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# Railway applications — Measuring of new and modified freight wagons —

## Part 5: Bogies with 3 wheelsets

The European Standard EN 13775-5:2004 has the status of a  
British Standard

ICS 45.060.20





## National foreword

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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;
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### Summary of pages

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English version

## Railway applications - Measuring of new and modified freight wagons - Part 5: Bogies with 3 wheelsets

Applications ferroviaires - Mesure des wagons lors de leur construction et lors de modifications - Partie 5: Bogies à trois essieux

Bahnanwendungen - Vermessung von Güterwagen beim Neubau und bei Umbauten - Teil 5: Drehgestelle mit 3 Radsätzen

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

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## Contents

Page

Foreword.....	3
Introduction.....	4
1 Scope.....	4
2 Normative references.....	4
3 Terms and definitions .....	4
4 Symbols and abbreviations .....	4
5 Requirements .....	5
5.1 General.....	5
5.2 Precondition .....	5
5.3 Measuring processes.....	5
Annex A (normative) Control sheet.....	15
Annex B (informative) Example of measuring process 1.....	17
Annex C (informative) Terminology.....	20
Bibliography.....	21

## Foreword

This document EN 13775-5:2004 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of an identical text or by endorsement, at the latest by December 2004, and conflicting national standards shall be withdrawn at the latest by December 2004.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 3 wheelsets. This ensures that the measuring processes are applied in accordance with uniform criteria. It applies to new and modified bogies with 3 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

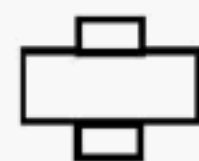
For the purposes of this European Standard, the following symbols and abbreviations apply.

1 Bogie end 1

2 Bogie end 2



Bearing point for suspension compensating beam



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.

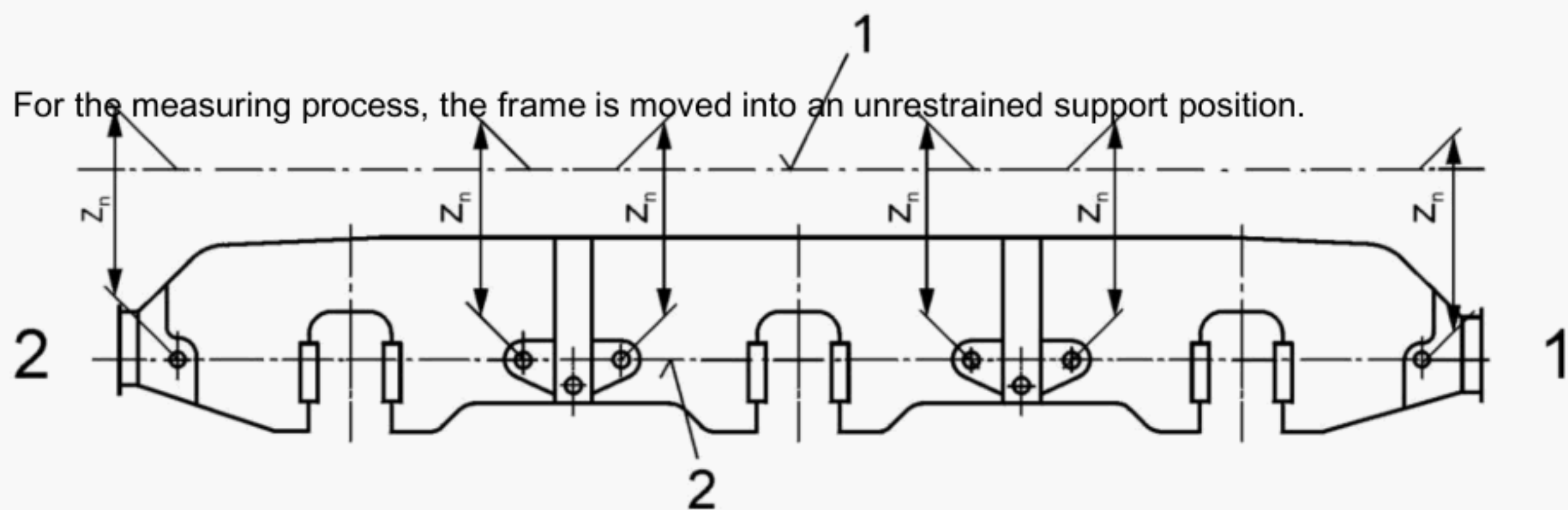
Not all the measuring point dimension designations are listed in the figures in this standard. Unless otherwise indicated, the figures show the normal position.

### 5.3 Measuring processes

A control sheet form for the results of the measuring processes is given in annex A.

#### Measuring process 1

Position of the suspension bracket holes and position of the holes for the compensating beam.



#### Key

- 1 Levelling plane
- 2 Theoretical auxiliary plane

Figure 1

The distance from the suspension bracket holes and the suspension compensating beam holes  $z_n$  to the levelling plane is measured (see Figure 1). The  $z_n$  values shall be averaged for each beam and the mean value shall be adopted for further measurement of both holes.



From the 8 measurements obtained  $z_n$ , the distances between the 6 pairs of suspension brackets and the levelling plane shall be determined in the middle of the axle in each case.

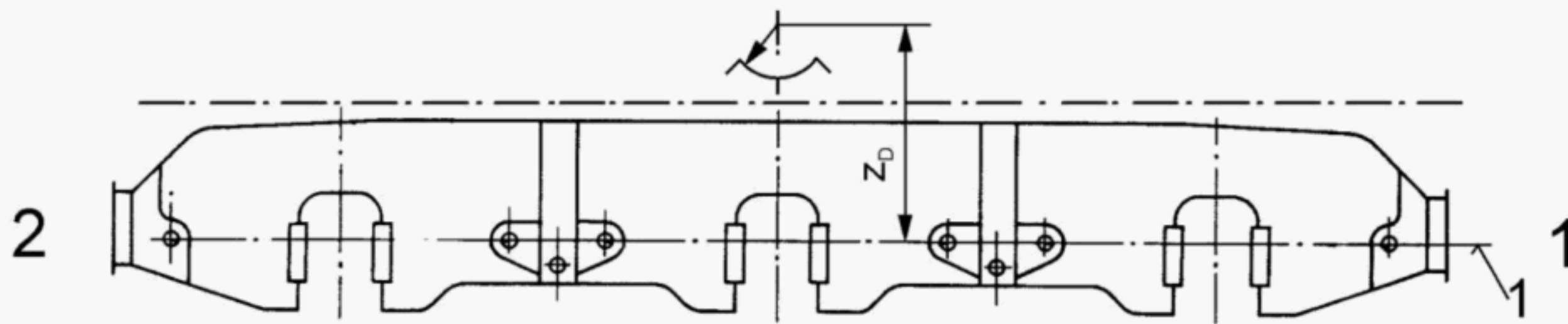
The deviation  $z_n$  of the 6 mean values to the levelling plane shall be calculated.

Limit deviations for  $z_n$ :  $\pm 3$  mm

See annex B.

### Measuring process 2

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

Limit deviations for  $z_D$ :  $\pm 2$  mm

### Measuring process 3

Distance between the outside front faces of the suspension brackets and the bearing points for the suspension compensating beams in the transverse direction of the bogie.

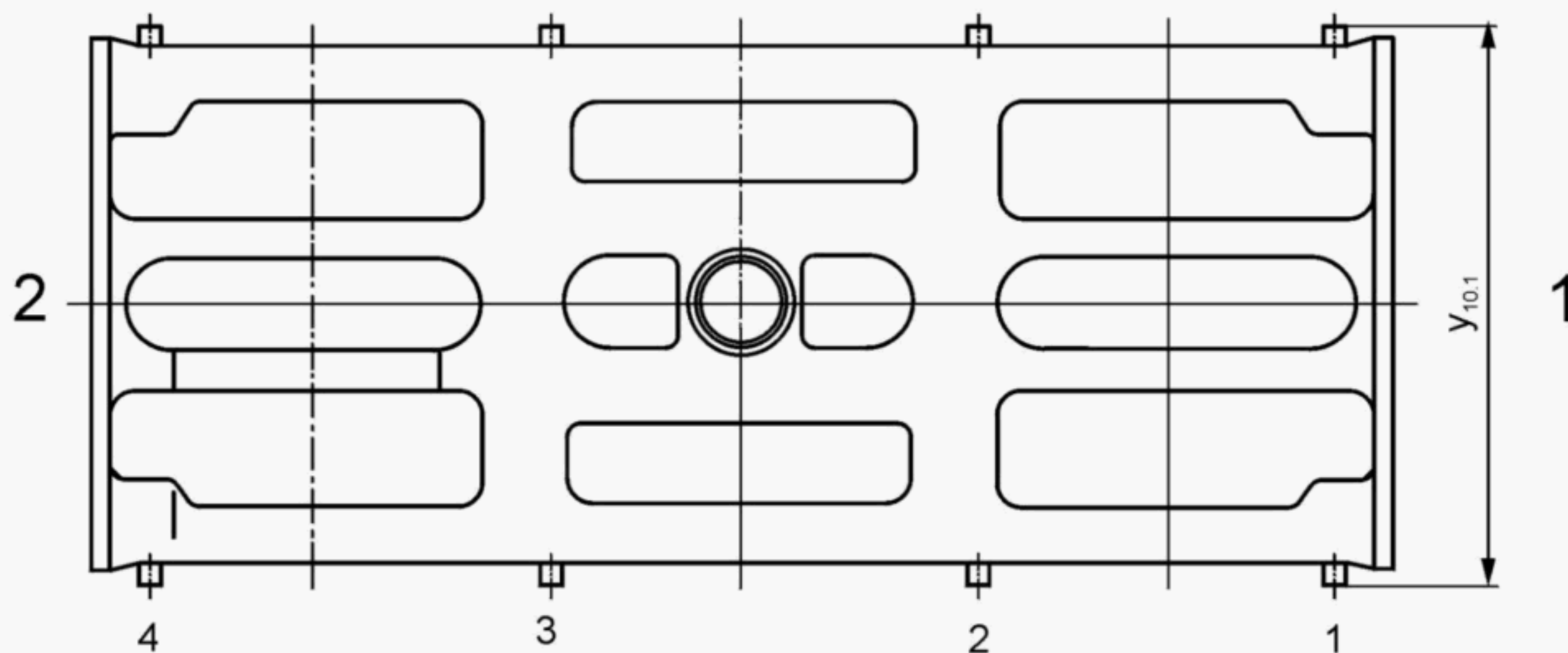
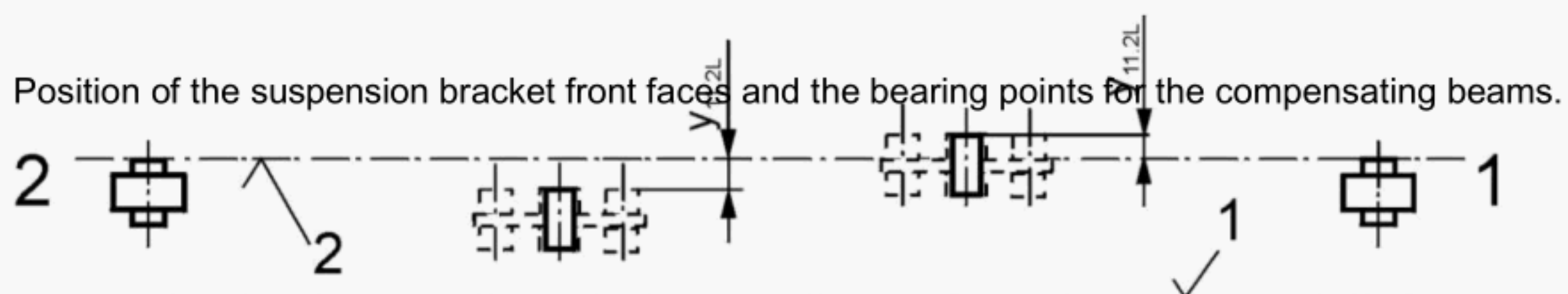


Figure 3

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

Limit deviation for  $y_{10}$ :  $\pm 2$  mm

#### Measuring process 4



#### Key

- 1 Centre line of the bogie
- 2 Reference plane

Figure 4

The deviation  $y_{11}$  of the four front faces of the compensating beams 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 the centres of pairs of suspension brackets.

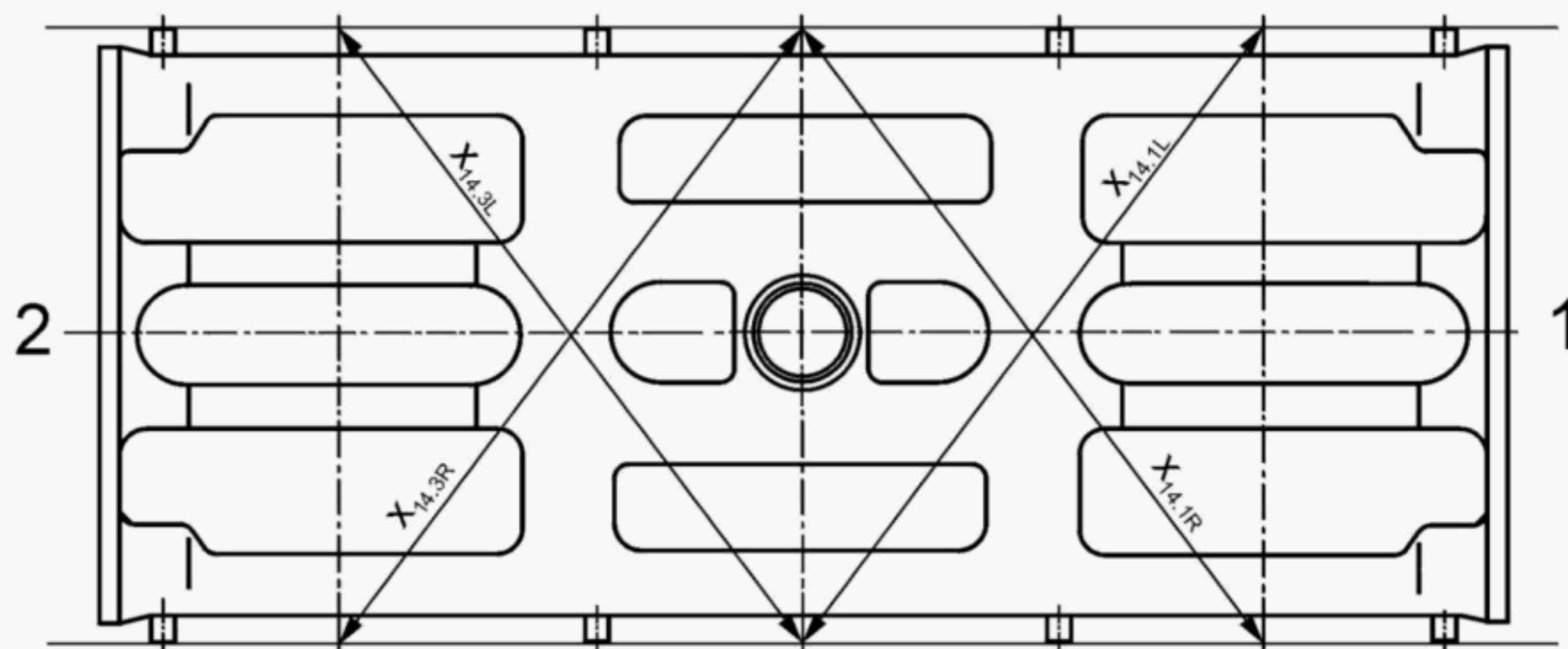


Figure 5

The diagonal distances  $x_{14}$  between the centres of the associated pairs of suspension brackets are measured (see Figure 5).

Permissible difference for two diagonally associated  $x_{14}$  dimensions: 3 mm

## Measuring process 6

Concentricity of the bogie pivot.

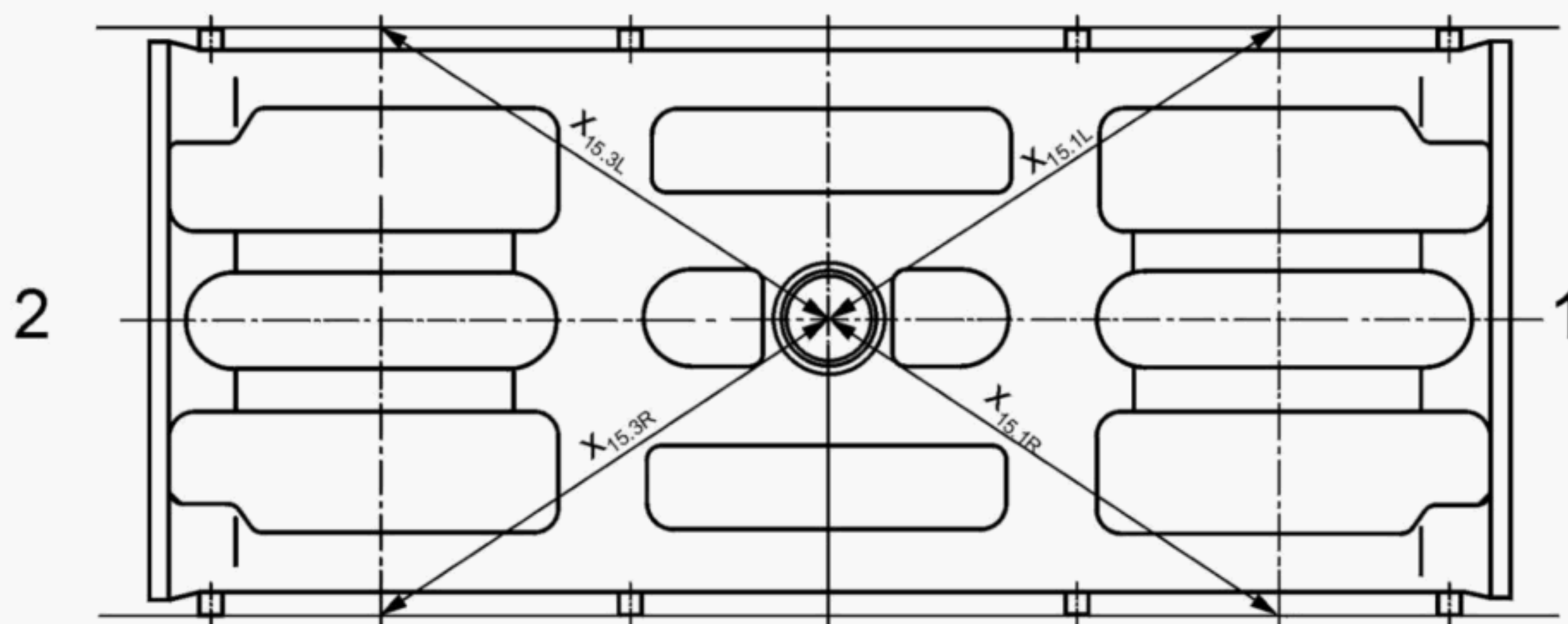


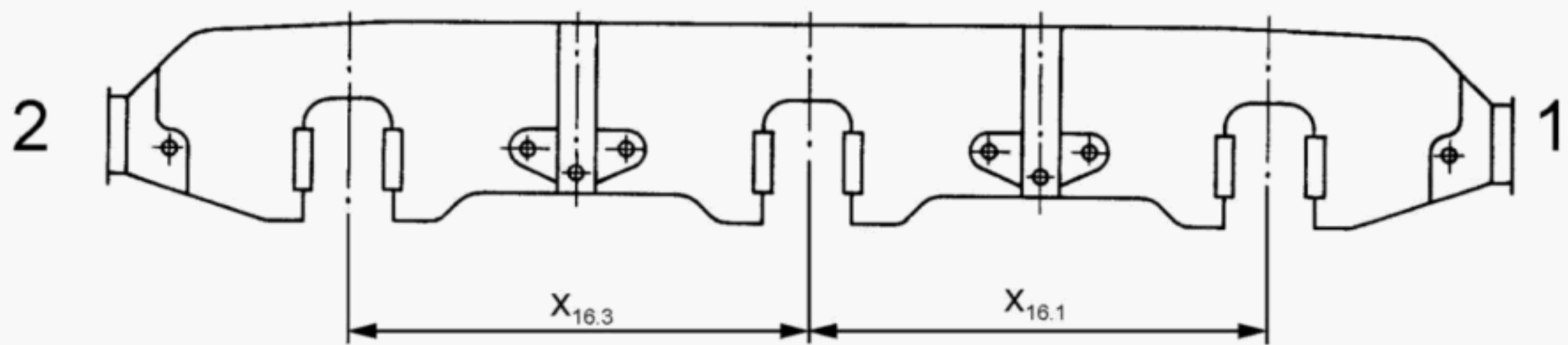
Figure 6

The dimensions  $x_{15.1}$  and  $x_{15.3}$  are measured on the right-hand and left-hand sides (see Figure 6).

Permissible difference for  $x_{15}$ : 4 mm

**Measuring process 7**

Wheel base

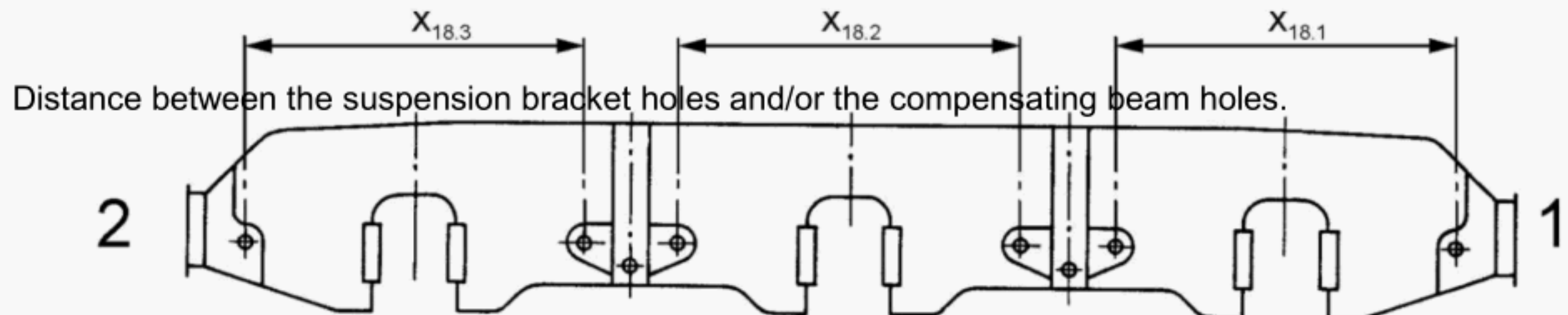
**Figure 7**

The distances between the pairs of suspension brackets are measured at measuring points  $x_{16.1}$  and  $x_{16.3}$  on the right-hand and left-hand sides (see Figure 7).

Limit deviations for  $x_{16}$  :  $\pm 2$  mm

Permissible difference between  $x_{16.1}$  R and  $x_{16.1}$  L: 2 mm

and  $x_{16.3}$  R and  $x_{16.3}$  L: 2 mm

**Measuring process 8**

Distance between the suspension bracket holes and/or the compensating beam holes.

**Figure 8**

The dimensions  $x_{18.1}$  to  $x_{18.3}$  are measured on the right-hand and left-hand sides (see Figure 8).

Limit deviations for  $x_{18}$ :  $\pm 2$  mm





### Measuring process 9

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

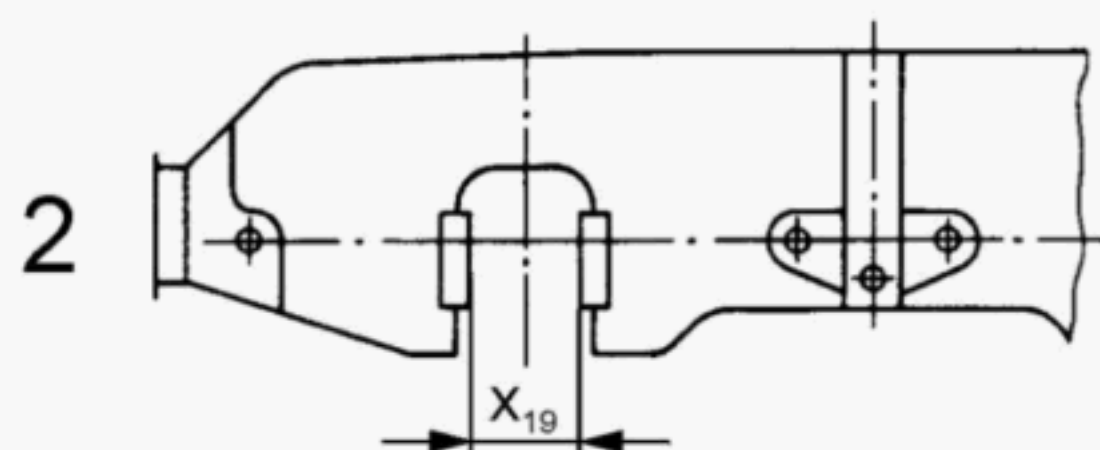


Figure 9

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

Limit deviations for  $x_{19}$ :  $\pm 1,5$  mm

### Measuring process 10

Symmetry of the axle-guard cheeks.

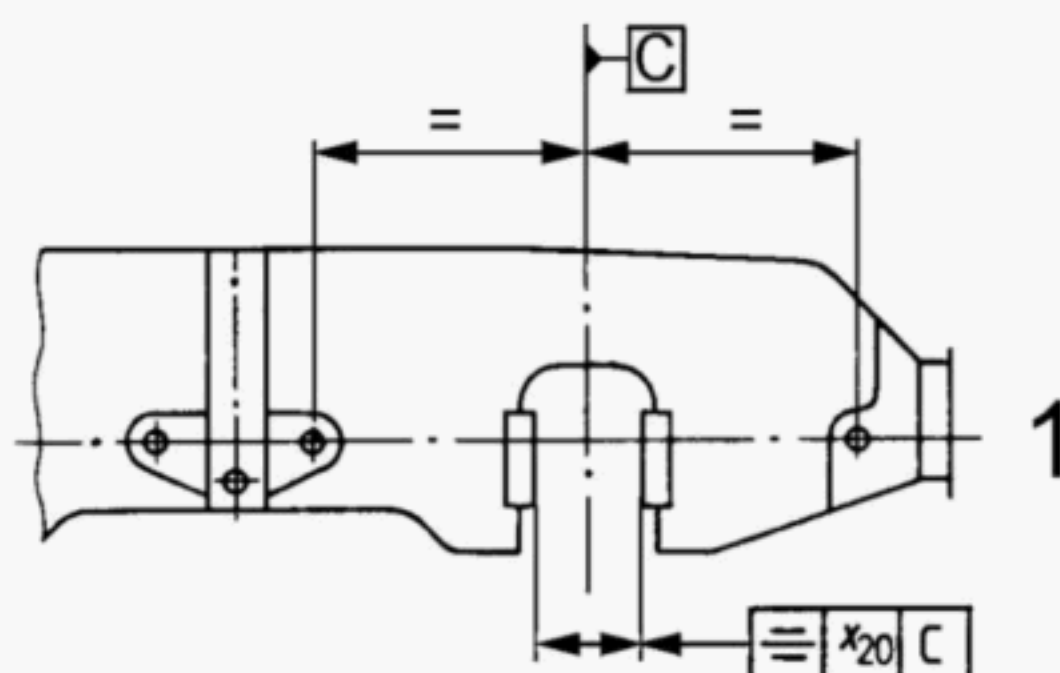


Figure 10

The symmetrical deviation of the axle-guard cheeks relative to the suspension bracket holes or the compensating beam holes is measured (see Figure 10).

Tolerance on symmetry  $x_{20}$ :  $\pm 3$  mm

### Measuring process 11

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

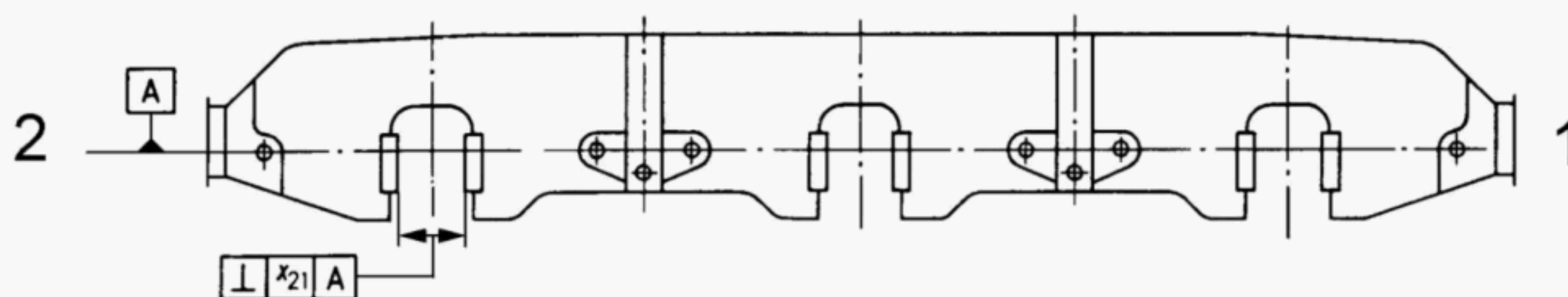


Figure 11

The deviation from rectangularity of the axle-guard cheeks relative to the holes of the suspension brackets or the horizontal compensating beam holes is measured (see Figure 11). The measured length is the length of the axle-guard plates.

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

### Measuring process 12

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

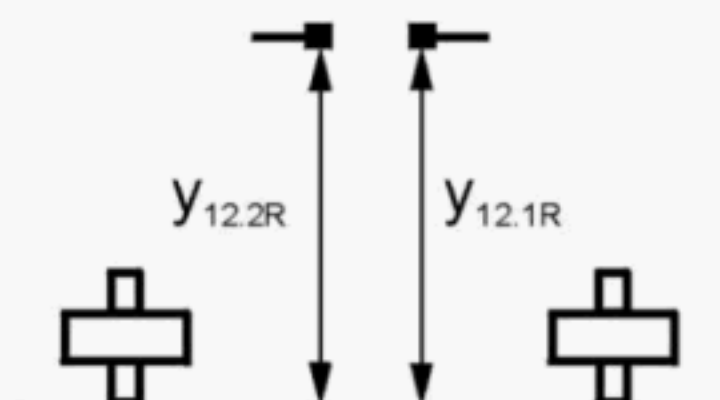


Figure 12

The distance between the outside face of the axle-guard cheeks and the suspension bracket reference axis is measured (see Figure 12).

Limit deviations for  $y_{12}$ :  $\pm 2$  mm

### Measuring process 13

Distance between the pairs of axle-guard cheeks.

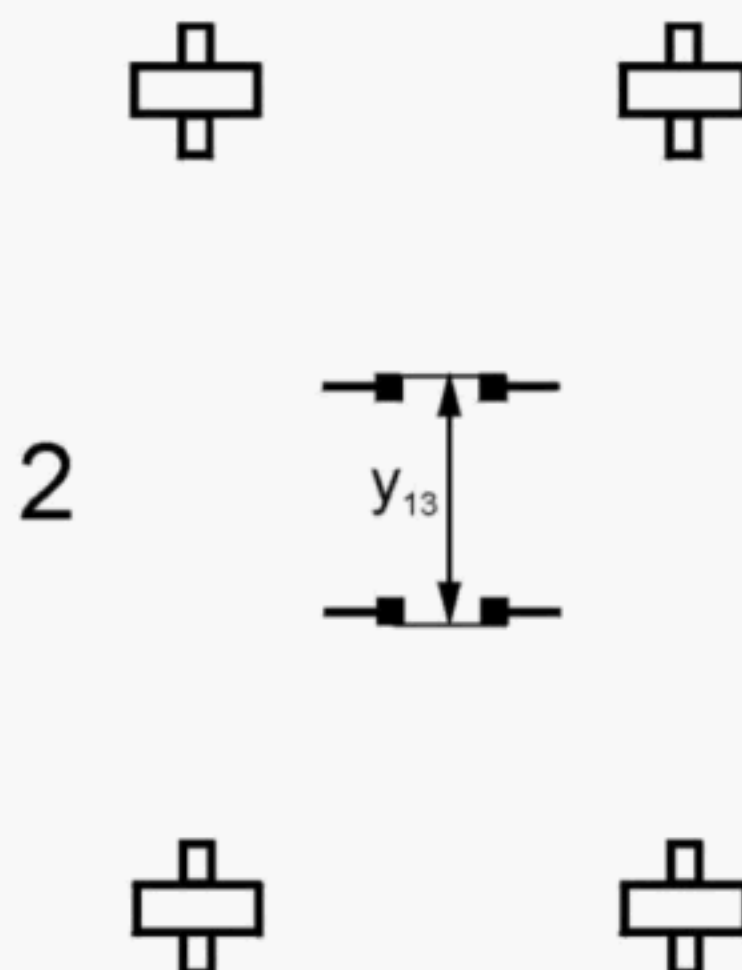


Figure 13

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

Limit deviations for  $y_{13}$ :  $\pm 2$  mm

## Measuring process 14

Rectangularity of the axle-guard cheeks.

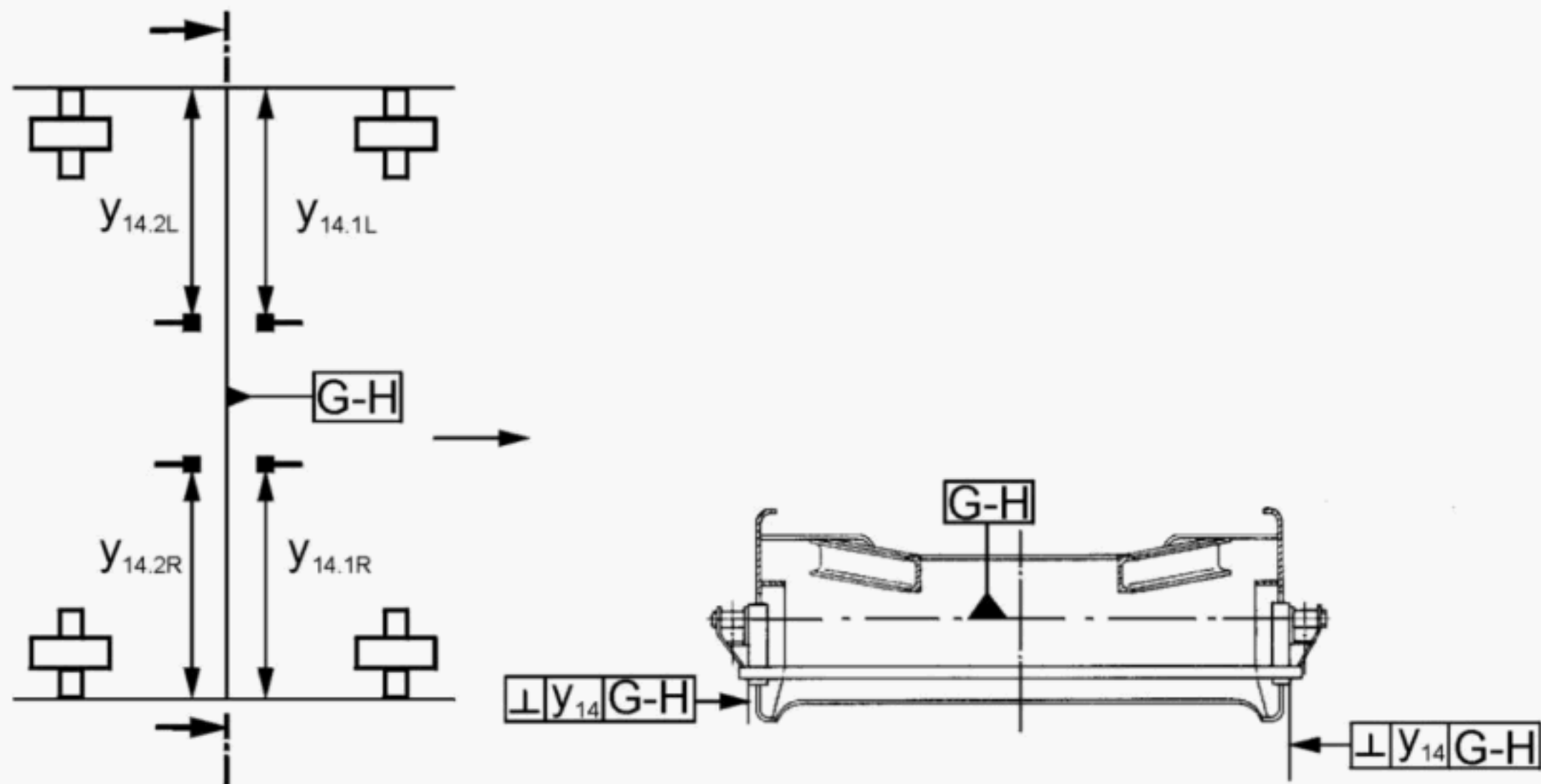


Figure 14

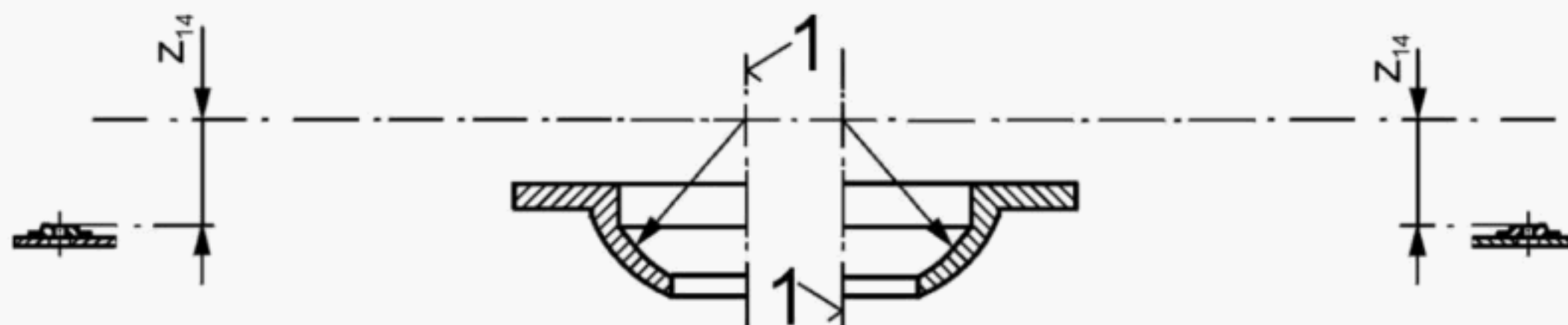
The deviation in rectangularity of the outside faces of the axle-guard cheeks is measured relative to a reference line (G-H) formed by joining up each opposite pair of suspension bracket bushings (see Figure 14).

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

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

## Measuring process 15

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



Key

1 Centre of the bogie pivot

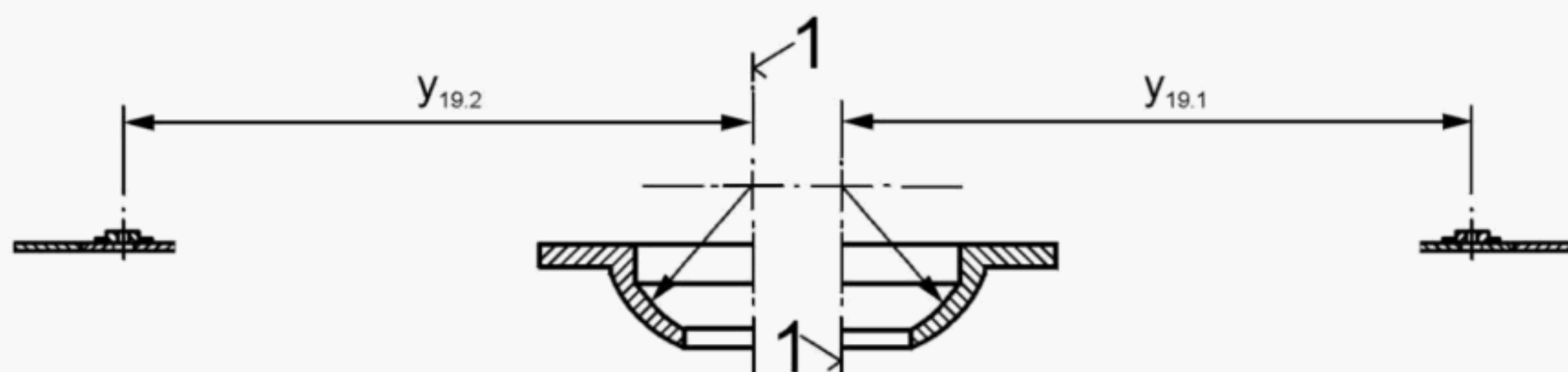
Figure 15

The distances  $z_{14}$  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  $z_{14}$ :  $\pm 1$  mm

**Measuring process 16**

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

**Key**

1 Centre of the bogie pivot

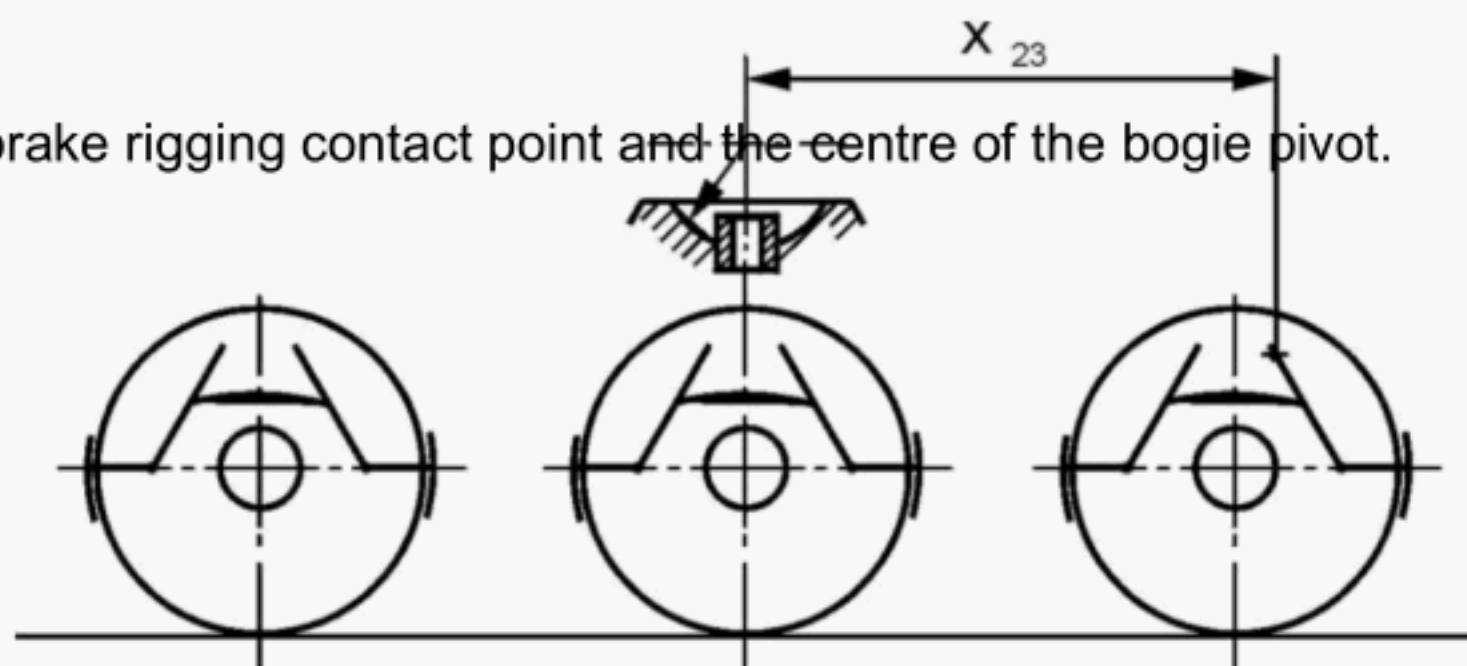
**Figure 16**

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

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

**Measuring process 17**

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

**Figure 17**

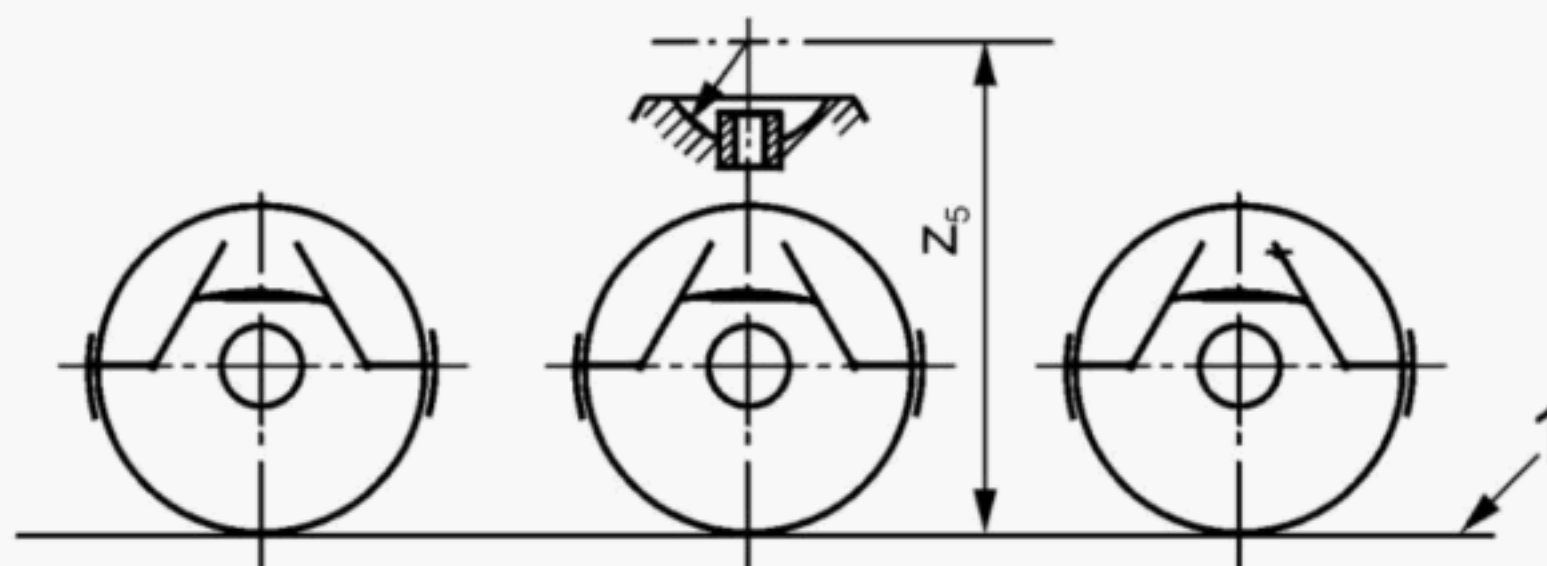
The distance  $x_{23}$  between the brake rigging contact point and the centre of the bogie pivot is measured (see Figure 17). For this, the brake blocks are resting on the wheel without any pressure applied.

Limit deviations for  $x_{23}$ :  $\pm 25$  mm



## Measuring process 18

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



### Key

1 Top of the rail SO

Figure 18

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 31 t (see Figure 18).

Limit deviation for  $z_5$ :  mm

## Annex A

### (normative)

## Control sheet

## Control sheet form

Annex A contains a control sheet form with the individual measuring processes. The structures of the control sheet are based on practical experience. This form shall be used in principle for documenting the measured results. In Table A.1 "Control sheet form", dotted lines have been provided 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

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 and the holes for the suspension compensating beam (see annex B)	Z <sub>n</sub>	±3	R							
				L							
2	Distance between the theoretical plane of suspension bracket bushing pair and the centre of the bogie pivot.	Z <sub>D</sub> ± 2		R							
				L							
3	Distance between the outside front faces of the suspension brackets and the bearing points for the suspension compensating beams in the transverse direction of the bogie										
4	Position of the suspension bracket front faces and the bearing points for the compensating beam			R							
				L							
		± 2									
		-----									
		y <sub>10</sub>	± 2								
		y <sub>11</sub> -----									
5	Diagonal distance between the centres of pairs of suspension brackets	X <sub>14</sub> -----	3	R							
				L							
6	Concentricity of the bogie pivot	x <sub>15</sub>	4	R							
				L							
7	Wheel base	x <sub>16</sub> -----	± 2	R							
				L							
8	Distance between the suspension bracket holes and/or the compensating beam holes	X <sub>18</sub>	± 2	R							
				L							
9	Longitudinal distance between the axle-guard cheeks at the narrowest point relative to the vertical	X <sub>19</sub> -----	± 1,5	R							
				L							





Table A.1 (*concluded*)

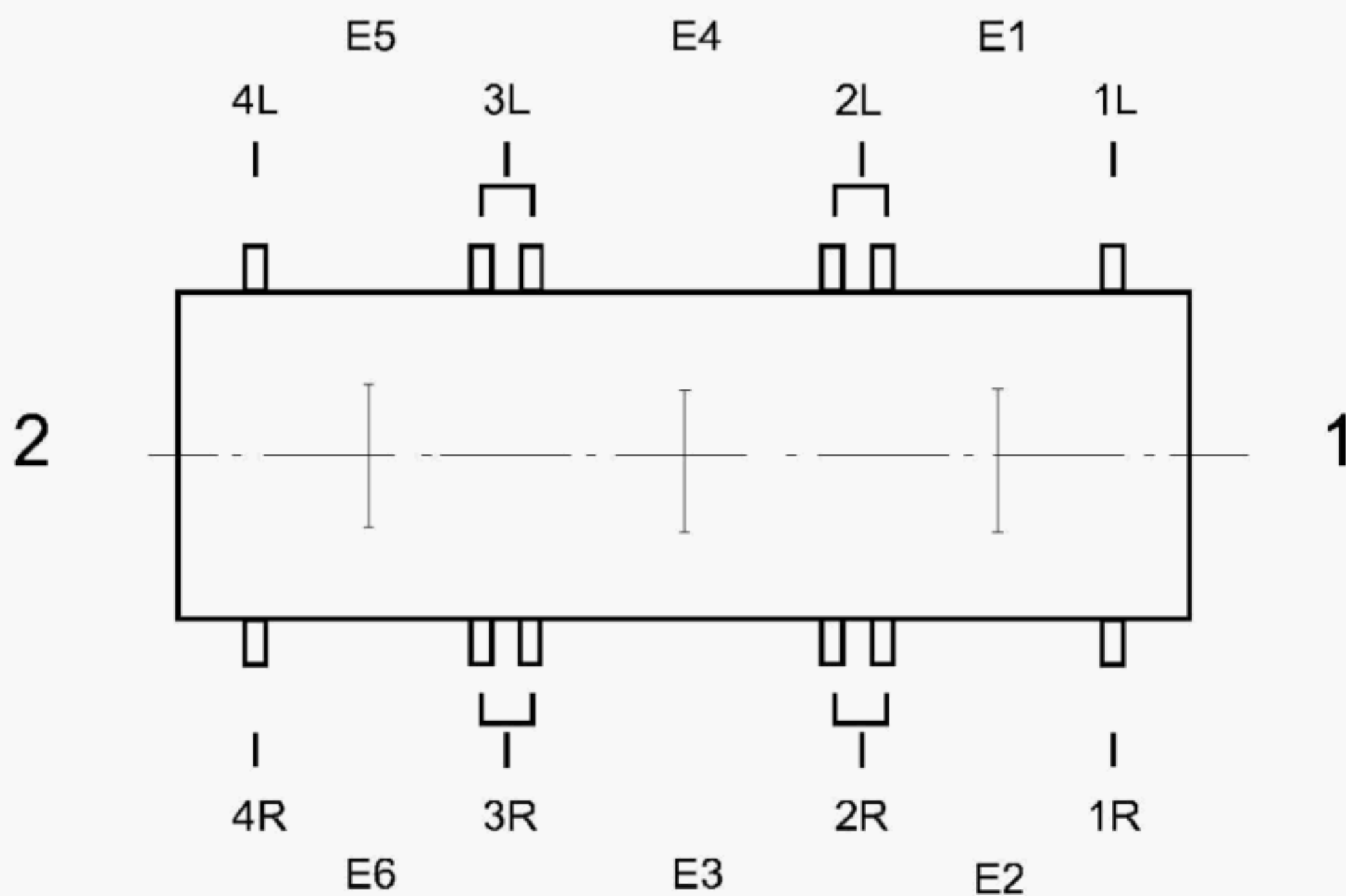
Measuring process		Dimensions in mm		Actual limit deviations or tolerances at the designated measuring points						Remark	
		Measuring point nominal dimension	Limit deviation or tolerance		1	2	3	4	5	6	
16	Distance between the side bearers and the centre of the bogie pivot	y <sub>19</sub> .....	± 2	R L							
17	Distance between the brake rigging contact point and the centre of the bogie pivot	x <sub>23</sub> .....	± 25								
18	Distance between the centre of the bogie pivot and the top of the rail	z <sub>5</sub> .....	+3 - 5								
Company		Purchaser:	Underframe Nb.:			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 bracket holes and position of the holes for the compensating beam

The position of the suspension bracket holes and of the compensating beam holes should theoretically be determined via 12 measuring points. In practice, however, only 8 measuring points are taken into account as the tolerances on the position of the compensating beam holes compared with the fulcrum are negligible.



Suspension bracket measuring point	Measured value [mm]	Mean value	Difference to mean value plane	Plane of suspension bracket pair
1L	144,0	142,0	0	E1
2L	140,0			
1R	143,0	142,5	0,5	E2
2R	142,0			
2R	142,0	141,5	-0,5	E3
3R	141,0			
2L	140,0	141,0	-1	E4
3L	141,5			
3L	141,5	141,5	-0,5	E5
4L	142,0			
3R	141,0	142,0	0	E6
4R	143,0			

The levelling plane is defined by points E1, E2 and E6. The values E3, E4 and E6 lie within the permissible tolerance to the levelling plane.

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

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

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

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



## Bibliography

- [1] prEN 1277:1997, *Logistics - Structure, basic terms and definitions in logistics*.
- [2] EN 13775-2, *Railway applications — Measurement of new and modified freight wagons — Part 2: Freight wagons with bogies*.
- [3] EN 13775-3, *Railway applications — Measurement of new and modified freight wagons — Part 3: Freight wagons with 2 wheelsets*.
- [4] EN 13775-4, *Railway applications — Measurement of new and modified freight wagons — Part 5: Bogies with 2 wheelsets*.
- [5] EN 13775-6, *Railway applications — Measurement of new and modified freight wagons — Part 6: Multiple and articulated freight wagons*.

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