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COMMISSION IMPLEMENTING REGULATION (EU) .../...

of **XXX**

implementing Regulation (EU) 2019/1242 of the European Parliament and of the Council by determining the procedures for the in-service verification of the CO₂ emissions of heavy-duty vehicles

This draft has not been adopted or endorsed by the European Commission. Any views expressed are the preliminary views of the Commission services and may not in any circumstances be regarded as stating an official position of the Commission.

COMMISSION IMPLEMENTING REGULATION (EU) .../...

of **XXX**

implementing Regulation (EU) 2019/1242 of the European Parliament and of the Council by determining the procedures for the in-service verification of the CO₂ emissions of heavy-duty vehicles

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 CO₂ emission performance standards for new heavy-duty vehicles, and amending Regulations (EC) No 595/2009 and (EU) No 2018/956 of the European Parliament and of the Council and Council Directive 96/53/EC¹, 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 CO₂ 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 Council² and Commission Regulation (EU) 2017/2400³ ('granting approval authorities') are to verify for those manufacturers, on the basis of appropriate and representative vehicle samples, that the CO₂ emission and fuel consumption values recorded in the customer information files correspond to the CO₂ 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 CO₂ emissions and fuel consumption ('in-service verification').

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

² 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>).

³ 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 CO₂ 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>).

- (3) Commission Delegated Regulation (EU) 2024/1127⁴ 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.
- (5) In order to target for in-service verification those families with vehicles or tyres presenting the highest risk for a deviation in the CO₂ emission and fuel consumption values from the specific CO₂ 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 CO₂ 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 CO₂ emissions and fuel consumption have been determined under Article 8 of Regulation (EU) 2022/1362⁵ ('total number of trailers under Article 8 of 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 CO₂ 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 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.

⁴ 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 CO₂ 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).

⁵ Commission Implementing Regulation (EU) 2022/1362 of 1 August 2022 implementing Regulation (EC) No 595/2009 of the European Parliament and of the Council as regards the performance of heavy-duty trailers with regard to their influence on the CO₂ emissions, fuel consumption, energy consumption and zero emission driving range of motor vehicles and amending Implementing Regulation (EU) 2020/683, OJ L 205, 5.8.2022, p. 145, ELI: http://data.europa.eu/eli/reg_impl/2022/1362/oj

- (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 CO₂ 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 CO₂ 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.
- (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 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ emissions of a manufacturer, it is appropriate that the Commission determines the size of the deviation in the CO₂ emission values and which vehicles are concerned.
- (21) A correction of the average specific CO₂ emissions of a manufacturer should be applied from the reporting period of the year 2019, as that is the starting point from which the average specific CO₂ emissions are determined 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 2024/1127.
2. This Regulation also lays down detailed rules on reporting deviations found in the CO₂ 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 CO₂ emissions of the manufacturers for which a deviation in the CO₂ 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, Commission Regulation (EU) 2017/2400, and Article 2 of Commission 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) ‘air drag family’ means an air drag family as defined 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) 2020/740⁶;
- (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 as defined in Section 1, point (1), 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 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 CO₂ emission values’ means that the CO₂ emissions of vehicles determined in an in-service verification carried out under this Regulation, are higher than the emissions determined, for vehicles, in accordance with the procedures set out in Regulation (EU) 2017/2400 or, for trailers, in accordance with the procedures set out in Regulation (EU) 2022/1362, and recorded in the customer information file, certificates of conformity or individual approval certificates accompanying those vehicles or trailers, taking into account the statistical evaluation of the tests in accordance with Annex I.

⁶ 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>).

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, air drag families, CFD families and ISV tyre families, on the basis of the risk of a deviation in the CO₂ 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 a 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 CO₂ 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, 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, air drag families and ISV tyre families with similar technical characteristics but with lower CO₂ emissions, identified using the data collected pursuant to Article 1 of Commission Delegated Regulation (EU) 2021/1430⁷;
 - (c) evidence of a deviation in the CO₂ 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) 2022/163⁸;
 - (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 Regulation (EU) 2021/1430 and from conformity of production tests performed pursuant to Section 4 of Annex X to Regulation 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, air drag families, CFD families and ISV tyre families with the highest risk of a deviation in the CO₂ 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.

⁷ 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 CO₂ 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).

⁸ 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).

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, 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, for which the CO₂ 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'), 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 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 referred to in Table 1 of Annex I to this Regulation 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) identifies families for one or more manufacturers for which the 'total number of vehicles under Article 9' 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 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 for which the CO₂ emissions and fuel consumption have been determined under Article 8 of Regulation (EU) 2022/1362 ('total number of trailers under Article 8 of 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 under Article 8 of Regulation (EU) 2022/1362.

In addition, the granting approval authority shall perform each reporting period one mass test per trailer 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 Commission 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 vehicles that, at the time of selection, 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 of the European Parliament and of the Council⁹.

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

⁹ 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>.

of conformity, or individual approval certificates, using the checklist set out in Annex III.

If a vehicle has undergone any modifications with relevance to CO₂ emissions and fuel consumption in any subsequent manufacturing stage, the original vehicle configuration has either to be restored or the vehicle is excluded from the 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 CO₂ 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) 582/2011¹⁰;
 - (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.
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) the vehicle shall be selected from an 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;
 - (b) the vehicle 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) the vehicle shall not have undergone changes in the aerodynamic configuration which do not allow restoring the aerodynamic configuration as documented in the certificate of conformity.
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.

Article 6

Test conditions for VTP tests

1. The ratio of CO₂ 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.

¹⁰ 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 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 CO₂ 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 CO₂ emission values as follows:

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

where:

- $\text{average}_{\text{ratio}}$ is the average C_{VTP} ratio as defined in Annex I for VTP test results;
 - $\text{CO}_{2\text{ ref}}$ is the declared CO₂ emission value of the vehicle of the VTP family with the highest CO₂ emission value;
- (b) start an investigation to determine the cause of that failure, in accordance with Article 20 of Regulation (EU) 2017/2400.

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.

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 CO₂ emission values of the air drag family undergoing air drag tests, by using the method set out in Annex II.
2. In case the 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 as defined in Section 1, point (1), 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 CO₂ 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 CO₂ 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. 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 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 Council¹¹.
3. Any additional parts that are not taken into account for the corrections referred to in paragraph 1 of this Regulation 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

¹¹ 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 15 of this Regulation (mass_{in-service verification}), to the ‘corrected mass in running order’ of that trailer recorded in entry 1.1.10 of the customer information file in accordance with part II of Annex IV to Regulation (EU) 2022/1362.

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 CO₂ emission values of the vehicle manufacturer undergoing mass tests, 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 massratio (averageratio) 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, 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 CO₂ emission or fuel consumption values in the tests performed for the purpose of CO₂ 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.
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 CO₂ emission values by comparing the CO₂ 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 CO₂ emission values shall be 10% of the CO₂ emission value of the reference CO₂ 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 Regulation (EU) 2024/1127 at least the following information for each family tested:
 - (a) the type of tests performed;
 - (a) the vehicle checklist;
 - (b) the test conditions;
 - (c) the test results of each of the individual test vehicles or tyres;
 - (d) the statistical evaluation of the test results;
 - (e) if applicable, the calculation of the size of the deviation;
 - (f) 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 CO₂ emission values, the granting approval authority shall come to the conclusion that there is no lack of correspondence between the CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ emission values found as a result of the in-service verification does not lead to a lack of correspondence between the CO₂ 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 CO₂ 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 CO₂ 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 CO₂ emission values and all vehicles that are concerned, as follows:

- (a) for a VTP family, the size of the deviation in the CO₂ 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(3) 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 air drag family, the Commission shall determine the size of the deviation in the CO₂ emission values for each vehicle subgroup of this 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 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 that air drag family.
- (c) for a CFD family, the size of the deviation in CO₂ emission values 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 that air drag family.
- (d) for an ISV tyre family, the Commission shall determine the size of the deviation in the CO₂ 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_{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 January 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 CO₂ 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 $mass_{\text{declared}}$ 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 CO₂ 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 CO₂ 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 CO₂ emission values to the vehicles concerned, as determined in accordance with Article 22, for calculating the average specific CO₂ 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 CO₂ emission values to the vehicles concerned as determined in Article 22 for correcting the average specific CO₂ 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 2019.

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,

For the Commission
The President
Ursula VON DER LEYEN