

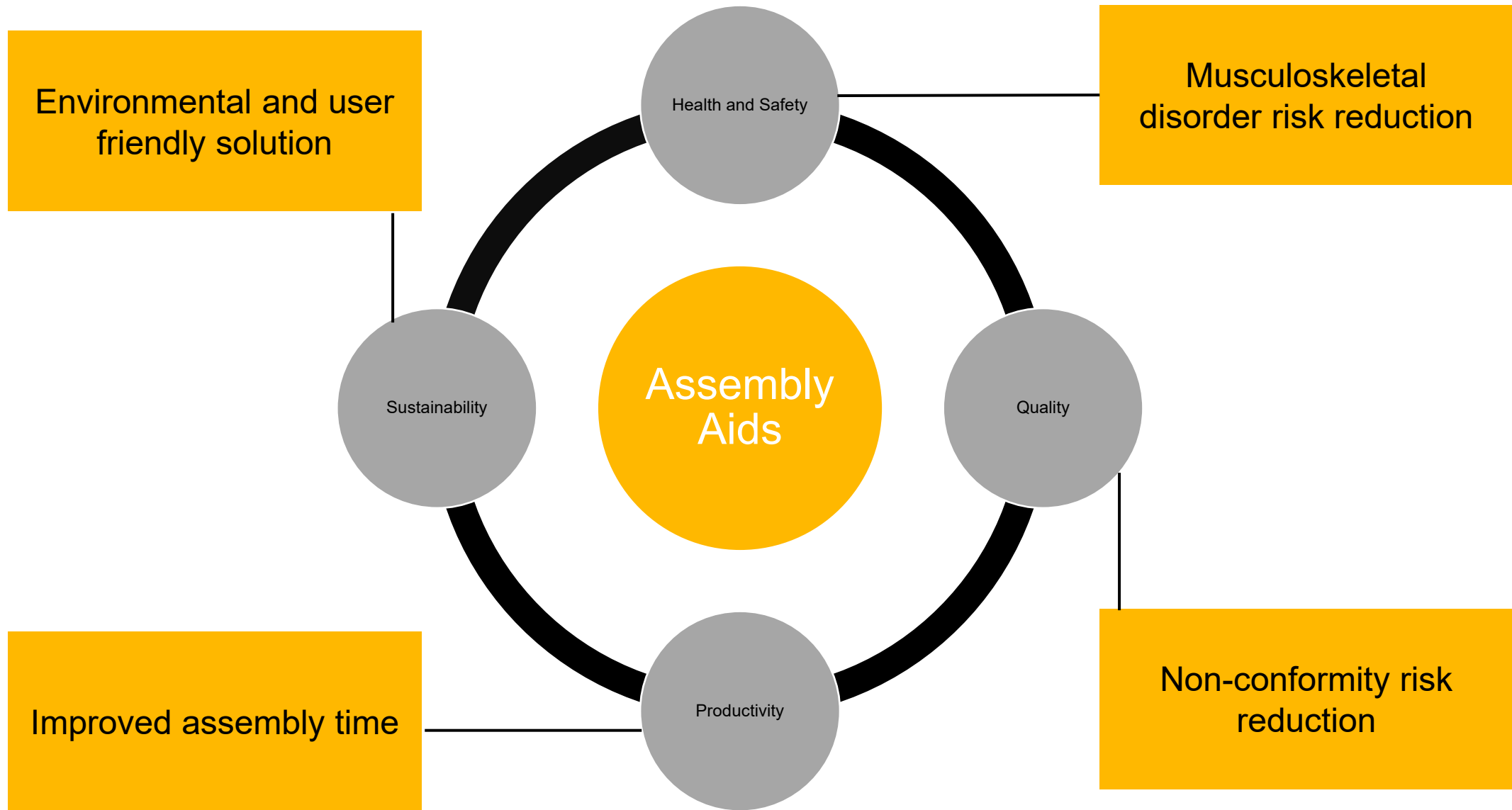
A large industrial robot arm, painted in orange and grey, is shown in the process of welding a car chassis. The robot is positioned on the right side of the frame, with its arm extended towards the center. A dense spray of bright, golden-yellow sparks is being emitted from the welding point, creating a dramatic visual effect. The background is a blurred industrial setting with other car chassis and machinery, suggesting a busy manufacturing environment. The overall lighting is somewhat dim, with the primary light source being the sparks from the welding process.

# Klüber Assembly Aids Kit

**KLÜBER**  
LUBRICATION

a brand of  FREUDENBERG

# Why assembly aid lubricants are important ?



# Improved productivity and safety on the workplace

Regardless of whether excessive insertion forces are only recognized at the end of development of assembly processes, i.e. shortly before the SOP, or you want to avoid them from the start of the development:

The **Klüber Automotive Assembly Aids Kit** is the perfect tool to quickly test and validate a solution



# Klüber Assembly Aids Kit

For automotive OEMs and suppliers, the Klüber Assembly Aids Kit is a compact toolkit that can help solve the problems of excessive assembly efforts.



Fast and flexible solution for testing in laboratories and on production lines



Touch and feel of the lubricants



The kit contains 16 different lubricants



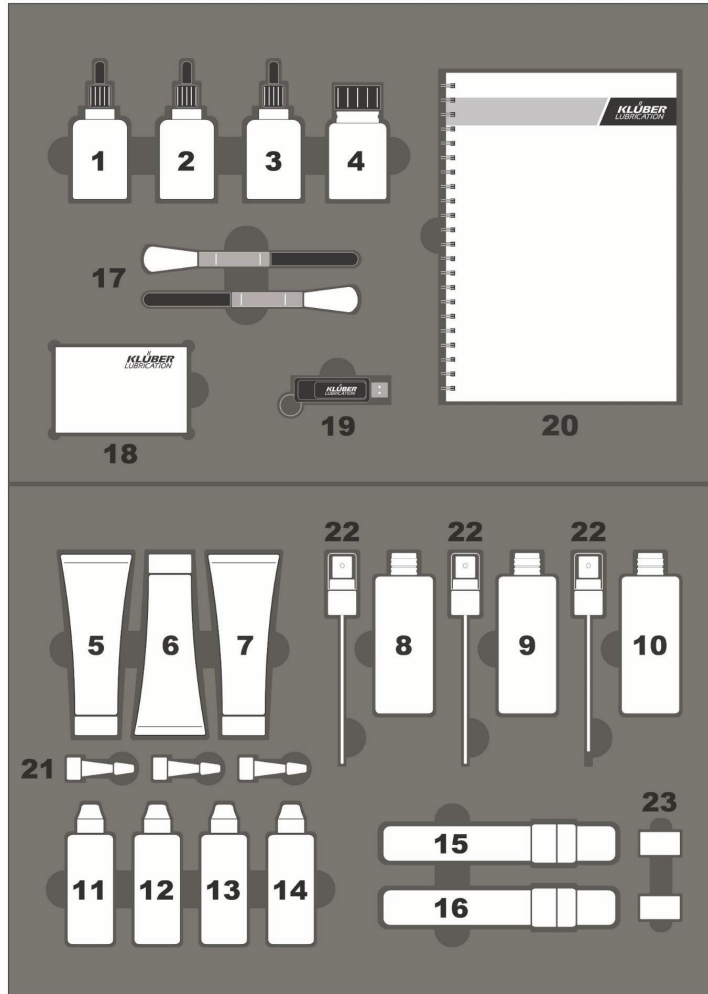
Specially formulated lubricants to reduce insertion efforts for manual assemblies and ensure workers safety



Includes environmental friendly lubricants based on water. The case is made at 90% from sugar cane



# Assembly Aids Kit Overview



| No | Product                            | Type                                      |
|----|------------------------------------|---|
| 1  | Klüberfluid 9 R 100                | PAG / Ester oil                           |
| 2  | Klübersynth MZ 4-17                | PAO oil                                   |
| 3  | Klübersynth M 4-32 ESP             | PAO oil                                   |
| 4  | Klüberplus S 03-105                | PTFE Dispersion                           |
| 5  | Klüberpaste 46 MR 401              | PAG - Lithium paste with solid lubricants |
| 6  | Klüberpaste HEL 46-450             | PAG - Lithium paste with solid lubricants |
| 7  | Klüberbeta VR 87-883               | Silicone - PTFE grease                    |
| 8  | Klüberalfa MR 3-500                | PFPE dispersion                           |
| 9  | Klüberplus S 06-100 M4             | Water based temporary lubricant           |
| 10 | Klüberplus S 07-100 M4             | Water based temporary lubricant           |
| 11 | Klüberplus S 06-100                | Water based temporary lubricant           |
| 12 | Klüberplus S 06-100 M2             | Water based temporary lubricant           |
| 13 | Klüberplus S 07-100                | Water based temporary lubricant           |
| 14 | Klüberplus S 07-100 M2             | Water based temporary lubricant           |
| 15 | Klübertop TP 36-1300 N A/B Komp. A | Bonded coating                            |
| 16 | Klübertop TP 29-1310 N A/B Komp. A | Bonded coating                            |
| 17 | Brush                              | -   |
| 18 | Business card                      | -   |
| 19 | USB stick                          | -   |
| 20 | Booklet                            | -   |
| 21 | Nozzle                             | -   |
| 22 | Spray head                         | -   |
| 23 | Replacement foam for pens          | -   |

## Klüberplus S serie

### *Water based temporary lubricants*

*e.g. bushings, radial shaft seals, profile seals, moulded rubber parts, O-rings, hoses, rubber sleeves*

#### Temporary lubrication

- easy to install, remove or otherwise manipulate
- unsurpassed lubrication compared to home grown-solutions (e.g. soap suds, isopropanol etc. )

#### Disappears after use

- provides a high degree of lubrication while it is wet
- stays long enough to let the work be completed
- does not contain silicones (Klüberplus S 06 – Series)

#### Additional value

- integrated corrosion protector
- high degree of stability, even if the product has been frozen
- water based, not toxic

Application can be done either automatically or manually with a sprayer, sponge or brush without any agitation required before use.

### **Klüberplus S 07-100 & Klüberplus S 06-100**

|                    |                         |
|--------------------|-------------------------|
| Colour space :     | Transparent             |
| Odeur :            | Neutral                 |
| Viscosity @ 40°C : | 1400 mm <sup>2</sup> /s |
| Product base :     | Polyurethane            |

### **Klüberplus S 07-100 M2 & Klüberplus S 06-100 M2**

|                    |                       |
|--------------------|-----------------------|
| Colour space :     | Transparent           |
| Odeur :            | Neutral               |
| Viscosity @ 40°C : | 75 mm <sup>2</sup> /s |
| Product base :     | Polyurethane          |

### **Klüberplus S 07-100 M4 & Klüberplus S 06-100 M4**

|                    |                       |
|--------------------|-----------------------|
| Colour space :     | Transparent           |
| Odeur :            | Neutral               |
| Viscosity @ 40°C : | 13 mm <sup>2</sup> /s |
| Product base :     | Polyurethane          |

#### **Benefits :**

- Only temporary lubrication effect
- Sustainable (low amount of chemicals)
- Ready to use mixtures in different viscosities

# Synthetic oils

## Klüberfluid 9 R 100

*e.g. brake components, on steel for storage and transport, SBR and EPDM sealings*

### Benefits :

- EPDM compatibility
- Anti-corrosion protection
- Improved wettability

### Product data :

Base oil : PAG + Ester  
Viscosity @ 40°C : 115 mm<sup>2</sup>/s

## Klübersynth MZ 4-17

*e.g. rolling bearings, corrosion protection of machines or components even against salt water*

### Benefits :

- Anti-corrosion protection
- Very good low temperature properties

### Product data

Base oil : PAO  
Operating temperature : -50°C to 150°C  
Viscosity @ 40°C : 20 mm<sup>2</sup>/s

# Synthetic oils

## Klübersynth M 4-32 ESP

*e.g. sealings, elastomer parts, electrical components*

### Benefits :

- High insulation resistance providing ample thermal conductivity
- Anti-corrosion protection
- No additivation

### Product data :

Base oil : PAO  
Viscosity @ 40°C : 32 mm<sup>2</sup>/s





# Assembly pastes

## Klüberpaste 46 MR 401

*e.g. press fit assembly of pins and bolts, mounting of rolling bearings, wheels and flanges, spindles, spline shafts, radial shaft seals*

### Benefits :

- Very good protection against tribocorrosion
- Very good load-carrying capacity
- For metal / metal contact

### Product data :

|                         |                        |
|-------------------------|------------------------|
| Base oil :              | PAG                    |
| Thickener :             | Lithium soap           |
| Operating temperature : | -40°C to 150°C         |
| Viscosity @ 40°C :      | 360 mm <sup>2</sup> /s |
| NLGI class :            | 1                      |

## Klüberpaste HEL 46-450

*e.g. screws, hot air ducts like exhaust systems, connecting elements in turbochargers and compressors*

### Benefits :

- Very good protection against tribocorrosion
- Performance at high temperature
- For metal / metal contact

### Product data :

|                         |                       |
|-------------------------|-----------------------|
| Base oil :              | PAG + Ester           |
| Thickener :             | Lithium soap          |
| Operating temperature : | -40°C à 1000°C        |
| Viscosity @ 40°C :      | 42 mm <sup>2</sup> /s |
| Grade NLGI :            | 0                     |

# Sprayable PFPE dispersion

## Klüberalfa MR 3-500

*e.g. silicone elastomers, plastic materials*

### Benefits :

- A mix of a PFPE oil and a dispersable solvent (not combustible or flammable)
- A dry lubricating film
- Extended compatibility with plastics and elastomers
- Easy and reliable application

### Product data :

Service temperature : 200°C max.  
Viscosity @ 40°C : 395 mm<sup>2</sup>/s  
Density : 1,55 g/cm<sup>3</sup>  
Colour space : Colourless



# Grease

## Klüberbeta VR 87-883

*e.g. valves and fittings, O-rings, radial shaft seals*

### Benefits :

- neutral behaviour towards elastomers, plastics and metals
- Does not contain any harmful components for users
- Certified for drinking water contact

### Product data :

Service temperature : 200°C max.  
Viscosity @ 40°C : 395 mm<sup>2</sup>/s  
Density : 1,55 g/cm<sup>3</sup>  
Colour space : Colourless



# Bonded coatings

## Klüber<sup>®</sup>top TP 36-1300 N

*For elastomer and plastic parts that need to be dried or transported before assembly*

### Benefits :

- Soft, visually appealing surface
- High chemical stability
- High elasticity
- Air drying and mono-component

### Main properties :

|                        |                |
|------------------------|----------------|
| Binder :               | PU             |
| Solid lubricant :      | PTFE           |
| Service temperature :  | -40°C to 100°C |
| Friction coefficient : | 0,3            |

## Klüber<sup>®</sup>top TP 29-1310 N

*For elastomer and plastic parts that need to be dried or transported before assembly*

### Benefits :

- Soft, visually appealing
- Good abrasion resistance
- Good adhesion on many materials
- Air drying and mono-component

### Main properties :

|                        |                |
|------------------------|----------------|
| Binder :               | PU             |
| Solid lubricant :      | PTFE           |
| Service temperature :  | -40°C to 180°C |
| Friction coefficient : | 0,3            |

# Bonded coatings

## Klüberplus S 03-105

*e.g. rubber hoses, tubes, sealing elements, O-rings, shaft seals*

### Benefits :

- Water-miscible PTFE dispersion for dry assembly
- Air drying coating
- Easy to apply

### Product data :

|                         |                |
|-------------------------|----------------|
| Solid lubricant :       | PTFE           |
| Binder :                | Organic        |
| Solvent :               | Water          |
| Operating temperature : | -40°C to 180°C |
| Colour space :          | Withish        |



# Overview of plastic compatibility

| Type                              | Product name  | ABS<br>Acrylonitrile<br>butadiene styre | PA<br>Polyamide    | PC<br>Polycarbonate   | HDPE<br>High Density<br>Polyethhylene | POM<br>Acetal Resin   | PP<br>Polypropylene   |
|-----------------------------------|---|---|--------------------|-----------------------|---------------------------------------|-----------------------|-----------------------|
| synthetic oil                     | 1 Klüberfluid 9 R 100   | limited compatibility                   | Usually compatible | Non compatible        | Usually compatible                    | Usually compatible    | Usually compatible    |
| ester / synthetic hydrocarbon oil | 2 Klübersynth MZ 4-17   | limited compatibility                   | Usually compatible | limited compatibility | limited compatibility                 | Usually compatible    | Non compatible        |
| synthetic hydrocarbon oil         | 3 Klübersynth M 4-32 ESP  | Usually compatible                      | Usually compatible | Usually compatible    | Usually compatible                    | limited compatibility | Non compatible        |
| PTFE dispersion                   | 4 Klüberplus S 03-105   | Usually compatible                      | Usually compatible | Usually compatible    | Usually compatible                    | Usually compatible    | Usually compatible    |
| paste                             | 5 Klüberpaste 46 MR 401<br>6 Klüberpaste HEL 46-450   | Non compatible                          | Usually compatible | Non compatible        | Usually compatible                    | limited compatibility | limited compatibility |
| grease<br>(Silicone oil /PTFE)    | 7 Klüberbeta VR 87-883  | Usually compatible                      | Usually compatible | Usually compatible    | Usually compatible                    | Usually compatible    | Usually compatible    |
| PFPE oil dispersion               | 8 Klüberalfa MR 3-500   | Usually compatible                      | Usually compatible | Usually compatible    | Usually compatible                    | Usually compatible    | Usually compatible    |
| water miscible gel                | 9 Klüberplus S 06-100 M4<br>10 Klüberplus S 07-100 M4<br>11 Klüberplus S 06-100<br>12 Klüberplus S 06-100 M2<br>13 Klüberplus S 07-100<br>14 Klüberplus S 07-100 M2 | Usually compatible                      | Usually compatible | limited compatibility | Usually compatible                    | Usually compatible    | Usually compatible    |
| coating                           | 15 Klübertop TP 36-1300 N<br>A/B Komp A<br>16 Klübertop TP 29-1310 N<br>A-B Komp A  | Usually compatible                      | Usually compatible | Usually compatible    | Usually compatible                    | Usually compatible    | Usually compatible    |

# Overview of elastomer compatibility

| Type                              | Product name  | ACM<br>Polyacrylate<br>rubber | EPDM<br>Ethylene<br>propylene diene | FKM (Viton)<br>Fluorocarbon<br>rubber | HNBR<br>Hydrogenated<br>NBR | SBR<br>Styrene<br>butadiene | VMQ (Silicone)<br>Silicone rubber |
|-----------------------------------|---|-------------------------------|-------------------------------------|---------------------------------------|-----------------------------|-----------------------------|-----------------------------------|
| synthetic oil                     | 1 Klüberfluid 9 R 100   | Non compatible                | Usually compatible                  | Non compatible                        | Non compatible              | Usually compatible          | Non compatible                    |
| ester / synthetic hydrocarbon oil | 2 Klübersynth MZ 4-17   | Non compatible                | Non compatible                      | Usually compatible                    | Non compatible              | Non compatible              | limited compatibility             |
| synthetic hydrocarbon oil         | 3 Klübersynth M 4-32 ESP  | Usually compatible            | Non compatible                      | Usually compatible                    | Usually compatible          | Non compatible              | limited compatibility             |
| PTFE dispersion                   | 4 Klüberplus S 03-105   | Usually compatible            | Usually compatible                  | Usually compatible                    | Usually compatible          | Usually compatible          | Usually compatible                |
| paste                             | 5 Klüberpaste 46 MR 401<br>6 Klüberpaste HEL 46-450   | Non compatible                | limited compatibility               | Non compatible                        | Non compatible              | limited compatibility       | limited compatibility             |
| grease<br>(Silicone oil /PTFE)    | 7 Klüberbeta VR 87-883  | Usually compatible            | Usually compatible                  | Usually compatible                    | Usually compatible          | Usually compatible          | Non compatible                    |
| PFPE oil dispersion               | 8 Klüberalfa MR 3-500   | Usually compatible            | Usually compatible                  | Usually compatible                    | Usually compatible          | Usually compatible          | Usually compatible                |
| water miscible gel                | 9 Klüberplus S 06-100 M4<br>10 Klüberplus S 07-100 M4<br>11 Klüberplus S 06-100<br>12 Klüberplus S 06-100 M2<br>13 Klüberplus S 07-100<br>14 Klüberplus S 07-100 M2 | Usually compatible            | Usually compatible                  | Usually compatible                    | Usually compatible          | Usually compatible          | Usually compatible                |
| coating                           | 15 Klübertop TP 36-1300 N<br>A/B Komp A<br>16 Klübertop TP 29-1310 N<br>A-B Komp A  | Usually compatible            | Usually compatible                  | Usually compatible                    | Usually compatible          | Usually compatible          | Usually compatible                |

# Overview of metal compatibility

| Type                              | Product name  | Steel                 | Stainless steel       | Zinc plated steel     | Aluminium             |
|-----------------------------------|---|-----------------------|-----------------------|-----------------------|-----------------------|
| synthetic oil                     | <b>1 Klüberfluid 9 R 100</b>  | Usually compatible    | Usually compatible    | limited compatibility | limited compatibility |
| ester / synthetic hydrocarbon oil | <b>2 Klübersynth MZ 4-17</b>  | Usually compatible    | Usually compatible    | Usually compatible    | Usually compatible    |
| synthetic hydrocarbon oil         | <b>3 Klübersynth M 4-32 ESP</b>   | Usually compatible    | Usually compatible    | Usually compatible    | Usually compatible    |
| PTFE dispersion                   | <b>4 Klüberplus S 03-105</b>  | Non compatible        | limited compatibility | Non compatible        | Non compatible        |
| paste                             | <b>5 Klüberpaste 46 MR 401</b><br><b>6 Klüberpaste HEL 46-450</b>                                     | Usually compatible    | Usually compatible    | limited compatibility | Usually compatible    |
| grease<br>(Silicone oil /PTFE)    | <b>7 Klüberbeta VR 87-883</b>   | Usually compatible    | Usually compatible    | Usually compatible    | Usually compatible    |
| PFPE oil dispersion               | <b>8 Klüberalfa MR 3-500</b>  | Usually compatible    | Usually compatible    | Usually compatible    | Usually compatible    |
| water miscible gel                | <b>9 Klüberplus S 06-100 M4</b><br><b>11 Klüberplus S 06-100</b><br><b>12 Klüberplus S 06-100 M2</b>  | limited compatibility | limited compatibility | Non compatible        | limited compatibility |
|                                   | <b>10 Klüberplus S 07-100 M4</b><br><b>13 Klüberplus S 07-100</b><br><b>14 Klüberplus S 07-100 M2</b> | limited compatibility | Usually compatible    | Non compatible        | limited compatibility |
|                                   | <b>15 Klübertop TP 36-1300 N</b><br><b>A/B Komp A</b>   | Non compatible        | limited compatibility | Non compatible        | Non compatible        |
|                                   | <b>16 Klübertop TP 29-1310 N</b><br><b>A-B Komp A</b>   | Non compatible        | limited compatibility | Non compatible        | Non compatible        |



# Content of Klüber Assembly Aids Kit

Benefits at a glance



## Replacement felt tip for the pens

Solid particles in combination with the binder clog the initial felt when not in use for a while. The user can easily replace it.



## Sprayhead for PFPE-Dispersion

remove the lid and replace it by the spray head to apply Klüberalfa MR series. Spraying allows you to cover wide areas.



## Grommet / nozzles for grease tubes

nozzles can be screwed on the tubes to apply the greases directly to hard-to-reach lube points.



## Brushes

for easy application of lubricants

# Content of Klüber Assembly Aids Kit

Benefits at a glance



## Information booklet

Products informations, overview of plastic compatibility, overview of elastomer compatibility



## USB stick

Contains products informations and safety data sheets in different languages



## Business card

Your contact person at Klüber Lubrication

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