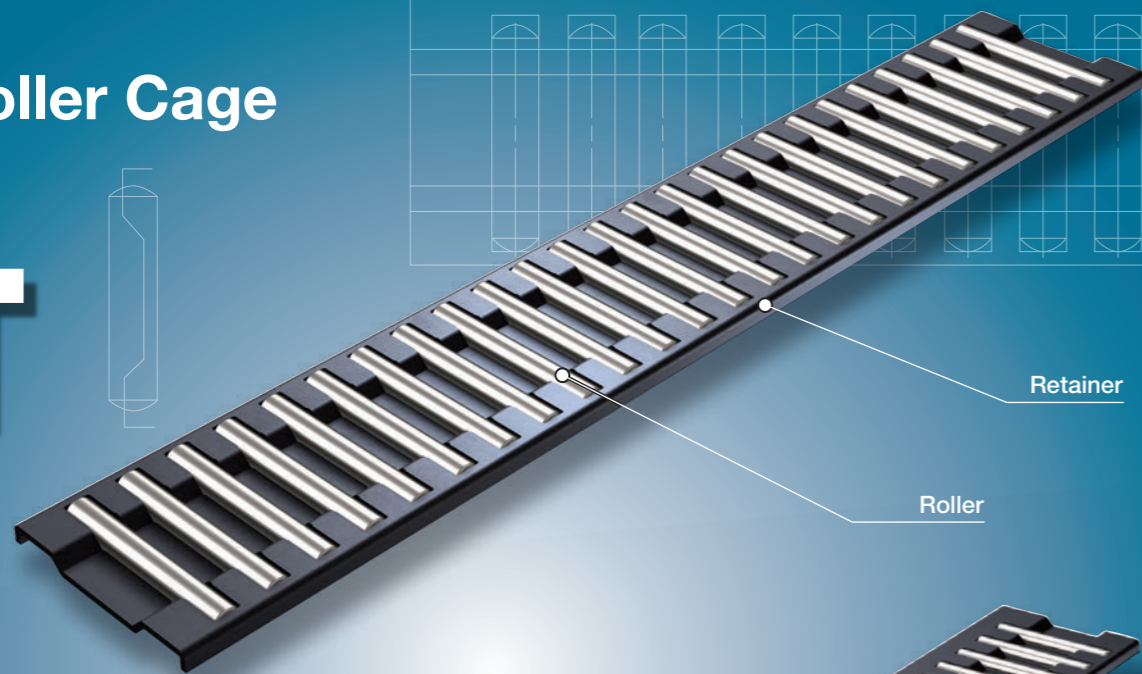
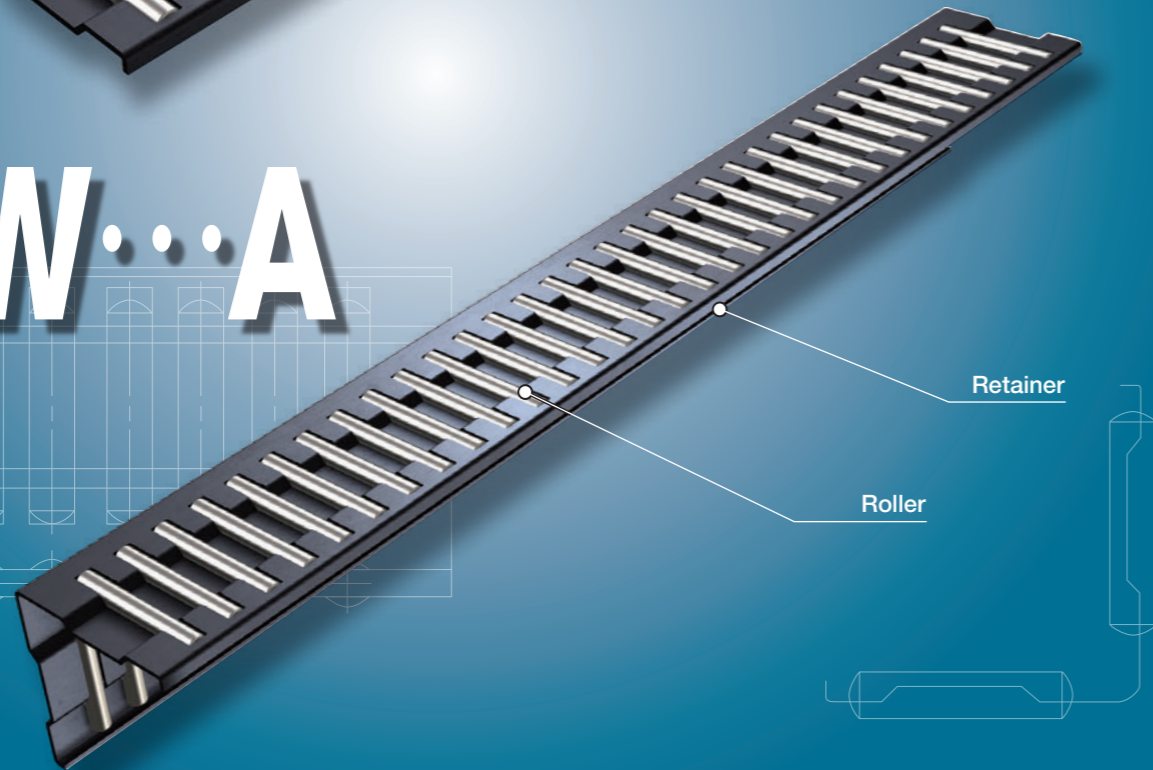


# Flat Roller Cage

# FT



# FTW...A



## Points

### 1 Low section

Flat Roller Cage is a limited linear motion guide consisting of high accuracy rollers and a very precise retainers and features low cross sectional height which is as high as the roller diameter.

### 2 Large load rating

Rollers are assembled in a cage with a small pitch distance, so load ratings are large and the rigidity is high.

### 3 Simple replacement for rolling guide

A single row model and a double row model with a 90° are standardized and can be easily used to modify the conventional plain guide ways of machine tools, etc. into a rolling guide type without a large-scale redesign of the bed.

### 4 Smooth operations and low noise

As a retainer processed with high accuracy guides the rollers, the frictional resistance is very low without stick-slip, and stable linear motion is obtained. Retainers made of synthetic resin are most suitable for applications where low noise is required.

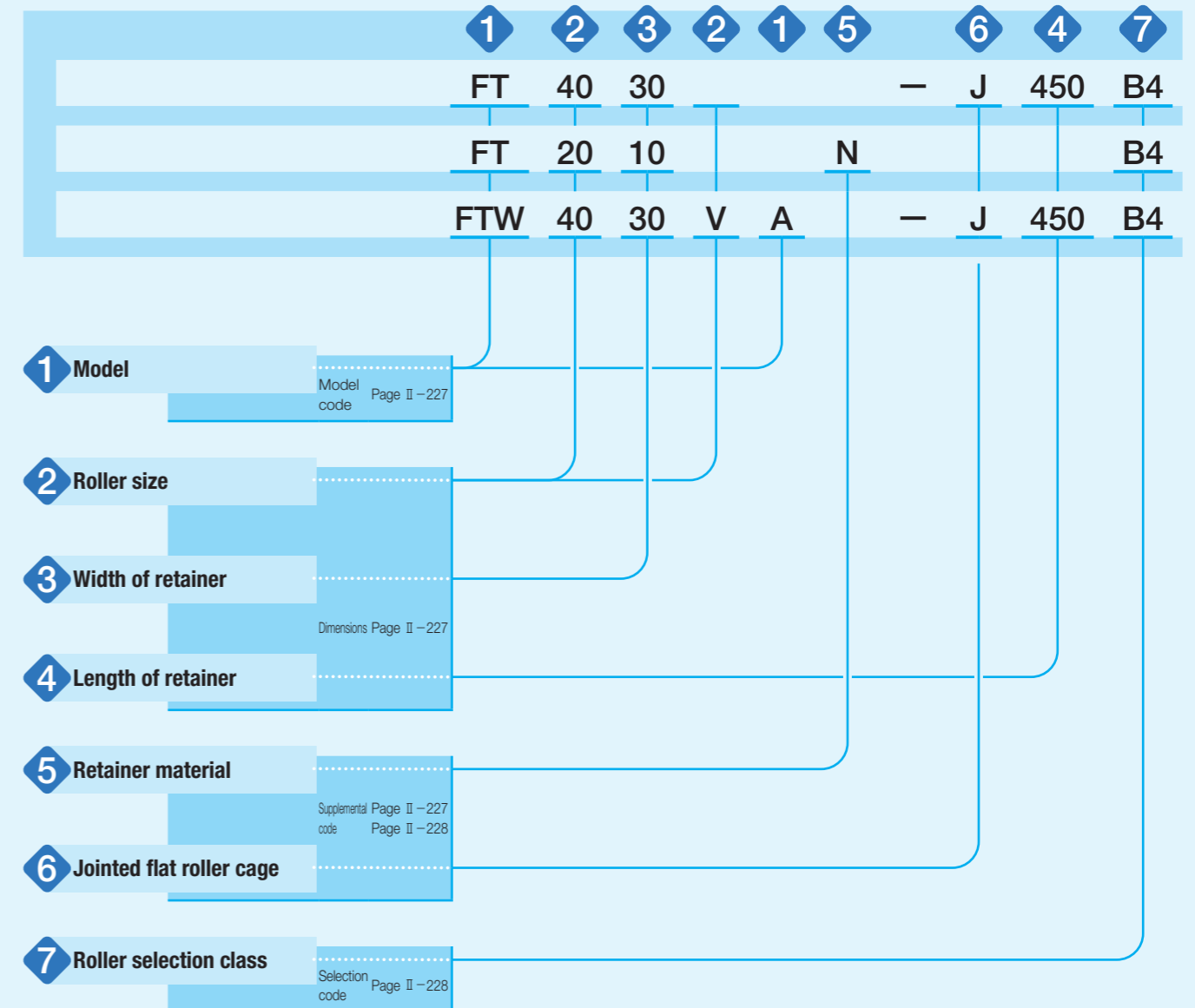
### 5 Easy handling

The rollers are caged in a retainer securely, allowing easy handling.

## Identification Number and Specification

### Example of an identification number

The specification of FT and FTW...A are indicated by the identification number. Indicate the identification number, consisting of a model code, dimensions, a supplemental code, and a selection code for each specification to apply.



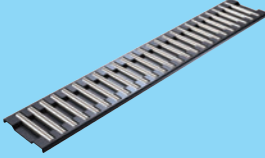
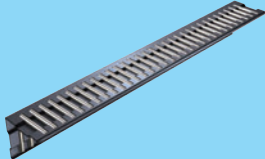
RW · SR · GSN  
FT · FTW...A

# Identification Number and Specification - Model · Roller Size · Width of Retainer · Length of Retainer · Retainer Material -

**1 Model**  
 Flat Roller Cage  
 Single row type : FT  
 Double row angle type : FTW...A  
 For applicable models and roller sizes, see Table 1.

**2 Roller size**  
 Indicate 10 times as large value as the roller diameter (mm).  
 Indicate  $10\sqrt{2}$  times as large integer value as roller diameter (mm) for those with code V.

**Table 1 Models and sizes of FT and FTW...A**

| Shape  | Retainer material    | Model   | Roller size |    |    |    |    |    |     |     |
|--|----------------------|---------|-------------|----|----|----|----|----|-----|-----|
|  |                      |         | 20          | 25 | 30 | 35 | 40 | 50 | 100 | 200 |
| Single row type<br>       | Steel made           | FT      | ○           | ○  | ○  | ○  | ○  | ○  | ○   | ○   |
|  | Synthetic resin made | FT...N  | ○           | ○  | ○  | ○  | -  | -  | -   | -   |
| Double row angle type<br> | Steel made           | FTW...A | -           | -  | -  | -  | ○  | ○  | ○   | ○   |

**3 Width of retainer**  
 Indicate the width of retainer in mm.

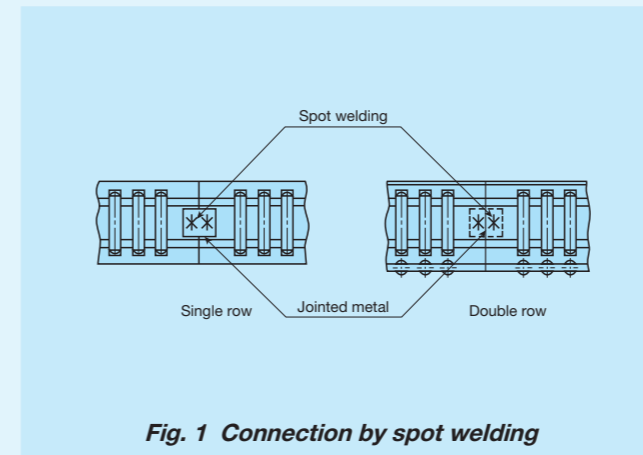
**4 Length of retainer**  
 Indicate the length of retainer in mm.  
 Length other than the standard length stated in the dimension table can be prepared upon request.  
 Contact **IKO** for further information.

**5 Retainer material**  
 Steel made : No symbol Specify the retainer material.  
 Synthetic resin made : N For applicable models and roller sizes, see Table 1.

# - Jointed Flat Roller Cage · Roller Selection Class -

**6 Jointed flat roller cage**  
 Standard length : No symbol Indicate full length of the retainer as well and specify ones longer than the standard length.  
 Jointed flat roller cage : J

Flat Roller Cage with extended full length can be produced by connecting steel made retainers each other. If needed, please specify a retainer full length in mm after the supplemental code "J" following the way indicated in the example of an identification number. Maximum length of a jointed flat roller cage is indicated in Table 2.  
 Length longer than the maximum stated in Table 2 can be prepared upon request. Contact **IKO** for further information.



**Fig. 1 Connection by spot welding**

**Table 2 Maximum length of jointed flat roller cage** unit: mm

| Identification number | Maximum length of retainer |
|-----------------------|----------------------------|
| FT 2010               | 300                        |
| FT 2515               |                            |
| FT 3020               |                            |
| FT 3525               | 375                        |
| FT 4030               |                            |
| FT 4035               | 600                        |
| FT 4026 V             |                            |
| FT 5038               | 1 000                      |
| FT 5043               |                            |
| FT 5030 V             |                            |
| FT 10080              |                            |
| FT 10060 V            |                            |
| FT 200120             |                            |
| FT 200100 V           | 1 000                      |
| FTW 4030 VA           |                            |
| FTW 5045 A            | 1 000                      |
| FTW 5050 A            |                            |
| FTW 5035 VA           |                            |
| FTW 10095 A           | 1 500                      |
| FTW 10070 VA          |                            |
| FTW 200150 A          |                            |
| FTW 200120 VA         |                            |

**7 Roller selection class**  
 For roller selection classes and tolerances of dimensions for roller diameters, see Table 3.

Tolerances of dimensions for roller diameters are indicated in Table 3. Normally, one of the standard selection classes is delivered. To achieve accurate load distribution, it is necessary to combine products with the same selection code. If needed, please specify it following the way indicated in the example of an identification number.

**Table 3 Roller selection class** unit:  $\mu\text{m}$

| Selection class | Selection code | Average tolerances of dimensions for roller diameters <sup>(1)</sup> |
|-----------------|----------------|--|
| Standard        | B2             | 0 ~ -2   |
|                 | B4             | -2 ~ -4  |
|                 | B6             | -4 ~ -6  |
|                 | B8             | -6 ~ -8  |
| Semi-standard   | A1             | 0 ~ -1   |
|                 | A2             | -1 ~ -2  |
|                 | A3             | -2 ~ -3  |
|                 | A4             | -3 ~ -4  |
|                 | A5             | -4 ~ -5  |
|                 | A6             | -5 ~ -6  |

Note <sup>(1)</sup> Allowance of roundness and cylindricity follows JIS B 1506:2005 roller bearing - roller.

# Precaution for Use

## ① Raceway

Recommended values for surface hardness and roughness of mating raceway are shown in Table 4 and the recommended value for the minimum effective hardening depth is shown in Table 5.

**Table 4 Surface hardness and roughness of raceway**

| Item              | Recommended value                     | Remark   |
|-------------------|---------------------------------------|--|
| Surface hardness  | 58~64HRC                              | When the surface hardness is low, multiply the load rating by hardness factor (1). |
| Surface roughness | 0.2 μmRa or lower (0.8 μmRy or lower) | Where accuracy standard is low, around 0.8 μmRa (3.2 μmRy) is also allowed.        |

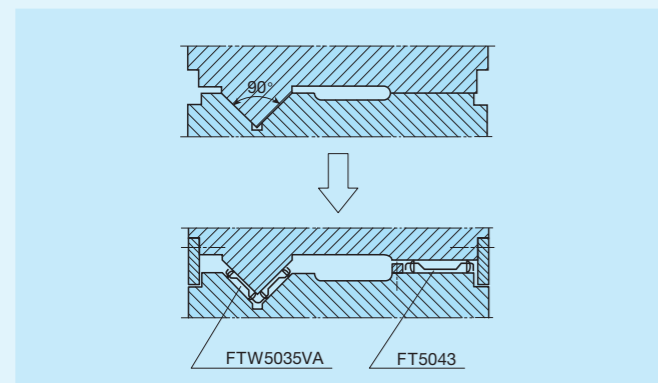
Note (1) For hardness factor, refer to Fig. 3 in page III-5.

**Table 5 Minimum effective hardening depth of raceway**  
unit: mm

| Roller diameter |        | Recommended value for minimum effective hardening depth |
|-----------------|--------|---|
| Over            | Incl.  |   |
| —               | 3      | 0.5   |
| 3               | 4      | 0.8   |
| 4               | 5      | 1.0   |
| 5               | 8      | 1.5   |
| 8               | 10     | 2.0   |
| 10              | 14.142 | 2.5   |
| 14.142          | 20     | 3.5   |

## ② When used for bed surface and 90° V surface

After complete lapping as indicated in Fig. 2, mount FT to FTW...VA, or FT...V to FTW...A. Combination of Flat Roller Cage at this point is indicated in Table 6.



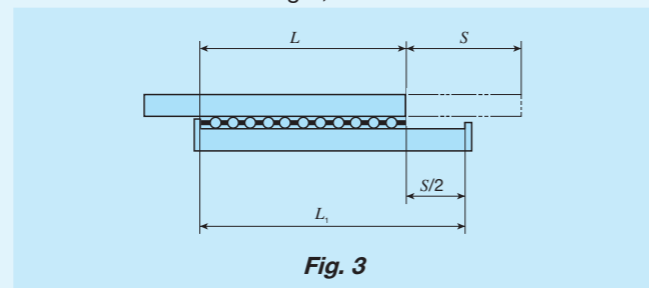
**Fig. 2 Example of use on flat surface and 90° V surface**

## ③ Stroke length and retainer length

Movement in a linear direction as in Fig. 3 will move the Flat Roller Cage in the same direction by one half of the movement amount. Therefore, way length, stroke length and retainer length are correlated as follows:

$$L_1 = \frac{S}{2} + L \dots \dots \dots (1)$$

where,  $L_1$  : Way length, mm  
 $S$  : Stroke length, mm  
 $L$  : Retainer length, mm



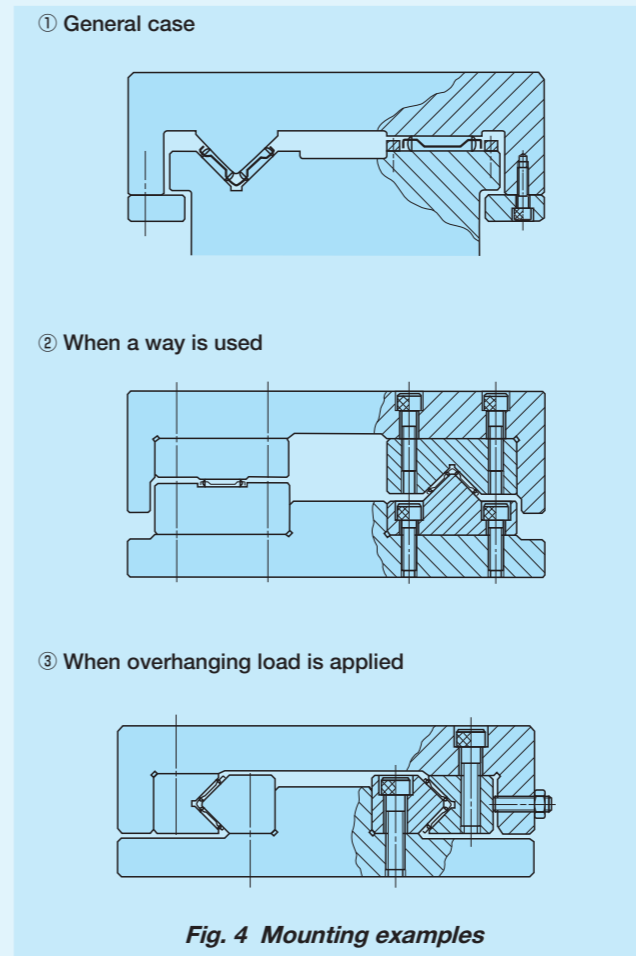
## ④ Operating temperature

If the retainer is made of steel, it can withstand higher temperature. However, if you use it in an environment exceeding 100°C, please contact **IKO**.

The retainer made of synthetic resin can withstand up to 100°C. For continuous operation, please keep it under 80°C.

# Precaution for Mounting

FT and FTW...A are typically mounted as indicated in Fig. 4. When the heat-treated and polished way is mounted to the device body, you must be careful not to make deformation by tightening.



**Fig. 4 Mounting examples**

**Table 6 Combination of Flat Roller Cage**

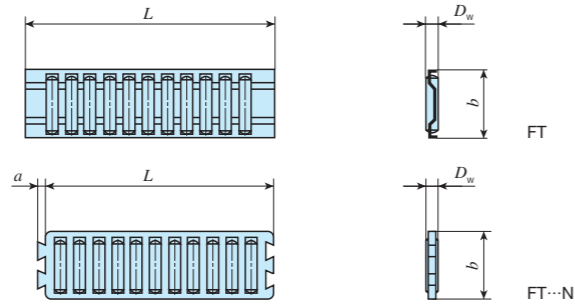
| Combination Number | For flat surface      |                       | For 90° V surface     |                       |
|--------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                    | Identification number | Roller diameter $D_w$ | Identification number | Roller diameter $D_w$ |
| 1                  | FT 4030               | 4                     | FTW 4030 VA           | 2.828                 |
| 2                  | FT 4035               | 4                     | FTW 4030 VA           | 2.828                 |
| 3                  | FT 5038               | 5                     | FTW 5035 VA           | 3.535                 |
| 4                  | FT 5043               | 5                     | FTW 5035 VA           | 3.535                 |
| 5                  | FT 10060 V            | 7.071                 | FTW 5045 A            | 5                     |
| 6                  | FT 10060 V            | 7.071                 | FTW 5050 A            | 5                     |
| 7                  | FT 10080              | 10                    | FTW 10070 VA          | 7.071                 |
| 8                  | FT 200100 V           | 14.142                | FTW 10095 A           | 10                    |
| 9                  | FT 200120             | 20                    | FTW 200120 VA         | 14.142                |

unit: mm

# IKO Flat Roller Cage

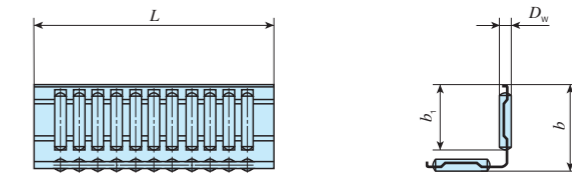
## Single row type Flat Roller Cage

|       |    |    |     |     |
|-------|----|----|-----|-----|
| Shape | FT |    |     |     |
|       |    |    |     |     |
| Size  | 20 | 25 | 30  | 35  |
|       | 40 | 50 | 100 | 200 |



## Double row angle type Flat Roller Cage

|       |         |    |     |     |
|-------|---------|----|-----|-----|
| Shape | FTW...A |    |     |     |
|       |         |    |     |     |
| Size  | —       | —  | —   | —   |
|       | 40      | 50 | 100 | 200 |



| Identification number |                             | Mass (Ref.)<br>g | Nominal dimensions<br>mm |     |     |     | Basic dynamic<br>load rating<br>C<br>N | Basic static<br>load rating<br>C <sub>0</sub><br>N |           |
|-----------------------|-----------------------------|------------------|--------------------------|-----|-----|-----|--|--|-----------|
| Steel retainer        | Synthetic resin<br>retainer |                  | D <sub>w</sub>           | b   | L   | a   |  |  |           |
| —                     | FT 2010 N                   | 1.63             | 2                        | 10  | 32  | 2   | 8 660                                  | 19 800   |           |
| FT 2010 - 32          | —                           | 1.91             |                          |     | —   | —   | —                                      | 9 710  | 22 900    |
| FT 2010 - 100         | —                           | 5.8              |                          |     | 100 | —   | —                                      | 22 900   | 68 700    |
| —                     | FT 2515 N                   | 4.3              | 2.5                      | 15  | 45  | 2.5 | 17 300                                 | 41 100   |           |
| FT 2515 - 45          | —                           | 5.6              |                          |     | —   | —   | —                                      | 22 000   | 56 200    |
| FT 2515 - 100         | —                           | 11.6             |                          |     | 100 | —   | —                                      | 37 900   | 112 000   |
| —                     | FT 3020 N                   | 9.7              | 3                        | 20  | 60  | 3   | 31 600                                 | 78 800   |           |
| FT 3020 - 60          | —                           | 12.5             |                          |     | —   | —   | —                                      | 37 100   | 96 700    |
| —                     | FT 3525 N                   | 18.6             |                          |     | 75  | 3.5 | —                                      | 51 400   | 132 000   |
| FT 3525 - 75          | —                           | 23               | 3.5                      | 25  | 75  | —   | 58 400                                 | 155 000  |           |
| FT 4030 - 150         | —                           | 73               |                          |     | 30  | —   | —                                      | 127 000  | 382 000   |
| FT 4035 - 150         | —                           | 86               |                          |     | 35  | 150 | —                                      | 143 000  | 446 000   |
| FT 4026V - 150        | —                           | 45               | 2.828                    | 26  | 150 | —   | 97 300                                 | 347 000  |           |
| FT 5038 - 250         | —                           | 195              | 5                        | 38  | 250 | —   | 267 000                                | 851 000  |           |
| FT 5043 - 250         | —                           | 200              |                          |     |     |     | 43                                     | 306 000  | 1 020 000 |
| FT 5030V - 250        | —                           | 103              | 3.535                    | 30  | 250 | —   | 180 000                                | 652 000  |           |
| FT 10080 - 500        | —                           | 1 610            | 10                       | 80  | 500 | —   | 1 390 000                              | 4 370 000  |           |
| FT 10060V - 500       | —                           | 870              | 7.071                    | 60  | 500 | —   | 838 000                                | 2 900 000  |           |
| FT 200120 - 500       | —                           | 4 940            | 20                       | 120 | 500 | —   | 3 120 000                              | 7 670 000  |           |
| FT 200100V - 500      | —                           | 2 860            | 14.142                   | 100 | 500 | —   | 2 090 000                              | 5 820 000  |           |

| Identification number |                             | Mass (Ref.)<br>g | Nominal dimensions<br>mm |     |     |                | Basic dynamic<br>load rating<br>C<br>N | Basic static<br>load rating<br>C <sub>0</sub><br>N |
|-----------------------|-----------------------------|------------------|--------------------------|-----|-----|----------------|--|--|
| Steel retainer        | Synthetic resin<br>retainer |                  | D <sub>w</sub>           | b   | L   | b <sub>1</sub> |  |  |
| FTW 4030 VA - 150     | —                           | 94               | 2.828                    | 30  | 150 | 24.5           | 118 000                                | 491 000  |
| FTW 5045 A - 250      | —                           | 410              | 5                        | 45  | 250 | 35.5           | 332 000                                | 1 240 000  |
| FTW 5050 A - 250      | —                           | 460              |                          | 50  |     | 40.5           | 371 000                                | 1 440 000  |
| FTW 5035 VA - 250     | —                           | 220              | 3.535                    | 35  | 250 | 29             | 218 000                                | 922 000  |
| FTW 10095 A - 500     | —                           | 3 360            | 10                       | 95  | 500 | 77             | 1 680 000                              | 6 180 000  |
| FTW 10070 VA - 500    | —                           | 1 790            | 7.071                    | 70  | 500 | 56.5           | 1 020 000                              | 4 110 000  |
| FTW 200150 A - 500    | —                           | 10 200           | 20                       | 150 | 500 | 118            | 3 790 000                              | 10 800 000   |
| FTW 200120 VA - 500   | —                           | 5 940            | 14.142                   | 120 | 500 | 96             | 2 530 000                              | 8 220 000  |