

## Service Life with a Preload Considered

When using an LM Guide under a medium preload (clearance C0), it is necessary to calculate the service life while taking into account the magnitude of the preload.

To identify the appropriate preload for any selected LM Guide model, contact THK.

## Rigidity

When a load is applied to an LM Guide, the bearings and LM block will elastically deform within the allowable load range. The ratio of displacement to applied load is referred to as "rigidity." The radial internal clearance (preload) for the LM Guide can be specified in order to reduce displacement.

By using balls larger than the width of the race, they will naturally deform elastically as they roll, allowing the load to be maintained for longer while limiting displacement in the LM Guide.

The effect of the preload can be up to 2.8 times greater than the size of the preload itself. If that level is exceeded, the preload is released and the effect of the preload is lost.

When a preloaded LM Guide takes an external load, the displacement will be linear. The level of displacement will be approximately half that of an LM Guide with no preload.

The preload, in addition to reducing displacement, helps prevent premature failure due to vibration and impact/shock.

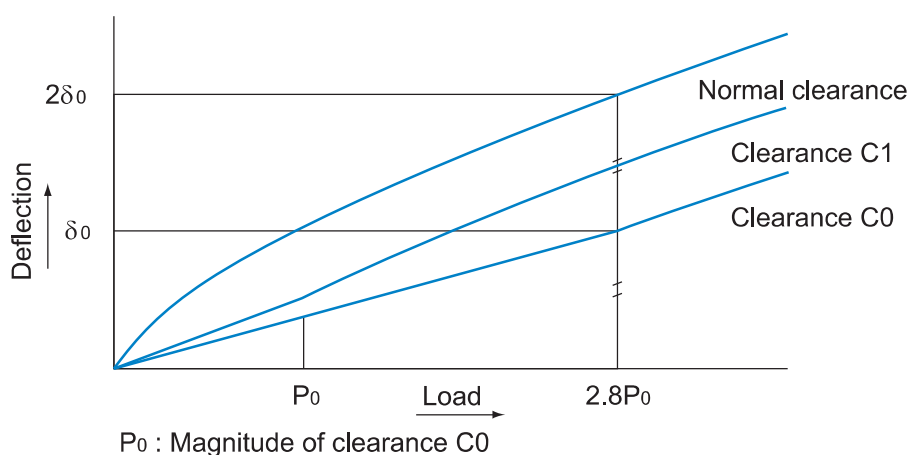
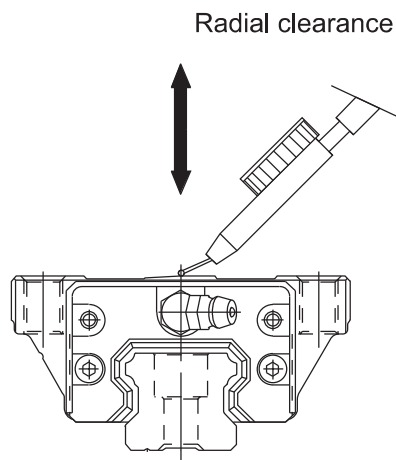


Fig.10 Rigidity Data

$$K = \frac{P}{\delta}$$

K	: Rigidity value	(N/μm)
δ	: Deflection	(μm)
P	: Calculated load	(N)

## Radial Clearance Standard for Each Model



### [Radial clearances for models SHS and SCR]

Unit:  $\mu\text{m}$ 

Indication symbol	Normal	Light preload	Medium preload
Model No.	No Symbol	C1	C0
15	-5 to 0	-12 to -5	—
20	-6 to 0	-12 to -6	-18 to -12
25	-8 to 0	-14 to -8	-20 to -14
30	-9 to 0	-17 to -9	-27 to -17
35	-11 to 0	-19 to -11	-29 to -19
45	-12 to 0	-22 to -12	-32 to -22
55	-15 to 0	-28 to -16	-38 to -28
65	-18 to 0	-34 to -22	-45 to -34

### [Radial clearance for model SSR]

Unit:  $\mu\text{m}$ 

Indication symbol	Normal	Light preload
Model No.	No Symbol	C1
15	-4 to +2	-10 to -4
20	-5 to +2	-12 to -5
25	-6 to +3	-15 to -6
30	-7 to +4	-18 to -7
35	-8 to +4	-20 to -8

### [Radial clearance for models SVR/SVS, NR-X/NRS-X, and NR/NRS]

Unit:  $\mu\text{m}$ 

Indication symbol	Normal	Light preload	Medium preload
Model No.	No Symbol	C1	C0
25	-3 to +2	-6 to -3	-9 to -6
30	-4 to +2	-8 to -4	-12 to -8
35	-4 to +2	-8 to -4	-12 to -8
45	-5 to +3	-10 to -5	-15 to -10
55	-6 to +3	-11 to -6	-16 to -11
65	-8 to +3	-14 to -8	-20 to -14
75	-10 to +4	-17 to -10	-24 to -17
85	-13 to +4	-20 to -13	-27 to -20
100	-14 to +4	-24 to -14	-34 to -24

### [Radial clearance for model SHW]

Unit:  $\mu\text{m}$ 

Indication symbol	Normal	Light preload	Medium preload
Model No.	No Symbol	C1	C0
12	-1.5 to 0	-4 to -1	—
14	-2 to 0	-5 to -1	—
17	-3 to 0	-7 to -3	—
21	-4 to +2	-8 to -4	—
27	-5 to +2	-11 to -5	—
35	-8 to +4	-18 to -8	-28 to -18
50	-10 to +5	-24 to -10	-38 to -24

### [Radial clearance for models SRS, RSX, and RSX-M1]

Unit:  $\mu\text{m}$ 

Indication symbol	Normal	Light preload
Model No.	No Symbol	C1
5	0 to +1.5	-1 to 0
7	-2 to +2	-3 to 0
9	-2 to +2	-4 to 0
12	-3 to +3	-6 to 0
15	-5 to +5	-10 to 0
20	-5 to +5	-10 to 0
25	-7 to +7	-14 to 0

Note) Model RSX includes types 7, 9, 12, and 15.

## Point of Selection

## Predicting the Rigidity

## [Radial clearance for models HSR, CSR, HSR-M1 and HSR-M1VV]

Unit:  $\mu\text{m}$ 

Indication symbol	Normal	Light preload	Medium preload
Model No.	No Symbol	C1	C0
8	-1 to +1	-4 to -1	—
10	-2 to +2	-5 to -1	—
12	-3 to +3	-6 to -2	—
15	-4 to +2	-12 to -4	—
20	-5 to +2	-14 to -5	-23 to -14
25	-6 to +3	-16 to -6	-26 to -16
30	-7 to +4	-19 to -7	-31 to -19
35	-8 to +4	-22 to -8	-35 to -22

Unit:  $\mu\text{m}$ 

Indication symbol	Normal	Light preload	Medium preload
Model No.	No Symbol	C1	C0
45	-10 to +5	-25 to -10	-40 to -25
55	-12 to +5	-29 to -12	-46 to -29
65	-14 to +7	-32 to -14	-50 to -32
85	-16 to +8	-36 to -16	-56 to -36
100	-19 to +9	-42 to -19	-65 to -42
120	-21 to +10	-47 to -21	-73 to -47
150	-23 to +11	-51 to -23	-79 to -51

## [Radial clearances for models SR and SR-M1]

Unit:  $\mu\text{m}$ 

Indication symbol	Normal	Light preload	Medium preload
Model No.	No Symbol	C1	C0
15	-4 to +2	-10 to -4	—
20	-5 to +2	-12 to -5	-17 to -12
25	-6 to +3	-15 to -6	-21 to -15
30	-7 to +4	-18 to -7	-26 to -18
35	-8 to +4	-20 to -8	-31 to -20
45	-10 to +5	-24 to -10	-36 to -24
55	-12 to +5	-28 to -12	-45 to -28
70	-14 to +7	-32 to -14	-50 to -32
85	-20 to +9	-46 to -20	-70 to -46
100	-22 to +10	-52 to -22	-78 to -52
120	-25 to +12	-57 to -25	-87 to -57
150	-29 to +14	-69 to -29	-104 to -69

## [Radial clearance for model HRW]

Unit:  $\mu\text{m}$ 

Indication symbol	Normal	Light preload	Medium preload
Model No.	No Symbol	C1	C0
12	-1.5 to +1.5	-4 to -1	—
14	-2 to +2	-5 to -1	—
17	-3 to +2	-7 to -3	—
21	-4 to +2	-8 to -4	—
27	-5 to +2	-11 to -5	—
35	-8 to +4	-18 to -8	-28 to -18
50	-10 to +5	-24 to -10	-38 to -24
60	-12 to +5	-27 to -12	-42 to -27

## [Radial clearance for models RSR, RSR-W and RSR-M1]

Unit:  $\mu\text{m}$ 

Indication symbol	Normal	Light preload
Model No.	No Symbol	C1
2	0 to +4	—
3	0 to +1	-0.5 to 0
9	-2 to +2	-4 to 0
12	-3 to +3	-6 to 0
14	-5 to +5	-10 to 0
15	-5 to +5	-10 to 0
20	-7 to +7	-14 to 0

## [Radial clearance for model MX]

Unit:  $\mu\text{m}$ 

Indication symbol	Normal	Light preload
Model No.	No Symbol	C1
5	0 to +1.5	-1 to 0
7	-2 to +2	-3 to 0

**[Radial clearance for model JR]**Unit:  $\mu\text{m}$ 

Indication symbol	Normal
Model No.	No Symbol
25	0 to +30
35	0 to +30
45	0 to +50
55	0 to +50

**[Radial clearances for models HCR and HMG]**Unit:  $\mu\text{m}$ 

Indication symbol	Normal	Light preload
Model No.	No Symbol	C1
12	-3 to +3	-6 to -2
15	-4 to +2	-12 to -4
25	-6 to +3	-16 to -6
35	-8 to +4	-22 to -8
45	-10 to +5	-25 to -10
65	-14 to +7	-32 to -14

**[Radial clearance for model NSR-TBC]**Unit:  $\mu\text{m}$ 

Indication symbol	Normal	Light preload	Medium preload
Model No.	No Symbol	C1	C0
20	-5 to +5	-15 to -5	-25 to -15
25	-5 to +5	-15 to -5	-25 to -15
30	-5 to +5	-15 to -5	-25 to -15
40	-8 to +8	-22 to -8	-36 to -22
50	-8 to +8	-22 to -8	-36 to -22
70	-10 to +10	-26 to -10	-42 to -26

**[Radial clearance for model HSR-M2]**Unit:  $\mu\text{m}$ 

Indication symbol	Normal	Light preload
Model No.	No Symbol	C1
15	-4 to +2	-12 to -4
20	-5 to +2	-14 to -5
25	-6 to +3	-16 to -6

**[Radial clearances for models SRG and SRN]**Unit:  $\mu\text{m}$ 

Indication symbol	Normal	Light preload	Medium preload
Model No.	No Symbol	C1	C0
15	-0.5 to 0	-1 to -0.5	-2 to -1
20	-0.8 to 0	-2 to -0.8	-3 to -2
25	-2 to -1	-3 to -2	-4 to -3
30	-2 to -1	-3 to -2	-4 to -3
35	-2 to -1	-3 to -2	-5 to -3
45	-2 to -1	-3 to -2	-5 to -3
55	-2 to -1	-4 to -2	-6 to -4
65	-3 to -1	-5 to -3	-8 to -5
85	-3 to -1	-7 to -3	-12 to -7
100	-3 to -1	-8 to -3	-13 to -8

**[Radial clearance for model SRW]**Unit:  $\mu\text{m}$ 

Indication symbol	Normal	Light preload	Medium preload
Model No.	No Symbol	C1	C0
70	-2 to -1	-3 to -2	-5 to -3
85	-2 to -1	-4 to -2	-6 to -4
100	-3 to -1	-5 to -3	-8 to -5
130	-3 to -1	-7 to -3	-12 to -7
150	-3 to -1	-8 to -3	-13 to -8

**[Radial clearance for model EPF]**Unit:  $\mu\text{m}$ 

Indication symbol	Normal
Model No.	No Symbol
7M	0 or less
9M	
12M	
15M	