

**HIWIN**<sup>®</sup>

Lineartechnologie



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Lubricating instructions  
for linear guideways  
and  
ballscrews

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## Contents

<b>1</b>	<b>Basic information on this document</b> .....	<b>4</b>
1.1	Symbols used .....	4
<b>2</b>	<b>Safety</b> <b>5</b>	
2.1	Proper use of lubricants .....	5
2.2	Safety instructions for the storage of lubricants.....	5
<b>3</b>	<b>Selection of a lubricant</b> .....	<b>5</b>
3.1	Miscibility .....	6
3.2	Operating conditions .....	6
3.3	Use of greases and oils in centralized lubrication systems .....	6
<b>4</b>	<b>Lubrication of linear guideways</b> .....	<b>7</b>
4.1	Lubrication connections.....	7
4.1.1	Lubrication connection on the front end.....	7
4.1.2	Lubrication connection on the side .....	7
4.1.3	Lubrication connection from above.....	8
4.2	Initial lubrication when placing into operation .....	9
4.3	Relubrication .....	10
4.4	Lubricant quantities and lubrication intervals .....	10
4.4.1	Lubricant quantities and lubricating intervals for grease lubrication .....	10
4.4.2	Lubricant quantities and lubricating intervals for lubrication with low-viscosity grease ..	15
4.4.3	Lubricant quantities for oil lubrication .....	16
4.5	Self-lubricating block 'E2' .....	18
<b>5</b>	<b>Lubrication of ball screws</b> .....	<b>19</b>
5.1	General notes on lubricant quantities.....	19
5.1.1	Initial lubrication when placing into operation .....	19
5.1.2	Relubrication .....	19
5.2	Lubricant quantities and lubrication intervals .....	20
5.2.1	Lubricant quantities and lubricating intervals for lubrication with grease .....	20
5.2.2	Lubricant quantities and lubricating intervals for lubrication with low-viscosity grease ..	21
5.2.3	Lubricant quantities and lubrication intervals for oil lubrication.....	22
<b>6</b>	<b>HIWIN grease guns and greases</b> .....	<b>23</b>
6.1	HIWIN grease guns .....	23
6.2	HIWIN greases.....	23
<b>7</b>	<b>Recommended lubricants</b> .....	<b>24</b>
7.1	Grease lubrication .....	24
7.1.1	Standard applications .....	24
7.1.2	Heavy-duty applications.....	24
7.1.3	Clean room / vacuum applications.....	25
7.1.4	Clean room / vacuum applications at high speeds .....	25
7.1.5	Applications with high speeds .....	25
7.1.6	Applications in the foodstuffs industry in acc. with USDA H1.....	25
7.2	Lubrication with low-viscosity grease.....	25
7.2.1	Standard applications .....	26
7.2.2	Heavy-duty applications.....	26
7.2.3	Clean room / vacuum applications.....	26
7.2.4	Applications with high speeds .....	26
7.2.5	Applications in the foodstuffs industry in acc. with USDA H1.....	27
7.3	Oil lubrication .....	27
7.3.1	Standard applications .....	27
7.3.2	Heavy-duty applications.....	27
7.3.3	Clean room / vacuum applications.....	28
7.3.4	Applications with high speeds .....	28
7.3.5	Applications in the foodstuffs industry in acc. with USDA H1.....	28

## 1 Basic information on this document

Linear technology machine elements must be adequately supplied with lubricant to ensure correct functioning and a long service life.

These lubricating instructions are intended to assist the user in selecting suitable lubricants and lubricant quantities and in determining the appropriate lubrication intervals.

The information provided here does not release the user from his obligation to carry out practical testing to check the specified lubrication intervals and to make adjustments where necessary. After every lubrication process, a check must be carried out to ascertain whether the machine element is still adequately lubricated (check for lubricant film).

### Lubricants

- reduce wear
- protect against dirt
- provide protection against corrosion

The lubricant is a constructional element and should already be taken into consideration when designing a machine. The operating temperature range and operating and ambient conditions must be considered when selecting a lubricant.

### 1.1 Symbols used



#### WARNING

Warnings serve to protect people against concrete or possible dangers to life and health. Warnings must absolutely be heeded.

#### NOTE

#### NOTE

Notes serve to protect the products or other parts of the system or offer tips on more efficient design of work sequences.



#### INFO

Infos offer additional information on lubrication.



Work instructions are marked with the checklist symbol. The actions described must be carried out and adhered to according to their sequence.

## 2 Safety



This chapter covers the safe handling of lubricants. Improper handling of lubricants can create a health hazard or the danger of fatal injury. The following instructions must be complied with. Before handling lubricants, always check the corresponding safety data sheet.

### 2.1 Proper use of lubricants

Prolonged and repeated contact with the skin should be avoided as far as possible. Areas of the skin splashed with lubricant should be cleaned with soap and water. Apply skin protection while working and a greasing skin cream after completing work. Where appropriate, wear oil-resistant protective clothing (e. g. gloves, apron). Do not wash your hands with petroleum, solvents or cooling lubricants which can be or are already mixed with water. Oil mist must be extracted at the point where it arises.

Protective goggles must be worn to prevent contact with the eyes. If lubricant should nevertheless get into the eyes, rinse the affected area with copious amounts of water. If irritation of the eyes persists, consult an ophthalmologist.

Under no circumstances should you induce vomiting if lubricant is accidentally swallowed. Seek medical help immediately.

As a rule, safety data sheets are available for lubricants, in accordance with 91/155/EEC. Here, you will find detailed information on health and environmental protection and accident prevention.

Most lubricants are hazardous to water. For this reason, they must never be allowed to get into the soil, water or sewage system.

### 2.2 Safety instructions for the storage of lubricants

Lubricants must be stored in well-sealed packaging in a cool, dry location. They must be protected against direct sunlight and frost. Lubricants must not be stored together with foodstuffs. Lubricants must not be stored together with oxidizing agents.

The instructions on the safety data sheet provided by the lubricant supplier must be observed.

## 3 Selection of a lubricant

Oils, greases or low-viscosity greases can be used as lubricants.

Depending on the product group, HIWIN products are supplied as standard with anti-corrosion protection, basic lubrication or ready-to-install with initial lubrication only. Both grease and oil may be used for basic lubrication at the factory. When relubricating, it is not possible to change from grease to oil lubrication. Products with anti-corrosion protection or basic lubrication must be lubricated before placing them into operation.

The same lubricants are used as for antifriction bearings. As a rule, the selection of a lubricant and the infeed method can be adapted to fit in with the lubrication of the other machine components.

#### **NOTE NOTE**

Lubricants containing MoS<sub>2</sub> or graphite must not be used.

### **3.1 Miscibility**

Always check the miscibility of different lubricants. Lubricant oils based on mineral oil of the same classification (e.g. CL) and of a similar viscosity (maximum one class difference) can be mixed.

Greases can be mixed if their base oil and the thickening type are the same. The viscosity of the base oil must be similar. The maximum difference in NLGI class is one level.

The use of lubricants other than those listed can mean shorter lubrication intervals and reduced performance. Chemical reactions between plastics, lubricants and preserving agents may also occur.

### **3.2 Operating conditions**

Essentially, the selection of a lubricant depends on the operating temperature and various operation-related factors, e.g. load, vibrations, oscillation, short-stroke applications. Special requirements such as use in combination with strong or aggressive media, in clean rooms, in a vacuum or in the foodstuff industry also need to be considered.

These instructions contain a list of applications and suitable lubricants. If you have any doubts, consult the lubricant supplier to ensure optimum lubrication.

### **3.3 Use of greases and oils in centralized lubrication systems**

We recommend that you carry out first lubrication before connection to a centralized lubrication system separately, using a grease gun. It is also important to ensure that all lines and elements up to the consumer loads are filled with lubricant and contain no air pockets.

Avoid long lines and lines of low diameter. Lines must be routed with an upward gradient.

The number of pulses depends on the partial quantities and the size of the piston distributor.

In addition, the lubrication system manufacturers' instructions must be observed.

## 4 Lubrication of linear guideways

HIWIN linear guideways can be lubricated with grease, low-viscosity grease or oil, depending on the specific application. The required lubricating pressure depends on the size, the lubricant, the length of the feed line and the type of lubrication connection used. For permanent lubrication systems, a minimum pressure of 4 to 6 bar is recommended. The maximum permissible lubricating pressure is 30 bar.

**NOTE NOTE**

Excessively high lubricating pressures and excessive quantities of lubricant can damage the block.

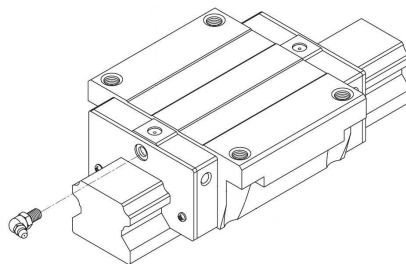
Particular care must be taken when lubricating blocks with double seals or SW seals, as these might otherwise be damaged.

### 4.1 Lubrication connections

HIWIN profile rail blocks offer three ways of attaching a lubrication connection:

#### 4.1.1 Lubrication connection on the front end

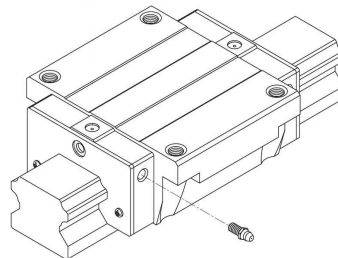
It is possible to install a lubrication connection on either side of the block. Connections which are not used are closed off.



#### 4.1.2 Lubrication connection on the side



The following preparations are necessary before using the side lubrication connections:



**Open the lubrication connection at the bottom of the drilled hole using a hot metal spike**

**NOTE NOTE**

Stop as soon as the first wall is penetrated!

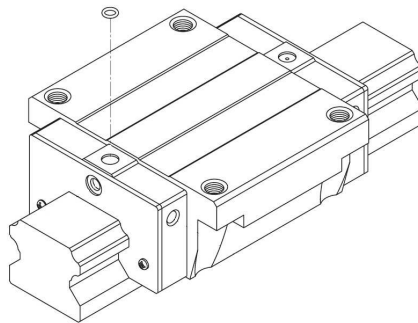
Diameter of the metal spike:  
 Diameter 2.5 mm up to size 35  
 Diameter 3.0 mm from size 45

A side lubrication connection should be fitted not on the reference side, but on the opposite side.

If this should become necessary, ensure that the lubrication connection does not protrude beyond the stop edge of the block.

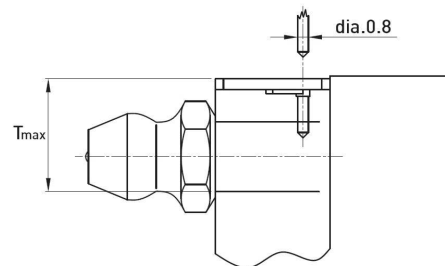
### 4.1.3 Lubrication connection from above

Alternatively, the block can be lubricated from above. In this case, an O-ring is used as a seal. See table 3.1 for the size of the O-ring. The O-ring is not included in the scope of delivery.



To establish a lubrication connection from above, it is first necessary to open the connection.

In the recess for the O-ring, there is a further recess. This must be penetrated to a maximum depth of  $T_{max}$  using a hot metal spike with diameter 0.8 mm as shown in the following table.

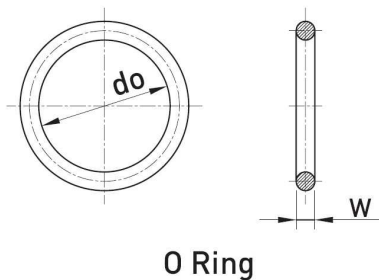


**NOTE NOTE**

A drill should not be used to open the lubrication bore, as there is a danger of chips getting into the block.

Table 4.1: Determining the size of the O-ring:

Size	O-ring		Lubrication bore from above
	d0 [mm]	W [mm]	max. depth Tmax. [mm]
HG15	2.5±0.15	1.5±0.15	3.75
HG20	4.5±0.15	1.5±0.15	5.70
HG25	4.5±0.15	1.5±0.15	5.80
HG30	4.5±0.15	1.5±0.15	6.30
HG35	4.5±0.15	1.5±0.15	8.80
HG45	4.5±0.15	1.5±0.15	8.20
HG55	4.5±0.15	1.5±0.15	11.80
HG65	4.5±0.15	1.5±0.15	10.80
EG15	2.5±0.15	1.5±0.15	6.90
EG20	4.5±0.15	1.5±0.15	8.40
EG25	4.5±0.15	1.5±0.15	10.40





Size	O-ring		Lubrication bore from above
EG30	4.5±0.15	1.5±0.15	10.40
RG25	7.5±0.15	1.5±0.15	5.80
RG30	7.5±0.15	1.5±0.15	6.20
RG35	7.5±0.15	1.5±0.15	8.65
RG45	7.5±0.15	1.5±0.15	9.50
RG55	7.5±0.15	1.5±0.15	11.60
RG65	7.5±0.15	1.5±0.15	14.50

HIWIN lubrication adapters can be used to connect the lubrication system.

## 4.2 Initial lubrication when placing into operation

HIWIN linear guideways of series MG and RG are delivered already protected. Initial lubrication is carried out in three steps:

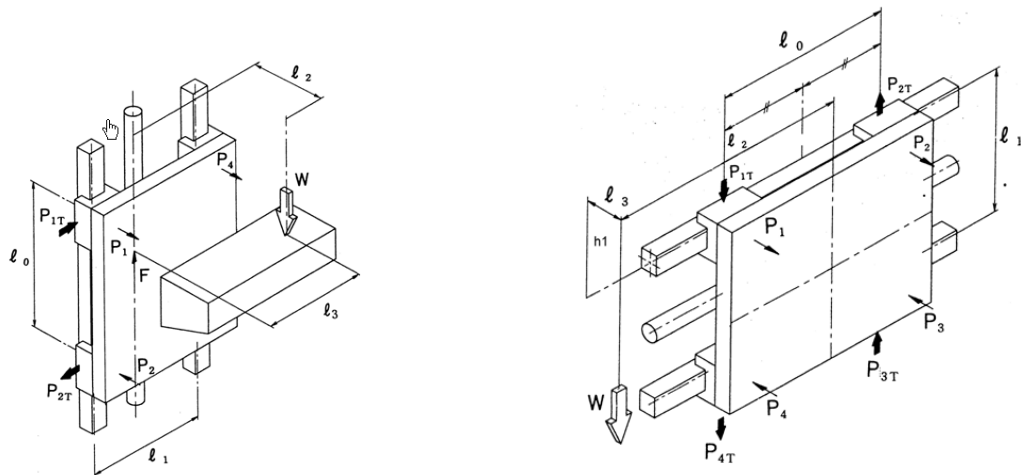
Apply the amount of grease specified in the table for the corresponding series by slowly pressing the grease gun. Move the block three times, by about three block lengths each time. Repeat the procedure described twice.

Check whether a lubricant film can be seen on the profile rail. If this is not the case, increase the lubricant quantities.

**i**

Blocks of the series HG, QH, EG, QE and WE are supplied with initial lubrication and need not be lubricated before placing into operation.

If the linear guideways are installed vertically, at the side or with the profile rail upward, the relubrication quantities must be increased by approx. 50 %.



For short-stroke applications (stroke < 2 x block lengths), initial lubrication is carried out as follows.

### Initial lubrication for short-stroke applications

Stroke < 2 x block length: Provide lubrication connections on both sides of the block and carry out lubrication once for each lubrication connection.

Stroke < 0.5 x block length: Provide lubrication connections on both sides of the block and lubricate. As you do so, move the block several times distance of two block lengths. Please contact us if this is not possible.

a

## 4.3 Relubrication

Relubrication depends to a very great extent on the loads and ambient conditions. Factors such as high loads, vibration and dirt mean shorter relubrication intervals. Where conditions are clean and the loads low, the relubrication intervals can be extended.

At the required intervals, apply the amount of lubricant listed in the table for the corresponding series once, by slowly pressing the grease gun.

If the linear guideways are installed vertically, at the side or with the profile rail upward, the relubrication quantities must be increased by approx. 50 %.

Check whether a lubricant film can be seen on the profile rail. If this is not the case, increase the lubricant quantities.

### Relubrication for short-stroke applications

For short-stroke applications (stroke < 2 x block length), relubrication should be carried out as indicated in chapter 4.2.

In the case of normal operating conditions, the specified relubrication intervals apply.

## 4.4 Lubricant quantities and lubrication intervals

### NOTE NOTE

Never place linear guideways into operation without basic lubrication.

The lubrication intervals listed below are reference values and may vary according to the ambient conditions. In general, excessively high quantities of lubricant or lubricating pressure can damage or destroy the product. It is imperative that you carry out the work steps as described to prevent damage to products.

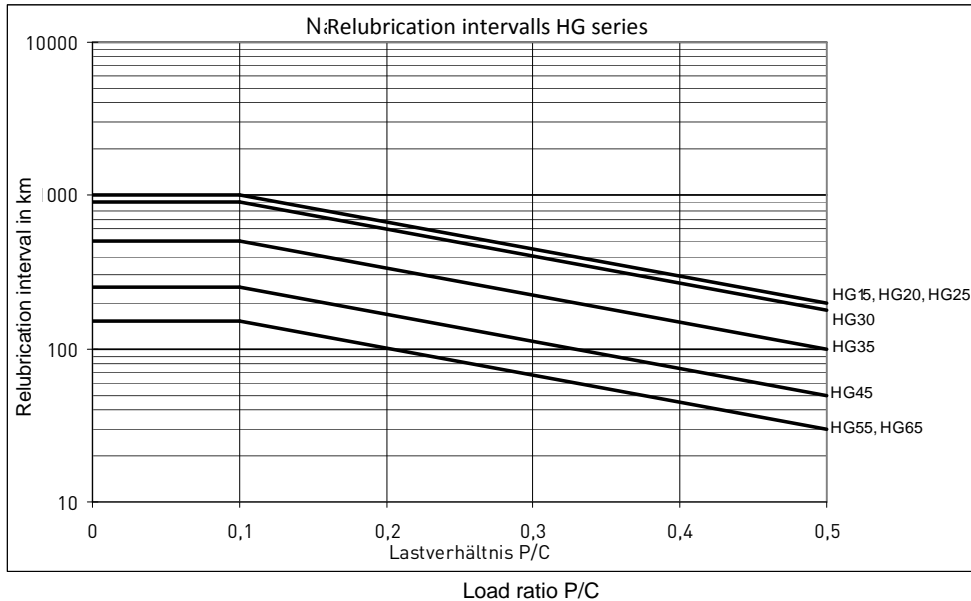
Among other factors, the relubrication intervals depend on the load ratio P/C. P stands for the dynamically equivalent load and C for the dynamic basic load rating. You can find further information on these values in the linear guideways catalog.

### 4.4.1 Lubricant quantities and lubricating intervals for grease lubrication

#### *Lubricant quantities for grease lubrication on the HG series*

Size	Initial lubrication		Relubrication	
	Partial quantity [cm <sup>3</sup> ]		Quantity [cm <sup>3</sup> ]	
	Heavy duty (C)	Super heavy duty (H)	Heavy duty (C)	Super heavy duty (H)
HG15	0.3 (3x)	--	0.3	--
HG20	0.5 (3x)	0.7 (3x)	0.5	0.7
HG25	0.8 (3x)	1.0 (3x)	0.8	1.0
HG30	1.3 (3x)	1.7 (3x)	1.3	1.7
HG35	1.9 (3x)	2.4 (3x)	1.9	2.4
HG45	3.8 (3x)	4.6 (3x)	3.8	4.6
HG55	6.3 (3x)	7.7 (3x)	6.3	7.7
HG65	10.0 (3x)	13.5 (3x)	10.0	13.5

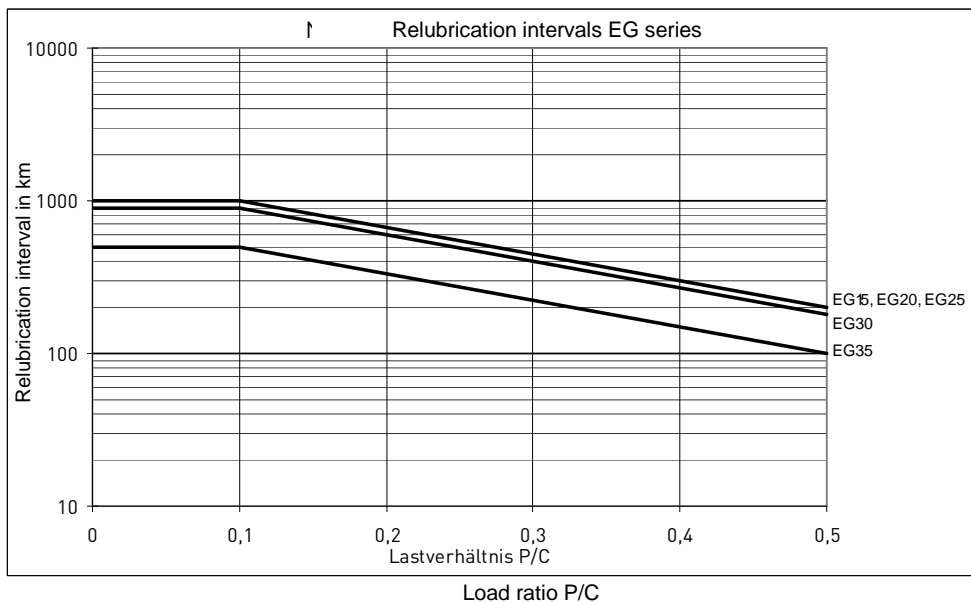
### Load-dependent relubrication intervals for grease lubrication



### Lubricant quantities for grease lubrication on the EG series

	Initial lubrication		Relubrication	
	Partial quantity [cm³]		Quantity [cm³]	
Size	Medium load (S)	Heavy duty (C)	Medium load (S)	Heavy duty (C)
EG15	0.2 (3x)	0.3 (3x)	0.2	0.3
EG20	0.3 (3x)	0.4 (3x)	0.3	0.4
EG25	0.5 (3x)	0.8 (3x)	0.5	0.8
EG30	0.7 (3x)	1.1 (3x)	0.7	1.1
EG35	0.9 (3x)	1.4 (3x)	0.9	1.4

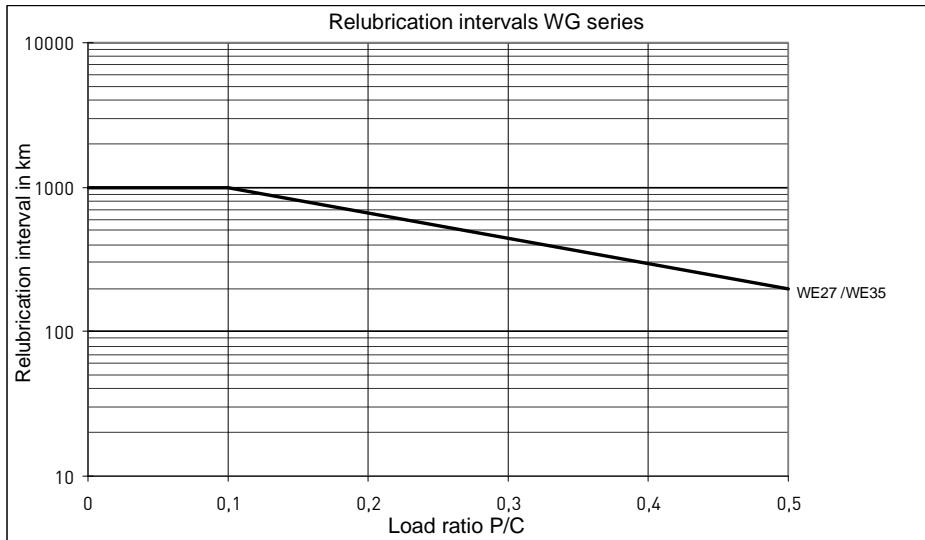
### Load-dependent relubrication intervals for grease lubrication



**Lubricant quantities for grease lubrication on the WE series**

	Initial lubrication	Relubrication
Size	Partial quantity [cm <sup>3</sup> ]	Quantity [cm <sup>3</sup> ]
<b>WE27</b>	0.6 (3x)	0.3
<b>WE35</b>	1.6 (3x)	0.4

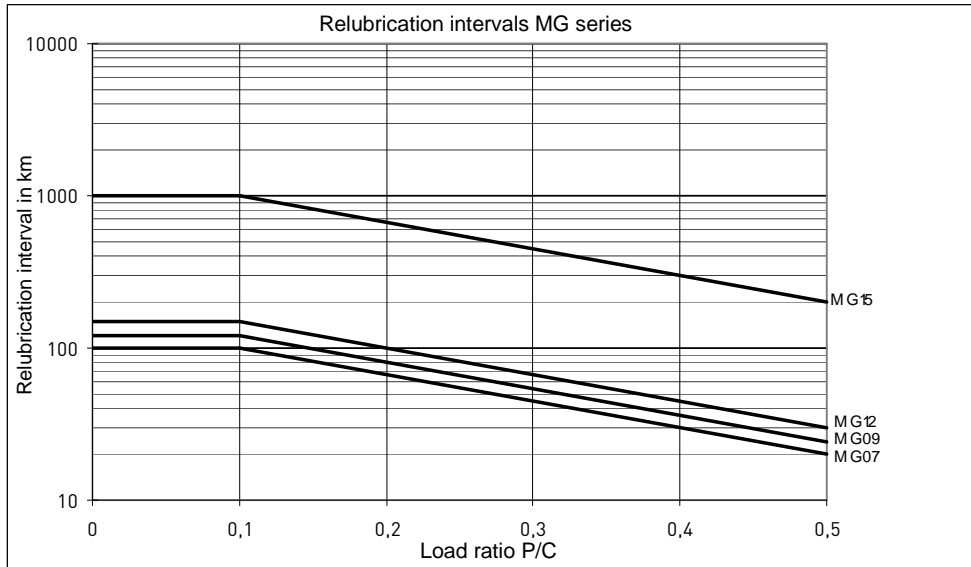
**Load-dependent relubrication intervals for grease lubrication**



**Lubricant quantities for grease lubrication on the MG series**

Size	Initial lubrication		Relubrication	
	Partial quantity [cm <sup>3</sup> ]		Quantity [cm <sup>3</sup> ]	
	Heavy duty (C)	Super heavy duty (H)	Heavy duty (C)	Super heavy duty (H)
<b>MGN07</b>	0.01 (3x)	0.02 (3x)	0.01	0.02
<b>MGN09</b>	0.02 (3x)	0.03 (3x)	0.02	0.03
<b>MGN12</b>	0.03 (3x)	0.03 (3x)	0.04	0.07
<b>MGN15</b>	0.04 (3x)	0.06 (3x)	0.07	0.09
<b>MGW07</b>	0.01 (3x)	0.02 (3x)	0.01	0.02
<b>MGW09</b>	0.02 (3x)	0.03 (3x)	0.02	0.03
<b>MGW12</b>	0.04 (3x)	0.07 (3x)	0.04	0.07
<b>MGW15</b>	0.07 (3x)	0.09 (3x)	0.07	0.09

### Load-dependent relubrication intervals for grease lubrication



### Lubricant quantities for grease lubrication on the QH series

**i**

Blocks in the QH series are supplied with basic lubrication and therefore need no lubrication before being placed into operation.

Size	Quantity [cm <sup>3</sup> ]	
	Heavy duty (C)	Super heavy duty (H)
QH15	0.3	--
QH20	0.5	0.6
QH25	0.6	0.8
QH30	1.1	1.3
QH35	1.6	1.9
QH45	3.0	3.7

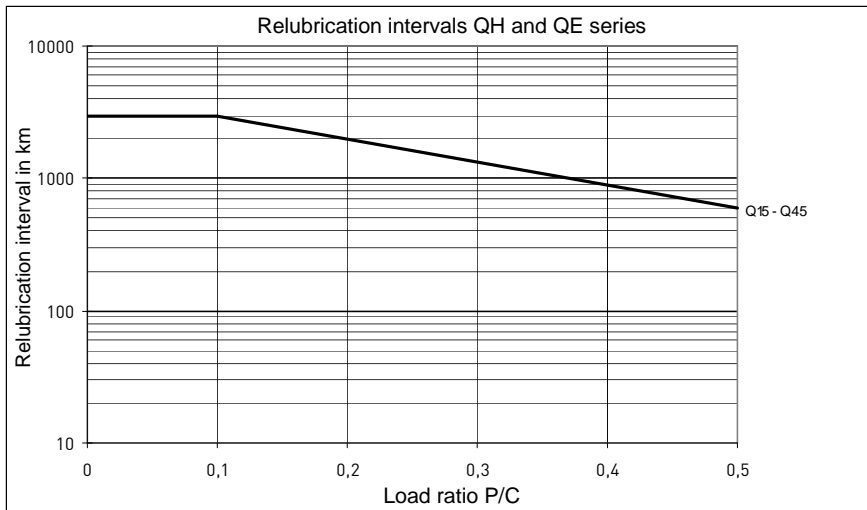
### Lubricant quantities for grease lubrication on the QE series

**i**

Blocks in the QE series are supplied with basic lubrication and therefore need no lubrication before being placed into operation.

Size	Quantity [cm <sup>3</sup> ]	
	Medium load (S)	Heavy duty (C)
QE15	0.2	0.3
QE20	0.3	0.4
QE25	0.4	0.7
QE30	0.6	0.9

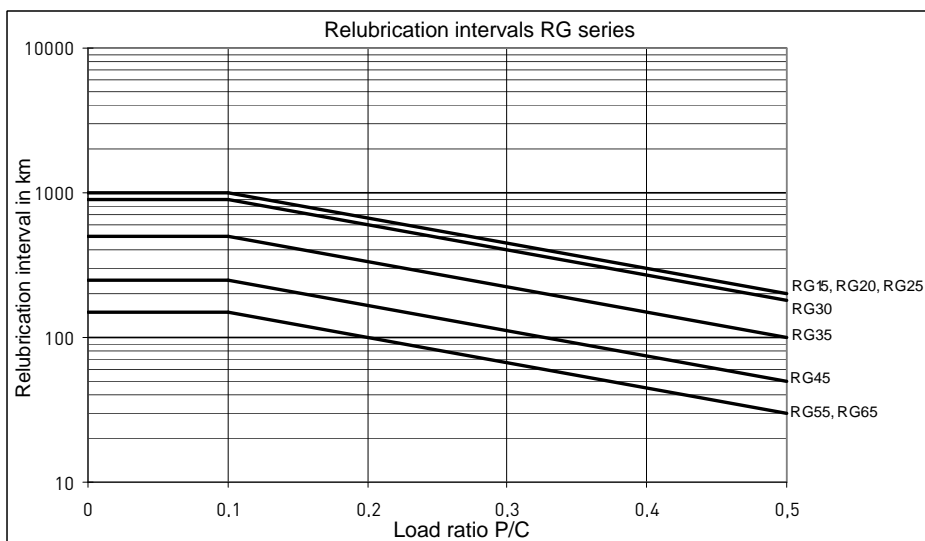
### Load-dependent relubrication intervals for grease lubrication



### Lubricant quantities for grease lubrication on the RG series

Size	Initial lubrication		Relubrication	
	Partial quantity [cm <sup>3</sup> ]		Quantity [cm <sup>3</sup> ]	
	Heavy duty (C)	Super heavy duty (H)	Heavy duty (C)	Super heavy duty (H)
RG15	0.5 (3x)	--	0.3	--
RG20	0.8 (3x)	1.0 (3x)	0.8	1.0
RG25	1.2 (3x)	1.4 (3x)	1.2	1.4
RG30	1.5 (3x)	1.7 (3x)	1.5	1.7
RG35	2.0 (3x)	2.4 (3x)	2.0	2.4
RG45	3.2 (3x)	3.9 (3x)	3.2	3.9
RG55	4.7 (3x)	5.9 (3x)	4.7	5.9
RG65	8.7 (3x)	10.5 (3x)	8.7	10.5

### Load-dependent relubrication intervals for grease lubrication



#### 4.4.2 Lubricant quantities and lubricating intervals for lubrication with low-viscosity grease

We recommend that you carry out first lubrication before connection to a centralized lubrication system separately, using a grease gun.

It is also important to ensure that all lines and elements up to the consumer loads are filled with lubricant and contain no air pockets. Avoid long lines and lines of low diameter. Lines must be routed with an upward gradient.

The number of pulses depends on the partial quantities and the size of the piston distributor.

In addition, the lubrication system manufacturers' instructions must be observed.

##### ***Lubricant quantities for lubrication with low-viscosity grease***

The lubricant quantities when using low-viscosity grease are identical to those for grease lubrication.

##### ***Relubrication interval when using low-viscosity grease***

The relubrication intervals for low-viscosity grease are reduced to about 75 % of the relubrication intervals for grease lubrication (period between two lubrication operations).

##### ***Piston distributor size for metering units (infeed systems) when using low-viscosity grease***

To ensure adequate lubrication, the following minimum sizes for the piston distributors used must be observed. The time interval between the individual lubrication pulses depends on the relubrication quantity, the relubrication interval and the piston distributor size:

$$\text{time interval between lubrication pulses [km]} = \frac{\text{piston distributor size [cm}^3\text{]}}{\text{relubrication quantity [cm}^3\text{]}} \times \text{relubrication interval [km]}$$

Size	Piston distributor size [cm <sup>3</sup> ]		
	Installation position horizontal	Installation position vertical	Installation position on-wall mounting
15	0.03	0.06	0.06
20	0.03	0.06	0.06
25	0.06	0.10	0.10
30	0.10	0.20	0.20
35	0.16	0.30	0.30
45	0.20	0.40	0.40
55	0.30	0.60	0.60
65	0.30	0.60	0.60

## 4.4.3 Lubricant quantities for oil lubrication

It is important when using a centralized lubrication system to ensure that all lines and elements up to the consumer loads are filled with lubricant and contain no air pockets. Avoid long lines and lines of low diameter. Lines must be routed with an upward gradient.

The number of pulses depends on the partial quantities and the size of the piston distributor. The interval between two pulses is calculated from the ratio of the number of pulses and the relubrication interval.

In addition, the lubrication system manufacturers' instructions must be observed.

### *Lubricant quantities for oil lubrication on the HG/EG series*

Size	Initial lubrication			Relubrication		
	Partial quantity [cm <sup>3</sup> ]			Quantity [cm <sup>3</sup> ]		
	Medium load (S)	Heavy duty (C)	Super heavy duty (H)	Medium load (S)	Heavy duty (C)	Super heavy duty (H)
15	0.3 (3x)	0.3 (3x)	--	0.3	0.3	--
20	0.5 (3x)	0.5 (3x)	0.5 (3x)	0.5	0.5	0.5
25	0.7 (3x)	0.8 (3x)	1.0 (3x)	0.7	0.8	1.0
30	0.9 (3x)	1.0 (3x)	1.2 (3x)	0.9	1.0	1.2
35	1.2 (3x)	1.5 (3x)	1.8 (3x)	1.2	1.5	1.8
45	--	1.7 (3x)	2.0 (3x)	--	1.7	2.0
55	--	2.5 (3x)	2.8 (3x)	--	2.5	2.8
65	--	4.5 (3x)	4.8 (3x)	--	4.5	4.8

### *Relubrication interval for oil lubrication*

The relubrication intervals for oil lubrication are reduced to 50 % of the relubrication intervals for grease lubrication (period between two lubrication operations).

### *Lubricant quantities for oil lubrication on the MG series*

Size	Initial lubrication		Relubrication	
	Partial quantity [cm <sup>3</sup> ]		Quantity [cm <sup>3</sup> ]	
	Heavy duty (C)	Super heavy duty (H)	Heavy duty (C)	Super heavy duty (H)
MGN07	0.01 (3x)	0.02 (3x)	0.01	0.02
MGN09	0.02 (3x)	0.03 (3x)	0.02	0.03
MGN12	0.03 (3x)	0.03 (3x)	0.04	0.07
MGN15	0.04 (3x)	0.06 (3x)	0.07	0.09
MGW07	0.01 (3x)	0.02 (3x)	0.01	0.02
MGW09	0.02 (3x)	0.03 (3x)	0.02	0.03
MGW12	0.04 (3x)	0.07 (3x)	0.04	0.07
MGW15	0.07 (3x)	0.09 (3x)	0.07	0.09



### *Relubrication interval for oil lubrication*

The relubrication intervals for oil lubrication are reduced to 50 % of the relubrication intervals for grease lubrication (period between two lubrication operations).

### *Lubricant quantities for oil lubrication on the WE series*

	Initial lubrication	Relubrication
	Partial quantity [cm <sup>3</sup> ]	Quantity [cm <sup>3</sup> ]
Size	Heavy duty (C)	Heavy duty (C)
<b>WE27</b>	0.7 (3x)	0.7
<b>WE35</b>	1.2 (3x)	1.2

### *Relubrication interval for oil lubrication*

The relubrication intervals for oil lubrication are reduced to 50 % of the relubrication intervals for grease lubrication (period between two lubrication operations).

### *Lubricant quantities for oil lubrication on the RG series*

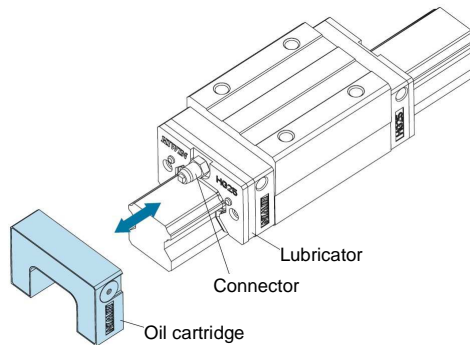
	Initial lubrication		Relubrication	
	Partial quantity [cm <sup>3</sup> ]		Quantity [cm <sup>3</sup> ]	
Size	Heavy duty (C)	Super heavy duty (H)	Heavy duty (C)	Super heavy duty (H)
<b>RG15</b>	0.3 (3x)	--	0.3	--
<b>RG20</b>	0.5 (3x)	0.5 (3x)	0.5	0.5
<b>RG25</b>	0.8 (3x)	1.0 (3x)	0.8	1.0
<b>RG30</b>	1.0 (3x)	1.2 (3x)	1.0	1.2
<b>RG35</b>	1.3 (3x)	1.7 (3x)	1.3	1.7
<b>RG45</b>	1.6 (3x)	1.8 (3x)	1.6	1.8
<b>RG55</b>	2.2 (3x)	2.6 (3x)	2.2	2.6
<b>RG65</b>	4.2 (3x)	4.5 (3x)	4.2	4.5

### *Relubrication interval for oil lubrication*

The relubrication intervals for lubrication with low-viscosity grease are reduced to 50 % of the relubrication intervals for grease lubrication.

## 4.5 Self-lubricating kit ,E2'

Self-lubricating kit E2 consists of a lubricator between the end cap and the end seal and a replaceable oil cartridge. The oil cartridge can be replaced without dismantling the block.



Lubricant from the oil cartridge passes via the connector to the lubricator, which then lubricates the track of the groove of the rail. The special design of the oil cartridge allows the block to be fitted in any position without impairing the lubrication function.

The replacement intervals for the oil cartridge depend to a great extent on the loads and the ambient conditions. Factors such as high loads, vibration and dirt mean that the oil cartridge has to be replaced more frequently.

The following table shows when, at the latest, the filling level of the oil cartridge must be checked.

Model	Oil quantity [cm <sup>3</sup> ]	Kilometrage [km]
HG15E2	1.6	2000
HG20E2	3.9	4000
HG25E2	5.1	6000
HG30E2	7.8	8000
HG35E2	9.8	10000
HG45E2	18.5	20000
HG55E2	25.9	30000
HG65E2	50.8	40000
EG15E2	1.7	2000
EG20E2	2.9	3000
EG25E2	4.8	5000
EG30E2	8.9	9000
RG25E2	5.0	6000
RG30E2	7.5	8000
RG35E2	10.7	10000
RG45E2	18.5	20000
RG55E2	26.5	30000
RG65E2	50.5	40000

Standard oil:  
Mobil SHC 639  
fully synthetic on hydrocarbon basis (PAO)  
viscosity class: ISO VG 1000

Alternatively, oils of the same classification and viscosity may be used.

## 5 Lubrication of ball screws

HIWIN ball screws can be lubricated using oil, grease or low-viscosity grease, depending on the specific application. The required lubricating pressure depends on the size, the lubricant, the length of the feed line and the type of lubrication connection used.

**NOTE NOTE**

Excessively high lubricating pressure and excessive quantities of lubricant can damage the ball screw nut.

Particular care must be taken when lubricating ball nuts with felt or lip seals, as the seals might otherwise be damaged.

### 5.1 General notes on lubricant quantities

#### 5.1.1 Initial lubrication when placing into operation

HIWIN ball screws are delivered already protected as standard. Initial lubrication is carried out in three steps:

Apply the amount of grease shown in the table for the corresponding series. Move the nut three times by about three nut lengths. Repeat this process twice.

**Initial lubrication for short-stroke applications:**

Stroke < 2 x nut length: Plane off and lubricate the lubricating connections on both sides of the nut.

Stroke < 0.5 x nut length: Plane off and lubricate the lubricating connections on both sides of the nut. As you do so, move the ball nut several times a distance of two block lengths. Please contact us if this is not possible.

For short-stroke applications, the lubricant quantities in the corresponding tables must be doubled.

In the case of nuts without a lubricating connection, the lubricant is applied via the spindle.

#### 5.1.2 Relubrication

Relubrication depends to a very great extent on the loads and ambient conditions. Factors such as high loads, vibration and dirt mean shorter relubrication intervals. Where conditions are clean and the loads low, the relubrication intervals can be extended.

If the ball screws are installed vertically, the relubrication quantities must be increased by approx. 50 %.

In the case of normal operating conditions, the specified relubrication intervals apply.

For relubrication in the case of short-stroke applications, proceed as indicated in chapter 5.1.1.

## 5.2 Lubricant quantities and lubrication intervals

### NOTE NOTE

Never place ball screws into operation without basic lubrication.

The lubrication intervals listed below are reference values and may vary according to the ambient conditions. In general, excessively high quantities of lubricant or excessive lubricating pressure can damage or destroy the product. It is imperative that you carry out the work steps as described to prevent damage to products.

### 5.2.1 Lubricant quantities and lubricating intervals for lubrication with grease

#### *Lubricant quantities for ball screws with grease lubrication*

Size	Single nut		Double nut	
	Lubricant quantity for initial lubrication [cm <sup>3</sup> ]	Lubricant quantity for relubrication [cm <sup>3</sup> ]	Lubricant quantity for initial lubrication [cm <sup>3</sup> ]	Lubricant quantity for relubrication [cm <sup>3</sup> ]
8x2.5	0.05 (3x)	0.1	--	--
10x2.5	0.1 (3x)	0.1	--	--
10x4	0.1 (3x)	0.2	--	--
12x4	0.1 (3x)	0.2	--	--
16x5	0.2 (3x)	0.4	0.8 (3x)	1.6
16x10K3	0.4 (3x)	0.8	--	--
16x16K2	0.3 (3x)	0.6	--	--
20x5T4	0.4 (3x)	0.8	0.9 (3x)	1.8
20x10K3	0.3 (3x)	0.6	--	--
20x20K2	0.5 (3x)	1.0	--	--
25x5T4	0.6 (3x)	1.2	1.3 (3x)	2.2
25x10K4	0.6 (3x)	1.2	--	--
25x10T3	0.7 (3x)	1.4	1.0 (3x)	2.0
25x25K2	0.8 (3x)	1.6	--	--
32x5T5	0.9 (3x)	1.8	1.7 (3x)	2.7
32x10K5	1.5 (3x)	2.0	--	--
32x10T4	3.5 (3x)	4.0	6.5 (3x)	9.0
32x20K3	1.5 (3x)	2.0	--	--
32x20T2	3.5 (3x)	4.0	7.5 (3x)	11.0
32x32K2	2.0 (3x)	3.0	--	--
40x5	1.5 (3x)	2.0	2.5 (3x)	4.0
40x10K4	3.0 (3x)	4.0	--	--
40x10T4	5.0 (3x)	7.5	9.5 (3x)	15.0
40x20K3	4.5 (3x)	5.5	--	--
40x20T2	5.0 (3x)	7.5	10.0 (3x)	16.0
40x40K2	5.0 (3x)	7.5	--	--
50x5	1.5 (3x)	2.0	3.5 (3x)	5.0
50x10K6	5.5 (3x)	7.5	--	--
50x10T4	5.5 (3x)	7.5	11.5 (3x)	18.0
50x20K5	8.5 (3x)	12.0	--	--
50x20T3	8.5 (3x)	12.0	15.0 (3x)	22.0
50x40K3	8.5 (3x)	12.0	--	--

Size	Single nut		Double nut	
	Lubricant quantity for initial lubrication [cm <sup>3</sup> ]	Lubricant quantity for relubrication [cm <sup>3</sup> ]	Lubricant quantity for initial lubrication [cm <sup>3</sup> ]	Lubricant quantity for relubrication [cm <sup>3</sup> ]
63x10	9.0 (3x)	15.0	17.0 (3x)	25.0
63x20T4	17.0 (3x)	25.0	30.0 (3x)	45.0
63x20T5	21.0 (3x)	30.0	--	--
63x20K6	35.0 (3x)	52.0	--	--
80x10	12.0 (3x)	18.0	20.0 (3x)	30.0
80x20T4	22.0 (3x)	33.0	37.0 (3x)	55.0
80x20T5	25.0 (3x)	37.0	--	--
80x20K6	40.0 (3x)	60.0	--	--
80x20K7	45.0 (3x)	68.0	--	--

### ***Relubrication interval for grease lubrication***

The relubrication intervals for grease lubrication under standard conditions and in a clean environment are between 200 and 600 hours.

#### **Standard conditions:**

Load ratio: max. 20 % of the dynamic basic load rating  
 Temperature range: 0 °C ... 60 °C  
 Speed coefficient: > 120,000  
 No jolting and vibration

Under conditions which differ from these and with soiling, relubrication must be carried out more frequently.

## **5.2.2 Lubricant quantities and lubricating intervals for lubrication with low-viscosity grease**

We recommend that you carry out first lubrication before connection to a centralized lubrication system separately, using a grease gun.

It is also important to ensure that all lines and elements up to the consumer load are filled with lubricant and contain no air pockets. Avoid long lines and lines of low diameter. Lines must be routed with an upward gradient.

The number of pulses depends on the partial quantities and the size of the piston distributor.

In addition, the lubrication system manufacturers' instructions must be observed.

### ***Lubricant quantities for lubrication with low-viscosity grease***

The lubricant quantities when using low-viscosity grease are identical to those for grease lubrication.

### ***Relubrication interval when using low-viscosity grease***

The relubrication intervals for lubrication with low-viscosity grease are reduced to 50 % of the relubrication intervals for grease lubrication.

### 5.2.3 Lubricant quantities and lubrication intervals for oil lubrication

It is important when using a centralized lubrication system to ensure that all lines and elements up to the consumer loads are filled with lubricant and contain no air pockets. Avoid long lines and lines of low diameter. Lines must be routed with an upward gradient.

The number of pulses depends on the partial quantities and the size of the piston distributor.

In addition, the lubrication system manufacturers' instructions must be observed.

#### *Lubricant quantities for oil lubrication*

	Initial lubrication	Relubrication
Nominal diameter [mm]	Partial oil quantity [cm <sup>3</sup> ]	Oil quantity [cm <sup>3</sup> /8h]
8	0.2 (x3)	0.1
10	0.2 (x3)	0.1
12	0.2 (x3)	0.1
16	0.3 (x3)	0.2
20	0.3 (x3)	0.3
25	0.5 (x3)	0.5
32	0.5 (x3)	0.5
40	0.9 (x3)	0.7
50	1.1 (x3)	1.0
63	2.0 (x3)	1.5
80	3.0 (x3)	2.0

#### *Oil-bath lubrication:*

With oil-bath lubrication, the spindle should be 0.5 to 1 mm above the oil level.

#### *Relubrication interval when using low-viscosity grease*

Relubrication intervals with oil lubrication should not be longer than 8 hours with the above.

## 6 HIWIN grease guns and greases

### 6.1 HIWIN grease guns

Grease guns are available in two different sizes:

Article number: 5-12-0009  
Designation: GN-080M  
Grease gun for 70g bellows cartridge  
Grease quantity per stroke: 0.5 cm<sup>3</sup>

Article number: 5-12-0010  
Designation: GN-400C  
Grease gun for 400g cartridge  
Grease quantity per stroke: 0.8 cm<sup>3</sup>

The grease guns are supplied with a set of lubricating nozzles developed for the lubrication of linear guideways.

Article number of the set without grease gun: 5-12-0035

### 6.2 HIWIN greases

HIWIN offers the following greases in various sizes. The characteristics and areas of application of the greases are described in chapter 7.

Article number	Designation grease type	Designation package
5-12-0012	G01	70 g cartridge
5-12-0013	G01	400 g cartridge
5-12-0014	G01	1 kg can
5-12-0015	G02	70 g cartridge
5-12-0016	G02	400 g cartridge
5-12-0017	G02	1 kg can
5-12-0018	G03	70 g cartridge
5-12-0019	G03	400 g cartridge
5-12-0020	G03	1 kg can
5-12-0021	G04	70 g cartridge
5-12-0022	G04	400 g cartridge
5-12-0023	G04	1 kg can
5-12-0024	G05	70 g cartridge
5-12-0025	G05	400 g cartridge
5-12-0026	G05	1 kg can
5-12-0027	Oil for E2 lubrication unit Mobile SHC 639	1l bottle

## 7 Recommended lubricants

Essentially, the selection of a lubricant depends on the operating temperature and various operation-related factors, e.g. load, vibrations, oscillation, short-stroke applications. Special requirements such as use in combination with strong or aggressive media, in clean rooms, in a vacuum or in the foodstuff industry also need to be considered.

There follows a list of applications and suitable lubricants. If you have any doubts, consult the lubricant supplier to ensure optimum lubrication.

### 7.1 Grease lubrication

For grease lubrication, we recommend greases in accordance with DIN 51825 of consistency class NLGI 2 as specified by DIN 51818.

For normal loads, standard greases with the designation " – K1K" are sufficient.

For higher loads ( $P/C < 15$ ), high-pressure lubricating greases are required: "– KP1K"

The use of greases of other consistency classes is possible subject to the approval of the lubricant supplier.

**NOTE NOTE**

Greases with solid particles such as graphite or  $MOS_2$  must not be used.

The following information on lubricants serves to provide examples and is only intended as an aid to selection. Other lubricants may be selected after clarification of the specific application with the lubricant supplier.

#### 7.1.1 Standard applications

Load ratio: max. 15 % of the dynamic basic load rating

Temperature range: -10 °C ... 80 °C

Speed: < 1 m/s

Speed coefficient: < 120,000

Recommended greases:

HIWIN	G05
Klüber	Klüberlub GL-261
Mobil	Mobilux EP1
Fuchs Lubritech	Lagermeister BF2
Lubcon	TURMOGREASE CAK 2502

#### 7.1.2 Heavy-duty applications

Load ratio: max. 50 % of the dynamic basic load rating

Temperature range: 0 °C ... 80 °C

Speed: < 1 m/s

Speed coefficient: < 120,000

Recommended greases:

HIWIN	G01
Klüber	Klüberlub BE 71-501
Fuchs Lubritech	Lagermeister EP2
Lubcon	TURMOGREASE Li 802EP



### 7.1.3 Clean room / vacuum applications

Load ratio: max. 50 % of the dynamic basic load rating

Temperature range: -10 °C ... 80 °C

Speed: < 1 m/s

Speed coefficient: < 120,000

Recommended greases:

HIWIN	G02
Klüber	Klüberalfa HX 83-302
Fuchs Lubritech	gleitmo 591

### 7.1.4 Clean room / vacuum applications at high speeds

Load ratio: max. 50 % of the dynamic basic load rating

Temperature range: -10 °C ... 80 °C

Speed: > 1 m/s

Speed coefficient: > 120.000

Recommended greases:

HIWIN	G03
Klüber	Isoflex Topas NCA52

### 7.1.5 Applications with high speeds

Load ratio: max. 50 % of the dynamic basic load rating

Temperature range: -10 °C ... 80 °C

Speed: > 1 m/s

Speed coefficient: > 120.000

Recommended greases:

HIWIN	G04
Klüber	Isoflex NCA15
Lubcon	TURMOGREASE Highspeed L252

### 7.1.6 Applications in the foodstuffs industry in acc. with USDA H1

Load ratio: max. 15 % of the dynamic basic load rating

Temperature range: -10 °C ... 80 °C

Speed: < 1 m/s

Speed coefficient: < 120,000

Recommended greases:

Klüber	Klübersynth UH1 14-151
Mobil	Mobilgrease FM102
Fuchs Lubritech	GERALYN 1

## 7.2 Lubrication with low-viscosity grease

In centralized lubrication systems, low-viscosity greases are frequently used, as they are distributed more effectively over the whole system due to their soft structure.

Observe the lubrication system manufacturers' instructions.

The following information on lubricants serves to provide examples and is only intended as an aid to selection. Other lubricants may be used after clarification of the specific application and the centralized lubrication system used with the lubricant supplier.

In addition, the lubricant manufacturers' instructions must be observed.

## 7.2.1 Standard applications

Load ratio: max. 15 % of the dynamic basic load rating

Temperature range: -10 °C ... 80 °C

Speed: < 1 m/s

Speed coefficient: < 120,000

Recommended low-viscosity greases:

Klüber	MICROLUBE GB 00
Mobil	Mobilux EP004
Fuchs Lubritech	GEARMASTER LI 400 /

## 7.2.2 Heavy-duty applications

Load ratio: max. 50 % of the dynamic basic load rating

Temperature range: 0 °C ... 80 °C

Speed: < 1 m/s

Speed coefficient: < 120,000

Recommended low-viscosity greases:

We recommend that you consult a lubricant manufacturer regarding the use of low-viscosity greases for heavy-duty applications

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## 7.2.3 Clean room / vacuum applications

Load ratio: max. 50 % of the dynamic basic load rating

Temperature range: -10 °C ... 80 °C

Speed: < 1 m/s

Speed coefficient: < 120,000

Recommended low-viscosity greases:

We recommend that you consult a lubricant manufacturer regarding the use of low-viscosity greases for clean room / vacuum applications

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## 7.2.4 Applications with high speeds

Load ratio: max. 50 % of the dynamic basic load rating

Temperature range: -10 °C ... 80 °C

Speed: > 1 m/s

Speed coefficient: > 120.000

Recommended low-viscosity greases:

Klüber	Isoplex Topas NCA5051
Mobil	Mobilux EP004
Fuchs Lubritech	GEARMASTER LI 400 /

### 7.2.5 Applications in the foodstuffs industry in acc. with USDA H1

Load ratio: max. 15 % of the dynamic basic load rating

Temperature range: -10 °C ... 80 °C

Speed: < 1 m/s

Speed coefficient: < 120,000

Recommended low-viscosity greases:

Klüber	Klübersynth UH1 14-1600
Mobil	Mobilgrease FM 003
Fuchs Lubritech	GERLYNN 00

## 7.3 Oil lubrication

Lubricating oils offer the advantage of more even distribution and reach the contact surfaces more effectively. However, this also means that lubricating oils collect in the lower area of the product as a result of the force of gravity and thus more quickly cause soiling. For this reason, higher quantities of lubricant are required than with grease lubrication. Oil lubrication is as a rule only suitable where a centralized lubrication system is used or for products equipped with a lubrication unit.

Observe the lubrication system manufacturer's instructions.

The following information on lubricants serves to provide examples and is only intended as an aid to selection. Other lubricants may be used after clarification of the specific application and the centralized lubrication system used with the lubricant supplier.

### 7.3.1 Standard applications

Load ratio: max. 15 % of the dynamic basic load rating

Temperature range: -10 °C ... 80 °C

Speed: < 1 m/s

Speed coefficient: < 120,000

Recommended oils:

Klüber	Klüberoil GEM 1-150 N
Mobil	Mobilgear 630
Fuchs Lubritech	GEARMASTER CLP 320

### 7.3.2 Heavy-duty applications

Load ratio: max. 50 % of the dynamic basic load rating

Temperature range: 0 °C ... 80 °C

Speed: < 1 m/s

Speed coefficient: < 120,000

Recommended oils:

We recommend that you consult a lubricant manufacturer regarding the use of oils for heavy-duty applications

### 7.3.3 Clean room / vacuum applications

Load ratio: max. 50 % of the dynamic basic load rating

Temperature range: -10 °C ... 80 °C

Speed: < 1 m/s

Speed coefficient: < 120,000

Recommended oils:

Klüber	Tyreno Fluid E-95 V
Mobil	Mobilgear 626

### 7.3.4 Applications with high speeds

Load ratio: max. 50 % of the dynamic basic load rating

Temperature range: -10 °C ... 80 °C

Speed: > 1 m/s

Speed coefficient: > 120.000

Recommended oils:

Klüber	Klüberoil GEM 1-46 N
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### 7.3.5 Applications in the foodstuffs industry in acc. with USDA H1

Load ratio: max. 15 % of the dynamic basic load rating

Temperature range: -10 °C ... 80 °C

Speed: < 1 m/s

Speed coefficient: < 120,000

Recommended oils:

Klüber	Klüberoil 4 UH1-68 N
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Notes:



Linear Guideways



Ball Screws



Linear Axes with ballscrew



Linear Motor Systems



Rotary Tables



Linear Actuators



Ball Bearings

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