



Shapes, Flat bars & Round bars by JFE Bars & Shapes Corporation

JFE Bars & Shapes Corporation

A vertical photograph on the left side of the page shows the Tokyo Skytree tower in the background, a bridge in the middle ground, and water in the foreground. The image is partially obscured by a blue gradient overlay.

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I Corporate Profile

1) Lines of Business

Company Name	JFE Bars & Shapes Corporation
Date of Established	April 1, 1999
Capital	JPY 30 billion
Head Office	5-11-3, Shinbashi, Minato-ku, Tokyo 105-0004, Japan
Business	1) Manufacture and sales of ordinary steel blooms and billets 2) Manufacture and sales of ordinary steel products 3) Manufacture of various processed products, and processing and sales of by-products, relating to the preceding items 4) Industrial waste disposal services 5) All other businesses associated with or relating to the preceding items

2) Products

- Shapes Equal Leg Angles, Unequal Leg Angles, Channel Beams, H Beams, I beams, T beams, V shapes
- Flat Bars Flat bars
- Steel Bars Deformed Bars, Round Bars
- Blooms
- Billets

3) Main Manufacturing Facilities

Plant		Production capacity(T/M)	Specifications	ISO9001		ISO14001	
				Register No.	Date of register	Register No.	Date of register
Kashima Works	Steelmaking shop	35,000	150T electric arc furnace Ladle refining Continuous casting machine	0594	March, 2000	E1260	March, 2006
	Medium and small shape mill	30,000	140T reheating furnace Two high reversing mill				
Himeji Works	Steelmaking shop	75,000	150T electric arc furnace Ladle refining Continuous casting machine	0111	December, 1995	E1265	April, 2006
	Large shape mill	50,000	140T reheating furnace Two high reversing mill				
	Medium and small shape mill	25,000	120T reheating furnace Two high reversing mill				



Kashima Works



Himeji Works

4) Manufacturing Standards

Our Company manufactures products based on the JIS, but consult us regarding foreign standards and other requests.

① Certified JIS Standards

JIS No.	Name of standard		Works		Type
			KASHIMA	HIMEJI	
JIS G3101	Rolled steels for general structure	SS400 SS490 SS540	○ ○ ○	○ ○ ○	Shapes, Flat bars
JIS G3106	Rolled steels for welded structure	SS400A SS400B SS400C	○ ○ ○	○ ○ ○	
		SS490A SS490B SS490C	○ ○ ○	○ ○ ○	
		SS490YA SS490YB	○ ○	○ ○	
JIS G3114	Hot-rolled atmospheric corrosion resisting steels for welded structure	SMA400AW SMA490AW		○ ○	
JIS G3136	Rolled steels for building structure	SN400A SN400B SN490B	○ ○ ○	○ ○ ○	
JIS G3129	High tensile strength steel for tower structural purposes	SH590S	○	○	Equal leg angles

② Standards of JFE Bars & Shapes Corp.

Name	Name of standard		Works		Product
			KASHIMA	HIMEJI	
HI-TOWER	High yield point steel for tower structural purposes	HI-TOWER 390W HI-TOWER 590K		○ ○	Shapes

③ Foreign standards

Name	Name of standard		Works		Product
			KASHIMA	HIMEJI	
BS EN 10025-2	Hot rolled products of structural steels	S275JR S275J0	○	○ ○	Shapes, Flat bars
		S355JR S355J0	○	○ ○	
ASTM A36/A36M	Standard specification for carbon structural steel	A36 A572 Gr.42 A572 Gr.50	○	○ ○ ○	Shapes, Flat bars
AS/NZS 3679.1	Structural steel Hot-rolled bars and sections	300		○	Shapes

④ Certificates from Various Countries

Country	Name of certificate	Certified by	Works		Product
			KASHIMA	HIMEJI	
Malaysia	Product Certification Licence 【PCL】	SIRIM QAS	○	○	Shapes
Singapore	Factory Production Control Certificate 【FPC】	ABSG Consulting		○	Shapes

⑤ Ship Classification Society Standards

type	grade	NK Nippon Kaiji Kyokai		AB American Bureau of Shipping		LR Lloyd's Register of Shipping		NV Det Norske Veritas		BV Bureau Veritas		GL Germanischer Lloyd		KR Korean Register Association		CCS China Classification Society		VL DNV GL	
		Kashima	Himeji	Kashima	Himeji	Kashima	Himeji	Kashima	Himeji	Kashima	Himeji	Kashima	Himeji	Kashima	Himeji	Kashima	Himeji	Kashima	Himeji
Mild steels	A	○	○	○	○	○	○	○	○		○	○	○	○	○	○	○	○	○
	B		○		○		○		○		○		○		○		○		○
	D		○		○		○		○		○		○		○		○		○
High tention steels	32A		○		○		○		○		○		○		○		○		○
	32D		○		○		○		○		○		○		○		○		○
	36A		○		○		○		○		○		○		○		○		○
	36D		○		○		○		○		○		○		○		○		○

*Remark Please contact us in advance when ordering B grade, D grade, and the grades marked with *.

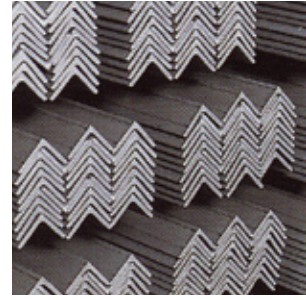
II Outline of Bar & Shape Products

1) Products



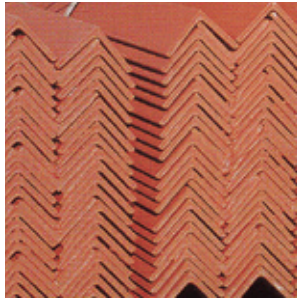
● H Beams (HB)

Used as structural materials for buildings, bridges, tunnel supports, etc. and as temporary scaffolding for construction work. Also used as foundation piles for various types of structures including quay walls, bridges, buildings, highways, etc.



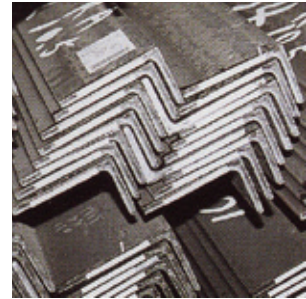
● Equal Leg Angles (AB)

Used in large quantities in construction applications. Also widely used in steel towers, ships, industrial machinery, automobiles, railway rolling stock, etc.



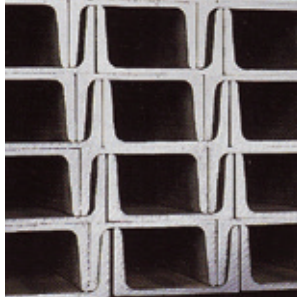
● Color Shapes (AB/CB)

Used mainly as mounting members for ALC (Autoclaved Lightweight Concrete) panels.



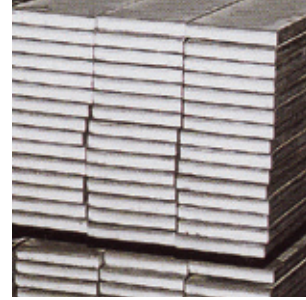
● Unequal Leg Angles (ABS)

Used in applications centering on construction and machine structural use, and particularly in ship structural members, underframes of railway rolling stock and other applications in which force acts in a fixed direction.



● Channel Beams (CB)

Used as structural materials for buildings, ships, machinery, railway rolling stock, etc.



● Flat Bars (FB)

Used in steel frame structures and as structural materials for machinery and ships. Also used as materials for secondary products such as nuts, washers, cutting tools, etc. The range of applications is extremely large.



● Round Bars

Used widely in tools and as foundation materials for buildings, etc.

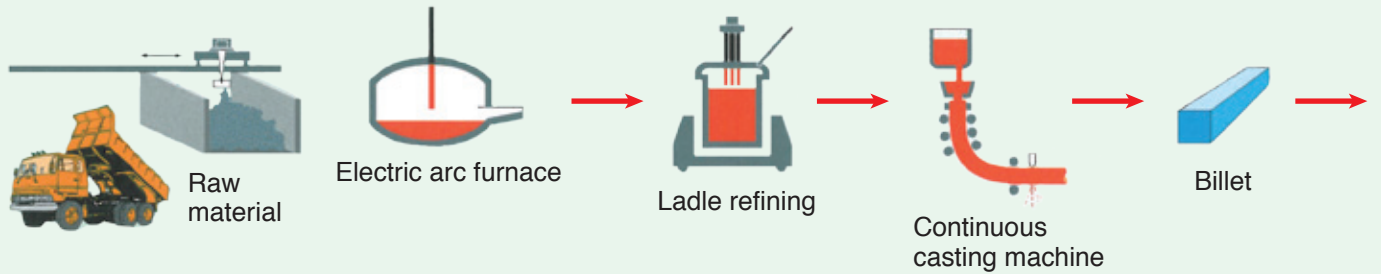


● Deformed Flat Bars

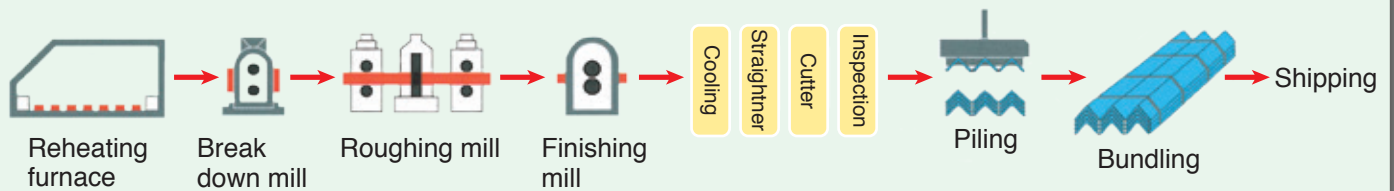
Types include tapered flat bars (TFB) for end plates of concrete piles and grooved flat bars (GFB) for use as non-welded joints in concrete piles.

2) Manufacturing Process

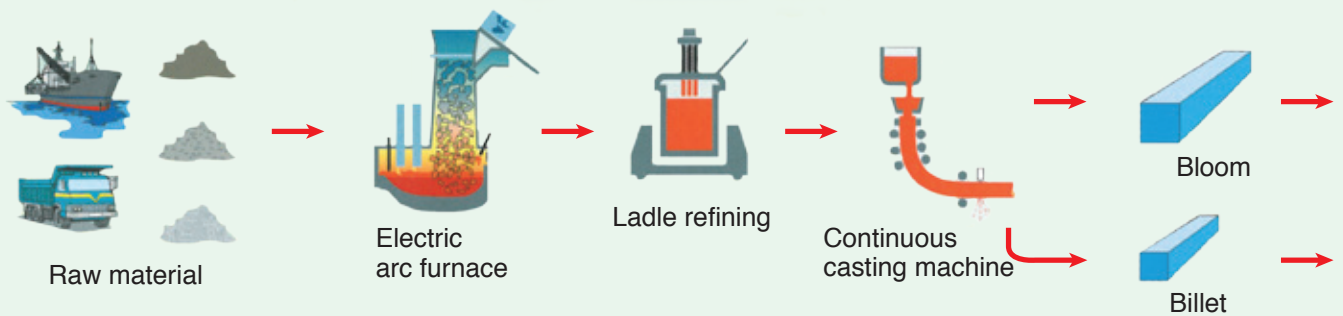
Kashima Works



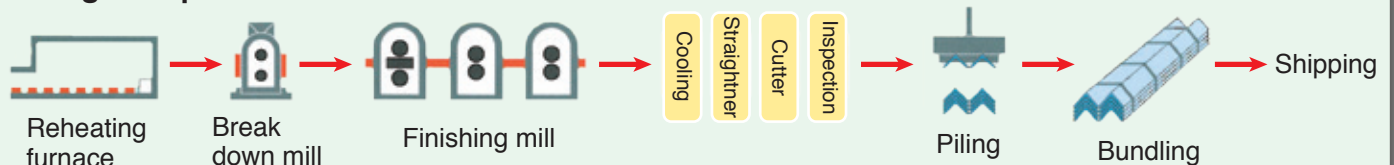
● Medium and Small Shape Mill



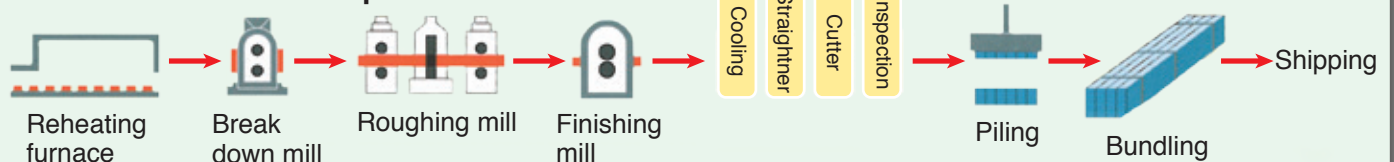
Himeji Works



● Large Shape Mill



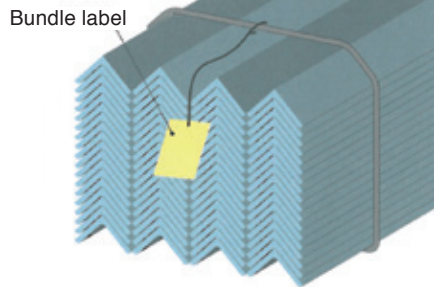
● Medium and Small Shape Mill



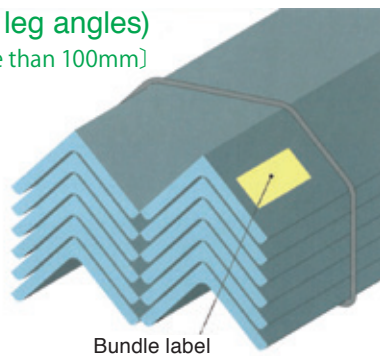
3) Product Packing Styles

Standard of package and marking

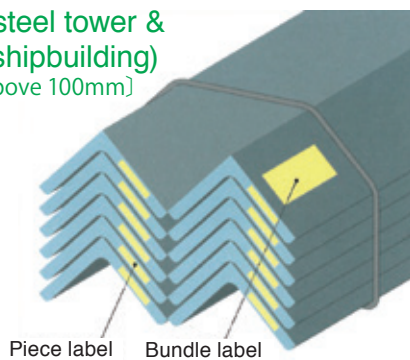
- AB(Equal leg angles)
[Width less than 100mm]



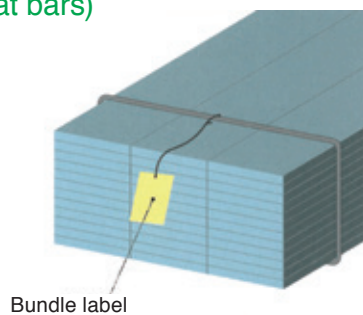
- AB(Equal leg angles)
[Width more than 100mm]



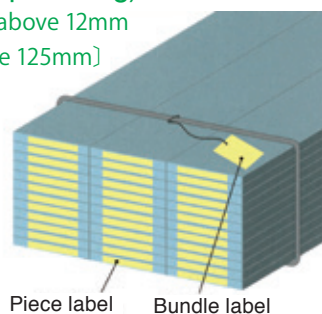
- AB(for steel tower & shipbuilding)
[Width above 100mm]



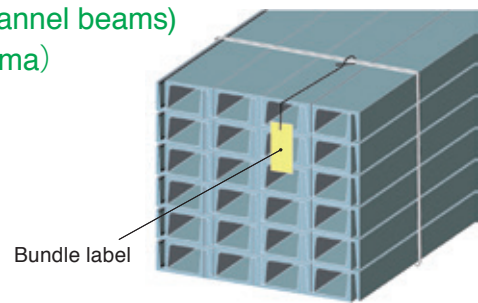
- FB(Flat bars)



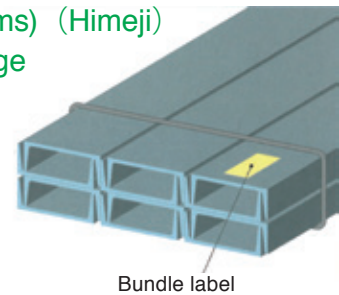
- FB(for shipbuilding)
[Thickness above 12mm
Width above 125mm]



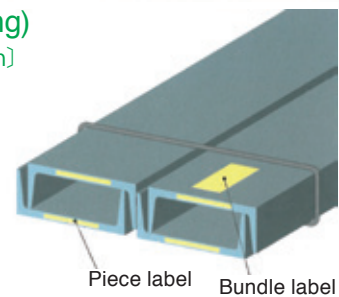
- CB(Channel beams)
(Kashima)



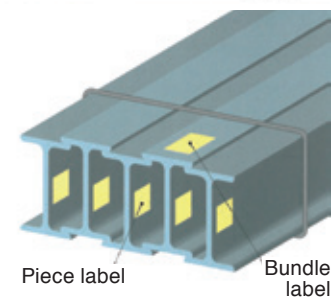
- CB(Channel beams) (Himeji)
PFC(Parallel flange channels)



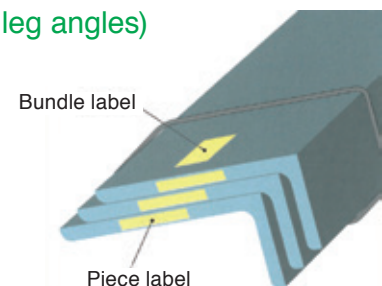
- CB(for shipbuilding)
[Thickness above 6mm]



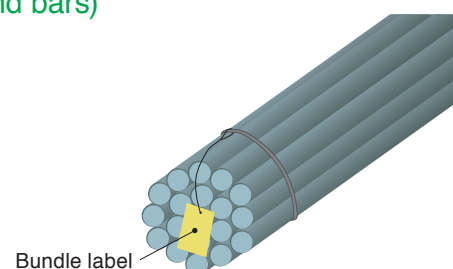
- HB(H beams)
IB(I beams)



- ABS(Unequal leg angles)



- RB(Round bars)



4) Marking

An example of labels

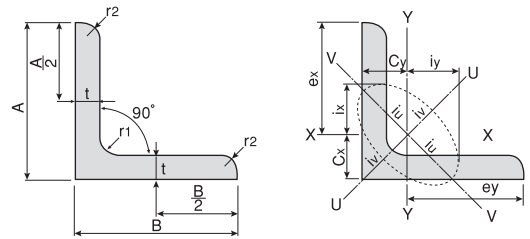
Type of products	
Bundle label	Himeji Works Large shape mill ● HB ● IB ● AB ● ABS ● CB Kashima Works ● AB Himeji Works Medium and small shape mill ● AB ● FB
	Himeji Works Large shape mill Customer Number & contract SS400 120X120X8 6.000 M 24 本/2117KG 4-1517-1 JFE 条鋼 株式会社 姫路製造所 JFE Bars & Shapes Corporation, Himeji, Japan 0 125402 02 0002 Logo mark
	Kashima Works & Himeji Works Medium and small shape mill AB SS400 50X50X6 5.500 M 80 本 / 1,952 KG N9940 861390701E010 JFE 条鋼 株式会社 鹿島製造所 JFE Bars & Shapes Corporation, Kashima, Japan
Piece label	● HB ● IB Specification: SS400 Products size: HB 200X100X5.5X8 Length: 12.000M 1-2345-6 JFE 条鋼 株式会社 姫路製造所 JFE Bars & Shapes Corporation, Himeji, Japan Logo mark
	● FB ● AB ● ABS ● CB KA 12341 12×150 6.0 Specification Heat no. Size Length

III Bar & Shape Product Dimension Tables

JFE-BS

1 AB (Equal Leg Angles) (Kashima) (Himeji)

Geometrical of inertia $I=ai^2$
 Radius of gyration of area $i=\sqrt{I/a}$
 Modulus of section $Z=I/e$
 (a : sectional area)



〈Product shapes, dimensions and sectional properties〉

Dimension (mm)				Sectional area (cm ²)	Unit mass (kg/m)	Position of center of gravity (cm) (Cx=Cy)	Geometrical moment of inertia (cm ⁴)			Radius of gyration of area (cm)			Modulus of section (cm ³) (Zx=Zy)	Works	
A×B	t	r ₁	r ₂				Ix=Iy	max Iu	min Iv	ix=iy	max Iu	min Iv		Kashima	Himeji
20×20	3	4	2	1.127	0.885	0.595	0.388	0.613	0.163	0.587	0.737	0.380	0.276	○	○
25×25	3	4	2	1.427	1.12	0.719	0.797	1.26	0.332	0.747	0.940	0.483	0.448	○	○
30×30	3	4	2	1.727	1.36	0.844	1.42	2.26	0.590	0.908	1.14	0.585	0.661	○	○
	5	4	3	2.746	2.16	0.917	2.14	3.37	0.902	0.882	1.11	0.573	1.03	○	○
40×40	3	4.5	2	2.336	1.83	1.09	3.53	5.60	1.46	1.23	1.55	0.790	1.21	○	○
	*4	4.5	2	3.066	2.41	1.13	4.55	7.23	1.88	1.22	1.54	0.783	1.59	○	○
	5	4.5	3	3.755	2.95	1.17	5.42	8.59	2.25	1.20	1.51	0.774	1.91	○	○
	*6	4.5	3	4.445	3.49	1.20	6.31	9.97	2.64	1.19	1.50	0.771	2.26	○	○
45×45	3	6.5	2	2.684	2.11	1.20	5.12	8.09	2.15	1.38	1.74	0.895	1.55	○	○
	4	6.5	3	3.492	2.74	1.24	6.50	10.3	2.70	1.36	1.72	0.880	2.00	○	○
	5	6.5	3	4.302	3.38	1.28	7.91	12.5	3.29	1.36	1.71	0.874	2.46	○	○
50×50	3	6.5	3	2.962	2.33	1.32	6.95	11.0	2.91	1.53	1.93	0.990	1.89	○	○
	4	6.5	3	3.892	3.06	1.37	9.06	14.4	3.76	1.53	1.92	0.983	2.49	○	○
	5	6.5	3	4.802	3.77	1.41	11.1	17.5	4.58	1.52	1.91	0.976	3.08	○	○
	6	6.5	4.5	5.644	4.43	1.44	12.6	20.0	5.23	1.50	1.88	0.963	3.55	○	○
	8	6.5	4.5	7.364	5.78	1.52	16.1	25.4	6.76	1.48	1.86	0.958	4.62	○	○
60×60	4	6.5	3	4.692	3.68	1.61	16.0	25.4	6.62	1.85	2.33	1.19	3.66	○	○
	5	6.5	3	5.802	4.55	1.66	19.6	31.2	8.09	1.84	2.32	1.18	4.52	○	○
	6	6.5	3	6.892	5.41	1.70	23.0	36.6	9.51	1.83	2.30	1.17	5.36	○	○
65×65	5	8.5	3	6.367	5.00	1.77	25.3	40.1	10.5	1.99	2.51	1.28	5.35	○	○
	6	8.5	4	7.527	5.91	1.81	29.4	46.6	12.2	1.98	2.49	1.27	6.26	○	○
	8	8.5	6	9.761	7.66	1.88	36.8	58.3	15.3	1.94	2.44	1.25	7.96	○	○
70×70	5	8.5	4	6.837	5.37	1.89	31.5	49.9	13.0	2.15	2.70	1.38	6.16	○	○
	6	8.5	4	8.127	6.38	1.93	37.1	58.9	15.3	2.14	2.69	1.37	7.33	○	○
	7	8.5	5	9.358	7.35	1.97	42.0	66.7	17.4	2.12	2.67	1.36	8.35	○	○
75×75	5	8.5	4	7.337	5.76	2.01	39.0	61.9	16.2	2.31	2.90	1.48	7.11	○	○
	6	8.5	4	8.727	6.85	2.06	46.1	73.2	19.0	2.30	2.90	1.48	8.47	○	○
	*8	8.5	6	11.36	8.92	2.12	58.1	92.3	24.0	2.26	2.85	1.45	10.8	○	○
	9	8.5	6	12.69	9.96	2.17	64.4	102	26.7	2.25	2.84	1.45	12.1	○	○
	12	8.5	6	16.56	13.0	2.29	81.9	129	34.5	2.22	2.79	1.44	15.7	○	○
80×80	6	8.5	4	9.327	7.32	2.18	56.4	89.6	23.2	2.46	3.10	1.58	9.70	○	○
	*8	8.5	6	12.16	9.55	2.25	71.4	113	29.4	2.42	3.05	1.55	12.4	○	○

- *Remark (1) Available lengths are as follows.
 In case that A and B are under 90mm, 5.5m to 12.5m(0.5m pitch).
 In case that A and B are 100 to 150mm, 5.5m to 18.5m(0.5m pitch).
 Please inquire regarding other lengths.
 (2) Please contact us in advance when ordering the sizes marked with *.

Dimension (mm)				Sectional area (cm ²)	Unit mass (kg/m)	Position of center of gravity (cm) (Cx=Cy)	Geometrical moment of inertia(cm ⁴)			Radius of gyration of area (cm)			Modulus of section (cm ³) (Zx=Zy)	Works	
A×B	t	r ₁	r ₂				Ix=Iy	max Iu	min Iv	ix=iy	max Iu	min Iv		Kashima	Himeji
90×90	6	10	5	10.55	8.28	2.42	80.7	128	33.4	2.77	3.48	1.78	12.3	○	○
	7	10	5	12.22	9.59	2.46	93.0	148	38.3	2.76	3.48	1.77	14.2	○	○
	*8	10	5	13.87	10.9	2.50	105	166	43.2	2.75	3.46	1.77	16.1		○
	*9	10	5	15.50	12.2	2.53	114	181	46.9	2.72	3.43	1.75	17.6		○
	10	10	7	17.00	13.3	2.57	125	199	51.7	2.71	3.42	1.74	19.5	○	○
	13	10	7	21.71	17.0	2.69	156	248	65.3	2.68	3.38	1.73	24.8	○	○
100×100	*6	10	5	11.75	9.22	2.66	112	178	46.3	3.09	3.89	1.98	15.3		○
	7	10	5	13.62	10.7	2.71	129	205	53.2	3.08	3.88	1.98	17.7	○	○
	*8	10	6	15.42	12.1	2.75	145	230	59.4	3.06	3.86	1.96	19.9		○
	*9	10	7	17.19	13.5	2.78	159	253	65.3	3.04	3.84	1.95	22.1		○
	10	10	7	19.00	14.9	2.82	175	278	72.0	3.04	3.83	1.95	24.4	○	○
	13	10	7	24.31	19.1	2.94	220	348	91.1	3.00	3.78	1.94	31.1	○	○
120×120	8	12	5	18.76	14.7	3.24	258	410	106	3.71	4.67	2.38	29.5		○
	*10	12	6	23.15	18.2	3.32	314	499	129	3.68	4.64	2.36	36.2		○
	*12	12	8.5	27.36	21.5	3.39	363	576	149	3.64	4.59	2.33	42.1		○
130×130	9	12	6	22.74	17.9	3.53	366	583	150	4.01	5.06	2.57	38.7		○
	*10	12	6	25.15	19.7	3.57	403	641	165	4.00	5.05	2.56	42.8		○
	*11	12	8.5	27.39	21.5	3.59	432	687	177	3.97	5.01	2.54	45.9		○
	12	12	8.5	29.76	23.4	3.64	467	743	192	3.96	5.00	2.54	49.9		○
	15	12	8.5	36.75	28.8	3.76	568	902	234	3.93	4.95	2.53	61.5		○
150×150	10	14	7	29.21	22.9	4.05	627	997	258	4.63	5.84	2.97	57.3		○
	*11	14	7	32.00	25.1	4.10	684	1,090	281	4.62	5.83	2.96	62.8		○
	12	14	7	34.77	27.3	4.14	740	1,180	304	4.61	5.82	2.96	68.1		○
	15	14	10	42.74	33.6	4.24	888	1,410	365	4.56	5.75	2.92	82.6		○
	*16	14	10	45.43	35.7	4.28	940	1,490	386	4.55	5.73	2.92	87.7		○
	19	14	10	53.38	41.9	4.40	1,090	1,730	451	4.52	5.69	2.91	103		○

*Remark (1) Available lengths are as follows.
 In case that A and B are under 90mm, 5.5m to 12.5m(0.5m pitch).
 In case that A and B are 100 to 150mm, 5.5m to 18.5m(0.5m pitch).
 Please inquire regarding other lengths.
 (2) Please contact us in advance when ordering the sizes marked with *.

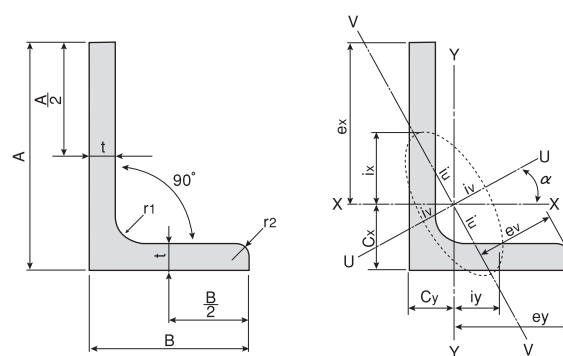
2 Color Shapes (AB/CB) Kashima Himeji

〈Specification of Paint〉

	JIS K5621	JIS K5674
Paint name	ESBA #650 red rust color	ASCA NA PRIMER
Paint manufacturer	Shinto Paint Co., Ltd.	KANSAI Paint Co., Ltd.
Type of paint	Water soluble paint	Water soluble paint
Rustproofing performance	Equivalent to JIS K5621-3 class	Equivalent to JIS K5674-2 class

*Remark (1) Standard lengths are 5.5 m and 6.0 m. Please inquire regarding other lengths.
 (2) For products types other than AB and CB, please inquire in advance when placing an order.

3 ABS (Unequal Leg Angles) (Himeji)



Geometrical of inertia $I = ai^2$
 Radius of gyration of area $i = \sqrt{I/a}$
 Modulus of section $Z = I/e$
 (a : sectional area)

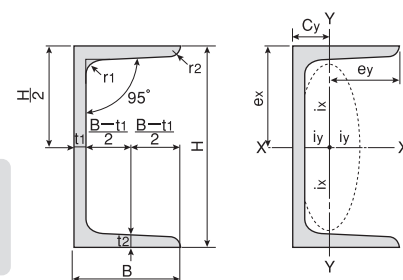
〈Product shapes, dimensions and sectional properties〉

Dimension (mm)				Sectional area (cm ²)	Unit mass (kg/m)	Position of center of gravity (cm)		Geometrical moment of inertia (cm ⁴)				Radius of gyration of area (cm)				tan α	Modulus of section (cm ³)	
A×B	t	r ₁	r ₂			Cx	Cy	I _x	I _y	max I _u	min I _v	ix	iy	max i _u	min i _v		Z _x	Z _y
100×75	7	10	5	11.87	9.32	3.06	1.83	118	56.9	144	30.8	3.15	2.19	3.49	1.61	0.548	17.0	10.0
	10	10	7	16.50	13.0	3.17	1.94	159	76.1	194	41.3	3.11	2.15	3.43	1.58	0.543	23.3	13.7
125×75	7	10	5	13.62	10.7	4.10	1.64	219	60.4	243	36.4	4.01	2.11	4.23	1.64	0.362	26.1	10.3
	10	10	7	19.00	14.9	4.22	1.75	299	80.8	330	49.0	3.96	2.06	4.17	1.61	0.357	36.1	14.1
150×90	9	12	6	20.94	16.4	4.95	1.99	485	133	537	80.4	4.81	2.52	5.06	1.96	0.361	48.2	19.0
	12	12	8.5	27.36	21.5	5.07	2.10	619	167	685	102	4.76	2.47	5.00	1.93	0.357	62.3	24.3

*Remark Length ranges from 5.5m to 18.5m at intervals of 0.5m.
 Please inquire regarding other lengths.

4

CB (Channel Beams) (Kashima) (Himeji)



Geometrical of inertia $I = ai^2$
 Radius of gyration of area $i = \sqrt{I/a}$
 Modulus of section $Z = I/e$
 (a : sectional area)

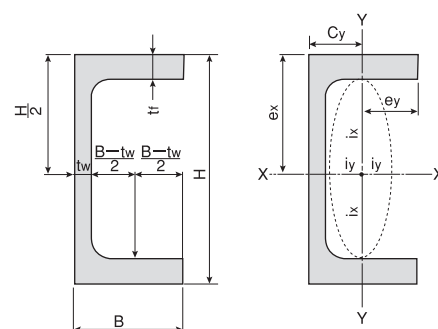
〈Product shapes, dimensions and sectional properties〉

Dimension (mm)					Sectional area (cm ²)	Unit mass (kg/m)	Position of center of gravity (cm)		Geometrical moment of inertia (cm ⁴)		Radius of gyration of area (cm)		Modulus of section (cm ³)		Works	
H×B	t ₁	t ₂	r ₁	r ₂			C _x	C _y	I _x	I _y	i _x	i _y	Z _x	Z _y	Kashima	Himeji
75×40	5	7	8	4	8.818	6.92	0	1.28	75.3	12.2	2.92	1.17	20.1	4.47	○	○
100×50	5	7.5	8	4	11.92	9.36	0	1.54	188	26.0	3.97	1.48	37.6	7.52	○	○
125×65	6	8	8	4	17.11	13.4	0	1.90	424	61.8	4.98	1.90	67.8	13.4		○
150×75	6.5	10	10	5	23.71	18.6	0	2.28	861	117	6.03	2.22	115	22.4		○
	9	12.5	15	7.5	30.59	24.0	0	2.31	1,050	147	5.86	2.19	140	28.3		○
180×75	7	10.5	11	5.5	27.20	21.4	0	2.13	1,380	131	7.12	2.19	153	24.3		○
200×80	7.5	11	12	6	31.33	24.6	0	2.21	1,950	168	7.88	2.32	195	29.1		○
200×90	8	13.5	14	7	38.65	30.3	0	2.74	2,490	277	8.02	2.68	249	44.1		○
250×90	9	13	14	7	44.07	34.6	0	2.40	4,180	294	9.74	2.58	334	44.5		○
300×90	9	13	14	7	48.57	38.1	0	2.22	6,440	309	11.5	2.52	429	45.7		○

*Remark Length ranges from 5.5m to 18.5m at intervals of 0.5m.
 Please inquire regarding other lengths.

5

PFC (Parallel Flange Channels) (Himeji)



Geometrical of inertia $I = ai^2$
 Radius of gyration of area $i = \sqrt{I/a}$
 Modulus of section $Z = I/e$
 (a : sectional area)

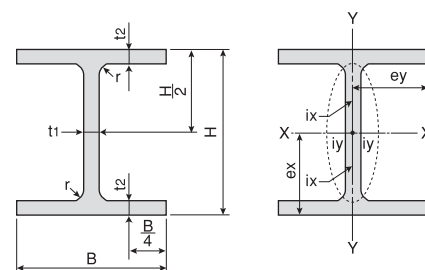
〈Product shapes, dimensions and sectional properties〉

	Dimension (mm)		Sectional area (cm ²)	Unit mass (kg/m)	Position of center of gravity (cm)		Geometrical moment of inertia (cm ⁴)		Radius of gyration of area (cm)		Modulus of section (cm ³)	
	H×B×t _r ×t _w	r			C _x	C _y	I _x	I _y	i _x	i _y	Z _x	Z _y
75PFC	75×40×6.1×3.8	8	7.5	5.90	0	1.37	68.3	12.0	3.01	1.26	18.2	4.6
100PFC	100×50×6.7×4.2	8	10.6	8.31	0	1.67	173.5	26.7	4.04	1.59	34.7	8.0
125PFC	125×65×7.5×4.7	8	15.2	11.9	0	2.18	396.9	65.8	5.11	2.08	63.5	15.2
*150PFC	150×75×9.5×6	10	22.5	17.7	0	2.49	833.9	128.6	6.08	2.39	111.2	25.7
*180PFC	180×75×11×6	12	26.6	20.9	0	2.45	1413.1	150.9	7.29	2.38	157.0	29.9
*200PFC	200×75×12×6	12	29.2	22.9	0	2.44	1910.3	165.5	8.09	2.38	191.0	32.7

*Remark Please contact us in advance when ordering the sizes marked with *.

6 HB (H Beams) Himeji

Geometrical of inertia $I=ai^2$
 Radius of gyration of area $i=\sqrt{I/a}$
 Modulus of section $Z=I/e$
 (a : sectional area)



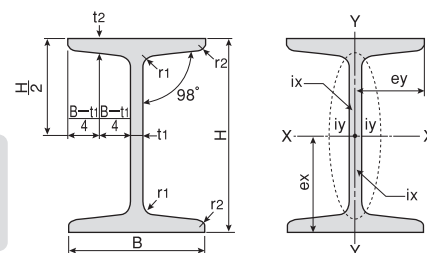
〈Product shapes, dimensions and sectional properties〉

	Dimension (mm)		Sectional area (cm ²)	Unit mass (kg/m)	Geometrical moment of inertia (cm ⁴)		Radius of gyration of area (cm)		Modulus of section (cm ³)	
	H×B×t ₁ ×t ₂	r			I _x	I _y	i _x	i _y	Z _x	Z _y
100×100	100×100×6×8	8	21.59	16.9	378	134	4.18	2.49	75.6	26.7
108×104	108×104×10×12	8	33.91	26.6	636	226	4.33	2.58	118	44
125×125	125×125×6.5×9	8	30.00	23.6	839	293	5.29	3.13	134	46.9
150×150	150×150×7×10	8	39.65	31.1	1,620	563	6.40	3.77	216	75.1
154×151	154×151×8×12	8	47.19	37.0	2,000	689	6.51	3.82	260	91
148×100	148×100×6×9	8	26.35	20.7	1,000	150	6.17	2.39	135	30.1
150×75	150×75×5×7	8	17.85	14.0	666	49.5	6.11	1.66	88.8	13.2
175×90	175×90×5×8	8	22.90	18.0	1,210	97.5	7.26	2.06	138	21.7
200×100	200×100×5.5×8	8	26.67	20.9	1,810	134	8.23	2.24	181	26.7
198×99	198×99×4.5×7	8	22.69	17.8	1,540	113	8.25	2.24	156	22.9
250×125	250×125×6×9	8	36.97	29.0	3,960	294	10.4	2.82	317	47.0
248×124	248×124×5×8	8	31.99	25.1	3,450	255	10.4	2.82	278	41.1
200×150	194×150×6×9	8	38.11	29.9	2,630	507	8.3	3.65	271	67.6
300×150	300×150×6.5×9	13	46.78	36.7	7,210	508	12.4	3.29	481	67.7
298×149	298×149×5.5×8	13	40.80	32.0	6,320	442	12.4	3.29	424	59

*Remark Length ranges from 6.0m to 12.0m at intervals of 1.0m.

7 IB (I Beams) Himeji

Geometrical of inertia $I = a i^2$
 Radius of gyration of area $i = \sqrt{I/a}$
 Modulus of section $Z = I/e$
 (a : sectional area)



〈Product shapes, dimensions and sectional properties〉

Dimension (mm)					Sectional area (cm ²)	Unit mass (kg/m)	Position of center of gravity (cm)		Geometrical moment of inertia (cm ⁴)		Radius of gyration of area (cm)		Modulus of section (cm ³)	
H×B	t ₁	t ₂	r ₁	r ₂			C _x	C _y	I _x	I _y	i _x	i _y	Z _x	Z _y
*150×75	5.5	9.5	9	4.5	21.83	17.1	0	0	819	57.5	6.12	1.62	109	15.3
*200×100	7	10	10	5	33.06	26.0	0	0	2170	138	8.11	2.05	217	27.7

*Remark (1) Length ranges from 5.5m to 18.5m at intervals of 0.5m.
 Please inquire regarding other lengths.
 (2) Please contact us in advance when ordering the sizes marked with *.

8 FB (Flat Bars) Himeji



〈Manufacturing size list〉

t \ B	25	32	38	44	50	60	65	70	75	80	90	100	110	125	150	180	200
4.5	○	○	○	○	○		○					○					
6	○	○	○	○	○	○	○	○	○	○	○	○		○	○		
9	○	○	○	○	○	○	◎	○	◎	○	○	◎		◎	◎	●	●
10												*○					
12	○	○	○		○	○	○	○	◎	○	○	◎		◎	◎	●	●
16		○	○		○		○		○	○	○	◎	*○	◎	◎	●	●
19					○		○		○		○	◎		◎	◎	●	●
22					○		○		○		○	◎		◎	◎	●	●
25					○		○		○		○	◎		◎	◎	●	●

*Remark ○: Suitable for sharp edge ●: Suitable for corner R (round edge) ◎: Suitable for sharp edge and corner R.

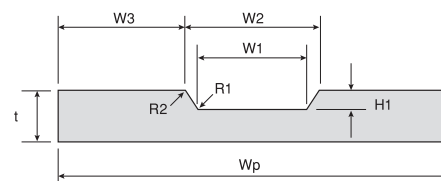
〈Shape and measure〉

Dimension (mm)		Sectional area (cm ²)	Unit mass (kg/m)	Dimension (mm)		Sectional area (cm ²)	Unit mass (kg/m)	Dimension (mm)		Sectional area (cm ²)	Unit mass (kg/m)
t	B			t	B			t	B		
4.5	25	1.125	0.883	9	100	9.000	7.06	16	125	20.00	15.7
4.5	32	1.440	1.13	9	120	10.80	8.48	16	150	24.00	18.8
4.5	38	1.710	1.34	9	125	11.25	8.83	16	180	28.80	22.6
4.5	44	1.980	1.55	9	150	13.50	10.6	16	200	32.00	25.1
4.5	50	2.250	1.77	9	180	16.20	12.7	19	50	9.500	7.46
4.5	65	2.925	2.30	9	200	18.00	14.1	19	65	12.35	9.69
4.5	100	4.500	3.53	*10	100	10.00	7.85	19	75	14.25	11.2
6	25	1.500	1.18	12	25	3.000	2.36	19	90	17.10	13.4
6	32	1.920	1.51	12	32	3.840	3.01	19	100	19.00	14.9
6	38	2.280	1.79	12	38	4.560	3.58	19	125	23.75	18.6
6	44	2.640	2.07	12	50	6.000	4.71	19	150	28.50	22.4
6	50	3.000	2.36	12	60	7.200	5.65	19	180	34.20	26.8
6	60	3.600	2.83	12	65	7.800	6.12	19	200	38.00	29.8
6	65	3.900	3.06	12	70	8.400	6.59	22	50	11.00	8.64
6	70	4.200	3.30	12	75	9.000	7.06	22	65	14.30	11.2
6	75	4.500	3.53	12	80	9.600	7.54	22	75	16.50	13.0
6	80	4.800	3.77	12	90	10.80	8.48	22	90	19.80	15.5
6	90	5.400	4.24	12	100	12.00	9.42	22	100	22.00	17.3
6	100	6.000	4.71	12	120	14.40	11.3	22	125	27.50	21.6
6	125	7.500	5.89	12	125	15.00	11.8	22	150	33.00	25.9
6	150	9.000	7.06	12	150	18.00	14.1	22	180	39.60	31.1
9	25	2.250	1.77	12	180	21.60	17.0	22	200	44.00	34.5
9	32	2.880	2.26	12	200	24.00	18.8	25	50	12.50	9.81
9	38	3.420	2.68	16	32	5.120	4.02	25	65	16.25	12.8
9	44	3.960	3.11	16	38	6.080	4.77	25	75	18.75	14.7
9	50	4.500	3.53	16	50	8.000	6.28	25	90	22.50	17.7
9	60	5.400	4.24	16	65	10.40	8.16	25	100	25.00	19.6
9	65	5.850	4.59	16	75	12.00	9.42	25	125	31.25	24.5
9	70	6.300	4.95	16	80	12.80	10.0	25	150	37.50	29.4
9	75	6.750	5.30	16	90	14.40	11.3	25	180	45.00	35.3
9	80	7.200	5.65	16	100	16.00	12.6	25	200	50.00	39.2
9	90	8.100	6.36	*16	110	17.60	13.8				

*Remark (1) Available length is 5.5m and 6.0m. Please contact us for other lengths.

(2) Please contact us in advance when ordering the sizes marked with *.

9 GFB, TFB (Deformed Flat Bars) Himeji



GFB (Grooved Flat Bars)

〈Shape and measure〉

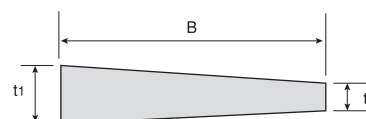
Size	Dimension						Unit mass (kg/m)
	Thickness t	Breadth Wp	Dimensions of groove				
			W1	W2	W3	H1	
* 14×110	14	110	18.15	22.15	44.0	5	11.3
* 16×110	16	110	28.15	32.95	38.6	6	12.4
* 17×110	17	110	26.15	30.15	40.0	5	13.6

*Remark Please contact us in advance when ordering the sizes marked with *.

TFB (Tapered Flat Bars)

〈Shape and measure〉

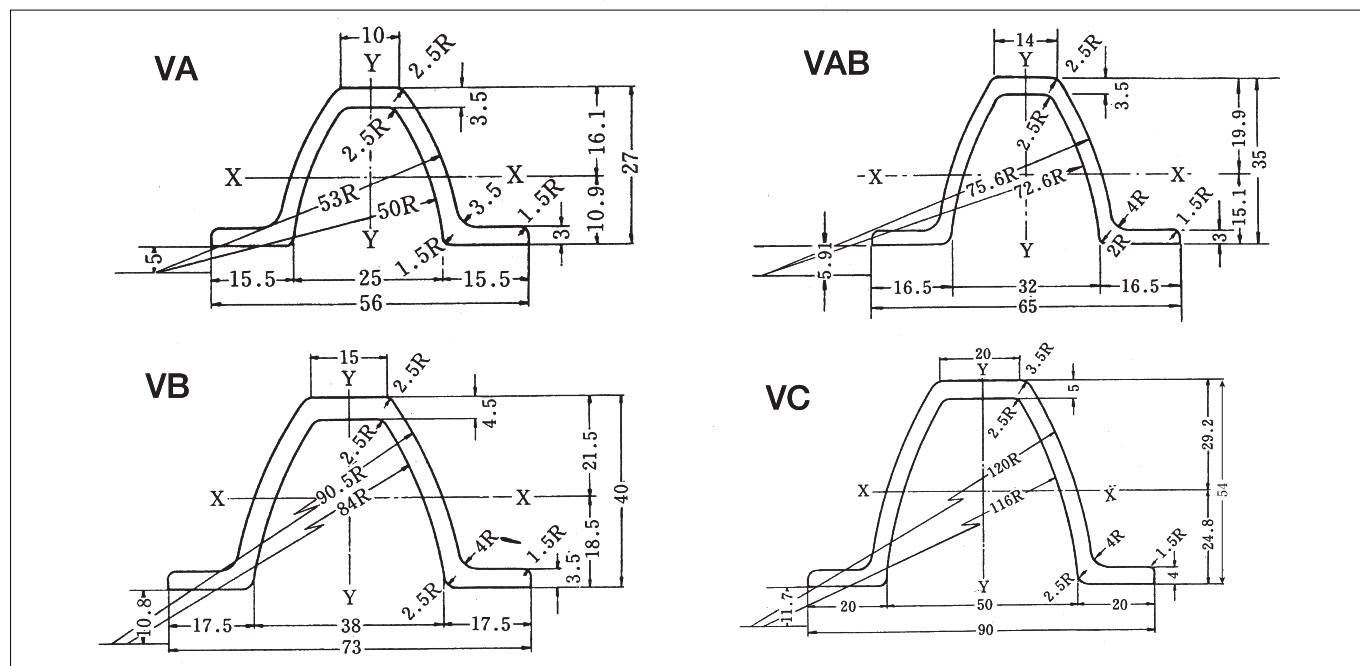
Size	Thickness		Breadth	Unit mass (kg/m)
	t1 (mm)	t2 (mm)	B (mm)	
* 18.2×15.2×82.0	18.2	15.2	82.0	10.7
* 18.2×15.2×92.0	18.2	15.2	92.0	12.1
* 21.3×18.1×92.0	21.3	18.1	92.0	14.2
* 21.2×18.2×102.0	21.2	18.2	102.0	15.8
* 21.2×18.2×112.0	21.2	18.2	112.0	17.3
* 21.6×18.4×123.0	21.6	18.4	123.0	19.3
* 24.8×21.2×123.5	24.8	21.2	123.5	22.3
* 21.5×18.5×133.0	21.5	18.5	133.0	20.9
* 24.7×21.3×133.0	24.7	21.3	133.0	24.0



*Remark Please contact us in advance when ordering the sizes marked with *.

10 V Shapes Kashima

〈Sectional view〉

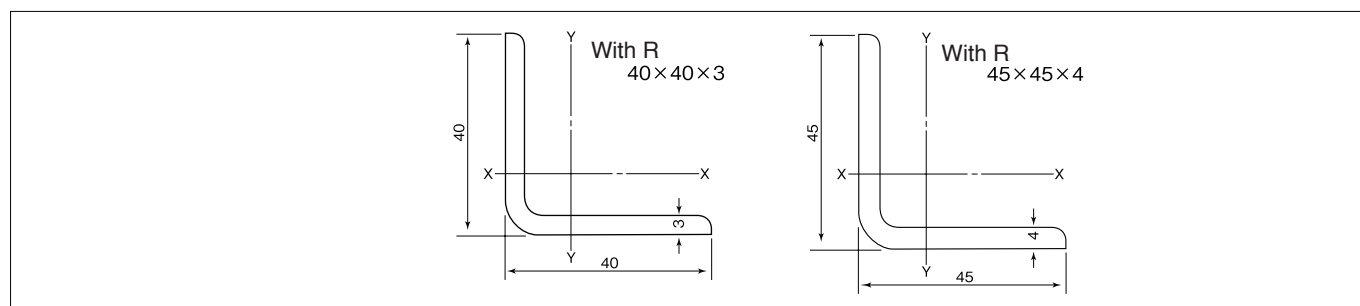


〈Section performance〉

main	Name	Sectional area	Weight	Geometrical moment of inertia		Radius of gyration of area		Modulus of section	
	Unit	cm ²	kg/m	I _x cm ⁴	I _y cm ⁴	i _x cm	i _y cm	Z _x cm ³	Z _y cm ³
	VA	2.656	2.09	2.56	5.95	0.98	1.50	1.59	2.12
	VAB	3.466	2.72	4.74	9.60	1.17	1.66	2.38	2.95
	VB	4.570	3.59	9.23	13.1	1.42	1.69	4.29	3.59
	VC	6.667	5.23	24.4	37.0	1.91	2.35	8.35	8.22

11 R-Angles (Angles with Corner R) Kashima

〈Sectional view〉

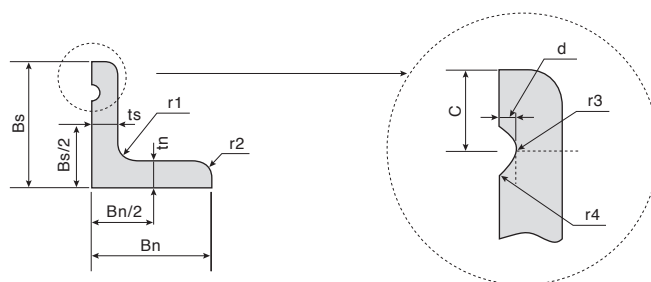


〈Section performance〉

Furring	Name	Sectional area	Weight	Geometrical moment of inertia			Radius of gyration of area			Modulus of section
	Unit	cm ²	kg/m	I _x =I _y cm ⁴	max I _u cm ⁴	min I _v cm ⁴	i _x =i _y cm	max i _u cm	min i _v cm	Z _x =Z _y cm ³
	R-30x30x3	1.673	1.31	1.39	2.26	0.53	0.913	1.16	0.563	0.653
	R-40x40x3	2.283	1.79	3.47	5.60	1.34	1.23	1.57	0.77	1.20
	R-45x45x4	3.391	2.66	6.45	10.3	2.61	1.38	1.74	0.88	1.99

*Remark The tolerances (permissible variations) of the flange width (side), height, thickness, squareness and weight conform to JIS G 3192 (Dimensions, mass and permissible variations of hot rolled steel sections).

12 G-Angles (Grooved Equal Leg Angles) Kashima



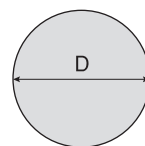
〈Product shapes, dimensions and sectional properties〉

Dimension (mm)								Sectional area (cm ²)	Unit mass (kg/m)	Position moment of area (cm)		Geometrical moment of inertia (cm ⁴)				Radius of gyration of area (cm)				Modulus of section (cm ³)	
A×B	t	r1	r2	c	d	r3	r4			Cx	Cy	Ix	Iy	max Iu	min Iu	ix	iy	max iu	min iv	Zx	Zy
90×90	13	10	7	20	4	4	2	21.45	16.8	2.64	2.72	155	152	241	64.9	2.69	2.66	3.35	1.74	24.6	23.8

13 RB (Round Bars) Mizushima

〈Product shapes〉

Diameter (mm)	Sectional area (mm ²)	Unit mass (kg/m)
13	132.7	1.04
16	201.1	1.58
19	283.5	2.23
22	380.1	2.98
25	490.9	3.85

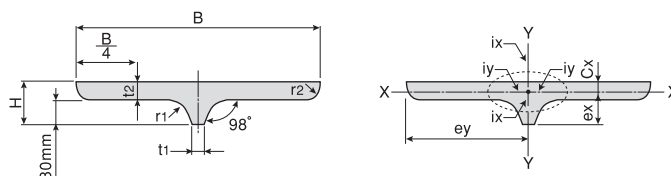


D is the diameter

*Remark Available length is 5.5m and 6.0m.
Please inquire regarding other lengths.

14 WTB (T Beams) Himeji

Geometrical of inertia $I=ai^2$
Radius of gyration of area $i=\sqrt{I/a}$
Modulus of section $Z=I/e$
(a : sectional area)



〈Product shapes, dimensions and sectional properties〉

Dimension (mm)							Sectional area (cm ²)	Unit mass (kg/m)	Position of center of gravity (cm)	Geometrical moment of inertia (cm ⁴)		Radius of gyration of area (cm)		Modulus of section (cm ³)	
H×B	B	H	t ₁	t ₂	r ₁	r ₂			Cx	Ix	Iy	ix	iy	Zx	Zy
*125×9	125	39	12	9	6	3	16.19	12.7	1.00	15.6	147	0.981	3.02	5.37	23.6

*Remark (1) Length ranges from 5.5m to 18.5m at intervals of 0.5m. Please inquire regarding other lengths.
(2) Please contact us in advance when ordering the size marked with *.

〈Chemical composition〉

Standard	Symbol	Chemical composition (%)					
		C	Si	Mn	P	S	Others
JIS G3101 Rolled steels for general structure	SS400	—	—	—	0.050 or less	0.050 or less	—
JIS G3106 Rolled steels for welded structure	SM400A	$t \leq 50$, 0.23 or less	—	2.5 x C or more	0.035 or less	0.035 or less	—
	SM400B	$t \leq 50$, 0.20 or less	0.35 or less	0.60-1.50	0.035 or less	0.035 or less	—
	SM400C	$t \leq 100$, 0.18 or less	0.35 or less	0.60-1.50	0.035 or less	0.035 or less	—
	SM490A	$t \leq 50$, 0.20 or less	0.55 or less	1.65 or less	0.035 or less	0.035 or less	—
	SM490B	$t \leq 50$, 0.18 or less	0.55 or less	1.65 or less	0.035 or less	0.035 or less	—
	SM490C	$t \leq 100$, 0.18 or less	0.55 or less	1.65 or less	0.035 or less	0.035 or less	—
	SM490YA	$t \leq 100$, 0.20 or less	0.55 or less	1.65 or less	0.035 or less	0.035 or less	—
	SM490YB						
	SM520B	$t \leq 100$, 0.20 or less	0.55 or less	1.65 or less	0.035 or less	0.035 or less	—
	SM520C						
JIS G3114 Hot-rolled atmospheric corrosion resisting steels for welded structure	SMA400AW	0.18 or less	0.15-0.65	1.25 or less	0.035 or less	0.035 or less	Cu : 0.30-0.50 Cr : 0.45-0.75 Ni : 0.05-0.30
	SMA400AP		0.55 or less				Cu : 0.20-0.35 Cr : 0.30-0.55
	SMA490AW	0.18 or less	0.15-0.65	1.40 or less	0.035 or less	0.035 or less	Cu : 0.30-0.50 Cr : 0.45-0.75 Ni : 0.05-0.30
	SMA490AP		0.55 or less				Cu : 0.20-0.35 Cr : 0.30-0.55

〈Mechanical properties〉

Symbol	Side width	Tensile test							Bending test	Impact test				
		Yield point or proof stress (N/mm ²)		Tensile strength (N/mm ²)	Yield ratio (%)	Elongation			Bending radius (bending angle: 180°) (No. 1 test piece)	Charpy absorbed energy *1 (J) (0°C, V notch) (L direction)				
	(mm)	t ≤ 16	16 < t ≤ 40			Thickness of steel material (mm)	Test piece	(%)						
SS400	Less than 40	245 or more	235 or more	400-510	—	3 ≤ t ≤ 5	No.5	21 or more	1.5t*2	—				
							No.14B	21 or more						
						5 < t ≤ 16	No.5	27 or more						
							No.14B	24 or more						
						16 < t ≤ 40	No.5	33 or more						
							No.14B	24 or more						
	40 or more	245 or more	235 or more	400-510	—	t ≤ 5	No.5	21 or more	1.5t*2	—				
						5 < t ≤ 16	No.1A	17 or more						
16 < t ≤ 50						No.1A	21 or more							
SM400A SM400B SM400C	Less than 40	245 or more	235 or more	400-510	—	3 ≤ t ≤ 5	No.5	23 or more	—	SM400A	—			
							No.14B	23 or more						
						5 < t ≤ 16	No.5	28 or more		SM400B	27 or more			
							No.14B	26 or more						
						16 < t ≤ 40	No.5	35 or more		SM400C	47 or more			
							No.14B	25 or more						
						40 or more	245 or more	235 or more		400-510	—	t ≤ 5	No.5	23 or more
												5 < t ≤ 16	No.1A	18 or more
	16 < t ≤ 50	No.1A	22 or more											
	SM490A SM490B SM490C	Less than 40	325 or more	315 or more	490-610	—	3 ≤ t ≤ 5	No.5		22 or more	—	SM490A	—	
								No.14B		22 or more				
5 < t ≤ 16							No.5	27 or more	SM490B	27 or more				
							No.14B	24 or more						
16 < t ≤ 40							No.5	33 or more	SM490C	47 or more				
							No.14B	24 or more						
40 or more							325 or more	315 or more	490-610	—		t ≤ 5	No.5	22 or more
												5 < t ≤ 16	No.1A	17 or more
		16 < t ≤ 50	No.1A	21 or more										
SM490YA SM490YB		Less than 40	365 or more	355 or more	490-610	—	3 ≤ t ≤ 5	No.5	19 or more	—		SM490YA	—	
								No.14B	19 or more					
	5 < t ≤ 16						No.5	24 or more	SM490YB		27 or more			
							No.14B	22 or more						
	16 < t ≤ 40						No.5	30 or more						
							No.14B	22 or more						
	40 or more						365 or more	355 or more	490-610		—	t ≤ 5	No.5	19 or more
												5 < t ≤ 16	No.1A	15 or more
	16 < t ≤ 50	No.1A	19 or more											
SM520B SM520C	Less than 40	365 or more	355 or more	520-640	—	3 ≤ t ≤ 5	No.5	19 or more	—	SM520B	27 or more			
							No.14B	19 or more						
						5 < t ≤ 16	No.5	24 or more		SM520C	47 or more			
							No.14B	22 or more						
						16 < t ≤ 40	No.5	30 or more						
							No.14B	22 or more						
						40 or more	365 or more	355 or more		520-640	—	t ≤ 5	No.5	19 or more
												5 < t ≤ 16	No.1A	15 or more
	16 < t ≤ 50	No.1A	19 or more											
SMA400AW SMA400AP	40 or more	245 or more	235 or more	Upper limit according to instructions.	—	t ≤ 5	No.5	22 or more	—	—				
						t ≤ 16	No.1A	17 or more						
						16 < t ≤ 50	No.1A	21 or more						
SMA490AW SMA490AP	40 or more	365 or more	355 or more	Upper limit according to instructions.	—	t ≤ 5	No.5	19 or more	—	—				
						t ≤ 16	No.1A	15 or more						
						16 < t ≤ 50	No.1A	19 or more						

*Remark (1) *1 Applied when thickness exceeds 12 mm.

(2) *2 The bending test will be omitted if not particularly specified by the customer.

〈Chemical composition〉

Standard		Symbol	Chemical composition (%)					
			C	Si	Mn	P	S	Others
JIS G3136		SN400A	6 ≤ t ≤ 100 0.24 or less	—	—	0.050 or less	0.050 or less	—
Rolled steels for building structure		SN400B	6 ≤ t ≤ 50 0.20 or less	0.35 or less	0.60-1.50	0.030 or less	0.015 or less	Ceq : 0.36 or less*1 (P _{CM} : 0.26 or less)
		SN490B	6 ≤ t ≤ 50 0.18 or less	0.55 or less	1.65 or less	0.030 or less	0.015 or less	t≤40 Ceq : 0.44 or less*1 (P _{CM} : 0.29 or less)
High tensile strength steel for tower structural purposes	JIS G3101	SS540	0.30 or less	—	1.60 or less	0.040 or less	0.040 or less	—
	JIS G3129	SH590S	0.18 or less	0.40 or less	1.80 or less	0.035 or less	0.030 or less	Nb + V : 0.15 or less Ceq : 0.45 or less
	HI-TOWER	HITOWER390W	0.23 or less	0.40 or less	1.60 or less	0.040 or less	0.040 or less	—
		HITOWER590K	0.18 or less	0.40 or less	1.80 or less	0.035 or less	0.030 or less	Nb + V : 0.15 or less Ceq : 0.45 or less
High standard steel Arch support		HT590/SS540	0.18 or less	0.55 or less	1.60 or less	0.035 or less	0.030 or less	Ceq : 0.47 or less N : 0.45 or less*2

- *Notes (1) *1 For the carbon equivalent (Ceq), the critical metal parameter (PCM) for weld cracking (weld cracking susceptibility composition) can be applied by agreement between the parties concerned.

$$\text{Ceq} = \text{C} + \text{Mn}/6 + \text{Si}/24 + \text{Ni}/40 + \text{Cr}/5 + \text{Mo}/4 + \text{V}/14$$

$$\text{P}_{\text{CM}} = \text{C} + \text{Si}/30 + \text{Mn}/20 + \text{Cu}/20 + \text{Ni}/60 + \text{Cr}/20 + \text{Mo}/15 + \text{V}/10 + 5\text{B}$$
The elements specified in these formulas are analyzed irrespective of whether they are added or not, and the results are used in the calculation.
(2) *2 N means total nitrogen content.
(3) When necessary, alloying elements other than those mentioned above can be added.
(4) For standards other than SS400, please inquire in advance.

Standard	Symbol	Chemical composition (%)					
		C	Si	Mn	P	S	Others
JIS G3112 Steel bars for concrete reinforcement	SR235	—	—	—	0.050 or less	0.050 or less	—

〈Mechanical properties〉

Symbol	Side width	Tensile test							Bending test	Impact test
		Yield point or proof stress (N/mm ²)		Tensile strength (N/mm ²)	Yield ratio (%)	Elongation			Bending radius (bending angle: 180°) (No. 1 test piece)	Charpy absorbed energy *2 (J) (0°C, V notch) (L direction)
	(mm)	t ≤ 16	16 < t ≤ 40			Thickness of steel material (mm)	Test piece	(%)		
SN400A	—	235 or more	235 or more	400 ~ 510	—	6 ≤ t ≤ 16	No.1A	17 or more	—	—
						16 < t ≤ 50	No.1A	21 or more		
SN400B	—	235 or more	235 or more 355 or less	400 ~ 510	80 or less*1	6 ≤ t ≤ 16	No.1A	18 or more	—	27 or more
						16 < t ≤ 50	No.1A	22 or more		
SN490B	—	325 or more	325 or more 445 or less	490 ~ 610	80 or less*1	6 ≤ t ≤ 16	No.1A	17 or more	—	27 or more
						16 < t ≤ 50	No.1A	21 or more		
SS540	Less than 40	400 or more	390 or more	540 or more	—	3 ≤ t ≤ 5	No.5	16 or more	2.0t*3	—
							No.14B	16 or more		
						5 < t ≤ 16	No.5	21 or more		
							No.14B	19 or more		
	40 or more	400 or more	390 or more	540 or more	—	16 < t ≤ 40	No.5	27 or more	2.0t*3	—
							No.14B	20 or more		
						t ≤ 5	No.5	16 or more		
							5 < t ≤ 16	No.1A		
SH590S	40 or more	440 or more	440 or more	590 or more	—	t ≤ 16	No.1A	13 or more	—	—
						16 < t	No.1A	17 or more		
HITOWER390W	40 or more	400 or more	390 or more	570 or more	—	t ≤ 16	No.1A	13 or more	2.0t*3	—
						16 < t	No.1A	17 or more		
HITOWER590K	40 or more	440 or more	440 or more	590 or more	—	t ≤ 16	No.1A	13 or more	2.0t*3	—
						16 < t	No.1A	17 or more		
HT590/SS540	—	440 or more	440 or more	590 or more	—	—	No.1A*4 No.1B*4	17 or more*5	—	—

*Notes (1) *1 In H beams in which t1 is 9 mm or less, the upper limit of the yield ratio shall be 85%.
(2) *2 Applied when thickness exceeds 12 mm.
(3) *3 The bending test will be omitted if not particularly specified by the customer.
(4) *4 When the H height is 100 or 108, the No. 1 B test piece shall be used, and when the H height is 150 or 154, No. 1 A shall be used.
(5) *5 Before/after strain aging.
(6) For standards other than SS400, please inquire in advance.

Symbol	Side width	Tensile test							Bending test	Impact test
		Yield point or proof stress (N/mm ²)		Tensile strength (N/mm ²)	Yield ratio (%)	Elongation			Bending radius (bending angle: 180°) (No. 2 test piece)	Charpy absorbed energy (J) (0°C, V notch) (L direction)
	(mm)	t ≤ 16	16 < t ≤ 40			Thickness of steel material (mm)	Test piece	(%)		
SR235	—	235 or more	380-520	—	Diameter ≤ 25	No.2	20 or more	1.5×D	—	
					Diameter > 25	No.14A	22 or more			

● The contents of this catalogue conform to JIS standards when the catalogue was issued. In some cases, the relevant JIS standard may be revised after issuance of this catalogue. In such cases, please refer separately to the contents of the most recent JIS standard.



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