

8.1 Characteristics

(1) Excellent Wear Resistance

Unlike linear ball bearing that requires running on high hardness heat treated shaft (SUJ2), Self-Lubricated Linear Bearing can be used with Hard Chrome Plated Shaft (S45C). Under correct use, the life expectancy is much higher than linear ball bearings.

(3) Multi-Functions

Suitable for either linear, rotary, or combination of both motions.

(5) Self-Lubricating

Lubrications are not required; however, the use of adequate lubrications can minimize frictions and wear

(7) Chemical and corrosion resistance

Great resistance to corrosion allows the bearing to be operating or submerging in alcohol, gasoline, water, oil and stand up to harsh environment.

(9) Low friction

Low coefficient of friction eliminates oscillating, which is suitable for continuous and intermittent motions.

(11) Quiet operation

Quieter operation over linear ball bearing at any operating speed.



(2) Interchangeability

Full range of ABBA Self-Lubricated Linear Bearings product line includes Standard, Thin Profile, Profile, and Flanged Type. All Self-Lubricated bearings are interchangeable with our Linear Ball Bearings products.

(4) High impact capability

Great capabilities of dampening high impacts, vibrations, and uneven loads while keeping the components from damaging.

(6) High load capacity

ABBA Self-Lubricating Linear Bearings can withstand average 3~4 times load capacity over linear ball bearings.

(8) Reliable

Reliable bearing dimensions due to the liner will not expand to water or oil unlike general industrial use plastic. Thermal expansion effect is also minimal to the bearing, and will not cause binding to the shaft.

(10) Substitutability

In the case of the shaft had been scored by linear ball bearing, self-lubricated linear bearing can be installed to the damaged shaft after slight sanding the shaft by sand paper as emergency repair.

(12) Wide range of applications

Produces minimum particulates, which is suitable for vacuum and clean rooms applications. Applicable applications include Automation Machines, Transfer Equipment, Vice, Robotic Arms, Robots, Positioning Device, Automotive, Office Equipment, Semi-Conductor Manufacturing, Bio-Chemical Plant, Food Processing Plant, and Fabric Manufacturing related applications.



Ball Caged

Miniature

Cam Roller

Round Shaft

Ball Screw

Support Unit

Ball Screw

Linear Guide

8.2 / Structure

1. Anodized aluminum, 6060 T6

2.Water-proof Bonding Agent

3.Frelon thickness: 0.5mm

The composition of super wear-resistant sliding plate is

Teflon + Glass fiber + Metal powder + Special formula, which are imported high-tech materials, generally used in the wear-resistant rails of the million-level precision machine tool, it can slide uppon high load for a long time without abrasion. Its wear-resistant function is better than General DU bearings.

8.3 / Size selection



Use the formula below to calculate Maximum PV Value (Load x Velocity), then multiply its value by Safety Factor. Cross reference the value to dimension chart in our catalogue page to select bearing size. The size of bearing is proportional to the load and Velocity.

Formula

- Maximum load = L / N x F
- Load x Velocity = L / N x V x F
- Axial Driving Force = µ x L
- L : Total Load Capacity (kgf)
- N : Number of Bearings
- F : Safety Factor 2~3
- V : Velocity (m/sec)
- μ : Fricition Factor : 0.15~0.25

Example 1

Assuming a sliding platform has a load of 100kg, uses 4 bearings, and velocity is 0.6 m/sec. Caculation of bearing size and required axial driving force is shown below.

Where

- L = 100 kgf, N = 4, assume
- F = 2.5, μ = 0.2, V=0.6 m/sec
- Maximum load = L / N x F = 100 / 4 x 2.5 = 62.5 kgf
- Load x Velocity = L / N x V x F = 100 / 4 x 0.6 x 2.5
- = 37.5 kgf · m/sec
- Required Driving force = $\mu x L = 0.2 x 100 = 20 \text{ kgf}$

Cross reference the results to dimension chart, known TM 25 Bearing (Max. Load = 1000 kgf, Max. Load x Velocity = 52.8 kgf \cdot m/sec) is capable of this application.

Example 2

Assuming all values remains unchanged, except velocity increases to 1.0 m/sec. Calculation of bearing size is shown below.

Where

• Load x Velocity = L / N x V x F = 100 / 4 x 1.0 x 2.5 = 62.5 kgf · m/sec

According to the dimension chart, TM30 bearing (Max \cdot Load x Velocity =68.7 kgf \cdot m/sec is capable of this application.

8.4 / Life calculation

Bearing's Life Calculation is based on Maximum allowable amount of wear. Once this value has been decided, bearing's life can be calculated by using the formula below. Under constant load and velocity, bearing's life is proportional to bearing inner diameter.

Formula

 $T = W \swarrow (K \times P \times V)$ $P = L \swarrow (A \times I \times N)$

- T : Sliding time (hour)
- W : Amount of Wear (mm)
- K : Wearing rate : 1×10^{-7} A : Bearing inner diameter (cm)
 - I : Bearing length (cm)
- P : Pressure (kgf/cm²)

V: Velocity (m/min)

L : Total load (kgf) N : Number of Bearings

Example 3

To calculate the life of TM25 bearing from example 1.

Where

W = 0.05mm, K = 1 x 10^{-7} , A = 2.5

From dimension chart known

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I = 5.9 , L=100 kgf
V = 0.6 \times 60 = 36 m / min
P = L / (A \times I \times N)
= 100 / (2.5 \times 5.9 \times 4)
= 1.69 kgf / cm^{2}
T = W / (K \times P \times V)
= 0.05(1 \times 10^{-7} \times 1.69 \times 36)
= 8218 hours
```

Usage per day = $6 \times 300 \times 8 / 3600 = 4$ hours Total life time = 8218 / 4 = 2054 days

Note:

Allowable amount of wear is proportional to bearing's life. For example, if allowable amout of wear = 0.01mm, Bearing's life = 4108 days.



8.5 Cantilevered loads

Example

When distance X equals to 100mm, minimum bearing separation Y must be at least 50mm.

Caution

Binding of the bearing can occur when the ratio exceeds 2:1
Adequate lubrications will help reduce friction and helps increase the 2:1 ratio

In the case of holding more than 2:1 ratio, method of using counter weight could be use to prevent binding. Use the formula shown below.

Formula

 $M \times X = W \times Z$

 $\label{eq:mass_state} \begin{array}{l} M: Mass of load \\ X: Distance from load to the shaft \\ W: Mass of counter weight \\ Z: 1.5 \ x \ (Y) \end{array}$

Example

 $40 \times 200 = W \times Z(1.5 \times 50 = 75)$ W = 40 × 200 / 75 = 106.7Kg

When W is calculated, load per bearing can be calculated. M + W / # of bearings

Example

40 + 106.7 / 4 = 36.7 Kg / Bearing

If the ratio of the cantilever installation is greater than 2: 1, a counterweight method can be used to avoid bearing binding.





Load 承載物 Standard

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Miniature

Cam Roller

Round Shaft

Ball Screw

Support Unit

Ball Screw

Linear Guide



X (2Y Max)



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8.6 Open type bearing mounting configurations

Load capacities on open type self-lubricated linear bearings will depending on their mounting configurations.







Ball Screw

Linear Guide



SMP Open type



h1 θ°

Unit : mm

Mode	el No.	Inner Dia.	Dimensions							
Standard type	Open type	Ødr (F8)	ØD (h6)	L	В	W	ØD1	h1	θ°	
SM 6	-	6	12	19	13.5	1.15	11.5	_	-	
SM 8	-	8	15	24	17.5	1.15	14.3	—	-	
SM 10	SMP 10	10	19	29	22.0	1.35	18.0	6.8	80 °	
SM 12	SMP 12	12	21	30	23.0	1.35	20.0	8	80 °	
SM 13	SMP 13	13	23	32	23.0	1.35	22.9	9	80 °	
SM 16	SMP 16	16	28	37	26.5	1.65	26.6	11	80 °	
SM 20	SMP 20	20	32	42	30.5	1.65	30.3	11	60 °	
SM 25	SMP 25	25	40	59	41.0	1.90	38.0	12	50 °	
SM 30	SMP 30	30	45	64	44.5	1.90	42.5	15	50 °	
SM 35	SMP 35	35	52	70	49.5	2.20	49.0	17	50 °	
SM 40	SMP 40	40	60	80	60.5	2.20	57.0	20	50 °	
SM 50	SMP 50	50	80	100	74.0	2.70	76.5	25	50 °	
SM 60	SMP 60	60	90	110	85.0	3.15	86.5	30	50 °	



Cam Roller Miniature Ball Caged

Round Shaft

Linear Guide





Unit	:	mm
•••••	•	

Mod	el No.	Max. Static load	Max. PV	Max, Speed	Weight (g)	
Standard type	Onen type	max. etailo loud		max. opood	, voig	
	Орен туре	(kgf)	(kgf * m/sec)	(m / sec)	SM	SMP
SM 6	-	80	4.1	2	4.4	—
SM 8	—	130	6.9	2	8.3	_
SM 10	SMP 10	200	10.4	2	16.2	12.5
SM 12	SMP 12	250	12.9	2	19	13.9
SM 13	SMP 13	290	14.9	2	24.6	17.9
SM 16	SMP 16	410	21.2	2	41.7	30.0
SM 20	SMP 20	580	30.1	2	56	43.4
SM 25	SMP 25	1000	52.8	2	122.8	99.2
SM 30	SMP 30	1300	68.7	2	153.7	123.5
SM 35	SMP 35	1700	87.7	2	221	177.8
SM 40	SMP 40	2200	115.0	2	341.6	275.6
SM 50	SMP 50	3500	179.0	2	832.7	679.8
SM 60	SMP 60	4600	236.0	2	1057	860.8

Ball Screw

8.8 SMT Thin profile type

Ordering key : SMT 20





1 SMT thin profile self-lubricated linear bearing

2 Bearing inner diameter







L

Unit : mm

Model No.	Inner Dia.		Dimensions ØD (h6) L B W ØD1				Max. Static load	Max. PV	Max Speed	Weight
	Ødr (F8)	ØD (h6)	L	В	W	ØD1	(kgf)	(kgf * m/sec)	(m / sec)	(g)
SMT10	10	17	26	8 <u>.</u> 3	1.15	16.20	180	9.3	2	10.49
SMT12	12	19	28	8.7	1.35	18 <u>.</u> 00	230	12	2	12.97
SMT16	16	24	30	10.7	1.35	22 <u>.</u> 90	330	17.2	2	20.49
SMT20	20	28	30	13 <u>.</u> 3	1 <u>.</u> 65	26 <u>.</u> 60	420	21.5	2	24.59
SMT25	25	35	40	15 <u>.</u> 8	1.65	33 <u>.</u> 00	700	35.8	2	51.23
SMT30	30	40	50	18 <u>.</u> 8	1.90	38.00	1050	53.7	2	74.71
SMT40	40	52	60	24.4	2.20	49.00	1600	85.9	2	141.4
SMT50	50	62	70	29.4	2.20	59.00	2400	125	2	200.8



8.9 SMK Square flange type

Ordering key : SMK 20





SMK Square flange self-lubricated bearing

2 Bearing inner diameter



ØX*ØY*Z





Model No.	Inner Dia.		Dimensions							
	Ødr (F8)	ØD (h6)	L	ØDf	K	t	P.C.D.	ØX	ØY	Z
SMK 10	10	19	29	40	30	9	29	4.5	7.5	4.1
SMK 12	12	21	30	42	32	9	32	4 <u>.</u> 5	7.5	4.1
SMK 13	13	23	32	43	34	9	33	4.5	7 <u>.</u> 5	4 <u>.</u> 1
SMK 16	16	28	37	48	37	9	38	4 <u>.</u> 5	7 <u>.</u> 5	41
SMK 20	20	32	42	54	42	11	43	5.5	9.0	5.1
SMK 25	25	40	59	62	50	11	51	5.5	9 <u>.</u> 0	5.1
SMK 30	30	45	64	74	58	14	60	6.6	11 <u>.</u> 0	6.1
SMK 35	35	52	70	82	64	14	67	6.6	11.0	6.1
SMK 40	40	60	80	96	75	18	78	9.0	14 <u>.</u> 0	8.1
SMK 50	50	80	100	116	92	20	98	9.0	14.0	8.1

Model No.	Max. Static load	Max. PV	Max. Speed	Weight	
	(kgf)	(kgf * m/sec)	(m / sec)	(g)	
SMK 10	200	10.4	2	33	
SMK 12	250	12 <u>.</u> 9	2	35	
SMK 13	290	14.9	2	38	
SMK 16	410	21 <u>.</u> 2	2	56	
SMK 20	580	30.1	2	75	
SMK 25	1000	52 <u>.</u> 8	2	149	
SMK 30	1300	68.7	2	202	
SMK 35	1700	87 <u>.</u> 7	2	296	
SMK 40	2200	115.0	2	450	
SMK 50	3500	179 <u>.</u> 0	2	1000	

Linear Guide

Standard

Ball Caged

Miniature

Cam Roller

Round Shaft

Ball Screw

Support Unit

Unit : mm

8.10 SMF Round flange type

Ordering key : SMF 20





1 SMF Round flange self-lubricated bearing

2 Bearing inner diameter





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Model No.	Inner Dia.	Dimensions									
	Ødr (F8)	ØD (h6)	L	ØDf	t	P.C.D.	ØX	ØY	Z		
SMF 6	6	12	19	28	8	20	3.5	6.0	3.1		
SMF 8	8	15	24	32	8	24	3.5	6.0	3.1		
SMF 10	10	19	29	40	9	29	4.5	7.5	4.1		
SMF 12	12	21	30	42	9	32	4.5	7.5	4.1		
SMF 16	16	28	37	48	9	38	4.5	7.5	4.1		
SMF 20	20	32	42	54	11	43	5.5	9.0	5.1		
SMF 25	25	40	59	62	11	51	5.5	9.0	5.1		
SMF 30	30	45	64	74	14	60	6.6	11.0	6.1		

Model No.	Max. Static load	Max. PV	Max. Speed	Weight
	(kgf)	(kgf * m/sec)	(m / sec)	(g)
SMF 6	80	4.1	2	12
SMF 8	130	6.9	2	14
SMF 10	200	10.4	2	36
SMF 12	250	12.9	2	38
SMF 16	410	21.2	2	60
SMF 20	580	30.1	2	80
SMF 25	1000	52.8	2	160
SMF 30	1300	68.7	2	212



Ball Caged

Miniature

Cam Roller

Round Shaft

Ball Screw

Support Unit

Linear Guide

8.11/SMFD Center flange type

Ordering key : SMFD 20





SMFD Center flange self-lubricated bearing

2 Bearing inner diameter







ØX*ØY*Z

Ødr

QQ

Unit : mm

Model No	Inner Dia.	Dimensions								
Model No.	Ødr (F8)	ØD (h6)	L	L1	ØDf	t	P.C.D	ØX	ØY	Z
SMFD 16	16	28	70	28.5	48	13	38	4.5	7.5	4.1
SMFD 20	20	32	80	32.5	54	15	43	5.5	9.0	5.1
SMFD 25	25	40	112	48.5	62	15	51	5.5	9.0	5.1
SMFD 30	30	45	123	51.5	74	20	60	6.6	11.0	6.1

Model No	Max. Static load	Max. PV	Max. Speed	Weight
	(kgf)	(kgf * m/sec)	(m / sec)	(g)
SMFD 16	780	38.1	2	113
SMFD 20	1100	54.2	2	150
SMFD 25	1900	95	2	303
SMFD 30	2470	123.7	2	407

8.12 SMK-L Long square flange type

Ordering key : SMK-L 20





1 SMK-L Long type round flange self-lubricated bearing

2 Bearing inner diameter



ØX*ØY*Z





Model No.	Inner Dia.		Dimensions								
	Ødr (F8)	ØD (h6)	L	ØDf	K	t	P.C.D.	ØX	ØY	Z	
SMK10L	10	19	55	40	30	10	29	4.5	7.5	4.1	
SMK12L	12	21	57	42	32	13	32	4.5	7.5	4.1	
SMK16L	16	28	70	48	37	13	38	4.5	7.5	4.1	
SMK20L	20	32	80	54	42	15	43	5.5	9.0	5.1	
SMK25L	25	40	112	62	50	15	51	5.5	9.0	5.1	
SMK30L	30	45	123	74	58	20	60	6.6	11.0	6.1	
SMK35L	35	52	135	82	64	20	67	6.6	11.0	6.1	
SMK40L	40	60	151	96	75	22	78	9.0	14.0	8.1	
Model No.	Max. Sta	tic load		Мах	k. PV		Max. S	Speed	We	ight	
	(kgi	f)	(kgf * m/sec)			(m / sec)		(g)			
SMK10L	380)	18.7				2		62		
SMK12L	475	5	23.2				2		67		
SMK16L			38.1				2		106		
	780)		38	3.1		2	2	10		
SMK20L	780 110) 0		38 54	3.1 .2		2	2	1(14	43	
SMK20L SMK25L	780 110 190) 0 0		38 54 95	3.1 .2 5.0		2	2	10 14 28	4 <mark>3</mark> 33	
SMK20L SMK25L SMK30L	780 110 190 247) 0 0 0		38 54 95 123	8.1 .2 5.0 3.7		2	2 2 2 2 2	10 14 28 38	43 33 38	
SMK20L SMK25L SMK30L SMK35L	780 110 190 247 323) 0 0 0 0		38 54 95 123 15	3.1 4.2 5.0 3.7 7.9		22	2 2 2 2 2 2 2	10 14 28 38 57	43 33 38 70	



Ball Caged

Miniature

Cam Roller

Round Shaft

Ball Screw

Support Unit

Linear Guide

8.13 SMF-L Long round flange type

Ordering key : SMF-L 20





SMF-L Long type round flange self-lubricated bearing

2 Bearing inner diameter









Unit : mm

Model No.	Inner Dia.	Dimensions							
	Ødr (F8)	ØD (h6)	L	ØDf	t	P.C.D.	ØX	ØY	Z
SMF12L	12	21	57	42	13	32	4.5	7.5	4.1
SMF16L	16	28	70	48	13	38	4.5	7.5	4.1
SMF20L	20	32	80	54	15	43	5.5	9.0	5.1
SMF25L	25	40	112	62	15	51	5.5	9.0	5.1
SMF30L	30	45	123	74	20	60	6.6	11.0	6.1

Model No.	Max. Static load	Max. PV	Max. Speed	Weight	
	(kgf)	(kgf * m/sec)	(m / sec)	(g)	
SMF12L	475	23.2	2	72	
SMF16L	780	38.1	2	113	
SMF20L	1100	54.2	2	150	
SMF25L	1900	95.0	2	303	
SMF30L	2470	123.7	2	407	