System preload

Definition of preload

Ball runner blocks can be preloaded to increase rigidity. The internal pre-tensioning forces that occur in this connection must be considered in the life expectancy calculation. You can choose the preload class to match the area of application. Refer to the table for pre-tensioning force F_{pr}.

Example

- Area of application: Precise guide systems with low external load and high overall rigidity requirements. This results in preload class C1.
- Selected ball runner block FNS R1651 314 20
- The selected ball runner block yields a pre-tensioning force F_{pr} according to the table.
- It is installed at 840 N internal pre-tensioning force F_{pr}.

Code	Preload	Application area
C0[1)]	**Without preload (clearance)**	For particularly smooth-running guide systems with the lowest possible friction for applications with large installation tolerances. Clearance versions are available only in accuracy classes N and H.
C1	**Moderate preload**	For precise guide systems with low external loads and high demands on overall rigidity.
C2	**Average preload**	For precise guide systems with both high external loading and high demands on overall rigidity; also recommended for single-rail systems. Above average moment loads can be absorbed without significant elastic deflection. Further improved overall rigidity with only medium moment loads.
C3	**High preload**	For high-rigidity guide systems like precision machine tools, etc. Above average loads and moments can be absorbed with the least possible elastic deflection. Ball runner blocks with preload C3 available only in accuracy classes UP, SP and XP; heavy duty ball runner blocks only in UP, SP and P.

1) In the case of ball runner blocks without preload (preload class C0), there is a clearance between the ball runner block and the rail of 1 to 10 μm. When using two rails and more than one ball runner block per guide rail, this clearance is usually equalized by parallelism tolerances.

Pre-tensioning force F_{pr}

Ball runner block	Part number		Design style	Preload class	Size							
					15	20	25	30	35	45	55	65
					Pre-tensioning force F_{pr} (N)							
Standard ball runner block Heavy-duty ball runner block - Steel[3] - Resist NR[4] - Resist CR[6]	R1651[3)6)]	R2001[4)]	FNS	C1[1)]	160	380	460	630	840	1 360	1 960	2 460
	R1622[3)6)]	R2011[4)]	SNS	C1[2)]	150	350	430	590	840	1 270		
	R1621[3)6)]		SNH	C2[1)]	620	1 500	1 820	2 540	3 350	5 450	7 860	9 840
				C2[2)]	580	1390	1700	2 340	3 350	5 060		
				C3[1)]	1 010	2 440	2 960	4 120	5 450	8 850	12 800	16 000
				C3[2)]	950	2 260	2 770	3 810	5 450	8 230		
	R1653[3)6)]	R2002[4)]	FLS	C1[1)]	200	490	610	800	1 110	1 810	2 480	3 260
	R1623[3)6)]	R2012[4)]	SLS	C1[2)]	180	460	550	760	1 060	1 640		
	R1624[3)6)]		SLH	C2[1)]	800	1 950	2 430	3 200	4 450	7 230	9940	13000
				C2[2)]	720	1 850	2 200	3 040	4 240	6 550		
				C3[1)]	1 300	3 170	3 950	5 200	7 230	11 800	16 100	21 200
				C3[2)]	1 170	3 000	3 580	4 940	6 890	10 600		
Standard ball runner block - Steel[3] - Resist NR[4] - Resist CR[6]	R1665[3)6)]	R2000[4)]	FKS	C1[1)]	110	250	320	440	590			
	R1666[3)6)]	R2010[4)]	SKS	C1[2)]	90	250	280	440	590			
	R1693[3)6)]		FNN	C1[1)]		290	460					
	R1694[3)6)]		SNN									
	R1663[3)6)]		FKN	C1[1)]		190	320					
	R1664[3)6)]		SKN									
Super ball runner blocks - Steel[3] - Resist CR[6]	R1661[3)6)]		FKS	C1[1)]	80	200	230	320	420			
	R1662[3)6)])		SKS									
Standard high-speed ball runner blocks - Steel	R2001...9.		FNS	C2[1)]	420	1 020	1 240	1 720	2 280			
	R2011...9.		SNS									
	R2002...9.		FLS	C2[1)]	700	1 330	1 660	2 180	3 020			
	R2012...9.		SLS									
Standard ball runner block - Aluminum	R1631		FNS	C1[1)]	160	380	460	630	840			
	R1632		SNS	C1[2)]	150	350	430	590	840			
Standard ball runner block - Resist NR II[5]	R2001...0.		FNS	C1[1)]	100	250	300	420	550			
	R2011...0.		SNS	C1[2)]	90	230	280	390	550			
				C2[1)]	410	980	1 200	1 660	2 210			
				C2[2)]	380	910	1 120	1 540	2 210			
	R2002...0.		FLS	C1[1)]	170	320	400	530	730			
	R2012...0.		SLS	C1[2)]	150	300	360	500	700			
				C2[1)]	680	1 280	1 600	2 100	2 920			
				C2[2)]	610	1 220	1 450	2 000	2 780			
	R2000...0.		FKS	C1[1)]	90	160	210	290	390			
	R2010...0.		SKS	C1[2)]	80	160	180	290	390			
Wide steel ball runner blocks - Steel[3] - Resist CR[6]	R1671[3)6)]		CNS	C1[1)]		270	580		1160			
				C1[2)]		260	550					
	R1672[3)6)])		BNS	C1[1)]		270	580					
				C1[2)]		260	550					

1) Ball runner blocks **without** ball chain.
2) Ball runner blocks **with** ball chain.
3) Steel: All steel parts made of carbon steel.
4) Resist NR size 15 – 35: Ball runner block body made of corrosion-resistant steel per EN 10088.
5) Resist NR II: All steel parts made of corrosion-resistant steel per EN 10088.
6) Resist CR: Ball runner block body made of steel with matte-silver hard-chrome plated corrosion-resistant coating.