

Roller Screws vs Ball Screws

Typical Application	Typical actuation system with a projected life of about 5 years of a single shift usage in a normal plant environment		Medium/high speed application in a clean and protected environment such as a CNC machine or a production line		Very demanding application in a difficult environment with a very long design life. Replacing failed screws is not an option in a non accessible place	
	Roller Screw	Ball Screw	Roller Screw	Ball Screw	Roller Screw	Ball Screw
Screw Diameter (mm)	21	20	39	40	100	100
Lead (mm)	5	5	10	10	24	10
Dynamic Load Rating (N)	39,500	10,100	120,100	66,600	481,200	98,700
Mean Cubic Load for a typical Cycle (N)	10,000	10,000	50,000	50,000	200,000	200,000
Total travel for one cycle (mm)	1,000	1,000	2,000	2,000	5,000	5,000
Number of cycle per day					48	48
Number of cycle per hour	60	60	20	20		
Number of 8 hours shift per day	1	1	2	2		
Number of working days per year	250	250	250	250	365	365
Number of years	5	5	5	5	60	60
Life at B10 in Revolutions	61,629,875	1,030,301	13,858,589	2,363,266	13,927,939	120,188
Required life at B10 in Revolutions	15,000,000	15,000,000	10,000,000	10,000,000	1,051,200	1,051,200
Life at B5 in Revolutions	38,210,523	638,787	8,592,325	1,465,225	8,635,322	74,517
Required life at B5 in Revolutions	15,000,000	15,000,000	10,000,000	10,000,000	1,051,200	1,051,200
Life at B1 in Revolutions	12,942,274	216,363	2,910,304	496,286	2,924,867	25,240
Required life at B1 in Revolutions	15,000,000	15,000,000	10,000,000	10,000,000	1,051,200	1,051,200
Ratio of Roller Screw vs Ball Screw life	60		6		116	
Purchase Price	\$4,000.00	\$1,000.00	\$7,000.00	\$2,500.00	\$28,000.00	\$10,000.00
Cost of Ownership (for the B10 life)	\$4,000.00	\$15,000.00	\$7,000.00	\$12,500.00	\$28,000.00	\$90,000.00
Cost of Ownership (for the B5 life)	\$4,000.00	\$24,000.00	\$14,000.00	\$17,500.00	\$28,000.00	\$150,000.00
Cost of Ownership (for the B1 life)	\$8,000.00	\$70,000.00	\$28,000.00	\$52,500.00	\$28,000.00	\$420,000.00

Comments: In the third case, roller screws are not only the most economical solution, they are the only one since replacement is not an option

Dynamic ratings are published by a manufacturer of both ball and roller screws: Both Dynamic capacity and life calculations use the same criteria.