



Installation and Operating Manual for RK Kutting – Hose Lines and Components



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Important Instructions

Before installation and start-up of the RK Kutting hose lines or components (called Product in the following), this Installation and Operating Manual must be carefully read. Instructions and warnings of danger must especially be paid attention to. This Installation and Operating Manual is valid provided that the correct product is selected for the purpose of use. Selection and design of the Product are **not** part of this Installation and Operating Manual. If this Installation and Operating Manual is not followed or incorrectly interpreted, then all Product liability and warranty from RK Kutting is null and void. The same also applies to the dismantling or modification of our Product.

This Installation and Operating Manual must be kept safe, and in the event of subsequent delivery of our Product whether individually or part of a machine, it must be available at all times for the operator.

Preliminary remark

When connected, hose lines manufactured by RK Kutting assembled with approved hose and hose fittings.

Safety during use can only be guaranteed when using hose lines in the original (as delivered) condition and when properly handled. Each change or improper handling method releases RK Kutting from the responsibility, liability and warranty.

The installation and commissioning of our products must only be carried out by trained personnel.

As the use of the hoses is outside of our control, we cannot accept any liability for damage that occurs by improper use.

Safety instructions for hose lines

Based on the Information Sheet No. 015 of "DGV" Technical Committee for Engineering, we point out that hose line fittings consisting of a turned pipe socket with cutting ring are no longer used for hydraulic hose lines as these no longer reflect best practice state of the art design.

- Do not kink the hose line and absolutely conform to the given bending radius.
- The given bending radius corresponds to a static application, for dynamic applications we recommend to double the bending radius.
- Do not allow any torsional or tensional stresses.
- Do not use hose lines in tension to lift or drag other equipment.
- Only use adaptors, reducers, etc. approved by RK Kutting.
- Please consult the appropriate compatibility list for the chemical resistance.
- The lines must be inspected at regular intervals.
- Before each use the hose lines must be inspected for damage, kinks, wear, corrosion, cracks or other damage. Damaged hose lines must be replaced immediately!
- Only use hose lines whose allowable operating pressure is actually known.
- Hoses and hose lines of unknown origin or with incomplete labelling may not be used.
- Only use clean media to increase the service life of the hose line.
- If a malfunction is suspected, the product or machine to which the hose is installed must immediately be stopped and the hose replaced.
- The max. operating pressure is defined by the weakest component of the hose line.
- The max. Permissible operating temperature may not be exceeded; please also observe the respective correction factors.
- We recommend use of a protective hose suitable for the temperature for operating temperatures over 100 °C, in all exposed areas.

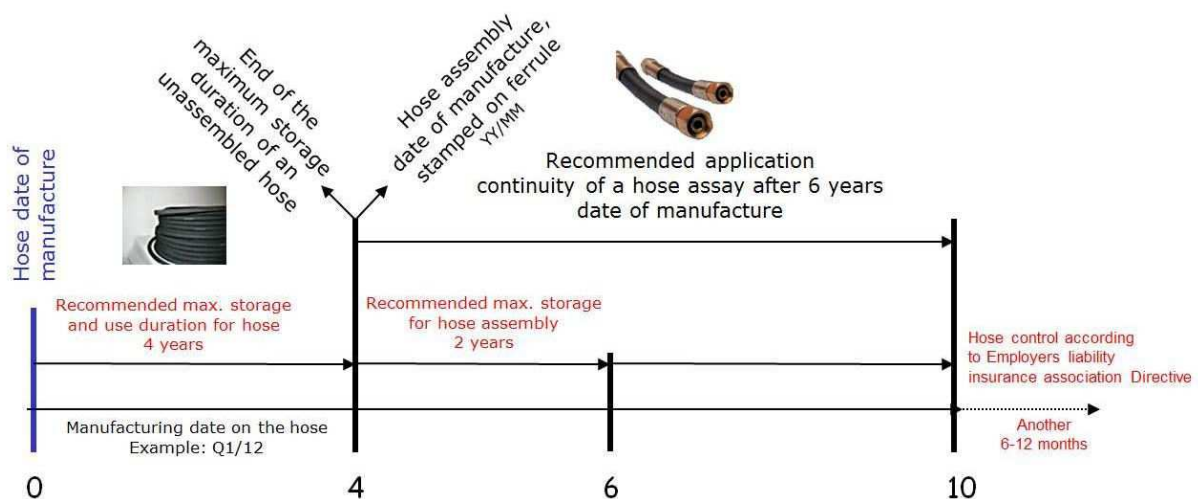
In addition, please also observe "Safe Application of Hose Lines" leaflet T002 6/2004 BGI 572 and DIN 20066:2002-10 Hose Lines, as well as DIN EN 982 "Safety requirements for fluid power systems". Operating pressures and resistance lists are located in the RK Kutting catalogue "Products for high pressure", which we will be glad to send you, or can be viewed at www.kutting.de.

Hazard information

- **Danger due to hose bursting.** A risk can occur from flying fragments.
- **Danger due to leaks in the hose line.** Serious cut injuries up to dismemberment can occur especially from medium escaping in a fine stream and high pressure. Scalding can occur from hot medium. Also chemical additives to water can cause irritation and chemical burns.
- **Danger due to hot medium in the hose line.** Serious burns can occur from touching the hot surface of the hose line.
- **The length of the hose line can change under pressure.** This can compromise the geometry of the hose leading to tensioning or twisting, which in turn can affect the functional safety of the hose.
- **Danger due to hose fittings and components for connecting hose lines.** Dangers can occur due to loosening, breaking or tearing of hose fittings and components for connecting hose lines through uncontrolled "whipping" of the hose line (whip effect).
- **Danger due to hoses laying around.** Hoses laying around create a potential "tripping hazard".

Storage and use duration

DIN 7716 applies for the storage of hoses (also refer to ISO 8331)



- Even with proper storage and the permitted loads, hoses and hose lines are subject to natural ageing. This limits their period of use.
- Improper storage, mechanical loading and impermissible loading are frequent causes of failure.
- The duration of use can be established in individual cases depending on values from experience and may deviate from the following reference values.
- When assembling hose lines, the hose (bulk hose material) must not be more than four years old.

- The duration of use of an assembled hose line, including a possible storage time, should not exceed six years. For this, the storage time should not exceed two years.

In operational practice the hoses should be stored according to the FIFO principle. FIFO (English. **F**irst In **F**irst Out)

Inspection criteria

In order to prevent accidents, preventive maintenance is paramount.

Maintenance frequency should be determined on the basis of the respective operating conditions.

For this purpose, the operator employs a “qualified person” who is familiar with potential hazards and able to rectify them.

Hose lines must be replaced when the following criteria are detected:

- Damage to the outer layer to the filler (e.g., deep abrasions, cuts)
- Brittleness of the outer layer (cracking of the hose material)
- Deformation, which does not correspond to the natural shape of the hose or hose lines, in both the pressureless and pressurised condition.
- Leaks in the hose line
- Damage or deformation of the hose fitting (sealing function restricted); slight surface damage is no reason for replacement.
- Hose working loose from the fitting.
- Corrosion of the fitting reduces the function and strength.
- Requirements for installation not observed.
- Duration of storage and/or use of the hose or the hose line exceeded. If there is no information on the duration of storage and use available, then the reference values according to "Storage and use duration" are recommended.

Hose lines must not be made out of hoses that were previously used as part of a hose line. **A repair is therefore not permissible!**

Free of silicone

Silicone or material that contains silicone wasn't in the process of producing our PTFE / THP hoses or hose lines. Due to the fact that the material can be damaged or contaminated by silicone during handling and transport, we cannot confirm an absolute silicone-free content.

Furthermore, not all causes in the production chain can be excluded. In order to meet the demands regarding LABS- and silicone-free content, the components must be cleaned appropriately before assembly.

Assembly

Please follow DIN 20066:2002-10 Part 13, Requirements for installation, and leaflet T002 6/2004, Examples of proper handling.

In order to ensure the functionality of hose lines and not shorten their duration of use due to additional stresses, the following must be observed:

- Hose lines must not be stressed by tension, twisting and compression during operation unless they are especially designed for this.
- The smallest bending radius specified by the manufacturer must always be ensured. RK Kutting recommends at least doubling the bending radius when under dynamic loading in order to achieve an extended service life.
- Hose lines must be protected against damage due to an external mechanical impact, thermal or chemical effects.
- Before commissioning any connections that can be loosened must be checked for a tight fit. When tightening the connecting screws make sure that the connecting piece (nipple) is not turned inside the ferrule. Under no circumstances should the connecting screws be tightened if a hose line is under pressure.
- The hose line must not be held on the ferrule (e.g., in a vice or with a pipe wrench).
- Do not put the hose line into operation if there is visible external damage. The hose line must be cleaned in a suitable manner if necessary before commissioning.
- Hose lines that require earth bonding acc. to BGR132 must be checked and retrofitted if they do not conform.
- Do not exceed the pressure, vacuum, (do not exceed the max. permissible operating excess pressure or vacuum of the hose line) and temperature (max. permissible operating temperature depending on the medium). This must be checked against the resistance lists of the hose line components if necessary.
- Resistance materials of the hose lines must be resistant to the flow media under operating conditions. This must be checked against the resistance lists if necessary.
- Hose line wear and abrasion must be factored in and checked.
- In order to operate hose lines safely, technical, organisational and personal safety measures must be implemented. Technical and organisational measures have priority. If all dangers cannot be avoided through these measures, provide and use effective personal safety equipment.
- Hose lines should not be painted over, as this can negatively influence the ageing behaviour and the labelling will not be legible (acc. to BGR 237).
- Hoses and hose lines are subject to a certain elongation and shortening; the respective pressure and/or the respective temperature have influence on this and therefore, this must be taken into consideration during installation.
- Take into consideration the own weight of the overall hose line with the medium; this is in particular relevant in case of great acceleration values and supporting measures are recommended in the area of fittings.
- Check the electric properties of the hose whenever necessary.
- Please note the potentially occurring electrostatic charge of hose lines and introduce the adequate measures for discharging (earthing).

Installation of hose lines in cable ducts and drag chains

The installation in cable ducts and drag chains should be carried out as illustrated in the images below.



The following instructions must be observed in this process:

- Separate every hose line from the adjacent hose line with the aid of a bar, in order to prevent formation of chafe marks. Recommended separation with a bar = free space 1.2 x outside diameter of the hose line.
- Install the hose lines in such a way that they are neither too tight nor too loose in the cable drag. Hose lines must be fixed in case of high dynamic movements against drifting in the cable drag. Fixation is made on the moveable connection of the cable drag.
- The bending radius of the cable drag must be large enough as to correspond to the greatest nominal width of the hose line in the drag and this bending radius is multiplied by a factor of 2.
- Adequate measures must be implemented in case of a potential length adjustment or shortening / elongation under pressure or temperature.
- At best, install the hose line along the entire length and strain them with the permissible operating pressure or with the selected process temperature. In this way, an efficient elongation or shortening can be included in the length compensation.

Disassembly of hose lines with the aid of pinned connecting nut

When disassembling the hose lines with the aid of pinned connecting nut, it must be ensured that the medium does not leak out of the hose into the connecting nut and remains there, because this can lead to formation of resin deposits.

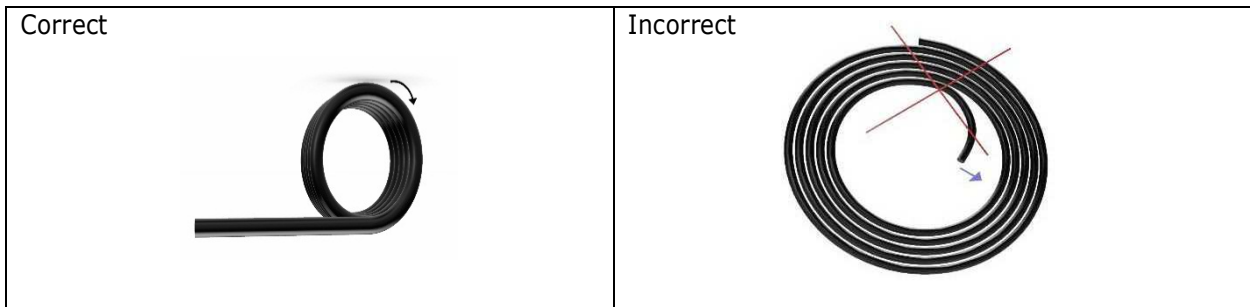
The connecting nut can be jammed as a result of this. This could further affect the function of the hose line and lead to other defects and faults.



Examples of proper handling and laying of hose lines

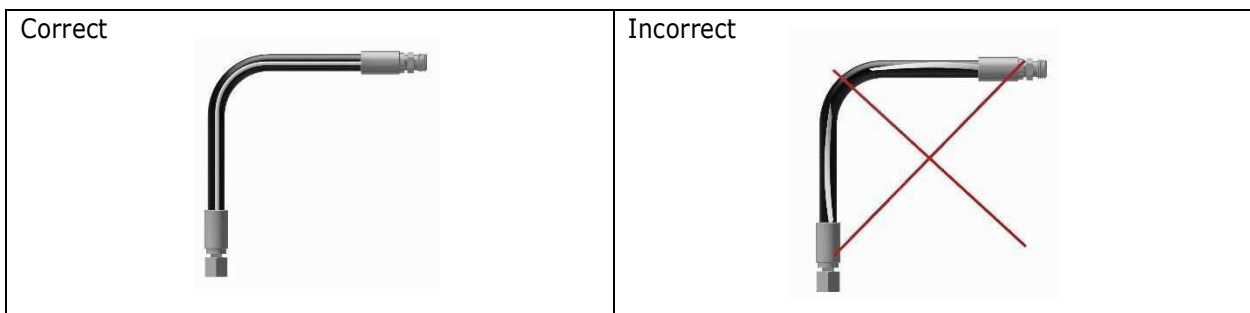
Example 1

Lay hose lines straight by unrolling the hose ring. By pulling on one end of the hose ring the permissible minimum bending radius of the hose is not reached and in addition a torsional load is applied



Example 2

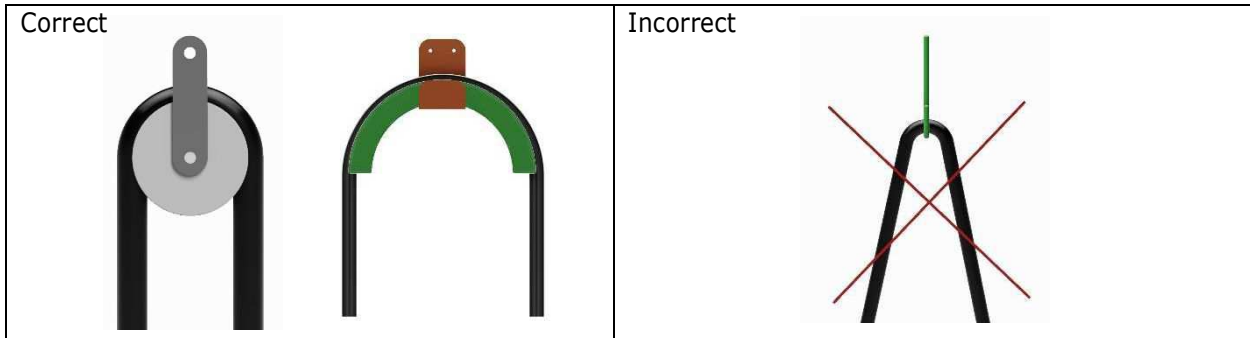
Connect the hose line with no twist.





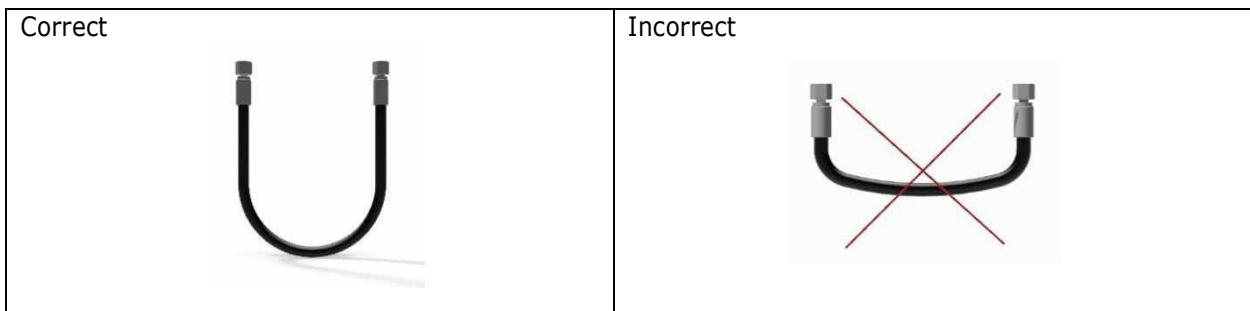
Example 3

Prevent high bending loads by using a roller corresponding to the permissible bending radius or a hose saddle.



Example 4

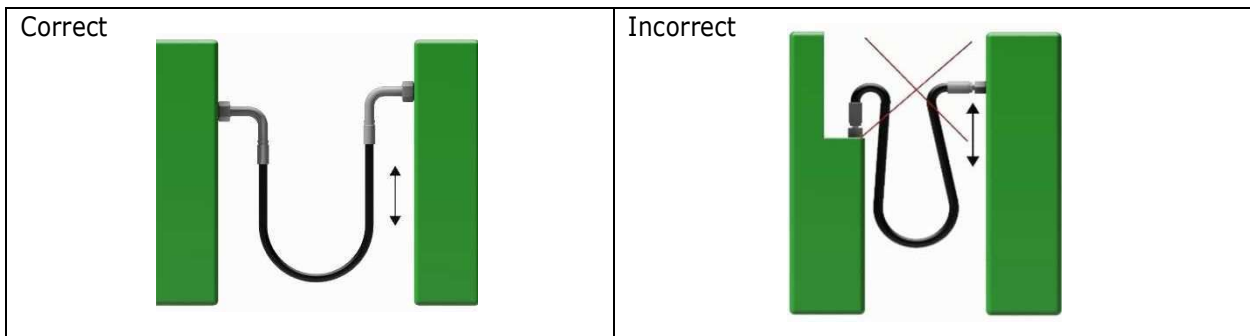
Install hose line in a 180° arc with sufficient neutral hose ends. Determination of length is done according to manufacturer's data. The installation distance is according to the required bending radius.





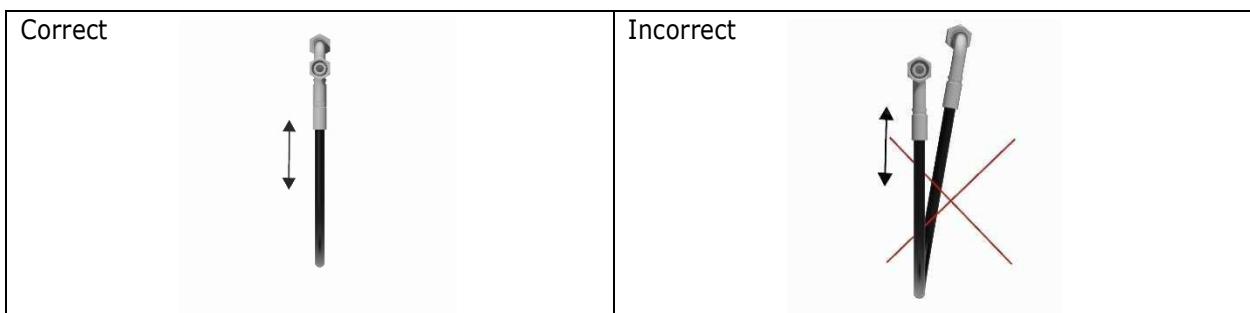
Example 5

Avoid impermissible bending directly behind the connection fittings by using rigid pipe elbows. Observe the minimum bending radius (also with manual use of the hose line). Recommendation: For dynamic load the bending radius must at least be doubled!



Example 6

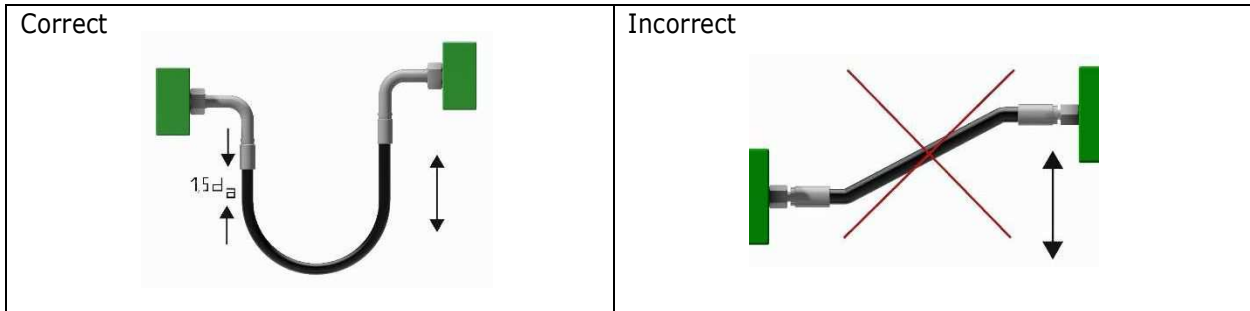
Direction of movement and hose axis must lie in one plane. Damaging torsional loads are avoided by this method.





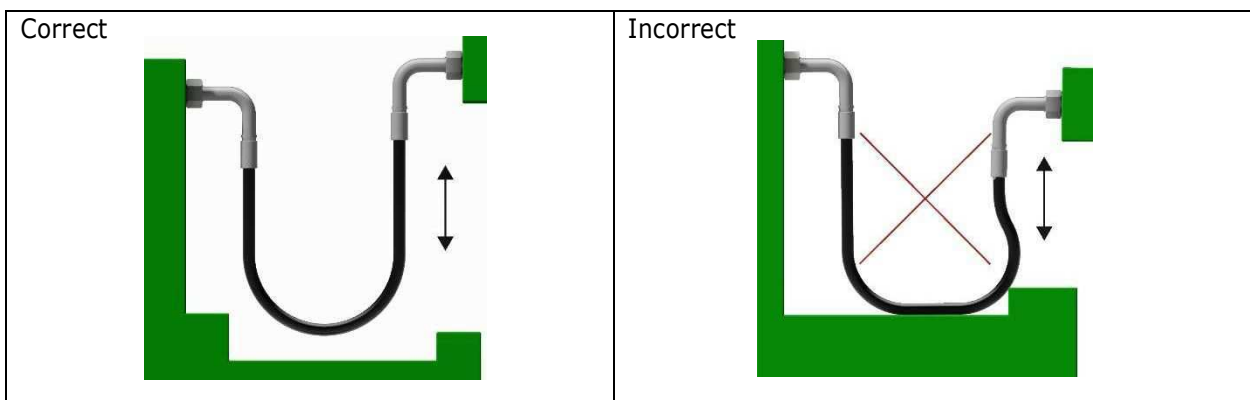
Example 7

Alternating bending loads and overly tight bending directly behind the connection fittings by the use of rigid pipe elbows is not permitted. After a straight section, a minimum length of **1.5 times** the hose diameter d_a should be provided to the next bend.



Example 8

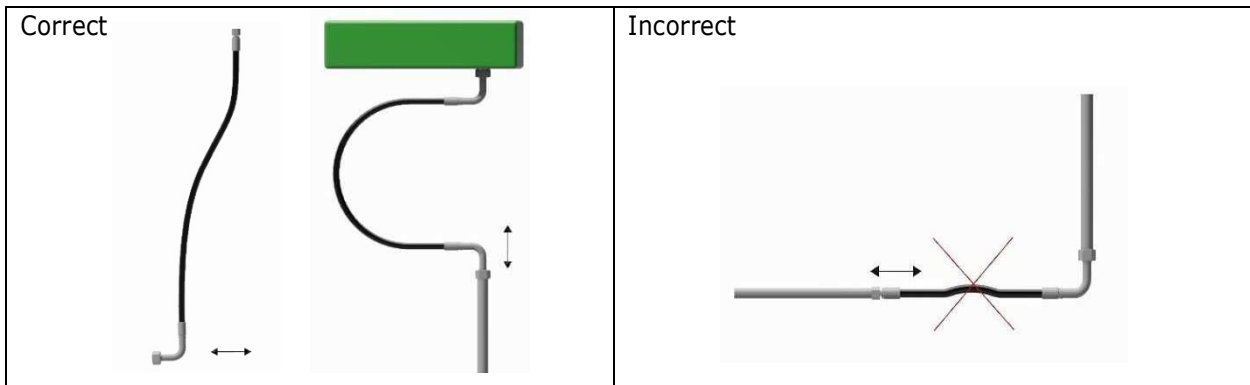
Hose lines as free-hanging arcs should be arranged so that they do not come in contact with the wall or other objects or with the floor during an extended stroke.





Example 9

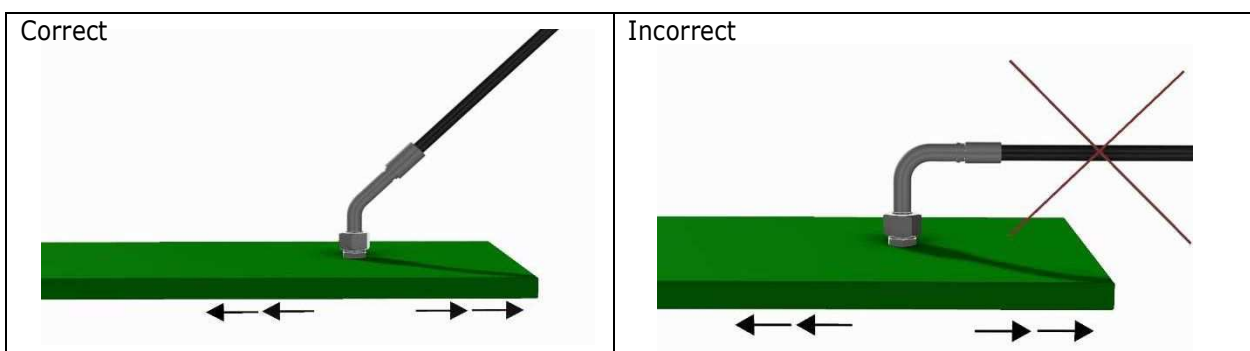
Lateral installation only permissible for the acceptance of small extensions. Stretching or compressing the hose line is not permitted.



Instructions for accommodation of vibrations

Example 10

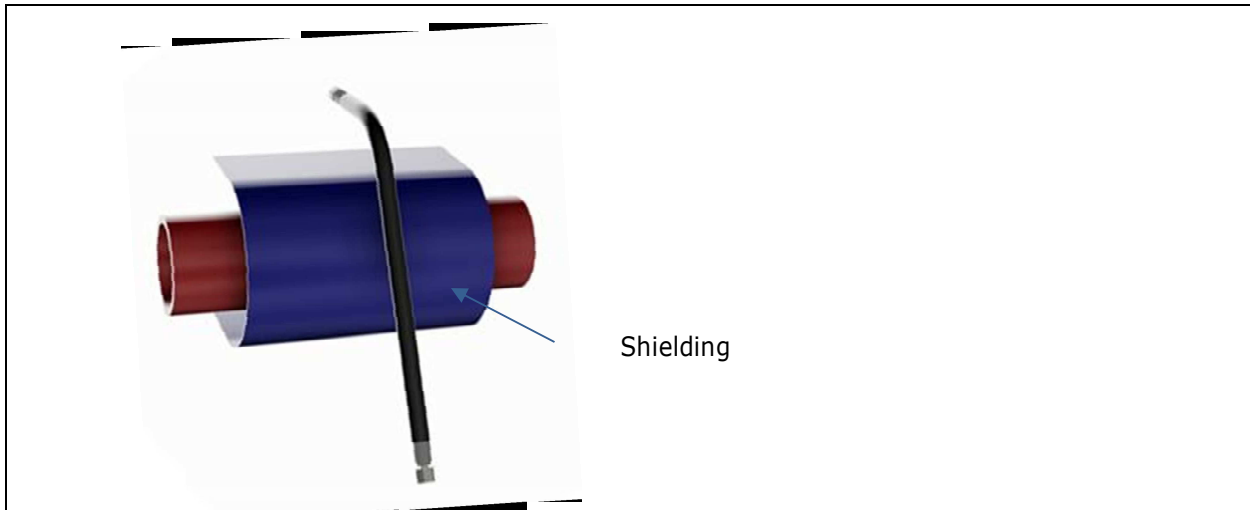
If heavy vibrations from machine parts occur where there are hose line connections, the hose lines must not be laid in the direction of the vibration, but rather only in a sufficiently large angle to it.





Example 11

If subjected to high external temperatures, the hose lines must either be installed at a sufficient distance from the heat radiating components or protected through suitable measures (shielding).





Appendix

The contents including all pictures are the property of RK Kutting GmbH.

Reference source for quoted standards and UVV:

DIN, EN and ISO via Beuth Verlag GmbH (www.beuth.de)
Accident Prevention Regulations, BG rules, BG guidelines,
BG information in full text: (www.hvbg.de)

Manufacturer

RK Kutting GmbH
Egerten 9
D-74388 Talheim

Telephone	+49 (0) 7133-9814-0
Fax	+49 (0) 7133-9814-11
E-mail	info@kutting.de
Homepage	www.kutting.de