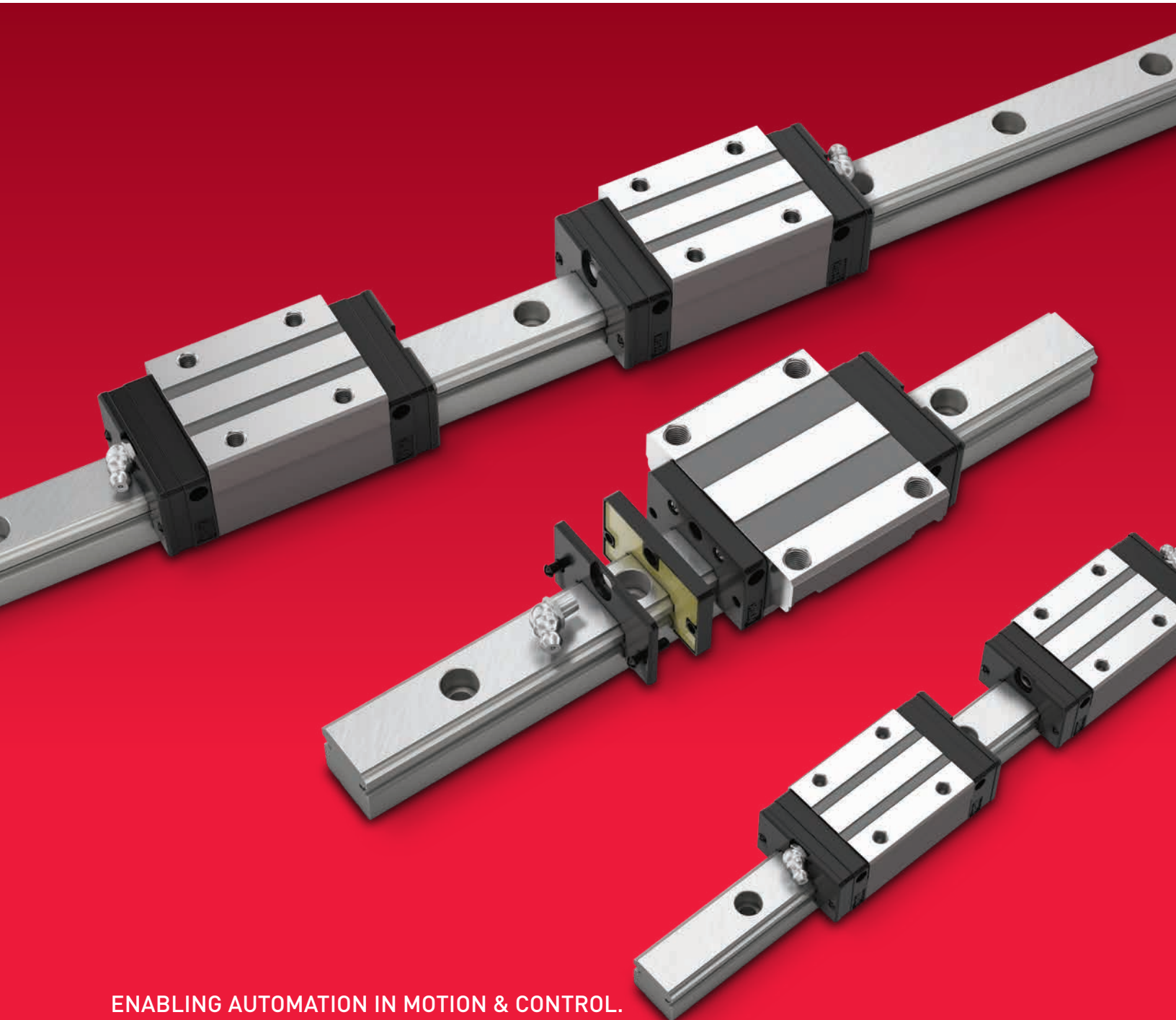




K1-L™ LUBRICATION UNITS

LONG-LASTING, LOW-MAINTENANCE LUBRICATION FOR NSK LINEAR GUIDES



ENABLING AUTOMATION IN MOTION & CONTROL.



ENABLING INNOVATION

PRECISION MACHINE COMPONENTS AND INTEGRATED SYSTEMS

For decades, NSK has specialized in developing electromechanical solutions — integrating our precision machine components with control technology — to deliver advanced, reliable and precise motion and control.

Robotic surgery. Medical imaging. Biomedicine. Semiconductor. 3D printing. Factory automation. Our customers are vast and diverse, united by precision-critical applications and NSK's ability to achieve coherent mechatronic solutions that offer:

- › Augmented machine function and accuracy
- › Optimized system performance, space and life
- › Reduced costs and complexity

From complex systems to single-axis solutions, NSK delivers innovative and ideal integrated motion solutions to enable automation and accuracy in machine function, and delivers a competitive edge to our customers.

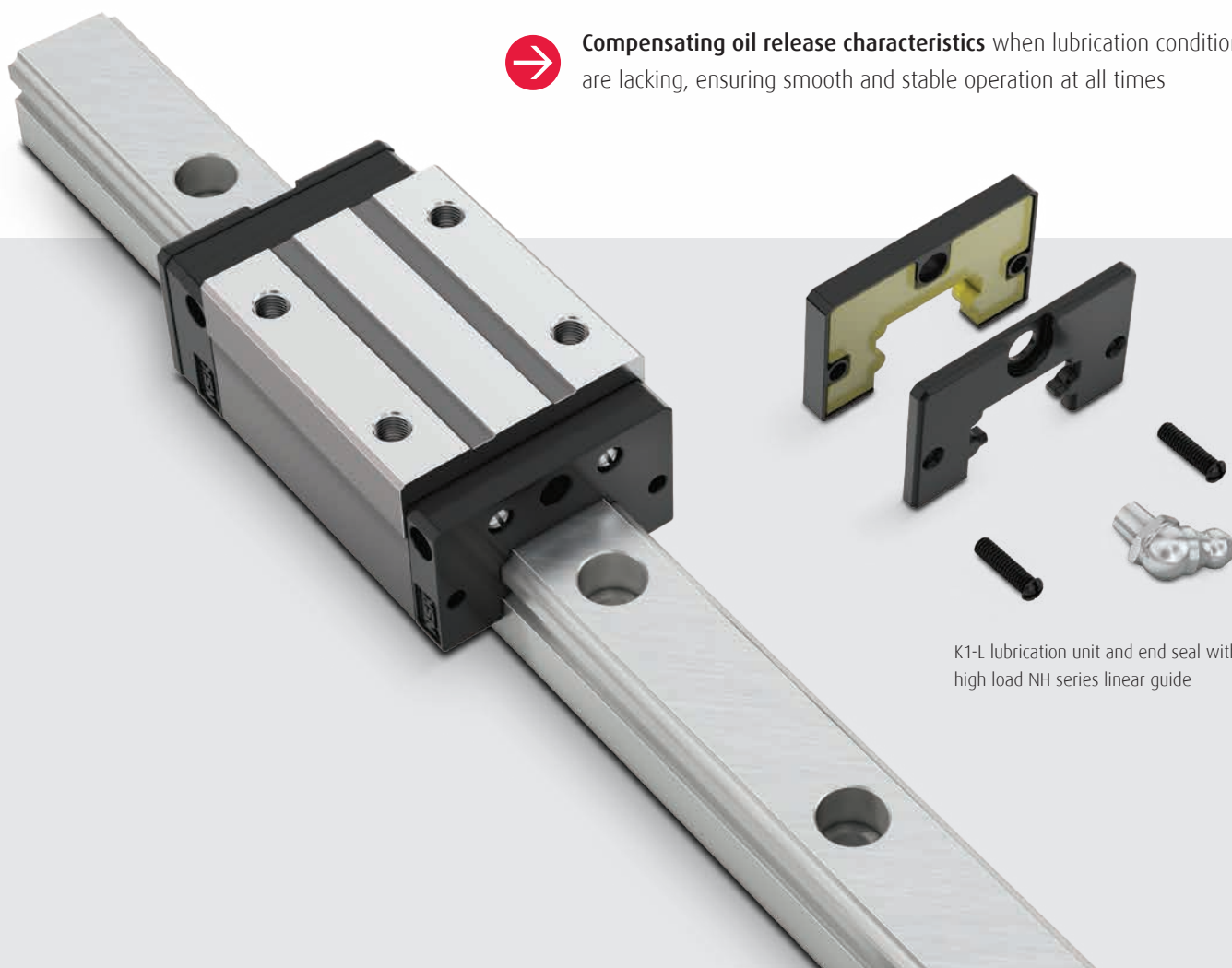
LONG LASTING, LOW MAINTENANCE LUBRICATION

NSK series linear guides deliver outstanding precision accuracy with extremely high load ratings. With state-of-the-art advancements in ball groove geometry and recirculation, load ratings and rating life have increased dramatically while attaining smooth and quiet circulation in high-speed applications.

NEW ENHANCED K1-L LUBRICATION UNITS

Built on 25 years of proven results with long-term maintenance-free lubrication, NSK's new generation K1-L lubrication units increase mean time between maintenance with reduced energy and environmental impacts and even higher lubricating capabilities including:

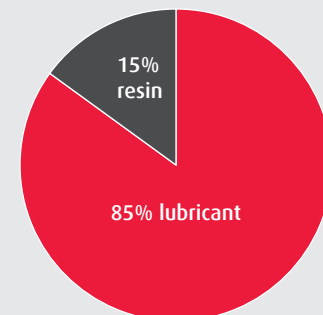
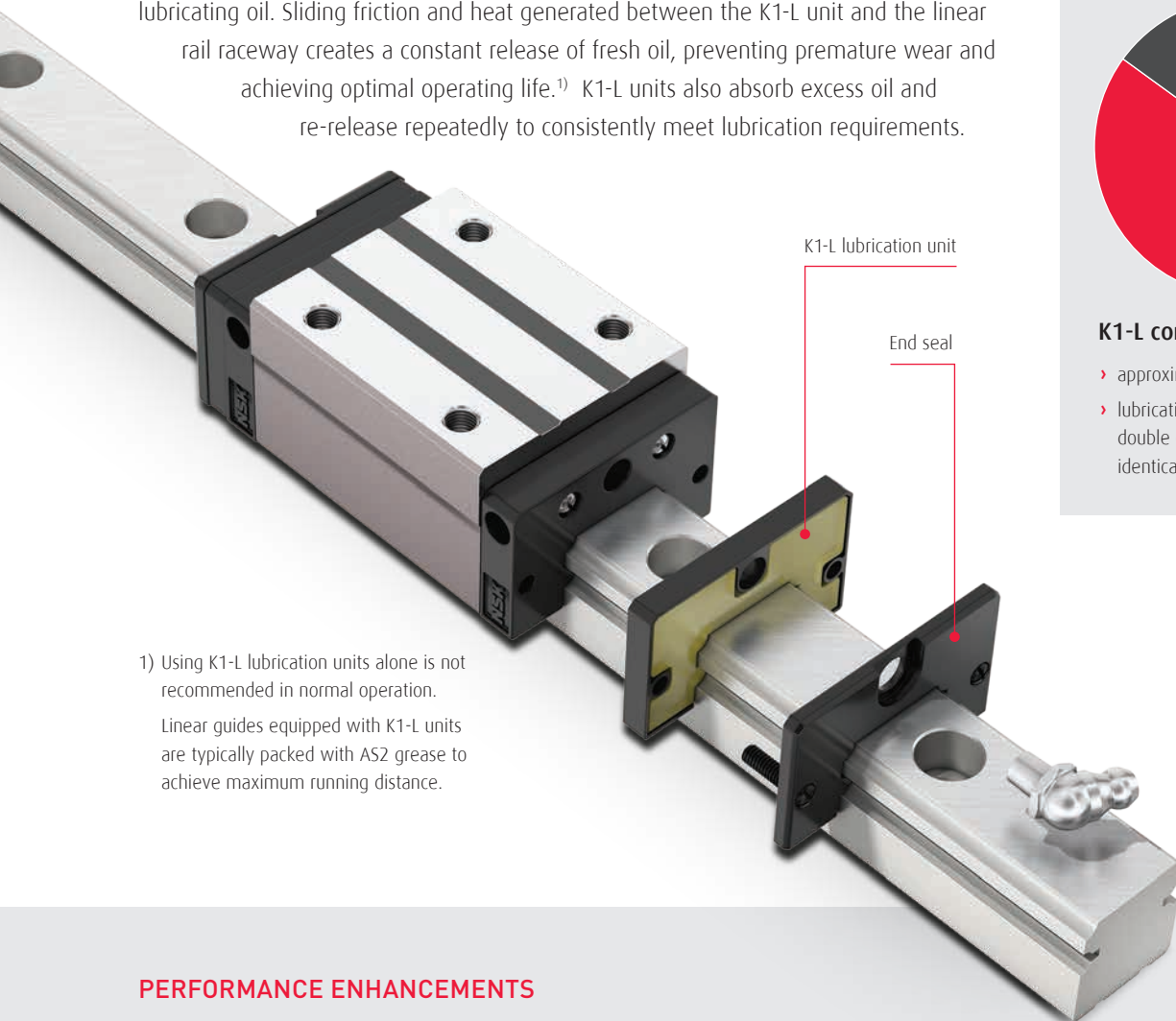
- ➔ **Extended maintenance-free operation** with newly developed material delivering lubrication nearly twice as long as conventional K1
- ➔ **20% reduction of friction force** through improved rail-contact design, reducing energy use in drive equipment
- ➔ **Compensating oil release characteristics** when lubrication conditions are lacking, ensuring smooth and stable operation at all times



K1-L lubrication unit and end seal with a high load NH series linear guide

DESIGN AND OPERATING ADVANTAGES

NSK K1-L lubricating units are made of a porous synthetic resin containing abundant lubricating oil. Sliding friction and heat generated between the K1-L unit and the linear rail raceway creates a constant release of fresh oil, preventing premature wear and achieving optimal operating life.¹⁾ K1-L units also absorb excess oil and re-release repeatedly to consistently meet lubrication requirements.



K1-L composition by weight

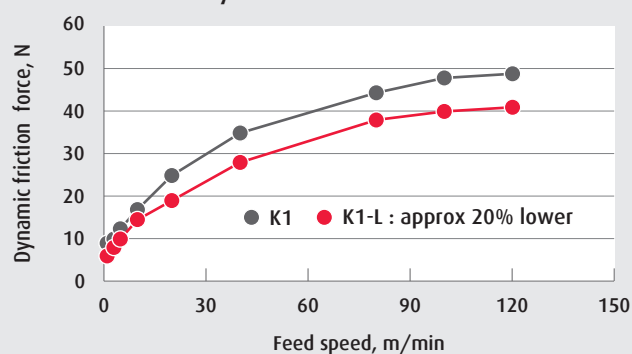
- › approximately 85% lubricant
- › lubricating oil supply period nearly double conventional K1 units in identical operation conditions

1) Using K1-L lubrication units alone is not recommended in normal operation.

Linear guides equipped with K1-L units are typically packed with AS2 grease to achieve maximum running distance.

PERFORMANCE ENHANCEMENTS

Reduced dynamic friction while slide moves

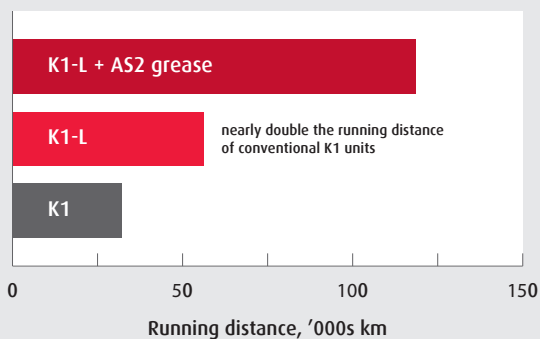


Model: NH25 with slight preload

Lubrication: lubrication unit (2 per slide) + packed AS2 grease

External load: none

Extended maintenance-free operation



Model: NH25 with slight preload

Lubrication: lubrication unit (2 per slide)

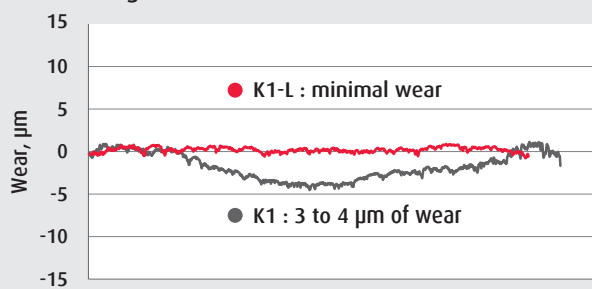
External load: none

Feed speed: 3.2 m/min

RANGE OF K1-L AVAILABILITY BY SERIES AND TYPE

LINEAR GUIDE SERIES / TYPES		STANDARD DESIGN TYPE	COMPACT DESIGN TYPE
NH	General duty series with a full range of interchangeable ball slides and rails	slider sizes 15 to 65	
NS			slider sizes 15 to 35
DH	Long-life series with TF heat treatment technology and a full range of interchangeable ball slides and rails	slider sizes 15 to 65	
DS			slider sizes 15 to 35
VH	General duty series with highly dust-resistant end seals	slider sizes 15 to 55	
DV	Long-life series with highly dust-resistant end seals	slider sizes 15 to 55	
HS	High-accuracy series		slider sizes 15 to 35

Longer life under harsh environments



Wear of slide ball groove, running distance 100 km

Model: NH25 with slight preload

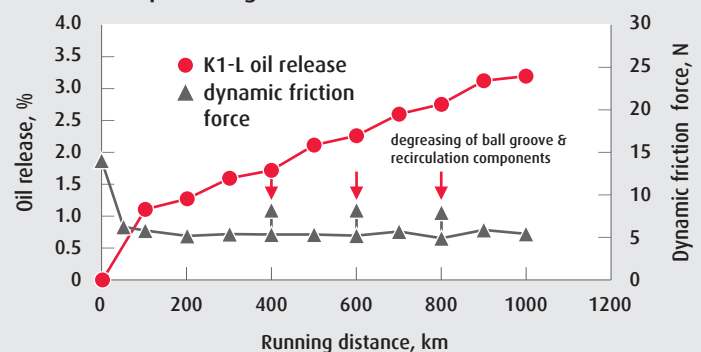
Lubrication: lubrication unit (2 per slide) + packed AS2 grease

External load: none

Feed speed: 1 m/s

Contamination: iron powder spread on rail every 100 strokes

Compensating oil release characteristics



Model: NH25 with slight preload

Lubrication: lubrication unit (2 per slide) + packed AS2 grease

External load: none

Test conditions: recreation of poor lubrication with repeated removal of lubricant from ball groove and recirculation system

LINEAR GUIDE DESIGN TYPES

BALL SLIDE SHAPES AND LOAD CHARACTERISTICS

RANGE OF DESIGN TYPES - BALL SLIDE SHAPES AND LOAD CHARACTERISTICS				
BALL SLIDE SHAPE AND INSTALLATION METHOD		HIGH LOAD	SUPER-HIGH LOAD	MEDIUM LOAD
		STANDARD	LONG	SHORT
AN BN				
AL BL CL				
EM GM JM				

THICKNESS - SINGLE K1-L UNIT (MM)			
BALL SLIDE MODEL		STANDARD	COMPACT
BALL SLIDE SIZE	15	5.3	4.8
	20	5.3	5.3
	25	5.8	5.3
	30	6.0	6.0
	35	6.5	6.5
	45	7.5	--
	55	7.5	--
	65	9.0	--

HANDLING PRECAUTIONS FOR NSK K1-L

Permissible operating temperature:

50°C maximum (80°C can be tolerated for brief periods)

Chemicals that should not contact NSK K1-L:

Do not leave NSK K1-L in organic solvents, such as hexane or other thinners that remove oil, or in anti-corrosion agents containing kerosene.

NSK K1-L has the same dimensions as NSK K1. However, when using multiple K1-L units, the slider length will be longer than that using multiple K1 units due to the shape of the case.

RANGE OF K1-L AVAILABILITY

NH/NS AND DH/DS SERIES LINEAR GUIDE



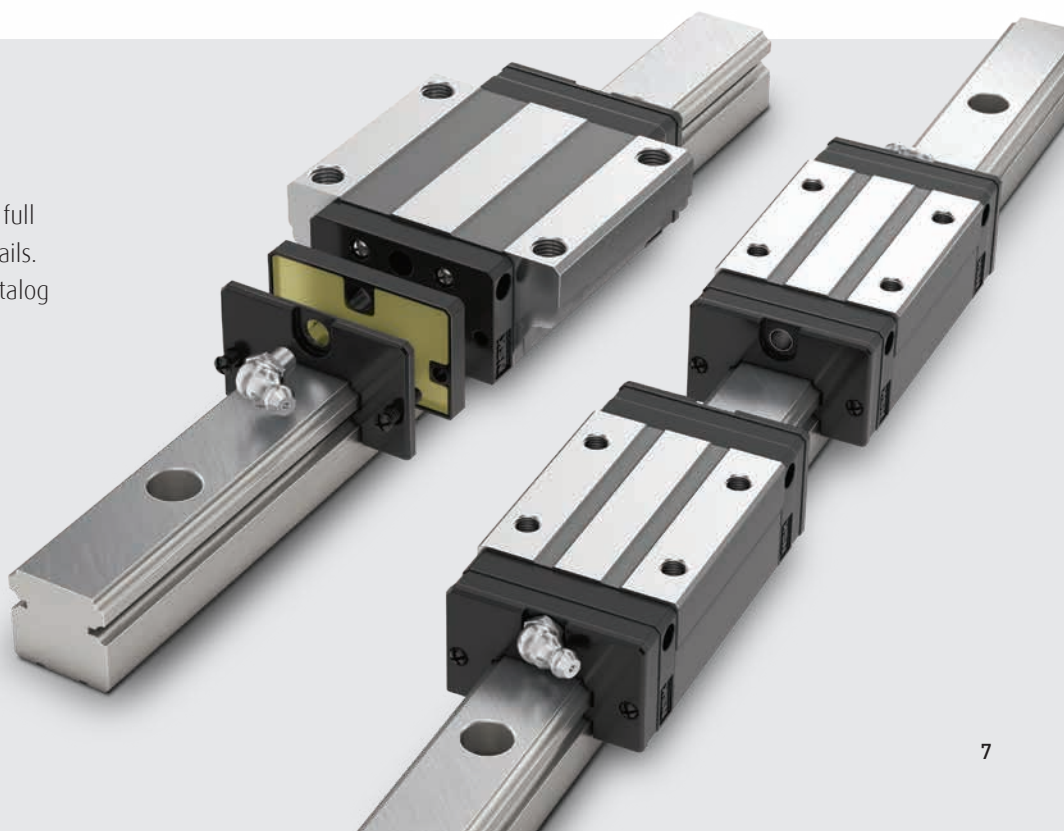
RANGE OF K1-L AVAILABILITY - LINEAR GUIDE SERIES NH/NS AND DH/DS								
BALL SLIDE LOAD		HIGH LOAD (STANDARD)			SUPER-HIGH LOAD (LONG)			MEDIUM LOAD (SHORT)
BALL SLIDE SHAPE		SQUARE	LOW PROFILE SQUARE	FLANGE	SQUARE	LOW PROFILE SQUARE	FLANGE	LOW PROFILE SQUARE
SERIES / MODEL / SIZE		AN	AL	EM	BN	BL	GM	CL
STANDARD TYPE - NH, DH	15							
	20							
	25							
	30							
	35							
	45							
	55							
	65							
COMPACT TYPE - NS, DS	15							
	20							
	25							
	30							
	35							

NH/NS Series Linear Guides

NSK's premier general duty series, with a full range of interchangeable ball slides and rails. For additional information, refer to the catalog **Precision Machine Components E3162**.

DH/DS Series Linear Guides

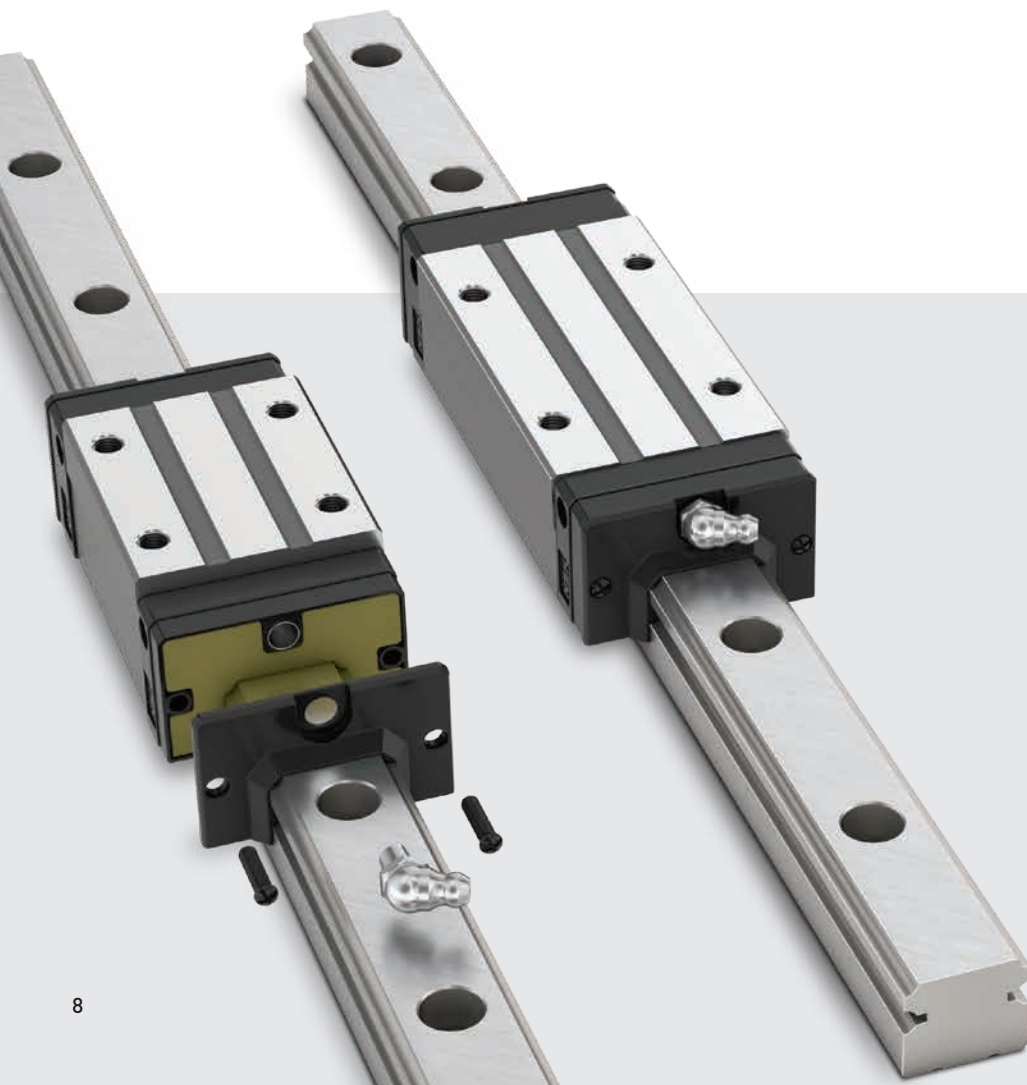
NSK's long-life series featuring TF heat treatment technology for higher capacity and endurance. With a full range of interchangeable ball slides and rails. For additional information, refer to the catalog **Long-Life Series: DH/DS Models E3336**.



RANGE OF K1-L AVAILABILITY

VH AND DV SERIES LINEAR GUIDES

RANGE OF K1-L AVAILABILITY - LINEAR GUIDE SERIES VH AND DV								
BALL SLIDE LOAD		HIGH LOAD (STANDARD)			SUPER-HIGH LOAD (LONG)			MEDIUM LOAD (SHORT)
BALL SLIDE SHAPE		SQUARE	LOW PROFILE SQUARE	FLANGE	SQUARE	LOW PROFILE SQUARE	FLANGE	LOW PROFILE SQUARE
SERIES / MODEL / SIZE		AN	AL	EM	BN	BL	GM	CL
STANDARD TYPE - VH, DV	15							
	20							
	25							
	30							
	35							
	45							
	55							
	65							



VH Series Linear Guides

NSK's general duty series, equipped with highly dust-resistant end seals. Available in standard ball slide configurations. For additional information, refer to the catalog **Precision Machine Components E3162**.

DV Series Linear Guides

NSK's long-life series, equipped with highly dust-resistant end seals. Available in standard ball slide configurations. For additional information, refer to the catalog **Long-Life Series: DH/DS Models E3336**.

RANGE OF K1-L AVAILABILITY

HS SERIES LINEAR GUIDES



RANGE OF K1-L AVAILABILITY - LINEAR GUIDE SERIES HS								
BALL SLIDE LOAD		HIGH LOAD (STANDARD)			SUPER-HIGH LOAD (LONG)			MEDIUM LOAD (SHORT)
BALL SLIDE SHAPE		SQUARE	LOW PROFILE SQUARE	FLANGE	SQUARE	LOW PROFILE SQUARE	FLANGE	LOW PROFILE SQUARE
SERIES / MODEL / SIZE		AN	AL	EM	BN	BL	GM	CL
COMPACT TYPE - HS	15							
	20							
	25							
	30							
	35							



HS Series Linear Guides

NSK's compact, high-accuracy series for high precision equipment and measuring instruments. For additional information, refer to the catalog **Precision Machine Components E3162**.

DESIGNATION SYSTEM

PRELOADED LINEAR GUIDE ASSEMBLIES WITH K1-L LUBRICATION UNITS

Ball Slide Model		Rail Length		Material / Surface Treatment		Design Serial Number		Preload
NH	25	1200	AN	C	2	***	L5	3
Ball Slide Size		Ball Slide Shape		Ball Sides Per Rail		Accuracy		

DESIGNATION	ATTRIBUTE	
Ball Slide Model	NH	general duty series, standard model
	NS	general duty series, compact model
	DH	long-life series, standard model
	DS	long-life series, compact model
	VH	general duty series with highly dust-resistant end seals, standard model
	DV	long-life series with highly dust-resistant end seals, standard model
	HS	high-accuracy series, compact model
Ball Slide Size ¹⁾		standard models: 15, 20, 25, 30, 35, 45, 55, 65 compact models: 15, 20, 25, 30, 35
Rail Length		expressed in millimeters
Ball Slide Shape	AN	high-load / standard / square type
	BN	super-high load / long / square type
	AL	high-load / standard / low-profile square type
	BL	super-high load / long / low-profile square type
	EM	high-load / standard length / flange type
	GM	super-high load / long / flange type

DESIGNATION	ATTRIBUTE	
Material / Surface Treatment	C	special high carbon steel (standard)
	D	special high carbon steel with surface treatment
	K ²⁾	stainless steel
	H ²⁾	stainless steel with surface treatment
Ball Slides Per Rail		quantity required for application as defined by customer
Design Serial Number		defined by NSK
Accuracy	L3	K1-L, ultra precision (P3)
	L4	K1-L, super precision (P4)
	L5	K1-L, high precision (P5)
	L6	K1-L, precision grade (P6)
	LN	K1-L, normal grade (PN)
Preload	0	fine clearance Z0
	1	slight preload Z1
	3	medium preload Z3

Notes:

Designation system shown does not consider available accessories such as double seals and protector plates.

Designations for NH / NS models supplied from NSK Precision America production will deviate from that shown - contact NSK.

- 1) Sizes 45 and 55 apply to NH, DH, and VH models only. Size 65 applies to NH and DH models only.
- 2) Stainless steel cannot be selected for DH, DS, or DV models.

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