



2025/35

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**COMMISSION IMPLEMENTING REGULATION (EU) 2025/35**

**of 13 January 2025**

**implementing Regulation (EU) 2019/1242 of the European Parliament and of the Council by  
determining the procedures for the in-service verification of the CO<sub>2</sub> emissions of heavy-duty  
vehicles**

**(Text with EEA relevance)**

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EU) 2019/1242 of the European Parliament and of the Council of 20 June 2019 setting CO<sub>2</sub> emission performance standards for new heavy-duty vehicles, and amending Regulations (EC) No 595/2009 and (EU) 2018/956 of the European Parliament and of the Council and Council Directive 96/53/EC<sup>(1)</sup>, and in particular Article 9(3) and Article 13(4), first subparagraph, thereof,

Whereas:

- (1) Article 9 of Regulation (EU) 2019/1242 requires type-approval authorities to report to the Commission any deviations in the CO<sub>2</sub> emission values of heavy-duty vehicles in service as compared to the values that are indicated in the certificates of conformity or in the customer information file accompanying those vehicles as a result of verifications performed in accordance with Article 13 of that Regulation.
- (2) Under Article 13 of Regulation (EU) 2019/1242, type-approval authorities which granted manufacturers a licence to operate a simulation tool under Regulation (EC) No 595/2009 of the European Parliament and of the Council<sup>(2)</sup> and Commission Regulation (EU) 2017/2400<sup>(3)</sup> ('granting approval authorities') are to verify for those manufacturers, on the basis of appropriate and representative vehicle samples, that the CO<sub>2</sub> emission and fuel consumption values recorded in the customer information files correspond to the CO<sub>2</sub> emissions from, and fuel consumption of, heavy-duty vehicles in-service as determined in accordance with Regulation (EC) No 595/2009 and its implementing measures, as well as the presence of any strategies on board or relating to the sampled vehicles that artificially improve the vehicles' performance in the tests performed or in the calculations made for the purpose of certifying the CO<sub>2</sub> emissions and fuel consumption ('in-service verification').
- (3) Commission Delegated Regulation (EU) 2024/1127<sup>(4)</sup> sets out the guiding principles and criteria for defining the procedures for performing the in-service verification.
- (4) This Regulation sets out detailed procedures for the in-service verification, in line with those guiding principles and criteria.

<sup>(1)</sup> OJ L 198, 25.7.2019, p. 202, ELI: <http://data.europa.eu/eli/reg/2019/1242/oj>.

<sup>(2)</sup> Regulation (EC) No 595/2009 of the European Parliament and of the Council of 18 June 2009 on type-approval of motor vehicles and engines with respect to emissions from heavy duty vehicles (Euro VI) and on access to vehicle repair and maintenance information and amending Regulation (EC) No 715/2007 and Directive 2007/46/EC and repealing Directives 80/1269/EEC, 2005/55/EC and 2005/78/EC (OJ L 188, 18.7.2009, p. 1, ELI: <http://data.europa.eu/eli/reg/2009/595/oj>).

<sup>(3)</sup> Commission Regulation (EU) 2017/2400 of 12 December 2017 implementing Regulation (EC) No 595/2009 of the European Parliament and of the Council as regards the determination of the CO<sub>2</sub> emissions and fuel consumption of heavy-duty vehicles and amending Directive 2007/46/EC of the European Parliament and of the Council and Commission Regulation (EU) No 582/2011 (OJ L 349, 29.12.2017, p. 1, ELI: <http://data.europa.eu/eli/reg/2017/2400/oj>).

<sup>(4)</sup> Commission Delegated Regulation (EU) 2024/1127 of 8 February 2024 supplementing Regulation (EU) 2019/1242 of the European Parliament and of the Council by setting out the guiding principles and criteria for defining the procedures for the verification of the CO<sub>2</sub> emissions and fuel consumption values of heavy-duty vehicles in-service (in-service verification) (OJ L, 2024/1127, 16.4.2024, ELI: [http://data.europa.eu/eli/reg\\_del/2024/1127/oj](http://data.europa.eu/eli/reg_del/2024/1127/oj)).

- (5) In order to target for in-service verification those families with vehicles or tyres presenting the highest risk for a deviation in the CO<sub>2</sub> emission and fuel consumption values from the specific CO<sub>2</sub> emission and fuel consumption values recorded in the customer information file, the granting approval authority should select families on the basis of a risk assessment to be performed by the Commission.
- (6) In the case of tyres, as an in-service verification tyre family can be used by multiple vehicle manufacturers, it is appropriate to limit the testing of tyres from an in-service verification tyre family to one granting approval authority within each in-service verification reporting period, in order to simplify the process and reduce the administrative burden. Similarly, a component defining a verification testing procedure family can be used by multiple vehicle manufacturers. Therefore, it is appropriate to limit also the testing of vehicles from a verification testing procedure family to one granting approval authority within each in-service verification reporting period.
- (7) In order to ensure that the in-service verification is representative, the granting approval authorities should select a minimum number of families to be tested, based on the calculation, for each manufacturer, of the total number of vehicles, for which the CO<sub>2</sub> emissions and fuel consumption have been determined under Article 9 of Regulation (EU) 2017/2400 ('total number of vehicles under Article 9 of Regulation (EU) 2017/2400'), and in the case of trailers, based on the calculation, for each trailer manufacturer, of the total number of trailers, for which the CO<sub>2</sub> emissions and fuel consumption have been determined under Article 8 of Commission Implementing Regulation (EU) 2022/1362 <sup>(9)</sup> ('total number of trailers under Article 8 of Implementing Regulation (EU) 2022/1362'). In the case of trailers, only in-service verification ('ISV') tyre families should be selected for in-service verification, as the verification testing procedure and air drag tests are not yet defined for trailers.
- (8) The CO<sub>2</sub> emission and fuel consumption values recorded in the customer information file is to be determined by a simulation tool, based on certification testing of relevant vehicle components. Conformity of the simulation tool operation is to be verified by a verification testing procedure at vehicle level in accordance with Regulation (EU) 2017/2400. It is appropriate to require that the vehicles selected for the in-service verification tests are in a similar condition as those tested during the verification testing procedure, in particular by setting requirements for their maximum mileage and age.
- (9) Only new tyres are appropriate for a tyre rolling resistance coefficient test carried out within an in-service verification, as testing used tyres would result, due to their wear, in a significantly lower rolling resistance coefficient. The selection of tyres for in-service verification tests should be independent from the selection of vehicles for in-service verification tests.
- (10) In order to allow the granting approval authority to come to a conclusion for all vehicles concerned, on the basis of the test results for the vehicles sampled, a statistical evaluation method based on sequential sampling has been established.
- (11) In case a verification testing procedure family fails the statistical evaluation of the test results as set out in Annex I, the CO<sub>2</sub> emission values of all vehicles concerned should be corrected, as passing that verification testing procedure is a prerequisite for maintaining the emissions type approval. In addition, it is appropriate that the granting approval authority investigates if there is sufficient evidence that a specific component is the cause of failing the statistical evaluation, in which case more vehicles could be concerned.
- (12) In order to verify that the CO<sub>2</sub> emission and fuel consumption values recorded in the customer information file correspond to those values of heavy-duty vehicles in service, the test conditions and test results should be specified in accordance with Regulation (EC) No 595/2009 and its implementing measures.

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<sup>(9)</sup> 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<sub>2</sub> 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, ELI: [http://data.europa.eu/eli/reg\\_impl/2022/1362/oj](http://data.europa.eu/eli/reg_impl/2022/1362/oj)).

- (13) For air drag test conditions, to ensure that the possible variations in test conditions between in-service verification tests are reduced as much as possible, it is appropriate to apply the air drag test conditions in accordance with Regulation (EU) 2017/2400 in the latest version in force, as these conditions have been narrowed down compared to the conditions applicable at the time of the certification.
- (14) In accordance with Regulation (EU) 2017/2400, manufacturers are allowed to determine air drag values based on a computational fluid dynamics ('CFD') simulation method. Therefore, it is appropriate to introduce a specific test to verify the specific validation of that simulation method as part of the in-service verification tests to verify the air drag values.
- (15) In order to detect an artificial strategy, which operates only during the verification tests and not during normal operation in-service, it is crucial that the specific testing conditions are not known beforehand. Therefore, the conditions for the dedicated artificial strategy tests should be determined on a case-by-case basis by the granting approval authority.
- (16) Given that the exact nature of artificial strategies cannot be known beforehand, the analysis and evaluation of the artificial strategy test results should be done by the granting approval authority based on a comparison of results found under different test conditions.
- (17) In order to document the test results and provide for their further analysis, the granting approval authority should make the test report available to the Commission and the manufacturer concerned. In order to support the risk assessment performed by the Commission, it is appropriate to require that the test data is also submitted to the Commission, using a dedicated platform.
- (18) If a deviation in the CO<sub>2</sub> emission values has been found, the manufacturer concerned should be given the opportunity to react to the findings of the granting approval authority within an appropriate time limit to avoid an undue lengthening of the in-service verification process. It should, however, be possible to extend the time limit in order to properly assess the technical documents provided.
- (19) Where a lack of correspondence between CO<sub>2</sub> emission values of the in-service verification and the values recorded in the customer information files, or the presence of any strategies artificially improving those vehicles' performance is found as a result of the performance of in-service verification tests, the specific CO<sub>2</sub> emissions of all vehicles concerned should be corrected, given that the test vehicles are deemed to be representative of all vehicles concerned.
- (20) In order to take the deviations into account for the purpose of calculating and correcting the average specific CO<sub>2</sub> emissions of a manufacturer, it is appropriate that the Commission determines the size of the deviation in the CO<sub>2</sub> emission values and which vehicles are concerned.
- (21) A correction of the average specific CO<sub>2</sub> emissions of a manufacturer should be applied from the reporting period of the year 2025, as that is the first reporting period for which CO<sub>2</sub> emissions reduction targets are applied in accordance with Regulation (EU) 2019/1242.

(22) The measures provided for in this Regulation are in accordance with the opinion of the Climate Change Committee,

HAS ADOPTED THIS REGULATION:

#### *Article 1*

### **Subject matter and scope**

1. This Regulation defines detailed procedures for the in-service verification of heavy-duty vehicles referred to in Delegated Regulation (EU) 2024/1127.
2. This Regulation also lays down detailed rules on reporting deviations found in the CO<sub>2</sub> emission values of heavy-duty vehicles in-service as compared to the values that are indicated in the certificates of conformity or in the customer information files, as a result of in-service verification and for taking those deviations into account in the calculation of the average specific CO<sub>2</sub> emissions of the manufacturers for which a deviation in the CO<sub>2</sub> emission values was found as a result of the in-service verification.
3. This Regulation does not apply to zero emission heavy-duty vehicles as defined in Article 3, point (11), of Regulation (EU) 2019/1242.

#### *Article 2*

### **Definitions**

For the purpose of this Regulation, the definitions in Article 3 of, and Annexes III, VIII, X and Xa to, Regulation (EU) 2017/2400, and Article 2 of Delegated Regulation (EU) 2024/1127 shall apply.

In addition, the following definitions shall apply:

- (1) ‘verification testing procedure (“VTP”) family’ means a group of vehicles which have in common one or more of the components, separate technical units and systems listed in Article 12(1), points (a) to (f), (h) and (j), of Regulation (EU) 2017/2400;
- (2) ‘verification testing procedure (“VTP”) test’ means a test carried out in accordance with the verification testing procedure performed on a vehicle in service in accordance with Annex Xa to Regulation (EU) 2017/2400;
- (3) ‘in-service verification (“ISV”) air drag family’ means a group of vehicles, that have a lower or equal declared air drag value than the parent vehicle of the air drag family which has been selected for performing an air drag test, and that are permitted to be with this parent vehicle within the same air drag family as set out in Appendix 5 of Annex VIII to Regulation (EU) 2017/2400;
- (4) ‘air drag test’ means a constant speed test with torque measurements performed on a vehicle in service in accordance with Section 3 of Annex VIII to Regulation (EU) 2017/2400;
- (5) ‘CFD family’ means a group of vehicles for which the air drag value has been determined using the same computational fluid dynamics (‘CFD’) simulation method, as approved in accordance with Appendix 10 of Annex VIII to Regulation (EU) 2017/2400;
- (6) ‘CFD method air drag test’ means a test to verify the specific validation of the computational fluid dynamics (‘CFD’) simulation method approved in accordance with Appendix 10 of Annex VIII to Regulation (EU) 2017/2400;

- (7) 'in-service verification ("ISV") tyre family' means a group of tyres consisting, for the purpose of in-service verification, of all tyres belonging to a type of tyre, as defined in Section 2, point 3, of Annex X to Regulation (EU) 2017/2400, from the same manufacturer and from the same fuel efficiency class, as defined in Regulation (EU) 2020/740 of the European Parliament and of the Council <sup>(6)</sup>;
- (8) 'tyre rolling resistance coefficient ("RRC") test' means a test performed on each tyre in accordance with Section 3, point 3.2, of Annex X to Regulation (EU) 2017/2400, in a reference laboratory or candidate laboratory as defined in Section 1, point (1) and (2), of Annex V to Regulation (EU) 2020/740;
- (9) 'mass test' means a test to determine the 'corrected actual mass of the vehicle', as defined in Section 2, point (4), of Annex III to Regulation (EU) 2017/2400, or in the case of a trailer, the 'corrected mass in running order', as defined in Section 3, Table 1, of Annex III to Implementing Regulation (EU) 2022/1362;
- (10) 'artificial strategies test' means a dedicated test performed on a vehicle in-service to verify whether artificial strategies are present;
- (11) 'deviation in the CO<sub>2</sub> emission values' means that the CO<sub>2</sub> emissions of vehicles determined in an in-service verification carried out under this Regulation, are higher than the emissions determined, for motor vehicles, in accordance with the procedures set out in Regulation (EU) 2017/2400 or, for trailers, in accordance with the procedures set out in Implementing Regulation (EU) 2022/1362, and recorded in the customer information file, certificates of conformity or individual approval certificates accompanying those motor vehicles or trailers, taking into account the statistical evaluation of the tests in accordance with Annex I.

### Article 3

#### Selection of families

1. When selecting vehicles in accordance with Article 3 of Delegated Regulation (EU) 2024/1127, the granting approval authority shall select vehicles from VTP families, ISV air drag families, CFD families and ISV tyre families, on the basis of the risk of a deviation in the CO<sub>2</sub> emission values of the vehicles with certain components, separate technical units or systems or tyres of those families, as assessed by the Commission in accordance with paragraph 2 of this Article and reported in accordance with paragraph 3 of this Article.

The granting approval authority shall also ensure that vehicles from a VTP family or tyres from an ISV tyre family are not being tested by another granting approval authority in the same in-service verification reporting period.

2. When assessing the risk of a deviation in the CO<sub>2</sub> emission values referred to in paragraph 1, first subparagraph, the Commission shall take into account at least the following elements, when available:

- (a) the total number of new vehicles from the VTP family, ISV air drag family and ISV tyre family that have been placed on the Union market;
- (b) the data from vehicles belonging to certain VTP families, ISV air drag families and ISV tyre families with similar technical characteristics but with lower CO<sub>2</sub> emissions, identified using the data collected pursuant to Article 1 of Commission Delegated Regulation (EU) 2021/1430 <sup>(7)</sup>;

<sup>(6)</sup> Regulation (EU) 2020/740 of the European Parliament and of the Council of 25 May 2020 on the labelling of tyres with respect to fuel efficiency and other parameters, amending Regulation (EU) 2017/1369 and repealing Regulation (EC) No 1222/2009 (OJ L 177, 5.6.2020, p. 1, ELI: <http://data.europa.eu/eli/reg/2020/740/oj>).

<sup>(7)</sup> Commission Delegated Regulation (EU) 2021/1430 of 31 May 2021 supplementing Regulation (EU) 2018/956 of the European Parliament and of the Council by specifying the data to be reported by the Member States for the purposes of verifying the CO<sub>2</sub> emissions and fuel consumption of new heavy-duty vehicles (OJ L 309, 2.9.2021, p. 3, ELI: [http://data.europa.eu/eli/reg\\_del/2021/1430/oj](http://data.europa.eu/eli/reg_del/2021/1430/oj)).

- (c) evidence of a deviation in the CO<sub>2</sub> emission values obtained by the Commission, or received from another type-approval authority, a market surveillance authority, or a third party complying with the requirements of Commission Implementing Regulation (EU) 2022/163 <sup>(\*)</sup>;
- (d) the results of previous in-service verifications, and in particular the findings related to the presence of artificial strategies;
- (e) relevant information from tests performed and reported to the Commission pursuant to Delegated Regulation (EU) 2021/1430 and from conformity of production tests performed pursuant to Section 4 of Annex X to Regulation (EU) 2017/2400;
- (f) real-world fuel consumption data.

3. Each year, by 30 June, the Commission shall publish a report containing a list of VTP families, ISV air drag families, CFD families and ISV tyre families with the highest risk of a deviation in the CO<sub>2</sub> emission values. The report shall also describe the methodology used for the assessment referred to in paragraph 1, first subparagraph, undertaken in the reporting period the report concerns, and the main findings of that assessment.

#### Article 4

#### **Type and number of in-service verification tests**

1. Each reporting period, the granting approval authority shall perform, for each manufacturer to which it has granted a licence to operate the simulation tool, at least for the number of VTP families, ISV air drag families and ISV tyre families selected in accordance with Article 3 and set out in Table 1 of Annex I, the corresponding in-service verification tests on the individual vehicles and tyres selected in accordance with Article 5.

The granting approval authority shall calculate, for each manufacturer, the 'total number of vehicles under Article 9 of Regulation (EU) 2017/2400', referred to in Table 1 of Annex I to this Regulation, as the average, over the three reporting periods preceding the in-service verification, of the manufacturer's total number of vehicles for which the CO<sub>2</sub> emissions and fuel consumption have been determined under Article 9 of Regulation (EU) 2017/2400.

In addition, for each manufacturer for whom the 'total number of vehicles under Article 9 of Regulation (EU) 2017/2400' is equal to or higher than 5 000, the granting approval authority shall perform each reporting period one mass test per manufacturer and one artificial strategies test per manufacturer.

2. If the risk assessment referred to in Article 3(1) of this Regulation identifies families for one or more manufacturers for which the 'total number of vehicles under Article 9 of Regulation (EU) 2017/2400' is lower than 5 000, the granting approval authority shall perform the corresponding test(s) for at least one such manufacturer.

3. In addition, if the risk assessment referred to in Article 3(1) identifies a CFD family, the granting approval authority shall perform the CFD method air drag test for that CFD family.

4. For trailer manufacturers, the granting approval authority shall perform the tyre RRC tests on the tyres selected in accordance with Article 5 for each reporting period, at least for the number of tyre families set out in Table 2 of Annex I to this Regulation.

The granting approval authority shall calculate, for each trailer manufacturer, the 'total number of trailers under Article 8 of Implementing Regulation (EU) 2022/1362', referred to in Table 2 of Annex I to this Regulation, as the average, over the three reporting periods preceding the in-service verification, of the trailer manufacturer's total number of trailers for which the CO<sub>2</sub> emissions and fuel consumption have been determined under Article 8 of Implementing Regulation (EU) 2022/1362.

<sup>(\*)</sup> Commission Implementing Regulation (EU) 2022/163 of 7 February 2022 laying down rules on the application of Regulation (EU) 2018/858 of the European Parliament and of the Council as regards functional requirements for market surveillance of vehicles, systems, components and separate technical units (OJ L 27, 8.2.2022, p. 1, ELI: [http://data.europa.eu/eli/reg\\_impl/2022/163/oj](http://data.europa.eu/eli/reg_impl/2022/163/oj)).

In addition, for each trailer manufacturer for whom the 'total number of trailers under Article 8 of Implementing Regulation (EU) 2022/1362' is equal to or higher than 5 000, the granting approval authority shall perform each reporting period one mass test per trailer manufacturer.

If the risk assessment referred to in Article 3(1) identifies trailer manufacturers for which the 'total number of vehicles under Article 8 of Implementing Regulation (EU) 2022/1362' is lower than 5 000, the granting approval authority shall perform the corresponding test(s) for at least one such manufacturer.

5. For each family selected in accordance with Article 3, the following tests shall be carried out for the following number of vehicles and tyres selected in accordance with Article 5:

- (a) VTP tests: for 1 to maximum 5 vehicles;
- (b) air drag tests: for 1 to maximum 5 vehicles;
- (c) CFD method air drag tests: for 2 vehicles, where the two vehicles are allowed to be from different air drag families;
- (d) tyre RRC tests: for 3 to maximum 10 tyres.

The results of the tests referred to in the first subparagraph, points (a), (b) and (d), shall be evaluated in accordance with the method described in Annex II to this Regulation, while the results of the tests referred to in the first subparagraph, point (c), shall be evaluated in accordance with the method described in Appendix 10 of Annex VIII of Regulation (EU) 2017/2400.

6. In addition to the tests referred to in paragraph 5, the following tests shall be carried out pursuant to paragraph 1, third subparagraph, for each manufacturer for the following number of vehicles selected in accordance with Article 5:

- (a) mass tests: for 3 to maximum 10 vehicles;
- (b) artificial strategies tests: for at least 1 vehicle.

The results of the tests referred to in the first subparagraph, point (a), shall be evaluated in accordance with the method described in Annex II.

7. The granting approval authority may decide to include in-service verification test results performed by the Commission, another type-approval authority, a market surveillance authority or a third party complying with the requirements of Implementing Regulation (EU) 2022/163 in the statistical method described in Annex I if both of the following conditions are met:

- (a) the granting approval authority is informed of such upcoming testing in order to allow the granting approval authority to observe the testing;
- (b) all results of such in-service verification testing are reported to the granting approval authority within 5 days from the performance of each test.

## Article 5

### Selection of individual test vehicles and tyres

1. The granting approval authority shall select test motor vehicles that, at the time of selection, are preferably not older than three years and meet all of the following criteria:

- (a) they have a minimum mileage of 25 000 km;
- (b) they fulfil the maximum age and mileage criteria set out in Article 4(2), third subparagraph, of Regulation (EC) No 595/2009.

The granting approval authority shall select test trailers that, at the time of selection, are not older than 5 years, counted from the date of their first registration.

2. The granting approval authority shall verify and ensure that the test vehicles are in a state representative of a vehicle properly maintained and used, and have characteristics similar to those recorded in the customer information files, certificates of conformity, or individual approval certificates, using the checklist set out in Annex III.

If a vehicle has undergone a test for conformity of production, the vehicle shall be excluded from any in-service verification test.

3. In addition to the requirements set out in paragraphs 1 and 2, a vehicle selected for a VTP test shall fulfil all of the following requirements:

- (a) it shall not be a vehicle for which standard values for the transmission and for the axle losses have been used for the CO<sub>2</sub> certification of its components, separate technical units or systems unless no other vehicle can be found;
- (b) it shall be subject to the provisions set out in points 3.3 to 3.6 of Annex II to Commission Regulation (EU) 582/2011 <sup>(9)</sup>;
- (c) it shall be subject to the provisions on fuel and lubricants as set out in point 4.2 of Annex Xa to Regulation (EU) 2017/2400;
- (d) it shall not have undergone modifications with relevance for the results of the VTP test in any subsequent manufacturing stage, which do not allow restoring the powertrain configuration as documented in the customer information file.

4. In addition to the requirements set out in paragraphs 1 and 2, a vehicle selected for an air drag test shall fulfil all of the following requirements:

- (a) it shall be selected from an ISV air drag family for which the air drag value has been determined in accordance with point 3 of Annex VIII to Regulation (EU) 2017/2400 and for which a standard value has not been used;
- (b) it shall be part of the testable members of an air drag family in accordance with point 4.3 of Appendix 5 of Annex VIII to Regulation (EU) 2017/2400;
- (c) it shall not have undergone changes in the aerodynamic configuration which do not allow restoring the aerodynamic configuration as documented in the customer information file.

5. In the case of rigid lorries selected for a mass test, only vehicles without superstructure shall be selected.

6. Tyres to be selected for a tyre rolling resistance coefficient test shall be new tyres, which are sold in the market and have a certification in accordance with Regulation (EU) 2017/2400.

7. When the granting approval authority cannot find the required number of vehicles in accordance with Article 4, paragraph 5, point (a) and (b), due to the provisions in paragraph 3 and 4 of this Article, the granting approval shall complete the ISV testing procedure within the next ISV reporting period. If it can still not find the required number of vehicles within the next ISV reporting period, the statistical procedure shall be closed as 'not completed' and it shall select another family in accordance with Article 3.

#### Article 6

#### Test conditions for VTP tests

1. The ratio of CO<sub>2</sub> emissions measured and simulated in the VTP ( $C_{VTP, ratio}$ ) shall be determined in accordance with the VTP set out in Section 6 of Annex Xa to Regulation (EU) 2017/2400 in the version in force at the time of certification of the test vehicles.

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<sup>(9)</sup> Commission Regulation (EU) No 582/2011 of 25 May 2011 implementing and amending Regulation (EC) No 595/2009 of the European Parliament and of the Council with respect to emissions from heavy duty vehicles (Euro VI) and amending Annexes I and III to Directive 2007/46/EC of the European Parliament and of the Council (OJ L 167, 25.6.2011, p. 1, ELI: <http://data.europa.eu/eli/reg/2011/582/oj>).

2. The granting approval authority shall ensure that the measurement equipment complies with the requirements of Section 5 of Annex Xa to Regulation (EU) 2017/2400.

#### Article 7

##### VTP test result of an individual test vehicle

1. For each individual test vehicle undergoing a VTP test, the granting approval authority shall determine the  $C_{VTP, ratio}$  in accordance with Section 7 of Annex Xa to Regulation (EU) 2017/2400.

2. For each individual test vehicle, the granting approval authority shall, before and after the VTP, read out from the vehicle the values related to the on-board fuel consumption meter and the odometer as provided for by Annex Xa to Regulation (EU) 2017/2400 and include them in the test report.

#### Article 8

##### Statistical evaluation of VTP test results, calculation of the size of the deviation and investigation thereof

1. The granting approval authority shall evaluate the VTP test results of the individual test vehicles obtained in accordance with Article 7 to establish whether or not there is a deviation in the  $CO_2$  emission values of the VTP family undergoing the VTP tests, by using the method set out in Annex II to this Regulation.

2. If the VTP family fails the statistical evaluation as set out in Annex II to this Regulation, the granting approval authority shall proceed as follows:

(a) determine the size of the deviation in the  $CO_2$  emission values as follows:

$$\text{Deviation} = (\text{average}_{ratio} - 1) * CO_{2 ref} [g/tkm],$$

where:

—  $\text{average}_{ratio}$  is the average  $C_{VTP, ratio}$  as defined in Annex II for VTP test results,

—  $CO_{2 ref}$  is the declared  $CO_2$  emission value of the vehicle of the VTP family with the highest  $CO_2$  emission value;

(b) start an investigation to determine the cause of that failure, in accordance with Article 20 of Regulation (EU) 2017/2400. Other approval authorities that are possibly involved in the component certification shall collaborate as necessary for the investigation.

#### Article 9

##### Test conditions for air drag tests

1. The air drag characteristics shall be determined in accordance with the constant speed test procedure laid down in Annex VIII of Regulation (EU) 2017/2400 in the latest version in force.

2. The granting approval authority shall ensure that the test track requirements, the requirements for ambient conditions, the installation of the vehicle and the measurement equipment comply with the requirements set out in points 3.1 to 3.4 of Section 3 of Annex VIII to Regulation (EU) 2017/2400 in the latest version in force. Manufacturers may provide tyres to the granting approval authority for air drag tests.

*Article 10***Air drag test result of an individual test vehicle**

1. For each individual test vehicle undergoing an air drag test, the granting approval authority shall determine the product of drag coefficient by cross sectional area for zero crosswind conditions ('air drag value ( $C_dA$ )') from the measurements during the constant speed test in accordance with Article 9 of this Regulation, using the air drag pre-processing tool version of the parent air drag in accordance with Attachment 1 of Appendix 2 to Annex VIII to Regulation (EU) 2017/2400.
2. For each individual test vehicle undergoing an air drag test, the granting approval authority shall determine the air drag test result (' $C_dA_{ratio}$ ') as the ratio of the air drag value determined in accordance with paragraph 1 of this Article (' $C_dA_{in-service\ verification}$ '), to the declared air drag value of that vehicle (' $C_dA_{declared}$ ') recorded in entry 1.8.4 of the manufacturer's records file, in accordance with Section 3, Part I, of Annex IV to Regulation (EU) 2017/2400.

*Article 11***Statistical evaluation of air drag test results and calculation of the size of the deviation**

1. The granting approval authority shall evaluate the air drag test results of the individual test vehicles obtained in accordance with Article 10 to establish whether or not there is a deviation in the CO<sub>2</sub> emission values of the ISV air drag family undergoing air drag tests, by using the method set out in Annex II.
2. In case the ISV air drag family fails the statistical evaluation as set out in Annex II, the granting approval authority shall determine the size of the air drag deviation as the average value for  $C_dA_{ratio}$  ( $average_{ratio}$ ) as defined in Annex II for air drag test results.

*Article 12***Test conditions for tyre RRC tests**

1. The tyre RRC shall be determined in accordance with the tyre RRC measurement procedure laid down in point 3.2 of Annex X to Regulation (EU) 2017/2400, in the version in force at the time of certification of the test tyres.
2. The granting approval authority shall ensure that the tyres are tested in a reference laboratory or candidate laboratory as defined in Section 1, point (1) and (2), of Annex V to Regulation (EU) 2020/740.

*Article 13***Tyre RRC test result of an individual test tyre**

For each individual test tyre undergoing a tyre RRC test, the granting approval authority shall determine the tyre RRC test result (' $RRC_{ratio}$ ') as the ratio of the tyre RRC value determined in accordance with Article 12 (' $RRC_{in-service\ verification}$ ') of this Regulation to the declared tyre RRC value of that tyre (' $RRC_{declared}$ ') recorded in point 7.1 of the certificate of CO<sub>2</sub> emissions and fuel consumption related properties, in accordance with Appendix 1 of Annex X to Regulation (EU) 2017/2400.

#### Article 14

##### Statistical evaluation of tyre RRC test results and calculation of the size of the deviation

1. The granting approval authority shall evaluate the tyre RRC test results of the individual test tyres obtained in accordance with Article 13 to establish whether or not there is a deviation in the CO<sub>2</sub> emission values of the ISV tyre family undergoing tyre RRC tests, by using the method set out in Annex II.
2. In case the ISV tyre family fails the statistical evaluation as set out in Annex II, the granting approval authority shall determine the size of the tyre RRC deviation as the average value for  $RRC_{ratio}$  ( $average_{ratio}$ ) as defined in Annex II for tyre RRC test results.

#### Article 15

##### Test conditions for mass tests

1. In case of a motor vehicle, the mass test shall consist of determining the 'corrected actual mass of the vehicle' by weighing a test vehicle and applying the corrections provided for in Section 2, point (4), of Annex III to Regulation (EU) 2017/2400, or, in the case of a trailer, of determining its 'corrected mass in running order of the trailer' by weighing a test vehicle and applying the corrections provided for in Section 3, Table 1, of Annex III to Implementing Regulation (EU) 2022/1362.
2. The granting approval authority shall ensure that the weighing instrument complies with the requirements set out in Directive 2014/31/EU of the European Parliament and of the Council <sup>(10)</sup>.
3. Any additional parts that are not taken into account for the corrections referred to in paragraph 1 of this Article shall be removed, or their mass shall be subtracted from the mass determined in accordance with paragraph 1.
4. If not all the standard equipment is installed, the corresponding mass of the missing construction elements referred to in point 4.2 of Annex III to Regulation (EU) 2017/2400 shall be added as described in point 4.3 of that Annex.

#### Article 16

##### Mass test result of an individual test vehicle

1. For each individual test vehicle undergoing a mass test, the granting approval authority shall determine the mass test result ( $mass_{ratio}$ ) as the ratio of the 'corrected actual mass of the vehicle', determined in accordance with Article 15 of this Regulation ( $mass_{in-service\ verification}$ ), to the 'corrected actual mass' of that vehicle ( $mass_{declared}$ ) recorded in entry 1.1.8 of the customer information file in accordance with Section 3, Part II, of Annex IV to Regulation (EU) 2017/2400.
2. In the case of a trailer, for each individual test vehicle undergoing a mass test, the granting approval authority shall determine the mass test result ( $mass_{ratio}$ ) as the ratio of the 'corrected mass in running order of the trailer', determined in accordance with Article 15 of this Regulation ( $mass_{in-service\ verification}$ ), to the 'corrected mass in running order' of that trailer ( $mass_{declared}$ ) recorded in entry 1.1.10 of the customer information file in accordance with Part II of Annex IV to Implementing Regulation (EU) 2022/1362.

<sup>(10)</sup> Directive 2014/31/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of non-automatic weighing instruments (OJ L 96, 29.3.2014, p. 107, ELI: <http://data.europa.eu/eli/dir/2014/31/oj>).

### Article 17

#### Statistical evaluation of mass test results and calculation of the size of the deviation

1. The granting approval authority shall evaluate the mass test results of individual test vehicles obtained in accordance with Article 16 to establish whether or not there is a deviation in the CO<sub>2</sub> emission values of all vehicles of that manufacturer, by using the method set out in Annex II.
2. In case the vehicle manufacturer fails the statistical evaluation as set out in Annex II, the granting approval authority shall determine the size of the mass deviation as the average value for  $mass_{ratio}$  ( $average_{ratio}$ ) as defined in Annex II for mass test results.

### Article 18

#### Test conditions for artificial strategies tests

The granting approval authority shall verify the presence of artificial strategies in the test vehicle selected in accordance with Article 5 of this Regulation by means of at least the following tests:

- (a) a VTP test;
- (b) a VTP test with the test conditions set outside the boundaries set out in Annex Xa to Regulation (EU) 2017/2400, or any other test for which the testing conditions do not lead to a significant change in the physical response of the vehicle or any of its sub-systems.

### Article 19

#### Evaluation of artificial strategies test results and calculation of the size of the deviation

1. The granting approval authority shall evaluate the results of the tests performed in accordance with Article 18 of this Regulation to assess the risk of artificial strategies being present in the test vehicle, by comparing the  $C_{VTP, ratio}$  determined in accordance with point 7.2.2 of Annex Xa to Regulation (EU) 2017/2400 and obtained in the test referred to in Article 18, point (b), of this Regulation, with the  $C_{VTP, ratio}$  obtained in the test referred to in Article 18, point (a), of this Regulation. In addition, the granting approval authority shall evaluate any other relevant tests performed on the vehicle concerned.
2. The granting approval authority shall describe in the test report the criteria used for the evaluation carried out in accordance with paragraph 1. For that purpose, artificial strategies shall be understood as any software, control logic, hardware or component on board or relating to the vehicle, which reduces the vehicle's CO<sub>2</sub> emission or fuel consumption values in the tests performed for the purpose of CO<sub>2</sub> emissions certification, but which does not operate consistently when the vehicle is in-service, taking into account the difference between those test conditions and the in-service conditions, unless that inconsistent operation results from requirements laid down in Union law or is justified by the necessity to protect the vehicle against immediate damage or to ensure the safe operation of the vehicle.
3. If, based on the assessment carried out in accordance with paragraph 1, the granting approval authority concludes that the risk that artificial strategies are present in the test vehicle is high, it shall specify and perform a specific test programme in addition to the tests performed in accordance with Article 18, to identify the presence or absence of an artificial strategy. On the request of the granting approval authority, the manufacturer shall provide all relevant related software code to identify the presence or absence of an artificial strategy.

4. If the granting approval authority concludes that artificial strategies are present, it shall determine the vehicles concerned and the size of the deviation in the CO<sub>2</sub> emission values by comparing the CO<sub>2</sub> emission value with and without artificial strategies. If the size of that deviation cannot be determined based on the tests performed in accordance with Article 18 and, if applicable, paragraph 3 of this Article, the size of the deviation in the CO<sub>2</sub> emission values shall be 10 % of the CO<sub>2</sub> emission value of the reference CO<sub>2</sub> emissions of the vehicle sub-group.

#### Article 20

##### Test report

1. The granting approval authority shall include in the test reports referred to in Article 5(1) of Delegated Regulation (EU) 2024/1127 at least the following information for each family tested:

- (a) the type of tests performed;
- (b) the vehicle checklist;
- (c) the test conditions;
- (d) the test results of each of the individual test vehicles or tyres;
- (e) the statistical evaluation of the test results;
- (f) if applicable, the calculation of the size of the deviation;
- (g) in case of an artificial strategies test: the criteria used for evaluating the test results.

2. Within 20 working days of finishing the tests, the granting approval authority shall make the test report available to the manufacturer of the vehicles or tyres concerned and upload it in an encrypted format to a dedicated Commission server, together with the following data for each of the individual test vehicles or tyres:

- (a) for each VTP test performed, the data specified in point (1) of Annex IV to this Regulation;
- (b) for each air drag test performed, the data specified in point (2) of Annex IV to this Regulation;
- (c) for each CFD method air drag test performed, the data and calculations specified in Appendix 10 to Annex VIII to Regulation (EU) 2017/2400;
- (d) for each tyre rolling resistance coefficient test performed, the data specified in point (3) of Annex IV to this Regulation;
- (e) for each mass test performed, the data specified in point (4) of Annex IV to this Regulation.

The data and parameters specified in points (a) to (e) shall not be published.

Where all data have been correctly uploaded for all tested vehicles or tyres of a family, a receipt shall be sent from the Commission server to the uploading entity.

#### Article 21

##### Conclusions of the granting approval authority

1. If the results of the in-service verification show that there is no deviation in the CO<sub>2</sub> emission values, the granting approval authority shall come to the conclusion that there is no lack of correspondence between the CO<sub>2</sub> emission values of the in-service verification and the values recorded in the customer information file, and include that conclusion in the test report.

2. If the results of the in-service verification show that there is a deviation in the CO<sub>2</sub> emission values, the manufacturer may contest the results within 20 working days after receiving the test report, by providing evidence demonstrating the correspondence between the CO<sub>2</sub> emission values of the in-service verification and the values recorded in the customer information file. The manufacturer may request an extension of 20 working days to provide that evidence.

In the absence of a reaction, the manufacturer shall be considered to have accepted the results of the in-service verification.

3. Taking into account the evidence provided by the manufacturer under paragraph 2, the granting approval authority shall come to a conclusion on whether or not the in-service verification has identified a lack of correspondence between the CO<sub>2</sub> emission values of the in-service verification and the values recorded in the customer information file, or the presence of artificial strategies.

The granting approval authority shall transmit its conclusion to the manufacturer concerned and to the Commission at the latest 40 working days, or in case of extension in accordance with paragraph 2, at the latest 80 working days, after having sent the test report to the manufacturer under paragraph 2.

4. The granting approval authority's conclusion referred to in paragraph 3 shall, as a minimum, include the following:

- (a) where the granting approval authority finds that there is no lack of correspondence between the CO<sub>2</sub> emission values of the in-service verification and the values recorded in the customer information file, or cannot establish the presence of artificial strategies:
  - (i) the type of test and the family concerned;
  - (ii) the grounds for its finding that the deviation in CO<sub>2</sub> emission values found as a result of the in-service verification does not lead to a lack of correspondence between the CO<sub>2</sub> emission values of the in-service verification and the values recorded in the customer information file;
- (b) where the granting approval authority establishes a lack of correspondence between the CO<sub>2</sub> emission values of the in-service verification and the values recorded in the customer information file, or the presence of artificial strategies:
  - (i) the type of test and the family concerned;
  - (ii) the size of the deviation, as reported in accordance with Article 20(1), point (e);
  - (iii) where applicable, the artificial strategies identified.

5. Before 30 September of each calendar year, the granting approval authority shall publish an overview of the in-service verifications performed in the previous reporting period and its conclusions issued in that reporting period, as referred to in paragraphs 1 and 3, using the format set out in Annex V. For in-service verification tests for which no conclusion is established before the publication of the overview, the conclusion shall be included in the next annual overview.

## Article 22

### Size of the deviation in CO<sub>2</sub> emission values and determination of the vehicles concerned

Where the granting approval authority has issued a conclusion as referred to in Article 21(4), point (b), the Commission shall determine the size of the deviation in the CO<sub>2</sub> emission values and all vehicles that are concerned, as follows:

- (a) for a VTP family, the size of the deviation in the CO<sub>2</sub> emission values is equal to the size of the deviations established by the granting approval authority and referred to in Article 21(4), point (b)(ii) of this Regulation. The vehicles concerned are all vehicles of the VTP family that have the same combination of engine and transmission. If the investigation under Article 8(2)(b) determines that the cause of the failure referred to in that provision is a component listed in Article 12(1), points (a) to (f), (h) and (j), of Regulation (EU) 2017/2400, the vehicles concerned are all vehicles with that component;

- (b) for an ISV air drag family, the Commission shall determine the size of the deviation in the CO<sub>2</sub> emission values for each vehicle subgroup of this ISV air drag family, based on re-running the reference model in the simulation tool with the declared value and with the corrected value for air drag. The corrected value for air drag is  $C_{dA_{\text{declared}}}$  multiplied by the size of the deviation referred to in Article 21(4), point (b)(ii). The vehicles concerned are all vehicles of the ISV air drag family concerned, referred to in Article 21(4), point (b)(i), and all vehicles for which the air drag value has been transferred from an air drag family of that ISV air drag family;
- (c) for a CFD family, the Commission shall determine the size of the deviation in CO<sub>2</sub> emission values for each vehicle subgroup and for each air drag family of this CFD family, based on re-running the reference model in the simulation tool with the declared value and with the corrected value for air drag. The corrected value for air drag is equal to the air drag value for the parent (worst case) vehicle of each air drag family, or in case this value is determined by CFD simulation, the default value for this air drag family, minus the declared air drag value for each vehicle concerned. The vehicles concerned are all vehicles of that CFD family, and all vehicles for which the air drag value has been transferred from an air drag family of that CFD family;
- (d) for an ISV tyre family, the Commission shall determine the size of the deviation in the CO<sub>2</sub> emission values for each vehicle subgroup of this ISV tyre family, based on re-running the reference model in the simulation tool with the declared value and with the corrected value for the rolling resistance coefficient. The corrected value for the rolling resistance coefficient is  $RRC_{\text{declared}}$  multiplied by the size of the deviation referred to in Article 21(4), point (b)(ii). The vehicles concerned are all vehicles registered after 1 July 2025 using tyres from the ISV tyre family concerned, referred to in Article 21(4), point (b)(i);
- (e) for a mass test, the Commission shall determine the size of the deviation in the CO<sub>2</sub> emission values, based on re-running the fleet-average model in the simulation tool with the declared value and the corrected value for mass, for each vehicle sub-group of this manufacturer. The corrected value for mass is  $\text{mass}_{\text{declared}}$  multiplied by the size of the deviation referred to in Article 21(4), point (b)(ii). The vehicles concerned are all vehicles of the manufacturer;
- (f) in case an artificial strategy is present according to the conclusion referred to in Article 21(4), point (b), the size of the deviation in the CO<sub>2</sub> emission values is equal to the size of the deviation referred to in Article 21(4), point (b)(ii). The vehicles concerned shall be determined based on the conclusion referred to in Article 21(4), point (b).

### Article 23

#### Calculation and correction of the average specific CO<sub>2</sub> emissions of a manufacturer

1. Where the granting approval authority has issued a conclusion as referred to in Article 21(4), point (b), of this Regulation, the Commission shall, for the reporting period of the year in which the conclusion was issued and for the following reporting periods, apply the size of the deviation in CO<sub>2</sub> emission values to the vehicles concerned, as determined in accordance with Article 22, for calculating the average specific CO<sub>2</sub> emissions of a manufacturer in accordance with Article 4 of Regulation (EU) 2019/1242.
2. The Commission shall also apply the size of the deviation of the CO<sub>2</sub> emission values to the vehicles concerned, as determined in accordance with Article 22, for correcting the average specific CO<sub>2</sub> emissions of the manufacturer for the ten reporting periods prior to the reporting period of the year in which the conclusion was issued, but not earlier than the reporting period of the year 2025.

*Article 24***Entry into force and application**

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 13 January 2025.

*For the Commission*  
*The President*  
Ursula VON DER LEYEN

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## ANNEX I

## MINIMUM NUMBER OF FAMILIES SELECTED

1. For vehicle manufacturers:

Table 1

**Number of families, for which the corresponding in-service verification tests on the individual vehicles and tyres shall be performed**

| Total number of vehicles under Article 9 of Regulation (EU) 2017/2400 | Number of VTP families (VTP test) | Number of air drag families (air drag test) | Number of ISV tyre families (tyre RRC test) |
|-----------------------------------------------------------------------|-----------------------------------|---------------------------------------------|---------------------------------------------|
| 5 000 to 20 000                                                       | 1                                 | 1                                           | 1                                           |
| 20 001 to 40 000                                                      | 1                                 | 1                                           | 2                                           |
| More than 40 000                                                      | 2                                 | 2                                           | 3                                           |

2. For trailer manufacturers:

Table 2

**Number of ISV tyre families, for which the corresponding in-service verification tests on the individual tyres shall be performed**

| Total number of trailers under Article 8 of Implementing Regulation (EU) 2022/1362 | Number of ISV tyre families (tyre RRC test) |
|------------------------------------------------------------------------------------|---------------------------------------------|
| Up to 10 000                                                                       | 1                                           |
| More than 10 000                                                                   | 2                                           |

## ANNEX II

## STATISTICAL EVALUATION OF THE TESTS

## 1. Starting point

The starting point for the statistical evaluation of the test results are the following values, calculated for the minimum number of individual test vehicles or tyres:

1. for VTP tests, the value ' $C_{VTP, ratio}$ ' calculated in accordance with Article 7, for  $N = 1$ ;
2. for air drag tests, the value ' $C_{dA_{ratio}}$ ' calculated in accordance with Article 10(2), for  $N = 1$ ;
3. for tyre rolling resistance coefficient tests, the value ' $RRC_{ratio}$ ' calculated in accordance with Article 13, for  $N = 3$ ;
4. for mass tests, the value ' $mass_{ratio}$ ' calculated in accordance with Article 16, for  $N = 3$ .

The granting approval authority shall determine if it is necessary to test additional vehicles or tyres by applying the criteria set out in point 3 of this Annex.

## 2. Statistical parameters

For the total number of vehicles or tyres tested ( $N$ ), the average ( $X_{tests}$ ) and the standard deviation ( $s$ ) of the test results shall be determined by applying the following formulas:

$$X_{tests} = \frac{(x_1 + x_2 + \dots + x_N)}{N}$$

and

$$s = \sqrt{\frac{(x_1 - X_{tests})^2 + (x_2 - X_{tests})^2 + \dots + (x_N - X_{tests})^2}{N - 1}} \text{ if } N > 2,$$

where:

$x_i$  is the ratio calculated for the individual test vehicle or tyre  $i$ :

- $C_{VTP, ratio}$  for VTP test results in accordance with Article 7,
- $C_{dA_{ratio}}$  for air drag test results in accordance with Article 10(2),
- $RRC_{ratio}$  for tyre rolling resistance coefficient test results in accordance with Article 13,
- $mass_{ratio}$  for mass test results in accordance with Article 16.

## 3. Evaluation

After each additional vehicle or tyre tested, the value  $X_{tests}$  shall be assessed as set out below in order to reach one of the following conclusions for the vehicle or tyre family concerned:

1. Pass the family if:  $X_{tests} \leq bound_P$ ,
2. Fail the family if:  $X_{tests} > bound_F$ ,
3. Test an additional vehicle or tyre if:  $bound_P < X_{tests} \leq bound_F$

where:

$bound_P$  and  $bound_F$  are set out in Table 1 of this Annex for VTP test results and for air drag test results;

$bound_P$  and  $bound_F$  are set out in Table 2 of this Annex for tyre rolling resistance coefficient test results and for mass test results;

$s$  is the standard deviation determined in accordance with point 2 of this Annex;

$A$  is 1,03 for VTP test results;

A is  $\frac{1,03*N_x + 1,07*N_y}{N_x + N_y}$  for air drag test results,

where

$N_x$  is the number of vehicles tested with a date of first registration from 1 July 2027;

$N_y$  is the number of vehicles tested with a date of first registration before 1 July 2027;

A is 1,03 for tyre rolling resistance coefficient test results;

A is  $\frac{1,02*N_x + 1,05*N_y}{N_x + N_y}$  for mass test results,

where

$N_x$  is the number of vehicles tested with a date of first registration from 1 July 2027;

$N_y$  is the number of vehicles tested with a date of first registration before 1 July 2027.

Table 1

**Values for bound  $p$  and bound  $F$  for VTP test results and for air drag test results**

| Number of vehicles tested | bound $p$        | bound $F$        |
|---------------------------|------------------|------------------|
| 1                         | $A - 0,03$       | $A + 0,07$       |
| 2                         | $A - 0,03$       | $A + 0,05$       |
| 3                         | $A - 0,8027 * s$ | $A + 0,7325 * s$ |
| 4                         | $A - 0,3973 * s$ | $A + 0,2233 * s$ |
| 5                         | A                | A                |

Table 2

**Values for bound  $p$  and bound  $F$  for tyre rolling resistance coefficient test results and for mass test results**

| Number of vehicles tested | bound $p$        | bound $F$                            |
|---------------------------|------------------|--------------------------------------|
| 3                         | $A - 2,2655 * s$ | $A + \max\{1,1062, (0,02 / s)\} * s$ |
| 4                         | $A - 1,5093 * s$ | $A + 0,5970 * s$                     |
| 5                         | $A - 1,1230 * s$ | $A + 0,3737 * s$                     |
| 6                         | $A - 0,8196 * s$ | $A + 0,2430 * s$                     |
| 7                         | $A - 0,5944 * s$ | $A + 0,1548 * s$                     |
| 8                         | $A - 0,3866 * s$ | $A + 0,0902 * s$                     |
| 9                         | $A - 0,1873 * s$ | $A + 0,0402 * s$                     |
| 10                        | A                | A                                    |

**4. Calculation of the size of the deviation**

For the calculation of the size of the deviation, the  $\text{average}_{\text{ratio}}$  is defined as  $X_{\text{tests}}$  for the total number of vehicles tested, after the vehicle or tyre family has failed according to point 3(2) of this Annex:

$$\text{average}_{\text{ratio}} = X_{\text{tests}}$$

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## ANNEX III

## CHECKLIST FOR VEHICLES SELECTED FOR IN-SERVICE VERIFICATION TESTS

## 1. Definitions

For the purposes of this Annex, the following definitions shall apply:

- (1) 'Exclusion criteria' means that if the condition described is met (reply to the question is 'yes'), the vehicle cannot be selected for in-service verification tests.
- (2) 'Confidential' means that this information shall be kept as appropriate by the granting approval authority, but not be included in the test report submitted to the Commission.

## 2. Vehicle characteristics

2.1. The following information shall be recorded and included in the test report:

|        |                                                       |              |
|--------|-------------------------------------------------------|--------------|
| 2.1.1. | Vehicle identification number (VIN)                   | CONFIDENTIAL |
| 2.1.2. | Mileage [km]                                          |              |
| 2.1.3. | Date of first registration                            |              |
| 2.1.4. | Cryptographic hash of the manufacturer's records file | CONFIDENTIAL |

2.2. The following exclusion criteria shall be checked:

|        |                                                                                                                                                                                  | Yes / No |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 2.2.1. | Mileage:<br><i>Is the mileage lower than 25 000 km or higher than 160 000 / 300 000 / 700 000 km according to Article 4(2) of Regulation (EC) No 595/2009?</i>                   |          |
| 2.2.2. | Date of first registration:<br><i>Is that date more than 5/6/7 years, as referred to in Article 4(2) of Regulation (EC) No 595/2009, prior to the date of vehicle selection?</i> |          |

## 3. Vehicle owner / user interview

*(The owner shall have no knowledge of the implications of the replies)*

3.1. The following information shall be recorded:

|        |                              |              |
|--------|------------------------------|--------------|
| 3.1.1. | Name of the owner:           | CONFIDENTIAL |
| 3.1.2. | Contact (address/telephone): | CONFIDENTIAL |

3.2. The following exclusion criteria shall be checked:

|        | <i>Unauthorised use of the vehicle</i>                                              | Yes / No |
|--------|-------------------------------------------------------------------------------------|----------|
| 3.2.1. | Has the vehicle carried heavy loads over the specifications of the manufacturer?    |          |
| 3.2.2. | Was the vehicle used for racing or motor sports?                                    |          |
| 3.2.3. | Was the vehicle driven in a non-EU Member State for more than 10 % of driving time? |          |

|         | <i>Unauthorised use of the vehicle</i>                                                                                                                                 | <b>Yes / No</b> |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 3.2.4.  | Has the vehicle been used with a wrong fuel type (e.g. gasoline instead of diesel) or with non-commercially available EU-quality fuel (black market, or blended fuel)? |                 |
| 3.2.5.  | Has a fuel additive, not approved by the manufacturer, been used?                                                                                                      |                 |
|         | <i>Unauthorised repairs</i>                                                                                                                                            |                 |
| 3.2.6.  | Has the vehicle not been maintained in accordance with the manufacturer's instructions?                                                                                |                 |
| 3.2.7.  | Have there been unauthorised major engine or vehicle repairs?                                                                                                          |                 |
| 3.2.8.  | Was the vehicle involved in a serious accident?                                                                                                                        |                 |
|         | <i>Unauthorised changes</i>                                                                                                                                            |                 |
| 3.2.9.  | Has there been a power increase/tuning?                                                                                                                                |                 |
| 3.2.10. | Was any part of the emissions after-treatment system permanently removed?                                                                                              |                 |
| 3.2.11. | Were there any unauthorised emission related devices installed (urea killer, emulator, etc.)?                                                                          |                 |

#### 4. Vehicle examination

4.1. The following information shall be included in the test report:

|        |                                                                               |                                                                |
|--------|-------------------------------------------------------------------------------|----------------------------------------------------------------|
| 4.1.1. | Powertrain Control Module software and calibration part numbers and checksums |                                                                |
| 4.1.2. | OBD diagnosis                                                                 | Read Diagnostic Trouble Codes & print error log <sup>(1)</sup> |
| 4.1.3. | OBD Service Mode 09 Query                                                     | Read Service Mode 09 and record the information                |
| 4.1.4. | OBD mode 07                                                                   | Read Service Mode 07 and record the information                |
| 4.1.5. | Pictures of the tested vehicle including of the underbody                     |                                                                |

<sup>(1)</sup> All systems shall be part of OBD Diagnosis and 'Error logs/Information detected and diagnosed' shall be part of the test report.  
 Remark: All checks requiring OBD connections are to be performed before and after the emission test.

4.2. The following exclusion criteria shall be checked:

|        |                                                                                                                                                                                                                                                                       | <b>Yes/No</b> |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 4.2.1. | For VTP tests ONLY:<br>Are there any warning lights on the instrument panel activated indicating a vehicle or exhaust after-treatment system malfunctioning that cannot be resolved by normal maintenance? (Malfunction Indication Light, Engine Service Light, etc.) |               |
| 4.2.2. | For VTP tests ONLY:<br>Are there any modifications with relevance for the results of the VTP test in any subsequent manufacturing stage, which do not allow restoring the powertrain configuration as documented in the customer information file?                    |               |

|        |                                                                                                                                                                                               | Yes/No |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| 4.2.3. | For air drag tests ONLY:<br>Are there any changes in the aerodynamic configuration which do not allow restoring the aerodynamic configuration as documented in the customer information file? |        |

4.3. If the following conditions are not met, the vehicle may still be selected on the condition that appropriate action is taken before performing in-service verification tests:

|        | Check to do                                                                                                                        | Issue identified and action to be taken                                                                                                  |
|--------|------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 4.3.1. | Fuel tank level                                                                                                                    | <i>If fuel reserve light ON, refuel before test.</i>                                                                                     |
| 4.3.2. | Diesel exhaust fluid (AdBlue)                                                                                                      | <i>If SCR light is on after engine-on, the AdBlue shall be filled in, or the repair executed before the vehicle is used for testing.</i> |
| 4.3.3. | Air filter and oil filter<br><i>Check for contamination and damage</i>                                                             | <i>If damaged or heavily contaminated or less than 800 km before the next recommended change; change the filters.</i>                    |
| 4.3.4. | Check fluid levels and grade<br><i>Check the max. and min. levels (engine oil, cooling liquid)</i>                                 | <i>If below minimum, top up.<br/>If different grade, replace.</i>                                                                        |
| 4.3.5. | Ignition cable (positive ignition)<br><i>Check spark plugs, cables, etc.</i>                                                       | <i>In case of damage, replace them.</i>                                                                                                  |
| 4.3.6. | Service<br><i>Check if less than 800 km away from next scheduled service</i>                                                       | <i>If yes, then perform the service.</i>                                                                                                 |
| 4.3.7. | For air drag tests ONLY:<br><i>Check if wheel alignment and adjustable vehicle height / ground clearance are out of range.</i>     | <i>If yes, adjust wheel alignment and vehicle height / ground clearance to be in range.</i>                                              |
| 4.3.8. | For air drag test ONLY:<br><i>Check if a standard body is installed in accordance with Annex VIII to regulation (EU) 2017/2400</i> | <i>If not, install a standard body.</i>                                                                                                  |

## ANNEX IV

## IN-SERVICE VERIFICATION TEST DATA TO REPORT

## 1. In-service verification test data to report for a VTP test

The data to report is the data of the test reports referred to in Article 20(1), second subparagraph, of Commission Regulation (EU) 2017/2400.

In addition, the following data shall be reported:

| No | Parameters                                                                    | Unit | Source | Remarks                                                                              |
|----|-------------------------------------------------------------------------------|------|--------|--------------------------------------------------------------------------------------|
| 1  | Granting approval authority responsible for the in-service verification tests | —    | —      |                                                                                      |
| 2  | Vehicle number                                                                | —    | —      | Vehicle sequence (1, 2, 3, ...10) in the statistical evaluation                      |
| 3  | Total number of vehicles tested                                               | —    | —      | Total number of vehicles included in the statistical evaluation described in Annex I |
| 4  | Pass/fail decision                                                            | —    | —      | Pass or fail for the test                                                            |

## 2. In-service verification test data to report for an air drag test

The data to report is the data specified in Appendix 2 of Annex VIII to Regulation (EU) 2017/2400.

In addition, the following data shall be reported:

| No | Parameters                                                                    | Unit | Source | Remarks                                                                              |
|----|-------------------------------------------------------------------------------|------|--------|--------------------------------------------------------------------------------------|
| 1  | Granting approval authority responsible for the in-service verification tests | —    | —      |                                                                                      |
| 2  | Vehicle number                                                                | —    | —      | Vehicle sequence (1, 2, 3, ...10) in the statistical evaluation                      |
| 3  | Total number of vehicles tested                                               | —    | —      | Total number of vehicles included in the statistical evaluation described in Annex I |
| 4  | Vehicle identification number (VIN)                                           | —    | —      | The VIN of the vehicle selected                                                      |
| 5  | Odometer reading at start of the ISV tests                                    | km   |        |                                                                                      |
| 6  | Test track on which tests have been conducted                                 | —    |        |                                                                                      |
| 7  | Total vehicle mass during measurement                                         | kg   | —      | Actual vehicle mass during the measurement                                           |
| 8  | Maximum vehicle height during measurement                                     | m    | —      |                                                                                      |
| 9  | Average ambient temperature during first low speed test                       | °C   | —      |                                                                                      |

| No | Parameters                                                                                                                                                 | Unit           | Source | Remarks                            |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------|------------------------------------|
| 10 | Average vehicle speed during high speed tests                                                                                                              | km/h           | —      |                                    |
| 11 | Product of drag coefficient ( $C_d$ ) by cross sectional area ( $A_{cr}$ ) for zero crosswind conditions $C_d A_{cr}(0)$                                   | m <sup>2</sup> | —      |                                    |
| 12 | Product of drag coefficient ( $C_d$ ) by cross sectional area ( $A_{cr}$ ) for average crosswind conditions during constant speed test $C_d A_{cr}(\beta)$ | m <sup>2</sup> | —      |                                    |
| 13 | Average yaw angle during constant speed test $\beta$                                                                                                       | °              | —      |                                    |
| 14 | Version number of air drag pre-processing tool                                                                                                             | —              | —      |                                    |
| 15 | Air drag test result ( $C_d A_{ratio}$ )                                                                                                                   | —              | —      | As defined in Article 10           |
| 16 | Cryptographic hash of the manufacturer's records file                                                                                                      |                | —      |                                    |
| 17 | Declared $C_d A$                                                                                                                                           | m <sup>2</sup> | —      | Declared value for air drag family |
| 18 | Pass/fail decision                                                                                                                                         | —              | —      | Pass or fail for the test          |

In addition, for a CFD method air drag test, the data and calculations specified in point 2 of Appendix 10 of Annex VIII to Regulation (EU) 2017/2400 shall be reported.

### 3. In-service verification test data to report for a tyre RRC test

The data to report is the data specified in Appendix 2 of Annex X of Regulation (EU) 2017/2400.

In addition, the following data shall be reported:

| No | Parameters                                                                    | Unit | Source | Remarks                                                                           |
|----|-------------------------------------------------------------------------------|------|--------|-----------------------------------------------------------------------------------|
| 1  | Granting approval authority responsible for the in-service verification tests | —    | —      |                                                                                   |
| 2  | Name and location of laboratory performing the ISV test                       |      |        |                                                                                   |
| 3  | Tyre number                                                                   | —    | —      | Tyres sequence (1, 2, 3, ...10) in the statistical evaluation                     |
| 4  | Total number of tyres tested                                                  | —    | —      | Total number of tyres included in the statistical evaluation described in Annex I |
| 5  | Tyre certification number                                                     |      |        | In accordance with Appendix 4 of Annex X of Commission Regulation (EU) 2017/2400  |

| No | Parameters                                                        | Unit | Source | Remarks                                     |
|----|-------------------------------------------------------------------|------|--------|---------------------------------------------|
| 6  | Hash of the tyre certificate                                      |      |        |                                             |
| 7  | Name and location of certification laboratory                     |      |        |                                             |
| 8  | Tyre rolling resistance coefficient test result ( $RRC_{ratio}$ ) |      |        | As defined in Article 13 of this Regulation |
| 9  | Pass/fail decision                                                | —    |        | Pass or fail for the test                   |

#### 4. In-service verification test data to report for a mass test

The following data shall be reported:

| No | Parameters                                                                    | Unit | Source                             | Remarks                                                                              |
|----|-------------------------------------------------------------------------------|------|------------------------------------|--------------------------------------------------------------------------------------|
| 1  | Granting approval authority responsible for the in-service verification tests | —    | —                                  |                                                                                      |
| 2  | Vehicle number                                                                | —    | —                                  | Vehicle sequence (1, 2, 3, ... 10) in the statistical evaluation                     |
| 3  | Total number of vehicles tested                                               | —    | —                                  | Total number of vehicles included in the statistical evaluation described in Annex I |
| 4  | Name and address of the vehicle manufacturer                                  |      |                                    |                                                                                      |
| 5  | Vehicle identification number (VIN)                                           |      |                                    |                                                                                      |
| 6  | Odometer reading at start of the ISV tests                                    | km   |                                    |                                                                                      |
| 7  | Vehicle model                                                                 |      |                                    |                                                                                      |
| 8  | Vehicle category                                                              |      |                                    |                                                                                      |
| 9  | Axle configuration                                                            |      |                                    |                                                                                      |
| 10 | Total Permissible Maximum Laden Mass (TPMLM)                                  |      |                                    |                                                                                      |
| 11 | Vehicle group                                                                 |      |                                    |                                                                                      |
| 12 | Cryptographic hash of the manufacturer's records file                         |      |                                    |                                                                                      |
| 13 | Measured Corrected actual mass of the vehicle                                 | kg   |                                    | In accordance with Article 15                                                        |
| 14 | Declared Corrected actual mass of the vehicle                                 | kg   | 1.1.8 of customer information file | In accordance with Article 16                                                        |
| 15 | The mass test result ( $mass_{ratio}$ )                                       |      |                                    | As defined in Article 14                                                             |
| 16 | Pass/fail decision                                                            |      |                                    | Pass or fail for the test                                                            |

## ANNEX V

## REPORTING FORMAT FOR THE IN-SERVICE VERIFICATION ANNUAL OVERVIEW

## A. General information

|     |                                                                                                                                |  |
|-----|--------------------------------------------------------------------------------------------------------------------------------|--|
| (1) | Granting approval authority                                                                                                    |  |
| (2) | Date of annual overview                                                                                                        |  |
| (3) | Reporting period of the year concerned                                                                                         |  |
| (4) | Total number of vehicles per manufacturer for the average of the three reporting periods preceding the in-service verification |  |
| (5) | Minimum number of VTP / air drag / ISV tyre families selected                                                                  |  |
| (6) | Total number of VTP / air drag / CFD / ISV tyre families selected in the year concerned                                        |  |

## B. List of the VTP / air drag / CFD / ISV tyre families selected for the in-service verification

- Identification number of the family selected (ISV ID),
- Vehicle manufacturer concerned (OEM),
- VTP / air drag / CFD / ISV tyre family identifiers for each of the families selected,
- Reason(s) underlying the selection of the families for the in-service verification:
  - ‘risk assessment’ if based on Article 3,
  - ‘other’ if any other reason, please specify in a footnote.

| ISV ID | OEM | VTP / air drag / CFD / ISV tyre family identifiers | Reason |
|--------|-----|----------------------------------------------------|--------|
| 1      |     |                                                    |        |
| 2      |     |                                                    |        |
| 3      |     |                                                    |        |
| ...    |     |                                                    |        |

## C. Summary of in-service verification test results

- Type of test: verification testing procedure (VTP), air drag (AD), CFD method air drag (CFD), tyre rolling resistance coefficient (RRC), mass (mass) or artificial strategies (AS) tests,
- Minimum number of families per type of test (Min.), calculated according to Article 4(1) based on point A(4) of this Annex,
- Total number of tests per type of test (Total),
- Total number of conclusions per type of test:
  - no lack of correspondence (Pass),
  - lack of correspondence (Fail),
  - no conclusion established yet (Pending).

| Type of test               | Min. | Total | Pass | Fail | Pending |
|----------------------------|------|-------|------|------|---------|
| VTP test                   |      |       |      |      |         |
| Air drag test              |      |       |      |      |         |
| CFD method air drag test   |      |       |      |      |         |
| Tyre RRC test              |      |       |      |      |         |
| Mass test                  | 1    |       |      |      |         |
| Artificial strategies test | 1    |       |      |      |         |

D. *Detailed in-service verification test results for the year concerned*

- Identification number of the family selected (ISV ID),
- Manufacturer concerned (OEM),
- Type of test performed (Type of test): verification testing procedure (VTP), air drag (AD), CFD method air drag (CFD), tyre rolling resistance coefficient (RRC), mass (mass) or artificial strategies (AS) tests,
- Start date of the test (Start date) according to Article 5(2) of Delegated Regulation (EU) 2024/1127,
- Name of the organisation(s) performing the test (granting approval authority or Technical Service) (GAA/TS),
- Number of vehicles tested (No of vehicles),
- Test result of each individual test vehicle ( $\text{average}_{\text{ratio}}$ ),
- Conclusion of the test (Conclusion/Deviation), that is 'Pass', 'Fail' or 'Pending', including size of the deviation in case of 'Fail',
- Test report reference number (Test ref.),
- Conclusion reference number (Conclusion ref.).

| ISV ID | OEM | Type of test | Start date | GAA/TS | No of vehicles | $\text{average}_{\text{ratio}}$ | Conclusion/Deviation | Test ref. | Conclusion ref. |
|--------|-----|--------------|------------|--------|----------------|---------------------------------|----------------------|-----------|-----------------|
| 1      |     |              |            |        |                |                                 |                      |           |                 |
| 2      |     |              |            |        |                |                                 |                      |           |                 |
| 3      |     |              |            |        |                |                                 |                      |           |                 |
| ...    |     |              |            |        |                |                                 |                      |           |                 |

- E. Detailed in-service verification test results, for which conclusions were reported as 'Pending' in the previous annual overview
- Reporting period of the year concerned (Year),
  - Other fields: see description under point D,
  - If the GAA can still not find the required number of vehicles, it shall indicate 'not completed' in the field 'Conclusion/Deviation'.

| Year | ISV ID | OEM | Type of test | Start date | GAA/TS | No of vehicles | average <sub>ratio</sub> | Conclusion/ Deviation | Test ref. | Conclusion ref. |
|------|--------|-----|--------------|------------|--------|----------------|--------------------------|-----------------------|-----------|-----------------|
| ...  | ...    |     |              |            |        |                |                          |                       |           |                 |