In addition to this installation guideline the respective General Technical Approval for bearing accessories [1], the bearing drawings and the bearing installation drawings in accordance with ZTV-ING 8-3 [2] as well as DIN EN 1337-11 [3] have to be present and considered. According to ZTV-ING 8-3 chapter 2.4 (1) a bearing manufacturer's specialist or his appointed local representative has to be present on site during the installation of the first bearing of its kind. In accordance with guideline 804 [4], module 5101 chapter 1 (2) of the DB, the installation of all bearings and the belonging placing of mortar joints needed for railway bridges, has to be conferred on the bearings´ manufacturer. The specialist or his local representative have to prove their successful attendance in a VHFL-MPAS-course (course A) for qualification for installation of bearings in bridge and building construction. The scope of service of the bearing manufacturer at the installation supervision is regulated in the VHFL guideline no. 1 [5]. A „Bearing of its kind" is differenced as follows:

- Bearings of a design, for example spherical bearing
- Bearings, where the horizontal forces are transmitted through anchors, dowels or welded shear studs.
- Bearings, where the horizontal forces are transmitted through friction in the connecting joint.
- Bearings attached to steel superstructures.

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## 1 Transport and temporary storage

Bridge bearings are sensitive components, their function can be maintained by cautious handling only. Sliding (backing) plate and bearing base are normally parallel aligned at the workshop and fixed through auxiliary screw joint construction to be secured for transport, so that they remain in the planned position and form when delivered. The parallel alignment has to be preserved under all circumstances until the bearing is build in, so don't unscrew the auxiliary construction (see figure 1) until the bearing has fixed connections with the base and the superstructure. Never dump the bearings out of transport vehicles, but unload them by taking them on specially designed attach points and transport them safely (see figure 1).

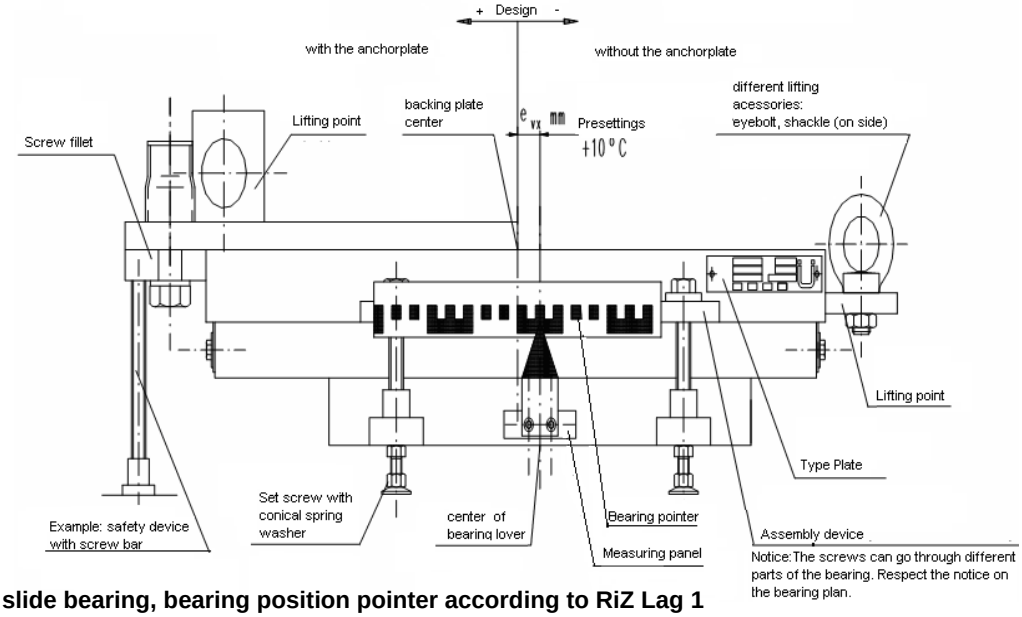



**Fig. 1: Side view of slide bearing, bearing position pointer according to RiZ Lag 1**

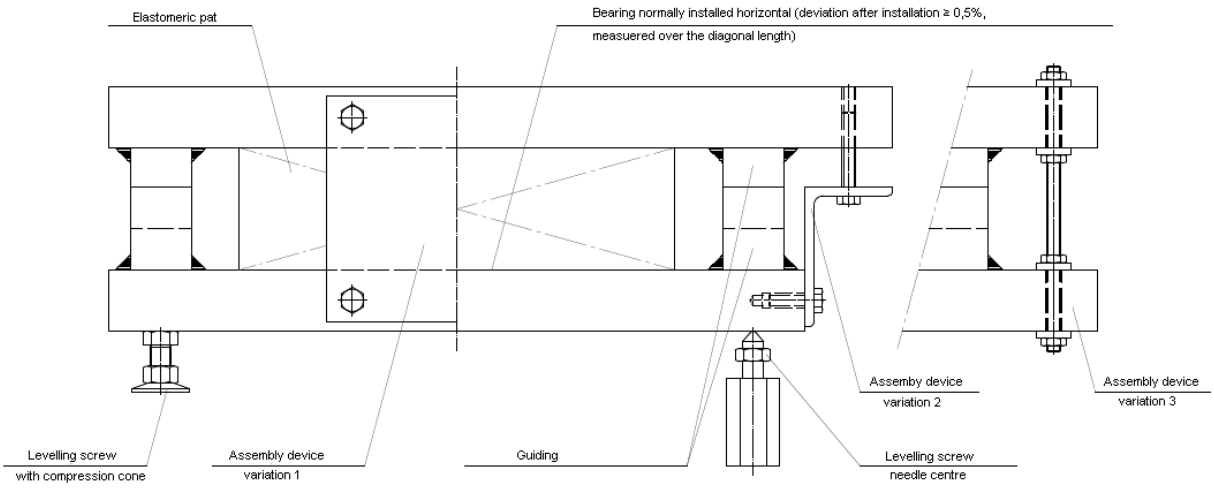



**Fig. 2: Side view of elastomeric bearing combined with guide bearing according to DIN EN 1337-8 [6]**

At arrival on site, first the bearings have to be inspected according to DIN EN 1337-11, Chapter 5 on:

- No signs of external damage, especially of anticorrosive coatings on the bearing
- Cleanliness
- Fix position of assembly device according to the plan
- Compliance with the temporary storage plan respectively the bearing dislocation plan, the bearing plan if not partly or completely assured through the control or acceptance procedure, but in any case
- The labelling of the top and the bottom, type plate according to ZTV-ING 8-3, Appendix B
- The measuring points and levels
- The bearing position pointer if necessary
- The size and direction of the presetting
- The readjustment facility, which can be provided if necessary
- Temporary storage on the site

If unscheduled changes are detected or damage, the facts will have to be noted in shipping documents and the manufacturer has to be informed in writing immediately. Bearings not mounted immediately have to be temporary stored on pallets in an appropriate place and have to be protected against damage, dirt, moisture and heat. Be sure to provide enough ventilation to avoid condensation see DIN EN 1337-11.

## 2 Bearing types and systems (regarding to the numbering see DIN EN 1337-1 [7], table 1)

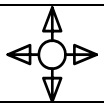
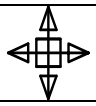
| Symbol | Abbreviation | Bearing type |
|---|---|---|
|  | P<br>2.1, 3.1, 3.2 | Steel Spherical bearing/Pot bearing<br>steel point and rocker bearing, fixed in any horizontal direction |
|  | P1<br>2.2, 3.3, 3.4 | Steel spherical bearing/Pot bearing<br>steel point and rocker bearing with uniaxial movable sliding part |
|  | P2<br>2.3, 3.5 | Steel Spherical bearing/Pot bearing<br>steel point and rocker bearing with biaxial movable sliding part |
|  | V<br>1.6 | Elastomeric bearing with securing device for two axes |
|  | V1<br>1.1 | Elastomeric bearing with restraints (RS) for one axis |
|  | V2<br>1.1 | Elastomeric bearing, biaxial deformable, with/without upper and lower bearing plate |
|  | VG1<br>1.3 | Elastomeric bearing with unindirectional movable sliding part and Guide bearing for the other axis |
|  | VG2<br>1.4 | Elastomeric bearing with multidirectional movable sliding part |
|  | VGE2<br>1.5 | Elastomeric bearing with unindirectional movable sliding part |
|  | H1<br>8.2 | Guide bearing with restraints for one axis |
|  | H<br>8.1 | Restrained bearing, fixed in any horizontal direction |

**Table 1: Common bearing types**

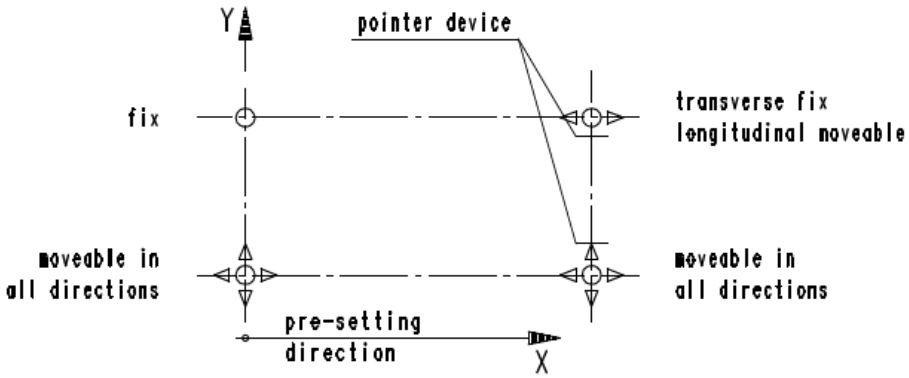



**Fig. 3: Example of a bearing system**

## 3 Top side labelling of bearings

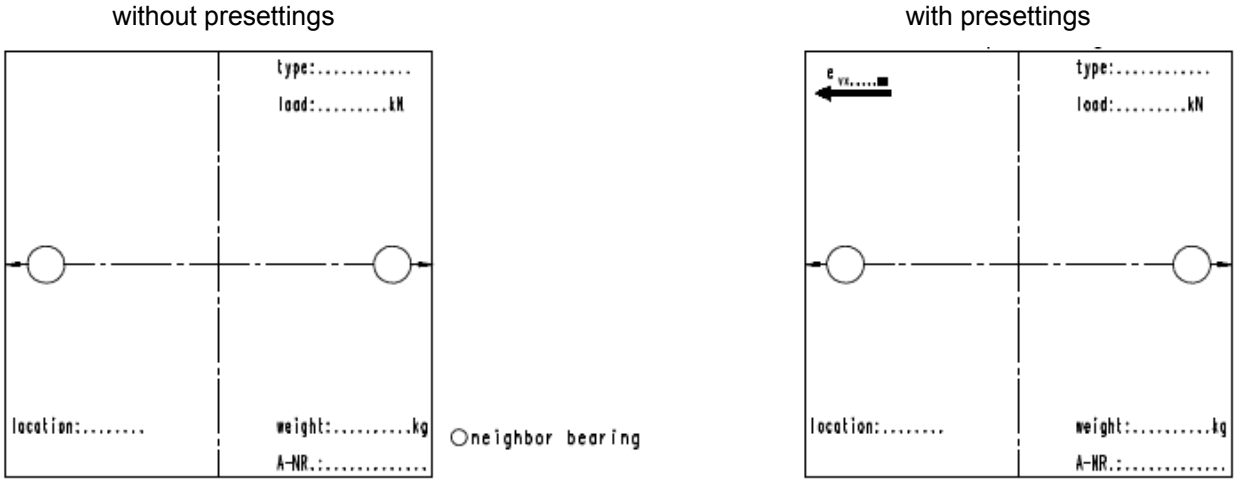



**Fig. 4: Top side labelling of bearings**

The following specifications are listed:

- Abbreviation together with the maximal load $N_d$ in kN
- Arrow in presetting direction with the specification of the dimension of presetting $e_{vx}$ in mm (marked red)
- Contract Nr. and drawing page number
- Installation location and bearing weight in kgs
- The markings in circles point to arrow directions of neighbouring bearings.

On each bearing also the x-axis (normally parallel to the bridge axis) and the y-axis (normally transverse to the bridge axis) are plotted and marked through colour edged centre punches on the bearing upper plate and on the front and long sides of upper and lower bearing parts. The red mark marks the centre of the backing plate. The distance from the red marks to the y-axis is equal to the dimension of the pre-setting.

## 4 Type plate

The bearings labelled on the Type plate contain the most important data:

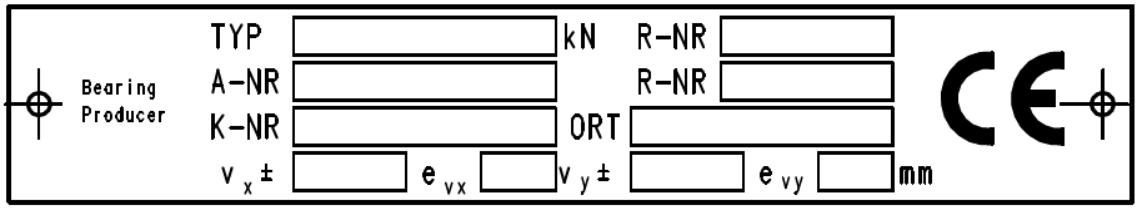


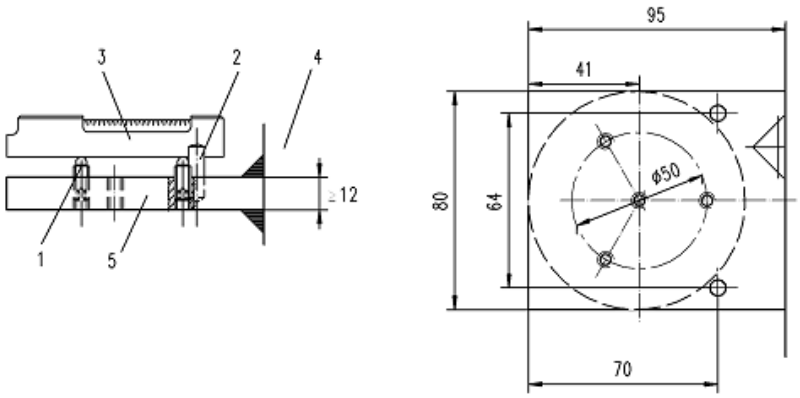

**Fig. 5: Type plate example**
(See also ZTV-ING 8-3, Appedix B and technical approval of the DIBt for bearing accessories, Appendix 7)

At the production plant following contents are written in free fields:

- TYP : Abbreviation according to EN 1337-1- manufacturer's type designation
- A-NR : Order Nr. and year of production
- K-NR : Control card Nr. / Bearing Nr.
- R-NR : Approval No. or Standard (e.g. EN 1337-3)
- ORT : Installation location
- $v_x$ or $v_y$ : Design displacement in x- and/or y-direction
- $e_{vx}$ or $e_{vy}$ : Presetting in x- and/or y-direction

## 5 Measuring plane on the bearing

If required by the customer as measuring plane a panel (measurement console) is installed on the bearing´s bottom plate, which is provided with three pins where the 2-axis-spirit-level (system MPA Stuttgart) is to place. On elastomeric bearings the measuring plane can be formed by two adjustable measuring points on the anchor plates or bearing plates, each in the direction of the principal axis.




Whereas:

1 Threaded pin M6x16 in stainless steel with machined sphere
2 Position pin (grooved pin ϕ6x16) according ISO 8741)
3 Disc waterlevel / measurement range: 5 scale divisions = 0.3 %)
4 Bearing
5 Panel for 3-pin measuring plane

**Fig. 6: 3-pin-method**

The measuring plane is being protected by way of a protection cover which will be removed prior to measurement and be placed again after measurement. The printed notes have to be observed!

The 2-axes-water scale (system MPA Stuttgart) must be flush at its front and at its side with the measurement panel.

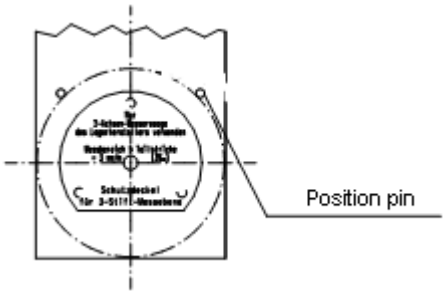



**Fig. 7: Protection cover of the measuring plane**

Alternatively the measuring plane can be fixed to the backing plate, to the base plate or to the lower anchor plate.

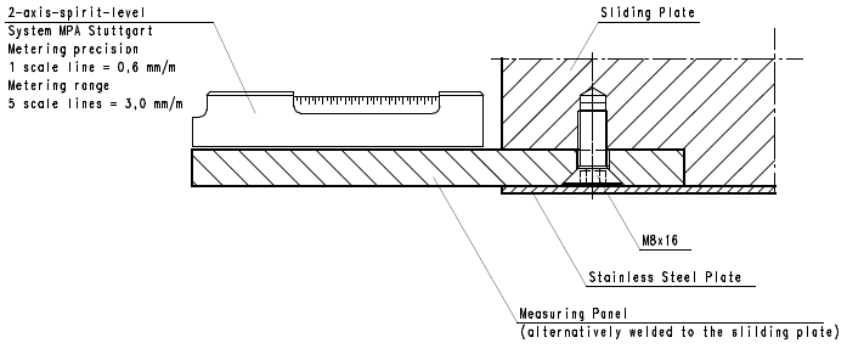



**Fig. 8: Integrated measuring plane in backing plate**

The measurement plane deviation to the horizontal sliding surface may normally not be larger than 0.1% (to be controlled by measurement at the reference surface on the top of the backing plate). In case there is suspicion of damages of the measurement plane caused by shipment, the bearing manufacturer has to be contacted immediately.

## 6 Measuring points on the bearing

Exceptionally important parameters for controlling or estimating the functionality of the bearing are the sliding and tilting clearances. The position of the measuring points is therefore marked as follows:

- Protrusion: Notch and/or colour mark at the edge of the spherical cap or pot piston or at the edge of the PTFE-backing plate
- Tilting gap: red points on the front ends of the bottom plate of the spherical bearing or colour marks at pot piston edge

Further specifications can, if required, be found in setup drawings Lag 2 to Lag 5 and Lag 7.

Protrusion and Tilting gap:

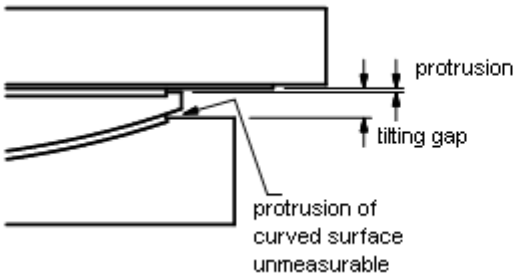



**Fig. 9: Spherical bearing**

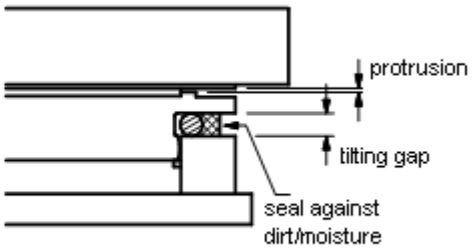



**Fig. 10: Pot bearing**

On elastomeric bearings with sliding elements only the sliding clearance has to be measured. There is no tilt gap measuring (due to elastomeric bearing!)

## 7 Presettings

The bearing presettings have to be executed at the production plant according to the prescribed values for the given temperature range at build in (exceptionally for the respective build in temperature). Thereby the upper bearing plate (backing plate) is displaced against the bearing base. The direction of this displacement out of the central position is marked with a red arrow at the top side of the bearing (see Figure 4). On the bearing plan the direction of presetting is evident from the support system.

A correction of the presetting is necessary only in rare exceptional cases due to the fact that all bearings are normally presetted for the temperature range $\pm$ 10° C.
Modifications of presettings are allowed in special cases only and according to the bearing displacement plan and may be carried out only by the appointed specialist of the bearing manufacturer. The responsible engineer of the building project should release the change of the presetting.

## 8 Bearings with anchor plates

Although the contact surfaces of backing and anchor plates in the bearings are mechanically treated, the possibility of bulging exists when screwing down the pre-stressed screws especially in the middle field of the anchor plates. If the bulges are larger than the permitted flatness tolerance, the bearings should not be delivered and installed with full tightened screws. In such a case the tightening has to be done after the concrete superstructure or mortar joint have hardened. Such bearings shall be provided with a label with following notice:

**ATTENTION! After unleashing of construction PRE-STRESS these screws with the specified TURNING MOMENT according to the bearing plan.**

## 9 Installation of bearings

For proper installation the construction firm has to have the following tools or devices to be available:

- for horizontal adjustment:

  2-Axis-spirit-level ∅ 80 mm, (Slice-bubble-level) — Metering precision: 1 scale line = 0,6 mm/m; Metering range: 5 scale lines = 3 mm/m

- For tilting gap and protrusion measurement:

  1 mirror, illuminated, on a flexible holder;
  1 kit of telescope jigs 8-12, 7 mm, 12, 7-19 mm, 19-32 mm
  1 kit of sensor jigs (Spy) from 0,1 to 2 mm, each at least 300 mm long
  1 slide rule up to 150 mm
  1 precision measuring tape 2 m long
  1 torch.

- For under pouring:

  large plastic funnel for the connecting hose ∅ ≥ 30 mm;
  smooth transparent plastic hose, ∅ ≥ 30 mm;
  forced mixer with trough;
  measuring cup with 1 l capacity;
  2 to 3 small plastic buckets;
  Formwork (wooden frame with three-edge batten as upper mount end) with sealing against the fundament and mounting possibility;
  Combination wrench for set-screws, M 12 (SW 19), M 16 (SW 24);
  Pads for set-screws (from sheet steel)
  Hexagonal wrench with transverse holder M 6 (SW 10) and M 8 (SW 13) for the pointers of the bearing position indicator;
  PE-Foil and adhesive tape for prevention of dirt during under pouring;
  A crower and appropriate support for bearing trimming on graticule with a small jet angle assistance.
  1 - 2 metallic chain strings, chain links: Length/width/∅ 30/10/3 mm
  And minimum 2 aluminium- or steel bands (for case wrapping), each of 2 m length with transverse profile of 25 mm x 1, 5 - 3 mm for bleeding the mortar joint.

- For understaffing:

  Staffing irons and 2 insertion plates.

For repairing of the anticorrosion protection appropriate coating materials and utensils have to be at hand.

The bearings have to be mounted according to all points of the bearing installation drawings (dimensions, heights, inclination, side and front position, material quality of mortar joints, presetting). They have to be mounted exactly to the planed position and direction as on the ground plan and to the height and inclination as on the sheer plan. Therefore they have to be put onto set-screws and repositioned until the punch marks on the bearing (x- and y-axis) correspond to the marks on bearing bases concreted in advance. If there is no bearing base then the bearing is put on three set-screw bases (see figure 12). In such a case a steel wire cross shall be stretched across each bearing on site to position the bearing as planned. Normally the bearings are mounted horizontally i.e. the measured deviation of the horizontal in x- axis and y-axes, as measured on the measuring level at the bearing, shall not exceed 0,3 %, for elastomeric bearings 0,5% (possible declination error according to Chapter 5, last part of this guideline, included). The x-axis mark on the upper bearing plate has to correspond with the movement direction from the bearing installation drawing. Further, the presetting direction (red arrow on the upper bearing plate) has to be checked.
**Exception:** At transverse movable bearings (normally without presetting) the y-Axis is the direction of movement.

## 10 Mortar joints and contact surfaces

The DIN EN 1337-11, part 6, ZTV-ING 8-3, part 2.4 as well as the technical approval for bearing accessories of the DIBt, part 4 shall be considered.

The unreinforced mortar joint has to be between 2 and 5 cm or for special mortar according to the manufacturer´s information thick and designed to transmit the vertical and horizontal design loads. Mortar joints with a thickness of > 5cm have to be reinforced according to the statics. Therefore:

- The stability of mortar has to be verified by a suitability test according to the relevant provisions (Cast concrete or –mortar according to guideline of the DAfStb, low-shrinking mortar class SKVM III, early-strength-class B, Attest of an approved material testing institution needed).
- The contact surface of the cement bounded mortar (Process it according to manufacturer's instructions) has to be saturated with water at least 24 hours before concreting, so no water is sucked out of the thin layer of the mortar joint at setting by the bearing base.
- Just before concreting the remained water has to be removed.

When using reaction resin mortar (i.e. in case of bearing replacement with mortar joints of ca. 2,5 cm or mounting at temperatures below + 5°C) you normally have to pre-dry the contact surface. Please follow the instruction of mortar producers. The reaction resin mortars or injection materials further have to be durable in regard to resistance and deformation. Avoid direct contact of reaction resin mortar to elastomeric bearings; because an unintended sliding at this joint could occur.

For mortar material the following can be regarded as general:
Follow the mortar producer's instruction on the packaging. Check the material at delivery (Age, packing, etc.). Never exceed the prescribed amount of water with concrete mortars.

Applies to all bearings: all contact surfaces have to be free of grease and oil (castings oil) otherwise their friction joint is questionable. Further bearings have to be free of particles, which could influence their functioning and possible dirt (i.e. splashes of concrete) has to be removed at once.
Mortar joints with thickness > 5 cm have to be dimensioned according to DIN technical report 102, chapter 4.3.1 or DIN 1045-1, chapter 10.2.

## 10.1 Making of mortar joints

Mortar joints between the base and the bearing according to EN 1337, part 11, para. 6.2 are made as follows:
The bearings have to be put on set-screws and brought to the planned position i.e. the bearings have to be put on the planned height and be levelled horizontally with the 2-axis- spirit level set on the measuring level.
ATTENTION! Verify the moving direction, position and pre-adjustment according to plan once again!

**According to the coordination with the contractor the bearings can be**

**a) under poured with mortar:**
On bearings with anchor elements the mortar joint is under poured with a high quality and a sufficient mortar flow (i.e. Pagel-Mortar V 1), after the lower bearing base has been finished to the planned upper edge. In doing so, the mortar is poured into the formwork through the transparent plastic hose attached to a funnel. Pay special attention to sufficient de-aeration. For this, metal chains are inserted parallel in a distance of 15 – 20 cm and pulled to and fro. Besides that diagonal poking with steel bands (Transverse profile of 25 mm x 1,5-3 mm) into the joint is necessary so the air can escape. When the joint is full (app. 1 cm over the lower edge of the bearing), the chains and bands are removed again.

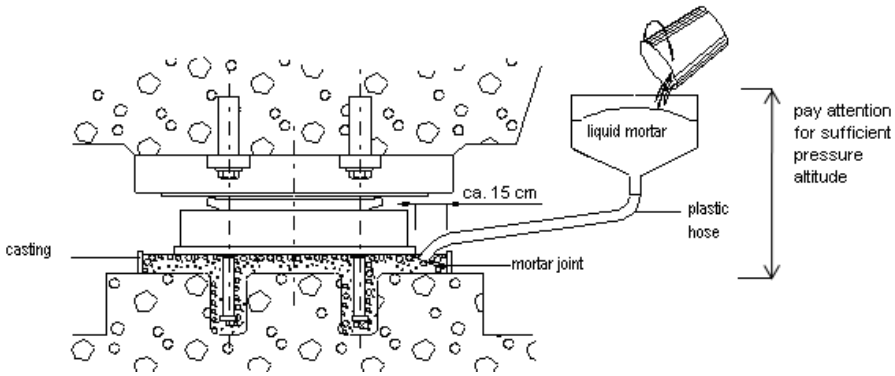



**Fig. 11: Under pouring of the bearing joint**

**b) tamped with concrete:**
If the bearing plates are going to be tamped, Pagel-Mortar V 14 or reaction resin mortar (i.e. MC-DUR 3500 A) of plastic consistency can be used. Primarily at warm weather a partial portion preparation of the material is advisable. First of all, the bearings have to be put on set-screws and brought to the planned position. With higher gaps the tamping is made against a wooden batten keyed under the bearing in the middle at long side, whereby the mortar is stamped in with a stamping iron (handle with front transverse plate). When the first half is tamped, remove the wooden batten and tamp the other side.

It is possible to work without the wooden batten with two opposite man and tamping irons. The mortar is tamped from one side to the middle and at that the inserted tamping iron from other side provides the needed support. This is repeated until the material itself is resistant enough to tamp the remaining joint. These works should only be performed by special skilled personal.

The joint can be also filled from one side when there is a three side casting.

The joint has to be complete without any air bubbles in the mortar joint at any rate.

After hardening of the mortar joint the set screws have to be unscrewed and accordingly relieved.

## 10.2 Connection to concrete superstructure

In most cases the superstructure is concreted directly on the bearing. The formwork has to be put as near as possible to the bearing and the rest slot between the formwork and the upper bearing plate has to be sealed, so no cement slurry runs down the front sides of the bearing. It is not allowed to put a foil in-between. It have to be made arrangements for avoiding the dislocations of the bearing for example due to temperature expansion of the form.

If formwork is necessary, it is contractors own responsibility and work, whereby attention has to be paid to scheduled dismantling of assembly devices. As soon as the bearing is fixed and the concrete or mortar has hardened (after approx. 8 hours), the colour marked (red or yellow) screws have to be removed before the pretension. Already by the casting work, the opportunity for removing these screws has to be provided.

Mainly with pot sliding bearings and elastomeric sliding bearings there is a possibility to replace the screws or thread rods on the cutwater or abutment with plastic screwing elements (from Polyamide). By all means, attention has to be paid to directions on the bearing drawings! Then there is no need for the screw removing opportunity before striking.

## 10.3 Connection to a steel superstructure

The surfaces of the adjacent structural members have to comply to the following requirements:
According to the General Approval, the tolerance in smoothness of sliding bearings amounts to 0.0003 x $D_{LP}$ (= diagonal of the bearing plate that is to be connected), and in case of elastomeric bearings it is 0.003 x $D_{LP} \leq 1$ mm (DIN EN 1337-11, General Approval for bearing accessories of the German Institute of Civil Engineering, DIBt).
Existing slopes have usually to be balanced in a way that the bearings have to be installed horizontally, that is, the measured deviation from the horizontal plane in direction to the x and y axis, which is to be checked at the bearing at its measurement plane by means of a 2-axes-water level may in case of sliding bearings after their installation not be larger than 3 ‰ (in case of elastomeric bearings ≤ 5 ‰).

Should in exceptional cases these conditions be met, the bridge bearings can be screwed to the superstructure which still is in lifted position, then jointly be lowered into their final position, and finally the lower mortar bed can be created. In case of bridge bearings with lower anchor plates, sufficiently large recess space has to be foreseen in the bearing plinth to accommodate the anchor studs. Prior to creation of the mortar bed the bridge bearings have to be carefully supported by way of adjustable screws, and the fixation bolts have to be loosened (relax the bolts by opening ½ rotation), such that the movements of the superstructure can be accommodated during the curing process. In any case it has to be noted that the individual bearing elements do not detach from each other. After the mortar has reached the required compressive strength, the superstructure can be lowered onto the bridge bearings. Finally, the fixation bolts (auxiliary elements) and the hydraulic jacks will be removed.
In case that the adjacent surfaces of the steel superstructure cannot be produced in the required tolerance (which especially applies to sliding bearings),after the initial mounting, the superstructure will be lowered into their final position while resting on auxiliary supports or hydraulic jacks, and then will receive their final support together with the bridge bearings. Principally, 2 cases can be discerned:

**Bridge bearings that can accommodate horizontal forces by way of friction and thus do not need any extra anchorage:**

The spacing between the upper edge of the plinth of the bridge bearing and the lower edge of the superstructure has to be designed in a way that both above the bearings and below a mortar bed of about 2-5 cm can be established. We recommend implementation according to the directions under item 10.1b of this guideline to fill with mortar in plastic consistency (e.g., Pagel V14/40 or equivalent).

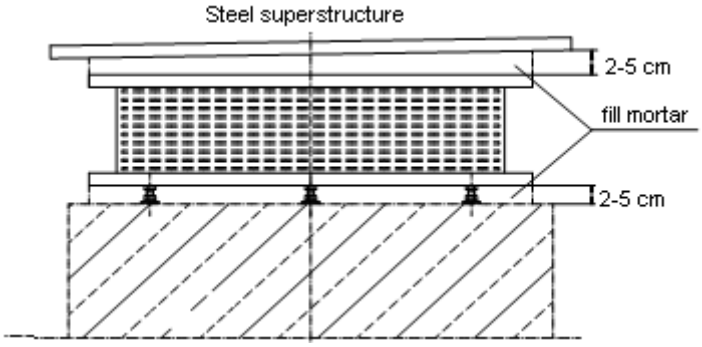



**Fig. 12: Bearing without anchor**

**Bridge bearings that cannot accommodate the horizontal forces by way of friction and thus require extra anchorage**

a) Bolted connection to the superstructure

The clearance between the upper edge of the bearing plinth and the lower edge of the superstructure has to be designed in a way that under the bridge bearing a mortar bed of a height of 2-5 cm and above the bearings a wedge shaped shim plate of an average thickness of at least 18 mm can be implemented. This process can be described as follows:

The substructure is being lowered on auxiliary supports/hydraulic jacks in final position, and in the bearing plinth suitably large recesses are foreseen for the anchor studs. The bridge bearing will be installed as follows:

- The lower anchor plate will be separated from the bearing and will be placed on the bearing plinth such that the anchor studs fit into the recesses designed for them.
- The bridge bearing is being shifted in its final position, the bolted connections with the lower anchor plate are being reincorporated, and this unit then is being lowered on adjustable screws. The bolted connections of the anchor plate shall not have contact with the bearing plinth.
- On the wedge shaped shim plate which is being manufactured by on-site measurement a special smoothing cement (e.g. DIAMANT Multimetall Steel 1018 or equivalent) is being placed in a roof shaped way in order to balance any imperfections, and such that the material distributes without bubbles when compressed.
- The shim plate is being inserted on top of the upper bearing plate such that the bore holes of bearing plate and shim plate are on top of each other.
- With the help of the bolted connections between bearings and superstructure the bridge bearing together with the placed shim plate will be pressed against the superstructure and simultaneously be leveled horizontally at the measurement location by way of a water level.
- The bridge bearing has to be cleaned from the smoothing cement that was squeezed out

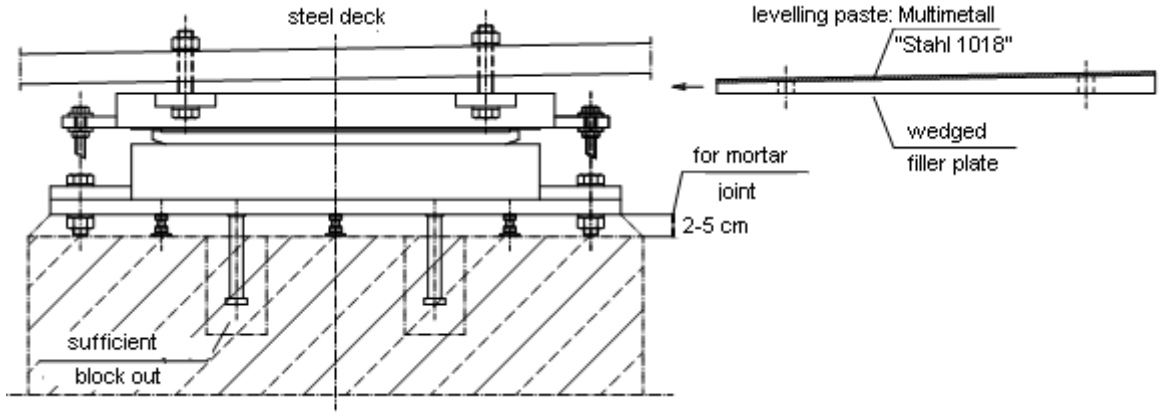



**Fig. 13: Bridge bearing with anchorage**

Finally, the lower mortar bed will be implemented, while considering sections 10.1a and 10.3 paragraph 2 of this guideline.

b) Connection to the superstructure by way of a mortar bed and a welded steel frame

The clearance between the upper edge of the bearing plinth and the lower edge of the superstructure has to be designed in a way that both above and below the bridge bearings a mortar bed of a height of each 2-5 cm can be implemented. The process will be described as follows:

The substructure is being lowered on auxiliary supports/hydraulic jacks in final position, and in the bearing plinth suitably large recesses are foreseen for the anchor studs. The bridge bearing will be installed as follows:

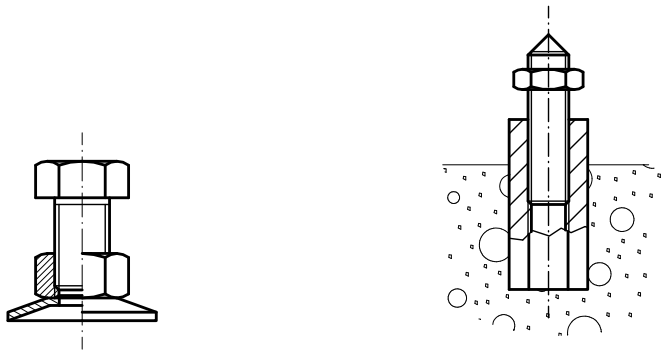
- On site a steel frame has to be welded to the superstructure. The size of this frame has to be dimensioned such that the upper bearing plate fits into this frame with a clearance of at least 10 mm.
- The bridge bearing is being inserted as described under a) and will be fixed in height by way of adjustable screws such that the upper bearing plate by design reaches into the frame (at least 10 mm).
- The clearance between upper bearing plate and steel frame will be subject to horizontal formwork.
- By way of filling holes and vent holes which are located at the superstructure the upper mortar bed will be implemented (e.g., with Pagel V1 or equivalent)
- Other solutions like the injection of cleavage filling material also is possible

## 11 Concreting load

When using wide projecting sliding plates they have to be secured against twist due to concreting load of fresh concrete or vibration to provide the overturn of the whole bearing. The contractor has to support the sliding plates on their ends whereby this support can be mounted under the mounting links on bearings without anchor plates and under the screw fillet on bearings with anchor plates (see figure 1). The overturn protection can be made as screwed construction only. Wooden support is not allowed.

## 12 Release of bearings

As soon as the upper structure concrete or the mortar of mortar joints hardens, i.e. when the bearing is fixed mounted and before the pre-stressing, loose the colour marked screws of the assembly device and close the holes with provided stoppers. Plastic screwing elements remind in place. If fixed set screws are integrated in the bearing it has to be examined again if they are screwed up and therefore relieved. If the bearings were mounted with loose screws with conical spring washers or set-screw racks then they remain in the structure.



a) b)

**Fig. 14: a) adjusting screw with conical spring washers**
**b) adjusting screw with turned top in drilled- in or a concrete setted elongate nut**

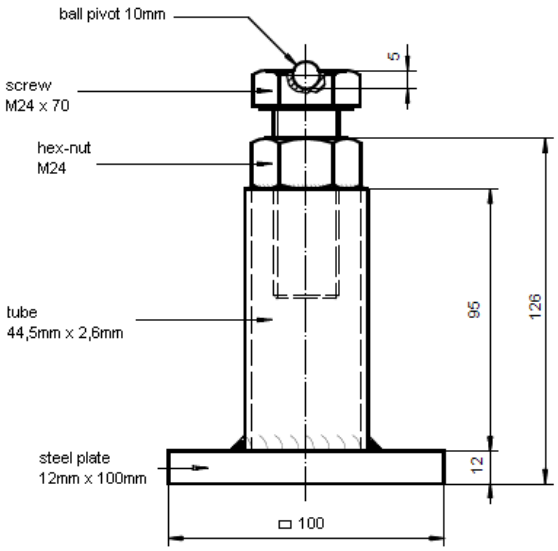



**Fig. 15: support for adjusting screw**

### 12.1 Start of bearing operation

After the formwork is removed, clean the bearings and repair eventually damaged anticorrosion protection. Specifications therefore are in ZTV-ING part 4.3 and have to be discussed with the manufacturer. Because bridge bearings get damaged easily, such work has to be executed carefully (no pressed air etc.). Working with fire, flammable goods or chemicals near the bridge bearings is not allowed.

### 12.2 Bearing installation report

The check up at arrival, the mounting, the start of operation and the initial measurement have to be written down in a protocol (see Attachment 1).

The bearing installation report for the first mounting is made by the site engineer. When mounting the first of bearings of specific type the bearing's producer specialist fills in the data into the column "Installation" of the protocol and confirms the instruction by his signature and date in the column "Notes".

### 12.3 Initial measurement

The consignee has to initiate the initial measurement. Therefore he can freely authorise a producer's specialist or a foreign institution. The client executes such a measurement during the general inspection according to DIN 1076. Thereby the horizontal position at the bearing's measuring level, the slide and tilt slots on marked measuring points and the displacement in appendance on approximate temperature of the structure are measured. The consignee has to provide for all the necessary instruments, tools and support and also for scaffolding if needed.

## 13. Literature

[1] General Technical Approval for bearing accessories
[2] ZTV-ING:2010, chapter 8.3
[3] DIN EN 1337-11:1998 “Structural bearings – Transportation, storage and installation
[4] Guideline 804:2003, Module 5101
[5] VHFL-Guideline 1:2010
[6 DIN EN 1337-8:2006 Structural bearings – Guide bearings and restraint bearings
[7] DIN EN 1337-1:2001 Structural bearings – General design rules

*(Space for notes)*

**Attachment 1**

## Bearing installation report

Although this bearing installation report comprises all items generally deemed indispensable for such a record, it does not claim to be exhaustive in respect of features that may need to be checked and recorded.

### 1 Report front page

The front page should include the following information.

- General information (designation, location, owner etc.)
- Structure type
- Method of construction
- Type of bearing
- Manufacturer/job n°
- Bearing system layout and/or bearing installation drawing n°
- Description of Upper connection
- Description of lower connection
- Type and Brand name of materials used

| | |
|---|---|
| Filled in by: | Approved by: |
| Place | Place |
| Date | Date |
| Name and signature | Name and signature |

### 2 Report subsequent pages

The report should give information about the following aspects

| | | | | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|
| 1 | Installation location (support no./alignment) as per drawing | | | | | | |
| 2 | Prior to installation | Bearing type(abbreviation according to EN 1337-1) / Bearing no. | | | | | |
| 3 | | Vertical load capacity in kilonewton | $N_{Rd}$ | | | | |
| 4 | | Horizontal load capacity in kilonewton<br>in x-direction | $V_x$, Rd ±<br>Vy, Rd ± | | | | |
| 5 | | Displacement capacity in millimetre, + indicating<br>the direction away from the fixed point | Ux ±<br>Uy ± | | | | |
| 6 | | Preset in millimetre | $U_{VX}$<br>$U_{vy}$ | | | | |
| 7 | | Bearing Drawing no. / sheet no. | | | | | |
| 8 | | Date of delivery | | | | | |
| 9 | | Correctly off loaded, properly supported and covered (Y/N/N.A.) | | | | | |
| 10 | | Proper marking on upper face of bearing (Y/N/N.A.) | | | | | |
| | | | | | | | |
| 12 | | Proper labelling of bearing (Y/N/N.A.) | | | | | |
| 13 | | 3-pin measuring plane on lower face of bearing | | | | | |
| 14 | | Proper protection against corrosion (Y/N/N.A.) | | | | | |
| 15 | | Correct temporary clamping devices (Y/N/N.A.) | | | | | |
| 16 | Installation | Proper installation location as per line 1 (Y/N/N.A.) | | | | | |
| 18 | | Cleanness of mortar contact surface (Y/N/N.A.) | | | | | |
| 19 | | Amount of present in millimetre, proper position and orientation, any adjustment of preset (Y/N/N.A.) | | | | | |
| 20 | | Deviation from the horizontal, in millimetre per metre, (longitudinal / transverse) | | | | | |
| 21 | | Application of mortar | Date | | | | |
| | | time | (from ... to ...) | | | | |
| 22 | | Shade air temperature/strucutral temperature, in degrees Celsius | | | | | |
| 23 | | Thickness of mortar joints in millimetre | upper | | | | |
| | | | lower | | | | |
| 24 | Start of function | Initial loading of the bearing<br>Date / time | | | | | |
| 25 | | Temporary clamping devices released / removed (Y/N/N.A.) | | | | | |
| 26 | | Protection of sliding surfaces in place (Y/N/N.A.) | | | | | |
| 27 | | Cleanliness, condition of support (Y/N/N.A.) | | | | | |
| | | Proper protection against corrosion (Y/N/N.A.) | | | | | |
| 28 | Initial measurements | Date / Time of initial measurements | | | | | |
| 29 | | Shade air temperature/strucutral temperature, in degrees Celsius | | | | | |
| 30 | | Deviation from the horizontal, in millimetre per metre, (longitudinal / transverse) | | | | | |
| 31 | | Displacement in millimetre, proper orientation (Y/N/N.A.) | UX/UY | | | | |
| 32 | | Protusion h in millimetres | max/min | | | | |
| | | Guide clearance in millimet | max. horizontal and vertical | | | | |
| 33 | | Tilting clearance in millimetre | max / min | | | | |
| 34 | Remarks or other information, e.g. with regard to erection procedures, temporary alterations of fixed points, displacement indicator, 3-pin measuring plane, anchorage, etc. | | | | | | |

**NOTE:** Bearing should not be adjusted by means of the levelling screws.