

Council Directive 96/53/EC of 25 July 1996 laying down for certain road vehicles circulating within the Community the maximum authorized dimensions in national and international traffic and the maximum authorized weights in international traffic

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## ANNEX I

## MAXIMUM WEIGHTS AND DIMENSIONS AND RELATED CHARACTERISTICS OF VEHICLES

1.	<b>Maximum authorized dimensions for the vehicles referred to in Article 1 (1) (a)</b>	
[ <sup>F1</sup> 1.1	<i>maximum length:</i>	
	— motor vehicle other than a bus 12,00 m	12,00 m
	— trailer	12,00 m
	— articulated vehicle	16,50 m
	— road train	18,75 m
	— articulated bus	18,75 m
	— bus with two axles	13,50 m
	— bus with more than two axles	15,00 m
	— bus + trailer	18,75 m]
1.2	<i>Maximum width:</i>	
	[ <sup>F2</sup> (a) all vehicles except the vehicles referred to in point (b)	2,55 m]
	[ <sup>F2</sup> (b) superstructures of conditioned vehicles or conditioned containers or swap bodies transported by vehicles	2,60 m]
1.3	<i>Maximum height (any vehicle)</i>	4,00 m
1.4	Removable superstructures and standardized freight items such as containers are included in the dimensions specified in points 1.1, 1.2, 1.3, 1.6, 1.7, 1.8 and 4.4	
[ <sup>F3</sup> 1.4a	If any removable attachments such as ski-boxes are fitted to a bus, its length, including the attachments, must not exceed the maximum length laid down in point 1.1	]

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1.5	Any motor vehicle or vehicle combination which is in motion must be able to turn within a swept circle having an outer radius of 12,50 m and an inner radius of 5,30 m	
[ <sup>F3</sup> 1.5a	<i>Additional requirements for buses</i>  With the vehicle stationary, a vertical plane tangential to the side of the vehicle and facing outwards from the circle shall be established by marking a line on the ground. In the case of an articulated vehicle, the two rigid portions shall be aligned with the plane  When the vehicle moves from a straight line approach into the circular area described in point 1.5, no part of it shall move outside of that vertical plane by more than 0,60 m	]
1.6	Maximum distance between the axis of the fifth-wheel king pin and the rear of a semi-trailer	12,00 m
1.7	Maximum distance measured parallel to the longitudinal axis of the road train from the foremost external point of the loading area behind the cabin to the rearmost external point of the trailer of the combination, minus the distance between the rear of the drawing vehicle and the front of the trailer	15,65 m

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1.8	Maximum distance measured parallel to the longitudinal axis of the road train from the foremost external point of the loading area behind the cabin to the rearmost external point of the trailer of the combination	16,40 m
2.	<b>Maximum authorized vehicle weight (in tonnes)</b>	
2.1	<i>Vehicles forming part of a vehicle combination</i>	
2.1.1	Two-axle trailer	18 tonnes
2.1.2	Three-axle trailer	24 tonnes
2.2	<i>Vehicle combinations</i>	
2.2.1	Road trains with five or six axles [ <sup>F4</sup> In the case of vehicle combinations including alternatively fuelled or zero-emission vehicles, the maximum authorised weights provided for in this section shall be increased by the additional weight of the alternative fuel or zero-emission technology with a maximum of 1 tonne and 2 tonnes respectively.]	
	(a) two-axle motor vehicle with three-axle trailer	40 tonnes
	(b) three-axle motor vehicle with two or three-axle trailer	40 tonnes
2.2.2	Articulated vehicles with five or six axles [ <sup>F4</sup> In the case of vehicle combinations including alternatively fuelled or zero-emission vehicles, the maximum authorised weights provided for in this section shall be increased by the additional weight of the alternative fuel or zero-emission technology with a maximum of 1 tonne and 2 tonnes respectively.]	

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	(a) two-axle motor vehicle with three-axle semi-trailer	40 tonnes
	(b) three-axle motor vehicle with two or three-axle semi-trailer	40 tonnes
	[ <sup>F2</sup> (c) two-axle motor vehicle with three-axle semi-trailer carrying, in intermodal transport operations, one or more containers or swap bodies, up to a total maximum length of 45 feet	42 tonnes]
	[ <sup>F5</sup> (d) three-axle motor vehicle with two- or three-axle semi-trailer carrying, in intermodal transport operations, one or more containers or swap bodies, up to a total maximum length of 45 feet	44 tonnes]
2.2.3	Road trains with four axles consisting of a two-axle motor vehicle and a two-axle trailer [ <sup>F4</sup> In the case of vehicle combinations including alternatively fuelled or zero-emission vehicles, the maximum authorised weights provided for in this section shall be increased by the additional weight of the alternative fuel or zero-emission technology with a maximum of 1 tonne and 2 tonnes respectively.]	36 tonnes
2.2.4	Articulated vehicles with four axles consisting of a two-axle motor vehicle and a two-axle semi-trailer, if the distance between the axles of the semi-trailer: [ <sup>F4</sup> In the case of vehicle combinations including alternatively fuelled or zero-emission vehicles, the maximum authorised weights provided for in this section shall be increased	

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	by the additional weight of the alternative fuel or zero-emission technology with a maximum of 1 tonne and 2 tonnes respectively.]	
2.2.4.1	is 1,3 m or greater but not more than 1,8 m	36 tonnes
2.2.4.2	is greater than 1,8 m	36 tonnes + 2 tonnes margin when the maximum authorized weight (MAW) of the motor vehicle (18 tonnes) and the MAW of the tandem axle of the semi-trailer (20 tonnes) are respected and the driving axle is fitted with twin tyres and air suspension or suspension recognized as being equivalent within the Community as defined in Annex II
2.3	<i>Motor vehicles</i>	
[ <sup>F2</sup> 2.3.1	Two-axle motor vehicles other than buses: 18 tonnes Two-axle alternatively fuelled motor vehicles other than buses: the maximum authorised weight of 18 tonnes is increased by the additional weight required for the alternative fuel technology with a maximum of 1 tonne [ <sup>F4</sup> Zero-emission vehicles: the maximum authorised weight of 18 tonnes is increased by the additional weight of the zero-emission technology with a maximum of 2 tonnes.]	Two-axle buses: 19,5 tonnes]
[ <sup>F2</sup> 2.3.2	Three-axle motor vehicles	25 tonnes, or 26 tonnes where the driving axle is fitted with twin tyres and air suspension or suspension recognised as being equivalent within the Union as defined in Annex II, or where each driving axle is fitted with twin tyres and the maximum weight of

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		<p>each axle does not exceed 9,5 tonnes.</p> <p>Three-axle alternatively fuelled motor vehicles: the maximum authorised weight of 25 tonnes, or 26 tonnes where the driving axle is fitted with twin tyres and air suspension or suspension recognised as being equivalent within the Union as defined in Annex II, or where each driving axle is fitted with twin tyres and the maximum weight of each axle does not exceed 9,5 tonnes, is increased by the additional weight required for the alternative fuel technology with a maximum of 1 tonne</p> <p>[<sup>F4</sup>Three-axle zero-emission vehicles: the maximum authorised weight of 25 tonnes, or 26 tonnes where the driving axle is fitted with twin tyres and air suspension or suspension recognised as being equivalent within the Union as defined in Annex II or where each driving axle is fitted with twin tyres and the maximum weight of each axle does not exceed 9,5 tonnes, is increased by the additional weight of the zero-emission technology with a maximum of 2 tonnes.]]</p>
2.3.3	Four-axle motor vehicles with two steering axles	—32 tonnes where the driving axle is fitted with twin tyres and air suspension or suspension recognized as being equivalent within the Community as defined in Annex II, or where each driving axle is fitted with twin tyres and the maximum weight of each axle does not exceed 9,5 tonnes

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[ <sup>F2</sup> 2.4	Three-axle articulated buses	28 tonnes Three-axle articulated buses alternatively fuelled: the maximum authorised weight of 28 tonnes is increased by the additional weight required for the alternative fuel technology with a maximum of 1 tonne [ <sup>F4</sup> Three-axle articulated buses that are zero-emission vehicles: the maximum authorised weight of 28 tonnes is increased by the additional weight of the zero-emission technology with a maximum of 2 tonnes.]]
3.	<b>Maximum authorized axle weight of the vehicles referred to in Article 1 (1) (b) (in tonnes)</b>	
3.1	<i>Single axles</i> Single non-driving axle	10 tonnes
3.2	<i>Tandem axles of trailers and semi-trailers</i> The sum of the axle weights per tandem axle must not exceed, if the distance (d) between the axles is:	
3.2.1	less than 1 m ( $d < 1,0$ )	11 tonnes
3.2.2	between 1,0 m and less than 1,3 m ( $1,0 \leq d < 1,3$ )	16 tonnes
3.2.3	between 1,3 m and less than 1,8 m ( $1,3 \leq d < 1,8$ )	18 tonnes
3.2.4	1,8 m or more ( $1,8 \leq d$ )	20 tonnes
3.3	<i>Tri-axles of trailers and semi-trailers</i> The sum of the axle weights per tri-axle must not exceed, if the distance (d) between the axles is:	



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3.3.1	1,3 m or less ( $d \leq 1,3$ )	21 tonnes
3.3.2	over 1,3 m and up to 1,4 m ( $1,3 < d \leq 1,4$ )	24 tonnes
3.4	<i>Driving axle</i>	
3.4.1	Driving axle of the vehicles referred to in 2.2.1 and 2.2.2	11,5 tonnes
3.4.2	Driving axle of the vehicles referred to in points 2.2.3, 2.2.4, 2.3 and 2.4	11,5 tonnes
3.5	<i>Tandem axles of motor vehicles</i>  The sum of the axle weights per tandem axle must not exceed, if the distance (d) between the axles is:	
3.5.1	less than 1 m ( $d < 1,0$ )	11,5 tonnes
3.5.2	1,0 m or greater but less than 1,3 m ( $1,0 \leq d < 1,3$ )	16 tonnes
3.5.3	1,3 m or greater but less than 1,8 m ( $1,3 \leq d < 1,8$ )	—18 tonnes —19 tonnes where the driving axle is fitted with twin tyres and air suspension or suspension recognized as being equivalent within the Community as defined in Annex II, or where each driving axle is fitted with twin tyres and where the maximum weight for each axle does not exceed 9,5 tonnes
4.	<b>Related characteristics of the vehicles referred to in Article 1 (1) (b)</b>	
4.1	<i>All vehicles</i>  The weight borne by the driving axle or driving axles of a vehicle or vehicle combination must not be less than 25 % of the total	

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	laden weight of the vehicle or vehicle combination, when used in international traffic	
4.2	<i>Road trains</i> The distance between the rear axle of a motor vehicle and the front axle of a trailer must not be less than 3,00 m.	
4.3	<i>Maximum authorized weight depending on the wheelbase</i> The maximum authorized weight in tonnes of a four-axle motor vehicle may not exceed five times the distance in metres between the axes of the foremost and rearmost axles of the vehicle	
4.4	<i>Semi-trailers</i> The distance measured horizontally between the axis of the fifth-wheel king pin and any point at the front of the semi-trailer must not exceed 2,04 m	

#### Textual Amendments

- F1** Substituted by Directive 2002/7/EC of the European Parliament and of the Council of 18 February 2002 amending Council Directive 96/53/EC laying down for certain road vehicles circulating within the Community the maximum authorised dimensions in national and international traffic and the maximum authorised weights in international traffic.
- F2** Substituted by Directive (EU) 2015/719 of the European Parliament and of the Council of 29 April 2015 amending Council Directive 96/53/EC laying down for certain road vehicles circulating within the Community the maximum authorised dimensions in national and international traffic and the maximum authorised weights in international traffic (Text with EEA relevance).
- F3** Inserted by Directive 2002/7/EC of the European Parliament and of the Council of 18 February 2002 amending Council Directive 96/53/EC laying down for certain road vehicles circulating within the

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Community the maximum authorised dimensions in national and international traffic and the maximum authorised weights in international traffic.

**F4** Inserted by Regulation (EU) 2019/1242 of the European Parliament and of the Council of 20 June 2019 setting CO<sub>2</sub> emission performance standards for new heavy-duty vehicles and amending Regulations (EC) No 595/2009 and (EU) 2018/956 of the European Parliament and of the Council and Council Directive 96/53/EC (Text with EEA relevance).

**F5** Inserted by Directive (EU) 2015/719 of the European Parliament and of the Council of 29 April 2015 amending Council Directive 96/53/EC laying down for certain road vehicles circulating within the Community the maximum authorised dimensions in national and international traffic and the maximum authorised weights in international traffic (Text with EEA relevance).

## ANNEX II

### CONDITIONS RELATING TO EQUIVALENCE BETWEEN CERTAIN NON-AIR SUSPENSION SYSTEMS AND AIR SUSPENSION FOR VEHICLE DRIVING AXLE(S)

#### 1. DEFINITION OF AIR SUSPENSION

A suspension system is considered to be air suspended if at least 75 % of the spring effect is caused by the air spring.

#### 2. EQUIVALENCE TO AIR SUSPENSION

A suspension recognized as being equivalent to air suspension must conform to the following:

- 2.1. during free transient low frequency vertical oscillation of the sprung mass above a driving axle or bogie, the measured frequency and damping with the suspension carrying its maximum load must fall within the limits defined in points 2.2 to 2.5;
- 2.2. each axle must be fitted with hydraulic dampers. On tandem axle bogies, the dampers must be positioned to minimize the oscillation of the bogies;
- 2.3. the mean damping ratio D must be more than 20 % of critical damping for the suspension in its normal conditions with hydraulic dampers in place and operating;
- 2.4. the damping ratio D of the suspension with all hydraulic dampers removed or incapacitated must be not more than 50 % of D;
- 2.5. the frequency of the sprung mass above the driving axle or bogie in a free transient vertical oscillation must not be higher than 2,0 Hz;
- 2.6. the frequency and damping of the suspension are given in paragraph 3. The test procedures for measuring the frequency and damping are laid down in paragraph 4.

#### 3. DEFINITION OF FREQUENCY AND DAMPING

In this definition a sprung mass M (kg) above a driving axle or bogie is considered. The axle or bogie has a total vertical stiffness between the road surface and the sprung mass of K Newtons/metre (N/m) and a total damping coefficient of C Newtons per metre per second (N.s/m). The vertical displacement of the sprung mass is Z. The equation of motion for free oscillation of the sprung mass is:

$$M \frac{d^2 Z}{dt^2} + C \frac{dZ}{dt} + kZ = 0$$

The frequency of oscillation of the sprung mass F (rad/sec) is:

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$$F = \sqrt{\frac{K}{M} - \frac{C^2}{4M^2}}$$

The damping is critical when  $C = C_0$ ,

where

$$C_0 = 2\sqrt{KM}$$

The damping ratio as a fraction of critical damping is

$$\frac{C}{C_0}$$

During free transient oscillation of the sprung mass the vertical motion of the mass will follow a damped sinusoidal path (Figure 2). The frequency can be estimated by measuring the time for as many cycles of oscillation as can be observed. The damping can be estimated by measuring the heights of successive peaks of the oscillation in the same direction. If the peak amplitudes of the first and second cycles of the oscillation are  $A_1$  and  $A_2$ , then the damping ratio  $D$  is;

$$D = \frac{C}{C_0} = \frac{1}{2\pi} \times \ln \frac{A_1}{A_2}$$

‘ln’ being the natural logarithm of the amplitude ratio.

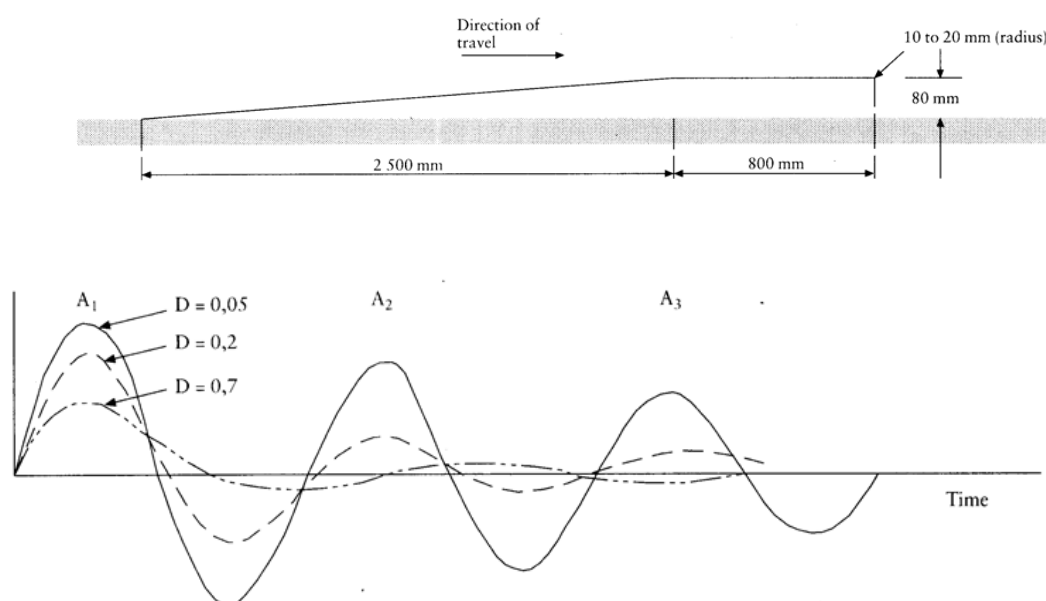
#### 4. TEST PROCEDURE

To establish by test the damping ratio  $D$ , the damping ratio with hydraulic dampers removed, and the frequency  $F$  of the suspension, the loaded vehicle should either:

- (a) be driven at low speed (5 km/hr + 1 km/hr) over an 80 mm step with the profile shown in Figure 1. The transient oscillation to be analyzed for frequency and damping occurs after the wheels on the driving axle have left the step;  
or
- (b) be pulled down by its chassis so that the driving axle load is 1,5 times its maximum static value. The vehicle held down is suddenly released and the subsequent oscillation analyzed;  
or
- (c) be pulled up by its chassis so that the sprung mass is lifted by 80 mm above the driving axle. The vehicle held up is suddenly dropped and the subsequent oscillation analyzed;  
or
- (d) be subjected to other procedures insofar as it has been proved by the manufacturer, to the satisfaction of the technical department, that they are equivalent.

The vehicle should be instrumented with a vertical displacement transducer between driving axle and chassis, directly above the driving axle. From the trace, the time interval between the first and second compression peaks can be measured to obtain the frequency  $F$  and the amplitude ratio to obtain the damping. For twin-drive bogies, vertical displacement transducers should be fitted between each driving axle and the chassis directly above it.

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## ANNEX IV

### PLATE RELATING TO DIMENSIONS REFERRED TO IN ARTICLE 6 (1) (a)

#### I.

The plate relating to dimensions, as far as possible affixed next to the plate referred to in Directive 76/114/EEC, must contain the following data:

1. name of the manufacturer<sup>(1)</sup>;
2. vehicle identification number<sup>(2)</sup>;
3. length of the motor vehicle, trailer or semi-trailer (L);
4. width of the motor vehicle, trailer or semi-trailer (W);
5. data for the measurement of the length of vehicle combinations:
  - the distance (a) between the front of the motor vehicle and the centre of the coupling device (coupling hook or fifth wheel); in the case of a fifth wheel with several coupling points, the minimum and maximum values must be given ( $a_{\min}$  and  $a_{\max}$ ),
  - the distance (b) between the centre of the coupling device of the trailer (fifth wheel ring) or of the semi-trailer (kingpin) and the rear of the trailer or of the semi-trailer; in the case of a device with several coupling points, the minimum and maximum values must be given ( $b_{\min}$  and  $b_{\max}$ ).

The length of vehicle combinations is the length of the motor vehicle and trailer or semi-trailer placed in a straight line behind each other.

- II. The values given on the proof of compliance shall reproduce exactly the measurements carried out directly on the vehicle.



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Article 1 (1)	Article 1 (1)								
Article 1 (1) (a)	—								
Article 1 (1) (b)	Article 1 (1) (b)								
Article 1 (2)	Article 1 (2)								
Article 2 1st to 4th and 6th to 10th indents					Article 1 (2)				
Article 2 5th, 11th and 12th indents	—								
Article 2 last paragraph	—								
Article 3 (1)	—								
Article 3 (1) (a) (b)	Article 3 (1) (a) (b)								
Article 3 (2)	Article 3 (2)								
Article 3 (3)	—								
Article 4	—								
Article 5 (a)							Article 1 (1)		
Article 5 (b)								Article 1 (1)	
Article 6 (1 to 4)			Article 1 (1 to 4)						

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Article 6 (5 to 6)			Article 2 (1 to 2)						
Article 7	Article 6								
Article 8						Article 1			
Articles 9 to 12	—								
Article 13	Article 9								
Annex I	Annex I								
Point 1	Point 1								
Point 1.1 1st to 3rd and 5th indent								Article 1 (2)	
Point 1.1 4th indent	—								
Point 1.2 (a)	—								
Point 1.2 (b)	—								
Point 1.3 to 1.5	Point 1.3 to 1.5								
Point 1.6							Article 1 (3)		
Point 1.7								Article 1 (3)	
Point 1.8	—								
Point 2 to 2.2.1 (b)	Point 2 to 2.2.1 (b)								
Point 2.2.2 (a to c)	Point 2.2.2 (a to c)								



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Point 2.2.3 Point 2.2.4.1					Article 1 (5) (b)				
Point 2.2.4.2									Article 1 (1) (a)
Point 2.3 to 2.3.1					Article 1 (5) (c)				
Point 2.3.2 to 2.3.3									Article 1 (1) (b to c)
Point 2.4					Article 1 (5) (c)				
Point 3 to 3.3.2	Point 3 to 3.3.2								
Point 3.4 to 3.4.1		Article 1 (3)							
Point 3.4.2 to 3.5.2					Article 1 (5) (d)				
Point 3.5.3									Article 1 (1) (d)
Point 4 to 4.2	Point 4 to 4.2								
Point 4.3					Article 1 (5) (e)				
Point 4.4							Article 1 (4)		
Annex II									Annex III
Annex III			Annex						

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- (1) This information need not be repeated where the vehicle carries a single plate containing data on both weights and dimensions.
- (2) This information need not be repeated where the vehicle carries a single plate containing data on both weights and dimensions.