BRITISH STANDARD

BS EN
13775-4:2004

Railway applications — Measuring of new and modified freight wagons —

Part 4: Bogies with 2 wheelsets

The European Standard EN 13775-4:2004 has the status of a British Standard

ICS 45.060.20

BSI
British Standards

National foreword

This British Standard is the official English language version of EN 13775-4:2004.

The UK participation in its preparation was entrusted by Technical Committee RAE/1, Railway applications, to Subcommittee RAE/1/-/9, Wagons (tank/freight), which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/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 subcommittee can be obtained on request to its secretary.

The members of Technical Committee RAE/1 and Panel RAE/1/-/9 believe that the last sentence in paragraph 2 of Clause 1

"Where appropriate, other measuring processes not specified here are necessary and are specified in each individual case."

is misleading and should be interpreted as

"Where appropriate, other measuring processes not specified here may be necessary and will be specified in each individual case by the purchaser or operator."

Cross-references

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Applications ferroviaires - Mesure des wagons lors de leur construction et lors de modifications - Partie 4: Bogies à deux essieux

Bahnanwendungen - Vermessung von Güterwagen beim Neubau und bei Umbauten - Teil 4: Drehgestelle mit 2 Radsätzen

This European Standard was approved by CEN on 1 April 2004.

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.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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Foreword

This document EN 13775-4:2004 has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

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 December 2004, and conflicting national standards shall be withdrawn at the latest by December 2004.

This European Standard EN 13775 "Railway applications – Measurement of new and modified freight wagons" comprises the following parts:

— Part 1: Measuring principles

— Part 2: Freight wagons with bogies

— Part 3: Freight wagons with 2 wheelsets

— Part 4: Bogies with 2 wheelsets

— Part 5: Bogies with 3 wheelsets

— Part 6: Multiple and articulated freight wagons

Annex A is normative, Annexes B to D are informative.

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

Introduction

It is normal practice in all European countries to carry out checks and measurements on the major components of new and modified freight wagons and bogies. In view of the importance of uniform criteria for international transport in all European countries, this European Standard has been prepared.

1 Scope

This European Standard specifies principles and requirements for measuring bogies with 2 wheelsets. This ensures that the measuring processes are applied in accordance with uniform criteria. It applies to new and modified bogies with 2 wheelsets.

Provisions going beyond the scope of these requirements are generally agreed between the contracting parties involved. The measuring processes relate to the bogies with or without add-ons in their entirety or just part of them if the geometrical structure does not permit anything else. Where appropriate, other measuring processes not specified here are necessary and are specified in each individual case.

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 (including amendments).

EN 13775-1:2003, *Railway applications — Measuring new and modified freight wagons — Part 1: Measuring principles.*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 13775-1:2003 apply.

4 Symbols and abbreviations

For the purposes of this European Standard, the following symbols and abbreviations apply.

DG **:** Bogie

1 Bogie end 1

2 Bogie end 2

Suspension bracket with bushing

Axle guard with axle-guard cheek

5 Requirements

5.1 General

The limit deviations apply to the finished product in each case.

Deviations from this European Standard are allowed as long as they do not assume proportions that represent an operating hazard. However, they shall be agreed with the contracting party involved and the inspection agency.

5.2 Precondition

The precondition for carrying out the measuring processes as specified in this standard is that the measuring principles laid down in EN 13775-1 are adhered to.

5.3 Measuring processes

5.3.1 General

The control sheet form for the results of the measuring processes in annex A shall be used.

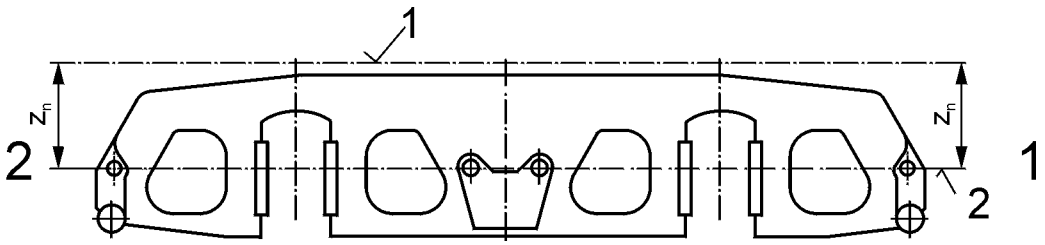
The measuring processes to be carried out differ partially as a function of the type of bogie. Basically, there are two different types of bogies. The measuring processes on bogies with laminated springs are described in 5.3.2 and those on bogies with other springs in 5.3.3.

5.3.2 Measuring processes on bogie with laminated springs

Measuring process 1

Position of the suspension bracket holes.

For the measuring process, the frame shall be moved into an unrestrained support position.



Key

1 Levelling plane
2 Theoretical plane of suspension bracket bushing pair (auxiliary plane)

Figure 1

The distance between the suspension bracket holes and the levelling plane is measured.

From the 8 measurements obtained z_n, between the 4 pairs of suspension brackets, the distance to the levelling plane in the centre of the running gear shall be determined (see Figure 1).

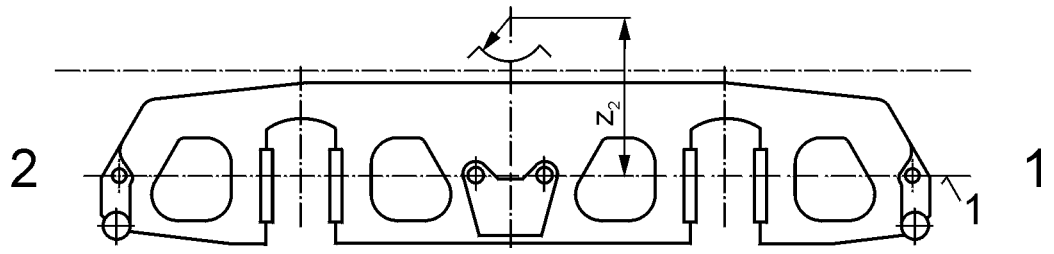
From these 4 values, the deviation z_1 from the plane shall be calculated for one point given by the other 3 distances.

An example for this is given in annex B.

Limit deviations for z_1: 3 mm

Measuring process 2

Distance between the theoretical plane of the suspension bracket bushing pair (auxiliary plane) and the centre of the bogie pivot.



Key

1 Theoretical plane of suspension bracket bushing pair (auxiliary plane)

Figure 2

The theoretical plane of the suspension bracket bushing pair (auxiliary plane) determined in measuring process 1 is the reference plane for measuring the centre point of the bogie pivot (see Figure 2).

Limit deviations for z_2: ± 2 mm

Measuring process 3

Distance between the outside front faces of the suspension brackets in the transverse direction of the bogie.

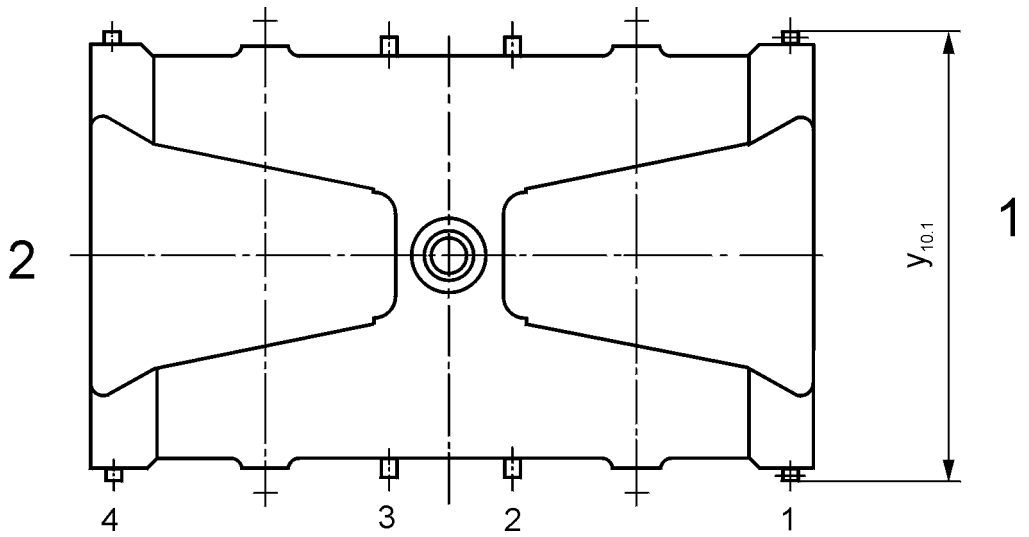


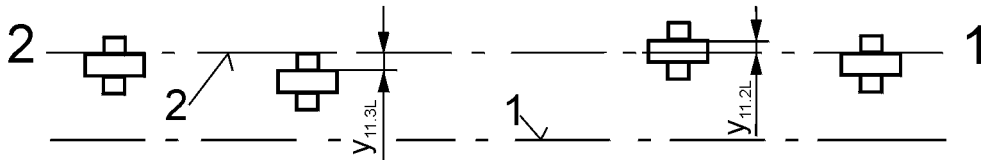
Figure 3

The distance y_{10} between the opposite front faces of the suspension brackets is measured at measuring points 1, 2, 3, 4 (see Figure 3).

Limit deviations for y_{10}: ± 2 mm

Measuring process 4

Position of the suspension bracket front faces



Key

1 Centre line of bogie
2 Reference plane

Figure 4

The deviation y_{11} of the two front faces of the inner suspension brackets from the alignment of the front faces of the outer suspension brackets is measured (see Figure 4).

Limit deviations for y_{11}: $\pm$ 2 mm

Measuring process 5

Diagonal distance between pairs of suspension brackets.

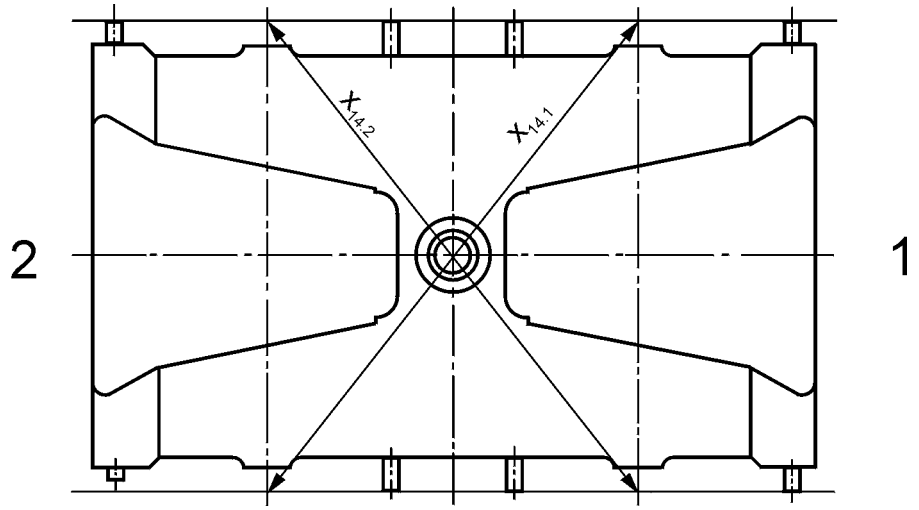


Figure 5

The dimensions $x_{14.1}$ and $x_{14.2}$ are measured on the right-hand and left-hand sides (see Figure 5).

Permissible difference for x_{14}: 3 mm

Measuring process 6

Concentricity of the bogie pivot.

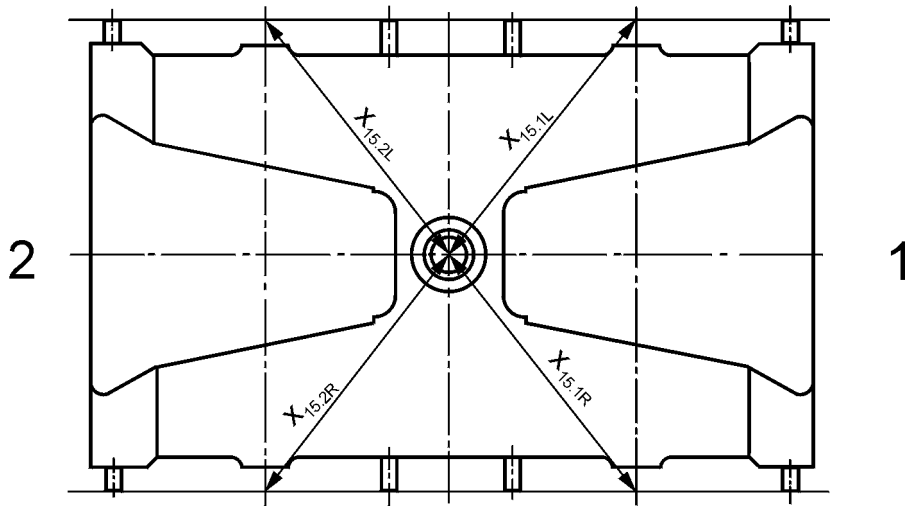


Figure 6

The dimensions $x_{15.1}$ and $x_{15.2}$ are measured on the right-hand and left-hand sides (see Figure 6).

Permissible difference for x_{15}: 3 mm

Measuring process 7

Wheel base.

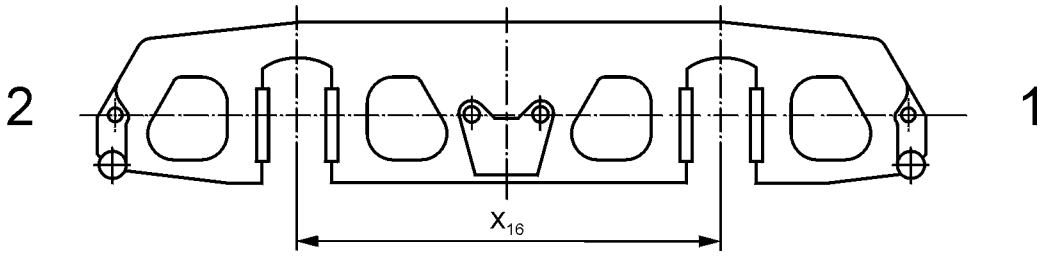


Figure 7

The distance x_{16} between the pairs of suspension brackets is measured at measuring points $x_{16\,R}$ and $x_{16\,L}$ (see Figure 7).

Limit deviations for x_{16}: ± 2 mm

Permissible difference between $x_{16\,R}$ and $x_{16\,L}$: 2 mm

Measuring process 8

Distance between suspension bracket holes.

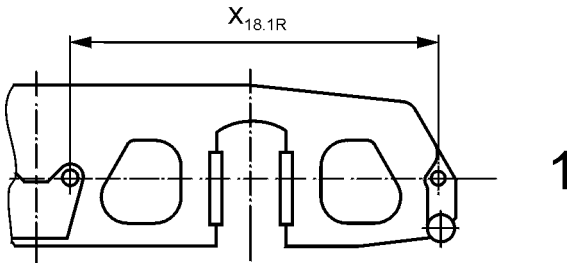


Figure 8

The distance x_{18} is measured at measuring points 1R, 2R, 1L, 2L (see Figure 8).

Limit deviations for x_{18}: ± 2 mm

Measuring process 9

Longitudinal distance between the axle-guard cheeks at the narrowest point relative to the vertical.

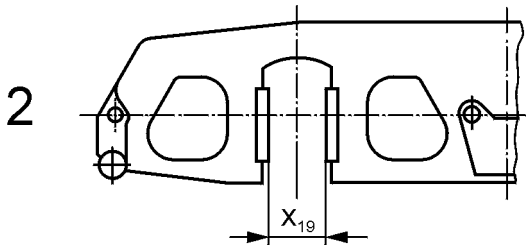


Figure 9

The distance x_{19} between the axle-guard cheeks of a pair of axle-guards is measured (see Figure 9). The measured length is the length of the axle-guard plates.

Limit deviations for x_{19}: ± 1,5 mm

Measuring process 10

Symmetry of the axle-guard cheeks.

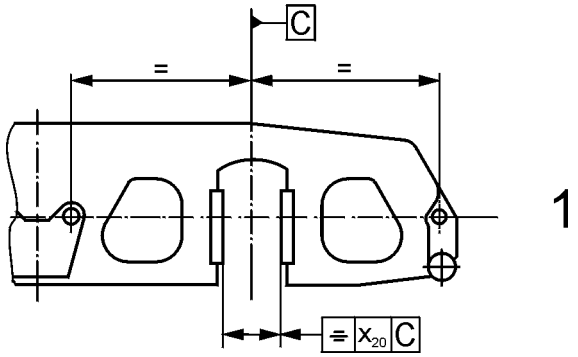


Figure 10

The symmetrical deviation of the axle-guard cheeks relative to the centre of the distance between the suspension bracket holes is measured (see Figure 10).

Tolerance on symmetry x_{20} = 4 mm

Measuring process 11

Rectangularity of the axle-guard cheeks in the longitudinal direction.

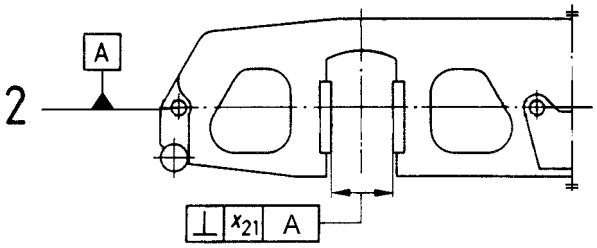


Figure 11

The deviation from rectangularity of the axle-guard cheeks relative to the holes of the suspension bracket pair is measured in the longitudinal direction (see Figure 11).

Tolerance on rectangularity x_{21}: 1,5 mm

Measuring process 12

Distance between the outside faces of the axle-guard cheeks and the outside faces of the suspension bracket bushings.

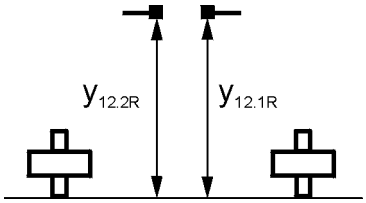


Figure 12

The distance y_{12} between the outside faces of the axle-guard cheeks and the outside faces of the suspension brackets is measured (see Figure 12). The measurement is taken for each suspension bracket pair.

Limit deviations for y_{12}: ± 2 mm

Measuring process 13

Distance between the pairs of axle-guard cheeks

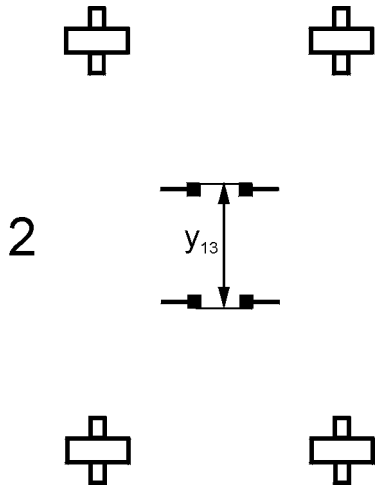


Figure 13

The distance y_{13} between the outside faces of the opposite pairs of axle-guard cheeks is measured (see Figure 13).

Limit deviations for y_{13}: ± 2 mm

Measuring process 14

Rectangularity of the axle-guard cheeks.

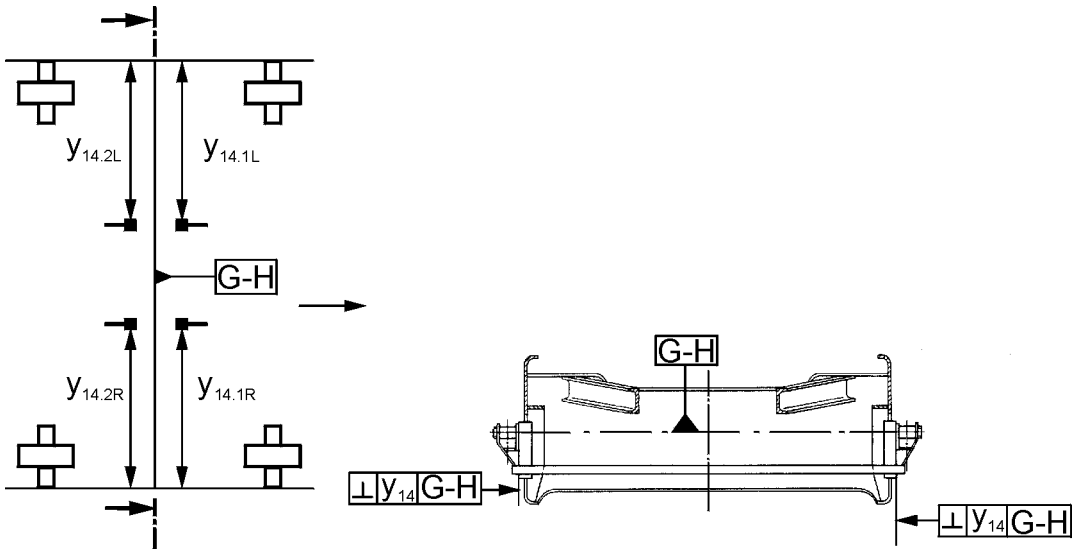


Figure 14

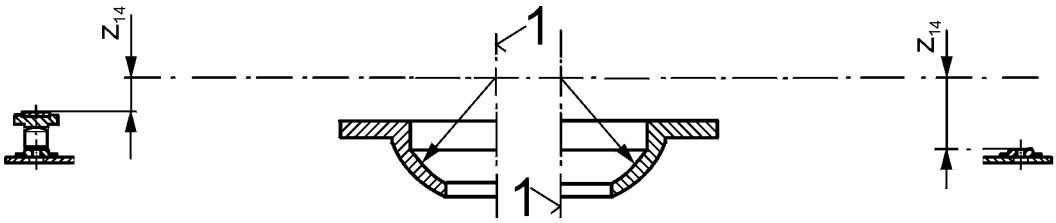
The deviation in rectangularity of the outside faces of the axle-guard cheeks is measured relative to a reference line (G-H) formed by joining up each opposite pair of suspension bracket bushings (see Figure 14).

The measured length is the length of the axle-guard plate. The measurement is carried out on every plate.

Tolerance on rectangularity y_{14}: 1,5 mm

Measuring process 15

Distance between the top of the side bearer and the bogie pivot.



Key

1 Centre of the bogie pivot

Bogie with elastic side bearers

Bogie with rigid side bearers

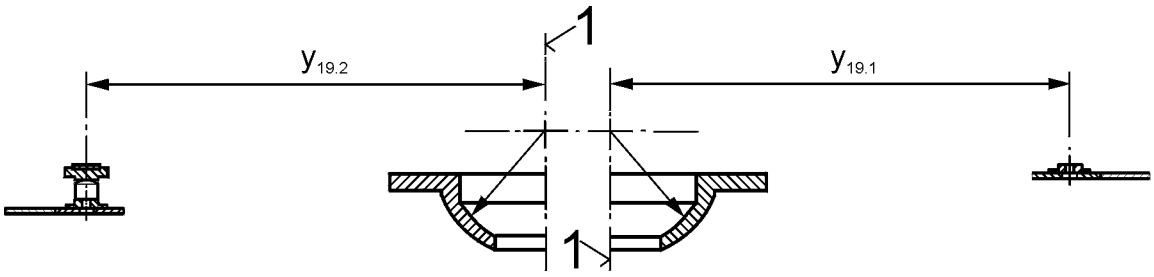
Figure 15

The distance z_{14} between the top of the side bearers and the centre of the bogie pivot with the bogie pivot insert fitted is measured (see Figure 15).

Limit deviations for z_{14}: ± 1 mm

Measuring process 16

Distance between the side bearers and the centre of the bogie pivot.



Key

1 Centre of the bogie pivot

Bogie with elastic side bearers Bogie with rigid side bearers

Figure 16

The distance between the centre of the side bearers and the centre of the bogie pivot is measured (see Figure 16).

Limit deviations for y_{19}: ± 2 mm

Measuring process 17

Distance between the brake rigging contact point and the centre of the bogie pivot.

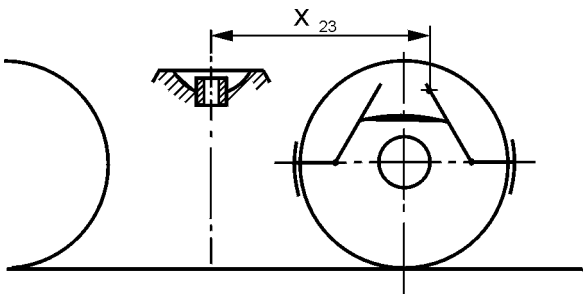


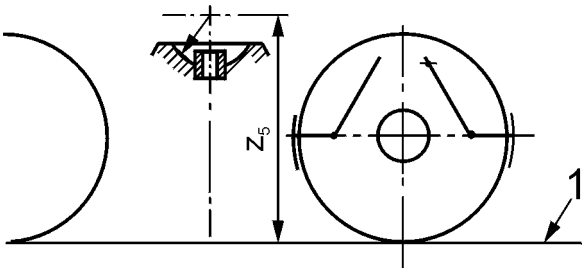
Figure 17

The distance x_{23} between the brake rigging contact point and the centre of the bogie pivot is measured (see Figure 17). For this, the brake blocks are resting on the wheel without any pressure applied.

Limit deviations for x_{23}: ± 15 mm

Measuring process 18

Distance between the centre of the bogie pivot and the top of the rail.



Key

1 Top of rail SO

Figure 18

The distance z_5 between the centre of the bogie pivot and the top of the rail is measured (see Figure 18) with a vehicle tare weight of 20 t.

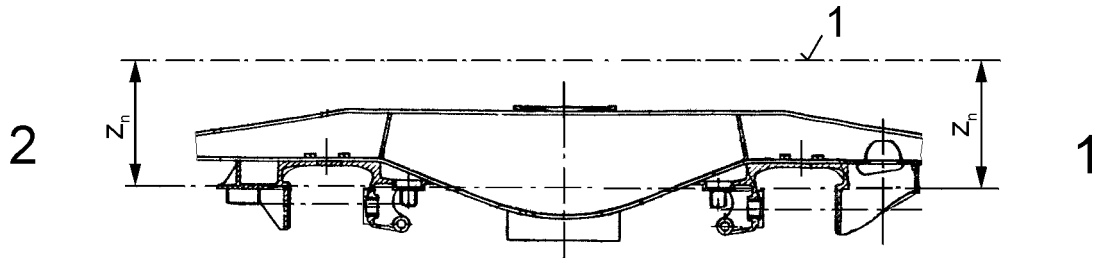
A possible method of carrying out these measurements is illustrated in annex C.

Limit deviation for z_5: $^{+3}_{-5}$ mm

5.3.3 Measuring processes on bogies with other springs

Measuring process 19

Position of the centre points of the suspension support surfaces.



Key

1 Levelling plane

Figure 19

The distance between the centre points of the suspension support faces and the levelling plane is measured (see Figure 19).

From the 4 measurements obtained z_n, between the 4 centre points of the suspension support surfaces, the distance to the levelling plane shall be determined.

From these 4 values, the deviation z_3 from the plane shall be calculated for one point given by the other 3 distances.

An example for this is given in annex B.

Limit deviations for z_3: $\pm$ 2 mm

Measuring process 20

Distance between the inner front faces of the axle-box guides in the transverse direction of the bogie.

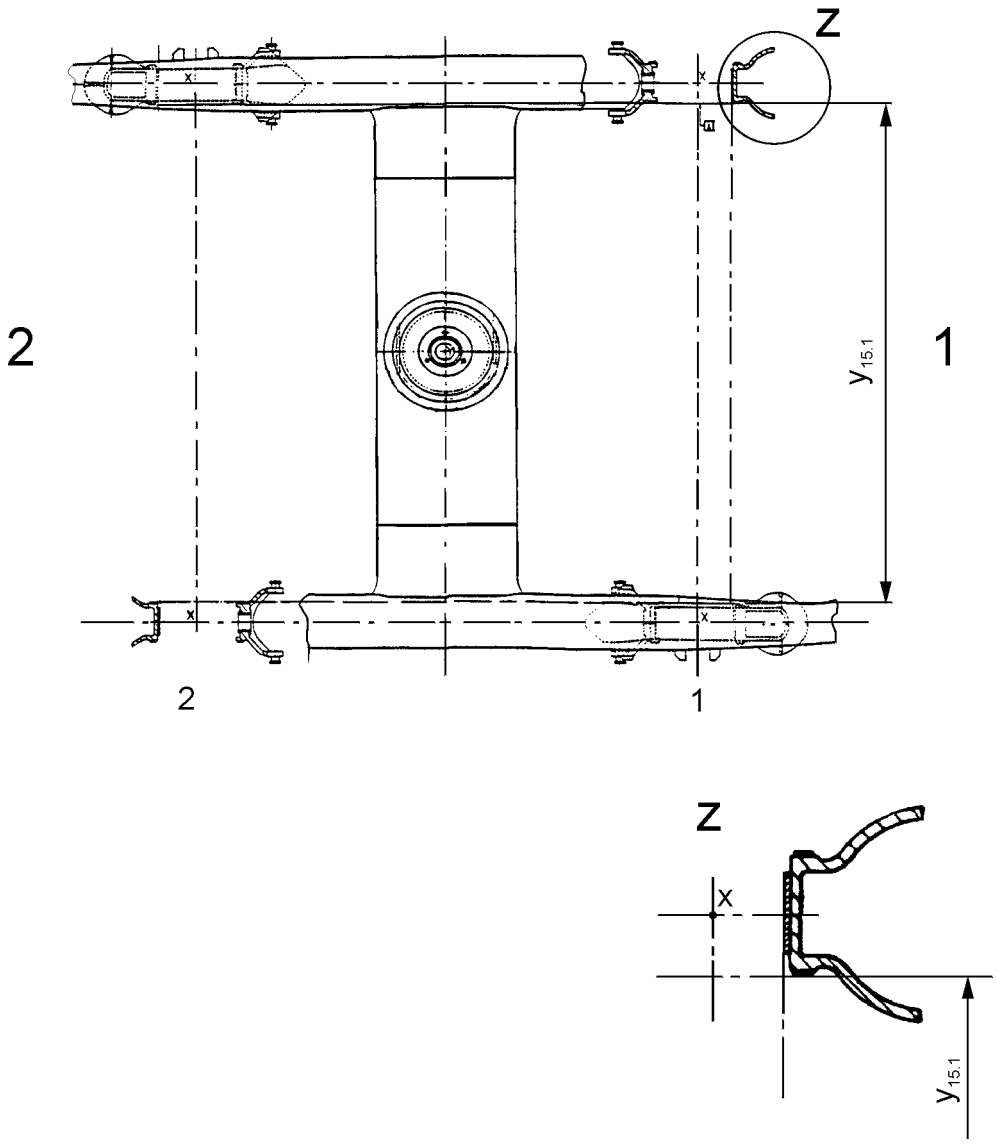


Figure 20

The distance between opposite inner front faces of the axle-box guides is measured at measuring points 1, 2 (see Figure 20).

Limit deviation for y_{15}: ± 0,5 mm

Measuring process 21

Concentricity of the bogie pivot.

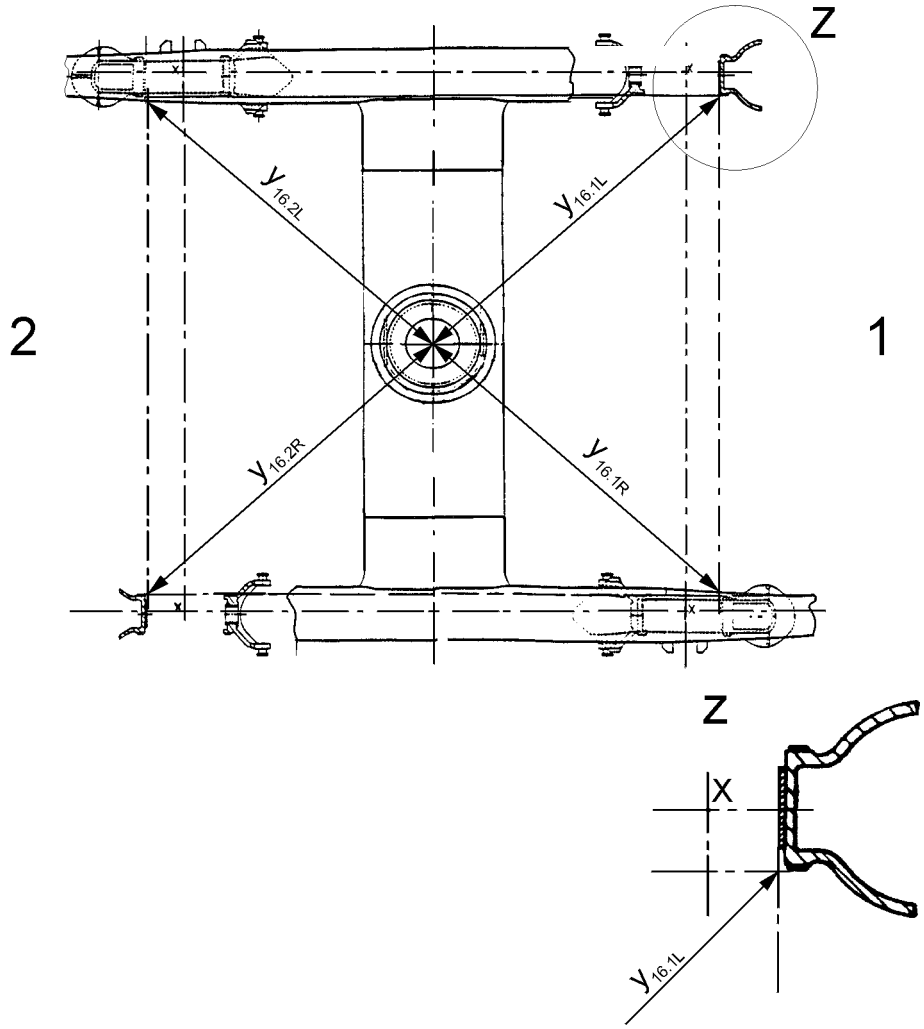


Figure 21

The dimensions $y_{16.1}$ and $y_{16.2}$ are measured on the right-hand and left-hand sides (see Figure 21).

Permissible difference for y_{16}: 3 mm

Measuring process 22

Diagonal distance between the axle-box guides.

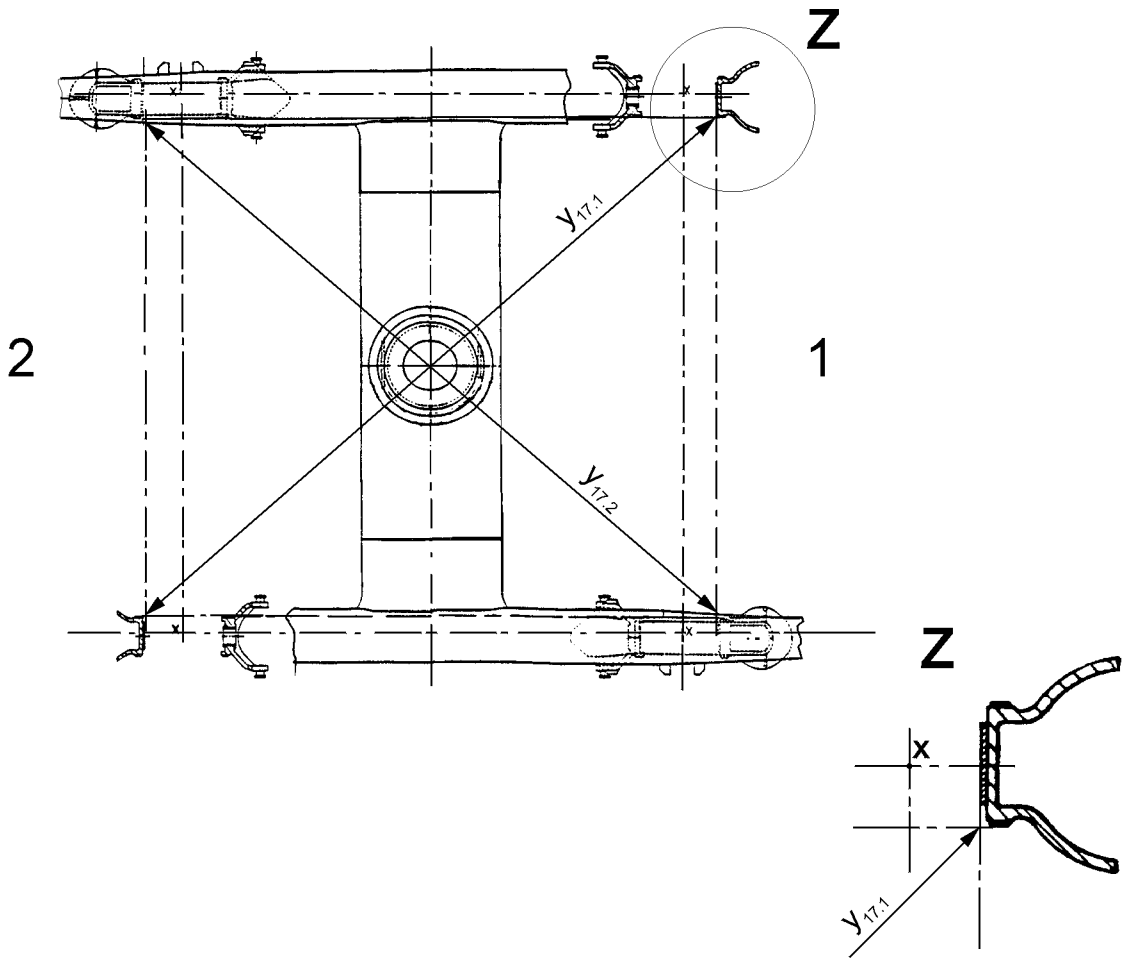


Figure 22

The dimensions $y_{17.1}$ and $y_{17.2}$ are measured (see Figure 22).

Permissible difference for y_{17}: 1,5 mm

Measuring process 23

Longitudinal distance between the axle-box guides.

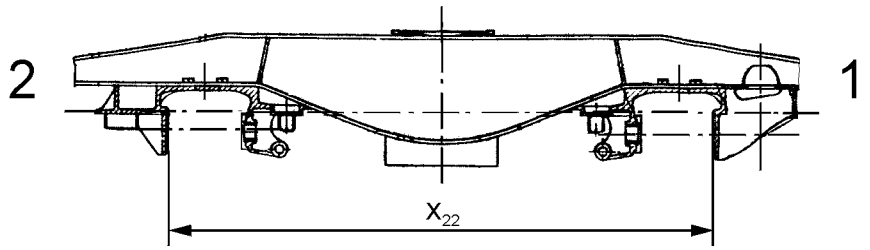


Figure 23

The longitudinal distance between the axle-box guides is measured at measuring points $x_{22\,R}$ and $x_{22\,L}$ (see Figure 23).

Limit deviations for x_{22}: ± 1 mm

Permissible difference between $x_{22\,R}$ and $x_{22\,L}$: 1 mm

Measuring process 24

Width of the axle-box guides.

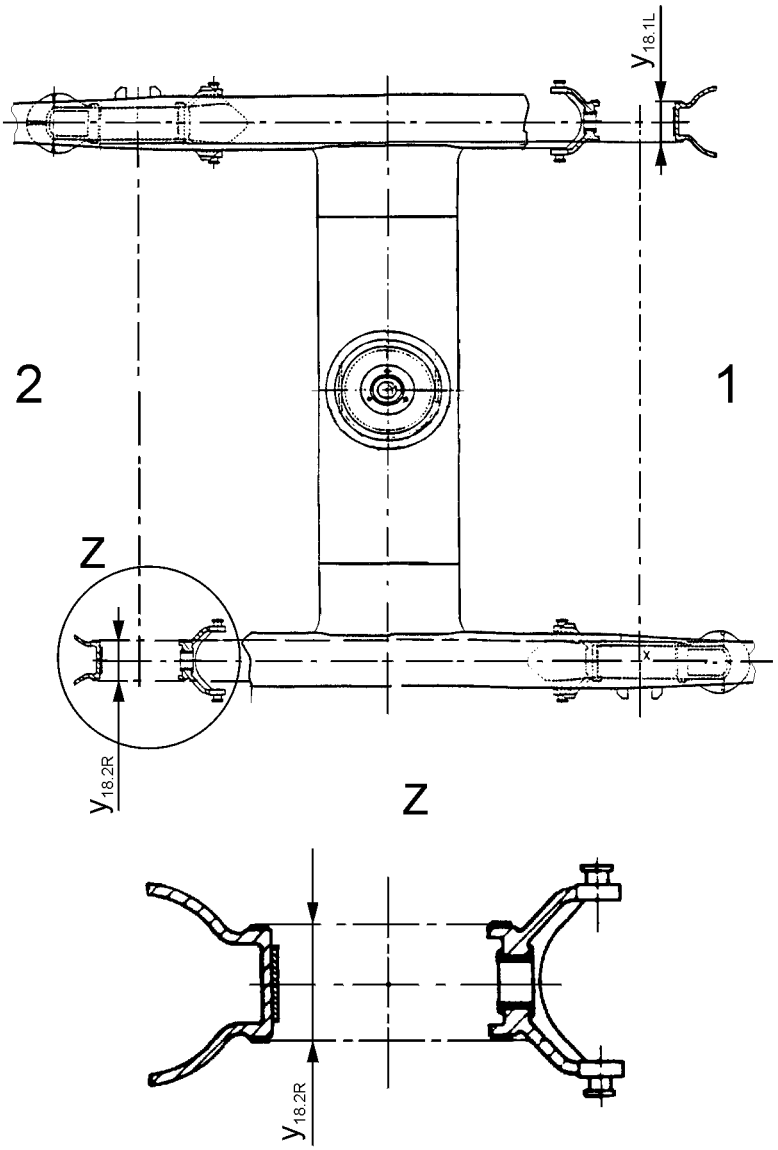


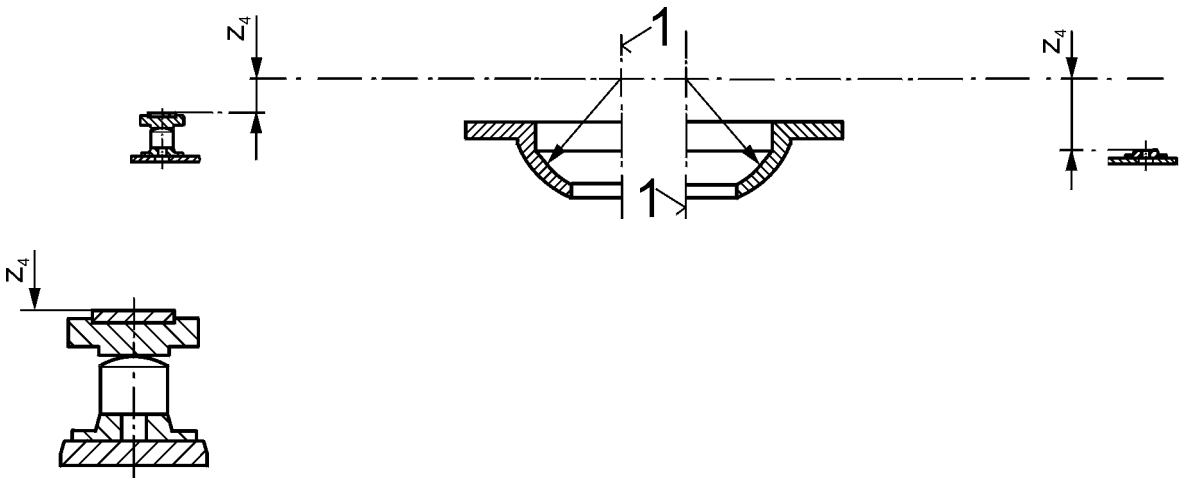
Figure 24

The widths of the axle-box guides are measured at measuring points 1R, 2R, 3R, 4R, 1L, 2L, 3L, 4L (see Figure 24).

Permissible deviation for y_{18}: ± 0,7 mm

Measuring process 25

Distance between the top of the side bearer and the centre of the bogie pivot.



Key

1 Centre of the bogie pivot

Bogie with elastic side bearers

Bogie with rigid side bearers

Figure 25

The limit deviations shall be specified in accordance with the basic type of construction of the side bearers in line with one of the following sets of measuring instructions.

The measurement is carried out with the bogie pivot insert in place.

Rigid side bearers:

The distances z_4 between the top of the rigid side bearers and the centre of the bogie pivot are measured (see Figure 25).

Limit deviations for z_4: $\pm$ 1 mm

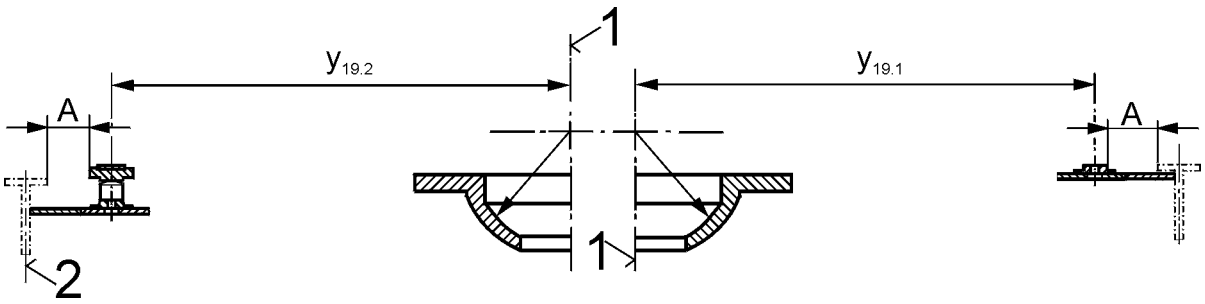
Elastic side bearers:

With the springs removed, the distances z_4 between the top of the elastic side bearers and the centre of the bogie pivot are measured (see Figure 25).

Limit deviations for z_4: $\pm$ 1 mm

Measuring process 26

Distance between the side bearers and the centre of the bogie pivot.



Key

1 Centre of the bogie pivot
2 Side frame

Bogie with elastic side bearers

Bogie with rigid side bearers

Figure 26

The distance between the centre of the side bearer and the centre of the bogie pivot is measured (see Figure 26).

It shall be ensured that an adequate clearance A exists between the side bearer and the top corner of the side frame.

Limit deviations for y_{19}: $\pm$ 2 mm

Measuring process 27

Distance between the spring retainer and the support.

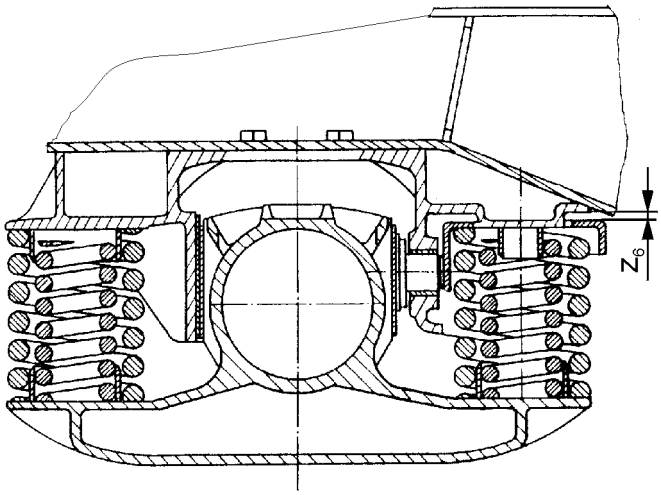


Figure 27

The clearance at each axle-box guide is measured (see Figure 27).

Limit deviations for z_6: $^{+3}_{-5}$ mm

Measuring process 28

Distance between the brake rigging contact point and the centre of the bogie pivot.

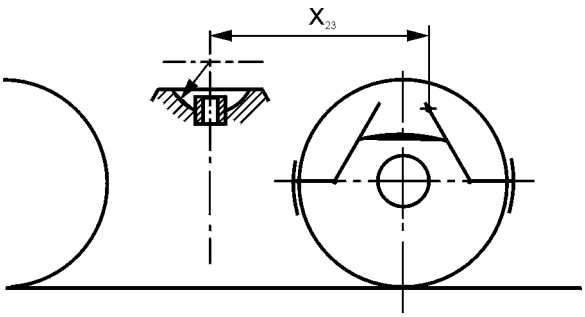


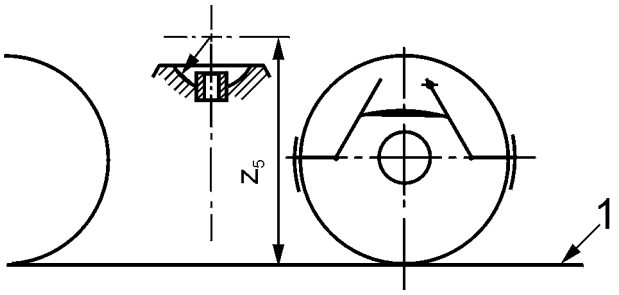
Figure 28

The distance x_{23} between the brake rigging contact point and the centre of the bogie pivot is measured (see Figure 28). For this, the brake blocks are resting on the wheel without any pressure applied.

Limit deviations for x_{23}: ± 15 mm

Measuring process 29

Distance between the centre of the bogie pivot and the top of the rail.



Key

1 Top of the rail SO

Figure 29

The distance z_5 between the centre of the bogie pivot and the top of the rail is measured with a vehicle tare weight of 20 t (see Figure 29).

A possible method for carrying out these measurements is illustrated in annex C.

Limit deviation for z_5: $^{+3}_{-5}$ mm

Annex A
(normative)

Control sheet

Control sheet forms

Annex A contains two control sheet forms with the individual measuring processes. The structures of the control sheets are based on practical experience. Depending on the type of bogie, this form shall be used in principle for documenting the measured results. In Tables A.1 and A.2, "Control sheet forms" have dotted lines in the "Measuring point/nominal dimension" column for recording the nominal dimensions of the drawings. In the "Actual limit deviations at the designated measuring points" column, there are spaces for recording the limit deviations or tolerances actually established. This makes statistical assessment possible.

Table A.1 — Control sheet for bogies with laminated springs

Measuring process		Dimensions in mm			Actual limit deviations or tolerances at the designated measuring points						Remark
		Measuring point nominal dimension	Limit deviation or tolerance		1	2	3	4	5	6	
1	Position of the suspension bracket holes (see annex B)	z_n	3	R							
				L							
2	Distance between the theoretical plane of the suspension bracket bushing pair (auxiliary plane) and the centre of the bogie pivot	z_2	± 2	R							
				L							
3	Distance between the outside front faces of the suspension brackets in the transverse direction of the bogie	y_{10}	± 2	R							
				L							
4	Position of the suspension bracket front faces	y_{11}	± 2	R							
				L							
5	Diagonal distance between pairs of suspension brackets	x_{14}	3	R							
				L							
6	Concentricity of the bogie pivot	x_{15}	3	R							
				L							
7	Wheel base	x_{16}	± 2	R							
				L							
8	Distance between suspension bracket holes	x_{18}	± 2	R							
				L							
9	Longitudinal distance between the axle-guard cheeks	x_{19}	± 1,5	R							
				L							
10	Symmetry of the axle-guard cheeks	x_{20}	3	R							
				L							
11	Rectangularity of the axle-guard cheeks in the longitudinal direction	x_{21}	1,5	R							
				L							
12	Distance between the outside faces of the axle-guard cheeks and the outside faces of the suspension bracket bushings	y_{12}	± 2	R							
				L							
13	Distance between the pairs of axle-guard cheeks	y_{13}	± 2	R							
				L							
14	Rectangularity of the axle-guard cheeks	y_{14}	1,5	R							
				L							
15	Distance between the top of the side bearer and the bogie pivot	z_{14}	± 1	R							
				L							

Table A.1 (*concluded*)

	Measuring process	Dimensions in mm: Measuring point nominal dimension	Limit deviation or tolerance		Actual limit deviations or tolerances at the designated measuring points: 1	2	3	4	5	6	Remark
16	Distance between the side bearers and the centre of the bogie pivot	y_{19}	± 2	R							
				L							
17	Distance between the brake rigging contact point and the centre of the bogie pivot	x_{23}	± 15								
18	Distance between the centre of the bogie pivot ball and the top of the rail	z_5	+3 −5								

Company	Purchaser:	Underframe No.:			Bogie No.:	
			Date:	Name:	Date:	Name:
	Order No.:	Acceptance:				
Sheet No.:	Drawing No.:	Approval:				

Table A.2 — Control sheet for bogies with other springs

	Measuring process	Dimensions in mm: Measuring point nominal dimension	Limit deviation or tolerance		Actual limit deviations or tolerances at the designated measuring points: 1	2	3	4	5	6	Remark
19	Position of the centre points of the suspension support surfaces (see annex B)	z (z_n)	± 2	R							
				L							
20	Distance between the inner front faces of the axle-box guides in the transverse direction of the bogie	y_{15}	± 0,5								
21	Concentricity of the bogie pivot	y_{16}	3	R							
				L							
22	Diagonal distance between the axle-box guides	y_{17}	1,5	R							
				L							
23	Longitudinal distance between the axle-box guides	x_{22}	± 1	R							
				L							
24	Width of the axle-box guides	y_{18}	± 0,7	R							
				L							
25	Distance between the top of the side bearer and the centre of the bogie pivot	z_4	± 1	R							
				L							
26	Distance between the side bearers and the centre of the bogie pivot	y_{19}	± 2	R							
				L							
27	Distance between the spring retainer and the support	z_6	+2 −3	R							
				L							
28	Distance between the brake rigging contact point and the centre of the bogie pivot	x_{23}	± 15								
29	Distance between the centre of the bogie pivot and the top of the rail	z_5	+3 −5								

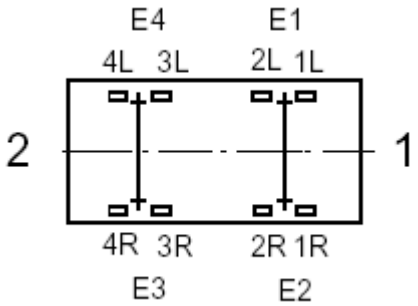
Company	Purchaser:	Underframe No.:			Bogie No.:	
			Date:	Name:	Date:	Name:
	Order No.:	Acceptance:				
Sheet No.:	Drawing No.:	Approval:				

Annex B

(informative)

Example of measuring process 1

Position of the suspension sockets holes



Suspension bracket measuring point	Measured value [mm]	Mean value	Difference to mean value plane	Plane of suspension bracket pair
1L	144	142	0	E1
2L	140			
1R	144,5	142,5	0,5	E2
2R	140,5			
3R	144	144,5	2,5	E3
4R	145			
3L	145	146	4	E4
4L	147			

Distortion = $|(E1 - E2) - (E4 - E3)| = |(0 - 0,5) - (4,0 - 2,5)| = |-2| = 2$

At E4 the frame is distorted 2 mm.

Bogie frame No.				
3 L				
4 L				
3 R				
4 R				
1 L				
2 L				
1 R				
2 R				

At E... the bogie frame is distorted … mm

Bogie frame No.				
3 L				
4 L				
3 R				
4 R				
1 L				
2 L				
1 R				
2 R				

At E ... the bogie frame is distorted.... mm

Bogie frame No.				
3 L				
4 L				
3 R				
4 R				
1 L				
2 L				
1 R				
2 R				

At E... the bogie frame is distorted … mm

Bogie frame No.				
3 L				
4 L				
3 R				
4 R				
1 L				
2 L				
1 R				
2 R				

At E ... the bogie frame is distorted.... mm

Bogie frame No.				
3 L				
4 L				
3 R				
4 R				
1 L				
2 L				
1 R				
2 R				

At E... the bogie frame is distorted … mm

Bogie frame No.				
3 L				
4 L				
3 R				
4 R				
1 L				
2 L				
1 R				
2 R				

At E ... the bogie frame is distorted.... mm

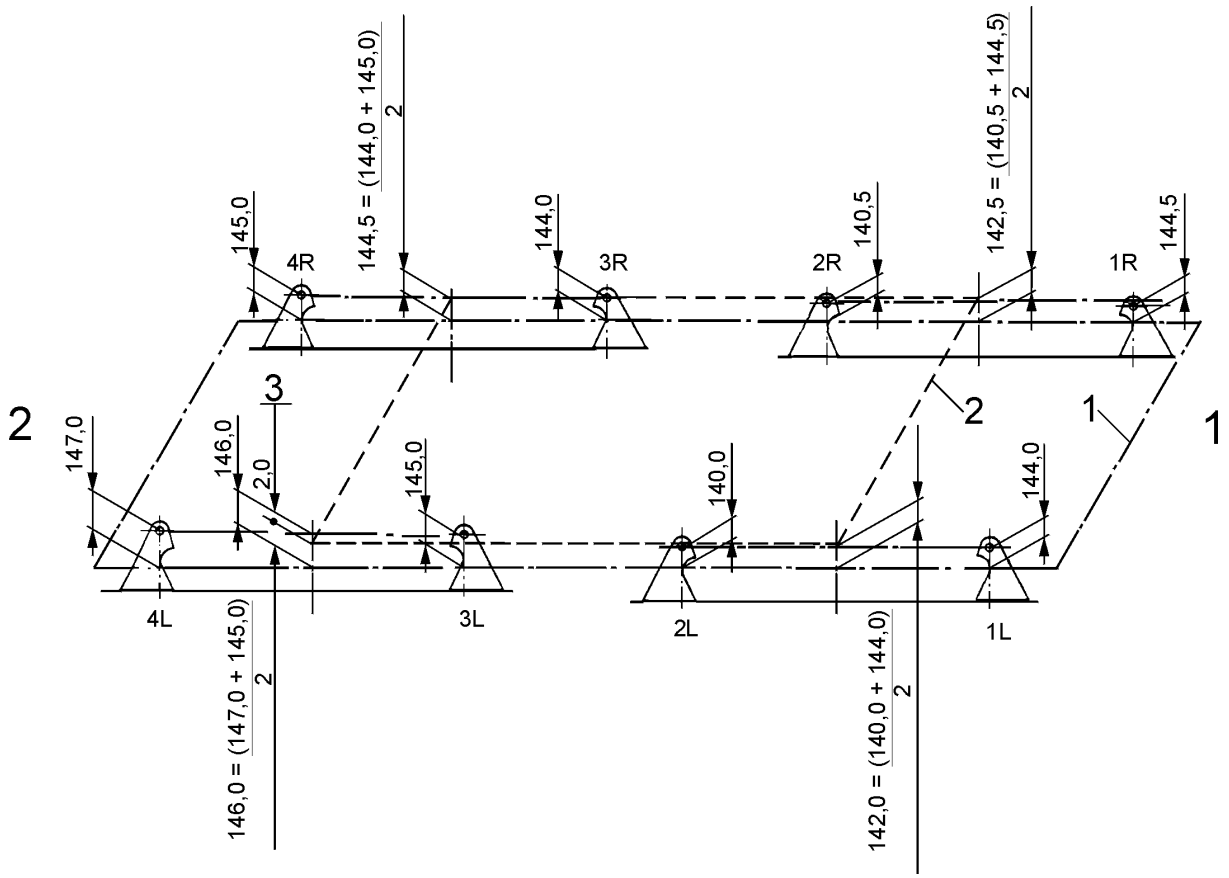
In order to avoid having to align the pairs of suspension brackets exactly to the levelling plane, an auxiliary plane is determined by calculation from the values measured after a rough alignment.

The following mean values to the levelling plane result for the respective pairs of suspension brackets from the numerical example:

1L - 2L	142,0 mm	3L - 4L	146,0 mm
1R - 2R	142,5 mm	3R - 4R	144,5 mm

An auxiliary plane formed through the centres of suspension bracket pairs 1L - 2L, 1R - 2R and 3R - 4R gives the deviation "z_{12}" in suspension bracket pair 3L - 4L. (In the numerical example given, for 3L - 4L, a deviation of 2 mm results for "z_{12}"). The position of the auxiliary plane relative to the levelling plane can be seen from the diagram below.

Shown in the backbone position



Key

1 Levelling plane
2 Auxiliary plane
3 Deviation z1

Table B.1 — Position of the auxiliary plane relative to the levelling plane (example)

Annex C
(informative)

Checking the height of the bogie pivot centre

C.1 Introduction

The freight wagon-bogie diagram shows the bogie beneath a wagon with a tare weight of T = 20 000 kg on the rails (unless otherwise specified).

The height of the bogie pivot centre H has a tolerance that does not take account of the friction of the suspension damper.

The bogie is subjected, by a press, to a load Fzc on the bogie pivot centre.

The height measurements are carried out under a load Fzc = F_T. F_T represents the mass of half the wagon body with a tare weight T = 20 000 kg (general case).

$$F_T\ [\ kN\ ] = \left(\frac{T}{2} - m^+\right) \times \frac{9{,}81}{1000}$$

Example for a bogie mass m^+ = 4 500 kg:

$$F_T = \frac{10\,000 - 4\,500}{1000} \text{ x } 9{,}81 = 53{,}95 \text{ kN}$$

C.2 Measurements

Two measurements are carried out under load F_T:

1 – Increasing load from 0 to F_T = **measurement H1**

2 – Increasing load up to ≈ 100 kN

3 – Decreasing load from ≈ 100 kN to F_T, **measurement H2**

The height H to be noted is the mean value of H1 and H2, i.e.:

$$H = \frac{H1 + H2}{2}$$

H shall be between the values illustrated in the bogie diagram.

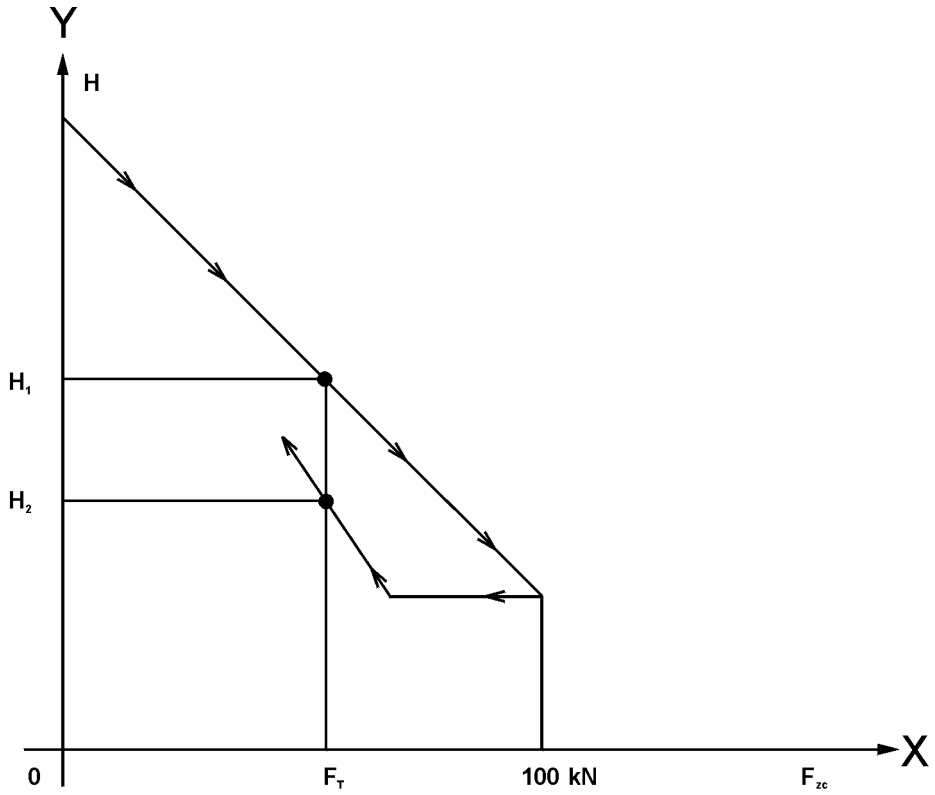


Figure C.1 — Bogie diagram

Key

y-axis = height of bogie pivot centre
z-axis = load on the bogie pivot

NOTE 1 The 100 kN load is not mandatory, but it is important that the load up to F_T results in an effective raising of the bogie pivot centre (dry friction of the suspension damper is a threshold value phenomenon: a slight fluctuation in the load causes no movement).

NOTE 2 It is necessary to run through 2 or 3 loading cycles from 0 kN to 100 kN before the measurement in order to ensure the correct position of the different spring elements.

Annex D
(informative)

Terminology

Terminology

English	French	German
Axle-box guide	glissière de boîte d'essieu	Radsatzlagerführung
Axle-box guide	glissière de boîte d'essieu	Radsatzhaltergleitführung
Axle-guard cheeks	glissières de plaque de garde	Radsatzhaltergleitbacken
Axle-guard pair	paire de plaques de garde	Radsatzhalterpaar
Bogie pivot	Crapaudine	Drehpfanne
Bogie pivot centre	centre de la crapaudine	Drehpfannemitte
Brake rigging	timonerie de frein	Bremsgestänge
Elastic side bearer	lisoir élastique	federndes Gleitstück
Front face of suspension bracket	face extrême du support de suspension	Federbockstirnfläche
Rigid side bearer	lisoir fixe	festes Gleitstück
Running gear	organe de roulement	Laufwerk
Side bearer	Lisoir	Gleitstück
Support surface of suspension	surface d'appui de la suspension	Federabstützungsfläche
Suspension bracket	support de suspension	Federbock
Suspension bracket hole	alésage du support de suspension	Federbockbohrung
Suspension bracket pair	paire de support de suspension	Federbockpaar
Suspension stop	butée de support	Federfangbock
Wheel base	Empattement	Radstand

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