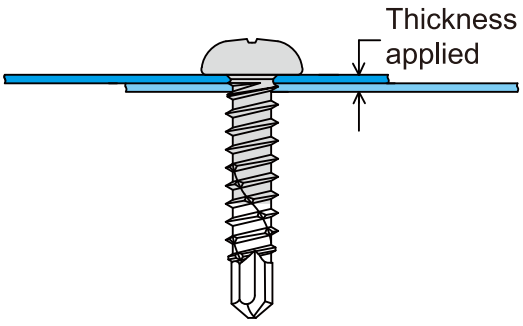
Item #	Size	Thickness applied	M	L	S	ϕdk	H	Cross Recess	ϕd
07001413	4×13	1.2~2.5	6	13	Fully Threaded	8.0	2.9	#2	4.2
07001416	4×16		7	16					
07001419	4×19	1.2~3.2	8.5	19					
07001425	4×25		14.5	25					
07001519	5×19	1.6~3.2	8.5	19	Fully Threaded	9.3	3.3	#2	4.8
07001525	5×25	1.6~4.5	12.5	25					
07001535	5×35		22.5	35					

※An order for unlisted sizes.









M : Effective Stainless Length L : Over All Length S : Thread Length ϕdk : Flange Dia H : Head Heigth
ϕd : Thread Dia

Hex Head #3 point

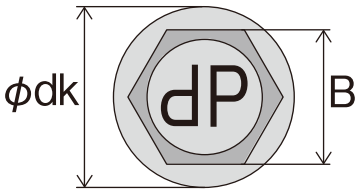
★ For Metal Sheets Connecting

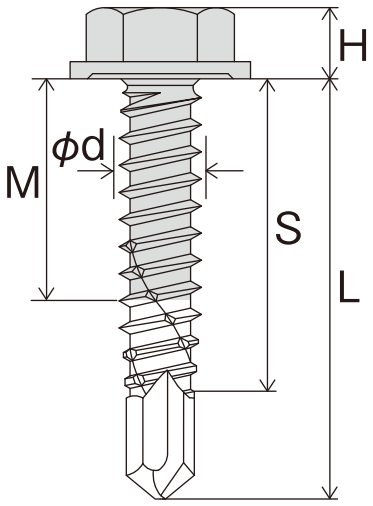
Sarface Treatment RUSPERT·PLUS®

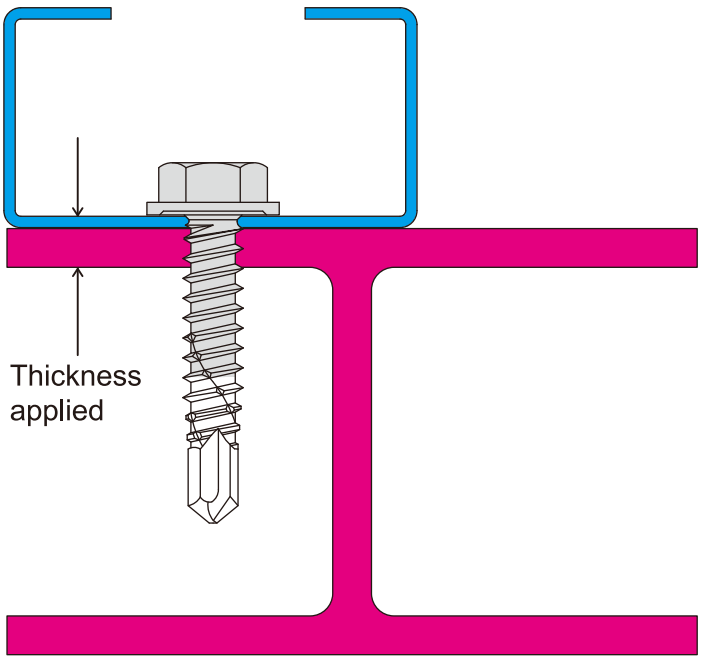
(mm)

Item #	Size	Thickness applied	M	L	S	ϕdk	B	H	ϕd
08301519	5×19	1.6~3.2	8.5	19	Fully Threaded	11.0	8.0	5.3	4.8
08301525	5×25	1.6~4.0	12.5	25					
08301535	5×35		22.5	35					
08301545	5×45		32.5	45					
08301825	6×25	2.3~4.5	10.5	25	Fully Threaded	13.0	9.5	6.5	6.3
08301835	6×35	2.3~6.0	18.0	35					
08301845	6×45		28.0	45					

※An order for unlisted sizes.







M : Effective Stainless Length L : Over All Length S : Thread Length ϕdk : Flange Dia B : Width Across Flat
H : Head Height ϕd : Thread Dia

Hex Head #3 point

★ For Roof

★ For Exterior Wall

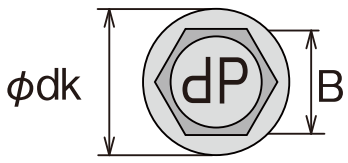
Sarface Treatment RUSPERT·PLUS®

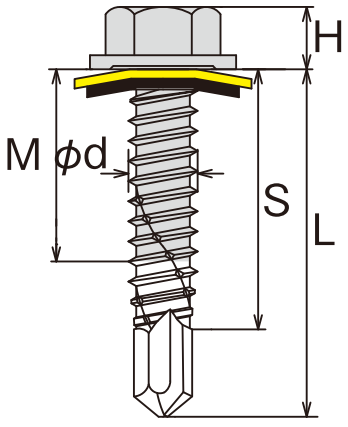
Stainles EPDM Bonded Washer, ϕ16,Assembled

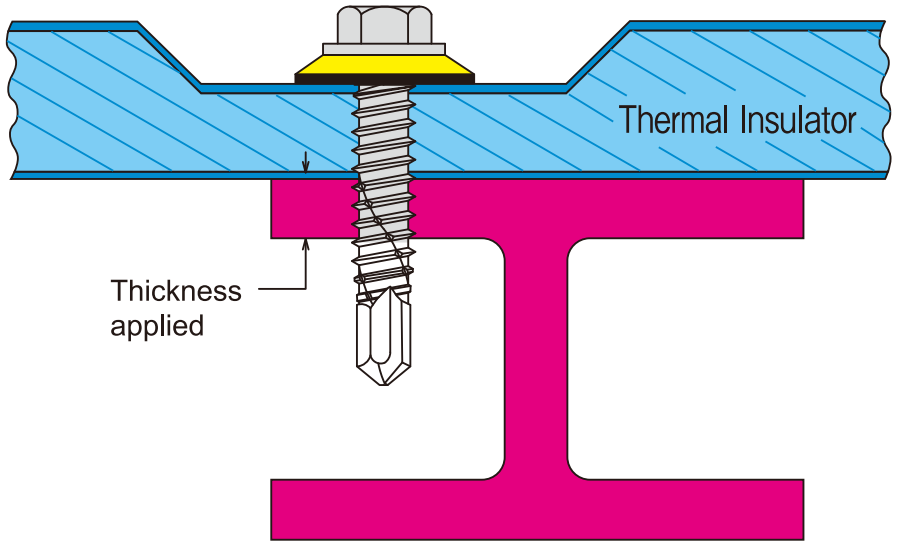
(mm)

Item #	Size	Thickness applied	M	L	S	ϕdk	B	H	ϕd
08301519	5×19	1.6~3.2	8.5	19	Fully Threaded	11.0	8.0	5.3	4.8
08301525	5×25	1.6~4.0	12.5	25					
08301535	5×35		22.5	35					
08301545	5×45		32.5	45					
08301825	6×25	2.3~4.5	10.5	25	Fully Threaded	13.0	9.5	6.5	6.3
08301835	6×35	2.3~6.0	18.0	35					
08301845	6×45		28.0	45					

※An order for unlisted sizes.







M : Effective Stainless Length L : Over All Length S : Thread Length ϕdk : Flange Dia B : Width Across Flat
H : Head Height ϕd : Thread Dia

Hex Head Mini point

★ For Exterior

★ For Thin Sheet

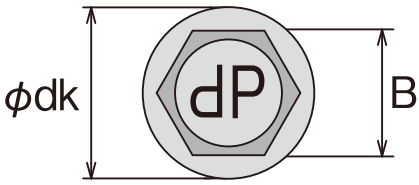
Sarface Treatment RUSPERT·PLUS®

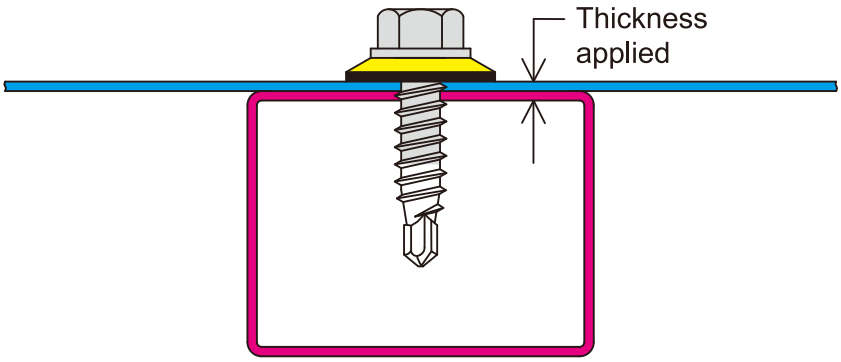
Stainles EPDM Bonded Washer, ϕ16,Assembled

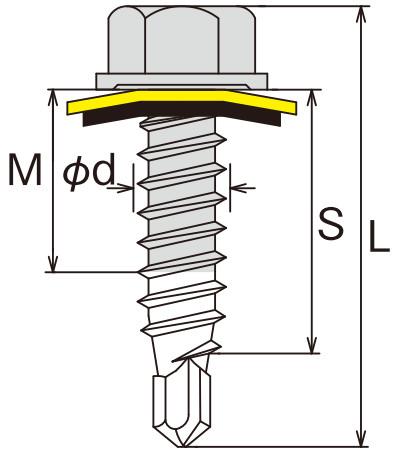
(mm)

Item #	Size	Thickness applied	M	L	S	ϕdk	B	H	ϕd
08606520W	5×20	0.6~1.2	8.5	20	Fully Threaded	11.0	8.0	5.3	4.8
08606622W	5.5×22		10	22					5.5
08606825W	6×25		12	25					6.3

※An order for unlisted sizes.







M : Effective Stainless Length L : Over All Length S : Thread Length ϕdk : Flange Dia B : Width Across Flat
H : Head Height ϕd : Thread Dia

Hex Head

#5 point

★ For Wall Thermal Insulator

★ For Thick Plate

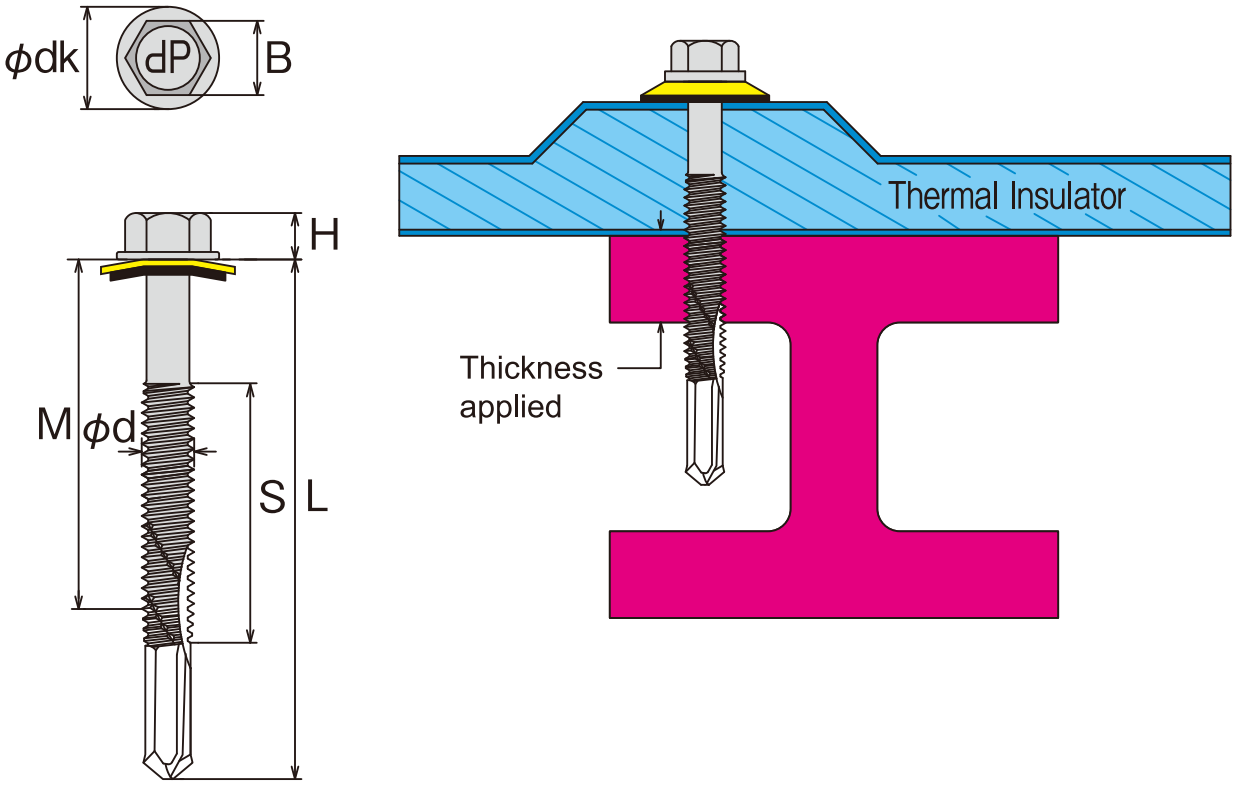
Sarface Treatment RUSPERT·PLUS®

Stainles EPDM Bonded Washer, ϕ16,Assembled

(mm)

Item #	Size	Thickness applied	M	L	S	ϕdk	B	H	ϕd
08610640W	5.5×40	4.0~12.0	16	40	Fully Threaded	11.0	8.0	5.3	5.5
08610650W	5.5×50		26	50					
08610662W	5.5×62		38	62					
08610680W	5.5×80		56	80	40.0				
08610600W	5.5×100		76	100	50.0				

※An order for unlisted sizes.



M : Effective Stainless Length L : Over All Length S : Thread Length ϕdk : Flange Dia B : Width Across Flat
H : Head Height ϕd : Thread Dia

Hex Head
#3 point

Double-Thread

★ For Thermal Insulator Panel

★ Roof Cover

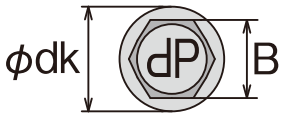
Sarface Treatment RUSPERT·PLUS®

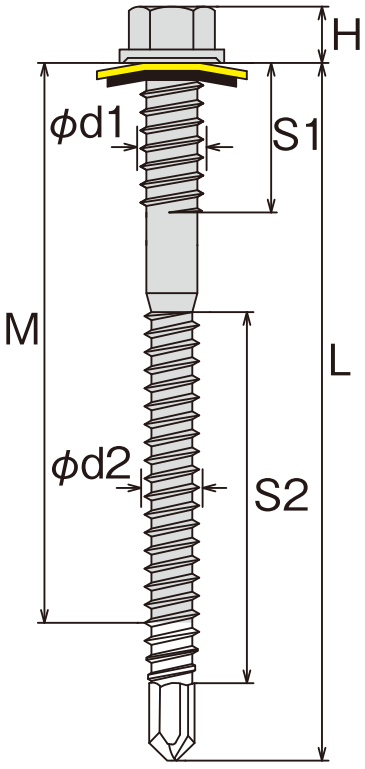
Stainles EPDM Bonded Washer, ϕ16,Assembled

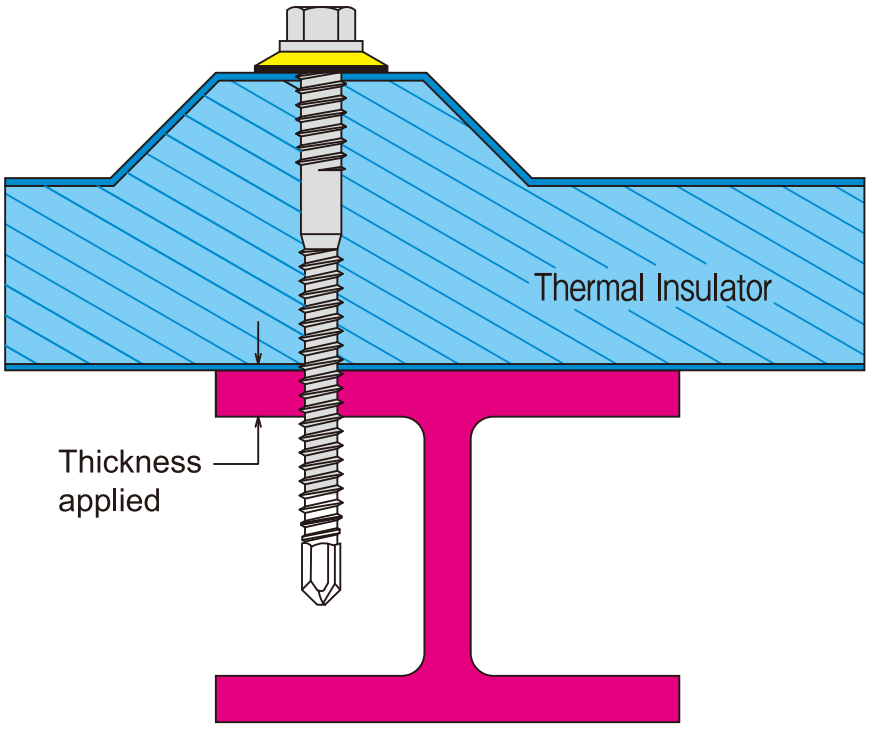
(mm)

Item #	Size	Thickness applied	M	L	S1	S2	ϕdk	B	H	ϕd1	ϕd2
08608870W	5.5/6×70	3.5~6.0	54	70	15	36	11.0	8.0	5.3	6.3	5.5
08608885W	5.5/6×85		69	85		41					
08608805W	5.5/6×110		94	110		46					
08608807W	5.5/6×125		109	125		56					
08608808W	5.5/6×145		129	145		71					

※An order for unlisted sizes.







Characteristic of Double-Thread

The deep threads with larger diameter under head shall keep the surface metal of insulation from sinking and damage from the top pressure.

M : Effective Stainless Length L : Over All Length S1 : Upper Thread Length S2 : Bottom Thread Length
ϕdk : Flange Dia B : Width Across Flat H : Head Height ϕd1 : Upper Thread Dia ϕd2 : Bottom Thread Dia

Hex Head
#2 point

Double-Thread

★ For Thermal Insulator Panel

★ Roof Cover

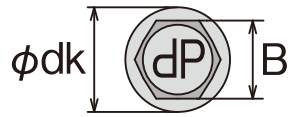
Sarface Treatment RUSPERT·PLUS®

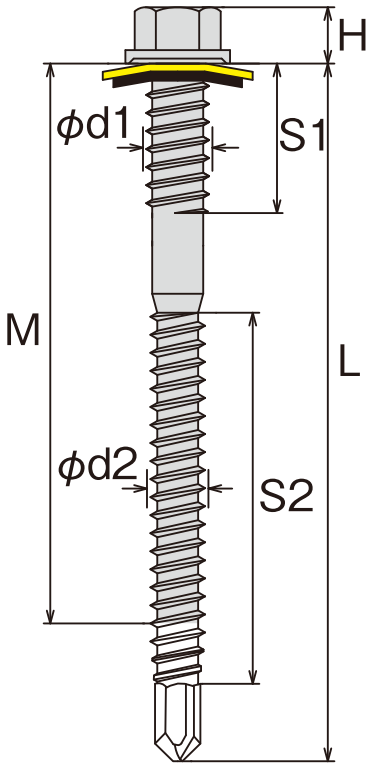
Stainles EPDM Bonded Washer, ϕ16,Assembled

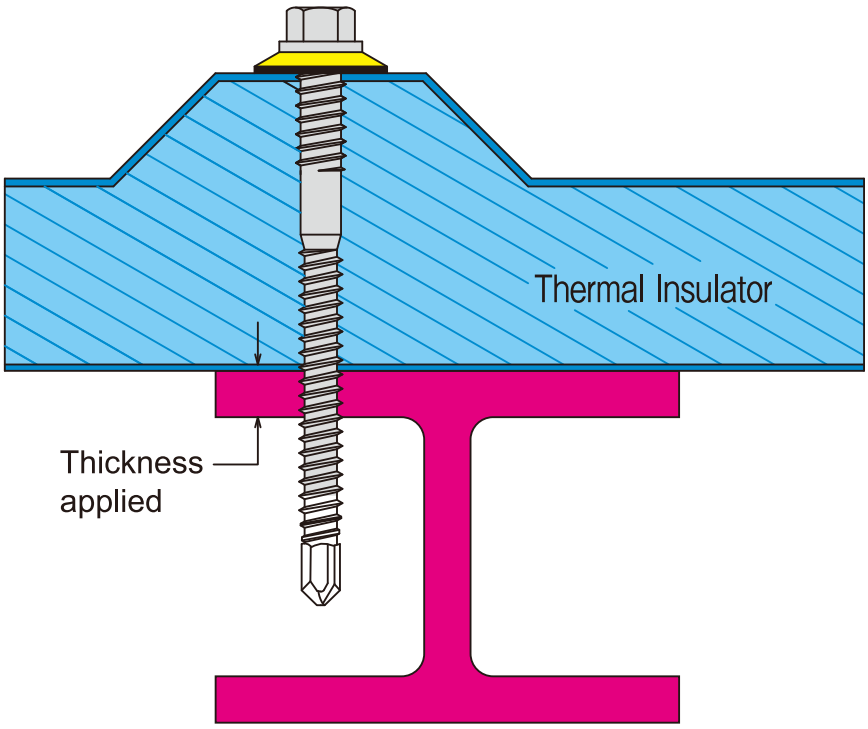
(mm)

Item #	Size	Thickness applied	M	L	S1	S2	ϕdk	B	H	ϕd1	ϕd2
08607870W	5.5/6×70	1.2~3.5	54	70	15	36	11.0	8.0	5.3	6.3	5.5
08607885W	5.5/6×85		69	85		41					
08607805W	5.5/6×110		94	110		46					
08607807W	5.5/6×125		109	125		56					
08607808W	5.5/6×145		129	145		71					

※An order for unlisted sizes.

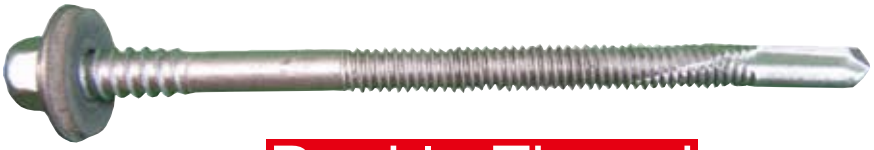






※ #1drill point for wood application is available upon request.

M : Effective Stainless Length L : Over All Length S1 : Upper Thread Length S2 : Bottom Thread Length
ϕdk : Flange Dia B : Width Across Flat H : Head Height ϕd1 : Upper Thread Dia ϕd2 : Bottom Thread Dia



Hex Head

#5 point

Double-Thread

★ For Thermal Insulator Panel

★ Roof Cover

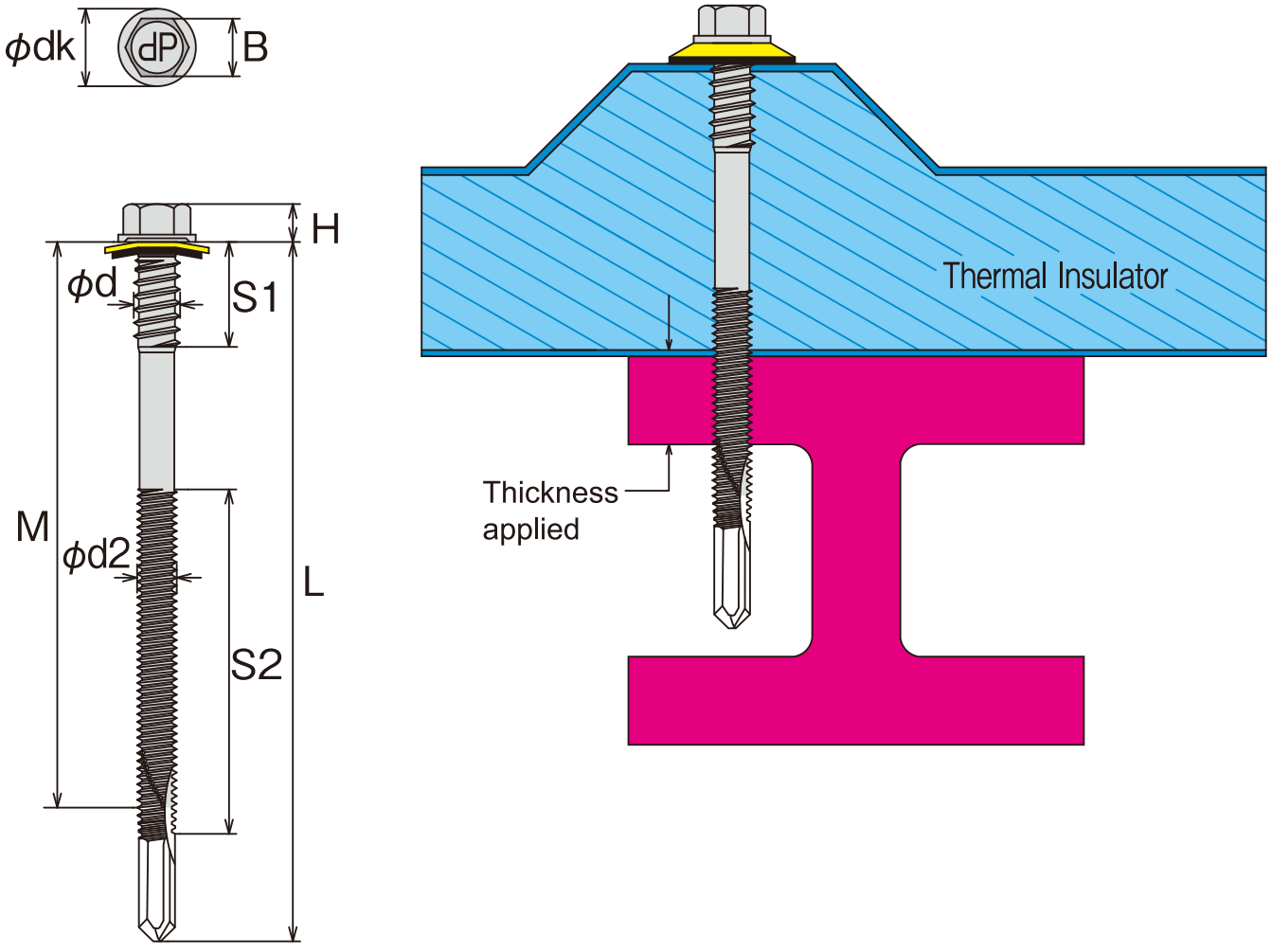
Sarface Treatment RUSPERT·PLUS®

Stainles EPDM Bonded Washer, ϕ16,Assembled

(mm)

Item #	Size	Thickness applied	M	L	S1	S2	ϕdk	B	H	ϕd1	ϕd2
08609880W	5.5/6×80	4.0~12.5	56	80	10	40	11.0	8.0	5.3	6.3	5.5
08609895W	5.5/6×95		71	95	15	47.5					
08609811W	5.5/6×115		91	115							
08609813W	5.5/6×135		111	135							

※An order for unlisted sizes.



M : Effective Stainless Length L : Over All Length S1 : Upper Thread Length S2 : Bottom Thread Length
ϕdk : Flange Dia B : Width Across Flat H : Head Height ϕd1 : Upper Thread Dia ϕd2 : Bottom Thread Dia

Wing Screws

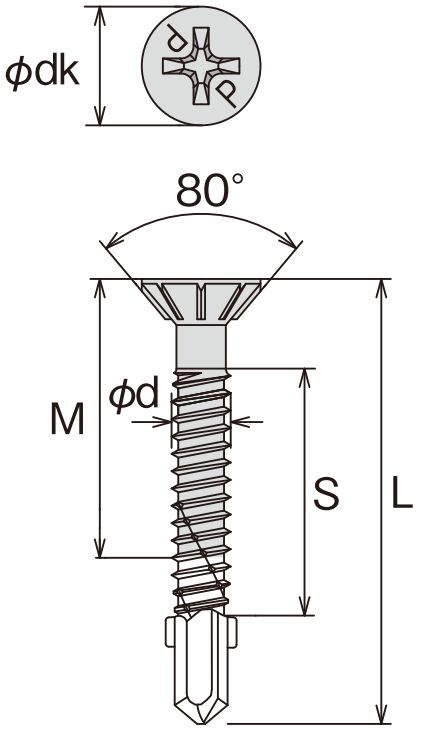
★ For Wood Panel

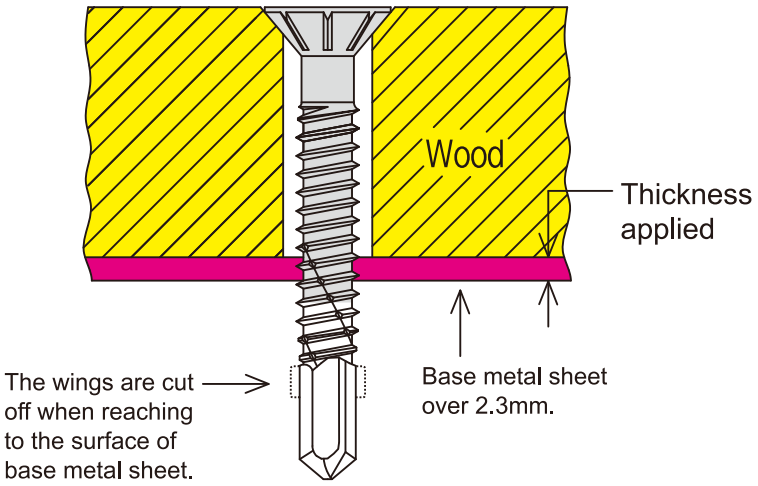
Sarface Treatment RUSPERT·PLUS®

(mm)

Item #	Size	Thickness applied	M	L	S	ϕdk	Cross Recess	ϕd
07101432	4×32	2.3~3.2	12	32	Fully Threaded	7.0	#2	4.2
07101437	4×37		17	37				
07101537	5×37	2.3~3.2	21.5	37	Fully Threaded	9.5	#2	4.8
07101545	5×45		29.5	45				
07101870	6×70	2.3~5.5	51	70	48	12.0	#3	6.3

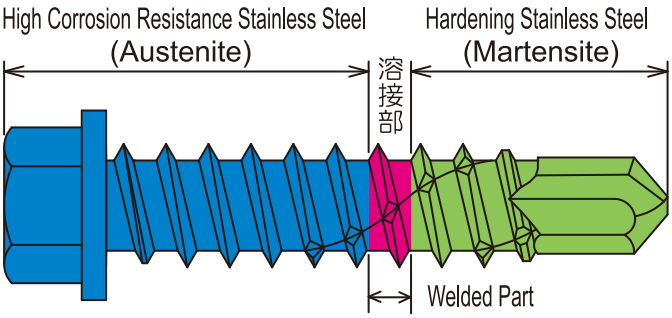
※An order for unlisted sizes.





M : Effective Stainless Length L : Over All Length S : Thread Length ϕdk : Flange Dia ϕd : Thread Dia

Brilliant decoration of Stainless steel



SUPER PIASTA screw is the combination of two best advantages of stainless steel, which is used for the head and fastening shank, and martensitic stainless steel, which for the drill point and tapping shank.
By means of using martensitic stainless steel, which has hardenability, for the drill point, SUPER PIASTA screw is finished only with special passivation, keeping one color of brilliant stainless.

「PAN」

(mm)

Item #	Size	Thickness applied	M	L	S	ϕdk	H	Cross Recess	ϕd
07009413	4×13	1.2~2.5	6	13	Fully Threaded	8.0	2.9	#2	4.2
07009416	4×16		7	16					
07009419	4×19	1.2~3.2	8.5	19					
07009425	4×25		14.5	25					
07009519	5×19	1.6~3.2	8.5	19	Fully Threaded	9.3	3.3	#2	4.8
07009525	5×25	1.6~4.5	12.5	25					
07009535	5×35		22.5	35					

「FLAT」

(mm)

Item #	Size	Thickness applied	M	L	S	ϕdk	Cross Recess	ϕd
07108416	4×16	1.2~1.6	9.5	16	Fully Threaded	8.0	#2	4.2
07108419	4×19	1.2~3.2	10.5	19				
07108425	4×25		14.5	25				
07108519	5×19	1.6~2.5	10.0	19	Fully Threaded	10.0	#2	4.8
07108525	5×25	1.6~3.2	14.5	25				

「HEX」

(mm)

Item #	Size	Thickness applied	M	L	S	ϕdk	H	ϕd
08384519	5×19	1.6~3.2	8.5	19	Fully Threaded	8.0	5.3	4.8
08384525	5×25	1.6~4.5	12.5	25				
08384535	5×35		22.5	35				

●SUPER PIASTA screw was created for drilling stainless steel sheets efficiently by using SUS-420J2 stainless steel, which has high heat resistance for the drill point and already patented in Europe. For use of stainless sheets, please ask for the manual in details.

M : Effective Stainless Length　L : Over All Length　S : Thread Length　ϕdk : Flange Dia　H : Head Height
ϕd : Thread Dia

SELF DRILLING SCREWS
by BI-METAL 18-8(A2)

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Any change on specification permissible due to quality improvement.

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