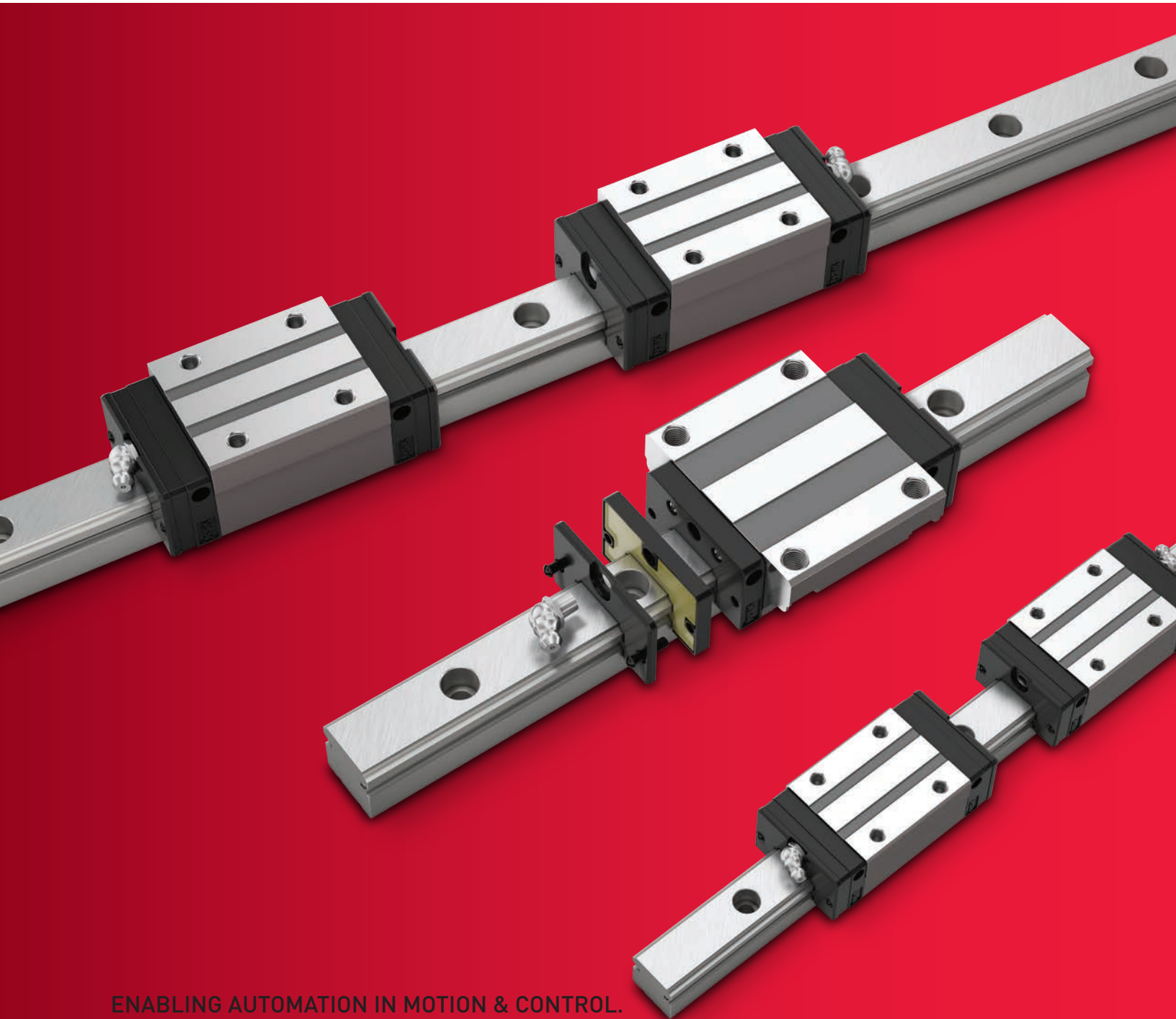


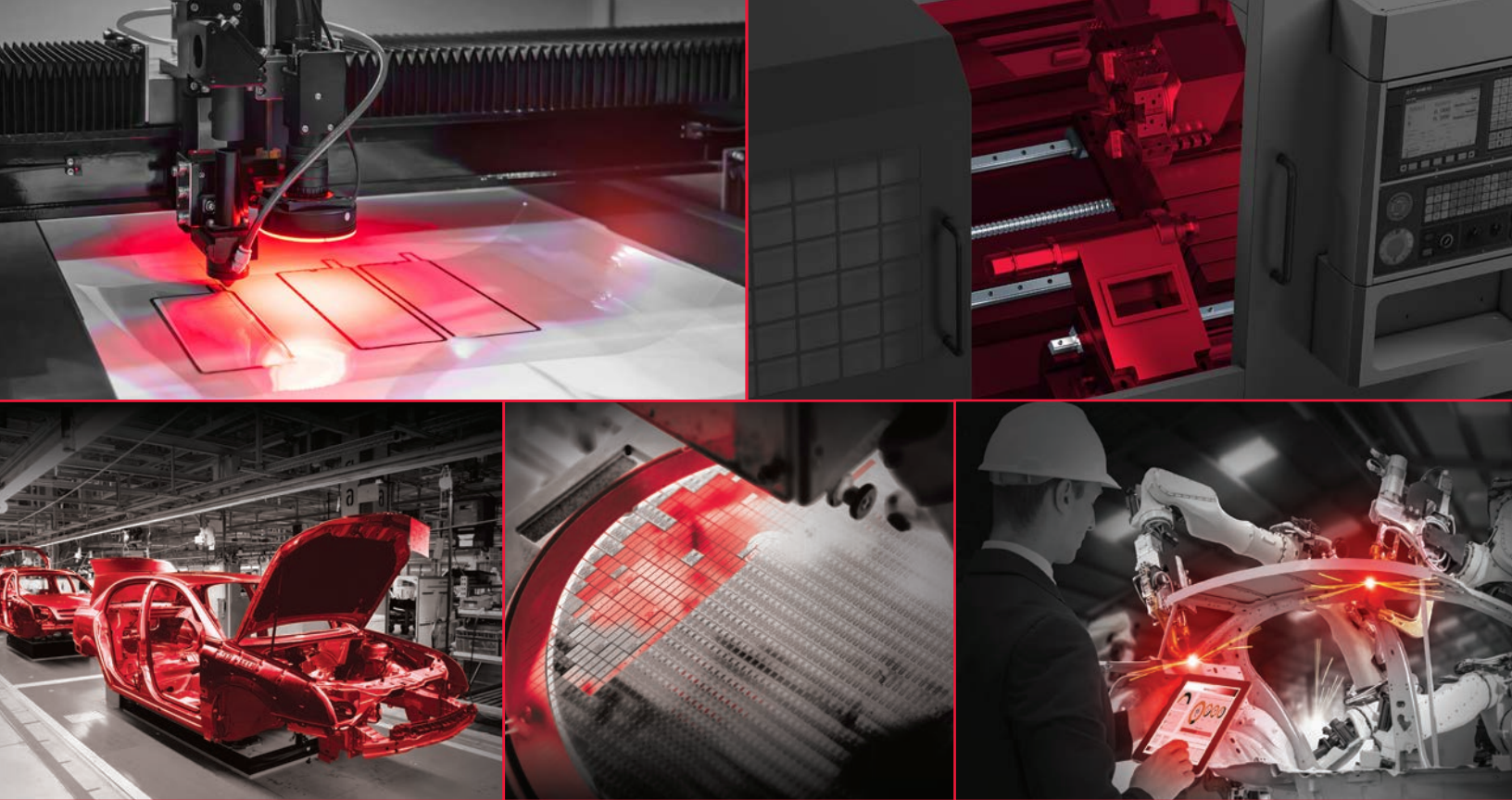


K1-L™ LUBRICATION UNITS

LONG LASTING, LOW MAINTENANCE LUBRICATION FOR NSK LINEAR GUIDES



ENABLING AUTOMATION IN MOTION & CONTROL.



ENABLING AUTOMATION

NSK MECHATRONIC SYSTEM SOLUTIONS

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.

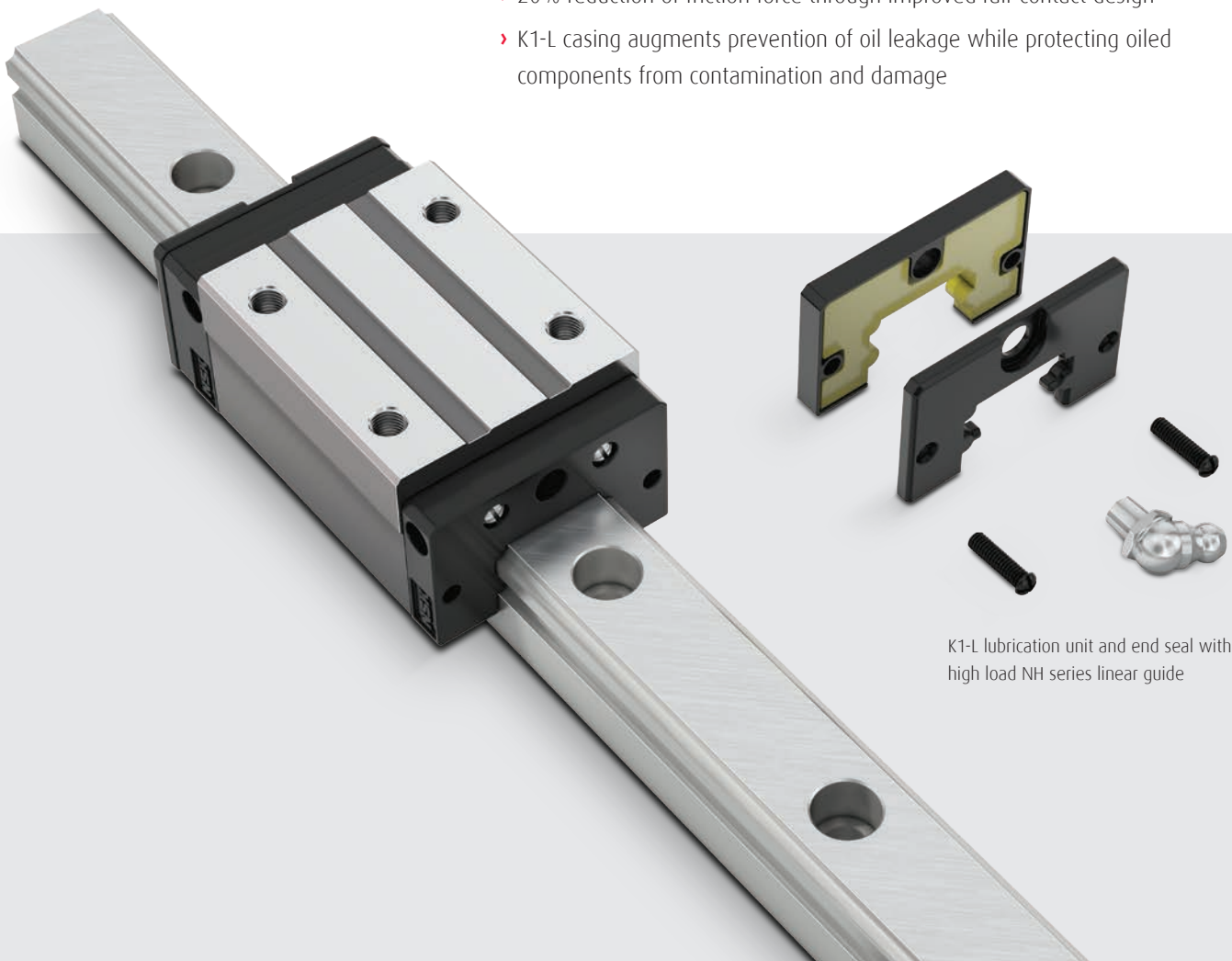
MAINTENANCE-FREE PRECISION MOTION

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

NEW ENHANCED K1-L LUBRICATION UNITS

For more than 20 years, NSK has delivered long-term maintenance-free lubrication for linear guides with our K1 lubrication unit. With our new generation K1-L, NSK has increased mean time between maintenance with reduced energy and environmental impacts through product enhancements including:

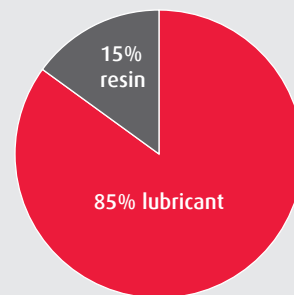
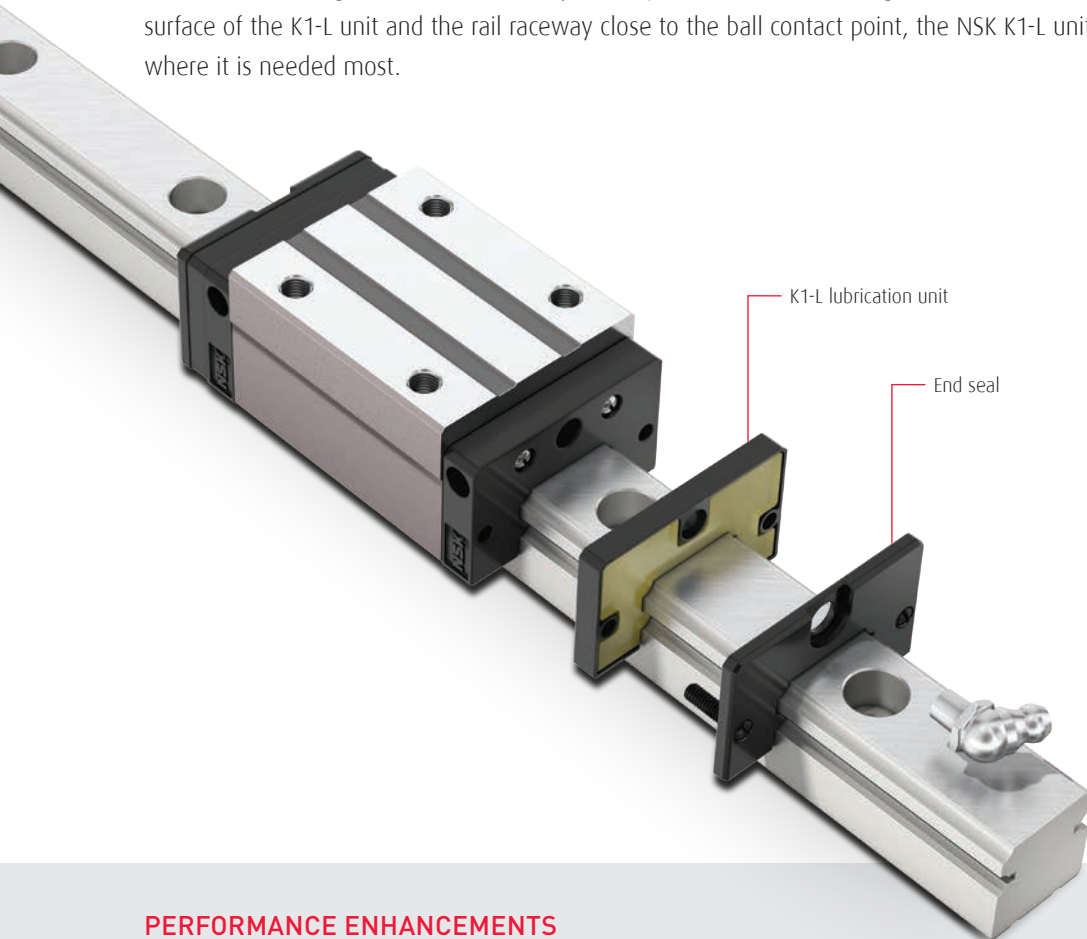
- › Increased supply of lubrication oil from newly developed material - life is increased by 1.8 times compared to conventional K1 material
- › 20% reduction of friction force through improved rail-contact design
- › K1-L casing augments prevention of oil leakage while protecting oiled components from contamination and damage



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. Through contact between the surface of the K1-L unit and the rail raceway close to the ball contact point, the NSK K1-L unit constantly supplies fresh oil to where it is needed most.

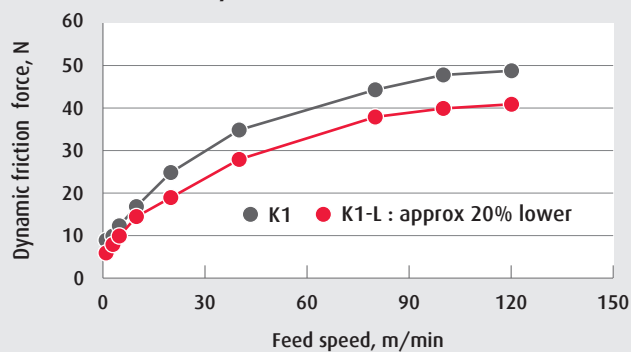


NSK K1-L composition by weight

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

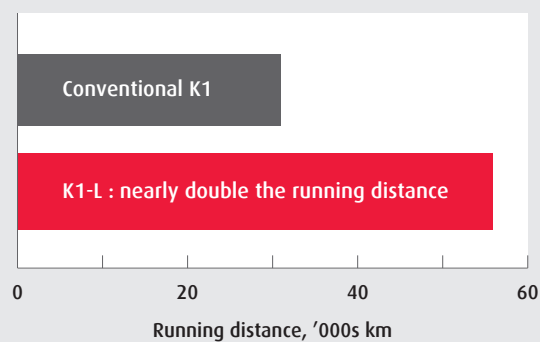
PERFORMANCE ENHANCEMENTS

Reduced dynamic friction while slide moves



Model: NH25 with slight preload
Lubrication: lubrication unit + packed AS2 grease
External load: none

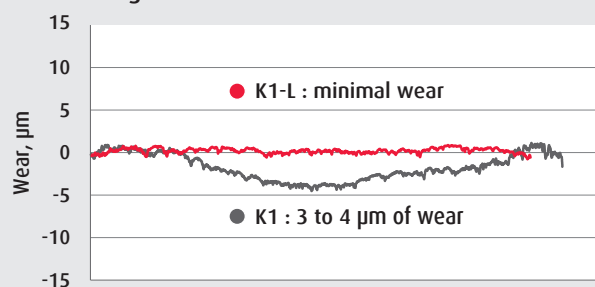
Extended maintenance-free operation



Model: NH25 with slight preload
Lubrication: lubrication unit only
External load: none
Feed speed: 3.2 m/min

RANGE OF AVAILABILITY			
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

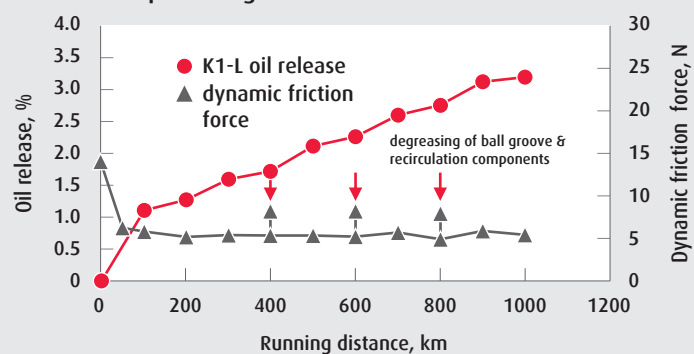
Lubrication: lubrication unit + packed AS2 grease

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 + 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



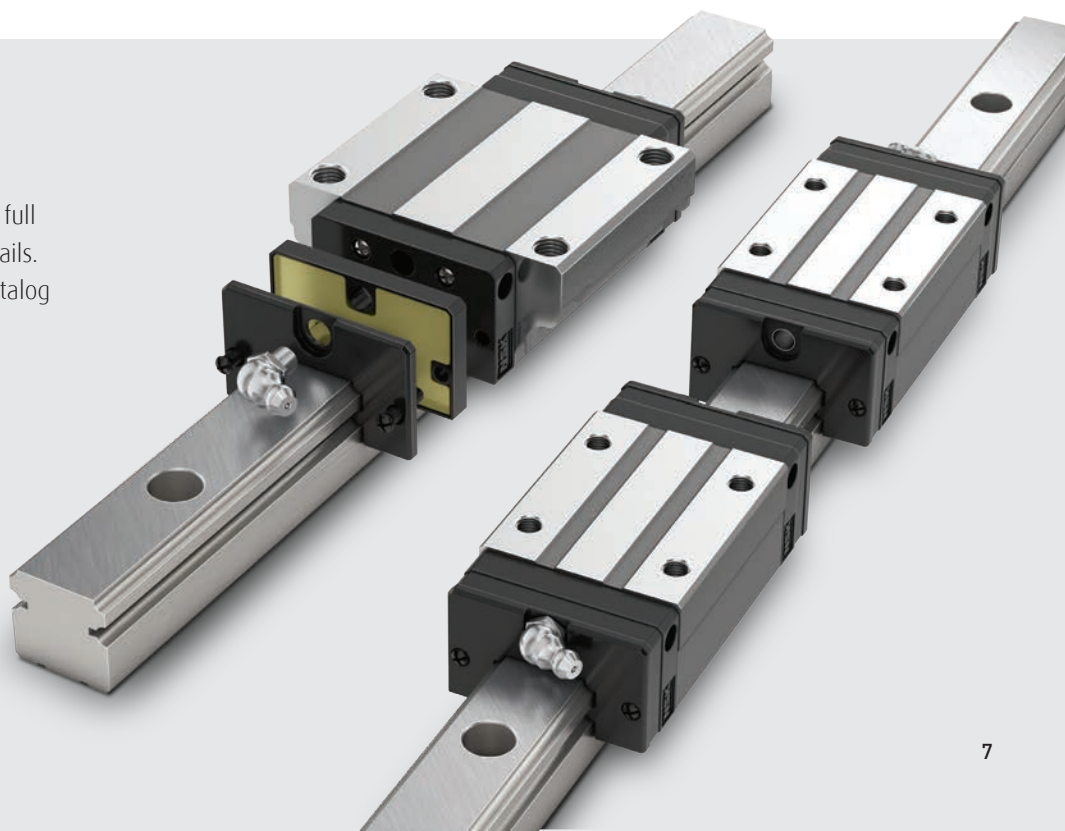
RANGE OF K1-L AVAILABILITY - LINEAR GUIDE SERIES NH/NS AND DH/DS								
BALL SLIDE LOAD		HIGH LOAD (STANDARD)			SUPER-HIGH LOAD (LONG)			MEDIUM LOAD (SHORT)
BALL SLIDE SHAPE		SQUARE	LOW PROFILE SQUARE	FLANGE	SQUARE	LOW PROFILE SQUARE	FLANGE	LOW PROFILE SQUARE
SERIES / MODEL / SIZE		AN	AL	EM	BN	BL	GM	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

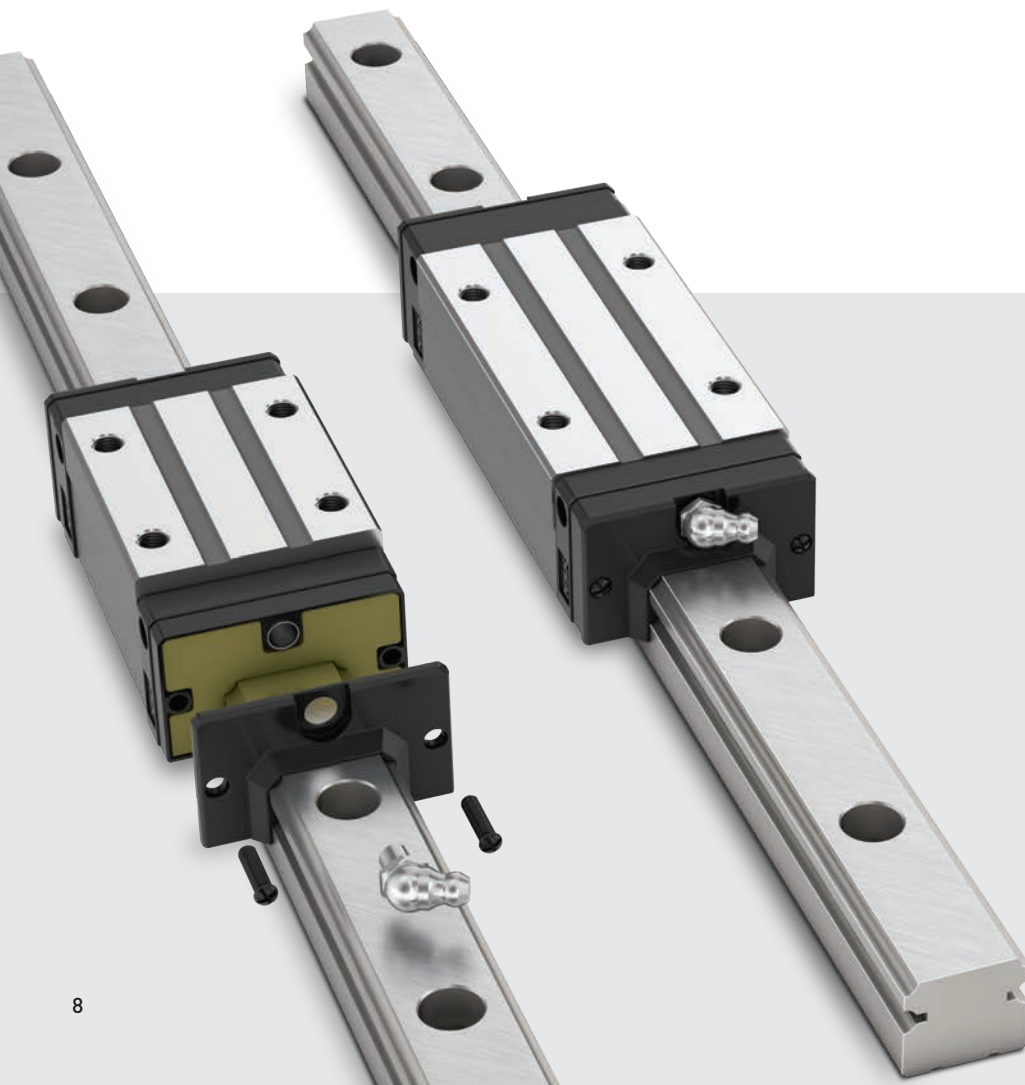
NSK's long-life series featuring TF heat treatment technology for higher capacity and endurance. With a full range of interchangeable ball slides and rails. For additional information, refer to the catalog **Long-Life Series: DH/DS Models E3336**.



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

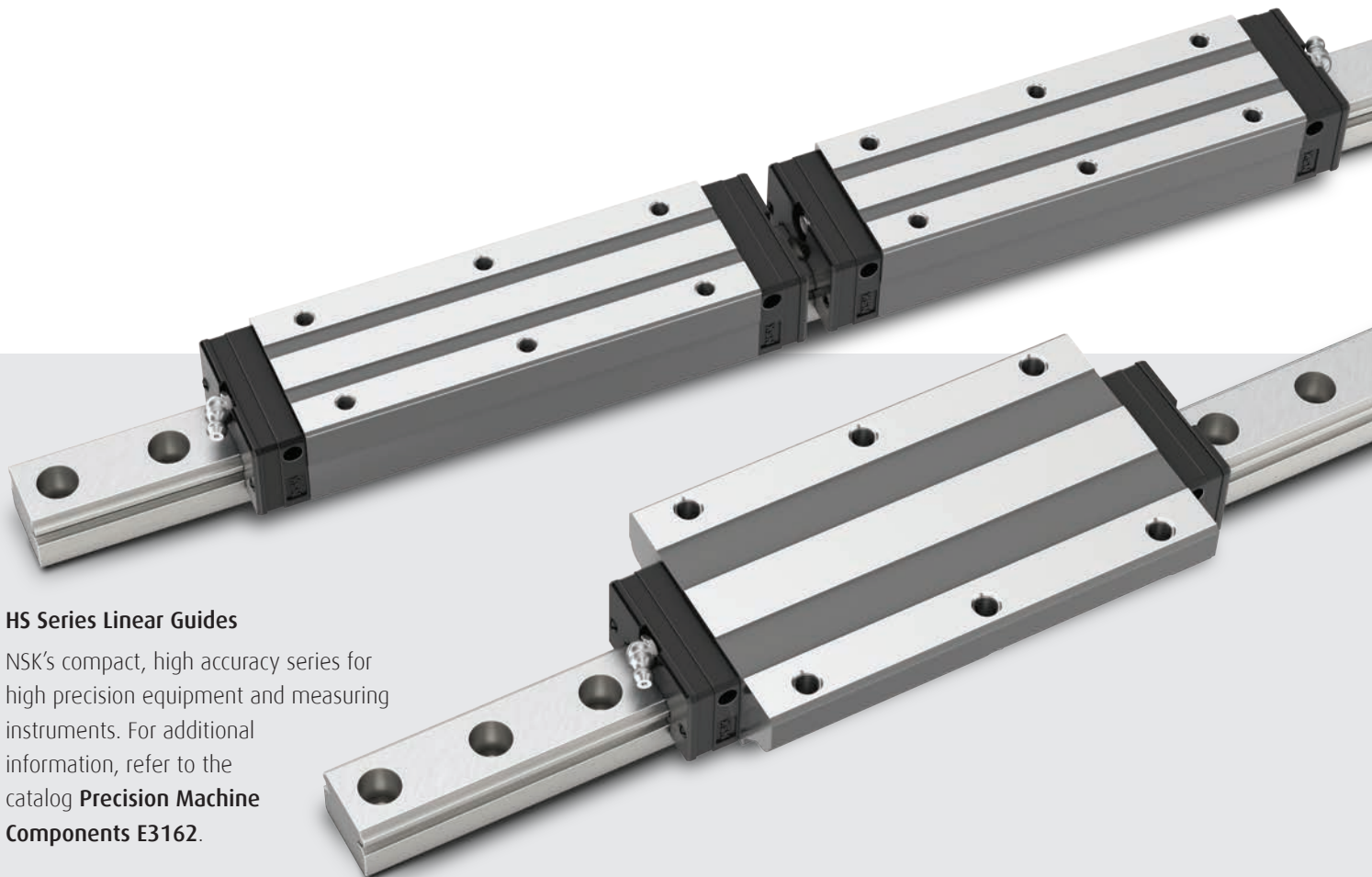
NSK's long-life series, equipped with highly dust-resistant end seals. Available in standard ball slide configurations. For additional information, refer to the catalog **Long-Life Series: DH/DS Models E3336**.

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**.

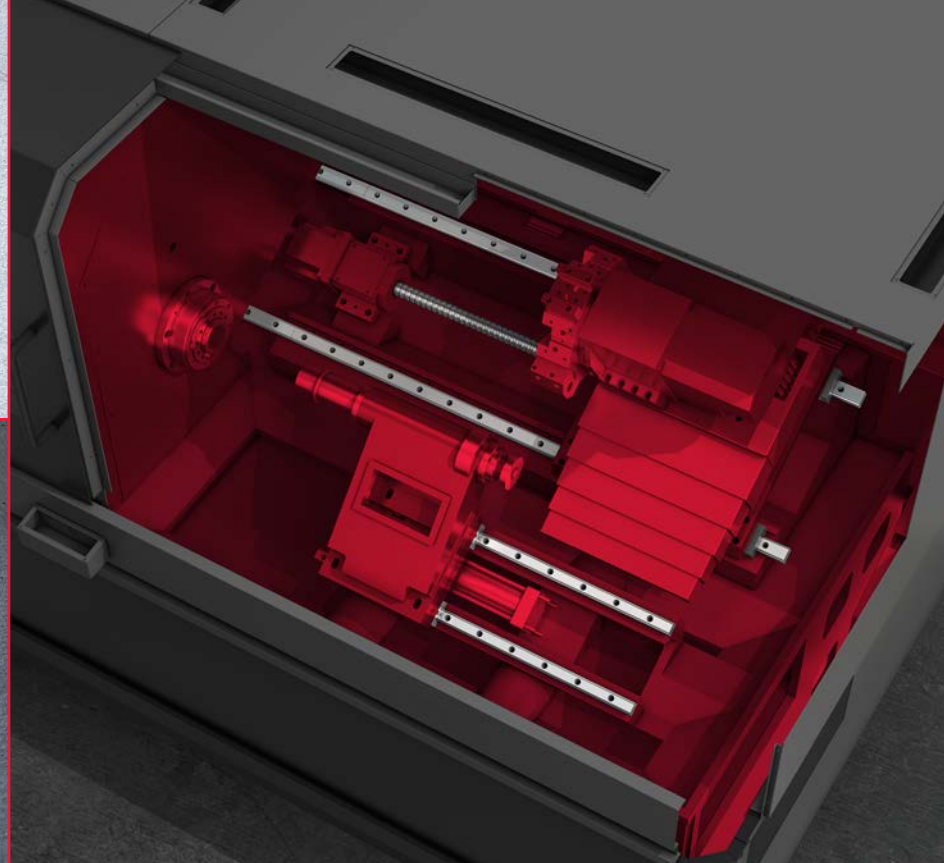
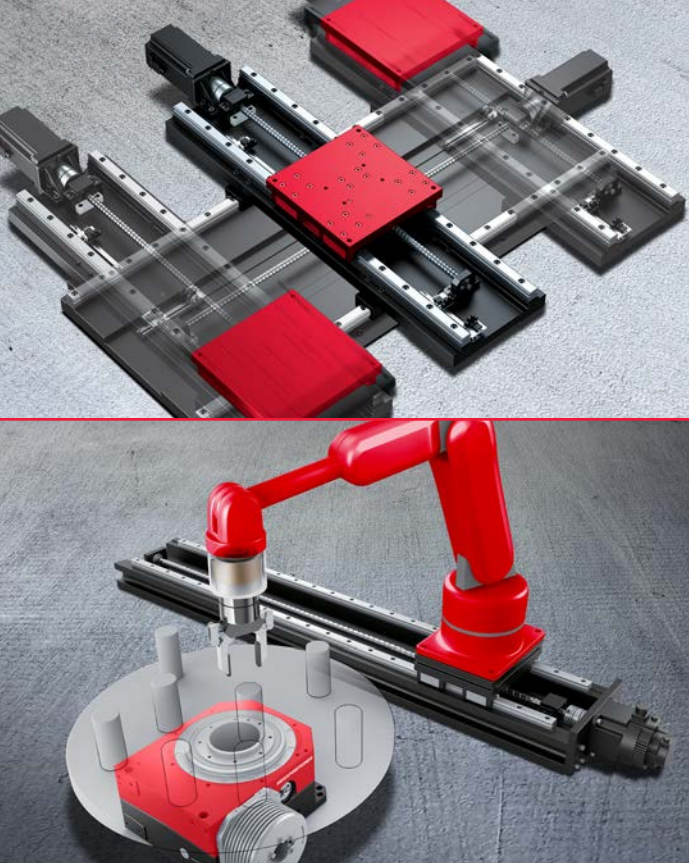
DESIGNATION SYSTEM

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		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	stainless steel
	H	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



ACCUMULATED EXPERTISE, OPTIMAL SUPPORT

For your precision machine component and integrated system requirements, you can rely on the optimum interaction of NSK design solutions, comprehensive engineering support, domestic manufacturing capabilities and access to our global technology network. Our local automation experts will collaborate closely with you through all aspects of design, provide intensive project management and extend comprehensive technical support. We aim to deliver to our customers the ideal motion and control solution and experience.

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