

**B-3-3.11 Ball Screw with L1 Seal designed for Minimal Grease Splatter [Patent application submitted]**

**1. Features**

- Substantial reduction in grease splatter  
The amount of grease splatter for the L1 seal is reduced to 1/10 compared to NSK standard seal to contribute to maintain equipment and working environment clean.

- Adoption of non-contact type seal  
Seal torque is avoided by optimizing the seal shape. The current seals with relatively small splatter are all contact type seals, but the L1 seal is the first non-contact type seal to achieve low grease spatter.

- Seal cover is equipped as standard.  
To prevent grease from dripping, a seal cover is equipped as standard.

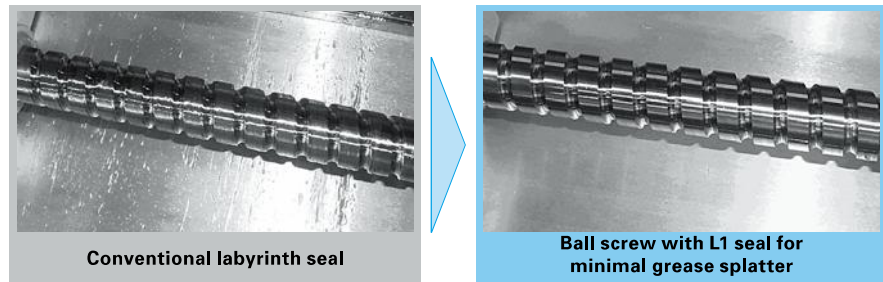
- Later fitting to NSK standard ball screws is available.

NSK ensures quick delivery because later fitting to "Compact FA Series" and "High Speed SS Series" is possible.

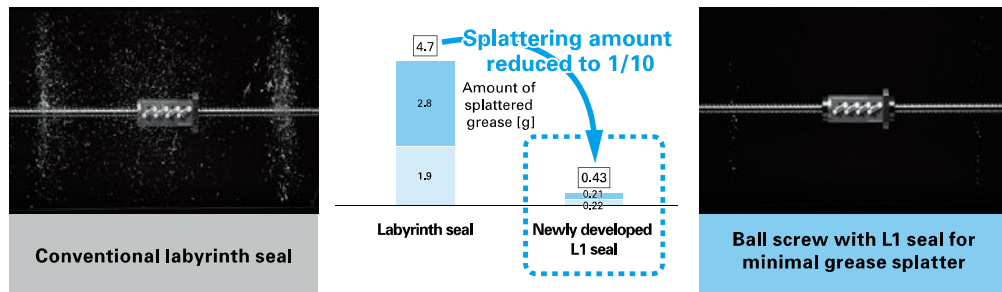
**2. Specifications**

**(1) Applicable ball screw**

- Shaft diameter : 15 to 23 mm
- Lead : 5 mm min.
- Lubricant : NSK standard grease, NSK clean grease, grease for general food
- Environment : Ambient temperature
- Short lead time: Can be fitted to NSK standard stock ball screws.  
Compact FA series (dia.15 to 25 mm)  
High speed SS series (dia.32 mm)



**Fig. 1 Comparison of grease splatter from the shaft**



**Fig. 2 Results of grease splattering test**

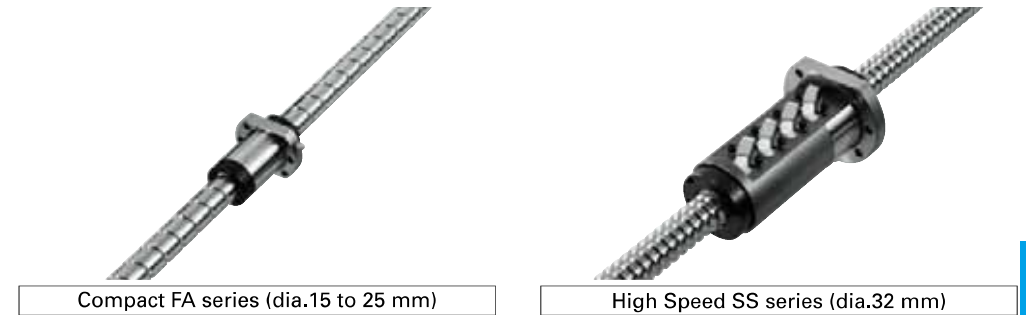
**(2) Design-related precautions**

When designing the screw shaft end, the one end shall be cut-through. For general precautions regarding ball screws, refer to "Design Precautions" (page B83) and "Handling Precautions" (page B103).

**Table 1 Combinations of shaft diameter and lead**

Lead \ Shaft dia.	5	10	20	25	Applicable series
15	○	○	○		Compact FA
20	○	○	○		
25	○	○	○	○	
32	○	○			High speed SS

Please contact NSK except for the above types.



**Fig. 3 of grease splatter from the shaft**

**3. Example of reference number**

A structure of "Reference number for ball screw" is as follows.  
\*"L1" is added at the end of "nut model code" and "Specifications number".

◇Reference number for ball screw

**W2005 -\*\*\*L1 - C5Z10**

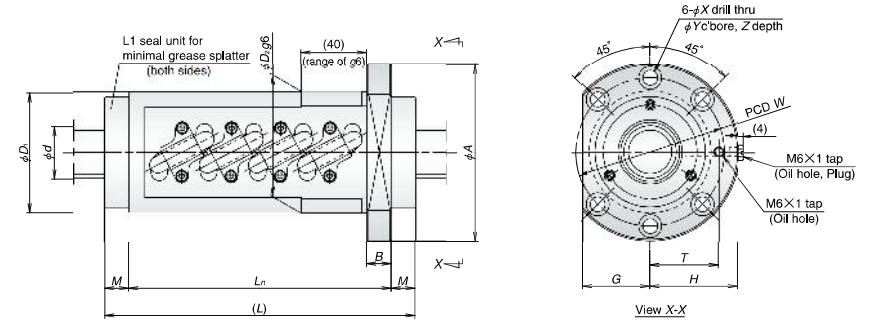
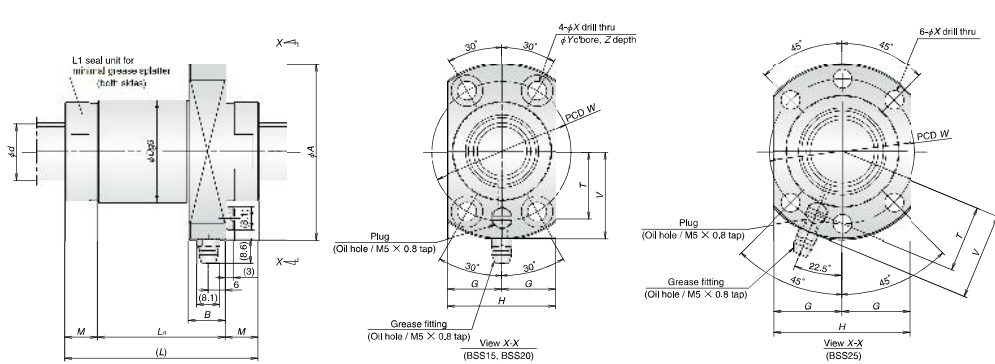
NSK L1 equipped type ball screw code

**4. Precautions for use**

- Maximum temperatures are as follows.  
Compact FA series with L1 seal: 80 °C (at outside diameter of ball nut)  
High Speed SS series with L1 seal: 60 °C (at outside diameter of ball nut)
- Do not use the product in environments where foreign matter is present.
- Please note that L1 seal reduces grease splatter but cannot reduce it to zero.

The data shown in the catalog are the results of our tests, and no warranty is given to sealing performance on actual usage on machinery.  
The amount of grease splatter is affected by usage conditions (rotational speed, temperature, greases, grease filling amount). Dust covers and other measures to keep machinery free of dust are recommended.

# Ball Screw with L1 Seal designed for Minimal Grease Splatter



Model No.	Shaft dia. <i>d</i>	Lead <i>l</i>	Basic load rating (N)		Ball nut dimensions										Seal dimensions <i>M</i>	Total length with nut & seal <i>L</i>	Internal spatial volume of nut (cm <sup>3</sup> )	Standard volume of grease replenishing (cm <sup>3</sup> )		
			Dynamic <i>C<sub>d</sub></i>	Static <i>C<sub>0s</sub></i>	Dia. <i>D</i>	Flange				Nut length <i>L<sub>n</sub></i>	Bolt holes								Oil hole position	
					<i>D</i>	<i>A</i>	<i>G</i>	<i>H</i>	<i>B</i>	<i>L<sub>n</sub></i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>	<i>T</i>	<i>V</i>				
<b>BSS1505-3E</b>	15	5								30							50			
<b>BSS1510-3E</b>	15	10	5 460	10 200	28	51	15.5	31	11	43	39	5.5	9.5	5.5	18	25	10	63	2.0	1.0
<b>BSS1520-2E</b>	15	20	5 070	8 730	32	55	16.5	33		51	43				20	27	15	81	2.8	1.4
<b>BSS2005-3E</b>	20	5								31							12	55	3.4	1.7
<b>BSS2010-3E</b>	20	10	8 790	18 500	36	62	19	38	13	45	49	6.6	11	6.5	23.5	30.5	12	69	3.2	1.6
<b>BSS2020-2E</b>	20	20	5 900	11 700						54							18	90		
<b>BSS2505-3E</b>	25	5	9 760	23 600						32							12	56	4.4	2.2
<b>BSS2510-4E</b>	25	10	12 800	32 300	40	62	24	48	12	56	51	6.6	-	-	23.5	30.5	12	80	4.7	2.4
<b>BSS2520-2E</b>	25	20								54							20	94	3.9	2.0
<b>BSS2525-2E</b>	25	25	6 560	14 600						63							20	103	4.3	2.2

Model No.	Shaft dia. <i>d</i>	Lead <i>l</i>	Basic load rating (N)		Ball nut dimensions										Seal dimensions <i>M</i>	Total length with nut & seal <i>L</i>	Internal spatial volume of nut (cm <sup>3</sup> )	Standard volume of grease replenishing (cm <sup>3</sup> )		
			Dynamic <i>C<sub>d</sub></i>	Static <i>C<sub>0s</sub></i>	Dia. <i>D<sub>1</sub></i> , <i>D<sub>2</sub></i>	Flange				Nut length <i>L<sub>n</sub></i>	Bolt holes								Oil hole position <i>T</i>	
					<i>D<sub>1</sub></i>	<i>D<sub>2</sub></i>	<i>A</i>	<i>G</i>	<i>H</i>	<i>B</i>	<i>L<sub>n</sub></i>	<i>W</i>	<i>X</i>	<i>Y</i>	<i>Z</i>	<i>T</i>				
<b>HSS3205</b>	32	5	18 500	56 100	57	58	85	32	42	13	89	71	6.6	11	6.5	33	9.5	108	10	5
<b>HSS3210</b>	32	10	46 300	108 000	73	74	108	41	53.5	15	160	90	9	14	8.5	45	14.5	189	43	22

Notes: 1. Maximum operating temperature: 60°C (at outside diameter of ball nut)

Notes: 1. Maximum operating temperature: 80°C (at outside diameter of ball nut)  
2. Grease nipple attachment is done only on the outer side of the flange (see diagram).

L1 Seal