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# Operating Instructions

## for HKS Fabric expansion joints

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Because of their highly flexible materials, HKS fabric expansion joints are susceptible to damage of all types and adverse loads in operation. For reliable operation of a fabric expansion joint and, thus, the complete system, carefully and completely read the following instructions and regulations and strictly observe. If these should appear to be doubtful or incomplete, consult HKS in any case.

### 1. Packaging / storage / transportation

- 1.1 Up to starting installation, the fabric expansion joints must be stored in the transportation packaging in a dry, cool, dust-free room protected from light and reasonably ventilated. It is not permitted to store in the open protected from the weather. The rubber parts must be protected against draught. No equipment generating ozone must be operated, such as electric motors, fluorescent sources of light etc. in the storeroom. No solvent, fuels, chemicals or similar must simultaneously be stored. In particular, make sure that no condensation forms on the fabric expansion joint.
- 1.2 Fabric expansion joints that have been stored at temperatures of less than +5 °C before installation, should be heated to a temperature of approx. +20°C before installation.
- 1.3 As far as possible, transportation locks must also be removed after installation.

### 2. Assembly/installation instructions, commissioning

- 2.1 HKS fabric expansion joints must only be installed and commissioned by trained, skilled installation personnel. Prerequisite for safe operation is the correct and professional installation!
- 2.2 Before installation, completely remove the packaging and check the fabric expansion joints for any damage during transportation and/or storage. When cleaning the fabric bellows, use neither a solvent nor sharp-edged equipment, such as wire brushes or similar. Only fully serviceable fabric expansion joints must be installed! If in doubt, consult HKS!
- 2.3 For ambient temperatures of less than +5 °C, installation of fabric expansion joints is only possible with restrictions and should always be agreed with us.
- 2.4 Before installing the fabric expansion joint, the pipeline system must be correctly prepared, i.e. the ends of the pipeline are aligned, the fixed flange is welded and the supports are installed. The floating bearing must be fully serviceable. Furthermore, make sure that the holes in the flange align and the installation space in the pipeline conforms to the installation length of the fabric expansion joint.
- 2.5 During installation, make sure that fabric expansion joints are not damaged (e.g. by welding splatter, thermal load, mechanical damage, impact loads, objects falling, contamination etc.). If welding tasks are required, the fabric expansion joints must be covered by a suitable means against the welding heat and sparks.
- 2.6 The fabric bellows must not be coated with paint.
- 2.7 From a gas velocity of 7 m/s and/or abrasive dusts in the medium to be conveyed, internal deflectors (guide tubes) are required. The guide tubes must be designed so that there is no obstruction to the motion.
- 2.8 Fabric expansion joints are very sensitive towards the effect of sharp-edged objects. Therefore, it is imperative to make sure that all steel parts (flanges, steel parts for accepting the fabric expansion joint, deflectors etc.) with which the fabric expansion joint comes into contact are deburred or have a radius.
- 2.9 HKS fabric expansion joints are supplied with or without bolt holes (depending on the customer requirement). To stamp the bolt holes on site, we recommend the following procedure: The loose flange is used as a template in order to position the bolt holes to mark. Use a piece of hardwood or plastic as an underlay. The bolt holes are then stamped out using a hollow punch. Alternatively, the bolt holes can be drilled using a hand drill. Here, the fabric expansion joint is clamped between the fixed and loose flange by clamps or screw clamps. Thereby, extreme caution is required so that the drill does not touch the surface of the fabric expansion joint and, thereby, become damaged.
- 2.10 Fabric expansion joints with a flange connection present particular requirements on the counter flange of the pipeline. The sealing surface of the counter flanges must be planar and clean. No sharp-edged ends of the pipe or flange must press on the fabric seal surface, because this could be cut.
- 2.11 For fabric expansion joints with an internal guide tube, observe the direction of flow!
- 2.12 Unless specifically authorized by HKS, fabric expansion joints must never be heat insulated. In contrast, it is important that unobstructed air circulation is ensured around the fabric expansion joint.

- 2.13 The fabric expansion joint should be installed so that uninhibited visual inspection for integrity can be carried out at regular intervals. If defects are visible, e.g. bubble formation, surface cracks or irregular deformation, immediately inform HKS and/or replace the fabric expansion joint.
- 2.14 The seam is the weakest point of the fabric expansion joint. This should be at the thermally and mechanically least stressed point. In the event of condensate forming in horizontal lines and unobstructed heat dissipation, the fabric expansion joint must be aligned so that the seam is at the top.
- 2.15 If only fabric bellows are ordered with flange connection, but without flange, before installation, the fabric bellows must be mounted at the flange provided in the pipeline on site.
- 2.16 For fabric expansion joints with a flange connection, the length of the bolts must be selected so that the bellows are not touched or even damaged. The risk of damage through excessively long bolts is increased if the fabric bellows expand under pressure whilst operating!
- 2.17 In order to prevent the risk of fire during commissioning, during installation, do not spray the bolt connections with penetrating agent.
- 2.18 HKS recommends the use of flange bolts, quality class 5.6 and 8.8. The bolts must be fully tightened uniformly, crosswise in 3 steps. In the first step, all bolts are uniformly tightened by hand (make sure that sealing surface is parallel!). In the second step, all bolts are more firmly tighten crosswise and, in the third step, the bolts are also tightened crosswise using a torque wrench. Thereby, as tightening torque for the bolts, HKS recommends to use the values stated in the Technical Information TI-007 (published by the Güteausschuss der Gütegemeinschaft Weichstoff-Kompensatoren (Quality Commission of the Quality Association for Fabric expansion joints) e.V., refer to <http://www.qafej.org/> tab "Technical Information").
- 2.19 No sharp-edged tools must be used, so that the fabric bellow is not damaged if the tool slips.
- 2.20 Because the flexible fabric "sets" after commissioning and this can result in the bolts loosening, the bolts must be retightened once or twice.
- 2.21 If the same fabric expansion joint must be removed and installed, e.g. for inspection, the sealing effect can be thereby reduced, in particular in the flange area.
- 2.22 It is imperative to observe the general valid and relevant safety and accident prevention regulations!

### 3. Operation

- 3.1 HKS fabric expansion joints must only be operated within the limits of the design conditions in accordance with the data from the manufacturer.
- 3.2 Fabric expansion joints must only be operated within the permitted pressure range. For the upper and lower limit of the permitted pressure range (minimum operating pressure, maximum operating pressure PS), refer to the HKS order documents. If no lower operating pressure limit is stated in the order documents, this is 0 bar as standard.
- 3.3 Prevent impacts within the system.
- 3.4 Fabric expansion joints must only be operated within the permitted temperature range. For the upper and lower limit of the permitted temperature range (minimum operating temperature, maximum operating temperature TS), refer to the HKS order documents. If no lower operating temperature limit is stated in the order documents, this is -10 °C as standard.
- 3.5 The fabric expansion joint must only be exposed to media for which it has been intended and designed. If no information is given, it is only suitable for the medium air.
- 3.6 For safe operation of the fabric expansion joint and, thus the whole system, it is imperative to observe and adhere to all of the information and instructions.

### 4. Maintenance

- 4.1 HKS fabric expansion joints are maintenance-free components that, however, must be considered as expendable parts. It is important that the parts installed are externally examined at regular intervals for any signs of ageing (embrittlement, leakage, formation of bubbles). For larger maintenance tasks on the system at an interval of 1-2 years, the condition of the internal cladding should also be evaluated (swelling, hardening, elutions, cracks).

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## 5. Repair

- 5.1 If repair of a fabric expansion joint is required in an exceptional case, the tasks or modifications to the fabric and connecting parts of the fabric expansion joints (e.g. flange, guide pipe or safety parts) must only be carried out by staff from HKS, or companies authorized by HKS. In this case, HKS detailed information should be given to HKS about how the damage occurred and operating conditions, so that it is perhaps possible for HKS to suggest improvement procedures.

## 6. Warranty

- 6.1 HKS assumes the warranty for their products in accordance with the statutory provisions of the Federal Republic of Germany (verification by the delivery note and invoice). Damage that occurs through natural degeneration (wear), overload or incorrect handling, are excluded from the warranty.

## 7. Environmental Protection

- 7.1 Product, accessories and packaging should be environmentally-friendly recycled.