



Lubricating instructions for linear guideways and ballscrews

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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 MoS₂ 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.

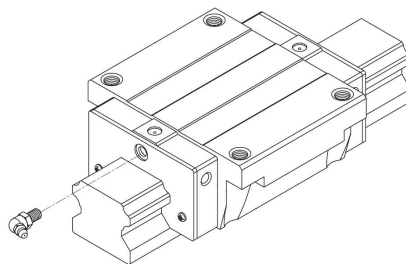
Particular care must be taken when lubricating blocks with double seals or SW seals, as these might otherwise be damaged.

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

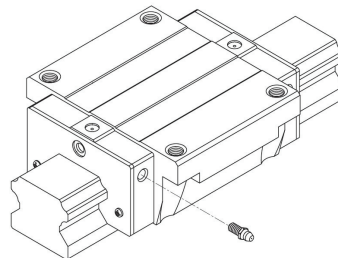
It is possible to install a lubrication connection on either side of the block. Connections which are not used are closed off.



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!

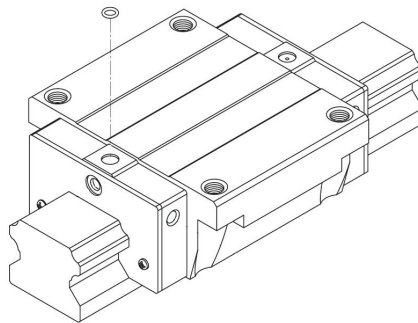
Diameter of the metal spike:
 Diameter 2.5 mm up to size 35
 Diameter 3.0 mm from size 45

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.

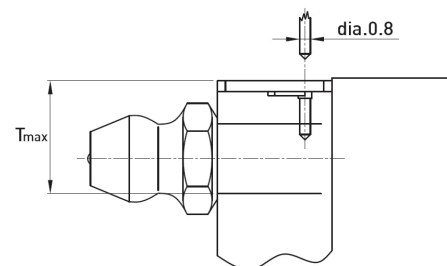
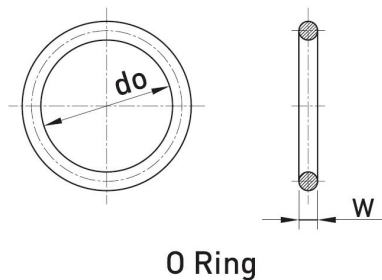


Table 4.1: Determining the size of the O-ring:

| Size | O-ring | | Lubrication bore from above |
|------|------------|-----------|-------------------------------------|
| | d0 [mm] | W [mm] | max. depth T _{max} [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 HG, EG, MG, MG and WE are delivered already protected. Initial lubrication is carried out in three steps:

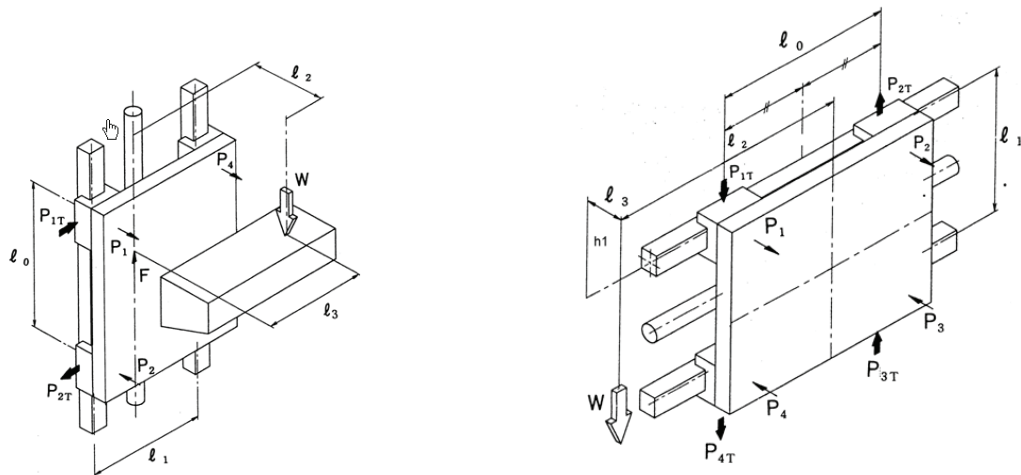
Apply the amount of grease specified in the table for the corresponding series by slowly pressing the grease gun. Move the block three times, by about three block lengths each time. Repeat the procedure described twice.

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

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Blocks of the series QH and QE 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.

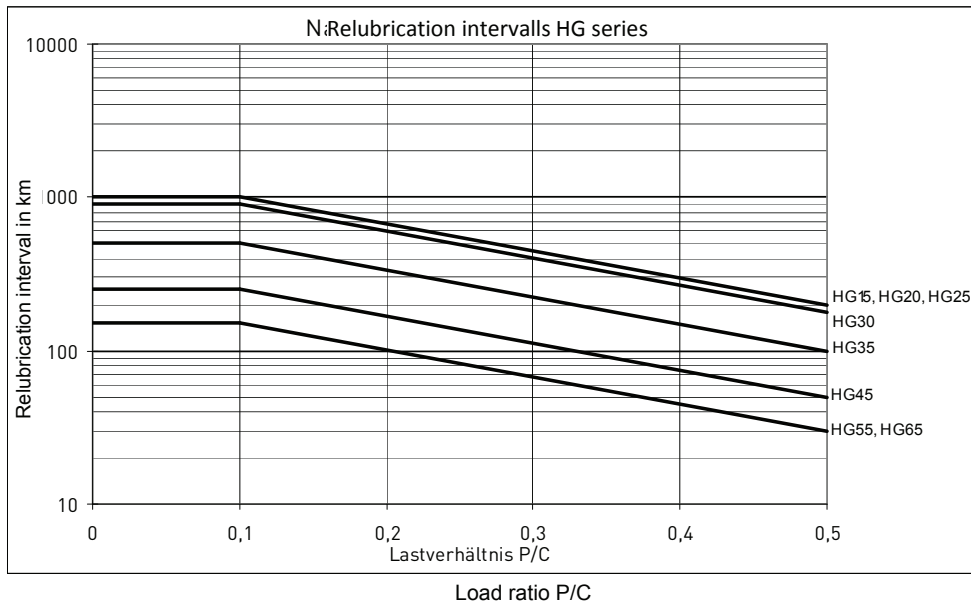
Among other factors, the relubrication intervals depend on the load ratio P/C. P stands for the dynamically equivalent load and C for the dynamic basic load rating. You can find further information on these values in the linear guideways catalog.

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 ³] | | Quantity [cm ³] | |
| | 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 |

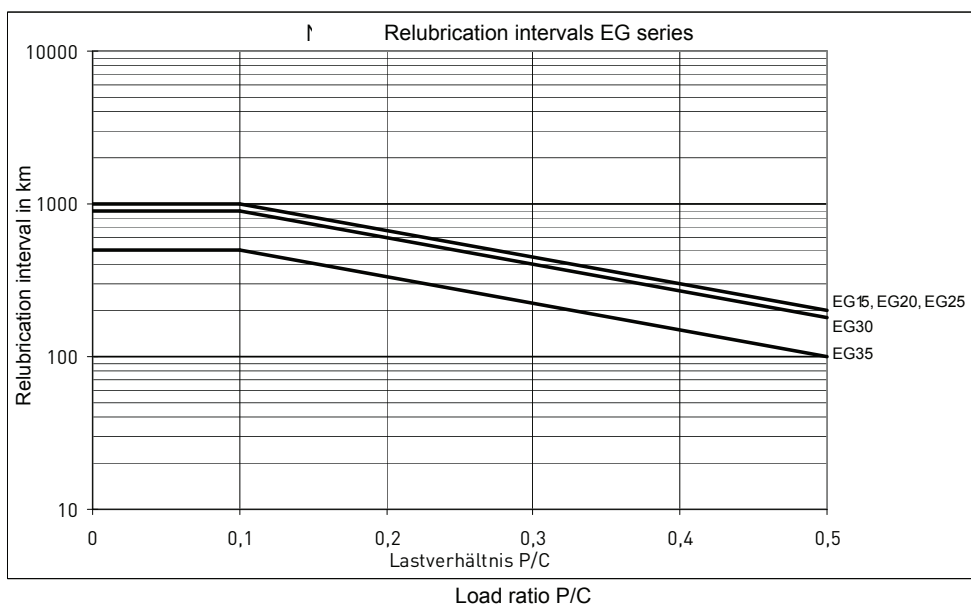
Load-dependent relubrication intervals for grease lubrication



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 |

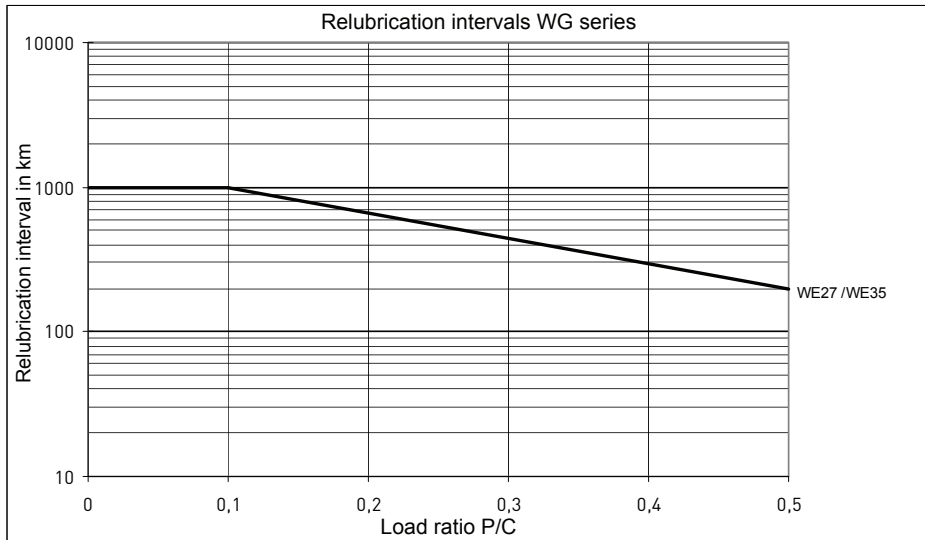
Load-dependent relubrication intervals for grease lubrication



Lubricant quantities for grease lubrication on the WE series

| | Initial lubrication | Relubrication |
|------|-------------------------------------|-----------------------------|
| Size | Partial quantity [cm ³] | Quantity [cm ³] |
| WE27 | 0.6 (3x) | 0.3 |
| WE35 | 1.6 (3x) | 0.4 |

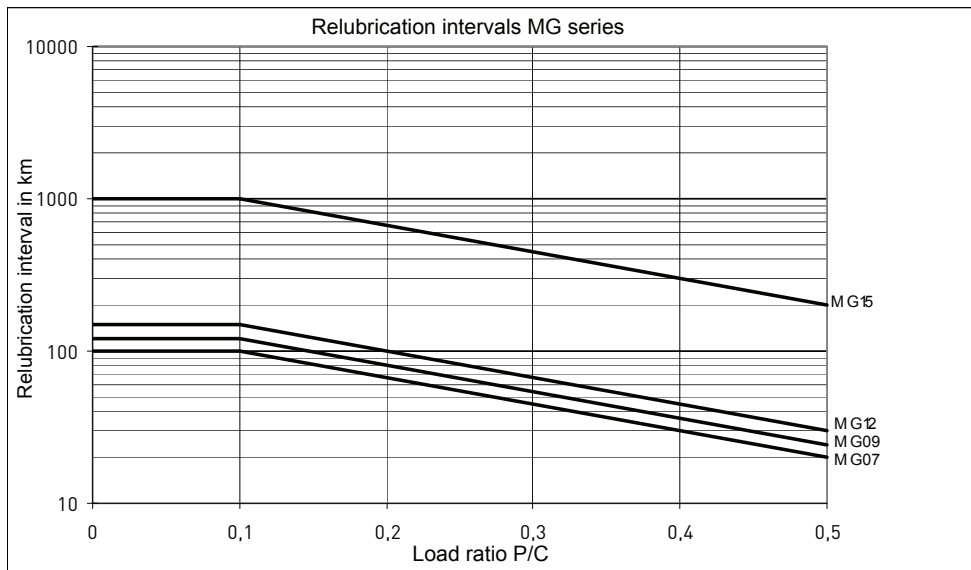
Load-dependent relubrication intervals for grease lubrication



Lubricant quantities for grease lubrication on the MG series

| Size | Initial lubrication | | Relubrication | |
|-------|-------------------------------------|----------------------|-----------------------------|----------------------|
| | Partial quantity [cm ³] | | Quantity [cm ³] | |
| | 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 |

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 ³] | |
|------|-----------------------------|----------------------|
| | 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 |

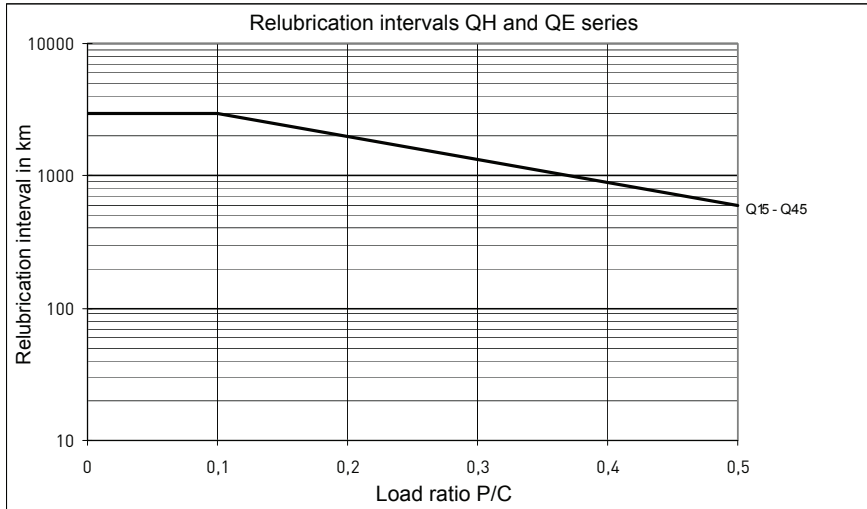
Lubricant quantities for grease lubrication on the QE series

i

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

| Size | Quantity [cm ³] | |
|------|-----------------------------|----------------|
| | 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 |

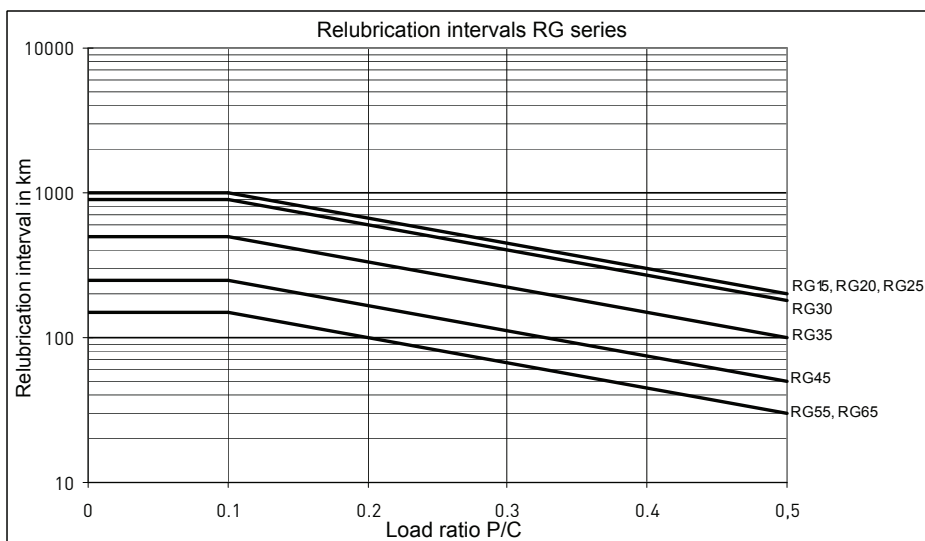
Load-dependent relubrication intervals for grease lubrication



Lubricant quantities for grease lubrication on the RG series

| Size | Initial lubrication | | Relubrication | |
|------|-------------------------------------|----------------------|-----------------------------|----------------------|
| | Partial quantity [cm ³] | | Quantity [cm ³] | |
| | 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 ³] | | |
|------|--|--------------------------------|--|
| | 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 ³] | | | Quantity [cm ³] | | |
| | 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 ³] | | Quantity [cm ³] | |
| | 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 ³] | Quantity [cm ³] |
| Size | Heavy duty (C) | Heavy duty (C) |
| WE27 | 0.7 (3x) | 0.7 |
| WE35 | 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

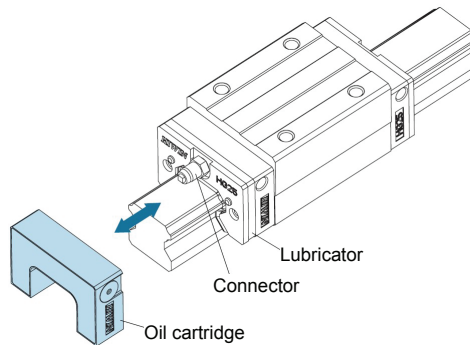
| | Initial lubrication | | Relubrication | |
|------|-------------------------------------|----------------------|-----------------------------|----------------------|
| | Partial quantity [cm ³] | | Quantity [cm ³] | |
| Size | Heavy duty (C) | Super heavy duty (H) | Heavy duty (C) | Super heavy duty (H) |
| RG15 | 0.3 (3x) | -- | 0.3 | -- |
| RG20 | 0.5 (3x) | 0.5 (3x) | 0.5 | 0.5 |
| RG25 | 0.8 (3x) | 1.0 (3x) | 0.8 | 1.0 |
| RG30 | 1.0 (3x) | 1.2 (3x) | 1.0 | 1.2 |
| RG35 | 1.3 (3x) | 1.7 (3x) | 1.3 | 1.7 |
| RG45 | 1.6 (3x) | 1.8 (3x) | 1.6 | 1.8 |
| RG55 | 2.2 (3x) | 2.6 (3x) | 2.2 | 2.6 |
| RG65 | 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 ³] | 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 ³] | Lubricant quantity for relubrication [cm ³] | Lubricant quantity for initial lubrication [cm ³] | Lubricant quantity for relubrication [cm ³] |
| 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 ³] | Lubricant quantity for relubrication [cm ³] | Lubricant quantity for initial lubrication [cm ³] | Lubricant quantity for relubrication [cm ³] |
| 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 ³] | Oil quantity [cm ³ /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 cm³

Article number: 5-12-0010
Designation: GN-400C
Grease gun for 400g cartridge
Grease quantity per stroke: 0.8 cm³

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 |
|--------|----------------------|

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 |
|--------|----------------------|

Notes:



Linear Guideways



Ball Screws



Linear Axes with ballscrew



Linear Motor Systems



Rotary Tables



Linear Actuators



Ball Bearings

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