

Structural bearings

Part 11. Transport, storage and installation

The European Standard EN 1337-11 : 1997 has the status of a British Standard

ICS 91.010.30

National foreword

This British Standard is the English language version of EN 1337-11 : 1998 published by the European Committee for Standardization (CEN).

The UK participation in its preparation was entrusted to Technical Committee B/522, Structural bearings, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled 'International Standards Correspondence Index', or by using the 'Find' facility of the BSI Standards Electronic Catalogue.

Additional information

Contrary to the advice given in paragraph 4 of the European foreword, this Part will come into effect before Parts 1 and 2.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 1 to 11, and a back cover.

Amendments issued since publication

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English version

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Appareils d'appui structuraux — Partie 11:
Transport, entreposage intermédiaire, et montage

Lager in Bauwesen — Teil 11: Transport,
Zwischenlagerung und Einbau

This European Standard was approved by CEN on 24 October 1997.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

This European Standard has been prepared by Working Group 1 of Technical Committee CEN/TC 167, Structural bearings, the secretariat of which is held by UNI.

This European Standard EN 1337 *Structural bearings* consists of the following 11 Parts:

Part 1: *General design rules*

Part 2: *Sliding elements*

Part 3: *Elastomeric bearings*

Part 4: *Roller bearings*

Part 5: *Pot bearings*

Part 6: *Rocker bearings*

Part 7: *Spherical and cylindrical PTFE bearings*

Part 8: *Guided bearings and restrained bearings*

Part 9: *Protection*

Part 10: *Inspection and maintenance*

Part 11: *Transport, storage and installation*

This Part 11: *Transport, storage and installation* includes annex A (informative) and annex B (informative).

Further to CEN/TC 167's decision, Part 1 and Part 2 form a package of standards and they come into force together, while the other Parts come into force separately after the publication of Part 1 and Part 2.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 1998, and conflicting national standards shall be withdrawn at the latest by May 1998.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This standard is applicable to the transport, storage and installation of bearings used in the construction of bridges or of structures requiring comparable bearing systems.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ENV 206	<i>Concrete – Performance, production, placing and compliance criteria</i>
prEN 1337-1:1993	<i>Structural bearings – Part 1: General design rules</i>
prEN 1337-2	<i>Structural bearings – Part 2: Sliding elements</i>
EN 1337-9	<i>Structural bearings – Part 9: Protection</i>
prEN 1337-3	<i>Structural bearings – Part 3: Elastomeric bearings</i>

3 General requirements

Packaging of bearings shall be such that damages during transport will not occur.

Handling and installation of bearings shall only be carried out by qualified personnel whose knowledge and qualifications shall be proved.

Bearings shall be handled with care and protected from damage and contamination. If unsuitable for lifting by hand, permanent or temporary attachments shall be provided to facilitate handling by mechanical means.

The bearing installation drawing, specified in clause 4 of this standard, shall be available on site.

Unloading of bearings from transport shall be done by means of cranes and elevators which carry the bearings by the lifting devices provided (elements with loops). Chain blocks with hooks shall be used when lifting bearings by crane or pulley (bridges constructed by incremental launching).

If bearings are not installed in the structure immediately after delivery they shall be stored by the user on an appropriate substrate, e.g. on planks, being provided with a protective cover and ventilated from underneath. The interim storage shall be such that the bearings will not be polluted or damaged by exposure to weather (heat, rain, snow or hail) nor by contaminants or other deleterious effects such as ongoing work on site or traffic on site.

4 Bearing installation drawing

A bearing installation drawing showing all the data required for the installation (such as dimensions, levels, inclinations, lateral and longitudinal position, tolerances, qualities of the construction material in the bearing joint, pre-setting of the bearing as a function of temperature of the structure) shall be prepared.

The bearing installation drawing may be combined with the drawing of the bearing system to form a single design document.

5 Inspection after delivery

At site, prior to installation, the condition of the bearings shall be inspected and reported. Special attention shall be given to the following points:

- visible damage, particularly to the corrosion protection (see EN 1337-9). The nature and extent of any damage shall be indicated together with details of any permissible remedial action on the bearing installation drawing;
- cleanliness;
- security of the temporary clamping devices;
- conformance to the installation and working drawings if this has not already been established by way of quality control or acceptance inspection;
- marking on the top surface of the bearing and on the type plate as well as marking of x- and y-axis and, if necessary, of presetting on the faces of upper and bottom part of the bearing, in addition identification of measuring points at rotating gap and eventually sliding gap;
- position of all means used to ensure the exact positioning and installation of the bearings, where specified;
- indicating device required for movable bearings in main direction of movement, where required;
- the magnitude and direction of presetting, if specified;
- possibility of readjustment, if provided;
- temporary storage on site (see clause 3).

6 Installation

6.1 General

Alterations shall only be made to the as-delivered condition of the bearings where specific instructions to do so are given on the installation drawing. Any alterations shall only be carried out by suitably qualified persons in accordance with paragraph 2 of clause 3.

If required, the first bearing of a given type (as agreed between the parties involved) shall be installed in the presence of a qualified agent of the manufacturer.

Bearings shall be installed in accordance with the installation drawing in all respects in accordance with the marking on the top surface of the bearing.

The approximate temperature prevailing in the structure and, in special cases, the variations in temperature at different points in the structure, shall be established and used when necessary to determine any presetting (see annex A).

The same considerations apply to temporary changes in the setting or fixing of the bearings.

The setting of the bearings shall be checked after they have become operative.

6.2 Placing of bearings

Generally bearings shall be installed on an intermediate bed of mortar which serves as a levelling course. Only elastomeric bearings without outer steel plates may be placed directly on the supporting surface which shall be clean, dry, smooth and level within the tolerances given prEN 1337-3.

Where specified, levelling screws shall be used to adjust the position of the bearing.

As an alternative, wedges or other suitable devices may be used.

Under no circumstances are 'rigid' areas permitted to be produced underneath the bearing. This can be avoided by removing the temporary supports as soon as the mortar has achieved its required resistance.

Alternatively a temporary support consisting of compressive material may be used. Account must be taken in this case of the fact that, due to its incompressibility, elastomeric material will not be suitable for this purpose if it cannot expand laterally.

The bearing may:

- a) be placed on a cambered bed of stiffly plastic mortar in such a way that excess mortar can be squeezed out on all sides; or
- b) be bedded by pouring or grouting, using free flowing mortar; care shall be taken for an appropriate ventilation. Bearings with headed studs shall generally be installed using pouring or grouting technics; or
- c) be bedded such that mortar can be packed underneath. This method is only recommended for use where the smaller side length is less than 500 mm.

The mortar shall be low shrinkage.

If other materials are used their suitability shall be proved.

Irrespective of the method used, the bearing shall be supported over its whole area.

6.3 Mounting of superstructure or structural component on the bearing

Structural components of in-situ concrete are generally formed directly on the bearing subsequent to its installation. The surface of the bearing and the structural component shall be in direct contact and have no separating layer. Care shall be taken to keep the bearing clean, to avoid damage by wet concrete and to ensure that it can be replaced without difficulty.

In the case of precast concrete or steel members, appropriate measures shall be taken to ensure their uniform contact with the bearing.

Attachment by welding shall only be permitted in exceptional cases. Any such welding shall only be carried out by suitably qualified persons in accordance with clause 3. Measures shall be taken to prevent damage by heat to sensitive items such as plastic parts.

The corrosion protection system shall be reinstated after welding, where necessary.

6.4 Height correction

Should height correction prove necessary, it shall be effected by grouting or packing with fine-grained mortar or similar materials.

Height correction with the aid of additional metal plates is only permitted if metal to metal surfaces are machined and if it can be ensured they remain flat until their installation is completed. Consideration shall also be given to the corrosion protection required for the plates.

Height correction shall only be carried out by suitably qualified persons in accordance with clause 3.

6.5 Installation tolerances

If any installation tolerances as given in other Parts of this European standard are exceeded the structural implications of the error shall be calculated and appropriate action agreed upon.

6.6 Mortar joints¹⁾ The thickness of non-reinforced mortar joints between the bearing and the plinth shall not exceed

50 mm or

$$0,1 \times \frac{\text{surface contact area}}{\text{perimeter of contact area}} + 15 \text{ mm, in millimetres}$$

whichever is smaller.

Furthermore, the thickness shall not be less than three times the maximum aggregate size.

¹⁾ Including resin mortar.

The suitability of the mortar used and the method of placing shall be verified by testing in accordance with the relevant specifications.

In the case of cement mortar or cement grout the plinth concrete surface shall be saturated with water prior to installation in order to prevent dehydration. Immediately before the mortar is poured any water remaining on the surface shall be blown out.

When resin mortar is employed the chemical properties of the resin and the resin/filler ratio shall be such as to give a satisfactory consistency and setting time to ensure the correct installation under site conditions. Durability in terms of strength, final hardening and shape shall be considered.

If resin mortar is to be in direct contact with the bearing the chemical compatibility and friction coefficient shall be verified by test unless prior satisfactory use in similar conditions can be demonstrated.

Installation aids shall be designed to facilitate the installation and ensure the correct design setting of the bearings or structural components.

6.7 Formwork for mortar joints

Formwork shall not be removed until the mortar has hardened sufficiently, but must be removed completely by the time the bearing is fully operative. Removal by burning off is not permitted.

6.8 Release of structure onto bearings

The release of the structure onto the bearings shall take place in accordance with the construction drawings. Any adjusting screws shall remain operative until the mortar of any intermediate layer(s) has hardened sufficiently. Subsequently all hard packs and setting devices shall be removed before the bearing becomes fully operative, unless the levelling screws are designed such that they become inoperative when the final load is applied.

7 Records

7.1 General

Records shall be made of the inspections carried out in accordance with clauses 5 and 6, and 7.2 to 7.5, as well as of the results of such inspections (see specimen form annex B).

The records may be omitted except in case of explicit dispensation by the client in the following case:

- elastomeric bearings utilized for structures consisting of single-span girders with spans not exceeding 25 m or for other structures of not more than 25 m between any fixed point and the bearing furthest away from that point.

7.2 Prior to installation

A record shall be made of all results of the inspection specified in clause 5.

7.3 Installation

If not agreed otherwise, a record shall be made of:

- a) date and time of installation;
- b) temperature of structure, as specified in 6.1;
- c) setting of bearing;
- d) position of bearing relative to superstructure/substructure and to the axes;
- e) condition of bearing, including its protection system against corrosion;
- f) any adjustment made to the setting;
- g) state of temporary clamping devices;
- h) condition of the support and bearing base;
- i) proof of suitability of the joint mortar according to 6.6 in accordance with ENV 206.

7.4 Start of function (release)

The date and time of the release of structure onto the bearing shall be noted and it shall be confirmed that the screws of any temporary clamping device have been loosened or removed.

It shall be noted whether the bearing is in its design position once the mortar of the joints has hardened and any temporary clamping devices have been removed and whether the values of rotating and sliding gap are correct.

7.5 Temporary fixed points

If movable bearings are initially installed as fixed bearings, further measurements as specified in 7.3 shall be made and recorded after the fixing devices have been removed. (Only for large bridges for which an alteration of fixed points is necessary.)

8 Final finish

The bearings shall not be obstructed in its function by any work which may still need to be carried out in connection with protection against corrosion.

Examples of this include grit blasting of exposed sliding surfaces and clogging of moving parts with excess paint.

9 Attestation of conformity

NOTE. This is not a product standard and so there are no provisions of attestation of conformity.

Annex A (informative)**Explanatory remarks****A.1 Explanatory remarks on clause 3**

Where prefabricated members (steel, concrete, timber etc.) rest on the bearing, care should be taken to ensure that a good fit with no gaps exists between the bearing and the prefabricated member. The mortar joint should normally be formed after the member and bearing have been laid and levelled.

It may be necessary to carry out a check with the aid of gauge points marked on the base of the bearing. The gauge points should be provided as datum references for checking the direction of placing and parallelism of the bearing planes.

If used, installation aids should be capable of bearing the structural component to be supported for as long as is necessary until the bearing has become fully operative. This means that the installation aids should be capable of holding the bearing or the structural components in their design position during the various stages of construction (placing the concrete, stripping the formwork, mounting, etc.) and of preventing any skewing or eccentricity.

When the installation aids are removed, any sudden transference of load onto the installed bearing should be prevented. Resilient bearings should not be restrained in respect of the free deformation of the side faces after the installation aids have been removed.

A.2 Explanatory remarks on 6.1

The mean temperature of the structure can be determined by measuring the surface temperature at suitably chosen points with the choice of these measurement points depending on the bridge cross-section and the topographic conditions.

The surface temperature can be measured, for example, by means of a digital seconds thermometer with a sensor for surface temperatures or by affixing foil thermo-elements.

If the bridge overspans different topographic conditions (e.g. land or water surfaces), it is recommended that the bridge be divided in its longitudinal direction into different sections with the mean temperature of the structure being measured for each section concerned. That mean temperature for each section can then be used to calculate the movement of each section and hence any necessary bearing adjustment.

The choice of points for temperature measurement and hence the method for estimating the mean temperature is given below for some types of bridge:

Slabs

For slabs the temperature should be measured at the centre of the top and bottom surfaces. The mean of these two values will then be the average temperature of the slab.

T-beams

For T-beam construction the mean temperature of the slab should be taken as the average of the top and bottom surface temperatures at the centre of the deck.

The mean temperature of the beams should be taken as the average of the surface temperatures at the centre of the outer faces of the two outer main girders.

The mean temperature of the whole superstructure should then be estimated by averaging the above two mean temperatures weighted in proportion to the box cross-sectional areas of the respective parts.

Box girders

For box girders the air temperature inside the box may be taken as the mean temperature of the structure. (This is normally correct to within $\pm 1^\circ \text{C}$.)

As bearings are usually adjusted before the deck surfacing is applied, measuring the temperature of the top of the slab is not normally a problem. Where the surfacing has already been applied a suitable method should be derived.

An alternative is given in annex B.2 of prEN 1337-10¹⁾.

¹⁾ This document is in preparation.

Annex B (informative)**Specimen bearing schedule**

Although this specimen bearing schedule 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 (see clause 7).

In lines 1 to 18 the corresponding data of the bearings should be inserted on the basis of the approved plans of the manufacturer of the bearing (lines 1 to 7), the condition of the bearings after their unloading from transport (lines 8 to 15), and the condition of the mortar contact area (line 18).

In lines 19 to 23 the relevant information about presetting and adjustment, as well as mortar and mortar joint must be inserted. Furthermore, in the case of construction using in-situ concrete it is necessary to indicate the air temperature measured by means of an appropriate measuring device in the shade, as well as the concrete temperature measured on the pier head or abutment support.

For bearings for bridges constructed by incremental launching or for replacement bearings for existing structures a similar form should be used.

Structure (designation, location):

Method of construction:

Client:

Contractor:

Type of bearing:

Manufacturer/job no:

When required, third party inspection by:

Bearing system layout and/or bearing installation drawing no.

Type of mortar used and suitability test

Design of mortar joints: lower mortar joint: upper mortar joint:

	0	1	2	3	4
1	Installation location (support no./alignment) as per drawing				
2	Bearing type (abbreviation according to prEN 1337-1)/ Bearing no.				
3	Load F_i in kilonewtons				
4	Horizontal forces F_x/F_y in kilonewtons				
5	Calculated displacement in millimetres, + indicating the direction away from the fixed point	$v_x \pm$			
		$v_y \pm$			
6	Setting in millimetres	e_{vx}			
		e_{vy}			
7	Drawing no. / sheet no.				
8	Date of delivery				
9	Prior to installation	Correctly unloaded, laid on squared timber and covered			
10		Location of marking on upper face of bearing			
11		Indicator provided			
12		Plate indicating type of bearing			
13		3-pin measuring plane on lower face of bearing			
14		Cleanliness and protection against corrosion			
15		Correct and firm seating of temporary clamping devices			
16		Installation location as per line 1			
17		Raising of superstructure Date and time			
18		Cleanliness of mortar contact surfaces			
19		Direction and magnitude of presetting in millimetres, + indicating the direction away from the fixed point			
20		Deviation from the horizontal, in millimetres per metre, determined at the measuring points (longitudinal/transverse)			
21	Installation	Placing of mortar	Date		
			time (from ... to ...)		
22		Air temperature/temperature in structure, in degrees Celsius			
23		Thickness of mortar joints in millimetres	upper		
		(u) = unreinforced, (b) = reinforced	lower		
24		Lowering of superstructure			
		Date/time			
25	Start of function	Temporary clamping devices released/removed			
26		Protection of sliding surfaces in place			
27		Cleanliness and protection against corrosion			

	0		1	2	3	4
28	Initial measurements	Date/time				
29		Air temperature/temperature in structure, in degrees Celsius				
30		Deviation from the horizontal, in millimetres per metre, determined at the measuring points (longitudinal/transverse)				
31		Displacement in millimetres, + indicating the direction away from the fixed point v_x/v_y				
32		Sliding clearance in millimetres max/min				
33		Tilting clearance in millimetres max/min				
34	Remarks or other information, e.g. with regard to erection procedures, temporary alterations of fixed points, etc.					
Remark: Bearings shall only be adjusted by means of the levelling screws.						

Prepared by:

Seen by:

Place

Place

Date

Date

Contractor

Client

Notes on how to complete the specimen bearing schedule**B.1 General**

The bearing schedule, a specimen of which is provided in this European Standard, is intended to provide a formal record of compliance with the provisions of this European Standard. After completion, it or a copy, should be filed and made available to the inspector carrying out the inspections in accordance with prEN 1337-10¹⁾. It should be noted that the layout of the form is not intended for direct copying, as it must be expanded to allow sufficient space for the schedule against each item. It may also be desirable to omit irrelevant items for certain structures and to add others required in special circumstances. The administrative management of the schedule is subject to national regulations.

B.2 Schedule heading*Structure (designation, location)*

The name or reference number of the structure should be given together with either a map reference or a description of its location.

Method of construction

In addition to the material used in the structure, the order in which it was built should be given, as this may assist in explaining unexpected bearing movements in the future.

Client

This is self-explanatory.

Contractor

In addition to the main contractor, all relevant sub-contractors should be listed.

Type of bearing

The general type of bearing covered by the schedule should be given. Item 2 of **B.3** below will give specific information relating to individual bearings.

Manufacturer/job number

The information provided here should be sufficient to enable the time and place of manufacture of the bearing to be ascertained in addition to the identity of the manufacturer. It should be sufficient to trace installation back to the place of manufacture if necessary.

¹⁾ This document is in preparation.

When required, third party inspection

In many cases the services of an independent inspector will be engaged to check the bearing during manufacture or at some other stage before final acceptance. In this case, the name of the inspector should be given together with details of his terms of reference.

Bearing system layout and/or bearing installation drawing number

Under this heading the numbers of all drawings showing details of the layout of the bearings and the required procedures for their installation should be given.

Type of mortar and suitability test

The type of mortar to be used should be recorded together with the results of any tests required under 6.6.

B.3 Guidance for completion of each item on the schedule

Prior to installation

1) Installation location as per drawing:

The required position for the installation of each bearing should be given in such a way that there is no possibility of confusion;

2) Bearing type and no.:

The description of the bearing type and the symbol used should be in accordance with table 1 of prEN 1337-1 : 1993;

3) Load:

This (nominal) value should be subject to agreement;

4) Horizontal forces:

These (nominal) values should be subject to agreement;

5) Calculated displacement:

The calculated displacement should be provided by the designer of the structure;

6) Presetting:

Any presetting provided at the works should be noted here, together with any provisions for modification to this presetting during installation;

7) Drawing number:

The number of the manufacturer's detail drawing should be given and a copy of the drawing should be available;

8) Date of delivery:

Date of delivery to the site;

9) Correctly unloaded, laid on squared timber and covered:

This item is intended to record that the bearing has actually been unloaded without damage and stored in a safe place on site;

10) Location of marking:

This item is intended to record that the bearing has been marked with the information required under 7.3.2 of prEN 1337-1 : 1993 and to record where on the bearing the last two items can be found;

11) Indicator provided:

If an indicator was specified by the owner or the designer of the structure or the bearing, its presence should be recorded;

12) Identification plate indicating type of bearing:

The requirements in respect of the identification plate are specified in 7.3.1 of prEN 1337-1 : 1993;

13) 3-pin measuring plane:

This plane is required for the measurement of rotation (7.5 of prEN 1337-1 : 1993);

14) Cleanness and protection against corrosion:

The bearing should be inspected to ensure that it is clean and that any protection against corrosion is intact;

15) Correct and firm seating of temporary clamping devices:

Where temporary clamping devices are provided by the manufacturer these should be checked to ensure that they are undamaged and holding the bearing firmly as required;

16) Installation location:

This is to confirm that the bearings have been installed at the location given in the plans;

17) Raising the superstructure:

Not normally of relevance for new structures;

18) Cleanness of mortar contact surfaces:

Any surfaces which will be in contact with mortar bedding should be free from any substance liable to interfere with the bond between the bearing and the mortar;

Installation

19) Direction and magnitude of presetting:

If presetting has been specified, the magnitude and direction provided should be recorded;

20) Deviation from the horizontal:

The bearing should be checked after installation to ensure that any deviation from the horizontal is within the specified tolerances, see also item 30;

21) Placing of mortar:

Date and time to be recorded;

22) Air temperature/temperature in structure:

The temperature of the structure when the bearing becomes connected to it should be given. Details of how this was measured or estimated should also be provided;

23) Thickness of mortar joint:

The method of placing the mortar specified above should be given together with the required thickness of the bed (maximum and minimum);

Start of function

24) Date/time:

In some cases the release of the structure onto the bearings will be a definite positive act at a particular time. In most cases however, the structure over the bearing will be built up over a period of time and the whole of the structure will not be complete until just before it is handed over to the owner. In such cases, the 'start of function' inspection will probably be the final inspection before acceptance by the owner. In either case, the 'date/time' refers to the date and time at which the measurements in this section were made;

25) Temporary clamping devices released/removed:

At this inspection the bearing should be checked to ensure that any temporary clamping devices have been released including those meant to be released automatically at the first movement and, if designed to be removed, have been removed. Where temporary restraint to the structure has been provided remote from the bearing, this should also be inspected to ensure that it is no longer restraining the structure and that any parts intended to be removed have been removed, and, where appropriate, the structure has been restored;

26) Protection of sliding surfaces in place:

Applies to sliding bearings, see prEN 1337-2;

27) Cleanliness and protection against corrosion:

At this stage the bearings and their surroundings should be clean and free from construction debris. All corrosion protection should be undamaged or satisfactorily repaired. This should be checked;

28 to 33) Initial measurements:

The initial measurements under this item should be done in such a way that they can be directly compared with those called for during routine inspections in accordance with prEN 1337-10¹⁾;

30) Deviation from the horizontal:

Deviation from the horizontal should be measured in the same way that this was done under item 20 to enable a realistic comparison to be made; see also item 20;

34) Remarks:

Under 'Remarks' there should be confirmation that any special construction requirements have been carried out. Attention should also be drawn to any factors that will assist the inspector making subsequent routine inspections in accordance with prEN 1337-10¹⁾. In particular, attention should be drawn to any items that might otherwise be overlooked in subsequent inspections.

¹⁾ This document is in preparation.

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