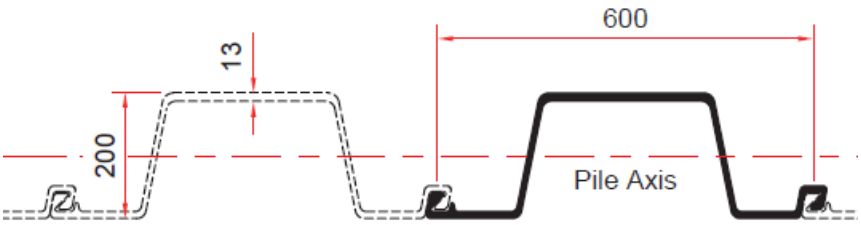
NS-SP-J (Zero-Pile)



Close-proximity (zero dead space) installation
Zero-Piles can be installed in close proximity to existing structures, permitting construction of retaining walls abutting site boundaries resulting in "**zero dead space**" and making the maximum use of the site area leading to significant value addition to any land development.

100% interlock integrity
As interlocks are located on the outermost side of the wall, there is no need to consider reduction of sectional properties due to the slip on interlocks, which permits economical design.

Cost-saving and Work-shortening of Temporary Work
Compared with the conventional steel sheet pile for temporary work with the effective width of 400mm, Zero-Piles have the effective width of 600mm. This makes it possible to reduce the water tightness.

Sectional Properties

Type	Dimension			Per pile				Per 1 m of pile wall width			
	Effective width W mm	Effective height h mm	Thickness t mm	Sectional area cm^2	Moment of inertia cm^4	Section modulus cm^3	Unit mass kg/m	Sectional area cm^2/m	Moment of inertia cm^4/m	Section modulus cm^3/m	Unit mass kg/m^2
Zero-Pile	600	200	13.0	111.2	7,250	705	87.3	185.3	12,090	1,175	145

Material Quality

Classification	Grade	Chemical composition (%)						Ceq. (%)
		C	Si	Mn	P	S	N	Ceq.
Weldable hot rolled steel sheet piles JIS A5523	SYW295	0.18max.	0.55max.	1.50max.	0.04max.	0.04max.	0.0060max.	0.44max..
	SYW390							0.45max.

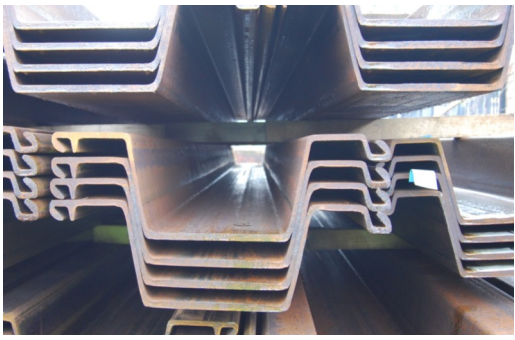
Note: Ceq. = C+Mn/6+Si/24+Ni/40+Cr/5+Mr/4+V/14

Classification	Grade	Yield point N/mm^2	Tensile Strength N/mm^2	Test Specimen	Elongation %	Charpy V-notch toughness J				Type and direction of test specimen
						Test temperature (°C)	Standard size test specimen	Sub-size test specimen		
							10 X 10mm	10 X 7.5mm	10 X 5mm	
Weldable hot rolled steel sheet piles JIS A 5523	SYW295	295min.	450min.	No.1A	18min.	0	43min.	32min.	22min.	V notch in rolling direction
				No.14B	24min.					
	SYW390	390min.	490min.	No.1A	16min.					
				No.14B	20min.					

Note: Chemical composition and mechanical properties conform to JIS A5523-2012. N is shown by total in accordance with section 5. Note 2 of JIS A5523-2012.
Grade of S355GP (EN 10248 Part 1) is also available upon request.

Tolerance of Shapes and Dimensions

Item		Tolerance
Full width		+ 10 mm - 5 mm
Height		± 4%
Thickness	Under 10 mm	± 1.0 mm
	10 mm and over to 16 mm excl.	± 1.2 mm
	16 mm and over	± 1.5 mm
Length		+ Not specified 0
Deflection	10 m and under in length	Full length (m) x 0.12% max.
	Over 10 m in length	(Full length - 10 m) x 0.10% + 12 mm max.
Camber	10 m and under in length	Full length (m) x 0.25% max.
	Over 10 m in length	(Full length - 10 m) x 0.20% + 25 mm max.
Difference in vertically cut section		Within 4% of width
Mating joint angle		≥ 4°



Note: 1. Tolerance of shapes and Dimensions conform to JIS A5523-2012
2. "Deflection" stands for the deviation from the plain parallel to the sheet pile wall and "Camber" stands for the deviation from the plain for vertical to the sheet pile wall

Deviation Angle

Zero-Piles can be interlocked with some of the U-type sheet piles. The compatible types for interlocking depend on the site conditions. Please consult Nippon Steel & Sumitomo Metal for details.

Sectional Properties after Corrosion

Type	Sectional Properties without corrosion loss		Sectional Properties with 1 mm corrosion loss per side		
	I_o (cm^4/m)	Z_o (cm^3/m)	η (%)	I (cm^4/m)	Z (cm^3/m)
Zero-Pile	12,090	1,175	85	10,300	999

I_o, Z_o : Moment of Inertia and Section Modulus without corrosion loss
η : Reduction ratio after corrosion
I, Z : Moment of Inertia and Section Modulus after corrosion

Steps to calculate sectional properties after corrosion;
① Assume corrosion rate and lifetime of facility, and calculate the corrosion loss of marine side t_1 (mm) and that of land side t_2 *(mm).*
② Calculate corrosion loss rate α (= t_2/t_1).
③ By using the corrosion loss of marine side, t_1 (mm) and the corrosion loss rate α, obtain the reduction ratio of sectional properties, η from the following graphs.
④ Calculate the sectional properties after corrosion loss, Z and I by multiplying the sectional properties before corrosion loss, Z_o and I_o by the reduction ratio η.

Section modulus $Z = Z_o \times \eta$ Moment of Inertia $I = I_o \times \eta$

Graphs for obtaining the reduction ratio of sectional properties, ŋ

η : reduction ratio of sectional properties after corrosion (%)
t_1, t_2 : corrosions loss of marine side and land side (mm)
α : corrosion loss rate, $\alpha = t_2/t_1$
Note : Only the illustrated ranges are effective in the following graphs.