



# JFE COLUMN



JFE Steel Corporation



Preface

JFE Column products include JFE Column- ER, JFE Column BCR, and JFE Column- BCP. **JFE Column ER** is a square pipe manufactured by roll forming followed by electric resistance welding in conformity with JIS G 3466 (Carbon Steel Square pipes for General Structural Purposes).

**JFE Column BCR** is a square pipe manufactured by roll forming and electric resistance welding. **JFE Column BCP** is a large-diameter, heavy-walled square pipe manufactured by press forming and submerged arc welding.

The latter two, **JFE Column BCR** and **JFE Column- BCP** are manufactured based on a new product standard established by the Japan Iron & Steel Federation with the aim of improving performance of structural members of buildings such as weldability and plastic deformation properties required of column materials. Both of these products have received product certification from the Japanese government.

In addition, a new square pipe, **JFE Column- BCP325T** has been developed. This new product is manufactured by cold press forming and has excellent plastic deformation and earthquake-resistant properties that surpass those of JFE Column- BCP due to markedly improved corner performance.

Users are asked to select the product that is best suited for their particular application.



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Features of JFE Square Columns

- **Ideal section moduli for columns**  
Excellent strength for compression, bending, and torsion loads reduces structural weight.
- **Large open floor spaces are possible**  
Available floor space can be efficiently enlarged using small columns because of their high strength.
- **Eminently suitable for buildings without wall braces**  
Square sections have the same strength on the X-and Y-axes, which eliminates the necessity for bracing the Y-axis(weak axis) as is required for H-shape columns.
- **Easy finishing and economical installation**  
The flat surface provides a smaller surface area for painting, fireproof coating, and interior and exterior material mounting, and facilitates construction.
- **Easy fabrication and clean appearance**  
The square section geometry facilitates fabrication and simplifies the installation of beam junctions.
- **Good appearance, even if uncoated**  
The round corners offer a pleasing appearance, even if uncoated.
- **Wide range of sizes**  
JFE Column products are available in a wide range of standard sizes from 200×200 to 1000×1000 .

reaction materials in Japan. In addition to these many advantages, JFE Column BCR and JFE Column-BCP, which meet the newly established the Japan Iron and Steel Federation, offer the following features:

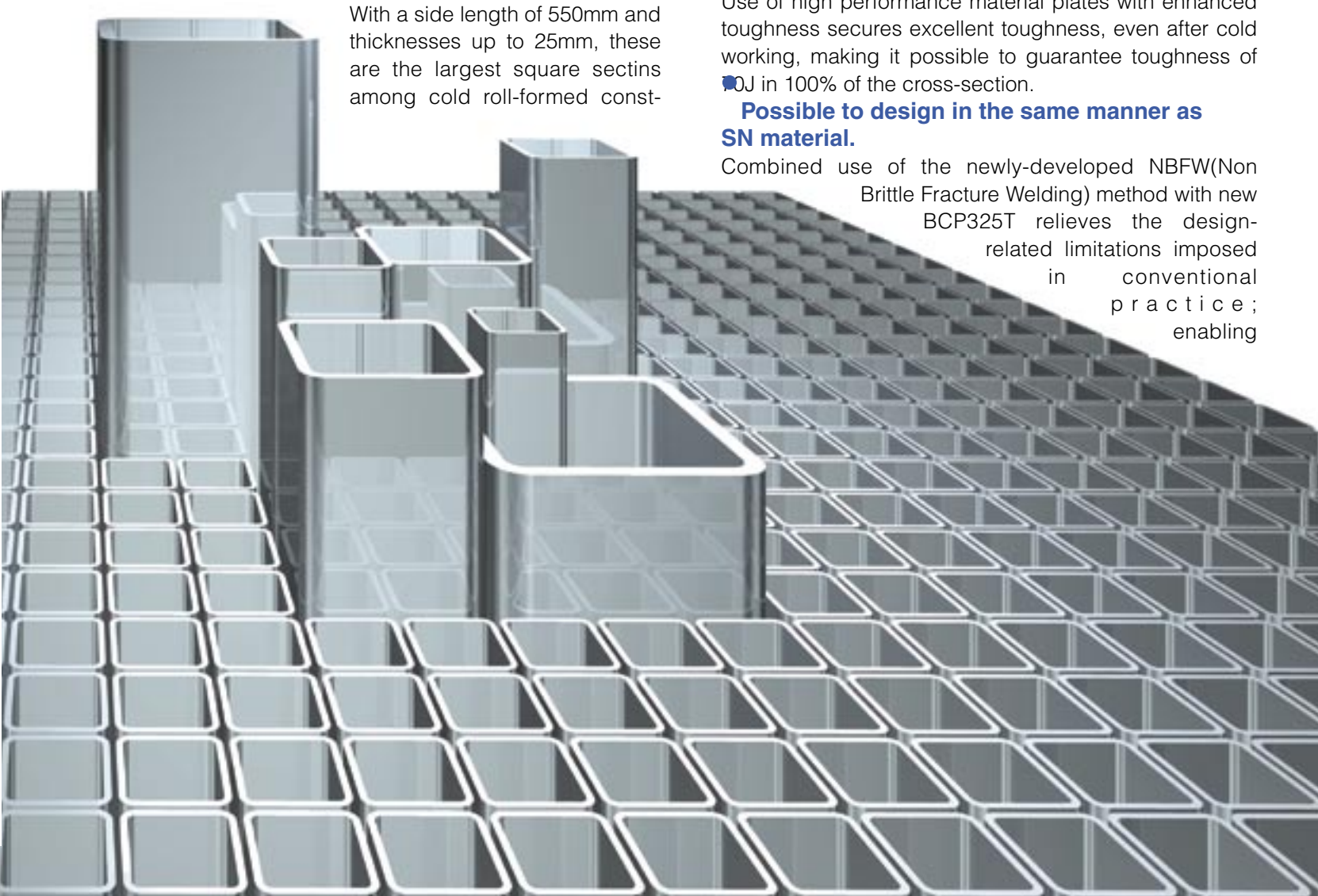
● **Approved by the The Japanese goverment**  
JFE Column BCR and JFE Column-BCP can be used with complete confidence, as both have been approved by Japanese government.

● **Improved performance as building structural materials**  
These products conform to the new standard of the Japan Iron and Steel Federation, which is intended to improve weldability, plastic deformation performance, and other properties required in building structural materials. In particular, both have demonstrated ample plastic deformation performance for use in columns in a large number of actual-scale bending tests, ensuring even higher reliability in weldability and earthquake resistance.

Features of newly-developed cold press formed square section steel pipe JFE Column-BCP325T

● **Toughness of 100% of the cross-section is guaranteed.**  
Use of high performance material plates with enhanced toughness secures excellent toughness, even after cold working, making it possible to guarantee toughness of 100J in 100% of the cross-section.

● **Possible to design in the same manner as SN material.**  
Combined use of the newly-developed NBFW(Non Brittle Fracture Welding) method with new BCP325T relieves the design-related limitations imposed in conventional practice; enabling



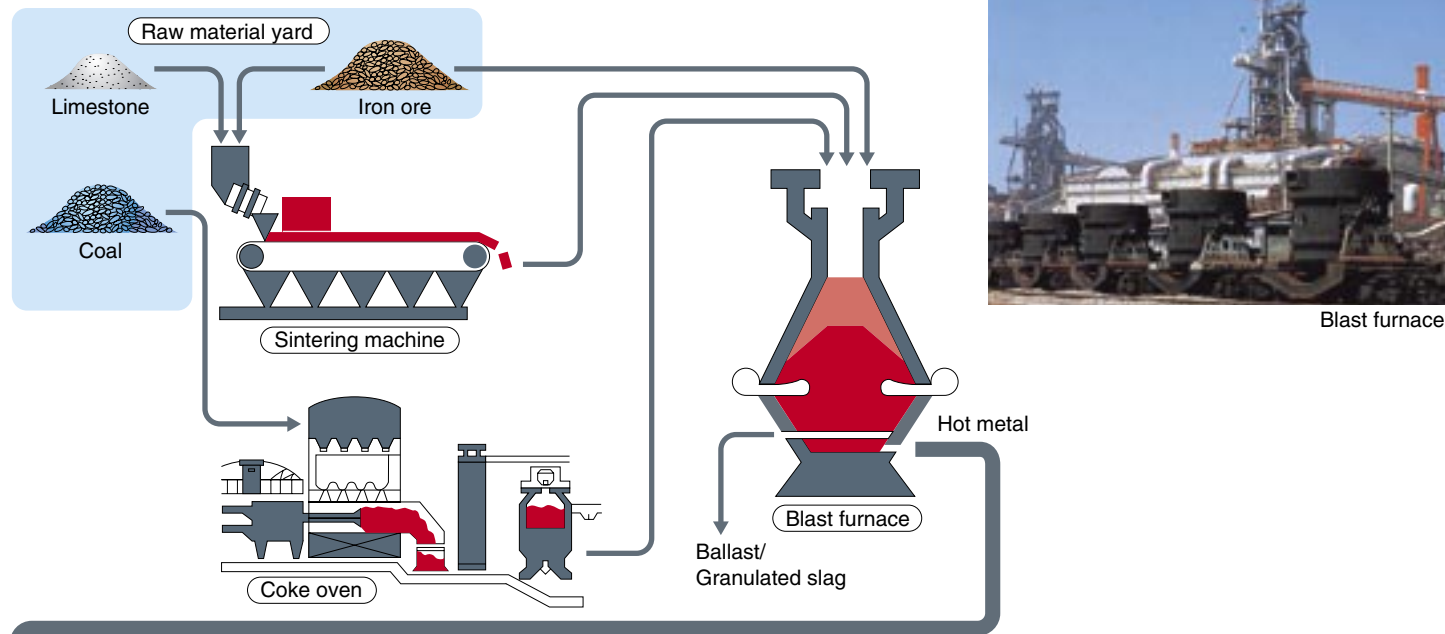
With a side length of 550mm and thicknesses up to 25mm, these are the largest square sectins among cold roll-formed const-



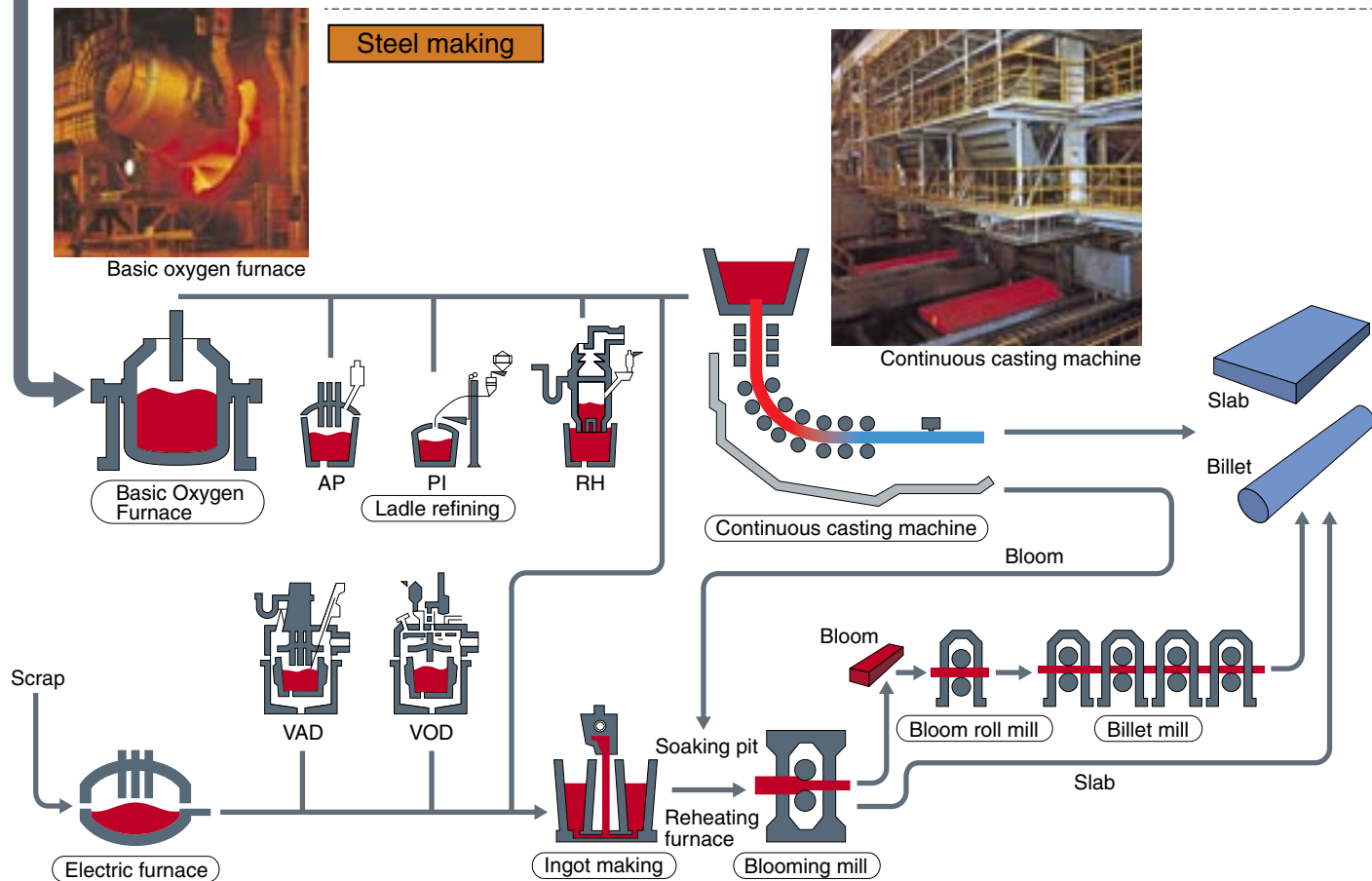
# Manufacturing Process of Steel Products

- **Blast furnace** : Sintered ore, coke, and other materials are charged from the top, and hot blast is blown from the tuyeres. The coke is burned, and ore is reduced and melted to produce pig iron.
- **Basic Oxygen Furnace** : Oxygen is blown into the molten pig iron to remove impurities, re-sulting in steel of the specified composition.
- **Continuous Casting Machine** : Molten steel is continuously solidified directly into salabs.

## Iron making



## Steel making

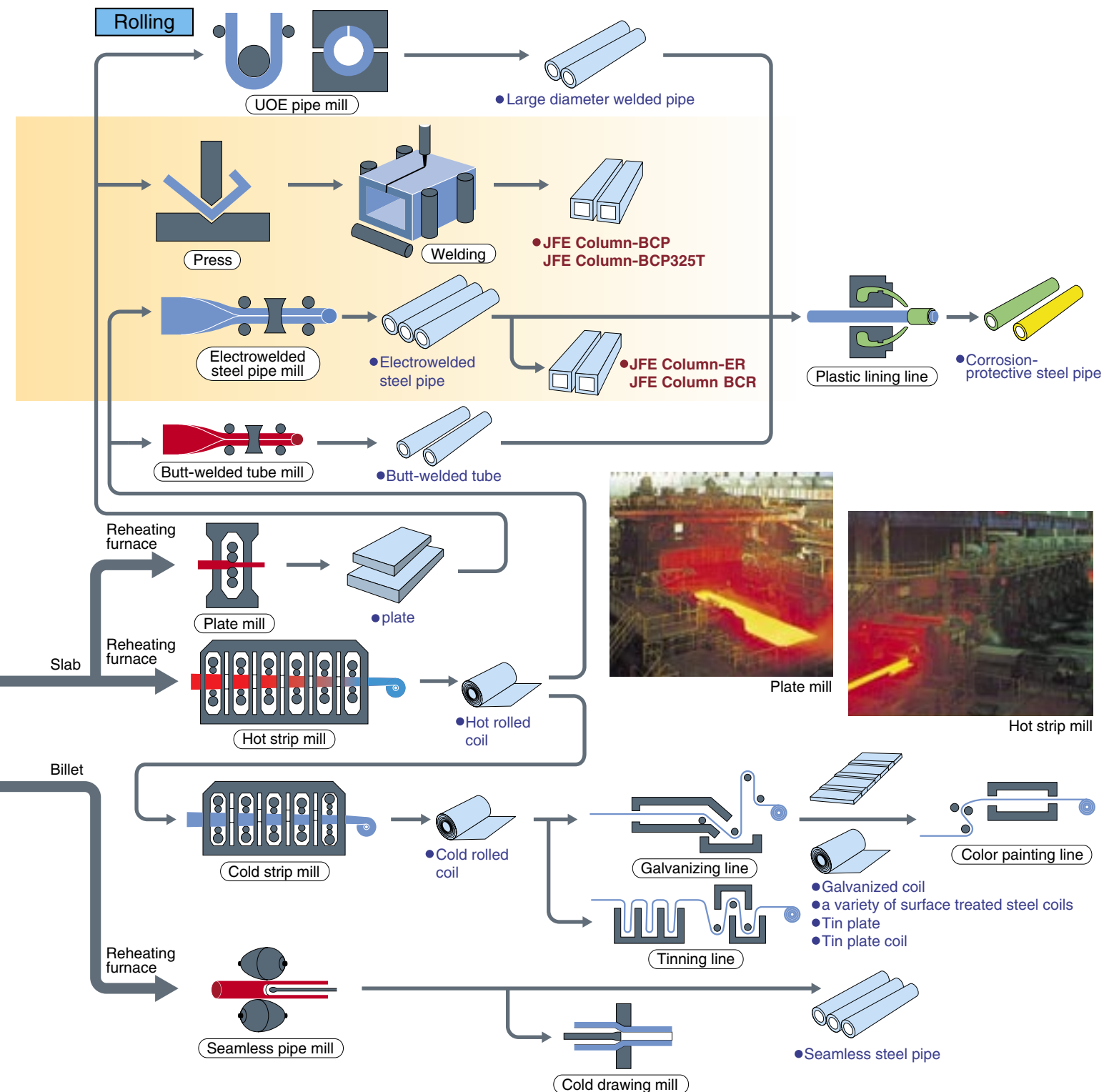


## JFE Column-ER JFE Column-BCR

- **Hot Strip Mill** : Slabs heated in a reheating furnace are continuously rolled by a roughing mill and a finishing mill to become hot rolled coils.
- **Electric Welded Tubular Mill** : Hot rolled coils are formed into rectangular tubulars by several sets of rolls and electric resistance welded to produce JFE Column-ER & JFE Column BCR.

## JFE Column-BCP JFE Column-BCP325T

- **Plate Mill** : Slabs are heated in a reheating furnace and then hot-rolled for the production of steel plate.
- Steel plates are cut into the specified size, the edges prepared, and then pressed and formed into shape. The seams are welded form both inside and outside of the joint by a submerged arc welder to produce JFE Column-BCP & JFE Column-BCP325T.

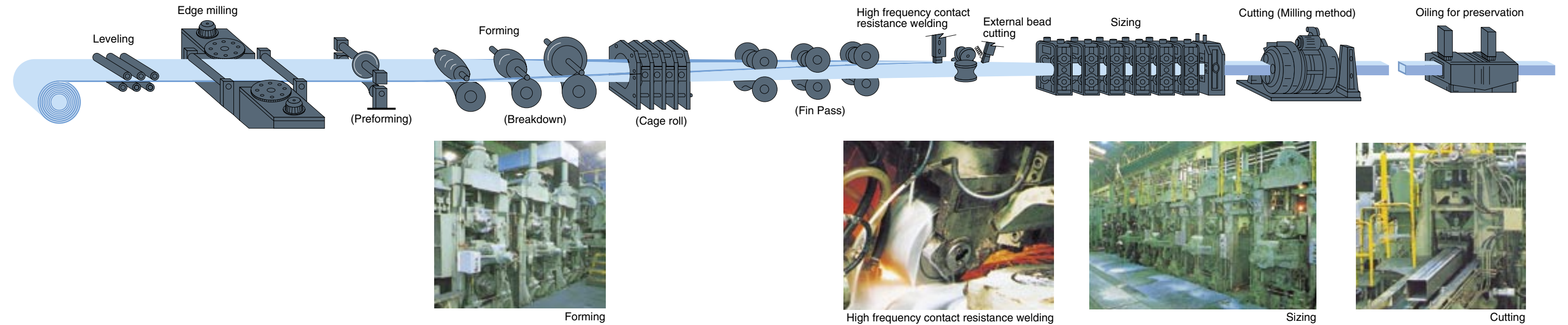




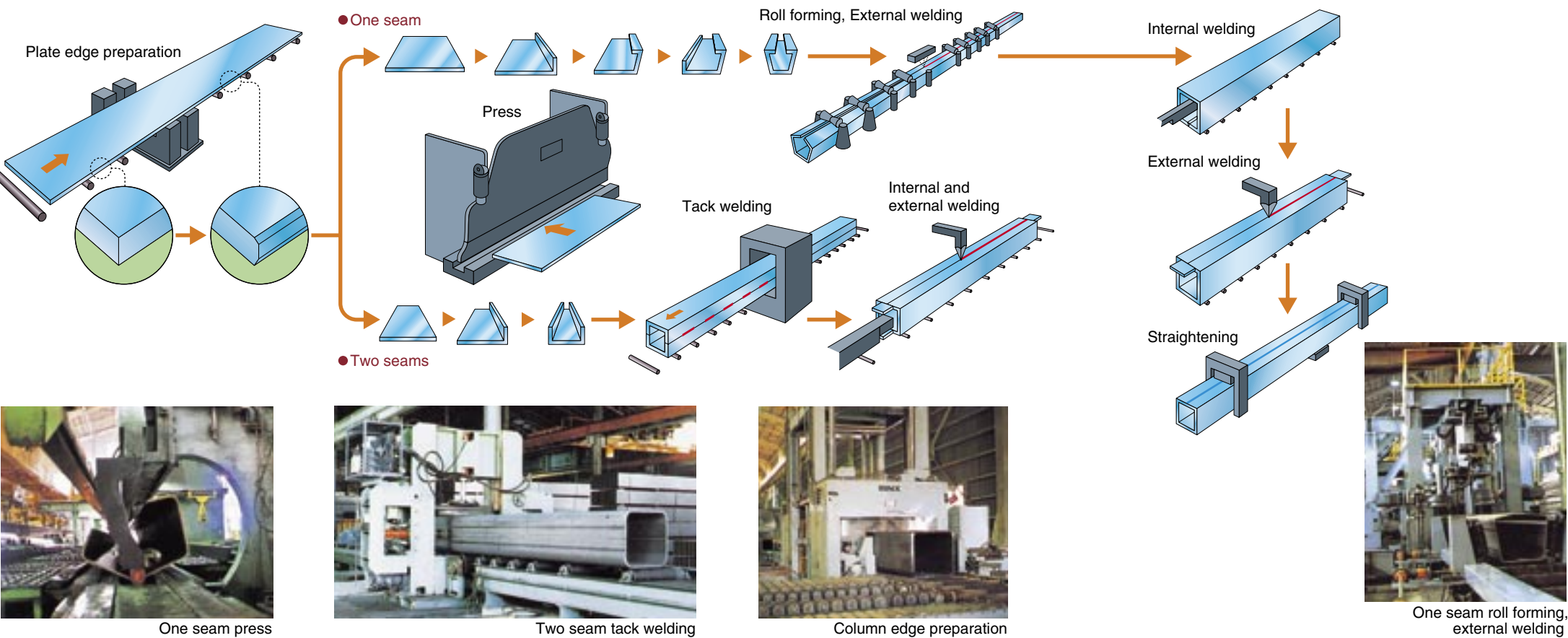
# Production Process of JFE Columns and Available Product Sizes

Raw material coils and plates for JFE columns are manufactured at East Japan Works and West Japan Works with the state-of-the-art equipment and technology under the strict quality control.

## JFE Column-ER / JFE Column-BCR



## JFE Column-BCP / JFE Column-BCP325T



## Available sizes of JFE column

	Dimension (mm)	Thickness (mm)															
		6	8	9	12	14	16	19	22	25	28	32	36	38	40		
Square	200×200	●	●	●	●												
	250×250	●	●	●	●	●											
	300×300	●	●	●	●	●	●										
	350×350			●	●	●	●	●	●								
	400×400			●	●	●	●	●	●	●	●						
	450×450			●	●	●	●	●	●	●	●	●	●				
	500×500				●	●	●	●	●	●	●	●	●	●			
	550×550						●	●	●	●	●	●	●	●	●		
	600×600						●	●	●	●	●	●	●	●	●	●	
	650×650						●	●	●	●	●	●	●	●	●	●	●
Rectangular	700×700						●	●	●	●	●	●	●	●	●	●	●
	750×750							●	●	●	●	●	●	●	●	●	●
	800×800							●	●	●	●	●	●	●	●	●	●
	850×850							●	●	●	●	●	●	●	●	●	●
	900×900							●	●	●	●	●	●	●	●	●	●
	950×950								●	●	●	●	●	●	●	●	●
	1000×1000								●	●	●	●	●	●	●	●	●
	700×600							●	●	●	●	●	●	●	●	●	●
	800×600							●	●	●	●	●	●	●	●	●	●
	800×700							●	●	●	●	●	●	●	●	●	●
Rectangular	900×650							●	●	●	●	●	●	●	●	●	●
	900×700							●	●	●	●	●	●	●	●	●	●
	1000×700								●	●	●	●	●	●	●	●	●
	1000×800									●	●	●	●	●	●	●	●

● JFE Column-ER, JFE Column BCR  
 ● JFE Column BCP ( I seam ), JFE Column BCP325T ( I seam )  
 ● JFE Column BCP ( II seam ), JFE Column BCP325T ( II seam )  
 ▨ JFE Column BCR is not contained 25mm thickness

Note : please contact us for items not shown above.

# JFE Column-ER

## Product Specifications

JFE Column-ER is manufactured in conformance with JIS G 3466 (Carbon Steel Square Pipes for General Structural Purposes)

### Chemical Composition

Grade	Chemical Composition (%)				
	C	Si	Mn	P	S
STKR400	0.25 max.	—	—	0.040 max.	0.040 max.
STKR490	0.18 max.	0.55 max.	1.50 max.	0.040 max.	0.040 max.

Remarks : The chemical composition of JFE Column is by ladle analysis.

### Mechanical Properties

Grade	Tensile Test			
	Yield point or Proof stress (N/mm <sup>2</sup> )	Tensile strength (N/mm <sup>2</sup> )	Elongation (%)	Test piece
STKR400	245 min.	400 min.	23 min.	No.5
STKR490	325 min.	490 min.	23 min.	No.5

Remarks : 1. The minimum elongation for JFE Columns with wall thicknesses less than 8 mm shall be calculated by subtracting 1.5% for each 1 mm decrease in wall thickness below 8 mm from the values of elongation given in the above table, and the result rounded to an integer in compliance with JIS Z 8401.

2. The tensile test piece is removed from an area away from the seams.

### Dimensional tolerance

Item and classification		Dimensional tolerance
Length of side		±1.0% and ±3.0mm
Unevenness of flat portion of each side		Less than 0.5% of side length, but less than 3mm
Angularity made by adjacent flat plate portions		±1.0°
Length		+ not specified, - 0
Corner dimension : S		3.0× Thickness (mm), mm, max.
Camber	Products less than 9m in length	1/1500 of total length, max.
	Products 9m or more in length	1/1250 of total length, max.
Thickness		±10%

Remarks : 1. The length of a side, unevenness of flat portion of each side, angularity made by adjacent flat plate positions and external radius curvature of a corner shall be measured at arbitrary point excluding 50mm ranges from both ends of a box column.

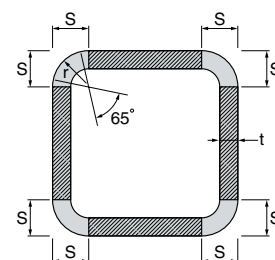
2. Flat plate portion is defined as the hatched portion shown in the above figure.

3. The S dimension that defines the flat plate portion is assumed to be  $S = r$ , Where  $r$  is the upper limit of the external radius of curvature.

4. The unevenness of flat plate portion of each side and the angularity made by adjacent flat plate portions are measured at a location away from weld reinforcement.

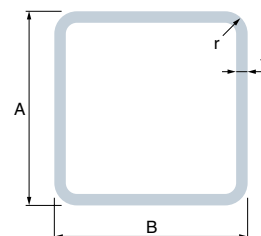
5. The camber tolerance is applicable to the upper to lower bend and right to left bend with a long pitch.

6. The thickness tolerance is applied to locations away from any weld reinforcement.



〈Note〉 Please contact us for products other than those specified above.

## ●Available Size and Section Moduli



Side length (mm)	Wall thickness (mm)	Upper limit of external radius (mm)	Sectional Area (cm <sup>2</sup> )	Unit mass (kg/m)	Geometrical Moment of inertia (cm <sup>4</sup> )	Radius of gyration of area (cm)	Modulus of section (cm <sup>3</sup> )	Plastic Modulus of section (cm <sup>3</sup> )	Classification of Ratio of Width to thickness	
A × B	t	r	A	W	I	i	Z	Zp	400N Class	490N Class
200 × 200	6.0	18.0	45.63	35.8	2830	7.88	283	330	B	C
	8.0 *	24.0	59.79	46.9	3620	7.78	362	426	A	A
	9.0	27.0	66.67	52.3	3990	7.73	399	472	A	A
	12.0	36.0	86.53	67.9	4980	7.59	498	601	A	A
250 × 250	6.0	18.0	57.63	45.2	5670	9.92	454	524	C	D
	8.0 *	24.0	75.79	59.5	7320	9.82	585	683	A	B
	9.0	27.0	84.67	66.5	8090	9.78	647	759	A	B
	12.0	36.0	110.5	86.8	10300	9.63	820	975	A	A
	16.0	48.0	143.2	112	12800	9.44	1020	1240	A	A
300 × 300	6.0	18.0	69.63	54.7	9960	12.0	664	764	D	D
	9.0	27.0	102.7	80.6	14300	11.8	956	1110	B	C
	12.0	36.0	134.5	106	18300	11.7	1220	1440	A	A
	16.0	48.0	175.2	138	23100	11.5	1540	1840	A	A
	19.0	57.0	204.3	160	26200	11.3	1750	2120	A	A
350 × 350	9.0	27.0	120.7	94.7	23200	13.9	1320	1530	C	C
	12.0	36.0	158.5	124	29800	13.7	1700	1990	A	B
	16.0	48.0	207.2	163	37900	13.5	2160	2570	A	A
	19.0	57.0	242.3	190	43400	13.4	2480	2970	A	A
	22.0	66.0	276.2	217	48400	13.2	2760	3340	A	A
400 × 400	9.0	27.0	138.7	109	35100	15.9	1750	2020	C	D
	12.0	36.0	182.5	143	45300	15.8	2270	2640	B	C
	16.0	48.0	239.2	188	57900	15.6	2900	3410	A	A
	19.0	57.0	280.3	220	66000	15.4	3330	3960	A	A
	22.0	66.0	320.2	251	74700	15.3	3740	4480	A	A
	25.0	75.0	358.9	282	82200	15.1	4110	4970	A	A
450 × 450	9.0	27.0	156.7	123	50400	17.9	2240	2580	D	D
	12.0	36.0	206.5	162	65400	17.8	2910	3370	C	C
	16.0	48.0	271.2	213	84100	17.6	3740	4380	A	B
	19.0	57.0	318.3	250	97100	17.5	4310	5090	A	A
	22.0	66.0	364.2	286	109000	17.3	4850	5780	A	A
	25.0	75.0	408.9	321	121000	17.2	5360	6430	A	A
500 × 500	12.0	36.0	230.5	181	90800	19.8	3630	4200	C	D
	16.0	48.0	303.2	238	117000	19.6	4680	5460	A	B
	19.0	57.0	356.3	280	136000	19.5	5420	6370	A	A
	22.0	66.0	408.2	320	153000	19.4	6120	7240	A	A
	25.0	75.0	458.9	360	169000	19.2	6780	8070	A	A
550 × 550	16.0	48.0	335.2	263	158000	21.7	5730	6670	B	C
	19.0	57.0	394.3	310	183000	21.5	6660	7790	A	B
	22.0	66.0	452.2	355	207000	21.4	7530	8870	A	A
	25.0	75.0	508.9	394	230000	21.3	8360	9910	A	A

Remarks : 1. The width/thickness ratio classification for columns A to D is in conformity with the width/thickness ratio classification for columns FA to FD in "Structural calculation instruction and explanation based on the new aseismic structure standards of the Enforcement Ordinance of the Revised Building Standards Act."

2. Standard product lengths are from 6m to 18m in 1meter increments.

3. Max.dimension on JIS G 3466(Carbon Steel Square Pipes for General Structural) is 350 × 350 × 12

Note : Please contact us for items shown \* mark.



# JFE Column-BCR

## Product Specifications

### Chemical Composition

JFE Column BCR is manufactured in accordance with the standards of The Japan Iron and Steel Federation.

Grade	Chemical Composition (%)						Carbon Equivalent (%)	Weld crack Sensitivity Composition (%)
	C	Si	Mn	P	S	N		
BCR295	0.20 max.	0.35 max.	1.40 max.	0.030 max.	0.015 max.	0.006 max.	0.36 max.	0.26 max.

Remarks : 1. When necessary, addition of alloying elements other than the above is possible.

2. Assuming a free N content of 0.006% or less, an N content of 0.009% is possible.

3. With the agreement of the parties concerned, weld crack sensitivity composition can be applied in place of the carbon equivalent(Ceq).

$$Ceq (\%) = C + Mn/6 + Si/24 + Ni/40 + Cr/5 + Mo/4 + V/14$$

$$\text{Weld crack sensitivity composition (\%)} = C + Si/30 + Mn/20 + Cu/20 + Ni/60 + Cr/20 + Mo/15 + V/10 + 5B$$

### Mechanical Properties

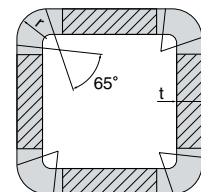
Grade	Thickness (mm)	Yield point or Proof stress (N/mm <sup>2</sup> )	Tensile strength (N/mm <sup>2</sup> )	Yield ratio (%)	Elongation		Charpy absorbed energy	
					Test piece	Elongation (%)	Test Temperature (C°)	Absorbed Energy (J)
BCR295	6 ≤ t < 12	295 min.	400 min. 550 max.	—	No.5	23 min.	0	27 min.
	12 ≤ t ≤ 16	295 min.		90 max.		27 min.		
	16 < t ≤ 22	445 max.						

Remarks : 1. For wall thicknesses of less than 8mm, the minimum elongation is calculated by subtracting 1.5% from the value shown above for each 1 mm reduction in thickness, rounded to the nearest whole number in accordance with JIS Z 8401.

2. Charpy absorbed energy is tested at flat plate areas, excluding welded surface of square hollow sections with thicknesses exceeding 12mm. Test pieces are JIS No.4, taken in longitudinal direction.

### Dimensional tolerance

Item and classification		Dimensional tolerance
Length of side		±1.0% and ±3.0mm
Unevenness of flat portion of each side		Less than 0.5% of side length, but less than 3mm
Angularity made by adjacent flat plate portions		±1.0°
Length		— 0, + not specified
Camber	Product length less than 9m	1/1500 of total length, max.
	Product length 9m or more	1/1250 of total length, max.
Torsion		{1.5 × Length of side(mm)/1000} × Total length(m), mm, max.
Thickness	6mm or more, less than 16mm	−0.3 +1.0mm
	16mm or more, up to 22mm	−0.3 +1.2mm
Angular radius of curvature		(2.5 ± 0.5) × Thickness(mm)



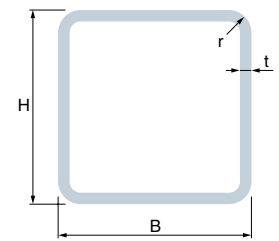
Remarks : 1. Unevenness of the flat portion, angularity between adjacent flat portions, and thickness tolerances apply to all parts except weld reinforcement areas.

2. The radius of curvature means the radius of curvature at the point of intersection of the exterior sides of the corner and lines at 45° to the adjacent side and is measured in the range of 65° around the center of intersection.

3. Camber tolerance is applicable to the upper to lower bend and right to left bend with a long pitch.

〈Note〉 Please contact us for products other than those specified above.

## ●Available Size and Section Moduli



Dimensions (mm)				Sectional Area (cm <sup>2</sup> )	Unit Mass (kg/m)	Geometrical Moment of inertia (cm <sup>4</sup> )	Radius of gyration of area (cm)	Modulus of section (cm <sup>3</sup> )	Plastic Modulus of section (cm <sup>3</sup> )	Ratio of Width to thickness	Classification of Ratio of Width to thickness
H	B	R	t	A	W	I	i	Z	Z <sub>p</sub>	H/t	BCR295
200	200	15	6	45.32	35.6	2,800	7.86	280	327	33.3	B
		20	8	59.24	46.5	3,570	7.76	357	421	25.0	A
		22.5	9	65.98	51.8	3,920	7.71	392	465	22.2	A
		30	12	85.30	67.0	4,860	7.55	486	588	16.7	A
250	250	15	6	57.32	45.0	5,620	9.90	450	521	41.7	C
		20	8	75.24	59.1	7,230	9.80	578	676	31.3	B
		22.5	9	83.98	65.9	7,980	9.75	639	750	27.8	A
		30	12	109.3	85.8	10,100	9.59	805	959	20.8	A
		35	14 *	125.4	98.5	11,300	9.49	903	1,090	17.9	A
		40	16	141.0	111	12,400	9.38	992	1,210	15.6	A
300	300	15	6	69.32	54.4	9,890	11.9	660	760	50.0	D
		20	8	91.24	71.6	12,800	11.8	853	991	37.5	C
		22.5	9	102.0	80.1	14,200	11.8	946	1,100	33.3	B
		30	12	133.3	105	18,100	11.6	1,200	1,420	25.0	A
		35	14 *	153.4	120	20,400	11.5	1,360	1,620	21.4	A
		40	16	173.0	136	22,600	11.4	1,510	1,810	18.8	A
		47.5	19	201.2	158	25,500	11.3	1,700	2,070	15.8	A
350	350	22.5	9	120.0	94.2	23,000	13.8	1,310	1,520	38.9	C
		30	12	157.3	123	29,400	13.7	1,680	1,970	29.2	A
		35	14 *	181.4	142	33,400	13.6	1,910	2,260	25.0	A
		40	16	205.0	161	37,200	13.5	2,130	2,530	21.9	A
		47.5	19	239.2	188	42,400	13.3	2,420	2,910	18.4	A
		55	22	272.0	214	47,100	13.2	2,690	3,270	15.9	A
400	400	22.5	9	138.0	108	34,800	15.9	1,740	2,010	44.4	D
		30	12	181.3	142	44,800	15.7	2,240	2,610	33.3	B
		35	14 *	209.4	164	51,100	15.6	2,560	3,000	28.6	A
		40	16	237.0	186	57,100	15.5	2,850	3,370	25.0	A
		47.5	19	277.2	218	65,400	15.4	3,270	3,900	21.1	A
		55	22	316.0	248	73,000	15.2	3,650	4,390	18.2	A
450	450	22.5	9	156.0	122	50,100	17.9	2,230	2,560	50.0	D
		30	12	205.3	161	64,800	17.8	2,880	3,340	37.5	C
		35	14 *	237.4	186	74,100	17.7	3,290	3,840	32.1	B
		40	16	269.0	211	82,900	17.6	3,690	4,330	28.1	A
		47.5	19	315.2	247	95,500	17.4	4,240	5,020	23.7	A
		55	22	360.0	283	107,000	17.2	4,760	5,680	20.5	A
500	500	30	12	229.3	180	90,000	19.8	3,600	4,160	41.7	C
		35	14 *	265.4	208	103,000	19.7	4,120	4,790	35.7	C
		40	16	301.0	236	116,000	19.6	4,630	5,410	31.3	B
		47.5	19	353.2	277	134,000	19.4	5,340	6,290	26.3	A
		55	22	404.0	317	150,000	19.3	6,010	7,130	22.7	A
550	550	40	16	333.0	261	156,000	21.6	5,670	6,610	34.4	C
		47.5	19	391.2	307	181,000	21.5	6,570	7,700	28.9	A
		55	22	448.0	352	204,000	21.3	7,420	8,750	25.0	A

Remarks : 1. The width/thickness ratio classification for columns A to D is in conformity with the width/thickness ratio classification for columns FA to FD in "Structural calculation instruction and explanation based on the new aseismic structure standards of the Enforcement Ordinance of the Revised Building Standards Act."

2. Standard product lengths are from 6m to 18m in 1 meter increments.

Note : Please contact us for items shown \* mark.



# JFE Column-BCP

## Product Specifications

JFE Column BCP is manufactured in accordance with the standards of The Japan Iron and Steel Federation.

### Chemical Composition

Grade	Chemical Composition (%)						Carbon Equivalent (%)	Weld crack Sensitivity Composition (%)
	C	Si	Mn	P	S	N		
BCP235(SN400B)	0.20 max.	0.35 max.	0.60 min.	0.030 max.	0.015 max.	0.006 max.	0.36 max.	0.26 max.
BCP235(SN400C)			1.40 max.	0.020 max.	0.008 max.			
BCP325(SN490B)	0.18 max.	0.55 max.	1.60 max.	0.030 max.	0.015 max.	0.006 max.	0.44 max.	0.29 max.
BCP325(SN490C)				0.020 max.	0.008 max.			

Remarks : 1. When necessary, addition of alloying elements other than the above is possible.

2. Assuming a free N content of 0.006% or less, an N content of 0.009% is possible.

3. With the agreement of the parties concerned, weld crack sensitivity composition can be applied in place of the carbon equivalent (Ceq).

$$Ceq (\%) = C + Mn/6 + Si/24 + Ni/40 + Cr/5 + Mo/4 + V/14$$

$$\text{Weld crack sensitivity composition (\%)} = C + Si/30 + Mn/20 + Cu/20 + Ni/60 + Cr/20 + Mo/15 + V/10 + 5B$$

### Mechanical Properties

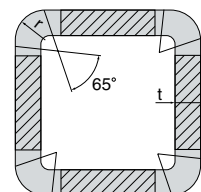
Grade	Thickness (mm)	Yield point or Proof stress (N/mm <sup>2</sup> )	Tensile strength (N/mm <sup>2</sup> )	Yield ratio (%)	Elongation		Charpy absorbed energy		
					Test piece	Elongation (%)	Test Temperature (C°)	Absorbed Energy (J)	
BCP235	6 ≤ t < 12	235 min.	400 min. 510 max.	—	No.1A	18 min.	0	27 min.	
	12 ≤ t ≤ 16	235 min.		80 max.					
	16 < t ≤ 40	355 max.							
BCP325	6 ≤ t < 12	325 min.	490 min. 610 max.	—		17 min.			
	12 ≤ t ≤ 16	325 min.		80 max.		21 min.			
	16 < t ≤ 40	445 max.							

Remarks : 1. For wall thicknesses of less than 8mm, the minimum elongation is calculated by subtracting 1.5% from the value shown above for each 1 mm reduction in thickness, rounded to the nearest whole number in accordance with JIS Z 8401.

2. Charpy absorbed energy is tested at flat plate areas, excluding welded surface of square hollow sections with thicknesses exceeding 12mm. Test pieces are JIS No.4, taken in longitudinal direction.

### Dimensional tolerance

Item and classification		Dimensional tolerance
Length of side		±1.0% and ±3.0mm
Unevenness of flat portion of each side		Less than 0.5% of side length, but less than 3mm
Angularity made by adjacent flat plate portions		±1.0°
Length		— 0 + not specified,
Camber	Product length less than 9m	1/1500 of total length, max.
	Product length 9m or more	1/1250 of total length, max.
Torsion		{1.5 × Length of side(mm)/1000} × Total length(m), mm, max.
Thickness	12mm or more, less than 16mm	−0.3 +1.0mm
	16mm or more, less than 25mm	−0.3 +1.2mm
	25mm or more, up to 40mm	−0.3 +1.3mm
Angular radius of curvature	12mm or more, less than 19mm	(3.5 ± 0.5) × Thickness(mm)
	over 19mm, less than 40mm	(3.5 ± 0.4) × Thickness(mm)



Remarks : 1. Unevenness of the flat portion, angularity between adjacent flat portions, and thickness tolerances apply to all parts except weld reinforcement areas.

2. The radius of curvature means the radius of curvature at the point of intersection of the exterior sides of the corner and lines at 45° to the adjacent side and is measured in the range of 65° around the center of intersection.

3. Camber tolerance is applicable to the upper to lower bend and right to left bend with a long pitch.

〈Note〉 Please contact us for products other than those specified above.

# JFE Column-BCP325T

## Product Specifications

### Chemical Composition

Grade	Chemical Composition (%)						Carbon Equivalent (%)	Weld crack Sensitivity Composition (%)
	C	Si	Mn	P	S	N		
BCP325T	0.18 max.	0.55 max.	1.60 max.	0.020 max.	0.005 max.	0.006 max.	0.44 max.	0.29 max.

Remarks : 1. When necessary, addition of alloying elements other than the above is possible.

2. With the agreement of the parties concerned, weld crack sensitivity composition can be applied in place of the carbon equivalent(Ceq).

$$Ceq (\%) = C + Mn/6 + Si/24 + Ni/40 + Cr/5 + Mo/4 + V/14$$

$$\text{Weld crack sensitivity composition } (\%) = C + Si/30 + Mn/20 + Cu/20 + Ni/60 + Cr/20 + Mo/15 + V/10 + 5B$$

3. HAZ toughness index in MAG welding (%) =  $C + Mn/8 + 6(P + S) + 12N - 4Ti$

However N = total N, When  $Ti \leq 0.005\%$ , consider  $Ti = 0$

### Mechanical Properties

Grade	Thickness (mm)	Yield point or Proof stress (N/mm <sup>2</sup> )	Tensile strength (N/mm <sup>2</sup> )	Yield ratio (%)	Elongation		Charpy absorbed energy	
					Test piece	Elongation (%)	Test Temperature (C°)	Absorbed Energy (J)
BCP325T	12 ≤ t ≤ 16	325 min.	490 min.	80 max.	No.1A	17 min.	0	70 min.
	16 < t ≤ 40	445 max.	610 max.			21 min.		

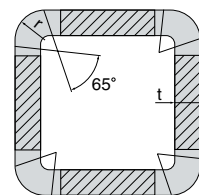
Remarks : 1. Charpy absorbed energy is tested at flat area and corner. Test pieces are JIS No.4, taken in the longitudinal direction.

2. Test pieces of Charpy absorbed energy are permissible to use the sub-size piece of 7.5mm width, when can not be taken the full size.

When, Absorbed energy ≥ 52J

### Dimensional tolerance

Item and classification		Dimensional tolerance
Length of side		±1.0% and ±3.0mm
Unevenness of flat portion of each side		Less than 0.5% of side length, but less than 3mm
Angularity made by adjacent flat plate portions		±1.0°
Length		- 0, + not specified
Camber	Product length less than 9m	1/1500 of total length, max.
	Product length 9m or more	1/1250 of total length, max.
Torsion		$\{1.5 \times \text{Length of side(mm)}/1000\} \times \text{Total length(m), mm, max.}$
Thickness	12mm or more, less than 16mm	- 0.3 + 1.0mm
	16mm or more, less than 25mm	- 0.3 + 1.2mm
	25mm or more, up to 40mm	- 0.3 + 1.3mm
Angular radius of curvature	12mm or more, less than 19mm	$(3.5 \pm 0.5) \times \text{Thickness(mm)}$
	over 19mm, up to 40mm	$(3.5 \pm 0.4) \times \text{Thickness(mm)}$



Remarks : 1. Unevenness of the flat portion, angularity between adjacent flat portions, and thickness tolerances apply to all parts except weld reinforcement areas.

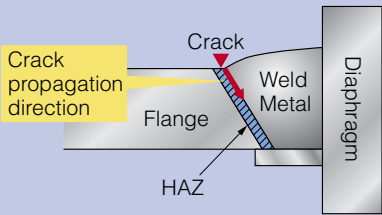
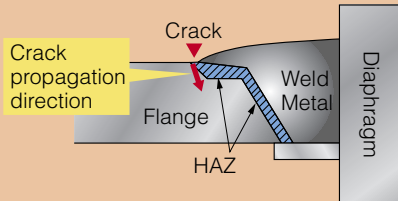
2. The radius of curvature means the radius of curvature at the point of intersection of the exterior sides of the corner and lines at 45° to the adjacent side and is measured in the range of 65° around the center of intersection.

〈Note〉 Please contact us for products other than those specified above.



# JFE Column-BCP/JFE Column-BCP325T

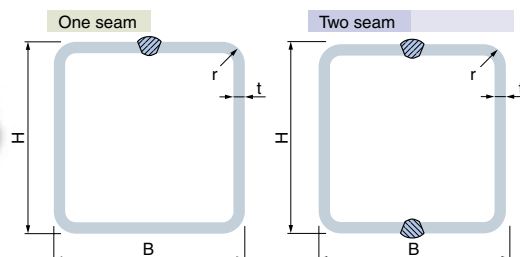
## ● Differences between BCP325 and BCP325T

	Conventional BCP	BCP325T												
1. Chemical composition	<table> <tr> <th>P</th><th>S</th><th>N (%)</th></tr> <tr> <td>0.030 max.</td><td>0.015 max.</td><td>0.006 max.</td></tr> </table> <p>However, if the free N content is reduced to 0.006% or less by addition of Al or other N-fixing element, N contents as high as 0.009% are permissible.</p>	P	S	N (%)	0.030 max.	0.015 max.	0.006 max.	<table> <tr> <th>P</th><th>S</th><th>N (%)</th></tr> <tr> <td>0.020 max.</td><td>0.005 max.</td><td>0.006 max.</td></tr> </table> <p>Shows total N content. Relaxation of N requirement as in conventional BCP is not permissible</p>	P	S	N (%)	0.020 max.	0.005 max.	0.006 max.
P	S	N (%)												
0.030 max.	0.015 max.	0.006 max.												
P	S	N (%)												
0.020 max.	0.005 max.	0.006 max.												
2. Corner toughness guarantee	No provision	Guarantee that $vEo \geq 70J$ using Charpy impact test piece taken from column corner.												
3. Guidance for execution of diaphragm weld by welding execution procedure	<p>No provision</p> <p>With conventional welding methods, in particular, there was a large danger of brittle fracture by the crack propagation route shown in the following figure.</p> 	<p>Even if cracking is initiated, the crack does not propagate in the embrittled zone along the groove.</p> <p>Depending on the material, ductile fracture may occur.</p> <p>In addition, recommended welding conditions are shown.</p> 												
4. Chemical composition index for securing HAZ toughness	No provision	<p>HAZ toughness index in MAG welding <math>f_{HAZ} \leq 0.58\%</math></p> <p>*HAZ toughness index in MAG welding <math>f_{HAZ} = C + Mn/8 + 6(P + S) + 12N - 4Ti</math></p> <p>However, N = total N.</p> <p>When <math>Ti \leq 0.005\%</math>, consider <math>Ti = 0</math>.</p>												
5. Available size range (applicable plate thickness)	6 mm or more.	12 mm or more												
6. Design method (Reference: See Cold Formed Square Section Steel Pipe Design and Execution Manual.)	<p>●Route1 Internal diaphragm seismic stress increase coefficient = 1.1 External and through diaphragm seismic stress increase coefficient = 1.1</p> <p>●Route2 Column-beam yield strength ratio <math>\geq 1.5</math></p> <p>●Route3 Internal diaphragm column yield strength reduction factor = 0.85 External and through diaphragm column yield strength reduction factor = 0.80</p>	<p>●Route1 Internal diaphragm seismic stress increase coefficient = 1.0 External and through diaphragm seismic stress increase coefficient = 1.0</p> <p>●Route2 Study of column-beam yield strength ratio not required.</p> <p>●Route3 Internal diaphragm column yield strength reduction factor = 1.00 External and through diaphragm column yield strength reduction factor = 1.00</p> <p>Accordingly, it is possible to design in the same manner as with welded four side box columns and hot formed square section seteel pipes.</p>												

\* HAZ toughness index in MAG welding conforms to "Development of New Steel Structure Building System Using Advanced Technology" and "Establishment of Performance Evaluation Method for Welding Materials and Welded Joints in Building Structures" final reports (Architectural Laboratories, Japan Iron and Steel Federation, Welding Society).

## ● Available Sizes and Section Moduli

### Square Section



Dimensions (mm)				Sectional Area (cm <sup>2</sup> )	Unit Mass (kg/m)	Geometrical moment of inertia (cm <sup>4</sup> )	Radius of Gyration of area (cm)	Modulus of section (cm <sup>3</sup> )	Plastic Modulus of section (cm <sup>3</sup> )	Ratio of Width to thickness	Classification of Ratio of Width to thickness	
H	B	R	t	A	W	I	i	Z	Zp	H/t	BCP235	BCP325 BCP325T
400	400	66.5	19	271.0	213	62,800	15.2	3,140	3,770	21.1	A	A
		77	22	307.7	242	69,500	15.0	3,480	4,220	18.2	A	A
		87.5	25	342.8	269	75,400	14.8	3,770	4,640	16.0	A	A
450	450	66.5	19	309.0	243	92,200	17.3	4,100	4,880	23.7	A	A
		77	22	351.7	276	103,000	17.1	4,560	5,490	20.5	A	A
		87.5	25	392.8	308	112,000	16.9	4,980	6,050	18.0	A	A
		98	28	432.3	339	121,000	16.7	5,360	6,580	16.1	A	A
		◆112	32	482.3	379	130,000	16.4	5,780	7,210	14.1	A	A
500	500	56	16	296.6	233	113,000	19.5	4,510	5,290	31.3	A	B
		66.5	19	347.0	272	130,000	19.3	5,180	6,130	26.3	A	A
		77	22	395.7	311	145,000	19.1	5,800	6,920	22.7	A	A
		87.5	25	442.8	348	159,000	18.9	6,360	7,660	20.0	A	A
		98	28	488.3	383	172,000	18.8	6,870	8,360	17.9	A	A
		112	32	546.3	429	187,000	18.5	7,470	9,210	15.6	A	A
550	550	56	16	328.6	258	153,000	21.5	5,550	6,480	34.4	B	C
		66.5	19	385.0	302	176,000	21.4	6,390	7,530	28.9	A	B
		77	22	439.7	345	197,000	21.2	7,180	8,520	25.0	A	A
		87.5	25	492.8	387	217,000	21.0	7,900	9,460	22.0	A	A
		98	28	544.3	427	236,000	20.8	8,570	10,300	19.6	A	A
		112	32	610.3	479	258,000	20.6	9,380	11,400	17.2	A	A
		◆126	36	673.4	529	277,000	20.3	10,100	12,400	15.3	A	A
		◆133	38	703.9	553	286,000	20.2	10,400	12,900	14.5	A	A
		◆140	40	733.6	576	294,000	20.0	10,700	13,400	13.8	A	A
600	600	56	16	360.6	283	201,000	23.6	6,690	7,790	37.5	C	C
		66.5	19	423.0	332	232,000	23.4	7,730	9,070	31.6	A	B
		77	22	483.7	380	261,000	23.2	8,710	10,300	27.3	A	B
		87.5	25	542.8	426	288,000	23.1	9,620	11,400	24.0	A	A
		98	28	600.3	471	314,000	22.9	10,500	12,500	21.4	A	A
		112	32	674.3	529	345,000	22.6	11,500	13,900	18.8	A	A
		◆126	36	745.4	585	372,000	22.4	12,400	15,200	16.7	A	A
		◆133	38	779.9	612	385,000	22.2	12,800	15,800	15.8	A	A
		◆140	40	813.6	639	397,000	22.1	13,200	16,400	15.0	A	A
650	650	56	16	392.6	308	258,000	25.6	7,940	9,220	40.6	C	C
		66.5	19	461.0	362	299,000	25.5	9,200	10,700	34.2	B	C
		77	22	527.7	414	337,000	25.3	10,400	12,200	29.5	A	B
		87.5	25	592.8	465	374,000	25.1	11,500	13,600	26.0	A	A
		98	28	656.3	515	407,000	24.9	12,500	14,900	23.2	A	A
		112	32	738.3	580	449,000	24.7	13,800	16,600	20.3	A	A
		◆126	36	817.4	642	487,000	24.4	15,000	18,200	18.1	A	A
		◆133	38	855.9	672	505,000	24.3	15,500	19,000	17.1	A	A
		◆140	40	893.6	702	521,000	24.1	16,000	19,700	16.3	A	A
700	700	56	16	424.6	333	325,000	27.7	9,300	10,800	43.8	C	D
		66.5	19	499.0	392	378,000	27.5	10,800	12,600	36.8	B	C
		77	22	571.7	449	427,000	27.3	12,200	14,300	31.8	A	B
		87.5	25	642.8	505	474,000	27.1	13,500	16,000	28.0	A	B
		98	28	712.3	559	518,000	27.0	14,800	17,600	25.0	A	A
		112	32	802.3	630	573,000	26.7	16,400	19,600	21.9	A	A
		◆126	36	889.4	698	623,000	26.5	17,800	21,500	19.4	A	A
		◆133	38	931.9	732	646,000	26.3	18,500	22,400	18.4	A	A
		◆140	40	973.6	764	669,000	26.2	19,100	23,300	17.5	A	A

note : ◆ Indicate two seamed products



# JFE Column-BCP/JFE Column-BCP325T

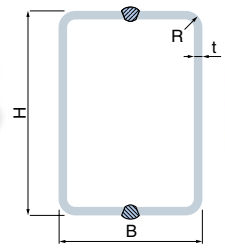
## ●Available Size and Section Moduli

### Square Section

Dimensions (mm)				Sectional Area (cm <sup>2</sup> )	Unit Mass (kg/m)	Geometrical moment of inertia (cm <sup>4</sup> )	Radius of gyration of area (cm)	Modulus of section (cm <sup>3</sup> )	Plastic Modulus of section (cm <sup>3</sup> )	Ratio of Width to thickness	Classification of Ratio of width to thickness	
H	B	R	t	A	W	I	i	Z	Zp	H/t	BCP235	BCP325 BCP325T
750	750	66.5	19	537.0	422	469,000	29.6	12,500	14,500	39.5	C	C
		77	22	615.7	483	531,000	29.4	14,200	16,600	34.1	B	C
		87.5	25	692.8	544	591,000	29.2	15,700	18,500	30.0	A	B
		98	28	768.3	603	647,000	29.0	17,200	20,400	26.8	A	A
		112	32	866.3	680	717,000	28.8	19,100	22,800	23.4	A	A
		126	36	961.4	755	782,000	28.5	20,900	25,000	20.8	A	A
		133	38	1,008	791	813,000	28.4	21,700	26,100	19.7	A	A
		140	40	1,054	827	842,000	28.3	22,400	27,200	18.8	A	A
800	800	66.5	19	575.0	451	574,000	31.6	14,300	16,600	42.1	C	D
		77	22	659.7	518	651,000	31.4	16,300	19,000	36.4	B	C
		87.5	25	742.8	583	725,000	31.2	18,100	21,200	32.0	A	B
		98	28	824.3	647	795,000	31.1	19,900	23,400	28.6	A	B
		112	32	930.3	730	884,000	30.8	22,100	26,200	25.0	A	A
		126	36	1,033	811	966,000	30.6	24,100	28,900	22.2	A	A
		133	38	1,084	851	1,000,000	30.4	25,100	30,100	21.1	A	A
		140	40	1,134	890	1,040,000	30.3	26,100	31,400	20.0	A	A
850	850	66.5	19	613.0	481	694,000	33.6	16,300	18,900	44.7	C	D
		77	22	703.7	552	788,000	33.5	18,500	21,600	38.6	C	C
		87.5	25	792.8	622	879,000	33.3	20,700	24,200	34.0	B	C
		98	28	880.3	691	965,000	33.1	22,700	26,700	30.4	A	B
		112	32	994.3	781	1,070,000	32.9	25,300	29,900	26.6	A	A
		126	36	1,105	868	1,180,000	32.6	27,700	33,000	23.6	A	A
		133	38	1,160	911	1,220,000	32.5	28,800	34,400	22.4	A	A
		140	40	1,214	953	1,270,000	32.4	29,900	35,900	21.3	A	A
900	900	66.5	19	651.0	511	829,000	35.7	18,400	21,300	47.4	C	D
		77	22	747.7	587	943,000	35.5	21,000	24,300	40.9	C	C
		87.5	25	842.8	662	1,050,000	35.3	23,400	27,300	36.0	B	C
		98	28	936.3	735	1,160,000	35.2	25,700	30,100	32.1	A	C
		112	32	1,058	831	1,290,000	34.9	28,700	33,800	28.1	A	B
		126	36	1,177	924	1,420,000	34.7	31,500	37,300	25.0	A	A
		133	38	1,236	970	1,480,000	34.5	32,800	39,000	23.7	A	A
		140	40	1,294	1,016	1,530,000	34.4	34,100	40,700	22.5	A	A
950	950	77	22	791.7	622	1,120,000	37.6	23,500	27,200	43.2	C	D
		87.5	25	892.8	701	1,250,000	37.4	26,300	30,600	38.0	C	C
		98	28	992.3	779	1,370,000	37.2	28,900	33,800	33.9	B	C
		112	32	1,122	881	1,530,000	37.0	32,300	38,000	29.7	A	B
		126	36	1,249	981	1,680,000	36.7	35,500	42,000	26.4	A	A
		133	38	1,312	1,030	1,760,000	36.6	37,000	43,900	25.0	A	A
		140	40	1,374	1,078	1,830,000	36.5	38,500	45,800	23.8	A	A
1000	1000	77	22	835.7	656	1,310,000	39.6	26,200	30,300	45.5	C	D
		87.5	25	942.8	740	1,470,000	39.4	29,300	34,000	40.0	C	C
		98	28	1,048	823	1,610,000	39.2	32,300	37,700	35.7	B	C
		112	32	1,186	931	1,810,000	39.0	36,100	42,400	31.3	A	B
		126	36	1,321	1,037	1,990,000	38.8	39,700	46,900	27.8	A	B
		133	38	1,388	1,090	2,070,000	38.6	41,500	49,100	26.3	A	A
		140	40	1,454	1,141	2,160,000	38.5	43,100	51,200	25.0	A	A

## ●Available Size and Section Moduli

Rectangular Section (two seam)



Dimensions (mm)				Sectional Area (cm <sup>2</sup> )	Unit Mass (kg/m)	Geometrical Moment of inertia (cm <sup>4</sup> )		Radius of Gyraton of area (cm)		Modurus of section (cm <sup>3</sup> )		Plastic Modulus of section (cm <sup>3</sup> )		Ratio of Width to thickness	Classification of Ratio of Width to thickness	
H	B	R	t	A	W	Ix	Iy	ix	iy	Zx	Zy	Zpx	Zpy	H/t	BCP235	BCP325 BCP325T
700	600	66.5	19	461.0	362	333,000	264,000	26.9	23.9	9,530	8,800	11,300	10,200	36.8	B	C
		77	22	527.7	414	376,000	298,000	26.7	23.8	10,800	9,930	12,800	11,600	31.8	A	B
		87.5	25	592.8	465	417,000	330,000	26.5	23.6	11,900	11,000	14,300	12,900	28.0	A	B
		98	28	656.3	515	455,000	360,000	26.3	23.4	13,000	12,000	15,700	14,100	25.0	A	A
		112	32	738.3	580	501,000	396,000	26.1	23.2	14,300	13,200	17,400	15,700	21.9	A	A
		126	36	817.4	642	544,000	430,000	25.8	22.9	15,500	14,300	19,100	17,200	19.4	A	A
		133	38	856.0	672	563,000	445,000	25.6	22.8	16,100	14,800	19,900	17,900	18.4	A	A
		140	40	893.6	702	582,000	460,000	25.5	22.7	16,600	15,300	20,600	18,600	17.5	A	A
800	600	66.5	19	499.0	392	458,000	296,000	30.3	24.4	11,500	9,870	13,700	11,300	42.1	C	D
		77	22	571.7	449	518,000	335,000	30.1	24.2	13,000	11,200	15,600	12,800	36.4	B	C
		87.5	25	642.8	505	575,000	371,000	29.9	24.0	14,400	12,400	17,400	14,300	32.0	A	B
		98	28	712.3	559	628,000	406,000	29.7	23.9	15,700	13,500	19,100	15,700	28.6	A	B
		112	32	802.3	630	695,000	448,000	29.4	23.6	17,400	14,900	21,300	17,600	25.0	A	A
		126	36	889.4	698	756,000	487,000	29.1	23.4	18,900	16,200	23,400	19,300	22.2	A	A
		133	38	931.9	732	784,000	505,000	29.0	23.3	19,600	16,800	24,400	20,100	21.1	A	A
		140	40	973.6	764	811,000	522,000	28.9	23.2	20,300	17,400	25,300	20,800	20.0	A	A
800	700	66.5	19	537.0	422	516,000	422,000	31.0	28.0	12,900	12,000	15,200	13,900	42.1	C	D
		77	22	615.7	483	585,000	478,000	30.8	27.9	14,600	13,600	17,300	15,800	36.4	B	C
		87.5	25	692.8	544	650,000	531,000	30.6	27.7	16,200	15,200	19,300	17,700	32.0	A	B
		98	28	768.3	603	712,000	581,000	30.4	27.5	17,800	16,600	21,300	19,400	28.6	A	B
		112	32	866.3	680	789,000	644,000	30.2	27.3	19,700	18,400	23,800	21,700	25.0	A	A
		126	36	961.4	755	861,000	702,000	29.9	27.0	21,500	20,100	26,100	23,900	22.2	A	A
		133	38	1,008	791	894,000	730,000	29.8	26.9	22,400	20,900	27,200	24,900	21.1	A	A
		140	40	1,054	827	926,000	756,000	29.7	26.8	23,200	21,600	28,300	25,900	20.0	A	A
900	650	66.5	19	556.0	436	644,000	393,000	34.0	26.6	14,300	12,100	17,100	13,700	47.4	C	D
		77	22	637.7	501	731,000	446,000	33.9	26.4	16,200	13,700	19,500	15,700	40.9	C	C
		87.5	25	717.8	563	813,000	496,000	33.7	26.3	18,100	15,300	21,800	17,500	36.0	B	C
		98	28	796.3	625	891,000	543,000	33.4	26.1	19,800	16,700	24,000	19,300	32.1	A	C
		112	32	898.3	705	989,000	602,000	33.2	25.9	22,000	18,500	26,900	21,600	28.1	A	B
		126	36	997.4	783	1,080,000	657,000	32.9	25.7	24,000	20,200	29,500	23,700	25.0	A	A
		133	38	1,046	821	1,120,000	683,000	32.8	25.5	24,900	21,000	30,800	24,800	23.7	A	A
		140	40	1,094	859	1,160,000	707,000	32.6	25.4	25,800	21,800	32,100	25,800	22.5	A	A
900	700	66.5	19	575.0	541	681,000	466,000	34.4	28.5	15,100	13,300	17,900	15,200	47.4	C	D
		77	22	659.7	518	773,000	528,000	34.2	28.3	17,200	15,100	20,500	17,300	40.9	C	C
		87.5	25	742.8	583	861,000	588,000	34.0	28.1	19,100	16,800	22,900	19,300	36.0	B	C
		98	28	824.3	647	944,000	644,000	33.8	28.0	21,000	18,400	25,200	21,300	32.1	A	C
		112	32	930.3	730	1,050,000	716,000	33.6	27.7	23,300	20,400	28,200	23,900	28.1	A	B
		126	36	1,033	811	1,150,000	782,000	33.3	27.5	25,500	22,300	31,100	26,300	25.0	A	A
		133	38	1,084	851	1,190,000	813,000	33.2	27.4	26,500	23,200	32,500	27,400	23.7	A	A
		140	40	1,134	890	1,240,000	843,000	33.0	27.3	27,500	24,100	33,800	28,600	22.5	A	A
1000	700	77	22	703.7	552	995,000	579,000	37.6	28.7	19,900	16,500	23,900	18,800	45.5	C	D
		87.5	25	792.8	622	1,110,000	645,000	37.4	28.5	22,200	18,400	26,700	21,000	40.0	C	C
		98	28	880.3	691	1,220,000	708,000	37.2	28.4	24,400	20,200	29,500	23,200	35.7	B	C
		112	32	994.3	781	1,360,000	787,000	36.9	28.1	27,100	22,500	33,100	26,000	31.3	A	B
		126	36	1,105	868	1,480,000	861,000	36.6	27.9	29,700	24,600	36,500	28,700	27.8	A	B
		133	38	1,160	911	1,550,000	896,000	36.5	27.8	30,900	25,600	38,100	29,900	26.3	A	A
		140	40	1,214	953	1,600,000	930,000	36.4	27.7	32,100	26,600	39,700	31,200	25.0	A	A
1000	800	77	22	747.7	587	1,100,000	784,000	38.4	32.4	22,000	19,600	26,000	22,400	45.5	C	D
		87.5	25	842.8	662	1,230,000	875,000	38.2	32.2	24,600	21,900	29,200	25,100	40.0	C	C
		98	28	936.3	735	1,350,000	962,000	38.0	32.1	27,000	24,100	32,200	27,700	35.7	B	C
		112	32	1,058	831	1,510,000	1,070,000	37.7	31.8	30,100	26,800	36,200	31,100	31.3	A	B
		126	36	1,177	942	1,650,000	1,180,000	37.5	31.6	33,000	29,400	39,900	34,400	27.8	A	B
		133	38	1,236	970	1,720,000	1,230,000	37.3	31.5	34,400	30,600	41,700	35,900	26.3	A	A
		140	40	1,294	1,016	1,790,000	1,270,000	37.2	31.4	35,800	31,800	43,500	37,500	25.0	A	A

Remarks : 1. The width/thickness ratio classification for columns A to D is in conformity with the width/thickness ratio classification for columns FA to FD in "Structural calculation instruction and explanation based on the new aseismic structure standards of the Enforcement Ordinance of the Revised Building Standards Act."

2. please contact us for wall thickness and dimensions other than those listed above.



# JFE Column-BCP/JFE Column-BCP325T

## ●Available Product Length of JFE Column-BCP & BCP325T

Thickness (mm) Length (mm)	16	19	22	25	28	32	36	40
400 × 400		6 ~ 12	5 ~ 10	4.5 ~ 9 4.5 ~ 7.5				
450 × 450		6 ~ 12	6 ~ 12	6 ~ 12	6 ~ 12	5 ~ 10 5 ~ 9		
500 × 500	6 ~ 12	6 ~ 12	6 ~ 12	6 ~ 12	6 ~ 12	6 ~ 12 6 ~ 10		
550 × 550	6 ~ 12	6 ~ 12	6 ~ 12	6 ~ 12	6 ~ 12	6 ~ 12	5 ~ 10 5 ~ 9	5 ~ 9 5 ~ 8
600 × 600	6 ~ 12	6 ~ 12	6 ~ 12	6 ~ 12	6 ~ 12	6 ~ 12	5 ~ 10 5 ~ 9	5 ~ 9 5 ~ 8
650 × 650	6 ~ 12	6 ~ 12	6 ~ 12	6 ~ 12	6 ~ 12	6 ~ 12	5 ~ 10 5 ~ 9	5 ~ 9 5 ~ 8
700 × 700	6 ~ 11	6 ~ 12	6 ~ 12	6 ~ 12	6 ~ 12	6 ~ 12	5 ~ 10 5 ~ 9	5 ~ 9 5 ~ 8
750 × 750		5 ~ 11	5 ~ 11	5 ~ 11	5 ~ 11	5 ~ 11 5 ~ 10	5 ~ 10 5 ~ 9	5 ~ 9 5 ~ 8
800 × 800		5 ~ 11	5 ~ 11	5 ~ 11	5 ~ 11	5 ~ 11 5 ~ 10	5 ~ 10 5 ~ 9	5 ~ 9 5 ~ 8
850 × 850		5 ~ 11	5 ~ 11	5 ~ 11	5 ~ 11	5 ~ 11 5 ~ 10	5 ~ 10 5 ~ 9	5 ~ 9 5 ~ 8
900 × 900		5 ~ 11	5 ~ 11	5 ~ 11	5 ~ 11	5 ~ 11 5 ~ 10	5 ~ 10 5 ~ 9	5 ~ 9 5 ~ 8
950 × 950			5 ~ 11	5 ~ 11	5 ~ 11	5 ~ 11 5 ~ 10	5 ~ 10 5 ~ 9	5 ~ 9 5 ~ 8
1000 × 1000			5 ~ 11	5 ~ 11	5 ~ 11	5 ~ 11 5 ~ 10	5 ~ 9.5 5 ~ 9	5 ~ 8.5 5 ~ 8

Remarks : 1. Figures show the range of available product lengths(m). The upper line shows available lengths of BCP235; the lower line shows BCP325 and BCP325T.

2. Standard product lengths are as shown above, in 1 meter increments.

3.   Indicates two seamed products.

## ●Precision Cutting and Edge Preparation of JFE Column-BCP & BCP325T

**Precision cutting and edge preparation can be performed when specified in the customer's order.**

1. Available size range for precision cutting/edge preparation : 300 × 300 ~ 1000 × 1000

2. Precision cutting accuracy : Specified length ± 2.00mm

3. Standard groove angle : 350

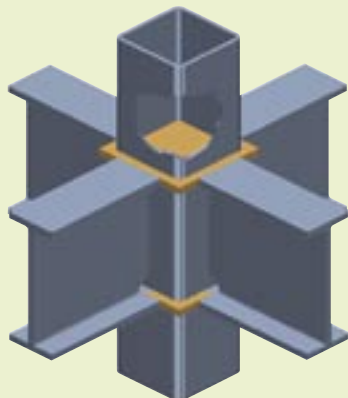
4. The cut section or groove surface is as-machine cut or as-gas cut and may rust.  
Rust preventive oil coating is available subject to negotiation.

5. The edge preparation surface is extremely sharp and must be handled carefully to avoid injury.

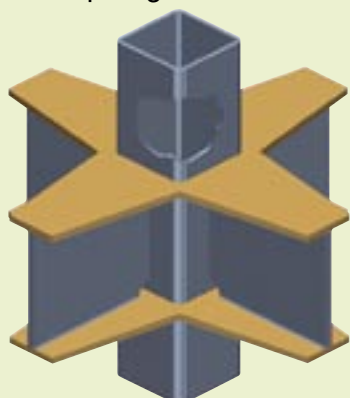
## Pillar and Beam Junctions using JFE Columns

The methods of pillar and beam junctions using NK Columns shown in the following figures can be applied to any type of diaphragm.

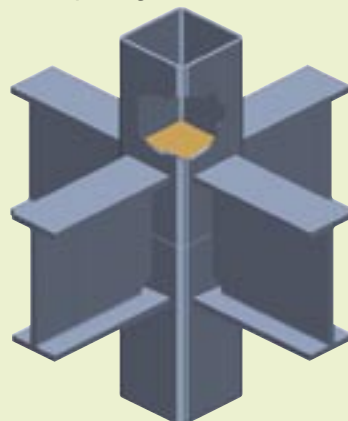
### ●Penetrated diaphragm



### ●External diaphragm



### ●Internal diaphragm



### 〈Note〉

Application of Hot Zn dip galvanized to JFE Column may cause cracks according to treatment conditions.

In case that the Hot Zn dip galvanized is tried, please let us know it when ordering.

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