Needle roller

When made of GCr15 steel, the hardness of needle roller is HRC61 ~ 65. There are two types of needle rollers, needle rollers with flat head and needle rollers with round head. Three tolerance grades (2, 3 and 5), among of them, Grade 2 is the highest and Grade 5 is the lowest. The roughness of cylindrical surface of the needle roller shall not be greater than 0.2 μm. Radius limits of round head of needles roller with round head for different grades should be: $R_{smin} = D_w/2$, $R_{smax} = L_w/2$. Shape tolerances of needle roller shall conform to the specifications in Table 1. The limits of chamfer dimension for needle rollers with flat head for different grades shall conform to the specifications in Table 2.

Needle roller codes are represented with the following items:
(1) (2) (3) (4) (5)

(1): Shapes of needle roller heads, flat head needle rollers represented with P, round head needle roller without marked.
(2): Nominal dimension of needle roller: Diameter length in "mm" (not coded).
(3): Tolerance class is represented with G and digital, i.e. G2, G3, G5, G5 without marked.
(4): Gauge of needle roller: represented with upper and lower deviations in μm (not marked).
(5): Applied standard and technical condition code.

Example:

Needle Roller P 3 × 15.8 G2 Gb309-2 002 represents flat head needle rollers conforming to GB 309-2002, tolerance is G2, dimension is 3 × 15.8.

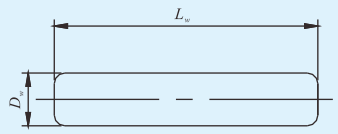


Fig 1 Flat head needle roller

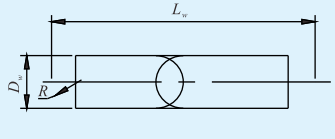


Fig2 Round head rolling needle

Symbol interpretation:

Nominal diameter of needle roller D_w
Single diameter of needle roller D_{ws}
Single plane diameter of needle roller D_{wmp}
Nominal length of needle roller L_w
Single length of needle roller L_{ws}
Single chamfer dimension of needle roller with flat head r_s
Allowable minimum single chamfer dimension of needle roller with flat head r_{smin}
Allowable maximum single chamfer dimension of needle roller with flat head r_{smax}
Radius of needle roller with round head R

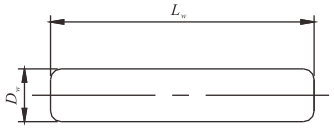
Table 1 Unit: μm

Tolerance class	Group diameter variation V_{DwL}	Upper and lower deviation of group average diameter D_{wmp}	Maximum roundness error	Diameter variation V_{Dwp}
2	2	0/−2, −1/−3 −2/−4, −3/−5 −4/−6, −5/−7 −6/−8, −7/−9 −8/−10	1	1
3	3	0/−3, −1.5/−4.5 −3/−6, −4.5/−7.5 −6/−9, −7/−10	1.5	1.5
5	5	0/−5, −3/−8 −5/−10	2.5	2

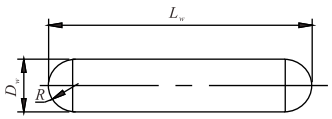
Note:
1. Tolerance values are only applicable for the middle of the total length of needle roller. Only middle of the cylindrical surface of needle roller is allowed to be convex.
2. Convex of needle roller shall not exceed 1 μm. There is no specification for Class 3 and Class 5.
3. Length tolerances of needle roller for all tolerance grades are h13.

Table 2 Unit: μm

Nominal diameter of needle roller D_w		limit of chamfer dimension		
Over	Up to	r_{smin}	r_{smax}	
			Radial	Axial
–	1	0.1	0.3	0.5
1	1.5	0.1	0.4	0.6
1.5	3	0.1	0.6	0.8
3	6	0.1	0.9	1.0



Needle rollers with flat head



Needle roller with round head

Dimensions (mm)				Weight per thousand pcs
D_w	L_w	r_{smin}	r_{smax}	W kg
1	5.8	0.1	0.3	0.035
	6.8	0.1	0.3	0.04
	7.8	0.1	0.3	0.047
	9.8	0.1	0.3	0.06
1.5	5.8	0.1	0.4	0.06
	6.8	0.1	0.4	0.09
	7.8	0.1	0.4	0.11
	9.8	0.1	0.4	0.13
	11.8	0.1	0.4	0.16
	13.8	0.1	0.4	0.18
2	7.8	0.1	0.4	0.19
	9.8	0.1	0.4	0.24
	11.8	0.1	0.4	0.29
	13.8	0.1	0.4	0.34
	15.8	0.1	0.4	0.39
	17.8	0.1	0.4	0.44
	19.8	0.1	0.4	0.49
2.5	7.8	0.1	0.4	0.36
	9.8	0.1	0.4	0.38
	11.8	0.1	0.4	0.45
	13.8	0.1	0.4	0.53
	15.8	0.1	0.4	0.61
	17.8	0.1	0.4	0.69
	19.8	0.1	0.4	0.76
	21.8	0.1	0.4	0.84
	23.8	0.1	0.4	0.92
3	9.8	0.1	0.4	0.54
	11.8	0.1	0.4	0.65
	13.8	0.1	0.4	0.76

Dimensions (mm)				Weight per thousand pcs
D_w	L_w	r_{smin}	r_{smax}	W kg
3	15.8	0.1	0.4	0.87
	17.8	0.1	0.4	0.99
	19.8	0.1	0.4	1.10
	21.8	0.1	0.4	1.21
	23.8	0.1	0.4	1.32
	25.8	0.1	0.4	1.38
	27.8	0.1	0.4	1.54
	29.8	0.1	0.4	1.65
3.5	11.8	0.1	0.6	0.87
	13.8	0.1	0.6	0.97
	15.8	0.1	0.6	1.12
	17.8	0.1	0.6	1.27
	19.8	0.1	0.6	1.43
	21.8	0.1	0.6	1.57
	23.8	0.1	0.6	1.73
	25.8	0.1	0.6	1.87
	27.8	0.1	0.6	2.03
	29.8	0.1	0.6	2.17
	34.8	0.1	0.6	2.54
4	15.8	0.1	0.6	1.57
	17.8	0.1	0.6	1.65
	19.8	0.1	0.6	1.85
	21.8	0.1	0.6	2.04
	23.8	0.1	0.6	2.28
	25.8	0.1	0.6	2.48
	27.8	0.1	0.6	2.68
	29.8	0.1	0.6	2.84
	34.8	0.1	0.6	3.33
	39.8	0.1	0.6	3.85

Dimensions (mm)				Weight per thousand pcs
D_w	L_w	r_{smin}	r_{smax}	W kg
5	19.8	0.1	0.6	2.85
	21.8	0.1	0.6	3.45
	23.8	0.1	0.6	3.65
	25.8	0.1	0.6	3.85
	27.8	0.1	0.6	4.22
	29.8	0.1	0.6	4.40
	34.8	0.1	0.6	5.15
	39.8	0.1	0.6	5.89
	49.8	0.1	0.6	7.43