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NOTE

From:	General Secretariat of the Council
To:	Delegations
Subject:	Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Regulation (EU) 2019/1242 as regards strengthening the CO_2 emission performance standards for new heavy-duty vehicles and integrating reporting obligations, and repealing Regulation (EU) 2018/956 – Annexes

Delegations will find in the Annex the Commission proposal and the mandates of the European Parliament and the Council of the Annexes for the above mentioned proposal.

COMMISSION PROPOSAL

ANNEX I

Average specific emissions, average specific emission targets and excess emissions

1. VEHICLE SUB-GROUPS

1.1. For the purposes of this Regulation a sub-group *sg* is defined for each new heavy-duty vehicle.

1.1.1. For vehicles of category N the sub-group sg is defined as follows:

Vehicle group according to Annex I to Regulation (EU) 2017/2400	**Vocational vehicle according to Article 3(9) of this Regulation**	**Cab type**	**Engine power**	**Operational range (OR)**	**Vehicle sub-group (sg) attributed for the purposes of this Regulation**
53	**No**	**All**			**53**
54	**No**	**All**			**54**
1s	**No**	**All**			**1s**
1	**No**	**All**			**1**
2	**No**	**All**			**2**
3	**No**	**All**			**3**
4	**No**	**All**	**<170 kW**	**All**	**4-UD**
	No	**Day cab**	**≥170 kW**	**All**	**4-RD**
	No	**Sleeper cab**	**≥170 kW and <265 kW**		
	No	**Sleeper cab**	**≥265 kW**	**< 350 km**	
	No	**Sleeper cab**	**≥265 kW**	**≥ 350 km**	**4-LH**
9	**No**	**Day cab**	**All**	**All**	**9-RD**
	No	**Sleeper cab**	**All**	**< 350 km**	
	No	**Sleeper cab**	**All**	**≥ 350 km**	**9-LH**
5	**No**	**Day cab**	**All**	**All**	**5-RD**
	No	**Sleeper cab**	**< 265 kW**		
	No	**Sleeper cab**	**≥ 265 kW**	**< 350 km**	

	No	**Sleeper cab**	**≥ 265 kW**	**≥ 350 km**	**5-LH**
10	**No**	**Day cab**	**All**	**All**	**10-RD**
	No	**Sleeper cab**	**All**	**< 350 km**	
	No	**Sleeper cab**	**All**	**≥ 350 km**	**10-LH**
11	**No**	**All**			**11**
12	**No**	**All**			**12**
16	**No**	**All**			**16**

‘Sleeper cab’ means a type of cab that has a compartment behind the driver's seat intended to be used for sleeping as reported in accordance with Articles 13a and 13b.

’Day cab’ means a type of cab that is not a sleeper cab.

Where a new heavy-duty vehicle is attributed to sub-group 4-UD, but data on the CO_2 emissions in g/km are not available for the UDL or UDR mission profiles as defined in point 2.1, Table 2 the new heavy-duty vehicle shall be attributed to the sub-group 4-RD

’Operational range’ means the distance a vehicle can travel under long haul transport conditions without being re-charged or re-filled, as provided for in point 1.3.

1.1.2. For vehicles of category M the sub-group *sg* is defined as follows:

Vehicle group pursuant to Annex I to Regulation (EU) 2017/2400	**Vehicle sub-group (sg) attributed for the purposes of this Regulation**
31a, 31d	**31-LF**
31b1	**31-L1**
31b2	**31-L2**
31c, 31e	**31-DD**
32a, 32b	**32-C2**
32c, 32d	**32-C3**
32e, 32f	**32-DD**
33a, 33d, 37a, 37d	**33-LF**
33b1, 37b1	**33-L1**
33b2, 37b2	**33-L2**

33c, 33e, 37c, 37e	**33-DD**
34a, 34b, 36a, 36b, 38a, 38b, 40a, 40b	**34-C2**
34c, 34d, 36c, 36d, 38c, 38d, 40c, 40d	**34-C3**
34e, 34f, 36e, 36f, 38e, 38f, 40e, 40f	**34-DD**
35a, 35b1, 35b2, 35c	**35-FE**
39a, 39b1, 39b2, 35c	**39-FE**

1.1.3. For vehicles of category O the sub-group *sg* is defined as follows:

Vehicle groups defined in Annex I of Regulation (EU) 2022/1362	**Vehicle sub-group (sg) attributed for the purposes of this Regulation**
All groups provided in Table 1 with 1, 2, 3 axles	**Same as provided in column "vehicle group" of the tables in Annex I to Regulation (EU) 2022/1362.**
All groups provided in Table 4 with 1, 2, 3 axles	
All groups provided in Table 6	

1.2. Vocational vehicles are defined by the following criteria:

Vehicle category	**Chassis configuration**	**Criteria for vocational vehicles**
N	**Rigid**	**One of the following digits, as listed in Appendix 2 of Annex I to Regulation (EU) 2018/858, is used to supplement the code for bodywork indicated in entry 38 of the certificate of conformity: 09, 10, 15, 16, 18, 19, 20, 23, 24, 25, 26, 27, 28, 31;**
	Tractor	**Maximum speed not exceeding 79 km/h**

1.3. Operational ranges for the purposes of this Regulation are set as follows:

Powertrain technology	**Operational range (OR)**
Vehicles drawing energy for the purpose of mechanical propulsion only from an electrical energy or power storage device	**OR = actual charge depleting range as provided for by point 2.4.1 of part I of Annex IV to Regulation (EU) 2017/2400 for the LHR mission profile**
Other technologies	**OR > 350 km**

1.4. Definitions of mission profiles

RDL	**Regional delivery payload low**
RDR	**Regional delivery payload representative**
LHL	**Long haul payload low**
LHR	**Long haul payload representative**
UDL	**Urban delivery payload low**
UDR	**Urban delivery payload representative**
REL	**Regional delivery (EMS) payload low**
RER	**Regional delivery (EMS) payload representative**
LEL	**Long haul (EMS) payload low**
LER	**Long haul (EMS) payload representative**
MUL	**Municipal utility payload low**
MUR	**Municipal utility payload representative**
COL	**Construction payload low**
COR	**Construction payload representative**
HPL	**Heavy urban, person transport, low load**
HPR	**Heavy urban, person transport, representative load**
UPL	**Urban, person transport, low load**
UPR	**Urban, person transport, representative load**
SPL	**Sub-urban, person transport, low load**
SPR	**Sub-urban, person transport, representative load**
IPL	**Inter-urban, person transport, low load**
IPR	**Inter-uban, person transport, representative load**
CPL	**Coach, person transport, low load**
CPR	**Coach, person transport, representative load**

2. CALCULATION OF THE AVERAGE SPECIFIC EMISSIONS OF A MANUFACTURER

2.1. Calculation of the specific CO_2 emissions of a new heavy-duty vehicle

The specific emissions in g/km of a new heavy-duty vehicle *v* attributed to a sub-group *sg* or of its primary vehicle shall be calculated in accordance with the following formula:

$$CO2_v = \sum_{mp} W_{sg,mp} \times CO2_{v,mp}$$

$$CO2\mathrm{p}_v = \sum_{mp} W_{sg,mp} \times CO2\mathrm{p}_{v,mp}$$

Where,

$\sum_{mp}$ is the sum over all mission profiles *mp* listed in Table 2;

sg is the sub-group to which the new heavy-duty vehicle *v* has been attributed according to Section 1 of this Annex;

$W_{sg,mp,}$ is the mission profile weight specified in points 2.1.1 to 2.1.3;

$CO2_{v,mp}$ is the CO_2 emissions in g/km of the new heavy-duty vehicle *v* determined for a mission profile *mp*, reported in accordance with Articles 13a and 13b and normalised pursuant to Annex III;

$CO2p_{v,mp}$ is the CO_2 emissions in g/km of the primary vehicle of the new heavy-duty vehicle *v*, determined for a mission profile *mp*, reported in accordance with Articles 13a and 13b;

For zero-emissions motor vehicles the values of $CO2_{v,mp}$ and $CO2p_{v,mp}$ shall be set to 0.

2.1.1. Mission profile weights ($W_{sg,mp}$) for vehicles of category N

Vehicle sub-group (sg)*	**Mission profile (*mp*)****										
	RDL	**RDR**	**LHL**	**LHR**	**UDL**	**UDR**	**REL, RER, LEL, LER**	**MUL**	**MUR**	**COL**	**COR**
53	**0,25**	**0,25**	**0**	**0**	**0,25**	**0,25**	**0**	**0**	**0**	**0**	**0**
54	**0,25**	**0,25**	**0**	**0**	**0,25**	**0,25**	**0**	**0**	**0**	**0**	**0**
1s	**0,1**	**0,3**	**0**	**0**	**0,18**	**0,42**	**0**	**0**	**0**	**0**	**0**
1	**0,1**	**0,3**	**0**	**0**	**0,18**	**0,42**	**0**	**0**	**0**	**0**	**0**
2	**0,125**	**0,375**	**0**	**0**	**0,15**	**0,35**	**0**	**0**	**0**	**0**	**0**
3	**0,125**	**0,375**	**0**	**0**	**0,15**	**0,35**	**0**	**0**	**0**	**0**	**0**
4-UD	**0**	**0**	**0**	**0**	**0,5**	**0,5**	**0**	**0**	**0**	**0**	**0**
4-RD	**0,45**	**0,45**	**0,05**	**0,05**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4-LH	**0,05**	**0,05**	**0,45**	**0,45**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4v	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,25**	**0,25**	**0,25**	**0,25**
5-RD	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5-LH	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5v	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,5**	**0,5**
9-RD	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
9-LH	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
9v	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,25**	**0,25**	**0,25**	**0,25**
10-RD	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
10-LH	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
10v	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,5**	**0,5**
11	**0,15**	**0,35**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,15**	**0,35**
12	**0,21**	**0,49**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,09**	**0,21**
16	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,3**	**0,7**

* See definitions in point 1.1

** See definitions in point 1.4

2.1.2. Mission profile weights (Wsg,mp) for vehicles of category M

Vehicle sub-group *(sg)**	**Mission profile (*mp*)****									
	HPL	**HPR**	**UPL**	**UPR**	**SPL**	**SPR**	**IPL**	**IPR**	**CPL**	**CPR**
31-LF	**0,27**	**0,23**	**0,15**	**0,13**	**0,11**	**0,11**	**0**	**0**	**0**	**0**
31-L1	**0,05**	**0,05**	**0,16**	**0,14**	**0,32**	**0,28**	**0**	**0**	**0**	**0**
31-L2	**0,05**	**0,05**	**0,09**	**0,08**	**0,15**	**0,13**	**0,24**	**0,21**	**0**	**0**
31-DD	**0,20**	**0,31**	**0,12**	**0,18**	**0,07**	**0,12**	**0**	**0**	**0**	**0**
32-C2	**0**	**0**	**0**	**0**	**0**	**0**	**0,47**	**0,43**	**0,04**	**0,06**
32-C3	**0**	**0**	**0**	**0**	**0**	**0**	**0,05**	**0,05**	**0,30**	**0,60**
32-DD	**0**	**0**	**0**	**0**	**0**	**0**	**0,05**	**0,05**	**0,35**	**0,55**
33-LF	**0,27**	**0,23**	**0,15**	**0,13**	**0,11**	**0,11**	**0**	**0**	**0**	**0**
33-L1	**0,05**	**0,05**	**0,16**	**0,14**	**0,32**	**0,28**	**0**	**0**	**0**	**0**
33-L2	**0,05**	**0,05**	**0,09**	**0,08**	**0,15**	**0,13**	**0,24**	**0,21**	**0**	**0**
33-DD	**0,20**	**0,31**	**0,12**	**0,18**	**0,07**	**0,12**	**0**	**0**	**0**	**0**
34-C2	**0**	**0**	**0**	**0**	**0**	**0**	**0,47**	**0,43**	**0,04**	**0,06**
34-C3	**0**	**0**	**0**	**0**	**0**	**0**	**0,05**	**0,05**	**0,30**	**0,60**
34-DD	**0**	**0**	**0**	**0**	**0**	**0**	**0,05**	**0,05**	**0,35**	**0,55**
35-FE	**0,27**	**0,23**	**0,15**	**0,13**	**0,11**	**0,11**	**0**	**0**	**0**	**0**
39-FE	**0,27**	**0,23**	**0,15**	**0,13**	**0,11**	**0,11**	**0**	**0**	**0**	**0**

* See definitions in point 1.1

** See definitions in poit 1.4

2.1.3. Mission profile weights (Wsg,mp) for vehicles of category O

Vehicle sub-group *(sg)**	**Mission profile (*mp*)****						
	RDL	**RDR**	**LHL**	**LHR**	**UDL**	**UDR**	**REL, RER, LEL, LER**
111, 111V,112, 112V, 113	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**
121, 121V, 122, 122V, 123, 123V, 124, 124V, 125, 126	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
131, 131v, 132, 132v, 133	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
421, 421v, 422, 422v, 423	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
431, 431v, 432, 432v, 433	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
611, 612	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**
611v, 612v	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
621, 623	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**
621V, 622, 622V, 623V, 624, 624V, 625	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
631, 631v, 632, 632v, 633	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**

* See definitions in point 1.1

** See definitions in point 1.4

2.2. Average specific CO_2 emissions of all new heavy-duty vehicles in a sub-group for a manufacturer

For each manufacturer and each ***reporting period***, the average specific CO_2 emissions $avgCO2_{sg}$ of all new heavy-duty vehicles in a sub-group *sg* or their primary vehicles, if applicable, shall be calculated as follows:

2.2.1. For category N and O vehicles:

$$avgCO2_{sg} = \frac{\sum_v CO2_v}{V_{sg} \times PL_{sg}} \quad \text{(in g/tkm)}$$

2.2.2. For category M complete or completed vehicles:

$$avgCO2_{sg} = \frac{\sum_v CO2_v}{(V_{sg} - Vpv_{sg}) \times PN_{sg}} \text{ n g/pkm)}$$

2.2.3. For category M primary vehicles of heavy-duty vehicles:

$$avgCO2p_{sg} = \frac{\sum_v CO2p_v}{Vpv_{sg} \times PN_{sg}} \quad \text{(in g/pkm)}$$

Where,

$\sum_v$ is the sum over all new heavy-duty vehicles of the manufacturer in the sub-group *sg,* subject to the provisions of Article 7b*;*

$CO2_v$ is the specific CO_2 emissions of the new heavy-duty vehicle *v* determined in accordance with point 2.1;

$CO2p_v$ is the specific CO_2 emissions of the primary vehicle of the new heavy-duty vehicle *v* determined in accordance with point 2.1;

V_{sg} is the number of new heavy-duty vehicles of the manufacturer in subgroup *sg*;

Vpv_{sg} the number of new heavy-duty vehicles within the sub-group *sg*, which pursuant to Article 7b shall be accounted for with the CO2 emissions of their primary vehicles in the calculation of the average specific CO2 emissions of point 2.2.3.;

PL_{sg} is the average payload of vehicles in the sub-group *sg* as determined in point 2.5.

PN_{sg} is the average passenger number of vehicles in the sub-group *sg* as determined in point 2.5.

2.3. Calculation of the zero- and low-emission factor as referred to in Article 5

2.3.1 Reporting periods 2019 to 2024

For each manufacturer and reporting period from 2019 to 2024, the zero- and low-emission factor (ZLEV) referred to in Article 5 shall be calculated as follows:

$ZLEV = V_{all} / (V_{conv} + V_{zlev})$ with a minimum of 0,97

where:

V_{all} *is the number of new heavy-duty vehicles of the manufacturer in the sub-groups sg = 4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH;*

V_{conv} *is the number of new heavy-duty vehicles of the manufacturer in the sub-groups sg = 4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH excluding zero- and low-emission heavy-duty vehicles;*

V_{zlev} *is the sum of Vin and Vout,*

where,

V_{in} *is* $\sum_v (1+ (1 – CO2_v/LET_{sg}))$

with $\sum_v$ *being the sum over all new zero- and low-emission heavy-duty vehicles in the sub-groups sg = 4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH;*

$CO2_v$ *is the specific CO_2 emissions in g/km of a zero- and low-emission heavy-duty vehicle v determined in accordance with point 2.1.;*

LET_{sg} *is the low-emission threshold of the sub-group sg to which the vehicle v belongs as defined in point 2.3.4;*

V_{out} *is the total number of zero-emission heavy-duty vehicles, which are not in the sub-groups referred to by the definition of V_{in}, and with a maximum of 1,5% of V_{conv} .*

2.3.2 Reporting periods from 2025 to 2029

For each manufacturer and ***reporting period***, the zero- and low-emission factor (ZLEV) referred to in Article 5 shall be calculated as follows:

ZLEV = 1 - (y - x) unless this sum is larger than 1 or lower than 0.97 in which case the ZLEV factor shall be set to 1 or 0.97 respectively

Where:

x is 0,02

y is the sum of V_{in} and V_{out}, divided by V_{total}, where:

V_{in} is the total number of newly registered low- and zero-emission heavy-duty vehicles in the sub-groups sg = 4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH, where each of them is counted as $ZLEV_{specifi}$ in accordance with the formula below:

$ZLEV_{specific} = 1 - (CO2_v / LET_{sg})$

Where:

$CO2_v$ is the specific CO_2 emissions in g/km of a zero- and low-emission heavy-duty vehicle v determined in accordance with point 2.1,

LET_{sg} is the low-emission threshold of the sub-group sg to which the vehicle v belongs as defined in point 2.3.4;

V_{out} is the total number of newly registered zero-emission heavy-duty vehicles, which are not in the sub-groups referred to by the definition of V_{in}, and with a maximum of 0,035 of V_{total};

V_{total} is the total number of newly registered heavy-duty vehicles of the manufacturer in that reporting period.

Where V_{in}/V_{total} is lower than 0,0075, the ZLEV factor shall be set to 1.

2.3.3 Reporting periods as from 2030

ZLEV = 1

2.3.4 Calculation of the low-emission threshold

The low-emission threshold LET_{sg} of the sub-group sg is defined as follows:

$LET_{sg} = (rCO2_{sg} \times PL_{sg}) / 2$

Where:

$rCO2_{sg}$ is the reference CO_2 emissions of the sub-group sg, as determined in point 3;

PL_{sg} is the average payload of vehicles in the sub-group sg as determined in point 2.5.

2.4. Calculation of vehicle shares

For each manufacturer and each ***reporting period***, the share of new heavy-duty vehicles in a sub-group $share_{sg}$ shall be calculated as follows:

$$share_{sg} = \frac{V_{sg}}{V}$$

For each manufacturer and each ***reporting period***, the share of new zero-emissions heavy-duty vehicles in a sub-group zev_{sg} shall be calculated as follows:

$$zev_{sg} = \frac{Vzev_{sg}}{V_{sg}}$$

For each manufacturer and each ***reporting period***, the share of new heavy-duty vehicles within the sub-group sg, which pursuant to Article 7b shall be accounted for with the CO2 emissions of their primary vehicles in the calculation of the average specific CO2 emissions of point 2.2., shall be calculated as follows:

$$pv_{sg} = \frac{Vpv_{sg}}{V_{sg}}$$

Where,

$Vzev_{sg}$ is the number of new zero-emissions heavy-duty vehicles of the manufacturer in a subgroup *sg*;

Vpv_{sg} the number of new heavy-duty vehicles within the sub-group *sg*, which pursuant to Article 7b shall be accounted for with the CO_2 emissions of their primary vehicles in the calculation of the average specific CO_2 emissions of point 2.2.;

V_{sg} is the number of new heavy-duty vehicles of the manufacturer in a subgroup *sg*;

V is the number of new heavy-duty vehicles of the manufacturer.

2.5. **Payload values, passenger numbers and cargo volumes**

The average payload value PL_{sg} of a vehicle of category N or O in a sub-group sg shall be calculated as follows:

$$PL_{sg} = \sum_{mp} W_{sg,mp} \times PL_{sg,mp}$$

The average passenger number PN_{sg} of a vehicle of category M in a sub-group sg shall be calculated as follows:

$$PN_{sg} = \sum_{mp} W_{sg,mp} \times PN_{sg,mp}$$

Where,

$\sum_{mp}$ is the sum over all mission profiles *mp*

$W_{sg,mp,}$ is the mission profile weight specified in points 2.1.1 to 2.1.3

$PL_{sg,mp}$ is the payload value attributed to the vehicles of category N and O in the sub-group *sg* for the mission profile *mp*, as defined in points 2.5.1 and 2.5.3.

$PN_{sg,mp}$ is the passenger number attributed to the vehicles of category M in the sub-group *sg* for the mission profile *mp*, as defined in point 2.5.2.

2.5.1. Vehicles of category N.

Payload values $PL_{sg, mp}$ (in tons) are determined as follows:

<table>
<tr><th rowspan="2">Vehicle sub-group sg*</th><th colspan="14">Mission profile mp**</th></tr>
<tr><th>RDL</th><th>RDR</th><th>LHL</th><th>LHR</th><th>UDL</th><th>UDR</th><th>REL</th><th>RER</th><th>LEL</th><th>LER</th><th>MUL</th><th>MUR</th><th>COL</th><th>COR</th></tr>
<tr><td>53</td><td colspan="2" rowspan="5">As determined in point 3.1.1</td><td colspan="2">Not applicable</td><td colspan="2" rowspan="5">As determined in point 3.1.1</td><td colspan="8" rowspan="5">Not applicable</td></tr>
<tr><td>54</td></tr>
<tr><td>1s</td></tr>
<tr><td>1</td></tr>
<tr><td>2</td><td colspan="2">As determined in point 3.1.1</td></tr>
<tr><td>3</td><td colspan="2">Not applicable</td></tr>
<tr><td>4-UD</td><td>0,9</td><td>4,4</td><td>1,9</td><td>14</td><td>0,9</td><td>4,4</td><td>3,5</td><td>17,5</td><td>3,5</td><td>26,5</td><td>0,6</td><td>3,0</td><td>0,9</td><td>4,4</td></tr>
<tr><td>4-RD</td></tr>
<tr><td>4-LH</td></tr>
<tr><td>4v</td></tr>
<tr><td>5-RD</td><td>2,6</td><td>12,9</td><td>2,6</td><td>19,3</td><td>2,6</td><td>12,9</td><td>3,5</td><td>17,5</td><td>3,5</td><td>26,5</td><td>n.a.</td><td>n.a.</td><td>2,6</td><td>12,9</td></tr>
<tr><td>5-LH</td></tr>
<tr><td>5v</td></tr>
<tr><td>9-RD</td><td>1,4</td><td>7,1</td><td>2,6</td><td>19,3</td><td>1,4</td><td>7,1</td><td>3,5</td><td>17,5</td><td>3,5</td><td>26,5</td><td>1,2</td><td>6,0</td><td>1,4</td><td>7,1</td></tr>
<tr><td>9-LH</td></tr>
<tr><td>9v</td></tr>
<tr><td>10-RD</td><td>2,6</td><td>12,9</td><td>2,6</td><td>19,3</td><td>2,6</td><td>12,9</td><td>3,5</td><td>17,5</td><td>3,5</td><td>26,5</td><td>n.a.</td><td>n.a.</td><td>2,6</td><td>12,9</td></tr>
<tr><td>10-LH</td></tr>
<tr><td>10v</td></tr>
<tr><td>11</td><td>1,4</td><td>7,1</td><td>2,6</td><td>19,3</td><td>1,4</td><td>7,1</td><td>3,5</td><td>17,5</td><td>3,5</td><td>26,5</td><td>1,2</td><td>6,0</td><td>1,4</td><td>7,1</td></tr>
<tr><td>12</td><td>2,6</td><td>12,9</td><td>2,6</td><td>19,3</td><td>2,6</td><td>12,9</td><td>3,5</td><td>17,5</td><td>3,5</td><td>26,5</td><td>n.a.</td><td>n.a.</td><td>2,6</td><td>12,9</td></tr>
<tr><td>16</td><td colspan="12">Not applicable</td><td>2,6</td><td>12,9</td></tr>
</table>

* See definitions in point 1.1

** See definitions in point 1.4

Technically permissible maximum payload values $maxPL_{sg}$ and cargo volumes CV_{sg} are determined according to point 3.1.1.

2.5.2. Vehicles of category M.

Passenger numbers $PN_{sg,mp}$, passenger masses $PM_{sg,mp}$ and technically permissible maximum passenger numbers $maxPN_{sg}$ for sub-group *sg* and mission profile *mp* are determined according to point 3.1.1.

2.5.3. Vehicles of category O.

Payload values $PL_{sg,\ mp}$ (in tons) are determined as follows:

Vehicle sub-group *(sg)**	**Mission profile (*mp*)****						
	RDL	**RDR**	**LHL**	**LHR**	**UDL**	**UDR**	**REL, RER, LEL, LER**
111, 111V,112, 112V, 113	**1,5**	**7,5**	**1,5**	**11,2**	**n.a.**	**n.a.**	**n.a.**
121, 121V, 123, 123V, , 125	**2,2**	**11,2**	**2,2**	**16,8**	**n.a.**	**n.a.**	**n.a.**
122, 122V, 124, 124V, 126	**2,4**	**12,2**	**2,4**	**18,3**	**n.a.**	**n.a.**	**n.a.**
131, 131v, 132, 132v, 133	**2,6**	**12,9**	**2,6**	**19,3**	**n.a.**	**n.a.**	**n.a.**
421, 421v, 422, 422v, 423	**2,6**	**12,9**	**2,6**	**19,3**	**n.a.**	**n.a.**	**n.a.**
431, 431v, 432, 432v, 433	**2,6**	**12,9**	**2,6**	**19,3**	**n.a.**	**n.a.**	**n.a.**
611, 612	**1,2**	**6,1**	**1,2**	**9,2**	**n.a.**	**n.a.**	**n.a.**
611v, 612v	**1,2**	**6,1**	**1,2**	**9,2**	**n.a.**	**n.a.**	**n.a.**
621, 621v, 623, 623v	**1,3**	**6,3**	**1,3**	**9,5**	**n.a.**	**n.a.**	**n.a.**
622, 622V, 624, 624V, 625	**2,6**	**12,9**	**2,6**	**19,3**	**n.a.**	**n.a.**	**n.a.**
631, 631v, 632, 632v, 633	**2,6**	**12,9**	**2,6**	**19,3**	**n.a.**	**n.a.**	**n.a.**

* See definitions in point 1.1

** See definitions in point 1.4

Technically permissible maximum payload values $maxPL_{sg}$ and cargo volumes CV_{sg} are determined according to point 3.1.1.

2.6. Calculation of the mileage and payload or passenger-number weighting factor

The mileage and payload (passenger) weighting factor (MPW_{sg}) of a sub-group *sg* is defined as the product of the annual mileage specified in point 2.6.1 and the payload and passenger-number values for the sub-group specified in points 2.5.1, 2.5.2 and 2.5.3 for vehicle categories N, M and O, respectively, normalised to the respective value for sub-group 5-LH, and shall be calculated as follows:

$$MPW_{sg} = \frac{(AM_{sg} \times PL_{sg})}{(AM_{5-LH} \times PL_{5-LH})} \qquad \text{(for category N and O vehicles)}$$

$$MPW_{sg} = \frac{(AM_{sg} \times PN_{sg})}{(AM_{5-LH} \times PL_{5-LH})} \qquad \text{(for category M vehicles)}$$

Where,

AM_{sg} is the annual mileage specified in point 2.6.1, 2.6.2 and 2.6.3 for the vehicles in the respective sub-group;

$AM_{5\text{-}LH}$ is the annual mileage specified for the sub-group 5-LH in 2.6.1;

PL_{sg} is as determined in points 2.5.1 and 2.5.3;

PN_{sg} is as determined in point 2.5.2;

$PL_{5\text{-}LH}$ is the average payload value for the sub-group 5-LH as determined in point 2.5.1.

2.6.1. Annual mileages for vehicles of category N

Vehicle sub-group *(sg)**	Annual mileage AM_{sg} (in km)
53	58 000
54	58 000
1s	58 000
1	58 000
2	60 000
3	60 000
4-UD	60 000
4-RD	78 000
4-LH	98 000
4v	60 000
5-RD	78 000
5-LH	116 000
5v	60 000
9-RD	73 000
9-LH	108 000
9v	60 000
10-RD	68 000
10-LH	107 000
10v	60 000
11	65 000
12	67 000
16	60 000

* See definitions in point 1.1

2.6.2. Annual mileages for vehicles of category M

Vehicle sub-group *(sg)**	Annual mileage AM_{sg} (in km)
31-LF	60 000
31-L1	60 000
31-L2	60 000
31-DD	60 000
32-C2	96 000
32-C3	96 000
32-DD	96 000
33-LF	60 000
33-L1	60 000
33-L2	60 000
33-DD	60 000

34-C2	96 000
34-C3	96 000
34-DD	96 000
35-FE	60 000
39-FE	60 000

* See definitions in point 1.1

2.6.3. Annual mileages for vehicles of category O

Vehicle sub-group *(sg)**	Annual mileage AM_{sg} (in km)
111, 111V,112, 112V, 113	52 000
121, 121V, 122, 122V, 123, 123V, 124, 124V, 125, 126, 131, 131v, 132, 132v, 133	77 000
421, 421v, 422, 422v, 423, 431, 431v, 432, 432v, 433	68 000
611, 612, 611v, 612v, 621, 623, 621v, 623v	40 000
622, 622V, 624, 624V, 625, 631, 631v, 632, 632v, 633	68 000

* See definitions in point 1.1

2.7. Average specific CO_2 emissions of manufacturers, as referred to in Article 4

For each manufacturer the following average specific CO_2 emissions shall be calculated:

2.7.1. For the reporting peridods 2019 to 2029:

$$CO2(2025) = ZLEV \times \sum_{sg} share_{sg} \times MPW_{sg} \times avgCO2_{sg}$$

2.7.2. For the reporting peridods as from 2025:

$$CO2(NO) = \sum_{sg} share_{sg} \times MPW_{sg} \times avgCO2_{sg}$$

$$CO2(MCO2) = \sum_{sg} share_{sg} \times MPW_{sg} \times [avgCO2_{sg} \times (1 - pv_{sg}) + avgCO2p_{sg} \times pv_{sg}]$$

$$CO2(MZE) = \sum_{sg} share_{sg} \times MPW_{sg} \times (1 - zev_{sg}) \times rCO2_{sg}$$

$$CO2(M) = CO2(MCO2) + CO2(MZE)$$

Where,

$\sum_{sg}$	is the sum is over those sub-groups that are included in the calculation of the particular average specific CO_2 emissions according to point 4.2;
$ZLEV$	is as determined in point 2.3;
$share_{sg}$	is as determined in point 2.4;
zev_{sg}	is as determined in point 2.4;
pv_{sg}	is as determined in point 2.4;
MPW_{sg}	is as determined in point 2.6;
$avgCO2_{sg}$	is as determined in point 2.2;
$avgCO2p_{sg}$	is as determined in point 2.2;
$rCO2_{sg}$	is as determined in point 3.1.2.

3. **Calculation of the reference values**

3.1. Reference values

The following reference values shall be calculated on the basis of all new heavy-duty vehicles of all manufacturers for the reference period applicable to the sub-group *sg* according to point 3.2.

3.1.1. For each vehicle sub-group *sg,* payload $PL_{sg,mp}$, passenger number $PN_{sg,mp}$, passenger mass $PM_{sg,mp}$, technically permissible maximum payload $maxPL_{sg}$, technically permissible maximum passenger number $maxPN_{sg}$ and cargo volume CV_{sg} values shall be cacluclated as follows:

$$PL_{sg,mp} = \frac{\sum_v PL_{v,mp}}{rV_{sg}}$$ (for vehicles of category N)*

$PN_{sg,mp} = \frac{\sum_v PN_{v,mp}}{rV_{sg}}$ (for vehicles of category M)*

$PM_{sg,mp} = \frac{\sum_v PM_{v,mp}}{rV_{sg}}$ (for vehicles of category M)*

$maxPL_{sg} = \frac{\sum_v maxPL_v}{rV_{sg}}$ (for vehicles of category N)

$maxPN_{sg} = \frac{\sum_v maxPN_v}{rV_{sg}}$ (for vehicles of category M)

$CV_{sg} = \frac{\sum_v CV_v}{rV_{sg}}$ (for vehicles of category O)

(*only for vehicle sub-groups, for which no explicit values for $PL_{sg,mp}$ or $PN_{sg,mp}$ are provided in point 2.5**)**

3.1.2. Reference CO_2 emissions $rCO2_{sg}$ referred to in Article 3 shall be caclulated as follows:

$rCO2_{sg} = \frac{\sum_v (CO2_v / PL_{sg})}{rV_{sg}}$ *(for vehicles of category N and O)*

$rCO2_{sg} = \frac{\sum_v (CO2_v / PN_{sg})}{rV_{sg}}$ (for vehicles of category M)

$rCO2p_{sg} = \frac{\sum_v (CO2p_v / PN_{sg})}{rV_{sg}}$ (for vehicles of category M)

Where,

$\sum_v$ is the sum over all new heavy-duty vehicles in the sub-group *sg* registered in the reference period applicable to *sg* acording to point 3.2;

$CO2_v$ are the specific CO_2 emissions of the new heavy-duty vehicle *v* as determined in accordance with point 2.1, if applicable adjusted pursuant to Annex II;

$CO2p_v$ are the specific CO_2 emissions of the primary vehicle of the new-heavy duty vehicle *v* as determined in accordance with point 2.1, if applicable adjusted pursuant to Annex II;;

rV_{sg} is the number of all new heavy-duty vehicles in the sub-group *sg* registered in the reference period applicable to *sg* acording to point 3.2;

PL_{sg} is the average payload of vehicles in the sub-group *sg* as determined in point 2.5;

PN_{sg} is the average passenger number of vehicles in the sub-group *sg* as determined in point 2.5;

$PL_{v,mp}$ is the payload of vehicle *v* in the mission profile *mp*, as determined from the data reported according to Articles 13a and 13b ;

$PN_{v,mp}$ is the passenger number of vehicle *v* in the mission profile *mp* as determined from the data reported according to Articles 13a and 13b;

$PM_{v,mp}$ is the passenger mass of vehicle *v* in the mission profile *mp* as determined from the data reported according to Articles 13a and 13b;

$maxPL_v$ is the technically permissible maximum payload of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

$maxPN_v$ is the technically permissible maximum passenger number of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

CV_v is the cargo volume of vehicle *v* as determined from the data reported according to Articles 13a and 13b.

3.2. Reference periods applicable to sub-groups

The following reporting periods shall be applied as reference periods to vehicle sub-groups:

Vehicle sub-group *sg*	**Reporting period of the year applicable as reference period**
4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH	2019
All others	2025

3.2.1. If in the reference period as specified in point 3.2 in a sub-group *sg* the number of new heavy-duty vehicles of all manufacturers is less than 50 the following rules shall apply:

The average specific CO2 emissions $avgCO2_{sg}$ and $avgCO2p_{sg}$ as provided for in point 2.2 and the reference CO2 emissions $rCO2_{sg}$ and $rCO2p_{sg}$ as provided for in point 3.1.2 shall be set to "0" for all manufacturers in the sub-group *sg* for the purpose of calculating the average specific CO2 emissions according to point 2.7 and the specific CO2 emissions targets according to point 4.1 for the reporting periods of the years < Y + 5. Here Y is the year of the first reporting period in which the number of new heavy-duty vehicles of all manufacturers in the sub-group *sg* is at least 50.

To obtain the reference CO2 emissions $rCO2_{sg}$ and $rCO2p_{sg}$ for the purpose of calculating the specific emissions target according to point 4, first the corresponding entities provided for in point 3.1.2 shall be calculated for the reporting period of the year *Y* instead of for the reference period applicable to the sub-group *sg* according to point 3.2. The resulting values shall then be divided by

– the target factor $RET_{sg,Y}$, as defined in point 5.1.1, for obtaining reference CO2 emissions $rCO2_{sg}$,

– the target factor $RETp_{sg,Y}$, as defined in point 5.1.1, for obtaining reference CO2 emissions $rCO2p_{sg}$.

4. Calculation of the specific emission target of a manufacturer referred to in Article 6

4.1. Specific emission targets

For each manufacturer the following specific emission targets *T* shall be calculated as follows:

4.1.1. For the reporting periods of the years from 2025 to 2029:

$$T(2025) = \sum_{sg} share_{sg} \times MPW_{sg} \times (1 - rf_{sg}) \times rCO2_{sg}$$

4.1.2. For the reporting periods of the years as from 2030:

$$T(NO) = \sum_{sg} share_{sg} \times MPW_{sg} \times (1 - rf_{sg}) \times rCO2_{sg}$$

$$T(MCO2) = \sum_{sg} share_{sg} \times MPW_{sg} \times [(1 - pv_{sg}) \times (1 - rf_{sg}) \times rCO2_{sg} + pv_{sg} \times (1 - rfp_{sg}) \times rCO2p_{sg}]$$

$$T(MZE) = \sum_{sg} share_{sg} \times MPW_{sg} \times (1 - zevM_{sg}) \times rCO2_{sg}$$

$$T(M) = T(MCO2) + T(MZE)$$

Where,

$\sum_{sg}$	is the sum over those sub-groups that are inclued in the calculation of the particular specific emissions target according to point 4.2;
$share_{sg}$	is as determined in point 2.4;
MPW_{sg}	is as determined point 2.6;
rf_{sg}	is the CO_2 reduction target ***applicable in*** the specific ***reporting period*** to new heavy dutyvehicles in sub-group *sg* as provided for in point 4.3;
rfp_{sg}	is the CO_2 reduction target ***applicable in*** the specific ***reporting period*** to primary vehicles of new heavy-duty vehicles in sub-group *sg* as provided for in point 4.3;
$zevM_{sg}$	is the zero-emission vehicles mandate ***applicable in*** the specific ***reporting period*** to vehicles in sub-group *sg* as provided for in point 4.3;
$rCO2_{sg}$	is as determined in point 3.1.2;
$rCO2p_{sg}$	is as determined in point 3.1.2;
pv_{sg}	is as determined in point 2.4.

4.2. Vehicle sub-groups included in the calculation of average specific CO_2 emissions and specific emissions targets of manufacturers

The following sub-groups *sg* shall be included in the calculation of the specific CO_2 emissions *CO2(X),* specific emissions targets *T(X)* and CO2 emissions trajectory $ET(X)_Y$:

X = 2025	**X= NO**	**X = MCO2**	**X= MZE**
vehicle sub-groups, subject to CO_2 emissions targets according to Article 3a paragraph 1 (a)	**sub-groups of transport of goods vehicles, subject to CO_2 emissions targets according to Article 3a paragraphs 1(b), 1(c) and 1(d) and paragraph 3**	**sub-groups of transport of persons vehicles, subject to CO_2 emissions targets according to Article 3a paragraphs 1(b), 1(c) and 1(d)**	**sub-groups of transport of persons vehicles, subject to zero-emissions vehicle targets according to Article 3b**
4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH	All vehicle sub-groups referred to in points 1.1.1 and 1.1.3.	32-C2, 32-C3, 32-DD, 34-C2, 34-C3, 34-DD,	31-LF, 31-L1, 31-L2, 31-DD, 33-LF, 33-L1, 33-L2, 33-DD, 35-FE, 39-FE

4.3. CO_2 reduction targets and zero-emissions vehicle mandates

4.3.1. The following CO_2 emissions reduction targets rf_{sg} and rfp_{sg} pursuant to Article 3a shall apply to vehicles in the sub-group *sg* for different reporting periods:

CO_2 reduction targets rf_{sg} and rfp_{sg}					
Sub-groups *sg*		Reporting period of the years			
		2025 – 2029	2030 – 2034	2035 – 2039	As from 2040
Medium lorries	**53, 54**	**0**	**43%**	**64%**	**90%**
Heavy lorries > 7,4t	**1s, 1, 2, 3**	**0**	**43%**	**64%**	**90%**
Heavy lorries > 16 t with 4x2 and 6x4 axle configurations	**4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH**	**15%**	**43%**	**64%**	**90%**
Heavy lorries > 16 t with special axle configurations	**11, 12, 16**	**0**	**43%**	**64%**	**90%**
Coaches (rf_{sg})	**32-C2, 32-C3, 32-DD, 34-C2, 34-C3, 34-DD**	**0**	**43%**	**64%**	**90%**
Primary vehicles of coaches (rfp_{sg})	**32-C2, 32-C3, 32-DD,**	**0**	**43%**	**64%**	**90%**

	34-C2, 34-C3, 34-DD				
Trailers		**0**	**7,5%**	**7,5%**	**7,5%**
Semi-trailers		**0**	**15%**	**15%**	**15%**

For reporting periods of the years before 2025, all CO_2 reduction targets rf_{sg} and rfp_{sg} shall be 0.

4.3.2. The following zero-emission vehicle targets $zevM_{sg}$ pursuant to Article 3b are applicable to vehicles in the sub-group *sg* for different reporting periods:

Zero-emission vehicle mandates $zevM_{sg}$					
Sub-groups *sg*		Reporting period of the years			
		before 2030	2030 – 2034	2035 – 2039	As from 2040
Urban heavy buses	**31-LF, 31-L1, 31-DD, 33-LF, 33-L1, 33-DD, 35-FE, 39-FE, 31-L2, 33-L2**	**0**	**100%**	**100%**	**100%**

5. Emission credits and debts referred to in Article 7

5.1. CO_2 emissions reduction trajectories

5.1.1. Target factors

For each vehicle sub-group *sg* and reporting period of a year *Y* target factors shall be defined as follows:

$$RET_{sg,Y} = (1-rf_{sg,uY})+(rf_{sg,uY} - rf_{sg,lY}) \times (uY - Y)/(uY - lY)$$

$$RETp_{sg,Y} = (1-rfp_{sg,uY})+(rfp_{sg,uY} - rfp_{sg,lY}) \times (uY - Y)/(uY - lY)$$

$$ZET_{sg,Y} = (1-zevM_{sg,uY})+(zevM_{sg,uY} - zevM_{sg,lY}) \times (uY - Y)/(uY - lY)$$

Where,

lY, uY	are the values for the lower year and upper year in the set {rY, 2025, 2030, 2040} defining the smallest intervall for which the condition $lY \leq Y < uY$ holds;
rY	is the year of the reference period applicable to the vehicle sub-group *sg* according to point 3.2;
$rf_{sg,lY}$, $rf_{sg,uY}$	are the CO_2 reduction targets of the sub-group *sg* for new heavy duty vehiches of the years lY and uY according to point 4.3;
$rfp_{sg,lY}$, $rfp_{sg,uY}$	are the CO_2 reduction targets of the sub-group *sg* for primary vehicles of new heavy duty vehiches of the years lY and uY according to point 4.3;

$zevM_{sg,lY}$, $zevM_{sg,uY}$ are the zero emissions vehicle mandates for new heavy duty vehiches of the years *lY* and *uY* according to point 4.3;

For reporting years Y < rY, the values of $RET_{sg,Y}$, $RETp_{sg,Y}$ and $ZET_{sg,Y}$ shall be set to 1 such that there is no contribution of the vehicle sub-group *sg* to the CO2 emissions trajectory.

5.1.2. CO_2 emissions reduction trajectories

5.1.2.1. Then for each vehicle sub-group *sg* and reporting period of a year *Y* the following CO_2 emissions reduction trajectories shall be defined:

$$ET_{sg,Y} = RET_{sg,Y} \times rCO2_{sg}$$

$$ETp_{sg,Y} = RETp_{sg,Y} \times rCO2p_{sg}$$

$$ETz_{sg,Y} = ZET_{sg,Y} \times rCO2_{sg}$$

5.1.2.2. For each manufacturer and reporting periods of a year *Y* between 2019 and 2024 the following CO_2 emissions reduction trajectories shall be defined:

$$ET(2025)_Y = \sum_{sg} share_{sg} \times MPW_{sg} \times ET_{sg,Y}$$

5.1.2.3. For each manufacturer and reporting periods of a year *Y* between 2025 and 2040 the following CO_2 emissions reduction trajectories shall be defined:

$$ET(NO)_Y = \sum_{sg} share_{sg} \times MPW_{sg} \times ET_{sg,Y}$$

$$ET(MCO2)_Y = \sum_{sg} share_{sg} \times MPW_{sg} \times [(1- pv_{sg}) \times ET_{sg,Y} + pv_{sg} \times ETp_{sg,Y}]$$

$$ET(MZE)_Y = \sum_{sg} share_{sg} \times MPW_{sg} \times ETz_{sg,Y}$$

$$ET(M)_Y = ET(MCO2)_Y + ET(MZE)_Y$$

Where,

$\sum_{sg}$ is the sum over those sub-groups that are inclued in the calculation of the particular CO_2 emissions trajectory according to point 4.2;

$share_{sg}$ is the share of new heavy-duty vehicles of the manufacturer in the sub-group sg, as determined in point 2.4;

MPW_{sg} is as determined point 2.6;

$rCO2_{sg}$ is as determined in point 3.1.2;

$rCO2p_{sg}$ is as determined in point 3.1.2;

pv_{sg} is the share of new heavy-duty vehicles of the manufacturer within the sub-group *sg*, which pursuant to Article 7b shall be accounted for with the CO_2 emissions of their primary vehicles in the calculation of the average specific CO_2 emissions of point 2.2

5.2. Calculation of the emission credits and debts in each reporting period

For each manufacturer and each reporting period of the years Y from 2019 to 2040 the emission credits $cCO2(X)_Y$ and emission debts $dCO2(X)_Y$, *(X = NO, M),* shall be the maximum of the following values and 0 (i.e. emission credits and debts cannot be negative):

	2019 ≤ Y< 2025	**2025 ≤ Y< 2030**	**2030 ≤ Y< 2040**
$cCO2(NO)_Y$	$[ET(2025)_Y - CO2(2025)_Y] \times V_y$	$[ET(NO)_Y - CO2(NO)_Y] \times V_y$	$[ET(NO)_Y - CO2(NO)_Y] \times V_y$
$dCO2(NO)_Y$	0	$[CO2(2025)_Y - T(2025)_Y] \times V_y$	$[CO2(NO)_Y - T(NO)_Y] \times V_y$
$cCO2(M)_Y$	**0**	$[ET(M)_Y - CO2(M)_Y] \times V_y$	$[ET(M)_Y - CO2(M)_Y] \times V_y$
$dCO2(M)_Y$	**0**	**0**	$[CO2(M)_Y - T(M)_Y] \times V_y$

Where,

$ET(X)_Y$ is the manufacturer's emission trajectory in the ***reporting period of the*** year Y determined in accordance with point 5.1 *(X = 2025, NO, M);*

$CO2(X)_Y$ is the manufacturer's average specific emissions in the ***reporting period of the*** year Y determined in accordance with point 2.7 *(X = 2025, NO, M)*;

$T(X)_Y$ is the manufacturer's specific emission target in the ***reporting period of the*** year Y determined in accordance with point 4 *(X = 2025, NO, M)*;

V_Y is the number of new heavy-duty vehicles of the manufacturer in the ***reporting period of the*** year Y.

5.3. Emission debt limit

For each manufacturer the emission debt limits $limCO2(X)_Y$ in a reporting period of the year *Y* are defined as follows:

$limCO2(NO)_Y = T(2025)_Y \times 0{,}05 \times V(2025)_Y$ for the reporting periods of the year Y < 2030;

$limCO2(NO)_Y = T(NO)_Y \times 0{,}05 \times V(NO)_Y$ for the reporting periods of the year Y ≥ 2030;

$limCO2(M)_Y = T(M)_Y \times 0{,}05 \times V(M)_Y$ for the reporting periods of the year Y ≥ 2030.

Where

$T(X)_Y$ is the manufacturer's specific emission target in the ***reporting period of the*** year Y determined in accordance with point 4 *(X = 2025, NO, M)*;

$V(X)_Y$ is the number of new heavy-duty vehicles of the manufacturer in the ***reporting period of the*** year Y in the vehicle sub-groups, which are included int the caclulation of the specific CO_2 emissions *CO2(X)* according to point 4.2 *(X = 2025, NO, M)*.

5.4. Early emission credits

Emission debts acquired ***for the reporting periods of the*** year 2025 shall be reduced by an amount corresponding to the emission credits acquired prior to ***this reporting period***, which is determined for each manufacturer as follows:

$$redCO2 = min(dCO2(NO)_{2025} ; \sum_{Y=2019}^{2024} cCO2(NO)_Y)$$

Where,

min is the minimum of the two values mentioned between the brackets;

$\sum_{Y=2019}^{2024}$ is the sum over the ***reporting periods of the years Y from*** 2019 to 2024;

$dCO2(NO)_Y$ is the emission debts for ***reporting period of the year*** Y as determined in accordance with point 5.2;

$cCO2(NO)_Y$ is the emission credits for the ***reporting period of the*** year Y as determined in accordance with point 5.2;.

6. Determination of a manufacturer's excess CO_2 emissions referred to in Article 8(2)

For each manufacturer and each ***reporting period*** of the year Y from ***the year*** 2025 onwards the value of the vehicle category specific excess CO_2 emissions $exeCO2(X)_Y$ shall be determined as follows. if the value is positive (X = NO, M). If the following calculations result in a negative value for $exeCO2(X)_Y$, the latter shall be set to 0.

For the *reporting period of* the year 2025:

$$exeCO2(NO)_{2025} = dCO2(NO)_{2025} - \sum_{Y=2019}^{2024} cCO2(NO)_Y - limCO2(NO)_{2025}$$

For the reporting periods of the years Y from 2026 to 2028, from 2030 to 2033 and from 2035 to 2038:

$$exeCO2(NO)_y = \sum_{I=2025}^{Y} (dCO2(NO)_I - cCO2(NO)_I) - \sum_{J=2025}^{Y-1} exeCO2(NO)_J - redCO2 - limCO2(NO)_Y$$

For the reporting periods of the years Y from from 2030 to 2033 and from 2035 to 2038:

$exeCO2(M)_y = \sum_{I=2025}^{Y} (dCO2(M)_I - cCO2(M)_I) - \sum_{J=2030}^{Y-1} exeCO2(M)_J - limCO2(M)_Y$

For the reporting period of the years Y = 2029, 2034 and 2039:

$exeCO2(NO)_Y = \sum_{I=2025}^{Y} (dCO2(NO)_I - cCO2(NO)_I) - \sum_{J=2025}^{Y-1} exeCO2(NO)_J - redCO2$

For the reporting period of the years Y = 2034 and 2039:

$exeCO2(M)_Y = \sum_{I=2025}^{Y} (dCO2(M)_I - cCO2(M)_I) - \sum_{J=2030}^{Y-1} exeCO2(M)_J$

For the reporting periods of the year 2040:

$exeCO2(NO)_{2040} = (CO2(NO)_{2040} - T(NO)_{2040}) \times V_{2040} +$

$\sum_{I=2025}^{2039} (dCO2(NO)_I - cCO2(NO)_I) - \sum_{J=2025}^{2039} exeCO2(NO)_J - redCO$

$exeCO2(M)_{2040} = (CO2(M)_{2040} - T(M)_{2040}) \times V_{2040} +$

$\sum_{I=2025}^{2039} (dCO2(M)_I - cCO2(M)_I) - \sum_{J=2030}^{2039} exeCO2(M)_J$

For the reporting periods of the years Y > 2040:

$exeCO2(NO)_Y = (CO2(NO)_Y - T(NO)_Y) \times V_Y$

$exeCO2(M)_Y = (CO2(M)_Y - T(M)_Y) \times V_Y$

Where,

$\sum_{Y=2019}^{2024}$	is the sum over the ***reporting periods of the years Y from*** 2019 to 2024;
$\sum_{I=2025}^{Y}$	is the sum over the ***reporting periods of the years I from*** 2025 to the year Y;
$\sum_{J=2025}^{Y-1}$	is the sum over the *reporting periods of the years J from* 2025 *to the year (Y-1);*
$\sum_{I=2025}^{2039}$	is the sum over the *reporting periods of the years I from 2025 to 2039*;
$\sum_{J=2030}^{Y-1}$	is the sum over the reporting periods of the years J from 2030 to the year (Y-1);
$dCO2(X)_Y$	is the emission debts for the *reporting period of the* year Y as determined in accordance with point 5.2 (X = NO, M);
$cCO2(X)_Y$	is the emission credits for the *reporting period of the* year Y as determined in accordance with point 5.2 (X = NO, M);
$limCO2(X)_Y$	is the emission debt limit as determined in accordance with point 5.3 (X = NO, M);
$redCO2(X)$	is the reduction of emission debts of the *reporting period of the* year 2025 as determined in accordance with 5.4 (X = NO, M).

In all other cases the value of the excess emissions $exeCO2(X)_Y$ shall be set to 0 (X = NO, M).

The excess CO2 emissions of the reporting period of the year Y as referred to in Article 8(2) shall be:

$$exeCO2_Y = exeCO2(NO)_Y + exeCO2(M)_Y$$

ANNEX II

Adjustment procedures referred to in Article 11

1. Adjustment of reference CO_2 emissions following an amendment of the type approval procedures referred to in Article 11(2)

Following an amendment of the type approval procedures referred to in Article 11(2), the reference CO_2 emissions referred to in Point 3.1.2 of Annex I shall be recalculated**.**
For this purpose the CO_2 emissions in g/km of new heavy-duty vehicles *v* of the reference period and of their primary vehicles determined for a mission profile *mp,* as referred to in point 2.1 of Annex I, shall be adjusted as follows:

$$CO2_{v,mp} = CO2(RP)_{v,mp} \cdot (\sum_r s_{r,sg} \cdot CO2_{r,mp}) / (\sum_r s_{r,sg} \cdot CO2(RP)_{r,mp})$$

$$CO2p_{v,mp} = CO2p(RP)_{v,mp} \cdot (\sum_r s_{r,sg} \cdot CO2p_{r,mp}) / (\sum_r s_{r,sg} \cdot CO2p(RP)_{r,mp})$$

Where

$\sum_r$	is the sum over all representative vehicles *r* for the sub-group *sg*;
sg	is the sub-group to which the vehicle *v* belongs;
$s_{r,sg}$	is the statistical weight of the representative vehicle *r* in the sub-group *sg;*
$CO2(RP)_{v,mp}$	is the specific CO_2 emissions of vehicle *v* in g/km, as determined on mission profile *mp* and based on the monitoring data of the reference period;
$CO2(RP)_{r,mp}$	is the specific CO_2 emissions of the representative vehicle *r* in g/km, as determined on mission profile *mp* in accordance with Regulation (EC) No 595/2009 and its implementing measures as it was applied in the reference period;
$CO2_{r,mp}$	is the specific CO_2 emissions of the representative vehicle *r*, as determined on mission profile *mp* in accordance with Regulation (EC) No 595/2009 and its implementing measures according to the amendments referred to in Article 11(3)(a);
$CO2p(RP)_{v,mp}$	is the specific CO_2 emissions of the primary vehicle of the heavy-duty vehicle *v* in g/km, as determined on mission profile *mp* and based on the monitoring data of the reference period;
$CO2p(RP)_{r,mp}$	is the specific CO_2 emissions of the primary vehicle of the representative vehicle *r* in g/km, as determined in accordance with Regulation (EC)

No 595/2009 and its implementing measures as it was applied in the reference period;

$CO2p_{r,mp}$ is the specific CO_2 emissions of the primary vehicle of the representative vehicle *r*, as determined on mission profile *mp* in accordance with Regulation (EC) No 595/2009 and its implementing measures according to the amendments referred to in Article 11(3)(a).

The specific CO_2 emissions shall be normalised pursuant to Annex III using those values for the parameters referred to in Article 14(1), point (f), that are applicable in the reporting period referred to in Article 11(2), point (a).

The representative vehicles shall be defined in accordance with the methodology referred to in Article 11(3).

2. Application of the adjusted reference CO_2 emissions according to Article 11(2)

If in the reporting period of the year Y the specific CO_2 emissions of some new heavy-duty vehicles of a manufacturer have been determined with amendments referred to in Article 11(2), the reference CO_2 emissions rCO_{sg} of the vehicle sub-group *sg* used in points 4 and 5.1 of Annex I shall be calculated as follows:

$$rCO2_{sg} = \sum_{,i} V_{sg,i}/V_{sg} \text{ x } rCO2_{sg,,i}$$

where:

$\sum_{,i}$ is the sum over

- for i = 1: the non-amended procedure for determining the CO2 emissions, for which the initial reference CO2 emissions without adjustments are applicable and
- for i ≥ 1: all subsequent amendments referred to in Article 11(2).

V_{sg} is the number of new heavy-duty vehicles of the manufacturer in the reporting period of the year *Y* and the vehicle sub-group *sg*;

$V_{sg,i}$ is the number of new heavy-duty vehicles of the manufacturer in the reporting period of the year *Y* and in the vehicle sub-group sg, the specific CO2 emissions of which have been determined with the amendment *i*;

$rCO2_{sg,i}$ are:

- for i = 0: the non-adjusted reference CO2 emissions
- for i ≥ 1: the reference CO2 emissions that have been determined for the vehicle sub-group *sg* with the amendment *i*.

ANNEX III

Normalisation of specific CO_2 emissions of new heavy-duty vehicles referred to in Article 4

1. Normalisation of specific CO_2 emissions

For the purposes of the caclulation in point 2.1 of Annex I, , the values of CO_2 emissions $CO2_{v,mp}$of vehicles are normalised as follow:

$CO2_{v,mp} = reportCO2_{v,mp} + \Delta CO2_{v,mp}(m) + \Delta CO2\text{cv}_{v,mp}$

$m = PL_{sg,mp} - PL_{v,mp} + cCW_v$ (for vehicles of categories N and O)

$m = PM_{sg,mp} - PM_{v,mp} + cCW_v$ (for vehicles of category M)

Where

$CO2_{v,mp}$	are the normalised CO_2 emissions of the vehicle *v* determined for a mission profile *mp* that are to be considered in the calculation of Annex I point 2.1;
$reportCO2_{v,mp}$	are the CO_2 emissions in g/km of the primary vehicle of a new heavy-duty vehicle *v* determined for a mission profile *mp* and reported in accordance with Articles 13a and 13b;
$\Delta CO2_{v,mp}(m)$	is to be determined in accordance with point 3;
$\Delta CO2\text{cv}_{v,mp}$	is to be determined in accordance with point 4;
$PL_{v,mp}$	is the payload of vehicle *v* in the mission profile *mp*, as determined from the data reported according to Articles 13a and 13b ;
$PL_{sg,mp}$	is the payload for sub-group *sg* and mission profile *mp* as provided for in point 2.5 of Annex I;
$PM_{v,mp}$	is the passenger mass of vehicle *v* in the mission profile *mp*, as determined from the data reported according to Articles 13a and 13b;
$PM_{sg,mp}$	is the passenger mass for sub-group *sg* and mission profile *mp* as provided for in point 2.5 of Annex I;
cCW_v	is the correction of the curb weight of the vehicle *v* according to point 2.

2. Curb Weight normalisation

Since the transport utility of a vehicle increases with its technically permissible maximum payload or passenger number, but for technical reasons higher values for these parameters are correlated with higher curb weights and therefore higher CO_2 emissions, the following correction of the curb weight of a vehicle *v* in sub-group *sg* for the purpose of the normalisation of its specific CO_2 emissions according to point 1 shall be applied:

$cCW_v = a_{sg} \cdot (maxPL_{sg} - maxPL_v)$ for vehicles of category N and O;

$cCW_v = a_{sg} \cdot (maxPN_{sg} - maxPN_v)$ for vehicles of category M;

Where

a_{sg} is a linear coefficient determined according to point 2.1 for the reporting period of the vehicle *v*;

$maxPL_v$ is the technically permissible maximum payload of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

$maxPN_v$ is the technically permissible maximum passenger number of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

$maxPL_{sg}$ is the technically permissible maximum payload of vehicle sub-group *sg* determined according to point 2.5 of Annex I;

$maxPN_{sg}$ is the technically permissible maximum passenger number of vehicle sub-group *sg* determined according to point 2.5 of Annex I.

2.1. Determination of normalisation parameters

For each reporting period the parameters a_{sg} and b_{sg} shall be determined with a linear regression analysis of the correlation of the values of CW_v with the values of $maxPL_v$ (category N and O vehicles) and $maxPN_v$ (category M vehicles), considering all newly registered vehicles *v* in the sub-group *sg*:

$CW_v \approx a_{sg} \cdot maxPL_v + b_{sg}$ for vehicles of category N and O;

$CW_v \approx a_{sg} \cdot maxPN_v + b_{sg}$ for vehicles of category M.

Where

CW_v is the curb weight of vehicle *v*, as determined from the data reported according to Articles 13a and 13b; if no precise value is available it may be approximated by the corrected actual mass of the vehicle *v*

$maxPL_v$ is the technically permissible maximum payload of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

$maxPN_v$ is the technically permissible maximum passenger number of vehicle *v* as determined from the data reported according to Articles 13a and 13b;.

3. Change of CO_2 emissions for change in total vehicle mass

The ex-post change of CO_2 emissions of a vehicle *v* to be determined for a mission profile *mp* due to an ex-post change in the total mass to be attributed to the vehicle for the determination of CO_2 emissions is defined by the following linear approximation:

$$\Delta CO2_{v,mp}(m) = \text{m} \cdot (CO2_{v,r} - CO2_{v,l}) / (\text{Mr} - \text{Ml})$$

Where:

m is the change of total mass attributed to the vehicle *v* for the determination of its CO_2 emissions;

$CO2_{v,r}$ are the CO_2 emissions of the vehicle *v* in g/km, without the change of mass, determined for the same mission profile *mp*, representative loading conditions;

$CO2_{v,l}$ are the CO_2 emissions of the vehicle *v* in g/km, without the change of mass, determined for the same mission profile *mp*, low loading conditions;

Mr is the total vehicle mass in simulation, without the change of mass, for the same mission profile *mp*, representative loading conditions;

Ml is the total vehicle mass in simulation, without the change of mass, for the same mission profile *mp*, low loading conditions.

4. Normalisation for different cargo volumes

Category O vehicles within the same sub-group have different cargo volumes. Since the transport utility of a vehicle increases with the cargo volume, but for technical reasons such increase is also correlated with higher CO_2 emissions, the following correction of the CO_2 emissions of a vehicle *v* in sub-group *sg* shall be applied:

$$\Delta CO2\text{cv}_{v,mp} = a_{sg,mp} \cdot (CV_{sg} - CV_v)$$

Where

$a_{sg,mp}$ is a linear coefficient determined according to point 4.1 for the reporting period of the vehicle *v*;

CV_v is the cargo volume of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

CV_{sg} is the cargo volume of vehicle sub-group *sg* determined according to point 2.5 of Annex I.

For vehicle of categories N and M the correction of CO_2 emissions $\Delta CO2\text{cv}_{v,mp}$ shall be 0.

4.1. Determination of normalisation parameters

For each reporting period and mission profile the parameters $a_{sg,mp}$ and $b_{sg,mp}$ shall be determined with a linear regression analysis of the correlation of the values of $[reportCO2_{v,mp} + \Delta CO2_{v,mp}(m)]$ with the values of CV_v, considering all newly registered vehicles *v* in the sub-group *sg*:

$$reportCO2_{v,mp} + \Delta CO2_{v,mp}(m) \approx a_{sg,mp} \cdot CV_v + b_{sg,mp}$$

Where

CV_v is the cargo volume of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

$reportCO2_{v,mp}$, $\Delta CO2_{v,mp}(m)$ are as defined in point 1.'

ANNEX II

'ANNEX IV

Rules on data to be monitored and reported as referred to in Articles 13a and 13b

PART A: DATA TO BE MONITORED AND REPORTED BY MEMBER STATES

(a) vehicle identification numbers of all new heavy-duty vehicles as referred to in Article 2 that are registered in the Member State territory;

(b) manufacturer name;

(c) make (trade name of manufacturer);

(d) the code for the bodywork as specified in entry 38 of the certificate of conformity, including, where applicable, the supplementing digits referred to in Annex I Appendix 2 to Regulation (EU) 2018/858;

(e) in the case of the heavy-duty vehicles referred to in Article 2, first paragraph, point (a) or (b), the information on the powerplant specified in entries 23, 23.1 and 26 of the certificate of conformity;

(f) the maximum speed of the vehicle as specified in entry 29 of the certificate of conformity;

(g) the stage of completion, as indicated in the chosen model of the certificate of conformity in accordance with Annex VIII, point 2 to Commission Implementing Regulation (EU) 2020/683;

(h) the vehicle category as specified in entry 0.4 of the certificate of conformity;

(i) the number of axles, as specified in entry 1 of the certificate of conformity;

(j) the technically permissible maximum laden mass, as specified in entry 16.1 of the certificate of conformity;

(k) the imprint of the cryptographic hash of the manufacturer's records file as specified in entry 49.1 of the certificate of conformity; for vehicles registered until 30 June 2025 Member States may report only the first 8 characters of the cryptographic hash;

(l) the specific CO2 emissions as specified in entry 49.5 of the certificate of conformity;

(m) the average payload value as specified in entry 49.6 of the certificate of conformity;

(n) the date of registration;

(o) for special purpose vehicles their designation as specified in entry 51 of the certificate of conformity;

(p) for vehicles approved under Article 2(3)(b) of Regulation 2018/858, the information that the vehicle was designed and constructed or adapted for use by civil protection fire services and forces responsible for maintaining public order;

(q) for vehicles registered for use by civil protection, fire services or forces responsible for maintaining public order or for use by the armed services, the confirmation that the vehicle is registered for use by civil protection, fire services or forces responsible for maintaining public order or for use by the armed services and that it fulfils the conditions set out in Article 2 paragraph 5 of this Regulation. For all vehicles including individually approved vehicles, the corresponding information shall be the information as to be provided in the EU certificate of conformity or EU individual vehicle approval certificate or the national individual approval certificate in accordance with the templates laid down in Commission Implementing Regulation (EU) 2020/683[1] regardless of any national exemptions applicable under Article 45(1) of Regulation (EU) 2018/858.

PART B: DATA TO BE REPORTED BY MANUFACTURERS AND OTHER ENTITIES

In accordance with Article 13b, each reporter shall report the following data for those vehicles, for which it is obliged to produce a Manufacturer's Records File (MRF) or Vehicle Information File (VIF) according to the provisions of Regulations 2017/2400 (EU) and Commission Implementing Regulation (EU) 2022/1362[2].

For vehicles referred to in Part A, points (p) and (q) of Annex IV the manufacturer referred to in Article 7a shall also inform the Commission in accordance with Article 2(4) and (5), if the vehicle which would otherwise be exempted from the obligations laid down in Article 3a, shall not be exempted from those obligations.

[1] Commission Implementing Regulation (EU) 2020/683 of 15 April 2020 implementing Regulation (EU) 2018/858 of the European Parliament and of the Council with regards to the administrative requirements for the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, OJ L 163 of 26.5.2020, p.1.

[2] Commission Implementing Regulation (EU) 2022/1362 of 1 August 2022 implementing Regulation (EC) No 595/2009 of the European Parliament and of the Council as regards the performance of heavy-duty trailers with regard to their influence on the CO2 emissions, fuel consumption, energy consumption and zero emission driving range of motor vehicles and amending Implementing Regulation (EU) 2020/683 (OJ L 205, 5.8.2022, p. 145.

Vehicle categories / sub-groups[3]	Reporters			
	Primary vehicle manufacturer(1)	**Interim vehicle manufacturer**(2)	**Vehicle manufacturer**	**Designated technical service**(8)
N / all	Not applicable	Not applicable	– MRF(4) – Additional information*	Not applicable
M / all	– VIF(4) (5) – MRF(4) (6) – Additional information* of the primary vehicle.	Not applicable	– VIF(4) (7) – MRF(4) (7) – Additional information* of the complete or completed vehicle.	Not applicable
O / all	Not applicable	Not applicable	– MRF(9) – Additional information*	– MRF(9) – Additional information*

(1) Article 3(29) of Commission Regulation (EU) 2017/2400.
(2) Article 3(31) of Commission Regulation (EU) 2017/2400
(3) Article 3(4a) of Commission Regulation (EU) 2017/2400
(4) Article 9(2) of Commission Regulation (EU) 2017/2400
(5) Point 2.3 of Annex I to Commission Regulation (EU) 2017/2400
(6) Point 2.4 of Annex I to Commission Regulation (EU) 2017/2400
(7) Point 2.7.5 of Annex I to Commission Regulation (EU) 2017/2400
(8) Article 8(6) of Commission Implementing Regulation (EU) 2022/1362
(9) Article 8(7) of Commission Implementing Regulation (EU) 2022/1362

***Additional Information:**

No	Monitoring parameter	Source	Applicable to vehicles
15	Make (trade name of manufacturer)		All
24	Name and address of transmission manufacturer	Point 0.4 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex VI to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only;
25	Make (trade name of transmission manufacturer	Point 0.1 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex VI to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only;

3

32	Name and address of axle manufacturer	Point 0.4 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex VII to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only; Category O;
33	Make (trade name of axle manufacturer)	Point 0.1 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex VII to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only; Category O;
39	Name and address of tyre manufacturer	Point 1 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex X to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only; Category O;
40	Make (trade name of tyre manufacturer)	Point 3 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex X to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only; Category O;
72	Number of license to operate the simulation tool		All
75	CO2 mass emission of the engine over WHTC (8) (g/kWh)	Point 1.4.2 of the addendum to Appendix 5, or point 1.4.2 of the addendum to Appendix 7, to Annex I to Regulation (EU) No 582/2011, whichever is applicable	Category N; Category M: primary vehicle only;
76	Fuel consumption of the engine over WHTC (g/kWh)	Point 1.4.2 of the addendum to Appendix 5, or point 1.4.2 of the addendum to Appendix 7, to Annex I to Regulation (EU) No 582/2011, whichever is applicable	Category N; Category M: primary vehicle only;
77	CO2 mass emission of the engine over WHSC (9) (g/kWh)	Point 1.4.1 of the addendum to Appendix 5, or point 1.4.1 of the addendum to Appendix 7, to Annex I to Regulation (EU) No 582/2011, whichever is applicable	Category N; Category M: primary vehicle only;

78	Fuel consumption of the engine over WHSC (g/kWh)	Point 1.4.1 of the addendum to Appendix 5, or point 1.4.1 of the addendum to Appendix 7, to Annex I to Regulation (EU) No 582/2011, whichever is applicable	Category N; Category M: primary vehicle only;
101	For vehicles with a date of simulation as of 1 July 2020, the type-approval number of the engine	Point 1.2.1. of addendum to Appendix 5, 6 or 7 to Annex I to Regulation (EU) No 582/ 2011, whichever is applicable	Category N; Category M: primary vehicle only;
102	For vehicles with a date of simulation as of 1 July 2021, the comma separated values file of the same name as the job file and with an extension.vsum comprising aggregated results per simulated mission profile and payload condition	File generated by the simulation tool referred to in Article 5(1)(a) of Regulation (EU) 2017/2400 in its graphical user interface (GUI) version	'sum exec data file'

PART C: AIR DRAG VALUE (CDXA) RANGES FOR THE PURPOSE OF PUBLICATION IN ACCORDANCE WITH ARTICLE 13c

For the purpose of making publicly available the CdxA value specified in data entry 23 in accordance with Article 13c, the Commission shall use the ranges defined in the following table containing the corresponding range for each CdxA value:

Range	**CdxA value [m2]**	
	Min CdxA (CdxA ≥ min CdxA)	**Max CdxA (CdxA < MaxCdxA)**
A1	0,00	3,00
A2	3,00	3,15
A3	3,15	3,31
A4	3,31	3,48
A5	3,48	3,65
A6	3,65	3,83
A7	3,83	4,02
A8	4,02	4,22
A9	4,22	4,43
A10	4,43	4,65
A11	4,65	4,88
A12	4,88	5,12
A13	5,12	5,38
A14	5,38	5,65
A15	5,65	5,93
A16	5,93	6,23
A17	6,23	6,54
A18	6,54	6,87
A19	6,87	7,21
A20	7,21	7,57
A21	7,57	7,95
A22	7,95	8,35
A23	8,35	8,77
A24	8,77	9,21

ANNEX V

Data reporting and management referred to in Articles 13a to 13c

1. REPORTING BY MEMBER STATES

1.1. The data specified in Part A of Annex IV shall be transmitted in accordance with Article 13a by the contact point of the competent authority via electronic data transfer to the Agency.

The contact point shall notify the Commission and the Agency when the data are transmitted by email to the following addresses:

EC-CO2-HDV-IMPLEMENTATION@ec.europa.eu

and

HDV-monitoring@eea.europa.eu

2. REPORTING BY MANUFACTURERS

2.1. Manufacturers shall notify the Commission without delay the following information:

(a) the manufacturer name indicated in the certificate of conformity or individual approval certificate;

(b) the World Manufacturer Identifier code (WMI code) as defined in Commission Regulation (EU) No 19/2011[4] to be used in the vehicle identification numbers of new heavy-duty vehicles to be placed on the market;

(c) the contact point responsible for uploading the data to the Agency.

They shall notify the Commission without delay of any changes to that information.

The notifications shall be sent to the addresses referred to in point 1.1.

2.2. The data specified in Part B, point 2 of Annex I shall be transmitted in accordance with Article 13b by the contact point of the manufacturer via electronic data transfer to the Agency.

The contact point shall notify the Commission and the Agency when the data are transmitted by email to the addresses referred to in point 1.1.

[4] Commission Regulation (EU) No 19/2011 of 11 January 2011 concerning type-approval requirements for the manufacturer's statutory plate and for the vehicle identification number of motor vehicles and their trailers and implementing Regulation (EC) No 661/2009 of the European Parliament and of the Council concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor (OJ L 8, 12.1.2011, p. 1).

3. DATA PROCESSING

3.1. The Agency shall process the data transmitted in accordance with points 1.1 and 2.2 and shall record the processed data in the register.

3.2. The data relating to heavy-duty vehicles registered in the preceding reporting period and recorded in the register shall be made public by 30 April each year, with the exception of the following data entries:

3.2.1. vehicle identification number;

3.2.2. name and address of the transmission manufacturer;

3.2.3. make (trade name of transmission manufacturer;

3.2.4. name and address of axle manufacturer;

3.2.5. make (trade name of axle manufacturer;

3.2.6. name and address of tyre manufacturer;

3.2.7. make (trade name of tyre manufacturer;

3.2.8. engine model;

3.2.9. transmission model;

3.2.10. retarder model;

3.2.11. torque converter model;

3.2.12. angle drive model;

3.2.13. axel model;

3.2.14. air drag model;

3.2.15 comma separated values file of the same name as the job file and with an extension.vsum comprising aggregated results per simulated mission profile and payload condition.

3.3. Where a competent authority or manufacturers identify errors in the data submitted, they shall without delay notify those to the Commission and the Agency by submitting an error notification report to the Agency and by email sent to the addresses referred to in point 1.1.

3.4. The Commission shall with the support of the Agency verify the notified errors and, where appropriate, correct the data in the register.

3.5. The Commission, with the support of the Agency, shall make available electronic formats for the data transmissions referred to in points 1.1 and 2.2 in due time before the transmission deadlines.

ANNEX VI

CORRELATION TABLE

Regulation (EU) 2018/956

Regulation (EU) 2018/956	This Regulation
Article 1	Article 1(2)
Article 2	Article 2
Article 3	Article 3
Article 4	Article 13a
Article 5	Article 13b
Article 6	Article 13c
Article 7	Article 13d
Article 8	Article 13e
Article 9	Article 13f
Article 10	-
Article 11	Article 14
Article 12	Article 16
Article 13	Article 17
Article 14	-
Annex I	Annex IV
Annex II	Annex V’

EUROPEAN PARLIAMENT MANDATE

ANNEX I

Average specific emissions, average specific emission targets and excess emissions

1. VEHICLE SUB-GROUPS

1.1. For the purposes of this Regulation a sub-group *sg* is defined for each new heavy-duty vehicle.

1.1.1. For vehicles of category N the sub-group sg is defined as follows:

Vehicle group according to Annex I to Regulation (EU) 2017/2400	**Vocational vehicle according to Article 3(9) of this Regulation**	**Cab type**	**Engine power**	**Operational range (OR)**	**Vehicle sub-group (sg) attributed for the purposes of this Regulation**
53	**No**	**All**			**53**
54	**No**	**All**			**54**
1s	**No**	**All**			**1s**
1	**No**	**All**			**1**
2	**No**	**All**			**2**
3	**No**	**All**			**3**
4	**No**	**All**	**<170 kW**	**All**	**4-UD**
	No	**Day cab**	**≥170 kW**	**All**	**4-RD**
	No	**Sleeper cab**	**≥170 kW and <265 kW**		
	No	**Sleeper cab**	**≥265 kW**	**< 350 km**	
	No	**Sleeper cab**	**≥265 kW**	**≥ 350 km**	**4-LH**
	Yes	***All***			***4v***

9	**No**	**Day cab**	**All**	**All**	**9-RD**
	No	**Sleeper cab**	**All**	**< 350 km**	
	No	**Sleeper cab**	**All**	**≥ 350 km**	**9-LH**
	Yes	***All***			***9v***
5	**No**	**Day cab**	**All**	**All**	**5-RD**
	No	**Sleeper cab**	**< 265 kW**		
	No	**Sleeper cab**	**≥ 265 kW**	**< 350 km**	
	No	**Sleeper cab**	**≥ 265 kW**	**≥ 350 km**	**5-LH**
	Yes	***All***			***5v***
10	**No**	**Day cab**	**All**	**All**	**10-RD**
	No	**Sleeper cab**	**All**	**< 350 km**	
	No	**Sleeper cab**	**All**	**≥ 350 km**	**10-LH**
	Yes	***All***			***10v***
11	~~**No**~~	***All***			**11**
12	~~**No**~~	***All***			**12**
16	~~**No**~~	***All***			**16 [Am. 70]**

1.1.1a. Attribution of small and medium lorries of category N2 with a maximum mass lower than 7, 4 tonnes, for which CO2 emissions have been determined in accordance with Regulation (EU) 2018/858

Characteristics of vehicle	***Vehicle sub-group (sg) attributed for the purposes of this Regulation***
Category N2, with Technical Permissible Maximum Laden Mass (TPMLM) ≤ 7,4 t	***53*** **[Am. 71]**

‘Sleeper cab’ means a type of cab that has a compartment behind the driver's seat intended to be used for sleeping as reported in accordance with Articles 13a and 13b.

’Day cab’ means a type of cab that is not a sleeper cab.

Where a new heavy-duty vehicle is attributed to sub-group 4-UD, but data on the CO_2 emissions in g/km are not available for the UDL or UDR mission profiles as defined in point 2.1, Table 2 the new heavy-duty vehicle shall be attributed to the sub-group 4-RD

’Operational range’ means the distance a vehicle can travel under long haul transport conditions without being re-charged or re-filled, as provided for in point 1.3.

1.1.2. For vehicles of category M the sub-group *sg* is defined as follows:

Vehicle group pursuant to Annex I to Regulation (EU) 2017/2400	**Vehicle sub-group (sg) attributed for the purposes of this Regulation**
31a, 31d	**31-LF**
31b1	**31-L1**
31b2	**31-L2**
31c, 31e	**31-DD**
32a, 32b	**32-C2**
32c, 32d	**32-C3**
32e, 32f	**32-DD**
33a, 33d, 37a, 37d	**33-LF**
33b1, 37b1	**33-L1**
33b2, 37b2	**33-L2**
33c, 33e, 37c, 37e	**33-DD**
34a, 34b, 36a, 36b, 38a, 38b, 40a, 40b	**34-C2**
34c, 34d, 36c, 36d, 38c, 38d, 40c, 40d	**34-C3**
34e, 34f, 36e, 36f, 38e, 38f, 40e, 40f	**34-DD**
35a, 35b1, 35b2, 35c	**35-FE**
39a, 39b1, 39b2, ~~35e~~ *39c*	**39-FE [Am. 72]**

1.1.3. For vehicles of category O the sub-group *sg* is defined as follows:

Vehicle groups defined in Annex I of Regulation (EU) 2022/1362	**Vehicle sub-group (sg) attributed for the purposes of this Regulation**
All groups provided in Table 1 with 1, 2, 3 axles	**Same as provided in column "vehicle group" of the tables in Annex I to Regulation (EU) 2022/1362.**
All groups provided in Table 4 with 1, 2, 3 axles	
All groups provided in Table 6	

1.2. Vocational vehicles are defined by the following criteria:

Vehicle category	**Chassis configuration**	**Criteria for vocational vehicles**
N	**Rigid**	**One of the following digits, as listed in Appendix 2 of Annex I to Regulation (EU) 2018/858, is used to supplement the code for bodywork indicated in entry 38 of the certificate of conformity: 09, 10, 15, 16, 18, 19, 20, 23, 24, 25, 26, 27, 28, 31;**
	Tractor	**Maximum speed not exceeding 79 km/h**

1.3. Operational ranges for the purposes of this Regulation are set as follows:

Powertrain technology	**Operational range (OR)**
Vehicles drawing energy for the purpose of mechanical propulsion only from an electrical energy or power storage device	**OR = actual charge depleting range as provided for by point 2.4.1 of part I of Annex IV to Regulation (EU) 2017/2400 for the LHR mission profile**
Other technologies	**OR > 350 km**

1.4. Definitions of mission profiles

RDL	**Regional delivery payload low**
RDR	**Regional delivery payload representative**
LHL	**Long haul payload low**
LHR	**Long haul payload representative**
UDL	**Urban delivery payload low**
UDR	**Urban delivery payload representative**
REL	**Regional delivery (EMS) payload low**
RER	**Regional delivery (EMS) payload representative**
LEL	**Long haul (EMS) payload low**
LER	**Long haul (EMS) payload representative**
MUL	**Municipal utility payload low**
MUR	**Municipal utility payload representative**
COL	**Construction payload low**
COR	**Construction payload representative**
HPL	**Heavy urban, person transport, low load**
HPR	**Heavy urban, person transport, representative load**
UPL	**Urban, person transport, low load**
UPR	**Urban, person transport, representative load**
SPL	**Sub-urban, person transport, low load**
SPR	**Sub-urban, person transport, representative load**
IPL	**Inter-urban, person transport, low load**
IPR	**Inter-uban, person transport, representative load**
CPL	**Coach, person transport, low load**
CPR	**Coach, person transport, representative load**

2. CALCULATION OF THE AVERAGE SPECIFIC EMISSIONS OF A MANUFACTURER

2.1. Calculation of the specific CO_2 emissions of a new heavy-duty vehicle

The specific emissions in g/km of a new heavy-duty vehicle *v* attributed to a sub-group *sg* or of its primary vehicle shall be calculated in accordance with the following formula:

$$CO2_v = \sum_{mp} W_{sg,mp} \times CO2_{v,mp}$$

$$CO2\mathrm{p}_v = \sum_{mp} W_{sg,mp} \times CO2\mathrm{p}_{v,mp}$$

Where,

$\sum_{mp}$ is the sum over all mission profiles *mp* listed in Table 2;

sg is the sub-group to which the new heavy-duty vehicle *v* has been attributed according to Section 1 of this Annex;

$W_{sg,mp,}$ is the mission profile weight specified in points 2.1.1 to 2.1.3;

$CO2_{v,mp}$ is the CO_2 emissions in g/km of the new heavy-duty vehicle *v* determined for a mission profile *mp*, reported in accordance with Articles 13a and 13b and normalised pursuant to Annex III;

$CO2\mathrm{p}_{v,mp}$ is the CO_2 emissions in g/km of the primary vehicle of the new heavy-duty vehicle *v*, determined for a mission profile *mp*, reported in accordance with Articles 13a and 13b;

For zero-emissions motor vehicles the values of $CO2_{v,mp}$ and $CO2p_{v,mp}$ shall be set to 0.

2.1.1. Mission profile weights ($W_{sg,mp}$) for vehicles of category N

Vehicle sub-group (sg)*	**Mission profile (*mp*)****										
	RDL	**RDR**	**LHL**	**LHR**	**UDL**	**UDR**	**REL, RER, LEL, LER**	**MUL**	**MUR**	**COL**	**COR**
53	**0,25**	**0,25**	**0**	**0**	**0,25**	**0,25**	**0**	**0**	**0**	**0**	**0**
54	**0,25**	**0,25**	**0**	**0**	**0,25**	**0,25**	**0**	**0**	**0**	**0**	**0**
1s	**0,1**	**0,3**	**0**	**0**	**0,18**	**0,42**	**0**	**0**	**0**	**0**	**0**
1	**0,1**	**0,3**	**0**	**0**	**0,18**	**0,42**	**0**	**0**	**0**	**0**	**0**
2	**0,125**	**0,375**	**0**	**0**	**0,15**	**0,35**	**0**	**0**	**0**	**0**	**0**
3	**0,125**	**0,375**	**0**	**0**	**0,15**	**0,35**	**0**	**0**	**0**	**0**	**0**
4-UD	**0**	**0**	**0**	**0**	**0,5**	**0,5**	**0**	**0**	**0**	**0**	**0**
4-RD	**0,45**	**0,45**	**0,05**	**0,05**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4-LH	**0,05**	**0,05**	**0,45**	**0,45**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4v	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,25**	**0,25**	**0,25**	**0,25**
5-RD	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5-LH	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5v	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,5**	**0,5**
9-RD	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
9-LH	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
9v	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,25**	**0,25**	**0,25**	**0,25**
10-RD	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
10-LH	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
10v	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,5**	**0,5**
11	**0,15**	**0,35**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,15**	**0,35**
12	**0,21**	**0,49**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,09**	**0,21**
16	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,3**	**0,7**

* See definitions in point 1.1

** See definitions in point 1.4

2.1.2. Mission profile weights (Wsg,mp) for vehicles of category M

Vehicle sub-group *(sg)**	**Mission profile (*mp*)****									
	HPL	**HPR**	**UPL**	**UPR**	**SPL**	**SPR**	**IPL**	**IPR**	**CPL**	**CPR**
31-LF	**0,27**	**0,23**	**0,15**	**0,13**	**0,11**	**0,11**	**0**	**0**	**0**	**0**
31-L1	**0,05**	**0,05**	**0,16**	**0,14**	**0,32**	**0,28**	**0**	**0**	**0**	**0**
31-L2	**0,05**	**0,05**	**0,09**	**0,08**	**0,15**	**0,13**	**0,24**	**0,21**	**0**	**0**
31-DD	**0,20**	**0,31**	**0,12**	**0,18**	**0,07**	**0,12**	**0**	**0**	**0**	**0**
32-C2	**0**	**0**	**0**	**0**	**0**	**0**	**0,47**	**0,43**	**0,04**	**0,06**
32-C3	**0**	**0**	**0**	**0**	**0**	**0**	**0,05**	**0,05**	**0,30**	**0,60**
32-DD	**0**	**0**	**0**	**0**	**0**	**0**	**0,05**	**0,05**	**0,35**	**0,55**
33-LF	**0,27**	**0,23**	**0,15**	**0,13**	**0,11**	**0,11**	**0**	**0**	**0**	**0**
33-L1	**0,05**	**0,05**	**0,16**	**0,14**	**0,32**	**0,28**	**0**	**0**	**0**	**0**
33-L2	**0,05**	**0,05**	**0,09**	**0,08**	**0,15**	**0,13**	**0,24**	**0,21**	**0**	**0**
33-DD	**0,20**	**0,31**	**0,12**	**0,18**	**0,07**	**0,12**	**0**	**0**	**0**	**0**
34-C2	**0**	**0**	**0**	**0**	**0**	**0**	**0,47**	**0,43**	**0,04**	**0,06**
34-C3	**0**	**0**	**0**	**0**	**0**	**0**	**0,05**	**0,05**	**0,30**	**0,60**
34-DD	**0**	**0**	**0**	**0**	**0**	**0**	**0,05**	**0,05**	**0,35**	**0,55**
35-FE	**0,27**	**0,23**	**0,15**	**0,13**	**0,11**	**0,11**	**0**	**0**	**0**	**0**
39-FE	**0,27**	**0,23**	**0,15**	**0,13**	**0,11**	**0,11**	**0**	**0**	**0**	**0**

* See definitions in point 1.1

** See definitions in poit 1.4

2.1.3. Mission profile weights (Wsg,mp) for vehicles of category O

Vehicle sub-group *(sg)**	**Mission profile (*mp*)****						
	RDL	**RDR**	**LHL**	**LHR**	**UDL**	**UDR**	**REL, RER, LEL, LER**
111, 111V,112, 112V, 113	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**
121, 121V, 122, 122V, 123, 123V, 124, 124V, 125, 126	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
131, 131v, 132, 132v, 133	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
421, 421v, 422, 422v, 423	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
431, 431v, 432, 432v, 433	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
611, 612	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**
611v, 612v	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
621, 623	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**
621V, 622, 622V, 623V, 624, 624V, 625	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
631, 631v, 632, 632v, 633	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**

* See definitions in point 1.1

** See definitions in point 1.4

2.2. Average specific CO_2 emissions of all new heavy-duty vehicles in a sub-group for a manufacturer

For each manufacturer and each ***reporting period***, the average specific CO_2 emissions $avgCO2_{sg}$ of all new heavy-duty vehicles in a sub-group *sg* or their primary vehicles, if applicable, shall be calculated as follows:

2.2.1. For category N and O vehicles:

$$avgCO2_{sg} = \frac{\sum_v CO2_v}{V_{sg} \times PL_{sg}} \quad \text{(in g/tkm)}$$

2.2.2. For category M complete or completed vehicles:

$$avgCO2_{sg} = \frac{\sum_v CO2_v}{(V_{sg} - Vpv_{sg}) \times PN_{sg}} \text{ n g/pkm)}$$

2.2.3. For category M primary vehicles of heavy-duty vehicles:

$$avgCO2p_{sg} = \frac{\sum_v CO2p_v}{Vpv_{sg} \times PN_{sg}} \quad \text{(in g/pkm)}$$

Where,

$\sum_v$ is the sum over all new heavy-duty vehicles of the manufacturer in the sub-group *sg,* subject to the provisions of Article 7b*;*

$CO2_v$ is the specific CO_2 emissions of the new heavy-duty vehicle *v* determined in accordance with point 2.1;

$CO2p_v$ is the specific CO_2 emissions of the primary vehicle of the new heavy-duty vehicle *v* determined in accordance with point 2.1;

V_{sg} is the number of new heavy-duty vehicles of the manufacturer in subgroup *sg*;

Vpv_{sg} the number of new heavy-duty vehicles within the sub-group *sg*, which pursuant to Article 7b shall be accounted for with the CO2 emissions of their primary vehicles in the calculation of the average specific CO2 emissions of point 2.2.3.;

PL_{sg} is the average payload of vehicles in the sub-group *sg* as determined in point 2.5.

PN_{sg} is the average passenger number of vehicles in the sub-group *sg* as determined in point 2.5.

2.3. Calculation of the zero- and low-emission factor as referred to in Article 5

2.3.1 Reporting periods 2019 to 2024

For each manufacturer and reporting period from 2019 to 2024, the zero- and low-emission factor (ZLEV) referred to in Article 5 shall be calculated as follows:

$$ZLEV = V_{all} / (V_{conv} + V_{zlev}) \quad \text{with a minimum of } 0{,}97$$

where:

V_{all} *is the number of new heavy-duty vehicles of the manufacturer in the sub-groups sg = 4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH;*

V_{conv} *is the number of new heavy-duty vehicles of the manufacturer in the sub-groups sg = 4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH excluding zero- and low-emission heavy-duty vehicles;*

V_{zlev} *is the sum of Vin and Vout,*

where,

V_{in} *is* $\sum_v (1 + (1 - CO2_v/LET_{sg}))$

with $\sum_v$ *being the sum over all new zero- and low-emission heavy-duty vehicles in the sub-groups sg = 4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH;*

$CO2_v$ *is the specific* CO_2 *emissions in g/km of a zero- and low-emission heavy-duty vehicle v determined in accordance with point 2.1.;*

LET_{sg} *is the low-emission threshold of the sub-group sg to which the vehicle v belongs as defined in point 2.3.4;*

V_{out} *is the total number of zero-emission heavy-duty vehicles, which are not in the sub-groups referred to by the definition of* V_{in}*, and with a maximum of 1,5% of* V_{conv} *.*

2.3.2 Reporting periods from 2025 to 2029

For each manufacturer and ***reporting period***, the zero- and low-emission factor (ZLEV) referred to in Article 5 shall be calculated as follows:

ZLEV = 1 - (y - x) unless this sum is larger than 1 or lower than 0.97 in which case the ZLEV factor shall be set to 1 or 0.97 respectively

Where:

x is ~~0,02~~ ***0,08*** **[Am. 73]**

y is the sum of V_{in} and V_{out}, divided by V_{total}, where:

V_{in} is the total number of newly registered ~~low- and~~ zero-emission heavy-duty vehicles in the sub-groups sg = 4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH~~, where each of them is counted as $ZLEV_{specifi}$ in accordance with the formula below~~: **[Am. 74]**

~~$ZLEV_{specific} = 1 - (CO2_v / LET_{sg})$~~ **[Am. 75]**

Where:

~~$CO2_v$ is the specific CO_2 emissions in g/km of a zero- and low-emission heavy-duty vehicle v determined in accordance with point 2.1,~~ **[Am. 76]**

~~LET_{sg} is the low-emission threshold of the sub-group sg to which the vehicle v belongs as defined in point 2.3.4;~~ **[Am. 77]**

V_{out} is the total number of newly registered zero-emission heavy-duty vehicles ***of category N***, which are not in the sub-groups referred to by the definition of V_{in} , and with a maximum of 0,035 of V_{total}; **[Am. 78]**

V_{total} is the total number of newly registered heavy-duty vehicles of the manufacturer in that reporting period.

Where V_{in}/V_{total} is lower than 0,0075, the ZLEV factor shall be set to 1.

2.3.3 Reporting periods as from 2030

ZLEV = 1

2.3.4 Calculation of the low-emission threshold

The low-emission threshold LET_{sg} of the sub-group sg is defined as follows:

$$LET_{sg} = (rCO2_{sg} \times PL_{sg}) / 2$$

Where:

$rCO2_{sg}$ is the reference CO_2 emissions of the sub-group sg, as determined in point 3;

PL_{sg} is the average payload of vehicles in the sub-group sg as determined in point 2.5.

2.4. Calculation of vehicle shares

For each manufacturer and each ***reporting period***, the share of new heavy-duty vehicles in a sub-group $share_{sg}$ shall be calculated as follows:

$$share_{sg} = \frac{V_{sg}}{V}$$

For each manufacturer and each ***reporting period***, the share of new zero-emissions heavy-duty vehicles in a sub-group zev_{sg} shall be calculated as follows:

$$zev_{sg} = \frac{Vzev_{sg}}{V_{sg}}$$

For each manufacturer and each ***reporting period***, the share of new heavy-duty vehicles within the sub-group sg, which pursuant to Article 7b shall be accounted for with the CO2 emissions of their primary vehicles in the calculation of the average specific CO2 emissions of point 2.2., shall be calculated as follows:

$$pv_{sg} = \frac{Vpv_{sg}}{V_{sg}}$$

Where,

$Vzev_{sg}$ is the number of new zero-emissions heavy-duty vehicles of the manufacturer in a subgroup *sg*;

Vpv_{sg} the number of new heavy-duty vehicles within the sub-group *sg*, which pursuant to Article 7b shall be accounted for with the CO2 emissions of their primary vehicles in the calculation of the average specific CO2 emissions of point 2.2.;

V_{sg} is the number of new heavy-duty vehicles of the manufacturer in a subgroup *sg*;

V is the number of new heavy-duty vehicles of the manufacturer.

2.5. **Payload values, passenger numbers and cargo volumes**

The average payload value PL_{sg} of a vehicle of category N or O in a sub-group sg shall be calculated as follows:

$$PL_{sg} = \sum_{mp} W_{sg,mp} \times PL_{sg,mp}$$

The average passenger number PN_{sg} of a vehicle of category M in a sub-group sg shall be calculated as follows:

$$PN_{sg} = \sum_{mp} W_{sg,mp} \times PN_{sg,mp}$$

Where,

$\sum_{mp}$ is the sum over all mission profiles *mp*

$W_{sg,mp,}$ is the mission profile weight specified in points 2.1.1 to 2.1.3

$PL_{sg,mp}$ is the payload value attributed to the vehicles of category N and O in the sub-group *sg* for the mission profile *mp*, as defined in points 2.5.1 and 2.5.3.

$PN_{sg,mp}$ is the passenger number attributed to the vehicles of category M in the sub-group *sg* for the mission profile *mp*, as defined in point 2.5.2.

2.5.1. Vehicles of category N.

Payload values $PL_{sg, mp}$ (in tons) are determined as follows:

<table>
<tr><th rowspan="2">Vehicle sub-group sg*</th><th colspan="14">Mission profile mp**</th></tr>
<tr><th>RDL</th><th>RDR</th><th>LHL</th><th>LHR</th><th>UDL</th><th>UDR</th><th>REL</th><th>RER</th><th>LEL</th><th>LER</th><th>MUL</th><th>MUR</th><th>COL</th><th>COR</th></tr>
<tr><td>53</td><td colspan="2" rowspan="5">As determined in point 3.1.1</td><td colspan="2">Not applicable</td><td colspan="2" rowspan="5">As determined in point 3.1.1</td><td colspan="8" rowspan="5">Not applicable</td></tr>
<tr><td>54</td></tr>
<tr><td>1s</td></tr>
<tr><td>1</td></tr>
<tr><td>2</td><td colspan="2">As determined in point 3.1.1</td></tr>
<tr><td>3</td><td colspan="2">Not applicable</td><td colspan="8"></td></tr>
<tr><td>4-UD</td><td rowspan="4">0,9</td><td rowspan="4">4,4</td><td rowspan="4">1,9</td><td rowspan="4">14</td><td rowspan="4">0,9</td><td rowspan="4">4,4</td><td rowspan="4">3,5</td><td rowspan="4">17,5</td><td rowspan="4">3,5</td><td rowspan="4">26,5</td><td rowspan="4">0,6</td><td rowspan="4">3,0</td><td rowspan="4">0,9</td><td rowspan="4">4,4</td></tr>
<tr><td>4-RD</td></tr>
<tr><td>4-LH</td></tr>
<tr><td>4v</td></tr>
<tr><td>5-RD</td><td rowspan="3">2,6</td><td rowspan="3">12,9</td><td rowspan="3">2,6</td><td rowspan="3">19,3</td><td rowspan="3">2,6</td><td rowspan="3">12,9</td><td rowspan="3">3,5</td><td rowspan="3">17,5</td><td rowspan="3">3,5</td><td rowspan="3">26,5</td><td rowspan="3">n.a.</td><td rowspan="3">n.a.</td><td rowspan="3">2,6</td><td rowspan="3">12,9</td></tr>
<tr><td>5-LH</td></tr>
<tr><td>5v</td></tr>
<tr><td>9-RD</td><td rowspan="3">1,4</td><td rowspan="3">7,1</td><td rowspan="3">2,6</td><td rowspan="3">19,3</td><td rowspan="3">1,4</td><td rowspan="3">7,1</td><td rowspan="3">3,5</td><td rowspan="3">17,5</td><td rowspan="3">3,5</td><td rowspan="3">26,5</td><td rowspan="3">1,2</td><td rowspan="3">6,0</td><td rowspan="3">1,4</td><td rowspan="3">7,1</td></tr>
<tr><td>9-LH</td></tr>
<tr><td>9v</td></tr>
<tr><td>10-RD</td><td rowspan="3">2,6</td><td rowspan="3">12,9</td><td rowspan="3">2,6</td><td rowspan="3">19,3</td><td rowspan="3">2,6</td><td rowspan="3">12,9</td><td rowspan="3">3,5</td><td rowspan="3">17,5</td><td rowspan="3">3,5</td><td rowspan="3">26,5</td><td rowspan="3">n.a.</td><td rowspan="3">n.a.</td><td rowspan="3">2,6</td><td rowspan="3">12,9</td></tr>
<tr><td>10-LH</td></tr>
<tr><td>10v</td></tr>
<tr><td>11</td><td>1,4</td><td>7,1</td><td>2,6</td><td>19,3</td><td>1,4</td><td>7,1</td><td>3,5</td><td>17,5</td><td>3,5</td><td>26,5</td><td>1,2</td><td>6,0</td><td>1,4</td><td>7,1</td></tr>
<tr><td>12</td><td>2,6</td><td>12,9</td><td>2,6</td><td>19,3</td><td>2,6</td><td>12,9</td><td>3,5</td><td>17,5</td><td>3,5</td><td>26,5</td><td>n.a.</td><td>n.a.</td><td>2,6</td><td>12,9</td></tr>
<tr><td>16</td><td colspan="12">Not applicable</td><td>2,6</td><td>12,9</td></tr>
</table>

* See definitions in point 1.1

** See definitions in point 1.4

Technically permissible maximum payload values $maxPL_{sg}$ and cargo volumes CV_{sg} are determined according to point 3.1.1.

2.5.2. Vehicles of category M.

Passenger numbers $PN_{sg,mp}$, passenger masses $PM_{sg,mp}$ and technically permissible maximum passenger numbers $maxPN_{sg}$ for sub-group *sg* and mission profile *mp* are determined according to point 3.1.1.

2.5.3. Vehicles of category O.

Payload values $PL_{sg,\ mp}$ (in tons) are determined as follows:

Vehicle sub-group *(sg)**	**Mission profile (*mp*)****						
	RDL	**RDR**	**LHL**	**LHR**	**UDL**	**UDR**	**REL, RER, LEL, LER**
111, 111V,112, 112V, 113	**1,5**	**7,5**	**1,5**	**11,2**	**n.a.**	**n.a.**	**n.a.**
121, 121V, 123, 123V, , 125	**2,2**	**11,2**	**2,2**	**16,8**	**n.a.**	**n.a.**	**n.a.**
122, 122V, 124, 124V, 126	**2,4**	**12,2**	**2,4**	**18,3**	**n.a.**	**n.a.**	**n.a.**
131, 131v, 132, 132v, 133	**2,6**	**12,9**	**2,6**	**19,3**	**n.a.**	**n.a.**	**n.a.**
421, 421v, 422, 422v, 423	**2,6**	**12,9**	**2,6**	**19,3**	**n.a.**	**n.a.**	**n.a.**
431, 431v, 432, 432v, 433	**2,6**	**12,9**	**2,6**	**19,3**	**n.a.**	**n.a.**	**n.a.**
611, 612	**1,2**	**6,1**	**1,2**	**9,2**	**n.a.**	**n.a.**	**n.a.**

611v, 612v	**1,2**	**6,1**	**1,2**	**9,2**	**n.a.**	**n.a.**	**n.a.**
621, 621v, 623, 623v	**1,3**	**6,3**	**1,3**	**9,5**	**n.a.**	**n.a.**	**n.a.**
622, 622V, 624, 624V, 625	**2,6**	**12,9**	**2,6**	**19,3**	**n.a.**	**n.a.**	**n.a.**
631, 631v, 632, 632v, 633	**2,6**	**12,9**	**2,6**	**19,3**	**n.a.**	**n.a.**	**n.a.**

* See definitions in point 1.1

** See definitions in point 1.4

Technically permissible maximum payload values $maxPL_{sg}$ and cargo volumes CV_{sg} are determined according to point 3.1.1.

2.6. Calculation of the mileage and payload or passenger-number weighting factor

The mileage and payload (passenger) weighting factor (MPW_{sg}) of a sub-group *sg* is defined as the product of the annual mileage specified in point 2.6.1 and the payload and passenger-number values for the sub-group specified in points 2.5.1, 2.5.2 and 2.5.3 for vehicle categories N, M and O, respectively, normalised to the respective value for sub-group 5-LH, and shall be calculated as follows:

$$MPW_{sg} = \frac{(AM_{sg} \times PL_{sg})}{(AM_{5-LH} \times PL_{5-LH})} \quad \text{(for category N and O vehicles)}$$

$$MPW_{sg} = \frac{(AM_{sg} \times PN_{sg})}{(AM_{5-LH} \times PL_{5-LH})} \quad \text{(for category M vehicles)}$$

Where,

AM_{sg} is the annual mileage specified in point 2.6.1, 2.6.2 and 2.6.3 for the vehicles in the respective sub-group;

$AM_{5\text{-}LH}$ is the annual mileage specified for the sub-group 5-LH in 2.6.1;

PL_{sg} is as determined in points 2.5.1 and 2.5.3;

PN_{sg} is as determined in point 2.5.2;

$PL_{5\text{-}LH}$ is the average payload value for the sub-group 5-LH as determined in point 2.5.1.

2.6.1. Annual mileages for vehicles of category N

Vehicle sub-group *(sg)**	Annual mileage AM_{sg} (in km)
53	58 000
54	58 000
1s	58 000
1	58 000
2	60 000
3	60 000
4-UD	60 000
4-RD	78 000
4-LH	98 000
4v	60 000
5-RD	78 000
5-LH	116 000
5v	60 000
9-RD	73 000
9-LH	108 000
9v	60 000
10-RD	68 000
10-LH	107 000
10v	60 000
11	65 000
12	67 000
16	60 000

* See definitions in point 1.1

2.6.2. Annual mileages for vehicles of category M

Vehicle sub-group *(sg)**	Annual mileage AM_{sg} (in km)
31-LF	60 000
31-L1	60 000
31-L2	60 000
31-DD	60 000
32-C2	96 000
32-C3	96 000
32-DD	96 000
33-LF	60 000
33-L1	60 000
33-L2	60 000
33-DD	60 000
34-C2	96 000
34-C3	96 000
34-DD	96 000
35-FE	60 000
39-FE	60 000

* See definitions in point 1.1

2.6.3. Annual mileages for vehicles of category O

Vehicle sub-group *(sg)**	Annual mileage AM_{sg} (in km)
111, 111V,112, 112V, 113	52 000
121, 121V, 122, 122V, 123, 123V, 124, 124V, 125, 126, 131, 131v, 132, 132v, 133	77 000
421, 421v, 422, 422v, 423, 431, 431v, 432, 432v, 433	68 000
611, 612, 611v, 612v, 621, 623, 621v, 623v	40 000
622, 622V, 624, 624V, 625, 631, 631v, 632, 632v, 633	68 000

* See definitions in point 1.1

2.7. Average specific CO_2 emissions of manufacturers, as referred to in Article 4

For each manufacturer the following average specific CO_2 emissions shall be calculated:

2.7.1. For the reporting peridods 2019 to 2029:

$$CO2(2025) = ZLEV \times \sum_{sg} share_{sg} \times MPW_{sg} \times avgCO2_{sg}$$

2.7.2. For the reporting peridods as from 2025:

$$CO2(NO) = \sum_{sg} share_{sg} \times MPW_{sg} \times avgCO2_{sg}$$

$$CO2(MCO2) = \sum_{sg} share_{sg} \times MPW_{sg} \times [avgCO2_{sg} \times (1 - pv_{sg}) + avgCO2p_{sg} \times pv_{sg}]$$

$$CO2(MZE) = \sum_{sg} share_{sg} \times MPW_{sg} \times (1 - zev_{sg}) \times rCO2_{sg}$$

$$CO2(M) = CO2(MCO2) + CO2(MZE)$$

Where,

$\sum_{sg}$	is the sum is over those sub-groups that are included in the calculation of the particular average specific CO_2 emissions according to point 4.2;
$ZLEV$	is as determined in point 2.3;
$share_{sg}$	is as determined in point 2.4;
zev_{sg}	is as determined in point 2.4;
pv_{sg}	is as determined in point 2.4;
MPW_{sg}	is as determined in point 2.6;
$avgCO2_{sg}$	is as determined in point 2.2;
$avgCO2p_{sg}$	is as determined in point 2.2;
$rCO2_{sg}$	is as determined in point 3.1.2.

3. **CALCULATION OF THE REFERENCE VALUES**

3.1. Reference values

The following reference values shall be calculated on the basis of all new heavy-duty vehicles of all manufacturers for the reference period applicable to the sub-group *sg* according to point 3.2.

3.1.1. For each vehicle sub-group *sg,* payload $PL_{sg,mp}$, passenger number $PN_{sg,mp}$, passenger mass $PM_{sg,mp}$, technically permissible maximum payload $maxPL_{sg}$, technically permissible maximum passenger number $maxPN_{sg}$ and cargo volume CV_{sg} values shall be cacluclated as follows:

$$PL_{sg,mp} = \frac{\sum_v PL_{v,mp}}{rV_{sg}} \quad \text{(for vehicles of category N)*}$$

$$PN_{sg,mp} = \frac{\sum_v PN_{v,mp}}{rV_{sg}} \quad \text{(for vehicles of category M)*}$$

$$PM_{sg,mp} = \frac{\sum_v PM_{v,mp}}{rV_{sg}} \quad \text{(for vehicles of category M)*}$$

$$maxPL_{sg} = \frac{\sum_v maxPL_v}{rV_{sg}}$$ (for vehicles of category N)

$$maxPN_{sg} = \frac{\sum_v maxPN_v}{rV_{sg}}$$ (for vehicles of category M)

$$CV_{sg} = \frac{\sum_v CV_v}{rV_{sg}}$$ (for vehicles of category O)

(*only for vehicle sub-groups, for which no explicit values for $PL_{sg,mp}$ or $PN_{sg,mp}$ are provided in point 2.5**)**

3.1.2. Reference CO_2 emissions $rCO2_{sg}$ referred to in Article 3 shall be caclulated as follows:

$$rCO2_{sg} = \frac{\sum_v (CO2_v / PL_{sg})}{rV_{sg}}$$ (for vehicles of category N and O)

$$rCO2_{sg} = \frac{\sum_v (CO2_v / PN_{sg})}{rV_{sg}}$$ (for vehicles of category M)

$$rCO2p_{sg} = \frac{\sum_v (CO2p_v / PN_{sg})}{rV_{sg}}$$ (for vehicles of category M)

Where,

$\sum_v$ is the sum over all new heavy-duty vehicles in the sub-group *sg* registered in the reference period applicable to *sg* acording to point 3.2;

$CO2_v$ are the specific CO_2 emissions of the new heavy-duty vehicle *v* as determined in accordance with point 2.1, if applicable adjusted pursuant to Annex II;

$CO2p_v$ are the specific CO_2 emissions of the primary vehicle of the new-heavy duty vehicle *v* as determined in accordance with point 2.1, if applicable adjusted pursuant to Annex II;;

rV_{sg} is the number of all new heavy-duty vehicles in the sub-group *sg* registered in the reference period applicable to *sg* acording to point 3.2;

PL_{sg} is the average payload of vehicles in the sub-group *sg* as determined in point 2.5;

PN_{sg} is the average passenger number of vehicles in the sub-group *sg* as determined in point 2.5;

$PL_{v,mp}$ is the payload of vehicle *v* in the mission profile *mp*, as determined from the data reported according to Articles 13a and 13b ;

$PN_{v,mp}$ is the passenger number of vehicle *v* in the mission profile *mp* as determined from the data reported according to Articles 13a and 13b;

$PM_{v,mp}$ is the passenger mass of vehicle *v* in the mission profile *mp* as determined from the data reported according to Articles 13a and 13b;

$maxPL_v$ is the technically permissible maximum payload of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

$maxPN_v$ is the technically permissible maximum passenger number of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

CV_v is the cargo volume of vehicle *v* as determined from the data reported according to Articles 13a and 13b.

3.2. Reference periods applicable to sub-groups

The following reporting periods shall be applied as reference periods to vehicle sub-groups:

Vehicle sub-group *sg*	**Reporting period of the year applicable as reference period**
4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH	2019
All others	2025

3.2.1. If in the reference period as specified in point 3.2 in a sub-group *sg* the number of new heavy-duty vehicles of all manufacturers is less than 50 the following rules shall apply:

The average specific CO2 emissions $avgCO2_{sg}$ and $avgCO2p_{sg}$ as provided for in point 2.2 and the reference CO2 emissions $rCO2_{sg}$ and $rCO2p_{sg}$ as provided for in point 3.1.2 shall be set to "0" for all manufacturers in the sub-group *sg* for the purpose of calculating the average specific CO2 emissions according to point 2.7 and the specific CO2 emissions targets according to point 4.1 for the reporting periods of the years < Y + 5. Here Y is the year of the first reporting period in which the number of new heavy-duty vehicles of all manufacturers in the sub-group *sg* is at least 50.

To obtain the reference CO2 emissions $rCO2_{sg}$ and $rCO2p_{sg}$ for the purpose of calculating the specific emissions target according to point 4, first the corresponding entities provided for in point 3.1.2 shall be calculated for the reporting period of the year *Y* instead of for the reference period applicable to the sub-group *sg* according to point 3.2.

The resulting values shall then be divided by

– the target factor $RET_{sg,Y}$, as defined in point 5.1.1, for obtaining reference CO2 emissions $rCO2_{sg}$,

– the target factor $RETp_{sg,Y}$, as defined in point 5.1.1, for obtaining reference CO2 emissions $rCO2p_{sg}$.

4. CALCULATION OF THE SPECIFIC EMISSION TARGET OF A MANUFACTURER REFERRED TO IN ARTICLE 6

4.1. Specific emission targets

For each manufacturer the following specific emission targets *T* shall be calculated as follows:

4.1.1. For the reporting periods of the years from 2025 to 2029:

$$T(2025) = \sum_{sg} share_{sg} \times MPW_{sg} \times (1 - rf_{sg}) \times rCO2_{sg}$$

4.1.2. For the reporting periods of the years as from 2030:

$$T(NO) = \sum_{sg} share_{sg} \times MPW_{sg} \times (1 - rf_{sg}) \times rCO2_{sg}$$
$$T(MCO2) = \sum_{sg} share_{sg} \times MPW_{sg} \times [(1 - pv_{sg}) \times (1 - rf_{sg}) \times rCO2_{sg} + pv_{sg} \times (1 - rfp_{sg}) \times rCO2p_{sg}]$$
$$T(MZE) = \sum_{sg} share_{sg} \times MPW_{sg} \times (1 - zevM_{sg}) \times rCO2_{sg}$$
$$T(M) = T(MCO2) + T(MZE)$$

Where,

$\sum_{sg}$	is the sum over those sub-groups that are inclued in the calculation of the particular specific emissions target according to point 4.2;
$share_{sg}$	is as determined in point 2.4;
MPW_{sg}	is as determined point 2.6;
rf_{sg}	is the CO_2 reduction target ***applicable in*** the specific ***reporting period*** to new heavy dutyvehicles in sub-group *sg* as provided for in point 4.3;
rfp_{sg}	is the CO_2 reduction target ***applicable in*** the specific ***reporting period*** to primary vehicles of new heavy-duty vehicles in sub-group *sg* as provided for in point 4.3;

$zevM_{sg}$	is the zero-emission vehicles mandate ***applicable in*** the specific ***reporting period*** to vehicles in sub-group *sg* as provided for in point 4.3;
$rCO2_{sg}$	is as determined in point 3.1.2;
$rCO2p_{sg}$	is as determined in point 3.1.2;
pv_{sg}	is as determined in point 2.4.

4.2. Vehicle sub-groups included in the calculation of average specific CO_2 emissions and specific emissions targets of manufacturers

The following sub-groups *sg* shall be included in the calculation of the specific CO_2 emissions *CO2(X),* specific emissions targets *T(X)* and CO2 emissions trajectory $ET(X)_Y$:

X = 2025	**X= NO**	**X = MCO2**	**X= MZE**
vehicle sub-groups, subject to CO_2 emissions targets according to Article 3a paragraph 1 (a)	**sub-groups of transport of goods vehicles, subject to CO_2 emissions targets according to Article 3a paragraphs 1(b), 1(c) and 1(d) and paragraph 3**	**sub-groups of transport of persons vehicles, subject to CO_2 emissions targets according to Article 3a paragraphs 1(b), 1(c) and 1(d)**	**sub-groups of transport of persons vehicles, subject to zero-emissions vehicle targets according to Article 3b**
4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH	All vehicle sub-groups referred to in points 1.1.1 and 1.1.3.	***31-L2,*** 32-C2, 32-C3, 32-DD, ***33-L2,*** 34-C2, 34-C3, 34-DD,	31-LF, 31-L1, ~~31-L2~~, 31-DD, 33-LF, 33-L1, ~~33-L2~~, 33-DD, 35-FE, 39-FE **[Am. 79]**

4.3. CO_2 reduction targets and zero-emissions vehicle mandates

4.3.1. The following CO_2 emissions reduction targets rf_{sg} and rfp_{sg} pursuant to Article 3a shall apply to vehicles in the sub-group *sg* for different reporting periods:

CO_2 reduction targets rf_{sg} and rfp_{sg}					
Sub-groups *sg*		Reporting period of the years			
		2025 – 2029	2030 – 2034	2035 – 2039	As from 2040
Medium lorries	**53, 54**	**0**	**43%**	**64%**	**90%**
Heavy lorries > 7,4t	**1s, 1, 2, 3**	**0**	**43%**	**64%**	**90%**
Heavy lorries > 16 t with 4x2 and 6x4 axle configurations	**4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH**	**15%**	**43%**	**64%**	**90%**
Heavy lorries > 16 t with special axle configurations	**11, 12, 16**	**0**	**43%**	**64%**	**90%**
Coaches (rf_{sg})	**32-C2, 32-C3, 32-DD, 34-C2, 34-C3, 34-DD**	**0**	**43%**	**64%**	**90%**
Primary vehicles of coaches (rfp_{sg})	**32-C2, 32-C3, 32-DD, 34-C2, 34-C3, 34-DD**	**0**	**43%**	**64%**	**90%**
Trailers		**0**	**7,5%**	**7,5%**	**7,5%**
Semi-trailers		**0**	**15%**	**15%**	**15%**

For reporting periods of the years before 2025, all CO_2 reduction targets rf_{sg} and rfp_{sg} shall be 0.

4.3.2. The following zero-emission vehicle targets $zevM_{sg}$ pursuant to Article 3b are applicable to vehicles in the sub-group *sg* for different reporting periods:

Zero-emission vehicle mandates $zevM_{sg}$					
Sub-groups *sg*		Reporting period of the years			
		before 2030	2030 – 2034	2035 – 2039	As from 2040
Urban heavy buses	**31-LF, 31-L1, 31-DD, 33-LF, 33-L1, 33-DD, 35-FE, 39-FE, ~~31-L2, 33-L2~~ [Am. 81]**	**0**	**100%**	**100%**	**100%**

5. EMISSION CREDITS AND DEBTS REFERRED TO IN ARTICLE 7

5.1. CO_2 emissions reduction trajectories

5.1.1. Target factors

For each vehicle sub-group *sg* and reporting period of a year *Y* target factors shall be defined as follows:

$$RET_{sg,Y} = (1-rf_{sg,uY})+(rf_{sg,uY} - rf_{sg,lY}) \times (uY - Y)/(uY - lY)$$
$$RETp_{sg,Y} = (1-rfp_{sg,uY})+(rfp_{sg,uY} - rfp_{sg,lY}) \times (uY - Y)/(uY - lY)$$
$$ZET_{sg,Y} = (1-zevM_{sg,uY})+(zevM_{sg,uY} - zevM_{sg,lY}) \times (uY - Y)/(uY - lY)$$

Where,

lY, uY	are the values for the lower year and upper year in the set {rY, 2025, 2030, 2040} defining the smallest intervall for which the condition $lY \leq Y < uY$ holds;
rY	is the year of the reference period applicable to the vehicle sub-group *sg* according to point 3.2;
$rf_{sg,lY}$, $rf_{sg,uY}$	are the CO2 reduction targets of the sub-group *sg* for new heavy duty vehiches of the years lY and uY according to point 4.3;
$rfp_{sg,lY}$, $rfp_{sg,uY}$	are the CO2 reduction targets of the sub-group *sg* for primary vehicles of new heavy duty vehiches of the years lY and uY according to point 4.3;

$zevM_{sg,lY}$, $zevM_{sg,uY}$ are the zero emissions vehicle mandates for new heavy duty vehiches of the years *lY* and *uY* according to point 4.3;

For reporting years Y < rY, the values of $RET_{sg,Y}$, $RETp_{sg,Y}$ and $ZET_{sg,Y}$ shall be set to 1 such that there is no contribution of the vehicle sub-group *sg* to the CO2 emissions trajectory.

5.1.2. CO_2 emissions reduction trajectories

5.1.2.1. Then for each vehicle sub-group *sg* and reporting period of a year *Y* the following CO_2 emissions reduction trajectories shall be defined:

$$ET_{sg,Y} = RET_{sg,Y} \times rCO2_{sg}$$

$$ETp_{sg,Y} = RETp_{sg,Y} \times rCO2p_{sg}$$

$$ETz_{sg,Y} = ZET_{sg,Y} \times rCO2_{sg}$$

5.1.2.2. For each manufacturer and reporting periods of a year *Y* between 2019 and 2024 the following CO_2 emissions reduction trajectories shall be defined:

$$ET(2025)_Y = \sum_{sg} share_{sg} \times MPW_{sg} \times ET_{sg,Y}$$

5.1.2.3. For each manufacturer and reporting periods of a year *Y* between 2025 and 2040 the following CO_2 emissions reduction trajectories shall be defined:

$$ET(NO)_Y = \sum_{sg} share_{sg} \times MPW_{sg} \times ET_{sg,Y}$$

$$ET(MCO2)_Y = \sum_{sg} share_{sg} \times MPW_{sg} \times [(1- pv_{sg}) \times ET_{sg,Y} + pv_{sg} \times ETp_{sg,Y}]$$

$$ET(MZE)_Y = \sum_{sg} share_{sg} \times MPW_{sg} \times ETz_{sg,Y}$$

$$ET(M)_Y = ET(MCO2)_Y + ET(MZE)_Y$$

Where,

$\sum_{sg}$ is the sum over those sub-groups that are inclued in the calculation of the particular CO2 emissions trajectory according to point 4.2;

$share_{sg}$ is the share of new heavy-duty vehicles of the manufacturer in the sub-group sg, as determined in point 2.4;

MPW_{sg} is as determined point 2.6;

$rCO2_{sg}$ is as determined in point 3.1.2;

$rCO2p_{sg}$ is as determined in point 3.1.2;

pv_{sg} is the share of new heavy-duty vehicles of the manufacturer within the sub-group *sg*, which pursuant to Article 7b shall be accounted for with the CO_2 emissions of their primary vehicles in the calculation of the average specific CO2 emissions of point 2.2

5.2. Calculation of the emission credits and debts in each reporting period

For each manufacturer and each reporting period of the years Y from 2019 to 2040 the emission credits $cCO2(X)_Y$ and emission debts $dCO2(X)_Y$, *(X = NO, M),* shall be the maximum of the following values and 0 (i.e. emission credits and debts cannot be negative):

	2019 ≤ Y< 2025	**2025 ≤ Y< 2030**	**2030 ≤ Y< 2040**
$cCO2(NO)_Y$	$[ET(2025)_Y - CO2(2025)_Y] \times V_y$	$[ET(NO)_Y - CO2(NO)_Y] \times V_y$	$[ET(NO)_Y - CO2(NO)_Y] \times V_y$
$dCO2(NO)_Y$	*0*	$[CO2(2025)_Y - T(2025)_Y] \times V_y$	$[CO2(NO)_Y - T(NO)_Y] \times V_y$
$cCO2(M)_Y$	**0**	$[ET(M)_Y - CO2(M)_Y] \times V_y$	$[ET(M)_Y - CO2(M)_Y] \times V_y$
$dCO2(M)_Y$	**0**	**0**	$[CO2(M)_Y - T(M)_Y] \times V_y$

Where,

$ET(X)_Y$ is the manufacturer's emission trajectory in the ***reporting period of the*** year Y determined in accordance with point 5.1 *(X = 2025, NO, M);*

$CO2(X)_Y$ is the manufacturer's average specific emissions in the ***reporting period of the*** year Y determined in accordance with point 2.7 *(X = 2025, NO, M)*;

$T(X)_Y$ is the manufacturer's specific emission target in the ***reporting period of the*** year Y determined in accordance with point 4 *(X = 2025, NO, M)*;

V_Y is the number of new heavy-duty vehicles of the manufacturer in the ***reporting period of the*** year Y.

5.3. Emission debt limit

For each manufacturer the emission debt limits $limCO2(X)_Y$ in a reporting period of the year *Y* are defined as follows:

$limCO2(NO)_Y = T(2025)_Y \times 0{,}05 \times V(2025)_Y$ for the reporting periods of the year Y < 2030;

$limCO2(NO)_Y = T(NO)_Y \times 0{,}05 \times V(NO)_Y$ for the reporting periods of the year Y ≥ 2030;

$limCO2(M)_Y = T(M)_Y \times 0{,}05 \times V(M)_Y$ for the reporting periods of the year Y ≥ 2030.

Where

$T(X)_Y$ is the manufacturer's specific emission target in the ***reporting period of the*** year Y determined in accordance with point 4 *(X = 2025, NO, M)*;

$V(X)_Y$ is the number of new heavy-duty vehicles of the manufacturer in the ***reporting period of the*** year Y in the vehicle sub-groups, which are included int the caclulation of the specific CO_2 emissions *CO2(X)* according to point 4.2 *(X = 2025, NO, M)*.

5.4. Early emission credits

Emission debts acquired ***for the reporting periods of the*** year 2025 shall be reduced by an amount corresponding to the emission credits acquired prior to ***this reporting period***, which is determined for each manufacturer as follows:

$$redCO2 = min(dCO2(NO)_{2025} ; \sum_{Y=2019}^{2024} cCO2(NO)_Y)$$

Where,

min	is the minimum of the two values mentioned between the brackets;
$\sum_{Y=2019}^{2024}$	is the sum over the ***reporting periods of the years Y from*** 2019 to 2024;
$dCO2(NO)_Y$	is the emission debts for ***reporting period of the year*** Y as determined in accordance with point 5.2;
$cCO2(NO)_Y$	is the emission credits for the ***reporting period of the*** year Y as determined in accordance with point 5.2;.

6. DETERMINATION OF A MANUFACTURER'S EXCESS CO2 EMISSIONS REFERRED TO IN ARTICLE 8(2)

For each manufacturer and each ***reporting period*** of the year Y from ***the year*** 2025 onwards the value of the vehicle category specific excess CO2 emissions $exeCO2(X)_Y$ shall be determined as follows. if the value is positive (X = NO, M). If the following calculations result in a negative value for $exeCO2(X)_Y$, the latter shall be set to 0.

For the *reporting period of* the year 2025:

$$exeCO2(NO)_{2025} = dCO2(NO)_{2025} - \sum_{Y=2019}^{2024} cCO2(NO)_Y - limCO2(NO)_{2025}$$

For the reporting periods of the years Y from 2026 to 2028, from 2030 to 2033 and from 2035 to 2038:

$$exeCO2(NO)_y = \sum_{I=2025}^{Y} (dCO2(NO)_I - cCO2(NO)_I) - \sum_{J=2025}^{Y-1} exeCO2(NO)_J - redCO2 - limCO2(NO)_Y$$

For the reporting periods of the years Y from from 2030 to 2033 and from 2035 to 2038:

$$exeCO2(M)_y = \sum_{I=2025}^{Y} (dCO2(M)_I - cCO2(M)_I) - \sum_{J=2030}^{Y-1} exeCO2(M)_J - limCO2(M)_Y$$

For the reporting period of the years Y = 2029, 2034 and 2039:

$exeCO2(NO)_Y = \sum_{I=2025}^{Y} (dCO2(NO)_I - cCO2(NO)_I) - \sum_{J=2025}^{Y-1} exeCO2(NO)_J - redCO2$

For the reporting period of the years Y = 2034 and 2039:

$exeCO2(M)_Y = \sum_{I=2025}^{Y} (dCO2(M)_I - cCO2(M)_I) - \sum_{J=2030}^{Y-1} exeCO2(M)_J$

For the reporting periods of the year 2040:

$exeCO2(NO)_{2040} = (CO2(NO)_{2040} - T(NO)_{2040}) \times V_{2040} +$

$\sum_{I=2025}^{2039} (dCO2(NO)_I - cCO2(NO)_I) - \sum_{J=2025}^{2039} exeCO2(NO)_J - redCO$

$exeCO2(M)_{2040} = (CO2(M)_{2040} - T(M)_{2040}) \times V_{2040} +$

$\sum_{I=2025}^{2039} (dCO2(M)_I - cCO2(M)_I) - \sum_{J=2030}^{2039} exeCO2(M)_J$

For the reporting periods of the years Y > 2040:

$exeCO2(NO)_Y = (CO2(NO)_Y - T(NO)_Y) \times V_Y$

$exeCO2(M)_Y = (CO2(M)_Y - T(M)_Y) \times V_Y$

Where,

$\sum_{Y=2019}^{2024}$	is the sum over the ***reporting periods of the years Y from*** 2019 to 2024;
$\sum_{I=2025}^{Y}$	is the sum over the ***reporting periods of the years I from*** 2025 to the year Y;
$\sum_{J=2025}^{Y-1}$	is the sum over the *reporting periods of the years J from* 2025 *to the year (Y-1);*
$\sum_{I=2025}^{2039}$	is the sum over the *reporting periods of the years I from 2025 to 2039*;
$\sum_{J=2030}^{Y-1}$	is the sum over the reporting periods of the years J from 2030 to the year (Y-1);
$dCO2(X)_Y$	is the emission debts for the *reporting period of the* year Y as determined in accordance with point 5.2 (X = NO, M);
$cCO2(X)_Y$	is the emission credits for the *reporting period of the* year Y as determined in accordance with point 5.2 (X = NO, M);
$limCO2(X)_Y$	is the emission debt limit as determined in accordance with point 5.3 (X = NO, M);
$redCO2(X)$	is the reduction of emission debts of the *reporting period of the* year 2025 as determined in accordance with 5.4 (X = NO, M).

In all other cases the value of the excess emissions $exeCO2(X)_Y$ shall be set to 0 (X = NO, M).

The excess CO2 emissions of the reporting period of the year Y as referred to in Article 8(2) shall be:

$$exeCO2_Y = exeCO2(NO)_Y + exeCO2(M)_Y$$

ANNEX II

Adjustment procedures referred to in Article 11

1. ADJUSTMENT OF REFERENCE CO_2 EMISSIONS FOLLOWING AN AMENDMENT OF THE TYPE APPROVAL PROCEDURES REFERRED TO IN ARTICLE 11(2)

Following an amendment of the type approval procedures referred to in Article 11(2), the reference CO_2 emissions referred to in Point 3.1.2 of Annex I shall be recalculated**.**

For this purpose the CO_2 emissions in g/km of new heavy-duty vehicles *v* of the reference period and of their primary vehicles determined for a mission profile *mp,* as referred to in point 2.1 of Annex I, shall be adjusted as follows:

$$CO2_{v,mp} = CO2(RP)_{v,mp} \cdot (\sum_r s_{r,sg} \cdot CO2_{r,mp}) / (\sum_r s_{r,sg} \cdot CO2(RP)_{r,mp})$$

$$CO2p_{v,mp} = CO2p(RP)_{v,mp} \cdot (\sum_r s_{r,sg} \cdot CO2p_{r,mp}) / (\sum_r s_{r,sg} \cdot CO2p(RP)_{r,mp})$$

Where

$\sum_r$	is the sum over all representative vehicles *r* for the sub-group *sg*;
sg	is the sub-group to which the vehicle *v* belongs;
$s_{r,sg}$	is the statistical weight of the representative vehicle *r* in the sub-group *sg;*
$CO2(RP)_{v,mp}$	is the specific CO_2 emissions of vehicle *v* in g/km, as determined on mission profile *mp* and based on the monitoring data of the reference period;
$CO2(RP)_{r,mp}$	is the specific CO_2 emissions of the representative vehicle *r* in g/km, as determined on mission profile *mp* in accordance with Regulation (EC) No 595/2009 and its implementing measures as it was applied in the reference period;
$CO2_{r,mp}$	is the specific CO_2 emissions of the representative vehicle *r*, as determined on mission profile *mp* in accordance with Regulation (EC) No 595/2009 and its implementing measures according to the amendments referred to in Article 11(3)(a);

$CO2p(RP)_{v,mp}$	is the specific CO_2 emissions of the primary vehicle of the heavy-duty vehicle *v* in g/km, as determined on mission profile *mp* and based on the monitoring data of the reference period;
$CO2p(RP)_{r,mp}$	is the specific CO_2 emissions of the primary vehicle of the representative vehicle *r* in g/km, as determined in accordance with Regulation (EC) No 595/2009 and its implementing measures as it was applied in the reference period;
$CO2p_{r,mp}$	is the specific CO_2 emissions of the primary vehicle of the representative vehicle *r*, as determined on mission profile *mp* in accordance with Regulation (EC) No 595/2009 and its implementing measures according to the amendments referred to in Article 11(3)(a).

The specific CO_2 emissions shall be normalised pursuant to Annex III using those values for the parameters referred to in Article 14(1), point (f), that are applicable in the reporting period referred to in Article 11(2), point (a).

The representative vehicles shall be defined in accordance with the methodology referred to in Article 11(3).

2. APPLICATION OF THE ADJUSTED REFERENCE CO2 EMISSIONS ACCORDING TO ARTICLE 11(2)

If in the reporting period of the year Y the specific CO2 emissions of some new heavy-duty vehicles of a manufacturer have been determined with amendments referred to in Article 11(2), the reference CO2 emissions rCO_{sg} of the vehicle sub-group *sg* used in points 4 and 5.1 of Annex I shall be calculated as follows:

$$rCO2_{sg} = \sum_{,i} V_{sg,i}/V_{sg} \text{ x } rCO2_{sg,,i}$$

where:

$\sum_{,i}$ is the sum over

- for i = 1: the non-amended procedure for determining the CO2 emissions, for which the initial reference CO2 emissions without adjustments are applicable and
- for i ≥ 1: all subsequent amendments referred to in Article 11(2).

V_{sg} is the number of new heavy-duty vehicles of the manufacturer in the reporting period of the year *Y* and the vehicle sub-group *sg*;

$V_{sg,i}$ is the number of new heavy-duty vehicles of the manufacturer in the reporting period of the year *Y* and in the vehicle sub-group sg, the specific CO2 emissions of which have been determined with the amendment *i*;

$rCO2_{sg,i}$ are:

- for i = 0: the non-adjusted reference CO2 emissions
- for i ≥ 1: the reference CO2 emissions that have been determined for the vehicle sub-group *sg* with the amendment *i*.

ANNEX III

Normalisation of specific CO_2 emissions of new heavy-duty vehicles referred to in Article 4

1. NORMALISATION OF SPECIFIC CO_2 EMISSIONS

For the purposes of the caclulation in point 2.1 of Annex I, , the values of CO_2 emissions $CO2_{v,mp}$of vehicles are normalised as follow:

$CO2_{v,mp} = reportCO2_{v,mp} + \Delta CO2_{v,mp}(m) + \Delta CO2\text{cv}_{v,mp}$

$m = PL_{sg,mp} - PL_{v,mp} + cCW_v$ (for vehicles of categories N and O)

$m = PM_{sg,mp} - PM_{v,mp} + cCW_v$ (for vehicles of category M)

Where

$CO2_{v,mp}$	are the normalised CO_2 emissions of the vehicle *v* determined for a mission profile *mp* that are to be considered in the calculation of Annex I point 2.1;
$reportCO2_{v,mp}$	are the CO_2 emissions in g/km of the ~~primary vehicle of a~~ new heavy-duty vehicle *v* determined for a mission profile *mp* and reported in accordance with Articles 13a and 13b; **[Am. 82]**
$\Delta CO2_{v,mp}(m)$	is to be determined in accordance with point 3;
$\Delta CO2\text{cv}_{v,mp}$	is to be determined in accordance with point 4;
$PL_{v,mp}$	is the payload of vehicle *v* in the mission profile *mp*, as determined from the data reported according to Articles 13a and 13b ;
$PL_{sg,mp}$	is the payload for sub-group *sg* and mission profile *mp* as provided for in point 2.5 of Annex I;
$PM_{v,mp}$	is the passenger mass of vehicle *v* in the mission profile *mp*, as determined from the data reported according to Articles 13a and 13b;
$PM_{sg,mp}$	is the passenger mass for sub-group *sg* and mission profile *mp* as provided for in point 2.5 of Annex I;
cCW_v	is the correction of the curb weight of the vehicle *v* according to point 2.

2. CURB WEIGHT NORMALISATION

Since the transport utility of a vehicle increases with its technically permissible maximum payload or passenger number, but for technical reasons higher values for these parameters are correlated with higher curb weights and therefore higher CO_2 emissions, the following correction of the curb weight of a vehicle *v* in sub-group *sg* for the purpose of the normalisation of its specific CO2 emissions according to point 1 shall be applied:

$cCW_v = a_{sg} \cdot (maxPL_{sg} - maxPL_v)$ for vehicles of category N and O;

$cCW_v = a_{sg} \cdot (maxPN_{sg} - maxPN_v)$ for vehicles of category M;

Where

a_{sg} is a linear coefficient determined according to point 2.1 for the reporting period of the vehicle *v*;

$maxPL_v$ is the technically permissible maximum payload of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

$maxPN_v$ is the technically permissible maximum passenger number of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

$maxPL_{sg}$ is the technically permissible maximum payload of vehicle sub-group *sg* determined according to point 2.5 of Annex I;

$maxPN_{sg}$ is the technically permissible maximum passenger number of vehicle sub-group *sg* determined according to point 2.5 of Annex I.

2.1. Determination of normalisation parameters

For each reporting period the parameters a_{sg} and b_{sg} shall be determined with a linear regression analysis of the correlation of the values of CW_v with the values of $maxPL_v$ (category N and O vehicles) and $maxPN_v$ (category M vehicles), considering all newly registered vehicles *v* in the sub-group *sg*:

$CW_v \approx a_{sg} \cdot maxPL_v + b_{sg}$ for vehicles of category N and O;

$CW_v \approx a_{sg} \cdot maxPN_v + b_{sg}$ for vehicles of category M.

Where

CW_v is the curb weight of vehicle *v*, as determined from the data reported according to Articles 13a and 13b; if no precise value is available it may be approximated by the corrected actual mass of the vehicle *v*

$maxPL_v$ is the technically permissible maximum payload of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

$maxPN_v$ is the technically permissible maximum passenger number of vehicle *v* as determined from the data reported according to Articles 13a and 13b;.

3. CHANGE OF CO_2 EMISSIONS FOR CHANGE IN TOTAL VEHICLE MASS

The ex-post change of CO_2 emissions of a vehicle *v* to be determined for a mission profile *mp* due to an ex-post change in the total mass to be attributed to the vehicle for the determination of CO_2 emissions is defined by the following linear approximation:

$$\Delta CO2_{v,mp}(m) = \text{m} \cdot (CO2_{v,r} - CO2_{v,l}) / (\text{Mr} - \text{Ml})$$

Where:

m is the change of total mass attributed to the vehicle *v* for the determination of its CO_2 emissions;

$CO2_{v,r}$ are the CO_2 emissions of the vehicle *v* in g/km, without the change of mass, determined for the same mission profile *mp*, representative loading conditions;

$CO2_{v,l}$ are the CO_2 emissions of the vehicle *v* in g/km, without the change of mass, determined for the same mission profile *mp*, low loading conditions;

Mr is the total vehicle mass in simulation, without the change of mass, for the same mission profile *mp*, representative loading conditions;

Ml is the total vehicle mass in simulation, without the change of mass, for the same mission profile *mp*, low loading conditions.

4. NORMALISATION FOR DIFFERENT CARGO VOLUMES

Category O vehicles within the same sub-group have different cargo volumes. Since the transport utility of a vehicle increases with the cargo volume, but for technical reasons such increase is also correlated with higher CO_2 emissions, the following correction of the CO_2 emissions of a vehicle *v* in sub-group *sg* shall be applied:

$$\Delta CO2\text{cv}_{v,mp} = a_{sg,mp} \cdot (CV_{sg} - CV_v)$$

Where

$a_{sg,mp}$ is a linear coefficient determined according to point 4.1 for the reporting period of the vehicle *v*;

CV_v is the cargo volume of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

CV_{sg} is the cargo volume of vehicle sub-group *sg* determined according to point 2.5 of Annex I.

For vehicle of categories N and M the correction of CO_2 emissions $\Delta CO2\text{cv}_{v,mp}$ shall be 0.

4.1. Determination of normalisation parameters

For each reporting period and mission profile the parameters $a_{sg,mp}$ and $b_{sg,mp}$ shall be determined with a linear regression analysis of the correlation of the values of $[reportCO2_{v,mp} + \Delta CO2_{v,mp}(m)]$ with the values of CV_v, considering all newly registered vehicles *v* in the sub-group *sg*:

$$reportCO2_{v,mp} + \Delta CO2_{v,mp}(m) \approx a_{sg,mp} \cdot CV_v + b_{sg,mp}$$

Where

CV_v is the cargo volume of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

$reportCO2_{v,mp}$, $\Delta CO2_{v,mp}(m)$ are as defined in point 1.'

ANNEX II

'ANNEX IV

Rules on data to be monitored and reported as referred to in Articles 13a and 13b

PART A: DATA TO BE MONITORED AND REPORTED BY MEMBER STATES

(a) vehicle identification numbers of all new heavy-duty vehicles as referred to in Article 2 that are registered in the Member State territory;

(b) manufacturer name;

(c) make (trade name of manufacturer);

(d) the code for the bodywork as specified in entry 38 of the certificate of conformity, including, where applicable, the supplementing digits referred to in Annex I Appendix 2 to Regulation (EU) 2018/858;

(e) in the case of the heavy-duty vehicles referred to in Article 2, first paragraph, point (a) or (b), the information on the powerplant specified in entries 23, 23.1 and 26 of the certificate of conformity;

(f) the maximum speed of the vehicle as specified in entry 29 of the certificate of conformity;

(g) the stage of completion, as indicated in the chosen model of the certificate of conformity in accordance with Annex VIII, point 2 to Commission Implementing Regulation (EU) 2020/683;

(h) the vehicle category as specified in entry 0.4 of the certificate of conformity;

(i) the number of axles, as specified in entry 1 of the certificate of conformity;

(j) the technically permissible maximum laden mass, as specified in entry 16.1 of the certificate of conformity;

(k) the imprint of the cryptographic hash of the manufacturer's records file as specified in entry 49.1 of the certificate of conformity; for vehicles registered until 30 June 2025 Member States may report only the first 8 characters of the cryptographic hash;

(l) the specific CO2 emissions as specified in entry 49.5 of the certificate of conformity;

(m) the average payload value as specified in entry 49.6 of the certificate of conformity;

(n) the date of registration;

(n a) the technically permissible maximum mass of the combination for a category N3 truck in an extra heavy combination (EHC) referred to in Article 3, point (24), as specified in entry 16.4 of the certificate of conformity or individual vehicle approval certificate; **[Am. 83]**

(n b) engine maximum net power as specified in entry 27.1. of the certificate of conformity or individual vehicle approval certificate; **[Am. 84]**

(o) for special purpose vehicles their designation as specified in entry 51 of the certificate of conformity;

(p) for vehicles approved under Article 2(3)(b) of Regulation 2018/858, the information that the vehicle was designed and constructed or adapted for use by civil protection fire services and forces responsible for maintaining public order;

(q) for vehicles registered for use by civil protection, fire services or forces responsible for maintaining public order or for use by the armed services, the confirmation that the vehicle is registered for use by civil protection, fire services or forces responsible for maintaining public order or for use by the armed services and that it fulfils the conditions set out in Article 2 paragraph 5 of this Regulation. For all vehicles including individually approved vehicles, the corresponding information shall be the information as to be provided in the EU certificate of conformity or EU individual vehicle approval certificate or the national individual approval certificate in accordance with the templates laid down in Commission Implementing Regulation (EU) 2020/683[5] regardless of any national exemptions applicable under Article 45(1) of Regulation (EU) 2018/858.

PART B: DATA TO BE REPORTED BY MANUFACTURERS AND OTHER ENTITIES

In accordance with Article 13b, each reporter shall report the following data for those vehicles, for which it is obliged to produce a Manufacturer's Records File (MRF) or Vehicle Information File (VIF) according to the provisions of Regulations 2017/2400 (EU) and Commission Implementing Regulation (EU) 2022/1362[6].

For vehicles referred to in Part A, points (p) and (q) of Annex IV the manufacturer referred to in Article 7a shall also inform the Commission in accordance with Article 2(4) and (5), if the vehicle which would otherwise be exempted from the obligations laid down in Article 3a, shall not be exempted from those obligations.

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[5] Commission Implementing Regulation (EU) 2020/683 of 15 April 2020 implementing Regulation (EU) 2018/858 of the European Parliament and of the Council with regards to the administrative requirements for the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, OJ L 163 of 26.5.2020, p.1.

[6] Commission Implementing Regulation (EU) 2022/1362 of 1 August 2022 implementing Regulation (EC) No 595/2009 of the European Parliament and of the Council as regards the performance of heavy-duty trailers with regard to their influence on the CO2 emissions, fuel consumption, energy consumption and zero emission driving range of motor vehicles and amending Implementing Regulation (EU) 2020/683 (OJ L 205, 5.8.2022, p. 145.

Vehicle categories / sub-groups[7]	Reporters			
	Primary vehicle manufacturer[(1)]	Interim vehicle manufacturer[(2)]	Vehicle manufacturer	Designated technical service[(8)]
N / all	Not applicable	Not applicable	– MRF[(4)] – Additional information*	Not applicable
M / all	– VIF[(4) (5)] – MRF[(4) (6)] – Additional information* of the primary vehicle.	Not applicable	– VIF[(4) (7)] – MRF[(4) (7)] – Additional information* of the complete or completed vehicle.	Not applicable
O / all	Not applicable	Not applicable	– MRF[(9)] – Additional information*	– MRF[(9)] – Additional information*

(1) Article 3(29) of Commission Regulation (EU) 2017/2400.

(2) Article 3(31) of Commission Regulation (EU) 2017/2400

(3) Article 3(4a) of Commission Regulation (EU) 2017/2400

(4) Article 9(2) of Commission Regulation (EU) 2017/2400

(5) Point 2.3 of Annex I to Commission Regulation (EU) 2017/2400

(6) Point 2.4 of Annex I to Commission Regulation (EU) 2017/2400

(7) Point 2.7.5 of Annex I to Commission Regulation (EU) 2017/2400

(8) Article 8(6) of Commission Implementing Regulation (EU) 2022/1362

(9) Article 8(7) of Commission Implementing Regulation (EU) 2022/1362

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***Additional Information:**

No	Monitoring parameter	Source	Applicable to vehicles
15	Make (trade name of manufacturer)		All
24	Name and address of transmission manufacturer	Point 0.4 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex VI to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only;
25	Make (trade name of transmission manufacturer	Point 0.1 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex VI to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only;
32	Name and address of axle manufacturer	Point 0.4 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex VII to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only; Category O;
33	Make (trade name of axle manufacturer)	Point 0.1 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex VII to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only; Category O;
39	Name and address of tyre manufacturer	Point 1 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex X to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only; Category O;
40	Make (trade name of tyre manufacturer)	Point 3 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex X to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only; Category O;
72	Number of license to operate the simulation tool		All

75	CO2 mass emission of the engine over WHTC (8) (g/kWh)	Point 1.4.2 of the addendum to Appendix 5, or point 1.4.2 of the addendum to Appendix 7, to Annex I to Regulation (EU) No 582/2011, whichever is applicable	Category N; Category M: primary vehicle only;
76	Fuel consumption of the engine over WHTC (g/kWh)	Point 1.4.2 of the addendum to Appendix 5, or point 1.4.2 of the addendum to Appendix 7, to Annex I to Regulation (EU) No 582/2011, whichever is applicable	Category N; Category M: primary vehicle only;
77	CO2 mass emission of the engine over WHSC (9) (g/kWh)	Point 1.4.1 of the addendum to Appendix 5, or point 1.4.1 of the addendum to Appendix 7, to Annex I to Regulation (EU) No 582/2011, whichever is applicable	Category N; Category M: primary vehicle only;
78	Fuel consumption of the engine over WHSC (g/kWh)	Point 1.4.1 of the addendum to Appendix 5, or point 1.4.1 of the addendum to Appendix 7, to Annex I to Regulation (EU) No 582/2011, whichever is applicable	Category N; Category M: primary vehicle only;
101	For vehicles with a date of simulation as of 1 July 2020, the type-approval number of the engine	Point 1.2.1. of addendum to Appendix 5, 6 or 7 to Annex I to Regulation (EU) No 582/ 2011, whichever is applicable	Category N; Category M: primary vehicle only;
102	For vehicles with a date of simulation as of 1 July 2021, the comma separated values file of the same name as the job file and with an extension.vsum comprising aggregated results per simulated mission profile and payload condition	File generated by the simulation tool referred to in Article 5(1)(a) of Regulation (EU) 2017/2400 in its graphical user interface (GUI) version	'sum exec data file'

PART C: AIR DRAG VALUE (CDXA) RANGES FOR THE PURPOSE OF PUBLICATION IN ACCORDANCE WITH ARTICLE 13c

For the purpose of making publicly available the CdxA value specified in data entry 23 in accordance with Article 13c, the Commission shall use the ranges defined in the following table containing the corresponding range for each CdxA value:

Range	**CdxA value [m2]**	
	Min CdxA (CdxA ≥ min CdxA)	**Max CdxA (CdxA < MaxCdxA)**
A1	0,00	3,00
A2	3,00	3,15
A3	3,15	3,31
A4	3,31	3,48
A5	3,48	3,65
A6	3,65	3,83
A7	3,83	4,02
A8	4,02	4,22
A9	4,22	4,43
A10	4,43	4,65
A11	4,65	4,88
A12	4,88	5,12
A13	5,12	5,38
A14	5,38	5,65
A15	5,65	5,93
A16	5,93	6,23
A17	6,23	6,54
A18	6,54	6,87
A19	6,87	7,21
A20	7,21	7,57
A21	7,57	7,95
A22	7,95	8,35
A23	8,35	8,77
A24	8,77	9,21

ANNEX V

Data reporting and management referred to in Articles 13a to 13c

1. REPORTING BY MEMBER STATES

1.1. The data specified in Part A of Annex IV shall be transmitted in accordance with Article 13a by the contact point of the competent authority via electronic data transfer to the Agency.

The contact point shall notify the Commission and the Agency when the data are transmitted by email to the following addresses:

EC-CO2-HDV-IMPLEMENTATION@ec.europa.eu

and

HDV-monitoring@eea.europa.eu

2. REPORTING BY MANUFACTURERS

2.1. Manufacturers shall notify the Commission without delay the following information:

(a) the manufacturer name indicated in the certificate of conformity or individual approval certificate;
(b) the World Manufacturer Identifier code (WMI code) as defined in Commission Regulation (EU) No 19/2011[8] to be used in the vehicle identification numbers of new heavy-duty vehicles to be placed on the market;
(c) the contact point responsible for uploading the data to the Agency.

They shall notify the Commission without delay of any changes to that information.

The notifications shall be sent to the addresses referred to in point 1.1.

[8] Commission Regulation (EU) No 19/2011 of 11 January 2011 concerning type-approval requirements for the manufacturer's statutory plate and for the vehicle identification number of motor vehicles and their trailers and implementing Regulation (EC) No 661/2009 of the European Parliament and of the Council concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor (OJ L 8, 12.1.2011, p. 1).

2.2. The data specified in Part B, point 2 of Annex I shall be transmitted in accordance with Article 13b by the contact point of the manufacturer via electronic data transfer to the Agency.

The contact point shall notify the Commission and the Agency when the data are transmitted by email to the addresses referred to in point 1.1.

3. DATA PROCESSING

3.1. The Agency shall process the data transmitted in accordance with points 1.1 and 2.2 and shall record the processed data in the register.

3.2. The data relating to heavy-duty vehicles registered in the preceding reporting period and recorded in the register shall be made public by 30 April each year, with the exception of the following data entries:

3.2.1. vehicle identification number;
3.2.2. name and address of the transmission manufacturer;
3.2.3. make (trade name of transmission manufacturer;
3.2.4. name and address of axle manufacturer;
3.2.5. make (trade name of axle manufacturer;
3.2.6. name and address of tyre manufacturer;
3.2.7. make (trade name of tyre manufacturer;
3.2.8. engine model;
3.2.9. transmission model;
3.2.10. retarder model;
3.2.11. torque converter model;
3.2.12. angle drive model;
3.2.13. axel model;
3.2.14. air drag model;
3.2.15 comma separated values file of the same name as the job file and with an extension.vsum comprising aggregated results per simulated mission profile and payload condition.

3.3. Where a competent authority or manufacturers identify errors in the data submitted, they shall without delay notify those to the Commission and the Agency by submitting an error notification report to the Agency and by email sent to the addresses referred to in point 1.1.

3.4. The Commission shall with the support of the Agency verify the notified errors and, where appropriate, correct the data in the register.

3.5. The Commission, with the support of the Agency, shall make available electronic formats for the data transmissions referred to in points 1.1 and 2.2 in due time before the transmission deadlines.

ANNEX VI

CORRELATION TABLE

Regulation (EU) 2018/956

Regulation (EU) 2018/956	This Regulation
Article 1	Article 1(2)
Article 2	Article 2
Article 3	Article 3
Article 4	Article 13a
Article 5	Article 13b
Article 6	Article 13c
Article 7	Article 13d
Article 8	Article 13e
Article 9	Article 13f
Article 10	-
Article 11	Article 14
Article 12	Article 16
Article 13	Article 17
Article 14	-
Annex I	Annex IV
Annex II	Annex V’

COUNCIL MANDATE

ANNEX I[9]

'ANNEX I

Average specific emissions, average specific emission targets and excess emissions

1. VEHICLE SUB-GROUPS, MISSION PROFILES AND RELATED PARAMETERS

1.1. For the purposes of this Regulation a sub-group *sg* is defined for each new heavy-duty vehicle.

1.1.1. For vehicles of category N the sub-group sg is defined as follows:

Vehicle group according to Annex I to Regulation (EU) 2017/2400	Vocational vehicle according to Article 3(9) of this Regulation	Cab type	Engine power	Operational range (OR)	Vehicle sub-group (sg) attributed for the purposes of this Regulation
53 and zero-emission vehicles in 51	**No**	**All**			**53**
54 and zero-emission vehicles in 52	**No**	**All**			**54**
1s	**No**	**All**			**1s**
1	**No**	**All**			**1**
2	**No**	**All**			**2**
3	**No**	**All**			**3**
4	**No**	**All**	**<170 kW**	**All**	**4-UD**
	No	**Day cab**	**≥170 kW**	**All**	**4-RD**
	No	**Sleeper cab**	**≥170 kW and <265 kW**		
	No	**Sleeper cab**	**≥265 kW**	**< 350 km**	

[9] Existing annexes are replaced in Annex I, new annexes are added in Annex II.

	No	**Sleeper cab**	**≥265 kW**	**≥ 350 km**	**4-LH**
9	**No**	**Day cab**	**All**	**All**	**9-RD**
	No	**Sleeper cab**	**All**	**< 350 km**	
	No	**Sleeper cab**	**All**	**≥ 350 km**	**9-LH**
5	**No**	**Day cab**	**All**	**All**	**5-RD**
	No	**Sleeper cab**	**< 265 kW**		
	No	**Sleeper cab**	**≥ 265 kW**	**< 350 km**	
	No	**Sleeper cab**	**≥ 265 kW**	**≥ 350 km**	**5-LH**
10	**No**	**Day cab**	**All**	**All**	**10-RD**
	No	**Sleeper cab**	**All**	**< 350 km**	
	No	**Sleeper cab**	**All**	**≥ 350 km**	**10-LH**
11	**No**	**All**			**11**
12	**No**	**All**			**12**
16	**No**	**All**			**16**

‘Sleeper cab’ means a type of cab that has a compartment behind the driver's seat intended to be used for sleeping as reported in accordance with Articles 13a and 13b.

’Day cab’ means a type of cab that is not a sleeper cab.

Where a new heavy-duty vehicle is attributed to sub-group 4-UD, but data on the CO_2 emissions in g/km are not available for the UDL or UDR mission profiles as defined in point ~~2.1. Table 2~~ **1.4.** the new heavy-duty vehicle shall be attributed to the sub-group 4-RD

’Operational range’ means the distance a vehicle can travel under long haul transport conditions without being re-charged or re-filled, as provided for in point 1.3.

1.1.2. For vehicles of category M the sub-group *sg* is defined as follows:

Vehicle group pursuant to Annex I to Regulation (EU) 2017/2400	**Vehicle sub-group (sg) attributed for the purposes of this Regulation**
31a, 31d	**31-LF**
31b1	**31-L1**
31b2	**31-L2**
31c, 31e	**31-DD**
32a, 32b	**32-C2**
32c, 32d	**32-C3**
32e, 32f	**32-DD**
33a, 33d, 37a, 37d	**33-LF**
33b1, 37b1	**33-L1**
33b2, 37b2	**33-L2**
33c, 33e, 37c, 37e	**33-DD**
34a, 34b, 36a, 36b, 38a, 38b, 40a, 40b	**34-C2**
34c, 34d, 36c, 36d, 38c, 38d, 40c, 40d	**34-C3**
34e, 34f, 36e, 36f, 38e, 38f, 40e, 40f	**34-DD**
35a, 35b1, 35b2, 35c	**35-FE**
39a, 39b1, 39b2, ~~35c,~~ 39c	**39-FE**

1.1.3. For vehicles of category O the sub-group *sg* is defined as follows:

Vehicle groups defined in Annex I of Regulation (EU) 2022/1362	**Vehicle sub-group (sg) attributed for the purposes of this Regulation**
All groups provided in Table 1 with 1, 2, 3 axles	**Same as provided in column "vehicle group" of the tables in Annex I to Regulation (EU) 2022/1362.**
All groups provided in Table 4 with ~~1,~~ 2 or 3 axles	
All groups provided in Table 6	

1.2. Vocational vehicles are defined by the following criteria:

Vehicle category	Chassis configuration	Criteria for vocational vehicles
N	**Rigid**	**One of the following digits, as listed in Appendix 2 of Annex I to Regulation (EU) 2018/858, is used to supplement the code for bodywork indicated in entry 38 of the certificate of conformity:** **09, 10, 15, 16, 18, 19, 20, 23, 24, 25, 26, 27, 28, 31;**
	Tractor	**Maximum speed not exceeding 79 km/h**

1.3. Operational ranges for the purposes of this Regulation are set as follows:

Powertrain technology	Operational range (OR)
Vehicles drawing energy for the purpose of mechanical propulsion only from an electrical energy or power storage device	**OR = actual charge depleting range as provided for by point 2.4.1 of part I of Annex IV to Regulation (EU) 2017/2400 for the LHR mission profile**
Other technologies	**OR > 350 km**

1.4. Definitions of mission profiles

RDL	**Regional delivery payload low**
RDR	**Regional delivery payload representative**
LHL	**Long haul payload low**
LHR	**Long haul payload representative**
UDL	**Urban delivery payload low**
UDR	**Urban delivery payload representative**
REL	**Regional delivery (EMS) payload low**
RER	**Regional delivery (EMS) payload representative**
LEL	**Long haul (EMS) payload low**
LER	**Long haul (EMS) payload representative**
MUL	**Municipal utility payload low**
MUR	**Municipal utility payload representative**
COL	**Construction payload low**
COR	**Construction payload representative**

HPL	**Heavy urban, ~~person~~ passenger transport, low load**
HPR	**Heavy urban, ~~person~~ passenger transport, representative load**
UPL	**Urban, ~~person~~ passenger transport, low load**
UPR	**Urban, ~~person~~ passenger transport, representative load**
SPL	**Sub-urban, ~~person~~ passenger transport, low load**
SPR	**Sub-urban, ~~person~~ passenger transport, representative load**
IPL	**Inter-urban, ~~person~~ passenger transport, low load**
IPR	**Inter-uban, ~~person~~ passenger transport, representative load**
CPL	**Coach, ~~person~~ passenger transport, low load**
CPR	**Coach, ~~person~~ passenger transport, representative load**

2. CALCULATION OF THE AVERAGE SPECIFIC EMISSIONS OF A MANUFACTURER

2.1. Calculation of the specific CO_2 emissions of a new heavy-duty vehicle

The specific emissions in g/km of a new heavy-duty vehicle *v* attributed to a sub-group *sg* or of its primary vehicle shall be calculated in accordance with the following formula:

$$CO2_v = \sum_{mp} W_{sg,mp} \times CO2_{v,mp}$$

$$CO2\mathrm{p}_v = \sum_{mp} W_{sg,mp} \times CO2\mathrm{p}_{v,mp}$$

Where,

$\sum_{mp}$ is the sum over all mission profiles *mp* listed in ~~Table 2~~ point 1.4.;

sg is the sub-group to which the new heavy-duty vehicle *v* has been attributed according to Section 1 of this Annex;

$W_{sg,mp,}$ is the mission profile weight specified in points 2.1.1 to 2.1.3;

$CO2_{v,mp}$ is the CO_2 emissions in g/km of the new heavy-duty vehicle *v* determined for a mission profile *mp*, reported in accordance with Articles 13a and 13b and normalised pursuant to Annex III;

$CO2p_{v,mp}$ is the CO_2 emissions in g/km of the primary vehicle of the new heavy-duty vehicle *v*, determined for a mission profile *mp*, **and for the chassis configuration (low/high floor, number of decks) applicable to its sub-group sg,** reported in accordance with Articles 13a and 13b **and normalised pursuant to Annex III**;

For zero-emissions motor vehicles the values of $CO2_{v,mp}$ and $CO2p_{v,mp}$ shall be set to 0.

2.1.1. Mission profile weights ($W_{sg,mp}$) for vehicles of category N

Vehicle sub-group (sg)*	**Mission profile (*mp*)****										
	RDL	**RDR**	**LHL**	**LHR**	**UDL**	**UDR**	**REL, RER, LEL, LER**	**MUL**	**MUR**	**COL**	**COR**
53	**0,25**	**0,25**	**0**	**0**	**0,25**	**0,25**	**0**	**0**	**0**	**0**	**0**
54	**0,25**	**0,25**	**0**	**0**	**0,25**	**0,25**	**0**	**0**	**0**	**0**	**0**
1s	**0,1**	**0,3**	**0**	**0**	**0,18**	**0,42**	**0**	**0**	**0**	**0**	**0**
1	**0,1**	**0,3**	**0**	**0**	**0,18**	**0,42**	**0**	**0**	**0**	**0**	**0**
2	**0,125**	**0,375**	**0**	**0**	**0,15**	**0,35**	**0**	**0**	**0**	**0**	**0**
3	**0,125**	**0,375**	**0**	**0**	**0,15**	**0,35**	**0**	**0**	**0**	**0**	**0**
4-UD	**0**	**0**	**0**	**0**	**0,5**	**0,5**	**0**	**0**	**0**	**0**	**0**
4-RD	**0,45**	**0,45**	**0,05**	**0,05**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4-LH	**0,05**	**0,05**	**0,45**	**0,45**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4v	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,25**	**0,25**	**0,25**	**0,25**
5-RD	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5-LH	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5v	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,5**	**0,5**
9-RD	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
9-LH	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
9v	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,25**	**0,25**	**0,25**	**0,25**
10-RD	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

10-LH	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
10v	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,5**	**0,5**
11	**0,15**	**0,35**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,15**	**0,35**
12	**0,21**	**0,49**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,09**	**0,21**
16	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,3**	**0,7**

* See definitions in point 1.1

** See definitions in point 1.4

2.1.2. Mission profile weights (Wsg,mp) for vehicles of category M

Vehicle sub-group *(sg)**	**Mission profile (*mp*)****									
	HPL	**HPR**	**UPL**	**UPR**	**SPL**	**SPR**	**IPL**	**IPR**	**CPL**	**CPR**
31-LF	**0,27**	**0,23**	**0,15**	**0,13**	**0,11**	**0,11**	**0**	**0**	**0**	**0**
31-L1	**0,05**	**0,05**	**0,16**	**0,14**	**0,32**	**0,28**	**0**	**0**	**0**	**0**
31-L2	**0,05**	**0,05**	**0,09**	**0,08**	**0,15**	**0,13**	**0,24**	**0,21**	**0**	**0**
31-DD	**0,20**	**0,31**	**0,12**	**0,18**	**0,07**	**0,12**	**0**	**0**	**0**	**0**
32-C2	**0**	**0**	**0**	**0**	**0**	**0**	**0,47**	**0,43**	**0,04**	**0,06**
32-C3	**0**	**0**	**0**	**0**	**0**	**0**	**0,05**	**0,05**	**0,30**	**0,60**
32-DD	**0**	**0**	**0**	**0**	**0**	**0**	**0,05**	**0,05**	**0,35**	**0,55**
33-LF	**0,27**	**0,23**	**0,15**	**0,13**	**0,11**	**0,11**	**0**	**0**	**0**	**0**
33-L1	**0,05**	**0,05**	**0,16**	**0,14**	**0,32**	**0,28**	**0**	**0**	**0**	**0**
33-L2	**0,05**	**0,05**	**0,09**	**0,08**	**0,15**	**0,13**	**0,24**	**0,21**	**0**	**0**
33-DD	**0,20**	**0,31**	**0,12**	**0,18**	**0,07**	**0,12**	**0**	**0**	**0**	**0**
34-C2	**0**	**0**	**0**	**0**	**0**	**0**	**0,47**	**0,43**	**0,04**	**0,06**
34-C3	**0**	**0**	**0**	**0**	**0**	**0**	**0,05**	**0,05**	**0,30**	**0,60**
34-DD	**0**	**0**	**0**	**0**	**0**	**0**	**0,05**	**0,05**	**0,35**	**0,55**
35-FE	**0,27**	**0,23**	**0,15**	**0,13**	**0,11**	**0,11**	**0**	**0**	**0**	**0**
39-FE	**0,27**	**0,23**	**0,15**	**0,13**	**0,11**	**0,11**	**0**	**0**	**0**	**0**

* See definitions in point 1.1

** See definitions in poit 1.4

2.1.3. Mission profile weights (Wsg,mp) for vehicles of category O

Vehicle sub-group ***(sg)****	**Mission profile (*mp*)****						
	RDL	**RDR**	**LHL**	**LHR**	**UDL**	**UDR**	**REL, RER, LEL, LER**
111, 111V,112, 112V, 113	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**
121, 121V, 122, 122V, 123, 123V, 124, 124V, 125, 126	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
131, 131v, 132, 132v, 133	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
421, 421v, 422, 422v, 423	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
431, 431v, 432, 432v, 433	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
611, 612	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**
611v, 612v	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
621, 623	**0,27**	**0,63**	**0,03**	**0,07**	**0**	**0**	**0**
621V, 622, 622V, 623V, 624, 624V, 625	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**
631, 631v, 632, 632v, 633	**0,03**	**0,07**	**0,27**	**0,63**	**0**	**0**	**0**

* See definitions in point 1.1

** See definitions in point 1.4

2.2. Average specific CO_2 emissions of all new heavy-duty vehicles in a sub-group for a manufacturer

For each manufacturer and each ***reporting period***, the average specific CO_2 emissions $avgCO2_{sg}$ of all new heavy-duty vehicles in a sub-group *sg* or their primary vehicles, if applicable, shall be calculated as follows:

2.2.1. For category N and O vehicles:

$$avgCO2_{sg} = \frac{\sum_v CO2_v}{V_{sg} \times PL_{sg}} \quad \text{(in g/tkm)}$$

2.2.2. For category M complete or completed vehicles:

$$avgCO2_{sg} = \frac{\sum_v CO2_v}{(V_{sg} - Vpv_{sg}) \times PN_{sg}} \quad \text{(in g/pkm)}$$

2.2.3. For category M primary vehicles of heavy-duty vehicles:

$$avgCO2p_{sg} = \frac{\sum_v CO2p_v}{Vpv_{sg} \times PN_{sg}} \quad \text{(in g/pkm)}$$

Where,

$\sum_v$ is the sum over all new heavy-duty vehicles of the manufacturer in the sub-group *sg,* subject to the provisions of Article 7b*;*

$CO2_v$ is the specific CO_2 emissions of the new heavy-duty vehicle *v* determined in accordance with point 2.1;

$CO2p_v$ is the specific CO_2 emissions of the primary vehicle of the new heavy-duty vehicle *v* determined in accordance with point 2.1;

V_{sg} is the number of new heavy-duty vehicles of the manufacturer in subgroup *sg*;

Vpv_{sg} the number of new heavy-duty vehicles within the sub-group *sg*, which pursuant to Article 7b shall be accounted for with the CO2 emissions of their primary vehicles in the calculation of the average specific CO2 emissions of point 2.2.3.;

PL_{sg} is the average payload of vehicles in the sub-group *sg* as determined in point 2.5.

PN_{sg} is the average passenger number of vehicles in the sub-group *sg* as determined in point 2.5.

2.3. Calculation of the zero- and low-emission factor as referred to in Article 5

2.3.1 Reporting periods 2019 to 2024

For each manufacturer and reporting period from 2019 to 2024, the zero- and low-emission factor (ZLEV) referred to in Article 5 shall be calculated as follows:

$$ZLEV = V_{all} / (V_{conv} + V_{zlev}) \quad \text{with a minimum of } 0{,}97$$

where:

V_{all} *is the number of new heavy-duty vehicles of the manufacturer in the sub-groups sg = 4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH;*

V_{conv} *is the number of new heavy-duty vehicles of the manufacturer in the sub-groups sg = 4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH excluding zero- and low-emission heavy-duty vehicles;*

V_{zlev} *is the sum of Vin and Vout,*

where,

V_{in} *is* $\sum_v (1 + (1 - CO2_v/LET_{sg}))$
with $\sum_v$ *being the sum over all new zero- and low-emission heavy-duty vehicles in the sub-groups sg = 4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH;*

$CO2_v$ *is the specific* CO_2 *emissions in g/km of a zero- and low-emission heavy-duty vehicle v determined in accordance with point 2.1.;*

LET_{sg} *is the low-emission threshold of the sub-group sg to which the vehicle v belongs as defined in point 2.3.4;*

V_{out} *is the total number of zero-emission heavy-duty vehicles, which are not in the sub-groups referred to by the definition of* V_{in}*, and with a maximum of 1,5% of* V_{conv} *.*

2.3.2 Reporting periods from 2025 to 2029

For each manufacturer and ***reporting period***, the zero- and low-emission factor (ZLEV) referred to in Article 5 shall be calculated as follows:

ZLEV = 1 - (y - x) unless this sum is larger than 1 or lower than 0.97 in which case the ZLEV factor shall be set to 1 or 0.97 respectively

Where:

x is 0,02

y is the sum of V_{in} and V_{out}, divided by V_{total}, where:

V_{in} is the total number of newly registered low- and zero-emission heavy-duty vehicles in the sub-groups sg = 4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH, where each of them is counted as $ZLEV_{specifi}$ in accordance with the formula below:

$ZLEV_{specific} = 1 - (CO2_v / LET_{sg})$

Where:

$CO2_v$ is the specific CO_2 emissions in g/km of a zero- and low-emission heavy-duty vehicle v determined in accordance with point 2.1,

LET_{sg} is the low-emission threshold of the sub-group sg to which the vehicle v belongs as defined in point 2.3.4;

V_{out} is the total number of newly registered zero-emission heavy-duty vehicles, which are not in the sub-groups referred to by the definition of V_{in}, and with a maximum of 0,035 of V_{total};

V_{total} is the total number of newly registered heavy-duty vehicles of the manufacturer in that reporting period.

Where V_{in}/V_{total} is lower than 0,0075, the ZLEV factor shall be set to 1.

2.3.3 Reporting periods as from 2030

ZLEV = 1

2.3.4 Calculation of the low-emission threshold

The low-emission threshold LET_{sg} of the sub-group sg is defined as follows:

$$LET_{sg} = (rCO2_{sg} \times PL_{sg}) / 2$$

Where:

$rCO2_{sg}$ is the reference CO_2 emissions of the sub-group sg, as determined in point 3;

PL_{sg} is the average payload of vehicles in the sub-group sg as determined in point 2.5.

2.4. Calculation of vehicle shares

For each manufacturer and each ***reporting period***, the share of new heavy-duty vehicles in a sub-group $share_{sg}$ shall be calculated as follows:

$$share_{sg} = \frac{V_{sg}}{V}$$

For each manufacturer and each ***reporting period***, the share of new zero-emissions heavy-duty vehicles in a sub-group zev_{sg} shall be calculated as follows:

$$zev_{sg} = \frac{Vzev_{sg}}{V_{sg}}$$

For each manufacturer and each ***reporting period***, the share of new heavy-duty vehicles within the sub-group sg, which pursuant to Article 7b shall be accounted for with the CO_2 emissions of their primary vehicles in the calculation of the average specific CO_2 emissions of point 2.2., shall be calculated as follows:

$$pv_{sg} = \frac{Vpv_{sg}}{V_{sg}}$$

Where,

$Vzev_{sg}$ is the number of new zero-emissions heavy-duty vehicles of the manufacturer in a subgroup *sg*;

Vpv_{sg} the number of new heavy-duty vehicles within the sub-group *sg*, which pursuant to Article 7b shall be accounted for with the CO_2 emissions of their primary vehicles in the calculation of the average specific CO_2 emissions of point 2.2.;

V_{sg} is the number of new heavy-duty vehicles of the manufacturer in a subgroup *sg*;

V is the number of new heavy-duty vehicles of the manufacturer.

2.5. **Payload values, passenger numbers and cargo volumes**

The average payload value PL_{sg} of a vehicle of category N or O in a sub-group sg shall be calculated as follows:

$$PL_{sg} = \sum_{mp} W_{sg,mp} \times PL_{sg,mp}$$

The average passenger number PN_{sg} of a vehicle of category M in a sub-group sg shall be calculated as follows:

$$PN_{sg} = \sum_{mp} W_{sg,mp} \times PN_{sg,mp}$$

Where,

$\sum_{mp}$ is the sum over all mission profiles *mp*

$W_{sg,mp,}$ is the mission profile weight specified in points 2.1.1 to 2.1.3

$PL_{sg,mp}$ is the payload value attributed to the vehicles of category N and O in the sub-group *sg* for the mission profile *mp*, as defined in points 2.5.1 and 2.5.3.

$PN_{sg,mp}$ is the passenger number attributed to the vehicles of category M in the sub-group *sg* for the mission profile *mp*, as defined in point 2.5.2.

2.5.1. Vehicles of category N.

Payload values $PL_{sg, mp}$ (in tons) are determined as follows:

<table>
<tr><th rowspan="2">Vehicle sub-group sg*</th><th colspan="14">Mission profile mp**</th></tr>
<tr><th>RDL</th><th>RDR</th><th>LHL</th><th>LHR</th><th>UDL</th><th>UDR</th><th>REL</th><th>RER</th><th>LEL</th><th>LER</th><th>MUL</th><th>MUR</th><th>COL</th><th>COR</th></tr>
<tr><td>53</td><td colspan="2" rowspan="5">As determined in point 3.1.1</td><td colspan="2" rowspan="2">Not applicable</td><td colspan="2" rowspan="5">As determined in point 3.1.1</td><td colspan="8" rowspan="5">Not applicable</td></tr>
<tr><td>54</td></tr>
<tr><td>1s</td></tr>
<tr><td>1</td></tr>
<tr><td>2</td><td colspan="2">As determined in point 3.1.1</td></tr>
<tr><td>3</td><td colspan="2">Not applicable</td></tr>
<tr><td>4-UD</td><td>0,9</td><td>4,4</td><td>1,9</td><td>14</td><td>0,9</td><td>4,4</td><td>3,5</td><td>17,5</td><td>3,5</td><td>26,5</td><td>0,6</td><td>3,0</td><td>0,9</td><td>4,4</td></tr>
<tr><td>4-RD</td></tr>
<tr><td>4-LH</td></tr>
<tr><td>4v</td></tr>
<tr><td>5-RD</td><td>2,6</td><td>12,9</td><td>2,6</td><td>19,3</td><td>2,6</td><td>12,9</td><td>3,5</td><td>17,5</td><td>3,5</td><td>26,5</td><td>n.a.</td><td>n.a.</td><td>2,6</td><td>12,9</td></tr>
<tr><td>5-LH</td></tr>
<tr><td>5v</td></tr>
<tr><td>9-RD</td><td>1,4</td><td>7,1</td><td>2,6</td><td>19,3</td><td>1,4</td><td>7,1</td><td>3,5</td><td>17,5</td><td>3,5</td><td>26,5</td><td>1,2</td><td>6,0</td><td>1,4</td><td>7,1</td></tr>
<tr><td>9-LH</td></tr>
<tr><td>9v</td></tr>
<tr><td>10-RD</td><td>2,6</td><td>12,9</td><td>2,6</td><td>19,3</td><td>2,6</td><td>12,9</td><td>3,5</td><td>17,5</td><td>3,5</td><td>26,5</td><td>n.a.</td><td>n.a.</td><td>2,6</td><td>12,9</td></tr>
<tr><td>10-LH</td></tr>
<tr><td>10v</td></tr>
<tr><td>11</td><td>1,4</td><td>7,1</td><td>2,6</td><td>19,3</td><td>1,4</td><td>7,1</td><td>3,5</td><td>17,5</td><td>3,5</td><td>26,5</td><td>1,2</td><td>6,0</td><td>1,4</td><td>7,1</td></tr>
<tr><td>12</td><td>2,6</td><td>12,9</td><td>2,6</td><td>19,3</td><td>2,6</td><td>12,9</td><td>3,5</td><td>17,5</td><td>3,5</td><td>26,5</td><td>n.a.</td><td>n.a.</td><td>2,6</td><td>12,9</td></tr>
<tr><td>16</td><td colspan="12">Not applicable</td><td>2,6</td><td>12,9</td></tr>
</table>

* See definitions in point 1.1

** See definitions in point 1.4

Technically permissible maximum payload values $maxPL_{sg}$ and cargo volumes CV_{sg} are determined according to point 3.1.1.

2.5.2. Vehicles of category M.

Passenger numbers $PN_{sg,mp}$, passenger masses $PM_{sg,mp}$ and technically permissible maximum passenger numbers $maxPN_{sg}$ for sub-group *sg* and mission profile *mp* are determined according to point 3.1.1.

2.5.3. Vehicles of category O.

Payload values $PL_{sg,\ mp}$ (in tons) are determined as follows:

Vehicle sub-group *(sg)**	**Mission profile (*mp*)****						
	RDL	**RDR**	**LHL**	**LHR**	**UDL**	**UDR**	**REL, RER, LEL, LER**
111, 111V,112, 112V, 113	**1,5**	**7,5**	**1,5**	**11,2**	**n.a.**	**n.a.**	**n.a.**
121, 121V, 123, 123V, , 125	**2,2**	**11,2**	**2,2**	**16,8**	**n.a.**	**n.a.**	**n.a.**
122, 122V, 124, 124V, 126	**2,4**	**12,2**	**2,4**	**18,3**	**n.a.**	**n.a.**	**n.a.**
131, 131v, 132, 132v, 133	**2,6**	**12,9**	**2,6**	**19,3**	**n.a.**	**n.a.**	**n.a.**
421, 421v, 422, 422v, 423	**2,6**	**12,9**	**2,6**	**19,3**	**n.a.**	**n.a.**	**n.a.**
431, 431v, 432, 432v, 433	**2,6**	**12,9**	**2,6**	**19,3**	**n.a.**	**n.a.**	**n.a.**
611, 612	**1,2**	**6,1**	**1,2**	**9,2**	**n.a.**	**n.a.**	**n.a.**
611v, 612v	**1,2**	**6,1**	**1,2**	**9,2**	**n.a.**	**n.a.**	**n.a.**
621, 621v, 623, 623v	**1,3**	**6,3**	**1,3**	**9,5**	**n.a.**	**n.a.**	**n.a.**
622, 622V, 624, 624V, 625	**2,6**	**12,9**	**2,6**	**19,3**	**n.a.**	**n.a.**	**n.a.**

631, 631v, 632, 632v, 633	**2,6**	**12,9**	**2,6**	**19,3**	**n.a.**	**n.a.**	**n.a.**

* See definitions in point 1.1

** See definitions in point 1.4

Technically permissible maximum payload values $maxPL_{sg}$ and cargo volumes CV_{sg} are determined according to point 3.1.1.

2.6. Calculation of the mileage and payload or passenger-number weighting factor

The mileage and payload (passenger) weighting factor (MPW_{sg}) of a sub-group *sg* is defined as the product of the annual mileage specified in point 2.6.1 and the payload and passenger-number values for the sub-group specified in points 2.5.1, 2.5.2 and 2.5.3 for vehicle categories N, M and O, respectively, normalised to the respective value for sub-group 5-LH, and shall be calculated as follows:

$$MPW_{sg} = \frac{(AM_{sg} \times PL_{sg})}{(AM_{5-LH} \times PL_{5-LH})} \quad \text{(for category N and O vehicles)}$$

$$MPW_{sg} = \frac{(AM_{sg} \times PN_{sg})}{(AM_{5-LH} \times PL_{5-LH})} \quad \text{(for category M vehicles)}$$

Where,

AM_{sg} is the annual mileage specified in point 2.6.1, 2.6.2 and 2.6.3 for the vehicles in the respective sub-group;

$AM_{5\text{-}LH}$ is the annual mileage specified for the sub-group 5-LH in 2.6.1;

PL_{sg} is as determined in points 2.5.1 and 2.5.3;

PN_{sg} is as determined in point 2.5.2;

$PL_{5\text{-}LH}$ is the average payload value for the sub-group 5-LH as determined in point 2.5.1.

2.6.1. Annual mileages for vehicles of category N

Vehicle sub-group *(sg)**	Annual mileage AM_{sg} (in km)
53	58 000
54	58 000
1s	58 000
1	58 000
2	60 000
3	60 000
4-UD	60 000
4-RD	78 000
4-LH	98 000
4v	60 000
5-RD	78 000
5-LH	116 000
5v	60 000
9-RD	73 000
9-LH	108 000
9v	60 000
10-RD	68 000
10-LH	107 000
10v	60 000
11	65 000
12	67 000
16	60 000

* See definitions in point 1.1

2.6.2. Annual mileages for vehicles of category M

Vehicle sub-group *(sg)**	Annual mileage AM_{sg} (in km)
31-LF	60 000
31-L1	60 000
31-L2	60 000
31-DD	60 000
32-C2	96 000
32-C3	96 000
32-DD	96 000
33-LF	60 000
33-L1	60 000
33-L2	60 000
33-DD	60 000
34-C2	96 000
34-C3	96 000
34-DD	96 000
35-FE	60 000
39-FE	60 000

* See definitions in point 1.1

2.6.3. Annual mileages for vehicles of category O

Vehicle sub-group *(sg)**	Annual mileage AM_{sg} (in km)
111, 111V,112, 112V, 113	52 000
121, 121V, 122, 122V, 123, 123V, 124, 124V, 125, 126, 131, 131v, 132, 132v, 133	77 000
421, 421v, 422, 422v, 423, 431, 431v, 432, 432v, 433	68 000

611, 612, 611v, 612v, 621, 623, 621v, 623v	40 000
622, 622V, 624, 624V, 625, 631, 631v, 632, 632v, 633	68 000

* See definitions in point 1.1

2.7. Average specific CO_2 emissions of manufacturers, as referred to in Article 4

For each manufacturer the following average specific CO_2 emissions shall be calculated:

2.7.1. For the reporting peridods 2019 to 2029:

$$CO2(2025) = ZLEV \times \sum_{sg} share_{sg} \times MPW_{sg} \times avgCO2_{sg}$$

2.7.2. For the reporting periods as from 2025:

$$CO2(NO) = \sum_{sg} share_{sg} \times MPW_{sg} \times avgCO2_{sg}$$

$$CO2(MCO2) = \sum_{sg} share_{sg} \times MPW_{sg} \times [avgCO2_{sg} \times (1 - pv_{sg}) + avgCO2p_{sg} \times pv_{sg}]$$

$$CO2(MZE) = \sum_{sg} share_{sg} \times MPW_{sg} \times (1 - zev_{sg}) \times rCO2_{sg}$$

$$CO2(M) = CO2(MCO2) + CO2(MZE)$$

Where,

$\sum_{sg}$ is the sum is over those sub-groups that are included in the calculation of the particular average specific CO_2 emissions according to point 4.2;

$ZLEV$ is as determined in point 2.3;

$share_{sg}$ is as determined in point 2.4;

zev_{sg} is as determined in point 2.4;

pv_{sg} is as determined in point 2.4;

MPW_{sg} is as determined in point 2.6;

$avgCO2_{sg}$ is as determined in point 2.2;

$avgCO2p_{sg}$ is as determined in point 2.2;

$rCO2_{sg}$ is as determined in point 3.1.2.

3. **CALCULATION OF THE REFERENCE VALUES**

3.1. Reference values

The following reference values shall be calculated on the basis of all new heavy-duty vehicles of all manufacturers for the reference period applicable to the sub-group *sg* according to point 3.2.

3.1.1. For each vehicle sub-group *sg,* payload $PL_{sg,mp}$, passenger number $PN_{sg,mp}$, passenger mass $PM_{sg,mp}$, technically permissible maximum payload $maxPL_{sg}$, technically permissible maximum passenger number $maxPN_{sg}$ and cargo volume CV_{sg} values shall be cacluclated as follows:

$$PL_{sg,mp} = \frac{\sum_v PL_{v,mp}}{rV_{sg}} \quad \text{(for vehicles of category N)*}$$

$$PN_{sg,mp} = \frac{\sum_v PN_{v,mp}}{rV_{sg}} \quad \text{(for vehicles of category M)*}$$

$$PM_{sg,mp} = \frac{\sum_v PM_{v,mp}}{rV_{sg}} \quad \text{(for vehicles of category M)*}$$

$$maxPL_{sg} = \frac{\sum_v maxPL_v}{rV_{sg}} \text{ (for vehicles of category N)}$$

$$maxPN_{sg} = \frac{\sum_v maxPN_v}{rV_{sg}} \text{ (for vehicles of category M)}$$

$$CV_{sg} = \frac{\sum_v CV_v}{rV_{sg}} \text{ (for vehicles of category O)}$$

(*only for vehicle sub-groups, for which no explicit values for $PL_{sg,mp}$ or $PN_{sg,mp}$ are provided in point 2.5**)**

3.1.2. Reference CO_2 emissions $rCO2_{sg}$ referred to in Article 3 shall be caclulated as follows:

$$rCO2_{sg} = \frac{\sum_v (CO2_v / PL_{sg})}{rV_{sg}} \text{ (for vehicles of category N and O)}$$

$$rCO2_{sg} = \frac{\sum_v (CO2_v / PN_{sg})}{rV_{sg}} \text{ (for vehicles of category M)}$$

$$rCO2p_{sg} = \frac{\sum_v (CO2p_v / PN_{sg})}{rV_{sg}} \text{(for vehicles of category M)}$$

Where,

Σ_v	is the sum over all new heavy-duty vehicles in the sub-group *sg* registered in the reference period applicable to *sg* acording to point 3.2;
$CO2_v$	are the specific CO_2 emissions of the new heavy-duty vehicle *v* as determined in accordance with point 2.1, if applicable adjusted pursuant to Annex II;
$CO2p_v$	are the specific CO_2 emissions of the primary vehicle of the new-heavy duty vehicle *v* as determined in accordance with point 2.1, if applicable adjusted pursuant to Annex II;;
rV_{sg}	is the number of all new heavy-duty vehicles in the sub-group *sg* registered in the reference period applicable to *sg* acording to point 3.2;
PL_{sg}	is the average payload of vehicles in the sub-group *sg* as determined in point 2.5;
PN_{sg}	is the average passenger number of vehicles in the sub-group *sg* as determined in point 2.5;
$PL_{v,mp}$	is the payload of vehicle *v* in the mission profile *mp*, as determined from the data reported according to Articles 13a and 13b ;
$PN_{v,mp}$	is the passenger number of vehicle *v* in the mission profile *mp* as determined from the data reported according to Articles 13a and 13b;
$PM_{v,mp}$	is the passenger mass of vehicle *v* in the mission profile *mp* as determined from the data reported according to Articles 13a and 13b;
$maxPL_v$	is the technically permissible maximum payload of vehicle *v* as determined from the data reported according to Articles 13a and 13b;
$maxPN_v$	is the technically permissible maximum passenger number of vehicle *v* as determined from the data reported according to Articles 13a and 13b;
CV_v	is the cargo volume of vehicle *v* as determined from the data reported according to Articles 13a and 13b.

3.2. Reference periods applicable to sub-groups

The following reporting periods shall be applied as reference periods to vehicle sub-groups:

Vehicle sub-group *sg*	**Reporting period of the year applicable as reference period**
4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH	2019
1, 2, 3, 11, 12, 16	**2021**
All others	2025

3.2.1. If in the reference period as specified in point 3.2 in a sub-group *sg* the number of new heavy-duty vehicles of all manufacturers is less than 50 the following rules shall apply:

The average specific CO_2 emissions $avgCO2_{sg}$ and $avgCO2p_{sg}$ as provided for in point 2.2 and the reference CO_2 emissions $rCO2_{sg}$ and $rCO2p_{sg}$ as provided for in point 3.1.2 shall be set to "0" for all manufacturers in the sub-group *sg* for the purpose of calculating the average specific CO_2 emissions according to point 2.7 and the specific CO_2 emissions targets according to point 4.1 for the reporting periods of the years < Y + 5. Here Y is the year of the first reporting period in which the number of new heavy-duty vehicles of all manufacturers in the sub-group *sg* is at least 50.

To obtain the reference CO_2 emissions $rCO2_{sg}$ and $rCO2p_{sg}$ for the purpose of calculating the specific emissions target according to point 4, first the corresponding ~~entities~~ **values** provided for in point 3.1.2 shall be calculated for the reporting period of the year *Y* instead of for the reference period applicable to the sub-group *sg* according to point 3.2.

The resulting values shall then be divided by

- the target factor $RET_{sg,Y}$, as defined in point 5.1.1, for obtaining reference CO_2 emissions $rCO2_{sg}$,
- the target factor $RETp_{sg,Y}$, as defined in point 5.1.1, for obtaining reference CO_2 emissions $rCO2p_{sg}$.

4. CALCULATION OF THE SPECIFIC EMISSION TARGET OF A MANUFACTURER REFERRED TO IN ARTICLE 6

4.1. Specific emission targets

For each manufacturer the following specific emission targets *T* shall be calculated as follows:

4.1.1. For the reporting periods of the years from 2025 to 2029:

$$T(2025) = \sum_{sg} share_{sg} \times MPW_{sg} \times (1 - rf_{sg}) \times rCO2_{sg}$$

4.1.2. For the reporting periods of the years as from 2030:

$$T(NO) = \sum_{sg} share_{sg} \times MPW_{sg} \times (1 - rf_{sg}) \times rCO2_{sg}$$

$$T(MCO2) = \sum_{sg} share_{sg} \times MPW_{sg} \times [(1 - pv_{sg}) \times (1 - rf_{sg}) \times rCO2_{sg} + pv_{sg} \times (1 - rfp_{sg}) \times rCO2p_{sg}]$$

$$T(MZE) = \sum_{sg} share_{sg} \times MPW_{sg} \times (1 - zevM_{sg}) \times rCO2_{sg}$$

$$T(M) = T(MCO2) + T(MZE)$$

Where,

$\sum_{sg}$	is the sum over those sub-groups that are inclued in the calculation of the particular specific emissions target according to point 4.2;
$share_{sg}$	is as determined in point 2.4;
MPW_{sg}	is as determined point 2.6;
rf_{sg}	is the CO_2 reduction target ***applicable in*** the specific ***reporting period*** to new heavy dutyvehicles in sub-group *sg* as provided for in point 4.3;
rfp_{sg}	is the CO_2 reduction target ***applicable in*** the specific ***reporting period*** to primary vehicles of new heavy-duty vehicles in sub-group *sg* as provided for in point 4.3;
$zevM_{sg}$	is the zero-emission vehicles mandate ***applicable in*** the specific ***reporting period*** to vehicles in sub-group *sg* as provided for in point 4.3;
$rCO2_{sg}$	is as determined in point 3.1.2;
$rCO2p_{sg}$	is as determined in point 3.1.2;
pv_{sg}	is as determined in point 2.4.

4.2. Vehicle sub-groups included in the calculation of average specific CO_2 emissions and specific emissions targets of manufacturers

The following sub-groups *sg* shall be included in the calculation of the specific CO_2 emissions *CO2(X),'* specific emissions targets *T(X)* and CO2 emissions trajectory $ET(X)_Y$:

X = 2025	**X= NO**	**X = MCO2**	**X= MZE**
vehicle sub-groups, subject to CO_2 emissions targets according to Article 3a paragraph 1 (a)	**sub-groups of transport of goods vehicles, subject to CO_2 emissions targets according to Article 3a paragraphs 1(b), 1(c) and 1(d) and paragraph 3**	**sub-groups of transport of ~~persons~~ passengers vehicles, subject to CO_2 emissions targets according to Article 3a paragraphs 1(b), 1(c) and 1(d) (Coaches and Class II Low Entry Buses)**	**sub-groups of transport of ~~persons~~ passengers vehicles, subject to zero-emissions vehicle targets according to Article 3b (Urban buses)**
4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH	All vehicle sub-groups referred to in points 1.1.1 and 1.1.3.	32-C2, 32-C3, 32-DD, 34-C2, 34-C3, 34-DD, **31-L2, 33-L2**	31-LF, 31-L1, ~~31-L2~~, 31-DD, 33-LF, 33-L1, ~~33-L2~~, 33-DD, 35-FE, 39-FE

4.3. CO_2 reduction targets and zero-emissions vehicle mandates

4.3.1. The following CO_2 emissions reduction targets rf_{sg} and rfp_{sg} pursuant to Article 3a shall apply to vehicles in the sub-group *sg* for different reporting periods:

CO_2 reduction targets rf_{sg} and rfp_{sg}					
Sub-groups *sg*		Reporting period of the years			
		2025 – 2029	2030 – 2034	2035 – 2039	As from 2040
Medium lorries	**53, 54**	**0**	**43%**	**64%**	**90%**
Heavy lorries > 7,4t	**1s, 1, 2, 3**	**0**	**43%**	**64%**	**90%**
Heavy lorries > 16 t with 4x2 and ~~6x4~~ 6x2 **axle configurations**	**4-UD, 4-RD, 4-LH, 5-RD, 5-LH, 9-RD, 9-LH, 10-RD, 10-LH**	**15%**	**43%**	**64%**	**90%**
Heavy lorries > 16 t with special axle configurations	**11, 12, 16**	**0**	**43%**	**64%**	**90%**
Coaches and interurban buses **(rf_{sg})**	**32-C2, 32-C3, 32-DD, 34-C2, 34-C3, 34-DD,** 31-L2, 33-L2	**0**	**43%**	**64%**	**90%**
Primary vehicles of coaches and interurban buses **(rfp_{sg})**	**32-C2, 32-C3, 32-DD, 34-C2, 34-C3, 34-DD,** 31-L2, 33-L2	**0**	**43%**	**64%**	**90%**
Trailers		**0**	**7,5%**	**7,5%**	**7,5%**
Semi-trailers		**0**	**7,5~~15~~%**	**7,5~~15~~%**	**7,5~~15~~%**

For reporting periods of the years before 2025, all CO_2 reduction targets rf_{sg} and rfp_{sg} shall be 0.

4.3.2. The following zero-emission vehicle targets $zevM_{sg}$ pursuant to Article 3b are applicable to vehicles in the sub-group *sg* for different reporting periods:

Zero-emission vehicle mandates $zevM_{sg}$					
Sub-groups *sg*		Reporting period of the years			
		before 2030	2030 – 2034	2035 – 2039	As from 2040
Urban ~~heavy~~ buses	**31-LF, 31-L1, 31-DD, 33-LF, 33-L1, 33-DD, 35-FE, 39-FE, ~~31-L2, 33-L2~~**	**0**	**~~100%~~ 85%**	**100%**	**100%**

5. EMISSION CREDITS AND DEBTS REFERRED TO IN ARTICLE 7

5.1. CO_2 emissions reduction trajectories

5.1.1. Target factors

For each vehicle sub-group *sg* and reporting period of a year *Y* target factors shall be defined as follows:

$$RET_{sg,Y} = (1\text{-}rf_{sg,uY}) + (rf_{sg,uY} - rf_{sg,lY}) \times (uY - Y)/(uY - lY)$$

$$RETp_{sg,Y} = (1\text{-}rfp_{sg,uY}) + (rfp_{sg,uY} - rfp_{sg,lY}) \times (uY - Y)/(uY - lY)$$

$$ZET_{sg,Y} = (1\text{-}zevM_{sg,uY}) + (zevM_{sg,uY} - zevM_{sg,lY}) \times (uY - Y)/(uY - lY)$$

Where,

lY, *uY*	are the values for the lower year and upper year - in the set {rY, 2025, 2030, **2035**, 2040} **for the sub-groups indicated in the column X = 2025 in the table of point 4.2**, - **in the set {rY, 2030, 2035, 2040} for all other sub-groups *sg*,** defining the smallest intervall for which the condition $lY \leq Y < uY$ holds;
rY	is the year of the reference period applicable to the vehicle sub-group *sg* according to point 3.2;
$rf_{sg,lY}$, $rf_{sg,uY}$	are the CO_2 reduction targets of the sub-group *sg* for new heavy duty vehiches of the years *lY* and *uY* according to point 4.3;
$rfp_{sg,lY}$, $rfp_{sg,uY}$	are the CO_2 reduction targets of the sub-group *sg* for primary vehicles of new heavy duty vehiches of the years *lY* and *uY* according to point 4.3;
$zevM_{sg,lY}$, $zevM_{sg,uY}$	are the zero emissions vehicle mandates for new heavy duty vehiches of the years *lY* and *uY* according to point 4.3;

For reporting years Y < rY, the values of $RET_{sg,Y}$, $RETp_{sg,Y}$ and $ZET_{sg,Y}$ shall be set to 1 such that there is no contribution of the vehicle sub-group *sg* to the CO2 emissions trajectory.

5.1.2. CO_2 emissions reduction trajectories

5.1.2.1. Then for each vehicle sub-group *sg* and reporting period of a year *Y* the following CO_2 emissions reduction trajectories shall be defined:

$$ET_{sg,Y} = RET_{sg,Y} \times rCO2_{sg}$$

$$ETp_{sg,Y} = RETp_{sg,Y} \times rCO2p_{sg}$$

$$ETz_{sg,Y} = ZET_{sg,Y} \times rCO2_{sg}$$

5.1.2.2. For each manufacturer and reporting periods of a year *Y* between 2019 and 2024 the following CO_2 emissions reduction trajectories shall be defined:

$$ET(2025)_Y = \sum_{sg} share_{sg} \times MPW_{sg} \times ET_{sg,Y}$$

5.1.2.3. For each manufacturer and reporting periods of a year *Y* between 2025 and 2040 the following CO_2 emissions reduction trajectories shall be defined:

$$ET(NO)_Y = \sum_{sg} share_{sg} \times MPW_{sg} \times ET_{sg,Y}$$

$$ET(MCO2)_Y = \sum_{sg} share_{sg} \times MPW_{sg} \times [(1- pv_{sg}) \times ET_{sg,Y} + pv_{sg} \times ETp_{sg,Y}]$$

$$ET(MZE)_Y = \sum_{sg} share_{sg} \times MPW_{sg} \times ETz_{sg,Y}$$

$$ET(M)_Y = ET(MCO2)_Y + ET(MZE)_Y$$

Where,

$\sum_{sg}$ is the sum over those sub-groups that are inclued in the calculation of the particular CO_2 emissions trajectory according to point 4.2;

$share_{sg}$ is the share of new heavy-duty vehicles of the manufacturer in the sub-group sg, as determined in point 2.4;

MPW_{sg} is as determined point 2.6;

$rCO2_{sg}$ is as determined in point 3.1.2;

$rCO2p_{sg}$ is as determined in point 3.1.2;

pv_{sg} is the share of new heavy-duty vehicles of the manufacturer within the sub-group *sg*, which pursuant to Article 7b shall be accounted for with the CO_2 emissions of their primary vehicles in the calculation of the average specific CO2 emissions of point 2.2

5.2. Calculation of the emission credits and debts in each reporting period

For each manufacturer and each reporting period of the years Y from 2019 to 2040 the emission credits $cCO2(X)_Y$ and emission debts $dCO2(X)_Y$, *(X = NO, M),* shall be the maximum of the following values and 0 (i.e. emission credits and debts cannot be negative):

	2019 ≤ Y< 2025	**2025 ≤ Y< 2030**	**2030 ≤ Y< 2040**
$cCO2(NO)_Y$	$[ET(2025)_Y - CO2(2025)_Y] \times V_y$	$[ET(NO)_Y - CO2(NO)_Y] \times V_y$	$[ET(NO)_Y - CO2(NO)_Y] \times V_y$
$dCO2(NO)_Y$	*0*	$[CO2(2025)_Y - T(2025)_Y] \times V_y$	$[CO2(NO)_Y - T(NO)_Y] \times V_y$
$cCO2(M)_Y$	**0**	$[ET(M)_Y - CO2(M)_Y] \times V_y$	$[ET(M)_Y - CO2(M)_Y] \times V_y$
$dCO2(M)_Y$	**0**	**0**	$[CO2(M)_Y - T(M)_Y] \times V_y$

Where,

$ET(X)_Y$ is the manufacturer's emission trajectory in the ***reporting period of the*** year Y determined in accordance with point 5.1 *(X = 2025, NO, M);*

$CO2(X)_Y$ is the manufacturer's average specific emissions in the ***reporting period of the*** year Y determined in accordance with point 2.7 *(X = 2025, NO, M)*;

$T(X)_Y$ is the manufacturer's specific emission target in the ***reporting period of the*** year Y determined in accordance with point 4 *(X = 2025, NO, M)*;

V_Y is the number of new heavy-duty vehicles of the manufacturer in the ***reporting period of the*** year Y.

5.3. Emission debt limit

For each manufacturer the emission debt limits $limCO2(X)_Y$ in a reporting period of the year *Y* are defined as follows:

$limCO2(NO)_Y = T(2025)_Y \times 0{,}05 \times V(2025)_Y$ for the reporting periods of the year Y < 2030;

$limCO2(NO)_Y = T(NO)_Y \times 0{,}05 \times V(NO)_Y$ for the reporting periods of the year Y ≥ 2030;

$limCO2(M)_Y = T(M)_Y \times 0{,}05 \times V(M)_Y$ for the reporting periods of the year Y ≥ 2030.

Where

$T(X)_Y$ is the manufacturer's specific emission target in the ***reporting period of the*** year Y determined in accordance with point 4 *(X = 2025, NO, M)*;

$V(X)_Y$ is the number of new heavy-duty vehicles of the manufacturer in the ***reporting period of the*** year Y in the vehicle sub-groups, which are included int the caclulation of the specific CO_2 emissions *CO2(X)* according to point 4.2 *(X = 2025, NO, M)*.

5.4. Early emission credits

Emission debts acquired ***for the reporting periods of the*** year 2025 shall be reduced by an amount corresponding to the emission credits acquired prior to ***this reporting period***, which is determined for each manufacturer as follows:

$$redCO2 = min(dCO2(NO)_{2025}\,;\ \sum_{Y=2019}^{2024} cCO2(NO)_Y)$$

Where,

min is the minimum of the two values mentioned between the brackets;

$\sum_{Y=2019}^{2024}$ is the sum over the ***reporting periods of the years Y from*** 2019 to 2024;

$dCO2(NO)_Y$ is the emission debts for ***reporting period of the year*** Y as determined in accordance with point 5.2;

$cCO2(NO)_Y$ is the emission credits for the ***reporting period of the*** year Y as determined in accordance with point 5.2;.

6. DETERMINATION OF A MANUFACTURER'S EXCESS CO_2 EMISSIONS REFERRED TO IN ARTICLE 8(2)

For each manufacturer and each ***reporting period*** of the year Y from ***the year*** 2025 onwards the value of the vehicle category specific excess CO_2 emissions $exeCO2(X)_Y$ shall be determined as follows. if the value is positive (X = NO, M). If the following calculations result in a negative value for $exeCO2(X)_Y$, the latter shall be set to 0.

For the *reporting period of* the year 2025:

$$exeCO2(NO)_{2025} = dCO2(NO)_{2025} - \sum_{Y=2019}^{2024} cCO2(NO)_Y - limCO2(NO)_{2025}$$

For the reporting periods of the years Y from 2026 to 2028, from 2030 to 2033 and from 2035 to 2038:

$$exeCO2(NO)_y = \sum_{I=2025}^{Y} (dCO2(NO)_I - cCO2(NO)_I) - \sum_{J=2025}^{Y-1} exeCO2(NO)_J - redCO2 - limCO2(NO)_Y$$

For the reporting periods of the years Y from from 2030 to 2033 and from 2035 to 2038:

$$exeCO2(M)_y = \sum_{I=2025}^{Y} (dCO2(M)_I - cCO2(M)_I) - \sum_{J=2030}^{Y-1} exeCO2(M)_J - limCO2(M)_Y$$

For the reporting period of the years Y = 2029, 2034 and 2039:

$$exeCO2(NO)_Y = \sum_{I=2025}^{Y} (dCO2(NO)_I - cCO2(NO)_I) - \sum_{J=2025}^{Y-1} exeCO2(NO)_J - redCO2$$

For the reporting period of the years Y = 2034 and 2039:

$$exeCO2(M)_Y = \sum_{I=2025}^{Y} (dCO2(M)_I - cCO2(M)_I) - \sum_{J=2030}^{Y-1} exeCO2(M)_J$$

For the reporting periods of the year 2040:

$$exeCO2(NO)_{2040} = (CO2(NO)_{2040} - T(NO)_{2040}) \times V_{2040} + \sum_{I=2025}^{2039} (dCO2(NO)_I - cCO2(NO)_I) - \sum_{J=2025}^{2039} exeCO2(NO)_J - redCO$$

$$exeCO2(M)_{2040} = (CO2(M)_{2040} - T(M)_{2040}) \times V_{2040} + \sum_{I=2025}^{2039} (dCO2(M)_I - cCO2(M)_I) - \sum_{J=2030}^{2039} exeCO2(M)_J$$

For the reporting periods of the years Y > 2040:

$$exeCO2(NO)_Y = (CO2(NO)_Y - T(NO)_Y) \times V_Y$$

$$exeCO2(M)_Y = (CO2(M)_Y - T(M)_Y) \times V_Y$$

Where,

$\sum_{Y=2019}^{2024}$ is the sum over the ***reporting periods of the years Y from*** 2019 to 2024;

$\sum_{I=2025}^{Y}$ is the sum over the ***reporting periods of the years I from*** 2025 to the year Y;

$\sum_{J=2025}^{Y-1}$ is the sum over the *reporting periods of the years J from* 2025 *to the year (Y-1);*

$\sum_{I=2025}^{2039}$ is the sum over the *reporting periods of the years I from 2025 to 2039*;

$\sum_{J=2030}^{Y-1}$ is the sum over the reporting periods of the years J from 2030 to the year (Y-1);

$dCO2(X)_Y$ is the emission debts for the *reporting period of the* year Y as determined in accordance with point 5.2 (X = NO, M);

$cCO2(X)_Y$ is the emission credits for the *reporting period of the* year Y as determined in accordance with point 5.2 (X = NO, M);

$limCO2(X)_Y$ is the emission debt limit as determined in accordance with point 5.3 (X = NO, M);

$redCO2(X)$ is the reduction of emission debts of the *reporting period of the* year 2025 as determined in accordance with 5.4 (X = NO, M).

In all other cases the value of the excess emissions $exeCO2(X)_Y$ shall be set to 0 (X = NO, M).

The excess CO_2 emissions of the reporting period of the year Y as referred to in Article 8(2) shall be:

$$exeCO2_Y = exeCO2(NO)_Y + exeCO2(M)_Y$$

ANNEX II

Adjustment procedures referred to in Article 11

1. ADJUSTMENT OF REFERENCE CO_2 EMISSIONS FOLLOWING AN AMENDMENT OF THE TYPE APPROVAL PROCEDURES REFERRED TO IN ARTICLE 11(2)

Following an amendment of the type approval procedures referred to in Article 11(2), the reference CO_2 emissions referred to in Point 3.1.2 of Annex I shall be recalculated**.**

For this purpose the CO_2 emissions in g/km of new heavy-duty vehicles *v* of the reference period and of their primary vehicles determined for a mission profile *mp,* as referred to in point 2.1 of Annex I, shall be adjusted as follows:

$$CO2_{v,mp} = CO2(RP)_{v,mp} \cdot (\sum_r s_{r,sg} \cdot CO2_{r,mp}) / (\sum_r s_{r,sg} \cdot CO2(RP)_{r,mp})$$

$$CO2p_{v,mp} = CO2p(RP)_{v,mp} \cdot (\sum_r s_{r,sg} \cdot CO2p_{r,mp}) / (\sum_r s_{r,sg} \cdot CO2p(RP)_{r,mp})$$

Where

$\sum_r$ is the sum over all representative vehicles *r* for the sub-group *sg*;

sg is the sub-group to which the vehicle *v* belongs;

$s_{r,sg}$ is the statistical weight of the representative vehicle *r* in the sub-group *sg;*

$CO2(RP)_{v,mp}$ is the specific CO_2 emissions of vehicle *v* in g/km, as determined on mission profile *mp* and based on the monitoring data of the reference period;

$CO2(RP)_{r,mp}$ is the specific CO_2 emissions of the representative vehicle *r* in g/km, as determined on mission profile *mp* in accordance with Regulation (EC) No 595/2009 and its implementing measures as it was applied in the reference period;

$CO2_{r,mp}$ is the specific CO_2 emissions of the representative vehicle *r*, as determined on mission profile *mp* in accordance with Regulation (EC) No 595/2009 and its implementing measures according to the amendments referred to in Article 11(3)(a);

$CO2p(RP)_{v,mp}$ is the specific CO_2 emissions of the primary vehicle of the heavy-duty vehicle *v* in g/km, as determined on mission profile *mp* and based on the monitoring data of the reference period;

$CO2p(RP)_{r,mp}$ is the specific CO_2 emissions of the primary vehicle of the representative vehicle *r* in g/km, as determined in accordance with Regulation (EC) No 595/2009 and its implementing measures as it was applied in the reference period;

$CO2p_{r,mp}$ is the specific CO_2 emissions of the primary vehicle of the representative vehicle *r*, as determined on mission profile *mp* in accordance with Regulation (EC) No 595/2009 and its implementing measures according to the amendments referred to in Article 11(3)(a).

The specific CO_2 emissions shall be normalised pursuant to Annex III using those values for the parameters referred to in Article 14(1), point (f), that are applicable in the reporting period referred to in Article 11(2), point (a).

The representative vehicles shall be defined in accordance with the methodology referred to in Article 11(3).

2. APPLICATION OF THE ADJUSTED REFERENCE CO_2 EMISSIONS ACCORDING TO ARTICLE 11(2)

If in the reporting period of the year Y the specific CO_2 emissions of some new heavy-duty vehicles of a manufacturer have been determined with amendments referred to in Article 11(2), the reference CO_2 emissions $\underline{rCO2_{sg}}$ of the vehicle sub-group *sg* used in points 4 and 5.1 of Annex I shall be calculated as follows:

$$rCO2_{sg} = \sum_{,i} V_{sg,i}/V_{sg} \text{ x } rCO2_{sg,,i}$$

where:

$\sum_{,i}$ is the sum over

- for i = ~~1~~**0**: the non-amended procedure for determining the CO_2 emissions, for which the initial reference CO_2 emissions without adjustments are applicable and
- for i ≥ 1: all subsequent amendments referred to in Article 11(2).

V_{sg} is the number of new heavy-duty vehicles of the manufacturer in the reporting period of the year *Y* and the vehicle sub-group *sg*;

$V_{sg,i}$ is the number of new heavy-duty vehicles of the manufacturer in the reporting period of the year *Y* and in the vehicle sub-group sg, the specific CO_2 emissions of which have been determined with the amendment *i*;

$rCO2_{sg,i}$ are:

- for i = 0: the non-adjusted reference CO_2 emissions
- for i ≥ 1: the reference CO_2 emissions that have been determined for the vehicle sub-group *sg* with the amendment *i*.

ANNEX II[10]

'ANNEX III

Normalisation of specific CO_2 emissions of new heavy-duty vehicles referred to in Article 4

1. NORMALISATION OF SPECIFIC CO_2 EMISSIONS

For the purposes of the caclulation in point 2.1 of Annex I, , the values of CO_2 emissions $CO2_{v,mp}$of vehicles are normalised as follow:

$CO2_{v,mp} = reportCO2_{v,mp} + \Delta CO2_{v,mp}(m) + \Delta CO2\text{cv}_{v,mp}$

$m = PL_{sg,mp} - PL_{v,mp} + cCW_v$ (for vehicles of categories N and O)

$m = PM_{sg,mp} - PM_{v,mp} + cCW_v$ (for vehicles of category M)

The values of CO2 emissions 〖CO2p〗 (v,mp)of primary vehicles are normalised according to the same methodology, using the parameters for primary vehicles.

Where

$CO2_{v,mp}$	are the normalised CO_2 emissions of the vehicle *v* determined for a mission profile *mp* that are to be considered in the calculation of Annex I point 2.1;
$reportCO2_{v,mp}$	are the CO_2 emissions in g/km ~~of the primary vehicle~~ of a new heavy-duty vehicle *v* determined for a mission profile *mp* and reported in accordance with Articles 13a and 13b;
$\Delta CO2_{v,mp}(m)$	is to be determined in accordance with point 3;
$\Delta CO2\text{cv}_{v,mp}$	is to be determined in accordance with point 4;
$PL_{v,mp}$	is the payload of vehicle *v* in the mission profile *mp*, as determined from the data reported according to Articles 13a and 13b ;
$PL_{sg,mp}$	is the payload for sub-group *sg* and mission profile *mp* as provided for in point 2.5 of Annex I;
$PM_{v,mp}$	is the passenger mass of vehicle *v* in the mission profile *mp*, as determined from the data reported according to Articles 13a and 13b;

[10] See footnote 20.

$PM_{sg,mp}$ is the passenger mass for sub-group *sg* and mission profile *mp* as provided for in point 2.5 of Annex I;

cCW_v is the correction of the curb weight of the vehicle *v* according to point 2.

2. CURB WEIGHT NORMALISATION

Since the transport utility of a vehicle increases with its technically permissible maximum payload or passenger number, but for technical reasons higher values for these parameters are correlated with higher curb weights and therefore higher CO_2 emissions, the following correction of the curb weight of a vehicle *v* in sub-group *sg* for the purpose of the normalisation of its specific CO_2 emissions according to point 1 shall be applied:

$cCW_v = a_{sg} \cdot (maxPL_{sg} - maxPL_v)$ for vehicles of category N ~~and O~~;

$cCW_v = 0$ **for vehicles of category O;**

$cCW_v = a_{sg} \cdot (maxPN_{sg} - maxPN_v)$ for vehicles of category M;

Where

a_{sg} is a linear coefficient determined according to point 2.1 for the reporting period of the vehicle *v*;

$maxPL_v$ is the technically permissible maximum payload of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

$maxPN_v$ is the technically permissible maximum passenger number of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

$maxPL_{sg}$ is the technically permissible maximum payload of vehicle sub-group *sg* determined according to point 2.5 of Annex I;

$maxPN_{sg}$ is the technically permissible maximum passenger number of vehicle sub-group *sg* determined according to point 2.5 of Annex I.

2.1. Determination of normalisation parameters

For each reporting period the parameters a_{sg} and b_{sg} shall be determined with a linear regression analysis of the correlation of the values of CW_v with the values of $maxPL_v$ (category N and O vehicles) and $maxPN_v$ (category M vehicles), considering all newly registered vehicles v in the sub-group sg:

$CW_v \approx a_{sg} \cdot maxPL_v + b_{sg}$ for vehicles of category N ~~and O~~;

$CW_v \approx a_{sg} \cdot maxPN_v + b_{sg}$ for vehicles of category M.

Where

CW_v is the curb weight of vehicle v, as determined from the data reported according to Articles 13a and 13b; if no precise value is available it may be approximated by the corrected actual mass of the vehicle v

$maxPL_v$ is the technically permissible maximum payload of vehicle v as determined from the data reported according to Articles 13a and 13b;

$maxPN_v$ is the technically permissible maximum passenger number of vehicle v as determined from the data reported according to Articles 13a and 13b;.

3. CHANGE OF CO_2 EMISSIONS FOR CHANGE IN TOTAL VEHICLE MASS

The ex-post change of CO_2 emissions of a vehicle v to be determined for a mission profile mp due to an ex-post change in the total mass to be attributed to the vehicle for the determination of CO_2 emissions is defined by the following linear approximation:

$$\Delta CO2_{v,mp}(m) = \text{m} \cdot (CO2_{v,r} - CO2_{v,l}) / (\text{Mr} - \text{Ml})$$

Where:

m is the change of total mass attributed to the vehicle v for the determination of its CO_2 emissions;

$CO2_{v,r}$ are the CO_2 emissions of the vehicle v in g/km, without the change of mass, determined for the same mission profile mp, representative loading conditions;

$CO2_{v,l}$ are the CO_2 emissions of the vehicle v in g/km, without the change of mass, determined for the same mission profile mp, low loading conditions;

Mr is the total vehicle mass in simulation, without the change of mass, for the same mission profile *mp*, representative loading conditions;

Ml is the total vehicle mass in simulation, without the change of mass, for the same mission profile *mp*, low loading conditions.

4. NORMALISATION FOR DIFFERENT CARGO VOLUMES

Category O vehicles within the same sub-group have different cargo volumes. Since the transport utility of a vehicle increases with the cargo volume, but for technical reasons such increase is also correlated with higher CO_2 emissions, the following correction of the CO_2 emissions of a vehicle *v* in sub-group *sg* shall be applied:

$$\Delta CO2\text{cv}_{v,mp} = a_{sg,mp} \cdot (CV_{sg} - CV_v)$$

Where

$a_{sg,mp}$ is a linear coefficient determined according to point 4.1 for the reporting period of the vehicle *v*;

CV_v is the cargo volume of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

CV_{sg} is the cargo volume of vehicle sub-group *sg* determined according to point 2.5 of Annex I.

For vehicle of categories N and M the correction of CO_2 emissions $\Delta CO2\text{cv}_{v,mp}$ shall be 0.

4.1. Determination of normalisation parameters

For each reporting period and mission profile the parameters $a_{sg,mp}$ and $b_{sg,mp}$ shall be determined with a linear regression analysis of the correlation of the values of $[reportCO2_{v,mp} + \Delta CO2_{v,mp}(m)]$ with the values of CV_v, considering all newly registered vehicles *v* in the sub-group *sg*:

$$reportCO2_{v,mp} + \Delta CO2_{v,mp}(m) \approx a_{sg,mp} \cdot CV_v + b_{sg,mp}$$

Where

CV_v is the cargo volume of vehicle *v* as determined from the data reported according to Articles 13a and 13b;

$reportCO2_{v,mp}$, $\Delta CO2_{v,mp}(m)$ are as defined in point 1.'

~~*ANNEX II*~~[11]

ANNEX IV

Rules on data to be monitored and reported as referred to in Articles 13a and 13b

PART A: DATA TO BE MONITORED AND REPORTED BY MEMBER STATES

(a) vehicle identification numbers of all new heavy-duty vehicles as referred to in Article 2 that are registered in the Member State territory;

(b) manufacturer name;

(c) make (trade name of manufacturer);

(d) the code for the bodywork as specified in entry 38 of the certificate of conformity, including, where applicable, the supplementing digits referred to in Annex I Appendix 2 to Regulation (EU) 2018/858;

(e) in the case of the heavy-duty vehicles referred to in Article 2, first paragraph, point (a) or (b), the information on the powerplant specified in entries 23, 23.1 and 26 of the certificate of conformity;

(f) the maximum speed of the vehicle as specified in entry 29 of the certificate of conformity;

(g) the stage of completion, as indicated in the chosen model of the certificate of conformity in accordance with Annex VIII, point 2 to Commission Implementing Regulation (EU) 2020/683;

(h) the vehicle category as specified in entry 0.4 of the certificate of conformity;

(i) the number of axles, as specified in entry 1 of the certificate of conformity;

(j) the technically permissible maximum laden mass, as specified in entry 16.1 of the certificate of conformity;

(k) the imprint of the cryptographic hash of the manufacturer's records file as specified in entry 49.1 of the certificate of conformity; for vehicles registered until 30 June 2025 Member States may report only the first 8 characters of the cryptographic hash;

(l) the specific CO_2 emissions as specified in entry 49.5 of the certificate of conformity;

(m) the average payload value as specified in entry 49.6 of the certificate of conformity;

[11] See footnotes 20 and 21.

(n) the date of registration;

(o) the technically permissible maximum mass of the combination for a category N3 truck in an extra heavy combination (EHC) referred to in Article 3 point (24) as specified in entry 16.4 of the certificate of conformity or individual vehicle approval certificate;

(~~o~~**p**) for special purpose vehicles their designation as specified in entry 51 of the certificate of conformity;

(q) the number of powered axles, as specified in entry 3 of the certificate of conformity

(~~p~~**r**) for vehicles approved under Article 2(3)(b) of Regulation 2018/858, the information that the vehicle was designed and constructed or adapted for use by civil protection fire services and forces responsible for maintaining public order;

(~~q~~ **s**) for vehicles registered for use by civil protection, fire services or forces responsible for maintaining public order or for use by the armed services, the confirmation that the vehicle is registered for use by civil protection, fire services or forces responsible for maintaining public order or for use by the armed services and that it fulfils the conditions set out in Article 2 paragraph 5 of this Regulation. For all vehicles including individually approved vehicles, the corresponding information shall be the information as to be provided in the EU certificate of conformity or EU individual vehicle approval certificate or the national individual approval certificate in accordance with the templates laid down in Commission Implementing Regulation (EU) 2020/683[12] regardless of any national exemptions applicable under Article 45(1) of Regulation (EU) 2018/858.

PART B: DATA TO BE REPORTED BY MANUFACTURERS AND OTHER ENTITIES

In accordance with Article 13b, each reporter shall report the following data for those vehicles, for which it is obliged to produce a Manufacturer's Records File (MRF) or Vehicle Information File (VIF) according to the provisions of Regulations 2017/2400 (EU) and Commission Implementing Regulation (EU) 2022/1362**[13]**.

[12] Commission Implementing Regulation (EU) 2020/683 of 15 April 2020 implementing Regulation (EU) 2018/858 of the European Parliament and of the Council with regards to the administrative requirements for the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, OJ L 163 of 26.5.2020, p.1.

[13] Commission Implementing Regulation (EU) 2022/1362 of 1 August 2022 implementing Regulation (EC) No 595/2009 of the European Parliament and of the Council as regards the performance of heavy-duty trailers with regard to their influence on the CO_2 emissions, fuel consumption, energy consumption and zero emission driving range of motor vehicles and amending Implementing Regulation (EU) 2020/683 (OJ L 205, 5.8.2022, p. 145.

For vehicles referred to in Part A, points (p) and (q) of Annex IV the manufacturer referred to in Article 7a shall also inform the Commission in accordance with Article 2(4) and (5), if the vehicle which would otherwise be exempted from the obligations laid down in Article 3a, shall not be exempted from those obligations.

Vehicle categories / sub-groups	Reporters			
	Primary vehicle manufacturer(1)	Interim vehicle manufacturer(2)	Vehicle manufacturer(3)	Designated technical service(8)
N / all	Not applicable	Not applicable	– MRF(4) – Additional information*	Not applicable
M / all	– VIF(4) (5) – MRF(4) (6) – Additional information* of the primary vehicle.	Not applicable	– VIF(4) (7) – MRF(4) (7) – Additional information* of the complete or completed vehicle.	Not applicable
O / all	Not applicable	Not applicable	– MRF(9) – Additional information*	– MRF(9) – Additional information*

(1) Article 3(29) of Commission Regulation (EU) 2017/2400.

(2) Article 3(31) of Commission Regulation (EU) 2017/2400

(3) Article 3(4a) of Commission Regulation (EU) 2017/2400

(4) Article 9(2) of Commission Regulation (EU) 2017/2400

(5) Point 2.3 of Annex I to Commission Regulation (EU) 2017/2400

(6) Point 2.4 of Annex I to Commission Regulation (EU) 2017/2400

(7) Point 2.7.5 of Annex I to Commission Regulation (EU) 2017/2400

(8) Article 8(6) of Commission Implementing Regulation (EU) 2022/1362

(9) Article 8(7) of Commission Implementing Regulation (EU) 2022/1362

***Additional Information:**

No	Monitoring parameter	Source	Applicable to vehicles
15	Make (trade name of manufacturer)		All
24	Name and address of transmission manufacturer	Point 0.4 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex VI to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only;
25	Make (trade name of transmission manufacturer	Point 0.1 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex VI to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only;
32	Name and address of axle manufacturer	Point 0.4 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex VII to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only; Category O;
33	Make (trade name of axle manufacturer)	Point 0.1 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex VII to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only; Category O;
39	Name and address of tyre manufacturer	Point 1 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex X to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only; Category O;
40	Make (trade name of tyre manufacturer)	Point 3 of the model of a certificate of a component, separate technical unit or system of Appendix 1 to Annex X to Regulation (EU) 2017/2400	Category N; Category M: primary vehicle only; Category O;
72	Number of license to operate the simulation tool		All
75	CO2 mass emission of the engine over WHTC (8) (g/kWh)	Point 1.4.2 of the addendum to Appendix 5, or point 1.4.2 of the addendum to Appendix 7, to Annex I to Regulation (EU) No 582/2011, whichever is applicable	Category N; Category M: primary vehicle only;
76	Fuel consumption of the engine over WHTC (g/kWh)	Point 1.4.2 of the addendum to Appendix 5, or point 1.4.2 of the addendum to Appendix 7, to Annex I to Regulation (EU) No 582/2011, whichever is applicable	Category N; Category M: primary vehicle only;
77	CO2 mass emission of the engine over WHSC (9) (g/kWh)	Point 1.4.1 of the addendum to Appendix 5, or point 1.4.1 of the addendum to Appendix 7, to Annex I to Regulation (EU) No 582/2011, whichever is applicable	Category N; Category M: primary vehicle only;

78	Fuel consumption of the engine over WHSC (g/kWh)	Point 1.4.1 of the addendum to Appendix 5, or point 1.4.1 of the addendum to Appendix 7, to Annex I to Regulation (EU) No 582/2011, whichever is applicable	Category N; Category M: primary vehicle only;
101	For vehicles with a date of simulation as of 1 July 2020, the type-approval number of the engine	Point 1.2.1. of addendum to Appendix 5, 6 or 7 to Annex I to Regulation (EU) No 582/ 2011, whichever is applicable	Category N; Category M: primary vehicle only;
102	For vehicles with a date of simulation as of 1 July 2021, the comma separated values file of the same name as the job file and with an extension.vsum comprising aggregated results per simulated mission profile and payload condition	File generated by the simulation tool referred to in Article 5(1)(a) of Regulation (EU) 2017/2400 in its graphical user interface (GUI) version	'~~sum exec data file~~ **all**

PART C: AIR DRAG VALUE (CDXA) RANGES FOR THE PURPOSE OF PUBLICATION IN ACCORDANCE WITH ARTICLE 13c

For the purpose of making publicly available the CdxA value specified in data entry 23 in accordance with Article 13c, the Commission shall use the ranges defined in the following table containing the corresponding range for each CdxA value:

Range	**CdxA value [m2]**	
	Min CdxA (CdxA ≥ min CdxA)	**Max CdxA (CdxA < MaxCdxA)**
A1	0,00	3,00
A2	3,00	3,15
A3	3,15	3,31
A4	3,31	3,48
A5	3,48	3,65
A6	3,65	3,83
A7	3,83	4,02
A8	4,02	4,22
A9	4,22	4,43
A10	4,43	4,65
A11	4,65	4,88
A12	4,88	5,12
A13	5,12	5,38
A14	5,38	5,65
A15	5,65	5,93
A16	5,93	6,23
A17	6,23	6,54
A18	6,54	6,87
A19	6,87	7,21
A20	7,21	7,57
A21	7,57	7,95
A22	7,95	8,35
A23	8,35	8,77
A24	8,77	9,21

ANNEX V

Data reporting and management referred to in Articles 13a to 13c

1. REPORTING BY MEMBER STATES

1.1. The data specified in Part A of Annex IV shall be transmitted in accordance with Article 13a by the contact point of the competent authority via electronic data transfer to the Agency.

The contact point shall notify the Commission and the Agency when the data are transmitted by email to the following addresses:

EC-CO2-HDV-IMPLEMENTATION@ec.europa.eu

and

HDV-monitoring@eea.europa.eu

2. REPORTING BY MANUFACTURERS

2.1. Manufacturers shall notify the Commission without delay the following information:

(a) the manufacturer name indicated in the certificate of conformity or individual approval certificate;
(b) the World Manufacturer Identifier code (WMI code) as defined in Commission Regulation (EU) No 19/2011[14] to be used in the vehicle identification numbers of new heavy-duty vehicles to be placed on the market;
(c) the contact point responsible for uploading the data to the Agency.

They shall notify the Commission without delay of any changes to that information.

The notifications shall be sent to the addresses referred to in point 1.1.

[14] Commission Regulation (EU) No 19/2011 of 11 January 2011 concerning type-approval requirements for the manufacturer's statutory plate and for the vehicle identification number of motor vehicles and their trailers and implementing Regulation (EC) No 661/2009 of the European Parliament and of the Council concerning type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefor (OJ L 8, 12.1.2011, p. 1).

2.2. The data specified in Part B, point 2 of Annex I shall be transmitted in accordance with Article 13b by the contact point of the manufacturer via electronic data transfer to the Agency.

The contact point shall notify the Commission and the Agency when the data are transmitted by email to the addresses referred to in point 1.1.

3. DATA PROCESSING

3.1. The Agency shall process the data transmitted in accordance with points 1.1 and 2.2 and shall record the processed data in the register.

3.2. The data relating to heavy-duty vehicles registered in the preceding reporting period and recorded in the register shall be made public by 30 April each year, with the exception of the following data entries:

3.2.1. vehicle identification number;
3.2.2. name and address of the transmission manufacturer;
3.2.3. make (trade name of transmission manufacturer;
3.2.4. name and address of axle manufacturer;
3.2.5. make (trade name of axle manufacturer;
3.2.6. name and address of tyre manufacturer;
3.2.7. make (trade name of tyre manufacturer;
3.2.8. engine model;
3.2.9. transmission model;
3.2.10. retarder model;
3.2.11. torque converter model;
3.2.12. angle drive model;
3.2.13. axel model;
3.2.14. air drag model;
3.2.15 comma separated values file of the same name as the job file and with an extension.vsum comprising aggregated results per simulated mission profile and payload condition.

3.3. Where a competent authority or manufacturers identify errors in the data submitted, they shall without delay notify those to the Commission and the Agency by submitting an error notification report to the Agency and by email sent to the addresses referred to in point 1.1.

3.4. The Commission shall with the support of the Agency verify the notified errors and, where appropriate, correct the data in the register.

3.5. The Commission, with the support of the Agency, shall make available electronic formats for the data transmissions referred to in points 1.1 and 2.2 in due time before the transmission deadlines.

ANNEX VI

CORRELATION TABLE

Regulation (EU) 2018/956

Regulation (EU) 2018/956	This Regulation
Article 1	Article 1(2)
Article 2	Article 2
Article 3	Article 3
Article 4	Article 13a
Article 5	Article 13b
Article 6	Article 13c
Article 7	Article 13d
Article 8	Article 13e
Article 9	Article 13f
Article 10	-
Article 11	Article 14
Article 12	Article 16
Article 13	Article 17
Article 14	-
Annex I	Annex IV
Annex II	Annex V’