Steel Sheet Piles

PU Steel Sheet Piles

Mechanical properties

PU steel sheet piles can be supplied in grades up to yield strength of 430 N/mm^2.

Dimensions and sectional properties

The PU steel sheet piles are available in the following sizes:

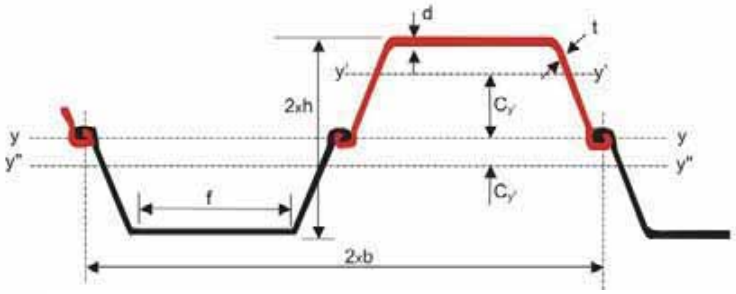

Figure 11 – PU Steel Sheet Piles: Dimensions

Section		h	b	Flat of pan f	Thickness of pan	Thickness of web	$C_{y'}$	$C_{y''}$	Mass per m	Section area A	Section Modulus Z_y	Moment Of Inertia I_y	Moment Of Inertia I_z	Radius of gyration r
		mm	mm	mm	mm	mm	mm	Mm	kg/m	cm^2	cm^3	cm^4	cm^4	cm
PU 6	per pile	113	600	330	7.5	6.4	68.9	23.0	45.3	57.7	146	1,290	23,900	4.73
	per m wall								75.0	96.0	600	6,720	-	8.36
PU 8	per pile	140	600	317	8.0	8.0	81.5	27.2	54.5	69.5	232	2,360	30,062	5.82
	per m wall								91.0	116.0	830	11,610	-	10.02
PU 12	per pile	180	600	257	9.8	9.0	100.4	33.5	65.9	84.0	366	4,450	34,937	7.28
	per m wall								110	140.0	1,200	21,550	-	12.41
PU 16	per pile	190	600	303	12.0	9.0	115.8	38.6	74.7	95.2	405	5,560	38,037	7.64
	per m wall								124	159.0	1600	30,520	-	13.87
PU 20	per pile	200	600	365	12.4	9.7	125.3	41.8	84.7	107.9	480	7,080	46,021	8.1
	per m wall								141	180.0	2000	39,970	-	14.92
PU 25	per pile	226	600	339	14.2	10.0	142.1	47.4	94.1	119.9	588	9,670	49,089	8.98
	per m wall								157	200.0	2,500	56,500	-	16.81
PU 32	per pile	226	600	341	19.5	11.0	148.6	49.5	114.6	146.0	645	11,100	55,134	8.72
	per m wall								191	243.0	3,200	72,260	-	17.23

Table 30 – PU Steel Sheet Piles: Section sizes

The PU sheet piles can be delivered in material according to British BS-standards, American ASTM-standards, Euronorms, and Japanese JIS-standards.

Interlocking options

Section	PU 6	PU 8	PU 12	PU 16	PU 20	PU 25	PU 32
PU 6							
PU 8	♣	♣	♣	♣			
PU 12	♣	♣	♣	♣	♣	♣	
PU 16	♣	♣	♣	♣	♣	♣	
PU 20			♣	♣	♣	♣	♣
PU 25			♣	♣	♣	♣	♣
PU 32					♣	♣	♣

♣ Interlocking possible

On request (require in advance indicating length of piles)

Table 31 – PU Steel Sheet Piles: Interlocking options

Dimensional tolerances

Width		Thickness of Pan				Weight [1]	Length	Squareness of ends [2]	Straightness [3]
single pile	interlocked piles	e≤8mm	8<e≤12	12<e≤18	e>18mm				
± 2%	± 3%	±0.5mm	±0.6mm	±0.8mm	±1.2mm	± 4%	± 200mm	≤10mm	0.2%

Notes: 1) Of total mass of the complete order.
2) Of the distance between 2 points of the cross-section.
3) Maximum deflection on the length of the pile.

Table 32 – PU Steel Sheet Piles: Dimensional tolerances

The maximum length for this U-type pile is usually between 25 to 31 metres, but longer lengths can be supplied.

Handling holes and double piles

The piles can on request be delivered with flame cut handling holes, 50mm diameter, located in the centre of the pan at 200-250 mm from the end.

Piles can also be fastened together to form double piles by pressing or welding the interlocks. Two to six pressing points per meter can be applied according to design requirements. A minimum shear force of 80 kN per one crimping point is admitted.

KSP Steel Sheet Piles

Mechanical properties

KSP steel sheet piles are manufactured according to JIS 5528 “Hot Rolled Steel Sheet Piles” (1988).

Designation JIS A 5528	Min. Yield Strength R_{eH}	Min. Tensile Strength R_m	Min. Elongation
Steel Name	N/mm^2	N/mm^2	%
SY295	295	490	17
SY390	390	540	15

Table 33 – KSP Steel Sheet Piles: Mechanical properties

Dimensions and sectional properties

The KSP steel sheet piles are available in the sizes shown in Table 35 under. Note the three new sizes KSP II$_W$, ons.

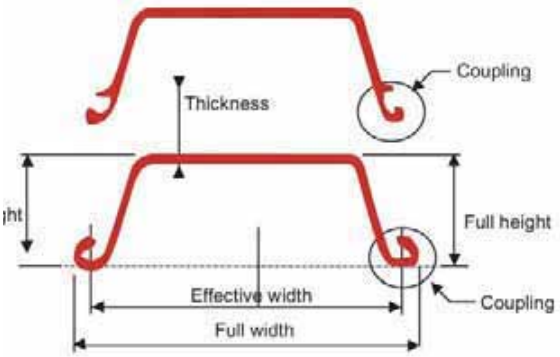

Figure 12 – KSP Steel Sheet Piles: Dimensions

Section	Dimensions			Section Area		Unit weight		Moment of Inertia		Modulus of section	
	width	height	thickness								
	w	h	t	A	A/m	M	M/m	I	I/m	Z_y	Z_y/m
	mm	mm	mm	cm^2	cm^2/m	kg/m	kg/m^2	cm^4	cm^4/m	cm^3	cm^3/m
KSP I_A	400	85	8.0	45.21	113.0	35.5	88.8	598	4,500	88	529
KSP II	400	100	10.5	61.18	153.0	48.0	120	1,240	8,740	152	874
KSP II_A	400	120	9.2	55.01	137.5	43.2	108	1,450	10,600	162	880
KSP III	400	130	13.0	76.42	191.0	60.0	150	2,320	17,400	232	1,340
KSP III_A	400	150	13.1	74.40	186.0	58.4	146	2,840	22,800	253	1,520
KSP IV	400	170	15.5	96.99	242.5	76.1	190	4,670	38,600	362	2,270
KSP IV_A	400	185	16.1	94.21	235.5	74.0	185	5,300	41,600	400	2,250
KSP V_L	500	200	24.3	133.8	267.6	105	210	7,960	63,000	520	3,150
KSP VI_L	500	225	27.6	153.0	306.0	120	240	11,400	86,000	680	3,820
KSP II_W	600	130	10.3	78.70	131.2	61.8	103	2,110	13,000	203	1,000
KSP III_W	600	180	13.4	103.9	173.2	81.6	136	5,220	32,400	376	1,800
KSP IV_W	600	210	18.0	135.3	225.5	106	177	8,630	56,700	539	2,700

Note: The sizes are also available in FSP sheet piles.
Sectional properties given per single pile, and per linear metre wall.

Table 34 – KSP Steel Sheet Piles: Section sizes and properties

Interlocking options

The sections can be interlocked with each other as shown in Table 36.

Section	KSP I_A	KSP II	KSP II_A	KSP III	KSP III_A	KSP IV	KSP IV_A	KSP V_L	KSP VI_L	KSP II_W	KSP III_W	KSP IV_W
KSP I_A	♣	♣	♣							♣		
KSP II	♣	♣	♣	♣						♣		
KSP II_A	♣	♣	♣		♣					♣		
KSP III		♣		♣	♣	♣				♣	♣	
KSP III_A			♣	♣	♣		♣			♣	♣	
KSP IV				♣		♣	♣	♣			♣	♣
KSP IV_A					♣	♣	♣	♣			♣	♣
KSP V_L						♣	♣	♣	♣			♣
KSP VI_L								♣	♣			
KSP II_W	♣	♣	♣	♣	♣					♣	♣	
KSP III_W				♣	♣	♣	♣			♣	♣	♣
KSP IV_W						♣	♣	♣			♣	♣

Table 35 – KSP Steel Sheet Piles: Interlocking options

The sheet piles can also be welded together to form box piles, as shown in section "Other section types" under the chapter "Steel sheet piles according to EN 10248:1996".

Dimensional tolerances

Full width		Effective width		Thickness of Section		
Traditional Single pile	Wider width Single pile	Traditional Single pile	Wider width Single pile	<10mm	≥10mm <16mm	≥16mm
W x ± 1%	+ 6mm - 5mm	Per meter wall width: Max 4mm deviation.		+ 1.0mm - 0.3mm	+ 1.2mm - 0.3mm	+ 1.5mm - 0.3mm

Full height	Length	Deflection of full length		Camber of full length		Difference in vertically cut sections
		L≤10m	L>10m	L≤10m	L>10m	
± 4%	- 0mm	L x 0.12%	L x 0.10%	L x 0.25% max.	L x 0.20% + 25mm max.	Within 4% of width

Notes: The deflection shall be in the direction parallel to the sheet pile wall and the camber shall be in the direction vertical to the sheet pile wall.

Table 36 – KSP Steel Sheet Piles: Dimensional tolerances

Recommended maximum lengths for driving

The recommended driving length for KSP steel sheet piles is maximum 30metres.

KSP Straight Web Sections

Mechanical properties

KSP straight web sections are manufactured according to JIS 5528 “Hot Rolled Steel Sheet Piles” (1988).

Designation JIS A 5528	Min. Yield Strength R_{eH}	Min. Tensile Strength R_m	Min. Elongation
Steel Name	N/mm^2	N/mm^2	%
SY295	295	490	17
SY390	390	540	15

Table 37 – KSP Straight Web Sections: Mechanical properties

Dimensions and sectional properties

The KSP straight web sections are available in the following sizes:

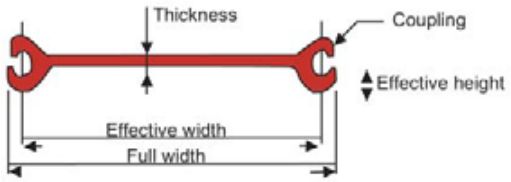

Figure 13 – KSP Straight Web Sections: Dimensions

Section	Dimensions			Section area	Unit weight		Moment of Inertia		Modulus of section	
	width	height	thickness	Per pile	Per pile	Per wall width	Per pile	Per wall width	Per pile	Per wall width
	mm	mm	mm	cm^2	kg/m	kg/m^2	cm^4	cm^4/m	cm^3	cm^3/m
KSP FL	500	44.5	9.5	78.57	61.7	123	184	396	45.7	89
KSP FXL	500	47.0	12.7	98.36	77.2	154	245	570	60.3	121

Table 38 – KSP Straight Web Sections: Section sizes and properties

Standard specification	Section size	Interlocking strength MN/m
JIS A 5528 SY295	KSP FL	4
	KSP FXL	6

Table 39 – KSP Straight Web Sections: Interlocking strength

The two sections can be interlocked with each other.

Dimensional tolerances

Full width Single pile	Full height	Thickness of Section			Length
		<10mm	≥10mm <16mm	≥16mm	
± 4mm	-	+ 1.5mm - 0.7mm	+ 1.5mm - 0.7mm	-	+ not specified - 0 mm

Deflection of full length		Camber of full length		Difference in vertically cut sections
L≤10m	L>10m	L≤10m	L>10m	
L x 0.15% max.	(L-10m) x 0.10% + 15mm max.	L x 0.20% max.	(L-10m) x 0.10% + 20mm max.	Within 4% of width

Notes: The deflection shall be in the direction parallel to the sheet pile wall and the camber shall be in the direction vertical to the sheet pile wall.

Table 40 – KSP Straight Web Sections: Dimensional tolerances